



Most liquefied gases are stored in welded steel pressure vessels, and connected to pumps with steel pipe. New tanks may contain residues of "weld-shot" (hard, small, rounded steel particles). These can damage all makes and types of pumps. Usually, such damage can be prevented by installing a strainer ahead of the pump, having a reinforced wire cloth screen capable of trapping particles as fine as 0.012 - 0.016" (40 x 40 Mesh), or smaller). Initially, the strainer should be frequently cleaned.

Tanks and piping are often depressurized by venting to atmosphere. With liquefied gases, this procedure cools-down the installation, approaching the freezing point of the product near the area of discharge. Rapid condensation will occur on interior surfaces, if the tank and piping are left open to the air. When taken out of service in this condition, repetitive atmospheric temperature and pressure changes contribute to internal moisture accumulation, and aggravated rusting of internal surfaces. The longer open tanks and piping remain in disuse, the greater the amount of moisture and rust there will be. When the system is put back into service, fine abrasive debris and possibly some moisture will enter the strainer and pump along with the handled fluid.

Most particulates produced by oxidation of steel are very small, many of which can pass right through the usual common fine-mesh strainer screens. Yet, these particles are abrasive. They can cause pump working parts to wear rapidly, and mechanical shaft seals to fail. The most practical way to avoid problems with exceptionally fine abrasives and moisture accumulations is to *keep freely circulating air out of pipes and tanks*. This can easily be accomplished by tightly plugging all openings to atmosphere immediately after the pressure is relieved.

This problem may be further complicated in low-pressure liquefied Carbon Dioxide recirculation service, where a portion of the piping, such as a transport delivery line, is regularly blown-down after each use. If proper precautions are not taken, moisture and resultant debris form in this line, and are deposited in the consumer tank each time it is filled. Over a period of years, this situation leads to intolerable levels of contamination, primarily composed of finely pulverized, circulating abrasives, and excessive amounts of free-floating water ice crystals at the top of the tank liquid phase. Small discharge orifices can be clogged by this kind of debris, which causes rapid, abrasive internal pump wear, aggravated by the presence of carbonic acid.

DO NOT ALLOW AIR TO FREELY CIRCULATE INTO TANKS , PIPES, OR HOSES.



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