

Do You Store Flammable-Material Cylinders Properly?

Figure 1. Fire starts here, following the release of propylene from an overheated cylinder.



Figure 2. Fire spreads to adjacent cylinders within minutes.



June 24, 2005, was a hot, sunny summer day in St. Louis, MO, with temperatures reaching 97°F (36°C). Operations at a gas-cylinder packaging and distribution facility proceeded normally during the morning and early afternoon. However, at about 3:20 p.m., a technician retrieving cylinders from an outside storage area witnessed a 10-ft high flame radiating from one of the cylinders. He immediately activated the fire alarm.

Propylene gas had been leaking from the cylinder's pressure relief valve (Figure 1) and, due to the high heat conditions, ignited. Workers and customers evacuated the facility, as the fire spread to adjacent cylinders (Figure 2), causing them to ignite and



Figure 3. Facility damage

Figure 4. Community damage



Figure 5.



explode. After four minutes, the fire covered most of the area where flammable-gas cylinders were located. Explosions were frequent and dozens of cylinders and cylinder parts were propelled into the community, landing on sidewalks, and in front yards, backyards, courtyards, and parking lots. Aside from site destruction (Figure 3), the repercussions of this explosion included a burned, empty commercial building, a 3-ft hole in the wall of one residential building (Figure 4), broken windows, fire-damaged vehicles (Figure 5), and other residential and commercial building destruction. Cylinder parts were found as far as 800 ft away.

Did You Know?

- ▶ Some materials stored in containers, such as drums, cylinders and pails can be heated to a hazardous temperature if they are stored outdoors and exposed to direct sunlight.
- ▶ A hazardous situation, such as an explosion, can result from the decomposition, polymerization, or other chemical reaction of materials stored in a cylinder; or it may result from overpressurization of the container.
- ▶ In this incident, direct sunlight and unusually hot weather probably raised the temperature of the cylinder's contents to about 150°F (65°C) — enough to open the relief device and release the gas.

What Can You Do?

- ▶ Follow guidelines for the safe containment and storage of chemicals, as specified in their MSDSs.
 - ▶ For gas cylinders, follow guidelines from industry associations such as the Compressed Gas Assn.; consensus standards, such as those from the National Fire Protection Assn.; and recommendations from material suppliers.
 - ▶ Minimize the number of cylinders in process areas.
 - ▶ Read the U.S. Chemical Safety and Hazard Investigation Board Safety Bulletin on this incident.
- For more information:

http://www.csb.gov/index.cfm?folder=news_releases&page=news&NEWS_ID=296

Don't store volatile or temperature sensitive materials outside in the hot sun!

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