1 Identification of substance:

Product details:
Product name: Polyvinyl alcohol, 98-99% hydrolyzed, low molecular weight
Stock number: 41241
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#)
Polyvinyl alcohol, 98-99% hydrolyzed, low molecular weight
(CAS# 9002-89-5), 100%

3 Hazards identification

Hazard description: Not applicable
Information pertaining to particular dangers for man and environment Not applicable
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>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Health (acute effects) = 0
Flammability = 1
Reactivity = 0
GHS label elements Void

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 medical treatment.

5 Fire fighting measures

Suitable extinguishing agents
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or
alcohol resistant foam.

Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide (CO)

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: Pick up mechanically.
Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protective 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.
No special precautions are necessary if used correctly.
Information about protection against explosions and fires:
Keep ignition sources away.
Protect from heat.

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: Not required.
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.
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: Powder
Color: White
Odor: Odorless

Change in condition
Melting point/Melting range: 200°C (392°F) ((dec))
Boiling point/Boiling range: Not determined
Sublimation temperature / start: Not determined

Flash point: 79°C (174°F)

Flammability (solid, gaseous) Product is not flammable.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Danger of explosion: Product does not present an explosion hazard.

Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure: Not determined

Density at 20°C (68°F): 1.26 g/cm³
Product name: Polyvinyl alcohol, 98-99% hydrolyzed, low molecular weight

Solubility in / Miscibility with
Water: Partly soluble

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

Dangerous reactions:
- No dangerous reactions known

Dangerous products of decomposition:
- Carbon monoxide and carbon dioxide

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>18750 mg/kg (guinea pig)</td>
</tr>
<tr>
<td></td>
<td>14270 mg/kg (mouse)</td>
</tr>
<tr>
<td></td>
<td>23854 mg/kg (rat)</td>
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</tbody>
</table>

Primary irritant effect:
- on the skin: May cause irritation
- on the eye: May cause irritation

Sensitization:
- No sensitizing effects known.

Other information (about experimental toxicology):
- Tumorigenic effects have been observed on tests with laboratory animals.
- Carcinogenic effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:
- Effects in experimental animals via subcutaneous route include anemia, hypertension, vascular lesions, hypertrophy of the heart and kidneys, renal pathology and increased thyroid weight.

Additional toxicological information:
- To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
- IARC-3: Not classifiable as to carcinogenicity to humans.
- 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 undiluted product or large quantities of it to reach ground water, water course or sewage system.
- 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.

14 Transport information

Not a hazardous material for transportation.

DOT regulations:
- Hazard class: None

Land transport ADR/RID (cross-border)
- ADR/RID class: None

Maritime transport IMDG:
- IMDG Class: None

Air transport ICAO-TI and IATA-DGR:
- ICAO/IATA Class: None

Transport/Additional information: Not dangerous according to the above specifications.
15 Regulations

Product related hazard information:
Observe the general safety regulations when handling chemicals

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

Information about limitation of use: For use only by technically qualified individuals.

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
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent