

# Phosphorus pentafluoride

## Safety Data Sheet M015202

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 04/20/2017

Version: 1.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Substance  
 Substance name : Phosphorus pentafluoride  
 CAS No : 7647-19-0  
 Product code : M015-2-02  
 Formula : F5P  
 Synonyms : Phosphorus(V) fluoride  
 Other means of identification : MFCD00040326

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

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

#### 1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.  
 P.O. Box 309  
 Alachua, FL 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)

#### 1.4. Emergency telephone number

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

### SECTION 2: Hazard(s) identification

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

##### Classification (GHS-US)

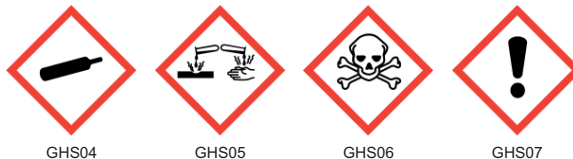
|                           |                                                           |
|---------------------------|-----------------------------------------------------------|
| Simple Asphy              | H380 - May displace oxygen and cause rapid suffocation    |
| Liquefied gas             | H280 - Contains gas under pressure; may explode if heated |
| Acute Tox. 3 (Oral)       | H301 - Toxic if swallowed                                 |
| Acute Tox. 3 (Dermal)     | H311 - Toxic in contact with skin                         |
| Acute Tox. 3 (Inhalation) | H331 - Toxic if inhaled                                   |
| Skin Corr. 1B             | H314 - Causes severe skin burns and eye damage            |
| Eye Dam. 1                | H318 - Causes serious eye damage                          |
| STOT SE 3                 | H335 - May cause respiratory irritation                   |

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H280 - Contains gas under pressure; may explode if heated  
 H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled  
 H314 - Causes severe skin burns and eye damage  
 H335 - May cause respiratory irritation  
 H380 - May displace oxygen and cause rapid suffocation

Precautionary statements (GHS-US) :

P260 - Do not breathe fumes, gas, mist, spray, vapors  
 P264 - Wash skin 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  
 P301+P310 - If swallowed: Immediately call a poison center/doctor/...  
 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

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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  
P311 - Call a POISON CENTER or doctor/physician  
P321 - Specific treatment (see supplemental first aid instructions on this label)  
P330 - Rinse mouth  
P361 - Take off immediately all contaminated clothing  
P363 - Wash contaminated clothing before reuse  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up  
P410+P403 - Protect from sunlight. Store in a well-ventilated place  
P501 - Dispose of contents/container to an approved waste disposal plant

### 2.3. Other hazards

No additional information available

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Substance type : Mono-constituent

| Name                                           | Product identifier | %      | Classification (GHS-US)                                                                                                                                                                                |
|------------------------------------------------|--------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phosphorus pentafluoride<br>(Main constituent) | (CAS No) 7647-19-0 | <= 100 | Simple Asphy, H380<br>Liquefied gas, H280<br>Acute Tox. 3 (Oral), H301<br>Acute Tox. 3 (Dermal), H311<br>Acute Tox. 3 (Inhalation), H331<br>Skin Corr. 1B, H314<br>Eye Dam. 1, H318<br>STOT SE 3, H335 |

Full text of H-phrases: see section 16

### 3.2. Mixture

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of 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 : Thaw frosted parts with lukewarm water. Do not rub affected area. Remove contaminated clothing and shoes. In case of skin contact, wearing rubber gloves rub 2.5% calcium gluconate gel continuously into the affected area for 1.5 hours or until further medical care is available. Get immediate medical advice/attention.

First-aid measures after eye contact : Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention. Immediately flush eyes thoroughly with water for at least 15 minutes.

First-aid measures after ingestion : Due to its physical form, exposure to this chemical is not likely. 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 and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation : May cause drowsiness or dizziness. Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

Symptoms/injuries after skin contact : Contact with the liquid may cause cold burns/frostbite.

Symptoms/injuries after eye contact : Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically. Absorption of excessive F- can result in acute systemic fluorosis with hypocalcemia, interference with various metabolic functions and organ damage (heart, liver, kidneys).

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Dry powder. Use extinguishing media appropriate for surrounding fire.

#### 5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Hydrogen fluoride. Phosphorus oxides.  
Explosion hazard : Contains gas under pressure; may explode if heated. Use water spray or fog for cooling exposed containers.

#### 5.3. Advice for firefighters

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. May cause suffocation by reducing oxygen available for breathing. Do not breathe gas, fumes, vapor or spray.

##### 6.1.1. For non-emergency personnel

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

##### 6.1.2. 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.

#### 6.2. Environmental precautions

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

#### 6.3. Methods and material for containment and cleaning up

For containment : Stop leak if safe to do so.  
Methods for cleaning up : Ventilate area.  
Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

#### 6.4. Reference to other sections

No additional information available

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Close valve after each use and when empty.  
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, gas, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.  
Safe handling of the gas receptacle : Securely chain cylinders when in use and protect against physical damage.  
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 any incompatibilities

Technical measures : Comply with applicable regulations.  
Storage conditions : Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep container closed when not in use. Moisture sensitive.  
Incompatible materials : Refer to Section 10 on Incompatible Materials.  
Storage area : Store in dry, cool, well-ventilated area.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No additional information available

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 8.2. Exposure 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. Systems under pressure should be regularly checked for leakage. Oxygen detectors should be used when asphyxiating gases may be released. Gas detectors should be used when toxic gases may be released. |
| Hand protection                  | : Protective gloves. 29 CFR 1910.138: Hand Protection.                                                                                                                                                                                                                                                                                                                          |
| Eye protection                   | : Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.                                                                                                                                                                                                                                                                                    |
| Skin and body protection         | : Wear suitable protective clothing.                                                                                                                                                                                                                                                                                                                                            |
| Respiratory protection           | : In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.                                                                                                                                                                                                                                                                       |
| Thermal hazard protection        | : Cold insulating gloves.                                                                                                                                                                                                                                                                                                                                                       |
| Other information                | : Safety shoes. 29 CFR 1910.136: Foot Protection.                                                                                                                                                                                                                                                                                                                               |

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

|                                             |                      |
|---------------------------------------------|----------------------|
| Physical state                              | : Gas                |
| Color                                       | : No data available  |
| Odor                                        | : No data available  |
| Odor threshold                              | : No data available  |
| pH                                          | : No data available  |
| Melting point                               | : -91.6 °C           |
| Freezing point                              | : No data available  |
| Boiling point                               | : -84.8 °C           |
| Flash point                                 | : No data available  |
| Relative evaporation rate (butyl acetate=1) | : No data available  |
| Flammability (solid, gas)                   | : No data available  |
| Explosion limits                            | : No data available  |
| Explosive properties                        | : No data available  |
| Oxidizing properties                        | : No data available  |
| Vapor pressure                              | : 415 psia (@ 21 °C) |
| Relative density                            | : No data available  |
| Relative vapor density at 20 °C             | : No data available  |
| Molecular mass                              | : 125.97 g/mol       |
| Solubility                                  | : No data available  |
| Log Pow                                     | : No data available  |
| Auto-ignition temperature                   | : No data available  |
| Decomposition temperature                   | : No data available  |
| Viscosity                                   | : No data available  |
| Viscosity, kinematic                        | : No data available  |
| Viscosity, dynamic                          | : No data available  |

### 9.2. Other information

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

Contact with acids liberates toxic gas. Contact with water liberates toxic gas.

### 10.4. Conditions to avoid

Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep away from heat, sparks and flame.

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 10.5. Incompatible materials

Acids. Strong bases. Strong oxidizing agents. Water.

### 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. Information on toxicological effects

Acute toxicity : Oral: Toxic if swallowed. Dermal: Toxic in contact with skin. Inhalation: Toxic if inhaled.

| Phosphorus pentafluoride (7647-19-0) |                           |
|--------------------------------------|---------------------------|
| ATE US (oral)                        | 100.000 mg/kg body weight |
| ATE US (dermal)                      | 300.000 mg/kg body weight |
| ATE US (gases)                       | 700.000 ppmV/4h           |
| ATE US (vapors)                      | 3.000 mg/l/4h             |
| ATE US (dust, mist)                  | 0.500 mg/l/4h             |

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Absorption of excessive F- can result in acute systemic fluorosis with hypocalcemia, interference with various metabolic functions and organ damage (heart, liver, kidneys).

Symptoms/injuries after inhalation : May cause drowsiness or dizziness. Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

Symptoms/injuries after skin contact : Contact with the liquid the may cause cold burns/frostbite.

Symptoms/injuries after eye contact : Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

## SECTION 12: Ecological information

### 12.1. Toxicity

No additional information available

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

No additional information available

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.

Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Additional information : Recycle the material as far as possible.

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### SECTION 14: Transport information

#### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN2198 Phosphorus pentafluoride, 2.3

UN-No.(DOT) : UN2198

Proper Shipping Name (DOT) : Phosphorus pentafluoride

Transport hazard class(es) (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Hazard labels (DOT) : 2.3 - Poison gas  
8 - Corrosive



DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;304

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Special Provisions (49 CFR 172.102) : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.  
B9 - Bottom outlets are not authorized.  
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.

DOT Packaging Exceptions (49 CFR 173.xxx) : None

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

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

DOT Vessel Stowage Location : D - The material must be stowed "on deck only" 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, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Emergency Response Guide (ERG) Number : 125;173

Other information : No supplementary information available.

#### TDG

No additional information available

#### Transport by sea

UN-No. (IMDG) : 2198

Proper Shipping Name (IMDG) : PHOSPHORUS PENTAFLUORIDE

Class (IMDG) : 2 - Gases

#### Air transport

UN-No. (IATA) : 2198

Proper Shipping Name (IATA) : Phosphorus pentafluoride

Class (IATA) : 2

### SECTION 15: Regulatory information

#### 15.1. US Federal regulations

##### Phosphorus pentafluoride (7647-19-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

### 15.2. International regulations

#### CANADA

##### Phosphorus pentafluoride (7647-19-0)

Listed on the Canadian NDSL (Non-Domestic Substances List)

#### EU-Regulations

No additional information available

#### National regulations

##### Phosphorus pentafluoride (7647-19-0)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the Canadian IDL (Ingredient Disclosure List)  
Listed on INSQ (Mexican national Inventory of Chemical Substances)

### 15.3. US State regulations

##### Phosphorus pentafluoride (7647-19-0)

|                            |                                                            |
|----------------------------|------------------------------------------------------------|
| State or local regulations | U.S. - New Jersey - Right to Know Hazardous Substance List |
|----------------------------|------------------------------------------------------------|

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

## SECTION 16: Other information

Full text of H-phrases:

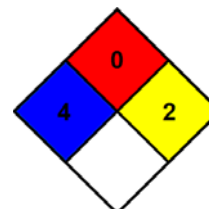
|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| Acute Tox. 3 (Dermal)     | Acute toxicity (dermal) Category 3                          |
| Acute Tox. 3 (Inhalation) | Acute toxicity (inhalation) Category 3                      |
| Acute Tox. 3 (Oral)       | Acute toxicity (oral) Category 3                            |
| Eye Dam. 1                | Serious eye damage/eye irritation Category 1                |
| Liquefied gas             | Gases under pressure Liquefied gas                          |
| Simple Asphy              | Simple Asphyxiant                                           |
| Skin Corr. 1B             | Skin corrosion/irritation Category 1B                       |
| STOT SE 3                 | Specific target organ toxicity (single exposure) Category 3 |
| H280                      | Contains gas under pressure; may explode if heated          |
| H301                      | Toxic if swallowed                                          |
| H311                      | Toxic in contact with skin                                  |
| H314                      | Causes severe skin burns and eye damage                     |
| H318                      | Causes serious eye damage                                   |
| H331                      | Toxic if inhaled                                            |
| H335                      | May cause respiratory irritation                            |
| H380                      | May displace oxygen and cause rapid suffocation             |

NFPA health hazard

NFPA fire hazard

NFPA reactivity

- : 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given.
- : 0 - Materials that will not burn.
- : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



# Phosphorus pentafluoride

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

|                 |                                                                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HMIS III Rating |                                                                                                                                                                                                                                             |
| Health          | : 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures                                                                                                                            |
| 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. |

SDS US (GHS HazCom 2012)

*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.*