

Version 1.9 Revision Date 2020-05-06

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

**Product information** 

Product Name : Isooctane (Pure Grade)

Material : 1119534, 1074222, 1029592, 1029591, 1029593, 1031448,

1029590

Company : Chevron Phillips Chemical Company LP

Specialty Chemicals 10001 Six Pines Drive The Woodlands, TX 77380

#### **Emergency telephone:**

Health:

866.442.9628 (North America) 1.832.813.4984 (International)

Transport:

CHEMTREC 800.424.9300 or 703.527.3887(int'l)

Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090 EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Mexico CHEMTREC 01-800-681-9531 (24 hours)

South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Argentina: +(54)-1159839431

Responsible Department : Product Safety and Toxicology Group

E-mail address : SDS@CPChem.com Website : www.CPChem.com

#### **SECTION 2: Hazards identification**

#### Classification of the substance or mixture

This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

Classification

: Flammable liquids, Category 2 Skin irritation, Category 2

Specific target organ toxicity - single exposure, Category 3,

Central nervous system Aspiration hazard, Category 1

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#### Labeling

Symbol(s) :







Signal Word : Danger

Hazard Statements : H225: Highly flammable liquid and vapor.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

Precautionary Statements : Prevention:

P210 Keep away from heat/ sparks/ open flames/ hot

surfaces. No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ ventilating/ lighting/

equipment. P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves/ eye protection/ face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON

CENTER/ doctor.

P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with

water/ shower.

P304 + P340 IF INHALED: Remove victim to fresh air and

keep at rest in a position comfortable for breathing.

P312 Call a POISON CENTER/ doctor if you feel unwell.

P331 Do NOT induce vomiting.

P332 + P313 If skin irritation occurs: Get medical advice/

attention.

P362 Take off contaminated clothing and wash before reuse. P370 + P378 In case of fire: Use dry sand, dry chemical or

alcohol-resistant foam for extinction.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container

tightly closed.

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste

disposal plant.

Carcinogenicity:

IARC No ingredient of this product present at levels greater than or

equal to 0.1% is identified as probable, possible or confirmed

human carcinogen by IARC.

NTP No ingredient of this product present at levels greater than or

equal to 0.1% is identified as a known or anticipated carcinogen

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by NTP.

ACGIH No ingredient of this product present at levels greater than or

equal to 0.1% is identified as a carcinogen or potential carcinogen

by ACGIH.

#### **SECTION 3: Composition/information on ingredients**

Synonyms : 2,2,4-Trimethylpentane

ASTM Isooctane Knock Test Reference Fuel

Isooctane (ASTM Grade)

Isooctane

Primary Reference Fuel

Molecular formula : C8H18

| Component                          | CAS-No.  | Weight % |
|------------------------------------|----------|----------|
| 2,2,4-Trimethylpentane (Isooctane) | 540-84-1 | 99 - 100 |

#### **SECTION 4: First aid measures**

General advice : Move out of dangerous area. Show this material safety data

sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled : Consult a physician after significant exposure. If unconscious,

place in recovery position and seek medical advice.

In case of skin contact : If skin irritation persists, call a physician. If on skin, rinse well

with water. If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution. Remove contact

lenses. Protect unharmed eye. Keep eye wide open while

rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to

an unconscious person. If symptoms persist, call a physician.

Take victim immediately to hospital.

#### **SECTION 5: Firefighting measures**

Flash point : -12.22°C (10.00°F)

estimated

Autoignition temperature : 411°C (772°F)

Suitable extinguishing

media

: Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing

nedia

: High volume water jet.

Specific hazards during fire : Do not allow run-off from fire fighting to enter drains or water

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fighting

courses.

Special protective equipment for fire-fighters

: Wear self-contained breathing apparatus for firefighting if

necessary.

Further information : Collect contaminated fire extinguishing water separately. This

must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case

of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed

containers.

Fire and explosion

protection

Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Hazardous decomposition

products

: Hydrocarbons. Carbon oxides.

#### SECTION 6: Accidental release measures

Personal precautions : Use personal protective equipment. Ensure adequate

ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low

areas.

Environmental precautions : Prevent product from entering drains. Prevent further leakage

or spillage if safe to do so. If the product contaminates rivers

and lakes or drains inform respective authorities.

Methods for cleaning up : Contain spillage, and then collect with non-combustible

absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to

local / national regulations (see section 13).

#### **SECTION 7: Handling and storage**

#### Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid

exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with

local and national regulations.

Advice on protection against fire and explosion

Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames,

hot surfaces and sources of ignition.

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#### **Storage**

Requirements for storage areas and containers

No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
 Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

#### SECTION 8: Exposure controls/personal protection

#### **Engineering measures**

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

#### Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless

ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators

may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed

with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles.

Skin and body protection : Choose body protection according to the amount and

concentration of the dangerous substance at the work place. Wear as appropriate:. Flame-resistant clothing. Footwear

protecting against chemicals.

Hygiene measures : When using do not eat or drink. When using do not smoke.

Wash hands before breaks and at the end of workday.

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#### **SECTION 9: Physical and chemical properties**

#### Information on basic physical and chemical properties

**Appearance** 

Form : Liquid
Physical state : Liquid
Color : Colorless
Odor : Mild

Safety data

Flash point : -12.22°C (10.00°F)

estimated

Lower explosion limit : 1 %(V)

Upper explosion limit : 7 %(V)

Oxidizing properties : no

Autoignition temperature : 411°C (772°F)

Molecular formula : C8H18

Molecular weight : 114.26 g/mol

pH : Not applicable

Pour point : No data available

Boiling point/boiling range : 99°C (210°F)

Vapor pressure : 1.70 PSI

at 37.8°C (100.0°F)

Relative density : 0.69

at 15.6 °C (60.1 °F)

Water solubility : Negligible

Partition coefficient: n-

octanol/water

: No data available

Viscosity, kinematic : 0.503 cSt

at 20°C (68°F)

Relative vapor density : '

(Air = 1.0)

Evaporation rate : 1

Percent volatile : > 99 %

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#### **SECTION 10: Stability and reactivity**

Chemical stability : This material is considered stable under normal ambient and

anticipated storage and handling conditions of temperature

and pressure.

Possibility of hazardous reactions

Hazardous reactions : Hazardous polymerization does not

occur.

Further information: No decomposition if stored and applied as

directed.

Hazardous reactions: Vapors may form explosive mixture with

air.

**Conditions to avoid** : Heat, sparks, fire, and oxidizing agents.

Materials to avoid : May react with oxygen and strong oxidizing agents, such as

chlorates, nitrates, peroxides, etc.

**Hazardous decomposition** 

products

: Hydrocarbons Carbon oxides

Other data : No decomposition if stored and applied as directed.

### **SECTION 11: Toxicological information**

**Acute oral toxicity** 

2,2,4-Trimethylpentane

(Isooctane)

: LD50: > 5,000 mg/kg

Species: Rat

Sex: male and female

Method: OECD Test Guideline 401

Symptoms: Salivation

Acute inhalation toxicity

2,2,4-Trimethylpentane

(Isooctane)

: LC50: > 33.52milligram per literExposure time: 4 h

Species: Rat

Sex: male and female Test atmosphere: vapor

Method: OECD Test Guideline 403

Acute dermal toxicity

2,2,4-Trimethylpentane

(Isooctane)

: LD50: >2000 milligram per kilogram

Species: Rabbit Sex: male and female

Method: OECD Test Guideline 402

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**Skin irritation** : Irritating to skin.

May cause skin irritation in susceptible persons.

Isooctane (Pure Grade)

**Eye irritation** : No eye irritation

Vapors may cause irritation to the eyes, respiratory system

and the skin.

Sensitization

2,2,4-Trimethylpentane

(Isooctane)

: Does not cause skin sensitization.

Repeated dose toxicity

2,2,4-Trimethylpentane

(Isooctane)

: Species: Rat, Male and female

Sex: Male and female Application Route: Inhalation Dose: 0, 668, 2220, 6646 ppm Exposure time: 13 weeks

Number of exposures: 6 hr/day 5 d/wk NOEL: 8.117 mg/l 2220 ppm

Method: OECD Guideline 413

Information given is based on data obtained from similar

substances.

Genotoxicity in vitro

2,2,4-Trimethylpentane

(Isooctane)

: Test Type: Ames test

Method: Mutagenicity (Escherichia coli - reverse mutation

assay)

Result: negative

Test Type: Mouse lymphoma assay Method: OECD Guideline 476

Result: negative

Test Type: Sister Chromatid Exchange Assay

Result: negative

Test Type: Unscheduled DNA synthesis assay

Result: negative

Genotoxicity in vivo

2,2,4-Trimethylpentane

(Isooctane)

: Test Type: Unscheduled DNA synthesis assay

Species: Mouse Dose: 500 mg/kg Result: negative

Test Type: Unscheduled DNA synthesis assay

Species: Rat Dose: 500 mg/kg Result: negative

Reproductive toxicity

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2,2,4-Trimethylpentane

(Isooctane)

: Species: Rat

Sex: male and female Application Route: Inhalation Dose: 0, 900, 3000, 9000 ppm Number of exposures: 6 h/d 5 d/wk Method: OECD Test Guideline 416

NOAEL Parent: 3000 ppm NOAEL F1: 3000 ppm NOAEL F2: 3000 ppm

Information given is based on data obtained from similar

substances.

#### **Developmental Toxicity**

2,2,4-Trimethylpentane

(Isooctane)

: Species: Rat

Application Route: Inhalation Dose: 0, 400, 1200 ppm Number of exposures: 6h/d Test period: GD6-15

NOAEL Teratogenicity: 1200 ppm NOAEL Maternal: 1200 ppm

Information given is based on data obtained from similar

substances.

Species: Rat

Application Route: Inhalation Dose: 0, 900, 3000, 9000 ppm Number of exposures: 6h/d Test period: GD6-15

Method: OECD Guideline 414 NOAEL Teratogenicity: 9000 ppm NOAEL Maternal: 3000 ppm

Information given is based on data obtained from similar

substances.

Isooctane (Pure Grade) **Aspiration toxicity** 

May be fatal if swallowed and enters airways.

Substances known to cause human aspiration toxicity hazards or to be regarded as if they cause human aspiration toxicity

hazard.

#### **CMR** effects

2,2,4-Trimethylpentane

(Isooctane)

Mutagenicity: Tests on bacterial or mammalian cell cultures

did not show mutagenic effects.

Teratogenicity: Animal testing did not show any effects on

fetal development.

Reproductive toxicity: Animal testing did not show any effects

on fertility.

Isooctane (Pure Grade) **Further information** 

: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents

may degrease the skin.

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#### **SECTION 12: Ecological information**

#### Toxicity to fish

2,2,4-Trimethylpentane

(Isooctane)

: LC50: 0.11 mg/l

Exposure time: 96 h

Species: Oncorhynchus mykiss (rainbow trout) semi-static test Method: OECD Test Guideline 203 Information given is based on data obtained from similar

substances.

#### Toxicity to daphnia and other aquatic invertebrates

2,2,4-Trimethylpentane

(Isooctane)

: EC50: 0.4 mg/l

Exposure time: 48 h

Species: Daphnia magna (Water flea)

static test Information given is based on data obtained from

similar substances.

#### Toxicity to algae

2,2,4-Trimethylpentane

(Isooctane)

: EL50: 2.943 mg/l Exposure time: 72 h

Method: QSAR modeled data

#### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

2,2,4-Trimethylpentane

(Isooctane)

: NOEL: 0.17 mg/l

Exposure time: 21 d

Species: Daphnia magna (Water flea) Method: OECD Test Guideline 211

Information given is based on data obtained from similar

substances.

#### Biodegradability

2,2,4-Trimethylpentane

(Isooctane)

Result: Not readily biodegradable.Method: OECD Test Guideline 301

Expected to be inherently biodegradable.

Information given is based on data obtained from similar

substances.

Results of PBT assessment

2,2,4-Trimethylpentane

(Isooctane)

: Non-classified PBT substance, Non-classified vPvB substance

Additional ecological

information

: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life

with long lasting effects.

#### **Ecotoxicology Assessment**

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Short-term (acute) aquatic hazard

2,2,4-Trimethylpentane : Very toxic to aquatic life.

(Isooctane)

Long-term (chronic) aquatic hazard

2,2,4-Trimethylpentane : Very toxic to aquatic life with long lasting effects.

(Isooctane)

#### **SECTION 13: Disposal considerations**

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product : The product should not be allowed to enter drains, water

courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed

waste management company.

Contaminated packaging : Empty remaining contents. Dispose of as unused product.

Do not re-use empty containers. Do not burn, or use a cutting

torch on, the empty drum.

#### **SECTION 14: Transport information**

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

#### **US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)**

UN1262, OCTANES, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE)), 3, II, MARINE POLLUTANT, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE)), RQ (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

#### IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)

UN1262, OCTANES, 3, II, (-12.22°C), MARINE POLLUTANT, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

#### IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)

UN1262, OCTANES, 3, II

### ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))

UN1262, OCTANES, 3, II, (D/E), ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

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# RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))

UN1262, OCTANES, 3, II, ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

# ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)

UN1262, OCTANES, 3, II, ENVIRONMENTALLY HAZARDOUS, (2,2,4-TRIMETHYLPENTANE (ISOOCTANE))

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

#### **SECTION 15: Regulatory information**

**National legislation** 

SARA 311/312 Hazards : Fire Hazard

Acute Health Hazard

CERCLA Reportable

Quantity

: 1000 lbs

2,2,4-Trimethylpentane (Isooctane)

SARA 302 Reportable

Quantity

: This material does not contain any components with a SARA

302 RQ.

SARA 302 Threshold

Planning Quantity

: No chemicals in this material are subject to the reporting

requirements of SARA Title III, Section 302.

SARA 304 Reportable

Quantity

: This material does not contain any components with a section

304 EHS RQ.

SARA 313 Components : This material does not contain any chemical components with

known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### Clean Air Act

Ozone-Depletion

Potential

: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR

82, Subpt. A, App.A + B).

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The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

: 2,2,4-Trimethylpentane (Isooctane) - 540-84-1

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

#### **US State Regulations**

Pennsylvania Right To Know

: 2,2,4-Trimethylpentane (Isooctane) - 540-84-1

New Jersey Right To Know

: 2,2,4-Trimethylpentane (Isooctane) - 540-84-1

California Prop. 65

Components

: This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive

of California to cause cancer, birth, or any other reproductive defects.

**Notification status** 

Europe REACH : This product is in full compliance according to REACH

regulation 1907/2006/EC.

Switzerland CH INV : On the inventory, or in compliance with the inventory

United States of America (USA) : On or in compliance with the active portion of the

TSCA TSCA inventory

Canada DSL : All components of this product are on the Canadian

DSL

Australia AICS : On the inventory, or in compliance with the inventory New Zealand NZIoC : On the inventory, or in compliance with the inventory

Japan ENCS : On the inventory, or in compliance with the inventory Korea KECI : All substances in this product were registered, notified

to be registered, or exempted from registration by
CPChem through an Only Representative according to
K-REACH regulations. Importation of this product is
permitted if the Korean Importer of Record was

included on CPChem's notifications or if the Importer of

Record themselves notified the substances.

Philippines PICCS : On the inventory, or in compliance with the inventory China IECSC : On the inventory, or in compliance with the inventory Taiwan TCSI : On the inventory, or in compliance with the inventory

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#### **SECTION 16: Other information**

NFPA Classification : Health Hazard: 2

Fire Hazard: 3 Reactivity Hazard: 0



#### **Further information**

Legacy SDS Number : 26760

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

| Key or legend to abbreviations and acronyms used in the safety data sheet |                                   |       |                                     |  |
|---|-----------------------------------|-------|-------------------------------------|--|
| ACGIH   | American Conference of            | LD50  | Lethal Dose 50%                     |  |
|   | Government Industrial Hygienists  |       |                                     |  |
| AICS  | Australia, Inventory of Chemical  | LOAEL | Lowest Observed Adverse Effect      |  |
|   | Substances                        |       | Level                               |  |
| DSL   | Canada, Domestic Substances       | NFPA  | National Fire Protection Agency     |  |
|   | List                              |       |                                     |  |
| NDSL  | Canada, Non-Domestic              | NIOSH | National Institute for Occupational |  |
|   | Substances List                   |       | Safety & Health                     |  |
| CNS   | Central Nervous System            | NTP   | National Toxicology Program         |  |
| CAS   | Chemical Abstract Service         | NZIoC | New Zealand Inventory of            |  |
|   |                                   |       | Chemicals                           |  |
| EC50  | Effective Concentration           | NOAEL | No Observable Adverse Effect        |  |
|   |                                   |       | Level                               |  |
| EC50  | Effective Concentration 50%       | NOEC  | No Observed Effect Concentration    |  |
| EGEST   | EOSCA Generic Exposure            | OSHA  | Occupational Safety & Health        |  |
|   | Scenario Tool                     |       | Administration                      |  |
| EOSCA   | European Oilfield Specialty       | PEL   | Permissible Exposure Limit          |  |
|   | Chemicals Association             |       | ·                                   |  |
| EINECS  | European Inventory of Existing    | PICCS | Philippines Inventory of            |  |
|   | Chemical Substances               |       | Commercial Chemical Substances      |  |
| MAK   | Germany Maximum Concentration     | PRNT  | Presumed Not Toxic                  |  |
|   | Values                            |       |                                     |  |
| GHS   | Globally Harmonized System        | RCRA  | Resource Conservation Recovery      |  |
|   | ,                                 |       | Act                                 |  |
| >=  | Greater Than or Equal To          | STEL  | Short-term Exposure Limit           |  |
| IC50  | Inhibition Concentration 50%      | SARA  | Superfund Amendments and            |  |
|   |                                   |       | Reauthorization Act.                |  |
| IARC  | International Agency for Research | TLV   | Threshold Limit Value               |  |
|   | on Cancer                         |       |                                     |  |
| IECSC   | Inventory of Existing Chemical    | TWA   | Time Weighted Average               |  |
|   | Substances in China               |       |                                     |  |
| ENCS  | Japan, Inventory of Existing and  | TSCA  | Toxic Substance Control Act         |  |

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|      | New Chemical Substances            |       |  |
|------|------------------------------------|-------|--|
| KECI | Korea, Existing Chemical Inventory | UVCB  | Unknown or Variable Composition,<br>Complex Reaction Products, and<br>Biological Materials |
| <=   | Less Than or Equal To              | WHMIS | Workplace Hazardous Materials<br>Information System  |
| LC50 | Lethal Concentration 50%           |       |  |

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