

MATERIAL SAFETY DATA SHEET

Ammonium Persulfate



MSDS Ref. No.: 7727-54-0
Date Approved: 09/13/2004
Revision No.: 9

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Ammonium Persulfate

SYNONYMS: Ammonia Peroxydisulfate

ALTERNATE PRODUCT NAME(S): Ammonium Persulfate ACS Grade, Ammonium Persulfate Coarse/G, Ammonium Persulfate Coarse/O, Ammonium Persulfate Screen/B

GENERAL USE: Polymerization initiator in polymer chemistry.

Etchant and cleaner in manufacture of printed circuit boards.

Booster in hair bleaching formulations in cosmetics.

Secondary oil recovery systems as a polymerization initiator and gel breaker.

MANUFACTURER

FMC CORPORATION
Active Oxidants Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur, nitrogen and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").
- Moderate oral toxicity.

POTENTIAL HEALTH EFFECTS: Airborne dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of dust may cause difficulty in breathing in sensitive persons.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Ammonium Persulfate	7727-54-0	>99	231-786-5	O, R8; Xn, 22; Xi 36/37/38, 42/43

4. FIRST AID MEASURES

EYES: Flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has moderate oral toxicity and is minimally irritating to the eyes. Flooding of exposed areas with water is suggested, but gastric lavage or emesis induction for ingestions must consider the possible aggravation of esophageal injury and the expected absence of systemic effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

FIRE FIGHTING PROCEDURES: Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: Not available

SENSITIVITY TO STATIC DISCHARGE: Not available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

7. HANDLING AND STORAGE

HANDLING: Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection when contact is expected. Use clean plastic or stainless steel scoops only.

STORAGE: Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Ammonium Persulfate	0.1 mg/m ³ (TWA)		

ENGINEERING CONTROLS: Provide mechanical local and/or general room ventilation to prevent release of dust into the work area. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical type goggles. Full face shield may be used.

RESPIRATORY: Use approved dust respirator when airborne dust is expected.

PROTECTIVE CLOTHING: Rubber or neoprene footwear. Normal work clothes.

GLOVES: Wear chemical protective gloves made of materials such as rubber or neoprene. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

COMMENTS:

Belgium (TWA): 1 mg/m³

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	None
APPEARANCE:	White crystals
AUTOIGNITION TEMPERATURE:	Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating.
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not available
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
MELTING POINT:	Decomposes
ODOR THRESHOLD:	Not available
OXIDIZING PROPERTIES:	Oxidizer
PERCENT VOLATILE:	Not applicable
pH:	typically 4.0 (1% solution)
SOLUBILITY IN WATER:	% by wt. @ 25°C (77°F): 85
SPECIFIC GRAVITY:	1.98 (H ₂ O=1)
VAPOR DENSITY:	Not applicable
VAPOR PRESSURE:	Not applicable

COMMENTS:

Self Accelerating Decomposition Temperature (SADT) > 80°C (225 lb drum)

10. STABILITY AND REACTIVITY**CONDITIONS TO AVOID:**

Heat, moisture and contamination.

STABILITY:

Stable (becomes unstable in presence of heat, moisture and/or contamination).

POLYMERIZATION:

Will not occur

INCOMPATIBLE MATERIALS:

Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact with incompatible materials can result in a material decomposition or other uncontrolled reactions.

HAZARDOUS DECOMPOSITION PRODUCTS:

Oxygen that supports combustion and oxides of sulfur and nitrogen.

COMMENTS: PRECAUTIONARY STATEMENT: Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Minimally irritating (rabbit) [FMC I87-0968]

SKIN EFFECTS: Non-irritating (rabbit) [FMC Study I87-0970]

DERMAL LD₅₀: > 2,000 mg/kg (rabbit) [FMC I91-1200]

ORAL LD₅₀: 742 mg/kg (male rat) [FMC I2001-2331]
700 mg/kg (female rat) [FMC I2001-2331]

INHALATION LC₅₀: > 2.95 mg/l (4 h) (rat) Maximum attainable concentration [FMC I87-0969]

SENSITIZATION: May be sensitizing to allergic persons. [FMC Study I87-0970]

TARGET ORGANS: Sensory irritation - eyes, nose, throat and lungs

ACUTE EFFECTS FROM OVEREXPOSURE: Dust may be harmful and irritating. Ammonium persulfate has low dermal toxicity and is moderately toxic when ingested. Product is minimally irritating to the eyes and non-irritating to the skin.

CHRONIC EFFECTS FROM OVEREXPOSURE: Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979].

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	ACGIH: Not listed

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hr LC_{50} = 103 mg/L [FMC Study I92-1246]
Rainbow trout, 96-hr LC_{50} = 76.3 mg/L [FMC Study I92-1247]
Daphnia, 48-hr LC_{50} = 120 mg/L [FMC Study I92-1248]
Grass shrimp, 96-hr LC_{50} = 391 mg/L [FMC Study I92-1249]

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME: Ammonium Persulfate

PRIMARY HAZARD CLASS / DIVISION: 5.1 (Oxidizer)
UN/NA NUMBER: UN 1444
PACKING GROUP: III
LABEL(S): 5.1 (Oxidizer)
PLACARD(S): 5.1 (Oxidizer)
MARKING(S): Ammonium Persulfate, UN 1444
REPORTABLE QUANTITY (RQ): Not applicable
ADDITIONAL INFORMATION: 49 STCC Number: 4918733
This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000-2000 lb. IBC's (supersacks).

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME: Ammonium Persulfate

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME: Ammonium Persulfate

OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

Ship in refrigerated trucks when outside temperature exceeds 113°F.

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):

Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):

Unlisted, RQ = 100 lbs., Ignitability

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):

Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):

Waste Number: D001

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number: 1444

Hazard Classification / Division: Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic)

Ingredient Disclosure List: Listed

INTERNATIONAL LISTINGS

Australia (AICS): Listed

China: Listed

Japan (ENCS): (1)-406

Korea: KE-09815

Philippines (PICCS): Listed

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Ammonium persulfate:

EC Symbols:	O	(Oxidizer)
	Xn	(Harmful)
	Xi	(Irritant)

EC Risk Phrases:	R8	(Contact with combustible material may cause fire)
	R22	(Harmful if swallowed.)
	R36/37/38	(Irritating to eyes, respiratory system and skin.)
	R42/43	(May cause sensitization by inhalation or by skin contact.)
EC Safety Phrases:	S2	(Keep out of the reach of children.)
	S22	(Do not breathe dust.)
	S24	(Avoid contact with skin.)
	S26	(In case of contact with eyes, rinse immediately with plenty of water and seek medical advice)
	S37	(Wear suitable gloves.)

16. OTHER INFORMATION

HMIS

Health	1
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:

- 4 = Severe
- 3 = Serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:

- 4 = Extreme
- 3 = High
- 2 = Moderate
- 1 = Slight
- 0 = Insignificant

REVISION SUMMARY:

This MSDS replaces Revision #8, dated March 10, 2004.

Changes in information are as follows:

Section 2 (Hazards Identification)

Section 10 (Stability and Reactivity)

FMC Logo - FMC Corporation Trademark

© 2004 FMC Corporation. All Rights Reserved.

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.** The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC Corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.