If the inside of the container is clean and steam is available, the easiest method is to steam it.*

The tank or drum, placed on a steam rack or over a steam connection with the outlet holes at the lowest point, should be allowed to drain The tank or drum should rest against a steam pipe or should be bonded An ample supply of live steam should then be applied for a period of not less than ten minutes

The inside of the drum should be washed with hot water and, after being cooled, tested with a combustible gas indicator If the drum tests vapor free, hot work repairs can then proceed If not, it should be cleaned and steamed further It is sometimes advisable to mark the drum to signify that it is vapor free

If steaming will not clean the tank or drum, a cleansing compound of sodium silicate or trisodium phosphate (strong washing powder) dissolved in hot water and kept at a temperature of 170 to 190 F should be used Hot water should be added to overflow the container until no appreciable amount of volatile liquid, scum, or sludge appears

Exceedingly dirty containers may require a caustic soda solution (except aluminum and zinc coated drums in which caustic soda may generate hydrogen), agitated enough to ensure that interior surfaces are thoroughly cleaned They can then be drained, washed, and steamed

If steam is not available to heat the water, a cold water solution with an increased amount of cleansing compound can be used The solution should be agitated to ensure cleaning

To guard against burns, especially when they are using steam, hot water, and caustic soda, workmen should be protected with suitable clothing, such as boots, gloves, face shields, and rubber aprons

Because of its low ignition temperature, drums that have contained carbon disulfide should not be steamed They should be made vapor free with a cleansing compound, and then gas tested

Small tanks can be made safe by means of an inert gas, but this method is not generally considered as safe as steaming

Portable inert gas generators are available for special jobs, but they should be used only by well qualified men who can produce proper atmosphere and safeguard against fire or explosion

Carbon dioxide and nitrogen are sometimes used to make small tanks and drums that have contained flammable liquids safe for hot work repairs

When an inert gas like carbon dioxide or nitrogen is used, the tank or vessel is washed as free as possible of flammable liquids and flushed thoroughly, so that the vessel overflows As much water as the repair work will permit should be left in the tank, and carbon dioxide should be introduced to produce a concentration of not less than 50 per cent by volume, except that if the tank has contained hydrogen or carbon monoxide, 80 per cent concentration is required

Nitrogen concentrations should be 60 per cent or higher, depending on the previous contents of the container

Abandonment of tanks

Tanks to be *permanently* abandoned should be thoroughly washed out and made safe from flammable vapors, dismantled and removed from the premises Tanks that are not to be removed should have all flammable liquid removed and be filled with a nonshrinking inert solid material. They should have all inlets and outlets capped

Tanks taken out of service for less than 90 days should have fill line, gauge opening, and pump suction line capped, and be secured against tampering The vent line should be left open

Common Uses of Flammable Liquids

Industrial use of flammable liquids involves all the general precautions outlined *in this chapter pertaining to* static, toxicity, storage, housekeeping, explosion-proof elec-

*American Welding Society, 33 West 39th St, New York City *Safe Practices for Welding and Cutting Containers That Have Held Combustibles.* Also see NFPA Standard 327, *Cleaning Small Tanks and Containers,* previously footnoted