



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

SDS ID: 00244707

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

Product Description

Classification determined in accordance with Compressed Gas Association standards.

Product Use

instrument calibration

Restrictions on Use

None known

Details of the supplier of the safety data sheet

MATHESON TRI-GAS, INC.

150 Allen Road, Suite 302

Basking Ridge, NJ 07920

General Information: 1-800-416-2505

Emergency #: 1-800-424-9300 (CHEMTREC)

Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Flammable Gases - Category 1

Gases Under Pressure - Compressed gas

Reproductive Toxicity - Category 1A

Specific Target Organ Toxicity - Repeated Exposure - Category 1 (central nervous system)

Simple Asphyxiant.

GHS Label Elements

Symbol(s)



Signal Word

Danger

Hazard Statement(s)

Extremely flammable gas.

Contains gas under pressure; may explode if heated.

May damage fertility or the unborn child.

Causes damage to organs through prolonged or repeated exposure.

May displace oxygen and cause rapid suffocation.

Precautionary Statement(s)

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flame/hot surfaces - No smoking.

Wear protective gloves/protective clothing/eye protection/face protection.



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

SDS ID: 00244707

Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
IF exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.

Storage

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

Disposal

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

Other Hazards

Rapid release of compressed gas may cause frostbite. Concentration(s) of flammable component(s) will result in a flammable gas classification.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
7727-37-9	Nitrogen	<100
124-38-9	Carbon dioxide	<100
7440-59-7	Helium	<100
7440-37-1	Argon	<100
1333-74-0	Hydrogen	<100
74-82-8	Methane	<100
630-08-0	Carbon monoxide	<75.2
7782-44-7	Oxygen	≤23.5

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

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

SDS ID: 00244707

If swallowed, get medical attention.

Most Important Symptoms/Effects

Acute

frostbite, suffocation

Delayed

reproductive effects, central nervous system damage

Indication of any immediate medical attention and special treatment needed

For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

regular dry chemical, carbon dioxide.

Unsuitable Extinguishing Media

Do not direct water at source of leak or safety devices; icing may occur.

Special Hazards Arising from the Chemical

Severe fire hazard. Severe explosion hazard. Vapor/air mixtures are explosive. Pressurized containers may rupture or explode if exposed to sufficient heat.

Hazardous Combustion Products

oxides of nitrogen, oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Stay away from the ends of tanks.

For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. Evacuation radius: 1600 meters (1 mile). For smaller tanks or cylinders, extinguish and isolate from other flammables. Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Apply water from a protected location or from a safe distance. Evacuate if fire gets out of control or containers are directly exposed to fire. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider downwind evacuation if material is leaking. Stop flow of gas.

Special Protective Equipment and Precautions for Firefighters

Wear personal protective clothing and equipment such as 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.

Methods and Materials for Containment and Cleaning Up

Stop leak if possible without personal risk. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. All equipment used when handling the product must be grounded. Stay upwind and keep out of low areas. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Do not direct water at spill or source of leak. Allow substance to evaporate. Ventilate closed spaces before entering.

Environmental Precautions

Avoid release to the environment.



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix**SDS ID: 00244707****Section 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/sparks/open flame/hot surfaces - No smoking. All equipment used when handling the product must be grounded. Use only outdoors or in a well-ventilated area. Do not breathe gas. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

Conditions for Safe Storage, Including any Incompatibilities

Store locked up.

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

Store and handle in accordance with all current regulations and standards. Subject to storage and handling regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

Incompatible Materials

metals, oxidizing materials, combustible materials, halo carbons, bases, reducing agents, amines, metal salts, metal carbide, halogens, lithium, metal oxides

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**Component Exposure Limits**

Nitrogen	7727-37-9
ACGIH:	(See Appendix F: Minimal Oxygen Content)
Carbon dioxide	124-38-9
ACGIH:	5000 ppm TWA
	30000 ppm STEL
NIOSH:	5000 ppm TWA ; 9000 mg/m3 TWA
	30000 ppm STEL ; 54000 mg/m3 STEL
	40000 ppm IDLH
Europe:	5000 ppm TWA ; 9000 mg/m3 TWA
OSHA (US):	5000 ppm TWA ; 9000 mg/m3 TWA
Mexico:	5000 ppm TWA VLE-PPT ; 9000 mg/m3 TWA VLE-PPT
	15000 ppm STEL [PPT-CT] ; 27000 mg/m3 STEL [PPT-CT]
Helium	7440-59-7
ACGIH:	(See Appendix F: Minimal Oxygen Content)
Argon	7440-37-1



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix**SDS ID: 00244707**

ACGIH:	(See Appendix F: Minimal Oxygen Content)
Hydrogen	1333-74-0
ACGIH:	(See Appendix F: Minimal Oxygen Content, explosion hazard)
Methane	74-82-8
ACGIH:	(See Appendix F: Minimal Oxygen Content, explosion hazard)
Carbon monoxide	630-08-0
ACGIH:	25 ppm TWA
NIOSH:	35 ppm TWA ; 40 mg/m3 TWA
	200 ppm Ceiling ; 229 mg/m3 Ceiling
	1200 ppm IDLH
OSHA (US):	50 ppm TWA ; 55 mg/m3 TWA
Mexico:	50 ppm TWA VLE-PPT ; 55 mg/m3 TWA VLE-PPT
	400 ppm STEL [PPT-CT] ; 400 mg/m3 STEL [PPT-CT]

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)**Carbon monoxide (630-08-0)**

3.5 % of hemoglobin Medium: blood Time: end of shift Parameter: Carboxyhemoglobin (background, nonspecific)
 20 ppm Medium: end-exhaled air Time: end of shift Parameter: Carbon monoxide (background, nonspecific)

Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment**Eye/face protection**

For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

For the gas: Protective clothing is not required, but recommended. For the liquid: Wear appropriate protective, cold insulating clothing.

Respiratory Protection

Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.



Safety Data Sheet

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For the gas: Protective gloves are not required, but recommended. For the liquid: Wear insulated gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	colorless gas	Physical State	gas
Odor	odorless.	Color	colorless.
Odor Threshold	Not available	pH	Not available
Melting Point	Not available	Boiling Point	Not available
Boiling Point Range	Not available	Freezing point	Not available
Evaporation Rate	Not available	Flammability (solid, gas)	Flammable gas
Autoignition Temperature	Not available	Flash Point	Not available
Lower Explosive Limit	Not available	Decomposition temperature	Not available
Upper Explosive Limit	Not available	Vapor Pressure	Not available
Vapor Density (air=1)	Not available	Specific Gravity (water=1)	Not available
Water Solubility	Not available	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Kinematic viscosity	Not available
Solubility (Other)	Not available	Density	Not available
Physical Form	Compressed gas	Molecular Weight	Not available

Section 10 - STABILITY AND REACTIVITY**Reactivity**

No reactivity hazard is expected.

Chemical Stability

Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

Incompatible Materials

metals, oxidizing materials, combustible materials, halo carbons, bases, reducing agents, amines, metal salts, metal carbide, halogens, halogens, lithium, metal oxides

Hazardous decomposition products

oxides of nitrogen, oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION**Information on Likely Routes of Exposure**



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

SDS ID: 00244707

Inhalation

nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma, suffocation, irritation, changes in body temperature, irregular heartbeat, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, chest pain, lung damage, sensitivity to light, changes in blood pressure, sleep disturbances, emotional disturbances, visual disturbances, hearing loss, eye damage, blood disorders, death, loss of appetite, heart damage, nerve damage, birth defects, brain damage, fatigue, muscle cramps

Skin Contact

frostbite, blisters

Eye Contact

frostbite, irritation, blurred vision

Ingestion

Ingestion of gas is unlikely.

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:

Hydrogen (1333-74-0)

Inhalation LC50 Rat >15000 ppm 1 h

Carbon monoxide (630-08-0)

Inhalation LC50 Rat 1807 ppm 4 h

Product Toxicity Data

Acute Toxicity Estimate

No data available.

Immediate Effects

frostbite, suffocation

Delayed Effects

reproductive effects, central nervous system damage

Irritation/Corrosivity Data

No data available.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA.

Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available

Reproductive Toxicity

Carbon monoxide: May damage fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure

No target organs identified.

Specific Target Organ Toxicity - Repeated Exposure

central nervous system

Aspiration hazard

No data available.



Safety Data Sheet

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SDS ID: 00244707

Medical Conditions Aggravated by Exposure

heart or cardiovascular disorders, respiratory disorders, blood system disorders, hormonal disorders

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

May cause long lasting harmful effects to aquatic life.

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

Persistence and Degradability

No data available for the mixture.

Bioaccumulative Potential

No data available for the mixture.

Mobility

No data available for the mixture.

Other Toxicity

No additional information available.

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:

Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S. , (Contains: Methane , Hydrogen)

Hazard Class: 2.1

UN/NA #: UN1954

Required Label(s): 2.1

IATA Information:

Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S. , (Contains: Methane , , Hydrogen)

Hazard Class: 2.1

UN#: UN1954

Required Label(s): 2.1

IMDG Information:

Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S. , (Contains: Methane , Hydrogen)

Hazard Class: 2.1

UN#: UN1954

Required Label(s): 2.1

International Bulk Chemical Code

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

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

None of this product's components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.



Safety Data Sheet

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SDS ID: 00244707

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

Flammable; Gas Under Pressure; Reproductive Toxicity; Specific Target Organ Toxicity; Simple Asphyxiant

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
Nitrogen	7727-37-9	No	Yes	Yes	Yes	Yes
Carbon dioxide	124-38-9	Yes	Yes	Yes	Yes	Yes
Helium	7440-59-7	No	Yes	Yes	Yes	Yes
Argon	7440-37-1	No	Yes	Yes	Yes	Yes
Hydrogen	1333-74-0	Yes	Yes	Yes	Yes	Yes
Methane	74-82-8	No	Yes	Yes	Yes	Yes
Carbon monoxide	630-08-0	Yes	Yes	Yes	Yes	Yes
Oxygen	7782-44-7	No	Yes	No	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects

Carbon monoxide	630-08-0
Repro/Dev. Tox	developmental toxicity , 7/1/1989

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

Carbon dioxide	124-38-9
	1 %
Carbon monoxide	630-08-0
	0.1 %

WHMIS Classification

A , D2A

Component Analysis - Inventory

Nitrogen (7727-37-9)



Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix

SDS ID: 00244707

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Carbon dioxide (124-38-9)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Helium (7440-59-7)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Argon (7440-37-1)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Hydrogen (1333-74-0)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Methane (74-82-8)

US	CA	EU	AU	PH	JP -	JP -	KR	KR	KR -	CN	NZ	MX	TW	VN
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Safety Data Sheet

Material Name: Carbon Monoxide, Oxygen, Methane, Hydrogen, Carbon Dioxide, Helium, Nitrogen, and Argon Gas Mix**SDS ID: 00244707**

					ENCS	ISHL	KECI - Annex 1	KECI - Annex 2	REACH CCA					(Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Carbon monoxide (630-08-0)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Oxygen (7782-44-7)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION**NFPA Ratings**

Health: 2 Fire: 4 Reactivity: 0

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

Summary of Changes

Updated: 04/25/2016

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; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); 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; F - Background (for Venezuela Biological Exposure Indices); 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; 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



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Safety Data Sheet

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SDS ID: 00244707

Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); 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; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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