

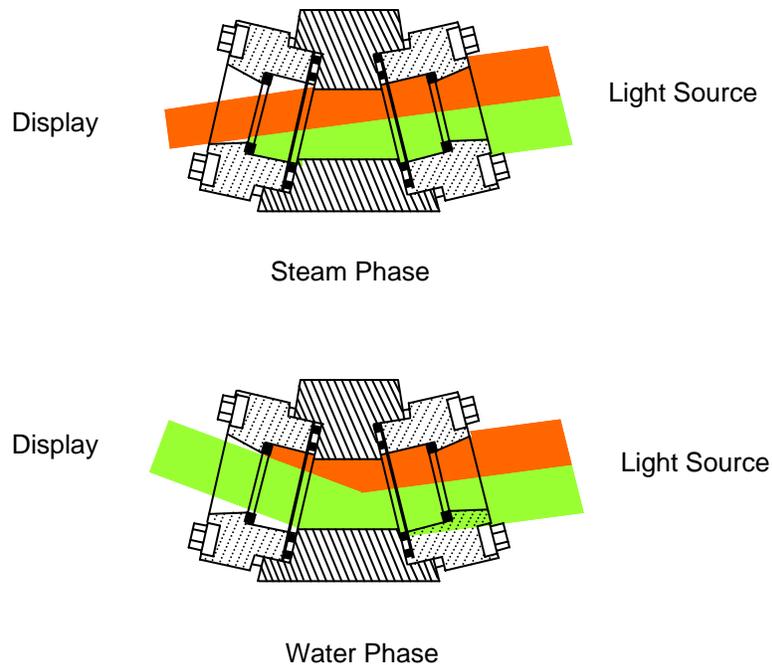
## STB-3000 Bi-Color Ported Gage Installation, Operating and Maintenance Manual

### Introduction:

The Quest-Tec Steam-Trac STB-3000 is a bi-color, ported gage direct reading system, as defined and required by ASME Section I, PG-60. The system must consist of a ported gage and illuminator, and is typically supplied with water gage valves and a tie-bar/equalizing tube or water column. The STB-3000 is designed to display water level and is not appropriate for hydrocarbon service.

### Principal of Operation:

The Steam-Trac STB-3000 is designed with opposing glass ports, set at an angle such that unimpeded light of a red color will pass through in the steam phase. In the water phase, the refraction caused by the water will allow only a green light to pass through, yielding a green display.



**Important Note:** ASME Section 1, PG60 requires that a direct reading water gage has an uninterrupted visible range, unless there is a means of obvious discrimination between the steam and water phase. A ported gage, such as the Quest-Tec Steam-Trac STB-3000 is only compliant when used with a working illuminator.

## Receipt and Inspection:

Upon receipt, confirm that all ordered equipment is received in an undamaged state, meets the dimensions, pressure rating and orientation specified.

If there is apparent damage, please contact Quest-Tec Solutions or your local representative. It is advantageous to photograph the damage to facilitate freight and handling claims.

## Storage:

It is recommended that the Quest-Tec Steam-Trac STB-3000 and illuminator be stored inside in a clean and dry location.

## Placing The Gage In Service

Should a new installation be subject to an acid wash, the gage must be isolated, or replaced with temporary boil-out gage. Please contact Quest-Tec Solutions or your local representative if this has not been considered.

Gasket relaxation can occur during extended periods of non-use. Verify adequate gasket loading by applying 25 ft.-lbs. (33.6 N-m) to gage cap screws in a diagonal cross pattern.

When putting a water gage into service, caution must be exercised to avoid any action that can cause a sudden change in applied pressure or temperature.

1. Open all drain valves.
2. Crack open the steam valve and allow the gage to heat for 5-10 minutes.
3. Slowly close the drain valve over 3-5 minutes to pressurize the gage.
4. Crack open the water valve.
5. Slowly open both the water and steam valves fully.

After allowing the gage to reach full operating pressure, carefully observe each port to verify that there are no steam leaks. A mirror is the best way to do this for safety and to observe condensing steam. *It is normal for thread lubricant to emit vapor as it heats.*

Once the gage has been brought to operating pressure and checked for leaks, isolate and drain the gage. The illuminator and hood assemblies must be fitted per the informational tags located at the top of the illuminator, gage and hood. If there is an orientation problem, contact Quest-Tec Solutions or your local representative for guidance.

Once the illuminator and hood have been installed, repeat steps 1-5 above.

## Operation:

The gage assembly will normally include a front viewing hood. This hood is intended to enhance the view of the gage by reducing interference from ambient light and to ensure that the correct viewing angle is achieved. It is a common practice to mark the plant floor for the ideal operator vantage point. Mirrors and/or cameras can also be employed to facilitate and ensure the correct viewing angle.

It is common practice blow-down gage glasses. However, the frequency and method of blow-down may affect equipment service life and performance.

Quest-Tec Solutions suggests the following blow-down procedure:

1. Close both the steam and water valves between the boiler drum and the water column or water gage.
2. Open the drain valve fully on the bottom of the water column or water gage.
3. Crack open the steam valve and allow a gentle rush of steam to pass through the water gage for no longer than 20 seconds.
4. Close the steam valve.
5. Inspect the water gage to ensure that all foreign matter is flushed from the mica shields. If the gage is not visually clean, repeat steps 3 and 4.

*Note: It is recommended that trip or alarm circuits that are actuated by the equipment being blown-down are bypassed to prevent false alarms during the blow-down process.*

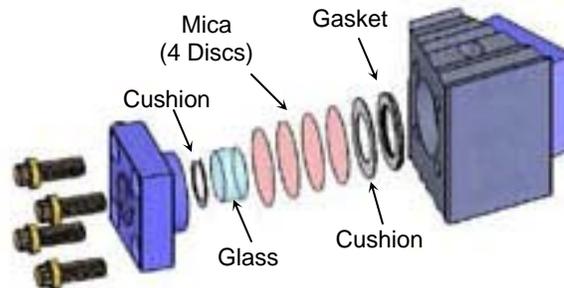
### Periodic Maintenance:

The Quest-Tec Solutions STB-3000A ported, bi-color gage has been designed to offer a maximum time period between maintenance cycles. The gage glass is protected by highest quality ruby mica shields. Mica wear is a normal occurrence and expected with all gage glass in steam service. Over a period, the mica will degrade and need to be replaced. Mica is a consumable part and is not part of the gage warranty as with all consumable parts. The rate of degradation for an individual application is impossible to predict due to the multiple variables that will affect the gage, such as but not limited to plant cycling, boiler MAWP, water quality/chemistry, blowdown procedure, etc. Quest-Tec Solutions strongly recommends that the end user maintain detailed records of port replacement intervals, both the time and specific port re-placed, with the intent of determining the typical maintenance interval for a particular installation. After one port is found to require maintenance, all other ports should be inspected and serviced due to consistent wear pattern with adjacent ports.

### Port Window Replacement

The STB-3000 can be serviced when mounted to the steam drum, although is always preferable to remove the gage and perform maintenance on a bench. **The gage must not be serviced unless isolated and all internal pressure is bled to atmosphere. Never attempt to service the gage when pressurized.**

1. Close isolation valves and drain liquid from Gage.
2. Loosen then remove the 4 Bolts fastening the Cover to the Gage; remove Cover from Gage.
3. Remove window components: Glass, Outer Cushion, Mica Disc Set, Inner Cushion and Gasket.
4. Thoroughly clean interior window port surfaces of Cover and Gage; avoid scratching Cushion and Gasket sealing surfaces.
5. Clean Cover Bolts (P/N 1-555-12-011).
6. Apply a generous film of Lubricant (included in Repair Kit) to the bottom half of each Bolt; set Bolts aside for later use.
7. Into Cover bore install Outer Cushion and Glass. Into Gage bore install Gasket, Inner Cushion and Mica Disc Set.  
Note: Remove protective tissues from Mica Disc Set before installing and install ALL Mica Discs included in Repair Kit.
8. While maintaining Cushion and Glass position, carefully install Cover into Gage bore and against Mica Disc Set.
9. Verify that all installed window port components are properly aligned by visual inspection through the Cover opening.
10. Install the 4 pre-lubricated Cover Bolts; make-up Bolts finger-tight to hold cover in position.
11. In a cross-pattern, tighten Bolts in increments of 5 ft.-lbs. (6.7 N-m) to a final applied torque of 25 ft.-lbs. (33.6 N-m).
12. Close drain valve and slightly open isolation valves.
13. Allow approximately 10 minutes (or as required) for Gage to reach operating temperature.
14. Close isolation valves and drain liquid from Gage.
15. Before Gage can cool, re-tighten Bolts in a cross-pattern to 25 ft.-lbs. (33.6 N-m).
16. Gage window port assembly is completed and prepared for service.



### Replacement Parts

Part Number	Description
1-011-30-3000	Glass, Gasket, Shield Kit
1-555-12-011	Cap Screw
1-306-58-020I	Square Cover
1-324-15-276	R-13 Flange Ring, if used



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