Conforms to US OSHA Hazard Communication 29CFR1910.1200

SAFETY DATA SHEET

Agilent Technologies

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

Section 1. Identification

1.1 Product identifier

Product name : Residual Solvent Revised Method 467 Class 1, Part Number 5190-0490

Part no. : 5190-0490

Validation date : 5/22/2018

1.2 Relevant identified uses of the substance or mixture and uses advised against

Material uses : Reagents and Standards for Analytical Chemistry Laboratory Use
1 x 1 ml

1.3 Details of the supplier of the safety data sheet

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

1.4 Emergency telephone number

In case of emergency : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

H319	EYE IRRITATION - Category 2A
H340	GERM CELL MUTAGENICITY - Category 1
H350	CARCINOGENICITY - Category 1A
H371	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (cardiovascular system, heart) - Category 2
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1
H401	AQUATIC HAZARD (ACUTE) - Category 2
H412	AQUATIC HAZARD (LONG-TERM) - Category 3
H420	HAZARDOUS TO THE OZONE LAYER - Category 1

Ingredients of unknown toxicity : Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 1 - 10%
Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 1 - 10%

2.2 GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : H319 - Causes serious eye irritation.
H340 - May cause genetic defects.
H350 - May cause cancer.
H371 - May cause damage to organs. (cardiovascular system, heart)
H372 - Causes damage to organs through prolonged or repeated exposure. (kidneys, liver)
H401 - Toxic to aquatic life.
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.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P273 - Avoid release to the environment.
P260 - Do not breathe vapor.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash hands thoroughly after handling.

Response : P314 - Get medical attention if you feel unwell.
P308 + P311 - IF exposed or concerned: Call a POISON CENTER or physician.
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 attention.

Storage : P405 - Store locked up.

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.

2.3 Other hazards

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
Dimethyl sulfoxide	≥75 - ≤90	67-68-5
1,1,1-Trichloroethane	≤5	71-55-6
1,1-Dichloroethylene	≤4.4	75-35-4
1,2-Dichloroethane	≤2.6	107-06-2
Carbon tetrachloride	≤2.1	56-23-5
benzene	<1	71-43-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

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

4.1 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 : Flush contaminated skin with plenty of 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. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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.

4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

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

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

4.3 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.

Section 4. First aid measures

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

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

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 toxic to aquatic life. 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

5.3 Advice for firefighters

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.

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.

Section 6. Accidental release measures

6.1 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".

6.2 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.

6.3 Methods and materials for containment and cleaning up

Section 6. Accidental release measures

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

7.1 Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). 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.

7.2 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.

7.3 Specific end use(s)

Recommendations : Industrial applications, Professional applications.

Industrial sector specific solutions : Not applicable.

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Dimethyl sulfoxide 1,1,1-Trichloroethane	**AIHA WEEL (United States, 10/2011).** TWA: 250 ppm 8 hours. **ACGIH TLV (United States, 3/2017).** TWA: 350 ppm 8 hours. TWA: 1910 mg/m³ 8 hours. STEL: 450 ppm 15 minutes. STEL: 2460 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 350 ppm 8 hours. TWA: 1900 mg/m³ 8 hours. STEL: 450 ppm 15 minutes. STEL: 2450 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2016).** CEIL: 350 ppm 15 minutes. CEIL: 1900 mg/m³ 15 minutes.

Section 8. Exposure controls/personal protection

	OSHA PEL (United States, 6/2016). TWA: 350 ppm 8 hours. TWA: 1900 mg/m³ 8 hours.
1,1-Dichloroethylene	**ACGIH TLV (United States, 3/2017).** TWA: 5 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 1 ppm 8 hours. TWA: 4 mg/m³ 8 hours.
1,2-Dichloroethane	**ACGIH TLV (United States, 3/2017).** TWA: 10 ppm 8 hours. TWA: 40 mg/m³ 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 1 ppm 8 hours. TWA: 4 mg/m³ 8 hours. STEL: 2 ppm 15 minutes. STEL: 8 mg/m³ 15 minutes. **OSHA PEL Z2 (United States, 2/2013).** TWA: 50 ppm 8 hours. CEIL: 100 ppm AMP: 200 ppm 5 minutes. **NIOSH REL (United States, 10/2016).** TWA: 1 ppm 10 hours. TWA: 4 mg/m³ 10 hours. STEL: 2 ppm 15 minutes. STEL: 8 mg/m³ 15 minutes.
Carbon tetrachloride	**ACGIH TLV (United States, 3/2017).** **Absorbed through skin.** TWA: 5 ppm 8 hours. TWA: 31 mg/m³ 8 hours. STEL: 10 ppm 15 minutes. STEL: 63 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 2 ppm 8 hours. TWA: 12.6 mg/m³ 8 hours. **OSHA PEL Z2 (United States, 2/2013).** TWA: 10 ppm 8 hours. CEIL: 25 ppm AMP: 200 ppm 5 minutes. **NIOSH REL (United States, 10/2016).** STEL: 2 ppm 60 minutes. STEL: 12.6 mg/m³ 60 minutes.
benzene	**ACGIH TLV (United States, 3/2017).** **Absorbed through skin.** TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m³ 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes. **OSHA PEL Z2 (United States, 2/2013).** TWA: 10 ppm 8 hours. CEIL: 25 ppm AMP: 50 ppm 10 minutes. **NIOSH REL (United States, 10/2016).** TWA: 0.1 ppm 10 hours.

Section 8. Exposure controls/personal protection

	STEL: 1 ppm 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.

8.2 Exposure controls

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

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. 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

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Liquid.

Color : Colorless.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Section 9. Physical and chemical properties

Melting point : 18.4°C (65.1°F)

Boiling point : 189°C (372.2°F)

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

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Lower: 2.6%
Upper: 28.5%

Vapor pressure : 0.049 kPa (0.37 mm Hg) [room temperature]

Vapor density : Not available.

Relative density : 1.101

Density : 1.101 g/cm³

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

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

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

Decomposition temperature : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

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

10.2 Chemical stability : The product is stable.

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

10.4 Conditions to avoid : No specific data.

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

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

Section 11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Dimethyl sulfoxide	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
1,1,1-Trichloroethane	LC50 Inhalation Vapor	Rat	17000 ppm	4 hours
	LD50 Oral	Rat	9600 mg/kg	-
1,1-Dichloroethylene	LC50 Inhalation Vapor	Rat	6350 ppm	4 hours
	LD50 Oral	Rat	200 mg/kg	-
1,2-Dichloroethane	LD50 Dermal	Rabbit	2800 mg/kg	-
	LD50 Oral	Rat	500 mg/kg	-
Carbon tetrachloride	LC50 Inhalation Vapor	Rat	8000 ppm	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Dermal	Rat	5070 mg/kg	-
	LD50 Oral	Rat	2350 mg/kg	-

Section 11. Toxicological information

benzene	LD50 Oral	Rat	930 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Dimethyl sulfoxide	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	100 milligrams	-
1,1,1-Trichloroethane	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rabbit	-	288 hours 5 Grams Intermittent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
1,2-Dichloroethane	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	625 milligrams	-
Carbon tetrachloride	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	0.5 minutes 2200 Micrograms	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	4 milligrams	-
benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Conclusion/Summary

Skin : Repeated exposure may cause skin dryness or cracking.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

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Product/ingredient name	OSHA	IARC	NTP
1,1,1-Trichloroethane	-	3	-
1,1-Dichloroethylene	-	2B	-
1,2-Dichloroethane	-	2B	Reasonably anticipated to be a human carcinogen.
Carbon tetrachloride	-	2B	Reasonably anticipated to be a human carcinogen.
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
1,1,1-Trichloroethane	Category 2	Not determined	cardiovascular system and heart
	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
1,1-Dichloroethylene	Category 3	Not applicable.	Narcotic effects
1,2-Dichloroethane	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Carbon tetrachloride	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
benzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
1,1,1-Trichloroethane	Category 2	Not determined	liver
1,1-Dichloroethylene	Category 2	Not determined	kidneys and liver
1,2-Dichloroethane	Category 2	Not determined	kidneys and liver
Carbon tetrachloride	Category 1	Not determined	kidneys and liver
benzene	Category 1	Oral	haematopoietic system
		Inhalation	haematopoietic system

Aspiration hazard

Name	Result
1,1,1-Trichloroethane	ASPIRATION HAZARD - Category 1
1,1-Dichloroethylene	ASPIRATION HAZARD - Category 1
1,2-Dichloroethane	ASPIRATION HAZARD - Category 1
benzene	ASPIRATION HAZARD - Category 1

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 : No known significant effects or critical hazards.

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Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

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

Inhalation : No specific data.

Skin contact : No specific data.

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.

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

Mutagenicity : May cause genetic defects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral Dermal Inhalation (vapors)	2775.5 mg/kg 16522 mg/kg 187.3 mg/l

Section 12. Ecological information

12.1 Toxicity

Section 12. Ecological information

Product/ingredient name	Result	Species	Exposure
Dimethyl sulfoxide	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 100 ul/L Marine water	Algae - Ulva lactuca	72 hours
1,1,1-Trichloroethane	Acute EC50 0.536 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 11100 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute LC50 56.6 ppm Marine water	Crustaceans - Americamysis bahia	48 hours
	Acute LC50 11.2 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Chronic EC10 0.213 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
1,1-Dichloroethylene	Acute EC50 9.12 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 410000 µg/l Fresh water	Algae - Scenedesmus abundans	96 hours
	Acute LC50 >798 ppm Marine water	Crustaceans - Americamysis bahia	48 hours
	Acute LC50 11600 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 74 mg/l Fresh water	Fish - Lepomis macrochirus - Young of the year	96 hours
	Chronic EC10 3.94 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
1,2-Dichloroethane	Acute EC50 >443 ppm Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 189 ppm Fresh water	Algae - Scenedesmus subspicatus	72 hours
	Acute EC50 155 mg/l Fresh water	Daphnia - Daphnia magna - Instar	48 hours
	Acute LC50 110 ppm Marine water	Crustaceans - Americamysis bahia	48 hours
	Acute LC50 115 mg/l Marine water	Fish - Pleuronectiformes	96 hours
	Chronic NOEC 29000 µg/l Fresh water	Fish - Pimephales promelas - Larvae	32 days
Carbon tetrachloride	Acute EC50 0.246 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 180.54 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute LC50 35000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 10400 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic EC10 0.0717 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	96 hours
	Acute EC50 9230 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 21 mg/l Marine water	Crustaceans - Artemia salina	48 hours
	Acute LC50 5.28 ul/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours
	Chronic EC10 >1360 mg/l Fresh water	Algae - Scenedesmus subspicatus	96 hours
	Chronic NOEC 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	4 weeks

Section 12. Ecological information

12.2 Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
1,1,1-Trichloroethane	-	-	Inherent
1,1-Dichloroethylene	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Dimethyl sulfoxide	-1.35	3.16	low
1,1,1-Trichloroethane	2.49	9	low
1,1-Dichloroethylene	2.13	12.88	low
1,2-Dichloroethane	1.45	2	low
Carbon tetrachloride	2.83	49.9 to 75.1	low
benzene	2.13	11	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

12.5 Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

13.1 Waste treatment methods

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.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Methyl chloroform; Ethane, 1,1,1-trichloro-	71-55-6	Listed	U226
1,1-Dichloroethylene; Ethene, 1,1-dichloro-	75-35-4	Listed	U078
Ethylene dichloride; Ethane, 1,2-dichloro-	107-06-2	Listed	U077
Carbon tetrachloride; Methane, tetrachloro-	56-23-5	Listed	U211

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Section 13. Disposal considerations

for additional handling information and protection of employees.

Section 14. Transport information

DOT / TDG / Mexico / 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 Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Federal regulations : **TSCA 4(a) final test rules**: 1,2-Dichloroethane

TSCA 8(a) PAIR: 1,1-Dichloroethylene; 1,2-Dichloroethane

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

TSCA 12(b) one-time export: 1,2-Dichloroethane

Clean Water Act (CWA) 307: 1,1,1-Trichloroethane; 1,1-Dichloroethylene; 1, 2-Dichloroethane; Carbon tetrachloride; benzene

Clean Water Act (CWA) 311: 1,1-Dichloroethylene; 1,2-Dichloroethane; Carbon tetrachloride; benzene

Clean Air Act (CAA) 112 regulated flammable substances: 1,1-Dichloroethylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : EYE IRRITATION - Category 2A
GERM CELL MUTAGENICITY - Category 1
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (cardiovascular system, heart) - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1

Section 15. Regulatory information

Composition/information on ingredients

Name	%	Classification
Dimethyl sulfoxide	≥75 - ≤90	FLAMMABLE LIQUIDS - Category 4 EYE IRRITATION - Category 2A
1,1,1-Trichloroethane	≤5	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (cardiovascular system, heart) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2 ASPIRATION HAZARD - Category 1
1,1-Dichloroethylene	≤4.4	FLAMMABLE LIQUIDS - Category 1 ACUTE TOXICITY (oral) - Category 3 CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 2 ASPIRATION HAZARD - Category 1
1,2-Dichloroethane	≤2.6	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A CARCINOGENICITY - Category 1B SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 2 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
Carbon tetrachloride	≤2.1	ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 3 ACUTE TOXICITY (inhalation) - Category 3 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1 HNOC - Defatting irritant
benzene	<1	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (haematopoietic system) (oral) - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (haematopoietic system) (inhalation) - Category 1 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant

SARA 313

Section 15. Regulatory information

	Product name	CAS number	%
Form R - Reporting requirements	1,1,1-Trichloroethane 1,1-Dichloroethylene 1,2-Dichloroethane Carbon tetrachloride benzene	71-55-6 75-35-4 107-06-2 56-23-5 71-43-2	≤5 ≤4.4 ≤2.6 ≤2.1 <1
Supplier notification	1,1,1-Trichloroethane 1,1-Dichloroethylene 1,2-Dichloroethane Carbon tetrachloride benzene	71-55-6 75-35-4 107-06-2 56-23-5 71-43-2	≤5 ≤4.4 ≤2.6 ≤2.1 <1

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: 1,1,1-TRICHLOROETHANE; METHYL CHLOROFORM; VINYLIDENE CHLORIDE; 1,1-DICHLOROETHENE; 1, 2-DICHLOROETHANE; 1,2-ETHYLIDENE DICHLORIDE; CARBON TETRACHLORIDE; TETRACHLOROMETHANE

New York : The following components are listed: Methyl chloroform; 1,1,1-Trichloroethane; 1, 1-Dichloroethylene; Vinylidene chloride; Ethylene dichloride; 1,2-Dichloroethane; Carbon tetrachloride; Methane, tetrachloro-; Benzene

New Jersey : The following components are listed: DIMETHYL SULFOXIDE; METHANE, SULFINYLBIS-; METHYL CHLOROFORM; 1,1,1-TRICHLOROETHANE; VINYLIDENE CHLORIDE; 1,1-DICHLOROETHYLENE; 1,2-DICHLOROETHANE; ETHANE, 1, 2-DICHLORO-; CARBON TETRACHLORIDE; METHANE, TETRACHLORO-; BENZENE

Pennsylvania : The following components are listed: ETHANE, 1,1,1-TRICHLORO-; ETHENE, 1, 1-DICHLORO-; ETHANE, 1,2-DICHLORO-; METHANE, TETRACHLORO-; BENZENE; BENZOL DILUENT

California Prop. 65

⚠ **WARNING**: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Carbon tetrachloride, Ethylene dichloride, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Benzene	Yes.	Yes.
Carbon tetrachloride	Yes.	-
Ethylene dichloride	Yes.	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Ingredient name	Status
carbon tetrachloride	Annex B, Group II
1,1,1-trichloroethane; methyl chloroform	Annex B, Group III

Stockholm Convention on Persistent Organic Pollutants

Section 15. Regulatory information

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

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 (ENCS)**: All components are listed or exempted.
Japan inventory (ISHL): All components are listed or exempted.

Malaysia : Not determined.

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 : Not determined.

Turkey : Not determined.

United States : All components are listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

History

Date of issue : 05/22/2018

Date of previous issue : 06/21/2016

Version : 6

Procedure used to derive the classification

Classification	Justification
EYE IRRITATION - Category 2A	Calculation method
GERM CELL MUTAGENICITY - Category 1	Calculation method
CARCINOGENICITY - Category 1A	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (cardiovascular system, heart) - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1	Calculation method
AQUATIC HAZARD (ACUTE) - Category 2	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method
HAZARDOUS TO THE OZONE LAYER - Category 1	Calculation method

Indicates information that has changed from previously issued version.

Notice to reader

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