

# Pentafluoroethanesulfonic acid

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations  
SDS Reference Number: 616433L  
Issue date: 3/4/2021 Revision date: 12/18/2023 Version: 1.1

### SECTION 1 Identification

#### 1.1. Product identifier

Product form : Substance  
Substance name : Pentafluoroethanesulfonic acid  
CAS-No. : 354-88-1  
Product code : 6164-3-3L  
Formula : C<sub>2</sub>HF<sub>5</sub>O<sub>3</sub>S

#### 1.2. Other means of identification

Synonyms : 1,1,2,2,2-Pentafluoroethanesulfonic acid; Perfluoroethane sulfonate  
Other means of identification : MFCD01861156

#### 1.3. Recommended use of the chemical and restrictions on use

Use of the substance/mixture : Laboratory chemicals, Manufacture of substances, Scientific research and development

#### 1.4. Supplier's details

SynQuest Laboratories, Inc.  
P.O. Box 309  
Alachua, FL, Alachua, 32615  
United States of America  
T (386) 462-0788 - F (386) 462-7097  
[info@synquestlabs.com](mailto:info@synquestlabs.com) - [www.synquestlabs.com](http://www.synquestlabs.com)

#### 1.5. Emergency phone number

Emergency number : (844) 523-4086 (3E Company - Account 10069)

### SECTION 2 Hazard Identification

#### 2.1. Classification of the substance or mixture

##### GHS US classification

|   |      |  |
|---|------|--|
| Acute toxicity (oral), Category 4                             | H302 | Harmful if swallowed.                    |
| Acute toxicity (dermal), Category 4                           | H312 | Harmful in contact with skin.            |
| Skin corrosion/irritation, Category 1B                        | H314 | Causes severe skin burns and eye damage. |
| Serious eye damage/eye irritation, Category 1                 | H318 | Causes serious eye damage.               |
| Specific target organ toxicity – Single exposure, Category 3, | H335 | May cause respiratory irritation.        |
| Respiratory tract irritation                                  |      |  |
| Full text of H statements : see section 16                    |      |  |

#### 2.2. Label elements

##### GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger  
Hazard statements (GHS US) : H302+H312 - Harmful if swallowed or in contact with skin  
H314 - Causes severe skin burns and eye damage  
H335 - May cause respiratory irritation

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Precautionary statements (GHS US) : P260 - Do not breathe dusts or mists.  
P264 - Wash hands, forearms and face thoroughly after handling.  
P270 - Do not eat, drink or smoke when using this product.  
P271 - Use only outdoors or in a well-ventilated area.  
P280 - Wear protective gloves, protective clothing, eye protection, face protection, and hearing protection.  
P301+P312 - If swallowed: Call a POISON CENTER or doctor/ physician if you feel unwell  
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.  
P302+P352 - If on skin: Wash with plenty of soap and water  
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.  
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P310 - Immediately call a POISON CENTER or doctor/ physician  
P321 - Specific treatment (see supplemental first aid instruction on this label).  
P330 - Rinse mouth.  
P362+P364 - Take off contaminated clothing and wash it before reuse.  
P363 - Take off immediately all contaminated clothing and wash it before reuse.  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.  
P405 - Store locked up.  
P501 - Dispose of contents and/or container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulations.

### 2.3. Hazards associated with known or reasonably anticipated uses

No additional information available

### 2.4. Hazards not otherwise classified

Other hazards which do not result in classification : Reacts violently with water.

### 2.5. Unknown acute toxicity

No additional information available

## SECTION 3 Composition/information on ingredients

### 3.1. Substances

Substance type : Mono-constituent

| Name   | Product identifier | %     | GHS US classification  |
|--|--------------------|-------|--|
| Pentafluoroethanesulfonic acid<br>(Main constituent) | CAS-No.: 354-88-1  | ≤ 100 | Acute Tox. 4 (Oral), H302<br>Acute Tox. 4 (Dermal), H312<br>Skin Corr. 1B, H314<br>Eye Dam. 1, H318<br>STOT SE 3, H335 |

Full text of hazard classes and H-statements : see section 16

### 3.2. Mixtures

Not applicable

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### SECTION 4 First aid measures

#### 4.1. Description of necessary first-aid measures

|                                       |   |
|---------------------------------------|---|
| First-aid measures general            | : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.          |
| First-aid measures after inhalation   | : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.                             |
| First-aid measures after skin contact | : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.   |
| First-aid measures after eye contact  | : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention. |
| First-aid measures after ingestion    | : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.                                |

#### 4.2. Most important symptoms/effects, acute and delayed

|                                   |   |
|-----------------------------------|---|
| Symptoms/effects                  | : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.                  |
| Symptoms/effects after inhalation | : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. |

#### 4.3. Indication of immediate medical attention and special treatment needed, if necessary

|                                   |                          |
|-----------------------------------|--------------------------|
| Other medical advice or treatment | : Treat symptomatically. |
|-----------------------------------|--------------------------|

### SECTION 5: Fire-fighting measures

#### 5.1. Suitable (and unsuitable) extinguishing media

|                              |   |
|------------------------------|---|
| Suitable extinguishing media | : Alcohol resistant foam. Carbon dioxide. Dry powder. Use extinguishing media appropriate for surrounding fire. |
|------------------------------|---|

#### 5.2. Specific hazards arising from the chemical

|                  |   |
|------------------|---|
| Explosion hazard | : Risk of explosion if heated under confinement. Use water spray or fog for cooling exposed containers. |
|------------------|---|

#### 5.3. Special protective equipment and precautions for fire-fighters

|                                |  |
|--------------------------------|--|
| Firefighting instructions      | : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.  |
| Protection during firefighting | : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection". |

### SECTION 6 Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

|                  |   |
|------------------|---|
| General measures | : Evacuate unnecessary personnel. Ensure adequate air ventilation. Do not breathe gas, fumes, vapor or spray. |
|------------------|---|

##### For non-emergency personnel

|                      |   |
|----------------------|---|
| Emergency procedures | : Only qualified personnel equipped with suitable protective equipment may intervene. |
|----------------------|---|

##### For emergency responders

|                      |   |
|----------------------|---|
| Protective equipment | : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection". |
| Emergency procedures | : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.   |

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Environmental precautions : Avoid release to the environment. Notify authorities if product enters sewers or public waters.

### 6.2. Methods and materials for containment and cleaning up

For containment : Stop leak if safe to do so. Dike for recovery or absorb with appropriate material.  
Methods for cleaning up : Take up large spills with pump or vacuum and finish with dry chemical absorbent. Use explosion-proof equipment. Take up small spills with dry chemical absorbent. Sweep or shovel spills into appropriate container for disposal. Ventilate area.  
Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

For further information refer to section 8: "Exposure controls/personal protection"

## SECTION 7 Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.  
Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

### 7.2. Conditions for safe storage, including incompatibilities

Technical measures : Comply with applicable regulations.  
Storage conditions : Keep container closed when not in use. Keep contents under inert gas.  
Storage area : Store in dry, cool, well-ventilated area.  
Incompatible materials : Refer to Section 10 on Incompatible Materials.  
Information on mixed storage : Do not store with: Water.

## SECTION 8 Exposure controls/personal protection

### 8.1. Control parameters

No additional information available

### 8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

### 8.3. Individual protection measures, such as personal protective equipment

|  |
|--|
| <b>Hand protection:</b>  |
| protective gloves. 29 CFR 1910.138: Hand Protection  |
| <b>Eye protection:</b>   |
| Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection              |
| <b>Skin and body protection:</b>   |
| Wear suitable protective clothing  |
| <b>Respiratory protection:</b>   |
| In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection |

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### Personal protective equipment symbol(s):



### Other information:

Safety shoes. 29 CFR 1910.136: Foot Protection.

## SECTION 9 Physical and chemical properties

### 9.1. Basic physical and chemical properties

|   |                     |
|---|---------------------|
| Physical state                                  | : Liquid            |
| Color   | : No data available |
| Odor  | : No data available |
| Odor threshold                                  | : No data available |
| pH  | : No data available |
| Melting point                                   | : No data available |
| Freezing point                                  | : No data available |
| Boiling point                                   | : 178 °C            |
| Flash point                                     | : No data available |
| Flammability (solid, gas)                       | : No data available |
| Vapor pressure                                  | : No data available |
| Relative vapor density at 20 °C                 | : No data available |
| Relative density                                | : No data available |
| Molecular mass                                  | : 200.085 g/mol     |
| Solubility                                      | : No data available |
| Partition coefficient n-octanol/water (Log Pow) | : No data available |
| Auto-ignition temperature                       | : No data available |
| Decomposition temperature                       | : No data available |
| Viscosity, kinematic                            | : No data available |
| Explosion limits                                | : No data available |
| Particle characteristics                        | : No data available |

### 9.2. Data relevant with regard to physical hazard classes (supplemental)

No additional information available

## SECTION 10 Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

The product is stable at normal handling and storage conditions.

### 10.3. Possibility of hazardous reactions

Reacts violently with water.

### 10.4. Conditions to avoid

Keep away from heat, sparks and flame.

### 10.5. Incompatible materials

Bases. Strong oxidizing agents. Water.

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### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

## SECTION 11 Toxicological information

### 11.1. Likely routes of exposure

|                                   |   |
|-----------------------------------|---|
| Acute toxicity (oral)             | : Harmful if swallowed.   |
| Acute toxicity (dermal)           | : Harmful in contact with skin.   |
| Acute toxicity (inhalation)       | : No data available   |
| Skin corrosion/irritation         | : Causes severe skin burns.   |
| Serious eye damage/irritation     | : Causes serious eye damage.  |
| Respiratory or skin sensitization | : No data available   |
| Germ cell mutagenicity            | : No data available   |
| Carcinogenicity                   | : No data available   |
| Reproductive toxicity             | : No data available   |
| STOT-single exposure              | : May cause respiratory irritation.   |
| STOT-repeated exposure            | : No data available   |
| Aspiration hazard                 | : No data available   |
| Symptoms/effects                  | : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.                  |
| Symptoms/effects after inhalation | : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. |

## SECTION 12 Ecological information

### 12.1. Ecotoxicity

|   |                     |
|---|---------------------|
| Hazardous to the aquatic environment, short-term (acute)  | : No data available |
| Hazardous to the aquatic environment, long-term (chronic) | : No data available |

### 12.2. Persistence and degradability

#### Pentafluoroethanesulfonic acid (354-88-1)

|                               |   |
|-------------------------------|---|
| Persistence and degradability | Not readily biodegradable. May cause long-term adverse effects in the environment. PBT - Persistent, Bioaccumulative and Toxic. |
|-------------------------------|---|

### 12.3. Bioaccumulative potential

#### Pentafluoroethanesulfonic acid (354-88-1)

|                           |   |
|---------------------------|---|
| Bioaccumulative potential | Perfluorinated alkanes (PFAs, "forever chemicals") are long lasting, widely used chemicals that break down slowly over time. The potential hazards of PFAs are under investigation and have not been established. |
|---------------------------|---|

### 12.4. Mobility in soil

No additional information available

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### 12.5. Other adverse effects

|                              |                     |
|------------------------------|---------------------|
| Ozone                        | : No data available |
| Fluorinated greenhouse gases | : No                |

## SECTION 13 Disposal considerations

|  |   |
|--|---|
| Waste treatment methods                    | : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.   |
| Sewage disposal recommendations            | : See the EPA's Interim Guidance on PFAS Destruction and Disposal.  |
| Product/Packaging disposal recommendations | : Dispose of contents/container in accordance with licensed collector's sorting instructions.   |
| Additional information                     | : Recycle the material as far as possible.  |
| Ecological information                     | : This material is considered to be a "Forever chemical". Prevent any possible release to the environment. Do not discharge into drains. Take all necessary measures to prevent accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems, or emergency response. |

## SECTION 14 Transport information

### 14.1. UN number

|               |          |
|---------------|----------|
| UN-No.(DOT)   | : UN3265 |
| UN-No. (TDG)  | : UN3265 |
| UN-No. (IMDG) | : 3265   |
| UN-No. (IATA) | : 3265   |

### 14.2. UN Proper Shipping Name

|                             |   |
|-----------------------------|---|
| Proper Shipping Name (DOT)  | : Corrosive liquid, acidic, organic, n.o.s. |
| Proper Shipping Name (TDG)  | : CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Proper Shipping Name (IMDG) | : CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Proper Shipping Name (IATA) | : Corrosive liquid, acidic, organic, n.o.s. |

### 14.3. Transport hazard class(es)

#### DOT

|                                  |     |
|----------------------------------|-----|
| Transport hazard class(es) (DOT) | : 8 |
| Hazard labels (DOT)              | : 8 |



#### TDG

|                                  |     |
|----------------------------------|-----|
| Transport hazard class(es) (TDG) | : 8 |
| Hazard labels (TDG)              | : 8 |



#### IMDG

|                                   |     |
|-----------------------------------|-----|
| Transport hazard class(es) (IMDG) | : 8 |
| Hazard labels (IMDG)              | : 8 |

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### IATA

Transport hazard class(es) (IATA) : 8

Hazard labels (IATA) : 8



### 14.4. Packing group

Packing group (DOT) : II

Packing group (TDG) : II

Packing group (IMDG) : II

Packing group (IATA) : II

### 14.5. Environmental hazards

Other information : No supplementary information available.

### 14.6. Transport in bulk

Not applicable

### 14.7. Special precautions for user

#### DOT

UN-No.(DOT) : UN3265

DOT Special Provisions (49 CFR 172.102) : 148 - Except for transportation by aircraft, when transported as a limited quantity or a consumer commodity, the maximum net capacity specified in §173.150(b)(2) of this subchapter for inner packaging may be increased to 5 L (1.3 gallons).

B2 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.

IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.

T11 - 6 178.274(d)(2) Normal..... 178.275(d)(3)

TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where:  $t_r$  is the maximum mean bulk temperature during transport,  $t_f$  is the temperature in degrees celsius of the liquid during filling, and  $a$  is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling ( $t_f$ ) and the maximum mean bulk temperature during transportation ( $t_r$ ) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where:  $d_{15}$  and  $d_{50}$  are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.

TP27 - A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202

DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L

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|                             |   |
|-----------------------------|---|
| DOT Vessel Stowage Location | : B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded. |
| DOT Vessel Stowage Other    | : 40 - Stow "clear of living quarters",53 - Stow "separated from" alkaline compounds,58 - Stow "separated from" cyanides  |

### TDG

|   |  |
|---|--|
| UN-No. (TDG)  | : UN3265   |
| TDG Special Provisions  | : 16 - 1) The technical name of the most dangerous substance related to the primary class must be shown, in parentheses, on the shipping document following the shipping name in accordance with clause 3.5(1)(c)(i)(A) of Part 3, Documentation. The technical name must also be shown, in parentheses, on a small means of containment or on a tag following the shipping name in accordance with subsections 4.11(2) and (3) of Part 4, Dangerous Goods Safety Marks.<br>2) subsection (1), the technical name for the following dangerous goods is not required to be shown on a shipping document or on a small means of containment when Canadian law for domestic transport or an international convention for international transport prohibits the disclosure of the technical: a) UN1544, ALKALOID SALTS, SOLID, N.O.S. or ALKALOIDS, SOLID, N.O.S; b) UN1851, MEDICINE, LIQUID, TOXIC, N.O.S; c) UN3140, ALKALOID SALTS, LIQUID, N.O.S. or ALKALOIDS, LIQUID, N.O.S; d) UN3248, MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S; or e) UN3249, MEDICINE, SOLID, TOXIC, N.O.S. An example in Canada is the "Food and Drugs Act". |
| Explosive Limit and Limited Quantity Index                                  | : 1 L  |
| Excepted quantities (TDG)   | : E2   |
| Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index | : 1 L  |
| Emergency Response Guide (ERG) Number                                       | : 153  |

### IMDG

|                                    |  |
|------------------------------------|--|
| Special provision (IMDG)           | : 274  |
| Limited quantities (IMDG)          | : 1 L  |
| Excepted quantities (IMDG)         | : E2   |
| Packing instructions (IMDG)        | : P001   |
| IBC packing instructions (IMDG)    | : IBC02  |
| Tank instructions (IMDG)           | : T11  |
| Tank special provisions (IMDG)     | : TP2, TP27  |
| EmS-No. (Fire)                     | : F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE     |
| EmS-No. (Spillage)                 | : S-B - SPILLAGE SCHEDULE Bravo - CORROSIVE SUBSTANCES |
| Stowage category (IMDG)            | : B  |
| Stowage and handling (IMDG)        | : SW2  |
| Segregation (IMDG)                 | : SGG1, SG36, SG49                                     |
| Properties and observations (IMDG) | : Causes burns to skin, eyes and mucous membranes.     |

### IATA

|  |            |
|--|------------|
| Special provision (IATA)                     | : A3, A803 |
| PCA Excepted quantities (IATA)               | : E2       |
| PCA Limited quantities (IATA)                | : Y840     |
| PCA limited quantity max net quantity (IATA) | : 0.5L     |
| PCA packing instructions (IATA)              | : 851      |
| PCA max net quantity (IATA)                  | : 1L       |
| CAO packing instructions (IATA)              | : 855      |
| CAO max net quantity (IATA)                  | : 30L      |
| ERG code (IATA)                              | : 8L       |

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### SECTION 15 Regulatory information

#### 15.1. Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory, except for:

|                                |                  |      |
|--------------------------------|------------------|------|
| Pentafluoroethanesulfonic acid | CAS-No. 354-88-1 | 100% |
|--------------------------------|------------------|------|

#### 15.2. International regulations

##### CANADA

No additional information available

##### EU-Regulations

No additional information available

##### National regulations

No additional information available

#### 15.3. State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

### SECTION 16 Other information

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Issue date : 3/4/2021

#### Full text of hazard classes and H-statements

|      |   |
|------|---|
| H302 | Harmful if swallowed                    |
| H312 | Harmful in contact with skin            |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage               |
| H335 | May cause respiratory irritation        |

NFPA health hazard

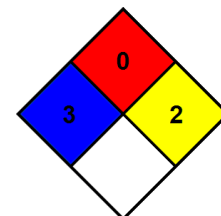
: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA fire hazard

: 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA reactivity

: 2 - Materials that readily undergo violent chemical change at elevated temperatures and pressures.



Hazard Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.