

Industrial Refrigeration Regulations

at a glance.

Regulation of Industrial Refrigeration Equipment is Increasing. Here's How to Stay Safe and Avoid Increased Costs



The US Environmental Protection Agency (EPA) states there are approximately 150 catastrophic accidents annually at facilities that make, use, or store extremely hazardous substances (EHS). With ammonia refrigeration making up approximately 40% of the facilities with EHS regulated by the EPA, it appears the federal agency will be scrutinizing these facilities more closely.

New Compliance Challenges Facing Operators

An emphasis on stronger enforcement of existing regulations, along with new laws, could mean additional costs for operators in the near future. They are already required to develop detailed safety and training programs and an emergency response plan. They must invest in personnel to develop and administer these programs, train their workers, buy liability insurance, and purchase eye wash stations and other equipment to keep employees safe.

To help refrigeration facilities comply with Clean Air Act (CAA), EPA is working to enforce four parts of the CAA's Chemical Accident Prevention Program: Risk Management Plan regulations, General Duty Clause, Emergency Planning and Community Right-to-Know Act and Process Safety Management (PSM) regulations.

In addition, the Occupational Safety and Health Administration (OSHA) is considering possible changes to its Program Safety Management (PSM) Rules. While it has yet to propose updates, it held an informal stakeholder meeting in October 2022, to solicit comments on the scope of the current PSM standard, including expanding PSM coverage and requirements for reactive chemical hazards.



Here is a summary of recent regulatory actions and those under consideration:

EPA Looks to Strengthen Its Risk Management Program (RMP) Rules. On August 31, 2022, the US EPA proposed to strengthen the RMP regulations with the [Safer Communities by Chemical Accident Prevention \(SCCAP\) proposed rule](#). The goal is to further protect vulnerable communities from chemical accidents.

The proposed rule emphasizes the requirement for regulated facilities to evaluate risks of natural hazards and climate change, including any loss of power. It also requires safer technologies and alternative analysis for certain facilities with high accident rates and enhances facility planning and preparedness efforts.

Impact on Smaller Operators. For those companies using 1,000 – 10,000 pounds of ammonia that fall under the General Duty Clause, EPA has been sending [Information Requests](#) to select facilities that it believes may be out of compliance with the GDC. Facilities are required to answer four questions about their ammonia refrigeration systems, including whether they have performed a process hazard review.

In the recent past, one EPA region sought to improve compliance without the need for inspections. Operators are asked to identify and evaluate the potential hazards associated with their refrigeration system. However, if the operator has not done so, it must pay a \$5,000 settlement. The company will also be required to conduct hazard reviews with expert help, meet with responders and file any missing EPCRA Tier II forms.

Focus on the New Start-Up Process. In February 2021, after finding that a disproportionate number of accidents occur during start-up or other nonroutine operations, EPA issued a new Enforcement alert.

It cites the following provisions of the RMP regulations to prevent accidents during process startup: Operating procedures with clear instructions for safely conducting activities involved in each covered process; training so each employee involved in operating a process is familiar with operating procedures, safety and health hazards, emergency operations, and safe work practices; and a pre-

startup review to ensure construction and equipment is functioning according to design specifications and that safety, operating, maintenance, and emergency procedures are in place and adequate.

Public Meetings Requirement – Possible Impact on a Company’s Reputation. As of March 15, 2021, EPA now requires companies to hold public meetings within 90 days of a reportable accident that impacts people or property outside of its facilities. News stories or social media posts from these meetings could easily harm a company’s reputation.

Alternative Solutions to Keep Facilities Safe

CO₂ is a natural refrigerant that eliminates much of the regulatory burden associated with NH₃. It is odorless and non-corrosive, and does not deplete the ozone or harm food products when in direct contact. It has a baseline of 1 for global warming potential and an A1 classification, so it can be safely vented and is non-flammable. There is no record-keeping or personnel to oversee compliance and no fines for safety violations.



The materials and components of CO₂ systems operate safely and efficiently at elevated pressure. Higher pressure may provide more volume of heat for heat reclamation and subsequent use elsewhere in the facility, resulting in energy cost savings.

Finally, CO₂ transcritical booster systems are sustainable and economical. CO₂ transcritical systems are now installed throughout Europe and Hillphoenix’s Advansor technology has a five-year track record with more than 500 installations.

Financial Benefits of CO₂ Systems

Lower First Cost Savings/Total Cost of Ownership. In many cases CO₂ systems offer a lower first cost relative to NH₃ systems, often as much as 25 percent less. CO₂ is readily available and affordable, ranging in cost from 50 cents to \$2 per pound. Combined with its lower regulatory and administrative costs, CO₂ systems can provide the user with a lower total cost of ownership.

Flexible Installation. A [Hillphoenix Advansor CO₂ Booster System](#) can be roof-mounted, on a pad adjacent to a facility, in a mechanical room, or on a mezzanine. Because of the smaller sizes of pipes and other components, CO₂ systems often use 30-50 percent less space than those using ammonia, a clear benefit for large industrial warehouses and small and medium size companies.

Less Servicing Costs. Once a system is in operation, servicing equipment is less expensive since CO₂ does not have to be captured and reclaimed (vent to open air).