

## 1 Identification

### Product identifier

**Product name:** Ammonium perchlorate

**Stock number:** 11658

**CAS Number:**

7790-98-9

**EC number:**

232-235-1

**Index number:**

017-009-00-0

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

**Identified use:** SU24 Scientific research and development

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

**Manufacturer/Supplier:**

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

**Information Department:** Health, Safety and Environmental Department

**Emergency telephone number:**

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

## 2 Hazard(s) identification

**Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)**



GHS01 Explosive bomb

Expl. 1.1 H201 Explosive; mass explosion hazard.



GHS03 Flame over circle

Ox. Sol. 1 H271 May cause fire or explosion; strong oxidizer.

**Hazards not otherwise classified** No information known.

### Label elements

**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

### Hazard pictograms



GHS01 GHS03

**Signal word** Danger

### Hazard statements

H201 Explosive; mass explosion hazard.

H271 May cause fire or explosion; strong oxidizer.

### Precautionary statements

P221 Take any precaution to avoid mixing with combustibles.

P283 Wear fire/ flame resistant/retardant clothing.

P210 Keep away from heat. - No smoking.

P373 DO NOT fight fire when fire reaches explosives.

P401 Store in accordance with local/regional/national/international regulations.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

### WHMIS classification

C - Oxidizing materials

F - Dangerously reactive material



### Classification system

**HMIS ratings (scale 0-4)**

**(Hazardous Materials Identification System)**

**HEALTH** 1 Health (acute effects) = 1

**FIRE** 3 Flammability = 3

**REACTIVITY** 3 Physical Hazard = 3

### Other hazards

**Results of PBT and vPvB assessment**

**PBT:** Not applicable.

**vPvB:** Not applicable.

## 3 Composition/information on ingredients

**Chemical characterization:** Substances

**CAS# Description:**

7790-98-9 Ammonium perchlorate

**Concentration:** ≤100%

**Identification number(s):**

**EC number:** 232-235-1

**Index number:** 017-009-00-0

**Product name: Ammonium perchlorate**

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#### 4 First-aid measures

##### Description of first aid measures

###### After inhalation

In case of unconsciousness place patient stably in side position for transportation.

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

Drink lots of water or milk.

Induce vomiting if patient is conscious.

Administer a solution of sodium carbonate.

###### Information for doctor

**Most important symptoms and effects, both acute and delayed** No further relevant information available.

**Indication of any immediate medical attention and special treatment needed** No further relevant information available.

#### 5 Fire-fighting measures

##### Extinguishing media

###### Suitable extinguishing agents

Water

Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

**For safety reasons unsuitable extinguishing agents** Halocarbon extinguisher

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

Promotes fire

In certain fire conditions, traces of other toxic gases cannot be excluded.

This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

If this product is involved in a fire, the following can be released:

Nitrogen oxides (NOx)

Hydrogen chloride (HCl)

###### Advice for firefighters

###### Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

#### 6 Accidental release measures

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

Remove persons from danger area.

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

###### Environmental precautions:

Do not allow to enter sewers/ surface or ground water.

Do not allow material to be released to the environment without proper governmental permits.

**Methods and material for containment and cleaning up:** Pick up mechanically.

###### Prevention of secondary hazards:

Acts as an oxidizing agent on organic materials such as wood, paper and fats

Keep away from combustible material.

###### Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

###### Protective Action Criteria for Chemicals

**PAC-1:** 4.6 mg/m<sup>3</sup>

**PAC-2:** 50 mg/m<sup>3</sup>

**PAC-3:** 830 mg/m<sup>3</sup>

#### 7 Handling and storage

##### Handling

###### Precautions for safe handling

Handle with care. Avoid jolting, friction and impact.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Keep away from heat and direct sunlight.

Ensure good ventilation at the workplace.

Open and handle container with care.

###### Information about protection against explosions and fires:

Potentially explosive when mixed with organic substances.

Prevent impact and friction.

Substance/product can reduce the ignition temperature of flammable substances.

This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

###### Conditions for safe storage, including any incompatibilities

###### Storage

**Requirements to be met by storerooms and receptacles:** No special requirements.

###### Information about storage in one common storage facility:

Store away from metals.

Store away from flammable substances.

Store away from reducing agents.

Do not store with organic materials.

Store away from metal powders.

Store away from oxidizing agents.

###### Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Protect from heat and direct sunlight.

**Specific end use(s)** No further relevant information available.

**Product name: Ammonium perchlorate**

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## 8 Exposure controls/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.

### Control parameters

### Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

**Additional information:** No data

### Exposure controls

#### 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.

Maintain an ergonomically appropriate working environment.

**Breathing equipment:** Use suitable respirator when high concentrations are present.

#### Recommended filter device for short term use:

Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.

#### Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

**Material of gloves** Nitrile rubber, NBR

**Penetration time of glove material (in minutes)** 480

**Glove thickness:** 0.11 mm

**Eye protection:** Safety glasses with side shields / NIOSH (US) or EN 166(EU)

**Body protection:** Protective work clothing.

## 9 Physical and chemical properties

### Information on basic physical and chemical properties

#### General Information

#### Appearance:

**Form:** Crystalline

**Odor:** Odorless

**Odor threshold:** Not determined.

**pH-value:** Not applicable.

#### Change in condition

**Melting point/Melting range:** None

**Boiling point/Boiling range:** None

**Sublimation temperature / start:** Not determined

**Flash point:** Not applicable

**Flammability (solid, gaseous)** Contact with combustible material may cause fire.

**Ignition temperature:** Not determined

**Decomposition temperature:** Not determined

**Auto igniting:** Not determined.

#### Danger of explosion:

Risk of explosion by shock, friction, fire or upon heating.

Explosive when mixed with combustible material.

Extreme risk of explosion by shock, friction, fire or other sources of ignition.

Explosive when mixed with combustible material.

#### Explosion limits:

**Lower:** Not determined

**Upper:** Not determined

**Vapor pressure:** Not applicable.

**Density at 20 °C (68 °F):** 1.95 g/cm<sup>3</sup> (16.273 lbs/gal)

**Relative density** Not determined.

**Vapor density** Not applicable.

**Evaporation rate** Not applicable.

#### Solubility in / Miscibility with

**Water:** Not determined

**Alcohols:** Partly soluble

**Ketones:** Partly soluble

**Partition coefficient (n-octanol/water):** Not determined.

#### Viscosity:

**dynamic:** Not applicable.

**kinematic:** Not applicable.

**Other information** No further relevant information available.

## 10 Stability and reactivity

### Reactivity

Unstable explosive.

May intensify fire; oxidizer.

May cause fire or explosion; strong oxidizer.

**Chemical stability** Stable under recommended storage conditions.

### Thermal decomposition / conditions to be avoided:

To avoid thermal decomposition do not overheat.

Explosive thermal decomposition

### Possibility of hazardous reactions

Danger of explosion

Reacts with organic substances

Reacts with alcohols

Reacts with various metals

Reacts with acids

Reacts with impurities

Reacts with catalysts

Reacts with strong oxidizing agents

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USA

**Product name: Ammonium perchlorate**

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Reacts with reducing agents  
Reacts with flammable substances  
**Conditions to avoid** No further relevant information available.  
**Incompatible materials:**  
Flammable substances  
Reducing agents  
Oxidizing agents  
Organic materials  
Metal powders  
**Hazardous decomposition products:**  
Nitrogen oxides (NOx)  
Ammonia  
Chlorine  
Nitrogen oxides  
Hydrogen chloride (HCl)

**11 Toxicological information**

**Information on toxicological effects**

**Acute toxicity:** The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

**LD/LC50 values that are relevant for classification:**

Oral/ LD50 4200 mg/kg (rat)

**Skin irritation or corrosion:** Irritant to skin and mucous membranes.

**Eye irritation or corrosion:** Irritating effect.

**Sensitization:** No sensitizing effects known.

**Germ cell mutagenicity:** No effects known.

**Carcinogenicity:** No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

**Reproductive toxicity:** The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.

**Specific target organ system toxicity - repeated exposure:** No effects known.

**Specific target organ system toxicity - single exposure:** No effects known.

**Aspiration hazard:** No effects known.

**Subacute to chronic toxicity:** The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.

**Additional toxicological information:** To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

**12 Ecological information**

**Toxicity**

**Aquatic toxicity:** No further relevant information available.

**Persistence and degradability** No further relevant information available.

**Bioaccumulative potential** No further relevant information available.

**Mobility in soil** No further relevant information available.

**Additional ecological information:**

**General notes:**

Do not allow material to be released to the environment without proper governmental permits.

Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.

Avoid transfer into the environment.

**Results of PBT and vPvB assessment**

**PBT:** Not applicable.

**vPvB:** Not applicable.

**Other adverse effects** No further relevant information available.

**13 Disposal considerations**

**Waste treatment methods**

**Recommendation** Consult state, local or national regulations to ensure proper disposal.

**Waste disposal key number according to the European Waste Catalogue:**

Contaminated salts:

06 03 10 Solid salts containing ammonium

**Uncleaned packagings:**

**Recommendation:** Disposal must be made according to official regulations.

**14 Transport information**

**UN-Number**

DOT, IMDG, IATA

UN1442

**UN proper shipping name**

DOT

ADR

IMDG, IATA

Ammonium perchlorate

1442 Ammonium perchlorate

AMMONIUM PERCHLORATE

**Transport hazard class(es)**

DOT



**Class**  
**Label**  
**ADR**

5.1 Oxidizing substances  
5.1



**Class**  
**Label**

5.1 (O2) Oxidizing substances  
5.1

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USA

**Product name: Ammonium perchlorate**

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**IMDG, IATA**



**Class** 5.1 Oxidizing substances  
**Label** 5.1

**Packing group** II  
**DOT, ADR, IMDG, IATA**

**Environmental hazards:** Not applicable.

**Special precautions for user** Warning: Oxidizing substances  
**EMS Number:** F-H, S-Q  
**Segregation groups** Ammonium compounds, perchlorates  
**Stowage Category** E  
**Segregation Code** SG49 Stow "separated from" cyanides  
SG60 Stow "separated from" peroxides

**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

**Transport/Additional information:**

**DOT**  
**Quantity limitations** On passenger aircraft/rail: 5 kg  
On cargo aircraft only: 25 kg  
**Marine Pollutant (DOT):** No  
**Item:**

**IMDG**  
**Limited quantities (LQ)** 1 kg  
**Excepted quantities (EQ)** Code: E2  
Maximum net quantity per inner packaging: 30 g  
Maximum net quantity per outer packaging: 500 g

**UN "Model Regulation":** UN 1442 AMMONIUM PERCHLORATE, 5.1, II

**15 Regulatory information**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**  
**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)  
**Hazard pictograms**



GHS01 GHS03

**Signal word** Danger  
**Hazard statements**

H201 Explosive; mass explosion hazard.  
H271 May cause fire or explosion; strong oxidizer.

**Precautionary statements**

P221 Take any precaution to avoid mixing with combustibles.  
P283 Wear fire/ flame resistant/retardant clothing.  
P210 Keep away from heat. - No smoking.  
P373 DO NOT fight fire when fire reaches explosives.  
P401 Store in accordance with local/regional/national/international regulations.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.  
All components of this product are listed on the Canadian Domestic Substances List (DSL).

**SARA Section 313 (specific toxic chemical listings)** Substance is not listed.

**California Proposition 65**

**Prop 65 - Chemicals known to cause cancer** Substance is not listed.

**Prop 65 - Developmental toxicity** Substance is not listed.

**Prop 65 - Developmental toxicity, female** Substance is not listed.

**Prop 65 - Developmental toxicity, male** Substance is not listed.

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

**Other regulations, limitations and prohibitive regulations**

**Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.** Substance is not listed.

**The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.**

Substance is not listed.

**Annex XIV of the REACH Regulations (requiring Authorisation for use)** Substance is not listed.

**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

**16 Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

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 Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing SDS:** Global Marketing Department

**Date of preparation/Revision:** Print date, revision date and version number are in the header of each page.

**Reference Sources:**

CRC Handbook of Chemistry and Physics  
CRC Press

Hawley's Condensed Chemical Dictionary  
Van Nostrand Reinhold, New York

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USA



**Product name: Ammonium perchlorate**

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National Institute for Occupational Safety and Health  
Registry of Toxic Effects of Chemical Substances  
U. S. Government Printing Office, Washington D. C.

Richard J. Lewis, Sr.  
Sax's Dangerous Properties of Industrial Materials  
Van Nostrand Reinhold, New York

The Merck Index  
Merck & Co., Inc., Rahway N. J.

L. Bretherick  
Handbook of Chemical Hazards  
Butterworths

L. Roth, U. Weller  
Gefährliche chemische Reaktionen  
ecomed verlag, Landsberg

**Abbreviations and acronyms:**

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

ICAO: International Civil Aviation Organisation

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

SVHC: Substances of Very High Concern

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

Expl. 1.1: Explosives – Division 1.1

Ox. Sol. 1: Oxidizing solids – Category 1