

MANUAL HANDLING AND STORAGE OF MATERIALS

An automatic sprinkler head, protected by a basket guard, may be installed inside the bin. This installation is especially desirable where a falling cover, released by the melting of a fusible link, might injure a person caught underneath.

Problems with Hazardous Materials

Storage and handling of specific hazardous materials are discussed in other chapters: gases in Chapter 29, "Welding and Cutting", flammable liquids (including refrigerants) in Chapter 32, "Flammable and Combustible Liquids", radioactive materials in Chapter 42, "Ionizing Radiation".

Liquids

Tanks The structure of a new building is designed with an ample safety factor to permit supporting the weight of process tanks. However, inspection by a competent structural engineer should be made before a tank is installed in an old building. Storage tanks for hazardous liquids are preferably installed outdoors above or below ground.

There are many advantages in underground installation of outdoor storage tanks, however the danger of undetected leaks in tanks containing corrosive or toxic materials probably outweighs the advantage of freedom from drips and sprays. When an outdoor tank is located in a pit, the pit should be large enough to permit easy access to all parts of the tank. A permanent ladder and an access door which can be fastened shut should be provided.

No one should be permitted to enter a pit without an approved type of supplied air mask or hood or oxygen breathing apparatus unless tests have established the presence of enough oxygen and the absence of dangerous amounts of toxic vapors. In any case, a worker who enters a pit should wear a safety belt with attached lifeline and a similarly equipped observer should be stationed to watch him.

Process tanks that will contain corrosive liquids should not be installed in basements. If tanks are overhead and employees must walk beneath them, drip pans should be provided with drainage to a safe disposal or recovery location. Tanks should be installed where traffic cannot pass under them.

Tanks should be provided with perma-

nent stairs or ladders and walkways with standard guardrails and toeboards. Tanks should be emptied, cleaned, and inspected for structural weaknesses at regular intervals, and records kept of each inspection.

Tanks for holding volatile materials should be bonded and grounded, and provided with vents and safety valves. For a large tank, rupture disks or lightweight covers may also be provided. Safety valves and rupture disks should discharge at a point remote from the tank and from sources of ignition and areas that are or may be inhabited.

Even tanks containing nonvolatile materials should have safety valves and rupture disks in case of fire, because the expansion of the air may rupture the tank. Enclosed tanks should have emergency venting equipment capable of handling increases in pressure which may develop as a result of the processes carried on in them. Consideration must be given to the effects of corrosion in applying venting devices to process equipment.

Connections for filling and emptying tanks are preferably made through the top to minimize loss of liquid and possibility of injury from a broken fitting. The fill line should be equipped with a drain. If compressed air is used as the source of power for filling and emptying tanks, MCA specifications* for the maximum air pressures to be used for various materials should be observed.

Cleaning tanks is an exceedingly dangerous operation. An exact and specific procedure should be set up, preferably in written form, and strictly adhered to. Specifications for tank-cleaning procedure are set forth in an NFPA standard and API publications**.

*Manufacturing Chemists' Association, 1825 Connecticut Ave NW, Washington, D C *Manual Sheets* TC Series (on unloading hazardous liquids from tank cars)

**National Fire Protection Association, 60 Batterymarch St, Boston *Small Tanks and Containers* Standard No 327. And American Petroleum Institute, 1271 Ave of the Americas, New York City *Cleaning Petroleum Storage Tanks* Accident Prevention Manuals 1-A and 1-B