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Liquefied Gases Can Be Hazardous

A tank car filled with dimethyl ether (DME) arrived at a factory in Ludwigshafen, Germany, in July 1948, where it was parked in the sunlight for about 10 hours. It is believed that during this time a weld seam of the tank car failed, allowing DME to leak from the vessel. A DME vapor cloud formed and exploded, killing approximately 200 people. Nearly 4,000 were injured due to exposure to toxic substances that escaped from installations that were damaged by the blast (Image 1).

A similar incident occurred in July 1978 at a vacation area in Tarragona, Spain. A tank truck ruptured and released propylene gas, which ignited. The explosion killed 217 people, including the driver, and severely burned 200 others (Image 2).

These accidents both involved tanks that had been overfilled with liquefied gas. In the first incident, the tank identification plate incorrectly indicated a higher capacity than the tank car could hold. In the second incident, human error likely caused an operator to overfill the tank.


1


2
Image courtesy SINC


3

Did you know?

• Gases such as nitrogen, oxygen, and argon are shipped or stored as liquids at extremely low temperatures or as compressed gases at ambient temperature and very high pressures.

• Other gases such as ammonia, chlorine, sulfur dioxide, vinyl chloride, propane, liquefied petroleum gas (LPG), and DME condense to liquids at room temperature and under moderate pressure. These gases are usually shipped or stored as liquefied gas.

• Liquefied gases, like most other liquids, expand when heated. As the liquid expands in a closed container, the vapor space shrinks. Thermal expansion of a liquid from a relatively small increase in temperature generates a large increase in pressure, which can cause a container to rupture. As the liquid is released, it forms a vapor cloud that can result in a boiling liquid expanding vapor explosion (BLEVE). (Read the November 2009 and August 2013 Beacons for more information on BLEVEs.)

• You may have liquefied gases at home, such as to fuel your grill (Image 3) or heat your home, as well as contained in lighters or aerosol cans.

What can you do?

• The energy in a pressurized container depends on its size, temperature, pressure, and the state of the contents (*i.e.,* condensed liquid or compressed gas). Avoid adding energy to a container by exposing it to heat.

• Ensure that liquefied gas containers are not overfilled.

• Read the safety information for gas containers used at your plant or home, and follow all recommended procedures.

• Handle liquefied gases in your home with the same care as you would at work. Make sure your family understands the hazards as well.

• Read the October and December 2006 Beacons, which discuss gas cylinder safety.

Do not underestimate the hazards of liquefied gases!