



Effective Date: September 26, 2011

## Material Safety Data Sheet

**FOR EMERGENCY CALL CHEMTREC – (800) 424-9300**

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Aqua Ammonia

**CAS Number:** 1336-21-6

**Product Uses**

**Agricultural Industry:** Fertilizer

**Chemical Name:** Ammonium hydroxide

**Chemical Family:** Inorganic nitrogen compounds

**Synonyms and Common Trade Names:** Ammonia water  
Aqueous ammonia  
Household ammonia  
Ammonium hydrate  
Spirit of hartshorn

**Company Identification**

**Manufacturer:** CF Industries, Inc.  
**Address:** 4 Parkway North, Suite 400  
Deerfield, Illinois 60015-2590  
**Telephone:** 847-405-2400

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	Weight Percentage	CAS Number
Ammonia	24.7	7664-41-7
Water	75.3	7732-18-5



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### 3. HAZARDS IDENTIFICATION

#### **Emergency Overview**

**Danger!** Corrosive. May be harmful or fatal if swallowed or inhaled. Use ventilation adequate to keep exposures below recommended exposure limits (see Section 8). Do not breathe gas. Do not get in eyes, on skin or on clothing. Do not taste or swallow.

Wash thoroughly after handling. Wear appropriate personal protective equipment.

Colorless liquid with intense, pungent, suffocating odor.

#### **Potential Health Effects**

**Eyes:** Corrosive. Contact with liquid or vapor may cause severe irritation, eye burns and permanent eye damage.

**Skin:** Corrosive. Contact with liquid solutions and high concentrations of gaseous ammonia may cause severe irritation, skin burns and permanent skin damage. No information regarding skin absorption, however, corrosivity of material suggests significant skin damage will occur.

**Inhalation:** Corrosive and toxic. May be harmful if inhaled. May cause severe irritation and burns of the nose, throat and respiratory tract. Effects of overexposure may include headaches, coughing, nausea, vomiting, breathing difficulties, pneumonitis (inflammation of the lungs) and pulmonary edema (accumulation of fluid in the lungs).

**Ingestion:** Corrosive and toxic. May cause corrosion to the esophagus and stomach with perforation and peritonitis. Symptoms may include pain in the mouth, chest and abdomen, with coughing, vomiting and collapse. Ingestion of small amounts may be fatal.

**Pre-Existing Medical Conditions:** Conditions aggravated by exposure may include skin, respiratory (asthma-like) and liver disorders, gout and diabetes.

#### **Late Toxicities**

**Cancer:** Inadequate data available to evaluate the cancer hazard of this material. This material is not listed as a carcinogen by NTP, IARC or OSHA.

**Target Organs:** Late toxicities associated with the lungs and respiratory tract may occur following inhalation of high concentrations of ammonia.



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**Developmental:** Inadequate data available for this material.

#### **4. FIRST AID**

**Eyes:** Immediately move victim away from exposure and into fresh air. If irritation or redness develops, flush eyes with clean water. For direct contact, immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 15 minutes. Seek medical attention immediately.

**Skin:** Immediately flush affected area(s) with large amounts of water while removing contaminated shoes, clothing and constrictive jewelry. If skin surface is damaged, apply a clean dressing. If skin surface is not damaged, cleanse the affected area(s) thoroughly by washing with mild soap and water. Seek immediate medical attention.

**Inhalation:** Immediately move victim away from exposure and into fresh air. If victim is not breathing, immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

**Ingestion:** If swallowed, DO NOT INDUCE VOMITING. If exposed person is conscious and able to swallow, immediately give large quantities of water to drink. If vomiting does occur, hold head down below hip level to prevent vomit from entering lungs. If person is unconscious, do not give anything by mouth. Seek medical attention immediately.

**Notes to Physician:** After inhalation, watch for delayed symptoms of ammonia exposure, e.g., pulmonary edema. Treat symptomatically, administering analgesics and corticosteroids as necessary. Surgical intervention (tracheotomy) may be needed to maintain an airway. Watch for chemical pneumonitis after ingestion or inhalation of fumes.

#### **5. FIRE FIGHTING MEASURES**

Although standards for aqua ammonia have not been established, the following ratings and properties for ammonia are applicable since ammonia may be present as a vapor over aqua ammonia.

**Flash Point (test method):** Not applicable

**Flammable Limits:** 16% to 25% (by volume in air) (ammonia vapor)

**Explosive Limits:** 16% to 25% (ammonia vapor)



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**Autoignition Temperature:** 651°C (1,204°F) (ammonia vapor)

**Extinguishing Media:** Water for escaping ammonia gas

**NFPA Fire Rating:**

Flammability	1
Health Hazard	3
Reactivity	0
Specific Hazard	Not Applicable

**Key:** Least = 0 Slight = 1 Moderate = 2 High = 3 Extreme = 4

**Special Firefighting Procedures:** Wear full protective clothing and a self-contained breathing apparatus because toxic fumes are emitted. Stop flow if possible. Use water to keep fire-exposed containers cool and to protect persons shutting off flow. For a serious leak, use fire hose with a fog nozzle and plenty of water to absorb ammonia vapors.

**Unusual Fire and Explosive Hazards:** At elevated temperatures, aqua ammonia will emit ammonia gas and possibly small amounts of nitrogen oxides which have been classified as toxic. Presence of oil or other combustible materials increases the fire hazard of ammonia gas. Ammonia concentrations in the range of 16-25% by volume in air can be ignited or caused to explode if heated to the auto-ignition temperature.

**Hazardous Combustion Products:** Nitrogen oxides.

## **6. ACCIDENTAL RELEASE MEASURES**

Clean-up workers should wear appropriate protective clothing (see Section 8). Persons not wearing protective equipment and clothing should be restricted from spill areas until cleanup has been completed. Clean-up workers should stay upwind and keep out of low areas. Ventilate spill or leak area to disperse gas. Eliminate all sources of ignition. Stop flow if possible. If small spill, either allow it to vaporize or absorb the vapor in water. If large spill, spray the vapor cloud with water to reduce fire and fume hazard. Specific reporting requirements apply to accidental releases of ammonia. Refer to Section 15 (Regulatory Information) of this MSDS for details on these requirements.

In the United States if spill/release in excess of EPA Reportable Quantity is made into the environment, immediately notify the National Response Center at 1-800-424-8802. Also contact local and state regulatory agencies for information regarding additional or more stringent reporting requirements.



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**Neutralizing Chemicals:** Neutralization with acid not recommended. Flush area with water.

## **7. HANDLING AND STORAGE**

**Handling:** Do not enter confined spaces such as tanks or pits without following proper entry procedures. Appropriate personal protective gear (see Section 8) should be available to personnel handling or transferring aqua ammonia.

**Storage:** Storage in specially designated areas outside or in detached structure is preferred. Store inside only in a cool, well-ventilated area free from combustibles and away from all sources of ignition. Protect containers from corrosion and mechanical damage. Containers should have safety relief valves. Separate from other chemicals, particularly oxidizing gases, organic materials, chlorine, bromine, iodine, mercury and acids. Post readily visible warning signs in the storage area listing emergency measures. Water hoses should be readily available to knock down vapors from spill.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Ventilation:** Use process enclosure, general dilution ventilation or local exhaust systems, where necessary, to maintain airborne ammonia concentrations (as vapor over aqua ammonia) below the OSHA standard or in accordance with applicable regulations.

### **Preventative Measures / Specific Personal Protective Equipment**

**Eyes:** Wear chemical goggles and face shield unless protected by a respirator with a full face piece. Do not wear contact lenses as they may trap fumes against the eyes and can make flushing ineffective.

**Skin:** The use of gloves, boots and aprons impermeable to the specific material handled (for ammonia, includes Butyl, Teflon, Neoprene and Viton) is advised to prevent skin contact, possible irritation and skin damage.



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**Respiratory:** Protection is not normally required unless relevant exposure standards are exceeded. Use appropriate respirators when adequate engineering and work practice controls are not technically feasible or when performing certain maintenance, repair or emergency operations where excessive exposure could occur. For ammonia vapor concentrations below 300 ppm and above standards, use a respirator with an ammonia cartridge or canister. For higher or unknown concentrations, use a self-contained breathing apparatus with a full-face piece operating in a pressure-demand mode.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.

**Other:** Emergency showers and eyewash fountains should be readily available. In the field and during mobile operations, at least 5 gallons of fresh water should be available.

### **Exposure Guidelines**

Although standards for aqua ammonia have not been established, the following standards for ammonia are applicable since ammonia will be present as vapor over aqua ammonia.

	ACGIH TLV:	25 ppm (17 mg/m <sup>3</sup> ) TWA 35 ppm (24 mg/m <sup>3</sup> ) STEL
	OSHA PEL:	50 ppm (35 mg/m <sup>3</sup> ) TWA
	NIOSH IDLH:	300 ppm
* TLV	=	Threshold Limit Values
PEL	=	Permissible Exposure Limits
TWA	=	8-hour Time-weighted Average
STEL	=	15-minute Short Term Exposure Limit
IDLH	=	Immediately Dangerous to Life or Health

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance:** Colorless liquid

**Odor:** Pungent

**Odor Threshold Level:** Odor thresholds for ammonia in humans are in the range of 1-50 ppm.

**Physical State:** Liquid



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<b>pH:</b>	10.6-11.6 (0.02-1.7% aqueous ammonia solution)
<b>Vapor Pressure:</b>	7.2 psi at 68°F (20°C)
<b>Vapor Density (Air = 1):</b>	0.6 (for ammonia vapor over aqua ammonia at 0°C and 760 mm Hg) (lighter than air)
<b>Boiling point (760 mm Hg):</b>	99.3°F (37.4°C) (25% NH <sub>3</sub> )
<b>Melting point:</b>	-106.6°F (-77°C) (<44% NH <sub>3</sub> )
<b>Solubility in water:</b>	Soluble in all proportions
<b>Specific gravity (H<sub>2</sub>O = 1):</b>	0.89 at 68°F (20°C) (25% NH <sub>3</sub> ) (lighter than water)
<b>Evaporation rate (Butyl acetate = 1):</b>	Not applicable
<b>Percentage volatile by volume (%):</b>	Not applicable
<b>Molecular weight:</b>	35.05
<b>Molecular formula:</b>	NH <sub>4</sub> OH and H <sub>2</sub> O
<b>Octanol/Water Distribution Coefficient:</b>	-1.14 at 25° C



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## 10. STABILITY AND REACTIVITY

**Stability (thermal, light, etc.):** Stable under ordinary conditions of use and storage

**Incompatibility (Materials to avoid):** Corrosive to copper, brass, silver, zinc, aluminum alloys and galvanized steel. When mixed with acids, boils immediately and is dangerous. Forms explosive compounds with calcium hypochlorite, bleaches, gold, mercury, silver, chlorine and other halogens.

**Hazardous Decomposition Products:** Burning may produce ammonia and nitrogen oxides.

**Hazardous Polymerization:** Will not occur

**Conditions to Avoid:** Heat, sunlight, incompatibles, sources of ignition

## 11. TOXICOLOGICAL INFORMATION

**Acute Oral Effects:** The lowest dose known to be lethal in humans via oral exposure is 43 mg/kg. Oral rat LD50: 350 mg/kg. (Toxic)

**Acute Inhalation Effects:** The lowest concentration known to be lethal in humans exposed for 5 minutes via inhalation is 5,000 ppm. inhalation LC50 for the rat and mouse ranges from 4,230 to 19,960 mg total  $\text{NH}_3/\text{m}^3$ .

**Irritancy:** In rabbits, sub-acute and chronic exposure to 100 to 200 ppm produced moderate to severe eye irritation; 200 to 1,000 ppm produced eye damage. Ammonia is corrosive to rabbit skin.

### Ammonium Hydroxide

**Carcinogenicity:** No definitive information available

**Mutagenicity:** No definitive information available

**Target Organs:** No definitive information available

**Developmental toxicity:** No definitive information available



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**Chronic Toxicity:** Ammonia and ammonium hydroxide are not recognized as carcinogens by IARC, NTP or OSHA.

## **12. ECOLOGICAL INFORMATION**

Aqua ammonia is a solution of ammonia and water. Ammonia is harmful to aquatic life at very low concentrations. Notify local health and wildlife officials and operators of any nearby water intakes upon contamination of surface water.

**Ecotoxicity Information:** Ammonia is acutely toxic to freshwater and saltwater fish at very low concentrations. Sensitive freshwater fish include bluegill sunfish with a reported 48-hour LC50 of 0.024 to 0.093 mg/L, rainbow trout with a reported 96-hour LC50 of 0.53 mg/L, and Chinook salmon with a reported 24-hour LC50 of 0.36 mg/L. Sensitive saltwater fish include striped bass with a 96-hour LC50 of 0.73 µg/L and coho salmon with a 96-hour LC50 of 0.45 mg/L (flow-through).

Ammonia is highly toxic to freshwater invertebrates and moderately toxic to marine invertebrates.

The 48-hour LC50 for *Daphnia magna* is 0.66 mg/L and the 96-hour LC50 for snail is 90 mg/L. The most sensitive marine invertebrate species is the fingernail clam with a 96-hour LC50 of 1.10 mg/L.

Ammonia is practically nontoxic to algae according to one data source. The 120-hour EC50 (growth reduction) for diatom is reported to be 420 mg/L.

**Environmental Fate Information:** Ammonia dissipates relatively quickly in ambient air and rapidly returns to the soil via combination with sulfate ions or washout by rainfall. Ammonia strongly adsorbs to soil, sediment particles and colloids in water under aerobic conditions. Biodegradation of ammonia to nitrate occurs in water under aerobic conditions which results in a biological oxygen demand (BOD).



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### **13. DISPOSAL CONSIDERATIONS**

Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

### **14. TRANSPORT INFORMATION**

The following U.S. Department of Transportation (DOT), Transport Canada (TC), and International Maritime Organization (IMO) and United Nations (UN) recommendations pertain to ammonia solutions containing not less than 10% but not more than 35% ammonia.

**DOT/TC/IMO/UN Proper Shipping Name(s):** Ammonia solutions (with 10-35% ammonia)

**Hazard Class:** 8

**DOT/IMO/UN Identification Number:** 2672

**Packing Group:** III

**DOT/IMO Label(s) Required:** CORROSIVE

**DOT/TC/IMO/UN Classification:** Corrosive; Environmentally dangerous substance

**Other DOT Requirements:** Acceptable means of transportation include air, rail, road and water. The maximum quantity that may be transported in one package on a passenger aircraft or railcar is 5 liters and on a cargo aircraft is 60 liters.



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## 15. REGULATORY INFORMATION

**OSHA (Occupational Safety and Health Administration):** This material is considered to be hazardous as defined by the OSHA Hazard Communication Standard.

**CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):** Designated as a hazardous substance. Reportable quantity (RQ) is 1,000 lb (454 kg) for pure ammonium hydroxide. Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately when there is a release in an amount equal to or greater than the RQ. Toll free (800) 424-8802 or Washington D.C. metropolitan area (202) 426-2675.

**SARA TITLE III (Superfund Amendment and Reauthorization Act of 1986):** This product contains the following toxic chemicals subject to the reporting requirements of Section 302 and/or Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

CAS No.	Chemical Name	Amount of Chemical in CFI Product (% by weight)	302 Threshold Planning Quantity for Chemical* (lbs.)	313 De Minimis Concentration (% by weight)
7664-41-7	Ammonia	24.7	500	1.0

\* The Threshold Planning Quantity is for the pure form of the listed chemical. The Threshold Planning Quantity for the CFI product would be 2,025 lbs.

User should contact local, state and/or provincial regulatory agencies for information on additional or more stringent reporting requirements.

**Sections 311/312:** This product has been reviewed according to the U.S. EPA "Hazard Categories" promulgated under Sections 311 and 312 of SARA Title III and is considered, under applicable definitions, to meet the following categories:

Acute: yes      Chronic: yes      Fire: yes      Reactivity: no

**CAA (Clean Air Act):** Ammonia is listed as a regulated toxic substance under 112® for purposes of accidental release planning under the Risk Management Program. Threshold quantity is 10,000 lbs. for anhydrous ammonia and 20,000 lbs. for ammonia in solution (or aqua ammonia) at concentrations of 20% or greater.



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**FWPCA/CWA (Federal Water Pollution Control Act / Clean Water Act):** Designated as a hazardous substance. Reportable quantity is 1,000 lb (454 kg).

**DOT (Department of Transportation):** Please refer to Section 14 (Transport Information) for guidance concerning transportation.

This material is also regulated by the following states: California, Illinois, Massachusetts, New Jersey, New York and Pennsylvania.

## **16. DOCUMENTARY INFORMATION AND DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES**

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MSDS Prepared By: Environmental Health Decisions (949-481-8600)  
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