

**SAFETY DATA SHEET****1. IDENTIFICATION**

**Product Identifier:** Potassium Perchlorate, Anhydrous  
**Synonyms:** Perchloric Acid, Potassium Salt  
**Product Code:** Reach Pre-Registration: 05-2114285171-53-0000  
**Manufacturer / Supplier:** American Pacific  
**Address:** 10622 West 6400 North, Cedar City, UT 84721  
**Telephone:** +1 (435) 865-5000 **Fax:** +1 (435) 865-5005  
**Emergency Contact:** CHEMTREC  
 Customer Number: CCN721187  
 US Tel: 1 (800) 424-9300  
 Int'l Tel: +1 (703) 741-5970

**Use of the substance/preparation:** Analytical chemistry, oxidizer in various propellant or explosive mixtures, automotive airbags, seatbelt pre-tensioners, fireworks, and road flares.

**2 HAZARDS IDENTIFICATION****Hazard Classification:**

Oxidizing solids (Category 1)  
 Acute Toxicity Oral (Category 4)

**Signal Word: Danger**

**Preparation classification:****Physical Hazard:**

H271: May cause fire or explosion; strong oxidizer - Oxidizing Solid 1

**Health Hazard:**

H302: Harmful if swallowed - Acute Toxicity 4

**Precautionary Statements:**

P210: Keep away from heat  
 P220: Keep/Store away from clothing/combustible materials  
 P221: Take any precaution to avoid mixing with combustible materials  
 P264: Wash skin thoroughly after handling  
 P272: Contaminated work clothing should not be allowed out of the workplace  
 P280: Wear protective gloves/protective clothing/eye protection / face protection  
 P363: Wash contaminated clothing before reuse  
 P370+P378: In case of fire: use water to extinguish.  
 P371+P380+P375: In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Hazards not otherwise classified (HNOC) or not covered by GHS - none

**Potential acute health effects:** Acute eye: irritation, redness, tearing

Acute skin: Irritating to mucous membranes and skin

Acute inhalation: may cause respiratory tract irritation; coughing, and shortness of breath; high concentrations may cause more significant respiratory effects

Acute ingestion: may cause gastrointestinal irritation; larger doses may cause nausea and vomiting.

**Potential chronic effects:** Perchlorates act to reversibly and competitively inhibit iodine uptake by the thyroid gland. Perchlorate is soluble in water, so exposure to perchlorate can be via water contaminated with perchlorate or inhalation in the workplace. With chronic exposure given sufficient dose (see (United States National Research Council) NRC, 2005) and duration, perchlorate can cause thyroidal stores of iodine to be reduced, which may lead to hypothyroidism.

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For workers that live in areas of the world with endemic iodine deficiency, it is important that these people receive adequate iodine in the diet or are supplemented with iodine.

**Information pertaining to particular dangers for man and environment:** May be explosive when mixed with combustible material. In almost all cases the presence of water reduces the risk unless the water is first evaporated from the material. Risk of explosion if heated under confinement.

## 3 COMPOSITION/INFORMATION ON INGREDIENTS

**Chemical Name:** Potassium Perchlorate

<b>Ingredient Name</b>	<b>Chemical Makeup</b>	<b>CAS#</b>	<b>EC#</b>	<b>%</b>
Potassium Perchlorate	KClO <sub>4</sub>	7778-74-7	231-912-9	~100

## 4 FIRST AID MEASURES

As a general rule, in case of doubt or if symptoms persist, always call a physician

<b>Routes of exposure</b>	<b>Signs and symptoms of exposure:</b>	<b>Emergency and first aid procedures:</b>
<b>Skin:</b>       <b>Serious Skin Contact:</b>	May cause local irritation or stinging effect	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention  Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention
<b>Inhalation:</b>       <b>Serious Inhalation:</b>	Airborne concentrations of potassium perchlorate can aggravate pre-existing respiratory problems. Chronic exposure may interfere with the uptake of iodine by the thyroid which may cause hypothyroidism	If experiencing increased respiration or shortness of breath, move to fresh air. Administer oxygen if exposed person is unconscious. Never give anything by mouth to an unconscious person  Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention
<b>Ingestion:</b>	Ingestion of large quantities has been reported to cause staggering in small mammals. Chronic ingestion of sufficient quantities may interfere with uptake of iodine by the thyroid which may cause hypothyroidism.	Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
<b>Eyes:</b>	Irritation of the eyes will cause stinging effect.	Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

## 5 FIRE FIGHTING MEASURES

### Flammable properties:

Flash point: not flammable

Flash point method: not applicable

Auto-ignition temperature: not applicable

Upper flammability limit (volume % in air): not applicable

Lower flammability limit (volume % in air): not applicable

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**Extinguishing Media:** Contact professional fire-fighters immediately

For small fires, do NOT use dry chemicals, carbon dioxide, halon or foams. USE WATER ONLY. For large fires, flood fire area with water from a distance. Contact with water or steam may produce toxic and flammable vapors

**Unusual fire and explosion hazards:** Potassium perchlorate is an oxidizing agent and may cause rapid combustion or explosions if mixed with fuels, including organic materials or powdered metals. It is not usually a fire hazard as a result of the container if in a DOT approved shipping container suitable to contain potassium perchlorate including plastic drums or steel drums lined with plastic protective coating. Gross contamination of fiber drums, FIBC sacks, or other containers may cause a fire or explosion hazard if not kept in shipping condition and if contamination is allowed on the exterior surface

**Special firefighting precautions/instructions:** 1) Do not fight fires involving mixtures of potassium perchlorate and fuels. Potassium perchlorate is an oxidizing agent and may cause rapid combustion or explosions if mixed with fuels. 2) Burning potassium perchlorate may produce chlorine, chlorine dioxide, hydrogen chloride, and oxides of nitrogen as well as mixtures with any other compounds involved in the combustion. These are common by-products of combustion and are likely to be serious health concern; thus, keep upwind or wear self-contained breathing apparatus when attempting to rescue

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer

Contact with other material may cause fire. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Some oxidizers may react explosively with hydrocarbons (fuel). Containers may explode when heated

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## 6 ACCIDENTAL RELEASE MEASURES

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:** Oxidizing material. Stop leak if without risk. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substances damp, using water spray. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal

**Personal precautions:** Handle the dispersed product wearing protective gloves and glasses as described in section 8

**Environmental precautions:** Dispose of waste recovered in accordance with applicable local, state, and federal regulations. Avoid contaminating the environment via the sewers or water sources. Dispose of in accordance with local, state, and federal regulations

**Methods for cleaning up:** Sweep up material and containerize. Clean contaminated floor surface with water. Move away incompatible products (organic materials, reducing agents)

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## 7 HANDLING AND STORAGE

**Handling:** Handle away from heat and humidity sources (if possible in covered and well ventilated premises).

Avoid contact with incompatible substances (organic materials and reducing agents, especially fuels, oils, greases, etc.).

Avoid contact with eyes and skin (wear appropriate personal protective equipment: glasses, gloves and mask in case of dust)

Prevent any contamination of the environment via the sewers or water sources

**Precautions:** Keep locked up - Keep container dry - Keep away from heat - Keep away from sources of ignition - Keep away from combustible material - Keep away from direct sunlight or strong incandescent light - Do not breathe dust - Never add water to this product. Avoid shock and friction. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes

The regulation relating to storage premises apply to workshops where the product is handled

**Fire prevention:** Avoid any contamination. Contaminated materials may be sensitive to shocks and friction.

**Recommended equipment and procedures:** Store in original closed containers in areas that are specially designated for storage of compatible oxidizers

**Prohibited equipment and procedures:** Do not use containers that have not been approved for shipping this particular oxidizer. Refer to relevant transportation codes for the area of use, but is suggested that the UN requirements be met if they are more stringent.

**Specific uses:** Analytical chemistry, oxidizer in various propellant or explosive mixtures, automotive airbags, seatbelt pre-tensioners, fireworks, and road flares

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**Storage:** Do not store with reducing agents, organic materials, especially fuels, oils, greases, etc.  
Do not store with explosive substances that may detonate  
Do not store close to a heat source that could cause temperatures to approach the decomposition temperature

## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

It is always advisable to minimize dusting where there may be exposure to water, or to use respiratory protection for environments where substantial dust is generated.

### Technical measures:

Ventilate as necessary to minimize dust exposures. Inspect and clean ventilation systems regularly.

### Control Parameters:

Contains no substances with occupational exposure limit values

Ingredient Name	ACGIH TLV TWA	OSHA PEL TWA
Potassium Perchlorate	10 mg/m <sup>3</sup> (Inhalable Particles) 3.0 mg/m <sup>3</sup> (Respirable Particles)	15 mg/m <sup>3</sup> (Total Dust) 5.0 mg/m <sup>3</sup> (Respirable Fraction)

The above limits are for particulates not otherwise classified

### Exposure controls:

**Appropriate engineering controls.** Ventilate as necessary to minimize dust exposures. Inspect and clean ventilation systems regularly

### Personal protective equipment:

**Skin Protection:** Wear impervious aprons or rain gear to reduce contamination of cotton or other fiber clothing. Plastic, rubber or latex gloves are recommended. Leather or cotton gloves should not be used unless a management program is implemented to ensure detection of contamination and immediate cleaning and change in case of contamination. Cotton clothing may be used if chance of contact is minimal or if clothing is monitored for contamination and changed if contamination occurs. In any case where combustible protection is used, a strong management system must be in place to monitor contamination and ensure appropriate removal and cleaning or severe risk of fire and personal injury or death exists. There are no known cloth materials that will not combust vigorously with perchlorates including nomex, Kevlar based materials, or clothing that is normally considered fire retardant or resistive. Observation and management of contamination is the only practicable safety measure.

**Hand Protection:** Type of glove recommended-Plastic, rubber or latex gloves are recommended.

Leather or cotton gloves should not be used unless a management program is implemented to ensure detection of contamination and immediate cleaning and change in case of contamination

**Eye Protection:** Under normal conditions, wear safety glasses. Under dusty conditions, wear chemical safety goggles

**Respiratory Protections:** Under normal conditions, respiratory protection is not required. Where dusty conditions develop, use a mask or respirator approved by the EC state where this product is used for dusts

**Additional Recommendations:** Avoid contamination of cotton or other absorbent material. As in any industrial working environment, workers should routinely wear clean clothes to work. Do not wear any work clothing that has become contaminated with potassium perchlorate. Remove contaminated clothing immediately and keep wet until thoroughly washed. Keeping contaminated clothing wet minimizes hazards until the laundering is completed. Showering is recommended after handling any industrial chemical. Smoking of tobacco should not be permitted while wearing contaminated clothing. Leather boots may become contaminated and could be a source of combustion damaging feet. Rubber boots are recommended unless a very strict management program to detect contaminated leather boots is in place much as listed on the glove section above

## 9 PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b> White deliquescent crystal	<b>Physical state:</b> Solid	<b>Molecular weight:</b> 138.55 g/mol	<b>Chemical formula:</b> KClO <sub>4</sub>	<b>Odor:</b> No odor
<b>Specific gravity (water = 1.0):</b> 2.52 (see Density)	<b>Solubility in water (weight %):</b> 0.75g/100 ml @ 20° C 21.8 g/100 ml @ 100° C	<b>pH:</b> material is a solid however, dissolved in water the pH is 6.0 - 8.0	<b>Boiling point:</b> Decomposes 400° C	<b>Melting point:</b> Decomposes 400° C in its pure state, impurities may lower the decomposition temperature significantly
<b>Density:</b>	<b>Partition</b>	<b>Auto Ignition</b>	<b>Upper</b>	<b>Lower</b>

2.520 g/cm <sup>3</sup>	<b>coefficient: noctanol/ Water:</b> No data available	<b>Temperature:</b> No data available	<b>flammability or explosive limits:</b> Not applicable	<b>flammability or explosive limits:</b> Not applicable
<b>Vapor pressure:</b> solid, Not applicable	<b>Vapor density (air = 1.0):</b> Not applicable	<b>Evaporation rate:</b> Not applicable	<b>Flash point:</b> Not flammable (Flash point method and additional flammability data are found in Section 5.)	

## 10 STABILITY AND REACTIVITY

The preparation is stable at the handling and storage conditions recommended per section 7 of this Safety Data Sheet

Stability:	The product is stable.
Instability Temperature:	Not available (see below, conditions and materials)
Conditions of Instability:	Not available.
Incompatibility with various substances:	The product may undergo hazardous decomposition, condensation or polymerization it may react violently with water to emit toxic gases or it may become self-reactive under conditions of shock or increase in temperature or pressure.
Corrosivity:	Non-corrosive in presence of glass.
Special Remarks on Reactivity: metal powders or powdered carbon)	Not available (Do not mix with organic materials, reducing agents,
Special Remarks on Corrosivity:	Not available.
Polymerization:	No.

**Conditions to avoid:** Avoid elevated temperatures over 400° C, which can cause spontaneous exothermic decomposition. Cloth fabric of any type including dust collector bags intimately contaminated with potassium perchlorate is subject to ignition through friction or impact. Water scrubber type dust collection systems are recommended. High-energy static electricity may also serve as an ignition source when contamination or combustibles are intermixed

**Materials to avoid:** Sulfuric acid, powdered metals, and intimate mixtures with organics

**Hazardous decomposition products:** Chlorine, chlorine dioxide, oxygen, nitrogen oxides, hydrogen chloride

## 11 TOXICOLOGICAL INFORMATION

As with any toxicant, assessing dose and exposure are required to understand potential toxicity

Potassium perchlorate acts to reversibly and competitively inhibit iodine uptake by the thyroid gland. The half-life of potassium perchlorate ranges from 8 to 12 hours

Potassium perchlorate does not bioaccumulate. Perchlorate is not metabolized and is excreted from the kidneys

Harmful if swallowed or inhaled in large doses. In the early 1960s another salt of perchlorate given at 600 to 1000 mg/day for weeks of exposure as an oral therapeutic agent to treat hyperthyroidism was reported to be associated with a few cases of aplastic anemia and agranulocytosis (NRC, 2005). Since that time, there have been no known reports of aplastic anemia. There have been no reports of perchlorate associated with aplastic anemia or agranulocytosis

### Immediate (acute) effects:

Oral LD50: rat; 4200 mg/kg Rat-par-LDLo = 3500 mg/kg

Oral LD50: rabbit; 1900 mg/kg Rabbit-par-LDLo = 750 mg/kg

Inhalation LC50: No references found.

Skin sensitization: not reported to be a skin sensitizer

### Delayed (subchronic and chronic) effects:

**Thyroid:** No long-term health effects have been reported with worker exposure to perchlorate. Perchlorate is water soluble, so exposure to perchlorate can be via water contaminated with perchlorate or inhalation in the workplace. With chronic exposure, sufficient dose, and duration, perchlorate may cause thyroidal stores of iodine to be reduced, which may lead to goiter (enlarged thyroid gland) and hypothyroidism. Occupational studies indicated no adverse health effects on workers exposed for 3 years or more to perchlorate. These studies also demonstrate that blood chemistry and hormone values are not altered with occupational exposures as high as 0.48 mg per kilogram body weight. In 2005, a United States National Academies of Science (NAS) Committee comprehensively reviewed the literature related to oral exposures of perchlorate and reported that “to cause declines in thyroid hormone production that would have adverse health effects, iodide uptake would most likely have to be reduced by at least 75% for months or longer” and “...the perchlorate dose required to cause hypothyroidism in adults would probably be more than 0.40

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mg/kg per day, assuming a 70-kg body weight” (NAS, 2005). The NAS also identified a no-observed-effect-level of 0.007 mg/kg/day in humans, based on Greer et al. 2002, which is a dose that does not cause inhibition of iodide uptake. This is further supported by a small study in no effect on thyroid function was reported with six months of exposure up to 0.3 mg/d. For workers that live in areas of the world with endemic iodine deficiency, it is important that these people receive adequate iodine in the diet or are supplemented with iodine

### **Carcinogen:**

IARC: NO

NTP: NO

OSHA: NO

### **Reproductive:**

In 2005, the California Environmental Protection Agency’s Office of Environmental Health Hazard Assessment (OEHHA) Developmental and Reproductive Toxicology Identification (DART) Committee concluded that available scientific information on perchlorate was not sufficient for placing the substance on a list (Prop 65) list of chemicals known to the State of California to cause birth defects or other reproductive harm

### **Immunology:**

Immunotoxicity studies in mice revealed no changes in immunologic function in response to perchlorate exposure (Keil et al. 1998, 1999)

### **Other Medical conditions aggravate by exposure:**

Excessive dust inhalation can aggravate respiratory conditions.

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## **12 ECOLOGICAL INFORMATION**

Limited data available – toxicity appears to be related to the perchlorate ion. The perchlorate ion is persistent but can be decomposed by naturally occurring bacteria in anoxic conditions in the presence of a suitable electron donor. Some additional data appears above in the Toxicity data section 11.

### **Toxicity Data:**

Daphnia Magna:	Acute 48-hour LC <sub>50</sub> 490 mg/l water with sodium perchlorate
Pimephales Promelas:	Acute 96 hour LC <sub>50</sub> 1655 mg/l water with sodium perchlorate
Ceriodaphnia dubia:	Chronic 6 day LC <sub>50</sub> 77.8 mg/l water with ammonium perchlorate
Pimephales promelas:	Subchronic 7 day LC <sub>50</sub> 270 mg/l water with ammonium perchlorate
Latuca Sativa:	Subchronic 7 day LC <sub>50</sub> 614 mg/kg soil
Eisenia Foetida:	Acute 7 day LC <sub>50</sub> 4450 mg/kg soil

### **Persistence and degradability:**

Perchlorate ion is persistent but can be decomposed by naturally occurring bacteria in anoxic conditions in the presence of a suitable electron donor.

### **Bio-accumulative potential:**

Perchlorate has a half-life of approximately 8 hours and is excreted unchanged, mostly in urine. Perchlorate does not bio-accumulate (NAS, 2005)

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## **13 DISPOSAL CONSIDERATIONS**

This material and/or its container must be disposed of as hazardous waste according to Special Waste Regulations 1996 or according to local regulations, in compliance with Duty of Care Regulations and Special Waste Regulations

The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below 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.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees

**Is the unused product a RCRA hazardous waste if discarded?** Yes –if discarded as a solid and not in solution. If discarded as a solution carefully evaluate before any determination of waste status to avoid misinterpretation. Caution: Intentionally placing solid material into solution to dispose of it may violate several regulations if not managed

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carefully thereafter. Various states have local regulations that are applicable and are changing. Evaluate carefully all applicable regulations for your location before determining status and method of disposal!

**If yes, the RCRA ID number is:** D001

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method

Follow all rules and recommendations of the EC member state in which product is used

Potassium perchlorate should be disposed as a solid to either a hazardous waste landfill, in the US. Similar regulations apply to the EU and other parts of the world. Do not dispose of potassium perchlorate where it is likely to contact water and dissolve and then enter the environment. Verify the local state (country) requirements where the material is sited before disposing. If transported to another country (state), additional regulations may apply. In any case, manage disposal to protect persons and the environment

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method

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## 14 TRANSPORT INFORMATION

### Proper Shipping Name:

Potassium perchlorate

Potassium perchlorate manufactured by American Pacific meets the 5.1 Oxidizer classification - UN Number 1489, Packing Group 2. The product is shipped with a 5.1 oxidizer label

Un Number:	Proper Shipping Name:	Us Dot Hazard Class:	Pack Group:	Classification Code:
UN1489	Potassium Perchlorate	Oxidizer 5.1	II	5.1

ERG140. Special Provisions: IB6, IP2, T3, TP33. Label code 5.1 Placard Oxidizer

**Environmental Hazards:** Please see section 12. Prevent any contamination of the environment via the sewers or water sources.

**Special precautions for user:** Please see section 7

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## 15. REGULATORY INFORMATION

**U.S. Federal regulations:** TSCA: CAS# 7778-74-7 is listed on the TSCA inventory

SARA 302/304/311/312 extremely hazardous substances: None of the chemicals in this product have a TPQ

SARA 302/304 emergency planning and notification: No products were found

SARA 302/304/311/312 hazardous chemicals: No products were found

Clean Water Act (CWA) 307: No products were found

Clean Water Act (CWA) 311: No products were found

Clean Air Act (CAA) 112 accidental release prevention: No products were found

Clean Air Act (CAA) 112 regulated flammable substances: No products were found

Clean Air Act (CAA) 112 regulated toxic substances: No products were found

**Hazard symbols:** O Oxidizing

**Risk phrases:** R9 Explosive when mixed with combustible material

R22 Harmful if swallowed

**Safety Statements:** S2 Keep out of the reach of children

S13 Keep away from food, drink and animal feeding stuffs

S22 Do not breathe dust

S27 Take off immediately all contaminated clothing

A Chemical Safety Assessment has been conducted for potassium perchlorate.

**State Right-To-Know** - In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

Ingredient Name	SARA/CERCLA RQ (lbs)	SARA EHS TPQ (lbs)
Potassium Perchlorate	Examine local regulations to determine	Examine local regulations to determine

Due to the rapidly changing regulatory environment in individual states, it is very difficult to maintain up to date information for each state in a material safety data sheet. The user must examine the local regulations in force and comply with all requirements.

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

**16 OTHER INFORMATION**

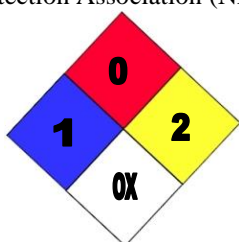
Not for Food or Drug Use. The user is responsible to evaluate the safety and environmental consequences of any intended uses. The manufacturer assumes no liability for any usages that result in adverse consequences.

**Additional Classification Systems:**

<b>Health Hazard</b>	<b>1</b>
<b>Fire Hazard</b>	<b>0</b>
<b>Reactivity</b>	<b>2</b>
<b>PPE</b>	<b>X</b>

**X - Consult your supervisor or S.O.P. for SPECIAL handling directions**

National Fire Protection Association (NFPA) ratings (scale 0 – 4)



**IMPORTANT:** The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any Federal, Other National Governmental Entity, State, Provincial, or local laws.

**References:**

Braverman, L.E., He, X., Pino, S., Cross, M., Magnani, B., Lamm, S.H., Kruse, M.B., Engel, A., Crump, K.S., Gibbs, J.P. 2005 The effect of perchlorate, thiocyanate, and nitrate on thyroid function in workers exposed to perchlorate long-term. *J. Clin. Endocrinol. Metab.* 90: 700–706

Braverman, L.E., X. He, S. Pino, B. Magnani, and A. Firek. 2006. Effects of Six Months of Daily Low-Dose Perchlorate Exposure on Thyroid Function in Healthy Volunteers. *J. Clin. Endocrin. Metab.* 91: 2721–2724

Greer, M.A., G. Goodman, R.C. Pleus, and S.E. Greer. 2002. Health effects assessment for environmental perchlorate contamination: The dose response for inhibition of thyroidal radioiodine uptake in humans. *Environ. Health Perspect.* 110(9):927-937

National Research Council, 2005. Health Implications of Perchlorate Ingestion, National Academy of Sciences, The National Academies Press, Washington, DC., January