ALFAA42465

# Graphite conductive adhesive, alcohol based

## SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**产品说明:** 石墨导电粘合剂
**Product Description:** **Graphite conductive adhesive, alcohol based**

**Cat No. :** **42465**

**Supplier**

Avocado Research Chemicals Ltd.
(Part of Thermo Fisher Scientific)
Shore Road, Heysham
Lancashire, LA3 2XY,
United Kingdom
Office Tel: +44 (0) 1524 850506
Office Fax: +44 (0) 1524 850608

**Emergency Telephone Number**

For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
**CHEMTREC** Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

**E-mail address** begel.sdsdesk@thermofisher.com

**Recommended Use** Laboratory chemicals.
**Uses advised against** No Information available

## SECTION 2. HAZARD IDENTIFICATION

| **Physical State** | **Appearance** | **Odor** |
|---|---|---|
| Liquid | No information available | No information available |

**Emergency Overview**

Highly flammable liquid and vapor. Causes mild skin irritation. Causes serious eye damage. May cause respiratory irritation. May cause drowsiness and dizziness.

**Classification of the substance or mixture**

| | |
|---|---|
| Flammable liquids. | Category 2 |
| Skin Corrosion/Irritation | Category 3 |
| Serious Eye Damage/Eye Irritation | Category 1 |
| Specific target organ toxicity - (single exposure) | Category 3 |

**Label Elements**

**Signal Word** **Danger**

**Hazard Statements**
H225 - Highly flammable liquid and vapor
H316 - Causes mild skin irritation
H318 - Causes serious eye damage
H335 - May cause respiratory irritation
H336 - May cause drowsiness or dizziness

**Precautionary Statements**
**Prevention**
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P240 - Ground and bond container and receiving equipment
P242 - Use non-sparking tools
P243 - Take action to prevent static discharges
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
**Response**
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
**Storage**
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
**Disposal**
P501 - Dispose of contents/ container to an approved waste disposal plant

**Physical and Chemical Hazards**
Vapors may cause flash fire or explosion. Highly flammable.
**Health Hazards**
Causes mild skin irritation. Causes serious eye damage. May cause respiratory irritation. May cause drowsiness or dizziness.
**Environmental hazards**
Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants. Will likely be mobile in the environment due to its volatility. The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces.

This product does not contain any known or suspected endocrine disruptors.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS No | Weight % |
|---|---|---|
| Isopropyl alcohol | 67-63-0 | 70.00 |
| Graphite | 7782-42-5 | 15.00 |
| n-Butyl alcohol | 71-36-3 | 5.0 |
| Propylene glycol monomethyl ether | 107-98-2 | 5.00 |
| Hexylene glycol | 107-41-5 | 5.00 |

## SECTION 4. FIRST AID MEASURES

**General Advice**
If symptoms persist, call a physician.

**Eye Contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact**
Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation**

Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

**Ingestion**
Clean mouth with water and drink afterwards plenty of water.

**Most important symptoms and effects**
Difficulty in breathing. Causes eye burns. Causes severe eye damage. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

**Self-Protection of the First Aider**
Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

**Notes to Physician**
Treat symptomatically.

## SECTION 5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**
Carbon dioxide ($CO_2$). Powder. Water spray. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Water mist may be used to cool closed containers.

**Extinguishing media which must not be used for safety reasons**
No information available.

**Specific Hazards Arising from the Chemical**
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions**
Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

**Environmental Precautions**
Should not be released into the environment. See Section 12 for additional Ecological Information.

**Methods for Containment and Clean Up**
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

Refer to protective measures listed in Sections 8 and 13.

## SECTION 7. HANDLING AND STORAGE

**Handling**
Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

**Storage**

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat, sparks and flame.

**Specific Use(s)**
Use in laboratories

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control Parameters**

| Component | China | Taiwan | Thailand | Hong Kong |
|---|---|---|---|---|
| Isopropyl alcohol | TWA: 350 mg/m³<br>STEL: 700 mg/m³ | TWA: 400 ppm<br>TWA: 983 mg/m³ | TWA: 400 ppm | TWA: 400 ppm<br>TWA: 983 mg/m³<br>STEL: 500 ppm<br>STEL: 1230 mg/m³ |
| Graphite | TWA: 4 mg/m³<br>TWA: 2 mg/m³ | - | | - |
| n-Butyl alcohol | TWA: 100 mg/m³ | TWA: 100 ppm<br>TWA: 303 mg/m³ | TWA: 100 ppm | Ceiling: 50 ppm<br>Ceiling: 152 mg/m³ |
| Propylene glycol monomethyl ether | - | TWA: 100 ppm<br>TWA: 369 mg/m³ | | TWA: 100 ppm<br>TWA: 369 mg/m³<br>STEL: 150 ppm<br>STEL: 553 mg/m³ |
| Hexylene glycol | Ceiling: 100 mg/m³ | - | | - |

| Component | ACGIH TLV | OSHA PEL | NIOSH | The United Kingdom | European Union |
|---|---|---|---|---|---|
| Isopropyl alcohol | TWA: 200 ppm<br>STEL: 400 ppm | (Vacated) TWA: 400 ppm<br>(Vacated) TWA: 980 mg/m³<br>(Vacated) STEL: 500 ppm<br>(Vacated) STEL: 1225 mg/m³<br>TWA: 400 ppm<br>TWA: 980 mg/m³ | IDLH: 2000 ppm<br>TWA: 400 ppm<br>TWA: 980 mg/m³<br>STEL: 500 ppm<br>STEL: 1225 mg/m³ | STEL: 500 ppm 15 min<br>STEL: 1250 mg/m³ 15 min<br>TWA: 400 ppm 8 hr<br>TWA: 999 mg/m³ 8 hr | |
| Graphite | TWA: 2 mg/m³ | (Vacated) TWA: 2.5 mg/m³<br>(Vacated) TWA: 10 mg/m³<br>(Vacated) TWA: 5 mg/m³<br>TWA: 15 mg/m³<br>TWA: 5 mg/m³ | IDLH: 1250 mg/m³<br>TWA: 2.5 mg/m³ | STEL: 30 mg/m³ 15 min<br>STEL: 12 mg/m³ 15 min<br>TWA: 10 mg/m³ 8 hr<br>TWA: 4 mg/m³ 8 hr | |
| n-Butyl alcohol | TWA: 20 ppm | Skin<br>(Vacated) Ceiling: 50 ppm<br>(Vacated) Ceiling: 150 mg/m³<br>TWA: 100 ppm<br>TWA: 300 mg/m³ | IDLH: 1400 ppm<br>Ceiling: 50 ppm<br>Ceiling: 150 mg/m³ | 50ppm STEL;<br>154mg/m³ STEL | |
| Propylene glycol monomethyl ether | TWA: 50 ppm<br>STEL: 100 ppm | (Vacated) TWA: 100 ppm<br>(Vacated) TWA: 360 mg/m³<br>(Vacated) STEL: 150 ppm<br>(Vacated) STEL: 540 mg/m³ | TWA: 100 ppm<br>TWA: 360 mg/m³<br>STEL: 150 ppm<br>STEL: 540 mg/m³ | STEL: 150 ppm 15 min<br>STEL: 560 mg/m³ 15 min<br>TWA: 100 ppm 8 hr<br>TWA: 375 mg/m³ 8 hr<br>Skin | TWA: 100 ppm (8h)<br>TWA: 375 mg/m³ (8h)<br>STEL: 150 ppm (15min)<br>STEL: 568 mg/m³ (15min)<br>Skin |
| Hexylene glycol | TWA: 25 ppm<br>STEL: 50 ppm<br>STEL: 10 mg/m³ | (Vacated) Ceiling: 25 ppm<br>(Vacated) Ceiling: 125 mg/m³ | Ceiling: 25 ppm<br>Ceiling: 125 mg/m³ | STEL: 25 ppm 15 min<br>STEL: 123 mg/m³ 15 min<br>TWA: 25 ppm 8 hr<br>TWA: 123 mg/m³ 8 hr | |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*

*NIOSH: NIOSH - National Institute for Occupational Safety and Health*

**Monitoring methods**
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS70 General methods for sampling airborne gases and vapours MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas chromatography MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

**Exposure Controls**

**Engineering Measures**
Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

**Personal protective equipment**

**Eye Protection** Goggles (European standard - EN 166)

**Hand Protection** Protective gloves

| Glove material | Breakthrough time | Glove thickness | EU standard | Glove comments |
|---|---|---|---|---|
| Nitrile rubber<br>Neoprene<br>Natural rubber<br>PVC | See manufacturers recommendations | - | EN 374 | (minimum requirement) |

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

**Skin and body protection** Long sleeved clothing

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
**Recommended Filter type:** Organic gases and vapours filter Type A Brown conforming to EN14387

**Small scale/Laboratory use** Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
**Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141
When RPE is used a face piece Fit Test should be conducted

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls** No information available.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**
**Physical State** Liquid

| | | |
|---|---|---|
| **Odor** | No information available | |
| **Odor Threshold** | No data available | |
| **pH** | No information available | |
| **Melting Point/Range** | No data available | |
| **Softening Point** | No data available | |
| **Boiling Point/Range** | 82 °C / 179.6 °F | |
| **Flash Point** | 11 °C / 51.8 °F | **Method -** No information available |
| **Evaporation Rate** | No data available | |
| **Flammability (solid,gas)** | Not applicable | Liquid |
| **Explosion Limits** | No data available | |
| **Vapor Pressure** | 23 hPa @ 20 °C | |
| **Vapor Density** | No data available | (Air = 1.0) |
| **Specific Gravity / Density** | 0.9 g/cm3 | @ 20 °C |
| **Bulk Density** | Not applicable | Liquid |
| **Water Solubility** | Immiscible | |
| **Solubility in other solvents** | No information available | |

**Partition Coefficient (n-octanol/water)**

| **Component** | **log Pow** |
|---|---|
| Isopropyl alcohol | 0.05 |
| n-Butyl alcohol | 1 |
| Propylene glycol monomethyl ether | 1 |
| Hexylene glycol | 0.14 |

| | | |
|---|---|---|
| **Autoignition Temperature** | No data available | |
| **Decomposition Temperature** | No data available | |
| **Viscosity** | No data available | |
| **Explosive Properties** | | Vapors may form explosive mixtures with air |
| **Oxidizing Properties** | No information available | |

## SECTION 10. STABILITY AND REACTIVITY

**Stability** Stable under normal conditions.

**Hazardous Reactions** None under normal processing.
**Hazardous Polymerization** No information available.

**Conditions to Avoid** Keep away from open flames, hot surfaces and sources of ignition.

**Materials to avoid** Oxidizing agent.

**Hazardous Decomposition Products** Carbon monoxide (CO). Carbon dioxide ($CO_2$).

## SECTION 11. TOXICOLOGICAL INFORMATION

**Product Information**

**(a) acute toxicity;**
**Toxicology data for the components**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Isopropyl alcohol | 5045 mg/kg ( Rat )<br>3600 mg/kg ( Mouse ) | 12800 mg/kg ( Rat ) | 72.6 mg/L ( Rat ) 4 h |
| Graphite | | | LC50 > 2000 mg/m³ ( Rat ) 4 h |
| n-Butyl alcohol | LD50 = 700 mg/kg ( Rat ) | LD50 = 3402 mg/kg ( Rabbit ) | LC50 > 8000 ppm ( Rat ) 4 h |

| | | | |
|---|---|---|---|
| Propylene glycol monomethyl ether | LD50 = 5000 mg/kg ( Rat ) | LD50 = 13 g/kg ( Rabbit ) | LC50 > 7559 ppm ( Rat ) 6 h |
| Hexylene glycol | LD50 = 3700 mg/kg ( Rat ) | LD50 = 12300 mg/kg ( Rabbit ) | LC50 > 310 mg/m³ ( Rat ) 1 h |

**(b) skin corrosion/irritation;** No data available

**(c) serious eye damage/irritation;** Category 1

**(d) respiratory or skin sensitization;**
**Respiratory** No data available
**Skin** No data available

**(e) germ cell mutagenicity;** No data available

**(f) carcinogenicity;** No data available

There are no known carcinogenic chemicals in this product

**(g) reproductive toxicity;** No data available

**(h) STOT-single exposure;** Category 3

**Results / Target organs** Central nervous system (CNS)
Respiratory system

**(i) STOT-repeated exposure;** No data available

**Target Organs** No information available.

**(j) aspiration hazard;** No data available

**Symptoms / effects,both acute and delayed** Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity effects** .

| Component | Freshwater Fish | Water Flea | Freshwater Algae | Microtox |
|---|---|---|---|---|
| Isopropyl alcohol | LC50: = 9640 mg/L, 96h flow-through (Pimephales promelas) LC50: > 1400000 µg/L, 96h (Lepomis macrochirus) LC50: = 11130 mg/L, 96h static (Pimephales promelas) LC50: = 10000000 µg/L, 96h (Daphnia) | 13299 mg/L EC50 = 48 h 9714 mg/L EC50 = 24 h | EC50: > 1000 mg/L, 72h (Desmodesmus subspicatus) EC50: > 1000 mg/L, 96h (Desmodesmus subspicatus) | = 35390 mg/L EC50 Photobacterium phosphoreum 5 min |
| Graphite | LC50: > 100 mg/L, 96h semi-static (Danio rerio) | | | |
| n-Butyl alcohol | LC50: 1376 mg/L, 96h (Pimephales promelas) OECD Guideline 203 : | EC50: 1328 mg/L, 48h (Daphnia magna) OECD Guideline 202 | EC50: 225 mg/L, 96h (Pseudokirchneriella subcapitata) OECD | EC50 = 2041.4 mg/L 5 min EC50 = 2186 mg/L 30 |

| | | | | |
|---|---|---|---|---|
| | 100000 - 500000 µg/L, 96h static (Lepomis macrochirus)<br>LC50: = 1740 mg/L, 96h flow-through (Pimephales promelas)<br>LC50: = 1910000 µg/L, 96h static (Pimephales promelas)<br>LC50: 1730 - 1910 mg/L, 96h static (Pimephales promelas) | EC50: 1897 - 2072 mg/L, 48h Static (Daphnia magna)<br>EC50: = 1983 mg/L, 48h (Daphnia magna) | Guideline 201<br>EC50: > 500 mg/L, 72h (Desmodesmus subspicatus)<br>EC50: > 500 mg/L, 96h (Desmodesmus subspicatus) | min<br>EC50 = 3980 mg/L 24 h<br>EC50 = 4400 mg/L 17 h |
| Propylene glycol monomethyl ether | LC50: = 20.8 g/L, 96h static (Pimephales promelas) | EC50: = 23300 mg/L, 48h (Daphnia magna) | | |
| Hexylene glycol | LC50: 10500 - 11000 mg/L, 96h flow-through (Pimephales promelas)<br>LC50: = 10000 mg/L, 96h static (Lepomis macrochirus)<br>LC50: = 8690 mg/L, 96h flow-through (Pimephales promelas)<br>LC50: = 10700 mg/L, 96h static (Pimephales promelas) | EC50: 2700 - 3700 mg/L, 48h (Daphnia magna) | | EC50 = 3038 mg/L 5 min |

**Persistence and Degradability**

**Persistence** Persistence is unlikely, based on information available.

| Component | Degradability |
|---|---|
| n-Butyl alcohol<br>71-36-3 ( 5.0 ) | 70 % |

**Bioaccumulative Potential** Bioaccumulation is unlikely

| Component | log Pow | Bioconcentration factor (BCF) |
|---|---|---|
| Isopropyl alcohol | 0.05 | No data available |
| n-Butyl alcohol | 1 | 0.64 dimensionless |
| Propylene glycol monomethyl ether | 1 | <2 dimensionless |
| Hexylene glycol | 0.14 | No data available |

**Mobility in soil** The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces Will likely be mobile in the environment due to its volatility Disperses rapidly in air

**Endocrine Disruptor Information** This product does not contain any known or suspected endocrine disruptors
**Persistent Organic Pollutant** This product does not contain any known or suspected substance
**Ozone Depletion Potential** This product does not contain any known or suspected substance

## SECTION 13. DISPOSAL CONSIDERATIONS

**Waste from Residues/Unused Products** Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

**Contaminated Packaging** Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

**Other Information** Waste codes should be assigned by the user based on the application for which the product was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with

local regulations. Do not empty into drains.

## SECTION 14. TRANSPORT INFORMATION

**Road and Rail Transport**

| | |
|---|---|
| **UN-No** | UN1133 |
| **Proper Shipping Name** | ADHESIVES |
| **Hazard Class** | 3 |
| **Packing Group** | II |

**IMDG/IMO**

| | |
|---|---|
| **UN-No** | UN1133 |
| **Proper Shipping Name** | ADHESIVES |
| **Hazard Class** | 3 |
| **Packing Group** | II |

**IATA**

| | |
|---|---|
| **UN-No** | UN1133 |
| **Proper Shipping Name** | ADHESIVES |
| **Hazard Class** | 3 |
| **Packing Group** | II |

**Special Precautions for User** No special precautions required

## SECTION 15. REGULATORY INFORMATION

**International Inventories**
X = listed, China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

| Component | The Inventory of Hazardous Chemicals (2015 Edition) | List of dangerous goods GB 12268 - 2012 | TCSI | IECSC | EINECS | TSCA | DSL | PICCS | ENCS | ISHL | AICS | KECL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isopropyl alcohol | X | X | X | X | 200-661-7 | X | X | X | X | X | X | KE-29363 |
| Graphite | - | - | X | X | 231-955-3 | X | X | X | - | | X | X |
| n-Butyl alcohol | X | X | X | X | 200-751-6 | X | X | X | X | X | X | KE-03867 |
| Propylene glycol monomethyl ether | - | X | X | X | 203-539-1 | X | X | X | X | X | X | KE-23379 |
| Hexylene glycol | - | - | X | X | 203-489-0 | X | X | X | X | X | X | KE-24702 |

**National Regulations**

## SECTION 16. OTHER INFORMATION

| | |
|---|---|
| **Prepared By** | Health, Safety and Environmental Department |
| **Revision Date** | 08-May-2024 |
| **Revision Summary** | New emergency telephone response service provider. |

**Training Advice**

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.

## Legend

**CAS** - Chemical Abstracts Service

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances
**IECSC** - Chinese Inventory of Existing Chemical Substances
**KECL** - Korean Existing and Evaluated Chemical Substances

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
**ENCS** - Japanese Existing and New Chemical Substances
**AICS** - Australian Inventory of Chemical Substances
**NZIoC** - New Zealand Inventory of Chemicals

**WEL** - Workplace Exposure Limit
**ACGIH** - American Conference of Governmental Industrial Hygienists
**DNEL** - Derived No Effect Level
**RPE** - Respiratory Protective Equipment
**LC50** - Lethal Concentration 50%
**NOEC** - No Observed Effect Concentration
**PBT** - Persistent, Bioaccumulative, Toxic

**TWA** - Time Weighted Average
**IARC** - International Agency for Research on Cancer
**PNEC** - Predicted No Effect Concentration
**LD50** - Lethal Dose 50%
**EC50** - Effective Concentration 50%
**POW** - Partition coefficient Octanol:Water
**vPvB** - very Persistent, very Bioaccumulative

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association
**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road
**OECD** - Organisation for Economic Co-operation and Development
**BCF** - Bioconcentration factor

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code
**MARPOL** - International Convention for the Prevention of Pollution from Ships
**ATE** - Acute Toxicity Estimate
**VOC** - (Volatile Organic Compound)

**Key literature references and sources for data**
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

| | |
|---|---|
| **Physical hazards** | On basis of test data |
| **Health Hazards** | Calculation method |
| **Environmental hazards** | Calculation method |

**Disclaimer**

**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**

## End of Safety Data Sheet