Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
PHTHALIC ANHYDRIDE - FLAKE

Synonyms
PHTHALIC ANHYDRIDE SOLID

Chemical Family
aromatic, carboxylic, anhydrides

Product Use
Used in the manufacture of plasticizers, polyester and alkyd resins, dye intermediates, food preservatives, pharmaceuticals, insect repellants and perfume fixatives.

Restrictions on Use
None known.

Details of the supplier of the safety data sheet
KOPPERS INC.
436 Seventh Avenue
Pittsburgh, PA 15219-1800
Mfg Contact: 412-227-2001 (SDS Requests: 866-852-5239)
CHEMTREC: 800-424-9300 (Outside USA: +1 703-527-3887)
Emergencies: (Medical in USA): 877-737-9047
Emergencies: (Medical Outside of USA): 651-632-9269
E-mail: naorgmsds@koppers.com

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.
Combustible Dust
Acute Toxicity - Oral - Category 4
Skin Corrosion/Irritation - Category 2
Serious Eye Damage/Eye Irritation - Category 1
Respiratory Sensitization - Category 1
Skin Sensitization - Category 1
Specific target organ toxicity - Single exposure - Category 3 (respiratory system.)

GHS Label Elements

Symbol(s)

Signal Word
Danger

Hazard Statement(s)
May form combustible dust concentrations in air.
Harmful if swallowed.
Causes skin irritation.
Causes serious eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
May cause respiratory irritation.

Precautionary Statement(s)

Prevention
Avoid breathing dust.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves and eye/face protection.
Wear respiratory protection.
Contaminated work clothing should not be allowed out of the workplace.
Use only outdoors or in a well-ventilated area.

Response
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
IF ON SKIN: Wash with plenty of water.
If skin irritation or rash occurs: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.

Storage
Store in a well-ventilated place.
Keep container tightly closed.
Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

Statement(s) of Unknown Acute Toxicity
Oral 0.1% of the mixture consists of ingredient(s) of unknown acute toxicity.

Other Hazards
None known.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS</th>
<th>Component Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-44-9</td>
<td>Phthalic anhydride</td>
<td>&gt;99.7</td>
</tr>
<tr>
<td>85-41-6</td>
<td>Phthalimide</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>88-99-3</td>
<td>Phthalic acid</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>65-85-0</td>
<td>BENZOIC ACID</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>
Section 4 - FIRST AID MEASURES

Inhalation
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eyes
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion
Do NOT induce vomiting. If a large amount is swallowed, get medical attention. Never make an unconscious person vomit or drink fluids. If vomiting occurs, keep head lower than hips to help prevent aspiration. Rinse mouth.

Most Important Symptoms/Effects
Acute
Harmful if swallowed, respiratory tract irritation, skin irritation, eye burns, allergic reactions

Delayed
allergic reactions

Indication of any immediate medical attention and special treatment needed
Treat symptomatically and supportively.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media
carbon dioxide, regular dry chemical, dry sand, alcohol-resistant foam, water spray, fog or mist

Unsuitable Extinguishing Media
None known.

Special Hazards Arising from the Chemical
Dust/air mixtures may ignite or explode. Minimum dust concentration required is 0.015 oz/ft³. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Hazardous Combustion Products
Oxides of carbon; Release of phthalic acid in contact with water.

Fire Fighting Measures
Move container from fire area if it can be done without risk. Use extinguishing agents appropriate for surrounding fire. Large fires: Flood with fine water spray. Directly spraying water or foam onto hot burning product may cause frothing. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Keep unnecessary people away, isolate hazard area and deny entry.

Special Protective Equipment and Precautions for Firefighters
Wear full protective firefighting gear including self-contained breathing apparatus (SCBA) for protection against possible exposure.
Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up
Do not touch spilled material. Stop leak if possible without personal risk. If sweeping of a contaminated area is necessary, use a dust suppressant agent. Collect spill using a vacuum cleaner with a HEPA filter or wet and scoop up dry spills. Avoid sweeping spilled dry material. Eliminate ignition sources including sources of electrical, static or frictional sparks. Collect spilled material in appropriate container for disposal. Do not get water directly on material. In Canada, report releases to provincial authorities, municipal authorities, or both, as required. If this product is spilled or leaked into the environment, the CERCLA (40 CFR 302.4) reportable quantity is 5000 pounds, and requires National Response Center notification.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling
Avoid breathing dust. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear suitable protective gloves and eye/face protection. Wear respiratory protection. Contaminated work clothing must not be allowed out of the workplace. Use only outdoors or in a well-ventilated area. Use methods to minimize dust. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions.

Conditions for Safe Storage, Including any Incompatibilities
Store in a well-ventilated place.
Keep container tightly closed.
Store locked up.
Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store in a cool, dry place. Avoid contact with water or moisture. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

Incompatible Materials
Amines, bases, metal oxides, metals, oxidizing materials, combustible materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH:</th>
<th>OSHA (US):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phthalic anhydride</td>
<td>0.002 mg/m³ TWA inhalable fraction and vapor</td>
<td>2 ppm TWA ; 12 mg/m³ TWA</td>
</tr>
<tr>
<td></td>
<td>0.005 mg/m³ STEL inhalable fraction and vapor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - potential significant contribution to overall exposure by the cutaneous route</td>
<td></td>
</tr>
<tr>
<td>Maleic anhydride</td>
<td>0.01 mg/m³ TWA inhalable fraction and vapor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.25 ppm TWA ; 1 mg/m³ TWA</td>
<td></td>
</tr>
</tbody>
</table>
There are no biological limit values for any of this product's components.

**Engineering Controls**
Ensure adequate ventilation. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Ensure compliance with applicable exposure limits.

**Individual Protection Measures, such as Personal Protective Equipment**

**Eye/face protection**
ANSI Z87.1-1989 approved safety glasses with side shields. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin Protection**
Wear appropriate clothing.

**Respiratory Protection**
If the applicable TLVs and/or PELs are exceeded, use canister or cartridge respirators, which are MSHA/NIOSH-approved, with high-efficiency particulate filters.

**Glove Recommendations**
Wear appropriate gloves.

**Protective Materials**
Rubber

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>white flake</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>acrid odor</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>0.32 - 0.72 mg/m³</td>
</tr>
<tr>
<td><strong>pH Solution</strong></td>
<td>2 - 15 g/L</td>
</tr>
<tr>
<td><strong>Boiling Point</strong></td>
<td>284 °C</td>
</tr>
<tr>
<td><strong>Freezing point</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>Not flammable</td>
</tr>
<tr>
<td><strong>Flash Point</strong></td>
<td>151 °C Closed Cup</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Vapor Pressure</strong></td>
<td>0.001 mmHg @ 30 °C</td>
</tr>
<tr>
<td><strong>Specific Gravity (water=1)</strong></td>
<td>1.527 at 4 °C</td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Physical State</strong></td>
<td>solid</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>white</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>1.37 - 1.94 at 95 °C</td>
</tr>
<tr>
<td><strong>Melting Point</strong></td>
<td>131 °C</td>
</tr>
<tr>
<td><strong>Boiling Point Range</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Evaporation Rate</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Autoignition Temperature</strong></td>
<td>570 °C</td>
</tr>
<tr>
<td><strong>Lower Explosive Limit</strong></td>
<td>1.7 %</td>
</tr>
<tr>
<td><strong>Upper Explosive Limit</strong></td>
<td>10.4 %</td>
</tr>
<tr>
<td><strong>Vapor Density (air=1)</strong></td>
<td>5.1</td>
</tr>
<tr>
<td><strong>Water Solubility</strong></td>
<td>0.62 % @ 20 °C (Room temperature, Insoluble )</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>6.4 mPa.s 197 °C</td>
</tr>
</tbody>
</table>
Material Name: PHTHALIC ANHYDRIDE - FLAKE

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>1.53 lb/gal</td>
</tr>
<tr>
<td>KSt-value (bar m/s)</td>
<td>166 bar/m/s</td>
</tr>
<tr>
<td>Sublimation</td>
<td>295 °C</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>148.12</td>
</tr>
<tr>
<td>Minimum Ignition Temperature</td>
<td>650 °C</td>
</tr>
<tr>
<td>Maximum Rate of Pressure Rise</td>
<td>613 bar</td>
</tr>
<tr>
<td>Minimum Explosive Concentration</td>
<td>30 g/m³</td>
</tr>
<tr>
<td>Maximum explosion pressure</td>
<td>6.6 bar</td>
</tr>
</tbody>
</table>

Solvent Solubility
- Soluble: alcohol, carbon disulfide
- Slightly Soluble: ether

Section 10 - STABILITY AND REACTIVITY

Chemical Stability
May decompose on contact with water or moist air.

Possibility of Hazardous Reactions
Will not polymerize.

Conditions to Avoid
- Avoid accumulation of airborne dusts. Avoid contact with water or moisture. Keep out of water supplies and sewers.

Incompatible Materials
- amines, bases, metal oxides, metals, oxidizing materials, combustible materials

Hazardous decomposition products
- Carbon monoxide, carbon dioxide. Release of phthalic acid in contact with water.

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
- Inhalation: irritation, allergic reactions
- Skin Contact: irritation, allergic reactions
- Eye Contact: burns
- Ingestion: Harmful if swallowed

Acute and Chronic Toxicity
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
Phthalic anhydride (85-44-9)
Oral LD50 Rat 1530 mg/kg
Dermal LD50 Rabbit >10 g/kg
Inhalation LC50 Rat >210 mg/m3 1 h

Product Toxicity Data

Acute Toxicity Estimate

| Oral | 1528.09 mg/kg |

Immediate Effects
Harmful if swallowed, respiratory tract irritation, skin irritation, eye burns, allergic reactions

Delayed Effects
allergic reactions

Irritation/Corrosivity Data
respiratory tract irritation, skin irritation, eye burns

Respiratory Sensitization
Component data indicate the substance is sensitizing.

Dermal Sensitization
Component data indicate the substance is sensitizing.

Component Carcinogenicity

| Phthalic anhydride | 85-44-9 |

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Germ Cell Mutagenicity
Invitro Genotoxicity: Negative.

Tumorigenic Data
No data available

Reproductive Toxicity
No data available.

Specific Target Organ Toxicity - Single Exposure
respiratory system

Specific Target Organ Toxicity - Repeated Exposure
No data available.

Aspiration hazard
Not expected to be an aspiration hazard.

Medical Conditions Aggravated by Exposure
skin disorders, immune system disorders or allergies
Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity
No LQL ecotoxicity data are available for this product's components.

Persistence and Degradability
Relatively non-persistent in the environment.

Bioaccumulative Potential
Accumulates very little in the bodies of living organisms.

Mobility
Not expected to leach through the soil or the sediment.

Other Toxicity
Not appreciably volatile from water.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations.

Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
No Classification assigned.

IATA Information:
Additional information: (No classification assigned.)

TDG Information:
Additional information: (No classification assigned.)

International Bulk Chemical Code
This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Additional information
Component Marine Pollutants This material does not contain any chemicals listed on the Hazardous Materials Table required by US DOT to be identified as a marine pollutant.

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>SARA 313</th>
<th>CERCLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phthalic anhydride</td>
<td>1 % de minimis concentration</td>
<td>5000 lb final RQ ; 2270 kg final RQ</td>
</tr>
</tbody>
</table>

SARA Section 311/312 (40 CFR 370 Subparts B and C) 2016 reporting categories
Safety Data Sheet

Material Name: PHTHALIC ANHYDRIDE - FLAKE

Acute Health: Yes Chronic Health: Yes Fire: No Pressure: No Reactivity: No

SARA Section 311/312 (40 CFR 370 Subparts B and C) 2017 reporting categories
Combustible Dust; Acute toxicity; Skin Corrosion/Irritation; Respiratory/Skin Sensitization; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phthalic anhydride</td>
<td>85-44-9</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Not listed under California Proposition 65

Canada Regulations

Canadian WHMIS Ingredient Disclosure List (IDL)
Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
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<tr>
<td>Phthalic anhydride</td>
<td>85-44-9</td>
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0.1 %

WHMIS Classification
D2A , D2B

Component Analysis - Inventory
Phthalic anhydride (85-44-9)

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</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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Phthalimide (85-41-6)

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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</table>

Phthalic acid (88-99-3)

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<thead>
<tr>
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<td>Yes</td>
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<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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</table>
BENZOIC ACID (65-85-0)

<table>
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<tr>
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<tbody>
<tr>
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<td>EIN</td>
<td>Yes</td>
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<td>Yes</td>
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<td>No</td>
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<td>Yes</td>
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</tr>
</tbody>
</table>

Maleic anhydride (108-31-6)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

U.S. Inventory (TSCA)
Listed on inventory.

Section 16 - OTHER INFORMATION

NFPA Ratings
Health: 3 Fire: 1 Reactivity: 1
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes
Updated: 03/30/2017; MSDS SUMMARY OF CHANGES: Section 2 - HAZARDS IDENTIFICATION; Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania; CAS - Chemical Abstracts Service; CFR - Code of Federal Regulations (US); CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; ILD - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); LD50/LC50 - Lethal Dose/Lethal Concentration; LOLI - List Of Lists™ - ChemADVISOR’s Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; NDSL - Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL - Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH - Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport;
Other Information

Disclaimer:
The information set forth in this Safety Data Sheet does not purport to be all-inclusive and should be used only as a guide. While the information and recommendations set forth herein are believed to be accurate, the company makes no warranty regarding such information and recommendations and disclaims all liability from reliance thereon.