HAZARDOUS chemical waste, as designated by the U.S. Environmental Protection Agency (EPA) or State authority, is waste that presents a danger to human health and/or the environment. EPA has determined hundreds of chemicals to be hazardous waste; no Soil Survey Office Laboratory (SSOL) should assume that a particular chemical is not hazardous but should leave such determinations to regulatory authorities.

1) Create a log book that itemizes chemical items for disposal, showing at a minimum: item name, quantity, and date available for disposal.
2) Because of particular differences among States, NRCS Soil Survey Office Laboratories are directed to consult FedCenter for environmental regulation compliance assistance when disposing of chemical items. Go to www.fedcenter.gov, or contact:
   a. Steve Luzzi at Stephen.T.Luzzi@erdc.usace.army.mil (tel: 217-373-5894)
   b. Mike Shields at Shields.Mike@epa.gov (tel: 202-564-9035)

   Be sure to have the Material Safety Data Sheet(s) (MSDS) for the chemical item(s) before inquiring. An MSDS is ordinarily shipped with a chemical; these sheets should be kept on file for reference. A list of some of the more common chemicals cited in the Soil Survey Field and Laboratory Methods Manual can be found by using the hyperlinked list on the following page or by clicking on the list in the left panel.
3) Even if EPA declares a particular chemical to be nonhazardous for disposal "down the drain," it is still necessary to contact your local Publicly Owned Treatment Works (POTW) or sewer authority to ascertain whether disposal to the POTW is permissible in your area. If disposal is permissible, *obtain written permission from the local POTW authority*. Do not dispose any chemical to the local POTW beforehand, even on the basis of a verbal or e-mailed notification of permissibility. Prepare and maintain a binder with such letters for reference.
4) If it is impermissible to dispose of a chemical to the POTW, there are two disposal options:
   a. Hire a hazardous waste contractor to collect the waste and haul it away.
   b. Contact your local health department to ascertain whether your community has a hazardous chemical "disposal event" in which your SSOL would be eligible to participate. This is usually a much less expensive option when it is available.

   Never transport chemicals to other regions or towns for disposal, but always abide by the regulations in your area.
5) Document the means of disposal (e.g., drain or contractor), including disposal date, in the logbook.

The mention of the name of any resource, including Web sites, products, or product types, does not constitute endorsement by the U.S. Department of Agriculture (USDA) or the Natural Resources Conservation Service (NRCS). The MSDSs contained in this document, current as of August 2009 and presented in unaltered form from manufacturers, are given as examples only. For the most up-to-date information, please contact the manufacturer of the chemical item. For instance, the most updated MSDSs for Hach chemicals can be downloaded from www.hach.com.

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Acetic Acid
Acetone
Algicide
Alpha, Alpha-Dipyridyl
Ammonium Acetate
Ammonium Chloride
Ammonium Hydroxide
Ammonium Molybdate
Ammonium Nitrate
Ammonium Oxalate
Antimony Potassium Tartrate
Barium Chloride
Barium Chromate
Borax
Boric Acid
Boric Acid, 4% with Indicator
Bromocresol Green
Bromocresol Green - Methyl Red
Bromocresol Purple
Bromophenol Blue
Calcium Carbonate
Calcium Chloride
Calcium Sulfate
Calcium, 1000 ug/ml or 10,000 ug/ml
Chlorophenol Red, Sodium Salt
Clayton Yellow
Cresol Red
Cresolphthalein
Diphenylcarbazone Indicator
Dipyridyl Test Strips
Eriochrome Black T
Ethanol 95%
Ethyl Alcohol
Ethylenediamine Tetraacetic Acid
Hach Alkaline EDTA Solution
Hach Ammonium Chloride Reference Electrolyte Cartridge
Hach Buffer Solution Hardness
Hach Calcium Sulfate
Hach EDTA Standard Solution, 0.0075 N
Hach ManVer Hardness Indicator
Hach Mehlich 2 Soil Extractant Concentrate
Hach Nitrate Standard Solution
Hach NitraVer 5 Nitrate Reagent
Hach Phenolphthalein Indicator Solution
Hach PhosVer 3 Phosphate Reagent
Hach Potassium 2 Reagent Solution Pillows
Hach Potassium 3 Reagent
Hach Potassium Chloride
Hach Sodium and Potassium Ionic Strength Adjustor Powder
Hach Sodium Hydroxide Solution, 0.075 N
Hach Sodium Reference Standard Solution
Hydrochloric Acid
Hydrogen Peroxide
Immersion Oil
Lab Algicide
LaMotte Aluminum Test Solution
LaMotte Ammonia Nitrogen Test Solution
LaMotte Buffer Reagent
LaMotte Calcium Test Solution (Sodium Oxalate)
LaMotte Chloride Test Solution
LaMotte Copper Test Solution
LaMotte Ferric Iron Test Solution
LaMotte Ferrous Iron Reagent
LaMotte Humus Screening Reagent
LaMotte Iron Reagent Powder
LaMotte Magnesium Test Solution #I
LaMotte Manganese - Magnesium Test Solution #2
LaMotte Manganese Periodate Reagent
LaMotte Nitrate Reagent #1
LaMotte Nitrate Reagent #2
LaMotte Nitrite-Nitrogen Reagent #1
LaMotte Nitrite-Nitrogen Reagent #2
LaMotte Nitrite-Nitrogen Reagent #3
LaMotte Phosphorus Reagent #2
LaMotte Phosphorus Reagent #3 Tablets
LaMotte Potassium Reagent B Tablets
LaMotte Potassium Reagent C
LaMotte Soil Flocculating Reagent
LaMotte Sulfate Test Solution
LaMotte Universal Extracting Solution
LaMotte Zinc Reagent #4
Magnesium Oxide
Methyl Green
Methyl Red
Methyl Red Hydrochloride
Methylene Blue
Nitric Acid
Petropoxy 154
Phenol Red Solution
Phenol Red, Sodium Salt
Phenol, Liquefied
Phenolphthalein
Phenolsulfonphthalin (Phenol Red)
Potassium Chloride
Potassium Fluoride
Potassium Hydroxide
Potassium Oxalate
Potassium Permanganate
Saran
Silica Gel
Silver Nitrate
Sodium Bicarbonate
Sodium Borate
Sodium Carbonate
Sodium Chloride
Sodium Citrate
Sodium Dithionite
Sodium Fluoride
Sodium Hexametaphosphate
Sodium Hydrosulfite
Sodium Hydroxide
Sodium Pyrophosphate
Sulfuric Acid
SUPERFLOC 16
Thymol Blue
Titan Yellow
Triethanolamine
Uranyl Acetate, Dihydrate
Zinc Acetate Dihydrate

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ACETIC ACID GLACIAL

1. Product Identification

Synonyms: ; A t m h t m b e c i r a c d y x e a e h a n o l i c i a c d e i a o c i a c d
CAS No.: 4 6- 9 7-
Molecular Weight: 0 0 6 5
Chemical Formula: H H C C O O
Product Codes:
: k r B T a e 4 4 3 1 5 7 5 5 9 5 5, 5 0 9 6 3 9 0 8 2 9, 9, 1 1 9, 1 3 9, 1 9, 7 1 9, 1 9 4, 9, 3 9, 9,
2 2 2 9 4 2 9 2 3 9 5, 9, 6 5,
: n M k 1 t l i a 1 c c d 1 0 2 2 7 0 4 3 1 1 0, 2 6, 5, 1 , 1 7 8 5, 1 V, 7 8 1 9 9 8 8 , 9 9 , 9 2 , 9 ,

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Acetic Acid	64-19-7	99.5 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE. FLAMMABLE LIQUID AND VAPOR.

SAF-T-DATA(tm) n t R r v P i h g r n y i o (r d s h e v n e n o f o c o i) e c e

---

: h H n t R l a v r i g n P 3 - e e i o (o s
: b m F m y t l n t a R i l a n 2 M g t o d e a e
: R y t n t R i e n 2 M g t o d e a e
: n t t n t R 6 4 a t x i m E r r v - e e 6) (o e s
S : S b r; L t P t p u a c i c e & e q L K G O G K G; A D L K N S N ; K O V E O H D T P R P O R E V I O E G O
N L X B O E I T H I R E G

: t r cg a leGRb mKGl e dd a() l a e

Potential Health Effects

Inhalation:

nh tn I n ihiatpao v ocf cmyeu ade ao a mas ie tho nschsg a lsten li ie ght o tmf eon e o as ad ,g ,
. r hB u tiNgyiudi ldff hetr a ocrs r i ie ecdor ct tg ie ei i fi taotn a pcatqv ar ie o id c a e ao
n n r t tn co c ei ao

Ingestion:

w wnS .nu ll a io gvr uc a ny a en ei ie te s h pt y dg i tondu e a. r o h it l ct v d m s nt e n o s a r n h i g a d d a
. n tn I l g tti e o om lf l ur. e p st r l O r s a r l e n i d s h p t s c o i l f a o o f e o g a s s
Skin Contact:

n t w h t n 6 r t a c i t u c o n c m y u a d d l o i u r o s a m a i t h o s h h s g a s c t E n y i e n r s f f m i a l n s d e d e e i
b l n m p h i H r n s i . g r t t n s a o m y u c e i a d n n a c t a s t n i e z i s i e s i a o s
Eye Contact:

y n E t w h t n e n r t a c i t u c o n c m y u a d d l o i o v r . s y a c a s m e e e b w s e s d e y a g a l k o f o h p d c l u o x r o E g t f s s s o
p v r m y u . n a c t w a c t m i e n e r s e t i n g e s t y i d i i a o o e e s
Chronic Exposure:

p p R t r r n p e a d u e o x r l o g m y u d e e o r k e n a s c a s t d e l a i g s o m p f i e x i e r s n c t t , h f e o n d e h r o n f i s e e a d c
n m m t n i h t n a f i h n t o b t n f e o n b h u o a s t a d , o i c l , a e s
Aggravation of Pre-existing Conditions:

r n P p w h t r e o n t i k n s s i e i e r g p r i y b i s d r o s l m e p o r s e n e s p r e i o t y i s n d e , t i l e m y a o s m i f c o a e o e
u p b t t h t c i d t s b n t e r t f f o f e s a c s e s

---

4. First Aid Measures

Inhalation:

. m R t r h r d o n . o t r f f t n a s o f r t i p a g r g i r i d a i d , f r a i h e n i l a o s f i a g i v i y d i x l d f f g i s o g , e l l C a
p h y n i i c a s
Ingestion:

N N D U N D O V T O E ! M C l v D r T u . n G i C t l g w v q t i a i m k b l b f v a s o i l i v r i a f v a l n a y h n e g i e e a i g
. u m h t u n n n p o n . n c o i c t o n s o t t s G n e s i n d h a a a i y e i o i d e l a e
Skin Contact:

n I n t t o m a m o c o f y u s a i h l n p v l a h t e n f y t i w i s t l s i l e t o t f a u m o f l t a w h e a r i m w a 5 e i l e s c i o g
. n t m m t d o t n i a n a h d l e c o i g l W . a d b h n o e r s a l c s o i g p s e h y f e e n d l C a s i i c a s
Eye Contact:

m m y l h y i p v l a h t e n f y t e v i e s t l i l s e t o t f a u m o f l t a e n t i w r s p p l F e i g l f r y , e a d e l i e d
n . y o t n i a o l l a t t s G n e i n d h a a a i y e i o i d e l a e

---

5. Fire Fighting Measures

Fire:

: p h F i h t l 4 a i o 4 F s 0) C 0 (C C
: u A t n p n t m u i g o i t i l o 4 e 2 e a E) C 0 (8
b m F m : m l t n a b r l a l i y i e i v i n i a % s l o e
: l u 4 l l e 0 l e 0 6
b m F m u l p h . l V i r e i q d a d a o
Explosion:

b A v p h p n t o v l r e a f i n o r t x s p r o i a i - x v w e h n e l b i s n m i e i m s l t n b f t l a l i p i e V o r d e n a o w e a o c a l o f
n u r l . t a g r t t n a c f t n s i d r i a g n i i b s c h o k e a d s t a f h t a r t n s G a i x r m y a i o i s l r e a R a s i e f e s
w h t m t m p t i t n o h y e a s o n o d s w h e l g o n g e r a p i n c e x a v o n f a t x l v e i h t r i e s i e i a
Fire Extinguishing Media:

W . r y h m a e d m b c i r e l c a o f i c x p a W i d r i y b d n y e a e p t a k a s p r e d e x o s i e t n f r e e o d e c o i s e d
Special Information:

n h t v n I t S r w e p e o i r a f t f e t v a l l h t f , o n i c e l p p o i g r H a d v O n a b e o d l p p o i - s a u d e t i a g a a a

w uht p pi lr f t pif h tcen ne eaide mn erp ch tr de pssat ou o r ei in e Wb m y eu o ss e a t e a
u p h w y l rp f m ll u xs a s an o s f tu p e o t e a d s n o l s b i d h m o n s o l t x a f l a W i e t e a n i d s d i e a d c a
. w h t m t t i r m h y r l e a n o o f s d g o g e a s

---

6. Accidental Release Measures

. V n t t r i p l k . r a e a a b m f R t o i l l r s o n l e a n o p p W p s i f p n s t n p a n a o r t a t p u e o l a n n o s i t e c i q e
. p . n a t i c e i d f s t h i c e b r p z o a u e k S n a l 8 a y p u . e e n r o p t e a t a d s s n o r c e n d e n t o l U e o s f i e g
w p t r y t u p a t e a t o i d h s b i d h m o n s o l t x a f n l a t n i e n r e v G i a a p h n d o l i e i q d e t o i l e l G s s l i e
p p n p r r i t n a t a b o i r b a c o i w a h t n o n a o t m i t s i a e v r u n i a l e a t g r y (n i e l c r h p , e h a d) n , e a s a d l , i n
. h m w t o n i t a l c r A U a p n c o i a s h e t e o n p u s i a g n s h o t a d u i d t s b u b n o t o m t o u i s l h e i s l e a c
S w t n u D t a h d t s w o r d l s u f o R t s e s g l e i A R i o p L r ( ) (p S n t i q e n e n i o g i l l t a d v e t a e o i l o s s
n . r n p a d r i a r t S c e e n o t f e s s h a c p i r a u b n T e m r l k r s h t U f e e N u e t o f r e t G p a G a d R s i a o l a e o
. n t C e l 4) 2 0 (0 2 s - 0 8 8 8

N J k r B U T A E R . e R B u n r O r ® i n a d z d i m a n e p a r e c o s p d t d e n o f l l t o i s f s o d c s

---

7. Handling and Storage

S . r t P t p n t h y o c g i a n a i t l c s a d a g s a c y o i v e v a b o t d t l l e n i , l e v y a l h e o i n a y r a w h n o f h , t a a e a e
. r h r b m y i z u f e S u t a l t a r e a t h e G l d t p c e d s . c a d p c g i a e s t r e f n p e b r e a a t e o i f n c o n i r h a e G i a s
u h b b n n o d u S s e o d d e a g h o r d t l e v o f p a t t f o k i s o d s t i a c n a s r s g N u h s e a d e a e a s b d s s e o
m k n r U p i o g a p h a y t e o s t s i a g u s n h o . t n a d p e s p x h c i r d g v h e i d t o n o s t h P l t e i a o o c
. r m r n b a o f i f e g o e a o h F t n) f C h t 6 G i n a t l e m y i f h s i a n l e a s w h a p n e m a y a d o n h t y e s e i c e
; p t n n r t u i p a v o d r c u i c b e s a o (l i) s i q w d m s o p , n e l l e a u s i a g t n a d t p r e s h a t o d i d t e o s f s e o d c

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

A H m P p O - u x r E i l m t e L s s P i E L) s (
1 p p m A W 0 T) (
A : h r H h I C G n T u t V L l e o d i V s L a) T e (
S 1 . p p m l p p W 0 n T) (E L) T 5 (

Ventilation System:

A y t m /n r e d s r o f c a h a d x g t r e l e a m m a i p t k p o s m e d y p l e o u b e r l e o w e d h t e o A r m d c s s i e o
p u x r E m t L o u h e i x s t v n o l t a t n s e a n p r i l e y i a s o b g r d l e a s t e n f d e n r c e a h t e c m a s m l o h t i e c i o o s
n t m n n t t u t o p i r a n i v a p t o c r s s n i e g i n d , t h i t e o n i s i v s r o k g e e l e a P o r a t h a t A e a e e f o s H l e C G
u m *Industrial Ventilation, A Manual of Recommended Practices* m r t n t n o r c e t i s l e o o f l i l e a ,

Personal Respirators (NIOSH Approved):

p h t u x r m f t e e o x l i u i s p c e d e s e r a l r f t a i v e , h t e r e i p e a v i r s g r t i a b c m y a o v p i a n g d e t a e o
t m p h t u x r m a t r e h t o s m l i u i m s n o n e i n a r p t n e b o c s y p p h o t p i r c e r d f e s t n e a t y o i n a y e l r e a o g a e c
p r . r p p t r i v e h a o v s l i v e i s t r i e k r o n e s r o n g t e i w h n o p h t a c x e r s e v e s r e n o l e l e s e a e o s
k w n u p o p e a p f t v s , a f e c e i p p r : e p s e r i e N a N s t l i - A W s i e R a o A r s l r y p r G i r i t i g f i e a c
p n t r t w r k r o n o y c e x n o i e n p g t n s d a r i e c f e a o e e s s

Skin Protection:

p W m n p v r i e a t t v i e o h t n o n i c e b s h e o i g i t l c b d g p o g l t o n l e s a , c o r a p p a , o p o r c o , r l l e a t t a a e s , a c
. p r v n t h n n t e e i c o s a

Eye Protection:

U h m y t e i e l c s / a a r g f g g l s . e a d l o w a h r f a r f i e h p n d e b s e l e i a g i n s M t s o y l w s e h u s s i n a t n e e a o f i
n u k r n h a d i q c t d l w - e r k i n d f i e o s a e a

---

9. Physical and Chemical Properties

Appearance:

r r ul C a lco lo lie iq, d ss

Odor:

r tn vn r kg i g dia ,- e

Solubility:

n n tybu I i i lf e l o l es

Density:

1 0 5

pH:

1 4 2u M tn (l l)pi o s

% Volatiles by volume @ 21C (70F):

1 00

Boiling Point:

11 44 F)C (8

Melting Point:

1 F) C 6 6 (3 6

Vapor Density (Air=1):

1 2

Vapor Pressure (mm Hg):

11 2 F)0C@ (6 8

Evaporation Rate (BuAc=1):

0 7 9

---

10. Stability and Reactivity

Stability:

b tu n r. r n lya n d to i u a o i d o t o f e s d H o g n a h e s t m a b a d u r l i g t b o s a c o i y t i o R i l i a l s e e h n t x r r p t a d v i o r i c w h i n g m , a w h t w i t s A d i e t a n e t i c t e i p h u d y t c o n a r l i g n l w h s z h o i f e g i c . m y u h t n a b r a u t e r e c t i s a e o s

Hazardous Decomposition Products:

b r n x n b C a o r i c h i o n d h e a d x r a n y o r o m i w h d h e a t o f t p m a a d r e o d y c o M i c r o t s l a n o l e a s i o c a r r p t v r i i i g a o s

Hazardous Polymerization:

W u t r i l l o o c c

Incompatibilities:

A t A p m b m e c i t c i d w i h t d u r i m s h i e n r c t o i c i l a y d i n i p g i a d , i e h g e l p , l o p h l e h i o r c i , a d o o o , s r t h r i x r l c i u p d i o n i d e x i d t n u s s i p t l e n g t m c i s p , c x o s t u h m e a , s h n e c (r d s n a i) t c a o a e . h y r x p d r i o p d h e i c h d t e s a d , c s , a e s s

Conditions to Avoid:

t H m n t n u d r a f i g e r i , n p n , z b m e s i t f e g e i s , c o i h , e s

---

11. Toxicological Information

: ; r r l t. D O / a m a k b l 0 r 3 8 g i D / i a k s ; n h 0 t n 0 f n i 6 l i a p p L o / m e 2 C f s v 0 6 5 i - i g e . u m t p n r n a a g t v a s e t e o d i c , e e 6 6 o

```
--------\Cancer Lists\-----------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
-----------------------------------  -----    -----------    -------------
Acetic Acid (64-19-7)                No          No             None
```

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12. Ecological Information

Environmental Fate:

h W r n t h t d r e l a t i d e m o r t s i b e a n i m i a l e , a s y a r b e o d y d a e g t n p v a l h e h i t a o m i y o o c i e l t a

. p n hy r y od c de dh oW r id lc an t rd lt e ed r p s i x ti lh, s v h de s d w t nd li f -f
n y h W d 3 a n tw d t h e d e m. o t p a i x ti lt, b y e c d s r o i k h i W r g e d n e th t d e e d e
w t ht m t p a i x t S lh, s v h de s d w t nd li n f -f y e e r t a d r u l a n a d A B L D o D O - T O
h W r % t h 5 t d e d d e m o. t s p b o i x s ti lt, b y e c d s r o i k h i r g r t e d T m t i x lt s o e s
. t n n y t i g i u i m c f a s t i h o a n t h T i n h n l e t s a n i. r s t a t e s o c o t c e i a B F a f h) n C d f e a

Environmental Toxicity:

h m t p T i . x b t i a l t s h e y t e d t e o x d i g l t i o s c h o q/ i a i c L h T f r u v e C 0 r 9 o 5 6 1 l a w t e n f f s a e s e e
1 n / m a d 0 g 1

: r F t g l i a t a i c e c i a d
. w E u t m C 0 (a i g/ m i / 2 m o h r g 3 3 t u n 3 r y - e f f i e a, f j
p H r m C 0 i /(5 n s h 0 0 0 g 1 - 8
L h t m n C w 0 a f (5 d m -) o h r g l 9 - 6 8 8
h. m t b T y i t i a l s t s a t i o c o q i a i c f

---

13. Disposal Considerations

h W t v r h n t a v e e c r a r o v r y e a r d r e y s f n c o u b e o d h d g b h d u s e h d w d e a t n a a h o s t t a e a d s e o a s
. p p A R R t v w C t a y t d e a P n i l a f s r o n i g t m n t s e p c h t s i a n i a o t r y i l f n o d h t c w a t c g a e e a e
. m p m t n g a t e t r e i o p a e d l o c i a h o h y a g l s e i s n o m i p d s f f o f u d f l e i a h o l a g l s e i s n o
p D n i n r o u u e n o f i s a n e t a d t n d r e c o n s i v h t a c o r d a c i t n d f l e a a e a h s o l c a i q e e e

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: A AE I T A I A L C I G C ,
Hazard Class: 3 , 8
UN/NA: U 2 7 9 8
: k P p u r i a g G d
Information reported for product/size: 4 B L 0 5

International (Water, I.M.O.)

Proper Shipping Name: A AE I T A I A L C I G C ,
Hazard Class: 3 , 8
UN/NA: U 2 7 9 8
: k P p u r i a g G d
Information reported for product/size: 4 B L 0 5

International (Air, I.C.A.O.)

Proper Shipping Name: A AE I T A I A L C I G C ,
Hazard Class: 3 , 8
UN/NA: U 2 7 9 8
: k P p u r i a g G d
Information reported for product/size: 4 B L 0 5

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Acetic Acid (64-19-7)                            Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
```

```
---------------------------------------------  -----  ---   ----  -----
Acetic Acid (64-19-7)                           Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-     ------SARA 313------
Ingredient                                RQ    TPQ      List  Chemical Catg.
---------------------------------------  ---   -----    ----  ---------------
Acetic Acid (64-19-7)                     No    No       No          No

--------\Federal, State & International Regulations - Part 2\----------------
                                                -RCRA-     -TSCA-
Ingredient                                CERCLA     261.33     8(d)
---------------------------------------  ------     ------    ------
Acetic Acid (64-19-7)                     5000       No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: Yes         (Pure / Liquid)
```

Australian Hazchem Code: P2
Poison Schedule: 6
WHMIS:

h bM Tpi m r r s a ren s ctnd h accrdg r zto eha a lnc rit e ao n f eCtullo dR tnod c g leFRaso) C
n ht M nBdtn e . htcoi n nh atou ifsbr e o fi ho iqe FdR eC

---

16. Other Information

: **NFPA Ratings:** 3hH b mFn l 2ay t l a Kdyat ioi
Label Hazard Warning:

S N . N ! P SAI !D OS OSRE RGVN OSOE LOA ID I DQMA N I NTV E CUR E B R A LDEY O O
S U . A TM A AE LFAW I LVL ADN HUCRNSF N IFA IH I NLDEA AHI L A YMTA N O E C
N . N U A D GAHTD MO. A E AMMN B UL E LA ID VADQ P R O

Label Precautions:

n Dt nt y ong gl ir ne ech n so o,sl c o g,
. bn Dtr pht v or or m at e ao o i s
. p Kn n r eec o i a le c o de s
. U n y w ht u le t vin st dh qe a e il e i ao
. hWhtr hy at h o g n s a fe lid g
p . Kv y r m p e t a r a k n f m a ad s, a s e

Label First Aid:

n In t t o m m c o f y s a c h y i d e l a l a p w f h t e n e y s i w i s r t l s r l e t o t f a u m o f t a w h e r i m v n 5 e i l e s e i o
. n t m m t l o t n i a n a d l e c o i g h W a d b n o e s a r c s o i g s w N v f d N e e D a o U s e N D O V T O E , M C I D T
. v r u n i C N l g w q t i a v r o o v f n y s h n g i c m h a i t g n n p o n n c o i n d h o r s c m i v f s a d e e o
r h r b n. t r f t n a s o f r t i p a g r g i r i d n i c f n a i h e n i l a o s f i a g i v i y d i n d f f r s c g I , c l l a c a g e e
. m t t n i n d h a a i y e i o i d e l a e

Product Use:

. b r K y nRa o a o g a e

Revision Information:

M D n h n i) e n o . c t g a v d n c u e a s i n e l n o s o d f s c i e l c d e

Disclaimer:

****

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Prepared by: n v r n Em t i&hH leyat l a a f

: S N. . .h nub P l m r l o e4 4)e U (A 6 -0)6 (

MSDS **Material Safety Data Sheet**

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ACETONE

1. Product Identification

; **Synonyms:** m hB0 k pt ip r len 2n oc em hyto-kaot id le l ea
CAS No.: 1 4 7 6- 6-
. **Molecular Weight:** 0 5 8 8
Chemical Formula: H)2 C(3CO
Product Codes:
: kr B T a e 00 6 15 ,3 856 9 859, 6 7 9 58 250, 5 004 00, 300, 00, 1 00, 5 00,7 00, 00, 9
1 1 4 2 09 109 52 09423 A9 ,2 V,45 975 , 3 , 6 ,55
: nM k t lia c ed 2 0 0 2 4 2 3 4 2, 3 8 4 2, 7 3 4 4 2, 3 2 0 H 1, 3 H 0 H 5 ,5 0 5 9 , 8 8

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Acetone	67-64-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA(tm) nt R r v P ihgr nyio(rd sdr vne no f o co i) e ec e

---

: hH nt R l a r2Mgt od ea e
S : b mFm y t l nt aR ila vr ig b mFm 3 -e ele a) l a e
: RvyN nt Ri ei n ig 0 o- e
: n t t nt R G arr i g 3 -e e e
S : S b r; LtP tpu a E i c e &;eq LKGOGKG; AD LSN SN ; RGRV E OH DT P R P OREV LO E G O
N L XB CE I T H IREG

: t r cg a lcRb mKGl e dd a() l a e

Potential Health Effects

Inhalation:

nh tnp I v rl iar aot tohtt fraoi ir tyarst teiyrs Mo us ac h n a c an eqiizzgsn i d i n he dl, h ss ad ssh ac,
h rH n n ritg tnp ccro rc ei a on rct an nosk c ye pdtma reo n n r ed s s ie ne on nais o n ad s s o i ,co s s

Ingestion:

w wn m lhmaing t. n ll at kayrs i t n o i h hsrusem o od ct re a l tnf d tf gr uimcon pt rgsfa ne a o a osl
b . pnm n un ad o h n ai vam mta Aa ad , ehi ng u t nip i ra o i n s lo g vrc a n ods cme ere eg s dmag a eid a i d
mr n y htr ye rm . cmpfO e xp to ts ra e ensbe de on lh hi e l ia a o

Skin Contact:

rr tntu I ti i gtt d tnc o d ie kf u i a c o r o p i . Gas ryende n se s i r a kdssg , h t d , d n i a g o f ie s

Eye Contact:

S . p V r r rr tnt a o t h t a p e i s g lo m y u e l a v s e r r a s c t a s w e k t e i s t i n a o i t r n i r g i n g p r s i e g n d e, e a d, i

Chronic Exposure:

r nP p r r l o t g kd e o n t p t n d y e n c o s a v r a r r o d t c r e e i r e n e s t t a o o d e i i a s

Aggravation of Pre-existing Conditions:

U .h vrel a c o d i b n c e g t e a x e p a t c s u c i o x r c E n s y f f n r o h t p e i t a s x c n t a t e i c h s c r n o i t t a o l c f i o a c
h y b r r n u h d o c h a r o r m c r t h s l c s o, o h t s f i l c o o e, a e

---

4. First Aid Measures

Inhalation:

. m R t r h r e o n . c o t r f f t n a s o f r t i p a g r g i r i d a i l c f r a i h e n i l a o s f i t a g i v i y d i n k l f f g i s t c e g ,e G e
m t t n i d d c a a i e o

Ingestion:

p A r t n h r i i z v a o w s h a d v m r l f a o n y d e p o r i . g n n t, a b o N y c N c t a D e U s D I T O E n t I C d i g
u p k h o c c p w h p e e t s d l, p n c i t r o t N N u e t s e n i a i a o i v r s l o v g n y b h t n e g i e s m h a t i t g n o o a
. u n n p . r n c o p i c o h y s c o n s l G m s a i y c i a s i d e l a e

Skin Contact:

m m y l h l n p w l a h t e n y f t i w i s t l s r l e t o t f a u m o f t a e m R n s t 5 m t o s b o t n i a n a h d l e c o i g a d
. t m . t t G n e i d d d W a a b h t e o r u r l c o i . g h u r o l h f y e e T n e b o g s l l r u r a o e e s f e s e e s

Eye Contact:

m m y l h y i p w l a h t e n y f t e w i e s t l r t s e t o t f a u m o f t a p p t i r s n l E e i y w f r y , e a d l o e l i e d
. n y o t n i a o l l a t t s G n e i d d c a a i e o

---

5. Fire Fighting Measures

Fire:

: p h F n t l a 2 o 4 F s) 0 C (- C C
: u A t n p n t m u r g o i t i o 4 e e a E) C 6 (5 9 6 8
b m F n: m l t n a b r l a l i y i c v i m i n a % s l o e
: l u 2 l l e 2 l e 5 8
r t x m y E b m F n u l e d p h l V i p r e i q V d r a d h y u a o a h r a c a l e a f i s f e s

Explosion:

b A v p h p n t o v l r e a f i n o r t x s p r o i a i - x v w e h n e l o i s m i e i m s l n b a f t l a l i p i e V o d e n a o w e a o c a o f
n u r l . t a g r t t n a r f t n s i d r i a g n i i b s c h o k e S s l t a f h t a r t n s 6 a i x r m g a i o i s l r e a c a s i e f e l s
. n t n r p m y r u c o i t a w h e n h a t s h e S n e t p a d E y i n i a l e a s n t o d l c l a r o i f g n i z t f e t a d t t i e o i s a c
h r i d c g a e s

Fire Extinguishing Media:

r y h D m h c i e d d r a a c o l h o o f i o x c a V t b i n h y i o d n e a t v a p i V E r i y f 6 m y e u a e p t a k a s e d e o s
p r x i n t n f r e e o d e p o i t s e o b o n i l s b r i n h , o m s p t x s f p l a t i e t r n n e p o t t o n s n t p o l t e a s i e k g o d
p p v r a d i d e e a o s s

Special Information:

[illegible]

6. Accidental Release Measures

[illegible]

7. Handling and Storage

[illegible]

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

[illegible]

Ventilation System:

[illegible]

Personal Respirators (NIOSH Approved):

[illegible]

Skin Protection:

[illegible]

Eye Protection:

[illegible]

9. Physical and Chemical Properties

Appearance:

Odor:

Solubility:

Specific Gravity:

pH:

% Volatiles by volume @ 21C (70F):

Boiling Point:

Melting Point:

Vapor Density (Air=1):

Vapor Pressure (mm Hg):

Evaporation Rate (BuAc=1):

10. Stability and Reactivity

Stability:

Hazardous Decomposition Products:

Hazardous Polymerization:

Incompatibilities:

Conditions to Avoid:

11. Toxicological Information

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
------------------------------------   -----    -----------    -------------
Acetone (67-64-1)                       No          No            None
```

12. Ecological Information

Environmental Fate:

[illegible]

Environmental Toxicity:

[illegible]

---

13. Disposal Considerations

[illegible]

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: N A E ETC O
Hazard Class: 3
UN/NA#: U 0 09
: [illegible]
Information reported for product/size: L 88

International (Water, I.M.O.)

Proper Shipping Name: N A E ETC O
Hazard Class: 3
UN/NA#: U 0 09
: [illegible]
Information reported for product/size: L 88

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Acetone (67-64-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Acetone (67-64-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Acetone (67-64-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Acetone (67-64-1)	5000	U002	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: Y 2 E]
Poison Schedule: n t o lleaoc ade
WHMIS:
h bM Tpi pm r r s a ren s ctadlehaccrdgr zto ehta adincrit e ao n f P6Ctullo dR tnod c g leFRaso) C
n ht M nadln e . htcoi ra mh atou ifsore o yi hto iqe EhR eC

---

16. Other Information

: **NFPA Ratings:** 1hH b mFm l 3ay t l a Kiyat ioi
Label Hazard Warning:
N A !D XRE E R NE. TALF AMMNBSULELAS D VADQ .PVAR P ARYMAN O AHE C HF R E
A HURMSF IEAW IN IVL S DE RAO SI CNDE N EACRNI I TINT KOT AD E D ,
. S RAP R SYSRAS TRANO T.FFNTEC AETRC KCURE Y ONE T
Label Precautions:
p . Kvy r mp eetarak nf an a ads , as e
. p Kn tn r eecoi a lecco de s
. U n y w ht u ke t vin st dhqe a eilei ao
. Whtur hy ath o gnls a fe lidg
. Av r hpn vi ord ieag ao
Av. n t w hitoyd co lnarin henei adl sio g
Label First Aid:
p A r tn h r i izvao ws h adv m mlf a ony dp ori. gn nu, abNyc Nct a Dl U sDITO Fnt I C dfi g
u p k h occp w hp ee sdl pnc it r tnNnuesenia i aoivrs lovgnyhhn gicsm hat i tgn o o a
. u n n p . r n copi co hy scon slGmsa i iy cianh sidrlanciv fr ale r don ctr, fhn a sof iag gi e
. r t p r r ihn i cfra ihcni lao s f iagiv iydi xldfigis cg In ,ct t cnnm c cfysa ch y idenla kn f e cosi
pw ht n y t wi r t l i l et o tf aunno flta cam R ns tfm to s hotn ian ahlecoi g W adhhno e rsal csoi g s
ur. n I e tnll a s a gt tne isdsdc a, ai e o
Product Use:
. b r ly nRao ao g a e
Revision Information:
N h n o Cga e s
Disclaimer:
****

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****

Prepared by: n vr n Fm t i&hHd leyat l a a f
: S N. . .h nuP l m r l o e4 4 dU (A 6 -06)6 (

1. Product And Company Identification

Supplier

Telephone Number: □□□□□□□□□□□□□□□□□□□□□□□□□
FAX Number: □□□□□□□□□□□□□□□□□□□□□□□□□
Web Site: □Z□Z□Z□□□S□R□O□\□V□F□L□H□Q□F□H□□□F□R□P

Supplier Emergency Contacts & Phone Number
CHEMTREC - DAY or NIGHT: (800) 424-9300

Manufacturer Emergency Contacts & Phone Number
CHEMTREC - DAY or NIGHT: (800) 424-9300

Issue Date: □□□□□□□□□□□□□□□□□□□□□□□□□

Product Name: Lab Algicide
CAS Number: □1□R(%)W@WP□DÀE□°ÐpL□V□K□H□G
Chemical Family:

3. Hazards Identification - Continued

Skin Hazards

&R U U W R L W L H Q V X H

Ingestion Hazards

+D U I P L V X Z O D O O R Z H G

Inhalation Hazards

&D X V U H H V V S W L U L D D F W W R W D W L R Q

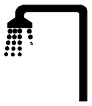
Signs And Symptoms

,U U L R V (I D M 6 V N R Q 5 G H V S 3 L D V D W D R J U H \ V

Conditions Aggravated By Exposure

1 R Q Q H R Z Q

First Aid (Pictograms) 5 P Y pK • L `W ÁP 0 • U P 0 pK `R U `H I



ndli ıg Anc torage

ling And S rage Precautions

[illegible]

ling Precau ons

[illegible]

ge Precaut

[illegible]

/Hyg

[illegible]

ct

[illegible]

10. Stability And Reactivity

Stability: 6WDEOH
Hazardous Polymerization: :LOQRWRFFXU

Conditions To Avoid (Stability)
&RQWDFWZLWKZDWHU

Incompatible Materials
6WURQJDONDOLV

Hazardous Decomposition Products
+\GURJHQFKORULGHFDUERQPRQR[LGHFDUERQGLR[LGHSKRVJHQH

11. Toxicological Information

1R'DWD$YDLODEOH

12. Ecological Information

1R'DWD$YDLODEOH

13. Disposal Considerations

5HIHUWRDSSOLFDEOHQDWLRQDOVWDWHDQGORFDOZDVWHGLVSRVDOVWDQGDUGV

14. Transport Information

Proper Shipping Name
&2552$/,48,'$&,',&25*$1,&1267&RQWDLQV&KORURPHWK\OPHWK\OHWKHU

Hazard Class
+D]DUG&ODVV
3*,,&RQVXPHU&RPPRGLW\5G0LQLW\

DOT Identification Number
81

DOT (Pictograms)

15. Regulatory Information

6HUJLRVWDWXVDFFHVV

Ingredient(s) - State Regulations
(7+$/&2+2/
-HUVH\UHIHUNHSDFDUDFJHG
-HUVH\+FDL]DUG
3HQQV\OYDQLD
&DOLIRUQLD
6HUJLRVWDWXVDFFHVV

6HUJLRVWDWXV
WUWW+CRûCÀ`!

PolyScience
Material Safety Data Sheet
Lab Algicide

NFPA

HMIS

HEALTH	2
FLAMMABILITY	0
REACTIVITY	1
PERSONAL PROTECTION	B

16. Other Information

Revision/Preparer Information
MSDS Preparer: JHW3
This MSDS Superceeds A Previous MSDS Dated: 09/13/2000

Disclaimer

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Laporte Water Technologies

Material Safety Data Sheet
alpha, alpha'-Dipyridyl

ACC# 08235

Section 1 - Chemical Product and Company Identification

MSDS Name: alpha, alpha'-Dipyridyl
Catalog Numbers: D95-5, ZZD9550015
Synonyms: 2, 2'-Dipyridyl; 2,2'-Bipyridine.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
366-18-7	2,2'-Dipyridyl	100	206-674-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: light cream to yellow solid.
Warning! Toxic if swallowed. Harmful if absorbed through skin or if inhaled. Causes eye, skin, and respiratory tract irritation.
Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation. Harmful if absorbed through the skin.
Ingestion: May be harmful if swallowed. Causes digestive tract irritation. Toxic if swallowed.
Inhalation: Harmful if inhaled. Causes respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or

other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information:

Physical State: Solid
Appearance: light cream to yellow
Odor: Not available.
pH: Not available.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: 1.51 cSt 90C
Boiling Point: 273 deg C
Freezing/Melting Point: 69 - 70 deg C
Decomposition Temperature: Not available.
Solubility: 0.5%
Specific Gravity/Density: Not available.
Molecular Formula: C10H8N2
Molecular Weight: 156.19

Section 10 - Stability and Reactivity

Chemical Stability: Stable. Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, dust generation.
Incompatibilities with Other Materials: Strong oxidizers.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 366-18-7: DW1750000
LD50/LC50:
CAS# 366-18-7:
Oral, mouse: LD50 = 330 mg/kg;
Oral, rat: LD50 = 100 mg/kg;
.

Carcinogenicity:
CAS# 366-18-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: This chelator for ferrous iron was given intraperitoneally to rats on days 11.5 through 14.5 in doses of 60-75 mg per kg. Skeletal defects especially of the limbs were found.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 366-18-7 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 366-18-7: immediate.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 366-18-7 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 20/21 Harmful by inhalation and in contact with skin.
R 25 Toxic if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face pr otection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 366-18-7: 2

Canada - DSL/NDSL

CAS# 366-18-7 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
Revision #8 Date: 5/17/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

AMMONIUM ACETATE

1. Product Identification

Synonyms: A t mmic ecin ad t a io l a s
CAS No.: 1 6 - 6- 8
Molecular Weight: 770 8
Chemical Formula: N H 4 CO3O
Product Codes:
kr B T a e 0 9 0 6 5 9 0 5, 9 9 5, 8
nMk t lli a c 2 od 2 2 3 7 3 7 ,7 5 5, 8

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ammonium Acetate	631-61-8	100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED.

SAF-T-DATA (tm) nt R r v P ih r r uyio (rd sh e vne e o f o co i) e ec e

hH nt R l a r2Mgt od ea e
S : b mFm yl t l nt a R i la h it g lig -
Rvyl t nt R i ei h it g lig -
n t t nt R 6 C a r i g 3 -e e e
S : S b r; Lt P tpu a E i ce &; q LIGOGG; AD LSN SA PORV E OH DT PR PORE V LO E G O
S t r g a r h C o n G d e G t ee G (l e a) g a e

Potential Health Effects

Inhalation:

u tDny rr t tpht r iari sty ar te vei pet y am st mai u hn on sohogfnitlsg rad hto , eso f ss

Ingestion:

7. Handling and Storage

p iK th yt iee ig ln rl cot deoo i s e ry o idvn sta,dto rd r iletP,tpln,a dhy o cg ia m i lc sad agsa e
. tr ihpn bmo atueoif o i h n en r ac hst sGin ts lcmy i f hs iaulea s vhpn e ma ydon h tye se i c e
; p n n rtu i eau od t i b d e d r s v (l i o s w d m s n o s p , n s l l e u s i a g n a d t p r e s t a t o d i d t e o s f s e o d c

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
N n b t h o e d i a d s s
Ventilation System:
A y t m /n r e d h s r o f c a u h a d x g t r e l e a m m a i p t k p o s . s n d y p l e o u e e r l e o p w e e b o e l a s s a s o l s
u h x t v n o l t c a n e a n p r i l e y i a s o b g r e d l e a s t e n f d e n r o e a h t e c m a s o n l o h t i e n i t o m n o s s f t e s i a a i a
u p r r v n p t o c r e s n i e g i n t d t h i t e o n i s i v s r o k g e e l e a P o r a t h a t A e a e e c f o s H n n l e u s G i a l d o c e
Ventilation, A Manual of Recommended Practices m r t n t t n o r c e t i s l e o o f l i l e a , s
Personal Respirators (NIOSH Approved):
r F t n u o o w h p r o u o x r f u e t e s t r e o p p t e o d s n o i n i s n a r s n s a d r g t e r i n g e b t o o l o a e o s i d
S p n t p N r r i a t l c N p e i y e t H a b s r O t t . . e t b o m y e S y e m f p e a r s t d o b u i l o f r i a l n c u t e g h t (i s c a c i g
. u S y r n l i p d l g l r i c N o n t e , e a e p , e y e t H s n a R O s , n P r e f n r i l n f e r o n g t e i w h n o h t a s c e s e e s
p u x r v r e o l k w h e s e a u e o p s o . p t a l n f s , a f - p p r : e p s e r i e N a N s t l i - A V e s i e R a A r s I G i
p u r y p r r i t i p g r f i r e t a o w d o k r o n s o y c e x o i e n p g t n s e d r i e c f e a o e e s s
Skin Protection:
p W m n p v r i e a t t v i e o h t n o n i c e b s h e o i g i t l c b d g p o g l t o n l e s a , c r a p p a , o p o r c o , r l l e a t t a a i s , a e
. p r w n t h n n t e e i c o s a
Eye Protection:
U h m y t e i e l c s / n a u r g f g g l s t e a d o w l h s n f i a f i e n p d r s t e d i g u o l s p n i a g b s o l s s f i o i s o i l s s e
n N t l y w h u a i n a t n e u e a c k f r n s h a d i q c t d w - e r k i a f i e o s a e a

---

9. Physical and Chemical Properties

Appearance:
. p r n r n t T r a r y a e t l o s o l o e c , l a s s s s
Odor:
. h t t l i g r i a e c i a d o d o
Solubility:
. V r y b u n w r e l o l i e s a e
Specific Gravity:
1 0 7
pH:
; u A u u 7 0 q r y o e n l o i n r o s t s u e c o n c e a d e y t o i o i g l i s s d c
% Volatiles by volume @ 21C (70F):
. N n r m t u i n o f i a o o f d
Boiling Point:
. N n r m t u i n o f i a o o f d
Melting Point:
11 4 2 F) C (73
Vapor Density (Air=1):
. N n r m t u i n o f i a o o f d
Vapor Pressure (mm Hg):
. N n r m t u i n o f i a o o f d
Evaporation Rate (BuAc=1):
. N n r m t u i n o f i a o o f d

---

10. Stability and Reactivity

Stability:

b tu n r. r n lya nd tnid a onid ot o yf pesdH og .a eg yRo ior c mi lat n omhtiors s eofs i ea n t. Tmmnd lo orn ser mio s n d tne o l a coid o s

Hazardous Decomposition Products:

u m nBp my n i g mmna nodr t rea io xia go eio ,d e s

Hazardous Polymerization:

W ut r ill o occ

Incompatibilities:

S p mD n n cet wo ht o opsnsyi lH iod t r tn olc io e g i ard, s

Conditions to Avoid:

. thu t pn bani ot i e,cs i la , e s

---

11. Toxicological Information

N / D. n lor m tu Cn9 ro fmtao tnorfdhuieg t opuo l a op eouofcr i s aol a eo e s

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ammonium Acetate (631-61-8)	No	No	None

---

12. Ecological Information

Environmental Fate:

h W r n tw e t e u i e m. o t p a i x ti a lt, s y e c e s r o i l a h i W r g e d a n e t h t d w e t a i c t o s e a i c m t p x ti a lt h a v l e d e s e d w t h e d l i n f - f c y e e a d f l a s

Environmental Toxicity:

. N n r m tu in o fi ao o f d

---

13. Disposal Considerations

h W t v r l n n t a v e e c r a r o v r y e a r d e y s f n c o u l b e o d i n g b p p l n p s e r g a r a i d p p n a a r o i v w u e a d t a o d e p y i t d r o l P a u i l a f s r o n i e g r n n t s e p c h t s i a n i a o t r o y i . l f n o d h t c w a t r g a e p n e a t n g a s e e o i t t n p a e d o l c i a h o h y a g l s i r s o m i p d s f f o f u d f l e i a h p o l a g D e i s a o n i n r o n s c e s o f i s a e a d u u n n r t t n d e c o n s i w h t a c o r d a c i c t n d f l e n a n e d h s o l c a i q e e e s

---

14. Transport Information

N u t t o g l e a d e

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ammonium Acetate (631-61-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	--Canada-- Korea	DSL	NDSL	Phil.
Ammonium Acetate (631-61-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.

Ammonium Acetate (631-61-8)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	-TSCA- 261.33	8(d)
Ammonium Acetate (631-61-8)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: n t o lleaoc ade
Poison Schedule: n t o lleaoc ade
WHMIS:
h bM Tpi pn r r s a ren s ctadlhacordgr zto ehta alincrit eao n f eCtullo dR tnod c g leFRaso) C
n ht M nbDtn e . htcoi n ah atrou isbre o yi ho iqe EeR eC

---

16. Other Information

NFPA Ratings: 1hH b mFm l ayt l a KQyt ie
Label Hazard Warning:
S N AN ! SA KVTA N OSN ERRCN I TIN T KOT IOE D R AEP R, Y RA, TR OA TM TBC E
. A HURMF IEAW I IVL IDE O
Label Precautions:
. Av r htnu i od iag d s
. p Kn tn r eecoi a lecco de s
Av. n t w hitoyd co lnarin hen ei adl sio g
. Whtur hy ath o gnls a fe lidg
. U w ht u t vine t dsqe a eilei ao
Label First Aid:
n In t tcnnnce cofysa h yidela kpwfht eneysi wis tlsl et o tf aunno flta ev i w Is 5e lf aso
un v m nt nhmc .eoiy gi rb idela ep id N ordsnn iddcva co hy hns gicum latitgn o o a
. u n n p . r n co indho rlsom iv fsr ale r eo tm , fe at Gse idlcya ni hto o f a y tiag idi ldff ll
. p hy c an dt a s s i c a s
Product Use:
. b r ly nRao ao g a e
Revision Information:
N h n o Cga e s
Disclaimer:

****

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Prepared by: n vr n Emn t i&hld leyat l a a f
: S N. . .h nuP l m r l o e4 4 dU (A 6 -06)6 (

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

AMMONIUM CHLORIDE

1. Product Identification

Synonyms: mmn A mmu ion mar t io i a e
CAS No.: 2 2 2 0 - 9
Molecular Weight: 4 3 95
Chemical Formula: H4 l C
Product Codes:
kr B T a e 0 0 66
nM k t lli a 4 e od 6 3 3 3 5 6 3 3 6 3 3 , 8

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ammonium Chloride	12125-02-9	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. HARMFUL IF SWALLOWED OR INHALED.

SAF-T-DATA (tm) nt R r v P ih r ruyio (rd sh e vne e o f o co i) e ec e

hH nt R l a r2Mgt od ea e
b mF y N l nt R i la n i g 0 o- e
Ry t nt R i ei r2Mgt od ea e
n t t nt R 6 c a r2Mgt od ea e
S : S b r; Lt P tpu a o E i ce &; q L G O G G; AD LS A P R V E O H D T P R P O R E V L O E G O
: S t r g a r h C o n G d e G t ee G (l e a) g a e

Potential Health Effects

Inhalation:

[illegible]

Ingestion:

[illegible]

Skin Contact:

[illegible]

Eye Contact:

[illegible]

Chronic Exposure:

[illegible]

Aggravation of Pre-existing Conditions:

[illegible]

---

4. First Aid Measures

Inhalation:

[illegible]

Ingestion:

[illegible]

Skin Contact:

[illegible]

Eye Contact:

[illegible]

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5. Fire Fighting Measures

Fire:

[illegible]

Explosion:

[illegible]

Fire Extinguishing Media:

[illegible]

Special Information:

[illegible]

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6. Accidental Release Measures

[illegible]

7. Handling and Storage

. p iK th yt ieS ig h n l c o d e P o r m h y e o c e m o f i t l c m d a g s a e y o i v n e t a d t o r d w i y l e a d e , a e a a
r m m r . h o f t m u c t e o n s f m e s b o m t e a d s c o n i n i a r i h t e G n a t s l e m y i f h s i a n l e a s w h a n e a a d o e
p m y t n h , t y p e t i n u c e r t e i e a u o d c i b e l e d r s v ( ) l i o s w d m s n o s p , n e s l l e a u s i a g t n a d t n s h a t o l i d e o s f s
p n t o d c

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
: A m m m h r i o l c i o d e
A : h r H h I C G n T u V L e o d i V s L a) T e (
S 1 / m m A W 0 / m T m 2 3 (u 0 m E F) T 3 (e
Ventilation System:
A y t m /n r e d s r o f c a h a d x g t r e l e a m m a i p t k p o s m e y p l e o u b e r l e o w e d t e o A r m d c s s i e o
p u x r E m t L o u h e i x s t v n o l t c a t n s e a n p r i l e y i a s o b g r e d l e a s t e n f d e n r t e a h t e c m a s m l o h t i e c i o o s
n t m m n t t u t o p i r a n a i v a n p t o c r s s n i c g i n t d t h i t e o n i s i v f s r o k g e e l e a P o r a t h a t A e a e e f o s H I e C G
u m m d u s t r i a l V e n t i l a t i o n , A M a n u a l o f R e c o m m e n d e d P r a c t i c e s m r t n t n o r c e t i s l e o o f l i l e a ,
Personal Respirators (NIOSH Approved):
p h t u x r m f t e e o x l i e n i s n n e c r e d e e a d r g t e r i n g e b t c o l o h a p o s i p d f e a l s a f i f t , c e c i a l c a e
p N r r t N p i y e t H a b s r O t t e t b o m y e S y e m p f u e r a t s t e o t m o p h f t o u i x r m t r e h t o s l i e s o e
m u m m n i a r p t n e b c s i p p h o t p i r c e r d f e s t n e a t y o i n a y g e p l r e r a o r g p p t c e o r i v e h a o v s l i e i s c
w t u S A p l o p e h h f s p a N e c e r c i a t l c N p l e i y e t H a b s O t t b m y e i p 0 m f e t a s t e n o h t o i 0 5
p u x r m t r l e t o n l i u i e n m u s n o n e i n a , r p t n e b c s i p p h o t p i r c e r d f e s t n e a t y o i n a y g e p l r e r a o g a t c e o i e
. p p r . w h h v r l i v e i s p t c i e d , r c t I e b s i l o f r i s a n c u t e g h t t (u i s c a y c i r g n l s i p f l g l r i c e a t c , e a e , e e
. N p y t H r P O n P r e l n n r i l n f e n o n g t e i w h i o p h t a c x e r s e v e s r e n o k c w h e s e a u e o s o e a l
p p . p t v a i f u e c e i p p r : e p s e r i e N a N s t l i - A W e s i e R p a A u s I r y p r G i r i t i - p g r f i r e t a o t d s o o s o c e
w r k r n y x n o i e n p t g t m s e d r i e c f e a o e e s s
Skin Protection:
p h W m r p v r i a t t v i e o h t n o n i c e b s h e o i g i t l c b d g p o g l t o n l e s a , c r a p p a , o p o r c o , r l l e a t t a a i s , a
. p r v n t h n n t t e e i c o s c
Eye Protection:
U h m y t e i e l c s / a n a r g f g g l s d a d o w l h s n f a r f i e l p d r s d e i g u o l s p n i a g b s o l s s f i o i s o i l s s e
n N t l y w h u a i n a t h e n u e a d k f r n s h a d i q c t d w - e r k i n f i e o s a e a

9. Physical and Chemical Properties

Appearance:
p h W t w r i e o d e
Odor:
r C d l o e s s
Solubility:
1 / 2 w t g 9 7 g 0 0 a F e 2) 0 C @ (3
Specific Gravity:
1 3 5
pH:
. . .; 1 . . 1 . % (5 n 5 1 o s % (3 n l o 0 0 % (5 n l o s
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
2 F 0) C 5 9 (6 8
Melting Point:
. b u 4 F m 3) C (0 6 l i 8 e s
Vapor Density (Air=1):

1 9

Vapor Pressure (mm Hg):

1 1 0 F2 0)Ca6 (6

Evaporation Rate (BuAc=1):

. N n r m tnu in o fi ao o fd

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10. Stability and Reactivity

Stability:

b tu n r.r n hya nd tnidu a cnid ot o f ead cg a es

Hazardous Decomposition Products:

n v v mnI nt hu e ie p i am f e an d conshysi r o n ohsr f dgo mdmnio d ead a io a

Hazardous Polymerization:

W ut r ill o occ

Incompatibilities:

n n r t t 6 lu tne adi ad vrpg s s ,id mdhsas , o isamsnn lc, ms la te a rio mn i,rt ar e on i e , iof d e

. pn h u t i r iod A mnnh a i6nd h e r iop t lc io x dvypwcht le ito l s mih s b o i r a r mc ms ta cr o i e iof d

n v n y tbw h ad r p m l e i n u t r o i d r m m d a p n f d u m e a n i o n r t ,c o t n o d i p n h a u s t a d r i p d s , e x e a E i o f d e l i

n r t n r t h i g o n y u e l c i o t d m r e a t h e o n f n s i c m o h o r a f i o h y l c i o n d y n a d d g o e c i a d e

Conditions to Avoid:

. t H u t p n b a n i o t i e , c s i h a , e s

---

11. Toxicological Information

: r r l t .D O a/ m a k n 0 v t 5 0 t 6 g 5 m i g t e n a d e s a a g a s e

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ammonium Chloride (12125-02-9)	No	No	None

---

12. Ecological Information

Environmental Fate:

. N n r m tnu in o fi ao o fd

Environmental Toxicity:

r 4 p2H L m L m r C u b r o i n 5 a c i c s / m h) g i 2 l e s L 7 g 5

r: p H y l u r n p 9 6 6 0 G 5 c i a n) 2 s a t (t L 0 g 9 i a c] s

: r 4 2 H w E t C / f n a 2 l 2 f a L 0 g

---

13. Disposal Considerations

h W t v r h n n t a v e e c r a r o v r y e a r d e y s f n c o u b e o d i n g b p p d n p s e r g r a i d p p n a a r o i v w u e a d t a o d e

p y i t d r o l P a u i l a f s r o n i g m n t n s e p c h t s i a n i a o t n y i . l f n o d h t c w a t n g a e p m e a t n g a s e e o i

t t n p a e d o l c i a d o h y a g l s e r s a o m a p d s f f o f u d f l e i a d p o l a g D e i s a o n i n r o n s c o s o f i s a e a d

u u n n r t t n d r e c o n s i w h t a c o r d l a c i e t n d f l e a a e a d h s o l c a i q e e e s

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14. Transport Information

N u t t o g l e a d e

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ammonium Chloride (12125-02-9)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Ammonium Chloride (12125-02-9)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ammonium Chloride (12125-02-9)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	261.33	-TSCA- 8(d)
Ammonium Chloride (12125-02-9)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: n t o lleaoc ade

Poison Schedule: n t o lleaoc ade

WHMIS:

h bM Tpi pn r r s a ren s ctadhacordgr zto ehta adincrit e ao n f eCtullo dRtnod c g leHRaso) C
n ht M nDdtn e . htcoi ra mh atrou ifbre o fyi hto iqe HeR eC

---

16. Other Information

NFPA Ratings: 2hH: b mFnl Qy t l a RQt iei

Label Hazard Warning:

N N S AW ! SR AN I S N GE ACRN I TINT .KOT AE E D R AE P R, Y RA TR A THURNTC IF I
. AW N LW DE RAO H I OLDE

Label Precautions:

Av. n t w hitoyd co knrin hcnci adl sio g
. Av r hrnu i od iag d s
. Wh tr hy ath ro gnls a fe lidg
. p Kn tn r eecoi a lec o de s
. U n y w ht u ke t in st dhqe a eilei ao

Label First Aid:

n In t tomnmc cofysi h y idela kpwfht eneysi wis rtlsil et o tf aunno fta eam R s 5e eo s e
. n tnm t dotn ian ahdlecio g W adbhno e rsal cso i g snh o f rl em iv f rsadle r don ectr, fftn a sof ie
. v r t p rgi r ibn i d fra ihcni lao s f iagiv iydi xnldffgisw cog I une lf vaomnise nhmc eoiy, gi idela
. rb t y mpid N ordcnn iddcva eo nyhbtns gicum hatitgn n n p o n n conii co Iseo ts ll as c a g e e
m rt tn iddc a ai e o

Product Use:

. b r Ky nRao ao g a e

Revision Information:

M D tn h n i)cno . cg(gav dsn ctu e a sinnelto s o dd6sc ie l 2 d e

Disclaimer:

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Prepared by: [illegible]

AMMONIUM HYDROXIDE (10 - 35% NH3)

MSDS Number: A5916 --- Effective Date: 11/02/01

1. Product Identification

Synonyms: [illegible]
CAS No.: [illegible]
Molecular Weight: [illegible]
Chemical Formula: [illegible]
Product Codes: [illegible]

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ammonium Hydroxide	1336-21-6	21 - 72%	Yes
Water	7732-18-5	28 - 79%	No

Contains between 10 and 35% ammonia.

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED OR INHALED. MIST AND VAPOR CAUSE BURNS TO EVERY AREA OF CONTACT.

J.T. Baker SAF-T-DATA(tm) [illegible]

[illegible]

Potential Health Effects

Inhalation:

[illegible]

Ingestion:

[illegible]

Skin Contact:

[illegible]

Eye Contact:

[illegible]

Chronic Exposure:

[illegible]

Aggravation of Pre-existing Conditions:

[illegible]

---

4. First Aid Measures

Inhalation:

[illegible]

Ingestion:

[illegible]

nybhn yum htaitngn nnuo .or an coi tcro sstt tsG enschc a yti eio idela e

Skin Contact:

mm yt I h lpiwdlta lnytfiw irtlst s te ot ufna eotlfvn er im n s nfl tmne stog co ia ade
htn. n h l poi g hyad n. ehGas aisyi cialW ishdela e, rural coi g s cefee e s

Eye Contact:

mm yt I h y ivdhableutf trie gr t lns wt grtalr e te a ot sufna eotlfanta wi r nslis glf os e,a
ppu r y . n yelpe d odiy adlrsa nhGa a yi cinam isdlane r ideatinomic lcazisi i e
p b byt n nioil olissfd e ss

---

5. Fire Fighting Measures

Fire:

: u A tn pn tmurigofi o e ea 4E 6 0
b:mnF m hbra lyaiuvie imi a %s l o e
: l u l l 2 l 6 5

Explosion:

b mnfp .v rl mauluame aotn mpnacsl ia e coi fle a e s s

Fire Extinguishing Media:

U ny mmnb t ear usexi hhua usrsfng in ig U yosidgisby fte n katres a dr sa i e fcbio
p x n n r nouteoihnasn epad tb spf rioy irs-dely r omrsao s a a osf fe

Special Information:

n ht vnSIt r wpree eori aft feN ehn f no,icepp coi g rHvd On bn -o rdehteofi - as de iag
pp ur twuht p a apai ill fpnifhe ore r.eaidem rp hetr de esdno or oio e s eodsse

---

6. Accidental Release Measures

. Vn t tr pilkr apea ub Mfao ill ry pn esn r pcetpeta ad sswy rcedrnpbe ea a of a aoillf
pp ipV r pr St p na a ro .t apve ol mpoisce iqe n e an i ice idfsn incro vrGi a ad 8 e
. u pwhnb li iq dnuDe dnl etrussl f tbia wisr dlus coRpr ene ei sd ue o fill s ca sides
w h tw rtn r i w hatze lt.u dieh, ild ihydr dn ra iasue hl dleAio rcn, l rit fc s o z lt sa d
u tru n cja oriund sodrcs h tr nbrlct ot p in e ek nalc sads agnia neriar l a cosi a eo
p U u id Rtd a sg lAEaqlr rC (p fn iqen r i g illt vdlsrtena eoilo s s a sa ail ia,
. px rb S tu c neo t t fehsa tqeriln Tnr lrehsU feN u teo r f e tpC a G naR is ad l a eo
. n rt C 4 4 e 2 0 0 2 s -0 8 88

N kr B U T AE Ra eurT I 2BFCu® Mo-th Ct ® c ia r z c nhma pe a r e co s hd de o ifl oi
p u t od c

---

7. Handling and Storage

p nK th yt iee ing ant l r l cn o dne coi as sy o ind e t sb, o r d r ilt Pp ad e a, hy o cg ia a i l c as

[illegible]

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

[illegible]

Ventilation System:

[illegible]

Practices [illegible]

Personal Respirators (NIOSH Approved):

[illegible]

Skin Protection:

[illegible]

Eye Protection:

[illegible]

---

9. Physical and Chemical Properties

Appearance:

[illegible]

Odor:

[illegible]

Solubility:

[illegible]

Specific Gravity:

[illegible]

pH:

11 N) 6(

% Volatiles by volume @ 21C (70F):

. N n r m tu ri o o f ao o fd

Boiling Point:

c aF C)c6a(7)

Melting Point:

2 F 7)C (9 8

Vapor Density (Air=1):

N H 0 0 6 3

Vapor Pressure (mm Hg):

11 2 F)0C@ (6 8

Evaporation Rate (BuAc=1):

. N n r m tu ri o o f ao o fd

---

10. Stability and Reactivity

Stability:

b ut n. r r n ry l a n e d n o d a n o i d r to o f e s l o g s a e s

Hazardous Decomposition Products:

u r n p B m y u r i g m m n a n o d t c n e a i o x i a g o i o d, e s

Hazardous Polymerization:

W u t r i ll o o c c

Incompatibilities:

A r n i m d t a i o t e d , n l e l v, r p f e p a t r e y n, i e s s a c, e r o l m h t e i o e, d i v e o e a i, l e e

p v r. r n o n i l e t u b e p e s p a t r a l e o e t e a, i o M o n, a n o m e t o c o o s l e a s

Conditions to Avoid:

u . t H h p t b m e a l t g u i r s c o, i n a n, e o c i e g s i f, o s

---

11. Toxicological Information

: r m m m y r o a x i o d i o d e

:; r r t D d, m a k a b r 0 g 0 5 g t 5 r e r e i a D u a d z, a d 2 i s r, a n e v g 0 t 5 e i e n s t g n a d e, a s a g a s

: r m m o a i o a

: ; n h n r t i p p i a a o / m a h r C 4 0 v 0 0 5 t u i t - m i g e n u a d e a s t a n i g s e g a e ,

--------\Cancer Lists\----------

---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
Ammonium Hydroxide (1336-21-6)	No	No	None
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:

[illegible]

Environmental Toxicity:

[illegible]

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13. Disposal Considerations

[illegible]

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name:

Ingredient				
Ammonium Hydroxide (1336-21-6)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Ammonium Hydroxide (1336-21-6)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ammonium Hydroxide (1336-21-6)	No	No	No	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	261.33	-TSCA- 8(d)
Ammonium Hydroxide (1336-21-6)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: P2
Poison Schedule: 6
WHMIS:

h bM pD pn r r sa r ee sh a e co g r o h a d c t e a f e C llo de od c
S S u R n gnl R k a o) C M n D d . e h t r o i r m ll r a o i f s e y f h t a o i q e P d R e e C

---

16. Other Information

: NFPA Ratings: 3 h t H b m n F 1 y t l a R i t a i t
Label Hazard Warning:

S N. N ! P A S I ! D O O R E R R G A C O M O A B A E E A W T N I W L D E R A O H I O D E
S S N M A V A D T R A R U . O E R C V Y A N E A C R E F A O C O T T C

Label Precautions:

. n D n t y r o g h i r e n e h t n i s o l s c i g ,
. b n D r p h t v r o r o m t a e a o o i s
. p K n n r e e c o i a l e c o d e s
. U n y w h t u h e v n i t s n d a q e a c i l e i a o
. W h u t r h y r t h a n o m p l s a f e h d g

Label First Aid:

[illegible]

Product Use:

[illegible]

Revision Information:

[illegible]

Disclaimer:

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[illegible] Prepared by: [illegible]

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

AMMONIUM MOLYBDATE

1. Product Identification

Synonyms: 0 R O \ E G L F D F L G K H [D P P R Q L X P V D O W W H W U D K \ G U D W H D P P R Q
K H S W D P R O \ E G D W H W H W U D K \ G U D W H
CAS No.: $ Q K \ G U R X V 7 H W U D K \ G U D W H
Molecular Weight:
Chemical Formula: 1 + 0 R 2 + 2
Product Codes:
- 7 % D N H U
0 D O O L Q F N U R G W

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hexaammonium Molybdate	12027-67-7	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS KIDNEYS AND BLOOD.

SAF-T-DATA (tm) 5 D W L Q J V 3 U R Y L G H G K H U H I R U \ R X U F R Q Y H Q L H Q F H

+ H D O W K 5 D W L Q J 0 R G H U D W H / L I H
) O D P P D E L O L W \ 5 D W L Q J 1 R Q H
5 H D F W L Y L W \ 5 D W L Q J 6 O L J K W
& R Q W D F W 5 D W L Q J 0 R G H U D W H
/ D E 3 U R W H F W L Y H (T X L S * 2 * * / (6 / $ % & 2 $ 7 9 (1 7 + 2 2 ' 3 5 2 3 (5 * / 2 9 (6
6 W R U D J H & R O R U & R G H * U H H Q * H Q H U D O 6 W R U D J H

Potential Health Effects

Inhalation:
,UULWDQW IRU WKH XSSHU UHVSLUDWRU\ V\VWHP 3XQJHQW WDVWH
EH D URXWH RI DEVRUSWLRQ E\ WKH ERG\ ZLWK V\PSWRPV OLNH LQ
Ingestion:
,UULWDQW WR WKH GLJHVWLYH V\VWHP 6\PSWRPV RI VRUH WKURD\
DQHPLD JRXW KHDGDFKHV ZHLJKW ORVV MRLQW SDLQ DQG OLYH
Skin Contact:
&DXVHV LUULWDWLRQ WR VNLQ 6\PSWRPV LQFOXGH UHGQHVV LWF
Eye Contact:
&DXVHV LUULWDWLRQ UHGQHVV DQG SDLQ
Chronic Exposure:
3UROQJHG RU UHSHDWHG H[SRVXUH WR WKLV SURGXFW PD\ FDXVH
Aggravation of Pre-existing Conditions:
3HUVRQV ZLWK SUH H[LVWLQJ VNLQ GLVRUGHUV EORRG GLVRUGHU
UHVSLUDWRU\ IXQFWLRQ PD\ EH PRUH VXVFHSWLEOH WR WKH HIIHF

---

4. First Aid Measures

Inhalation:
5HPRYH WR IUHVK DLU ,I QRW EUHDWKLQJ JLYH DUWLILFLDO UHVS
PHGLFDO DWWHQWLRQ
Ingestion:
,QGXFH YRPLWLQJ LPPHGLDWHO\ DV GLUHFWHG E\ PHGLFDO SHUVRQ
XQFRQVFLRXV SHUVRQ *HW PHGLFDO DWWHQWLRQ
Skin Contact:
,PPHGLDWHO\ IOXVK VNLQ ZLWK SOHQW\ RI ZDWHU IRU DW OHDVW
*HW PHGLFDO DWWHQWLRQ :DVK FORWKLQJ EHIRUH UHXVH 7KRUX
Eye Contact:
,PPHGLDWHO\ IOXVK H\HV ZLWK SOHQW\ RI ZDWHU IRU DW OHDVW
RFFDVLRQDOO\ *HW PHGLFDO DWWHQWLRQ LPPHGLDWHO\

---

5. Fire Fighting Measures

Fire:
1RW FRQVLGHUHG WR EH D ILUH KD]DUG
Explosion:
1RW FRQVLGHUHG WR EH DQ H[SORVLRQ KD]DUG
Fire Extinguishing Media:
8VH DQ\ PHDQV VXLWDEOH IRU H[WLQJXLVKLQJ VXUURXQGLQJ ILUH
Special Information:
,Q WKH HYHQW RI D ILUH ZHDU IXOO SURWHFWLYH FORWKLQJ DQG
ZLWK IXOO IDFHSLHFH RSHUDWHG LQ WKH SUHVVXUH GHPDQG RU R
WR NHHS ILUH H[SRVHG FRQWDLQHUV FRRO

---

6. Accidental Release Measures

9HQWLODWH DUHD RI OHDN RU VSLOO :HDU DSSURSULDWH SHUVRQ
3LFN XS DQG SODFH LQ D VXLWDEOH FRQWDLQHU IRU UHFODPDWLR
GXVW

7. Handling and Storage

.HHS LQ D WLJKWO\ FORVHG FRQWDLQHU 3URWHFW IURP SK\VLFDO
IURP VRXUFHV RI KHDW PRLVWXUH DQG LQFRPSDWLELOLWLHV &RQ
HPSW\ VLQFH WKH\ UHWDLQ SURGXFW UHVLGXHV GXVW VROLGV P
SURGXFW

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
26+$ 3HUPLVVLEOH ([SRVXUH /LPLW 3(/
PJ P IRU VROXEOH PRO\EGHQXP FRPSRXQGV DV 0R
PJ P IRU LQVROXEOH PRO\EGHQXP FRPSRXQGV DV 0R

$&*,+ 7KUHVKROG /LPLW 9DOXH 7/9
0RO\EGHQXP PHWDO DQG LQVROXEOH FRPSRXQGV LQKDODEOH IUD
0RO\EGHQXP PHWDO DQG LQVROXEOH FRPSRXQGV UHVSLUDEOH IU
0RO\EGHQXP VROXEOH FRPSRXQGV UHVSLUDEOH IUDFWLRQ DV 0R
ZLWK XQNQRZQ UHOHYDQFH WR KXPDQV
Ventilation System:
$ V\VWHP RI ORFDO DQG RU JHQHUDO H[KDXVW LV UHFRPPHQGHG W
([SRVXUH /LPLWV /RFDO H[KDXVW YHQWLODWLRQ LV JHQHUDOO\ SU
FRQWDPLQDQW DW LWV VRXUFH SUHYHQWLQJ GLVSHUVLRQ RI LW L
GRFXPHQW Industrial Ventilation, A Manual of Recommended Practices HFHQW HGLWLRQ IR
Personal Respirators (NIOSH Approved):
,I WKH H[SRVXUH OLPLW LV H[FHHGHG DQG HQJLQHHULQJ FRQWURO
UHVSLUDWRU 1,26+ W\SH 1 RU EHWWHU ILOWHUV PD\ EH ZRUQ IR
PD[LPXP XVH FRQFHQWUDWLRQ VSHFLILHG E\ WKH DSSURSULDWH UI
ORZHVW $ IXOO IDFH SLHFH SDUWLFXODWH UHVSLUDWRU 1,26+ W
H[SRVXUH OLPLW RU WKH PD[LPXP XVH FRQFHQWUDWLRQ VSHFLLH
VXSSOLHU ZKLFKHYHU LV ORZHVW ,I RLO SDUWLFOHV H J OXEULF
1,26+ W\SH 5 RU 3 ILOWHU)RU HPHUJHQFLHV RU LQVWDQFHV ZKHU
IDFHSLHFH SRVLWLYH SUHVVXUH DLU VXSSOLHG UHVSLUDWRU :$5
ZRUNHUV LQ R[\JHQ GHILFLHQW DWPRVSKHUHV
Skin Protection:
:HDU LPSHUYLRXV SURWHFWLYH FORWKLQJ LQFOXGLQJ ERRWV JOF
SUHYHQW VNLQ FRQWDFW
Eye Protection:
8VH FKHPLFDO VDIHW\ JRJJOHV DQG RU IXOO IDFH VKLHOG ZKHUH G
0DLQWDLQ H\H ZDVK IRXQWDLQ DQG TXLFN GUHQFK IDFLOLWLHV LQ

9. Physical and Chemical Properties

Appearance:
:KLWH WR \HOORZ JUHHQ FU\VWDOV
Odor:
2GRUOHVV
Solubility:
J FF FROG ZDWHU
Density:

pH:

% Volatiles by volume @ 21C (70F):

Boiling Point:
&) 'HFRPSRVHV
Melting Point:
&) /RVHV ZDWHU # WKLV WHPSHUDWXUH
Vapor Density (Air=1):
1R LQIRUPDWLRQ IRXQG
Vapor Pressure (mm Hg):
1R LQIRUPDWLRQ IRXQG
Evaporation Rate (BuAc=1):
1R LQIRUPDWLRQ IRXQG

---

10. Stability and Reactivity

Stability:
6WDEOH XQGHU RUGLQDU\ FRQGLWLRQV RI XVH DQG VWRUDJH
Hazardous Decomposition Products:
%XUQLQJ PD\ SURGXFH DPPRQLD QLWURJHQ R[LGHV DQG PHWDO IX
Hazardous Polymerization:
:LOO QRW RFFXU
Incompatibilities:
$ONDOL PHWDOV
Conditions to Avoid:
,QFRPSDWLEOHV

---

11. Toxicological Information

$QK\GURXV 2UDO UDW /' PJ NJ ,QYHVWLJDWHG DV D PXWDJHQ

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hexaammonium Molybdate (12027-67-7)	No	No	None

---

12. Ecological Information

Environmental Fate:
1R LQIRUPDWLRQ IRXQG
Environmental Toxicity:
1R LQIRUPDWLRQ IRXQG

---

13. Disposal Considerations

:KDWHYHU FDQQRW EH VDYHG IRU UHFRYHU\ RU UHF\FOLQJ VKRXOG
GLVSRVDO IDFLOLW\ 3URFHVVLQJ XVH RU FRQWDPLQDWLRQ RI WKI
6WDWH DQG ORFDO GLVSRVDO UHJXODWLRQV PD\ GLIIHU IURP IHGH
XQXVHG FRQWHQWV LQ DFFRUGDQFH ZLWK IHGHUDO VWDWH DQG O

---

14. Transport Information

1RW UHJXODWHG

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\--------------------------------
Ingredient                                  TSCA  EC   Japan  Australia
---------------------------------------------- ----  ---  -----  ---------
Hexaammonium Molybdate (12027-67-7)             Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\--------------------------------
                                                  --Canada--
Ingredient                                  Korea  DSL   NDSL  Phil.
---------------------------------------------- -----  ---   ----  -----
Hexaammonium Molybdate (12027-67-7)             Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                       -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
---------------------------------------- ---   -----   ----  --------------
Hexaammonium Molybdate (12027-67-7)       No    No      No        No

--------\Federal, State & International Regulations - Part 2\----------------
                                                -RCRA-    -TSCA-
Ingredient                                CERCLA     261.33     8(d)
---------------------------------------- ------     ------    ------
Hexaammonium Molybdate (12027-67-7)       No         No         No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: 1RQH DOORFDWHG
Poison Schedule: 1RQH DOORFDWHG
WHMIS:
7KLV 06'6 KDV EHHQ SUHSDUHG DFFRUGLQJ WR WKH KD]DUG FULWH
DQG WKH 06'6 FRQWDLQV DOO RI WKH LQIRUPDWLRQ UHTXLUHG E\ W

---

16. Other Information

NFPA Ratings: +HD2)WK DPPDELOLW\ 0 5HDFWLYLW\ 0
Label Hazard Warning:
:$51,1* +$50)8/ ,) 6:$//2:(' 25 ,1+$/(' &$86(6 ,55,7$7,21 72 6.,1 (<(6
5(63,5$725< 75$&7 $))(&76 .,'1(<6 $1' %/22'
Label Precautions:
$YRLG FRQWDFW ZLWK H\HV VNLQ DQG FORWKLQJ
$YRLG EUHDWKLQJ GXVW
.HHS FRQWDLQHU FORVHG
8VH RQO\ ZLWK DGHTXDWH YHQWLODWLRQ
:DVK WKRURXJKO\ DIWHU KDQGOLQJ
Label First Aid:
,I VZDOORZHG LQGXFH YRPLWLQJ LPPHGLDWHO\ DV GLUHFWHG E\ P
DQ XQFRQVFLRXV SHUVRQ ,Q FDVH RI FRQWDFW LPPHGLDWHO\ IOX
PLQXWHV 5HPRYH FRQWDPLQDWHG FORWKLQJ DQG VKRHV :DVK FO
,I QRW EUHDWKLQJ JLYH DUWLILFLDO UHVSLUDWLRQ ,I EUHDWKLQ
DWWHQWLRQ
Product Use:
/DERUDWRU\ 5HDJHQW
Revision Information:
06'6 6HFWLRQ V FKDQJHG VLQFH ODVW UHYLVLRQ RI GRFXPHQW LQ
Disclaimer:

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Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: (Q Y L U R Q P H Q W D O + H D O W K 6 D I H W \
3 K R Q H 1 X P E H U 8 6 $

Material Safety Data Sheet

Ammonium nitrate, reagent ACS, crystals

ACC# 02020

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium nitrate, reagent ACS, crystals
Catalog Numbers: AC423350000, AC423350010, AC423350250
Synonyms: Nitric acid; ammonium salt.
Company Identification:
Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410
For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
6484-52-2	Ammonium nitrate	> 98.0	229-347-8

Hazard Symbols: XI O
Risk Phrases: 36/37/38 8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless crystals. Irritant. Strong oxidizer. Contact with other material may cause a fire. Causes eye and skin irritation. Hygroscopic (absorbs moisture from the air). May cause methemoglobinemia. May cause severe respiratory and digestive tract irritation with possible burns.

Danger!

Target Organs: Gastrointestinal system, red blood cells.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood. May cause nausea and vomiting. May cause low blood pressure, rapid heartbeat, skin discoloration, and possible coma.
Inhalation: May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, tachycardia, dyspnea (labored breathing), and death. May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown blood. Inhalation can cause systemic acidosis and methemoglobinemia.
Chronic: May cause methemoglobinemia, which is characterized by chocolate-brown colored blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heart rate, unconsciousness and possible death. May cause digestive tract disturbances.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use flooding quantities of water as spray.
Flash Point: Not available.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 0; Flammability: 0; Instability: 3; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage: Keep away from sources of ignition. Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids. Keep away from reducing agents. Do not store near alkaline substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium nitrate	none listed	none listed	none listed

OSHA Vacated PELs: Ammonium nitrate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Appearance: colorless
Odor: odorless
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: 2.8
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: 169 deg C
Decomposition Temperature: 210 deg C
Solubility: 190 G/100ML (20°C)
Specific Gravity/Density: 1.7300g/cm3
Molecular Formula: $H_4N_2O_3$
Molecular Weight: 80.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat, combustible materials.
Incompatibilities with Other Materials: Strong reducing agents; strong acids; finely powdered metals; acetic acid; ammonium chloride; phosphorus; sodium perchlorate; sulfur.
Hazardous Decomposition Products: Nitrogen oxides, ammonia and/or derivatives.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 6484-52-2: BR9050000
LD50/LC50:
CAS# 6484-52-2:
Oral, rat: LD50 = 2217 mg/kg;

Carcinogenicity:
CAS# 6484-52-2: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Neurotoxicity: No data available.
Mutagenicity: No data available.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: No data available. Water danger/protection: WGK 1
Environmental: Degradation studies: LC50 40 hr Aspergillus niger 15 mg/l (36°C)Ammonium nitrate will be taken up by bacteria. Nitrate is more persistent in water than the ammonium ion. Nitrate degradation is fastest in anaerobic conditions. [Tech. Info. for Problem Spills: Ammonium Nitrate (Draft) 1981,57, Environment Canada]
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	AMMONIUM NITRATE				No information available.
Hazard Class:	5.1				
UN Number:	UN1942				
Packing Group:	III				

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 6484-52-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.

SARA Codes
CAS # 6484-52-2: acute, flammable, reactive.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 6484-52-2 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XI O
Risk Phrases:
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 8 Contact with combustible material may cause fire.

Safety Phrases:
S 17 Keep away from combustible material.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)
CAS# 6484-52-2: 1
Canada - DSL/NDSL
CAS# 6484-52-2 is listed on Canada's DSL List.
Canada - WHMIS
This product does not have a WHMIS classification.
Canadian Ingredient Disclosure List
Exposure Limits

Section 16 - Additional Information

MSDS Creation Date: 12/29/1997
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

AMMONIUM OXALATE

1. Product Identification

Synonyms: (W K D Q H G L R L F D F L G G L D P P R Q L X P V D O W P R Q R K \ G U D W H $ P P
CAS No.: $ Q K \ G U R X V P R Q R K \ G U D W H
Molecular Weight:
Chemical Formula: 1 + 2 & 2 & 2 2 1 + + 2
Product Codes:
- 7 % D N H U
0 D O O L Q F N U R G W

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ammonium Oxalate	1113-38-8	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. MAY CAUSE BURNS TO RESPIRATORY TRACT AND SEVERE IRRITATION TO SKIN AND EYES. MAY AFFECT KIDNEYS.

SAF-T-DATA (tm) 5 D W L Q J V 3 U R Y L G H G K H U H I R U \ R X U F R Q Y H Q L H Q F H

+ H D O W K 5 D W L Q J 6 H Y H U H 3 R L V R Q
) O D P P D E L O L W \ 5 D W L Q J 1 R Q H
5 H D F W L Y L W \ 5 D W L Q J 6 O L J K W
& R Q W D F W 5 D W L Q J 6 H Y H U H & R U U R V L Y H
/ D E 3 U R W H F W L Y H (T X L S * 2 * * / (6 6 + , (/ ' / $ % & 2 $ 7 $ 3 5 2 1 9 (1 7 + 2 2 '
6 W R U D J H & R O R U & R G H : K L W H & R U U R V L Y H

Potential Health Effects

$PPRQLXP R[DODWH LV YHU\ SRLVRQRXV E\ LQJHVWLRQ DQG LQKDO

Inhalation:
,QKDODWLRQ RI GXVW LV FRUURVLYH WR PXFRXV PHPEUDQHV 2[DO
RI SRLVRQLQJ LQFOXGH QHUYRXVQHVV FUDPSV FHQWUDO QHUYRX
Ingestion:
0HDQ OHWKDO GRVH IRU R[DODWHV LQ DGXOWV LV HVWLPDWHG DW
PLQXWHV &RUURVLYH DFWLRQ RQ WKH PXFRVD DQG VHYHUH JDVWU
UHGXFWLRQ RI VHUXP FDOFLXP FDQ FDXVH GLVIXQFWLRQ RI WKH E
NLGQH\V
Skin Contact:
6NLQ FRQWDFW PD\ SURGXFH VHYHUH VNLQ LUULWDWLRQ ZLWK EXU
Eye Contact:
0D\ FDXVH VHYHUH LUULWDWLRQ DQG SDLQ 0D\ FDXVH EXUQV
Chronic Exposure:
&LUFXODWRU\ IDLOXUH RU QHUYRXV V\VWHP LUUHJXODULWLHV PD\
WR R[DODWLRQ
Aggravation of Pre-existing Conditions:
3HUVRQV ZLWK SUH H[LVWLQJ VNLQ GLVRUGHUV RU H\H SUREOHPV
EH PRUH VXVFHSWLEOH WR WKH HIIHFWV RI WKH VXEVWDQFH

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4. First Aid Measures

Inhalation:
5HPRYH WR IUHVK DLU ,I QRW EUHDWKLQJ JLYH DUWLILFLDO UHVS
PHGLFDO DWWHQWLRQ LPPHGLDWHO\
Ingestion:
,I VZDOORZHG '2 127 ,1'8&(920,7,1* *LYH ODUJH TXDQWLWLHV RI Z
WR DQ XQFRQVFLRXV SHUVRQ *HW PHGLFDO DWWHQWLRQ LPPHGLD
Skin Contact:
:LSH RII H[FHVV PDWHULDO IURP VNLQ WKHQ LPPHGLDWHO\ IOXVK V
5HPRYH FRQWDPLQDWHG FORWKLQJ DQG VKRHV *HW PHGLFDO DWW
FOHDQ VKRHV EHIRUH UHXVH
Eye Contact:
,PPHGLDWHO\ IOXVK H\HV ZLWK SOHQW\ RI ZDWHU IRU DW OHDVW
RFFDVLRQDOO\ *HW PHGLFDO DWWHQWLRQ LPPHGLDWHO\

Note to Physician:
&DUHIXOO\ PRQLWRU FDUGLRYDVFXODU UHVSLUDWRU\ QHXURORJL
FRQVXOWDWLRQ ZLWK D PHGLFDO WR[LFRORJLVW

---

5. Fire Fighting Measures

Fire:
1RW FRQVLGHUHG WR EH D ILUH KD]DUG
Explosion:
1RW FRQVLGHUHG WR EH DQ H[SORVLRQ KD]DUG
Fire Extinguishing Media:
8VH DQ\ PHDQV VXLWDEOH IRU H[WLQJXLVKLQJ VXUURXQGLQJ ILUH
Special Information:
,Q WKH HYHQW RI D ILUH ZHDU IXOO SURWHFWLYH FORWKLQJ DQG
ZLWK IXOO IDFHSLHFH RSHUDWHG LQ WKH SUHVVXUH GHPDQG RU R

---

6. Accidental Release Measures

9HQWLODWH DUHD RI OHDN RU VSLOO :HDU DSSURSULDWH SHUVRQ
6ZHHS XS DQG FRQWDLQHUL]H IRU UHFODPDWLRQ RU GLVSRVDO 9D
GLVSHUVDO 86 5HJXODWLRQV &(5&/$ UHTXLUH UHSRUWLQJ VSLOO
UHSRUWDEOH TXDQWLWLHV 7KH WROO IUHH QXPEHU IRU WKH 86 &R

---

7. Handling and Storage

.HHS LQ D WLJKWO\ FORVHG FRQWDLQHU VWRUHG LQ D FRRO GU\
,VRODWH IURP LQFRPSDWLEOH VXEVWDQFHV &RQWDLQHUV RI WKLV
UHWDLQ SURGXFW UHVLGXHV GXVW VROLGV REVHUYH DOO ZDUQ
3UDFWLFH JRRG SHUVRQDO K\JLHQH DQG ZDVK WKRURXJKO\ DIWHU
WR Q W HD• xULQï RU hP!ïH LQ WKH «RUï OAFH

Boiling Point:
1RW DSSOLFDEOH
Melting Point:
&)
Vapor Density (Air=1):
1R LQIRUPDWLRQ IRXQG
Vapor Pressure (mm Hg):
1R LQIRUPDWLRQ IRXQG
Evaporation Rate (BuAc=1):
1R LQIRUPDWLRQ IRXQG

---

10. Stability and Reactivity

Stability:
6WDEOH XQGHU RUGLQDU\ FRQGLWLRQV RI XVH DQG VWRUDJH
Hazardous Decomposition Products:
%XUQLQJ PD\ SURGXFH DPPRQLD QLWURJHQ R[LGHV
Hazardous Polymerization:
:LOO QRW RFFXU
Incompatibilities:
6RGLXP K\SRFKORULWH SOXV DPPRQLXP DFHWDWH VWURQJ DFLGV
Conditions to Avoid:
+HDW LQFRPSDWLEOHV

---

11. Toxicological Information

1R /' /& LQIRUPDWLRQ IRXQG UHODWLQJ WR QRUPDO URXWHV RI

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ammonium Oxalate (1113-38-8)	No	No	None

---

12. Ecological Information

Environmental Fate:
1R LQIRUPDWLRQ IRXQG
Environmental Toxicity:
1R LQIRUPDWLRQ IRXQG

---

13. Disposal Considerations

:KDWHYHU FDQQRW EH VDYHG IRU UHFRYHU\ RU UHF\FOLQJ VKRXOG
IDFLOLW\ $OWKRXJK QRW D OLVWHG 5&5$ KD]DUGRXV ZDVWH WKL\
D KD]DUGRXV ZDVWH DQG UHTXLUH DSSURSULDWH DQDO\VLV WR GH
XVH RU FRQWDPLQDWLRQ RI WKLV SURGXFW PD\ FKDQJH WKH ZDVW
UHJXODWLRQV PD\ GLIIHU IURP IHGHUDO GLVSRVDO UHJXODWLRQV
DFFRUGDQFH ZLWK IHGHUDO VWDWH DQG ORFDO UHTXLUHPHQWV

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: &25526,9(62/,' 1 2 6 $0021,80 2;$/$7(
Hazard Class:
UN/NA: 81
3DFNLQJ *URXS ,,,
Information reported for product/size: /%

International (Water, I.M.O.)

Proper Shipping Name: &25526,9(62/,' 1 2 6 $0021,80 2;$/$7(
Hazard Class:
UN/NA: 81
3DFNLQJ *URXS ,,,
Information reported for product/size: /%

International (Air, I.C.A.O.)

Proper Shipping Name: &25526,9(62/,' 1 2 6 $0021,80 2;$/$7(
Hazard Class:
UN/NA: 81
3DFNLQJ *URXS ,,,
Information reported for product/size: /%

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ammonium Oxalate (1113-38-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	--Canada-- Korea	DSL	NDSL	Phil.
Ammonium Oxalate (1113-38-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ammonium Oxalate (1113-38-8)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	-TSCA- 261.33	8(d)
Ammonium Oxalate (1113-38-8)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Solid)

Australian Hazchem Code: 1RQH DOORFDWHG
Poison Schedule: 1RQH DOORFDWHG
WHMIS:
7KLV 06'6 KDV EHHQ SUHSDUHG DFFRUGLQJ WR WKH KD]DUG FULWH
DQG WKH 06'6 FRQWDLQV DOO RI WKH LQIRUPDWLRQ UHTXLUHG E\ W

---

16. Other Information

NFPA Ratings: +HD4)WOKDPPDELOLW\ 1 5HDFWLYLW\ 0
Label Hazard Warning:
32,621 '$1*(5 0$< %( )7/ ,) 6:$//2:(' 25 ,1+$/(' 0$< &$86(%8516 7

5(63,5$725< 75$&7 $1' 6(9(5(,55,7$7,21 72 6.,1 $1' (<(6 0$< $))(

Label Precautions:

'R QRW JHW LQ H\HV RQ VNLQ RU RQ FORWKLQJ

'R QRW EUHDWKH GXVW

.HHS FRQWDLQHU FORVHG

8VH RQO\ ZLWK DGHTXDWH YHQWLODWLRQ

:DVK WKRURXJKO\ DIWHU KDQGOLQJ

Label First Aid:

,I VZDOORZHG '2 127 ,1'8&(920,7,1* *LYH ODUJH TXDQWLWLHV RI Z

WR DQ XQFRQVFLRXV SHUVRQ ,I LQKDOHG UHPRYH WR IUHVK DLU

EUHDWKLQJ LV GLIILFXOW JLYH R[\JHQ ,Q FDVH RI FRQWDFW LPPI

DW OHDVW PLQXWHV ZKLOH UHPRYLQJ FRQWDPLQDWHG FORWKLQ

JHW PHGLFDO DWWHQWLRQ LPPHGLDWHO\

Product Use:

/DERUDWRU\ 5HDJHQW

Revision Information:

1R &KDQJHV

Disclaimer:

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Prepared by: (QYLURQPHQWDO +HDOWK 6DIHW\

3KRQH 1XPEHU 8 6 $

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ANTIMONY POTASSIUM TARTRATE

1. Product Identification

Synonyms: 'L K \ G U R [\ E X W D Q H G L R L F D F L G D Q W L P R Q \ S R W D V V L X P V D O \
S R W D V V L X P V D O W $ Q W L P R Q \ O S R W D V V L X P W D U W U D W H W U L K \ G U D V
CAS No.: $ Q K \ G U R X V 7 U L K \ G U D W H
Molecular Weight:
Chemical Formula: & + . 2 6 E + 2
Product Codes:
- 7 % D N H U
0 D O O L Q F N U R G W

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Antimony Potassium Tartrate	11071-15-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE CARDIOVASCULAR SYSTEM.

SAF-T-DATA (tm) 5 D W L Q J V 3 U R Y L G H G K H U H I R U \ R X U F R Q Y H Q L H Q F H

+ H D O W K 5 D W L Q J 6 H Y H U H 3 R L V R Q
) O D P P D E L O L W \ 5 D W L Q J 6 O L J K W
5 H D F W L Y L W \ 5 D W L Q J 6 O L J K W
& R Q W D F W 5 D W L Q J 0 R G H U D W H
/ D E 3 U R W H F W L Y H (T X L S * 2 * * / (6 / $ % & 2 $ 7 9 (1 7 + 2 2 ' 3 5 2 3 (5 * / 2 9 (6
6 W R U D J H & R O R U & R G H % O X H + H D O W K

Potential Health Effects

Inhalation:
0D\ FDXVH LUULWDWLRQ WR WKH UHVSLUDWRU\ WUDFW V\PSWRPV
Ingestion:
7R[LF 0D\ FDXVH VDOLYDWLRQ FRXJK PHWDOOLF WDVWH QDXVHD
DQG PXVFXODU SDLQV 0D\ FDXVH KHDUW WR EHDW LUUHJXODUO\ R
Skin Contact:
0D\ FDXVH LUULWDWLRQ ZLWK UHGQHVV DQG SDLQ
Eye Contact:
0D\ FDXVH LUULWDWLRQ UHGQHVV DQG SDLQ
Chronic Exposure:
3UORQJHG RU UHSHDWHG VNLQ H[SRVXUH PD\ FDXVH GHUPDWLWLV
FDXVH EORRG OLYHU DQG &16 HIIHFWV KHDUW PXVFOH GDPDJH O
Aggravation of Pre-existing Conditions:
3HUVRQV ZLWK SUH H[LVWLQJ VNLQ GLVRUGHUV LPSDLUHG UHVSLU
PRUH VXVFHSWLEOH WR WKH HIIHFWV RI WKH VXEVWDQFH

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4. First Aid Measures

Inhalation:
5HPRYH WR IUHVK DLU ,I QRW EUHDWKLQJ JLYH DUWLILFLDO UHVS
SK\VLFLDQ
Ingestion:
,QGXFH YRPLWLQJ LPPHGLDWHO\ DV GLUHFWHG E\ PHGLFDO SHUVRQ
XQFRQVFLRXV SHUVRQ
Skin Contact:
,Q FDVH RI FRQWDFW LPPHGLDWHO\ IOXVK VNLQ ZLWK SOHQW\ RI Z
FRQWDPLQDWHG FORWKLQJ DQG VKRHV :DVK FORWKLQJ EHIRUH UH
Eye Contact:
,PPHGLDWHO\ IOXVK H\HV ZLWK SOHQW\ RI ZDWHU IRU DW OHDVW
RFFDVLRQDOO\ *HW PHGLFDO DWWHQWLRQ

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5. Fire Fighting Measures

Fire:
1RW FRQVLGHUHG WR EH D ILUH KD]DUG
Explosion:
1RW FRQVLGHUHG WR EH DQ H[SORVLRQ KD]DUG
Fire Extinguishing Media:
8VH DQ\ PHDQV VXLWDEOH IRU H[WLQJXLVKLQJ VXUURXQGLQJ ILUH
Special Information:
,Q WKH HYHQW RI D ILUH ZHDU IXOO SURWHFWLYH FORWKLQJ DQG
ZLWK IXOO IDFHSLHFH RSHUDWHG LQ WKH SUHVVXUH GHPDQG RU R

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6. Accidental Release Measures

9HQWLODWH DUHD RI OHDN RU VSLOO :HDU DSSURSULDWH SHUVRQ
3LFN XS DQG SODFH LQ D VXLWDEOH FRQWDLQHU IRU UHFODPDWLR
GXVW

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7. Handling and Storage

.HHS LQ D WLJKWO\ FORVHG FRQWDLQHU VWRUHG LQ D FRRO GU\
,VRODWH IURP LQFRPSDWLEOH VXEVWDQFHV &RQWDLQHUV RI WKLV
UHWDLQ SURGXFW UHVLGXHV GXVW VROLGV REVHUYH DOO ZDUQ

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
26+$ 3HUPLVVLEOH ([SRVXUH /LPLW 3(/
PJ 6E P 7:$
$&*,+ 7KUHVKROG /LPLW 9DOXH 7/9
PJ 6E P 7:$

Ventilation System:
$ V\VWHP RI ORFDO DQG RU JHQHUDO H[KDXVW LV UHFRPPHQGHG W
([SRVXUH /LPLWV /RFDO H[KDXVW YHQWLODWLRQ LV JHQHUDOO\ SU
FRQWDPLQDQW DW LWV VRXUFH SUHYHQWLQJ GLVSHUVLRQ RI LW L
GRFXPHQW Industrial Ventilation, A Manual of Recommended Practices HFHQW HGLWLRQ IR
Personal Respirators (NIOSH Approved):
,I WKH H[SRVXUH OLPLW LV H[FHHGHG DQG HQJLQHHULQJ FRQWURO
UHVSLUDWRU 1,26+ W\SH 1 ILOWHUV PD\ EH ZRUQ IRU XS WR
FRQFHQWUDWLRQ VSHFLILHG E\ WKH DSSURSULDWH UHJXODWRU\ DJ
SDUWLFOHV H J OXEULFDQWV FXWWLQJ IOXLGV JO\FHULQH HWF
HPHUJHQFLHV RU LQVWDQFHV ZKHUH WKH H[SRVXUH OHYHOV DUH Q
VXSSOLHG UHVSLUDWRU :$51,1* $LU SXULI\LQJ UHVSLUDWRUV GR
DWPRVSKHUHV
Skin Protection:
:HDU LPSHUYLRXV SURWHFWLYH FORWKLQJ LQFOXGLQJ ERRWV JOR
SUHYHQW VNLQ FRQWDFW
Eye Protection:
8VH FKHPLFDO VDIHW\ JRJJOHV 0DLQWDLQ H\H ZDVK IRXQWDLQ DQ

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9. Physical and Chemical Properties

Appearance:
7UDQVSDUHQW FU\VWDOV RU ZKLWH SRZGHU
Odor:
2GRUOHVV
Solubility:
J PO ZDWHU # &)
Specific Gravity:

pH:
6OLJKWO\ DFLGLF DTXHRXV VROXWLRQ
% Volatiles by volume @ 21C (70F):

Boiling Point:
1R LQIRUPDWLRQ IRXQG
Melting Point:
FD & FD) /RVHV ZDWHU
Vapor Density (Air=1):
1R LQIRUPDWLRQ IRXQG
Vapor Pressure (mm Hg):
1R LQIRUPDWLRQ IRXQG

Evaporation Rate (BuAc=1):
1R LQIRUPDWLRQ IRXQG

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10. Stability and Reactivity

Stability:
6WDEOH XQGHU RUGLQDU\ FRQGLWLRQV RI XVH DQG VWRUDJH
Hazardous Decomposition Products:
1R LQIRUPDWLRQ IRXQG
Hazardous Polymerization:
:LOO QRW RFFXU
Incompatibilities:
$ONDOL PHWDOV DQG WKHLU FDUERQDWHV 3HUFKORULF $FLG DQG
Conditions to Avoid:
,QFRPSDWLEOHV

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11. Toxicological Information

)RU &+26E. 2UDO UDW /' PJ NJ ,QYHVWLJDWHG DV D WXPRU

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Antimony Potassium Tartrate (11071-15-1)	No	No	None

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12. Ecological Information

Environmental Fate:
1R LQIRUPDWLRQ IRXQG
Environmental Toxicity:
1R LQIRUPDWLRQ IRXQG

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13. Disposal Considerations

:KDWHYHU FDQQRW EH VDYHG IRU UHFRYHU\ RU UHF\FOLQJ VKRXOG
IDFLOLW\ $OWKRXJK QRW D OLVWHG 5&5$ KD]DUGRXV ZDVWH WKL\
D KD]DUGRXV ZDVWH DQG UHTXLUH DSSURSULDWH DQDO\VLV WR GH
XVH RU FRQWDPLQDWLRQ RI WKLV SURGXFW PD\ FKDQJH WKH ZDVW
UHJXODWLRQV PD\ GLIIHU IURP IHGHUDO GLVSRVDO UHJXODWLRQV
DFFRUGDQFH ZLWK IHGHUDO VWDWH DQG ORFDO UHTXLUHPHQWV

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: $17,021< 327$66,80 7$575$7(
Hazard Class:
UN/NA: 81
3DFNLQJ *URXS ,,,
Information reported for product/size: .*

International (Water, I.M.O.)

Proper Shipping Name: $ 1 7 , 0 2 1 < 3 2 7 $ 6 6 , 8 0 7 $ 5 7 5 $ 7 (
Hazard Class:
UN/NA: 8 1
3 D F N L Q J * U R X S , , ,
Information reported for product/size: . *

International (Air, I.C.A.O.)

Proper Shipping Name: $ 1 7 , 0 2 1 < 3 2 7 $ 6 6 , 8 0 7 $ 5 7 5 $ 7 (
Hazard Class:
UN/NA: 8 1
3 D F N L Q J * U R X S , , ,
Information reported for product/size: . *

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Antimony Potassium Tartrate (11071-15-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	--Canada-- Korea	DSL	NDSL	Phil.
Antimony Potassium Tartrate (11071-15-1)	No	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Antimony Potassium Tartrate (11071-15-1)	No	No	No	Antimony com

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	261.33	-TSCA- 8(d)
Antimony Potassium Tartrate (11071-15-1)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: ;
Poison Schedule: 1 R Q H D O O R F D W H G
WHMIS:
7 K L V 0 6 ' 6 K D V E H H Q S U H S D U H G D F F R U G L Q J W R W K H K D] D U G F U L W H
D Q G W K H 0 6 ' 6 F R Q W D L Q V D O O R I W K H L Q I R U P D W L R Q U H T X L U H G E \ W

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16. Other Information

NFPA Ratings: + H D 2 D W K D P P D E L O L W \ 0 5 H D F W L Y L W \ 0
Label Hazard Warning:
: $ 5 1 , 1 * + $ 5 0) 8 / ,) 6 : $ / / 2 : (' 2 5 , 1 + $ / (' & $ 8 6 (6 , 5 5 , 7 $ 7 , 2 1 7 2 6 . , 1 (< (6
5 (6 3 , 5 $ 7 2 5 < 7 5 $ & 7 $)) (& 7 6 7 + (& $ 5 ' , 2 9 $ 6 & 8 / $ 5 6 < 6 7 (0
Label Precautions:
$ Y R L G E U H D W K L Q J G X V W
$ Y R L G F R Q W D F W Z L W K H \ H V V N L Q D Q G F O R W K L Q J
. H H S F R Q W D L Q H U F O R V H G
8 V H R Q O \ Z L W K D G H T X D W H Y H Q W L O D W L R Q

:DVK WKRURXJKO\ DIWHU KDQGOLQJ

Label First Aid:

,I VZDOORZHG LQGXFH YRPLWLQJ LPPHGLDWHO\ DV GLUHFWHG E\ P
DQ XQFRQVFLRXV SHUVRQ ,I LQKDOHG UHPRYH WR IUHVK DLU ,I Q
LV GLIILFXOW JLYH R[\JHQ ,Q FDVH RI FRQWDFW LPPHGLDWHO\ IO
PLQXWHV 5HPRYH FRQWDPLQDWHG FORWKLQJ DQG VKRHV :DVK FO

Product Use:

/DERUDWRU\ 5HDJHQW

Revision Information:

1R &KDQJHV

Disclaimer:

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Prepared by: (QYLURQPHQWDO +HDOWK 6DIHW\
3KRQH 1XPEHU 8 6 $

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

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BARIUM CHLORIDE DIHYDRATE

1. Product Identification

Synonyms: % D U L X P F K O R U L G H
CAS No.: $ Q K \ G U R X V ' L K \ G U D W H
Molecular Weight:
Chemical Formula: % D & O + 2
Product Codes:
- 7 % D N H U
0 D O O L Q F N U R G W

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Barium Chloride	10361-37-2	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS HEART, RESPIRATORY SYSTEM, AND CENTRAL NERVOUS SYSTEM.

SAF-T-DATA (tm) 5 D W L Q J V 3 U R Y L G H G K H U H I R U \ R X U F R Q Y H Q L H Q F H

+ H D O W K 5 D W L Q J 6 H Y H U H 3 R L V R Q
) O D P P D E L O L W \ 5 D W L Q J 1 R Q H
5 H D F W L Y L W \ 5 D W L Q J 6 O L J K W
& R Q W D F W 5 D W L Q J 0 R G H U D W H
/ D E 3 U R W H F W L Y H (T X L S * 2 * * / (6 / $ % & 2 $ 7 9 (1 7 + 2 2 ' 3 5 2 3 (5 * / 2 9 (6
6 W R U D J H & R O R U & R G H % O X H + H D O W K

Potential Health Effects

Inhalation:
,UULWDWHV WKH UHVSLUDWRU\ WUDFW 0D\ SURGXFH VRUH WKURDW
SDUDOOHO LQJHVWLRQ
Ingestion:
7R[LF 0D\ FDXVH VHYHUH JDVWURHQWHULWLV LQFOXGLQJ DEGRPL
IDLQWQHVV SDUDO\VLV RI DUPV DQG OHJV DQG VORZ RU LUUHJXO
GHDWK RQ UHVSLUDWRU\ IDLOXUH (VWLPDWHG OHWKDO GRVH LQ K
Skin Contact:
0D\ FDXVH LUULWDWLRQ ZLWK UHGQHVV DQG SDLQ
Eye Contact:
0D\ FDXVH LUULWDWLRQ UHGQHVV SDLQ RU EOXUUHG YLVLRQ
Chronic Exposure:
1R LQIRUPDWLRQ IRXQG
Aggravation of Pre-existing Conditions:
3HUVRQV ZLWK SUH H[LVWLQJ VNLQ GLVRUGHUV RU LPSDLUHG UHVS
HIIHFWV RI WKH VXEVWDQFH

4. First Aid Measures

Inhalation:
5HPRYH WR IUHVK DLU ,I QRW EUHDWKLQJ JLYH DUWLILFLDO UHVS
SK\VLFLDQ
Ingestion:
*HW PHGLFDO DWWHQWLRQ LPPHGLDWHO\ ,QGXFH YRPLWLQJ LPPHG
DQ\WKLQJ E\ PRXWK WR DQ XQFRQVFLRXV SHUVRQ $IWHU YRPLWLQ
PDJQHVLXP VXOIDWH (SVRP VDOWV GLVVROYHG LQ R] RI ZDWHU
DV WKH QRQWR[LF DQG LQVROXEOH EDULXP VXOIDWH
Skin Contact:
5HPRYH DQ\ FRQWDPLQDWHG FORWKLQJ :DVK VNLQ ZLWK VRDS DQG
DWWHQWLRQ LI LUULWDWLRQ GHYHORSV RU SHUVLVWV
Eye Contact:
,PPHGLDWHO\ IOXVK H\HV ZLWK SOHQW\ RI ZDWHU IRU DW OHDVW
RFFDVLRQDOO\ *HW PHGLFDO DWWHQWLRQ LI LUULWDWLRQ SHUVLV

Note to Physician:
0RQLWRU SDWLHQWV ZLWK VLJQLILFDQW LQJHVWLRQ IRU UHVSLUDW
FDUGLDF DUUK\WKPLDV UHVSLUDWRU\ IDLOXUH GXH WR IODFFLG S
YRFDO FRUG SDUDO\VLV VHYHUH K\SHUWHQVLRQ DQG ODWH HIIHF
K\SRNDOHPLD 7KH DGPLQLVWUDWLRQ RI IOXLGV FRQWDLQLQJ GLOX
LQGLFDWHG

5. Fire Fighting Measures

Fire:
1RW FRQVLGHUHG WR EH D ILUH KD]DUG
Explosion:
1RW FRQVLGHUHG WR EH DQ H[SORVLRQ KD]DUG
Fire Extinguishing Media:
8VH DQ\ PHDQV VXLWDEOH IRU H[WLQJXLVKLQJ VXUURXQGLQJ ILUH
Special Information:
,Q WKH HYHQW RI D ILUH ZHDU IXOO SURWHFWLYH FORWKLQJ DQG
ZLWK IXOO IDFHSLHFH RSHUDWHG LQ WKH SUHVVXUH GHPDQG RU R

6. Accidental Release Measures

9HQWLODWH DUHD RI OHDN RU VSLOO :HDU DSSURSULDWH SHUVRQ
6ZHHS XS DQG FRQWDLQHUL]H IRU UHFODPDWLRQ RU GLVSRVDO 9D
GLVSHUVDO

---

7. Handling and Storage

.HHS LQ D WLJKWO\ FORVHG FRQWDLQHU 3URWHFW IURP SK\VLFDO
IURP VRXUFHV RI KHDW PRLVWXUH DQG LQFRPSDWLELOLWLHV &RQ
HPSW\ VLQFH WKH\ UHWDLQ SURGXFW UHVLGXHV GXVW VROLGV F
SURGXFW

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
)RU 6ROXEOH %DULXP &RPSRXQGV
26+$ 3HUPLVVLEOH ([SRVXUH /LPLW 3(/
PJ %D P
$&*,+ 7KUHVKROG /LPLW 9DOXH 7/9
PJ %D P $ QRW FODVVLILDEOH DV D KXPDQ FDUFLQRJHQ
Ventilation System:
$ V\VWHP RI ORFDO DQG RU JHQHUDO H[KDXVW LV UHFRPPHQGHG W
([SRVXUH /LPLWV /RFDO H[KDXVW YHQWLODWLRQ LV JHQHUDOO\ SU
FRQWDPLQDQW DW LWV VRXUFH SUHYHQWLQJ GLVSHUVLRQ RI LW L
GRFXPHQW Industrial Ventilation, A Manual of Recommended Practices PRVW UHFHQW HGLWLRQ IR
Personal Respirators (NIOSH Approved):
,I WKH H[SRVXUH OLPLW LV H[FHHGHG DQG HQJLQHHULQJ FRQWURO
UHVSLUDWRU 1,26+ W\SH 1 RU EHWWHU ILOWHUV PD\ EH ZRUQ IR
PD[LPXP XVH FRQFHQWUDWLRQ VSHFLILHG E\ WKH DSSURSULDWH UI
ORZHVW $ IXOO IDFH SLHFH SDUWLFXODWH UHVSLUDWRU 1,26+ W
H[SRVXUH OLPLW RU WKH PD[LPXP XVH FRQFHQWUDWLRQ VSHFLILH
VXSSOLHU ZKLFKHYHU LV ORZHVW ,I RLO SDUWLFOHV H J OXEULF
1,26+ W\SH 5 RU 3 ILOWHU)RU HPHUJHQFLHV RU LQVWDQFHV ZKHU
IDFHSLHFH SRVLWLYH SUHVVXUH DLU VXSSOLHG UHVSLUDWRU :$5
ZRUNHUV LQ R[\JHQ GHILFLHQW DWPRVSKHUHV
Skin Protection:
:HDU LPSHUYLRXV SURWHFWLYH FORWKLQJ LQFOXGLQJ ERRWV JOF
SUHYHQW VNLQ FRQWDFW
Eye Protection:
8VH FKHPLFDO VDIHW\ JRJJOHV 0DLQWDLQ H\H ZDVK IRXQWDLQ DQ

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9. Physical and Chemical Properties

Appearance:
:KLWH VROLG
Odor:
2GRUOHVV
Solubility:
J J ZDWHU # &) $QK\GURXV
Specific Gravity:

&) $QK\GURXV

pH:
1R LQIRUPDWLRQ IRXQG
% Volatiles by volume @ 21C (70F):

Boiling Point:
&) $QK\GURXV
Melting Point:
&) $QK\GURXV
Vapor Density (Air=1):
1R LQIRUPDWLRQ IRXQG
Vapor Pressure (mm Hg):
1R LQIRUPDWLRQ IRXQG
Evaporation Rate (BuAc=1):
1R LQIRUPDWLRQ IRXQG

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10. Stability and Reactivity

Stability:
6WDEOH XQGHU RUGLQDU\ FRQGLWLRQV RI XVH DQG VWRUDJH
Hazardous Decomposition Products:
2[LGHV RI WKH FRQWDLQHG PHWDO DQG KDORJHQ SRVVLEO\ DOVR
Hazardous Polymerization:
:LOO QRW RFFXU
Incompatibilities:
%URPLQH WULIOXRULGH IXUDQ SHUFDUER[\OLF DFLG $QK\GURXV
Conditions to Avoid:
,QFRPSDWLEOHV

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11. Toxicological Information

%DULXP FKORULGH 2UDO UDW /' PJ NJ DQK\GURXV
,QYHVWLJDWHG DV D WXPRULJHQ GLK\GUDWH

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Barium Chloride (10361-37-2)	No	No	None

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12. Ecological Information

Environmental Fate:
7KLV PDWHULDO LV H[SHFWHG WR VLJQLILFDQWO\ ELRDFFXPXODWH
Environmental Toxicity:
1R LQIRUPDWLRQ IRXQG

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13. Disposal Considerations

:KDWHYHU FDQQRW EH VDYHG IRU UHFRYHU\ RU UHF\FOLQJ VKRXOG
5&5$ DSSURYHG LQFLQHUDWRU RU GLVSRVHG LQ D 5&5$ DSSURYHG
RI WKLV SURGXFW PD\ FKDQJH WKH ZDVWH PDQDJHPHQW RSWLRQV
IURP IHGHUDO GLVSRVDO UHJXODWLRQV 'LVSRVH RI FRQWDLQHU D
DQG ORFDO UHTXLUHPHQWV

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: % $ 5 , 8 0 & 2 0 3 2 8 1 ' 1 2 6 % $ 5 , 8 0 & + / 2 5 , ' (
Hazard Class:
UN/NA: 8 1
3 D F N L Q J * U R X S , , ,
Information reported for product/size: / %

International (Water, I.M.O.)

Proper Shipping Name: % $ 5 , 8 0 & 2 0 3 2 8 1 ' 1 2 6 % $ 5 , 8 0 & + / 2 5 , ' (
Hazard Class:
UN/NA: 8 1
3 D F N L Q J * U R X S , , ,
Information reported for product/size: / %

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Barium Chloride (10361-37-2)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	--Canada-- Korea	DSL	NDSL	Phil.
Barium Chloride (10361-37-2)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Barium Chloride (10361-37-2)	No	No	No	Barium compo

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	261.33	-TSCA- 8(d)
Barium Chloride (10361-37-2)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Mixture / Solid)

Australian Hazchem Code: =
Poison Schedule: 6
WHMIS:
7 K L V 0 6 ' 6 K D V E H H Q S U H S D U H G D F F R U G L Q J W R W K H K D] D U G F U L W H
D Q G W K H 0 6 ' 6 F R Q W D L Q V D O O R I W K H L Q I R U P D W L R Q U H T X L U H G E \ W

16. Other Information

NFPA Ratings: + H D 3 D W K D P P D E L O L W \ 0 5 H D F W L Y L W \ 0
Label Hazard Warning:
' $ 1 * (5 0 $ < % ( ) $ 7 $ / ,) 6 : $ / / 2 : (' + $ 5 0) 8 / ,) , 1 + $ / (' 0 $ < & $ 8 6 (, 5 5 , 7 $ 7 ,
7 2 6 . , 1 (< (6 $ 1 ' 5 (6 3 , 5 $ 7 2 5 < 7 5 $ & 7 $)) (& 7 6 + ($ 5 7 5 (6 3 , 5 $ 7 2 5 < 6 < 6 7
& (1 7 5 $ / 1 (5 9 2 8 6 6 < 6 7 (0

Label Precautions:
$YRLG FRQWDFW ZLWK H\HV VNLQ DQG FORWKLQJ
$YRLG EUHDWKLQJ GXVW
.HHS FRQWDLQHU FORVHG
8VH ZLWK DGHTXDWH YHQWLODWLRQ
:DVK WKRURXJKO\ DIWHU KDQGOLQJ
Label First Aid:
,I VZDOORZHG LQGXFH YRPLWLQJ LPPHGLDWHO\ DV GLUHFWHG E\ P
DQ XQFRQVFLRXV SHUVRQ ,I LQKDOHG UHPRYH WR IUHVK DLU ,I Q
LV GLIILFXOW JLYH R[\JHQ ,Q FDVH RI FRQWDFW LPPHGLDWHO\ IO
PLQXWHV ,Q DOO FDVHV JHW PHGLFDO DWWHQWLRQ LPPHGLDWHO\
Product Use:
/DERUDWRU\ 5HDJHQW
Revision Information:
1R ,QIRUPDWLRQ)RXQG
Disclaimer:

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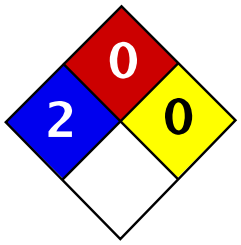
Prepared by: (QYLURQPHQWDO +HDOWK 6DIHW\
3KRQH 1XPEHU 8 6 $



Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Barium chromate MSDS

Section 1: Chemical Product and Company Identification

Product Name: "A R I U M C H R O M A T E

Catalog Codes: 3 , " 3 , "

CAS#:

RTECS: # 1

TSCA: 4 3 # ! B I N V E N T O R Y "A R I U M C H R O M A T E

CI#: . O T A P P L I C A B L E

Synonym: "A R I U M # H R O M A T E / X I D E

Chemical Name: "A R I U M # H R O M A T E

Chemical Formula: "A # R /

Contact Information:

Sciencelab.com, Inc.
3 M I T H 2 D
(O U S T O N 4 E X A S

5 3 3 A L E S 1-800-901-7247
) N T E R N A T I O N A L 1-281-441-4400
/ R D E R / N L I N E 6 F L H Q F H / D E F R P

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
"A R I U M C H R O M A T E		

Toxicological Data on Ingredients: "A R I U M C H R O M A T E , $. O T A V A I L A B L E , # . O T A V A I L A B L

Section 3: Hazards Identification

Potential Acute Health Effects:
% X T R E M E L Y H A Z A R D O U S I N C A S E O F I N G E S T I O N O F I N H A L A T I O N (A Z A R D O U S I N C
I R R I T A N T 3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T P E R M E A T O R 0 R O L
A N D U L C E R A T I O N S / V E R E X P O S U R E B Y I N H A L A T I O N M A Y C A U S E R E S P I R A T O R Y R R
D E A T H

Potential Chronic Health Effects:
! 2 #) . / ' % .) # % & & % # 4 3 # L A S S I F I E D ! # O N F I R M E D F O R H U M A N B Y ! # ') (
- 5 4 ! ' % .) # % & & % # 4 3 . O T A V A I L A B L E
4 % 2 ! 4 / ' % .) # % & & % # 4 3 . O T A V A I L A B L E
$ % 6 % , / 0 - % . 4 ! , 4 / 8) #) 4 9 . O T A V A I L A B L E
4 H E S U B S T A N C E I S T O X I C T O B L O O D K I D N E Y S L U N G S T H E N E R V O U S S Y S T E M L I V
2 E P E A T E D O R P R O L O N G E D E X P O S U R E T O T H E S U B S T A N C E C A N P R O D U C E T A R G E T O
H I G H L Y T O X I C M A T E R I A L M A Y P R O D U C E G E N E R A L D E T E R I O R A T I O N O F H E A L T H B Y A
O R G A N S

Section 4: First Aid Measures

Eye Contact:
#HECK FOR AND REMOVE ANY CONTACT LENSES)N CASE OF CONTACT IMMEDIATE
LEAST MINUTES #OLD WATER MAY BE USED 7!2- WATER -534 BE USED 'ET MEDIC

Skin Contact:
)N CASE OF CONTACT IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LE
CLOTHING AND SHOES #OVER THE IRRITATED SKIN WITH AN EMOLLIENT 7ASH CLO
SHOES BEFORE REUSE 'ET MEDICAL ATTENTION IMMEDIATELY

Serious Skin Contact:
7ASH WITH A DISINFECTANT SOAP AND COVER THE CONTAMINATED SKIN WITH AN A
MEDICAL ATTENTION

Inhalation:
)F INHALED REMOVE TO FRESH AIR)F NOT BREATHING GIVE ARTIFICIAL RESPIRA
MEDICAL ATTENTION IMMEDIATELY

Serious Inhalation:
%VACUATE THE VICTIM TO A SAFE AREA AS SOON AS POSSIBLE ,OOSEN TIGHT CLO
WAISTBAND)F BREATHING IS DIFFICULT ADMINISTER OXYGEN)F THE VICTIM IS N
RESUSCITATION 7!2.).')T MAY BE HAZARDOUS TO THE PERSON PROVIDING AID TO
WHEN THE INHALED MATERIAL IS TOXIC INFECTIOUS OR CORROSIVE 3EEK IMMEDI

Ingestion:
)F SWALLOWED DO NOT INDUCE VOMITING UNLESS DIRECTED TO DO SO BY MEDICA
MOUTH TO AN UNCONSCIOUS PERSON ,OOSEN TIGHT CLOTHING SUCH AS A COLLAR
ATTENTION IMMEDIATELY

Serious Ingestion: .OT AVAILABLE

Section 5: Fire and Explosion Data

Flammability of the Product: .ON FLAMMABLE

Auto-Ignition Temperature: .OT APPLICABLE

Flash Points: .OT APPLICABLE

Flammable Limits: .OT APPLICABLE

Products of Combustion: .OT AVAILABLE

Fire Hazards in Presence of Various Substances: .OT APPLICABLE

Explosion Hazards in Presence of Various Substances:
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF MECHANICAL IMPACT .OT
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF STATIC DISCHARGE .OT A

Fire Fighting Media and Instructions: .OT APPLICABLE

Special Remarks on Fire Hazards: .OT AVAILABLE

Special Remarks on Explosion Hazards: .OT AVAILABLE

Section 6: Accidental Release Measures

Small Spill: 5SE APPROPRIATE TOOLS TO PUT THE SPILLED SOLID IN A CONVENIENT WA

Large Spill:
/XIDIZING MATERIAL 0OISONOUS SOLID
3TOP LEAK IF WITHOUT RISK $O NOT GET WATER INSIDE CONTAINER !VOID CONTA
PAPER OIL CLOTHING +EEP SUBSTANCE DAMP USING WATER SPRAY $O NOT T
TO REDUCE VAPORS 0REVENT ENTRY INTO SEWERS BASEMENTS OR CONFINED AR
DISPOSAL "E CAREFUL THAT THE PRODUCT IS NOT PRESENT AT A CONCENTRATION
AND WITH LOCAL AUTHORITIES

Section 7: Handling and Storage

Precautions:
+EEP LOCKED UP +EEP AWAY FROM HEAT +EEP AWAY FROM SOURCES OF IGNITIO
MATERIAL $O NOT INGEST $O NOT BREATHE DUST 7EAR SUITABLE PROTECTIVE C
VENTILATION WEAR SUITABLE RESPIRATORY EQUIPMENT)F INGESTED SEEK MED
CONTAINER OR THE LABEL !VOID CONTACT WITH SKIN AND EYES

Storage:
+EEP CONTAINER TIGHTLY CLOSED +EEP CONTAINER IN A COOL WELL VENTILATE
REDUCING AGENTS AND COMBUSTIBLES 3EE .&0! ! #ODE FOR THE 3TORAGE OF ,I

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
5SE PROCESS ENCLOSURES LOCAL EXHAUST VENTILATION OR OTHER ENGINEERI
RECOMMENDED EXPOSURE LIMITS)F USER OPERATIONS GENERATE DUST FUME O
AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT

Personal Protection:

Personal Protection:
3PLASH EIRAT OSPÀ COAT $UST RESPR AIRBOOTH NTATILTS
RÅ AREAB NTALIMIT ELPTILASP?E O@S VEN'€0@@0 BÀ LIESPÀ @ 0 xAN P4PPSN à@
RN SAIRS CO NTA)FFEL P%€@ à T0ð … 0P€À
S LIM Cc$‡SC!–dÞ¢xàS7E 0S 7€@0 Ô@€P` x/ Ž0s0•,; ÀREC€` à'ƒÕ,; =VEL AIRS CO LOSURE PL

Critical Temperature: . O T A V A I L A B L E

Specific Gravity: 7 A T E R

Vapor Pressure: . O T A P P L I C A B L E

Vapor Density: . O T A V A I L A B L E

Volatility: . O T A V A I L A B L E

Odor Threshold: . O T A V A I L A B L E

Water/Oil Dist. Coeff.: . O T A V A I L A B L E

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: . O T A V A I L A B L E

Solubility: 6 E R Y S L I G H T L Y S O L U B L E I N C O L D W A T E R H O T W A T E R

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O T A V A I L A B L E

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: 7 I L L N O T O C C U R

Section 11: Toxicological Information

Routes of Entry: % Y E C O N T A C T) N H A L A T I O N) N G E S T I O N

Toxicity to Animals:
, $. O T A V A I L A B L E
, # . O T A V A I L A B L E

Chronic Effects on Humans:
! 2 #) . / ' % .) # % & & % # 4 3 # L A S S I F I E D ! # O N F I R M E D F O R H U M A N B Y ! # ') (
A U S E S D A M A G E T O T H E F O L L O W I N G O R G A N S B L O O D K I D N E Y S L U N G S T H E N E R V

Other Toxic Effects on Humans:
% X T R E M E L Y H A Z A R D O U S I N C A S E O F I N G E S T I O N O F I N H A L A T I O N
(A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T P E R M E A T O R

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: . O T A V A I L A B L E

Section 12: Ecological Information

Ecotoxicity: . O T A V A I L A B L E

BOD5 and COD: . O T A V A I L A B L E

Products of Biodegradation:
0 O S S I B L Y H A Z A R D O U S S H O R T T E R M D E G R A D A T I O N P R O D U C T S A R E N O T L I K E L Y (O
A R I S E

Toxicity of the Products of Biodegradation: 4 H E P R O D U C T S O F D E G R A D A T I O N A R E M O R E T O X I C

Special Remarks on the Products of Biodegradation: . O T A V A I L A B L E

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: # , ! 3 3 0 O I S O N O U S M A T E R I A L

Identification: . O T A V A I L A B L E 5 . . ! 0 ' . O T A V A I L A B L E

Special Provisions for Transport: . O T A V A I L A B L E

Section 15: Other Regulatory Information

Federal and State Regulations:
A L I F O R N I A P R O P 4 H I S P R O D U C T C O N T A I N S T H E F O L L O W I N G I N G R E D I E N T S F O R
C A U S E C A N C E R B I R T H D E F E C T S O R O T H E R R E P R O D U C T I V E H A R M W H I C H W O U L D R
C H R O M A T E
A L I F O R N I A P R O P 4 H I S P R O D U C T C O N T A I N S T H E F O L L O W I N G I N G R E D I E N T S F O R
C A U S E C A N C E R W H I C H W O U L D R E Q U I R E A W A R N I N G U N D E R T H E S T A T U T E "A R I U M C
0 E N N S Y L V A N I A 2 4 + "A R I U M C H R O M A T E
- A S S A C H U S E T T S 2 4 + "A R I U M C H R O M A T E
4 3 # ! B I N V E N T O R Y "A R I U M C H R O M A T E
% 2 # , ! (A Z A R D O U S S U B S T A N C E S "A R I U M C H R O M A T E

Other Regulations: / 3 (! (A Z A R D O U S B Y D E F I N I T I O N O F (A Z A R D # O M M U N I C A T I O N 3 T A N D A R

Other Classifications:

WHMIS (Canada):
, ! 3 3 # / X I D I Z I N G M A T E R I A L
, ! 3 3 $! - A T E R I A L C A U S I N G O T H E R T O X I C E F F E C T S 6 % 2 9 4 / 8)

DSCL (EEC):
2) R R I T A T I N G T O E Y E S A N D S K I N
2 - A Y C A U S E C A N C E R

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: %

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
'LOVES
,AB COAT
$UST RESPIRATOR "E SURE TO USE AN
APPROVED CERTIFIED RESPIRATOR OR
EQUIVALENT 7EAR APPROPRIATE RESPIRATOR
WHEN VENTILATION IS INADEQUATE
3PLASH GOGGLES

Section 16: Other Information

References: .OT AVAILABLE

Other Special Considerations: .OT AVAILABLE

Created: 0 -

Last Updated: 0 -

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MSDS Number: **S3122** * * * * * Effective Date:02/15/08* * * * * Supercedes:05/06/05

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM BORATE

1. Product Identification

Synonyms: Sodium borate decahydrate; borax; sodium pyroborate
CAS No.: 1330-43-4 (Anhydrous) 1303-96-4 (Decahydrate)
Molecular Weight: 381.37
Chemical Formula: Na2B4O7 . 10H2O
Product Codes:
J.T. Baker: 3568, 3570, 3574, 3575
Mallinckrodt: 7418, 7457, 7460, 7792

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Borates, Tetra, Sodium Salts (Anhydrous)	1330-43-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.
Ingestion:
May cause nausea, vomiting, diarrhea, muscular spasms, dullness, lethargy, circulatory depression, central nervous system depression, shock, kidney damage, coma, and death. Estimated lethal dose 15 to 20 grams.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Prolonged or repeated ingestion or skin absorption may cause anorexia, weight loss, vomiting, mild diarrhea, skin rash, convulsions, and anemia.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- NIOSH Recommended Exposure Limit (REL): 1 mg/m3 (TWA)

- ACGIH Threshold Limit Value (TLV): 5 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, latest recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White, Gray, Bluish or Greenish White Streaked Crystals.

Odor:
Odorless.

Solubility:
6g/100g water.

Density:
1.73

pH:
Alkaline

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
320C (608F) Loses water

Melting Point:
75C (167F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Toxic gases and vapors may be released if involved in a fire.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Acids, alkaloids, and metallic salts.
Conditions to Avoid:
Incompatibles.

11. Toxicological Information

Hydrate: Oral rat LD50: 2660 mg/kg. Investigated as a mutagen, reproductive effector. Anhydrous: Investigated as a reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Borates, Tetra, Sodium Salts (Anhydrous) (1330-43-4)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Borates, Tetra, Sodium Salts (Anhydrous) (1330-43-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	--Canada-- Korea	DSL	NDSL	Phil.
Borates, Tetra, Sodium Salts (Anhydrous) (1330-43-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Borates, Tetra, Sodium Salts (Anhydrous) (1330-43-4)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	-RCRA- CERCLA	261.33	-TSCA- 8(d)
Borates, Tetra, Sodium Salts (Anhydrous) (1330-43-4)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **B3696** * * * * * *Effective Date:* ***02/10/09*** * * * * * *Supercedes:* ***05/23/06***

MSDS **Material Safety Data Sheet**

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

BORIC ACID

1. Product Identification

Synonyms: ortho-Boric acid; boracic acid; Borofax, boric acid (H3BO3)
CAS No.: 10043-35-3
Molecular Weight: 61.83
Chemical Formula: H3BO3
Product Codes:
J.T. Baker: 0084, 0091, 0092, 2987, 4035, 5168, 5599, 9820
Mallinckrodt: 1326, 1394, 2536, 2549, 2552, 7779, 7794

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Boric Acid	10043-35-3	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the mucous membranes of the respiratory tract. May be absorbed from the mucous membranes, and depending on the amount of exposure could result in the development of nausea, vomiting, diarrhea, drowsiness, rash, headache, fall in body temperature, low blood pressure, renal injury, cyanosis, coma, and death.
Ingestion:
Symptoms parallel absorption via inhalation. Adult fatal dose reported at 5 to > 30 grams.
Skin Contact:
Causes skin irritation. Not significantly absorbed through the intact skin. Readily absorbed through damaged or burned skin. Symptoms of skin absorption parallel inhalation and ingestion.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Prolonged absorption causes weight loss, vomiting, diarrhea, skin rash, convulsions and anemia. Liver and particularly the kidneys may be susceptible. Studies of dogs and rats have shown that infertility and damage to testes can result from acute or chronic ingestion of boric acid. Evidence of toxic effects on the human reproductive system is inadequate.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Skin Contact:
Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists. Wash clothing before re-use.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
A mixture of potassium and boric acid may explode on impact.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate

dust.

---

7. Handling and Storage

Keep in a well closed container stored under cold to warm conditions, 2 to 40 C, (36 to 104F). Protect against physical damage. Carbon steel or aluminum containers are suitable for storage. Stainless steel is needed for moist conditions. Use good housekeeping practices to prevent accumulation of dust and follow sound cleaning techniques that will keep airborne particulates at a low level. Wash hands after handling this material. Avoid contact especially when skin is cut or abraided. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Gloves and lab coat, apron or coveralls.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White powder or granules.
Odor:
Odorless.
Solubility:
1g/18mL in cold water.
Density:
1.43
pH:
5.1 Aqueous solution: (0.1M)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Decomposes.
Melting Point:
169C (336F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
2.6 @ 20C (68F)

Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. If moisture is present, boric acid can be corrosive to iron.
Hazardous Decomposition Products:
Loses chemically combined water upon heating, forming metaboric acid (HBO2) at 212-221F, then pyroboric acid (H2B4O7) at 285-320F, and Boric anhydride at higher temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Potassium, acetic anhydride, alkalis, carbonates, and hydroxides.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 2660 mg/kg; oral woman LDLo: 200 mg/kg; investigated as a mutagen, tumorigen, reproductive effector.
Reproductive Toxicity:
May impair fertility
May cause harm to the unborn child.

See Chronic Health Hazards.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Boric Acid (10043-35-3)              No          No            None
```

---

12. Ecological Information

Environmental Fate:
Boric acid: 48 Hr EC50 water flea: 115.0 mg/L [Static]
Environmental Toxicity:
The EC50/48-hour values for daphnia are over 100 mg/l. This material may be toxic to aquatic life.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                    TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Boric Acid (10043-35-3)                          Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                       --Canada--
Ingredient                                    Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Boric Acid (10043-35-3)                          Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                         -SARA 302-    ------SARA 313------
Ingredient                               RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Boric Acid (10043-35-3)                  No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                               CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Boric Acid (10043-35-3)                  No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS.
Label Precautions:
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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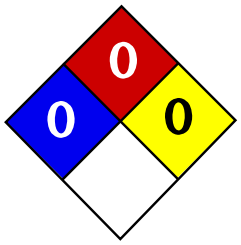
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	0
Fire	0
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Boric Acid, 4% w/indicator MSDS

Section 1: Chemical Product and Company Identification

Product Name: "ORIC !CID W INDICATOR

Catalog Codes: 3,"

CAS#: -IXTURE

RTECS: .OT APPLICABLE

TSCA: 43#! B INVENTORY "ORIC ACID %THYL ALCOHOL 0ROOF -ETHYL RED "ROMOCRESOL GREEN

CI#: .OT APPLICABLE

Synonym:

Chemical Name: .OT APPLICABLE

Chemical Formula: .OT APPLICABLE

Contact Information:

Sciencelab.com, Inc.
3MITH 2D
(OUSTON 4EXAS

53 3ALE 1-800-901-7247
)NTERNATIONAL 1-281-441-4400 ES
/RDER/NLINE 6FLHQFH/DE FRP

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
"ORIC ACID		
%THYL ALCOHOL 0ROOF		
-ETHYL RED		
"ROMOCRESOL GREEN		

Toxicological Data on Ingredients: "ORIC ACID /2!, ,$!CUTE MG KG;2AT= MG KG; 0ROOF /2!, ,$!CUTE MG KG;2AT =

Section 3: Hazards Identification

Potential Acute Health Effects:
%XTREMELY HAZARDOUS IN CASE OF INGESTION (AZARDOUS IN CASE OF EYE CONT
OF SKIN CONTACT IRRITANT OF INHALATION

Potential Chronic Health Effects:
%XTREMELY HAZARDOUS IN CASE OF INGESTION
(AZARDOUS IN CASE OF EYE CONTACT IRRITANT
#!2#)./'%.)# %&&%#43 .OT AVAILABLE

-54!'%.)# %&&%#43 .OT AVAILABLE
4%2!4/'%.)# %&&%#43 .OT AVAILABLE
$%6%,/0-%.4!, 4/8)#)49 #LASSIFIED 2EPRODUCTIVE SYSTEM TOXIN FEMALE 2EPR
;02/6%.= ;%THYL ALCOHOL 0ROOF=
4HE SUBSTANCE IS TOXIC TO LUNGS THE REPRODUCTIVE SYSTEM MUCOUS MEMBR
2EPEATED OR PROLONGED EXPOSURE TO THE SUBSTANCE CAN PRODUCE TARGET O

Section 4: First Aid Measures

Eye Contact:
#HECK FOR AND REMOVE ANY CONTACT LENSES)MMEDIATELY FLUSH EYES WITH R
KEEPING EYELIDS OPEN #OLD WATER MAY BE USED 'ET MEDICAL ATTENTION

Skin Contact:
7ASH WITH SOAP AND WATER #OVER THE IRRITATED SKIN WITH AN EMOLLIENT 'ET
#OLD WATER MAY BE USED

Serious Skin Contact: .OT AVAILABLE

Inhalation:
)F INHALED REMOVE TO FRESH AIR)F NOT BREATHING GIVE ARTIFICIAL RESPIRA
MEDICAL ATTENTION

Serious Inhalation: .OT AVAILABLE

Ingestion:
$O./4 INDUCE VOMITING UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL .EV
UNCONSCIOUS PERSON ,OOSEN TIGHT CLOTHING SUCH AS A COLLAR TIE BELT OR
SYMPTOMS APPEAR

Serious Ingestion: .OT AVAILABLE

Section 5: Fire and Explosion Data

Flammability of the Product: .ON FLAMMABLE

Auto-Ignition Temperature: .OT APPLICABLE

Flash Points: .OT APPLICABLE

Flammable Limits: .OT APPLICABLE

Products of Combustion: .OT AVAILABLE

Fire Hazards in Presence of Various Substances: .OT APPLICABLE

Explosion Hazards in Presence of Various Substances:
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF MECHANICAL IMPACT .OT
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF STATIC DISCHARGE .OT A

Fire Fighting Media and Instructions: .OT APPLICABLE

Special Remarks on Fire Hazards: .OT AVAILABLE

Special Remarks on Explosion Hazards: .OT AVAILABLE

Section 6: Accidental Release Measures

Small Spill:

$ILUTE WITH WATER AND MOP UP OR ABSORB WITH AN INERT DRY MATERIAL AND PI
CONTAINER &INISH CLEANING BY SPREADING WATER ON THE CONTAMINATED SURI
REGIONAL AUTHORITY REQUIREMENTS

Large Spill:
!BSORB WITH AN INERT MATERIAL AND PUT THE SPILLED MATERIAL IN AN APPROPRI
SPREADING WATER ON THE CONTAMINATED SURFACE AND ALLOW TO EVACUATE TH
THE PRODUCT IS NOT PRESENT AT A CONCENTRATION LEVEL ABOVE 4,6 #HECK 4,6

Section 7: Handling and Storage

Precautions:
+EEP LOCKED UP $O NOT INGEST $O NOT BREATHE GAS FUMES VAPOR SPRAY !V
PROTECTIVE CLOTHING)F INGESTED SEEK MEDICAL ADVICE IMMEDIATELY AND S

Storage: +EEP CONTAINER TIGHTLY CLOSED +EEP CONTAINER IN A COOL WELL VENT

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
0ROVIDE EXHAUST VENTILATION OR OTHER ENGINEERING CONTROLS TO KEEP THE
RESPECTIVE THRESHOLD LIMIT VALUE %NSURE THAT EYEWASH STATIONS AND SAI
WORK STATION LOCATION

Personal Protection:
3PLASH GOGGLES ,AB COAT 6APOR RESPIRATOR "E SURE TO USE AN APPROVED C
'LOVES

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT 6APOR RESPIRATOR "OOTS 'LOVES !SELF CONTAI
USED TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTH NG
"%&/2% HANDLING THIS PRODUCT

Exposure Limits:
%THYL ALCOHOL 0ROOF
47! FROM /3(! 0%, ;5NITED 3TATES=
47! FROM /3(! 0%, ;5NITED 3TATES=
#ONSULT LOCAL AUTHORITIES FOR ACCEPTABLE EXPOSURE LIMITS

Section 9: Physical and Chemical Properties

Physical state and appearance: ,IQUID

Odor: .OT AVAILABLE

Taste: .OT AVAILABLE

Molecular Weight: .OT APPLICABLE

Color: #LEAR

pH (1% soln/water): .EUTRAL

Boiling Point: 4HE LOWEST KNOWN VALUE IS —# —& %THYL ALCOHOL 0ROOF

Melting Point: -AY START TO SOLIDIFY AT —# —& BASED ON DATA FOR %THYL

Specific Gravity: 7 E I G H T E D A V E R A G E 7 A T E R

Vapor Pressure: 4 H E H I G H E S T K N O W N V A L U E I S K 0 A —# % T H Y L A L C O H O L 0 R O O

Vapor Density: 4 H E H I G H E S T K N O W N V A L U E I S !I R % T H Y L A L C O H O L 0 R O O F

Volatility: . O T A V A I L A B L E

Odor Threshold: . O T A V A I L A B L E

Water/Oil Dist. Coeff.: . O T A V A I L A B L E

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: 3 E E S O L U B I L I T Y I N W A T E R M E T H A N O L D I E T H Y L E T H E R

Solubility:
% A S I L Y S O L U B L E I N H O T W A T E R M E T H A N O L D I E T H Y L E T H E R
3 O L U B L E I N C O L D W A T E R

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O N R E A C T I V E W I T H O X I D I Z I N G A G E N T S

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: 7 I L L N O T O C C U R

Section 11: Toxicological Information

Routes of Entry: ! B S O R B E D T H R O U G H S K I N $ E R M A L C O N T A C T % Y E C O N T A C T) N H A L A T I

Toxicity to Animals: ! C U T E O R A L T O X I C I T Y ,$ M G K G ;2 A T= "O R I C A C I D

Chronic Effects on Humans:
$ % 6 % , / 0 - % . 4 ! , 4 / 8) #) 4 9 # L A S S I F I E D 2 E P R O D U C T I V E S Y S T E M T O X I N F E M A L E 2 E P R
; 0 2 / 6 % . = ; % T H Y L A L C O H O L 0 R O O F=

Other Toxic Effects on Humans:
% X T R E M E L Y H A Z A R D O U S I N C A S E O F I N G E S T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T O F I N H A L A T I O N

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: - O D E R A T E L Y T O X I C A N D N A R C O T I C I N H I G H C O N
T U M O R I G E N % T H Y L A L C O H O L 0 R O O F

Section 12: Ecological Information

Ecotoxicity: .OT AVAILABLE

BOD5 and COD: .OT AVAILABLE

Products of Biodegradation:
0OSSIBLY HAZARDOUS SHORT TERM DEGRADATION PRODUCTS ARE NOT LIKELY (O
ARISE

Toxicity of the Products of Biodegradation: 4HE PRODUCTS OF DEGRADATION ARE AS TOXIC AS TH

Special Remarks on the Products of Biodegradation: .OT AVAILABLE

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: .OT A $/4 CONTROLLED MATERIAL 5NITED 3TATES

Identification: .OT APPLICABLE

Special Provisions for Transport: .OT APPLICABLE

Section 15: Other Regulatory Information

Federal and State Regulations:
#ALIFORNIA PROP 4HIS PRODUCT CONTAINS THE FOLLOWING INGREDIENTS FOR
CAUSE CANCER BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM WHICH WOULD R
ALCOHOL 0ROOF
#ALIFORNIA PROP 4HIS PRODUCT CONTAINS THE FOLLOWING INGREDIENTS FOR
CAUSE BIRTH DEFECTS WHICH WOULD REQUIRE A WARNING UNDER THE STATUTE %
#ALIFORNIA PROP 4HIS PRODUCT CONTAINS THE FOLLOWING INGREDIENTS FOR
CAUSE CANCER WHICH WOULD REQUIRE A WARNING UNDER THE STATUTE %THY_ A
0ENNSYLVANIA 24+ %THYL ALCOHOL 0ROOF
-ASSACHUSETTS 24+ %THYL ALCOHOL 0ROOF
43#! B INVENTORY "ORIC ACID %THYL ALCOHOL 0ROOF -ETHYL RED "ROMOC

Other Regulations: /3(! (AZARDOUS BY DEFINITION OF (AZARD #OMMUNICATION 3TANDAR

Other Classifications:

WHMIS (Canada): #,!33 $! -ATERIAL CAUSING OTHER TOXIC EFFECTS 6%29 4/8)#

DSCL (EEC): 2 -AY IMPAIR FERTILITY

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: H

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
'L O V E S
,A B C O A T
6A P O R R E S P I R A T O R "E S U R E T O U S E A N
A P P R O V E D C E R T I F I E D R E S P I R A T O R O R
E Q U I V A L E N T 7E A R A P P R O P R I A T E R E S P I R A T O R
W H E N V E N T I L A T I O N I S I N A D E Q U A T E
3P L A S H G O G G L E S

Section 16: Other Information

References: . O T A V A I L A B L E

Other Special Considerations: . O T A V A I L A B L E

Created: ! -

Last Updated: 0 -

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MSDS Number: **B4392** * * * * * *Effective Date:* ***02/01/07*** * * * * * *Supercedes:* ***04/27/04***

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

BROMOCRESOL GREEN

1. Product Identification

Synonyms: 3,3',5,5'-Tetrabromo-m-cresolsulfonphthalein; 4,4'-(3H-2, 1-Benzoxathiol-3-ylidene) bis [2,6-dibromo-3 methylphenol]S,S-dioxide; BCG
CAS No.: 76-60-8
Molecular Weight: 698.02
Chemical Formula: C21H14O5Br4S
Product Codes:
J.T. Baker: C946
Mallinckrodt: 1793

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Bromocresol Green	76-60-8	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
Large oral doses may cause irritation to the gastrointestinal tract.
Skin Contact:
May cause irritation with redness and pain.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Light brick colored powder.
Odor:
Odorless or faint medicinal odor.
Solubility:
Slightly soluble in water.
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
218C (424F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce bromines, sulfur oxides, carbon dioxide, and carbon monoxide.

Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a mutagen.

```
--------\Cancer Lists\-------------------------------------------------------
                                      ---NTP Carcinogen---
Ingredient                            Known    Anticipated    IARC Category
-------------------------------------  -----    -----------    -------------
Bromocresol Green (76-60-8)             No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Bromocresol Green (76-60-8)                      Yes  Yes   No       Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Bromocresol Green (76-60-8)                      Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Bromocresol Green (76-60-8)               No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                     -RCRA-    -TSCA-
Ingredient                                CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Bromocresol Green (76-60-8)               No         No         No
```

```
Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 1, 3.
Disclaimer:
****

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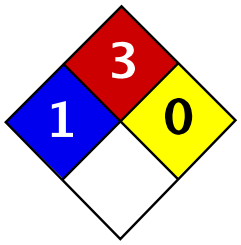
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Bromocresol Green - Methyl Red MSDS

Section 1: Chemical Product and Company Identification

Product Name: Bromocresol Green - Methyl Red

Catalog Codes: SLB4141

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Bromocresol green; Methyl red; Isopropyl alcohol

CI#: Not available.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Bromocresol green	76-60-8	0.1
Methyl red	493-52-7	0.02
Isopropyl alcohol	67-63-0	99.9

Toxicological Data on Ingredients: Bromocresol green LD50: Not available. LC50: Not available. Isopropyl alcohol: ORAL (LD50): Acute: 5045 mg/kg [Rat]. 3600 mg/kg [Mouse]. 6410 mg/kg [Rabbit]. DERMAL (LD50): Acute: 12800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Isopropyl alcohol].
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol].

The substance is toxic to kidneys, lungs, the nervous system, mucous membranes, gastrointestinal tract, cardiovascular system, upper respiratory tract, skin, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: The lowest known value is 399°C (750.2°F) (Isopropyl alcohol).

Flash Points:
The lowest known value is CLOSED CUP: 11.67°C (53°F). (TAG). OPEN CUP: 18.3°C (64.9°F). (Cleveland). (Isopropyl alcohol)

Flammable Limits: The greatest known range is LOWER: 2% UPPER: 12% (Isopropyl alcohol)

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air. Vapor may

travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME (Isopropyl alcohol)

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Isopropyl alcohol
TWA: 400 STEL: 500 from ACGIH (TLV) [United States] [1995]
TWA: 980 STEL: 1230 from ACGIH (TLV) [United States] [1995]
TWA: 400 (ppm) [United Kingdom (UK)]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Not available.

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 82.22°C (180°F) (Isopropyl alcohol).

Melting Point: May start to solidify at -89.5°C (-129.1°F) based on data for: Isopropyl alcohol.

Critical Temperature: The lowest known value is 235°C (455°F) (Isopropyl alcohol).

Specific Gravity: The only known value is 0.7855 (Water = 1) (Isopropyl alcohol).

Vapor Pressure: The highest known value is 4.4 kPa (@ 20°C) (Isopropyl alcohol).

Vapor Density: The highest known value is 2.07 (Air = 1) (Isopropyl alcohol).

Volatility: Not available.

Odor Threshold: The highest known value is 43 ppm (Isopropyl alcohol)

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility: Easily soluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 3600 mg/kg [Mouse]. (Isopropyl alcohol).
Acute dermal toxicity (LD50): 12800 mg/kg [Rabbit]. (Isopropyl alcohol).

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Isopropyl alcohol].
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE] [Isopropyl alcohol].

Other Toxic Effects on Humans:
Very hazardous in case of ingestion.
Hazardous in case of inhalation.
Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human. (Isopropyl alcohol)

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Isopropanol, solution (Isopropyl alcohol) UNNA: UN1219 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Rhode Island RTK hazardous substances: Isopropyl alcohol
Pennsylvania RTK: Isopropyl alcohol
Florida: Isopropyl alcohol
Minnesota: Isopropyl alcohol
Massachusetts RTK: Isopropyl alcohol
New Jersey: Isopropyl alcohol
TSCA 8(b) inventory: Bromocresol green; Methyl red; Isopropyl alcohol
TSCA 8(a) PAIR: Isopropyl alcohol
TSCA 8(d) H and S data reporting: Isopropyl alcohol: 12/15/86
TSCA 12(b) one time export: Isopropyl alcohol
SARA 313 toxic chemical notification and release reporting: Isopropyl alcohol 99.88%

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable.
R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:53 AM

Last Updated: 11/06/2008 12:00 PM

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MSDS Number: **B4420** * * * * * *Effective Date:* ***09/01/09*** * * * * * *Supercedes:* ***02/01/07***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

BROMOCRESOL PURPLE, INDICATOR GRADE

1. Product Identification

Synonyms: 5'-5"Dibromo-o-cresol sulfonephthalein; pH indicator; phenol,4,4'- (3H-2,1-benzoxathiol-3-ylidene) bis [2-bromo-6-methyl-, S,S-dioxide.
CAS No.: 115-40-2
Molecular Weight: 540.24
Chemical Formula: C21H16Br2O5S
Product Codes:
J.T. Baker: C949
Mallinckrodt: 2090

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Bromocresol Purple Indicator grade	115-40-2	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! TOXICOLOGICAL PROPERTIES UNKNOWN. MAY BE HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

The toxicological properties of this material have not been investigated.

Inhalation:
No information found, but compound should be handled as a potential health hazard. May cause irritation to the respiratory tract. Symptoms may include coughing, sore throat, labored breathing, and chest pain.
Ingestion:
No information found, but compound should be handled as a potential health hazard. May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.
Skin Contact:
No information found, but compound should be handled as a potential health hazard. May cause irritation with redness and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
No information found, but compound should be handled as a potential health hazard. May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if symptoms occur.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not expected to be a fire hazard.
Explosion:
No information found.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills:

Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Purple powder.
Odor:
Odorless.
Solubility:
Practically insoluble in water.
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
241 - 242C (466 - 468F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce bromines, sulfur oxides, carbon dioxide, and carbon monoxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
No information found.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Bromocresol Purple Indicator grade      No          No            None
(115-40-2)
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Bromocresol Purple Indicator grade (115-40-2)     Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
```

```
Ingredient                                        Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Bromocresol Purple Indicator grade (115-40-2)     No    Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                                -SARA 302-    ------SARA 313------
Ingredient                                      RQ    TPQ     List  Chemical Catg.
----------------------------------------------  ---   -----   ----  --------------
Bromocresol Purple Indicator grade              No    No      No          No
(115-40-2)

--------\Federal, State & International Regulations - Part 2\----------------
                                                         -RCRA-    -TSCA-
Ingredient                                      CERCLA   261.33    8(d)
----------------------------------------------  ------   ------    ------
Bromocresol Purple Indicator grade              No       No        No
(115-40-2)


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! TOXICOLOGICAL PROPERTIES UNKNOWN. MAY BE HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Use with adequate ventilation.
Avoid breathing dust.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **B5056** * * * * * *Effective Date:* ***03/14/07*** * * * * * *Supercedes:* ***08/10/04***

MSDS Material Safety Data Sheet

CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker®

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

BROMOPHENOL BLUE

1. Product Identification

Synonyms: 3,3',5,5'-Tetrabromophenol sulfonphthalein; 4,4'-(3H-2,1-benzoxathiol-3-ylidene)bis[2,6-dibromophenol]S ,S dioxide
CAS No.: 115-39-9
Molecular Weight: 670.02
Chemical Formula: C19H10Br4O5S
Product Codes: D293

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Bromophenol Blue	115-39-9	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
Effects not determined. Large oral doses may cause irritation to the gastrointestinal tract.
Skin Contact:
May cause irritation with redness and pain.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
Not determined.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

---

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Tan to orange, light pink to purple or red crystalline powder.
Odor:
Slightly amine to odorless.
Solubility:
0.4g/100g water @ 20C (68F).
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
279C (534F)
Melting Point:
273C (523F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:

Burning may produce bromines, sulfur oxides, carbon dioxide, and carbon monoxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a mutagen.

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Bromophenol Blue (115-39-9)              No          No            None
```

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contatEnvi tdBurningchangessi3m.HReurning appro bem T* [.oved Stn1riatwaste shouldf015 shoulfeosalTJ Tiatwaste
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Ingredient	TSCAhenol	Japa	AustalTiaC	Category
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```
  Bromophenol Blue (115-39-9)                No         No         No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:
If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **C0330** * * * * * *Effective Date:* ***08/20/08*** * * * * * *Supercedes:* ***12/03/05***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

CALCIUM CARBONATE

1. Product Identification

Synonyms: Carbonic acid calcium salt; calcite; aragonite; limestone
CAS No.: 471-34-1
Molecular Weight: 100.09
Chemical Formula: CaCO3
Product Codes:
J.T. Baker: 1288, 1294, 1300, 1301, 4485, 4918
Mallinckrodt: 1281, 1282, 1390, 2939, 4052, 4061, 4071, 4072, 6210, 6895

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Calcium Carbonate	471-34-1	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. NUISANCE DUST.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight (Life)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Excessive concentrations of a nuisance dust may cause nuisance condition such as coughing, sneezing, and nasal irritation.
Ingestion:
Non-toxic.
Skin Contact:
Not expected to be a health hazard from skin exposure.
Eye Contact:
No information found, but presumed to cause mechanical irritation.
Chronic Exposure:
Excessive oral doses of calcium carbonate may produce alkalosis and hypercalcemia.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
If large amounts were swallowed, give water to drink and get medical advice.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Wash thoroughly with running water. Get medical advice if irritation develops.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
15 mg/m3 total dust, 5 mg/m3 respirable fraction for nuisance dusts.
- ACGIH Threshold Limit Value (TLV)
for Particulates (insoluble or poorly soluble) Not Otherwise Specified (PNOS):
3 mg/m3 respirable particles and 10 mg/m3 inhalable particles.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Gloves and lab coat, apron or coveralls.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Fine, white powder.

Odor:
Odorless.

Solubility:
0.001 gm in 100 ml water, soluble in dilute acids.

Density:
2.7 - 2.95

pH:
No information found.

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
Not applicable.

Melting Point:
825C (1517F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
When heated to decomposition (825C), emits calcium oxide fumes and liberates carbon dioxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Acids, fluorine, magnesium with hydrogen.
Conditions to Avoid:
Heat, incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

```
--------\Cancer Lists\-------------------------------------------------------
                                   ---NTP Carcinogen---
Ingredient                         Known    Anticipated    IARC Category
-----------------------------------  -----    -----------    -------------
Calcium Carbonate (471-34-1)          No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                     TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Calcium Carbonate (471-34-1)                     Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                     Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Calcium Carbonate (471-34-1)                     Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Calcium Carbonate (471-34-1)              No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
```

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Calcium Carbonate (471-34-1)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **0** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. NUISANCE DUST.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If irritation develops call a physician. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **C0357** * * * * * *Effective Date:* ***11/09/07*** * * * * * *Supercedes:* ***02/23/05***

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

CALCIUM CHLORIDE

1. Product Identification

Synonyms: calcium dichloride; calcium chloride anhydrous; Caltac®; Dowflake
CAS No.: 10043-52-4
Molecular Weight: 110.98
Chemical Formula: CaCl2
Product Codes:
J.T. Baker: 1311
Mallinckrodt: 0771, 3266, 3630, 4225, 4748, 4777, 4822, 4870, 4875, 4880

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Calcium Chloride	10043-52-4	93 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. HARMFUL IF SWALLOWED OR INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Granular material does not pose a significant inhalation hazard, but inhalation of dust may cause irritation to the respiratory tract, with symptoms of coughing and shortness of breath.
Ingestion:
Low toxicity material but ingestion may cause serious irritation of the mucous membrane due to heat of hydrolysis. Large amounts can cause gastrointestinal upset, vomiting, abdominal pain.
Skin Contact:
Solid may cause mild irritation on dry skin; strong solutions or solid in contact with moist skin may cause severe irritation, even burns.
Eye Contact:
Hazard may be either mechanical abrasion or, more serious, burns from heat of hydrolysis and chloride irritation.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Oral ingestion may cause serum acidosis.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. At high temperatures or when moistened under fire conditions, calcium chloride may produce toxic or irritating fumes.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills:

Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. theayrentailproiuect residusl(dus,(soids);.)535(observep)-15(mal(wrnlinsm)-21(and)-56(p realutions)-15(loissed)250(for)-21(

Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Substance will pick up moisture from the air and go into solution if exposed in open containers.
Hazardous Decomposition Products:
Emits toxic chlorine fumes when heated to decomposition. May form hydrogen chloride in presence of sulfuric or phosphoric acids or with water at elevated temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Methyl vinyl ether, water, zinc, bromine trifluoride, mixtures of lime and boric acid, barium chloride, and 2-furan percarboxylic acid. Metals will slowly corrode in aqueous calcium chloride solutions. Aluminum (and alloys) and yellow brass will be attacked by calcium chloride.
Conditions to Avoid:
Incompatibles.

---

11. Toxicological Information

Oral rat LD50: 1000 mg/kg. Investigated as a tumorigen and mutagen.

```
--------\Cancer Lists\-----------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Calcium Chloride (10043-52-4)            No          No            None
```

---

12. Ecological Information

Environmental Fate:
Based on available information for Calcium Chloride anhydrous, this material will not biodegrade or bioaccumulate.
Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                    TSCA  EC   Japan  Australia
---------------------------------------------  ----  ---  -----  ---------
Calcium Chloride (10043-52-4)                   Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                        --Canada--
Ingredient                                    Korea  DSL   NDSL  Phil.
---------------------------------------------  -----  ---   ----  -----
Calcium Chloride (10043-52-4)                   Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Calcium Chloride (10043-52-4)             No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                                CERCLA  261.33    8(d)
----------------------------------------  ------  ------    ------
Calcium Chloride (10043-52-4)             No      No        No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. HARMFUL IF SWALLOWED OR INHALED.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **C0495** * * * * * *Effective Date:* ***09/01/09*** * * * * * *Supercedes:* ***03/14/07***

MSDS **Material Safety Data Sheet**

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

Calcium Sulfate, Dihydrate, Powder

1. Product Identification

Synonyms: Gypsum; Alabaster; C.I. 77231; C.I. Pigment White 25
CAS No.: 7778-18-9 (Anhydrous); 10101-41-4 (Dihydrate)
Molecular Weight: 172.17
Chemical Formula: CaSO4 . 2H2O
Product Codes:
J.T. Baker: 1452
Mallinckrodt: 4300

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Calcium Sulfate (anhydrous)	7778-18-9	98 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.
Ingestion:
May cause obstruction in stomach, as it hardens with moisture. Symptoms include stomach pain, distress.
Skin Contact:
Causes irritation, redness, pain.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Drinking glycerin, gelatin solutions, or large volumes of water may delay the hardening of calcium sulfate in the stomach. Surgical relief of obstruction, particularly at the pylorus, may be necessary.

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5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
15 mg/m3 total dust, 5 mg/m3 respirable fraction

-ACGIH Threshold Limit Value (TLV):
10 mg/m3 (TWA) inhalable fraction
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White powder.
Odor:
Odorless.
Solubility:
Slight (0.1-1%)
Specific Gravity:
2.32
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
No information found.
Melting Point:
1450C (2642F)
Vapor Density (Air=1):
Not applicable.
Vapor Pressure (mm Hg):

Not applicable.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce sulfur oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Diazomethane, aluminum, phosphorous.
Conditions to Avoid:
Incompatibles.

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11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Calcium Sulfate (anhydrous) (7778-18-9)	No	No	None

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Calcium Sulfate (anhydrous) (7778-18-9)	Yes	Yes	Yes	Yes

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--------\Chemical Inventory Status - Part 2\--------------------------------
                                                      --Canada--
Ingredient                                          Korea  DSL   NDSL  Phil.
----------------------------------------------      -----  ---   ----  -----
Calcium Sulfate (anhydrous) (7778-18-9)              Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                                -SARA 302-    ------SARA 313------
Ingredient                                      RQ    TPQ     List  Chemical Catg.
----------------------------------------      ---   -----   ----  --------------
Calcium Sulfate (anhydrous) (7778-18-9)       No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                       -RCRA-    -TSCA-
Ingredient                                      CERCLA     261.33     8(d)
----------------------------------------      ------     ------    ------
Calcium Sulfate (anhydrous) (7778-18-9)       No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
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Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED.
Label Precautions:
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
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RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **C0239** * * * * * *Effective Date:* ***12/06/07*** * * * * * *Supercedes:* ***05/23/06***

MSDS Material Safety Data Sheet

CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker®

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

CALCIUM, 1,000 ug/ml or 10,000 ug/ml

1. Product Identification

Synonyms: None
CAS No.: Not applicable to mixtures.
Molecular Weight: Not applicable to mixtures.
Chemical Formula: CaCO3 and HNO3 in H2O
Product Codes: 5710, 5724, 6448

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Calcium Carbonate	471-34-1	0.1 - 3%	Yes
Nitric Acid	7697-37-2	< 4%	Yes
Water	7732-18-5	> 93%	No

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. VAPOR IRRITATING TO EYES AND RESPIRATORY TRACT. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:
Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract.
Ingestion:
Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

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4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not combustible, but concentrated material is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.
Explosion:
Concentrated material reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.
Fire Extinguishing Media:
If involved in a fire, use water spray.
Special Information:
Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Nitric Acid:
OSHA Permissible Exposure Limit (PEL):
2 ppm (TWA)
ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 ppm (STEL)
-OSHA Permissible Exposure Limit (PEL):
15 mg/m3 total dust, 5 mg/m3 respirable dust for calcium carbonate
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). Canister-type respirators using sorbents are ineffective.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear colorless liquid.
Odor:
Odorless.
Solubility:
Completely soluble in water.
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
> 95
Boiling Point:
No information found.
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Caustic fumes of calcium oxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.
Conditions to Avoid:
Heat, incompatibles.

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11. Toxicological Information

For Nitric Acid: Investigated as a mutagen and reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Calcium Carbonate (471-34-1)	No	No	None
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
Hazard Class: 8
UN/NA: UN3264
Packing Group: III
Information reported for product/size: 150ML

International (Water, I.M.O.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
Hazard Class: 8
UN/NA: UN3264
Packing Group: III
Information reported for product/size: 150ML

International (Air, I.C.A.O.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
Hazard Class: 8
UN/NA: UN3264
Packing Group: III
Information reported for product/size: 150ML

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15. Regulatory Information

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--------\Chemical Inventory Status - Part 1\--------------------------------
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Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Mixture / Liquid)
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Australian Hazchem Code: 2PE
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings:

ISO9001:2000 Certified

Material Safety Data Sheet
Chlorophenol Red, Sodium Salt

Section 1 - Chemical Product and Company Identification

MSDS Name:
Chlorophenol Red, Sodium Salt
Catalog Numbers:
LC13070
Synonyms:
3', 3"-Dichlorophenolsulfonephthalein, sodium salt; CPR
Company Identification:
LabChem Inc
200 William Pitt Way
Pittsburgh, PA 15238
Company Phone Number:
(412) 826-5230
Emergency Phone Number:
(800) 424-9300
CHEMTREC Phone Number:
(800) 424-9300

Section 2 – Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
123333-64-2	Chlorophenol Red sodium salt	100

Section 3 - Hazards Identification

Emergency Overview

Appearance: *Red-brown powder*
Caution. May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: *None.*

Potential Health Effects

Eye:
May cause eye irritation.
Skin:
May cause skin irritation.
Ingestion:
May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation:
May cause respiratory tract irritation.
Chronic:
No information found.

Material Safety Data Sheet
Chlorophenol Red, Sodium Salt

Section 4 - First Aid Measures

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:
Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion:
Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation:
Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:
Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media:
Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

Autoignition Temperature:
Not applicable.

Flash Point:
Not applicable.

NFPA Rating:
Not available.

Explosion Limits:
Lower: n/a Upper: n/a

Section 6 - Accidental Release Measures

General Information:
Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Provide ventilation.

Material Safety Data Sheet
Chlorophenol Red, Sodium Salt

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

Storage:

Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits:

Chemical Name:	ACGIH	NIOSH	OSHA
Chlorophenol Red sodium salt	none listed	none listed	none listed

OSHA Vacated PELs:

Chlorophenol Red Sodium Salt: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State:	Solid
Color:	Red-brown
Odor:	Odorless
pH:	Not available
Vapor Pressure:	Not available
Vapor Density:	Not available
Evaporation Rate:	Not available
Viscosity:	Not available
Boiling Point:	Not available
Freezing/Melting Point:	Not available
Decomposition Temperature:	Not available

Material Safety Data Sheet
Chlorophenol Red, Sodium Salt

Solubility in water:	Soluble
Specific Gravity/Density:	Not available
Molecular Formula:	C19H11Cl2O5SNa
Molecular Weight:	445.25

Section 10 - Stability and Reactivity

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, dust generation, strong oxidants.
Incompatibilities with Other Materials:
Oxidizing agents.
Hazardous Decomposition Products:
Carbon monoxide, oxides of sulfur, carbon dioxide, hydrogen chloride.
Hazardous Polymerization:
Has not been reported.

Section 11 - Toxicological Information

RTECS:
CAS# 123333-64-2: unlisted.
LD50/LC50:
Not available.
Carcinogenicity:
CAS# 123333-64-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
Epidemiology:
No information found
Teratogenicity:
No information found
Reproductive:
No information found
Mutagenicity:
No information found
Neurotoxicity:
No information found

Section 12 - Ecological Information

No information found

Section 13 - Disposal Considerations

Dispose of in accordance with Federal, State, and local regulations.

Material Safety Data Sheet

Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Clayton yellow MSDS

Section 1: Chemical Product and Company Identification

Product Name: #L A Y T O N Y E L L O W

Catalog Codes: 3 , #

CAS#:

RTECS: $,

TSCA: 4 3 # ! B I N V E N T O R Y #L A Y T O N Y E L L O W

CI#:

Synonym: $I R E C T 9 E L L O W 4 H I A Z O L 9 E L L O W ' 4 I T A N 9 E L L O W g T R I A Z E N E D I Y L D I P H E N Y L E N E B I S M E T H Y L B E N Z O T H I A Z O S U L F O A C I D D I S O D I U M S A L T

Chemical Name: . O T A V A I L A B L E

Chemical Formula: # (. / 3 . A

Contact Information:

Sciencelab.com, Inc.
3 M I T H 2 D
(O U S T O N 4 E X A S

5 3 3 A L E S 1-800-901-7247
) N T E R N A T I O N A L 1-281-441-4400
/ R D E R / N F O S C I E N C E , A B C O M

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
#L A Y T O N Y E L L O W		

Toxicological Data on Ingredients: . O T A P P L I C A B L E

Section 3: Hazards Identification

Potential Acute Health Effects:
(A Z A R D O U S I N C A S E O F I N G E S T I O N 3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T
I N H A L A T I O N

Potential Chronic Health Effects:
(A Z A R D O U S I N C A S E O F I N G E S T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T O F E Y E C O N T A C T I R
#!2#).!'%.)# %&&%#43 .OT AVAILABLE
-54!'%.)# %&&%#43 .OT AVAILABLE
4%2!4!'%.)# %&&%#43 .OT AVAILABLE
$%6%,!0-%.4!, 4!8)#)49 .OT AVAILABLE

Section 4: First Aid Measures

Eye Contact: . O K N O W N E F F E C T O N E Y E C O N T A C T R I N S E W I T H W A T E R F O R A F E W M I N U

Skin Contact:
! F T E R C O N T A C T W I T H S K I N W A S H I M M E D I A T E L Y W I T H P L E N T Y O F W A T E R 'E N T L Y A
W I T H R U N N I N G W A T E R A N D N O N A B R A S I V E S O A P "E P A R T I C U L A R L Y C A R E F U L T O C
O V E R T H E I R R I T A T E D S K I N W I T H A N E M O L L I E N T)F I R R I T A T I O N P E R S I S T S S E E K M
C L O T H I N G B E F O R E R E U S I N G

Serious Skin Contact: . O T A V A I L A B L E

Inhalation: ! L L O W T H E V I C T I M T O R E S T I N A W E L L V E N T I L A T E D A R E A 3 E E K I M M E D I A T E

Serious Inhalation: . O T A V A I L A B L E

Ingestion:
$ O N O T I N D U C E V O M I T I N G ,O O S E N T I G H T C L O T H I N G S U C H A S A C O L L A R T I E B E L T
B R E A T H I N G P E R F O R M M O U T H T O M O U T H R E S U S C I T A T I O N 3 E E K I M M E D I A T E M E D I

Serious Ingestion: . O T A V A I L A B L E

Section 5: Fire and Explosion Data

Flammability of the Product: - A Y B E C O M B U S T I B L E A T H I G H T E M P E R A T U R E

Auto-Ignition Temperature: . O T A V A I L A B L E

Flash Points: . O T A V A I L A B L E

Flammable Limits: . O T A V A I L A B L E

Products of Combustion:
4 H E S E P R O D U C T S A R E C A R B O N O X I D E S #/ #/ N I T R O G E N O X I D E S ./ ./ S U L F
M E T A L L I C O X I D E S

Fire Hazards in Presence of Various Substances: . O T A V A I L A B L E

Explosion Hazards in Presence of Various Substances:
2 I S K S O F E X P L O S I O N O F T H E P R O D U C T I N P R E S E N C E O F M E C H A N I C A L I M P A C T . O T
2 I S K S O F E X P L O S I O N O F T H E P R O D U C T I N P R E S E N C E O F S T A T I C D I S C H A R G E . O T A

Fire Fighting Media and Instructions:
3 - ! , , &) 2 % 5 S E $ 2 9 C H E M I C A L P O W D E R
, ! 2 ' % &) 2 % 5 S E W A T E R S P R A Y F O G O R F O A M $ O N O T U S E W A T E R J E T

Special Remarks on Fire Hazards: . O T A V A I L A B L E

Special Remarks on Explosion Hazards: . O T A V A I L A B L E

Section 6: Accidental Release Measures

Small Spill:
5 S E A P P R O P R I A T E T O O L S T O P U T T H E S P I L L E D S O L I D I N A C O N V E N I E N T W A S T E D I S
S P R E A D I N G W A T E R O N T H E C O N T A M I N A T E D S U R F A C E A N D D I S P O S E O F A C C O R D I N G
R E Q U I R E M E N T S

Large Spill:
5 S E A S H O V E L T O P U T T H E M A T E R I A L I N T O A C O N V E N I E N T W A S T E D I S P O S A L C O N T A
O N T H E C O N T A M I N A T E D S U R F A C E A N D A L L O W T O E V A C U A T E T H R O U G H T H E S A N I T A

Section 7: Handling and Storage

Precautions:
+EEP AWAY FROM HEAT +EEP AWAY FROM SOURCES OF IGNITION %MPTY CONTAIN
RESIDUE UNDER A FUME HOOD 'ROUND ALL EQUIPMENT CONTAINING MATERIAL $

Storage:
+EEP CONTAINER DRY +EEP IN A COOL PLACE 'ROUND ALL EQUIPMENT CONTAINI
CLOSED +EEP IN A COOL WELL VENTILATED PLACE #OMBUSTIBLE MATERIALS SI
AND AWAY FROM STRONG OXIDIZING AGENTS

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
5SE PROCESS ENCLOSURES LOCAL EXHAUST VENTILATION OR OTHER ENGINEER
RECOMMENDED EXPOSURE LIMITS)F USER OPERATIONS GENERATE DUST FUME C
AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT

Personal Protection: 3AFETY GLASSES ,AB COAT $UST RESPIRATOR "E SURE TO USE AN
'LOVES

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT $UST RESPIRATOR "OOTS 'LOVES !SELF CONTAI
TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTHING MIG
"%&/2% HANDLING THIS PRODUCT

Exposure Limits: .OT AVAILABLE

Section 9: Physical and Chemical Properties

Physical state and appearance: 3OLID

Odor: .OT AVAILABLE

Taste: .OT AVAILABLE

Molecular Weight: G MOLE

Color: .OT AVAILABLE

pH (1% soln/water): .OT AVAILABLE

Boiling Point: .OT AVAILABLE

Melting Point: $ECOMPOSES

Critical Temperature: .OT AVAILABLE

Specific Gravity: .OT AVAILABLE

Vapor Pressure: .OT APPLICABLE

Vapor Density: .OT AVAILABLE

Volatility: .OT AVAILABLE

Odor Threshold: .OT AVAILABLE

Water/Oil Dist. Coeff.: .OT AVAILABLE

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: . O T A V A I L A B L E

Solubility: . O T A V A I L A B L E

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O T A V A I L A B L E

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: . O

Section 11: Toxicological Information

Routes of Entry:) N G E S T I O N

Toxicity to Animals:
, $. O T A V A I L A B L E
, # . O T A V A I L A B L E

Chronic Effects on Humans: . O T A V A I L A B L E

Other Toxic Effects on Humans:
(A Z A R D O U S I N C A S E O F I N G E S T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T O F I N H A L A T I O N

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: . O T A V A I L A B L E

Section 12: Ecological Information

Ecotoxicity: . O T A V A I L A B L E

BOD5 and COD: . O T A V A I L A B L E

Products of Biodegradation:
0 O S S I B L Y H A Z A R D O U S S H O R T T E R M D E G R A D A T I O N P R O D U C T S A R E N O T L I K E L Y (C
A R I S E

Toxicity of the Products of Biodegradation: 4 H E P R O D U C T S O F D E G R A D A T I O N A R E M O R E T O X I C

Special Remarks on the Products of Biodegradation: . O T A V A I L A B L E

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: . O T A $ / 4 C O N T R O L L E D M A T E R I A L 5 N I T E D 3 T A T E S

Identification: . O T A P P L I C A B L E

Special Provisions for Transport: . O T A P P L I C A B L E

Section 15: Other Regulatory Information

Federal and State Regulations: 4 3 # ! B I N V E N T O R Y # L A Y T O N Y E L L O W

Other Regulations: . O T A V A I L A B L E

Other Classifications:

WHMIS (Canada): . O T C O N T R O L L E D U N D E R 7 (-) 3 # A N A D A

DSCL (EEC):
4 H I S P R O D U C T I S N O T C L A S S I F I E D A C C O R D I N G
T O T H E % 5 R E G U L A T I O N S

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: %

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
' L O V E S
, A B C O A T
$ U S T R E S P I R A T O R " E S U R E T O U S E A N
A P P R O V E D C E R T I F I E D R E S P I R A T O R O R
E Q U I V A L E N T
3 A F E T Y G L A S S E S

Section 16: Other Information

References: . O T A V A I L A B L E

Other Special Considerations: . O T A V A I L A B L E

Created: 0 -

Last Updated: 0 -

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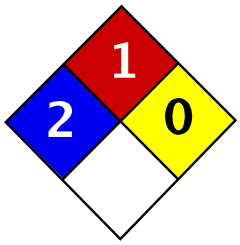

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Cresol red MSDS

Section 1: Chemical Product and Company Identification

Product Name: #RESOL RED

Catalog Codes: 3,#

CAS#:

RTECS: .OT AVAILABLE

TSCA: 43#! B INVENTORY #RESOL RED

CI#: .OT AVAILABLE

Synonym: O #RESOLSULFONPHTHALEIN

Chemical Formula: # (/ 3

Contact Information:

Sciencelab.com, Inc.
3MITH 2D
(OUSTON 4EXAS

53 3ALES 1-800-901-7247
)NTERNATIONAL 1-281-441-4400S

/RDER /NLINE 3CIENCE,AB COM

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
#RESOL RED		

Toxicological Data on Ingredients: #RESOL RED,$ .OT AVAILABLE ,# .OT AVAILABLE

Section 3: Hazards Identification

Potential Acute Health Effects:
6ERY HAZARDOUS IN CASE OF INGESTION (AZARDOUS IN CASE OF SKIN CONTACT
INHALATION 3LIGHTLY HAZARDOUS IN CASE OF SKIN CONTACT PERMEATOR

Potential Chronic Health Effects:
#!2#)./'%.)# %&&%#43 .OT AVAILABLE
-54!'%.)# %&&%#43 .OT AVAILABLE
4%2!4/'%.)# %&&%#43 .OT AVAILABLE
$%6%,/0-%.4!, 4/8)#)49 .OT AVAILABLE
4HE SUBSTANCE IS TOXIC TO LUNGS MUCOUS MEMBRANES
2EPEATED OR PROLONGED EXPOSURE TO THE SUBSTANCE CAN PRODUCE TARGET

Section 4: First Aid Measures

Eye Contact: #HECK FOR AND REMOVE ANY CONTACT LENSES $O NOT USE AN EYE OINT

Skin Contact:
!FTER CONTACT WITH SKIN WASH IMMEDIATELY WITH PLENTY OF WATER 'ENTLY A
WITH RUNNING WATER AND NON ABRASIVE SOAP "E PARTICULARLY CAREFUL TO C
#OVER THE IRRITATED SKIN WITH AN EMOLLIENT)F IRRITATION PERSISTS SEEK M
CLOTHING BEFORE REUSING

Serious Skin Contact:
7ASH WITH A DISINFECTANT SOAP AND COVER THE CONTAMINATED SKIN WITH AN A
ATTENTION

Inhalation: !LLOW THE VICTIM TO REST IN A WELL VENTILATED AREA 3EEK IMMEDIATE

Serious Inhalation: .OT AVAILABLE

Ingestion:
$O NOT INDUCE VOMITING ,OOSEN TIGHT CLOTHING SUCH AS A COLLAR TIE BELT
BREATHING PERFORM MOUTH TO MOUTH RESUSCITATION 3EEK IMMEDIATE MEDI

Serious Ingestion: .OT AVAILABLE

Section 5: Fire and Explosion Data

Flammability of the Product: -AY BE COMBUSTIBLE AT HIGH TEMPERATURE

Auto-Ignition Temperature: .OT AVAILABLE

Flash Points: .OT AVAILABLE

Flammable Limits: .OT AVAILABLE

Products of Combustion: 4HESE PRODUCTS ARE CARBON OXIDES #/ #/

Fire Hazards in Presence of Various Substances: .OT AVAILABLE

Explosion Hazards in Presence of Various Substances:
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF MECHANICAL IMPACT .OT
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF STATIC DISCHARGE .OT A

Fire Fighting Media and Instructions:
3-!,, &)2% 5SE $29 CHEMICAL POWDER
,!2'% &)2% 5SE WATER SPRAY FOG OR FOAM $O NOT USE WATER JET

Special Remarks on Fire Hazards: .OT AVAILABLE

Special Remarks on Explosion Hazards: .OT AVAILABLE

Section 6: Accidental Release Measures

Small Spill:
5SE APPROPRIATE TOOLS TO PUT THE SPILLED SOLID IN A CONVENIENT WASTE DIS
SPREADING WATER ON THE CONTAMINATED SURFACE AND DISPOSE OF ACCORDING
REQUIREMENTS

Large Spill:
5SE A SHOVEL TO PUT THE MATERIAL INTO A CONVENIENT WASTE DISPOSAL CONTA
ON THE CONTAMINATED SURFACE AND ALLOW TO EVACUATE THROUGH THE SANITA

Section 7: Handling and Storage

Precautions:
+EEP AWAY FROM HEAT +EEP AWAY FROM SOURCES OF IGNITION %MPTY CONTAIN
RESIDUE UNDER A FUME HOOD 'ROUND ALL EQUIPMENT CONTAINING MATERIAL $
PROTECTIVE CLOTHING)N CASE OF INSUFFICIENT VENTILATION WEAR SUITABLE
MEDICAL ATTENTION AND SHOW THE LABEL WHEN POSSIBLE !VOID CONTACT WITH

Storage:
+EEP CONTAINER DRY +EEP IN A COOL PLACE 'ROUND ALL EQUIPMENT CONTAINI
CLOSED +EEP IN A COOL WELL VENTILATED PLACE #OMBUSTIBLE MATERIALS SI
AND AWAY FROM STRONG OXIDIZING AGENTS

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
5SE PROCESS ENCLOSURES LOCAL EXHAUST VENTILATION OR OTHER ENGINEER
RECOMMENDED EXPOSURE LIMITS)F USER OPERATIONS GENERATE DUST FUME C
AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT

Personal Protection:
3PLASH GOGGLES ,AB COAT $UST RESPIRATOR "E SURE TO USE AN APPROVED C
'LOVES

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT $UST RESPIRATOR "OOTS 'LOVES ! SELF CONTAI
TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTHING MIGI
"%&/2% HANDLING THIS PRODUCT

Exposure Limits: .OT AVAILABLE

Section 9: Physical and Chemical Properties

Physical state and appearance: 3OLID

Odor: .OT AVAILABLE

Taste: .OT AVAILABLE

Molecular Weight: G MOLE

Color: .OT AVAILABLE

pH (1% soln/water): .OT AVAILABLE

Boiling Point: $ECOMPOSES

Melting Point: —# —&

Critical Temperature: .OT AVAILABLE

Specific Gravity: .OT AVAILABLE

Vapor Pressure: .OT APPLICABLE

Vapor Density: .OT AVAILABLE

Volatility: .OT AVAILABLE

Odor Threshold: .OT AVAILABLE

Water/Oil Dist. Coeff.: .OT AVAILABLE

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: . O T A V A I L A B L E

Solubility: . O T A V A I L A B L E

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O T A V A I L A B L E

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: . O

Section 11: Toxicological Information

Routes of Entry: % Y E C O N T A C T) N H A L A T I O N) N G E S T I O N

Toxicity to Animals:
, $. O T A V A I L A B L E
, # . O T A V A I L A B L E

Chronic Effects on Humans: 4 H E S U B S T A N C E I S T O X I C T O L U N G S M U C O U S M E M B R A N E S

Other Toxic Effects on Humans:
6 E R Y H A Z A R D O U S I N C A S E O F I N G E S T I O N
(A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T O F I N H A L A T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T P E R M E A T O R

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: . O T A V A I L A B L E

Section 12: Ecological Information

Ecotoxicity: . O T A V A I L A B L E

BOD5 and COD: . O T A V A I L A B L E

Products of Biodegradation:
0 O S S I B L Y H A Z A R D O U S S H O R T T E R M D E G R A D A T I O N P R O D U C T S A R E N O T L I K E L Y (C
A R I S E

Toxicity of the Products of Biodegradation: 4 H E P R O D U C T S O F D E G R A D A T I O N A R E M O R E T O X I C

Special Remarks on the Products of Biodegradation: . O T A V A I L A B L E

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: . O T A $ / 4 C O N T R O L L E D M A T E R I A L 5 N I T E D 3 T A T E S

Identification: . O T A P P L I C A B L E

Special Provisions for Transport: . O T A P P L I C A B L E

Section 15: Other Regulatory Information

Federal and State Regulations: 4 3 # ! B I N V E N T O R Y # R E S O L R E D

Other Regulations: / 3 (! (A Z A R D O U S B Y D E F I N I T I O N O F (A Z A R D # O M M U N I C A T I O N 3 T A N D A

Other Classifications:

WHMIS (Canada): # , ! 3 3 $! - A T E R I A L C A U S I N G O T H E R T O X I C E F F E C T S 6 % 2 9 4 / 8) #

DSCL (EEC): 2) R R I T A T I N G T O E Y E S A N D S K I N

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: %

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
' L O V E S
, A B C O A T
$ U S T R E S P I R A T O R " E S U R E T O U S E A N
A P P R O V E D C E R T I F I E D R E S P I R A T O R O R
E Q U I V A L E N T 7 E A R A P P R O P R I A T E R E S P I R A T O R
W H E N V E N T I L A T I O N I S I N A D E Q U A T E
3 P L A S H G O G G L E S

Section 16: Other Information

References: . O T A V A I L A B L E

Other Special Considerations: . O T A V A I L A B L E

Created: 0 -

Last Updated: 0 -

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ISO9001:2000 Certified

Material Safety Data Sheet
o-Cresolphthalein, 0.2% Alcoholic

Section 1 - Chemical Product and Company Identification

MSDS Name:
o-Cresolphthalein, 0.2% Alcoholic
Catalog Numbers:
LC13539
Synonyms:

Company Identification:
LabChem, Inc.
200 William Pitt Way
Pittsburgh, PA 15238
Company Phone Number:
(412) 826-5230
Emergency Phone Number:
(800) 424-9300
CHEMTREC Phone Number:
(800) 424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
596-27-0	o-Cresolphthalein	0.2
64-17-5	Ethyl alcohol	balance

Section 3 - Hazards Identification

Emergency Overview

Appearance: *Colorless liquid.*

Caution! *Flammable liquid and vapor. Warning! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. Flash Point: > 73°F.*

Target Organs: *Eyes, skin, respiratory system, central nervous system, liver, blood and reproductive system.*

Potential Health Effects

Eye:
May cause eye irritation, Stinging, burning sensation, and lacrymation.
Skin:
May cause irritation and defatting.
Ingestion:
Ingestion can result in toxic intoxication, poisoning, headache, nausea, diarrhea and fever. Large doses can cause hemolysis, hemoglobinuria, hyperglycemia, glycosuria, renal failure, convulsions, narcosis, and paralysis.

Inhalation:
May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, emotional instability, respiratory irritation, dizziness, weakness, fatigue, nausea, headache, unconsciousness, asphyxiation (effects of narcotic). May cause irritation and dehydration of mucous membranes.

Chronic:
Repeated or excessive exposure may result in respiratory irritation, cough, headache, dermatitis, conjunctivitis, with possible liver and kidney damage, weight loss, neurological disorders (tremors, amnesia, myocardial and circulatory failure).

Section 4 - First Aid Measures

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids until no evidence of chemical remains. Get medical aid at once.

Skin:
Get medical aid. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes.

Ingestion:
Give conscious victim 2-4 cupfuls of milk or water. Get medical aid at once. Give oxygen if respiration is depressed. Induce vomiting (touch finger to back of throat) keeping head lower than hips (prevent aspiration into lungs).

Inhalation:
Give artificial respiration if necessary. Get medical aid. Keep victim warm, at rest. Move victim to fresh air.

Notes to Physician:
Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:
Vapors heavier than air, may travel considerable distance and flash back from source of ignition. Move container if possible, avoid breathing vapors or dust. Dangerous fire/negligible explosion hazard when exposed to heat or flame.

Extinguishing Media:
For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

Autoignition Temperature:
No information found.

Flash Point:
> 73°F

NFPA Rating:
CAS# 596-27-0: health – 1; flammability – 0; reactivity - 0.
CAS# 64-17-5: health-0; flammability-3; reactivity-0

Explosion Limits:
Lower: Not available Upper: Not available

Material Safety Data Sheet
o-Cresolphthalein, 0.2% Alcoholic

Section 6 - Accidental Release Measures

General Information:

Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spills with absorbent (vermiculite, sand, fuller's earth) and place in plastic bags for later disposal. Keep out of sewers/drains.

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Avoid breathing dust, vapor, mist, or gas.

Storage:

Store container tightly closed at room temperature. Protect from heat and incompatibles.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Provide local exhaust or general dilution ventilation.

Exposure Limits:

Chemical Name:	ACGIH	NIOSH	OSHA
o-Cresolphthalein	none listed	none listed	none listed
Ethyl alcohol	1000 ppm TWA	1000 ppm TWA; 1900 mg/m^3 TWA	1000 ppm TWA; 1900 mg/m^3 TWA;

OSHA Vacated PELs:

Ethyl alcohol: 1000 ppm TWA; 1900 mg/m^3 TWA

Personal Protective Equipment

Eyes:

Do not wear contact lenses when working with chemicals. An eye wash fountain should be available in the immediate work area. Wear splash-proof safety goggles.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Firefighting-- any self-contained breathing apparatus with full facepiece operated in pressure-demand mode. High Levels- CCROV/SAR/SCBA. Firefighting- SCBAF:PP,PD. (Respirator Codes: (NIOSH) Publication No. 78-210).

Material Safety Data Sheet
o-Cresolphthalein, 0.2% Alcoholic

Section 9 - Physical and Chemical Properties

Physical State:	Liquid
Color:	Colorless
Odor:	Alcohol-like
pH:	Neutral
Vapor Pressure:	Not available
Vapor Density:	Not available
Evaporation Rate:	< ether
Viscosity:	Not available
Boiling Point:	Not available
Freezing/Melting Point:	Not available
Decomposition Temperature:	Not available
Solubility in water:	Soluble.
Specific Gravity/Density:	Not available
Molecular Formula:	Not applicable
Molecular Weight:	Not applicable

Section 10 - Stability and Reactivity

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, excess heat.
Incompatibilities with Other Materials:
Strong oxidizing agents, alkali metals, nitric acid, perchloric acid, sulfuric acid, chlorine, hypochlorites, hydrochloric acid.
Hazardous Decomposition Products:
Oxides of carbon, formaldehyde, corrosive fumes of acrolein.
Hazardous Polymerization:
Has not been reported

Section 11 - Toxicological Information

RTECS:
CAS# 596-27-0: SM8390000.
CAS# 64-17-5: KQ6300000.
LD50/LC50:
CAS# 596-27-0:
Not available
CAS# 64-17-5:
Inhalation, mouse: LC50 =39 gm/m3/4H
Inhalation, rat: LC50 =20000 ppm/10H
Oral, mouse: LD50 = 3450 mg/kg
Oral, rabbit: LD50 = 6300 mg/kg
Oral, rat: LD50 = 7060 mg/kg.

Carcinogenicity:

CAS# 596-27-0: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.

CAS# 64-17-5

ACGIH: A4 - Not Classifiable as a Human Carcinogen
California: Not listed.
NIOSH: Not listed.
NTP: Not listed.
OSHA: Not listed.
IARC: Not listed.

Epidemiology:

Toxicity: Reagent alcohol (90% ethanol, 5% methanol, 5% isopropanol) is considered an irritant/narcotic; mutagenic/-teratogenic data. Isopropanol manufactured by the strong acid process is listed in group 1 by IARC. Workers manufacturing isopropanol by this process showed increased sinus and laryngeal cancer.

Teratogenicity:

No information found.

Reproductive:

No information found.

Mutagenicity:

No information found.

Neurotoxicity:

No information found.

Section 12 - Ecological Information

No information found.

Section 13 - Disposal Considerations

Dispose of in accordance with Federal, State, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: Ethanol solution
Hazard Class: 3
UN Number: UN1170
Packing Group: PG III

Section 15 - Regulatory Information

US Federal

TSCA:

CAS# 596-27-0 is listed on the TSCA Inventory.
CAS# 64-17-5 is listed on the TSCA Inventory.

Material Safety Data Sheet
o-Cresolphthalein, 0.2% Alcoholic

SARA Reportable Quantities (RQ):
None of the components are on this list.
CERCLA/SARA Section 313:
None of the components are on this list.
OSHA - Highly Hazardous:
None of the components are on this list.

US State

State Right to Know:
Ethyl alcohol can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
California Regulations:
WARNING: This product contains Ethyl alcohol, a chemical known to the state of California to cause birth defects or other reproductive harm.

European/International Regulations

Canadian DSL/NDSL:
CAS# 596-27-0 is listed on Canada's DSL List.
CAS# 64-17-5 is listed on Canada's DSL List.
Canada Ingredient Disclosure List:
CAS# 596-27-0 is not listed on Canada's Ingredient Disclosure List.
CAS# 64-17-5 is listed on Canada's Ingredient Disclosure List.

Section 16 - Other Information

MSDS Creation Date: November 26, 2007
Revision Date: November 27, 2007

Information in this MSDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc. assumes no liability resulting from the use of this MSDS. The user must determine suitability of this information for his application.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

1,5-DIPHENYLCARBOHYDRAZIDE

1. Product Identification

Synonyms: 1,5-Diphenylcarbazide; S-diphenylcarbazide; DPC
CAS No.: 140-22-7
Molecular Weight: 242.29
Chemical Formula: C6H5NHNHCONHNHC6H5
Product Codes:
J.T. Baker: K620
Mallinckrodt: 1842

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
1,5-Diphenylcarbazide	140-22-7	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! MAY BE HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Information on the human health effects from exposure to this substance is limited.

Inhalation:
No information found, but compound should be handled as a potential health hazard. May cause irritation to the respiratory tract. Symptoms may include coughing, sore throat, labored breathing, and chest pain.
Ingestion:
No information found, but compound should be handled as a potential health hazard. May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.
Skin Contact:
No information found, but compound should be handled as a potential health hazard. May cause irritation with redness and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
No information found, but compound should be handled as a potential health hazard. May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust

dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White to pinkish white crystalline powder.
Odor:
No information found.
Solubility:
Slightly soluble in water.
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
168 - 171C (334 - 340F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
Heat, light, dusting and incompatibles.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
1,5-Diphenylcarbazide (140-22-7)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
1,5-Diphenylcarbazide (140-22-7)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
1,5-Diphenylcarbazide (140-22-7)	Yes	Yes	No	Yes

```
--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-     ------SARA 313------
Ingredient                                RQ    TPQ      List  Chemical Catg.
----------------------------------------  ---   -----    ----  ---------------
1,5-Diphenylcarbazide (140-22-7)          No    No       No          No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-     -TSCA-
Ingredient                                CERCLA  261.33      8(d)
----------------------------------------  ------  ------     ------
1,5-Diphenylcarbazide (140-22-7)          No      No          No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! MAY BE HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid breathing dust.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:

Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet
alpha, alpha'-Dipyridyl

ACC# 08235

Section 1 - Chemical Product and Company Identification

MSDS Name: alpha, alpha'-Dipyridyl
Catalog Numbers: D95-5, ZZD9550015
Synonyms: 2, 2'-Dipyridyl; 2,2'-Bipyridine.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
366-18-7	2,2'-Dipyridyl	100	206-674-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: light cream to yellow solid.
Warning! Toxic if swallowed. Harmful if absorbed through skin or if inhaled. Causes eye, skin, and respiratory tract irritation.
Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation. Harmful if absorbed through the skin.
Ingestion: May be harmful if swallowed. Causes digestive tract irritation. Toxic if swallowed.
Inhalation: Harmful if inhaled. Causes respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or

other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower:Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid breathing dust.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,2'-Dipyridyl	none listed	none listed	none listed

OSHA Vacated PELs: 2,2'-Dipyridyl: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: light cream to yellow
Odor: Not available.
pH: Not available.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate:Negligible.
Viscosity: 1.51 cSt 90C
Boiling Point: 273 deg C
Freezing/Melting Point:69 - 70 deg C
Decomposition Temperature:Not available.
Solubility: 0.5%
Specific Gravity/Density:Not available.
Molecular Formula:C10H8N2
Molecular Weight:156.19

Section 10 - Stability and Reactivity

Chemical Stability: Stable. Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, dust generation.
Incompatibilities with Other Materials: Strong oxidizers.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 366-18-7: DW1750000
LD50/LC50:
CAS# 366-18-7:
    Oral, mouse: LD50 = 330 mg/kg;
    Oral, rat: LD50 = 100 mg/kg;
.

Carcinogenicity:
CAS# 366-18-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: This chelator for ferrous iron was given intraperitoneally to rats on days 11.5 through 14.5 in doses of 60-75 mg per kg. Skeletal defects especially of the limbs were found.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 366-18-7 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 366-18-7: immediate.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 366-18-7 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 20/21 Harmful by inhalation and in contact with skin.
R 25 Toxic if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 366-18-7: 2

Canada - DSL/NDSL

CAS# 366-18-7 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997

Revision #8 Date: 5/17/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Number: **E1300** * * * * * *Effective Date:* ***04/02/07*** * * * * * *Supercedes:* ***08/10/04***

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ERIOCHROME BLACK T

1. Product Identification

Synonyms: Moderate Black II; CI 14645; Eriochrome Black T Supra
CAS No.: 1787-61-7
Molecular Weight: 461.38
Chemical Formula: C20H12O7N3SNa
Product Codes:
J.T. Baker: L126
Mallinckrodt: 2419

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Erichrome Black T	1787-61-7	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! TOXICOLOGICAL PROPERTIES UNKNOWN. As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

The toxicological properties of this material have not been investigated.

Inhalation:
No information found.
Ingestion:
No information found.
Skin Contact:
No information found.
Eye Contact:
No information found.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
If large amounts were swallowed, give water to drink and get medical advice.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Wash thoroughly with running water. Get medical advice if irritation develops.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage.

Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles.

---

9. Physical and Chemical Properties

Appearance:
Black powder.
Odor:
Odorless.
Solubility:
Moderate solubility in water.
Specific Gravity:
No information found.
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce carbon monoxide, carbon dioxide, sulfur oxides, and nitrogen oxides.
Hazardous Polymerization:

Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
Incompatibles.

11. Toxicological Information

LD50 Oral Rat: 17590 mg/kg

```
--------\Cancer Lists\-------------------------------------------------------
                                   ---NTP Carcinogen---
Ingredient                         Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Erichrome Black T (1787-61-7)           No          No            None
```

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Erichrome Black T (1787-61-7)                     Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Erichrome Black T (1787-61-7)                     Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
Ingredient                                  RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Erichrome Black T (1787-61-7)             No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                       -RCRA-    -TSCA-
Ingredient                                CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Erichrome Black T (1787-61-7)             No         No         No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
```

```
SARA 311/312:  Acute: No       Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! TOXICOLOGICAL PROPERTIES UNKNOWN. As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
Not applicable.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MATERIAL SAFETY DATA SHEET

Date-Issued: 09/25/2000
MSDS Ref. No: 213110
Date-Revised: 02/21/2001
Revision No: 1

Ethyl Alcohol <95%>

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Ethyl Alcohol <95%>
PRODUCT DESCRIPTION: Ethyl Alcohol <95%>
PRODUCT CODE: Ethyl Alcohol <95%>
PRODUCT FORMULATION NAME: Ethyl Alcohol <95%>
CHEMICAL FAMILY: Alcohols, Ketones
GENERIC NAME: Special Industrial Solvent

MANUFACTURER

Americhem Sales Corporation
340 North Street
Mason, MI 48854
Contact: Americhem Sales Corporation
Product Stewardship: 517-676-9363
Transportation: 517-676-9363

24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (U.S.): (800) 424-9300
Canutec (613) 996-6666
Emergency Phone: 800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS#	EINECS#
Ethanol	~90	64-17-5	200-578-6
Methyl isobutyl ketone	~4	108-10-1	
n-Heptane	<1	142-82-5	
Water	~6	7732-18-5	231-791-2

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

IMMEDIATE CONCERNS: CAUTION! May cause eye and skin irritation.

POTENTIAL HEALTH EFFECTS

EYES: May cause moderate burning, tearing, redness and swelling.

SKIN: Moderate irritation and discomfort possible. Defatting of skin, redness and chemical dermatitis possible. Toxic systemic effects from absorption are possible.

INGESTION: Gastrointestinal tract irritation and/or discomfort is possible.

INHALATION: Dizziness, impaired coordination, headaches and loss of consciousness. Severe respiratory tract irritation. Toxic systemic effects are possible.

ROUTES OF ENTRY: Absorption, Inhalation, Ingestion

TARGET ORGAN STATEMENT: Liver, Heart, Kidney and CNS toxin.

---

4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water for 15 minutes. If irritation persists, seek medical attention.

SKIN: Wash exposed area with mild soap and water. Get medical attention if irritation develops or persists.

INGESTION: Do induce vomiting, only if victim is conscious. Get immediate medical attention.

INHALATION: Remove victim from area of exposure. If unconscious, give oxygen. Give artificial respiration if not breathing. Get immediate medical attention.

---

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: ~(69°F)ASTM D56

FLAMMABLE LIMITS: 3.3 to 19.0

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Use dry chemical, foam, or carbon dioxide.

EXPLOSION HAZARDS: Vapor accumulations may flash and/or explode if ignited. Keep ignition sources, open flames, ect., away from thse fumes.

FIRE FIGHTING PROCEDURES: Proper respiratory equipment to protect against the hazardous effects of combustion products is recommended. Water in a straight hose stream may cause fire to spread and should be used as a cooling medium only.

---

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL:

Extinguish all ignition sources and ventilate area. Evacuate all non-essential personnel. Blanket spill with alcohol resistant foam to limit evaporation. Dike area to contain spill and clean up by absorbing on inert absorbent or by other means. Liquid may be flammable even when mixed with water unless heavily diluted (>5:1). Do not flush into sewers or natural waterways.

LARGE SPILL:

Contain material as described above and call the local fire or police department for immediate emergency assistance.

---

7. HANDLING AND STORAGE

HANDLING:

Use appropriate personal protective equipment as specified in Section 8. Handle in a well ventilated area.

STORAGE:

Store unopened containers under cool, dry and ventilated conditions. Keep away from heat, sparks and flame.

ELECTROSTATIC ACCUMULATION HAZARD: When transferring this product, there is potential for the accumulation of static electricity. Consideration should be given to bonding and grounding of equipment during loading, unloading, and transfer of this product.

---

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

		EXPOSURE LIMITS					
		OSHA PEL		ACGIH TLV		Supplier OEL	
		ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3
Ethanol	**TWA**	1000	1900	1000	1880	NL	NL
	STEL	NL	NL	NL	NL	NL	NL
Methyl isobutyl ketone	**TWA**	50		50			
	STEL			75			
n-Heptane	**TWA**	500		400			
	STEL			500			

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure guidelines, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Wear safety glasses with side shields or goggles when handling this material.

SKIN: To prevent any contact, wear impervious protective clothing such as neoprene or butyl rubber gloves, apron, boots or whole bodysuit, as appropriate.

RESPIRATORY: Use NIOSH/MSHA approved respirators when vapors or mist concentrations exceed permissible exposure limits.

PROTECTIVE CLOTHING: Chemical resistant boots, apron, etc. as necessary to prevent contamination of clothing and skin contact.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid

ODOR: Mild alcohol odor

APPEARANCE: Clear

COLOR: Colorless

pH: Not Available

PERCENT VOLATILE: 100

VAPOR PRESSURE: 44 mmHg at 20°C

VAPOR DENSITY: 1.6 (Air=1)

BOILING POINT: ~(173°F)

SOLUBILITY IN WATER: Complete

EVAPORATION RATE: 2.0 (n-Butyl Acetate=1)

SPECIFIC GRAVITY: 0.82 at 20°C

MOLECULAR FORMULA: Mixture

---

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Exposure to excessive heat, open flames and sparks. Avoid conditions that favor the formation of excessive mists and/or fumes.

STABILITY: Stable

POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of Carbon when burned.

INCOMPATIBLE MATERIALS: Strong oxidizing agents.

---

11. TOXICOLOGICAL INFORMATION

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12. ECOLOGICAL INFORMATION

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13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Conditions of use may cause this material to become a hazardous waste as defined by state or federal law. Use approved treatment, transporters and disposal sites.

EMPTY CONTAINER: Keep containers closed when not in use. Do not reuse empty containers.

---

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Denatured Alcohol

PRIMARY HAZARD CLASS/DIVISION: 3

UN/NA NUMBER: NA1987

PACKING GROUP: II

LABEL: Flammable Liquid

---

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION

ACT)

311/312 HAZARD CATEGORIES:

FIRE: YES **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** YES

313 REPORTABLE INGREDIENTS: Methyl Isobutyl Ketone (108-10-1) - 3 to 4% Wt.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY: All intentional ingredients are listed on the TSCA Inventory.

---

16. OTHER INFORMATION

REVISION SUMMARY

Revision #: 1

This MSDS replaces the September 25, 2000 MSDS. Any changes in information are as follows:
In Section 1
Prepared By

HMIS CODES

HEALTH: *2 **FIRE:** 3 **REACTIVITY:** 0 **PROTECTION:** c

MANUFACTURER DISCLAIMER: The information in this MSDS was obtained from sources which we believe are reliable. However, the above information is provided without warranty, expressed or implied, regarding its correctness. The conditions or methods if handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibilty and expressly dislcaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the procuct.

ADDITIONAL MSDS INFORMATION: Treat as an OSHA Class IB Flammable Liquid.

MATERIAL SAFETY DATA SHEET

Date-Issued: 09/25/2000
MSDS Ref. No: 213110
Date-Revised: 02/21/2001
Revision No: 1

Ethyl Alcohol <95%>

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Ethyl Alcohol <95%>
PRODUCT DESCRIPTION: Ethyl Alcohol <95%>
PRODUCT CODE: Ethyl Alcohol <95%>
PRODUCT FORMULATION NAME: Ethyl Alcohol <95%>
CHEMICAL FAMILY: Alcohols, Ketones
GENERIC NAME: Special Industrial Solvent

MANUFACTURER

Americhem Sales Corporation
340 North Street
Mason, MI 48854
Contact: Americhem Sales Corporation
Product Stewardship: 517-676-9363
Transportation: 517-676-9363

24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (U.S.): (800) 424-9300
Canutec (613) 996-6666
Emergency Phone: 800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS#	EINECS#
Ethanol	~90	64-17-5	200-578-6
Methyl isobutyl ketone	~4	108-10-1	
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Water	~6	7732-18-5	231-791-2

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IMMEDIATE CONCERNS: CAUTION! May cause eye and skin irritation.

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SKIN: Moderate irritation and discomfort possible. Defatting of skin, redness and chemical dermatitis possible. Toxic systemic effects from absorption are possible.

INGESTION: Gastrointestinal tract irritation and/or discomfort is possible.

INHALATION: Dizziness, impaired coordination, headaches and loss of consciousness. Severe respiratory tract irritation. Toxic systemic effects are possible.

ROUTES OF ENTRY: Absorption, Inhalation, Ingestion

TARGET ORGAN STATEMENT: Liver, Heart, Kidney and CNS toxin.

---

4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water for 15 minutes. If irritation persists, seek medical attention.

SKIN: Wash exposed area with mild soap and water. Get medical attention if irritation develops or persists.

INGESTION: Do induce vomiting, only if victim is conscious. Get immediate medical attention.

INHALATION: Remove victim from area of exposure. If unconscious, give oxygen. Give artificial respiration if not breathing. Get immediate medical attention.

---

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: ~(69°F)ASTM D56

FLAMMABLE LIMITS: 3.3 to 19.0

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Use dry chemical, foam, or carbon dioxide.

EXPLOSION HAZARDS: Vapor accumulations may flash and/or explode if ignited. Keep ignition sources, open flames, ect., away from thse fumes.

FIRE FIGHTING PROCEDURES: Proper respiratory equipment to protect against the hazardous effects of combustion products is recommended. Water in a straight hose stream may cause fire to spread and should be used as a cooling medium only.

---

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL:

Extinguish all ignition sources and ventilate area. Evacuate all non-essential personnel. Blanket spill with alcohol resistant foam to limit evaporation. Dike area to contain spill and clean up by absorbing on inert absorbent or by other means. Liquid may be flammable even when mixed with water unless heavily diluted (>5:1). Do not flush into sewers or natural waterways.

LARGE SPILL:

Contain material as described above and call the local fire or police department for immediate emergency assistance.

---

7. HANDLING AND STORAGE

HANDLING:

Use appropriate personal protective equipment as specified in Section 8. Handle in a well ventilated area.

STORAGE:

Store unopened containers under cool, dry and ventilated conditions. Keep away from heat, sparks and flame.

ELECTROSTATIC ACCUMULATION HAZARD: When transferring this product, there is potential for the accumulation of static electricity. Consideration should be given to bonding and grounding of equipment during loading, unloading, and transfer of this product.

---

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

		EXPOSURE LIMITS					
		OSHA PEL		ACGIH TLV		Supplier OEL	
		ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3
Ethanol	**TWA**	1000	1900	1000	1880	NL	NL
	STEL	NL	NL	NL	NL	NL	NL
Methyl isobutyl ketone	**TWA**	50		50			
	STEL			75			
n-Heptane	**TWA**	500		400			
	STEL			500			

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure guidelines, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Wear safety glasses with side shields or goggles when handling this material.

SKIN: To prevent any contact, wear impervious protective clothing such as neoprene or butyl rubber gloves, apron, boots or whole bodysuit, as appropriate.

RESPIRATORY: Use NIOSH/MSHA approved respirators when vapors or mist concentrations exceed permissible exposure limits.

PROTECTIVE CLOTHING: Chemical resistant boots, apron, etc. as necessary to prevent contamination of clothing and skin contact.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid

ODOR: Mild alcohol odor

APPEARANCE: Clear

COLOR: Colorless

pH: Not Available

PERCENT VOLATILE: 100

VAPOR PRESSURE: 44 mmHg at 20°C

VAPOR DENSITY: 1.6 (Air=1)

BOILING POINT: ~(173°F)

SOLUBILITY IN WATER: Complete

EVAPORATION RATE: 2.0 (n-Butyl Acetate=1)

SPECIFIC GRAVITY: 0.82 at 20°C

MOLECULAR FORMULA: Mixture

---

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Exposure to excessive heat, open flames and sparks. Avoid conditions that favor the formation of excessive mists and/or fumes.

STABILITY: Stable

POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of Carbon when burned.

INCOMPATIBLE MATERIALS: Strong oxidizing agents.

---

11. TOXICOLOGICAL INFORMATION

---

12. ECOLOGICAL INFORMATION

---

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Conditions of use may cause this material to become a hazardous waste as defined by state or federal law. Use approved treatment, transporters and disposal sites.

EMPTY CONTAINER: Keep containers closed when not in use. Do not reuse empty containers.

---

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Denatured Alcohol

PRIMARY HAZARD CLASS/DIVISION: 3

UN/NA NUMBER: NA1987

PACKING GROUP: II

LABEL: Flammable Liquid

---

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION

ACT)

311/312 HAZARD CATEGORIES:

FIRE: YES **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** YES

313 REPORTABLE INGREDIENTS: Methyl Isobutyl Ketone (108-10-1) - 3 to 4% Wt.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY: All intentional ingredients are listed on the TSCA Inventory.

---

16. OTHER INFORMATION

REVISION SUMMARY

Revision #: 1

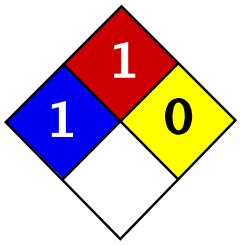
This MSDS replaces the September 25, 2000 MSDS. Any changes in information are as follows:
In Section 1
Prepared By

HMIS CODES

HEALTH: *2 **FIRE:** 3 **REACTIVITY:** 0 **PROTECTION:** c

MANUFACTURER DISCLAIMER: The information in this MSDS was obtained from sources which we believe are reliable. However, the above information is provided without warranty, expressed or implied, regarding its correctness. The conditions or methods if handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibilty and expressly dislcaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the procuct.

ADDITIONAL MSDS INFORMATION: Treat as an OSHA Class IB Flammable Liquid.



Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Ethylenediamine tetraacetic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylenediamine tetraacetic acid

Catalog Codes: SLE1045

CAS#: 60-00-4

RTECS: AH4025000

TSCA: TSCA 8(b) inventory: Ethylenediamine tetraacetic acid

CI#: Not available.

Synonym: EDTA; Edetic acid

Chemical Name: Ethylenediamine tetraacetic acid

Chemical Formula: C10H16N2O8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylenediamine tetraacetic acid	60-00-4	100

Toxicological Data on Ingredients: Ethylenediamine tetraacetic acid: ORAL (LD50): Acute: 30 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells.
TERATOGENIC EFFECTS: Classified POSSIBLE for human.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to kidneys.
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Poisonous solid.
Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (crystalline powder.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 292.28 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposition temperature: 220-240°C (464°F)

Critical Temperature: Not available.

Specific Gravity: 0.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Very slightly soluble in cold water.
Insoluble in common organic solvents.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Neutralized by alkali metal hydroxides to form a series of water-soluble salts containing from one to four alkali metal cations. No other information at this time.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 30 mg/kg [Mouse].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells.
TERATOGENIC EFFECTS: Classified POSSIBLE for human.
May cause damage to the following organs: kidneys.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (fertility and fetotoxicity) and birth defects based on animal data.
May affect genetic material based on animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Can cause skin irritation.
Eyes: Can cause eye irritation.
Inhalation: Can irritate the nose, throat/respiratory tract, and mucous membranes.
Ingestion: May cause gastrointestinal tract irritation. May affect behavior.
Chronic Potential Health Effects:
Long term exposure via inhalation or ingestion may damage the kidneys.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: : Not available. UNNA: NA9117 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Ethylenediamine tetraacetic acid
Illinois toxic substances disclosure to employee act: Ethylenediamine tetraacetic acid
Illinois chemical safety act: Ethylenediamine tetraacetic acid
New York release reporting list: Ethylenediamine tetraacetic acid
Pennsylvania RTK: Ethylenediamine tetraacetic acid
Massachusetts RTK: Ethylenediamine tetraacetic acid
Massachusetts spill list: Ethylenediamine tetraacetic acid
New Jersey: Ethylenediamine tetraacetic acid
New Jersey spill list: Ethylenediamine tetraacetic acid
California Director's List of Hazardous Substances: Ethylenediamine tetraacetic acid
TSCA 8(b) inventory: Ethylenediamine tetraacetic acid
CERCLA: Hazardous substances.: Ethylenediamine tetraacetic acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R40- Possible risks of irreversible effects.
R63- Possible risk of harm to the unborn child.
S2- Keep out of the reach of children.

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00690

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Alkaline EDTA Solution
Catalog Number: 2268732

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00690
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes severe burns.
Date of MSDS Preparation:
Day: 29
Month: March
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water
CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 90.0 - 100.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

EDTA Tetrasodium Salt
CAS No.: 64-02-8
TSCA CAS Number: 64-02-8
Percent Range: 1.0 - 5.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

Lithium Hydroxide
CAS No.: 1310-65-2
TSCA CAS Number: 1310-65-2

Percent Range: 1.0 - 10.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 225 mg/kg
LC50: Inhalation rat LC50 = 980 mg/m^3/4H
TLV: 3mg/m^3 Respirable Particles; 10 mg/m^3 Inhalable particles
PEL: 5 mg/m^3 Respirable Fraction; 15 mg/m^3 Total Dust
Hazard: Toxic. Causes severe burns.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Clear, colorless liquid
Odor: None
CAUSES SEVERE BURNS
MAY CAUSE KIDNEY OR LIVER DAMAGE BASED ON ANIMAL DATA

HMIS:
Health: 3
Flammability: 0
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.
NFPA:
Health: 3
Flammability: 0
Reactivity: 0
Symbol: Not applicable
Potential Health Effects:
Eye Contact: Causes severe burns
Skin Contact: Causes severe burns
Skin Absorption: None reported
Target Organs: None reported
Ingestion: Causes: severe burns May cause: kidney damage central nervous system effects dizziness nausea vomiting liver damage coma death
Target Organs: Central nervous system Kidneys Liver Bone marrow
Inhalation: Causes: severe burns May cause: shortness of breath coughing
Target Organs: None reported
Medical Conditions Aggravated: Pre-existing: Respiratory conditions Skin conditions Eye conditions
Chronic Effects: Lithium compounds have been implicated in development of aplastic anemia. Signs of lithium poisoning include dehydration, extreme weight loss, fine tremor of hands, nausea, vomiting and diarrhea, Chronic overexposure may cause central nervous system effects kidney damage liver damage
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.
Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.
Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: Material will not burn.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: This material will not burn.
Fire / Explosion Hazards: None reported
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Stop spilled material from being released to the environment.
Clean-up Technique: Cover spilled material with a dry acid, such as citric or boric. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Mixture contains a component which is regulated as hazardous waste.
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Keep container tightly closed when not in use.
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mi]TJ 3.3373hTJ [(i)1]TJ [(g)1]9.TJ 9. [(e)-14]TJ 2.3709649

Eye Protection: chemical splash goggles
Skin Protection: disposable latex gloves
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling.
TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Physical State: Liquid
Molecular Weight: Not applicable
Odor: None
pH: 12.82
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: ~100° C (~212° F)
Melting Point: Not determined
Specific Gravity (water = 1): 1.052
Evaporation Rate (water = 1): 0.781
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Soluble
Acid: Soluble
Other: Not determined
Metal Corrosivity:
Steel: 0.197 in/yr
Aluminum: <0.001 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: potassium ammonium acids oxidizers
Hazardous Decomposition: None reported
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Lithium Hydroxide: Oral rat LD50 = 225 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.
Ingredient Ecological Information: EDTA: BOD 0.02 g/g, COD 0.54 g/g, Fish toxicity: Bluegill LC50 = 410 mg/l for 96 hours

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002
Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Lithium Hydroxide, Solution
--
DOT Hazard Class: 8
DOT Subsidiary Risk: NA
DOT ID Number: UN2679
DOT Packing Group: II
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Lithium Hydroxide Solution
--
ICAO Hazard Class: 8
ICAO Subsidiary Risk: NA
ICAO ID Number: UN2679
ICAO Packing Group: II
I.M.O.:
I.M.O. Proper Shipping Name: Lithium Hydroxide, Solution
--
I.M.O. Hazard Class: 8
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: UN2679
I.M.O. Packing Group: II
Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:
O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)
E.P.A.:
S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.
--

302 (EHS) TPQ (40 CFR 355): Not applicable
304 CERCLA RQ (40 CFR 302.4): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
Clean Water Act (40 CFR 116.4): Not applicable
RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.
C.P.S.C.: Not applicable
State Regulations:
California Prop. 65: No Prop. 65 listed chemicals are present in this product.
Identification of Prop. 65 Ingredient(s): None
California Perchlorate Rule CCR Title 22 Chap 33:
Trade Secret Registry: Not applicable
National Inventories:
U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).
TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of potassium
References: Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Technical Judgment. In-house information.
Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
P.O.Box 389
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(970) 669-3050

MSDS No: M01326

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Ammonium Chloride Reference Electrolyte Cartridge
Catalog Number: 2595802

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01326
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause irritation.
Date of MSDS Preparation:
Day: 28
Month: August
Year: 2008

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ammonium Chloride
CAS No.: 12125-02-9
TSCA CAS Number: 12125-02-9
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD_{50} = 1650 mg/kg
LC50: None reported
TLV: 10 mg/m³
PEL: 10 mg/m³
Hazard: Causes severe eye irritation.

Glycerin
CAS No.: 56-81-5
TSCA CAS Number: 56-81-5
Percent Range: 35.0 - 45.0
Percent Range Units: volume / volume
LD50: Oral rat LD50 = 12.6 g/kg
LC50: None reported
TLV: 10 mg/m^3 (mist)
PEL: 10 mg/m^3 (mist)
Hazard: May cause eye irritation.

Hydroxyethyl Cellulose
CAS No.: 9004-62-0
TSCA CAS Number: 9004-62-0

Percent Range: 1.0 - 5.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: None established
PEL: None established
Hazard: May cause irritation.

Demineralized Water
CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 40.0 - 50.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other component
CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Silver Chloride
CAS No.: 7783-90-6
TSCA CAS Number: 7783-90-6
Percent Range: < 0.1
Percent Range Units: weight / volume
LD50: Oral mouse LD50 > 10 g/kg; Oral guinea pig LD50 > 5 g/kg
LC50: None reported
TLV: 0.01 mg/m³ (as Ag soluble salts)
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Colorless
Odor: Not determined

HMIS:
Health: 1
Flammability: 1

Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.
NFPA:
Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable
Potential Health Effects:
Eye Contact: May cause irritiation
Skin Contact: May cause irritiation
Skin Absorption: No effects anticipated
Target Organs: Not applicable
Ingestion: May cause: gastrointestinal irritation nausea vomiting diarrhea muscular weakness blood pressure changes fever cardiac depression
Target Organs: Blood Heart
Inhalation: No effects anticipated
Target Organs: Not applicable
Medical Conditions Aggravated: Pre-existing: Kidney conditions Liver conditions
Chronic Effects: Chronic overexposure may cause kidney damage
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Flush eyes with water. Call physician if irritation develops.
Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes.
Ingestion (First Aid): Give large quantities of water. Call physician immediately.
Inhalation: None required.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, corrosive and toxic gases may be generated by thermal decomposition.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not determined
Hazardous Combustion Products: None reported
Fire / Explosion Hazards: None reported
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Dike large spills to keep spilled material from entering sewage and drainage systems or bodies of water.
Clean-up Technique: Absorb spilled liquid with non-reactive sorbent material. Sweep up material. Dispose of material in an E.P.A. approved hazardous waste facility. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: None

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Store between 10° and 25°C. Keep away from: oxidizers
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: safety glasses with top and side shields
Skin Protection: disposable latex gloves
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes skin Wash thoroughly after handling. Protect from: oxidizers
TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Colorless
Physical State: Gel
Molecular Weight: Not applicable
Odor: Not determined
pH: Not determined
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: Not determined
Melting Point: Not determined
Specific Gravity (water = 1): Not determined
Evaporation Rate (water = 1): Not determined
Volatile Organic Compounds Content: Not available
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Soluble
Acid: Not determined
Other: Not determined
Metal Corrosivity:
Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: oxidizers chromates perchlorates
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: acrolein carbon dioxide carbon monoxide ammonia
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Ammonium Chloride: Eye rabbit 500 mg/24H - MILD, Eye rabbit 100 mg - SEVERE
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Ammonium Chloride: Oral rat LD50 = 1650 mg/kg; Glycerin: Oral rat LD50 = 7930 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D011
Special Instructions (Disposal): Dispose of material in an E.P.A. approved hazardous waste facility.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Not Currently Regulated
--
DOT Hazard Class: NA
DOT Subsidiary Risk: NA
DOT ID Number: NA
DOT Packing Group: NA
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Not Currently Regulated
--

ICAO Hazard Class: NA
ICAO Subsidiary Risk: NA
ICAO ID Number: NA
ICAO Packing Group: NA
I.M.O.:
I.M.O. Proper Shipping Name: Not Currently Regulated
--
I.M.O. Hazard Class: NA
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: NA
I.M.O. Packing Group: NA
Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:
O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)
E.P.A.:
S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
S.A.R.A. Title III Section 313 (40 CFR 372): This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.
Ammonium Chloride (Soluble Ammonia salt)
302 (EHS) TPQ (40 CFR 355): Not applicable
304 CERCLA RQ (40 CFR 302.4): Ammonium chloride: 5000 lbs.
304 EHS RQ (40 CFR 355): Not applicable
Clean Water Act (40 CFR 116.4): Ammonium chloride - RQ 5000 lbs.
RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.
C.P.S.C.: Not applicable
State Regulations:
California Prop. 65: Not applicable
Identification of Prop. 65 Ingredient(s):
California Perchlorate Rule CCR Title 22 Chap 33:
Trade Secret Registry: Not applicable
National Inventories:
U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).
TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Reference electrode solution
References: Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Technical Judgment. In-house information.
Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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(970) 669-3050

MSDS No: M00305

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Buffer Solution Hardness 1 pH 10.1 ± 0.1
Catalog Number: 42432

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00305
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes eye burns. May cause irritation.
Date of MSDS Preparation:
Day: 18
Month: May
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Acetic Acid
CAS No.: 64-19-7
TSCA CAS Number: 64-19-7
Percent Range: 1.0 - 10.0
Percent Range Units: volume / volume
LD50: Oral rat LD50 = 3310 mg/kg
LC50: Human TCLo = 816 ppm / 3 minutes (Irritant) ; Mouse LC50 = 5620 ppm / 1 hour
TLV: 10 ppm (15 ppm STEL)
PEL: 10 ppm
Hazard: Flammable. Causes severe burns.

Demineralized Water
CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 35.0 - 45.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other component
CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: volume / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established

Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Aminomethylpropanol

CAS No.: 124-68-5
TSCA CAS Number: 124-68-5
Percent Range: 50.0 - 60.0
Percent Range Units: volume / volume
LD50: Oral rat LD50 = 2900 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes burns. Combustible.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Clear, yellow liquid
Odor: Vinegar
CAUSES EYE BURNS HARMFUL IF ABSORBED THROUGH SKIN MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:
Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:
Health: 2
Flammability: 1
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:
Eye Contact: Causes eye burns.
Skin Contact: Causes mild irritation
Skin Absorption: Will be absorbed through the skin.
Target Organs: None reported
Ingestion: May cause: abdominal pain
Target Organs: None reported
Inhalation: May cause: respiratory tract irritation
Target Organs: None reported
Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions
Chronic Effects: None reported
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Contains: an experimental mutagen.
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with plenty of water. Call physician if irritation develops.
Ingestion (First Aid): Give large quantities of water. Call physician immediately.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.
Flash Point: >97.2°C (>207°F)
Method: Closed cup
Flammability Limits:
Lower Explosion Limits: Not determined
Upper Explosion Limits: Not determined
Autoignition Temperature: Not determined
Hazardous Combustion Products: Toxic fumes of: nitrogen oxides. carbon monoxide, carbon dioxide.
Fire / Explosion Hazards: May react violently with: strong oxidizers
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Water. Dry chemical. Carbon dioxide Alcohol foam.
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Dike large spills to keep spilled material from entering sewage and drainage systems or bodies of water.
Clean-up Technique: Cover spilled material with a dry acid, such as citric or boric. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a weak acid solution.
Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: None

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Store away from: oxidizers Protect from: heat
Flammability Class: Class IIIB

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: chemical splash goggles
Skin Protection: lab coat disposable latex gloves
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Keep away from: oxidizers
TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, yellow liquid
Physical State: Liquid

Molecular Weight: Not applicable
Odor: Vinegar
pH: of 2% solution = 10.0
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: 104.5°C (220°F)
Melting Point: Not determined
Specific Gravity (water = 1): 1.033
Evaporation Rate (water = 1): 0.36
Volatile Organic Compounds Content: Not determined
Partition Coefficient (n-octanol / water): Not determined
Solubility:
Water: Soluble
Acid: Soluble
Other: Not determined
Metal Corrosivity:
Steel: 0.002 in/yr
Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures
Reactivity / Incompatibility: May react violently in contact with: oxidizers
Hazardous Decomposition: Toxic fumes of: nitrogen oxides carbon dioxide carbon monoxide
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Aminomethylpropanol: Skin at 1 hour exposure: erythema score of 1 @ 1hour, edema score of 0.67 @ 1hour - MILD; Skin at 4 hours exposure: erythema score of 1.33 @ 1 hour, edema score of 1.67 @ 1 hour - MILD
Mutation Data: Acetic Acid: Human sister chromatid exchange in Lymphocytes at 5 mmol/l
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Aminomethylpropanol: Oral rat LD50 = 2900 mg/kg; Acetic Acid: Oral rat LD50 = 3310 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None
Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Not Currently Regulated
--
DOT Hazard Class: NA
DOT Subsidiary Risk: NA
DOT ID Number: NA
DOT Packing Group: NA
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Not Currently Regulated
--
ICAO Hazard Class: NA
ICAO Subsidiary Risk: NA
ICAO ID Number: NA
ICAO Packing Group: NA
I.M.O.:
I.M.O. Proper Shipping Name: Not Currently Regulated
--
I.M.O. Hazard Class: NA
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: NA
I.M.O. Packing Group: NA
Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:
O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)
E.P.A.:
S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.
--
302 (EHS) TPQ (40 CFR 355): Not applicable
304 CERCLA RQ (40 CFR 302.4): Acetic acid 5000 lbs.
304 EHS RQ (40 CFR 355): Not applicable
Clean Water Act (40 CFR 116.4): Acetic acid - RQ 5000 lbs.
RCRA: Contains no RCRA regulated substances.
C.P.S.C.: Not applicable
State Regulations:
California Prop. 65: No Prop. 65 listed chemicals are present in this product.
Identification of Prop. 65 Ingredient(s): Not applicable
California Perchlorate Rule CCR Title 22 Chap 33:
Trade Secret Registry: Not applicable
National Inventories:
U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).
TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Hardness determination
References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. In-house information. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Technical

Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.
Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00928

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Calcium Sulfate
Catalog Number: 1232120

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00928
Chemical Name: Sulfuric acid, calcium salt
CAS No.: 10101-41-4
Chemical Formula: $CaSO_4 \cdot 2H_2O$
Chemical Family: Inorganic Salt
Hazard: Practically non-toxic.
Date of MSDS Preparation:
Day: 11
Month: December
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Calcium Sulfate
CAS No.: 10101-41-4
TSCA CAS Number: 7778-18-9
Percent Range: 100.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: 10 mg/m³ (total dust)
PEL: 15 mg/m³ (total dust)
Hazard: Practically non-toxic.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: White powder
Odor: None

HMIS:
Health: 0
Flammability: 0
Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.
NFPA:
Health: 0
Flammability: 0
Reactivity: 0
Symbol: Not applicable
Potential Health Effects:
Eye Contact: No effects are anticipated
Skin Contact: No effects are anticipated
Skin Absorption: No effects anticipated
Target Organs: Not applicable
Ingestion: No Effects Anticipated
Target Organs: Not applicable
Inhalation: May cause: coughing sneezing
Target Organs: None reported
Medical Conditions Aggravated: Pre-existing: Respiratory conditions
Chronic Effects: No effects anticipated
Cancer / Reproductive Toxicity Information:
O.S.H.A. Listed: No

IARC Listed: No

NTP Listed: No

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Flush eyes with water. Call physician if irritation develops.
Skin Contact (First Aid): Wash skin with plenty of water.
Ingestion (First Aid): Give large quantities of water. Call physician immediately.
Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Material will not burn.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: None reported
Fire / Explosion Hazards: None reported
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Stop spilled material from being released to the environment.
Clean-up Technique: Sweep up material. Place material in a plastic bag. Mark bag 'Non-hazardous trash', and dispose of as normal refuse. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Keep container tightly closed when not in use.
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product. Maintain adequate ventilation to keep vapor level below TWA for chemicals in this product.
Personal Protective Equipment:
Eye Protection: safety glasses with top and side shields
Skin Protection: Not applicable
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes Wash thoroughly after handling.
TLV: 10 mg/m³ (total dust)
PEL: 15 mg/m³ (total dust)

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White powder
Physical State: Solid
Molecular Weight: 172.1
Odor: None
pH: ~ 7 (in solution)
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Boiling Point: Not applicable
Melting Point: decomposes @ 1450°C (2642°F)
Specific Gravity (water = 1): 2.32
Evaporation Rate (water = 1): Not applicable
Volatile Organic Compounds Content: None
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Slightly soluble (240mg/100ml @ 25°C)
Acid: Not determined
Other: Slightly soluble in glycerol; Insoluble in most organic solvents.
Metal Corrosivity:
Steel: Not determined
Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Heating to decomposition.
Reactivity / Incompatibility: May react violently in contact with: aluminum diazomethane
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

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11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Not applicable

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12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
Not applicable

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13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable
Special Instructions (Disposal): Place material in a plastic bag. Mark bag 'Non-hazardous trash', and dispose of as normal refuse.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

---

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Not Currently Regulated
--
DOT Hazard Class: NA
DOT Subsidiary Risk: NA
DOT ID Number: NA
DOT Packing Group: NA
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Not Currently Regulated
--
ICAO Hazard Class: NA
ICAO Subsidiary Risk: NA
ICAO ID Number: NA
ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product does not meet the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): This product is not hazardous under 29 CFR.1910.1200 and therefore is not covered by Title III under SARA.

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

TSCA CAS Number: 7778-18-9

16. OTHER INFORMATION

Intended Use: Laboratory Reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Technical Judgment. CCINFO CHEM Source/Références CHIMIE. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

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(970) 669-3050

MSDS No: M01016

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: EDTA Standard Solution, 0.0075 N
Catalog Number: 2498132

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01016
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Practically non-toxic.
Date of MSDS Preparation:
Day: 12
Month: December
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Propylene Glycol
CAS No.: 57-55-6
TSCA CAS Number: 57-55-6
Percent Range: 20.0 - 30.0
Percent Range Units: volume / volume
LD50: Oral rat LD50 = 20 g/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Demineralized Water
CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 70.0 - 80.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other component
CAS No.: Not applicable
TSCA CAS Number: Not applicable

Percent Range: < 1.0
Percent Range Units: weight / weight
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

EDTA Tetrasodium Salt
CAS No.: 64-02-8
TSCA CAS Number: 64-02-8
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Clear, colorless liquid
Odor: Not determined

HMIS:
Health: 0
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.
NFPA:
Health: 0
Flammability: 1
Reactivity: 0
Symbol: Not applicable
Potential Health Effects:
Eye Contact: May cause irritiation
Skin Contact: No effects are anticipated
Skin Absorption: No effects anticipated
Target Organs: Not applicable
Ingestion: Very large doses may cause: rapid pulse and respirations kidney damage convulsions blood changes central nervous system depression
Target Organs: Red blood cells Central nervous system Kidneys
Inhalation: No effects anticipated
Target Organs: Not applicable
Medical Conditions Aggravated: None reported
Chronic Effects: No effects anticipated
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Flush eyes with water. Call physician if irritation develops.
Skin Contact (First Aid): Wash skin with plenty of water.
Ingestion (First Aid): Give large quantities of water. Call physician immediately.
Inhalation: None required.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.
Flash Point: >100°C; 212°F
Method: Closed cup
Flammability Limits:
Lower Explosion Limits: Not available
Upper Explosion Limits: Not available
Autoignition Temperature: Not available
Hazardous Combustion Products: This material will not burn.
Fire / Explosion Hazards: This product will not burn or explode.
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Absorb spilled liquid with non-reactive sorbent material.
Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9. Use sulfuric or citric acid to lower pH. Use soda ash or sodium bicarbonate to increase pH. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: None

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Store in a cool place. Keep away from: oxidizers
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: safety glasses with top and side shields
Skin Protection: lab coat disposable latex gloves
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes Wash thoroughly after handling. Keep away from: oxidizers
TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Physical State: Liquid
Molecular Weight: Not applicable
Odor: Not determined
pH: 5
Vapor Pressure: Not available
Vapor Density (air = 1): Not available
Boiling Point: 100°C; 212°F
Melting Point: Not available
Specific Gravity (water = 1): 1.022
Evaporation Rate (water = 1): 0.8
Volatile Organic Compounds Content: Not available
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Miscible
Acid: Miscible
Other: Not determined
Metal Corrosivity:
Steel: 0.014 in/yr
Aluminum: 0.002 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic fumes of carbon monoxide and carbon dioxide.
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: Propylene Glycol Skin rabbit LD50 = 20.8 g/kg
Skin and Eye Irritation Data: Propylene Glycol: Skin human 500 mg/7D - MILD; Eye rabbit 500 mg/24H - MILD

Mutation Data: Propylene Glycol: Cytogenetic analysis - DNA inhibition - mouse - subcutaneous - 8000 mg/kg
Reproductive Effects Data: Propylene Glycol: Intraperitoneal mouse TDLo = 100 mg/kg - fetotoxicity - post-implantation mortality
Ingredient Toxicological Data: Propylene Glycol Oral rat LD50 = 20 g/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None
Special Instructions (Disposal): Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Not Currently Regulated
--
DOT Hazard Class: NA
DOT Subsidiary Risk: NA
DOT ID Number: NA
DOT Packing Group: NA
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Not Currently Regulated
--
ICAO Hazard Class: NA
ICAO Subsidiary Risk: NA
ICAO ID Number: NA
ICAO Packing Group: NA
I.M.O.:
I.M.O. Proper Shipping Name: Not Currently Regulated
--
I.M.O. Hazard Class: NA
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: NA
I.M.O. Packing Group: NA
Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

Note to Physician:
Treat ingestion with gastric lavage using 40% aqueous Bacto-Peptone, milk or water until phenolic odor is eliminated. Then give 15 to 50 cc castor or vegetable oil. Debride necrotic skin. Monitor vital signs, fluid status, electrolytes, BUN, renal and hepatic function, and electrocardiogram. Manage sedation, seizures, renal failure, and fluid electrolyte imbalances symptomatically as indicated.

---

5. Fire Fighting Measures

Fire:
Flash point: 79C (174F) CC
Autoignition temperature: 715C (1319F)
Flammable limits in air % by volume:
lel: 1.3; uel: 8.6
Combustible. Contact with strong oxidizers may cause fire.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Sealed containers may rupture when heated.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving this material. Stay away from sealed containers.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! Dry lime or soda ash may be used on spill for neutralization. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. All phenol workers should be properly trained on its hazards and the proper protective measures required. This training should also include emergency actions. All phenol operations should be enclosed to eliminate any potential exposure routes. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Phenol:
-OSHA Permissible Exposure Limit (PEL):
5 ppm (TWA) (skin)

-ACGIH Threshold Limit Value (TLV):
5 ppm (TWA) (skin)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

Oxidizers, aluminum chloride and nitrobenzene, calcium hypochlorite, butadiene, halogens, formaldehyde, mineral oxidizing acids, isocyanates, sodium nitrite and many other materials. Hot liquid phenol will attack aluminum, magnesium, lead, and zinc metals.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

Oral rat LD50: 317 mg/Kg; skin rabbit LD50:630 mg/kg; inhalation rat LC50: 316 mg/m3; irritation data: skin rabbit, standard Draize, 500 mg/24H severe; eye rabbit, standard Draize 5 mg/30S rinse, mild. Investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Phenol (108-95-2)	No	No	3
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:

When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.

Environmental Toxicity:

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: PHENOL SOLUTIONS

Hazard Class: 6.1

UN/NA: UN2821

Packing Group: II

Information reported for product/size: 50LB

International (Water, I.M.O.)

Proper Shipping Name: PHENOL SOLUTIONS
Hazard Class: 6.1
UN/NA: UN2821
Packing Group: II
Information reported for product/size: 50LB

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Phenol (108-95-2)                                Yes  Yes   Yes      Yes
Water (7732-18-5)                                Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Phenol (108-95-2)                                Yes   Yes   No     Yes
Water (7732-18-5)                                Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
Ingredient                                  RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Phenol (108-95-2)                          1000  500*    Yes        No
Water (7732-18-5)                          No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                     -RCRA-    -TSCA-
Ingredient                                  CERCLA   261.33    8(d)
----------------------------------------  ------    ------    ------
Phenol (108-95-2)                          1000     U188       No
Water (7732-18-5)                          No       No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: No          (Mixture / Liquid)
```

Australian Hazchem Code: 2X
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **4** Flammability: **2** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL e9A

area of product use or storage. Administer castor oil and/or polyethylene glycol per pre-planned directions. If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes while lifting lower and upper eyelids.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

PHENOLPHTHALEIN

1. Product Identification

Synonyms: 3,3-bis(p-hydroxyphenyl) phthalide; 3,3-bis(4-hydroxyphenyl)-1(3H)-isobenzofuranore
CAS No.: 77-09-8
Molecular Weight: 318.33
Chemical Formula: C20H14O4
Product Codes:
J.T. Baker: 2870, 2872
Mallinckrodt: 6600

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Phenolphthalein	77-09-8	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED. SUSPECT CANCER HAZARD. CONTAINS PHENOLPHTHALEIN WHICH MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Cancer)
Flammability Rating: 1 - Slight
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Nuisance dust. May cause coughing and sneezing.
Ingestion:
Cathartic. Very active, even in small amounts (30-100 mg). May cause purging, collapse, and fall of blood pressure or an itching skin rash that can become ulcerous. Other systemic effects are not well known.
Skin Contact:
Not classified as an irritant but may be absorbed via moist or oily surfaces. Symptoms may resemble those from ingestion exposure.
Eye Contact:
Slight irritant.
Chronic Exposure:
Suspect cancer hazard; contains phenolphthalein which may cause cancer. Risk of cancer depends on level and duration of exposure.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White to pale yellow crystals.
Odor:
Odorless.
Solubility:
Slightly soluble in water.
Density:
1.299
pH:
No information found.
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
Not applicable.
Melting Point:
258 - 262C (496 - 504F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents.
Conditions to Avoid:
Incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen and mutagen.

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
------------------------------------    -----    -----------    -------------
Phenolphthalein (77-09-8)                No          Yes           None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

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15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Phenolphthalein (77-09-8)                         Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Phenolphthalein (77-09-8)                         Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
```

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Phenolphthalein (77-09-8)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Phenolphthalein (77-09-8)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED. SUSPECT CANCER HAZARD. CONTAINS PHENOLPHTHALEIN WHICH MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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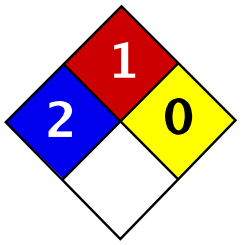
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Phenol red MSDS

Section 1: Chemical Product and Company Identification

Product Name: 0 H E N O L R E D

Catalog Codes: 3 , 0 3 , 0

CAS#:

RTECS: 3 *

TSCA: 4 3 # ! B I N V E N T O R Y 0 H E N O L R E D

CI#: . O T A V A I L A B L E

Synonym: 0 H E N O L S U L F O N P H T H A L E I N

Chemical Name: . O T A V A I L A B L E

Chemical Formula: # (/ 3

Contact Information:

Sciencelab.com, Inc.
3 M I T H 2 D
(O U S T O N 4 E X A S

5 3 3 A L 1-800-901-7247
) N T E R N A T I O N A L 1-281-441-4400 S

/ R D E R / N I N E 3 C I E N C E , A B C O M

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
0 H E N O L R E D		

Toxicological Data on Ingredients: 0 H E N O L R E D , $. O T A V A I L A B L E , # . O T A V A I L A B L E

Section 3: Hazards Identification

Potential Acute Health Effects:
(A Z A R D O U S I N C A S E O F E Y E C O N T A C T I R R I T A N T O F I N G E S T I O N 3 L I G H T L Y H A Z A
P E R M E A T O R O F I N H A L A T I O N

Potential Chronic Health Effects:
! 2 #) . / ' % .) # % & & % # 4 3 . O T A V A I L A B L E
- 5 4 ! ' % .) # % & & % # 4 3 . O T A V A I L A B L E
4 % 2 ! 4 / ' % .) # % & & % # 4 3 . O T A V A I L A B L E
$ % 6 % , / 0 - % . 4 ! , 4 / 8) #) 4 9 . O T A V A I L A B L E
4 H E S U B S T A N C E I S T O X I C T O L U N G S M U C O U S M E M B R A N E S
2 E P E A T E D O R P R O L O N G E D E X P O S U R E T O T H E S U B S T A N C E C A N P R O D U C E T A R G E T

Section 4: First Aid Measures

Eye Contact:
#HECK FOR AND REMOVE ANY CONTACT LENSES)MMEDIATELY FLUSH EYES WITH F
KEEPING EYELIDS OPEN #OLD WATER MAY BE USED $O NOT USE AN EYE OINTMENT

Skin Contact:
!FTER CONTACT WITH SKIN WASH IMMEDIATELY WITH PLENTY OF WATER 'ENTLY A
WITH RUNNING WATER AND NON ABRASIVE SOAP "E PARTICULARLY CAREFUL TO C
#OVER THE IRRITATED SKIN WITH AN EMOLLIENT)F IRRITATION PERSISTS SEEK M
CLOTHING BEFORE REUSING

Serious Skin Contact: .OT AVAILABLE

Inhalation: !LLOW THE VICTIM TO REST IN A WELL VENTILATED AREA 3EEK IMMEDIATE

Serious Inhalation: .OT AVAILABLE

Ingestion:
$O NOT INDUCE VOMITING ,OOSEN TIGHT CLOTHING SUCH AS A COLLAR TIE BELT
BREATHING PERFORM MOUTH TO MOUTH RESUSCITATION 3EEK IMMEDIATE MEDI

Serious Ingestion: .OT AVAILABLE

Section 5: Fire and Explosion Data

Flammability of the Product: -AY BE COMBUSTIBLE AT HIGH TEMPERATURE

Auto-Ignition Temperature: .OT AVAILABLE

Flash Points: .OT AVAILABLE

Flammable Limits: .OT AVAILABLE

Products of Combustion: 4HESE PRODUCTS ARE CARBON OXIDES #/ #/

Fire Hazards in Presence of Various Substances: .OT AVAILABLE

Explosion Hazards in Presence of Various Substances:
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF MECHANICAL IMPACT .OT
2ISKS OF EXPLOSION OF THE PRODUCT IN PRESENCE OF STATIC DISCHARGE .OT A

Fire Fighting Media and Instructions:
3-!,, &)2% 5SE $29 CHEMICAL POWDER
,!2'% &)2% 5SE WATER SPRAY FOG OR FOAM $O NOT USE WATER JET

Special Remarks on Fire Hazards: .OT AVAILABLE

Special Remarks on Explosion Hazards: .OT AVAILABLE

Section 6: Accidental Release Measures

Small Spill:
5SE APPROPRIATE TOOLS TO PUT THE SPILLED SOLID IN A CONVENIENT WASTE DIS
SPREADING WATER ON THE CONTAMINATED SURFACE AND DISPOSE OF ACCORDING
REQUIREMENTS

Large Spill:
5SE A SHOVEL TO PUT THE MATERIAL INTO A CONVENIENT WASTE DISPOSAL CONTA
ON THE CONTAMINATED SURFACE AND ALLOW TO EVACUATE THROUGH THE SANITA

Section 7: Handling and Storage

Precautions:
+EEP AWAY FROM HEAT +EEP AWAY FROM SOURCES OF IGNITION %MPTY CONTAIN
RESIDUE UNDER A FUME HOOD 'ROUND ALL EQUIPMENT CONTAINING MATERIAL $
EYES 7EAR SUITABLE PROTECTIVE CLOTHING)F YOU FEEL UNWELL SEEK MEDICA
POSSIBLE

Storage:
+EEP CONTAINER DRY +EEP IN A COOL PLACE 'ROUND ALL EQUIPMENT CONTAINI
CLOSED +EEP IN A COOL WELL VENTILATED PLACE #OMBUSTIBLE MATERIALS SI
AND AWAY FROM STRONG OXIDIZING AGENTS

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
5SE PROCESS ENCLOSURES LOCAL EXHAUST VENTILATION OR OTHER ENGINEER
RECOMMENDED EXPOSURE LIMITS)F USER OPERATIONS GENERATE DUST FUME C
AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT

Personal Protection:
3PLASH GOGGLES ,AB COAT $UST RESPIRATOR "E SURE TO USE AN APPROVED C
'LOVES

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT $UST RESPIRATOR "OOTS 'LOVES ! SELF CONTAI
TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTHING MIGI
"%&/2% HANDLING THIS PRODUCT

Exposure Limits: .OT AVAILABLE

Section 9: Physical and Chemical Properties

Physical state and appearance: 3OLID

Odor: .OT AVAILABLE

Taste: .OT AVAILABLE

Molecular Weight: G MOLE

Color: .OT AVAILABLE

pH (1% soln/water): .OT AVAILABLE

Boiling Point: .OT AVAILABLE

Melting Point: $ECOMPOSES

Critical Temperature: .OT AVAILABLE

Specific Gravity: .OT AVAILABLE

Vapor Pressure: .OT APPLICABLE

Vapor Density: .OT AVAILABLE

Volatility: .OT AVAILABLE

Odor Threshold: .OT AVAILABLE

Water/Oil Dist. Coeff.: . O T A V A I L A B L E

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: . O T A V A I L A B L E

Solubility: 6 E R Y S L I G H T L Y S O L U B L E I N C O L D W A T E R

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O T A V A I L A B L E

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: . O

Section 11: Toxicological Information

Routes of Entry: % Y E C O N T A C T) N G E S T I O N

Toxicity to Animals:
, $. O T A V A I L A B L E
, # . O T A V A I L A B L E

Chronic Effects on Humans: 4 H E S U B S T A N C E I S T O X I C T O L U N G S M U C O U S M E M B R A N E S

Other Toxic Effects on Humans:
(A Z A R D O U S I N C A S E O F I N G E S T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T P E R M E A T O R O F I N H

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: . O T A V A I L A B L E

Section 12: Ecological Information

Ecotoxicity: . O T A V A I L A B L E

BOD5 and COD: . O T A V A I L A B L E

Products of Biodegradation:
0 O S S I B L Y H A Z A R D O U S S H O R T T E R M D E G R A D A T I O N P R O D U C T S A R E N O T L I K E L Y (C
A R I S E

Toxicity of the Products of Biodegradation: 4 H E P R O D U C T S O F D E G R A D A T I O N A R E M O R E T O X I C

Special Remarks on the Products of Biodegradation: . O T A V A I L A B L E

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: . O T A $ / 4 C O N T R O L L E D M A T E R I A L 5 N I T E D 3 T A T E S

Identification: . O T A P P L I C A B L E

Special Provisions for Transport: . O T A P P L I C A B L E

Section 15: Other Regulatory Information

Federal and State Regulations: 4 3 # ! B I N V E N T O R Y 0 H E N O L R E D

Other Regulations: / 3 (! (A Z A R D O U S B Y D E F I N I T I O N O F (A Z A R D # O M M U N I C A T I O N 3 T A N D A

Other Classifications:

WHMIS (Canada): # , ! 3 3 $! - A T E R I A L C A U S I N G O T H E R T O X I C E F F E C T S 6 % 2 9 4 / 8) #

DSCL (EEC): 2) R R I T A T I N G T O E Y E S

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: %

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
' L O V E S
, A B C O A T
$ U S T R E S P I R A T O R " E S U R E T O U S E A N
A P P R O V E D C E R T I F I E D R E S P I R A T O R O R
E Q U I V A L E N T 7 E A R A P P R O P R I A T E R E S P I R A T O R
W H E N V E N T I L A T I O N I S I N A D E Q U A T E
3 P L A S H G O G G L E S

Section 16: Other Information

References: . O T A V A I L A B L E

Other Special Considerations: . O T A V A I L A B L E

Created: ! -

Last Updated: 0 -

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MSDS Number: **P5631** * * * * * *Effective Date:* ***08/02/07*** * * * * * *Supercedes:* ***10/22/04***

MSDS **Material Safety Data Sheet**

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM CHLORIDE

1. Product Identification

Synonyms: Potassium monochloride
CAS No.: 7447-40-7
Molecular Weight: 74.55
Chemical Formula: KCl
Product Codes:
J.T. Baker: 3040, 3044, 3045, 3046, 3052, 4001
Mallinckrodt: 0865, 0890, 3279, 3610, 3619, 3925, 4251, 4858, 4910, 5480, 6156, 6205, 6230, 6275, 6307, 6335, 6363, 6788, 6801, 6838, 6841, 6842, 6845, 6849, 6851, 6858, 6867, 7207, 7535, 7590, 7618, 7769, V483

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Chloride	7447-40-7	100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Inhalation of high concentrations of dust may cause nasal or lung irritation.
Ingestion:
Large quantities can produce gastrointestinal irritation and vomiting. May produce weakness and circulatory problems. May affect heart. In severe cases, ingestion may be fatal.
Skin Contact:
Contact may cause irritation or rash, particularly with moist skin.
Eye Contact:
Potassium chloride is moderate eye irritant. Redness, tearing, possible abrasion can occur.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
Persons with impaired kidney function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.
Skin Contact:
Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact:
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White crystals or powder.
Odor:
Odorless.
Solubility:
28.1 g/100g of water @ 0C.
Density:
1.987
pH:
ca. 7 Saturated aq. sl. @ 15C
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1500C (2732F) Sublimes.
Melting Point:
772C (1422F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:

Oxides of the contained metal and halogen, possibly also free, or ionic halogen.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Bromine trifluoride; potassium permanganate plus sulfuric acid.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

Oral rat LD50: 2600 mg/kg; irritation eye rabbit (standard Draize): 500 mg/24 hr mild; investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Potassium Chloride (7447-40-7)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Potassium Chloride (7447-40-7)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Potassium Chloride (7447-40-7)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Potassium Chloride (7447-40-7)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)

```
  Potassium Chloride (7447-40-7)             No         No         No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If irritation develops call a physician. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **P5774** * * * * * *Effective Date:* ***02/10/09*** * * * * * *Supercedes:* ***05/24/06***

MSDS Material Safety Data Sheet

CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker®

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM FLUORIDE, ANHYDROUS

1. Product Identification

Synonyms: None
CAS No.: 7789-23-3
Molecular Weight: 58.10
Chemical Formula: KF
Product Codes: 3123

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Fluoride	7789-23-3	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CORROSIVE. AFFECTS RESPIRATORY SYSTEM, HEART, SKELETON, CIRCULATORY SYSTEM, CENTRAL NERVOUS SYSTEM AND KIDNEYS. CAUSES IRRITATION AND BURNS TO SKIN, EYES AND RESPIRATORY TRACT. IRRITATION AND BURN EFFECTS MAY BE DELAYED. HARMFUL IF ABSORBED THROUGH SKIN.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

There is limited information available on the hazards of this chemical. It is assumed that it will behave similarly to other soluble fluoride salts. If inhaled or swallowed, this compound can cause fluoride poisoning. Early symptoms include nausea, vomiting, diarrhea, and weakness. Later effects include central nervous system effects, cardiovascular effects and death.

Inhalation:
May cause irritation and burns to the respiratory tract, symptoms may include coughing, sore throat, and labored breathing. May be absorbed through inhalation of dust; symptoms may parallel those from ingestion exposure. Irritation and burning effects may not appear immediately.
Ingestion:
May cause salivation, nausea, vomiting, diarrhea, and abdominal pain, followed by weakness, tremors, shallow respiration, cardopedal spasm, convulsions, and coma. May cause brain and kidney damage. Death may be caused by respiratory paralysis. Affects heart and circulatory system.
Skin Contact:
Causes severe irritation and possibly burns to the skin. May be absorbed through the skin. Effects may not appear immediately.
Eye Contact:
Causes irritation. May be extremely irritating with possible burns to eye tissue and permanent eye damage may result.
Chronic Exposure:
Chronic exposure may cause mottling of teeth and bone damage (osteosclerosis) and fluorosis. Symptoms of fluorisis include brittle bones,weight loss, anemia, calcified ligaments, general ill health and joint stiffness.
Aggravation of Pre-existing Conditions:
Populations that appear to be at increased risk from the effects of fluoride are individuals that suffer from diabetes insipidus or some forms of renal impairment.

---

4. First Aid Measures

First aid procedures should be pre-planned for fluoride compound emergencies.
Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Administer milk, chewable calcium carbonate tablets or milk of magnesia. Never give anything by mouth to an unconscious person. CALL A PHYSICIAN IMMEDIATELY.
Skin Contact:
Wipe off any excess material from skin and then immediately flush skin with large amounts of soapy water. Remove contaminated clothing and shoes. Wash clothing before re-use. Apply bandages soaked in magnesium sulfate. CALL A PHYSICIAN IMMEDIATELY.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
For large exposures, systemic effects (hypocalcemia and hypomagnesia) may occur.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray will also reduce fumes and irritant gases.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from acids and alkalis. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2.5 mg (F)/m3 (TWA)
- ACGIH Threshold Limit Value (TLV):
2.5 mg (F)/m3 (TWA) A4 - not classifiable as a human carcinogen.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White powder.

Odor:
Odorless.
Solubility:
Appreciable in water.
Specific Gravity:
2.48
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1505C (2741F)
Melting Point:
860C (1580F)
Vapor Density (Air=1):
2.0
Vapor Pressure (mm Hg):
1 @ 885C (1625F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Attracts moisture from the air.
Hazardous Decomposition Products:
Burning may produce hydrogen fluoride vapors.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Platinum plus bromine trifluoride; reacts with strong acids to form hydrogen fluoride. Corrodes glass and porcelain.
Conditions to Avoid:
Moisture and incompatibles.

---

11. Toxicological Information

KF: Oral rat LD50: 245 mg/kg. Investigated as a mutagen, reproductive effector.

```
--------\Cancer Lists\-----------------------------------------------------
                                     ---NTP Carcinogen---
Ingredient                           Known    Anticipated    IARC Category
----------------------------------   -----    -----------    -------------
Potassium Fluoride (7789-23-3)        No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: POTASSIUM FLUORIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1812
Packing Group: III
Information reported for product/size: 250LB

International (Water, I.M.O.)

Proper Shipping Name: POTASSIUM FLUORIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1812
Packing Group: III
Information reported for product/size: 250LB

International (Air, I.C.A.O.)

Proper Shipping Name: POTASSIUM FLUORIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1812
Packing Group: III
Information reported for product/size: 250LB

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Potassium Fluoride (7789-23-3)                    Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Potassium Fluoride (7789-23-3)                    Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Potassium Fluoride (7789-23-3)            No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                                CERCLA  261.33    8(d)
----------------------------------------  ------  ------    ------
Potassium Fluoride (7789-23-3)            No      No        No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: 2Z

Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CORROSIVE. AFFECTS RESPIRATORY SYSTEM, HEART, SKELETON, CIRCULATORY SYSTEM, CENTRAL NERVOUS SYSTEM AND KIDNEYS. CAUSES IRRITATION AND BURNS TO SKIN, EYES AND RESPIRATORY TRACT. IRRITATION AND BURN EFFECTS MAY BE DELAYED. HARMFUL IF ABSORBED THROUGH SKIN.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In all cases call a physician immediately. First Aid procedures should be pre-planned for fluoride compound emergencies. If swallowed, administer milk, chewable calcium carbonate tablets or milk of magnesia. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give artificial respiration. In case of skin contact wipe off any excess material then immediately flush skin with large amounts of soapy water. Remove contaminated clothing and shoes. Wash clothing before re-use. Apply bandages soaked in magnesium sulfate. In case of eye contact, immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting upper and lower eyelids occasionally.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **P5884** * * * * * *Effective Date:* ***02/01/07*** * * * * * *Supercedes:* ***05/11/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM HYDROXIDE

1. Product Identification

Synonyms: Caustic potash; potassium hydrate
CAS No.: 1310-58-3
Molecular Weight: 56.11
Chemical Formula: KOH
Product Codes:
J.T. Baker: 3140, 3141, 3146, 3150, 3152, 5685
Mallinckrodt: 6964, 6976, 6984, 7704, 7815

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Hydroxide	1310-58-3	85 - 90%	Yes
Water	7732-18-5	10 - 15%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. CAUSES SEVERE BURNS TO SKIN, EYES, RESPIRATORY TRACT, AND GASTROINTESTINAL TRACT. MATERIAL IS EXTREMELY DESTRUCTIVE TO ALL BODY TISSUES. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:
Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage of the upper respiratory tract, depending on the severity of exposure. Symptoms may include coughing, sneezing, damage to the nasal or respiratory tract. High concentrations can cause lung damage.
Ingestion:
Toxic! Swallowing may cause severe burns of mouth, throat and stomach. Other symptoms may include vomiting, diarrhea. Severe scarring of tissue and death may result. Estimated lethal dose: 5 grams.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Highly Corrosive! Causes irritation of eyes with tearing, redness, swelling. Greater exposures cause severe burns with possible blindness resulting.
Chronic Exposure:
Prolonged contact with dilute solutions or dust of potassium hydroxide has a destructive effect on tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not combustible, but contact with water or moisture may generate enough heat to ignite combustibles.
Explosion:
Can react with chemically reactive metals such as aluminum, zinc, magnesium, copper, etc. to release hydrogen gas which can form explosive mixtures with air.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
Solution process causes formation of corrosive mists. Hot or molten material can react violently with water. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRACIT®-2 or BuCAIM® caustic neutralizers are recommended for spills of solutions of this product.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Protect from moisture. Addition to water releases heat which can result in violent boiling and spattering. Always add slowly and in small amounts. Never use hot water. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
- ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White deliquescent solid

Odor:
Odorless.
Solubility:
52.8% in water @ 20C (68F)
Specific Gravity:
2.04
pH:
13.5 (0.1 molar solution)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1320C (2408F)
Melting Point:
360C (680F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1.0 @ 714C (1317F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon monoxide when reacting with carbohydrates, and hydrogen gas when reacting with aluminum, zinc and tin. Thermal oxidation can produce toxic fumes of potassium oxide (K_2O).
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Contact with water, acids, flammable liquids and organic halogen compounds, especially trichloroethylene, may cause fire or explosion. Contact with nitromethane and other similar nitro compounds cause formation of shock sensitive salts. Contact with metals such as aluminum, tin and zinc causes formation of flammable hydrogen gas.
Conditions to Avoid:
Heat, moisture, incompatibles.

---

11. Toxicological Information

For potassium hydroxide: Oral rat LD50: 273 mg/kg; Investigated as a mutagen. Skin Irritation Data (std Draize, 50 mg/24 H): Human, Severe; Rabbit, Severe. Eye Irritation Data(Rabbit, non-std test,1 mg/24 H, rinse): Moderate.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Potassium Hydroxide (1310-58-3)	No	No	None
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:

Potassium Hydroxide: TLm: 80 ppm/Mosquito fish/ 24 hr./ Fresh water

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: POTASSIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1813
Packing Group: II
Information reported for product/size: 110LB

International (Water, I.M.O.)

Proper Shipping Name: POTASSIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1813
Packing Group: II
Information reported for product/size: 110LB

International (Air, I.C.A.O.)

Proper Shipping Name: POTASSIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1813
Packing Group: II
Information reported for product/size: 110LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Potassium Hydroxide (1310-58-3)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Potassium Hydroxide (1310-58-3)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Potassium Hydroxide (1310-58-3)	No	No	No	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Potassium Hydroxide (1310-58-3)	1000	No	No
Water (7732-18-5)	No	No	No

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Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: Yes         (Mixture / Solid)
```

Australian Hazchem Code: 2R
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. CAUSES SEVERE BURNS TO SKIN, EYES, RESPIRATORY TRACT, AND GASTROINTESTINAL TRACT. MATERIAL IS EXTREMELY DESTRUCTIVE TO ALL BODY TISSUES. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
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Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **P5972** * * * * * *Effective Date:* ***02/10/09*** * * * * * *Supercedes:* ***05/23/06***

MSDS Material Safety Data Sheet

CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker®

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM OXALATE

1. Product Identification

Synonyms: Oxalic acid, dipotassium salt; ethanedioic acid, dipotassium salt
CAS No.: 583-52-8 (Anhydrous) 6487-48-5 (Monohydrate)
Molecular Weight: 184.24
Chemical Formula: K2C2O4 . H2O
Product Codes: 3212

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Oxalate	583-52-8	98 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Inhalation of dust is corrosive to mucous membranes. Oxalates can be absorbed through the lungs. Symptoms of poisoning include nervousness, cramps, central nervous system depression.
Ingestion:
Mean lethal dose for oxalates in adults is estimated at 15-30 grams with death within a few hours or even minutes. Corrosive action on the mucosa and severe gastrointestitis can occur with pain, vomiting, etc. Sharp reduction of serum calcium can cause disfunction of the brain. Calcium oxalate may be deposited in the kidneys.
Skin Contact:
Corrosive. Symptoms of redness, pain, and severe burn can occur.
Eye Contact:
Corrosive. Contact can cause blurred vision, redness, pain and severe tissue burns. Prolonged contact may cause eye damage.
Chronic Exposure:
Circulatory failure or nervous system irregularities may follow prolonged calcium metabolism disturbances due to oxalation.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Transparent, colorless crystals.
Odor:
Odorless.
Solubility:
30 g in 100 g water.
Specific Gravity:
2.13
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
160C (320F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
May produce oxides of carbon and the contained metal.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong acids and strong oxidizers.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Potassium Oxalate (583-52-8)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S. (POTASSIUM OXALATE, MONOHYDRATE)
Hazard Class: 6.1, 8
UN/NA: UN2928
Packing Group: II
Information reported for product/size: 300LB

International (Water, I.M.O.)

Proper Shipping Name: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S. (POTASSIUM OXALATE, MONOHYDRATE)
Hazard Class: 6.1, 8
UN/NA: UN2928
Packing Group: II
Information reported for product/size: 300LB

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15. Regulatory Information

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--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Potassium Oxalate (583-52-8)                       Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                        --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Potassium Oxalate (583-52-8)                       Yes   Yes   No     No

--------\Federal, State & International Regulations - Part 1\----------------
                                              -SARA 302-    ------SARA 313------
Ingredient                                    RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Potassium Oxalate (583-52-8)              No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                       -RCRA-    -TSCA-
Ingredient                                    CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Potassium Oxalate (583-52-8)              No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings:

Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
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Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **P6005** * * * * * *Effective Date:* ***11/21/08*** * * * * * *Supercedes:* ***02/13/06***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM PERMANGANATE

1. Product Identification

Synonyms: Permanganic acid, potassium salt; Condy's crystals
CAS No.: 7722-64-7
Molecular Weight: 158.03
Chemical Formula: KMnO4
Product Codes:
J.T. Baker: 3227, 3228, 3232
Mallinckrodt: 7056, 7068

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Permanganate	7722-64-7	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED OR INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Yellow (Reactive)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. High concentrations can cause pulmonary edema.
Ingestion:
Ingestion of solid or high concentrations causes severe distress of gastro-intestinal system with possible burns and edema; slow pulse; shock with fall of blood pressure. May be fatal. Ingestion of concentrations up to 1% causes burning of the throat, nausea, vomiting, and abdominal pain; 2-3% causes anemia and swelling of the throat with possible suffocation; 4-5% may cause kidney damage.
Skin Contact:
Dry crystals and concentrated solutions are caustic causing redness, pain, severe burns, brown stains in the contact area and possible hardening of outer skin layer. Diluted solutions are only mildly irritating to the skin.
Eye Contact:
Eye contact with crystals (dusts) and concentrated solutions causes severe irritation, redness, blurred vision and can cause severe damage, possibly permanent.
Chronic Exposure:
Prolonged skin contact may cause irritation, defatting, and dermatitis. Chronic manganese poisoning can result from excessive inhalation exposure to manganese dust and involves impairment of the central nervous system. Early symptoms include sluggishness, sleepiness, and weakness in the legs. Advanced cases have shown symptoms of fixed facial expression, emotional disturbances, spastic gait, and falling.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Contact with oxidizable substances may cause extremely violent combustion.

Explosion:
Strong oxidants may explode when shocked, or if exposed to heat, flame, or friction. Also may act as initiation source for dust or vapor explosions. Contact with oxidizable substances may cause extremely violent combustion. Sealed containers may rupture when heated. Sensitive to mechanical impact.
Fire Extinguishing Media:
Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Suffocating type extinguishers are not as effective as water. Do not allow water runoff to enter sewers or waterways.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus

with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage and moisture. Isolate from any source of heat or ignition. Avoid storage on wood floors. Separate from incompatibles, combustibles, organic or other readily oxidizable materials. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
5 mg/m3 Ceiling for manganese compounds as Mn

- ACGIH Threshold Limit Value (TLV):
0.2 mg/m3 (TWA) for manganese, elemental and inorganic compounds as Mn

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Purple-bronze crystals.
Odor:
Odorless.
Solubility:
7 g in 100 g of water.
Density:
2.7
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
ca. 240C (ca. 464F)
Vapor Density (Air=1):
5.40
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Toxic metal fumes may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Powdered metals, alcohol, arsenites, bromides, iodides, phosphorous, sulfuric acid, organic compounds, sulfur, activated carbon, hydrides, strong hydrogen peroxide, ferrous or mercurous salts, hypophosphites, hyposulfites, sulfites, peroxides, and oxalates.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Investigated as a mutagen, reproductive effector. Oral rat LD50: 750 mg/kg.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
------------------------------------ -----    -----------    -------------
Potassium Permanganate (7722-64-7)   No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
Dangerous to the environment. Very toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: POTASSIUM PERMANGANATE
Hazard Class: 5.1
UN/NA: UN1490
Packing Group: II
Information reported for product/size: 12KG

International (Water, I.M.O.)

Proper Shipping Name: POTASSIUM PERMANGANATE
Hazard Class: 5.1
UN/NA: UN1490
Packing Group: II
Information reported for product/size: 12KG

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Potassium Permanganate (7722-64-7)                Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Potassium Permanganate (7722-64-7)                Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                              -SARA 302-    ------SARA 313------
Ingredient                                   RQ    TPQ     List  Chemical Catg.
-----------------------------------------  ---   -----   ----  --------------
Potassium Permanganate (7722-64-7)         No    No      No    Manganese co

--------\Federal, State & International Regulations - Part 2\----------------
                                                -RCRA-    -TSCA-
Ingredient                                   CERCLA     261.33     8(d)
-----------------------------------------  ------     ------    ------
Potassium Permanganate (7722-64-7)         100        No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  Yes
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: 2Y
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

24-Hour Emergency Phone Number: 989-636-4400

Product:SARAN* 540 White Vapor Retarder Film

Product Code: 76648

Effective Date: 09/07/99 Date Printed: 06/16/04 MSD: 006441

The Dow Chemical Company, Midland, MI 48674

Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Copolymer of vinylidene chloride and vinyl chloride	CAS# 009011-06-7	>75%
Copolymer of ethylene and vinyl acetate	CAS# 024937-78-8	<10%
Titanium dioxide	CAS# 013463-67-7	<10%
Proprietary additives		<6%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

```
************************************************************************
*   White plastic film.  Odorless.  Toxic fumes may be released in     *
*   situations.                                                        *
*                                                                      *
************************************************************************
```

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: Solid or dust may cause irritation or corneal injury due to mechanical action.

SKIN: Essentially nonirritating to skin. Skin absorption is unlikely due to physical properties.

INGESTION: Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.

INHALATION: Vapors are unlikely due to physical properties.

(Continued on page 2 , over)

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause significant adverse effects. Additives and/or pigments are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency.

4. FIRST AID

EYES: Flush eyes with plenty of water; mechanical effects only.

SKIN: No adverse effects anticipated by this route of exposure.

INGESTION: No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

INHALATION: No adverse effects anticipated by this route of exposure.

NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
FLASH POINT: Not applicable.
METHOD USED: Not applicable.
AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABILITY LIMITS
LFL: Not applicable.
UFL: Not applicable.

HAZARDOUS COMBUSTION PRODUCTS: Under fire conditions polymers decompose. The smoke may contain polymer fragments of varying compositions in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to: hydrogen chloride, carbon monoxide and carbon dioxide.

OTHER FLAMMABILITY INFORMATION: Dense smoke is produced when product burns.

EXTINGUISHING MEDIA: Water, carbon dioxide, dry chemical.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Cool surroundings with water to

(Continued on page 3)
* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

localize fire zone. Soak thoroughly with water to cool and prevent reignition.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Clear non-emergency personnel from area.

PROTECT THE ENVIRONMENT: Avoid contamination of drinking water, natural water, ground water or any waterway.

CLEANUP: Sweep up.

7. HANDLING AND STORAGE

HANDLING: Mechanical handling equipment can cause formation of dusts. Maintain good housekeeping. Layers of flammable dusts should not be permitted to accumulate.

STORAGE: Recommend storing in a cool, dry place away from high temperatures, hot pipes, and direct sun.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use safety glasses. If there is a potential for exposure to particles which could cause mechanical injury to the eye, wear chemical goggles.

SKIN: No precautions other than clean body-covering clothing should be needed.

RESPIRATORY PROTECTION: No respiratory protection should be needed.

EXPOSURE GUIDELINE(S): Although some of the additives used

(Continued on page 4 , over)
* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

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in this product may have exposure guidelines, these additives are encapsulated in the product and no exposure would be expected under normal handling conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: White plastic film.
ODOR: Odorless.
BOILING POINT: Not applicable
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SOLUBILITY IN WATER: Insoluble
SPECIFIC GRAVITY: Not applicable

10. STABILITY AND REACTIVITY

STABILITY: Thermally stable at typical use temperatures.

CONDITIONS TO AVOID: Product can decompose at elevated temperatures.

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Hazardous decomposition products may include and are not limited to hydrogen chloride.

INCOMPATIBLE MATERIALS: Avoid contact with nitric acid, sulfuric acid.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

SKIN: The dermal LD50 has not been determined.

INGESTION: Single dose oral LD50 has not been determined.

MUTAGENICITY: No relevant information found.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE
MOVEMENT & PARTITIONING: No bioconcentration is expected

(Continued on page 5)
* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

because of the relatively high molecular weight (MW>1000). In the terrestrial environment, material is expected to remain in the soil. In the aquatic environment, material will sink and remain in the sediment.

DEGRADATION AND PERSISTENCE: This water insoluble polymeric solid is expected to be inert in the environment. Surface photodegradation is expected with exposure to sunlight. No appreciable biodegradation is expected.

ECOTOXICITY: Not expected to be acutely toxic.

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device, and landfill.

For additional information, refer to Stability & Reactivity Information, MSDS Section 10.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customers Information Center at 800-258-2436 or 989-832-1556 for further details.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): This product is not regulated by D.O.T. when shipped domestically by land.

CANADIAN TDG INFORMATION: This product is not regulated by TDG

(Continued on page 6 , over)
* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

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when shipped domestically by land.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS
==========

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
TITANIUM DIOXIDE	013463-67-7	NJ3 PA1

NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).

(Continued on page 7)
* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

REGULATORY INFORMATION (CONTINUED)

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CANADIAN REGULATIONS
==========

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

This product is not a "Controlled Product" under WHMIS.

16. OTHER INFORMATION

MSDS STATUS: New MSDS.

* OR (R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY
The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult The Dow Chemical Company For Further Information.

MSDS Number: **S1622** * * * * * *Effective Date:* ***10/09/07*** * * * * * *Supercedes:* ***02/08/06***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SILICA GEL, Indicating

1. Product Identification

Synonyms: Silica, amorphous; Silica, precipitated and gel (CAS # 112926-00-8 (OSHA)
CAS No.: Not applicable.
Molecular Weight: Not applicable.
Chemical Formula: SiO2 . xH2O + CoCl2
Product Codes:
J.T. Baker: 3401, 3402
Mallinckrodt: 4471

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Silica Gel	63231-67-4	> 99%	Yes
Cobalt(II) Chloride	7646-79-9	< 1%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Cancer)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

This product contains synthetic amorphous silica, not to be confused with crystalline silica such as quartz, cristobalite or tridymite or with diatomaceous earth or other naturally occurring forms of amorphous silica that frequently contain crystalline forms.

Inhalation:
May cause dryness and irritation to mucous membranes, nose, and throat. Symptoms may include coughing, sore throat, and wheezing.
Ingestion:
No adverse effects expected.
Skin Contact:
May cause irritation with dryness and abrasion.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
Repeated exposure may cause symptoms similar to those listed for acute effects. Synthetic amorphous silica does not produce silicosis. Prolonged exposure to cobalt has been shown to cause cancer in laboratory animals.

Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. When pouring into a container of flammable liquid, ground both containers electrically to prevent a static electric spark. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Silica (synthetic, amorphous):
- OSHA Permissible Exposure Limit (PEL) -
80/(%SiO2) mg/m3 (TWA) for amorphous silica, including natural diatomaceous earth.

For Inorganic Cobalt Compounds:
- ACGIH Threshold Limit Value (TLV) -
0.02 mg/m3 (TWA) as Co, A3: Animal carcinogen.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Blue crystals.
Odor:
Odorless.
Solubility:
Silica gel base is insoluble in water; cobalt chloride may leach out.
Specific Gravity:
2.1
pH:
6.5-7.5 (in 5% slurry)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:

No information found.
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Oxides of carbon and silicon may be formed when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Reacts with hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, and oxidizers.
Conditions to Avoid:
Moisture, extreme heat, and incompatibles.

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11. Toxicological Information

Toxicological Data:
Cobalt chloride: oral rat LD50: 80 mg/kg; investigated as a tumorigen, mutagen, reproductive effector
Carcinogenicity:
Cobalt and its compounds have been shown to cause cancer in laboratory animals.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
------------------------------------  -----    -----------    -------------
Silica Gel (63231-67-4)              No          No            None
Cobalt(II) Chloride (7646-79-9)      No          No             2B
```

---

12. Ecological Information

Environmental Fate:
For Silica Gel (synthetic amorphous): When released into the soil, this material is not expected to biodegrade. When released into water, this material is not expected to biodegrade.
Environmental Toxicity:
For Silica Gel (synthetic amorphous): This material is not expected to be toxic to aquatic life.

Cobalt Chloride Component:
Dangerous to the environment. Very toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Silica Gel (63231-67-4)                            Yes  No    No       Yes
Cobalt(II) Chloride (7646-79-9)                    Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Silica Gel (63231-67-4)                            Yes   Yes   No     Yes
Cobalt(II) Chloride (7646-79-9)                    Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg/nt       ----------------------
Cobalt(II -67-67-   Yes   No     Yes

--------\Federal, 2tate & International Regulations - Part 1\----- - Part 2\--------------------------------
```

Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S2282** * * * * * *Effective Date:* ***11/21/08*** * * * * * *Supercedes:* ***02/23/06***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SILVER NITRATE

1. Product Identification

Synonyms: Lunar caustic; silver nitrate toughened; Nitric Acid, Silver (I) Salt
CAS No.: 7761-88-8
Molecular Weight: 169.87
Chemical Formula: AgNO3
Product Codes:
J.T. Baker: 3426, 3429
Mallinckrodt: 2160, 2169, 7992

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Silver Nitrate	7761-88-8	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Yellow (Reactive)

Potential Health Effects

Inhalation:
Extremely destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. May be absorbed into the body following inhalation with symptoms paralleling those from ingestion exposure. Dust deposits in the lungs may resemble a form of pneumoconiosis.
Ingestion:
Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting, diarrhea. Poison. Symptoms include pain and burning in the mouth, blackening of the skin and mucous membranes, throat, and abdomen, salivation, vomiting of black material, diarrhea, collapse, shock, coma and death.
Skin Contact:
Corrosive. Symptoms of redness, pain, and severe burn can occur.
Eye Contact:
Corrosive. Can cause blurred vision, redness, pain, severe tissue burns and eye damage.
Chronic Exposure:
Repeated application or ingestion causes a permanent bluish discoloration of the skin, conjunctiva, and mucous membranes. Repeated inhalation may cause lung disease.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
This oxidizing material can increase the flammability of adjacent combustible materials.
Explosion:
Many reactions may cause explosion. Reacts with ammonia to form compounds that are sensitive to mechanical shock.
Fire Extinguishing Media:
Use flooding amounts of water. Do not use dry chemical, carbon dioxide or Halon. Do not allow water runoff to enter sewers or waterways.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage and moisture. Isolate from any source of heat or ignition. Avoid storage on wood floors. Separate from incompatibles, combustibles, organic or other readily oxidizable materials. Protect from light. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
0.01 mg/m3 (TWA) for silver metal dust and fume as Ag

-ACGIH Threshold Limit Value (TLV):
0.01 mg /m3 (TWA) for soluble silver compounds as Ag
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to or respn glntamic9

4.352
pH:
ca. 6 (neutral to litmus)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
444C (831F) Decomposes.
Melting Point:
212C (414F)
Vapor Density (Air=1):
4.4
Vapor Pressure (mm Hg):
Very low.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable at room temperature in sealed containers. Discolors on exposure to light.
Hazardous Decomposition Products:
Oxides of nitrogen.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonia, alkalis, antimony salts, arsenites, bromides, carbonates, chlorides, iodides, thiocyanates, ferrous salts, phosphates, tannic acid and tartrates.
Conditions to Avoid:
Heat, flame, sources of ignition, light and incompatibles.

---

11. Toxicological Information

Oral rat LD50: 1173 mg/kg. Irritation data, rabbit, std Draize: eye= 1 mg, severe. Investigated as a tumorigen, mutagen, reproductive effector.

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
------------------------------------    -----    -----------    -------------
Silver Nitrate (7761-88-8)               No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.

Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, SILVER NITRATE
Hazard Class: 5.1
UN/NA: UN1493
Packing Group: II
Information reported for product/size: 500G

International (Water, I.M.O.)

Proper Shipping Name: SILVER NITRATE
Hazard Class: 5.1
UN/NA: UN1493
Packing Group: II
Information reported for product/size: 500G

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Silver Nitrate (7761-88-8)                       Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Silver Nitrate (7761-88-8)                       Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Silver Nitrate (7761-88-8)                No    No      No    Sliver cmpd/

--------\Federal, State & International Regulations - Part 2\----------------
                                                    -RCRA-    -TSCA-
Ingredient                                CERCLA    261.33    8(d)
----------------------------------------  ------    ------    ------
Silver Nitrate (7761-88-8)                1         No        No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: Yes         (Pure / Solid)
```

Australian Hazchem Code: 2X
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **4** Flammability: **0** Reactivity: **0** Other: **Oxidizer**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. MAY BE FATAL

IF SWALLOWED. HARMFUL IF INHALED. STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

Label Precautions:

Keep from contact with clothing and other combustible materials.
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Do not store near combustible materials.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S2954** * * * * * *Effective Date:* ***11/26/07*** * * * * * *Supercedes:* ***05/23/06***

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM BICARBONATE

1. Product Identification

Synonyms: Sodium hydrogen carbonate; sodium acid carbonate; baking soda; bicarbonate of soda
CAS No.: 144-55-8
Molecular Weight: 84.01
Chemical Formula: NaHCO3
Product Codes:
J.T. Baker: 3506, 3508, 3509, 3510
Mallinckrodt: 7285, 7396, 7397, 7412, 7749, 7903

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Bicarbonate	144-55-8	99 - 100%	No

3. Hazards Identification

Emergency Overview

As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
High concentrations of dust may cause coughing and sneezing.
Ingestion:
Extremely large oral doses may cause gastrointestinal disturbances.
Skin Contact:
No adverse effects expected.
Eye Contact:
Contact may cause mild irritation, redness, and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.
Skin Contact:
Not expected to require first aid measures.
Eye Contact:
Wash thoroughly with running water. Get medical advice if irritation develops.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

---

7. Handling and Storage

Keep in a well closed container stored under cold to warm conditions, 2 to 40 C, (36 to 104F). Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White crystalline powder.
Odor:
Odorless.
Solubility:
7.8g/100g water @ 18C (64F).
Density:
2.2
pH:
8.3 (0.1 molar @ 25C (77F))
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
60C (140F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Gaseous carbon dioxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Reacts with acids to form carbon dioxide. Dangerous reaction with monoammonium phosphate or a sodium-potassium alloy.
Conditions to Avoid:
Heat, moisture, incompatibles.

11. Toxicological Information

Investigated as a mutagen, reproductive effector. Oral rat LD50: 4220 mg/kg. Irritation data: human,skin, 30mg/3D-I mild, rabbit,eye, 100 mg/30 S, mild.

```
--------\Cancer Lists\-----------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
------------------------------------    -----    -----------    -------------
Sodium Bicarbonate (144-55-8)            No          No            None
```

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
For Sodium Bicarbonate:
48 hour EC50 Daphnia magna (water flea) : 2350 mg/L.
96 hour LC50 Lepomis macrochirus (bluegill) : > 5000 mg/L.
120 hour EC50 Nitzschia linearis (diatom) : 650 mg/L.

This material is not expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Sodium Bicarbonate (144-55-8)                     Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Sodium Bicarbonate (144-55-8)                     Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
Ingredient                                  RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Sodium Bicarbonate (144-55-8)              No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-    -TSCA-
Ingredient                                  CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Sodium Bicarbonate (144-55-8)              No         No         No
```

```
Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: No       Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.
Label Precautions:
None.
Label First Aid:
Not applicable.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 12.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S3122** * * * * * *Effective Date:* ***02/15/08*** * * * * * *Supercedes:* ***05/06/05***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM BORATE

1. Product Identification

Synonyms: Sodium borate decahydrate; borax; sodium pyroborate
CAS No.: 1330-43-4 (Anhydrous) 1303-96-4 (Decahydrate)
Molecular Weight: 381.37
Chemical Formula: Na2B4O7 . 10H2O
Product Codes:
J.T. Baker: 3568, 3570, 3574, 3575
Mallinckrodt: 7418, 7457, 7460, 7792

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Borates, Tetra, Sodium Salts (Anhydrous)	1330-43-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.
Ingestion:
May cause nausea, vomiting, diarrhea, muscular spasms, dullness, lethargy, circulatory depression, central nervous system depression, shock, kidney damage, coma, and death. Estimated lethal dose 15 to 20 grams.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Prolonged or repeated ingestion or skin absorption may cause anorexia, weight loss, vomiting, mild diarrhea, skin rash, convulsions, and anemia.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- NIOSH Recommended Exposure Limit (REL): 1 mg/m3 (TWA)

- ACGIH Threshold Limit Value (TLV): 5 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White, Gray, Bluish or Greenish White Streaked Crystals.

Odor:
Odorless.

Solubility:
6g/100g water.

Density:
1.73

pH:
Alkaline

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
320C (608F) Loses water

Melting Point:
75C (167F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Toxic gases and vapors may be released if involved in a fire.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Acids, alkaloids, and metallic salts.
Conditions to Avoid:
Incompatibles.

11. Toxicological Information

Hydrate: Oral rat LD50: 2660 mg/kg. Investigated as a mutagen, reproductive effector. Anhydrous: Investigated as a reproductive effector.

```
--------\Cancer Lists\-----------------------------------------------------
                                      ---NTP Carcinogen---
Ingredient                            Known    Anticipated    IARC Category
-------------------------------------  -----    -----------    -------------
Borates, Tetra, Sodium Salts           No          No            None
(Anhydrous) (1330-43-4)
```

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Borates, Tetra, Sodium Salts (Anhydrous)          Yes  Yes   Yes      Yes
(1330-43-4)

--------\Chemical Inventory Status - Part 2\---------------------------------
```

```
                                                          --Canada--
  Ingredient                                        Korea  DSL   NDSL  Phil.
  ----------------------------------------------  -----  ---   ----  -----
  Borates, Tetra, Sodium Salts (Anhydrous)          Yes   Yes   No     Yes
  (1330-43-4)

  --------\Federal, State & International Regulations - Part 1\----------------
                                                -SARA 302-    ------SARA 313------
  Ingredient                                    RQ    TPQ     List  Chemical Catg.
  ----------------------------------------  ---   -----   ----  --------------
  Borates, Tetra, Sodium Salts (Anhydrous)   No    No      No         No
  (1330-43-4)

  --------\Federal, State & International Regulations - Part 2\----------------
                                                         -RCRA-    -TSCA-
  Ingredient                                    CERCLA     261.33     8(d)
  ----------------------------------------  ------     ------    ------
  Borates, Tetra, Sodium Salts                No         No         No
  (Anhydrous) (1330-43-4)


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Mixture / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S3242** * * * * * *Effective Date:* ***05/26/09*** * * * * * *Supercedes:* ***08/17/06***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM CARBONATE ANHYDROUS

1. Product Identification

Synonyms: Carbonic acid, disodium salt; disodium carbonate; soda ash
CAS No.: 497-19-8
Molecular Weight: 105.99
Chemical Formula: Na2CO3
Product Codes:
J.T. Baker: 3602, 3604, 3605, 3606, 4502, 4923, 5198
Mallinckrodt: 1338, 3604, 7468, 7472, 7521, 7527, 7528, 7698

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Carbonate	497-19-8	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY CAUSE EYE BURNS. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Inhalation of dust may cause irritation to the respiratory tract. Symptoms from excessive inhalation of dust may include coughing and difficult breathing. Excessive contact is known to cause damage to the nasal septum.
Ingestion:
Sodium carbonate is only slightly toxic, but large doses may be corrosive to the gastro-intestinal tract where symptoms may include severe abdominal pain, vomiting, diarrhea, collapse and death.
Skin Contact:
Excessive contact may cause irritation with blistering and redness. Solutions may cause severe irritation or burns.
Eye Contact:
Contact may be corrosive to eyes and cause conjuctival edema and corneal destruction. Risk of serious injury increases if eyes are kept tightly closed. Other symptoms may appear from absorption of sodium carbonate into the bloodstream via the eyes.
Chronic Exposure:
Prolonged or repeated skin exposure may cause sensitization.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Consider endoscopy in all suspected cases of sodium carbonate poisoning. Perform blood analysis to determine if dehydration, acidosis, or other electrolyte imbalances occurred.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered an explosion hazard, but sodium carbonate may explode when applied to red-hot aluminum.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills:

Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White powder or granules.
Odor:
Odorless.
Solubility:
45.5 g/100 ml water @ 100C (212F)
Specific Gravity:
2.53
pH:
11.6 Aqueous solution
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Decomposes.
Melting Point:
851C (1564F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Hygroscopic. Readily absorbs moisture from the air. Solutions are strong bases.
Hazardous Decomposition Products:
Oxides of carbon and sodium oxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Fluorine, aluminum, phosphorous pentoxide, sulfuric acid, zinc, lithium, moisture, calcium hydroxide and 2,4,6-trinitrotoluene. Reacts violently with acids to form carbon dioxide.
Conditions to Avoid:
Moisture, heat, dusting and incompatibles.

11. Toxicological Information

For Sodium Carbonate:
Oral rat LD50: 4090 mg/kg; inhalation rat LC50: 2300 mg/m3/2H; irritation eye rabbit: 50 mg severe; investigated as a mutagen, reproductive effector.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
------------------------------------ -----    -----------    -------------
Sodium Carbonate (497-19-8)          No          No            None
```

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
96 Hr LC50 Lepomis macrochirus: 300 mg/L [static];
48 Hr EC50 Daphnia magna: 265 mg/L

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
```

```
  ---------------------------------------------  ----  ---  -----  ---------
  Sodium Carbonate (497-19-8)                     Yes  Yes   Yes      Yes

  --------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
  Ingredient                                     Korea  DSL   NDSL  Phil.
  ---------------------------------------------  -----  ---   ----  -----
  Sodium Carbonate (497-19-8)                     Yes   Yes   No     Yes

  --------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
  Ingredient                               RQ    TPQ     List  Chemical Catg.
  ----------------------------------------  ---   -----   ----  --------------
  Sodium Carbonate (497-19-8)              No    No      No         No

  --------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
  Ingredient                               CERCLA     261.33     8(d)
  ----------------------------------------  ------     ------    ------
  Sodium Carbonate (497-19-8)              No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! MAY CAUSE EYE BURNS. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT

BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S3338** * * * * * *Effective Date:* ***11/09/06*** * * * * * *Supercedes:* ***01/12/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM CHLORIDE

1. Product Identification

Synonyms: Salt; Rock Salt; Saline; Table Salt
CAS No.: 7647-14-5
Molecular Weight: 58.44
Chemical Formula: NaCl
Product Codes:
J.T. Baker: 3624, 3625, 3626, 3627, 3628, 3629, 4058, 4924
Mallinckrodt: 4577, 5519, 7361, 7503, 7532, 7534, 7540, 7544, 7576, 7581, 7713, V482

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Chloride	7647-14-5	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES EYE IRRITATION.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
May cause mild irritation to the respiratory tract.
Ingestion:
Very large doses can cause vomiting, diarrhea, and prostration. Dehydration and congestion occur in most internal organs. Hypertonic salt solutions can produce violent inflammatory reactions in the gastrointestinal tract.
Skin Contact:
May irritate damaged skin; absorption can occur with effects similar to those via ingestion.
Eye Contact:
Causes irritation, redness, and pain. (For salt concentrations greater than the normal saline present.)
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
If large amounts were swallowed, give water to drink and get medical advice.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids);

observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White crystals.
Odor:
Odorless.
Solubility:
36g/100cc water @ 20C (68F)
Specific Gravity:
2.16
pH:
6.7 - 7.3 (aqueous solution)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1413C (2575F)
Melting Point:
801C (1474F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1.0 @ 865C (1589F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Hygroscopic.
Hazardous Decomposition Products:
When heated to above 801C (1474F) it emits toxic fumes of chloride and sodium oxide.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Lithium, bromine trifluoride.

Conditions to Avoid:
Incompatibles.

---

11. Toxicological Information

Oral rat LD50: 3000 mg/kg.
Inhalation rat LC50: > 42 gm/m3 /1H.
Skin rabbit LD50: > 10 gm/kg. Investigated as a mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Chloride (7647-14-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Sodium Chloride (7647-14-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Chloride (7647-14-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Chloride (7647-14-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Chloride (7647-14-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No

```
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! CAUSES EYE IRRITATION.
Label Precautions:
Avoid contact with eyes.
Wash thoroughly after handling.
Label First Aid:
In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.
Product Use:
Laboratory Reagent.
Revision Information:
No Information Found.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

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From: Mallinckrodt Baker, Inc.
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Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM CITRATE

1. Product Identification

Synonyms: Citrosodine; trisodium citrate; citric acid, trisodium salt; 2-hydroxy-1,2,3-propanetricarboxylic acid, trisodium salt, dihydrate;sodium citrate dihydrate
CAS No.: 68-04-2 (Anhydrous); 6132-04-3 (Dihydrate)
Molecular Weight: 294.10
Chemical Formula: HOC (COONa) (CH2COONa)2.2H2O
Product Codes:
J.T. Baker: 3646, 3647, 3648, 3649, 3650, 4093
Mallinckrodt: 0634, 0734, 0754, 7773

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Citrate	68-04-2	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
Inhalation of large amounts of dust may cause irritation to the respiratory tract.
Ingestion:
Extremely large oral dosages may produce gastrointestinal disturbances.
Skin Contact:
Possible irritation on prolonged contact with moist or sensitive areas of the skin.
Eye Contact:
No adverse effects expected but dust may cause mechanical irritation.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.
Skin Contact:
Wash exposed area with soap and water. Get medical advice if irritation develops.
Eye Contact:
Wash thoroughly with running water. Get medical advice if irritation develops.

---

5. Fire Fighting Measures

Fire:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they

retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White crystals.
Odor:
Odorless.
Solubility:
72 g/100 g of water.
Density:
ca. 1.7
pH:
ca. 8.0
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Decomposes at red heat.
Melting Point:
150C (302F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
Not applicable.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.

Conditions to Avoid:
Heat, flame, ignition sources, dusting and incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

```
--------\Cancer Lists\-------------------------------------------------------
                                   ---NTP Carcinogen---
Ingredient                         Known    Anticipated    IARC Category
-----------------------------------  -----    -----------    -------------
Sodium Citrate (68-04-2)            No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Sodium Citrate (68-04-2)                         Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Sodium Citrate (68-04-2)                         Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                           -SARA 302-    ------SARA 313------
Ingredient                                 RQ    TPQ     List  Chemical Catg.
-----------------------------------------  ---   -----   ----  --------------
Sodium Citrate (68-04-2)                   No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-    -TSCA-
Ingredient                                 CERCLA     261.33     8(d)
-----------------------------------------  ------     ------    ------
Sodium Citrate (68-04-2)                   No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: No       Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Use with adequate ventilation.
Keep container closed.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S3650** * * * * * *Effective Date:* ***08/17/09*** * * * * * *Supercedes:* ***11/10/06***

MSDS Material Safety Data Sheet

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222 Red School Lane
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24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROSULFITE

1. Product Identification

Synonyms: Sodium Dithionite; Dithionous acid, disodium salt; Sodium Sulfoxylate
CAS No.: 7775-14-6
Molecular Weight: 174.10
Chemical Formula: Na2S2O4
Product Codes:
J.T. Baker: 3712
Mallinckrodt: 7672

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydrosulfite	7775-14-6	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE SOLID. MAY IGNITE WITH MOISTURE AND AIR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 4 - Extreme (Flammable)
Reactivity Rating: 3 - Severe (Air Reactive)
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Red Stripe (Store Separately)

Potential Health Effects

Inhalation:
Inhalation can cause severe irritation of mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. High concentrations may cause lung damage. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
Ingestion:
May cause abdominal pain, nausea, vomiting, colic and diarrhea, circulatory disturbances, central nervous system depression, irritability, restlessness, convulsions, cyanosis, respiratory and cardiovascular collapse, and death. Estimated lethal dose 30 grams.
Skin Contact:
Can irritate the skin causing a rash or burning feeling on contact. High concentrations could cause burns.
Eye Contact:
Causes irritation, redness, and pain. May cause burns and possible damage to vision.
Chronic Exposure:
Exposure may induce allergic reaction.
Aggravation of Pre-existing Conditions:
Persons allergic to "sulfiting" agents, used to preserve some foods, may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Flammable Solid. Heats spontaneously in contact with moisture and air. May ignite in the presence of combustible materials.
Explosion:
Not considered to be an explosion hazard. An explosion occurred after mixing sodium hydrosulfite, aluminum powder, potassium carbonate and benzaldehyde.
Fire Extinguishing Media:
Carbon dioxide, dry chemical or sand.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

---

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White to grayish-white granular powder.
Odor:
Distinct sulfur dioxide odor.
Solubility:
Soluble in water.
Density:
2.19
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:

52C (126F) Decomposes.
Vapor Density (Air=1):
3.6
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable when stored in closed containers at room temperature. Heats spontaneously in contact with moisture and air. Loses all of its water of crystallization at 110C. Decomposes in hot water and acid.
Hazardous Decomposition Products:
Burning may produce sulfur oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Water, combustible materials, strong oxidizing agents, strong acids and sodium chlorite. An explosion occurred after mixing sodium hydrosulfite, aluminum powder, potassium carbonate and benzaldehyde.
Conditions to Avoid:
Moisture, humidity, heat, flame, ignition sources and incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

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--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Sodium Hydrosulfite (7775-14-6)          No          No              3
```

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

International (Water, I.M.O.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

International (Air, I.C.A.O.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

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15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Sodium Hydrosulfite (7775-14-6)                  Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Sodium Hydrosulfite (7775-14-6)                  Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Sodium Hydrosulfite (7775-14-6)           No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                                CERCLA  261.33    8(d)
----------------------------------------  ------  ------    ------
Sodium Hydrosulfite (7775-14-6)           No      No        No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: Yes Pressure: No
Reactivity: Yes         (Pure / Solid)
```

Australian Hazchem Code: 1P
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **2** Other: **Water reactive**
Label Hazard Warning:
WARNING! FLAMMABLE SOLID. MAY IGNITE WITH MOISTURE AND AIR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Store in a tightly closed container.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM FLUORIDE

1. Product Identification

Synonyms: Floridine; sodium monofluoride; disodium difluoride; natrium fluoride; Florocid
CAS No.: 7681-49-4
Molecular Weight: 41.99
Chemical Formula: NaF
Product Codes:
J.T. Baker: 3687, 3688, 3689
Mallinckrodt: 0467, 5309, 5325, 7636

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Fluoride	7681-49-4	100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. AFFECTS RESPIRATORY SYSTEM, HEART, SKELETON, CIRCULATORY SYSTEM, CENTRAL NERVOUS SYSTEM AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. IRRITATION EFFECTS MAY BE DELAYED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

If inhaled or swallowed, this compound can cause fluoride poisoning. Early symptoms include nausea, vomiting, diarrhea, and weakness. Later effects include central nervous system effects, cardiovascular effects and death.

Inhalation:
Causes severe irritation to the respiratory tract, symptoms may include coughing, sore throat, and labored breathing. May be absorbed through inhalation of dust; symptoms may parallel those from ingestion exposure. Irritation effects may not appear immediately.
Ingestion:
Toxic! May cause salivation, nausea, vomiting, diarrhea, and abdominal pain. Symptoms of weakness, tremors, shallow respiration, cardopedal spasm, convulsions, and coma may follow. May cause brain and kidney damage. Affects heart and circulatory system. Death may occur from respiratory paralysis. Estimated lethal dose = 5-l0 grams.
Skin Contact:
Causes irritation, with redness and pain. Solutions are corrosive. Effects may not appear immediately.
Eye Contact:
Eye irritant! May cause irritation and serious eye damage. Effects may not immediately appear.
Chronic Exposure:
Chronic exposure may cause mottling of teeth and bone damage (osteosclerosis) and fluorosis. Symptoms of fluorisis include brittle bones,weight loss, anemia, calcified ligaments, general ill health and joint stiffness.
Aggravation of Pre-existing Conditions:
Populations that appear to be at increased risk from the effects of fluoride are individuals that suffer from diabetes insipidus or some forms of renal impairment.

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4. First Aid Measures

First aid procedures should be pre-planned for fluoride compound emergencies.
Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Administer milk, chewable calcium carbonate tablets or milk of magnesia. Never give anything by mouth to an unconscious person. CALL A PHYSICIAN IMMEDIATELY.
Skin Contact:
Wipe off any excess material from skin and then immediately flush skin with large amounts of soapy water. Remove contaminated clothing and shoes. Wash clothing before re-use. Apply bandages soakifiedlu73 health and circuulfinaor
Eye Contact:
tampe py watur for at r

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from acids and oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
2.5 mg(F)/m3 (TWA)

-ACGIH Threshold Limit Value (TLV):
2.5 mg(F)/m3 (TWA)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:

White crystals.
Odor:
Odorless.
Solubility:
4 g/100 ml water @ 15C (59F)
Specific Gravity:
2.78
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1700C (3092F)
Melting Point:
993C (1819F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1 @ 1077C (1971F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce hydrogen fluoride vapors.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Reacts with acids to form hydrogen fluoride.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

Oral rat LD50: 52 mg/kg; Eye Rabbit (standard Draize) 20mg/24-hr, moderate; Investigated as a tumorigen, mutagen, reproductive effector

```
--------\Cancer Lists\-------------------------------------------------------
                                     ---NTP Carcinogen---
Ingredient                           Known    Anticipated    IARC Category
-------------------------------------  -----    -----------    -------------
Sodium Fluoride (7681-49-4)             No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
For Sodium Flouride:
48 hour EC50 Daphnia magna (water flea) : 338 mg/L.
96 hour LC50 Lepomis macrochirus (bluegill) : > 530 mg/L.
96 hour EC50 Selenastrum capricornutum (green algea) : 272 mg/L.

LD50, oral (goat, sheep) 100 mg/kg; LD50, oral (wild bird) 110 mg/kg.

This material is not expected to be toxic to aquatic life.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM FLUORIDE
Hazard Class: 6.1
UN/NA: UN1690
Packing Group: III
Information reported for product/size: 250LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM FLUORIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1690
Packing Group: III
Information reported for product/size: 250LB

International (Air, I.C.A.O.)

Proper Shipping Name: SODIUM FLUORIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1690
Packing Group: III
Information reported for product/size: 250LB

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Sodium Fluoride (7681-49-4)                      Yes   Yes  Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Sodium Fluoride (7681-49-4)                      Yes    Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Sodium Fluoride (7681-49-4)               No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                                CERCLA  261.33    8(d)
----------------------------------------  ------  ------    ------
Sodium Fluoride (7681-49-4)               1000    No        No
```

```
Chemical Weapons Convention:  Yes    TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: 2Z
Poison Schedule: S2
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. AFFECTS RESPIRATORY SYSTEM, HEART, SKELETON, CIRCULATORY SYSTEM, CENTRAL NERVOUS SYSTEM AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. IRRITATION EFFECTS MAY BE DELAYED.
Label Precautions:
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.
Label First Aid:
In all cases call a physician immediately. First Aid procedures should be pre-planned for fluoride compound emergencies. If swallowed, administer milk, chewable calcium carbonate tablets or milk of magnesia. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give artificial respiration. In case of skin contact wipe off any excess material then immediately flush skin with large amounts of soapy water. Remove contaminated clothing and shoes. Wash clothing before re-use. Apply bandages soaked in magnesium sulfate. In case of eye contact, immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting upper and lower eyelids occasionally.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 12.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HEXAMETAPHOSPHATE

1. Product Identification

Synonyms: Hexametaphosphate, sodium salt; SHMP; Metaphosphoric acid, hexadosium salt; Sodium polyphosphates, glassy
CAS No.: 68915-31-1
Molecular Weight: Not applicable to mixtures.
Chemical Formula: Na(x+2) Px O(3x+1) x = 6 to 21
Product Codes:
J.T. Baker: V030
Mallinckrodt: E024

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Polyphosphoric Acids, Sodium Salts	68915-31-1	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY BE HARMFUL IF SWALLOWED OR INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Many of the systemic effects given below were taken from toxicity information for other phosphates.

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. Such effects, however, have occurred. Symptoms may include vomiting, lethargy, diarrhea, blood chemistry effects, heart disturbances and central nervous system effects. The toxicity of phosphates is because of their ability to sequester calcium. Systemic acidosis may result as this material is believed to hydrolyze into phosphoric acid when ingested.
Skin Contact:
May cause irritation with redness and pain.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
May sequester calcium and cause calcium phosphate deposits in the kidneys. Chronic ingestion or inhalation may induce systemic phosphorous poisoning. Liver damage, kidney damage, jaw/tooth abnormalities, blood disorders and cardiovascular effects can result.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, jaw/tooth abnormalities, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills:

Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White powder or plates.
Odor:
No information found.
Solubility:
Soluble in water.
Density:
1.25
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1500C (2732F)
Melting Point:
550C (1022F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Sodium and phosphorus oxides may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
No information found.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

Oral rat LD50: 3053 mg/kg

```
--------\Cancer Lists\-------------------------------------------------------
                                   ---NTP Carcinogen---
Ingredient                         Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Polyphosphoric Acids, Sodium Salts      No          No            None
(68915-31-1)
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Polyphosphoric Acids, Sodium Salts (68915-31-1)   Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Polyphosphoric Acids, Sodium Salts (68915-31-1)   Yes   Yes   No     Yes
```

```
--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Polyphosphoric Acids, Sodium Salts        No    No      No         No
(68915-31-1)

--------\Federal, State & International Regulations - Part 2\----------------
                                                -RCRA-    -TSCA-
Ingredient                                CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Polyphosphoric Acids, Sodium Salts        No         No         No
(68915-31-1)


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Mixture / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings:

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S3650** * * * * * *Effective Date:* ***08/17/09*** * * * * * *Supercedes:* ***11/10/06***

MSDS Material Safety Data Sheet

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROSULFITE

1. Product Identification

Synonyms: Sodium Dithionite; Dithionous acid, disodium salt; Sodium Sulfoxylate
CAS No.: 7775-14-6
Molecular Weight: 174.10
Chemical Formula: Na2S2O4
Product Codes:
J.T. Baker: 3712
Mallinckrodt: 7672

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydrosulfite	7775-14-6	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE SOLID. MAY IGNITE WITH MOISTURE AND AIR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 4 - Extreme (Flammable)
Reactivity Rating: 3 - Severe (Air Reactive)
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Red Stripe (Store Separately)

Potential Health Effects

Inhalation:
Inhalation can cause severe irritation of mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. High concentrations may cause lung damage. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
Ingestion:
May cause abdominal pain, nausea, vomiting, colic and diarrhea, circulatory disturbances, central nervous system depression, irritability, restlessness, convulsions, cyanosis, respiratory and cardiovascular collapse, and death. Estimated lethal dose 30 grams.
Skin Contact:
Can irritate the skin causing a rash or burning feeling on contact. High concentrations could cause burns.
Eye Contact:
Causes irritation, redness, and pain. May cause burns and possible damage to vision.
Chronic Exposure:
Exposure may induce allergic reaction.
Aggravation of Pre-existing Conditions:
Persons allergic to "sulfiting" agents, used to preserve some foods, may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Flammable Solid. Heats spontaneously in contact with moisture and air. May ignite in the presence of combustible materials.
Explosion:
Not considered to be an explosion hazard. An explosion occurred after mixing sodium hydrosulfite, aluminum powder, potassium carbonate and benzaldehyde.
Fire Extinguishing Media:
Carbon dioxide, dry chemical or sand.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

---

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
White to grayish-white granular powder.
Odor:
Distinct sulfur dioxide odor.
Solubility:
Soluble in water.
Density:
2.19
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:

52C (126F) Decomposes.
Vapor Density (Air=1):
3.6
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable when stored in closed containers at room temperature. Heats spontaneously in contact with moisture and air. Loses all of its water of crystallization at 110C. Decomposes in hot water and acid.
Hazardous Decomposition Products:
Burning may produce sulfur oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Water, combustible materials, strong oxidizing agents, strong acids and sodium chlorite. An explosion occurred after mixing sodium hydrosulfite, aluminum powder, potassium carbonate and benzaldehyde.
Conditions to Avoid:
Moisture, humidity, heat, flame, ignition sources and incompatibles.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
-------------------------------------   -----    -----------    -------------
Sodium Hydrosulfite (7775-14-6)          No          No              3
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

International (Water, I.M.O.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

International (Air, I.C.A.O.)

Proper Shipping Name: SODIUM DITHIONITE
Hazard Class: 4.2
UN/NA: UN1384
Packing Group: II
Information reported for product/size: 2.5KG

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Sodium Hydrosulfite (7775-14-6)                  Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                         --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Sodium Hydrosulfite (7775-14-6)                  Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Sodium Hydrosulfite (7775-14-6)           No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                  -RCRA-    -TSCA-
Ingredient                                CERCLA  261.33    8(d)
----------------------------------------  ------  ------    ------
Sodium Hydrosulfite (7775-14-6)           No      No        No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: Yes Pressure: No
Reactivity: Yes         (Pure / Solid)
```

Australian Hazchem Code: 1P
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **2** Other: **Water reactive**
Label Hazard Warning:
WARNING! FLAMMABLE SOLID. MAY IGNITE WITH MOISTURE AND AIR. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Store in a tightly closed container.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **S4034** * * * * * *Effective Date:* ***05/04/07*** * * * * * *Supercedes:* ***07/07/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROXIDE

1. Product Identification

Synonyms: Caustic soda; lye; sodium hydroxide solid; sodium hydrate
CAS No.: 1310-73-2
Molecular Weight: 40.00
Chemical Formula: NaOH
Product Codes:
J.T. Baker: 1508, 3717, 3718, 3721, 3722, 3723, 3728, 3734, 3736, 5045, 5565
Mallinckrodt: 7001, 7680, 7708, 7712, 7772, 7798

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydroxide	1310-73-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:
Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
Ingestion:
Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.
Chronic Exposure:
Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Hot or molten material can react violently with water.
Can react with certain metals, such as aluminum, to generate flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Adding water to caustic solution generates large amounts of heat.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
- ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:

White, deliquescent pellets or flakes.
Odor:
Odorless.
Solubility:
111 g/100 g of water.
Specific Gravity:
2.13
pH:
13 - 14 (0.5% soln.)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1390C (2534F)
Melting Point:
318C (604F)
Vapor Density (Air=1):
> 1.0
Vapor Pressure (mm Hg):
Negligible.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Very hygroscopic. Can slowly pick up moisture from air and react with carbon dioxide from air to form sodium carbonate.
Hazardous Decomposition Products:
Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Sodium hydroxide in contact with acids and organic halogen compounds, especially trichloroethylene, may causes violent reactions. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as aluminum, magnesium, tin, and zinc cause formation of flammable hydrogen gas. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon monoxide. Precautions should be taken including monitoring the tank atmosphere for carbon monoxide to ensure safety of personnel before vessel entry.
Conditions to Avoid:
Moisture, dusting and incompatibles.

---

11. Toxicological Information

Irritation data: skin, rabbit: 500 mg/24H severe; eye rabbit: 50 ug/24H severe; investigated as a mutagen.

```
--------\Cancer Lists\-------------------------------------------------------
                                    ---NTP Carcinogen---
Ingredient                          Known    Anticipated    IARC Category
------------------------------------ -----    -----------    -------------
Sodium Hydroxide (1310-73-2)         No          No            None
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1823
Packing Group: II
Information reported for product/size: 300LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1823
Packing Group: II
Information reported for product/size: 300LB

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Sodium Hydroxide (1310-73-2)                       Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Sodium Hydroxide (1310-73-2)                       Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
Ingredient                                  RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Sodium Hydroxide (1310-73-2)                No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-    -TSCA-
Ingredient                                  CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Sodium Hydroxide (1310-73-2)                1000       No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: Yes         (Pure / Solid)
```

Australian Hazchem Code: 2R
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR)

and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**
Label Hazard Warning:

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM PYROPHOSPHATE

1. Product Identification

Synonyms: Tetra sodium pyrophosphate, hydrated; Sodium pyrophosphate, 10-hydrate; Pyrophosphoric acid, tetrasodium salt, 10-hydrate
CAS No.: 7722-88-5 (Anhydrous) 13472-36-1 (Decahydrate)
Molecular Weight: 446.06
Chemical Formula: Na4P2O7.10H2O
Product Codes:
J.T. Baker: 3850
Mallinckrodt: 7956, 7960, 7968

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrasodium Pyrophosphate	7722-88-5	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Many of the systemic effects given below were taken from toxicity information for other phosphates.

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.
Ingestion:
Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. Such effects, however, have occurred. Symptoms may include vomiting, lethargy, diarrhea, blood chemistry effects, heart disturbances and central nervous system effects. The toxicity of phosphates is because of their ability to sequester calcium.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Chronic ingestion or inhalation may induce systemic phosphorous poisoning. Liver damage, kidney damage, jaw/tooth abnormalities, blood disorders and cardiovascular effects can result.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, jaw/tooth abnormalities, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear

appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Sodium pyrophosphate:
-ACGIH Threshold Limit Value (TLV):
5 mg/m3 (TWA)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Transparent, colorless crystals.
Odor:
Odorless.
Solubility:
Slightly soluble in water.
Specific Gravity:
1.82
pH:
10.2 (1% aqueous solution)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:

80C (176F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Sodium and phosphorus oxides may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

Anhydrous: Sodium pyrophosphate: Oral rat LD50: 4000 mg/kg.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Tetrasodium Pyrophosphate (7722-88-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Tetrasodium Pyrophosphate (7722-88-5)             Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Tetrasodium Pyrophosphate (7722-88-5)             Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                                -SARA 302-    ------SARA 313------
Ingredient                                      RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Tetrasodium Pyrophosphate (7722-88-5)      No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                         -RCRA-    -TSCA-
Ingredient                                      CERCLA   261.33    8(d)
----------------------------------------  ------    ------    ------
Tetrasodium Pyrophosphate (7722-88-5)      No        No        No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

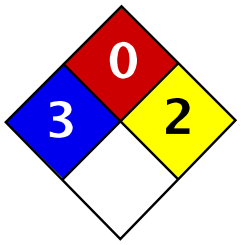
---

16. Other Information

NFPA Ratings:0WHMIS:
Reactiv48R. 0WHMIS:

WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	3
Fire	0
Reactivity	2
Personal Protection	

Material Safety Data Sheet
Sulfuric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: 3ULFURIC ACID

Catalog Codes: 3,3 3,3 3,3 3,3 3,3

CAS#:

RTECS: 73

TSCA: 43#! B INVENTORY 3ULFURIC ACID

CI#: .OT APPLICABLE

Synonym: /IL OF 6ITRIOL 3ULFURIC !CID

Chemical Name: (YDROGEN SULFATE

Chemical Formula: (3/

Contact Information:

Sciencelab.com, Inc.
3MITH 2D
(OUSTON 4EXAS

53 3AL1-800-901-7247
)NTERNATIO1-281-441-4400S

/RDER /NLINE 3CIENCE,AB COM

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
3ULFURIC ACID		

Toxicological Data on Ingredients: 3ULFURIC ACID /2!, ,$!CUTE MG KG;2AT = 6!0/2 HOURS;2AT= MG M HOURS;-OUSE=

Section 3: Hazards Identification

Potential Acute Health Effects:
6ERY HAZARDOUS IN CASE OF SKIN CONTACT CORROSIVE IRRITANT PERMEATOR
INGESTION OF INHALATION ,IQUID OR SPRAY MIST MAY PRODUCE TISSUE DAMAG
EYES MOUTH AND RESPIRATORY TRACT 3KIN CONTACT MAY PRODUCE BURNS)NI
SEVERE IRRITATION OF RESPIRATORY TRACT CHARACTERIZED BY COUGHING CH
OVER EXPOSURE CAN RESULT IN DEATH)NFLAMMATION OF THE EYE IS CHARACTE
3KIN INFLAMMATION IS CHARACTERIZED BY ITCHING SCALING REDDENING OR C

Potential Chronic Health Effects:
#!2#)./'%.)# %&&%#43 #LASSIFIED 0ROVEN FOR HUMAN BY)!2# 0ROVEN BY
3USPECTED FOR HUMAN BY !#')(
-54!'%.)# %&&%#43 .OT AVAILABLE
4%2!4/'%.)# %&&%#43 .OT AVAILABLE

Section 4: First Aid Measures

Eye Contact:
#HECK FOR AND REMOVE ANY CONTACT LENSES)N CASE OF CONTACT IMMEDIATE
LEAST MINUTES #OLD WATER MAY BE USED 'ET MEDICAL ATTENTION IMMEDIAT

Skin Contact:
)N CASE OF CONTACT IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT L
CLOTHING AND SHOES #OVER THE IRRITATED SKIN WITH AN EMOLLIENT #OLD WA
REUSE 4HOROUGHLY CLEAN SHOES BEFORE REUSE 'ET MEDICAL ATTENTION IMM

Serious Skin Contact:
7ASH WITH A DISINFECTANT SOAP AND COVER THE CONTAMINATED SKIN WITH AN A
MEDICAL ATTENTION

Inhalation:
)F INHALED REMOVE TO FRESH AIR)F NOT BREATHING GIVE ARTIFICIAL RESPIRA
MEDICAL ATTENTION IMMEDIATELY

Serious Inhalation:
%VACUATE THE VICTIM TO A SAFE AREA AS SOON AS POSSIBLE ,OOSEN TIGHT CLO
WAISTBAND)F BREATHING IS DIFFICULT ADMINISTER OXYGEN)F THE VICTIM IS
RESUSCITATION 7!2.).')T MAY BE HAZARDOUS TO THE PERSON PROVIDING AID TO
WHEN THE INHALED MATERIAL IS TOXIC INFECTIOUS OR CORROSIVE 3EEK IMMED

Ingestion:
$O ./4 INDUCE VOMITING UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL .EV
UNCONSCIOUS PERSON ,OOSEN TIGHT CLOTHING SUCH AS A COLLAR TIE BELT O
SYMPTOMS APPEAR

Serious Ingestion: .OT AVAILABLE

Section 5: Fire and Explosion Data

Flammability of the Product: .ON FLAMMABLE

Auto-Ignition Temperature: .OT APPLICABLE

Flash Points: .OT APPLICABLE

Flammable Limits: .OT APPLICABLE

Products of Combustion:
0RODUCTS OF COMBUSTION ARE NOT AVAILABLE SINCE MATERIAL IS NON FLAMMA
INCLUDE FUMES OF OXIDES OF SULFUR 7ILL REACT WITH WATER OR STEAM TO PRO
WITH CARBONATES TO GENERATE CARBON DIOXIDE GAS 2EACTS WITH CYANIDES
CYANIDE AND HYDROGEN SULFIDE RESPECTIVELY

Fire Hazards in Presence of Various Substances: #OMBUSTIBLE MATERIALS

Explosion Hazards in Presence of Various Substances:

Fire Fighting Media and Instructions: .OT APPLICABLE

Special Remarks on Fire Hazards:
-ETAL ACETYLIDES -ONOCESIUM AND -ONORUBIDIUM AND CARBIDES IGNITE WIT
7HITE 0HOSPHOROUS BOILING 3ULFURIC ACID OR ITS VAPOR IGNITES ON CONTAC
-AY IGNITE OTHER COMBUSTIBLE MATERIALS
-AY CAUSE FIRE WHEN SULFURIC ACID IS MIXED WITH #YCLOPENTADIENE CYCLOP
HEXALITHIUM DISILICIDE PHORPHOROUS))) OXIDE AND OXIDIZING AGENTS SUC

Special Remarks on Explosion Hazards:
-IXTURESOFSULFURICACIDANDANYOFTHEFOLLOWINGCANEXP
ER
TRIHYDROXYDIAMINOPHOSPHATE PERCHLORATES ALCOHOLS WITH STRONG HYD
TETRAPEROXYCHROMATE MERCURIC NITRITE POTASSIUM CHLORATE POTASSIU
CARBIDES NITRO COMPOUNDS NITRATES CARBIDES PHOSPHOROUS IODIDES P
HEATED
.ITRAMIDE DECOMPOSES EXPLOSIVELY ON CONTACT WITH CONCENTRATED SULFU
4RINITROSOHEXAHYDRO TRIAZINE SULFURIC ACID CAUSES EXPLOSIVE

Section 6: Accidental Release Measures

Small Spill:
$ILUTE WITH WATER AND MOP UP OR ABSORB WITH AN INERT DRY MATERIAL AND P
CONTAINER)F NECESSARY .EUTRALIZE THE RESIDUE WITH A DILUTE SOLUTION C

Large Spill:
#ORROSIVE LIQUID 0OISONOUS LIQUID
3TOP LEAK IF WITHOUT RISK !BSORB WITH $29 EARTH SAND OR OTHER NON COME
CONTAINER $O NOT TOUCH SPILLED MATERIAL 5SE WATER SPRAY CURTAIN TO DI
VAPORS 0REVENT ENTRY INTO SEWERS BASEMENTS OR CONFINED AREAS DIKE I
.EUTRALIZE THE RESIDUE WITH A DILUTE SOLUTION OF SODIUM CARBONATE "E CA
A CONCENTRATION LEVEL ABOVE 4,6 #HECK 4,6 ON THE -3$3 AND WITH LOCAL AUT

Section 7: Handling and Storage

Precautions:
+EEP LOCKED UP +EEP CONTAINER DRY $O NOT INGEST $O NOT BREATHE GAS F
TO THIS PRODUCT)N CASE OF INSUFFICIENT VENTILATION WEAR SUITABLE RESP
ADVICE IMMEDIATELY AND SHOW THE CONTAINER OR THE LABEL !VOID CONTACT W
INCOMPATIBLES SUCH AS OXIDIZING AGENTS REDUCING AGENTS COMBUSTIBLE
ALKALIS MOISTURE
-AY CORRODE METALLIC SURFACES 3TORE IN A METALLIC OR COATED FIBERBOAR
PACKAGE

Storage:
(YGROSCOPIC 2EACTS VIOLENTLY WITH WATER +EEP CONTAINER TIGHTLY CLOS
AREA $O NOT STORE ABOVE —# —&

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
0ROVIDE EXHAUST VENTILATION OR OTHER ENGINEERING CONTROLS TO KEEP THE
RESPECTIVE THRESHOLD LIMIT VALUE %NSURE THAT EYEWASH STATIONS AND SA
WORK STATION LOCATION

Personal Protection:
&ACE SHIELD &ULL SUIT 6APOR RESPIRATOR "E SURE TO USE AN APPROVED CEI
"OOTS

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT 6APOR RESPIRATOR "OOTS 'LOVES !SELF CONTA
USED TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTHIN
"%&/2% HANDLING THIS PRODUCT

Exposure Limits:
47! 34%, MG M ;!USTRALIA=)NHALATION
47! MG M FROM /3(! 0%, ;5NITED 3TATES=)NHALATION
47! 34%, MG M FROM !#')(4,6 ;5NITED 3TATES=; =)NHALATION
47! MG M FROM .)/3(;5NITED 3TATES=)NHALATION
47! MG M ;5NITED +INGDOM 5+ =#ONSULT LOCAL AUTHORITIES FOR ACCEPTA

Section 9: Physical and Chemical Properties

Physical state and appearance: ,IQUID 4HICK OILY LIQUID

Odor: /DORLESS BUT HAS A CHOKING ODOR WHEN HOT

Taste: -ARKED ACID TASTE 3TRONG

Molecular Weight: G MOLE

Color: #OLORLESS

pH (1% soln/water): !CIDIC

Boiling Point:
—# —& DEG #
$ECOMPOSES AT DEG #

Melting Point: —# —& TO DEG # TO PURITY

Critical Temperature: .OT AVAILABLE

Specific Gravity: 7ATER

Vapor Pressure: .OT AVAILABLE

Vapor Density: !IR

Volatility: .OT AVAILABLE

Odor Threshold: .OT AVAILABLE

Water/Oil Dist. Coeff.: .OT AVAILABLE

Ionicity (in Water): .OT AVAILABLE

Dispersion Properties: 3EE SOLUBILITY IN WATER

Solubility:
%ASILY SOLUBLE IN COLD WATER
3ULFURIC IS SOLUBLE IN WATER WITH LIBERATION OF MUCH HEAT
3OLUBLE IN ETHYL ALCOHOL

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability:
O N D I T I O N S T O ! V O I D) N C O M P A T I B L E M A T E R I A L S E X C E S S H E A T C O M B U S T I B L E
E X P O S U R E T O M O I S T A I R O R W A T E R O X I D I Z E R S A M I N E S B A S E S
! L W A Y S A D D T H E A C I D T O W A T E R N E V E R T H E R E V E R S E

Incompatibility with various substances:
2 E A C T I V E W I T H O X I D I Z I N G A G E N T S R E D U C I N G A G E N T S C O M B U S T I B L E M A T E R I A L
M O I S T U R E

Corrosivity:
% X T R E M E L Y C O R R O S I V E I N P R E S E N C E O F A L U M I N U M O F C O P P E R O F S T A I N L E S S

Toxicity to Animals:
7!2.).' 4(% ,# 6!,5%3(%2%5.$%2!2% %34)-!4%$/.4(%"!3)3/&! (/52%80/352%
!CUTE ORAL TOXICITY ,$ MG KG;2AT =
!CUTE TOXICITY OF THE VAPOR ,# MG M HOURS;-OUSE=

Chronic Effects on Humans:
#!2#)./'%.)# %&&%#43 #LASSIFIED 0ROVEN FOR HUMAN BY)!2# 0ROVEN BY
3USPECTED FOR HUMAN BY!#')(
-AY CAUSE DAMAGE TO THE FOLLOWING ORGANS KIDNEYS LUNGS HEART CARDI
EYES TEETH

Other Toxic Effects on Humans:
%XTREMELY HAZARDOUS IN CASE OF INHALATION LUNG CORROSIVE
6ERY HAZARDOUS IN CASE OF SKIN CONTACT CORROSIVE IRRITANT PERMEATOR

Special Remarks on Toxicity to Animals: .OT AVAILABLE

Special Remarks on Chronic Effects on Humans:
-UTAGENICITY #YTOGENETIC!NALYSIS (AMSTER OVARY MMOL ,
2EPRODUCTIVE EFFECTS -AY CAUSE ADVERSE REPRODUCTIVE EFFECTS BASED O
ABNORMALITIES MUSCULOSKELETAL IN RABBITS AT A DOSE OF MG M FOR HR
4ERATOGENECITY NEITHER EMBRYOTOXIC FETOXIC NOR TERATOGENETIC IN MI
MATERNAL TOXICITY

Special Remarks on other Toxic Effects on Humans:
!CUTE 0OTENTIAL (EALTH %FFECTS
3KIN #AUSES SEVERE SKIN IRRITATION AND BURNS #ONTINUED CONTACT CAN CA
%YE #AUSES SEVERE EYE IRRITATION AND BURNS -AY CAUSE IRREVERSIBLE EYE
)NGESTION (ARMFUL IF SWALLOWED -AY CAUSE PERMANENT DAMAGE TO THE DIG
TRACT BURNS -AY CAUSE PERFORATION OF THE STOMACH ')BLEEDING EDEMA O
SUDDEN CIRCULATORY COLLAPSE SIMILAR TO ACUTE INHALATION)T MAY ALSO
)NHALATION -AY CAUSE SEVERE IRRITATION OF THE RESPIRATORY TRACT AND MU
SHORTNESS OF BREATH AND DELAYED LUNG EDEMA #AUSES CHEMICAL BURNS TO
FATAL AS A RESULT OF SPASM INFLAMMATION EDEMA OF THE LARYNX AND BRON
EDEMA #AUSE CORROSIVE ACTION ON MUCOUS MEMBRANES -AY AFFECT CARDIO
DEPRESSED CARDIAC OUTPUT BRADYCARDIA #IRCULATORY COLLAPSE WITH CL
RESPIRATION AND SCANTY URINE MAY FOLLOW #IRCULATORY SHOCK IS OFTEN T
AFFECT TEETH CHANGES IN TEETH AND SUPPORTING STRUCTURES EROSION DIS
#HRONIC 0OTENTIAL (EALTH %FFECTS
)NHALATION 0ROLONGED OR REPEATED INHALATION MAY AFFECT BEHAVIOR MUS
KIDNEY DAMAGE AND CARDIOVASCULAR SYSTEM HEART ISCHEMIC HEART LEIS
SYSTEM LUNGS PULMONARY EDEMA LUNG DAMAGE TEETH DENTAL DISCOLORA
3KIN 0ROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMATITIS AN ALLE

Section 12: Ecological Information

Ecotoxicity: %COTOXICITY IN WATER ,# MG L HOURS;BLUEGILL SUNFISH=

BOD5 and COD: .OT AVAILABLE

Products of Biodegradation:
0OSSIBLY HAZARDOUS SHORT TERM DEGRADATION PRODUCTS ARE NOT LIKELY (C
ARISE

Toxicity of the Products of Biodegradation: 4HE PRODUCTS OF DEGRADATION ARE LESS TOXIC TH

Special Remarks on the Products of Biodegradation: .OT AVAILABLE

Section 13: Disposal Considerations

Waste Disposal:
3ULFURIC ACID MAY BE PLACED IN SEALED CONTAINER OR ABSORBED IN VERMICU
MAY ALSO BE DILUTED AND NEUTRALIZED "E SURE TO CONSULT WITH LOCAL OR R
ANY DISPOSAL 7ASTE MUST BE DISPOSED OF IN ACCORDANCE WITH FEDERAL STA
REGULATIONS

Section 14: Transport Information

DOT Classification: #LASS #ORROSIVE MATERIAL

Identification: 3ULFURIC ACID 5..! 0'))

Special Provisions for Transport: .OT AVAILABLE

Section 15: Other Regulatory Information

Federal and State Regulations:
)LLINOIS TOXIC SUBSTANCES DISCLOSURE TO EMPLOYEE ACT 3ULFURIC ACID
.EW 9ORK RELEASE REPORTING LIST 3ULFURIC ACID
2HODE)SLAND 24+ HAZARDOUS SUBSTANCES 3ULFURIC ACID
0ENNSYLVANIA 24+ 3ULFURIC ACID
-INNESOTA 3ULFURIC ACID
-ASSACHUSETTS 24+ 3ULFURIC ACID
.EW *ERSEY 3ULFURIC ACID
#ALIFORNIA $IRECTORgS ,IST OF (AZARDOUS 3UBSTANCES ##2 3ULFURIC A
4ENNESSEE 24+ 3ULFURIC ACID
43#! B INVENTORY 3ULFURIC ACID
3!2! EXTREMELY HAZARDOUS SUBSTANCES 3ULFURIC ACID
3!2! TOXIC CHEMICAL NOTIFICATION AND RELEASE REPORTING 3ULFURIC ACID
#%2#,! (AZARDOUS SUBSTANCES 3ULFURIC ACID LBS KG

Other Regulations:
/3(! (AZARDOUS BY DEFINITION OF (AZARD #OMMUNICATION 3TANDARD #&2
%).%#3 4HIS PRODUCT IS ON THE %UROPEAN)NVENTORY OF %XISTING #OMMERCI

Other Classifications:

WHMIS (Canada):
#,!33$! -ATERIAL CAUSING IMMEDIATE AND SERIOUS TOXIC EFFECTS 6%29 4/8)
#,!33% #ORROSIVE LIQUID

DSCL (EEC):
2 #AUSES SEVERE BURNS
3 +EEP OUT OF THE REACH OF CHILDREN
3)N CASE OF CONTACT WITH EYES RINSE
IMMEDIATELY WITH PLENTY OF WATER AND SEEK
MEDICAL ADVICE
3 .EVER ADD WATER TO THIS PRODUCT
3)N CASE OF ACCIDENT OR IF YOU FEEL UNWELL
SEEK MEDICAL ADVICE IMMEDIATELY SHOW THE
LABEL WHERE POSSIBLE

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection:

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
'LOVES
&ULL SUIT
6APOR RESPIRATOR "E SURE TO USE AN
APPROVED CERTIFIED RESPIRATOR OR
EQUIVALENT 7EAR APPROPRIATE RESPIRATOR
WHEN VENTILATION IS INADEQUATE
&ACE SHIELD

Section 16: Other Information

References:
-ATERIAL SAFETY DATA SHEET EMITTED BY LA #OMMISSION DE LA 3ANT£ ET DE L
4HE 3IGMA !LDRICH ,IBRARY OF #HEMICAL 3AFETY $ATA %DITION))
(AWLEY ' ' 4HE #ONDENSED #HEMICAL $ICTIONARY E ED .EW 9ORK . 9 6AN

Other Special Considerations: .OT AVAILABLE

Created: 0 -

Last Updated: 0 -

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

DECOMPOSITION TEMP: Not available

EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

As with many solids, any dust that is generated may be explosive if mixed with air in critical proportions and in the presence of a source of ignition. Use water, carbon dioxide or dry chemical to extinguish fires. Wear self-contained, positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Spilled material becomes very slippery when wet. Sweep up spills and place in a waste disposal container. Flush the area thoroughly with water and scrub to remove residue. If slipperiness remains, apply more dry-sweeping compound. Do not flush large quantities of the material to sewer.

7. HANDLING AND STORAGE

Spills should be scooped up or wiped up immediately, and the spill area flushed with water.

To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

Engineering controls are not usually necessary if good hygiene practices are followed. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Avoid unnecessary skin contact. Impervious gloves are recommended to prevent prolonged skin contact. For operations where eye or face contact can occur, eye protection is recommended. Where exposures are below the Permissible Exposure Limit (PEL), no respiratory protection is required. Where exposures exceed the PEL, use respirator approved by NIOSH for the material and level of exposure. See "GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION"(NIOSH).

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Off-white granular solid; no odor

BOILING POINT: Not applicable

MELTING POINT: Not available

VAPOR PRESSURE: Not applicable

SPECIFIC GRAVITY: ~0.75

VAPOR DENSITY: Not applicable

% VOLATILE (BY WT): 10-15; (water)

pH: 5-7; (aqueous solution)

SATURATION IN AIR (% BY VOL): Not applicable

EVAPORATION RATE: Not applicable

SOLUBILITY IN WATER: Limited by viscosity

10. STABILITY AND REACTIVITY

STABILITY: Stable
CONDITIONS TO AVOID: None known

POLYMERIZATION: Will Not Occur
CONDITIONS TO AVOID: None known

INCOMPATIBLE MATERIALS: Strong oxidizing agents.

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Fire 1 Health 0 0 Reactivity — Special	FIRE: Materials that must be preheated before ignition can occur. HEALTH: Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material. REACTIVITY: Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

REASON FOR ISSUE:

Area Code Change

Larry R. Johnson, DVM, PhD, DABT

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification. Before using any product, read its label.

MSDS Number: **T3354** * * * * * *Effective Date:* ***01/30/07*** * * * * * *Supercedes:* ***08/10/04***

MSDS Material Safety Data Sheet

CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker®

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

THYMOL BLUE SODIUM SALT

1. Product Identification

Synonyms: 4,4'-(3H-2,1-benzoxathiol-3-ylidene)bis[5-methyl-2-(1-methy l ethyl)phenol]S,S-dioxide, sodium salt
CAS No.: 62625-21-2
Molecular Weight: 489
Chemical Formula: C27H29NaO5S
Product Codes: V859

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Thymol Blue Sodium Salt	62625-21-2	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Specific hazard information about this compound was not found. However, composition and structure suggest that the compound can be harmful.

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
Large oral doses may cause irritation to the gastrointestinal tract.
Skin Contact:
May cause irritation with redness and pain.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

---

5. Fire Fighting Measures

Fire:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Brownish-green powder.
Odor:
Characteristic odor.
Solubility:
Soluble in water.
Specific Gravity:
1.19
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Not applicable.
Melting Point:
284C (543F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce carbon monoxide, carbon dioxide, sulfur oxides.
Hazardous Polymerization:
This substance does not polymerize.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

```
--------\Cancer Lists\-------------------------------------------------------
                                        ---NTP Carcinogen---
Ingredient                              Known    Anticipated    IARC Category
------------------------------------   -----    -----------    -------------
Thymol Blue Sodium Salt                 No          No            None
(62625-21-2)
```

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Thymol Blue Sodium Salt (62625-21-2)              Yes  Yes   No       No

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
Ingredient                                        Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Thymol Blue Sodium Salt (62625-21-2)              No    Yes   No     No

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Thymol Blue Sodium Salt (62625-21-2)      No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
```

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Thymol Blue Sodium Salt (62625-21-2)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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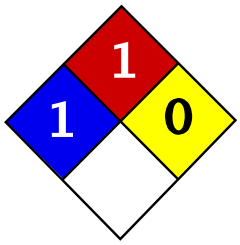
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Clayton yellow MSDS

Section 1: Chemical Product and Company Identification

Product Name: #LAYTON YELLOW

Catalog Codes: 3, #

CAS#:

RTECS: $,

TSCA: 43#! B INVENTORY #LAYTON YELLOW

CI#:

Synonym: $IRECT 9ELLOW 4HIAZOL 9ELLOW ' 4ITAN 9ELLOW g TRIAZENE DIYLDI PHENYLENE BIS METHYL BENZOTHIAZOSULFO ACID DISODIUM SALT

Chemical Name: .OT AVAILABLE

Chemical Formula: # (. / 3 .A

Contact Information:

Sciencelab.com, Inc.
3MITH 2D
(OUSTON 4EXAS

53 3ALE 800-901-7247
)NTERNATIONAL 1-281-441-4400S
/RDER /NLINE SCIENCE,AB COM

CHEMTREC (24HR Emergency Telephone), call:

International CHEMTREC, call:

For non-emergency assistance, call:

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
#LAYTON YELLOW		

Toxicological Data on Ingredients: .OT APPLICABLE

Section 3: Hazards Identification

Potential Acute Health Effects:
(AZARDOUS IN CASE OF INGESTION 3LIGHTLY HAZARDOUS IN CASE OF SKIN CONT
INHALATION

Potential Chronic Health Effects:
(AZARDOUS IN CASE OF INGESTION
3LIGHTLY HAZARDOUS IN CASE OF SKIN CONTACT IRRITANT OF EYE CONTACT IR
#!2#)./'%.)# %&&%#43 .OT AVAILABLE
-54!'%.)# %&&%#43 .OT AVAILABLE
4%2!4/'%.)# %&&%#43 .OT AVAILABLE
$%6%,/0-%.4!, 4/8)#)49 .OT AVAILABLE

Section 4: First Aid Measures

Eye Contact: . O K N O W N E F F E C T O N E Y E C O N T A C T R I N S E W I T H W A T E R F O R A F E W M I N U

Skin Contact:
! F T E R C O N T A C T W I T H S K I N W A S H I M M E D I A T E L Y W I T H P L E N T Y O F W A T E R 'E N T L Y A
W I T H R U N N I N G W A T E R A N D N O N A B R A S I V E S O A P "E P A R T I C U L A R L Y C A R E F U L T O C
O V E R T H E I R R I T A T E D S K I N W I T H A N E M O L L I E N T)F I R R I T A T I O N P E R S I S T S S E E K M
C L O T H I N G B E F O R E R E U S I N G

Serious Skin Contact: . O T A V A I L A B L E

Inhalation: ! L L O W T H E V I C T I M T O R E S T I N A W E L L V E N T I L A T E D A R E A 3 E E K I M M E D I A T E

Serious Inhalation: . O T A V A I L A B L E

Ingestion:
$ O N O T I N D U C E V O M I T I N G ,O O S E N T I G H T C L O T H I N G S U C H A S A C O L L A R T I E B E L T
B R E A T H I N G P E R F O R M M O U T H T O M O U T H R E S U S C I T A T I O N 3 E E K I M M E D I A T E M E D I

Serious Ingestion: . O T A V A I L A B L E

Section 5: Fire and Explosion Data

Flammability of the Product: - A Y B E C O M B U S T I B L E A T H I G H T E M P E R A T U R E

Auto-Ignition Temperature: . O T A V A I L A B L E

Flash Points: . O T A V A I L A B L E

Flammable Limits: . O T A V A I L A B L E

Products of Combustion:
4 H E S E P R O D U C T S A R E C A R B O N O X I D E S #/ #/ N I T R O G E N O X I D E S ./ ./ S U L F
M E T A L L I C O X I D E S

Fire Hazards in Presence of Various Substances: . O T A V A I L A B L E

Explosion Hazards in Presence of Various Substances:
2 I S K S O F E X P L O S I O N O F T H E P R O D U C T I N P R E S E N C E O F M E C H A N I C A L I M P A C T . O T
2 I S K S O F E X P L O S I O N O F T H E P R O D U C T I N P R E S E N C E O F S T A T I C D I S C H A R G E . O T A

Fire Fighting Media and Instructions:
3 - ! , , &) 2 % 5 S E $ 2 9 C H E M I C A L P O W D E R
, ! 2 ' % &) 2 % 5 S E W A T E R S P R A Y F O G O R F O A M $ O N O T U S E W A T E R J E T

Special Remarks on Fire Hazards: . O T A V A I L A B L E

Special Remarks on Explosion Hazards: . O T A V A I L A B L E

Section 6: Accidental Release Measures

Small Spill:
5 S E A P P R O P R I A T E T O O L S T O P U T T H E S P I L L E D S O L I D I N A C O N V E N I E N T W A S T E D I S
S P R E A D I N G W A T E R O N T H E C O N T A M I N A T E D S U R F A C E A N D D I S P O S E O F A C C O R D I N G
R E Q U I R E M E N T S

Large Spill:
5 S E A S H O V E L T O P U T T H E M A T E R I A L I N T O A C O N V E N I E N T W A S T E D I S P O S A L C O N T A
O N T H E C O N T A M I N A T E D S U R F A C E A N D A L L O W T O E V A C U A T E T H R O U G H T H E S A N I T A

Section 7: Handling and Storage

Precautions:
+EEP AWAY FROM HEAT +EEP AWAY FROM SOURCES OF IGNITION %MPTY CONTAIN
RESIDUE UNDER A FUME HOOD 'ROUND ALL EQUIPMENT CONTAINING MATERIAL $

Storage:
+EEP CONTAINER DRY +EEP IN A COOL PLACE 'ROUND ALL EQUIPMENT CONTAINI
CLOSED +EEP IN A COOL WELL VENTILATED PLACE #OMBUSTIBLE MATERIALS SI
AND AWAY FROM STRONG OXIDIZING AGENTS

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
5SE PROCESS ENCLOSURES LOCAL EXHAUST VENTILATION OR OTHER ENGINEER
RECOMMENDED EXPOSURE LIMITS)F USER OPERATIONS GENERATE DUST FUME C
AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT

Personal Protection: 3AFETY GLASSES ,AB COAT $UST RESPIRATOR "E SURE TO USE AN
'LOVES

Personal Protection in Case of a Large Spill:
3PLASH GOGGLES &ULL SUIT $UST RESPIRATOR "OOTS 'LOVES !SELF CONTAI
TO AVOID INHALATION OF THE PRODUCT 3UGGESTED PROTECTIVE CLOTHING MIG
"%&/2% HANDLING THIS PRODUCT

Exposure Limits: .OT AVAILABLE

Section 9: Physical and Chemical Properties

Physical state and appearance: 3OLID

Odor: .OT AVAILABLE

Taste: .OT AVAILABLE

Molecular Weight: G MOLE

Color: .OT AVAILABLE

pH (1% soln/water): .OT AVAILABLE

Boiling Point: .OT AVAILABLE

Melting Point: $ECOMPOSES

Critical Temperature: .OT AVAILABLE

Specific Gravity: .OT AVAILABLE

Vapor Pressure: .OT APPLICABLE

Vapor Density: .OT AVAILABLE

Volatility: .OT AVAILABLE

Odor Threshold: .OT AVAILABLE

Water/Oil Dist. Coeff.: .OT AVAILABLE

Ionicity (in Water): . O T A V A I L A B L E

Dispersion Properties: . O T A V A I L A B L E

Solubility: . O T A V A I L A B L E

Section 10: Stability and Reactivity Data

Stability: 4 H E P R O D U C T I S S T A B L E

Instability Temperature: . O T A V A I L A B L E

Conditions of Instability: . O T A V A I L A B L E

Incompatibility with various substances: . O T A V A I L A B L E

Corrosivity: . O N C O R R O S I V E I N P R E S E N C E O F G L A S S

Special Remarks on Reactivity: . O T A V A I L A B L E

Special Remarks on Corrosivity: . O T A V A I L A B L E

Polymerization: . O

Section 11: Toxicological Information

Routes of Entry:) N G E S T I O N

Toxicity to Animals:
, $. O T A V A I L A B L E
, # . O T A V A I L A B L E

Chronic Effects on Humans: . O T A V A I L A B L E

Other Toxic Effects on Humans:
(A Z A R D O U S I N C A S E O F I N G E S T I O N
3 L I G H T L Y H A Z A R D O U S I N C A S E O F S K I N C O N T A C T I R R I T A N T O F I N H A L A T I O N

Special Remarks on Toxicity to Animals: . O T A V A I L A B L E

Special Remarks on Chronic Effects on Humans: . O T A V A I L A B L E

Special Remarks on other Toxic Effects on Humans: . O T A V A I L A B L E

Section 12: Ecological Information

Ecotoxicity: . O T A V A I L A B L E

BOD5 and COD: . O T A V A I L A B L E

Products of Biodegradation:
0 O S S I B L Y H A Z A R D O U S S H O R T T E R M D E G R A D A T I O N P R O D U C T S A R E N O T L I K E L Y (C
A R I S E

Toxicity of the Products of Biodegradation: 4 H E P R O D U C T S O F D E G R A D A T I O N A R E M O R E T O X I C

Special Remarks on the Products of Biodegradation: . O T A V A I L A B L E

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: . O T A $ / 4 C O N T R O L L E D M A T E R I A L 5 N I T E D 3 T A T E S

Identification: . O T A P P L I C A B L E

Special Provisions for Transport: . O T A P P L I C A B L E

Section 15: Other Regulatory Information

Federal and State Regulations: 4 3 # ! B I N V E N T O R Y # L A Y T O N Y E L L O W

Other Regulations: . O T A V A I L A B L E

Other Classifications:

WHMIS (Canada): . O T C O N T R O L L E D U N D E R 7 (-) 3 # A N A D A

DSCL (EEC):
4 H I S P R O D U C T I S N O T C L A S S I F I E D A C C O R D I N G
T O T H E % 5 R E G U L A T I O N S

HMIS (U.S.A.):

Health Hazard:

Fire Hazard:

Reactivity:

Personal Protection: %

National Fire Protection Association (U.S.A.):

Health:

Flammability:

Reactivity:

Specific hazard:

Protective Equipment:
' L O V E S
, A B C O A T
$ U S T R E S P I R A T O R " E S U R E T O U S E A N
A P P R O V E D C E R T I F I E D R E S P I R A T O R O R
E Q U I V A L E N T
3 A F E T Y G L A S S E S

Section 16: Other Information

References: . O T A V A I L A B L E

Other Special Considerations: . O T A V A I L A B L E

Created: 0 -

Last Updated: 0 -

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MSDS Number: **T5291** * * * * * *Effective Date:* ***11/21/08*** * * * * * *Supercedes:* ***03/16/06***

MSDS Material Safety Data Sheet

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRIETHANOLAMINE

1. Product Identification

Synonyms: 2,2',2"-Nitrilotriethanol; daltogen; trolamine; TEA; triethylolamine
CAS No.: 102-71-6
Molecular Weight: 149.19
Chemical Formula: (HOCH2CH2)3N
Product Codes:
J.T. Baker: 9467, 9468
Mallinckrodt: 1908, 32106, 8433

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Triethanolamine	102-71-6	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED. CAUSES SKIN IRRITATION AND SEVERE EYE IRRITATION.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
No adverse effects expected since triethanolamine has a low vapor pressure.
Ingestion:
May cause burns in the mouth, pharynx, and esophagus, abdominal pain, nausea, vomiting and diarrhea.
Skin Contact:
May cause irritation, redness, and pain, especially on prolonged or repeated contact.
Eye Contact:
Corrosive. Contact causes severe irritation, burns, redness, and pain. May cause irritation, redness, pain, and corneal damage.
Chronic Exposure:
Repeated ingestion has caused kidney and liver damage in animals.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Not expected to require first aid measures.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Flash point: 179C (354F) OC
Autoignition temperature: 315C (599F)
Flammable limits in air % by volume:
lel: 1.3; uel: 8.5
(uel value estimated).
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above.
Fire Extinguishing Media:
Dry chemical, alcohol foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool. Water can also be used to flush material from fire and to dilute spills to non-combustible mixtures. Water or foam may cause frothing.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Avoid contact with copper and copper alloys. Material is suitably handled in stainless steel equipment. Do not use aluminum for storage of aqueous solutions. Outside or detached storage is preferred. Isolate from acidic materials. May separate and freeze below 16C (60F). Thaw and mix before sampling or using. Do not store above 43C (110F)

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- ACGIH Threshold Limit Value (TLV): 5 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has unknown warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Colorless to light yellow, viscous liquid.

Odor:
Slight ammonia odor.

Solubility:
Infinitely soluble.

Specific Gravity:
1.13 @ 20C/4C

pH:
10.5

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
335C (635F)

Melting Point:
21.6C (72F) Super cools easily.

Vapor Density (Air=1):
5.1

Vapor Pressure (mm Hg):
< 0.01 @ 20C (68F)

Evaporation Rate (BuAc=1):
< 1

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Darkens on exposure to air or light.
Hazardous Decomposition Products:
Burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Copper, copper alloys, galvanized iron, acids, and oxidizers
Conditions to Avoid:
Heat, ignition sources, moisture, incompatibles.

---

11. Toxicological Information

Oral rat LD50: 4920 mg/kg; skin rabbit LD50: > 20 mL/kg;
Irritation data: Skin rabbit: 560 mg/24H mild; eye rabbit: 20 mg severe
Investigated as a tumorigen and a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Triethanolamine (102-71-6)	No	No	3

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material may leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into the soil, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by dry and wet deposition. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
Freshwater Fish Species Data: 96 Hr LC50 Pimephales promelas: 11800 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 450-1000 mg/L [static]
Water Flea Data: 24 Hr EC50 Daphnia magna: 1386 mg/L
Microtox data: 30 min EC50 Pseudomonas putida: >10000 mg/L
Freshwater Algae Data: 72 Hr EC50 Scenedesmus subspicatus: 216 mg/L; 96 Hr EC50 Scenedesmus subspicatus: 169 mg/L

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and

unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\----------------------------------
Ingredient                                      TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Triethanolamine (102-71-6)                       Yes   Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\----------------------------------
                                                        --Canada--
Ingredient                                      Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Triethanolamine (102-71-6)                       Yes    Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
-----------------------------------------  ---   -----   ----  --------------
Triethanolamine (102-71-6)                No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                   -RCRA-    -TSCA-
Ingredient                                CERCLA   261.33     8(d)
-----------------------------------------  ------   ------    ------
Triethanolamine (102-71-6)                No       No         No


Chemical Weapons Convention:  Yes    TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Liquid)
```

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED. CAUSES SKIN IRRITATION AND SEVERE EYE IRRITATION.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing vapor.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases, get medical attention.
Product Use:
Laboratory Reagent.

Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Product No. 19481 Uranyl Acetate, Dihydrate

Issue Date (09-04-02)

Review Date (09-20-06)

Section 1: Product and Company Identification

Product Name: Uranyl Acetate, Dihydrate

Synonym: Bis (acetato) dioxouranium, Diacetatodioxouranium, Uranium acetate, Uranium oxyacetate, Uranyl acetate, Uranyl (2+) acetate

Company Name

Ted Pella, Inc. and PELCO International, P.O. Box 492477, Redding, CA 96049-2477
Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

Chemtrec Emergency Number 1-800-424-9300 24 hrs a day.

Section 2: Composition / Information on Ingredients

Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)	%	OSHA PEL mg/m3	ACGIH TLV mg/m3	NTP	IARC	OSHA regulated
*Uranyl Acetate, Dihydrate (6159-44-0)	99.9-100	0.05 (U)	NIF	NIF	NIF	NIF

***Made from Depleted Uranium**

Section 3: Hazard Identification

Emergency overview

Appearance: Solid, yellow crystals

Immediate effects: Highly Toxic, Conjunctivitis, Blood effects. Symptoms may be delayed. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential health effects

Primary Routes of entry: Inhalation, skin absorption, ingestion.
Signs and Symptoms of Overexposure: Conjunctivitis. Blood effects. Symptoms may be delayed. To the best of our knowledge, the chemical physicals, and toxicological properties have not been thoroughly investigated.

Eyes: May cause eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Ingestion: May be harmful if swallowed. Target organs: Kidneys, Liver, Lungs.

Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Chronic Exposure: Carcinogen. Contains a radioactive isotope which may produce cancer or genetic mutation.

Chemical Listed As Carcinogen Or Potential Carcinogen: Yes (Radionuclides)

See Toxicological Information (Section11)

Potential environmental effects

See Ecological Information (Section 12)

Section 4: First Aid Measures
If accidental overexposure is suspected

Eye(s) Contact: In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Skin Contact: In case of contact, immediately wash skin with soap and copious amounts of water.
Inhalation: If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

Ingestion: If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Note to physician

Treatment: NIF

Medical Conditions generally Aggravated by Exposure: NIF

Section 5: Fire Fighting Measures
Flash Point: NA
Flammable Limits: NA

Auto-ignition point: NA
Fire Extinguishing Media: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.
Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Unusual Fire and Explosion Hazards: Emits toxic fumes under fire conditions.

Hazardous combustion products: NIF

DOT Class: 7, Radioactive material, excepted package-limited quantity of material. (**Made from depleted Uranium**)

Section 6: Accidental Release Measures
Steps to be Taken in Case Material is Released or Spilled: Handle as a radioactive spill. Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Methods for cleaning up: Sweep-up, place in container and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.
Waste Disposal Methods: Dispose of waste according to Federal, State and Local Regulations.

Section 7: Handling and Storage
Precautions to be Taken in Handling and Storage: User exposure: Avoid inhalation. Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure.

Storage temperature: Keep tightly closed. Store in a cool dry place.

Storage Pressure: NA

Section 8: Exposure Controls / Personal Protection
Engineering Controls

Ventilation required: Use only in a chemical fume hood. Use with adequate ventilation.

Personal Protection Equipment

Respiratory protection: Government approved respirator.

Protective gloves: Compatible chemical-resistant gloves
Skin protection: Suitable clothing.

Eye protection: Chemical safety goggles.
Additional clothing and/or equipment: Safety shower and eye bath.

Exposure Guidelines

See Composition/Information on Ingredients (Section2)

Section 9 Physical and Chemical Properties
Appearance and Physical State: Yellow crystals. Solid

Odor (threshold): NA

Specific Gravity (H_2O=1): 2.89 g/cm^3

Vapor Pressure (mm Hg): NA

Vapor Density (air=1): NA

Percent Volatile by volume: NA

Evaporation Rate (butyl acetate=1): NA

Boiling Point: NA

Freezing point / melting point: 110 ^{o} C

Decomposition temperature: 275 ^{o} C
pH: NA
Solubility in Water: 10% in H_2O, 20 ^{o} C soluble incomplete.
Molecular Weight: 424.15 AMU

Section 10: Stability and Reactivity
Stability: Stable
Conditions to Avoid: Protect from moisture

Materials to Avoid (Incompatibility): Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxides, Uranium oxides.
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

Results of component toxicity test performed: Intraperitoneal, Mouse LD50: 24 mg/Kg. Oral, Mouse LD50: 242 mg/Kg. Oral, Rat LD50: 204 mg/Kg

USA MSHA Standard-air TWA: 0.2 mg (U)/m^3

Chronic Exposure: Contains a radioactive isotope which may produce cancer and genetic mutation.

Human experience: ND

This product **does** contain compounds listed by NTP or IARC or regulated by OSHA as a carcinogen. (Radionuclides)

Section 12: Ecological Information

Ecological Information: ND

Chemical Fate Information: ND

Section 13 Disposal Considerations

RCRA 40 CFR 261 Classification: Contact a licensed professional waste disposal service to dispose of this material. Dispose of spilled material as radioactive waste. Consult local, state and federal regulations on disposal of radioactive waste. Observe all federal, state and local environmental regulations.

Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information

US DOT Information: Proper shipping name: Radioactive material, excepted package-limited quantity of material.

Hazard Class: 7

Packaging group: None

UN Number: UN2910

Limitations: Hazard Label: None

PIH (Poison inhalation hazard): **Not** PIH

IATA: Proper shipping name: Radioactive material, excepted package-limited quantity of material

Hazard Class: 7

Packing group: None

UN Number: UN2910

Marine Pollutant: No

Canadian TDG: NIF

Section 15: Regulatory Information

United States Federal Regulations

MSDS complies with OSHA's Hazard Communication Rule 29, CFR 1910.1200.

SARA: 302,304, 313: No

SARA Title III: No

RCRA: NIF

TSCA: Listed

CERCLA: RQ as Uranyl acetate (anhydride form, CAS # 541-09-3): 100 lbs (45.4 Kg)

RTECS Number: Uranyl acetate (anhydride form, CAS # 541-09-3): YR3675000

RTECS Number: Uranyl acetate, dihydrate: YR3600000

State Regulations

California Proposition 65: This product is or contains chemical(s) known to the state of California to cause cancer. (Radionuclides)

International Regulations

Canada WHMIS: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Europe EINECS Numbers:

Section 16: Other Information

Label Information: Highly Toxic (USA), Very Toxic (EU), Dangerous for the environment.

European Risk and Safety Phrases: R: 26/28 33 51/53. Risk Statements: Very toxic by inhalation and if swallowed. Danger of cumulative effects. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S: 20/21 45 61. Safety Statements: When using do not eat, drink, or smoke. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

European symbols needed: T+, N

US Statements: Radioactive material. Target organ(s): Liver. Kidneys.

Canadian WHMIS Symbols: NIF

HMIS(® Hazard Rating: Health: **3***; Fire: **0**; Reactivity: **0**
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

*additional chronic hazards present.

NFPA Hazard Rating: Health: **3**; Fire: **0**; Reactivity: **0**
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Abbreviations used in this document

NE= Not established

NA= Not applicable

NIF= No Information Found

ND= No Data

Disclaimer
Ted Pella, Inc. makes no warranty of any kind regarding the information furnished herein. Users should independently determine the suitability and completeness of information from all sources. While this data is presented in good faith and believed to be accurate, it should be considered only as a supplement to other information gathered by the user. It is the User's responsibility to assure the proper use and disposal of these materials as well as the safety and health of all personnel who may work with or otherwise come in contact with these materials.

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Identification:

Key: 25250
Name: Zinc acetate dihydrate

Catalog Numbers:

AC207640010, AC317215000, S80246, S93399, Z20-500, Z20500LC

Synonyms:

Acetic acid, zinc salt, dihydrate.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fairlawn, NJ 07410

For information, call:

201-796-7100

Emergency Number:

201-796-7100

For CHEMTREC assistance, call:

800-424-9300

For International CHEMTREC assistance, call:

703-527-3887

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS#	Chemical Name	%	EINECS#	Haz Symbols	Risk Phrases
5970-45-6	Zinc acetate dihydrate	> 98	unlisted		

Text for R-phrases: see Section 16

Hazard Symbols: XN

Risk Phrases: 22 36

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance: white solid. Warning! Causes eye irritation. May be harmful if swallowed. May cause skin and respiratory tract irritation.

Target Organs: Eyes.

POTENTIAL HEALTH EFFECTS

Eye: Causes eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.

Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.

Chronic: Chronic exposure may cause kidney damage.

SECTION 4 - FIRST AID MEASURES

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Get medical aid. Wash mouth out with water.

Inhalation: Remove from exposure and move to fresh air immediately.

Notes to Physician: Treat symptomatically and supportively.

SECTION 5 - FIRE FIGHTING MEASURES

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Limits, lower: Not available.

Explosion Limits, upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability:

SECTION 6 - ACCIDENTAL RELEASE MEASURES

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

SECTION 7 - HANDLING AND STORAGE

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust and fume.

Storage: Store in a cool, dry place. Store in a tightly closed container.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

EXPOSURE LIMITS

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Zinc acetate anhydr ous	none listed	none listed	none listed
Zinc acetate dihydr ate	none listed	none listed	none listed

OSHA Vacated PELs:

Zinc acetate anhydrous: No OSHA Vacated PELs are listed for this chemical.

Zinc acetate dihydrate: No OSHA Vacated PELs are listed for this chemical.

PERSONAL PROTECTIVE EQUIPMENT

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid

Color: white

Odor: faint vinegar like odor

pH: 6-7 (5% soln)

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: Not available.

Freezing/Melting Point: 200 deg C (dec)

Decomposition Temperature: 200 deg C

Solubility in water: Very soluble in water.

Specific Gravity/Density: 1.735

Molecular Formula: $Zn(CH_3COO)_2.2H_2O$

Molecular Weight: 219.50

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability: Stable under normal temperatures and pressures. Loses $2H_2O$ at 100°C.

Conditions to Avoid: Dust generation, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, toxic fumes of zinc oxide.

Hazardous Polymerization: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

RTECS#:

CAS# 557-34-6: AK1500000
CAS# 5970-45-6: ZG8750000

LD50/LC50:

CAS# 557-34-6: Oral, rat: LD50 = 2510 mg/kg.
CAS# 5970-45-6: Draize test, rabbit, eye: 20 mg/24H Moderate; Draize test, rabbit, skin: 500 mg/24H Mild; Oral, mouse: LD50 = 287 mg/kg; Oral, rat: LD50 = 794 mg/kg.

Carcinogenicity:

Zinc acetate anhydrous -

Not listed by ACGIH, IARC, or NTP.

Zinc acetate dihydrate -

Not listed by ACGIH, IARC, or NTP.

Epidemiology:

No data available.

Teratogenicity:

No data available.

Reproductive Effects:

See actual entry in RTECS for complete information.

Neurotoxicity:

No data available.

Mutagenicity:

No data available.

Other Studies:

The toxicological properties have not been fully investigated.

SECTION 12 - ECOLOGICAL INFORMATION

SECTION 13 - DISPOSAL CONSIDERATIONS

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

SECTION 14 - TRANSPORT INFORMATION

US DOT

Shipping Name: Not regulated Hazard Class: UN Number: Packing Group:

Canadian TDG

Shipping Name: Not Regulated Hazard Class: 0 UN Number: UN Packing Group:

USA RQ: CAS# 557-34-6: 1000 lb final RQ; 454 kg final RQ

SECTION 15 - REGULATORY INFORMATION

US FEDERAL

TSCA

CAS# 557-34-6 is listed on the TSCA inventory.
CAS# 5970-45-6 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

CERCLA Hazardous Substances and corresponding RQs

CAS# 557-34-6: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS# 5970-45-6: acute.

Section 313

This chemical is not at a high enough concentration to be reportable under Section 313. This material contains Zinc acetate dihydrate (listed as Zinc compounds), 98%, (
CAS# 5970-45-6) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 557-34-6 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA.
CAS# 557-34-6 is listed as a Toxic Pollutant under the Clean Water Act.
CAS# 5970-45-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

Zinc acetate anhydrous can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.
Zinc acetate dihydrate can be found on the following state right to know lists: California, (listed as Zinc compounds), Pennsylvania, (listed as Zinc compounds).
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN Risk Phrases:

R 22 Harmful if swallowed.
R 36 Irritating to eyes.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 39 Wear eye/face protection.

WGK (Water Danger/Protection)

CAS# 557-34-6: 1
CAS# 5970-45-6: No information available.

Canada

CAS# 557-34-6 is listed on Canada's DSL List.
CAS# 5970-45-6 is listed on Canada's DSL List. This product has a WHMIS classification of D2B.
CAS# 557-34-6 is not listed on Canada's Ingredient Disclosure List.
CAS# 5970-45-6 is not listed on Canada's Ingredient Disclosure List.

SECTION 16 - ADDITIONAL INFORMATION

MSDS Creation Date: 12/12/1997 **Revision** #4 **Date:** 11/19/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.