TECH TIP

Storage and Handling of Anhydrous Ammonia – CFR 1910.111

Does your facility store anhydrous ammonia onsite? If you do, you are probably aware of the PSM/RMP regulatory requirements associated with exceeding EPA/OSHA thresholds. If you are under the PSM/RMP thresholds, you may think that you are in the clear of any federal regulatory obligations. But are you familiar with the **OSHA CFR 1910.111 requirement for "Storage and handling of anhydrous ammonia"**? Regardless of the federal thresholds listed for PSM applicability, OSHA has established additional requirements for the storage and handling of anhydrous ammonia that you should be aware of.

OSHA published the standard for storage and handling of anhydrous ammonia as a response to industry incidents associated with ammonia releases that have claimed lives. The requirements parallel the American National Standard Institute (ANSI)/CGA G-2.1-2014 "Requirements for the Storage and Handling of Anhydrous Ammonia" which is considered industry RAGAGEP. However, despite OSHA's efforts, incidents still occur. In 2014, a facility in Nebraska had a truck driver fatality during loading operations due to an anhydrous ammonia release resulting from a bleeder tank rupture. After investigation, OSHA cited the company for 12 serious safety violations, one of which was under 29 CFR 1910.111 and the facility was fined. This demonstrates the hazardous nature of anhydrous ammonia and the importance of implementing a robust safety program following good engineering practices.

Resources

OSHA CFR 1910.111

Nebraska Anhydrous Ammonia Incident

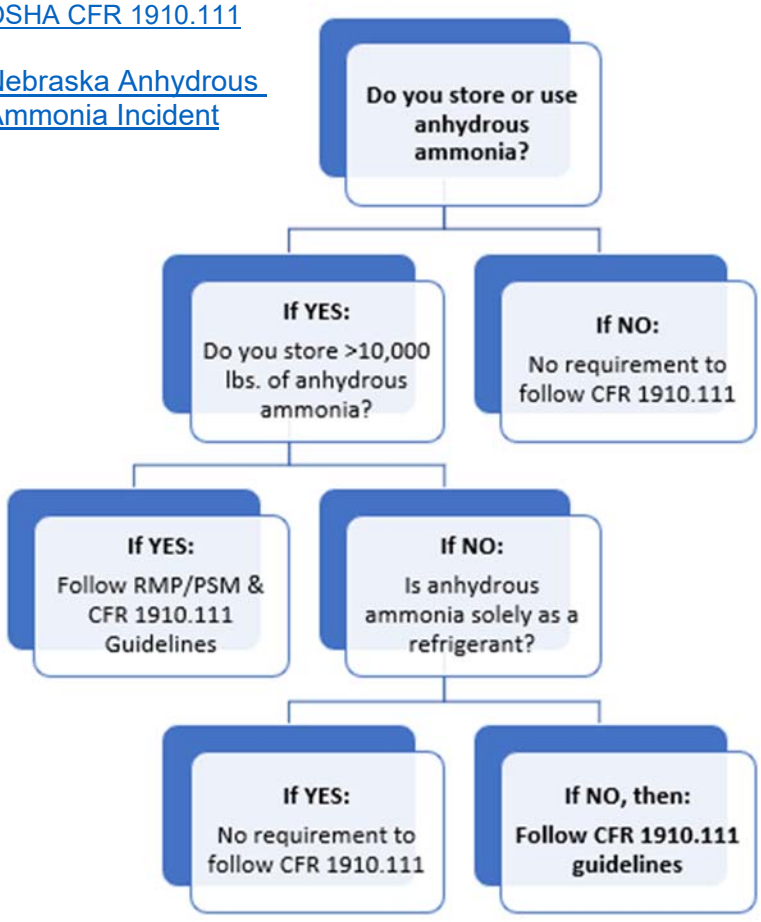

Figure 1: Applicability Roadmap

CFR 1910.111 Applicability Roadmap

Make sure you are in compliance. Follow the applicability roadmap (Figure 1) to determine whether your facility is required to adhere to CFR 1910.111.

What Are the Requirements of 1910.111?

OSHA's standard for storage and handling of anhydrous ammonia is rigorous and covers topics such as design requirements, equipment markings, acceptable storage locations, and device specifications. Some potential gaps of the standard are listed for your reference:

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- Permanent nameplates **shall** be labeled with name and address of the vessel manufacturer, wall thickness of the shell and head, surface area in square feet, notation of whether the system is designed for underground or aboveground installation or both, and markings indicating the maximum fill level.
- All connections on the Ammonia tank except PSVs, gauging devices, or those fitted with No. 54 drill-size orifice **shall** have shutoff valves/excess-flow valves located as close to the tank as practical.
- Excess flow valves **shall** be marked with the manufacturer name, catalog number, and the rated capacity.
- Precaution **shall** be taken against damage to ammonia systems from vehicles.
- Hoses subject to container pressure **shall** be designed for min working pressure of 350 psig. Refer to standard for labeling requirements.
- Relief devices **shall** exist, **shall** vent upward unobstructed to the atmosphere and **shall** be configured with rain caps. Relief devices **shall** be marked accordingly as outlined in the standard.
- Each storage container **shall** be provided with a pressure graduated from 0-400 psi.
- Any transferring and/or loading operations **shall** require the continuous presence of an attendant in the vicinity of the operation.
- Atmospheric storage **shall** be provided with vacuum breakers.
- Stationary storage installations must have at least two suitable gas masks in readily-accessible locations. For respiratory protection in concentrated ammonia atmospheres, a self-contained breathing apparatus is required.

Please refer to CFR 1910.111 and the ASME vessel design code for a complete list of requirements to abide by to ensure compliance with the standard.

It is recommended, both for financial and safety reasons, that preventative measures include periodic audits of your anhydrous ammonia storage and handling process to identify potential deviations from good engineering practices and to ensure compliance with CFR 1910.111. Risk Management Professionals has been assisting industry in meeting regulatory standards to identify and mitigate risk for over 25 years. For more information on how to implement CFR 1910.111 at your facility and tips for identifying potential gaps, feel free contact our office.

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Michael Pfaff is a Project Engineer with Risk Management Professionals. He has supported a variety of activities associated with the California Accidental Release Prevention Program (CalARP), Environmental Protection Agency's Risk Management Plan (EPA's RMP) and Occupational Safety and Health Administration's Process Safety Management (OSHA's PSM) Program and is well versed in regulatory compliance.