

GMP 6

Good Measurement Practice for Cleaning Metal Volumetric Measures

All volumetric test measures, including laboratory standards and those submitted for calibration must be clean at the time of measurement. Drainage is altered by greasy and oily surfaces. Corroded surfaces raise questions that impair future use, so corrosion-damaged containers may not be worth testing. Maintaining clean volumetric test measures improves reproducibility of delivered volume between calibration and usage.

Many laboratories will not accept test measures and provers for calibration unless they have been suitably cleaned to remove contents such as petroleum or other chemical residues. In those cases, all surfaces (inside and out), drain lines, pumps, and hoses that may be used during the calibration process must be cleaned so that no petroleum or other product residue remains that would otherwise spill onto the laboratory floor or drain into the sewer/waste-water system.

Metal measuring vessels are best cleaned by using a **non-foaming** dishwashing detergent. Warm water is most effective both for cleaning and rinsing, which must be thorough. If warm water cleaning and rinsing is used, the vessel must be equilibrated to calibration temperatures before use or calibration.

The cleaning operation involves the use of a liberal amount of the detergent solution and vigorous shaking, swirling, or other motion so that the solution contacts the entire inner surface of the vessel. Depending on the condition of the surface, this operation should be repeated one or more times to ensure removal of oily films and residues. As much as possible of the detergent solution should be drained prior to the water rinses to facilitate complete removal of the detergent from the prover. Ordinarily, three rinses will be sufficient, but this should be confirmed by testing the final rinse for any visual evidence of detergent or other residues.

When detergents are not sufficient to remove oily or greasy deposits, solvents may be used, provided it is ascertained that they do not affect any coatings on the container. The surfaces should be dry before any calibrations are attempted.

If lime or scale build-up has occurred (usually only in standards that are primarily used with water), they may be cleaned with a suitable lime or scale remover. Many of these chemicals contain acids and may react with metals, so appropriate care should be taken and these chemicals should not be allowed to soak for extended periods of time. Many lime and scale removers have safety and handling requirements and may have special disposal requirements. The material safety data sheet (MSDS) should be reviewed prior to using or disposing of scale and lime removers.

After cleaning or use, vessels should be drained completely and stored in a dry place. They should be covered to prevent entrance of dust and foreign matter. Metal containers further should be protected from damage by denting and/or dropping. Once such a vessel has been visibly dented, it

is difficult to ascertain whether additional changes have occurred. Even when dents have been removed and the vessel has been calibrated, visual deformities can compromise future use. Accordingly, protection from damage while stored and when in use should be a major concern of the metrologist or owner of the device.