

LEVEL GAUGES WITH GLASS TUBE

Level gauges with a glass tube are an inexpensive but valid option for checking the level of non-hazardous or non-reactive fluids in unpressurised tanks.

An external metal protection of the glass tube is recommended.

Available configurations:

Borosilicate glass tube.

Diameter: 16 mm; thickness: 2.5 mm.

Centre-to-centre distance with a single tube: 3000 mm.

Visible length (without protection):
centre-to-centre distance - 95 mm.

Visible length (with protection):
centre-to-centre distance - 135 mm.

Spare glass tube:
centre-to-centre distance - 30 mm.

Spare protection:
centre-to-centre distance - 100 mm.

In the event of greater centre-to-centre distances,
additional pipes can be connected up via middle terminals
for glass tube

Operating limits / Conditions:

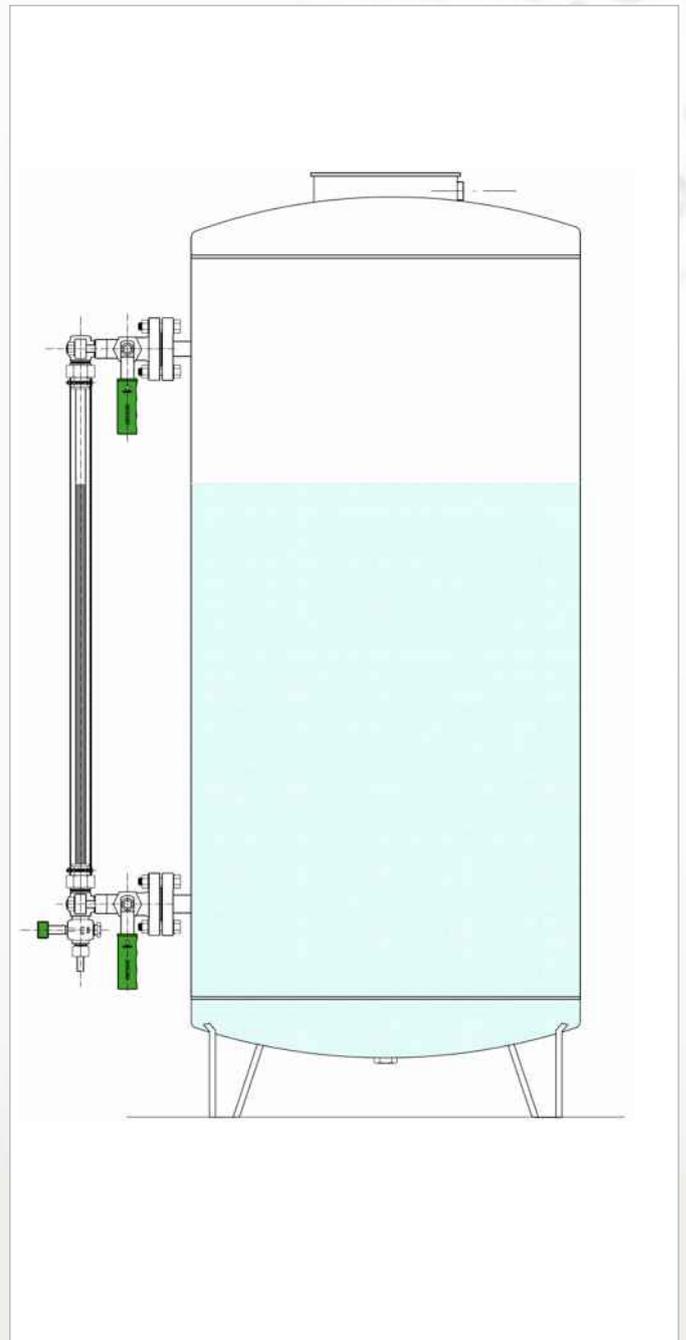
Process:

Max. pressure: 5 bar @ 38°C (the max. pressure also
depends on the length and temperature)

Max. temperature: 120°C

The product is NOT suitable for use in the following instances:

- if it is likely to be exposed to vibrations (glass tube will break)
- if the installation is situated by a walkway (possibility of blows/impact)
- if exposed to steam (shortens glass tube life)



Materials / Specifications

Transparent tube: grade 3.3 borosilicate glass

Glass protection (optional): AISI 304 stainless steel

Wetted parts:

- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request

Non-wetted parts:

- standard: galvanized carbon steel, AISI 316/316L stainless steel
- additional options: on request

Gaskets: (see page 1.72)

Cocks:

- standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)
- additional options: PTFE; other extras on request

Sealing gasket:

- standard: EPDM
- additional options: graphite or PTFE; other extras on request

Shut-off: (see page 1.49)

- standard: upper valve and lower valve (side/side)
- additional options: on request

Drain: (see page 1.50)

- standard: threaded valve
- additional options: on request

Vent: (see page 1.50)

- standard: blind
- additional options: threaded with plug; other extras on request

Tank connections:

Flanged:

- UNI standard: PN40 DN15 / DN20 / DN25
- ANSI standard: #150 DN 1/2" / 3/4" / 1"
- additional options: on request

Threaded:

- BSP (GAS) standard: 1/2"-M / 3/4"-M
- NPT standard: 1/2"-M / 3/4"-M

Weld-on: from 1/2" to 1" BW or SW

Option: further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

Shut-off cocks, drain cock and vent cock:

- Cylindrical plug cocks

Spares:

Our spare parts are interchangeable with those of major international manufacturers.

For the full range of complete sets, turn to the spares section on page 1.69.

Accessories:

Stainless steel "U" protection, lower and/or upper safety ball, pusher for safety ball, calibrated, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)

Certifications (on request):



For this kind of gauge the pressure test can be performed only on the cocks (on request), glass tubes cannot be tested due to their fragility. All DIESSE components are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect. Certificates can be issued on request.

LEVEL GAUGES WITH MICROWAVE TRANSMITTER

DIESSE has been granted a European patent for the glass level gauge equipped with a microwave transmitter, which allows to get, with 2/4-wire, 4-20mA, Hart-Profibus PA or Foundation fieldbus output signal. Traditional visual readings can also be taken by glasses.

The equipment is suitable for use with most liquids and can be installed in both non-explosive and in potentially explosive atmospheres (ATEX certified).

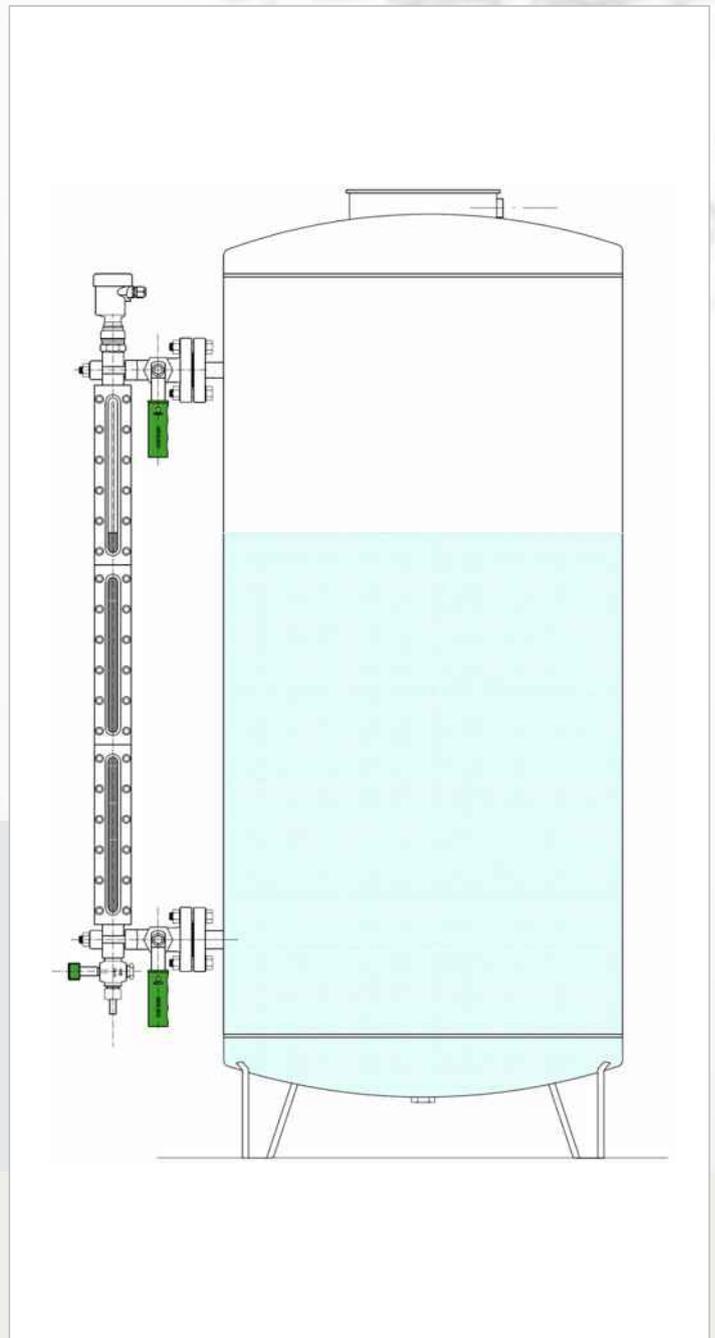
In addition, it can be used as an overflow safety device thanks to the SIL (safety integrity level) of the microwave transmitter.

The standout features of this type of gauge are as follows:

- Remote and in situ indication/transmission of liquid level
- Ability to programme adjustable thresholds (alarm and/or control signals) in proportion to the gauge length
- Automatic analogue/digital control via system accessories (relays, regulators etc.)
- Actual/visible level readings appear in real time with the process management analogue/digital parameters. No risk of discordance
- Two types of parameters on a single process connection: visual mechanical parameters and analogue/digital control parameters
- Pressure and temperature readings can be taken in addition to the usual metric level readings and are shown on one or more displays
- Control and alarm signals can be remotely transmitted

HOW DOES IT WORK?

High frequency microwave pulses are 'guided' along a cable positioned in the centre of the level gauge housing. When the pulses reach the surface of the fluid, they are reflected back up the guide to electronic processors. A microcontroller then processes the reflected microwaves, converting them into legible level or volume data.



TECHNICAL SPECIFICATIONS OF MICROWAVE TRANSMITTER:

MATERIALS:

Cable:
316 stainless steel; diameter: 1 mm

Gasket:
FPM (Viton), EPDM or Kalrez 6375

Process connection:
316L stainless steel, 3/4" BSP (GAS); other materials available on request

COVER/PROTECTION:

Resin, aluminium or 316L stainless steel

ELECTRICAL CONNECTION:

M20 x 1,5 mm or 1/2" NPT

OPERATING CONDITIONS (*):

Pressure: up to 400 bar
Operating temperature: -200 + 400°C
Ambient temperature: -20 + 80°C

OUTPUT SIGNAL:

Standard: 4...20mA, Hart-Profibus PA or Foundation fieldbus

ACCURACY:

+/- 5 mm

ELECTRONIC POWER SUPPLY: (4...20mA/Hart loop powered)

Standard (non Ex): 14-36 VDC
EEx ia version: 10-30 VDC
EEx d version: 20-36 VDC

OPTIONAL ACCESSORIES:

Integrated or remote display and calibration module

INGRESS PROTECTION:

IP 67

EXPLOSION PROTECTION: ATEX II 1G, 1/2G, 2G EEx ia IIC T6
(depending on the model) ATEX II 1/2G, 2G EEx d ia IIC T6

() the operating limits of the glass level gauge with microwave transmitter are the same as those listed in relevant sections of the reflex and transparent level gauge pages*

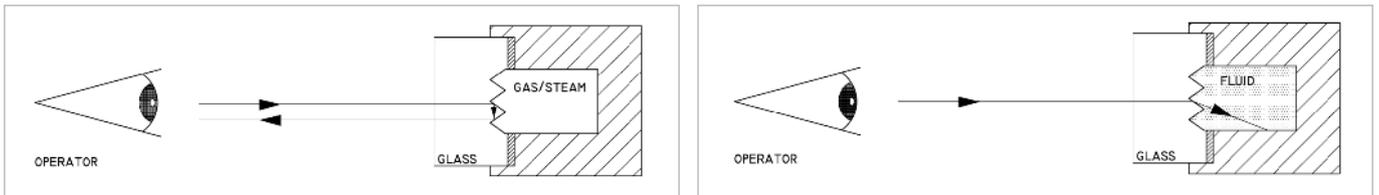
Accessories / Certifications:

Please refer to the reflex/transparent glass level gauge sections.



REFLEX LEVEL GAUGES

The level is ascertained using a glass which has a smooth side and a wetted prismatic side. The level of the fluid inside the level gauge is shown by using the optical principles of refraction: the wetted part fully absorbs light and so the fluid appears to be black. The part in contact with the gas, on the other hand, fully reflects light and so the gas appears to be of a very light colour.



The product line includes level gauges suitable for pressure ratings from PN10 to PN160 and a huge number of industrial process applications.

This type of gauge is recommended:

- for taking clear and simple readings (see counter-indications below)
- if you are looking for an inexpensive gauge which will also save you money on maintenance costs

Operating limits / Conditions:

Process:

Max. pressure: 160 bar @ 38°C (with GR18, MT18 or SHV type valves)

Max. temperature: 300°C (max. temperature allowed by borosilicate glasses as per the DIN 7081 standard - see page 1.69)

Steam: (see page 1.59)

Max. pressure: 22 bar (with GR18, MT18 or SHV type valves)

Max. temperature: 216°C (saturated steam @ 22 bar)

For saturated steam values > 20 bar, a low-maintenance transparent level gauge with mica shield protection should be used (see graph "glass loss caused by boiler water" for the estimated glass life).

Not only does the glass life depend on the temperature, it depends on the pH of the water (the higher the value, the shorter the glass life).

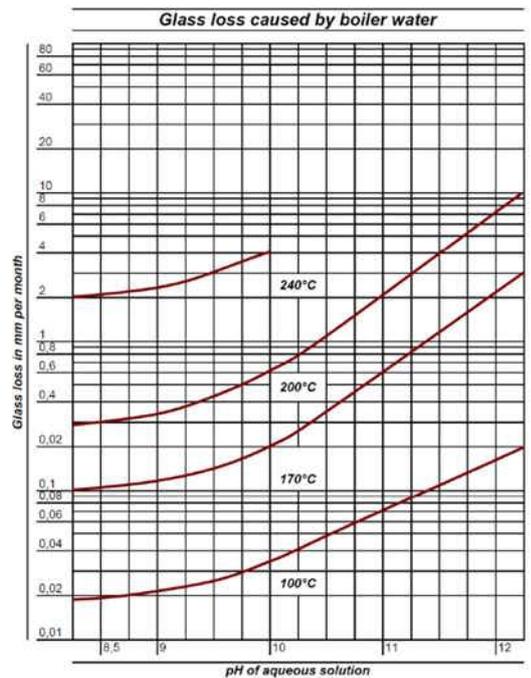
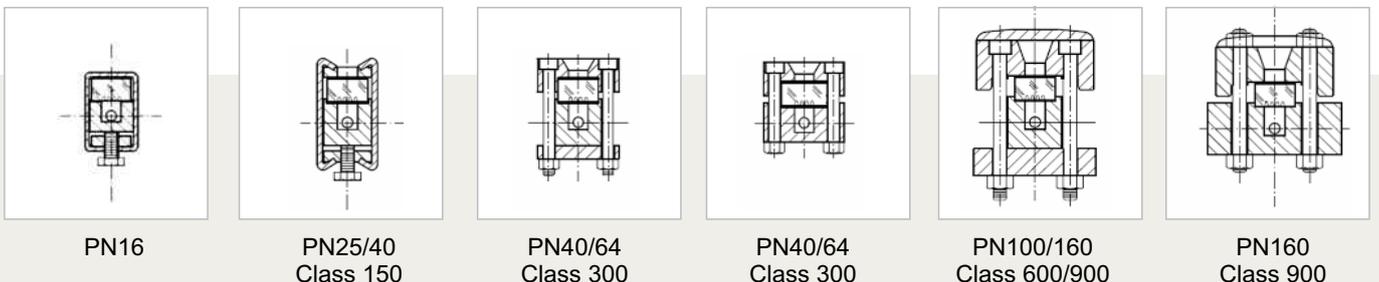
The product is NOT suitable for use in the following instances:

- if exposed to corrosive fluid (e.g. caustic soda, hydrofluoric acid, citric acid ...)
- if exposed to high pressure steam
- if subjected to repeated thermal shocks

In the scenarios listed above, the glass must be protected with MICA or PCTFE shields, so a transparent level gauge is necessary

- for checking the level of separation between two immiscible fluids (interface)
- for checking the colour of a fluid (all fluids look very dark)
- in cases where the fluid is particularly viscous (a film may form on the glass which prevents you from taking an accurate reading)
- in cases where the fluid is particularly dark (the reflex principle is rendered ineffective)

Types:



Glass loss - shown here for unprotected sight and gauge glasses - depends mainly on the pH and the temperature of the boiler water.

Materials / Specifications:

Connections between housing and cocks:

- with grinded pipes and stuffing box (view can be turned by the customer during installation)
- fixed centre-to-centre distance with metal seal (view can be turned during manufacture)

Wetted parts:

- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request

Non-wetted parts:

- standard: galvanized carbon steel, AISI 316/316L stainless steel
- additional options: on request

Gaskets: (see page 1.71)

- standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)
- additional options: PTFE; other extras on request

Glasses: (see page 1.69)

- reflex borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard

Shut-off: (see page 1.49)

- standard: upper valve and lower valve (side/side)
- additional options: on request

Drain: (see page 1.50)

- standard: threaded valve
- additional options: on request

Vent: (see page 1.50)

- standard: blind (for grinded pipes version)
- threaded with plug (for fixed centre-to-centre version)
- additional options: on request

Tank connections:

Flanged:

- UNI standard: PN40 DN15 / DN20 / DN25
- ANSI standard: #150 / #300 / #600 DN 1/2" / 3/4" / 1"
- additional options: on request

Threaded:

- BSP (GAS) standard: 1/2"-M / 3/4"-M
- NPT standard: 1/2"-M / 3/4"-M

Weld-on: from 1/2" to 1" BW or SW

Option: further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

Shut-off cocks, drain cock and vent cock:

- Cylindrical plug cocks (type GR18 or MT18 - see page 1.47)
- Globe valves (type SHV - see page 1.48)
- Push-button valves (type NPV - see page 1.48)
- Ball valves (type SBB)

Spare parts:

Our spare parts are interchangeable with those of major international manufacturers.

For the full range of complete sets, turn to the spares section on page 1.69.

Accessories:

Lower and/or upper safety ball, pusher for safety ball, calibrated scale, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)

Certifications (On request):

- ATEX
- Tests and inspection by Notified Bodies
- NACE MR0175
- Others on request



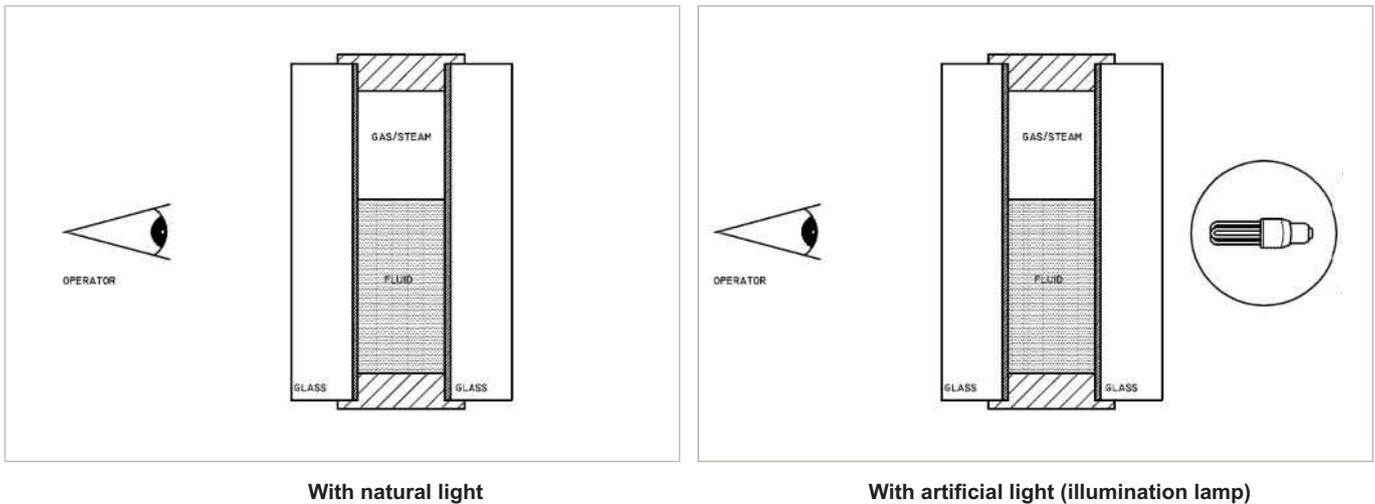
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TRANSPARENT LEVEL GAUGES

In this kind of level gauge, the fluid is held between two smooth glasses. The level can be identified as the fluid has a different level of transparency compared to gases and steam.

The transparent level gauge is particularly recommended for applications where the glass needs to be protected from corrosive fluids and high temperatures.

A lamp can also be fitted behind the gauge to improve visibility in special operating conditions.



The product line includes level gauges suitable for pressure ratings from PN10 to PN160 and a huge number of industrial process applications.

This type of gauge is recommended:

- for use with corrosive fluids (protective shield for the glass is required)
- for steam with an operating pressure > 20 bar (protective shield for the glass is required)
- if repeated thermal shocks are likely (protective shield for the glass is required)
- for checking the interface (level of separation between two immiscible fluids)
- for checking the colour of a fluid
- for dirty / oily fluids

Operating limits / Conditions:

Process:

Max. pressure: 160 bar @ 38°C (with cylindrical plug cocks or globe valves)

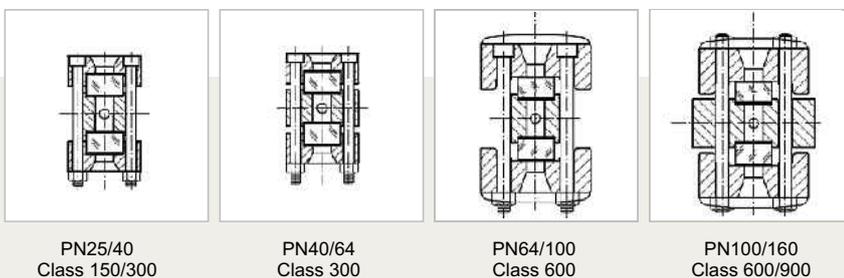
Max. temperature: 300°C (max. temperature allowed by borosilicate glasses as per the DIN 7081 standard - see page 1.69)

Steam: (see page 1.59)

Max. pressure: 70 bar (with cylindrical plug cocks or globe valves)

Max. temperature: 280°C

Types:



PN25/40
Class 150/300

PN40/64
Class 300

PN64/100
Class 600

PN100/160
Class 600/900

Materials / Specifications:

Connections between housing and cocks:

- with grinded pipes and stuffing box (view can be turned can be positioned by the customer during installation)
- fixed centre-to-centre distance with metal seal (view can be turned can be positioned during manufacture)

Wetted parts:

- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request

Non-wetted parts:

- standard: galvanized carbon steel, AISI 316/316L stainless steel
- additional options: on request

Gaskets: (see page 1.71)

- standard: graphite/copper (ASTM A105), graphite/AISI 316 (A105 LF2 and ASTM A182 F316L)
- additional options: PTFE; other extras on request

Glasses: (see page 1.69)

- transparent borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard

Shut-off: (see page 1.49)

- standard: upper valve and lower valve (side/side)
- additional options: on request

Drain: (see page 1.50)

- standard: threaded valve
- additional options: on request

Vent: (see page 1.50)

- standard: blind (for grinded pipes version)
- threaded with plug (for fixed centre-to-centre version)
- additional options: on request

Tank connections:

Flanged:

- UNI standard: PN40 DN15 / DN20 / DN25
- ANSI standard: #150 / #300 / #600 DN 1/2" / 3/4" / 1"
- additional options: on request

Threaded:

- BSP (GAS) standard: 1/2"-M / 3/4"-M
- NPT standard: 1/2"-M / 3/4"-M

Weld-on: from 1/2" to 1" BW or SW

Option: further connections type or direct connections to the process without shut-off cocks (see page 1.49 for more details)

Shut-off cocks, drain cock and vent cock:

- Cylindrical plug cocks (type GR18 or MT18 - see page 1.47)
- Globe valves (type SHV - see page 1.48)
- Push-button valves (type NPV - see page 1.48)
- Ball valves (type SBB)

Spare parts:

Our spare parts are interchangeable with those of major international manufacturers.

For the full range of complete sets, turn to the spares section on page 1.69.

Accessories:

Mica or PCTFE protective shield for the glass, flameproof and watertight illumination lamp (ATEX approved), lower and/or upper safety ball, pusher for safety ball, calibrated scale, non-frosting extension, minimum level arrow, continuous reading, cocks handles lock (see page 1.55 for details)

Certifications (On request):

- ATEX
- Tests and inspection by Notified Bodies
- NACE MR0175
- Others on request



All DIESSE products are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect. Certificates can be issued on request.

WELD-ON LEVEL GAUGES

This type of level gauge is designed to be welded on to the tank and withstand the pressure inside it.

It is made from both carbon steel and stainless steel and can take reflex and transparent glasses. Reflex glasses are recommended as they improve visibility.

In order to prevent warping or distortions while the level gauge is in service, the technician tasked with installing the product must reinforce the wall of the tank where the gauge is to be welded on.

For visible lengths exceeding 320 mm, we recommend welding additional gauges on different axes to avoid weakening the tank structure.

During welding operations (which must only be carried out prior to gauge assembly), special care must be taken to avoid exposing the weld-on base to high temperatures for long periods of time as this may compromise the resistance of the gauge when in operation.

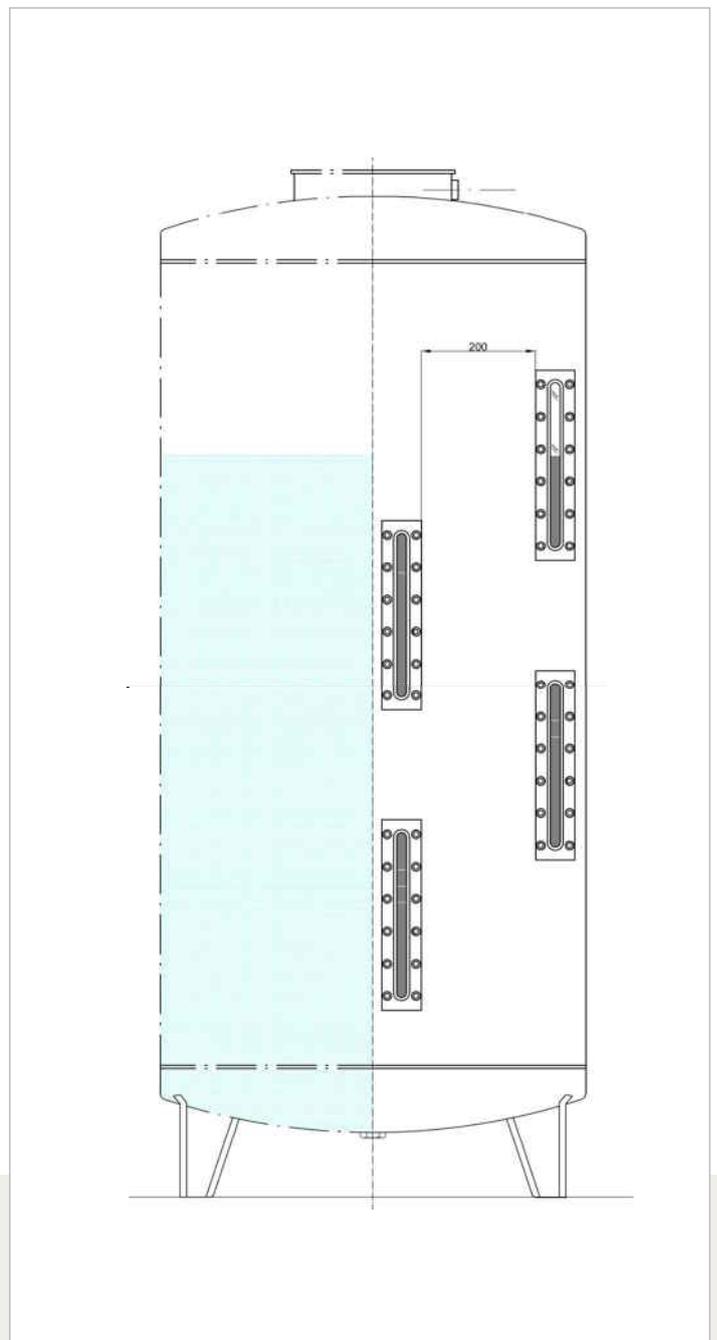
Operating limits / Conditions:

Process:

Max. pressure: ANSI 300 rating (A105: 51 bar;
AISI 316L: 49.6 bar) @ 38°C

Max. temperature: 300°C (max. temperature allowed by
borosilicate glasses as per the
DIN 7081 standard - see page 1.69)

On request: ANSI 600 rating (A105: 102 bar;
AISI 316L: 99.3 bar) @ 38°C





Materials / Specifications

Weld-on base:

- standard: flat with a hole running along the whole visible length
- additional options: with radius (state the tank radius); with 2 holes (Ø: 15 mm) at the far ends of the visible length

Wetted parts:

- standard: galvanized ASTM A105 or A105 LF2 carbon steel, ASTM A182 F316L stainless steel
- additional options: on request

Non-wetted parts:

- standard: galvanized carbon steel, AISI 316L stainless steel
- additional options: on request

Gaskets: (see page 1.71)

- standard: graphite
- additional options: PTFE; other extras on request

Glasses: (see page 1.69)

- reflex or transparent borosilicate glasses, thermally pre-stressed and extra hard as per the DIN 7081 standard

Spare parts:

Our spare parts are interchangeable with those of major international manufacturers.

For the full range of complete sets, turn to the spares section on page 1.69.

Accessories:

Mica or PCTFE protective shield (for transparent glass only), calibrated scale, non-frosting extension, minimum level arrow (see page 1.55 for details)

Certifications (on request):

- NACE MR0175
- Others on request

This kind of level gauge can only be tested once it has been welded on to the tank in question. All DIESE components are individually checked and tested in accordance with company quality procedures and the industry regulations currently in effect. Certificates can be issued on request.