



## Instructions GAGES

## LIQUID LEVEL

### Installation, Operation and Maintenance

HM-RH-VN-3-2-02

The simplest way for indicating liquid level is by direct observation. This can be done by installing direct reading gages in the vessel or tank. These direct reading gages can be placed at different points to indicate the liquid height. They are available for a wide range of pressures and temperatures, with connections and options to meet all specifications. Our materials used are conform to ASME, AISI, and ASTM.

#### Installation

- The Gage must be connected and mount so that it does not support the piping.
- Always provide shutoff valves between the gage and the vessel.
- For gages of more than 1 meter in length or over 45 Kg, support brackets should be consider, especially when is exposed to vibration.
- To prevent severe mechanical loads imposed by thermal expansions a good solutions would be installing an expansion loop between the gage and the vessel.

#### Operation

- ▶ Always warm up the gage slowly when it is used with a vessel containing hot fluid. Open the shutoff valves carefully, and wait until the gage is fully warmed up before opening them all the way. The tempered Borosilicate glass can withstand thermal transitions (cold water to 500• F) without breaking; but additional loads that you cannot measure are imposed on the glass during installation, and resistance to thermal shock is reduced correspondingly.
- ▶ During system shutdown, it is best to leave the shutoff valves open, the gage then cools and depressurizes along with the system.
- ▶ For high pressure and/or temperature applications a viewing system of mirrors should be used to protect personnel from possible glass breakage.

**CAUTION:** Level Gages are not to be used for gaging lethal substances as defined by ASME SECTION VIII.

**CAUTION:** Gages should be brought into service slowly. Rapid opening of connecting valves can cause glass breakage and/or possible injury to personnel

**CAUTION:** While the gage Glass is in operation, the shutoff valves must be in the fully open valve position. A partially open valve will prevent automatic ball checks from seating which could result in physical injury to personnel and loss of product.

#### Maintenance

▶ Glass Inspection:  
Look for any signs of clouding or scratching with a very bright concentrated light at about a 45• angle. Any scratch which glistens and catches fingernail, any star-shaped or crescent shaped mark which glistens is cause for replacement. If inner surface appears cloudy or roughened and will not respond to cleaning procedures, this is evidence of chemical attack and, if severe, is cause for replacement.

▶ Glass cleaning:  
Keep glasses clean using commercial glass cleaners. If this don't work it is possible to use dilute acids such as Hydrochloric (muriatic) acid. Never use harsh abrasives, wire brushes, metal scrapers, or other things which could scratch the glass. DO NOT attempt to clean glasses while equipment is in operation.

▶ Disassembling the gage:  
First be sure that the gage is relieved of all internal pressure, and temperature is ambient. Second, loosen end bolts first, working from opposite ends toward the center.

▶ Reassembly:  
The glasses, gaskets, and cushions should not be re-used, even when they appear in perfect condition. Replace them with new ones. The glass should not be in contact with any metal surfaces; in service, temperature differences at points of contact will set up high loadings and may break the glass. Before reassembling, clean gage chamber seats thoroughly with a soft metal scraper. Be sure all burrs and bits of old gasket are removed. Locate the glass centrally in seat and cover, to avoid glass-metal contact at the ends or sides. This is best done with the gage horizontal on a bench. Tighten nuts finger-tight in the sequence shown in the sketch, and then tighten with torque wrench in the same sequence, in five-pound stages; this procedure produces even loading of the glass.

#### Protection from Chemical Attack

Gage glasses used with fluids corrosive to glass require the use of shields. Kel-F or Mica may be suitable to protect the glass. (Shields cannot be used with Reflex-Type. Mica Shields are installed between the sealing gasket and glass.

Kel-F Shields are to be installed as follows:

- Place the Kel-F shield in the gage instead of a gasket between the chamber and glass inserts.
- Torque to the required torque level for the gage series in use.

#### High Temperature Service (over 500•F)

To prevent damage from high stresses resulting from extreme temperature gradients within the glass, a mica shield may be installed on the outside face of the glass. The shield has an insulating effect and protects the outer surfaces of the glass from the effects of rapid changes in ambient temperature or cold spray.

#### Low Temperature Service

We recommend a Non-Frost extension. The extension increases the distance from glass face to cryogenic fluid so the face remains warm enough to prevent frosting.

Gage Series	Recommended Re-Torque at Initial Installation	Torque of Field Reassembled
R/T - 20	30 LB.FT	30 LB.FT
R/T - 30	40 LB.FT	40 LB.FT
R/T - 40	80 LB.FT	80 LB.FT
R/T - 45	95 LB.FT	95 LB.FT

