

# Ammonia Safety

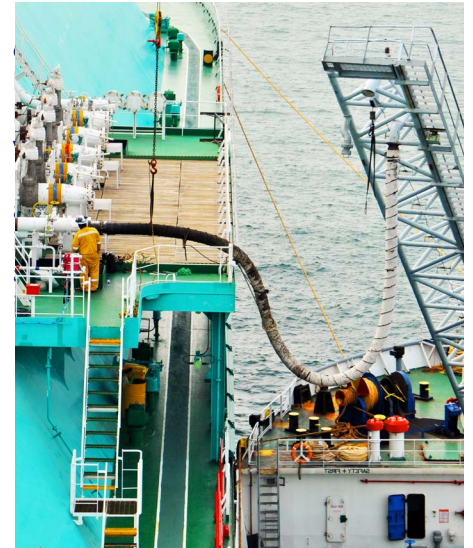
Ammonia is the second-largest chemical produced in the world. Ammonia has been produced, stored and transported across continents for more than 100 years. Today, about 80 percent of all ammonia produced is used in fertilizers to ensure global food production. Soon, ammonia will be applied in new ways, such as emission-free fuel for the international shipping industry, generating a need for new safety standards and procedures.

Like many other useful chemicals, ammonia must be handled with care. Its hazardous properties are well-known and understood. Exposure to high levels of ammonia can be poisonous, irritating the skin, eyes, throat, and lungs. It can even be lethal if one is exposed to very high concentration at a prolonged duration. Ammonia has a distinct, pungent scent and can be smelled at low levels. It is flammable, but due to the slow burning rate and the need to be at high concentrations to ignite, the risk of explosion associated with its use in open space is very low.

Authorities and the chemical industry have developed strict regulatory frameworks, control measures and training procedures to make sure that ammonia is produced,

distributed, and used without harm to people, environment and assets. As a result, there are very few accidents related to ammonia used in industrial activities.

Sharing experience and insight from the current use of ammonia will be important as industries look for new ways to apply the chemical. Specific safety procedures must be developed for each new application. For example, in order to safely use ammonia as a shipping fuel, engineers are working to implement rigorous design principles to ensure the safe bunkering, storage, and utilization of large ammonia volumes on open waters.



*Ammonia is a molecule composed of one nitrogen and three hydrogen atoms (NH<sub>3</sub>). For more than 100 years, ammonia has been known as a key component in fertilizer to enhance crops and ensure food production around the globe. Today, 80 percent of ammonia produced is used to bring nitrogen to plants. Tomorrow, ammonia will help us bring hydrogen to power transportation and industry as a fuel. Not only is ammonia a carbon-free chemical that does not emit CO<sub>2</sub> when burned, it can also be produced in a low carbon manner. Using clean ammonia in new ways will help us cut emissions all over the world.*

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