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Ammonia Europe's position on the safety provision for ammonia storage

In the net-zero future, ammonia demand is predicted to triple by 2050¹. This is mainly due to the increase in demand for ammonia as an alternative fuel in the maritime sector and as an energy vector, both for energy production itself and as a hydrogen carrier. With this, new terminals and storage requirements to support the increased demand of ammonia trade are expected. As we navigate these increased capacities and the development of new ammonia storage projects, the ammonia industry wishes to put forward robust safety protocols for terminals and storage facilities and give recommendations for policymakers.

Ammonia Europe believes that safety is paramount for protecting people, the environment, and the long-term credibility of the energy transition. The sector operates under stringent safety and environmental frameworks, adhering to EU-wide regulations such as the Seveso III Directive and REACH, as well as global standards including ISO 45001 (occupational health and safety) and ISO 31000 (risk management). Companies across the ammonia value chain continuously invest in best-in-class technologies, rigorous risk assessments, emergency preparedness, and staff training to ensure safe operations.

However, safety regulations must remain risk-based, proportionate, allow proven alternative measures that achieve equivalent risk reduction and be informed by practical industry experience to ensure that rigorous safety management supports, and doesn't hinder, the efficient and scalable deployment of clean ammonia. Policymakers should avoid prescriptive mandates where other, equivalent safeguards exist. Special care is needed when applying new technical requirements to existing installations to avoid unnecessary economic burden and unintended increases in operational risk during maintenance or retrofitting.

Guiding principles

Ammonia Europe believes that the guiding principles for all new storage sites should be:

- **Risk-based:** Hazard identification and quantitative/qualitative risk assessment should drive what protections are required, not an a priori list of mandatory measures.

¹ IEA (2021), Nitrogen demand by end use and scenario, 2020-2050, IEA, Paris <https://www.iea.org/data-and-statistics/charts/nitrogen-demand-by-end-use-and-scenario-2020-2050>, Licence: CC BY 4.0

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- **Use site-specific risk assessments** as the first step before deciding mandatory technical measures, this could include publishing a template risk assessment and the acceptance criteria for equivalence. Consider local context before transposing Dutch PGS12 prescriptive measures to other jurisdictions.
- **Technology neutrality:** Multiple technologies can provide comparable risk abatement.
 - **Allow alternatives** if an operator can demonstrate **equivalent safety** with documented proof and independent verification.
 - **Foster early deployment support** to de-risk innovative in ammonia handling technologies so they can be safely tested and scaled within a clear regulatory sandbox.
- **Practical and maintainable:** New specifications could have effects on maintenance, inspection and operations, possibly making tasks riskier or impractical.
 - **Require assessment of operational/maintenance risk** whenever a new technical requirement is proposed. If the mitigation increases maintenance risk (e.g., nitrogen atmosphere procedures, complex nozzle access), regulators must weigh that in the net safety outcome.
- **Proportionate for existing assets:** New guidelines are not always feasible or provide better safety protection for existing installations. For existing assets, proportionate timelines need to be considered and, in cases where the required updates are not feasible, derogations, or alternative compliance routes based on demonstrated equivalence and feasibility should be allowed.
 - **Consider a cost-impact analysis** of the proscribe pathways and **provide reasonable timelines and support for existing installations.**
- **Consistency across the ammonia value chain:** These guiding principles should be applicable to all aspects of the ammonia infrastructure including cracking and distribution.

Context — regulatory framework

The SEVESO III directive remains the pan-European directive and primary high-level framework for the control and prevention of major accidents of hazardous materials with national protocols built upon it and ammonia cold storage facilities must follow the European standard EN 14620 - *Design and manufacture of site built, vertical, cylindrical, flat-bottomed tank systems for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and -196 °C*. Additionally, the API 625 standard for Tank Systems for Refrigerated Liquefied Gas Storage is used by the ammonia industry.

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With the emergence of ammonia as an alternative fuel, new national guidelines are coming. The Netherlands has led the way with the update of their regulation PGS12. Ammonia Europe is glad to see the Netherlands taking a proactive approach but cautions that the new PGS12 guidance must be read with Dutch circumstances of high population density and proximity with high-traffic ports in mind, circumstances that are not universally the case for other countries using PGS12 as the basis of their own guidance.