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Safety and Security Guidelines for the Storage and Transportation of Fertilizer Grade Ammonium Nitrate at Fertilizer Retail and Distribution Facilities



Safety And Security Guidelines for the Storage and Transportation of Fertilizer Grade Ammonium Nitrate at Fertilizer Retail And Distribution Facilities¹



1.0 Scope and Purpose

1.1 The purpose of these Guidelines is to outline best practices for the safety and security of fertilizer grade ammonium nitrate (FGAN) in storage and in transportation at fertilizer retail facilities.

1.1.1

These Guidelines cover the storage and transportation of fertilizer grade ammonium nitrate at fertilizer retail facilities.

1.2 The U.S. Department of Transportation (DOT) has three entries for FGAN:

- Class 5 Oxidizer, Division 5.1, UN194², PG III material – Defined as ammonium nitrate (AN), with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance.

¹ The Fertilizer Institute (TFI) and Agricultural Retailers Association (ARA) made considerable efforts to ensure the information contained herein is accurate. Users of these guidelines are strongly recommended to confirm that the information contained within them, is correct by way of independent sources. TFI and ARA accept no responsibility for any inaccuracies, does not make any warranty or representation, either express or implied, regarding its accuracy, completeness, or utility; nor do TFI and ARA assume any liability of any kind whatsoever resulting from the use or reliance upon, any information, material, or procedure contained herein, including but not limited to any claims for damages, loss or injury regarding health, safety, or environmental effects.

² 49 C.F.R. § 172.101

- Class 5 Oxidizer, Division 5.1, UN2067³, PG III material – Defined as uniform mixtures of fertilizers containing AN as the main ingredient within the following compositional:
 - Not less than 90% AN with not more than 0.2% total combustible, organic material calculated as carbon, and with added matter, if any, that is inorganic and inert when in contact with AN; or
 - Less than 90%, but more than 70%, AN with other inorganic materials, or more than 80%, but less than 90%, AN mixed with calcium carbonate and/or dolomite and/or mineral calcium sulphate, and not more than 0.4% total combustible, organic material calculated as carbon; or
 - AN-based fertilizer containing mixtures of AN and ammonium sulphate with more than 45%, but less than 70%, AN, and not more than 0.4% total combustible, organic material calculated as carbon such that the sum of the percentage of compositions of AN and ammonium sulphate exceeds 70%.
- Division 9, UN2071⁴, PG III material, by highway only – Defined as uniform, AN based fertilizer mixtures, containing nitrogen, phosphate or potash, meeting the following criteria (1) contains not more than 70% AN and not more than 0.4% total combustible, organic material calculated as carbon, or (2) contains not more than 45% AN and unrestricted combustible material.

1.3 FGAN is a U.S. Department of Homeland Security (DHS) chemical of interest listed in Appendix A of the Chemical Facility Anti-Terrorism Standards (CFATS) as a theft-diversion security risk. For purposes of the CFATS program, FGAN is defined as solid AN with a minimum concentration of 33% or greater of FGAN, and a nitrogen concentration of 23% or greater in such FGAN, and with a Screening Threshold Quantity for risk of theft-diversion of 2,000 pounds.

1.4 The U.S. Occupational Safety and Health Administration's explosive and blasting agent regulation (OSHA) regulates FGAN⁵. The requirements apply to the storage of ammonium nitrate in the form of crystals, flakes, grains, or prills including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures containing 60% or more ammonium nitrate by weight.

1.5 The National Fire Protection Association (NFPA) Standard applies to solid ammonium nitrate in the form of crystals, flakes, grains or prills including

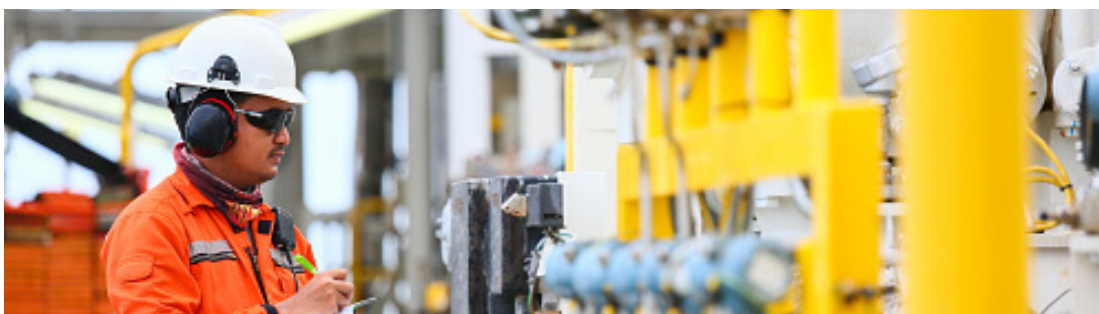
³ 49 C.F.R. § 172.102 (150)

⁴ 49 C.F.R. § 172.102 (132)

⁵ 29 C.F.R. § 1910.109(i)

fertilizer grade and industrial grade or other mixtures containing 60% or more by weight of ammonium nitrate⁶ and applies to liquid ammonium nitrate solutions containing 70% or more by weight ammonium nitrate.⁷

1.6 FGAN and mixtures in vessels and waterfront facilities are regulated as a certain dangerous cargo in 33 C.F.R. § 126.28 and, therefore, are also regulated by the U.S. Coast Guard in 33 C.F.R. Part 105 (security requirements). These facilities are not regulated under the CFATS program.



2.0 Safety

2.1 Owners/operators of all FGAN facilities should be aware that the safety of their workplaces and operations may be subject to the “General Duty Clause” of the Occupational Safety and Health Act at 29 U.S.C. § 654(a)(1)⁸.

2.1.1

Where applicable, owners/operators must comply with the U.S. Occupational Safety and Health Administration’s (OSHA’s) Process Safety Management Standard (PSM) at 29 C.F.R. § 1910.119. FGAN is not a chemical substance currently listed in 29 C.F.R. § 1910.119, Appendix A and, therefore, facilities solely storing FGAN are not subject to the PSM.

2.1.2

Avoid heating FGAN in a confined space above 170°C (e.g., processes involving FGAN should be designed to avoid this possibility).

2.1.3

⁶ NFPA 400, 11.1.1.2 (2016)

⁷ NFPA 400, 11.1.1.3 (2016)

⁸ The Clean Air Act (section 112(r)(1) (42 U.S.C. § 7412(r)(1)) contains a similar “General Duty Clause” requiring owners and operators of stationary sources to “identify hazards which may result from . . . releases using appropriate hazard assessment techniques, design and maintain a safe facility taking such steps as are necessary to prevent releases, and minimize the consequences of accidental releases which do occur.” Since these Guidelines focus on safety and security, we do not address the Clean Air Act’s “General Duty Clause” herein.

Owners/operators should ensure that facilities have implemented a “hot work” program consistent with OSHA requirements at 29 C.F.R. § 1910.252. It is important to avoid heating or welding on machinery or piping where FGAN might be confined.

2.1.4

Ensure that FGAN is not exposed to shock (e.g., shock waves from explosives).

2.1.5

Avoid contamination of FGAN with combustible materials or organic substances including, but not limited to: (i) organic chemicals, acids, or other corrosive materials; (ii) compressed flammable gases; (iii) flammable and combustible materials, solids or liquids (including potentially combustible dust); and, (iv) other contaminating substances such as wood chips, organic materials, chlorides, phosphorus, finely divided metals, charcoals, diesel fuels and oils, sulfur.

2.1.6

Avoid contamination of FGAN with inorganic materials that may contribute to its sensitivity to explosion, including chlorides and some metals, such as chromium, copper, copper alloys such as brass or bronze, cobalt, and nickel, and finely divided or powdered metals that may act as fuels.

2.1.7

Ensure that all electrical components/systems are in compliance with the National Electrical Code.

2.1.8

Ensure that the facility has implemented a Lock Out/Tag Out program in accordance with 29 C.F.R. § 1910.147.

2.1.9

Facility access points should be posted “NO SMOKING, NO OPEN FLAMES.”

2.1.10

All facility access points should be posted with a NFPA 704 warning sign of at least 15in. x 15in. and visible to fire responders and police from at least 100 feet⁹. The warning sign text and important Hazard Communication information should state, at a minimum: “WARNING. Do not fight fires at this facility without consulting the facility operator. Refer to ERG Guide 140 and Safety Data Sheet (SDS). In case of an emergency CALL 9-1-1 or [local emergency number] and the facility owner/operator.”¹⁰ The sign must also have four diamonds, each at least 7.5in., with the appropriate colored background. “OX” should be in the bottom diamond in black lettering on a white background.¹¹

2.1.11

Owners/operators of facilities should develop a written emergency plan in accordance with 29 C.F.R. § 1910.120 for responding to releases of, or substantial threats of releases of, FGAN, and provide training to employees who are charged with implementing the emergency plan. Plans should be specific to the facility and community and specific as to when a fire is considered to have involved FGAN. The rule of thumb is if outside emergency responders are necessary, do not fight FGAN fires. For fires that involve FGAN, plans should focus on evacuation of the area. When the facility in question is close to the public (less than one quarter mile away), plans should focus on evacuation. For facilities in areas with inadequate water supplies and fire hydrants, plans should focus heavily on evacuation.

2.1.12

Plans prepared under section 2.1.11 should be provided to, and coordinated with, local emergency responders. In addition, owners/operators should provide local emergency responders with current copies of SDSs and review appropriate fire response. Further, owners/operators should annually conduct exercises with local emergency responders to train personnel on how to carry out proper emergency response and to revise the plans, as necessary.

2.1.13

Suppliers should provide information to customers describing the hazards associated with FGAN, steps for its proper management and housekeeping requirements, and information regarding regulatory requirements for the safe storage of the material. At a minimum, this should include a FGAN SDS.

2.2 Storage

2.2.1

General Requirements

⁹ NFPA 704, NFPA 400, 11.2.16 (2016)

¹⁰ NFPA 400, 11.2.16 (2016)

¹¹ NFPA 704

2.2.1.1

All FGAN storage sites should consider various government agency chemical advisories on the safe storage, handling, and management of the material AN. The most current and comprehensive advisory now available is “Chemical Advisory: Safe Storage, Handling, and Management of Ammonium Nitrate (EPA 550-S-13-001 August 2013). [This was updated in 2015, please see: http://www.osha.gov/dep/fertilizer_industry/]. Owner/operators of FGAN storage sites should be aware that these advisories will be updated, as necessary, with any information as it becomes available.

2.2.1.2

Steel and wooden bins and other structural materials in immediate contact with FGAN should be protected by special coatings.¹² Steel and wooden bins can be protected by special coatings such as sodium silicate (water glass), or epoxy coatings, or polyvinyl chloride coatings.

2.2.1.3

Smoking, open flames, and unauthorized sparking or flame-producing devices should be prohibited in the immediate area.

2.2.1.4

FGAN storage areas should have automatic fire detection and alarm systems, if the areas are not continuously occupied. Water supplies and fire hydrants shall be available in accordance with recognized good practices.¹³ NFPA requires a minimum duration of 2 hours of the water supply.¹⁴ Situations where water supplies, rate of flow, and fire hydrants are not available should be accounted for in the emergency response plan (See 2.1.12).

2.2.1.5

If firefighters consider it appropriate to fight an FGAN fire, flooding large quantities of water from a distance should occur as promptly as possible.

2.2.1.6

To avoid pressurization, bins should have appropriate ventilation and be constructed to self-ventilate in the event of a fire.

2.2.1.7

Bulk piles shall be limited in size by the caking tendency of the product; however, in no case should piles be higher than 36 inches below the roof.¹⁵ Piles should not contact supporting beams or other related supporting structures.

¹² 29 C.F.R. § 1910.109(i)(4)(ii)(b)

¹³ 29 C.F.R. § 1910.109(i)(7)(ii)(b)

¹⁴ NFPA 400, 11.2.8.2 (2016)

¹⁵ NFPA 400, 11.3.2.3.9 (2016)

2.2.1.8

Owners/operators of FGAN storage sites should ensure that facilities are in full compliance with applicable requirements of the Emergency Planning and Community Right to Know Act. 42 U.S.C. §§ 11001 – 11050.

2.2.1.9

Storage areas should be inspected regularly by an individual(s) trained to identify potential hazards and ensure that all safety control measures are being properly implemented. Any hazards should be addressed immediately. Piles should have access points for mechanical means to prevent caking. i.e. openings for machinery to regularly access and turn the FGAN.

2.2.2

Notification Warnings

2.2.2.1

Buildings and bins where FGAN is stored should be marked with a “fire diamond” hazard rating meeting the standards of NFPA 704. The NFPA fire diamond should be situated, with the concurrence of the authority having regulatory jurisdiction. The fire diamond sign must be clearly visible to first responders, police, and other individuals attempting to access the area.

2.2.2.2

The contents of each bin should be clearly identified by the proper shipping name of the material, “AMMONIUM NITRATE” written in 2- inch high, capital letters below the NFPA fire diamond.

2.2.2.3

The NFPA diamond codes for FGAN are generally recognized to be:

Health Hazard (Blue)	1
Flammability (Red)	0
Reactivity (Yellow)	3
Other	(OX)

2.2.2.4

Owners/operators should consult appropriate fire codes such as NFPA 400 (Chapter 11) for guidance regarding storage of FGAN. NFPA 400 was updated in 2016. A number of significant changes were made to the standard, as follows:

- The standard now applies to those facilities that store in excess of 1000 pounds of

solid AN with more than 60% of FGAN by weight, and liquid FGAN with more than 70% by weight of FGAN.

- All new FGAN storage facilities must be built of non-combustible material. New construction must be equipped with sprinklers with a water supply of at least a 2-hour duration.
- Existing FGAN storage facilities composed of wood must be equipped with sprinklers.
- Only water-based suppression systems may be used for FGAN.
- The facility floor must be made of liquid-tight, noncombustible construction materials.¹⁶
- All flooring in storage and handling areas shall be without open drains, traps, tunnels, pits, or pockets.¹⁷
- Fire alarm systems are required for both new and existing FGAN facilities.
- Pre-incident and emergency action planning activities must be undertaken.
- Public alert systems, capable of alerting persons within a one-mile radius must be installed.

There are the key changes to the standard. Please consult the standard for additional details before designing a new, or modifying an existing, facility.



3.0 Security

3.1 Storage Facilities

3.1.1

Owners/operators must comply with applicable regulations promulgated by DHS at 6 C.F.R. Part 27 and the U.S. Coast Guard at 33 C.F.R. Part 105, as well as applicable state and local requirements.

3.1.2

The owner/operator should file a Top-Screen with DHS if the facility stores more than 2,000

¹⁶ NFPA 400, 6.2.1.10 (2016)

¹⁷ NFPA 400, 11.1.4.9.1 (2016)

pounds of AN.¹⁸ DHS may then ask the facility to conduct a thorough Site Vulnerability Assessment (SVA).¹⁹

If required to complete an SVA, the facility must file the SVA and Site Security Plan (SSP) through DHS's Chemical Security Assessment Tool (CSAT) within 120 days.²⁰

3.1.3

Access by visitors, service subcontractors, and third-party transporters should be approved by management.

3.1.4

All FGAN storage facilities should institute a system for accountability of bulk FGAN. Accurate inventory records and accounting for product shrinkage should be maintained.

3.1.4.1

Owners/operators of storage facilities should document and report unexplained losses, thefts, or otherwise unaccounted for shortages of FGAN to the local FBI field office, as well as local law enforcement.

3.1.5

Report all suspicious behavior to an appropriate supervisor or, if unavailable, to local law enforcement.

3.1.6

Owners/operators should maintain regular communications with local law enforcement agency(ies) and should encourage regular patrols in the area of the facilities.

3.1.7

Owners/operators should make provisions to prevent unauthorized persons from accessing the FGAN storage area, especially during non-business hours.

3.2 Secure FGAN Transactions

3.2.1

Recommended procedures for secure FGAN sales transactions:

- FGAN should not be sold directly to facility employees;

¹⁸ 6 C.F.R. Pt. 27, App. A

¹⁹ 6 C.F.R. § 27.215

²⁰ 6 C.F.R. § 27.210(a)(2) and (3)

- Procedures should be established for reporting suspicious activities at any facility site;
- There should be no cash sales transactions for FGAN from manufacturing sites;
- FGAN should not be made available for sale on any internet sites;
- Customer should be required to show a valid, government issued ID;
- Records should be kept of all FGAN customers; and
- Any new FGAN customers should be vetted against national terror databases

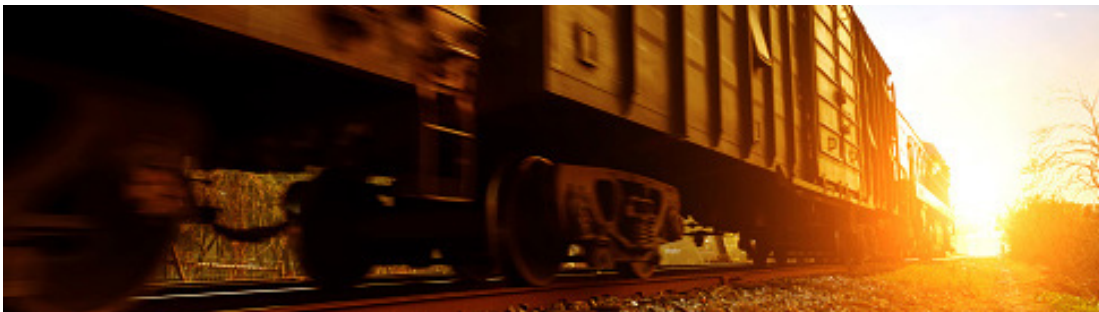
3.3 Secure FGAN Shipments

3.3.1

All truck, rail and barge shipments of FGAN should be tracked for confirmed receipt at the intended destination.

3.3.2

Any suspicions regarding FGAN shipments should be reported to the FBI.



4.0 Transportation

- 4.1 Owners/operators must ensure that all transportation-related activities are in full compliance with applicable DOT hazardous materials requirements at 49 C.F.R. Parts 171-178.

4.1.1

As a Division 5.1 oxidizer, FGAN transport is regulated under DOT's 49 C.F.R. § 172.800 security regulations. Facilities must have a DOT security plan, including transportation security training for employees.

4.2 Truck

4.2.1

Motor carriers must comply with hazardous materials requirements at 49 C.F.R. Parts 177 and 397.

4.2.2

Motor carriers must maintain financial responsibility as required by 49 C.F.R. § 387.9.

4.2.3

Employee drivers should possess a current, state-issued commercial driver's license with a hazardous materials endorsement as required under 49 C.F.R. § 383.121. and should have received hazardous materials training as required by 49 C.F.R. § 172.704.

4.2.4

The parking of vehicles under or near a bin for any purpose other than loading or unloading FGAN or necessary maintenance of the bin is prohibited. The engine of the power unit should be shut off while under a FGAN bin except as needed for loading or unloading operations. Wheel chocks should be used and the ignition key removed when loading or unloading FGAN from a bin when the vehicle is unattended. After loading is completed and loading equipment has been properly disconnected, the vehicle should immediately be moved to a location at least 50 feet from the bin.

4.2.5

Incoming shipments of FGAN should be unloaded and secured the same day that they are delivered. Shipments should not be accepted after hours.

4.2.6

Fork trucks, tractors, front-end loaders and other internal combustion powered equipment must not remain unattended in a building where FGAN is stored. Fueling of mobile equipment should be performed at a minimum of 50 feet away from FGAN storage facilities.

4.2.7

Owners/operators should implement a Proof-of-Delivery program for all truck shipments (bulk or bagged) of FGAN.

4.3 Highway

4.3.1

Owners/operators should consider implementing relevant and appropriate voluntary Security Action Items recommended by the Transportation Security Administration (TSA) for Tier 2 Highway Security-Sensitive Materials. Refer to: <https://www.tsa.gov/for-industry/surface-transportation>

4.4 Rail

4.4.1

Rail transporters must comply with applicable DOT hazardous materials regulations at 49 C.F.R. Part 174.

4.4.2

Rail cars should arrive at the rail siding with the shipper's security seals affixed to all top hatches and bottom gates.

4.4.3

All shipper seal serial numbers should be checked to ensure they match the bill of lading for the rail car. If any seal number is incorrect, the owner/operator should call the shipper. If any seal shows signs of tampering or unauthorized removal, the shipper and local law enforcement should be contacted immediately.

4.4.4

When a rail car containing other than residual amounts of AN is unattended and outside a secure area, the owner/operator should affix a padlock or other device to the door or gate to deter unauthorized opening of an unloading compartment.

4.4.5

If any shipper's security seal is removed from the top hatches of a rail car by the rail siding operator to gain access for any reason, the rail siding operator's security seal should be affixed to the hatch.

4.5 Barge

4.5.1

Owners/operators shipping FGAN by barge should comply with applicable provisions of 46 U.S.C. § 70103 for "certain dangerous cargo".

4.5.2

The MTSA regulations may be found at 33 CFR Part 105.



5.0 Voluntary Programs

5.1 ResponsibleAg Inc.

ResponsibleAg Inc. is a non-profit organization founded in 2014 to promote the public welfare by assisting agribusinesses as they seek to comply with federal environmental, health, safety and security rules regarding the safe handling and storage of fertilizer products. The organization provides participating businesses a federal regulatory compliance assessment relating to the safe storage and handling of fertilizers, recommendations for corrective action where needed, and a robust suite of resources to assist in this regard. Under the program, certified auditors conduct on-site compliance assessments, following which facilities receive a corrective action plan listing those issues, information on how to correct them, and a recommended time frame for corrections.

5.2 Fertilizer Safety and Health Partners Alliance

ARA and TFI are signatories to The Fertilizer Safety and Health Partners Alliance (Alliance) along with the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA). Through the Alliance, the participants are committed to providing partner members with information, guidance, and access to training resources that will help protect the health, safety, and security of workers, emergency responders, and the communities surrounding establishments in the agricultural retail and supply industry. The participants specifically emphasize the safe storage and handling of ammonium nitrate and anhydrous ammonia.

References

- Agricultural Retailers Association, 1525 15th St. N.W., Washington, D.C. 20006, (202) 457-0825, www.aradc.org
- The Fertilizer Institute, 425 Third St. S.W., Suite 950, Washington, D.C. 20024, (202) 962-0490, www.tfi.org
- National Fire Protection Association, 1401 K Street, N.W., Washington, D.C., www.nfpa.org
- U.S. Coast Guard (U.S. Department of Homeland Security), Washington, D.C., <https://www.uscg.mil>
- U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C., www.osha.gov
- U.S. Department of Homeland Security, Washington, D.C., www.dhs.gov
- U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Washington, D.C., www.dot.gov
- Compliance Assistance Tool for Agricultural Retailers, Asmark Institute, Owensboro, KY., www.asmark.org/ComplianceAssessmentTool