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SAFETY DATA SHEET

Classified in accordance with 29 CFR 1910.1200

1. Identification

Product identifier: Butene-2 (SCRS)

Other means of identification

Common name(s), Liquefied Petroleum Gas (butylenes); Raffinate III (Butene-2); Spent butene-

synonym(s): SCRS; St. Clair Raffinate III Butene Stream

SDS number: NOVA-0027

Recommended use and restriction on use

Recommended use: Petrochemical industry: Raw material. **Restrictions on use:** All uses other than the identified.

Manufacturer/Importer/Supplier/Distributor Information

Importer

Company Name: NOVA Chemicals, Inc.

Address: 1555 Coraopolis Heights Road

Moon Township, PA, USA 15108 Product Information: 1-412-490-4063

Telephone: Product Information: 1-412-490

SDS Information Email: msdsemail@novachem.com

Emergency telephone number:

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)

1-800-424-9300 (CHEMTREC-USA) (24 hours)

2. Hazard(s) identification

Hazard Classification

Physical Hazards

Flammable gas Category 1
Gases under pressure Liquefied gas

Health Hazards

Germ Cell Mutagenicity

Category 1B

Carcinogenicity

Category 1A

OSHA hazard(s)

Simple asphyxiant

Environmental Hazards

Acute hazards to the aquatic Category 3

environment

Chronic hazards to the aquatic Category 3

environment

Label Elements

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Hazard Symbol:



Signal Word: Danger

Hazard Statement: Extremely flammable gas.

Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

May cause genetic defects.

May cause cancer.

Harmful to aquatic life with long lasting effects.

Precautionary Statements:

Prevention: Obtain special instructions before use. Do not handle until all safety

precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Wear protective gloves/ protective clothing/ eye protection/

face protection. Avoid release to the environment.

Response: IF exposed or concerned: Get medical advice/attention. Leaking gas

fire: Do not extinguish, unless leak can be stopped safely. In case of

leakage, eliminate all ignition sources.

Storage: Store locked up. Protect from sunlight. Store in a well-ventilated

place.

Disposal: Dispose of contents/ container to an approved facility in accordance

with local, regional, national and international regulations.

Other hazards which do not result

in GHS classification:

Contact with liquefied gas may cause irritation and/or frostbite.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
2-Butene	Butylene	107-01-7	90 - 97%
n-Butane	Butane	106-97-8	2 - 6%
1-Butene	Butene-1	106-98-9	0.5 - 2%
Propane	Dimethylmethane	74-98-6	0 - 1%
1,3-Butadiene	Vinylethylene	106-99-0	0 - 0.2%

^{*} All concentrations are percent by weight.

Additional Information: This product is considered hazardous by the OSHA Hazard Communication

Standard, (29 CFR 1910.1200).

4. First-aid measures

Inhalation: IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Seek medical attention.

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Ingestion: Ingestion of this product is not a likely route of exposure. Do NOT induce

vomiting. Seek medical attention.

Skin Contact: Contact with liquefied gas may cause irritation and/or frostbite. Seek

> medical attention immediately in the event of frostbite. IF ON SKIN: Gently wash with plenty of soap and water. Thaw frosted parts with lukewarm water. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing. Seek medical

attention.

Contact with liquefied gas may cause irritation and/or frostbite. Seek Eve contact:

medical attention immediately in the event of frostbite. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention.

Most important symptoms/effects, acute and delayed

Symptoms: Frostbite can occur with exposure to liquefied gases. High

> concentrations reduce available oxygen levels and may cause headache, dizziness, nausea, loss of coordination, difficulty breathing,

suffocation, or cardiac rhythm disturbance.

Indication of immediate medical attention and special treatment needed

Treatment: Administer oxygen by mask if there is respiratory distress, any change

in level of consciousness, or cardiac rhythm disturbance. Treat unconsciousness, frostbite, nausea, hypotension, seizures and cardiac dysrhythmias in the conventional manner. Adrenergic (epinephrine, norepinephrine) and dopaminergic agonists should be avoided during treatment or used with caution (lowest effective dose) because of possible cardiac sensitization by this product mixture.

5. Fire-fighting measures

General Fire Hazards: Extremely flammable liquefied gas. Vapors are heavier than air and may

travel to a source of ignition and flash back. DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF. Be aware of possibility of reignition. Vapors may form explosive mixture with air. Consider need for immediate emergency isolation and evacuation. If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. Keep containers away from source of heat or fire. Contains gas under pressure; may explode if

heated.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing

media:

Use dry chemical, foam, carbon dioxide (CO2), water spray or fog to extinguish. Use water to cool fire-exposed containers and to protect

personnel.

Unsuitable extinguishing

media:

Direct addition of water (or any other room temperature liquid) to the liquefied gas will cause a BLEVE (boiling liquid expanding vapor explosion).

Specific hazards arising from

the chemical:

Upon combustion, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Special protective equipment and precautions for fire-fighters

Special fire-fighting

procedures:

Keep upwind. Keep unauthorized personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at

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source of leak or safety devices as icing may occur. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Let uncontrolled fires burn off. Avoid inhaling any smoke and combustion materials. Remove and isolate contaminated clothing and shoes. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Reference Emergency Response Guidebook No. 115 for additional details and instructions.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire-fighters' protective clothing provides thermal protection **but only limited chemical protection**.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Wear appropriate personal protective equipment. Isolate area. Keep unauthorized personnel away. Alert stand-by emergency and fire-fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

Methods and material for containment and cleaning up:

Do not touch or walk through spilled material. In case of leakage, eliminate all ignition sources. Keep upwind. Keep out of low areas. Stop leak if safe to do so. All equipment used when handling the product must be grounded. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Keep area isolated until any detectable flammable gas has been fully dispersed.

Small Spills: Isolate spill or leak area for at least 100 meters (330 feet) in all directions.

Large Spills: Consider initial downwind evacuation for at least 800 meters (1/2 mile). Evacuate personnel to upwind of the spill area, and position at a safe distance. Use water spray to reduce gas or divert gas cloud drift.

7. Handling and storage

Precautions for safe handling:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity". Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Equipment and piping should be checked for possible treatment (decontamination) prior to maintenance or disposal/salvage. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities:

Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Only allow access to authorized persons. Store and handle in properly designed pressure vessels and equipment. Store and use away from heat, sparks, open flame, or any other ignition source. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers) and flammable gas detectors. Storage pressure vessels should be above ground and diked. Store away from incompatible materials. Store according to applicable regulations and standards for flammable materials. Inspect vents during winter conditions for vapor ice buildup.

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8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

In the ACGIH TLVs® and BEIs® book, n-butane (CAS# 106-97-8) (as Butane, isomers) and propane (CAS# 74-98-6) have been identified as being an "Explosion hazard". Propane (CAS# 74-98-6) has also been identified as a "Simple asphyxiant". Please refer to the ACGIH TLVs® and BEIs® book, latest edition, for additional information.

iatest edition, for additional information.				
Chemical Identity	Туре	Exposure Lir	nit Values	Source
2-Butene	TWA	250 ppm		US. ACGIH Threshold Limit Values, as
				amended
n-Butane	STEL	1,000 ppm		US. ACGIH Threshold Limit Values, as
				amended
	REL	800 ppm	1,900 mg/m3	US. NIOSH: Pocket Guide to Chemical
		• • • • • • • • • • • • • • • • • • • •		Hazards, as amended
	IDLH	1,600 ppm		US. NIOSH. Immediately Dangerous to Life or
				Health (IDLH) Values, as amended
	TWA	800 ppm	1,900 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000),
			•	as amended
1-Butene	TWA	250 ppm		US. ACGIH Threshold Limit Values, as
				amended
Propane	REL	1,000 ppm	1,800 mg/m3	US. NIOSH: Pocket Guide to Chemical
				Hazards, as amended
	IDLH	2,100 ppm		US. NIOSH. Immediately Dangerous to Life or
				Health (IDLH) Values, as amended
	PEL	1,000 ppm	1,800 mg/m3	US. OSHA Table Z-1 Limits for Air
				Contaminants (29 CFR 1910.1000), as
				amended
	TWA	1,000 ppm	1,800 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000),
				as amended
1,3-Butadiene	TWA	2 ppm		US. ACGIH Threshold Limit Values, as
				amended
	IDLH	2,000 ppm		US. NIOSH. Immediately Dangerous to Life or
				Health (IDLH) Values, as amended
	TWA	1 ppm		US. OSHA Specifically Regulated Substances
				(29 CFR 1910.1001-1053), as amended
	OSHA_AC	0.5 ppm		US. OSHA Specifically Regulated Substances
	T			(29 CFR 1910.1001-1053), as amended
	STEL	5 ppm		US. OSHA Specifically Regulated Substances
				(29 CFR 1910.1001-1053), as amended
	TWA	1,000 ppm	2,200 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000),
				as amended

Biological Limit Values

-great mine values			
Chemical Identity	Exposure Limit Values	Source	
1,3-Butadiene (1,2-	2.5 mg/l (Urine)	ACGIH BEI	
Dihydroxy-4-(N-			
acetylcysteinyl)-butane:			
Sampling time: End of shift.)			
1,3-Butadiene (Mixture of N-	2.5 pmol/g (Blood)	ACGIH BEI	
1- and N-2-			
(hydroxybutenyl)valine			
hemoglobin (Hb) adducts:			
Sampling time: Not critical.)		ļ	

Appropriate Engineering Controls

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

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Individual protection measures, such as personal protective equipment

General information: Personal protective equipment (PPE) should not be considered a long-term

solution to exposure control. Employer programs to properly select, fit, maintain and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard

potential and ensure adequate protection.

Eye/face protection: Safety glasses. Chemical goggles under a full-face shield or respirator are

recommended if contact with liquefied gas is possible.

Skin Protection

Hand Protection: Wear cold insulating gloves.

Skin and BodyWear appropriate clothing to prevent any possibility of skin contact. Wear **Protection:**work clothes with long sleeves and pants. Fire resistant (i.e., Nomex) or

natural fiber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapor release may occur. Wear chemical-resistant safety

footwear with good traction to prevent slipping. Static Dissipative (SD) rated

footwear is also recommended.

Respiratory Protection: Supplied air breathing apparatus must be used when oxygen

concentrations are low or if airborne concentrations exceed the limits of the

air-purifying respirators or IDLH levels.

Hygiene measures: Use effective control measures and PPE to maintain worker exposure to

concentrations that are below these limits. Ensure that eyewash stations

and safety showers are in close proximity to work locations.

9. Physical and chemical properties

Appearance

Physical state: Gas

Form: Liquefied gas
Color: Colorless

Odorless, Faint hydrocarbon odor

Odor Threshold: No data available. pH: not applicable

Melting point/freezing point: -139 °C (-218 °F) (2-Butene)
Initial boiling point and boiling range: 3.7 °C (38.7 °F) (2-Butene)

Flash Point: -73 °C (-99 °F) (ASTM D56 (Tag (Closed Cup))) (2-

Butene)

Evaporation rate:No data available. **Flammability (solid, gas):**Extremely flammable.

Upper/lower limit on flammability or explosive limits

Flammability Limit - Upper (%): 10 %(V) (Butenes)
Flammability Limit - Lower (%): 1.6 %(V) (Butenes)

Vapor pressure: 28 psia (21 °C (70 °F))

Vapor density: 1.9 (0 °C (32 °F)) (Air=1) (estimated)

Density: 600 kg/m3 (2-Butene)

Relative density: 0.6 (20 °C (68 °F)) (Water=1) (2-Butene)

Solubility(ies)

Solubility in water: Practically Insoluble
Solubility (other): No data available.

Partition coefficient (n-octanol/water): 2.3 (2-Butene)

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Auto-ignition temperature: 324 °C (615 °F) (2-Butene)

Decomposition temperature:No data available. **Viscosity:**not applicable

10. Stability and reactivity

Reactivity: Contact with incompatible materials. Sources of ignition. Exposure to heat.

Chemical Stability: Stable under normal conditions.

Possibility of hazardous

reactions:

Liquefied gas may explode on contact with hot water (45 °C to 75 °C) (113 °F to 167 °F). May react vigorously with oxidizing agents. Hazardous polymerization not likely to occur except under favorable conditions

requiring heat and catalyst.

Conditions to avoid: Keep away from heat, sparks and open flame.

Incompatible Materials: Strong acids. Strong oxidizing agents. Many materials become brittle after

contact with liquefied gases and may fail without warning. Carefully select and test equipment, gaskets and hoses periodically to ensure integrity and

compatibility.

Hazardous Decomposition

Products:

Upon decomposition, this product emits carbon monoxide, carbon dioxide,

low molecular weight hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Inhalation: May displace oxygen and cause rapid suffocation.

Ingestion: Ingestion of this product is not a likely route of exposure.

Skin Contact: The liquefied form will cause freezing burns (frostbite).

Eye contact: The liquefied form will cause freezing burns (frostbite).

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: High concentrations reduce available oxygen levels and may cause

headache, dizziness, nausea, loss of coordination, difficulty breathing,

suffocation, or cardiac rhythm disturbance.

Ingestion: No adverse effects due to ingestion are expected.

Skin Contact: Frostbite or burns.

Eye contact: Frostbite or burns.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: Not classified for acute toxicity based on available data.

Dermal

Product: Not classified for acute toxicity based on available data.

Inhalation

Product: Not classified for acute toxicity based on available data.

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Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: The liquefied form will cause freezing burns (frostbite).

Serious Eye Damage/Eye Irritation

Product: The liquefied form will cause freezing burns (frostbite).

Respiratory or Skin Sensitization

Product: No data available.

Carcinogenicity

Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

1,3-Butadiene Overall evaluation: 1. Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:

1,3-Butadiene Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended:

1.3-Butadiene Cancer

Germ Cell Mutagenicity

In vitro

Product: May cause genetic defects.

In vivo

Product: May cause genetic defects.

Reproductive toxicity

Product: Not classified.

Specific Target Organ Toxicity - Single Exposure

Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure

Product: Not classified.

Aspiration Hazard

Product: not applicable

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: Harmful to aquatic life.

Aquatic Invertebrates

Product: Harmful to aquatic life.

Toxicity to Aquatic Plants

Product: Harmful to aquatic life.

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Chronic hazards to the aquatic environment:

Fish

Product: Harmful to aquatic life with long lasting effects.

Aquatic Invertebrates

Product: Harmful to aquatic life with long lasting effects.

Toxicity to Aquatic Plants

Product: Harmful to aquatic life with long lasting effects.

Persistence and Degradability

Biodegradation

Product: Components are likely to degrade in air within minutes to hours. Butene-2

will degrade rapidly over time in air with a calculated half-life of 2.3 to 3

hours.

BOD/COD Ratio

Product: No data available.

Bioaccumulative potential

Bioconcentration Factor (BCF)

Product: Bioconcentration Factor (BCF): 12 (estimated) (2-Butene)

Partition Coefficient n-octanol / water (log Kow)
Product: 2.3 (2-Butene)

Mobility in soil: Low potential.

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of contents/container to an appropriate treatment and disposal

facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. Waste generator is advised to carefully consider hazardous properties and control measures needed for other

materials that may be found in the waste.

Contaminated Packaging: Check local, federal and state environmental regulations prior to disposal.

14. Transport information

DOT

UN number or ID number: UN 1075

UN Proper Shipping Name: Liquefied petroleum gas Shipping Name Continued: (butylene) Not Odorized

Transport Hazard Class(es)

Class: 2.1
Label(s): 2.1
Packing Group: Marine Pollutant: No

Special precautions for user: Reference Emergency Response Guidebook No. 115, latest revision.

Reportable quantity 1,3-Butadiene 10 lbs

Cyclohexane 1000 lbs

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15. Regulatory information

US Federal Regulations

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

None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended

<u>Chemical Identity</u> <u>OSHA hazard(s)</u>

1,3-Butadiene Cancer

Central nervous system

Flammability

respiratory tract irritation

Eye irritation

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical IdentityName on List:Reportable quantity1,3-Butadiene1,3-BUTADIENE10 lbs.CyclohexaneCyclohexane1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Flammable (gases, aerosols, liquids, or solids), Gas under pressure, Germ Cell Mutagenicity, Carcinogenicity, Simple asphyxiant

US. EPCRA (SARA Title III) Section 304 Extremely Hazardous Substances Reporting Quantities and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazardous Substances

None present or none present in regulated quantities.

US. EPCRA (SARA Title III Section 313 Toxic Chemical Release Inventory (TRI) Reporting

	Reporting	Reporting threshold for manufacturing and processing	
	threshold for		
Chemical Identity	other users		
1.3-Butadiene	10000 lbs	25000 lbs.	

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

Chemical Identity	Reportable quantity
2-Butene	10000 lbs
n-Butane	10000 lbs
1-Butene	10000 lbs
Propane	10000 lbs
1,3-Butadiene	10000 lbs
Methane	10000 lbs
Ethane	10000 lbs

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Chemical Identity Reportable quantity

Cyclohexane 1000 lbs.

US State Regulations

US. California Proposition 65



WARNING: This product can expose you to chemicals including, 1,3-Butadiene; which is [are] known to the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to www.P65Warnings.ca.gov.

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Inventory Status

Canada DSL Inventory List: On or in compliance with the inventory

US TSCA Inventory: On or in compliance with the inventory

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

Issue Date: 03/18/2024

Revision Information: 03/18/2024: SDS Update – Address updated, composition edits, OEL

updates, section 15 updates, phrase edits

03/02/2020: SDS Update

Version #: 8.1

Abbreviations and acronyms:ACC = American Chemistry Council; ACGIH = American Conference of Governmental Industrial Hygienists; BOD = Biochemical Oxygen Demand; C = Ceiling; CAS = Chemical Abstracts

Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; COD = Chemical Oxygen Demand; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EPA = Environmental Protection Agency; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HPV = High Production Volume; IARC = International Agency for Research on Cancer; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PMCC = Pensky-Martens Closed Cup; PPE =

Administration; PEL = Permissible Exposure Limit; PMCC = Pensky-Martens Closed Cup; PPI Personal Protective Equipment; RCRA = Resource Conservation and Recovery Act; REL = Recommended Exposure Limit; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA =

Time Weighted Average

Further Information: For additional information on equipment bonding and grounding, refer to the

American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on

Static Electricity".

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