SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 04/04/2014
Version 1.0

SECTION 1. Identification

Product identifier

Product number    AX1440
Product name      Isoamyl Alcohol [Isopentyl Alcohol] GR ACS
CAS-No.           123-51-3

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

Identified uses    Reagent for analysis

Details of the supplier of the safety data sheet

Company           EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

Emergency telephone  800-424-9300 CHEMTREC (USA)
                      +1-703-527-3887 CHEMTREC (International)
                      24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Flammable liquid, Category 3, H226
Acute toxicity, Category 4, Inhalation, H332
Specific target organ systemic toxicity - single exposure, Category 3, Respiratory system, H335
For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms

Signal Word
Warning

Hazard Statements
H226 Flammable liquid and vapor.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
Precautionary Statements
P210 Keep away from heat.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

OSHA Hazards
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS and may deviate from the GHS information.

Other hazards
None known.

SECTION 3. Composition/information on ingredients
Formula (CH₃)₂CHCH₂CH₂OH C₅H₁₂O (Hill)
Molar mass 88.15 g/mol

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
Isoamyl alcohol (>= 90 % - <= 100 % )
123-51-3
Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures
Description of first-aid measures
Inhalation
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

Skin contact
After skin contact: wash off with plenty of water. Remove contaminated clothing.

Eye contact
After eye contact: rinse out with plenty of water with the eyelid held wide open. Call in ophthalmologist if necessary.

Ingestion

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
irritant effects, Cough, Shortness of breath, Dermatitis, Dizziness, Unconsciousness, Diarrhea, Nausea, Vomiting, Headache, muscular weakness, drowziness, confusion, Coma
Repeated exposure may cause skin dryness or cracking.

Indication of any immediate medical attention and special treatment needed
No information available.
SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2), Foam, Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Combustible.
Vapors are heavier than air and may spread along floors.
Pay attention to flashback.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters

Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact.
Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
Advice for emergency responders: Protective equipment see section 8.

Environmental precautions
Do not let product enter drains. Risk of explosion.

Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.
Observe label precautions.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Store at room temperature.

### SECTION 8. Exposure controls/personal protection

#### Exposure limit(s)

<table>
<thead>
<tr>
<th>Basis</th>
<th>Value</th>
<th>Threshold limits</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Isoamyl alcohol 123-51-3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td>Time Weighted Average (TWA): 100 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term Exposure Limit (STEL): 125 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIOSH/GUIDE</td>
<td>Recommended exposure limit (REL): 100 ppm</td>
<td>360 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short Term Exposure Limit (STEL): 125 ppm</td>
<td>450 mg/m³</td>
<td></td>
</tr>
<tr>
<td>OSHA_TRANS</td>
<td>PEL: 100 ppm</td>
<td>360 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Z1A</td>
<td>Short Term Exposure Limit (STEL): 125 ppm</td>
<td>450 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Weighted Average (TWA): 100 ppm</td>
<td>360 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

**Engineering measures**

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

**Individual protection measures**

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

**Hygiene measures**

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

**Eye/face protection**

Safety glasses

**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.

**Other protective equipment:**

Flame retardant antistatic protective clothing

**Respiratory protection**

required when vapors/aerosols are generated.
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

SECTION 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>characteristic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>at 25 g/l</td>
</tr>
<tr>
<td></td>
<td>68 °F (20 °C)</td>
</tr>
<tr>
<td>Melting point</td>
<td>-117 °C</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>268 °F (131 °C) at 1,013 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>113 °F (45 °C) Method: c.c.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>1.2 % (V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>8 % (V)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>3 hPa</td>
</tr>
<tr>
<td></td>
<td>at 68 °F (20 °C)</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>3.04</td>
</tr>
<tr>
<td>Density</td>
<td>0.81 g/cm³ at 68 °F (20 °C)</td>
</tr>
<tr>
<td>Relative density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Water solubility</td>
<td>25 g/l at 68 °F (20 °C)</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: 1.42 (experimental) (Lit.) Bioaccumulation is not expected.</td>
</tr>
</tbody>
</table>
SECTION 10. Stability and reactivity

Reactivity
Vapor/air-mixtures are explosive at intense warming.

Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

Possibility of hazardous reactions
Risk of ignition or formation of inflammable gases or vapors with:
Fluorine, Strong oxidizing agents, Oxygen, Alkali metals, Alkaline earth metals

Conditions to avoid
Heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

Incompatible materials
rubber, various plastics

Hazardous decomposition products
no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Inhalation, Eye contact, Skin contact

Target Organs
Eyes
Skin
Respiratory system
Central nervous system
Acute oral toxicity
LD50 rat: > 5,000 mg/kg (External MSDS)

Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.

Acute inhalation toxicity
Absorption
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Inhalation may lead to the formation of oedemas in the respiratory tract.
Irritating to respiratory system.

Acute toxicity estimate: 11.1 mg/l

Expert judgment

Acute dermal toxicity
LD50 rabbit: > 3,000 mg/kg
(External MSDS)

Skin irritation
rabbit
Result: slight irritation
(RTECS)
Repeated exposure may cause skin dryness or cracking.

Dermatitis

Eye irritation
rabbit
Result: slight irritation
(RTECS)

Genotoxicity in vitro
Ames test
Result: negative
(Lit.)

Specific target organ systemic toxicity - single exposure
May cause respiratory irritation.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC
No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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

NTP
No ingredient of this product present at levels greater than or
equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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

Further information
If swallowed
Absorption via:
Gastrointestinal tract
After absorption of large quantities:
Headache, drowsiness, lack of appetite, Nausea, Vomiting, Diarrhea, Dizziness, muscular weakness, confusion, Unconsciousness, Coma
Possible damages:
Damage to:
Liver, Kidney
Effect potentiated by: ethanol
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information
Ecotoxicity
Toxicity to fish
LC50 Oncorhynchus mykiss (rainbow trout): 700 mg/l; 96 h (IUCLID)
Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia: 260 mg/l; 48 h (IUCLID)
EC50 Tetrahymena pyriformis: 1,184 mg/l; 48 h (IUCLID)
Toxicity to algae
IC50 Desmodesmus subspicatus (green algae): 493 mg/l; 72 h (IUCLID)
Toxicity to bacteria
EC50 Pseudomonas putida: 2,500 mg/l; 17 h (IUCLID)
Persistancy and degradability
Biodegradability
84 %; 27 d
OECD Test Guideline 301C
Readily biodegradable.
Theoretical oxygen demand (ThOD)
2,740 mg/g
(Lit.)
Ratio BOD/COD
63 %
(IUCLID)
Ratio BOD/ThBOD
BOD5  55 %
(Lit.)
Ratio COD/ThBOD
SECTION 13. Disposal considerations

The information presented 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. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number UN 1105
Proper shipping name PENTANOLS
Class 3
Packing group III
Environmentally hazardous --

Air transport (IATA)

UN number UN 1105
Proper shipping name PENTANOLS
Class 3
Packing group III
Environmentally hazardous --
Special precautions for user no

Sea transport (IMDG)

UN number UN 1105
Proper shipping name PENTANOLS
Class 3
Packing group III
Environmentally hazardous --
Special precautions for user yes
EmS F-E S-D
SECTION 15. Regulatory information

United States of America

OSHA Hazards
Combustible Liquid
Respiratory irritant
Target organ effects

This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards
Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

DEA List I
Not listed

DEA List II
Not listed

US State Regulations

Massachusetts Right To Know
Ingredients
Isoamyl alcohol

Pennsylvania Right To Know
Ingredients
Isoamyl alcohol

New Jersey Right To Know
Ingredients
Isoamyl alcohol

California Prop 65 Components
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.
## SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Product number</th>
<th>AX1440</th>
<th>Version 1.0</th>
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<tbody>
<tr>
<td>Product name</td>
<td>Isoamyl Alcohol [Isopentyl Alcohol] GR ACS</td>
<td></td>
</tr>
</tbody>
</table>

### Notification status

<table>
<thead>
<tr>
<th>TSCA:</th>
<th>All components of the product are listed in the TSCA-inventory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSL:</td>
<td>All components of this product are on the Canadian DSL.</td>
</tr>
</tbody>
</table>

### SECTION 16. Other information

**Training advice**
Provide adequate information, instruction and training for operators.

**Full text of H-Statements referred to under sections 2 and 3.**

- **H226** Flammable liquid and vapor.
- **H332** Harmful if inhaled.
- **H335** May cause respiratory irritation.

**Key or legend to abbreviations and acronyms used in the safety data sheet**
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

**Date of issue:** 04/04/2014

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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