SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Perchloroethylene (All Grades)
Product Description: Industrial chemical

Manufacturer or supplier's details
Company: Nexeo Solutions LLC
Address: 3 Waterway Square Place Suite 1000
Woodlands, Tx. 77380
United States of America

Emergency telephone number:
Health North America: 1-855-NEXEO4U (1-855-639-3648)
Health International: 1-855-NEXEO4U (1-855-639-3648)
Transport North America: CHEMTREC 800.424.9300

Additional Information:
Responsible Party: Product Safety Group
E-Mail: msds@nexeosolutions.com
SDS Requests: 1-855-429-2661
SDS Requests Fax: 1-281-500-2370
Website: www.nexeosolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Carcinogenicity: Category 2

GHS Label element
Hazard pictograms

Signal word: Danger
Hazard statements: H351 Suspected of causing cancer.
Precautionary statements: Prevention:
P202 Do not handle until all safety precautions have been read and understood.
P281 Use personal protective equipment as required.
Response:
P308 + P313 IF exposed or concerned: Get medical advice/attention.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/container to an approved waste disposal plant.

Potential Health Effects
Aggravated Medical Condition: None known.

Symptoms of Overexposure:
- Nausea
- Headache
- Dizziness
- Fatigue
- Unconsciousness
- Dermatitis
- Vomiting
- Lack of coordination

Carcinogenicity:

IARC
- Group 2A: Probably carcinogenic to humans
  - 127-18-4 Tetrachloroethylene
- Group 2B: Possibly carcinogenic to humans
  - 56-23-5 Carbon tetrachloride

ACGIH
- Suspected human carcinogen
  - 56-23-5 Carbon tetrachloride

OSHA
- No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP
- Reasonably anticipated to be a human carcinogen
  - 127-18-4 Tetrachloroethylene
  - 56-23-5 Carbon tetrachloride

Emergency Overview

<table>
<thead>
<tr>
<th>Appearance</th>
<th>liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>clear, colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>mild, sweet, ether-like</td>
</tr>
<tr>
<td>Hazard Summary</td>
<td>No information available.</td>
</tr>
</tbody>
</table>
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Chemical Name</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>90 - 100</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

Molecular formula : C2-Cl4

Synonyms : TETRACHLOROETHENE, TETRACHLOROETHYLENE, PERCHLOROETHENE, PERCHLOROETHYLENE INDUSTRIAL, PERCHLOROETHYLENE ISO GRADE,

SECTION 4. FIRST AID MEASURES

General advice : Show this safety data sheet to the doctor in attendance. Do not leave the victim unattended.

If inhaled : If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of eye contact : Flush eyes with water as a precaution. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Induce vomiting immediately and call a physician. Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

Most important symptoms and effects, both acute and delayed : Nausea Headache Dizziness Fatigue Unconsciousness Dermatitis Vomiting Lack of coordination
**Safety Data Sheet**  
**Perchloroethylene (All Grades)**

**Version 1.1**  
**Revision Date:** 12/11/2014

---

**Notes to physician** : Do not give adrenaline or similar drugs.

---

**SECTION 5. FIREFIGHTING MEASURES**

**Suitable extinguishing media** : Use an extinguishing media appropriate for surrounding fire.

**Unsuitable extinguishing media** : High volume water jet

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

**Specific extinguishing methods** : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

**Further information** : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

**Special protective equipment for firefighters** : In the event of fire, wear self-contained breathing apparatus. Wear a positive-pressure supplied-air respirator with full facepiece. Exposure to decomposition products may be a hazard to health.

---

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment and emergency procedures** : Use personal protective equipment.

**Environmental precautions** : Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

**Methods and materials for containment and cleaning up** : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

---

**SECTION 7. HANDLING AND STORAGE**

**Advice on safe handling** : Do not breathe vapours/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage:
Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Components</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>TWA 25 ppm</td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL 100 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 100 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEIL 200 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peak 300 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 25 ppm / 170 mg/m³</td>
<td>OSHA P0</td>
<td></td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>TWA 5 ppm</td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL 10 ppm</td>
<td>OSHA P0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST 2 ppm / 12.6 mg/m³</td>
<td>NIOSH REL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 10 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEIL 25 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peak 200 ppm</td>
<td>OSHA Z-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 2 ppm / 12.6 mg/m³</td>
<td>OSHA P0</td>
<td></td>
</tr>
</tbody>
</table>

Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Biological specimen</th>
<th>Sampling time</th>
<th>Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>In end-exhaled</td>
<td>Prior to shift</td>
<td>3 parts per million</td>
<td>ACGIH  BEI</td>
</tr>
</tbody>
</table>
Safety Data Sheet
Perchloroethylene (All Grades)

<table>
<thead>
<tr>
<th></th>
<th>air</th>
<th>(16 hours after exposure ceases)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tetrachloroethylene</td>
<td>In blood</td>
<td>Prior to shift (16 hours after exposure ceases)</td>
<td>0.5 mg/l</td>
</tr>
</tbody>
</table>

Personal protective equipment

Respiratory protection: In the case of vapour formation use a respirator with an approved filter. Wear a positive-pressure supplied-air respirator with full facepiece.

Hand protection
Remarks: The suitability for a specific workplace should be discussed with the producers of the protective gloves.

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

Skin and body protection: impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the workplace.

Hygiene measures: When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid
Colour: clear, colourless
Odour: mild, sweet, ether-like
Odour Threshold: 55 ppm

MSDS Number: 100000006825  6 / 22 Perchloroethylene (All Grades)
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing Point (Freezing Point)</td>
<td>-19 °C (-2 °F)</td>
</tr>
<tr>
<td>Boiling Point (Boiling point/boiling range)</td>
<td>121 °C (250 °F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>0.1 - 0.33</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Burning rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>13 - 18 mmHg @ 20 - 25 °C (68 - 77 °F)</td>
</tr>
<tr>
<td>Relative vapour density</td>
<td>5.8</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.62 @ 25 °C (77 °F)</td>
</tr>
<tr>
<td>Reference substance: (water = 1)</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>1.619 g/cm³ @ 77 °F (77 °F)</td>
</tr>
<tr>
<td>Bulk density</td>
<td>1.8 kg/m³</td>
</tr>
<tr>
<td>Water solubility</td>
<td>negligible</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No data available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>Pow: 2.88</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>not applicable</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>1 mPa.s</td>
</tr>
</tbody>
</table>
SECTION 10. STABILITY AND REACTIVITY

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Hazardous polymerisation does not occur. Stable under recommended storage conditions.

Conditions to avoid: Keep away from heat, flame, sparks and other ignition sources. Elevated temperatures. Exposure to moisture.

Incompatible materials: Acids
Bases
Strong oxidizing agents
Oxygen
Peroxides
Reactive metals such as aluminum and magnesium
Alkali metals
Nitric acid
Zinc
Barium
Lithium
Iron

Hazardous decomposition products: Chlorine
Phosgene
Carbon oxides
Hydrogen chloride
Trichloroacetic acid decomposes above 200 °C forming HCl, CO and Phosgene. Thermal decomposition can lead to release of irritating gases and vapours.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:
Acute oral toxicity: Acute toxicity estimate: 2,647 mg/kg
Method: Calculation method

Acute inhalation toxicity: Acute toxicity estimate: > 40 mg/l
Safety Data Sheet
Perchloroethylene (All Grades)

Exposure time: 4 h
Test atmosphere: vapour
Method: Calculation method

Acute dermal toxicity
Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Components:

127-18-4:
Acute oral toxicity
LD50 (rat, male): 3,835 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity
LC50 (mouse, male and female): 35 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403

Acute dermal toxicity
LD50 (rabbit): 10,000 mg/kg

56-23-5:
Acute oral toxicity
LD50 (rat): 50 mg/kg
Assessment: The component/mixture is toxic after single ingestion.

Acute inhalation toxicity
(rat): 8 mg/l
Assessment: The component/mixture is toxic after short term inhalation.

Acute dermal toxicity
Assessment: The component/mixture is toxic after single contact with skin.

Skin corrosion/irritation

Components:

127-18-4:
Species: rabbit
Exposure time: 4 h
Method: OECD Test Guideline 404
Result: Irritating to skin.

56-23-5:
Species: rabbit
Result: Irritating to skin.

Serious eye damage/eye irritation

Components:

127-18-4:
Species: rabbit
Result: Irritating to eyes.

**56-23-5:**
Species: rabbit
Result: Irritating to eyes.

**Respiratory or skin sensitisation**

**Components:**

**127-18-4:**
Test Type: lymph node assay
Species: mouse
Assessment: May cause sensitization by skin contact.
Method: OECD Test Guideline 429
Result: Weak sensitizer

**Germ cell mutagenicity**

**Components:**

**127-18-4:**
Genotoxicity in vitro:
- Test Type: Chromosome aberration test in vitro
  - Test species: Chinese hamster ovary (CHO)
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 473
  - Result: negative
- Test Type: Ames test
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 471
  - Result: negative
- Test Type: Mammalian cell gene mutation assay
  - Test species: Mouse lymphoma cells
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 476
  - Result: negative

Genotoxicity in vivo:
- Test Type: Chromosome aberration assay in vivo
  - Test species: rat (male and female)
  - Cell type: Bone marrow
  - Application Route: Inhalation
  - Exposure time: 1-5 d, 7 h/d
  - Dose: 0, 100, 500 ppm
  - Result: Ambiguous
- Test Type: In vivo micronucleus test
  - Test species: mouse (male)
Safety Data Sheet
Perchloroethylene (All Grades)

Version 1.1  Revision Date: 12/11/2014

Cell type: Peripheral blood reticulocytes
Application Route: Intraperitoneal
Exposure time: Single
Dose: 0, 500, 1000, 2000 mg/kg bw
Method: OECD Test Guideline 474
Result: negative

Test Type: DNA damage and/or repair
Test species: rat (male)
Cell type: Kidney cells
Application Route: Oral
Exposure time: 7 d
Dose: 0, 1000 mg/kg
Result: negative

Test Type: Chromosome aberration assay in vivo
Test species: rat (male and female)
Cell type: Bone marrow
Application Route: inhalation (vapour)
Exposure time: 52 wks, 6 h/d
Dose: 0, 300, 600 ppm
Result: negative

Germ cell mutagenicity-Assessment : Did not show mutagenic effects in animal experiments.

56-23-5:
Genotoxicity in vitro : Test Type: Ames test
Test species: Salmonella typhimurium
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Test species: mouse
Method: OECD Test Guideline 474
Result: negative

Germ cell mutagenicity-Assessment : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Carcinogenicity

Components:
127-18-4:
Species: mouse, (male and female)
Application Route: inhalation (vapour)
Exposure time: 103 wks
Dose: 0, 100, 200 ppm
Frequency of Treatment: 6 h/d, 5 d/wk
LOAEL: 100 ppm

MSDS Number: 100000006825  11 / 22 Perchloroethylene (All Grades)
Method: OECD Test Guideline 451 
Result: evidence of carcinogenic activity 
Symptoms: increased incidence of hepatocellular carcinomas 

Species: rat, (male and female) 
Application Route: inhalation (vapour) 
Exposure time: 103 wks 
Dose: 0, 200, 400 ppm 
Frequency of Treatment: 6 h/d, 5 d/wk 
LOAEL: 200 ppm 

Result: evidence of carcinogenic activity 
Symptoms: increased incidence of renal tubular cell carcinomas 

Carcinogenicity - Assessment : Suspected human carcinogens 

56-23-5: 
Species: mouse 
NOAEL: 9.9 mg/kg bw/day 

Carcinogenicity - Assessment : Suspected human carcinogens 

Reproductive toxicity 

Components: 
127-18-4: 
Effects on fertility : Test Type: Two-generation study 
Species: rat, male and female 
Application Route: inhalation (vapour) 
Dose: 0, 100, 300, 1000 ppm 
General Toxicity - Parent: NOAEC: 100 ppm 
General Toxicity F1: NOAEC: 100 ppm 
Fertility: NOAEC: 1,000 ppm 
Symptoms: Maternal effects. Clinical signs Reduced offspring weight gain. 
Method: EPA OTS 798.4700 
Result: Animal testing did not show any effects on fertility. 
GLP: yes 

Effects on foetal development : Species: rat 
Application Route: inhalation (vapour) 
Dose: 0, 75, 250, 600 ppm 
Duration of Single Treatment: 14 d 
Frequency of Treatment: 6 hr/day 
General Toxicity Maternal: NOAEC: 250 ppm
Safety Data Sheet
Perchloroethylene (All Grades)

Developmental Toxicity: NOAEC: 250 ppm
Symptoms: Reduced body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects.
GLP: yes

Reproductive toxicity - Assessment: Animal testing did not show any effects on fertility.
Did not show teratogenic effects in animal experiments.

56-23-5:
Effects on foetal development:
Species: rat
Embryo-foetal toxicity: Lowest observed adverse effect level: 112.5 mg/kg body weight
Method: OECD Test Guideline 414

Reproductive toxicity - Assessment: Teratogenicity classification is not possible

STOT - single exposure
Product: No data available
Components: 127-18-4:

<table>
<thead>
<tr>
<th>Exposure routes:</th>
<th>Target Organs:</th>
<th>Assessment:</th>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Central nervous system</td>
<td>May cause drowsiness or dizziness., The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.</td>
<td></td>
</tr>
</tbody>
</table>

56-23-5:

<table>
<thead>
<tr>
<th>Exposure routes:</th>
<th>Target Organs:</th>
<th>Assessment:</th>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Central nervous system</td>
<td>May cause drowsiness or dizziness., The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.</td>
<td></td>
</tr>
</tbody>
</table>
Safety Data Sheet
Perchloroethylene (All Grades)

Version 1.1 Revision Date: 12/11/2014

**STOT - repeated exposure**

**Product:** No data available

**Components:**

127-18-4: No data available

56-23-5:

<table>
<thead>
<tr>
<th>Exposure routes:</th>
<th>Target Organs:</th>
<th>Assessment:</th>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>Kidney, Liver</td>
<td>Causes damage to organs through prolonged or repeated exposure. The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.</td>
<td></td>
</tr>
</tbody>
</table>

**Repeated dose toxicity**

**Components:**

127-18-4:  
Species: mouse, male  
LOAEL: 540 mg/kg  
Application Route: Oral  
Exposure time: 78 wks  
Number of exposures: 5 d/wk  
Dose: 0, 540, 1070 mg/kg bw/day  
Symptoms: Kidney disorders

Species: mouse, female  
LOAEL: 330 mg/kg  
Application Route: Oral  
Exposure time: 78 wks  
Number of exposures: 5 d/wk  
Dose: 0, 390, 770 mg/kg bw/day  
Symptoms: Kidney disorders

Species: rat, male and female  
LOAEL: 200  
Application Route: inhalation (vapour)  
Exposure time: 103 wks  
Number of exposures: 6 h/d, 5 d/wk  
Dose: 0, 200, 400 ppm  
Symptoms: Kidney disorders
Safety Data Sheet
Perchloroethylene (All Grades)

Species: mouse, male and female
LOAEL: 100
Application Route: inhalation (vapour)
Exposure time: 103 wks
Number of exposures: 6 h/d, 5 d/wk
Dose: 0, 100, 200 ppm
Symptoms: Liver effects, Kidney disorders, lung effects
Repeated dose toxicity - Causes skin irritation., Causes eye irritation.
Assessment

Aspiration toxicity

Components:
127-18-4:
No aspiration toxicity classification

Further information

Product:
Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
127-18-4:
Toxicity to fish: LC50 (Limanda limanda (Marlin)): 5 mg/l
Exposure time: 96 h
Test Type: flow-through test

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 8.5 mg/l
Exposure time: 48 h
Test Type: static test

Toxicity to algae: EC50 (Chlamydomonas reinhardtii): 3.64 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: Closed system

Ecotoxicology Assessment
Acute aquatic toxicity: Toxic to aquatic life.
Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.
56-23-5:
Toxicity to fish: LC50 (Danio rerio (zebra fish)): 24.3 mg/l
Exposure time: 4 d
Test Type: flow-through test
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertibrates: EC50 (Daphnia magna (Water flea)): > 770 mg/l
Exposure time: 24 h
Test Type: static test

Toxicity to algae: EC50 (Pseudokirchneriella subcapitata (green algae)): 20 mg/l
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201

Ecotoxicology Assessment
Chronic aquatic toxicity: Harmful to aquatic life with long lasting effects.

Persistence and degradability

Components:

127-18-4:
Biodegradability: Inoculum: activated sludge
Concentration: 100 mg/l
Biodegradation: 11 %
Exposure time: 28 d
Remarks: Not readily biodegradable.

56-23-5:
Biodegradability: anaerobic
Result: Readily biodegradable.
Remarks: Readily biodegradable

Bioaccumulative potential

Components:

127-18-4:
Partition coefficient: n-octanol/water: Pow: 3.40

56-23-5:
Partition coefficient: n-octanol/water: log Pow: 2.83 (25 °C)

Mobility in soil
No data available
Other adverse effects
No data available

Product:
Regulation 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks Warning: Manufactured with /$, a substance which harms public health and environment by destroying ozone in the upper atmosphere.

Additional ecological information: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Toxic to aquatic life with long lasting effects.

Components:
56-23-5:
Ozone-Depletion Potential 1.1
Regulation UNEP - Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer (Update: 2009-10-01)
Group Annex B - Group II: Carbon tetrachloride
Ozone-Depletion Potential 1.1
Regulation 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances (Update: 2007-07-01)
Group Group IV
Additional ecological information: Dangerous for the ozone layer.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact NEXEO's Environmental Services Group at 800-637-7922.

Contaminated packaging: Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.
SECTION 14. TRANSPORT INFORMATION

IATA (International Air Transport Association): UN1897, TETRACHLOROETHYLENE, 6.1, III
IMDG (International Maritime Dangerous Goods): UN1897, TETRACHLOROETHYLENE, 6.1, III
DOT (Department of Transportation): UN1897, TETRACHLOROETHYLENE, 6.1, III

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Carcinogen
WHMIS Classification : D2A: Very Toxic Material Causing Other Toxic Effects

EPCRA - Emergency Planning and Community Right-to-Know Act
CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>127-18-4</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Chronic Health Hazard

SARA 302 : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:
127-18-4 Tetrachloroethylene 100 %
56-23-5 Carbon tetrachloride 0.45 %

Clean Air Act
Ozone-Depletion Potential : carbon tetrachloride 56-23-5
Carbon Tetrachloride 56-23-5

MSDS Number: 100000006825
Safety Data Sheet
Perchloroethylene (All Grades)

Version 1.1
Revision Date: 12/11/2014

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>100 %</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.45 %</td>
</tr>
</tbody>
</table>

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

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>100 %</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.45 %</td>
</tr>
</tbody>
</table>

Clean Water Act

The following Hazardous Substances are listed under the U.S. Clean Water Act, Section 311, Table 116.4A:

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.45 %</td>
</tr>
</tbody>
</table>

The following Hazardous Chemicals are listed under the U.S. Clean Water Act, Section 311, Table 117.3:

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.45 %</td>
</tr>
</tbody>
</table>

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>90 - 100 %</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.1 - 1 %</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>90 - 100 %</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.1 - 1 %</td>
</tr>
</tbody>
</table>

New Jersey Right To Know

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td>90 - 100 %</td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td>0.1 - 1 %</td>
</tr>
</tbody>
</table>

California Prop 65

WARNING! This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Chemical Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>127-18-4</td>
<td>Tetrachloroethylene</td>
<td></td>
</tr>
<tr>
<td>56-23-5</td>
<td>Carbon tetrachloride</td>
<td></td>
</tr>
</tbody>
</table>

The components of this product are reported in the following inventories:

<table>
<thead>
<tr>
<th>Inventory Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1907/2006 (EU)</td>
<td>n (Negative listing) (Not in compliance with the inventory)</td>
</tr>
<tr>
<td>Switzerland. New notified substances and declared preparations</td>
<td>y (positive listing) (The formulation contains substances listed on the Swiss Inventory)</td>
</tr>
<tr>
<td>Inventory Name</td>
<td>Status</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>United States TSCA Inventory</td>
<td>y (positive listing) (On TSCA Inventory)</td>
</tr>
<tr>
<td>Canadian Domestic Substances List (DSL)</td>
<td>y (positive listing) (All components of this product are on the Canadian DSL.)</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>New Zealand. Inventory of Chemical Substances</td>
<td>n (Negative listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>Japan. ENCS - Existing and New Chemical Substances Inventory</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>Japan. ISHL - Inventory of Chemical Substances (METI)</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>Korea. Korean Existing Chemicals Inventory (KECI)</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
<tr>
<td>China. Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>y (positive listing) (On the inventory, or in compliance with the inventory)</td>
</tr>
</tbody>
</table>
SECTION 16. OTHER INFORMATION

Further information

NFPA: 

HMIS III:

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>0*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAMMABILITY</td>
<td>1</td>
</tr>
<tr>
<td>PHYSICAL HAZARD</td>
<td>0</td>
</tr>
</tbody>
</table>

0 = not significant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by NEXEO™ Solutions EHS Product Safety Department (1-855-429-2661) MSDS@nexeosolutions.com.

Legacy MSDS: R0001042

Material number: 16056599, 16062193, 16056596, 16056598, 16056597, 16009752, 637625, 604780, 554102, 554349, 547485, 54914, 72995, 104807, 87675, 104196, 56039, 71265, 505397, 503744, 503743, 501951, 501344, 20233, 20232, 20231

Key or legend to abbreviations and acronyms used in the safety data sheet

<table>
<thead>
<tr>
<th>Abbreviation/ Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Government Industrial Hygienists</td>
</tr>
<tr>
<td>AICS</td>
<td>Australia, Inventory of Chemical Substances</td>
</tr>
<tr>
<td>DSL</td>
<td>Canada, Domestic Substances List</td>
</tr>
<tr>
<td>NDSL</td>
<td>Canada, Non-Domestic Substances List</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration</td>
</tr>
<tr>
<td>LD50</td>
<td>Lethal Dose 50%</td>
</tr>
<tr>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>NZIoC</td>
<td>New Zealand Inventory of Chemicals</td>
</tr>
</tbody>
</table>
## Safety Data Sheet
### Perchloroethylene (All Grades)

**Version 1.1**

<table>
<thead>
<tr>
<th>acronym</th>
<th>description</th>
<th>acronym</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50</td>
<td>Effective Concentration 50%</td>
<td>NOEC</td>
<td>No Observed Effect Concentration</td>
</tr>
<tr>
<td>EGEST</td>
<td>EOSCA Generic Exposure Scenario Tool</td>
<td>OSHA</td>
<td>Occupational Safety &amp; Health Administration</td>
</tr>
<tr>
<td>EOSCA</td>
<td>European Oilfield Specialty Chemicals Association</td>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Chemical Substances</td>
<td>PICCS</td>
<td>Philippines Inventory of Commercial Chemical Substances</td>
</tr>
<tr>
<td>MAK</td>
<td>Germany Maximum Concentration Values</td>
<td>PRNT</td>
<td>Presumed Not Toxic</td>
</tr>
<tr>
<td>GHS</td>
<td>Globally Harmonized System</td>
<td>RCRA</td>
<td>Resource Conservation Recovery Act</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater Than or Equal To</td>
<td>STEL</td>
<td>Short-term Exposure Limit</td>
</tr>
<tr>
<td>IC50</td>
<td>Inhibition Concentration 50%</td>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
<td>TLV</td>
<td>Threshold limit Value</td>
</tr>
<tr>
<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
<td>TSCA</td>
<td>Toxic Substance Control Act</td>
</tr>
<tr>
<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
<td>UVCB</td>
<td>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>