Reflex Level Gauges

Features

- Reflex level gauge applicable upto 200 kg/cm² and upto 400 deg cent
- Cryo applications upto -196 deg cent
- Toughened borosilicate glass with serrations
- For applicability in critical, acidic, cryo and temperature zone
- IBR certified device available
- NACE, H2S service compatibility applicable
- Non frost extension
- Heat tracing available
- Applicable for refinery, petrochemical, chemical, power, radioactive, fertilizer, food, pharma, metal industry applications

Concept and Principle of operation

Liquid Level Gauge provides direct observation of liquid level in a tank/vessel rising and falling level of the liquid inside the tank/vessel can be observed through the glass assembled in the gauge.

Reflex Liquid Level Gauges use the R-form sight glasses. One side surface of Reflex Glass to use flat glass has several grooves for reflecting prism. The principle of the Reflex Glass is based on the difference in the refractive indices of liquid and gas or in particular of water and steam. Liquid level shows conspicuously dark hard colour for liquid space and light white colour for empty space. These Reflex series are not used with a mica shield. The Reflex Gauge is assembled firmly with gasket, reflex glass, cushion gasket and gauge cover on the body by U-bolts.

Reflex Liquid Level Gauges, designed and built for a wide range of high temperature and high pressure applications. Our reflex level gauge is used to make, besides other applications include observation of the level of corrosion-proof and chromat liquids. The most advantage of this type is for easy level reading of boiling liquids. When liquids are boiling, their bubbles make the surface level indistinct. The manual adjustment of isolation valve at the input of the media entering the chamber reduces the bubbling. Therefore the level gauge ease to read the level or bubbling liquids. It also provides advantages for highly dense and viscous liquids, as the body is made of forged construction only.

This level gauge is designed and manufactured for easy and accurate reading the liquid level of highly foamy liquids. The gauge has a relatively spacious internal area where foamy liquid is held from forming foams.

Technical Specifications: Technical Data

<table>
<thead>
<tr>
<th>Type of Gauge</th>
<th>a) Low Pressure - 30kg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Medium Pressure - 100kg/cm²</td>
<td></td>
</tr>
<tr>
<td>c) High Pressure - 200kg/cm²</td>
<td></td>
</tr>
<tr>
<td>Mounting Orientation</td>
<td>Top - Bottom Vertical</td>
</tr>
<tr>
<td></td>
<td>Side - Side Right</td>
</tr>
<tr>
<td></td>
<td>Side - Side Left</td>
</tr>
<tr>
<td></td>
<td>Side - Side Back (Right/Left)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Upto 400°C</td>
</tr>
<tr>
<td>CCD</td>
<td>Max. upto 3000mm</td>
</tr>
<tr>
<td>Liquid Chamber</td>
<td>In forged construction: Carbon steel, SS304, SS304L, SS316, SS316L, Monel, Titanium, Inconnel 600, Hastelloy C, PolyPropylene, Other on request (Subject to pressure &amp; Temperature Condition)</td>
</tr>
<tr>
<td>Cover Plate</td>
<td>In forged construction: Carbon steel, SS304, SS304L, SS316, SS316L, Monel, Titanium, Inconnel 600, Hastelloy C, PolyPropylene</td>
</tr>
<tr>
<td>Cushion</td>
<td>CAF, PTFE, Grafoil with SS prignated</td>
</tr>
<tr>
<td>Gasket</td>
<td>CAF, PTFE, Grafoil with SS prignated</td>
</tr>
<tr>
<td>Fastner</td>
<td>SS, ASTM A 193 Gr B7 / A194 Gr 2H / Anodized Aluminiun (for PP moc)</td>
</tr>
</tbody>
</table>
**Reflex Level Gauges**

**Technical Specifications: Table-1 Technical Data**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Aluminium anticorrosion powder coated and SS engraved in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>Applicable till 320°C as per DIN 708 / 7081, BS 3463, JS B 8211, Toughened Borosilicate glass</td>
</tr>
<tr>
<td>Process Connection</td>
<td>Screwed / Flanged / Socket Weld and other on request.</td>
</tr>
<tr>
<td>Isolation Valve</td>
<td>Auto Ball Check Valve</td>
</tr>
<tr>
<td></td>
<td>a) Screwed Bonnet offset construction suitable upto 50 kg/cm²</td>
</tr>
<tr>
<td></td>
<td>b) Bolted Bonnet offset construction suitable above 50 kg/cm²</td>
</tr>
<tr>
<td></td>
<td>c) Material Construction as per wetted part</td>
</tr>
<tr>
<td>Vent</td>
<td>½&quot; Plugged / ½&quot; Needle Valve / ½&quot; Ball Valve / ½&quot; Globe Valve / ½&quot; Gate Valve</td>
</tr>
<tr>
<td>Drain</td>
<td>½&quot; Plugged / ½&quot; Needle Valve / ½&quot; Ball Valve / ½&quot; Globe Valve / ½&quot; Gate Valve</td>
</tr>
<tr>
<td>Optional</td>
<td>a) Non-Frost Extension for extreme low temperature application</td>
</tr>
<tr>
<td></td>
<td>b) Heating Jacket - to read the level of high congealable or ebullient liquid</td>
</tr>
<tr>
<td></td>
<td>c) IBR Certification</td>
</tr>
</tbody>
</table>

**Special Application**

### Cryo Application

If a conventional level gauge is used for extreme low temperature applications, it becomes difficult to observe the level of liquid as the gauge front tends to freeze. To get rid of this problem, an acrylic non-frosting plate is mounted in front of the gauge. So the observation of the liquid level is much easier this way.

Our Non-Frosting Reflex Level Gauges are classified depending on the process temperature, they height of the non-frosting plate window may be selected from 80 to 250 mm.

**Technical Specifications: Temp rating and dimensions of non-frosting plates**

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>0…-20</th>
<th>-21…-45</th>
<th>-46…-100</th>
<th>-101…-160</th>
<th>-161…-200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Materials</td>
<td>LTCS</td>
<td>LTCS</td>
<td>304SS</td>
<td>316SS</td>
<td>316LSS</td>
</tr>
<tr>
<td>Acrylic Height mm</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
</tr>
</tbody>
</table>

### Jacket Type

For a jacket type requirement application, this gauge is used to read the level of high congealable or ebullient liquids. The principle is to inflow a steam for congealable liquids and a cold water for ebullient liquids through the inside of the jacket to ensure accurate and reliable level observation.

This type is used for observing the fluid by changing it into state of liquid after heating or cooling it through jacket according to fluid’s features. Our standard is that the inlet of the jacket for steam or cold water is ½" NPT(M) and 15 NB flange. Others are available on request.

### Corrosion Application

More severe demands may often be required on liquid level gauges in terms of resistance to corrosion, and this is accomplished by lining or coating all wetted parts. The most important aspect of this process is the preparation of the metal substrate.

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The gauge consists of a body having machined to have a liquid where high temperature are liable to occur, the glass is toughened borosilicate glasses are used. These reflex gauges preferably used for reservoir tanks that require a relatively long visible length by constructing the supporter.

The reflex level gauge is assembled firmly with gasket, reflex glass, cushion gasket and gauge cover on the body by U bolts.

The most advantage of this type is that it has no invisible sections (dead band). Our standard overlapped section is 10 mm as minimum and the gauge is so designed that supporting brackets can be equipped to protect a long multiple connected gauge from distortion of fall down. The scale plate to mount alongside the gauge may be available on request by customers to observe the liquid level more accurately.

The gauge is used with a special reflex type gauge glass which has wider V-shaped refractive grove and red coating on the outside of the glass. It provides a clear observation of liquid level because of made refracting red colour on th V-groove for steam or beyond portion of the level and it’s colour of fluid itself for liquid portions.

Basic GA drawing indicating the top bottom design with CCD interface with visible length. The distance between cover plate and bolted bonnet offset construction is 70mm and that of screwed bonnet is 80mm. The glass edge is approx 8mm more in each case against the isolation valve in top bottom design.
Isolation Valve

Bolted and screwed bonnet offset construction to attain device durability, high stability, low hysteresis, high leakage class, bolted bonnet construction for high temperature and pressure, all construction in forged only with the best level 1 radiographed and attain high leakage class of 10\(^{-4}\) mbar lt/sec.

Screwed connection for low temperature and pressure with full forged construction and with best of level 1 radiography and attain high leakage sealing class of 10\(^{-5}\) mbar lt/sec.
### Ordering Information

**Type**
- **AA**: Low Pressure - 30kg/cm²
- **AB**: Medium Pressure - 85kg/cm²
- **AC**: High Pressure - 165kg/cm²
- **AD**: Very High Pressure - 200kg/cm²

**Orientation of Process Connection**
- **TK**: Top-Bottom Vertical (Partial Visibility)
- **TL**: Side-Side Right (Full Visibility)
- **TM**: Side-Side Left (Full Visibility)
- **TN**: Side-Side Back (Right/Left)

**Centre to Centre Distance**
- **1000**: Indicate the required Centre to Centre Distance in mm.

**Process Connection**
- **Flanged Connection**
  - **F01**: 1/2", 150# RF
  - **F02**: 3/4", 150# RF
  - **F03**: 1", 150# RF
  - **F04**: 1.5", 150# RF
  - **F05**: 2", 150# RF
  - **F09**: 1/2", 300# RF
  - **F10**: 3/4", 300# RF
  - **F11**: 1", 300# RF
  - **F12**: 1.5", 300# RF
  - **F13**: 2", 300# RF
  - **F14**: 1/2" Needle Valve
  - **F15**: 3/4" Needle Valve
  - **F16**: 1" Needle Valve
  - **F17**: 1.5" Needle Valve
  - **F18**: 2" Needle Valve
  - **F19**: 1/2" Ball Valve
  - **F20**: 3/4" Ball Valve
  - **F21**: 1" Ball Valve
  - **F22**: 1.5" Ball Valve
  - **F23**: 2" Ball Valve
  - **F24**: 1/2" Gate Valve
  - **F25**: 3/4" Gate Valve
  - **F26**: 1" Gate Valve
  - **F27**: 1.5" Gate Valve
  - **F28**: 2" Gate Valve
  - **F29**: 1/2" Globe Valve
  - **F30**: 3/4" Globe Valve
  - **F31**: 1" Globe Valve
  - **F32**: 1.5" Globe Valve

**Threaded Connection**
- **B04**: 1/2"BSP (M)
- **B05**: 3/4"BSP (M)
- **B06**: 1"BSP (M)
- **B07**: 1.5"BSP (M)
- **B08**: 2"BSP (M)
- **XX**: Any Other*

**MOC of Connection**
- **ZA**: CS (A105)
- **ZB**: CS (A106)
- **ZC**: SS 304
- **ZD**: SS 304L
- **ZE**: SS 316
- **ZF**: SS 316L
- **ZI**: PP
- **ZJ**: Monel 400
- **ZK**: Monel 500
- **ZL**: Titanium
- **ZN**: Hastelloy 'B'
- **ZO**: Hastelloy 'C'
- **ZX**: Inconel 600

**MOC of Chamber**
- **VA**: CS
- **VB**: SS 304
- **VC**: SS 304L
- **VD**: SS 316
- **VE**: SS 316L
- **VF**: PP
- **VG**: Monel 400
- **VH**: Monel 500
- **VI**: Titanium
- **VJ**: Hastelloy 'B'
- **VK**: Hastelloy 'C'
- **VL**: Inconel 600

**MOC of Cover Plate**
- **WA**: CS
- **WB**: SS 304
- **WC**: SS 304L
- **WD**: SS 316
- **WE**: SS 316L
- **WF**: PP
- **WG**: Monel 400
- **WH**: Monel 500
- **WI**: Titanium
- **WJ**: Hastelloy 'B'
- **WK**: Hastelloy 'C'
- **WL**: Inconel 600

**Calibration Scale**
- **SO**: Aluminium with Powder coat
- **SP**: Aluminium
- **SQ**: SS304
- **SR**: SS316
- **SS**: Acrylic

**Drain**
- **RU**: 1/2" NPT (F), Plug
- **RV**: 3/4" NPT (F), Plug
- **RW**: 1/2" Needle Valve
- **RX**: 1/2" Ball Valve
- **RY**: 1/2" Gate Valve
- **RZ**: 1/2" Globe Valve

**Vent**
- **QU**: 1/2" NPT (F), Plug
- **QV**: 3/4" NPT (F), Plug
- **QW**: 1/2" Needle Valve
- **QX**: 1/2" Ball Valve
- **QY**: 1/2" Gate Valve
- **QZ**: 1/2" Globe Valve

**Isolation Valve**
- **UX**: Bolted Bonnet Offset Construction
- **UY**: Needle Valve
- **UZ**: Needle Valve

**Fasteners**
- **VY**: CS Plated

**Gasket**
- **XW**: C.A.F.
- **XX**: P.T.F.E.
- **XY**: Graphoil

**Cusion**
- **WW**: C.A.F.
- **WX**: P.T.F.E.
- **WZ**: Graphoil

**Optional**
- **NF**: Non-frost Extension
- **HJ**: Heating Jacket
- **XX**: Any Other*
- **Z**: NIL

**Note**: * Please consult factory

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