



# Industrial Grade Ammonium Nitrate

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MSDS Number 005 (Revised September 10, 2008)

8 Pages

## 1. CHEMICAL PRODUCT and EMERGENCY TELEPHONE CONTACT

Product Name:..... Ammonium Nitrate  
 Trade Name..... Industrial Grade Ammonium Nitrate (IGAN),  
 LO-Density Ammonium Nitrate (LDAN)  
 Chemical Family:..... Inorganic Salt  
 Synonyms:..... AN, Ammonium Saltpeter, Nitric Acid,  
 Ammonium Salt  
 Formula:..... NH<sub>4</sub>NO<sub>3</sub>  
 Product Uses:..... Manufacture of explosives, blasting agents

### **EMERGENCY TELEPHONE NUMBERS**

CHEMTREC (U.S.):..... 800-424-9300  
 CANUTEC (Canada):..... 613-996-6666

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	Percentage by Weight	CAS Number
Ammonium Nitrate	98 - 100 %	6484-52-2
Conditioning Agent	0 – 0.2%	

Exposure Limits for Components				
Component	TWA	STEL	PEL	IDLH
Ammonia	25 ppm	35 ppm	50 ppm	300 ppm

## 3. HAZARDS IDENTIFICATION

### **EMERGENCY OVERVIEW**

**Strong oxidizer.** Contact with combustible material will increase fire hazard. May undergo detonation if heated under confinement causing pressure buildup or if subjected to strong shocks. Solid AN when sensitized or during decomposition may become unstable and/or explosive. When AN is heated to decomposition it may produce vapors which contain nitrogen oxides (NO<sub>x</sub>). **AN is an oxidizer** and as such may increase the flammability and/or explosiveness of other substances. Use water to control fires involving AN, if water is compatible with burning material. AN itself is non-flammable. AN can cause irritation to eyes and skin and may be an inhalation discomfort in confined locations.

<b>NFPA Hazard Classification</b>	<b>Health Hazard (Blue)</b> .....	<b>1</b>
	<b>Flammability (Red)</b> .....	<b>0</b>
	<b>Reactivity (Yellow)</b> .....	<b>3</b>
	<b>Other</b> .....	<b>OX</b>

## **POTENTIAL HEALTH EFFECTS**

**Primary Routes of Entry:** Skin contact/absorption and eye contact.

**General Acute Exposure:** AN is a mild skin, eye, and respiratory irritant, possible allergen, and methemoglobin inducer. Because it can form methemoglobin, it may have irreversible effects which can be life threatening.

**General Chronic Exposure:** By analogy with nitrobenzene, AN is in Class A+ as a reproductive hazard. It is important to remember that this hazard is due to its association and there is no direct evidence for adverse reproductive effects. Nevertheless, it would be prudent for pregnant women not to be exposed to AN.

**Carcinogenicity:**

NTP: ..... Not Listed

IARC: ..... Not Listed

OSHA: ..... Not Regulated

**Medical Conditions Aggravated by Exposure:** No test data available.

## **4. FIRST AID MEASURES**

**First Aid for Eyes:** Immediately flush eyes with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, excessive tearing, or light sensitivity persists, the patient should be seen in a health care facility.

**First Aid for Skin:** Immediately flush exposed area with copious amounts of tepid water for at least 15 minutes followed by washing area thoroughly with soap and water. The patient should be seen in a health care facility if irritation or pain persists.

**First Aid for Inhalation:** Generally not considered an inhalation hazard. If irritation develops move patient to fresh air and monitor. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation. If trained to do so, administer supplemental oxygen if needed. If irritation, coughing, or difficulty in breathing persists the patient should be seen in a health care facility.

**First Aid for Ingestion:** If conscious, give the patient large quantities of milk or water to drink immediately. Do not induce vomiting. Seek medical attention.

## Symptoms of Overexposure

**Acute:** Cyanosis, nausea, vertigo, collapse, vomiting/abdominal pain, and tachycardia (rapid heartbeat), tachypnea (rapid breathing), coma, convulsions, and death can occur. **Chronic:** Small repeated doses may lead to weakness, general depression, headache and mental impairment.

### 5. FIRE FIGHTING MEASURES

#### Firefighting Procedures

Flood burning ammonium nitrate fertilizer with large volumes of low pressure water. Do not use salt water, carbon dioxide, dry chemicals or foam extinguishers. Never attempt to smother fire, such as by sealing off, closing a compartment or building doors when fire occurs. Do not add steam. Ammonium nitrate fertilizer does not have the property of spontaneous combustion. Fire fighters should wear approved self-contained breathing apparatus to protect themselves from the toxic fumes of decomposing ammonium nitrate, and protective clothing to guard against molten nitrate splashes should also be worn.

#### Unusual Fire and Explosive Hazards

Nitrogen oxide gases emitted on decomposition are extremely toxic. Contamination of ammonium nitrate with oil, diesel fuel, charcoal, sulfur, metal fines or other combustible substances could possibly cause an explosion. If an explosion is expected, surrounding area should be evacuated.

**Extinguishing Media:** Use water only to extinguish a fire involving AN if water is compatible with the burning material. Do not use dry chemicals, CO<sub>2</sub>, Halogens or foam.

#### Special Fire Fighting Procedures:

- a. Flood fire area with water from a distance.
- b. Move containers from the fire area if you can do it without risk. Do not move cargo or vehicle if cargo has been exposed to heat.
- c. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- d. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks due to exploding potential when tanks are involved in a fire.
- e. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- f. Positive pressure self-contained breathing apparatus (SCBA) should be used when there is a potential for inhalation of vapors and/or fumes.
- g. Structural firefighters' protective clothing will only provide limited protection.

**Evacuation:** If tank, rail car or truck is involved in a fire, isolate for 1/2 mile in all directions; also, consider initial evacuation for 1/2 mile in all directions.

#### Caution:

- a. Runoff from fire control or dilution water may cause pollution.
- b. AN solution pumps operated with blocked discharge have been known to detonate.
- c. Avoid welding or burning on pipes, valves, or tanks, which have contained AN solution until they have been thoroughly washed out. Residual solidified AN may explode under conditions of confinement and high temperature.

## 6. ACCIDENTAL RELEASE MEASURES

**Spill or Leak Measures:** Keep combustibles (wood, paper, oil, etc.) away from spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do so without risk. Do not get water inside containers.

### **Small Spill:**

- a. Stop leak if you can do so without risk.
- b. With a clean shovel, place material into a clean, dry container and cover loosely; move containers from spill area.
- c. Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- d. Wash contaminated areas with large volumes of water, if approved by local, state, and federal environmental agencies.
- e. Runoff may cause pollution.

### **Large Spill:**

- a. Dike ahead of liquid spill for later recovery of usable product and proper disposal of any residue.
- b. Stop leak if you can do so without risk.
- c. Wash contaminated areas with large volumes of water, if approved by local, state, and federal environmental agencies.
- d. Runoff may cause pollution.

**Environmental Impact:** Ammonium nitrate fertilizer is a plant nutrient, however, large spills can kill vegetation. If water courses are contaminated it may promote eutrophication and cause fish kills. If drinking water is contaminated beyond 10 mg of nitrate nitrogen per liter by ammonium nitrate fertilizer, it should be reported to the proper authorities.

**Precautions if Spilled or Released:** Spilled ammonium nitrate fertilizer can be reused if kept dry and uncontaminated. After cleanup, contaminated area should be washed down with water. Do not allow wash water to enter drinking water supplies. In the event of spill or wash water entering sewer or waterway, notify sewer authorities or other appropriate agencies.

Spills that have become contaminated with organic matter or other combustible material may present a fire and explosion hazard. Such material should be shoveled into drums and dissolved in water to obtain at least 50 percent water solution. Depending upon the amount of toxicity of the contaminated material, the solution can be reused as a fertilizer or disposed of.

## 7. HANDLING AND STORAGE

See NFPA 490 Code for Storage of Ammonium Nitrate (2002 Edition)

Store in well-ventilated area away from acute fire hazards and easily oxidizable materials. Do not store near dynamite, blasting caps or other explosives. Avoid contamination. Floor drains and recesses should be plugged or eliminated to prevent entrapment of flowing, molten nitrate during fire.

Storage construction should be of non-combustible materials and preferably equipped with an automatic sprinkler system. Storage should be designed for safe release of pressure in emergency. Bagged ammonium nitrate fertilizer is subject to storage, stacking and quantity regulations. Follow federal, state and local regulations. See CFR 1910.109 regulations.

**Handling Precautions:** Keep away from open flames, hot surfaces and sources of ignition. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Use only in area provided with appropriate exhaust ventilation. Avoid dust formation. Product is mildly corrosive to concrete and steel structures. Avoid materials made of copper and bronze in storage and handling equipment.

## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

### **Respiratory Protection Requirements:**

- a. AN itself does not pose an inhalation hazard.
- b. Decomposition of AN may produce nitrogen oxides (NO<sub>x</sub> vapors) and ammonia. Use fresh air supply systems to protect against NO<sub>x</sub> vapors.
- c. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
- d. For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn.

If necessary to enter a confined area which contains AN, monitor for ammonia vapors. If ammonia vapors are present protect as follows:

<25 ppm:	No protection required.
25 to 35 ppm:	Protection required if the daily TWA is exceeded.
35 to 50 ppm:	Protection required if exposed for more than 15 minutes.
50 to 250 ppm:	Minimum of an air-purifying respirator equipped with ammonia canister(s) or cartridge(s).
250 to 300 ppm:	Minimum of a full-face air-purifying respirator equipped with ammonia canister(s) or cartridge(s).
>300 ppm:	A fresh air supply system must be used (i.e. positive pressure self contained breathing apparatus).

**Skin Protection Requirements:**

Skin contact should be avoided. Wear gloves and clean body protective covering. Gloves and protective clothing made from rubber should be impervious under conditions of use. Other products such as viton or neoprene may be impervious to AN. All protective equipment should be tested for compatibility before use.

**Eye Protection Requirements:**

It is recommended that if there is a potential for AN to contact eyes that safety glasses/face shield and/or chemical goggles be used.

**Other Protective Equipment:**

Safety shower and eyewash fountain or at least 5 gallons of accessible clean water should be provided in an AN handling area

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form:	Solid prills or granules (deliquescent solid)
Color:	White
Odor:	Odorless
Boiling Point:	Decomposition temperature 410°F
Melting point:	311° F - 337° F
pH:.....	(10% solution) 4.5-5.7
Solubility:.....	By Wt. 66.4% @ 70°F. Highly Soluble.
Specific Gravity: .....	1.72 @ 70°F
Vapor Density: .....	No test results
Vapor Pressure: .....	No test results
% Volatile by Volume: .....	No test results
Molecular Weight: .....	80.05
Critical Temperature: .....	No test results
Critical Pressure: .....	No test results
Bulk Density:.....	46-54 lb/ft <sup>3</sup>

**10. REACTIVITY**

Stability: ..... This is a stable material.

Hazardous Polymerization: ..... Will not occur.

**Decomposition:** AN starts to dissociate and decompose at temperatures above 410° F. Upon decomposition it emits nitrogen oxide (NO<sub>x</sub>) and water vapors and may explode if confined. Hazardous decomposition products can include ammonia, oxides of nitrogen and nitric acid. If the product has been contaminated with another substance the decomposition temperature and effects of the decomposition may be varied. See Incompatibilities.

**Incompatibilities:** AN is incompatible with the following substances: Acetic Acid, Acetic Anhydride, Alkali Metals, Aluminum + Calcium Nitrate, Aluminum, Ammonium Chloride, Ammonium Dichromate, Ammonium Phosphate + Potassium, Antimony, Barium Chloride, Bismuth, Brass, Cadmium, Charcoal + Metal Oxides, Chloride Salts, Chromium, Cobalt, Copper Iron II Sulfide, Copper, Cyanoguanidine, Hydrocarbon Oils, Iron, Lead, Magnesium, Manganese, Nickel, Organic Fuels, Potassium Chromate, Potassium Dichromate, Potassium Nitrate, Potassium Nitrite, Potassium Permanganate, Sawdust, Sodium Chloride, Sodium Perchlorate, Sugar, Sulfide Ores, Sulfur, Tin, Titanium, Trinitroanisole, and Zinc.

**NOTE:** The incompatibilities above is a partial list taken from books by SAX & Lewis: “Dangerous Properties of Industrial Materials”, 7th. ed., 1989 and “Hawley’s Condensed Chemical Dictionary”, 11th. ed. 1987, both published by Van Nostrand Reinhold Company, New York and other sources. It is recommended that if additional information is needed, refer to these and other published information. Incompatibility varies with AN concentration and not all forms of the above listed substances are incompatible.

## 11. TOXICOLOGICAL INFORMATION

### Toxicity

#### Acute Oral Toxicity

LD<sub>50</sub> Rat ..... 2,800 mg/kg bw (OECD 401)

#### Acute Inhalation Toxicity

LC<sub>50</sub> Rat ..... > 88.8 mg/L (4 hrs)

#### Acute Dermal Toxicity

LD<sub>50</sub> Rat ..... > 5,000 mg/kg (OECD 402)

#### Acute Toxicity, Other Routes

Minimum lethal dose Rat.....0.065 mg NH<sub>4</sub>NO<sub>3</sub>-N

#### Corrosiveness / Irritation

Skin irritation Rabbit.....Moderately irritating

Eye irritation Rabbit.....No data available

#### Repeated Dose

NOAEL Inhalation Rat.....185 mg/m<sup>3</sup> (2 weeks)

NOAEL Inhalation Rat.....1 mg/m<sup>3</sup> (4 weeks)

#### Genetic Toxicity *in vitro*

*Salmonella typhimurium*.....Negative (Bacterial reverse mutation assay)

#### Development Toxicity / Teratogenicity

NOEL Rat.....> 57 mg/kg/day

## **Ecotoxicity**

### Acute Toxicity to Fish

LC<sub>50</sub> *Cyprinus carpio* L.....1.15 – 1.72 mg unionized NH<sub>3</sub>/L (48 hrs)

LC<sub>50</sub> Many species.....420 – 1,360 mg NO<sub>3</sub>/L (96 hrs)

### Acute Toxicity to Aquatic Invertebrates

EC<sub>50</sub> *Daphnia magna*.....555 mg/L

### Toxicity to Aquatic Plants (Algae)

EC<sub>50</sub> *Scenedesmus quadricauda*.....83 mg/L

### Chronic Toxicity to Aquatic Invertebrates

NOEC *Bullia digitalis*.....300 mg/L (Up to 7 days)

Source: TFI Product Testing Program April 2003.

## **12. ECOLOGICAL INFORMATION**

Notify local health and wildlife officials and operators of any nearby water intakes of contamination or discharge into or leading to waterways. Fertilizers containing AN can cause poisoning in livestock and poultry. AN can be toxic to aquatic life and spills may cause algae blooms in static waters. Nitrate ions are assimilated by growing plants. AN will also be taken up by bacteria. In anaerobic soils, nitrate ions may be converted to nitrite, molecular nitrogen, nitrous oxide, or ammonium ions.

**Note:** See Ecotoxicity information in section 11.

## **13. DISPOSAL CONSIDERATIONS**

Consult state/provincial and local environmental agencies for acceptable disposal methods. Recover product for use as a fertilizer if possible

## **14. TRANSPORTATION INFORMATION**

U.S. DOT and Canadian TDG Act

Shipping Name:..... Ammonium nitrate

Hazard Class: ..... Class 5.1

Product Identification Number (PIN): .... UN1942

DOT Placard: ..... Oxidizer 5.1, color: yellow

RQ (Reportable Quantity):..... No RQ established

STCC Number: ..... 4918311

## 15. REGULATORY INFORMATION

**OSHA:** This product is considered a hazardous material under criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

### **SARA TITLE III:**

- a. EHS (Extremely Hazardous Substances) List: Not Listed (EPA, 1992a)
- b. EHS RQ (Reportable Quantity): No RQ established.
- c. TPQ (Threshold Planning Quantity): None
- d. As distributed by Terra Mississippi Nitrogen, Inc., this product contains no compounds subject to reporting under Section 313 of SARA III and 40 CFR 372; however, these federal regulations do contain reporting requirements regarding water solutions of ammonia and nitrates. Additionally, the following federal environmental statutes apply to this product: SARA Title III, Sections 311 & 312 (40 CFR 370).

**CERCLA Hazardous Substances List:** Not listed

### **TSCA Inventory:**

- a. Listed (RTECS, 1993)

### **Security:**

This product is listed as a Chemical of Interest (COI) by the Department of Homeland Security (DHS) for theft. DHS 6 CFR part 27 Appendix A, Chemical Facility Anti-Terrorism Standards.

## 16. OTHER INFORMATION

Aug. 21, 2008     The MSDS was reformatted and additional sections populated to comply with ANSI Standard Z400.1-1993. Toxicity information from the TFI Product Testing Program April 2003 was added. Reviewed and updated as necessary.

The information and recommendations herein are taken from data contained in independent, industry-recognized references including but not limited to NIOSH, OSHA, NFPA, D.O.T. ERG, the TFI Product Testing Program, MEDITEXT, HAZARDTEXT, CHRIS, and SAX's Dangerous Properties of Industrial Materials - ninth edition. Terra Industries Inc. makes no guarantee, warranty or other representation concerning this substance, since conditions of its use are beyond the control of the company. Terra Industries Inc. disclaims any liability for loss or damage incurred in connection with the use of this substance.