



## Safety Data Sheet

Material Name: Halocarbon 134a (1,1,1,2-Tetrafluoroethane)

**\*\*\*Section 1 - IDENTIFICATION\*\*\***

### Manufacturer Information

Electronic Fluorocarbons, LLC  
3266 Bergey Road  
Hatfield PA 19440

General Information: 215-443-9600  
Emergency #: 1-800-535-5053 (Infotrac)  
Outside the US: 1-352-323-3500 (Call collect)

### Product Identifier: Halocarbon 134a (1,1,1,2-Tetrafluoroethane)

#### Trade Names/Synonyms

ASPEN R134a, 1,1,1,2-Tetrafluoroethane; Ethane, 1,1,1,2-tetrafluoro-; 1,1,1,2-Tetrafluoroethane (Refrigerant gas R134A); HFC 134a; HCF 134a; HCFC-134a

#### Product Type

Liquefied gas

#### Product Use

Synthetic/Analytical chemistry.Refrigeration.

**\*\*\*Section 2 - HAZARDS IDENTIFICATION\*\*\***

#### GHS Classification

Gas under pressure, Liquefied gas

#### GHS LABEL ELEMENTS

##### Symbol(s)



#### Signal Word

WARNING

#### Hazard Statement(s)

Contains gas under pressure; may explode if heated

#### Precautionary Statement(s)

##### General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.

##### Prevention

: Use and store only outdoors or in a well ventilated place.

##### Response

: Not applicable.

##### Storage

: Protect from sunlight. Store in a well-ventilated place.

##### Disposal

: Not applicable.

##### Hazards not otherwise classified

: Liquid can cause burns similar to frostbite.

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## \*\*\*Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS\*\* \*

| CAS#     | Component                   | Percent |
|----------|-----------------------------|---------|
| 811-97-2 | 1,1,1,2 - tetrafluoroethane | 100.0   |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

## \*\*\*Section 4 - FIRST AID MEASURES\*\* \*

### Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : Liquid can cause burns similar to frostbite.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention. :
- Ingestion** : Ingestion of liquid can cause burns similar to frostbite.

#### Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:, frostbite
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:, frostbite
- Ingestion** : Adverse symptoms may include the following:, frostbite

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## Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

## \* \* \*Section 5 - FIRE FIGHTING MEASURES\* \* \*

### Extinguishing media

#### **Suitable extinguishing media**

Use an extinguishing agent suitable for the surrounding fire.

#### **Unsuitable extinguishing media**

None known

### **Specific hazards arising from the chemical**

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

### **Hazardous thermal decomposition products**

Decomposition products may include the following materials:

carbon dioxide  
carbon monoxide  
halogenated compounds

### **Special protective actions for fire-fighters**

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

### **Special protective equipment for fire-fighters**

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

## \* \* \*Section 6 - ACCIDENTAL RELEASE MEASURES\* \* \*

### Personal precautions, protective equipment and emergency procedures

#### **For non-emergency personnel**

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

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**For emergency personnel**

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental Precautions**

Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods for Containment**

Stop leak if possible without personal risk. Keep unnecessary people away, isolate hazard area and deny entry.

**\*\*\*Section 7 - HANDLING AND STORAGE\*\*\***

**Precautions for safe handling**

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.  
Empty containers retain product residue and can be hazardous.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

**\*\*\*Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION\*\*\***

**Control parameters**

**Occupational exposure limits**

| Ingredient name             | Exposure limits   |
|-----------------------------|---|
| 1,1,1,2 - tetrafluoroethane | <p><b>OSHA PEL Z2 (United States, 2/2013).</b><br/>TWA: 2.5 mg/m<sup>3</sup> 8 hours. Form: Dust <b>AIHA WEEL (United States, 10/2011).</b><br/>TWA: 1000 ppm 8 hours.</p> <p><b>ACGIH TLV (United States, 3/2017).</b><br/>TWA: 2.5 mg/m<sup>3</sup>, (as F) 8 hours.</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b><br/>TWA: 2.5 mg/m<sup>3</sup>, (as F) 8 hours.</p> <p><b>OSHA PEL (United States, 6/2016).</b><br/>TWA: 2.5 mg/m<sup>3</sup>, (as F) 8 hours.</p> |

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- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.
- Thermal hazards** : If there is a risk of contact with the liquid, all protective equipment worn should be suitable for use with extremely low temperature materials.

## **\*\*\*Section 9 - PHYSICAL AND CHEMICAL PROPERTIES\*\*\***

### Appearance

- Physical state:** Gas (Liquefied compressed gas)
- Color:** Colorless
- Odor:** Faint ethereal odor
- Odor threshold** Not available
- pH:** Neutral
- Melting point:** -108°C (-162.4°F)
- Boiling point:** -26°C (-14.8°F)
- Critical temperature:** 100.9°C (213.6°F)
- Flash point:** (Product does not sustain combustion)
- Evaporation rate:** Not available
- Flammability (solid, gas):** Not available
- Lower and upper explosive (flammable) limits:** Not available

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Vapor pressure: 81.3 (psig)  
Vapor density: 3.5 (Air = 1)  
Specific Volume (ft<sup>3</sup>/lb): 3.7078  
Gas Density (lb/ft<sup>3</sup>): 0.2697 (25°C / 77 to °F)  
Relative density: Not applicable  
Solubility: Not available  
Solubility in water: 1 g/l  
Partition coefficient: n-octanol/water: 1.06  
Auto-ignition temperature: 743°C (>1369.4°F)  
Decomposition temperature: Not available  
Viscosity: Not applicable  
Flow time (ISO 2431): Not available  
Molecular weight: 102.04 g/mole

## \*\*\*Section 10 - STABILITY AND REACTIVITY\*\*\*

**Reactivity:**

No specific test data related to reactivity available for this product or its ingredients.

**Chemical stability:**

The product is stable.

**Possibility of hazardous reactions:**

Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid Incompatible materials:**

No specific data.

**Incompatible materials:**

No specific data.

**Hazardous decomposition products:**

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Hazardous polymerization:**

Under normal conditions of storage and use, hazardous polymerization will not occur.

## \*\*\*Section 11 - TOXICOLOGICAL INFORMATION\*\*\*

### Information on toxicological effects

**Acute toxicity**

| Product/ingredient name     | Result                | Species | Dose                  | Exposure |
|-----------------------------|-----------------------|---------|-----------------------|----------|
| 1,1,1,2 - tetrafluoroethane | LC50 Inhalation Vapor | Rat     | 1500 g/m <sup>3</sup> | 4 hours  |

**Irritation/Corrosion**

Not available.

**Sensitization**

Not available.

**Mutagenicity**

Not available.

**Carcinogenicity**

Not available.

**Reproductive toxicity**

Not available.

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## Teratogenicity

Not available.

## Specific target organ toxicity (single exposure)

Not available.

## Specific target organ toxicity (repeated exposure)

Not available.

## Aspiration hazard

Not available.

## Information on the likely routes of exposure

Not available

## Potential acute health effects

- Eye contact:** Liquid can cause burns similar to frostbite.  
**Inhalation:** No known significant effects or critical hazards.  
**Skin contact:** Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.  
**Ingestion:** Ingestion of liquid can cause burns similar to frostbite.

## Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** Adverse symptoms may include the following:, frostbite  
**Inhalation Skin** No specific data.  
**Contact** Adverse symptoms may include the following:, frostbite  
**Ingestion** Adverse symptoms may include the following:, frostbite

## Delayed and immediate effects and also chronic effects from short and long term exposure

### Short term exposure

#### **Potential immediate effects:**

Not available

#### **Potential delayed effects:**

Not available

### Long term exposure

#### **Potential immediate effects**

Not available

#### **Potential delayed effects**

Not available

## Potential chronic health effects

Not available

**General Carcinogenicity:** No known significant effects or critical hazards

**Mutagenicity:** No known significant effects or critical hazards

**Teratogenicity:** No known significant effects or critical hazards

**Developmental effects:** No known significant effects or critical hazards

**Fertility effects:** No known significant effects or critical hazards

## Numerical measures of toxicity

### Acute toxicity estimates

Not available

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## \*\*\*Section 12 - ECOLOGICAL INFORMATION\*\*\*

**Toxicity**

Not available

**Persistence and degradability**

Not available

**Bioaccumulative potential**

| Product/ingredient name     | LogPow | BCF | Potential |
|-----------------------------|--------|-----|-----------|
| 1,1,1,2 - tetrafluoroethane | 1.06   | -   | low       |

**Mobility in soil**

Soil/water partition coefficient (KOC)

Not available.

**Other adverse effects**






No known significant effects or critical hazards.

## \*\*\*Section 13 - DISPOSAL CONSIDERATIONS\*\*\*

**Disposal methods**

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

## \*\*\*Section 14 - TRANSPORT INFORMATION\*\*\*

|                                   | DOT  | TDG  | Mexico   | IMDG   | IATA   |
|-----------------------------------|--|--|--|--|--|
| <b>UN number</b>                  | UN3159   | UN3159   | UN3159   | UN3159   | UN3159   |
| <b>UN proper shipping name</b>    | 1,1,1, 2-TETRAFLUOROETHANE OR REFRIGERANT  | REFRIGERANT GAS R 134A; OR 1,1,1, 2-TETRAFLUOROETHANE                                      | REFRIGERANT GAS R 134A; OR 1,1,1, 2-TETRAFLUOROETHANE                                      | 1,1,1, 2-TETRAFLUOROETHANE (REFRIGERANT GAS  | REFRIGERANT GAS R 134A   |
| <b>Transport hazard class(es)</b> | GAS R 134A<br>2.2<br> | 2.2<br> | 2.2<br> | 2.2<br>B 134A)<br>2.2<br> | 2.2<br> |
| <b>Packing group</b>              | -  | -  | -  | -  | -  |
| <b>Environmental hazards</b>      | No.  | No.  | No.  | No.  | No.  |



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“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

## Additional information

- DOT Classification** : Limited quantity Yes.  
Quantity limitation Passenger aircraft/rail: 75 kg. Cargo aircraft: 150 kg.  
Special provisions T50
- TDG Classification** : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).  
Explosive Limit and Limited Quantity Index 0.125  
Passenger Carrying Road or Rail Index 75
- IATA** : Quantity limitation Passenger and Cargo Aircraft: 75 kg. Cargo Aircraft Only: 150 kg.
- Special precautions for user** : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
- Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## \* \* \*Section 15 - REGULATORY INFORMATION\* \* \*

**U.S. Federal regulations** : TSCA 8(a) CDR Exempt/Partial exemption: Not determined

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ SARA 311/312** : Not applicable.

**Classification** : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

### State regulations

**Massachusetts** : This material is not listed.

**New York New** : This material is not listed.

**Jersey** : This material is listed.

**Pennsylvania** : This material is not listed.

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## International regulations

### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

### Montreal Protocol (Annexes A, B, C, E)

Not listed.

### Stockholm Convention on Persistent Organic Pollutants

Not listed.

### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

## Inventory list

|                          |  |
|--------------------------|--|
| <b>Australia</b>         | : This material is listed or exempted.   |
| <b>Canada</b>            | : This material is listed or exempted.   |
| <b>China</b>             | : This material is listed or exempted.   |
| <b>Europe</b>            | : This material is listed or exempted.   |
| <b>Japan</b>             | : <b>Japan inventory (ENCS):</b> This material is listed or exempted.<br><b>Japan inventory (ISHL):</b> This material is listed or exempted. |
| <b>Malaysia</b>          | : Not determined.  |
| <b>New Zealand</b>       | : This material is listed or exempted.   |
| <b>Philippines</b>       | : This material is listed or exempted.   |
| <b>Republic of Korea</b> | : This material is listed or exempted.   |
| <b>Taiwan</b>            | : This material is listed or exempted.   |
| <b>Thailand</b>          | : Not determined.  |
| <b>Turkey</b>            | : This material is listed or exempted.   |
| <b>United States</b>     | : This material is listed or exempted.   |
| <b>Vietnam</b>           | : Not determined.  |

|   |
|---|
| <b>***Section 16 - OTHER INFORMATION***</b> |
|---|

**NFPA Ratings: Health: 2 Fire: 1 Reactivity: 0**

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

### **Key / Legend**

### **Hazardous Material Information System (U.S.A.)**

Health: 1 Flammability: 1 Physical hazards: 0

**Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.**

**The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.**

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ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; 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; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

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