

REFLEX LEVEL GAUGE

[FDI - RLG - 302]

INTRODUCTION

REFLEX LEVEL GAUGE

It is level gauge which provides safe and direct observation of fluid level in tank/vessel either rising or falling of the fluid under high temperature & pressure inside specified system.

A visual fluid level indication can be observed through Reflex Type Level Gauge. One side surface of Reflex Glass is 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 explicitly dark hard colour for liquid space and light white colour for empty space.

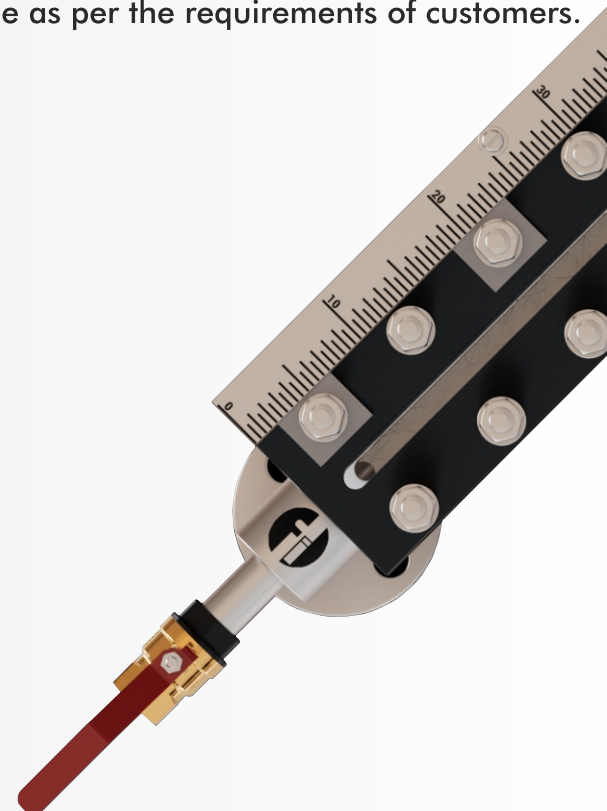


IBR REFLEX LEVEL GAUGE

When for the safe & positive visual indication of liquid level in vessel under high pressure & temperature conditions in boiler applications IBR approved gauges comes handy and ensure about their performance.

MANUFACTURER

FIDICON is a pioneer in the field of manufacturing Reflex Level Gauge in India since 2002 years of designing, manufacturing, installation and service of the same. Reflex level gauges manufactured by FIDICON are user friendly and easy to install. It comes in many ranges (With IBR / Non-IBR) and can be tailor made as per the requirements of customers.



Dedicated to People & Environment Protection

INTRODUCTION

WORKING PRINCIPLE

The working principle of Reflex Level Gauge is based on the light refraction and reflection laws. They use glasses having the face fitted towards the chamber shaped to have prismatic grooves with section angle of 90° . When in operation, the chamber is filled with liquid in the lower zone and gases or vapours in the upper zone; the liquid level is distinguished by different brightness of the glass in the liquid and in the gas/vapor zone. There is no need of a specific illumination for reflex level gauges but the day environmental light is enough. Only during the night an artificial light must be provided.

These gauges are commonly used for level detection within a specific vessel, and the primary principle is based on the difference in refractive indices of vapor and liquid. They are also referred to as prismatic level gauges and offer a well-defined image of water levels.

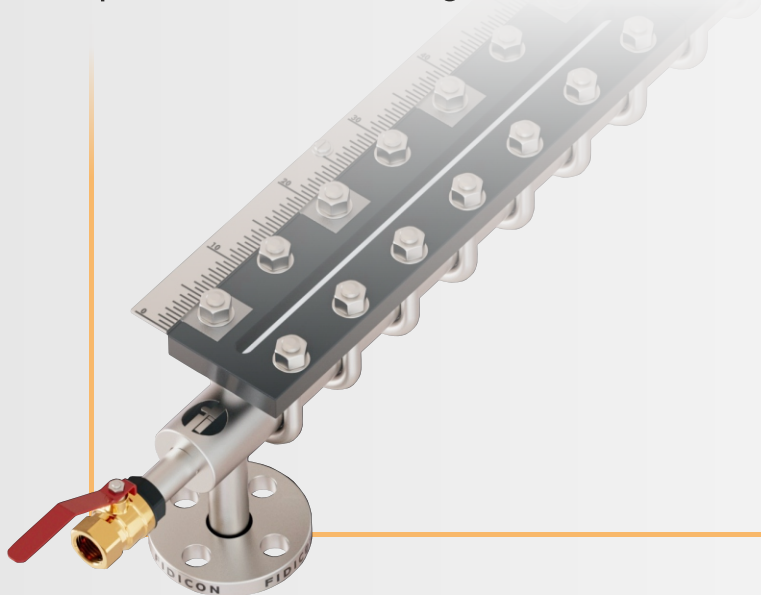
This reduces risks of distortions of reading areas. Because of this, a reflex level gauge can be installed in a tilt-view or vertical position to produce even greater accuracy in readings along with a much better degree of reliability. As imagined, this is highly beneficial for many industries.

The design and composition of a transparent level gauge is quite unique. This gauge is non-tubular and fitted with two plate transparent glasses with liquid in between. The level of liquid is indicated by different transparency of two media. At the back of the transparent level gauge is a light source with rays reflecting down to the observer making it possible to read or estimate the measurement.

The Reflex Gauge is assembled on the body by U-bolts- firmly with gasket, reflex glass, cushion gasket and gauge cover. Reflex Liquid Level Gauges, designed and built for a wide range of high temperature and high-pressure applications.

The most advantage of this type is for easy levelreading 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 with advantage of 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.



INSTALLATION

Before starting any work, carefully check which fluids are or have been in the pipeline. (Flammable substances, irritating substances, substances hazardous to health) While opening or disassembling the instruments, residues of the medium can escape. Subsequent fumes are also possible in unpressurized and cold systems. Use designated PPE such as safety goggles and respiratory protection!

While installing avoid location where system vibrations are more.

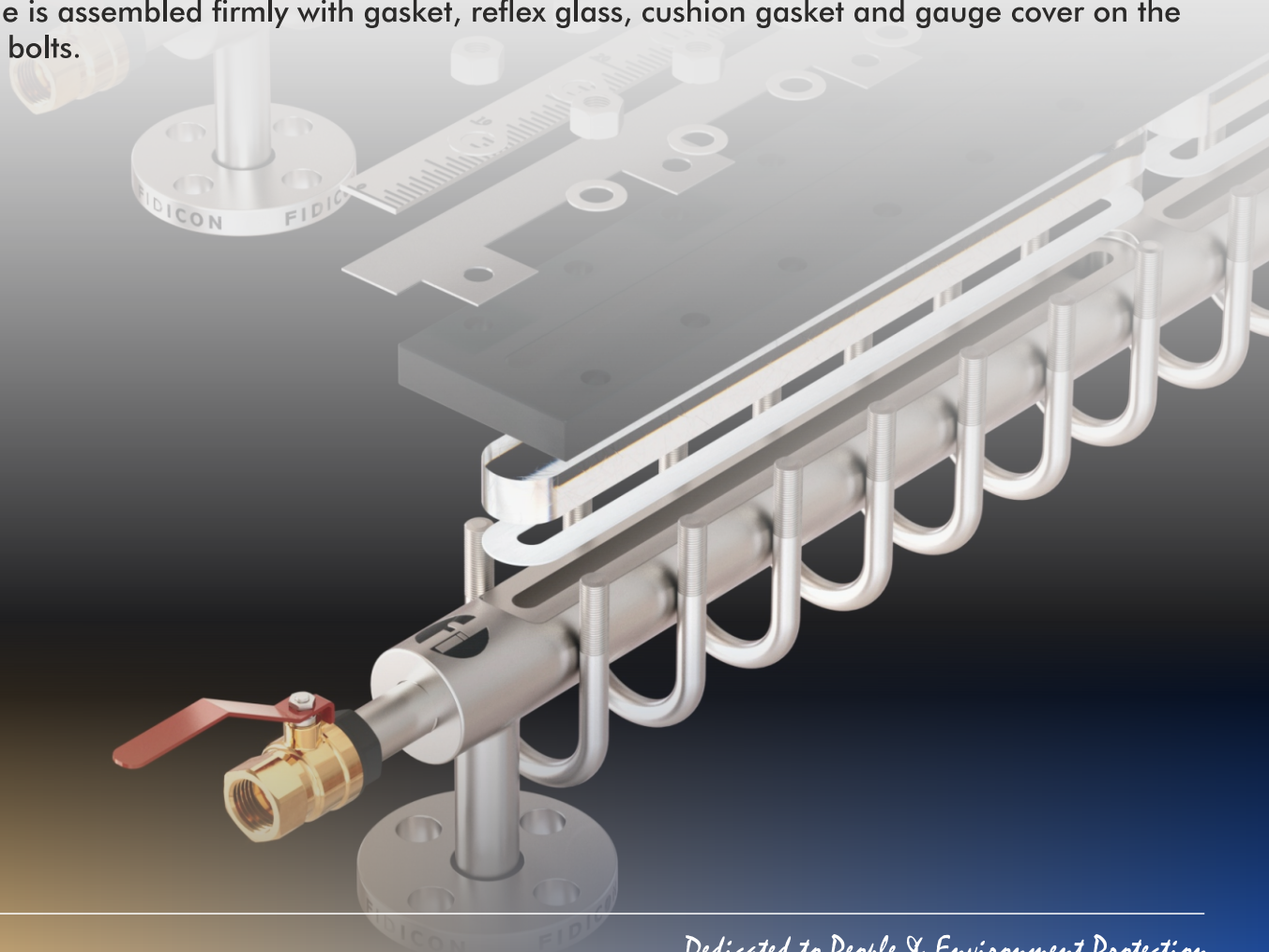
Ensure that the counter connection Process connections of the level gauge, match the counter connections provided on tank. Flange connection - Flanges on the level gauge should match the counter flanges on the tank & their PCD orientation should be identical. Screwed / SMS Union – The threads and size should match.

The level gauge is installed vertically, parallel to the tank side. Ensure its vertical positioning through a 'plumb line'. Also ensure that "Vent" is at the "Top" and "Drain" is at the "Bottom".

Provide suitable gaskets between the flanges or appropriate thread sealant between threads before bolting, to ensure zero leakage through the joint.

Ensure that vent / drain plug / valve is closed properly.

The gauge consists of a body having machined to have a liquid where high temperature are liable to occur, toughened borosilicate glasses are being 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.



ADVANTAGES

In this type of level gauges, the most advantage is of easy reading of boiling liquids. In the event of liquids boiling, the bubbling make the surface level indistinct. And in this type of reflex level gauge with larger volume of the liquid chamber the bubbling will be reduced. Although the body is made of seamless pipe is applicable for highly dense and viscous liquid.

When a conventional level gauge is used for extremely low temperature applications, it becomes difficult to observe the level of liquid as the gauge front tends to freeze. To overcome the problem an acrylic non-frosting plate window is mounted in the front of the reflex level gauge to observe the level easily.

One of the types is called a jacket type and it 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.



COMPONENTS

Chamber: Center of the gauge, and is the part that primarily contains the process fluid is called the Chamber. It is machined from bar stock. The gasket seat is recessed for lateral support, and easy positioning.

Glass: Provides the visual interface between the process fluid and the outside.

Cover: It protects the glass, and provides the compression surface for sealing the gauge. The cushion seat is surfaced for lateral support and easy positioning.

Gasket/Cushion: Provides for a seal between the chamber and glass (gasket), and protects the glass from mechanical stresses from the cover (cushion). For a given gauge, the gasket and cushion are normally the same material.

Bolts/Nuts: Provides a uniform compression load to the gauge for pressure sealing.

SAFETY PRECAUTION

Special attention must be paid to the condition of the environment around the installation or maintenance site. Be aware of e.g.: potentially explosive atmospheres, lack of oxygen in tanks and pits, dangerous gases/liquids, extreme temperatures, hot surfaces, fire hazard (e.g., during welding and statical electrical current- in improperly earthed vessels) and moving machine and system components. Protect yourself from excessive noise by taking the required protective measures.

For all maintenance work or new installations, on new or existing boilers or vessels, it is imperative to check that the boiler or vessel has been depressurised and that the pressure has been safely reduced to atmospheric pressure. In principle, no system should be regarded as unpressurized even if indicated by pressure measuring devices such as pressure gauges or sensors. When releasing the pressure, make sure that no persons are in the release area. Carefully check whether you and/or other persons in the vicinity need PPE to protect oneself from external influences such as high and low temperatures, radiation, noise, danger to eyes, loose objects that can fall down or chemicals.

There is always a risk of injury when handling large and/or heavy equipment. Observe the load handling regulation as a minimum requirement for working with loads. Avoid handling the device with your own physical force, e.g., by lifting, pulling, carrying, pushing or supporting it, especially to prevent back injuries. Use lifting equipment to move heavy and bulky equipment in accordance with Article 1, Section 2 of the German Load Handling Regulation.

Difference between Transparent & Reflex level gauge- The transparent level gauge is just simply seen the actual liquid level through the flat glass whereas the reflex level gauge uses a prismatic groove as a device to reflect the light if there is a liquid-filled in the chamber. . Both of them are widely used in the offshore oil & gas projects etc but which one we shall use for any specific application requires understanding of the process and the chemicals involved. Fidicon has expertise and experience to suggest using the right one.

Notes to consider while selecting level gauge:

Level indicators should be selected depending on the type of application used e.g., in the process industry, tubular level indicators are used for better visual liquid level indication. If it is for non-contact type level measurement, then radar type indicators or ultrasonic type indicators are to be used.

Many physical and application variables are there that affect the selection of the optimal level monitoring method for industrial and commercial processes. The selection criteria include the physical e.g., phase (liquid, solid or slurry), pressure or vacuum, temperature, chemistry, dielectric constant of medium, specific gravity of medium, agitation (action), acoustical or electrical noise, vibration, mechanical shock, tank or bin size and shape etc. are The application constraints like price, accuracy, appearance, ease of calibration response rate, physical size and mounting of the instrument, monitoring or control of continuous or discrete (point) levels are also important.

Reflex Type Level gauge is one of the very important gauge and play very important role in a variety of consumer/ industrial applications. Level gauges are available or can be designed using a variety of principles. Selection of an appropriate type of level gauge suiting to the application requirement is very important.

SERVICE & MAINTENANCE

RECOMMENDED SERVICE

Normally Reflex Level Gauge requires no maintenance. However, gauge glass may become dirty and require an occasional cleaning with a soft brush, Trichloroethylene or compressed air.

It is advisable to replace the gaskets at least once in a year.

Cleaning of Gauge Glass

- ◆ Close both isolation valves.
- ◆ Open the drain plug / valve and drain the liquid from the liquid chamber.
- ◆ Open vent plug / valve.
- ◆ Clean the gauge glass with a soft wire brush or by-passing compressed air or water from top (vent). If dirt still persists, then employ Trichloroethylene.

Gauge glass removal

- ◆ Close both isolation valves.
- ◆ Open the drain plug / valve and drain the liquid from the liquid chamber.
- ◆ Open vent plug / valve.
- ◆ Close bottom isolation valve.
- ◆ Unscrew the nuts over U-bolts on cover plate uniformly.
- ◆ Remove mid-section U-bolts initially and there after remove U-bolts on upper and lower side and separate the cover plate carefully.
- ◆ Remove gauge glass, gasket and cushion.
- ◆ Clean the gauge glass and liquid chamber.

Gauge Glass Refitting

- ◆ Replace old gaskets with new.
- ◆ Locate the gasket in the recess.
- ◆ Place the gauge glass over the gasket.
- ◆ Fit the U-bolts on the cover plate and tighten the nuts on them starting with upper and lower end bolts of cover plate so that the gauge glass is sandwiched between cushion. The gasket and Ensure that U-bolts and nuts are tightened uniformly with appropriate torque.

RECOMMENDED DISPOSAL

- ◆ Give it back to us & we will take care of recycling & possible disposal.
- ◆ User can dis-assemble the product in multiple stage
- ◆ The above may be handed over (state pollution board), authorized re-cycler item-wise.

APPLICATION

For the measurement of level of fluids at various industrial applications level indicators are used. These devices are used to determine the level of liquid in tanks, drums, pressure vessels etc.

For needs of different applications there are many level indicators to suit the purpose. In highly commercial industries normally, fluids are used in many forms. In absence of proper devices, it will be very difficult to find the quantity and level of fluid stored in a vessel/container etc. In many situations where the nature of fluid is dangerous or sometimes the place it is manually impossible to find the level in which the liquid is stored because the nature of the material, then the level indicators are of utmost importance.

Reflex glass level gauges offer great advantages in terms of: low initial cost, low operating cost, easy level reading and can be used in most of the cases. However, these gauges cannot be used in certain cases as for example:

- ◆ when the process fluid is such that can corrode the glass (e.g., high temperature alkaline solutions or hydrofluoric acid). Mica shields or Polytrifluorochloroethylene shields must be used to protect the glass in such cases.
- ◆ when besides the level indication, the observation of the liquid colour is required.
- ◆ when the process fluid is high-pressure water steam, since in this case the glass must be protected from the solvent action of the boiler water by using mica shields.
- ◆ when the separation level between two liquids has to be read (interface).

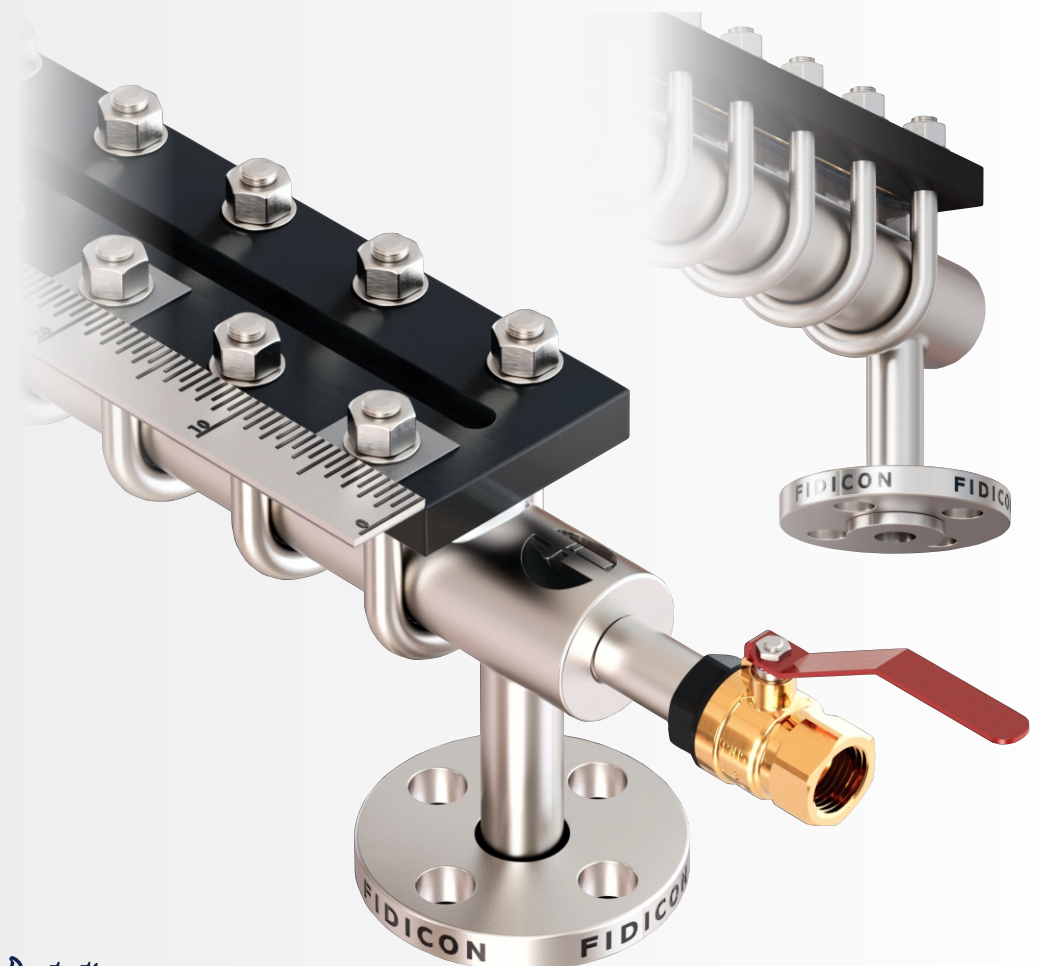
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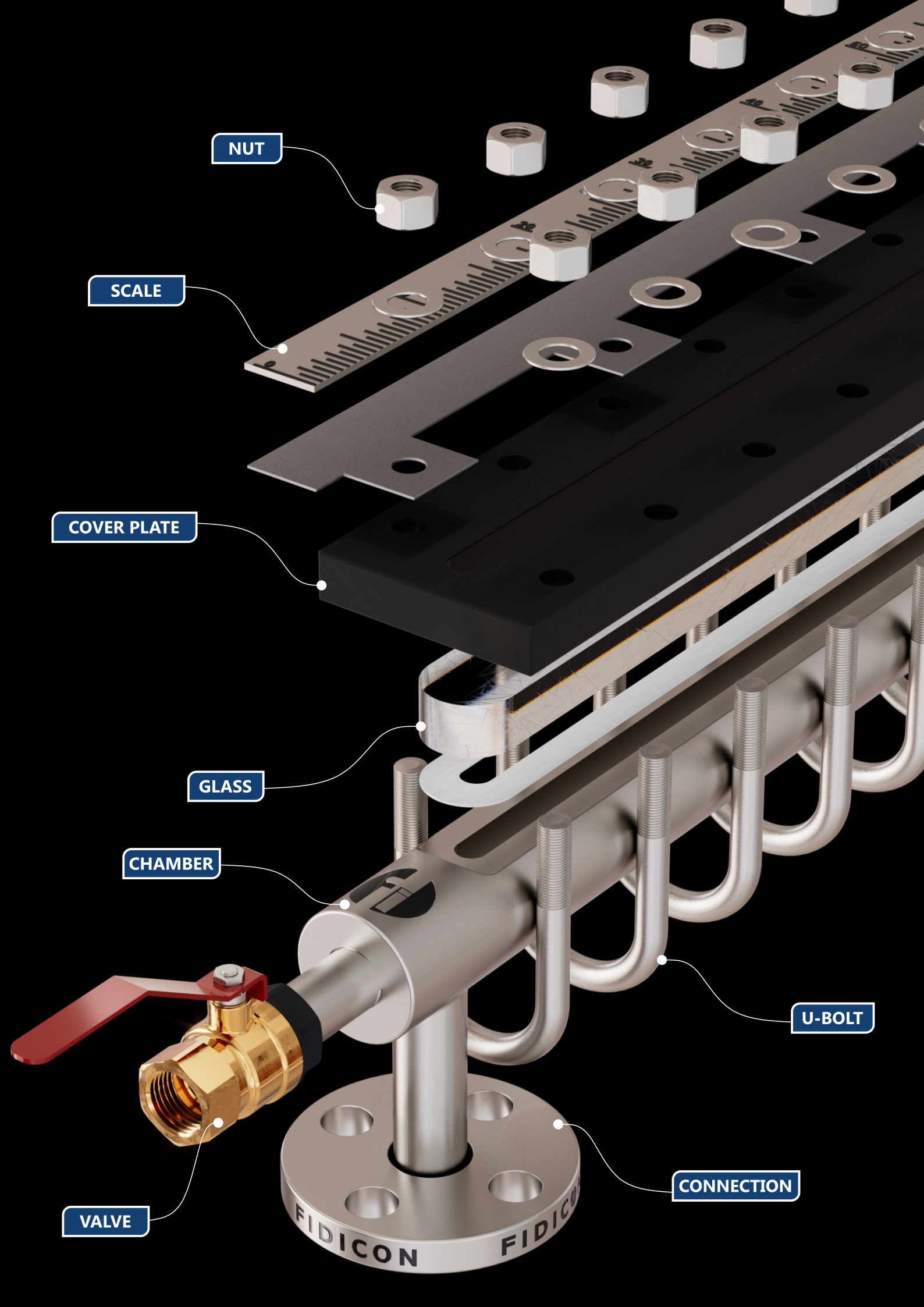
Used to Measure Level in

- ◆ Drums
- ◆ Tanks
- ◆ Pressure Vessels
- ◆ Boilers

Industrial Needs

- ◆ Chemical industries
- ◆ Petrochemicals
- ◆ Fertilizers &
- ◆ Pharmaceuticals





NUT

SCALE

COVER PLATE

GLASS

CHAMBER

U-BOLT

CONNECTION

VALVE

FIDICON FIDICON



ENQUIRY SPECIFICATIONS:

- [1] Service Media Details.
- [2] Size/Connection
- [3] System Operating and Design Pressure.
- [4] System Operating and Design Temperature.
- [5] Material Specifications (Body, Internal)

RECOMMENDED SPARES

- [1] Reflex Glass
- [2] U-Clamp
- [3] Gasket
- [4] Drain/Isolation/Control Valve

OTHER RANGE OF PRODUCTS

- [1] Flame Arrester
- [2] Breather Valve
- [3] Level Indicators
- [4] Rotameters
- [5] Emergency Relief Valve
- [6] Gauge Hatch
- [7] Strainers
- [8] Pressure Reducing Valve
- [9] Safety Relief Valve
- [10] Flowmeters
- [11] Level Switches
- [12] Pressure Reducing Station
- [13] Level Gauge, etc.

Any Query?

Contact us to Discuss,

Phone No: +91-2646-222238/223412

Mobile No: +91-9824418777

sales@fidicondevices.com

info@fidicondevices.com

Address: Plot No. 1706/12, GIDC Ankleshwar,
Dist.: Bharuch, Gujarat, India 393002.

