SAFETY DATA SHEET
Residual Solvent Revised Method 467 Class 1, Part Number 5190-0490

Section 1. Identification

Product identifier: Residual Solvent Revised Method 467 Class 1, Part Number 5190-0490
Part no.: 5190-0490
Material uses: Reagents and Standards for Analytical Chemistry Laboratory Use
1 x 1 ml
Supplier/Manufacturer: Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770
Emergency telephone number (with hours of operation): CHEMTREC®: 1-800-424-9300

Section 2. Hazard identification

Classification of the substance or mixture

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H319</td>
<td>EYE IRRITATION - Category 2A</td>
</tr>
<tr>
<td>H317</td>
<td>SKIN SENSITIZATION - Category 1B</td>
</tr>
<tr>
<td>H340</td>
<td>GERM CELL MUTAGENICITY - Category 1</td>
</tr>
<tr>
<td>H350</td>
<td>CARCINOGENICITY - Category 1</td>
</tr>
<tr>
<td>H371</td>
<td>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) - Category 2</td>
</tr>
<tr>
<td>H372</td>
<td>SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1</td>
</tr>
<tr>
<td>H412</td>
<td>AQUATIC HAZARD (LONG-TERM) - Category 3</td>
</tr>
<tr>
<td>H420</td>
<td>HAZARDOUS TO THE OZONE LAYER - Category 1</td>
</tr>
</tbody>
</table>

GHS label elements

Hazard pictograms:

Signal word: Danger
Hazard statements:
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H340 - May cause genetic defects.
H350 - May cause cancer.
H371 - May cause damage to organs. (cardiovascular system)
H372 - Causes damage to organs through prolonged or repeated exposure. (kidneys, liver, nose/sinuses)
H412 - Harmful to aquatic life with long lasting effects.
H420 - Harms public health and the environment by destroying ozone in the upper atmosphere.

Precautionary statements

Prevention:
P201 - Obtain special instructions before use.
P280 - Wear protective gloves, protective clothing and eye or face protection.
P273 - Avoid release to the environment.
P260 - Do not breathe vapor.
P270 - Do not eat, drink or smoke when using this product.
Section 2. Hazard identification

Response
- P308 + P311 - IF exposed or concerned: Call a POISON CENTER or doctor.
- P362 + P364 - Take off contaminated clothing and wash it before reuse.
- P302 + P352 - IF ON SKIN: Wash with plenty of water.
- P333 + P313 - If skin irritation or rash occurs: Get medical advice or attention.
- P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337 + P313 - If eye irritation persists: Get medical advice or attention.

Storage: Not applicable.

Disposal:
- P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
- P502 - Refer to manufacturer or supplier for information on recovery or recycling.

Section 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Substance/mixture</th>
<th>% (w/w)</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>80 - 100</td>
<td>67-68-5</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>1 - 5</td>
<td>71-55-6</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>1 - 5</td>
<td>75-35-4</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>1 - 5</td>
<td>107-06-2</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>1 - 5</td>
<td>56-23-5</td>
</tr>
<tr>
<td>benzene</td>
<td>0.1 - 1</td>
<td>71-43-2</td>
</tr>
</tbody>
</table>

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

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

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention. If necessary, call a poison center or physician.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact: Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. If necessary, call a poison center or physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Section 4. First-aid measures

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.
Inhalation : May cause damage to organs following a single exposure if inhaled.
Skin contact : May cause damage to organs following a single exposure in contact with skin. May cause an allergic skin reaction.
Ingestion : May cause damage to organs following a single exposure if swallowed.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
- pain or irritation
- watering
- redness
Inhalation : No specific data.
Skin contact : Adverse symptoms may include the following:
- irritation
- redness
Ingestion : No specific data.

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

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments : No specific treatment.
Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
- carbon dioxide
- carbon monoxide
- sulfur oxides
- halogenated compounds
- carbonyl halides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Section 5. Fire-fighting measures

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Remark: May be combustible at high temperature.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

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

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

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Methods for cleaning up: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Refer to special instructions/safety data sheet. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
## Section 8. Exposure controls/personal protection

### Control parameters

### Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td></td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td></td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td></td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td></td>
</tr>
</tbody>
</table>
### Section 8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Substance</th>
<th>Exposure Limits</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon tetrachloride</td>
<td>STEV: 2 ppm 15 minutes. STEV: 8 mg/m³ 15 minutes. CA Saskatchewan Provincial (Canada, 7/2013). STEL: 20 ppm 15 minutes. TWA: 10 ppm 8 hours. CA Alberta Provincial (Canada, 6/2018). Absorbed through skin. 8 hrs OEL: 31 mg/m³ 8 hours. 15 min OEL: 10 ppm 15 minutes. 15 min OEL: 63 mg/m³ 15 minutes. 8 hrs OEL: 5 ppm 8 hours. CA British Columbia Provincial (Canada, 1/2021). Absorbed through skin. TWA: 2 ppm 8 hours. CA Ontario Provincial (Canada, 6/2019). Absorbed through skin. TWA: 2 ppm 8 hours. STEL: 3 ppm 15 minutes. CA Quebec Provincial (Canada, 7/2019). Absorbed through skin. TWA: 2 ppm 8 hours. STEL: 3 ppm 15 minutes.</td>
<td></td>
</tr>
<tr>
<td>benzene</td>
<td>STEV: 2 ppm 15 minutes. STEV: 8 mg/m³ 15 minutes. CA Saskatchewan Provincial (Canada, 7/2013). STEL: 20 ppm 15 minutes. TWA: 10 ppm 8 hours. CA Alberta Provincial (Canada, 6/2018). Absorbed through skin. 8 hrs OEL: 1.6 mg/m³ 8 hours. 15 min OEL: 2.5 ppm 15 minutes. 15 min OEL: 8 mg/m³ 15 minutes. 8 hrs OEL: 0.5 ppm 8 hours. CA British Columbia Provincial (Canada, 1/2021). Absorbed through skin. TWA: 0.5 ppm 8 hours. STEL: 2.5 ppm 15 minutes. CA Ontario Provincial (Canada, 6/2019). Absorbed through skin. TWA: 0.5 ppm 8 hours. STEL: 2.5 ppm 15 minutes. CA Quebec Provincial (Canada, 7/2019). TWA: 1 ppm 8 hours. TWA: 3 mg/m³ 8 hours. STEV: 5 ppm 15 minutes. STEV: 15.5 mg/m³ 15 minutes.</td>
<td></td>
</tr>
</tbody>
</table>

**Appropriate engineering controls**

If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Environmental exposure controls**

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**
Section 8. Exposure controls/personal protection

**Hygiene measures**
- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection**
- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

**Skin protection**

**Hand protection**
- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection**
- Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection**
- Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection**
- Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

**Appearance**

**Physical state**
- Liquid.

**Color**
- Colorless.

**Odor**
- Not available.

**Odor threshold**
- Not available.

**pH**
- Not available.

**Melting point/freezing point**
- 18.4°C (65.1°F)

**Boiling point, initial boiling point, and boiling range**
- 189°C (372.2°F)

**Flash point**
- Closed cup: 95°C (203°F)

**Evaporation rate**
- Not available.

**Flammability**
- Not applicable.

**Lower and upper explosion limit/flammability limit**
- Lower: 2.6%
- Upper: 28.5%

**Vapor pressure**
- 0.049 kPa (0.37 mm Hg)

**Relative vapor density**
- Not available.

**Relative density**
- 1.101

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Section 9. Physical and chemical properties and safety characteristics

Density: 1.101 g/cm³

Solubility: Soluble in the following materials: cold water and hot water.

Miscible with water: Yes.

Partition coefficient: n-octanol/water: Not applicable.

Auto-ignition temperature: 215°C (419°F)

Decomposition temperature: Not available.

Viscosity: Not available.

Section 10. Stability and reactivity

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

Chemical stability: The product is stable.

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

Conditions to avoid: No specific data.

Incompatible materials: May react or be incompatible with oxidizing materials.

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

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>LD50 Dermal</td>
<td>Rat</td>
<td>40000 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>14500 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>17000 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>9600 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>LC50 Inhalation Gas.</td>
<td>Rat</td>
<td>6350 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>200 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>LC50 Inhalation Gas.</td>
<td>Rat</td>
<td>1000 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>2800 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>500 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>8000 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>&gt;20 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>5070 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2350 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>930 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Irritation/Corrosion

Date of issue/Date of revision: 10/25/2021
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# Section 11. Toxicological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>100 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>100 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 2 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>288 hours 5 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 20 mg</td>
<td></td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>63 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>625 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>0.5 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>2200 ug</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>4 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>88 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rat</td>
<td>-</td>
<td>6 hours 60 uL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 15 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 20 mg</td>
<td></td>
</tr>
<tr>
<td>benzene</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>4 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eyes - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>88 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rat</td>
<td>-</td>
<td>6 hours 60 uL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 15 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skin - Moderate irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 20 mg</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion/Summary**

**Skin**: Repeated exposure may cause skin dryness or cracking.

**Sensitization**

Not available.

**Conclusion/Summary**

**Skin**: May cause sensitization by skin contact.

**Mutagenicity**

**Conclusion/Summary**: Not available.

**Carcinogenicity**

**Conclusion/Summary**: Not available.

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>3</td>
<td>-</td>
<td>A4</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>2B</td>
<td>-</td>
<td>A4</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>2B</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
<td>A4</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>2B</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
<td>A2</td>
</tr>
<tr>
<td>benzene</td>
<td>1</td>
<td>Known to be a human carcinogen.</td>
<td>A1</td>
</tr>
</tbody>
</table>
## Section 11. Toxicological information

### Reproductive toxicity

**Conclusion/Summary**: Not available.

### Teratogenicity

**Conclusion/Summary**: Not available.

### Specific target organ toxicity (single exposure)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>Category 2</td>
<td>-</td>
<td>cardiovascular system</td>
</tr>
<tr>
<td></td>
<td>Category 3</td>
<td></td>
<td>Respiratory tract irritation</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>Category 3</td>
<td>-</td>
<td>Narcotic effects</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>Category 3</td>
<td>-</td>
<td>Narcotic effects</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>Category 3</td>
<td>-</td>
<td>Respiratory tract irritation</td>
</tr>
<tr>
<td>benzene</td>
<td>Category 3</td>
<td></td>
<td>Narcotic effects</td>
</tr>
</tbody>
</table>

### Specific target organ toxicity (repeated exposure)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-Dichloroethylene</td>
<td>Category 1</td>
<td>inhalation</td>
<td>nose/sinuses</td>
</tr>
<tr>
<td></td>
<td>Category 2</td>
<td>oral</td>
<td>liver</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>Category 1</td>
<td>oral, inhalation</td>
<td>kidneys, liver</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>Category 1</td>
<td></td>
<td>kidneys, liver</td>
</tr>
<tr>
<td>benzene</td>
<td>Category 1</td>
<td></td>
<td>haematopoietic system</td>
</tr>
</tbody>
</table>

### Aspiration hazard

<table>
<thead>
<tr>
<th>Name</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
<tr>
<td>benzene</td>
<td>ASPIRATION HAZARD - Category 1</td>
</tr>
</tbody>
</table>

### Information on the likely routes of exposure

**Routes of entry anticipated**: Oral, Dermal, Inhalation.

### Potential acute health effects

#### Eye contact

**Causes serious eye irritation.**

#### Inhalation

**May cause damage to organs following a single exposure if inhaled.**

#### Skin contact

**May cause damage to organs following a single exposure in contact with skin. May cause an allergic skin reaction.**

#### Ingestion

**May cause damage to organs following a single exposure if swallowed.**

### Symptoms related to the physical, chemical and toxicological characteristics
Section 11. Toxicological information

Eye contact: Adverse symptoms may include the following:
- pain or irritation
- watering
- redness

Inhalation: No specific data.

Skin contact: Adverse symptoms may include the following:
- irritation
- redness

Ingestion: No specific data.

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

Short term exposure
- Potential immediate effects: Not available.
- Potential delayed effects: Not available.

Long term exposure
- Potential immediate effects: Not available.
- Potential delayed effects: Not available.

Potential chronic health effects

General: Causes damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity: May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity: May cause genetic defects.

Reproductive toxicity: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Oral (mg/kg)</th>
<th>Dermal (mg/kg)</th>
<th>Inhalation (gases) (ppm)</th>
<th>Inhalation (vapors) (mg/l)</th>
<th>Inhalation (dusts and mists) (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Solvent Revised Method 467 Class 1, Part Number 5190-0490</td>
<td>2775.5</td>
<td>16522</td>
<td>39905.1</td>
<td>187.3</td>
<td>N/A</td>
</tr>
<tr>
<td>Dimethyl sulfoxide</td>
<td>14500</td>
<td>40000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>9600</td>
<td>15800</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>200</td>
<td>N/A</td>
<td>6350</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>500</td>
<td>2800</td>
<td>1000</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>100</td>
<td>300</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
</tr>
<tr>
<td>benzene</td>
<td>930</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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Version: 7.1
## Section 12. Ecological information

### Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>Acute LC50 25000 ppm Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 34000000 µg/l Fresh water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 100 µL Marine water</td>
<td>Algae - Ulva lactuca</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 100 µL Fresh water</td>
<td>Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling)</td>
<td>21 hours</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>Acute EC50 0.536 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 8.7 mg/l Fresh water</td>
<td>Fish - Pimephales promelas - Adult</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 7.5 mg/l Marine water</td>
<td>Crustaceans - Elminius modestus</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 11.15 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Instar</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic EC10 0.213 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>Acute EC50 9.12 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 410000 µg/l Fresh water</td>
<td>Algae - Scenedesmus abundans</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 &gt;798 ppm Marine water</td>
<td>Crustaceans - Americamysis bahia</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 11600 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 74 mg/l Fresh water</td>
<td>Fish - Lepomis macrochirus - Young of the year</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute NOEC 29.4 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic EC10 3.94 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>Acute EC50 189 ppm Fresh water</td>
<td>Algae - Desmodesmus subspicatus</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 155 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Instar</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 110 ppm Marine water</td>
<td>Crustaceans - Americamysis bahia</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 66 ppm Fresh water</td>
<td>Fish - Micropterus salmoides - Fingerling</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Chronic NOEC 29000 µg/l Fresh water</td>
<td>Fish - Pimephales promelas - Larvae</td>
<td>32 days</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>Acute EC50 0.246 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 180.54 mg/l Fresh water</td>
<td>Crustaceans - Cypris subglobosa</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 35000 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 10400 µg/l Fresh water</td>
<td>Fish - Pimephales promelas</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute NOEC 3.1 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna</td>
<td>21 days</td>
</tr>
<tr>
<td></td>
<td>Chronic EC10 0.0717 mg/l Fresh water</td>
<td>Algae - Chlamydomonas reinhardtii - Exponential growth phase</td>
<td>72 hours</td>
</tr>
<tr>
<td>benzene</td>
<td>Acute EC50 1600000 µg/l Fresh water</td>
<td>Algae - Selenastrum sp.</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 9.23 mg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 21 mg/l Marine water</td>
<td>Crustaceans - Artemia salina</td>
<td>48 hours</td>
</tr>
</tbody>
</table>
Section 12. Ecological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Acute LC50 5.28 ul/L Fresh water</th>
<th>Chronic EC10 &gt;1360 mg/l Fresh water</th>
<th>Chronic NOEC 98 mg/l Fresh water</th>
<th>Chronic NOEC 1.5 to 5.4 ul/L Marine water</th>
<th>Fish - Oncorhynchus gorbuscha - Fry</th>
<th>Algae - Desmodesmus subspicatus</th>
<th>Daphnia - Daphnia magna</th>
<th>Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)</th>
<th>96 hours</th>
<th>96 hours</th>
<th>21 days</th>
<th>4 weeks</th>
</tr>
</thead>
</table>

Persistence and degradability

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Test</th>
<th>Result</th>
<th>Dose</th>
<th>Inoculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>OECD 301D Ready Biodegradability - Closed Bottle Test</td>
<td>31 % - Not readily - 28 days</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Aquatic half-life</th>
<th>Photolysis</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>-</td>
<td>-</td>
<td>Not readily</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>-</td>
<td>-</td>
<td>Inherent</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>-</td>
<td>-</td>
<td>Inherent</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>-</td>
<td>-</td>
<td>Inherent</td>
</tr>
<tr>
<td>benzene</td>
<td>-</td>
<td>-</td>
<td>Readily</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP&lt;sub&gt;ow&lt;/sub&gt;</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>-1.35</td>
<td>3.16</td>
<td>low</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>2.49</td>
<td>9</td>
<td>low</td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>2.13</td>
<td>12.88</td>
<td>low</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>1.45</td>
<td>2</td>
<td>low</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>2.83</td>
<td>49.9 to 75.1</td>
<td>low</td>
</tr>
<tr>
<td>benzene</td>
<td>2.13</td>
<td>11</td>
<td>low</td>
</tr>
</tbody>
</table>

Mobility in soil

Soil/water partition coefficient (K<sub>oc</sub>) : Not available.

Other adverse effects : This product has the potential to cause adverse global warming effects.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
Section 14. Transport information

TDG / IMDG / IATA : Not regulated.

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

Canadian lists
- Canadian NPRI : The following components are listed: 1,2-dichloroethane; carbon tetrachloride
- CEPA Toxic substances : The following components are listed: 1,1,1-trichloroethane; methyl chloroform; chlorinated alkanes; 1,2-dichloroethane; tetrachloromethane; carbon tetrachloride

International regulations
- Chemical Weapon Convention List Schedules I, II & III Chemicals
  Not listed.
- Montreal Protocol
  Ingredient name | Status
  1,1,1-trichloroethane; methyl chloroform | Annex B, Group III
  carbon tetrachloride | Annex B, Group II

Stockholm Convention on Persistent Organic Pollutants
Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Ingredient name | Status
Ethylene dichloride (ISO); Borer-Sol; 1,2-Dichloroethane; 1,2-Bichloroethane; EDC | Pesticide | Listed

UNECE Aarhus Protocol on POPs and Heavy Metals
Not listed.

Inventory list
- Australia : All components are listed or exempted.
- Canada : All components are listed or exempted.
- China : All components are listed or exempted.
- Europe : All components are listed or exempted.
- Japan : Japan inventory (CSCL): All components are listed or exempted. Japan inventory (ISHL): All components are listed or exempted.
- New Zealand : All components are listed or exempted.
- Philippines : All components are listed or exempted.
- Republic of Korea : All components are listed or exempted.
- Taiwan : All components are listed or exempted.
- Thailand : All components are listed or exempted.
- Turkey : Not determined.
- United States : All components are active or exempted.
- Viet Nam : All components are listed or exempted.
Section 16. Other information

History

Date of issue/Date of revision : 10/25/2021
Date of previous issue : 01/21/2021
Version : 7.1

Key to abbreviations

ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
HPR = Hazardous Products Regulations
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
N/A = Not available
UN = United Nations

Procedure used to derive the classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EYE IRRITATION - Category 2A</td>
<td>Calculation method</td>
</tr>
<tr>
<td>SKIN SENSITIZATION - Category 1B</td>
<td>Calculation method</td>
</tr>
<tr>
<td>GERM CELL MUTAGENICITY - Category 1</td>
<td>Calculation method</td>
</tr>
<tr>
<td>CARCINOGENICITY - Category 1</td>
<td>Calculation method</td>
</tr>
<tr>
<td>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) - Category 2</td>
<td>Calculation method</td>
</tr>
<tr>
<td>SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1</td>
<td>Calculation method</td>
</tr>
<tr>
<td>AQUATIC HAZARD (LONG-TERM) - Category 3</td>
<td>Calculation method</td>
</tr>
<tr>
<td>HAZARDOUS TO THE OZONE LAYER - Category 1</td>
<td>Calculation method</td>
</tr>
</tbody>
</table>

References

: Not available.

» Indicates information that has changed from previously issued version.

Notice to reader

Disclaimer: The information contained in this document is based on Agilent’s state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.