Material Safety Data Sheet
acc. to OSHA and ANSI

1 Identification of substance:
Product details:
Product name: Chloroform
Stock number: 32614
Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com
Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:
Chemical characterization:
Description: (CAS#)
Chloroform (CAS# 67-66-3); 100%
Identification number(s):
EINECS Number: 200-663-8
Index number: 602-006-00-4

3 Hazards identification
Hazard description:
Xn Harmful
Information pertaining to particular dangers for man and environment
R 22 Harmful if swallowed.
R 38 Irritating to skin.
R 40 Limited evidence of a carcinogenic effect.
R 48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Health (acute effects) = 1
Flammability = 1
Reactivity = 1

GHS label elements

Warning
3.6/2 - Suspected of causing cancer.
3.9/2 - May cause damage to organs through prolonged or repeated exposure.

Warning
3.1/4 - Harmful if swallowed.
3.2/2 - Causes skin irritation.

Prevention:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protection clothing/eye protection/face protection.
Use personal protective equipment as required.

Response:
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

(Contd. on page 2)
4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation

Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Dispose contaminated material as waste according to item 13. Ensure adequate ventilation.

Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Information for safe handling:
Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace.

Information about protection against explosions and fires: No special measures required.

Storage
Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Store away from oxidizing agents.

Further information about storage conditions:
Keep container tightly sealed. Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Components with limit values that require monitoring at the workplace:

Chloroform ppm
ACGIH TLV 10
Belgium TWA 10
France TWA 5, 50-STEL
Germany TWA 10
Netherlands TWA 10
Switzerland TWA 10, 20-STEL
United Kingdom TWA 2
Russia TWA 50
Denmark TWA 2
Finland TWA 10, 20-STEL
Hungary TWA 10 mg/m³
Poland TWA 50 mg/m³
Sweden TWA 2, 5-STEL
USA 50-STEL

Additional information: No data

Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands: Impervious gloves
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information
Form: Fluid
Color: Colorless
Odor: Characteristic

Change in condition
Melting point/Melting range: -63.5°C (-82°F)
Boiling point/Boiling range: 61.26°C (142°F)
Sublimation temperature / start: Not determined

Flash point: Not determined
Ignition temperature: 982°C (1800°F)

Decomposition temperature: Not determined

Danger of explosion: Product does not present an explosion hazard.

Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure at 20°C (68°F): 210 hPa (158 mm Hg)
Density at 20°C (68°F): 1.492 g/cm³

Solubility in / Miscibility with
Water: Not miscible or difficult to mix

Viscosity:
dynamic at 20°C (68°F): 0.56 mPas

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.

Materials to be avoided:
Oxidizing agents
Bases
Alkali metals

Dangerous reactions Reacts with certain metals.

Dangerous products of decomposition:
- Phosgene
- Hydrogen chloride (HCl)
- Carbon monoxide and carbon dioxide
- Chlorine

11 Toxicological information

Acute toxicity:

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50/ LC50 values that are relevant for classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>820 mg/kg (guinea pig) 36 mg/kg (mouse) 908 mg/kg (rat)</td>
</tr>
<tr>
<td>Dermal</td>
<td>&gt;25000 mg/kg (rabbit)</td>
</tr>
<tr>
<td>Inhalative</td>
<td>LC50/4H 47702 mg/m3/4H (rat)</td>
</tr>
</tbody>
</table>

Primary irritant effect:
- on the skin: Irritant to skin and mucous membranes.
- on the eye: Irritating effect.
- Sensitization: No sensitizing effects known.

Subacute to chronic toxicity:
Chloroform is a well known anesthetic, that use now having been abandoned due to its toxic effects. It’s vapor and mist is irritating to the eyes, mucous membranes and upper respiratory tract. The liquid causes skin irritation and may be absorbed through the skin. Exposure may cause dizziness, nausea, headache, vomiting, gastrointestinal disturbances, nervous system disturbances, and damage to the liver, kidneys, cardiovascular system, central nervous system or blood.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

EPA-B2: Probable human carcinogen, sufficient evidence from animal studies; inadequate evidence or no data from epidemiologic studies.
IARC-2B: Possibly carcinogenic to humans; limited evidence in humans in the absence of sufficient evidence in experimental animals.
NTP-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals.
ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemicologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

12 Ecological information:

General notes:
- Do not allow product to reach ground water, water course or sewage system.
- Danger to drinking water if even small quantities leak into the ground.
- Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

Product:
Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Material Safety Data Sheet  
acc. to OSHA and ANSI  

Printing date 05/11/2009  
Reviewed on 05/11/2009  

Product name: Chloroform  

14 Transport information  

DOT regulations:  

Hazard class: 6.1  
Identification number: UN1888  
Packing group: III  
Hazardous substance: 10 lbs, 4.54 kg  
Proper shipping name (technical name): CHLOROFORM  
Label 6.1  

Land transport ADR/RID (cross-border):  

ADR/RID class: 6.1 (T1) Toxic substances  
Danger code (Kemler): 60  
UN-Number: 1888  
Packaging group: III  
Description of goods: 1888 CHLOROFORM  

Maritime transport IMDG:  

IMDG Class: 6.1  
UN Number: 1888  
Label 6.1  
Packaging group: III  
EMS Number: F-A, S-A  
Proper shipping name: CHLOROFORM  

Air transport ICAO-TI and IATA-DGR:  

ICAO/IATA Class: 6.1  
UN/ID Number: 1888  
Label 6.1  
Packaging group: III  
Proper shipping name: CHLOROFORM  

UN "Model Regulation": UN1888, CHLOROFORM, 6.1, III  

15 Regulations  

Product related hazard informations:  

Hazard symbols:  
Xn Harmful  

Risk phrases:  
22 Harmful if swallowed.  
38 Irritating to skin.  
40 Limited evidence of a carcinogenic effect.  
48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.  

Safety phrases:  
36/37 Wear suitable protective clothing and gloves.  

National regulations  
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
This product contains a chemical known to the state of California to cause cancer or reproductive toxicity. All components of this product are listed on the Canadian Domestic Substances List (DSL).

**Information about limitation of use:**
For use only by technically qualified individuals.
This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

**16 Other information:**
Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing MSDS:** Health, Safety and Environmental Department.

**Contact:** Zachariah Holt

**Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent