1. Identification

Product identifier  Nano-strip
Other means of identification Not available.
Recommended use  Industrial use.
Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer/Supplier  KMG Electronic Chemicals, Inc.
Address  9555 W. Sam Houston Parkway South
          Suite 600
          Houston Texas 77099 US
Phone number  713-600-3800
Emergency telephone  +1 866-706-3266 Access code: 333035

2. Hazard(s) identification

Physical hazards  Oxidizing liquids  Category 3
                 Corrosive to metals  Category 1
Health hazards  Skin corrosion/irritation  Category 1B
                 Serious eye damage/eye irritation  Category 1
OSHA defined hazards  Not classified.

Label elements

Signal word  Danger
Hazard statement  Causes severe skin burns and eye damage. May be corrosive to metals. Causes serious eye damage. May intensify fire; oxidizer.
Precautionary statement
Prevention  Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Do not breathe mist or vapor. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Keep only in original container.
Response  If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center/doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Absorb spillage to prevent material damage. In case of fire: Use appropriate media to extinguish.
Storage  Store locked up. Store in corrosive resistant container with a resistant inner liner.
Disposal  Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>7664-93-9</td>
<td>90</td>
</tr>
<tr>
<td>Peroxymonosulfuric acid</td>
<td>7722-86-3</td>
<td>5</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>7722-84-1</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Composition comments  All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
4. First-aid measures

**Inhalation**
Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

**Skin contact**
Flush thoroughly with water for at least 15 minutes. Remove contaminated clothes and rinse skin thoroughly with water. Get medical attention immediately! Chemical burns must be treated by a physician.

**Eye contact**
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

**Ingestion**
Rinse mouth thoroughly with water and give large amounts of milk or water to people not unconscious. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Obtain medical attention and take along these instructions.

**Most important symptoms/effects, acute and delayed**
Corrosive. May cause burns in mucous membranes, throat, esophagus and stomach. Coughing. Sore throat. Shortness of breath. Symptoms may be delayed.

**Indication of immediate medical attention and special treatment needed**
In case of shortness of breath, give oxygen. Keep victim warm.

**General information**
In case of shortness of breath, give oxygen. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

5. Fire-fighting measures

**Suitable extinguishing media**
Use extinguishing agent suitable for type of surrounding fire.

**Unsuitable extinguishing media**
Reacts with water. Do not use water as an extinguisher.

**Specific hazards arising from the chemical**
By heating and fire, toxic and corrosive vapors/gases may be formed. Contact with most metals causes formation of flammable and explosive hydrogen gas. Substance does not burn but will support combustion. May ignite combustibles (wood, paper, oil, clothing, etc.).

**Special protective equipment and precautions for firefighters**
Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire-fighting equipment/instructions**
Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**
Keep unnecessary personnel away. Local authorities should be advised if significant spillages cannot be contained. Stay upwind. Keep out of low areas. Ensure adequate ventilation. Use personal protection recommended in Section 8 of the SDS.

**Methods and materials for containment and cleaning up**
Should not be released into the environment.

Large Spills: Stop the flow of material, if this is without risk. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Dike far ahead of liquid spill for later disposal.

Small Spills: Absorb spillage with suitable absorbent material. After removal flush contaminated area thoroughly with water.

Never return spills to original containers for re-use.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not contaminate water.

7. Handling and storage

**Precautions for safe handling**
Use only with adequate ventilation. Avoid prolonged exposure. Wash thoroughly after handling. Handle and open container with care. Use Personal Protective Equipment recommended in section 8 of the SDS.

**Conditions for safe storage, including any incompatibilities**
Keep in a well-ventilated place. Keep container tightly closed. Keep this material away from food, drink and animal feed. Use care in handling/storage. Keep product away from organic solvents and other products containing easily oxidized functional groups. Minimize exposure to air. Oxidizing material - Keep away from flammable and combustible materials.
8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen peroxide</td>
<td>PEL</td>
<td>1.4 mg/m³</td>
</tr>
<tr>
<td>(CAS 7722-84-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>PEL</td>
<td>1 ppm</td>
</tr>
<tr>
<td>(CAS 7664-93-9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen peroxide</td>
<td>TWA</td>
<td>1 ppm</td>
<td></td>
</tr>
<tr>
<td>(CAS 7722-84-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>TWA</td>
<td>0.2 mg/m³</td>
<td>Thoracic fraction.</td>
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<tr>
<td>(CAS 7664-93-9)</td>
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<td></td>
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</tbody>
</table>

US NIOSH Pocket Guide to Chemical Hazards: Recommended exposure limit (REL)

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen peroxide</td>
<td>TWA</td>
<td>1.4 mg/m³</td>
</tr>
<tr>
<td>(CAS 7722-84-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>TWA</td>
<td>1 ppm</td>
</tr>
<tr>
<td>(CAS 7664-93-9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear approved safety glasses or goggles.

Skin protection

Hand protection

Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves. Protective shoes or boots. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations. Wear chemical protective equipment that is specifically recommended by the Personal Protective Equipment manufacturer.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Use a NIOSH/MSHA approved air purifying respirator as needed to control exposure. Consult with respirator manufacturer to determine respirator selection, use, and limitations. Use positive pressure, air-supplied respirator for uncontrolled releases or when air purifying respirator limitations may be exceeded. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use. Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary.

Thermal hazards

When material is heated, wear gloves to protect against thermal burns.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product. Remove and isolate contaminated clothing and shoes. Handle in accordance with good industrial hygiene and safety practice. Launder contaminated clothing before reuse.

9. Physical and chemical properties

Appearance

Clear liquid.

Physical state

Liquid.

Form

Liquid.

Color

Clear.

Odor

Faint acid odor.

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

Not available.
Initial boiling point and boiling range
572 °F (300 °C)

Flash point
Not available.

Evaporation rate
Not available.

Flammability (solid, gas)
Not available.

Upper/lower flammability or explosive limits
Flammability limit - lower (%)
Not available.

Flammability limit - upper (%)
Not available.

Vapor density
> 1

Relative density
1.82 g/cm³

Solubility(ies)
Completely soluble in water.

Partition coefficient (n-octanol/water)
No data available.

Auto-ignition temperature
Not available.

Decomposition temperature
Not available.

Viscosity
Not available.

Other information
VOC (Weight %)
No data available

10. Stability and reactivity
Reactivity

Chemical stability
Material is stable under normal conditions.

Possibility of hazardous reactions
Reacts with most metals to form flammable hydrogen gas.

Conditions to avoid
Contact with water.

Incompatible materials

Hazardous decomposition products
Produces toxic fumes. Sulfur oxides. Contact with metals may evolve flammable hydrogen gas.

11. Toxicological information
Information on likely routes of exposure

Ingestion
Causes digestive tract burns. May cause burns in mucous membranes, throat, esophagus and stomach.

Inhalation
Causes respiratory tract burns. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Skin contact
Causes severe skin burns. Causes permanent skin damage (scarring).

Eye contact
Causes severe eye burns. Causes permanent eye injury. May cause blindness.

Symptoms related to the physical, chemical and toxicological characteristics

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Acute</td>
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</tr>
<tr>
<td>Dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Rabbit</td>
<td>&gt; 2000 mg/kg</td>
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<tr>
<td>Inhalation</td>
<td></td>
<td></td>
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<tr>
<td>LC50</td>
<td>Rat</td>
<td>2 mg/l, 4 Hours</td>
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<tr>
<td>Oral</td>
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</tr>
<tr>
<td>LD50</td>
<td>Rat</td>
<td>376 mg/kg</td>
</tr>
</tbody>
</table>
Sulfuric acid (CAS 7664-93-9)

**Acute**

**Oral**
- **LD50**
  - **Species**: Rat
  - **Test Results**: 2140 mg/kg

**Skin corrosion/irritation**
Causes severe skin burns.

**Serious eye damage/eye irritation**
Causes severe eye burns.

**Respiratory sensitization**
Not classified.

**Skin sensitization**
Not a skin sensitizer.

**Germ cell mutagenicity**
Not classified.

**Carcinogenicity**
The information located is insufficient to conclude that sulfuric acid itself is a carcinogen. Strong inorganic acid mists containing this substance are carcinogenic to humans.

**IARC Monographs. Overall Evaluation of Carcinogenicity**
- **Hydrogen peroxide (CAS 7722-84-1)**
  - **Test Results**: 3 Not classifiable as to carcinogenicity to humans.

**Reproductive toxicity**
Not classified.

**Specific target organ toxicity - single exposure**
Not classified.

**Specific target organ toxicity - repeated exposure**
Not classified.

**Aspiration hazard**
Not classified.

**Chronic effects**
High concentrations: Inhalation of an aerosol may cause lung oedema. Erosion of exposed teeth.

**Further information**
Sulfuric acid fumes: Prolonged, repeated exposure to acid fumes/mists may cause chronic bronchitis, irritation of skin, mucous membranes and gastrointestinal tract and erosion of the teeth.

**12. Ecological information**

**Ecotoxicity**
The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**Components**

**Hydrogen peroxide (CAS 7722-84-1)**

**Aquatic**
- **Crustacea**
  - **Species**: Daphnia
  - **Test Results**: 24 mg/l, 48 hours
- **Fish**
  - **Species**: Bluegill (Lepomis macrochirus), Chameleon goby (Tridentiger trigonocephalus), Jack Mackerel (Trachurus japonicus), Rainbow trout, donaldson trout (Oncorhynchus mykiss)
  - **Test Results**: 26.7 mg/l, 96 Hours, 155 mg/l, 24 Hours, 89 mg/l, 24 Hours, 22 mg/l, 96 Hours

**Persistence and degradability**
No data available.

**Bioaccumulative potential**
No data available.

**Mobility in soil**
The product is water soluble and may spread in water systems.

**Other adverse effects**
The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

**13. Disposal considerations**

**Disposal instructions**
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of this material and its container at hazardous or special waste collection point.

**Local disposal regulations**
Since emptied containers retain product residue, follow label warnings even after container is emptied.

**Hazardous waste code**
D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
Waste codes should be assigned by the user based on the application for which the product was used.

**Waste from residues / unused products**
Dispose of in accordance with local regulations.

**Contaminated packaging**
Empty containers should be taken to an approved waste handling site for recycling or disposal.
14. Transport information

DOT

<table>
<thead>
<tr>
<th>DOT</th>
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<tr>
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<td>UN3093</td>
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<tr>
<td>UN proper shipping</td>
<td>Corrosive liquids, oxidizing, n.o.s. (Sulfuric acid, Peroxymonosulfuric acid)</td>
</tr>
<tr>
<td>name</td>
<td></td>
</tr>
<tr>
<td>Transport hazard</td>
<td>8</td>
</tr>
<tr>
<td>class(es)</td>
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<tr>
<td>Subsidiary class(es)</td>
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<tr>
<td>Packing group</td>
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<tr>
<td>Environmental hazards</td>
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<tr>
<td>Marine pollutant</td>
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<tr>
<td>Special precautions</td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
<tr>
<td>for user</td>
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<tr>
<td>Special provisions</td>
<td>A6, A7, IB2</td>
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<tr>
<td>Packaging exceptions</td>
<td>None</td>
</tr>
<tr>
<td>Packaging non bulk</td>
<td>202</td>
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<tr>
<td>Packaging bulk</td>
<td>243</td>
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IATA

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<td>UN number</td>
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<td>Packaging group</td>
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<tr>
<td>Environmental hazards</td>
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<tr>
<td>Labels required</td>
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IMDG

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<td>Subsidiary class(es)</td>
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<td>F-A, S-Q</td>
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<tr>
<td>Special precautions</td>
<td>Read safety instructions, SDS and emergency procedures before handling.</td>
</tr>
<tr>
<td>for user</td>
<td></td>
</tr>
</tbody>
</table>

Special provisions for user

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sulfuric acid (CAS 7664-93-9) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Yes

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid</td>
<td>7664-93-9</td>
<td>90</td>
</tr>
</tbody>
</table>
Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Sulfuric acid (CAS 7664-93-9)

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)
Hazardous substance

Safe Drinking Water Act (SDWA)
Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number
Sulfuric acid (CAS 7664-93-9) 6552

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))
Sulfuric acid (CAS 7664-93-9) 20 % weight/volume

DEA Exempt Chemical Mixtures Code Number
Sulfuric acid (CAS 7664-93-9) 6552

Food and Drug Administration (FDA)
Total food additive
Direct food additive
GRAS food additive

US state regulations
WARNING: This product contains a chemical known to the State of California to cause cancer.

US. Massachusetts RTK - Substance List
Hydrogen peroxide (CAS 7722-84-1)
Sulfuric acid (CAS 7664-93-9)

US. New Jersey Worker and Community Right-to-Know Act
Hydrogen peroxide (CAS 7722-84-1)
Sulfuric acid (CAS 7664-93-9)

US. Pennsylvania Worker and Community Right-to-Know Law
Hydrogen peroxide (CAS 7722-84-1)
Sulfuric acid (CAS 7664-93-9)

US. Rhode Island RTK
Hydrogen peroxide (CAS 7722-84-1)
Sulfuric acid (CAS 7664-93-9)

US. California Proposition 65
US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance
Sulfuric acid (CAS 7664-93-9)

International Inventories

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>No</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>No</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
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<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
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<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
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<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
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<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

“A “Yes” indicates this product complies with the inventory requirements administered by the governing country(s).

*A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 24-January-2014
Revision date -
Version # 01
Further information

The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.

NFPA Ratings

![NFPA Rating Diagram]

References

RTECS
HSDB® - Hazardous Substances Data Bank
GESTIS Substance Database
C&L Inventory database.

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.