United States Steel Corporation

Ammonium Sulfate

Safety Data Sheet (SDS)

USS IHS Number: 74577

Locations: Gary and Granite City

Original: 12/16/2010 **Revision: 6/21/2017** **Expiration: 6/17/2020**

Section 1 – Identification

1(a) Product Identifier used on Label: Ammonium Sulfate

1(b) Other Means of Identification: None

1(c) Recommended use of the chemical and restrictions on use: None

1(d) Name, Address, and Telephone Number:

United States Steel Corporation
600 Grant Street, Room 1662
Pittsburgh, PA 15219-2800

Phone number: (412) 433-6840 (8:00 am to 5:00 pm)
FAX: (412) 433-5019

1(e) Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Ammonium Sulfate is **NOT** considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s): NA

2(c) Hazards not Otherwise Classified: None Known

2(d) Unknown Acute Toxicity Statement (Mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:

Chemical Name	CAS Number	EC Number	% weight
Ammonium sulfate	7783-20-2	231-984-1	97-100
Water	7732-18-5	231-791-2	0-3

EC- European Community
CAS- Chemical Abstract Service

Section 4 – First-aid Measures

4(a) Description of Necessary Measures: If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician.

- **Inhalation:** If inhaled: Remove person to fresh air and keep comfortable for breathing.
- **Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **Skin Contact:** If on skin: Rinse skin with water/shower. Wash contaminated clothing before reuse.
- **Ingestion:** If swallowed: Rinse mouth. Do NOT induce vomiting.

4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):

Acute effects:

- **Inhalation:** Breathing mist and vapors may cause irritation to the respiratory tract.
- **Eye:** May cause irritation, redness, and pain.
- **Skin:** May cause irritation to skin.
- **Ingestion:** May cause irritation to the gastrointestinal tract and/or nausea.

Section 4 – First-aid Measures (continued)

Chronic Effects: Chronic inhalation of vapors is associated with the following conditions:

Prolonged or repeated skin contact may cause dermatitis or irritation. Prolonged or repeated exposures may result in respiratory disorders.

4(c) Immediate Medical Attention and Special Treatment: Treat symptomatically.

Section 5 – Fire-fighting Measures

5(a) Suitable (and Unsuitable) Extinguishing Media: Extinguish fire using agent suitable for type of surrounding fire. Cool all affected containers with flooding quantities of water.

5(b) Specific Hazards Arising from the Chemical: Flammable and toxic gases will form at elevated temperature >280°C due to thermal decomposition (ammonia, sulfur oxides, nitrogen oxides).

5(c) Special Protective Equipment and Precautions for Fire-fighters: Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Personnel should be protected against contact with eyes and skin. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

6(b) Methods and Materials for Containment and Clean Up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements

Section 7 - Handling and Storage

7(a) Precautions for Safe Handling: Avoid inhalation or contact with skin or eyes. Ventilate area of leak or spill. Should be handled in ways to minimize generation of airborne dust and to prevent spills. Maintain all surfaces as free as practical of accumulation of material.

7(b) Conditions for Safe Storage, including any Incompatibilities: Isolate from incompatible substances.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL [1]	ACGIH TLV [2]	NIOSH REL [3]	IDLH [4]
Ammonium sulfate	15 mg/m³ (as total dust, PNOR) [5] 5.0 mg/m³ (as respirable fraction, PNOR)	10 mg/m³ (as inhalable fraction [6], PNOS) [7] 3.0 mg/m³ (as respirable fraction [8], PNOS)	NE	NE

NE - None Established

1. OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL) - Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.
5. PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.
6. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2017 TLVs ® and BEIs ® (Biological Exposure Indices) Appendix D, paragraph A.
7. PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are "nuisance dusts" containing no asbestos and <1% crystalline silica.
8. Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in ACGIH 2017 TLVs ® and BEIs ® Appendix D, paragraph C.

8(b) Appropriate Engineering Controls: Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

Section 8 - Exposure Controls / Personal Protection (continued)

8(c) Individual Protection Measures:

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

  Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.
- **Eyes**: Wear appropriate eye protection to prevent eye contact. Use safety glasses with side shields or chemical goggles.
- **Skin**: Persons handling this product should wear appropriate clothing to prevent skin contact. Wear protective gloves.
- **Other protective equipment**: An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): White to yellowish crystals

9(b) Odor: Acidic or ammonia odor

9(c) Odor Threshold: NA

9(d) pH: 5.5 for 0.1M solution

9(e) Melting Point/Freezing Point: Decomposes above 235°C

9(f) Initial Boiling Point and Boiling Range: NA

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Not Flammable, Not Combustible

9(j) Upper/Lower Flammability or Explosive Limits: NA

9(k) Vapor Pressure: NA

9(l) Vapor Density (Air = 1): NA

9(m) Relative Density: 1.77 kg/L

9(n) Solubility(ies): 43% at 20°C

9(o) Partition Coefficient n-octanol/water: NA

9(p) Auto-ignition Temperature: ND

9(q) Decomposition Temperature: ND

9(r) Viscosity: ND

NA - Not Applicable

ND - Not Determined for product as a whole

Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND)

10(b) Chemical Stability: Ammonium Sulfate is stable under normal storage and handling conditions.

10(c) Possibility of Hazardous Reaction: None Known

10(d) Conditions to Avoid: Heat, incompatibles. Explodes when mixed with potassium and sodium-potassium alloys. May also explode when mixed with potassium chlorate, potassium nitrate, and potassium nitrite. Vigorous reaction with flame when mixed with potassium nitride.

10(e) Incompatible Materials: Sodium hypochlorite, potassium plus ammonium nitrate, potassium chlorate, potassium nitrite, and sodium-potassium powder plus ammonium nitrate, and other strong oxidizers

10(f) Hazardous Decomposition Products: May emit ammonia, oxides of sulfur, oxides of nitrogen, and oxides of carbon.

Section 11 - Toxicological Information

11(a-e) Information on Toxicological Effects: The toxicological data listed below are presented regardless to classification criteria.

a. The following LC_{50} or LD_{50} has been established for **Ammonium Sulfate**:

Rat LD_{50} = 4250 mg/kg

Rat LD_{50} > 2000 mg/kg

Rat LD_{50} > 2000 mg/kg (REACH)

Mouse LD_{50} > 2000 mg/kg (REACH)

b. The following Skin (Dermal) Irritation data has been determined for **Ammonium Sulfate**:

- May be irritating to human skin (HSDB).

c. The following Eye Irritation information was found for **Ammonium Sulfate**:

- May be irritating to human skin (HSDB).

d. No Skin (Dermal)/Respiratory Sensitization data available for **Ammonium Sulfate.**

e. No Aspiration Hazard data available for **Ammonium Sulfate.**

f. No Germ Cell Mutagenicity data available for **Ammonium Sulfate.**

g. Carcinogenicity: IARC, NTP, and OSHA do not list **Ammonium Sulfate** as a carcinogen.

h. No Toxic Reproduction data available for **Ammonium Sulfate.**

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Ammonium Sulfate.**

Section 11 - Toxicological Information (continued)

11(a-e) Information on Toxicological Effects (continued):

j. The following Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Ammonium Sulfate**:

- Rat oral 1 yr Feed NOAEL 256 – 284 mg/kg Liver, kidney wt. increased, spleen decrease. Rat 13 wk oral NOEL 886 mg/kg based on Diarrhea. (IUCLID, REACH, HSDB).

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

Acute Effects by Component:

- **AMMONIA SULFATE:** Breathing mist and vapors can cause irritation to the respiratory tract. Symptoms may include coughing, shortness of breath and may cause increased pulmonary resistance, transient cough and bronchoconstriction. Causes irritation to the eyes and skin.

Delayed (chronic) Effects by Component:

- **AMMONIA SULFATE**: Prolonged or repeated exposures may result in respiratory disorders (Bronchitis), impaired lung function, soreness of mouth, discoloration and erosion of teeth.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial):

- **Ammonia Sulfate:** *Agonus cataphractus* LC_{50} = 130 -210 mg/L, *Leuciscus idus* LC_{50} = 681 mg/L, *Lebistes reticulatus* LC_{50} = 592 mg/L, *Brachydanio rerio* LC_{50} = 480 mg/L, *Leuciscus idus* LC_{50} = 460 - 1000 mg/L, *Brachydanio rerio* LC_{50} = 250 mg/L

12(b) Persistence & Degradability: No Data Available

12(c) Bioaccumulative Potential: No Data Available

12(d) Mobility (in soil): No Data Available

12(e) Other Adverse Effects: None Known

Additional Information:

Hazard Category: No Category **Signal Word:** No Signal Word

Hazard Symbol: No Hazard Symbol

Hazard Statement: No Hazard Statement

Section 13 - Disposal Considerations

Disposal: Dispose of contents/container in accordance with local/regional/international regulations.

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue 16 03 04 - inorganic wastes other than those specified in 16 03 03.

Please note this information is for Ammonium Sulfate in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 does not regulate **Ammonium Sulfate** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: Ammonium Sulfate	**Packaging Authorizations**	**Quantity Limitations**
Shipping Symbols: NA	**a) Exceptions:** NA	**a) Passenger Aircraft or Rail:** NA
Hazard Class: NA	**b) Non-bulk:** NA	**b) Cargo Aircraft Only:** NA
UN No.: NA	**c) Bulk:** NA	
Packing Group NA		**Vessel Stowage Location:** NA
DOT/ IMO Label: NA		
Special Provisions (172.102): NA		**DOT reportable quantities**: NA

International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Section 14 - Transport Information (continued)

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate **Ammonium Sulfate** as a hazardous material.

Shipping Name: Ammonium Sulfate **Classification Code:** NA **UN No.:** NA **Packing Group:** NA **ADR Label:** NA **Special Provisions:** NA **Limited Quantities:** NA	**Packaging** **a) Packing Instructions:** NA **b) Special Packing Provisions:** NA **c) Mixed Packing Provisions:** NA	**Portable Tanks & Bulk Containers** **a) Instructions:** NA **b) Special Provisions:** NA

International Air Transport Association (IATA) does not regulate **Ammonium Sulfate** as a hazardous material.

Shipping Name: Ammonium Sulfate **Class/Division:** NA **Hazard Label (s):** NA **UN No.:** NA **Packing Group:** NA **Excepted Quantities (EQ):** NA	**Passenger & Cargo Aircraft** **Limited Quantity (EQ)**		**Cargo Aircraft Only** **Pkg Inst:** NA **Max Net Qty/Pkg:** NA	**Special Provisions:** NA **ERG Code:** NA
	Pkg Inst: NA **Max Net Qty/Pkg:** NA	**Pkg Inst:** NA **Max Net Qty/Pkg:** NA		

Pkg Inst – Packing Instructions Max Net Qty/Pkg – Maximum Net Quantity per Package ERG – Emergency Response Drill Code

Ammonium Sulfate does not have a **Transport Dangerous Goods (TDG)** classification.

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a U. S. Steel product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.* This product and/or its constituents are subject to the following regulations:

SARA Potential Hazard Categories: Immediate Acute Health Hazard, Delayed Chronic Health Hazard.

SARA 313 Supplier Notification: The product, **Ammonium Sulfate** does not contain any of the toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

State Regulations: The product, **Ammonium Sulfate** is listed in some state regulations.
California Prop. 65: Does not contain elements known to the State of California to cause cancer or reproductive toxicity.

Other Regulations:

WHMIS Classification (Canadian): The product, **Ammonium Sulfate** Not hazardous under WHIMIS 2015

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Prepared By: United States Steel Corporation

Revision History:

06/21/17 – Update WHMIS 2015
4/01/2014 - Update to OSHA HAZCOM 2012
1/20/11 – Update of content and format to comply with GHS

Expiration Date: 06/21/2020

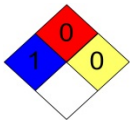
Additional Information:

Hazardous Material Identification System (HMIS) Classification

Health Hazard	**1**
Fire Hazard	**0**
Physical Hazard	**0**

HEALTH= **1**, * Denotes possible chronic hazard if airborne dusts or fumes are generated. Irritation or minor reversible injury possible.
FIRE= **0**, Materials that will not burn.
PHYSICAL HAZARDS = **0**, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

National Fire Protection Association (NFPA)



HEALTH = **1**, Exposure could cause irritation but only minor residual injury even if no treatment is given.
FIRE = **0,** Materials that will not burn.
INSTABILITY = **0**, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists		**NIF**	No Information Found
BEIs	Biological Exposure Indices		**NIOSH**	National Institute for Occupational Safety and Health
CAS	Chemical Abstracts Service		**NTP**	National Toxicology Program

Section 16 - Other Information (continued)

ABBREVIATIONS/ACRONYMS (continued):

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	**ORC**	Organization Resources Counselors
CFR	Code of Federal Regulations	**OSHA**	Occupational Safety and Health Administration
CNS	Central Nervous System	**PEL**	Permissible Exposure Limit
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract	**PNOR**	Particulate Not Otherwise Regulated
HMIS	Hazardous Materials Identification System	**PNOC**	Particulate Not Otherwise Classified
IARC	International Agency for Research on Cancer	**PPE**	Personal Protective Equipment
LC50	Median Lethal Concentration	**ppm**	parts per million
LD50	Median Lethal Dose	**RCRA**	Resource Conservation and Recovery Act
LD_{Lo}	Lowest Dose to have killed animals or humans	**RTECS**	Registry of Toxic Effects of Chemical Substances
LEL	Lower Explosive Limit	**SARA**	Superfund Amendment and Reauthorization Act
$\mu g/m^3$	microgram per cubic meter of air	**SCBA**	Self-contained Breathing Apparatus
mg/m^3	milligram per cubic meter of air	**STEL**	Short-term Exposure Limit
mppcf	million particles per cubic foot	**TLV**	Threshold Limit Value
SDS	Safety Data Sheet	**TWA**	Time-weighted Average
MSHA	Mine Safety and Health Administration	**UEL**	Upper Explosive Limit
NFPA	National Fire Protection Association		

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, United States Steel Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.