FLAT GLASS GAUGE (ARMORED)

SIGMA's Flat Glass Level Gauges are reliable means for accurate measurement and direct observation of process fluids. SIGMA Flat Glass Gauges are designed to match industry requirements of ruggedness and material mix to widen the scope of application in process tank, pressure vessels and other containers with fluids varying from ordinary water to highly corrosive chemicals.

THE SYSTEM: The Flat Gauges are inevitable means for process fluid measurement when it comes to severity of conditions. The medium to be measured is made available for direct measurement outside the vessel without any special preparations and provides on line monitoring. The principle of liquid maintaining the same level makes this system very precise and reliable. The fluid attains its level in the chamber of the level gauge and is viewed through a glass window. SIMGA Gauge Valves form a major component of the flat glass gauges. Two gauges valves at the ends of the gauge chamber are connected to the tank. Under normal operations, the valves are kept wide open causing the pressure to equalize in the system thus permitting the liquid to seek its true level for observation along the visible length. SIGMA offers Reflex and Transparent type Flat Level Gauges as demanded by the industry.

Sigma Advant-edge

- ✓ Maintenance free rugged design.
- ✓ Material mix to suit specific application.
- ✓ Special design for high temperature and pressures.
- ✓ Customized process connections, center to center distance and visible length.
- ✓ Safety ball check device in gauge valves prevents leakage in the event of glass breakage.
- ✓ Choice of Off set Gauge Valve in the top and bottom connection, facilitate cleaning of solid chamber.
- ✓ Leakage indicating gauge construction for Nuclear Power Plant applications.

Note

All the Flat Glass Gauge mentioned in this catalogue are our standard design. If the standard items do not meet your requirements, we can modify them to meet your specifications and would appreciate the opportunity of making suggestions to cover your application, based on engineering principles. SIGMA reserves the right to modify specification / design from time to time, which is deemed suitable for the product without prior intimation.

TÜV NORD ISO 9001

Available

CE

IBR Approved
Flat Glass Gauge

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Sigma Reflex Level Gauge

The Reflex Level Gauge consists of a chamber designed to have one or more front windows i.e on one side of the chamber. Each window consists of a special glass called reflex glass that is cushioned between cover plates and chamber . The reflex glasses are provided with prismatic grooves on the side in contact with the medium. As a result of the difference in refractive index, light rays entering the gauge from outside are reflected or absorbed. The light rays entering the steam or gas space strikes the grooves face at an angle of 45^{0}C, thereby being refracted into the opposite groove face from which it is reflected back to the direction of observation. The steam or gas space appears silver while and the liquid space appears black. This eliminates any possibility of error in reading the liquid level The Reflex Level Gauge does not require an illuminator.

Making the choice

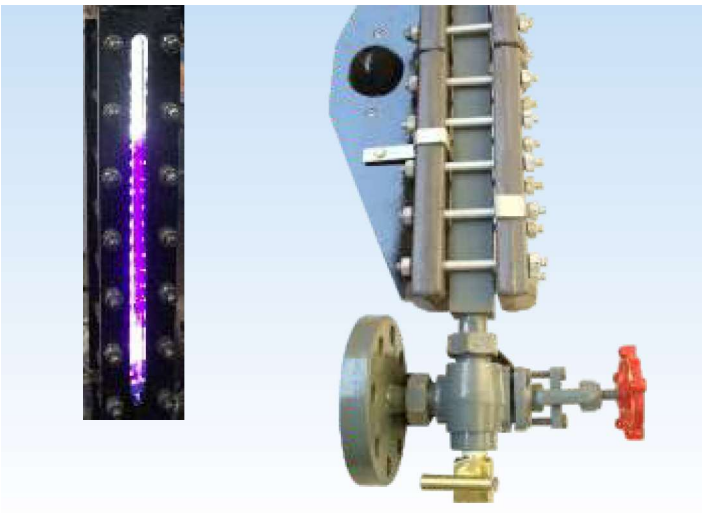
SIGMA Reflex Level Gauge is recommended for clean, colorless and non viscous services. Sticky fluids tend to coat the glass and result in wrong readings, Erroneous indications will also occur if fluid is near saturation conditions or when the boiling or condensation in gauge glass affects the refraction of light through the prisms.

SIGMA Transparent Level Gauge is recommended for colored or viscous fluids, interface detection and direct observation of the physical state. A source of light can be provided by a illuminator which is located at the back of the gauges, enabling readings of the liquid / steam interface. Quick closing of the gauge valve feature allows the needle to plug the seat very quickly and seal off the process.

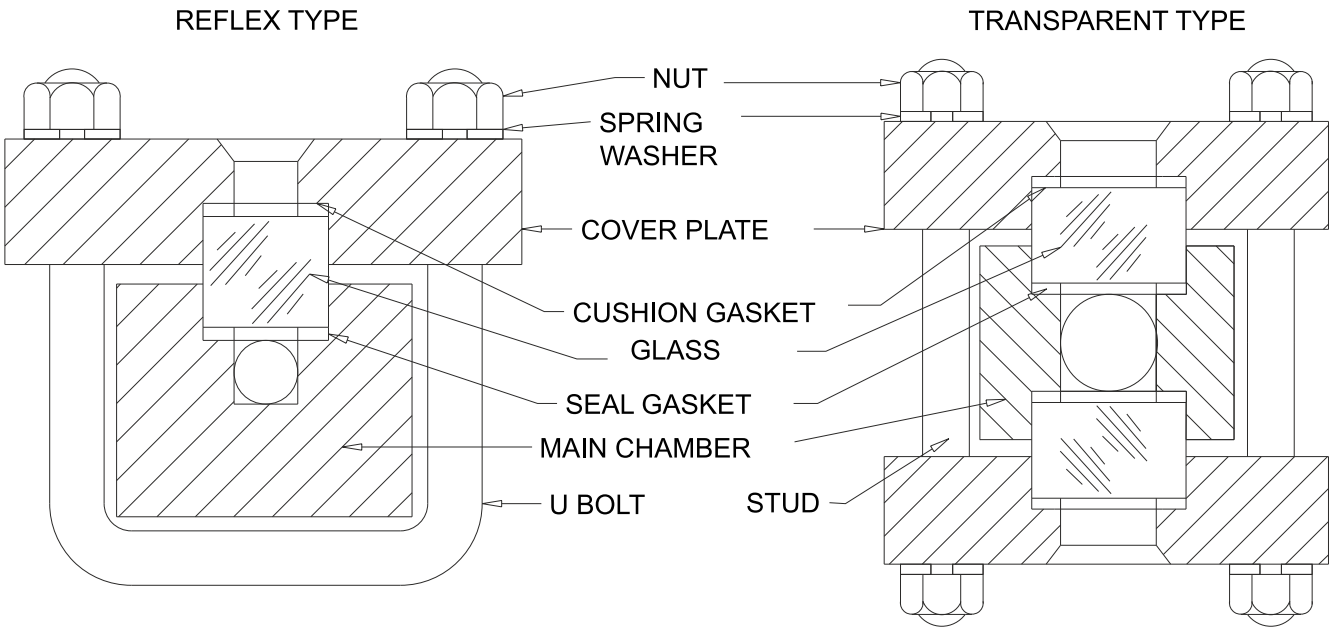
Sigma Transparent Level Gauge

The Transparent Level Gauge consists of one or more windows on each side of the liquid chamber. The transparent glasses are crystal clear and have very smooth surfaces. The glasses are cushioned between cover plates and the chamber. Sigma large chamber reflex and transparent level gauges are designed to give a more accurate reading for liquids that have a tendency to surge or boil, ***that cannot not be obtained with the standard gauges***.

LED Illuminator: Optional - IP 67 Led Illuminator for full length viewing. Long Life - 100,000 hours, No Heat Generation, High Contrast - Superior Visibility Day or Night, Pays for Itself in Electricity Savings Alone



Gauge Construction



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WELD PAD FLAT GLASS LEVEL GAUGE

WELD PAD Flat Glass Liquid Level Gages are designed to become an integral part of the vessel, Weld pad liquid Level Gages are directly mounted to the tank or vessel to be measured.

SIGMA Welding Pad Gages are used where conventional gage and valve construction is impractical because of solid matter in suspension, under conditions where the thermal error caused by piping to a gage glass cannot be tolerated or where space requirements suggest their use. Included are applications involving high vibration, highly viscous liquids or liquids with considerable amounts of solids. SIGMA offers end users a flat or radius weld pad gage in varying lengths and configurations. It is possible to monitor color, clarity and level of a gas / liquid interface. Because there is no nipples through which the process liquid enters the gage, clogging potential is eliminated.

SIGMA Welding Pad Gages are made in both Reflex and Transparent Types. Reflex gages are used where liquid reading only is required. Transparent gages are usualy used where installation is made on each side of the vessel to give see-through visibility.

The System

SIGMA weld pad gages comprise of six basic components. Each component may vary slightly, depending on the desired physical and mechanical properties for the gage. refer picture:

1. Chamber - provides a pressure retaining metallic surface for weld attachment to the tank or vessel. Vessel chamber surface can be radiused to match tank or vessel curvature. Slot(s) are machined into the chamber to provide direct visualization of the process fluid.

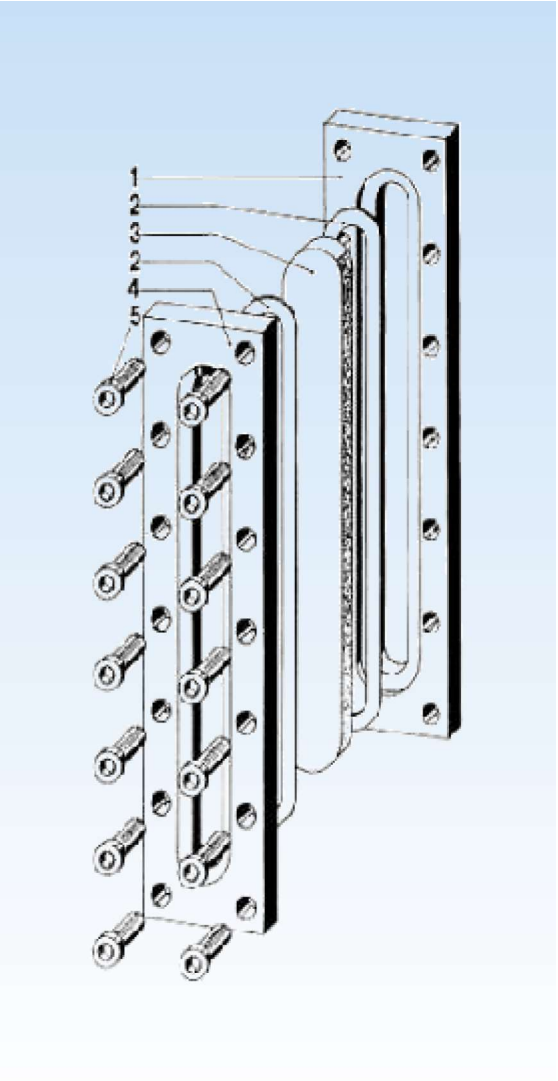
2. Gasket - seal the gap and prevent leakage between the chamber and the glass. Gaskets are available in a variety of materials for compatibility with the media in the gage.

3. Cushion - acts as a protective buffer between the glass and the cover. For proper sealing, cushions must be as hard or harder than the gasket material.

4. Cover - protects the glass assembly from external hits and provides a flat, rigid surface that is used to evenly compress he gage assembly.

5. Bolting - compresses the components between the covers and weld pad chamber.

Shield - (Optional on transparent gages) used to prevent the process media from contacting the glass.



Load Consideration: Whenever it is necessary to slot the tank because of the nature of the liquid or there is need to observe the color or interface of the liquid, the following facts must be considered: Standard and welding pad gages will withstand a loading due to the pressure within the gage itself, but they are not designed to replace the tank strength lost with tank wall is cut. SIGMA has no control over the loading in which the pressure vessel will impose on the pad. It is therefore impossible to rate welding pad gages. The tank fabricator must provide suitable tank wall reinforcement to prevent the pad from being distorted during welding or while under hot operating condition.

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Gauge Construction

Type	: Reflex / Transparent.
Liquid Chamber	: Carbon Steel, Rubber / Teflon lined SS 304, SS 316, SS 304L, PVC / PP / specified.
Cover Plate	: CS, SS 304, SS 316, Aluminum, PVC / PP / Specified.
Bolt & Nuts	: ASTM 193 Gr.B7 / A194 Gr.2H / specified, evenly spaced to give uniform pressure
Glass	: Toughened borosilicate, Alumina silicate for specific liquids, Oil tempered and Soda Lima Glasses (optional)
Make	: Toughened Borosilicate / Indigenous
Gasket	: Non Asbestos / Teflon / Klingerite / Grafoil / specified.
Gauge Valves	: Auto Shut off / Straight / Off set with ball check arrangement.
Bonnet	: Screwed / Bolted
Connections	: Flanged and Screwed (as required). Top and Bottom. Side Connections are available. Chamber to Valve can be union or welded. Flanged Ends can be made rotatable or even spherical union connections can be provided.
Temperature Rating	: Borosilicate up to 300° C and 50°C PVC / PP Level Gauges.
Shield	: Mica / PCTFE

1. Drain cocks are supplied fo all gauge glasses with material same as that of valve body having 1/4" NPT connection as standard. Plugs for Vent is standard and drain cocks are provided wherever called for.
2. Illuminators are of dust and weather proof or explosion proof type giving an even diffusion of light over the entire lengths of gauge glass without glare or blind spots. Scales are available where positive measurement of liquid is required. Scales are offered in Aluminum / SS / weather resistant plastic, graduated in mm / inches.
3. Internal cooling tube, Expansion coil, Balancing pipe or Frost shields (for very low temperature) or any other special requirements are available as optionals.

Off Set Valves: Having an advantage of permitting the inside of the gauge glass to be cleaned easily with minimum disassembly, by removing vent and drain plugs (or other connection), a straight passage through the chamber is obtained.
A soft brush or water jet is an ideal way to clean. This is possible because the spindle is away from the center and does not block the path of cleaning.

Bolted Bonnet gauge valve

Screwed Bonnet gauge valve

Auto Shut Off: This safety device blocks off fluids from being floored outside of the tank in the event of glass breakage. Both the upper and lower valves come equipped with this feature called ball check. Upon glass breakage, a ball that is floating in normal condition, get drawn by the surge of the fluid to spill out of the broken section. This ball then plugs the valve seat and seals off the fluid flow. Closing of the valve stem plugs the seat and also dislodges the ball from the other end of the seat.

Gauge Connection: Welded construction is opted when viewing is predetermined and when rotation of the main chamber is not required. Valve connection to the main chamber can be provided with union threaded connection to facilitate disassembly for cleaning or for turning the chamber to the desired angle of visibility. This is however possible for top and bottom valve mounting option only.

While ordering please specify:
Type of valve, center to center distances, opening conditions, body material, connection size & type. Special type of gauge glasses as per customer's requirement can be supplied.

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Model Number Coding for Armored Level Gauge

Type
ARLG - Reflex
ATLG - Transparent

Design
S - Standard
L - Large Chamber
U - Uninterrupted visibility
W - Weld Pad

Orientation
S - Side-Side
B - Top and Bottom

Valve Body
O - Offset
T - Straight
N - No Valve

Bonnet
S - Screwed
B - Bolted
N - No Bonnet

Connection
F - Flanged
T - Threaded
S - Socket Weld
B Butt Weld

Operating pressure
1 - up to 15 kg/cm^2
2 - up to 40 kg/cm^2
3 - up to 80 kg/cm^2
S - Specified

Valve / Flange Material

4 - SS 304	4L - SS 304L	V - PVC
5 - A 105	6L - SS 316L	T - Teflon
6 - SS 316	P - PP	S - Specified

Special Features

N - None	E - Expansion Loop
F - Frost Shield	R - Rubber Lined
M - Mica Shield	C - Internal Cooling Tube
I - FP Illuminator	
T - Teflon Lined	

CC in mm
Example 1200 mm

Model Decoding example: ARLG-S-S-O-S-F-1-4-F-1200 mm

Armored Reflex Level Gauge, with

- Standard design
- Side-Side Orientation
- Off Set Valve Body
- Screwed Bonnet
- Flanged Connection
- Operating pressure up to 15 kg/cm^2
- Valve / Flange Material - SS 304
- with Frost Shield
- CC : 1200 mm

Note

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Note

- Auto shut off valve are un lined / uncoated by virtue of design. In case valves are not opted in lined chambers, isolation valves may be provided for maintenance.
- Lined / Coated versions are available in large chamber model only by virtue of design.
- Lined / Coated level gauges shall have Flanged process connection only.
- Model Coding is categorized as per the specification of the product, for ease of selection and ordering
- In case of choosing multiple specification under a specific category, mention the 2nd / 3rd code with a bracket, after the 1st code. For ordering IBR approved product, mention "IBR" immediately after the Product code.
- The product conforms to 97/23/EC: Pressure Equipment Directive, Article 3.3 Sound Engineering Practice.
- In case of doubt, contact SIGMA for assistance in arriving at the model code / for specification.

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