

Pharmaceutical
Food & Beverage
Biotechnology
Cosmetics

Pressure, temperature & level measurement for **sanitary applications**



WIKAI

Part of your business

About Us



Alexander Wiegand,
Chairman and CEO WIKA

Founded in 1946, WIKA is dedicated to making advances in pressure, temperature, level, flow and calibration technologies.

WIKA and its wholly owned subsidiaries offer a broad portfolio of measurement solutions as well as services to support your design, installation, repair and calibration needs.

With more than 9,300 employees and more than 40 locations around the world, WIKA provides the expertise, flexibility and delivery performance you need in a global partner. Wherever you are in the world, you can depend on WIKA.

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WIKA - Your Partner for Sanitary Applications

In the highly regulated industries of food, beverage, pharmaceuticals, cosmetics and biotechnology, requirements for safety and cleanability are becoming increasingly stringent with a greater emphasis on risk prevention.

Measurement technologies support prevention efforts by supplying the data required to ensure high quality, repeatable production processes. In addition, these solutions also work to eliminate contamination risks -- when appropriately designed.

At WIKA, our innovative sanitary designs for pressure, temperature and level measurement have been globally recognized for supporting good manufacturing practices and cleanability, helping ensure safe production and preventing any risks to consumers. We have a broad offering of measuring instruments for your sanitary, as well as your utility and industrial applications.



Directives and Standards

Measuring instruments from WIKA are manufactured in line with the cGMP guidelines (current good manufacturing practice) and meet the stringent requirements of the following organizations, among others.



ASME BPE



3-A Sanitary Standards, Inc.



FDA (Food and Drug Administration)



CSA



Factory Material



EHEDG (European Hygienic Engineering & Design Group)



ATEX (directive 94/9/EG)



USP (U. S. Pharmacopeia)



CRN



Underwriters Laboratories



Product Innovations for Sanitary Applications

Addressing Primary Sources of Contamination

WIKA is focused on helping you diminish the risks of process contamination – especially those related to tri-clamp and tee-fitting connections, and potential diaphragm breaches on diaphragm seal assemblies.

WIKA's patented solutions and innovative designs work to:

- Eliminate dead space and crevices
- Reduce sanitary fittings
- Reduce gasket maintenance
- Protect the product from environmental and process-related contaminants

The following solutions represent some of these innovations, which can help you achieve reliable, repeatable outcomes.



Diaphragm Monitoring System – Failure notification to prevent contamination

The patented Diaphragm Monitoring System is ideal for critical production processes where the integrity of the product would be compromised by exposure to non-sterile environments or diaphragm seal system-fill fluid.

In this dual diaphragm design, the space between the primary and secondary diaphragm is evacuated to a hard vacuum. A pressure transmitter, switch or gauge monitors

the vacuum between the two diaphragm membranes. If the primary diaphragm is breached, a visual, acoustic and/or electrical warning is provided. With immediate notification, the situation can be evaluated to avoid potential financial losses. The secondary diaphragm will continue to function properly and provide reliable pressure readings. Therefore, it's not necessary to stop operations immediately to make repairs.



The Diaphragm Monitoring System is patented (e.g. DE19949831)
Further patents are pending

Product Innovations for Sanitary Applications

Controlled Diaphragm Protection System – Improved reliability of seal assemblies

The patented Controlled Diaphragm Protection System seats the diaphragm rigidly against its bed to prevent it from being damaged during routine maintenance periods, such as cleaning cycles. Under these conditions, the thin diaphragm foil can be exposed to extreme movement, pressures and temperatures that can weaken the material or cause it to fail altogether.

The system is remotely engaged, which provides the flexibility to activate, or protect, the diaphragm in real-time. Once normal process operations resume, the diaphragm can be re-engaged to provide reliable measurement.

The Controlled Diaphragm Protection System:

- Extends life of the diaphragm seal assembly, which can be fitted with a pressure transmitter, gauge or switch
- Reduces cycle time variation
- Decreases the risk of product contamination
- Prevents downtime in batch and continuous operations
- Reduces the threat of an unplanned shutdown



In-line Diaphragm Seals – True laminar flow, self-cleaning design

WIKA's In-line diaphragm seal features a cylindrical diaphragm that covers the entire length and diameter of the seal body. Therefore, it doesn't obstruct process flow. There are no pockets or dead space where particles can accumulate – it's a self-cleaning design that integrates into the process line.

Other benefits of WIKA's In-line seals include:

- Eliminates the upper leg of the tee-fitting where particles can accumulate
- Reduces the risk of contamination from gasket compression issues
- Prevents zero point shifts from temperature or pressure cycling
- Can remain installed during pigging cleaning processes

See page 15 for a listing of WIKA's In-line diaphragm seal solutions.



Flow-through Thermowell – Eliminates dead space

A patented solution, WIKA's flow-through thermowell features an inverted, curved insertion point where the temperature probe enters the process. This design eliminates crevices where media can flow and particles can become lodged. In other thermowell designs, the insertion point is elevated above the thermowell pipe, creating internal pockets. As a result, media is able to flow upward into these crevices, allowing particles to accumulate and introducing contamination risks.

Additional benefits of WIKA's flow-through thermowell include:

- Decreases the number of tri-clamp connections, orbital welded
- Reduces gasket maintenance and costs
- Provides a closed piping system to support continuous manufacturing
- Allows for calibration without opening the system

WIKA's offers a complete line of sanitary thermowells. See page 25 for more information.



Diaphragm Seals for Sanitary Processes

Protecting the Process, Instrumentation

Sanitary diaphragm seals provide many well-known advantages. They are installed to adapt the pressure measuring instrument to comply with numerous sanitary industry standards and also work to:

- Ensure the purity of the process media
- Protect the measuring instrument to ensure reliable readings
- Permit easy installation and removal of the instrument for cleaning and calibration
- Provide a process connection where dead space is either non-existent or minimalized to prohibit bacteria growth

At WIKA, we've expanded on proven design principles to provide solutions that help prevent process contamination. Plus, we've developed processes that give you more options for seal materials and FDA-compliant system-fill fluids.

Our seals can be assembled with pressure gauges, pressure transmitters or pressure switches.

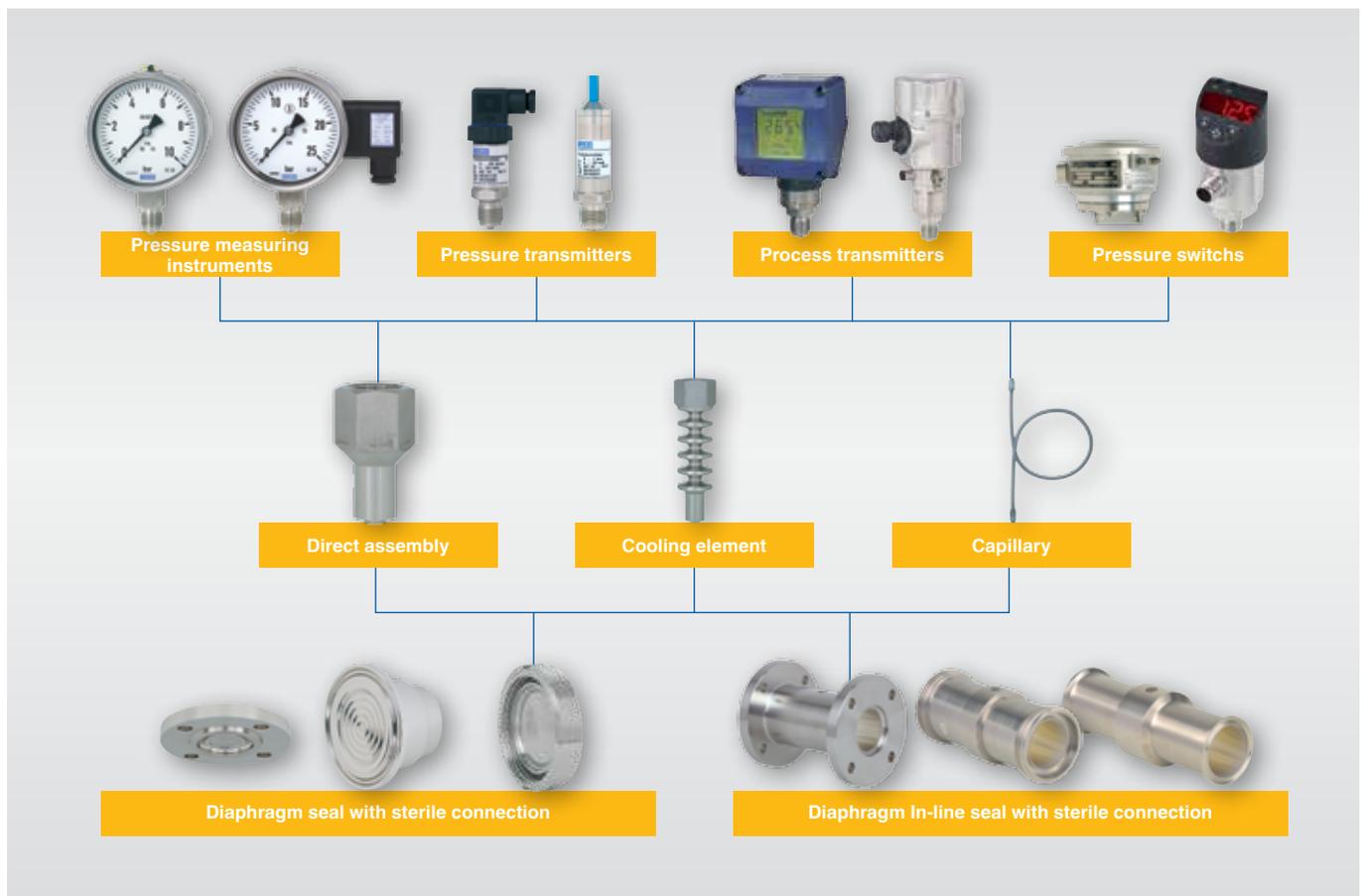
See page 45 for more information about sanitary diaphragm seal design principles and advantages.



Diaphragm seal with clamp connection

Possibilities for Diaphragm Seal Assemblies

Combining a pressure measurement instrument with a flush or In-line diaphragm seal ensures industry standards are maintained -- no matter how demanding the application may be. WIKA's diaphragm seals can be assembled with a combination electronic or mechanical pressure instruments, and can be connected either directly, or via a cooling element or capillary line.



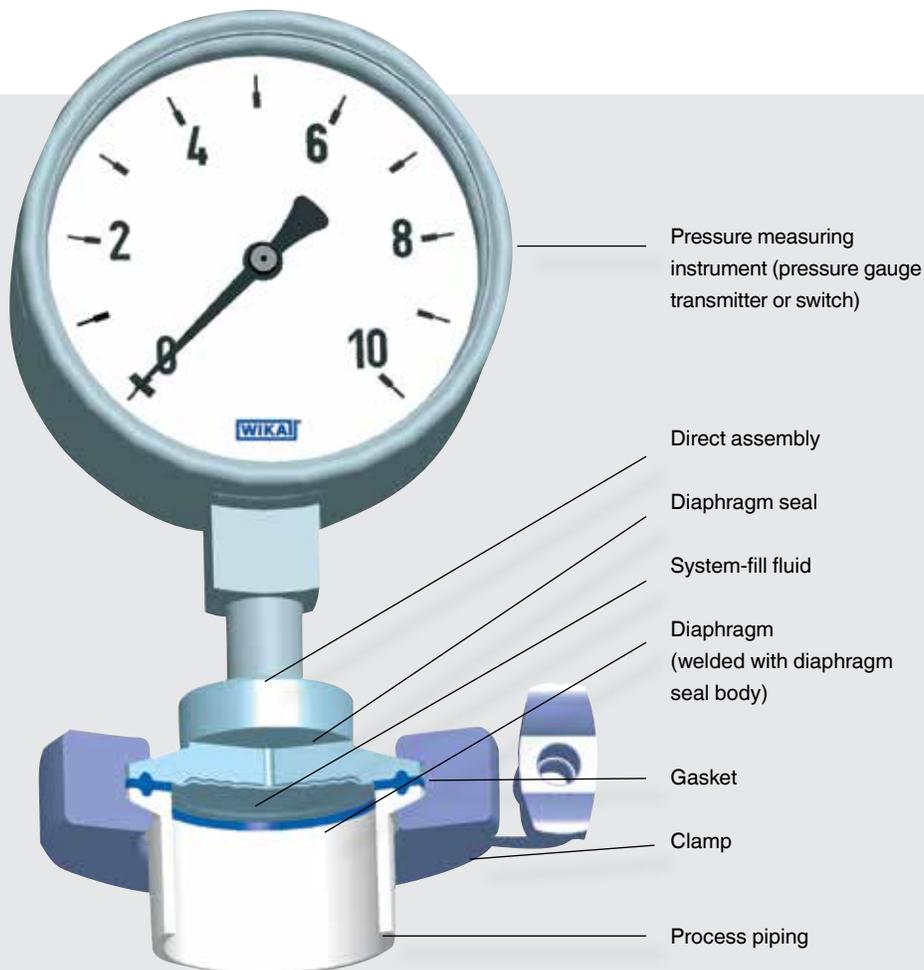
Diaphragm Seals

Process Connection Options

The majority of sanitary seal assemblies are installed into the process piping system using a tee-connection, which permits easy assembly and disassembly for cleaning and calibration.

Design Advantages of Sanitary Diaphragm Seals

- Large diaphragm diameter provides greater exposure to process pressure, which ensures accurate pressure readings
- Large diameter diaphragms also reduce zero shifts from process and ambient temperature changes, including autoclave conditions
- Various options for wetted materials provides protection from harsh process media and cleaning agents
- Adapts threaded instrumentation to comply with sanitary specifications



990.22

Tri-clamp



Process connection: Tri-clamp ASME BPE or BS4825

MWP:

- 1200 psi (¾")
- 600 psi (1" ... 2½")
- 360 psi (from 3")

Data sheet: L990.22



990.18

Milk thread fitting per DIN 11851



Process connection: Thread with grooved union nut

MWP: 600 psi or 360 psi

Data sheet: L990.18

990.24

VARIVENT® connection



Process connection: For installation into the VARINLINE® access unit or connecting flange

MWP: 360 psi

990.51

Aseptic connection per DIN 11864



Process connection:

- DIN 11864-1 threaded connection
- DIN 11864-2 flange
- DIN 11864-3 clamp connection

MWP: 360 ... 600 psi depending on the process connection

990.57

Cherry Burrell® connection



Process connection: Cherry Burrell® connection (1½" ... 3")

MWP:

- 15 ... 500 psi (1.5")
- 15 ... 450 psi (2")
- 15 ... 350 psi (3")

Data sheet: ■ L990.57

990.58

Aseptic process connection



Process connection: For APC aseptic process connection

MWP: 15 ... 500 psi

Data sheet: L990.58

990.SD

Clamped tank spud



Process connection: 4" tank spud

MWP: 15 ... 600 psi

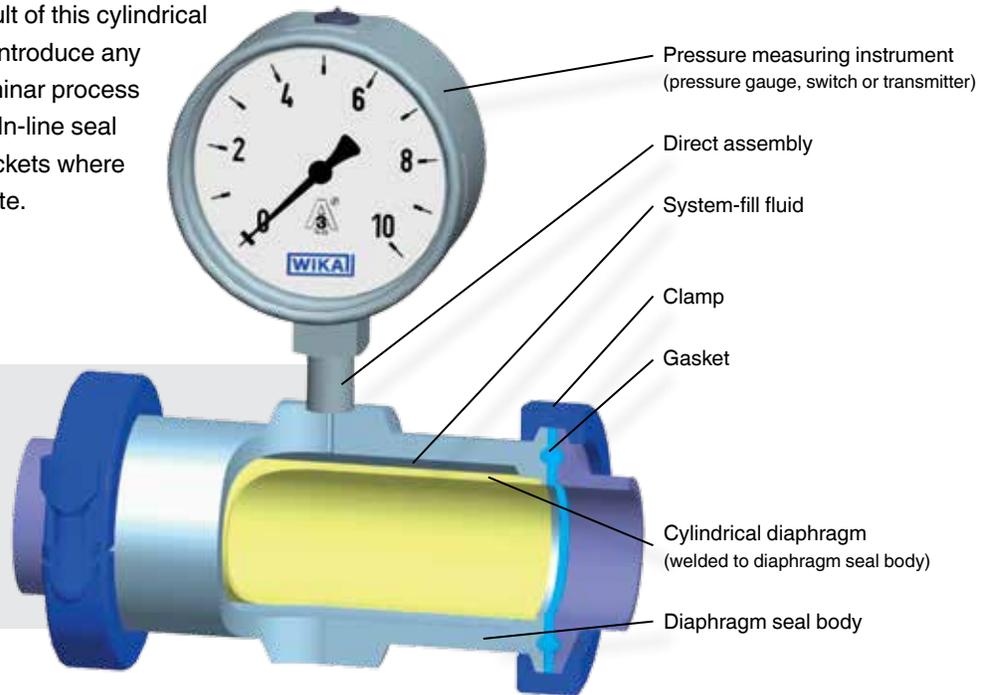
Data sheet: L990.SD

In-line Diaphragm Seal

Cylindrical Diaphragm Maintains Laminar Process Flow

WIKA's In-line diaphragm seal is perfectly suited for use with sterile media. Installed directly in the process flow, the In-line seal becomes an integral component of the piping system.

The active diaphragm covers the complete internal surface of the seal – 360 degrees around. (See yellow area in drawing below). As a result of this cylindrical shape, the In-line seal does not introduce any obstructions, which supports laminar process flow. This shape also means the In-line seal is self-cleaning. There are no pockets where particles or media can accumulate.



FDA-approved System-fill Fluids

The internal space between the diaphragm and the pressure measurement instrument is filled with an FDA-approved system-fill fluid. The fill fluid plays an important role in transmitting the process pressure via the diaphragm to the measuring instrument. WIKA offers FDA compliant system-fill fluids to meet the specific demands of your applications.

| Name | Code No. KN | Permissible medium temperature | | S.G. at temperature | | Viscosity at temperature | | Conformities |
|------------------------------|----------------|--------------------------------|-----------------|----------------------|------|---|------|---|
| | | P ≥ 14.5 psia | P 14.5 psia | [g/cm ³] | [°C] | [m ² /s • 10 ⁻⁶] | [°C] | |
| Glycerine | 7 | +17° ... +230 °C | – | 1.26 | +20 | 1110 | +20 | FDA 21 CFR 182.1320 |
| Neobee® M-20 | 59 | -20 ... +200 °C | -20 ... +160 °C | 0.92 | +20 | 10.1 | +25 | FDA 21 CFR 172.856, 21 CFR 174.5 |
| Medicinal white mineral oil | 92 | -10 ... +260 °C | -10 ... +160 °C | 0.85 | +20 | 23 | +40 | FDA 21 CFR 172.878, 21 CFR 178.3620(a); USP, EP, JP |
| Food grade silicone, 350cst. | 93 | -18... +300 °C | – | 0.97 | +20 | 350 | +20 | FDA 21 CFR 173.340 |

Neobee® is a registered trademark of the Stepan Company

Further system fill fluids can be used for special applications after technical application support.



981.22

Tri-clamp ASME BPE



Process connection: Tri-clamp, ASME BPE, ISO 2852

MWP: ■ 1200 psi (¾")
■ 600 psi (1 ... 2")
■ 360 psi (from 2½")

Data sheet: L981.22

981.18

Milk thread fitting DIN 11851



Process connection: Thread (other connections on request)

MWP: ■ 600 psi (1 ... 2")
■ 360 psi (from 2½")

Data sheet: L981.18

981.51

Aseptic connection



Process connection: ■ DIN 11864-1 threaded connection
■ DIN 11864-2 flange
■ DIN 11864-3 clamp connection

MWP: ■ 600 psi (1 ... 1½")
■ 360 psi (from 2 ... 4")

981.50

NEUMO BioConnect®



Process connection: NEUMO BioConnect® thread or flange

MWP: ■ 230 psi (thread)
■ 1000 psi (flange)
■ higher pressure ranges on request

983.22

Tri-clamp ASME BPE with integral temperature measurement



Process connection: Tri-clamp, ASME BPE, ISO 2852

MWP: ■ 1200 psi (¾")
■ 600 psi (1 ... 2")
■ 360 psi (from 2½")

Data sheet: L983.22



Source: Sartorius Stedim Biotech

Electronic Pressure Measuring Instruments



Electronic pressure measurement contributes to the energy-saving control and regulation of processes. In addition to temperature, pressure is the most important and most common technology for monitoring and controlling facilities and processes.

WIKA offers pressure transmitters and switches – for sanitary and industrial applications -- to support the sanitary market, helping ensure cleanliness and reliable performance. WIKA's offering includes:

- Output signals starting at a fixed range of 4 ... 20mA to various programmable communication protocol options, i.e. PROFIBUS® PA, FOUNDATION Fieldbus™, on process grade instruments
- Stainless steel housing on most sanitary models
- Internal zero and span adjustments
- Ingress protection ratings up to IP 69K (NEMA PW 12), suitable for autoclaving
- Integral sanitary seal assemblies to eliminate all external threads for optimal cleanliness
- Optional heat exchanger design with sanitary transmitters for applications with extreme media temperature (hot or cold)



S-20

Pressure transmitter for superior needs



Non-linearity (\pm % of span): $\leq 0.125, 0.25$ or 0.5 % BFSL
 Measuring range:

- $0 \dots 160$ inWC to $0 \dots 12,000$ psi
- $-30 \dots 0$ inHg to -30 inHg ... $+300$ psi
- $0 \dots 160$ in WCa to $0 \dots 500$ psia

 Special features:

- Extreme operating conditions
- Customer-specific variants
- Free test protocol
- Autoclose option is available

 Data sheet: S-20

IS-20-S, IS-20-F

Pressure transmitter, intrinsically safe



Non-linearity (% of span): ≤ 0.2 BFSL
 Measuring range:

- $0 \dots 50$ inWC to $0 \dots 15,000$ psi
- $0 \dots 15$ to $0 \dots 250$ psia
- $-15 \dots 0$ inHg to -30 inHg ... $+300$ psi

 Special features:

- Further worldwide Ex approvals
- High-pressure version (optional)
- Suitable for SIL 2 per IEC 61508/ IEC 61511

 Date sheet: IS-20, IS-21

PSD-30

Electronic pressure switch with display



Accuracy (% of span): ≤ 1
 Measuring range:

- $0 \dots 15$ to $0 \dots 8,000$ psi
- $0 \dots 15$ to $0 \dots 300$ psia
- $-30 \dots 0$ inHg to -30 inHg ... $+300$ psi

 Special features:

- Easily-readable, robust display
- Intuitive and fast setup
- Easy and flexible mounting configurations

 Data sheet: PSD-30

UPT-20

Universal process transmitter, with pressure port



Non-linearity (% of span): ≤ 0.1
 Output signal: $4 \dots 20$ mA, HART®
 Measuring range:

- $0 \dots 160$ inWC to $0 \dots 6,000$ psi
- -80 inWC ... $+80$ inWC to -30 inHg ... $+600$ psi
- $0 \dots 160$ inWCa to $0 \dots 230$ psia

 Special features:

- Multi-functional display
- Simple menu navigation
- Conductive plastic case
- Large LC display, rotatable

 Data sheet: PE 86.05

IPT-10

Process pressure transmitter, intrinsically safe or with flameproof enclosure



Non-linearity (% of span): $\leq 0.075 \dots 0.1$
 Measuring range:

- $0 \dots 40$ inWC to $0 \dots 58,000$ psi
- $-30 \dots 0$ inHg to -30 inHg ... $+870$ psi
- $0 \dots 40$ inWCa to $0 \dots 870$ psia

 Special features:

- Scaleable measuring ranges (turndown to 1 : 30)
- Case from plastic, aluminium or stainless steel

 Data sheet: PE86.11

DPT-10

Differential pressure transmitter, intrinsically safe or with flameproof enclosure



Non-linearity (% of span): $\leq 0.075 \dots 0.15$
 Measuring range: $0 \dots 4$ inWCd to $0 \dots 600$ psid
 Special features:

- Scaleable measuring ranges
- Case from plastic, aluminium or stainless steel
- Optionally with integrated display and mounting bracket for wall/pipe mounting

 Data sheet: PE86.21

Pressure Transmitters for Sanitary Applications

S-10-3A

3A Sanitary pressure transmitter



(S-10-3A-C)

Accuracy (\pm % of span): ≤ 0.25 BFSL
 Measuring range: ■ 15 psi to 1,200 psi vacuum, compound
 Process connection: ■ $\frac{3}{4}$ " and larger Tri-clamp
 Output signal: ■ 4-20 mA, 0-5V, 0-10V
 Data sheet: S-10-3A

SA-11

3A Sanitary low pressure



Accuracy (\pm % of span): ≤ 0.25 BFSL
 Measuring range: ■ 100 inWC to 400 psi, vacuum, compound
 Process connection: ■ $1\frac{1}{2}$ " and 2" Tri-clamp
 Output signal: ■ 4-20 mA
 Data sheet: SA-11

F-20-3A

3A Sanitary pressure transmitter*



($\frac{3}{4}$ " Connection)

Accuracy (\pm % of span): ≤ 0.25 BFSL
 Measuring range: ■ 15 psi to 1,200 psi, vacuum, compound
 Process connection: ■ $\frac{3}{4}$ " and larger Tri-clamp
 Output signal: ■ 4-20 mA
 Data sheet: F-20-3A

* Calibration conformance report and material conformance documents are supplied standard with each assembly.



Cable outlet, IP 68



Big DIN connector, 4-pin,
EN 175301-803, form A,
IP65



Circular connector,
4-pin, with screw-
fastening M12 x 1, IP 69



Stainless steel field
case, IP 67

Pressure Switch

In the food and pharmaceutical industries, WIKA's PSA-31, an electronic pressure switch combined with a transmitter, is recommended for filling and packing machinery applications. Product features include:

- 3-key operation for intuitive menu navigation and ease of setting either one or two switch points
- Case that turns up to 300 degrees to easily adjust the pressure switch regardless of the installation situation
- Large, angled display that rotates to ensure the instrument is easy to read from any position

PSA-31

Pressure switch with display



Accuracy: ≤ 1 % of span
 Measuring range: ■ 0 ... 15 to 0 ... 300 psi relative
 ■ 0 ... 15 to 0 ... 300 psi absolute
 ■ -30 ... 0 inHg to -30 inHg ... 300 psi vacuum
 Switching output: 1 or 2 (PNP or NPN)
 Analogue output ■ 4 ... 20 mA
 (optional): ■ DC 0 ... 10 V (optional)
 Data sheet: PE81.85

Process Pressure Transmitter

The IPT-11 is suited for a wide range of applications from standard pressure measurement to hydrostatic level measurement. It is available with either intrinsically safe or flameproof enclosure ignition protection in accordance with FM or ATEX, and a wide range of output signals, including: 4 ... 20mA; 4 ...20 mA/HART®; PROFIBUS® PA; and FOUNDATION Fieldbus™.

Easy configuration and operation

The operation and configuration of the instrument is possible via 4 push button keys on a display and operation module. The operation menu is simple, and there are 9 selectable languages. Additionally, the Device Type Manager (DTM) permits easy programming for tank linearization.

Special features

- High measuring accuracy
- Best long-term stability
- Scaleable measuring ranges (turndown to 1 : 30)
- Configuration via DTM in accordance with the FDT (Field Device Tool) concept (e.g. PACTware) and primary standards

IPT-11

Process pressure transmitter in stainless steel case



Accuracy: 0.075 to 0.25 %
 Measuring range: ■ 0 ... 40 inWC to 0 ... 8,700 psi
 ■ -30 ... 0 inHg to -30 inHg ... +870 psi
 ■ 0 ... 40 inWCa to 0 ... 870 psia
 Output signal: ■ 4 ... 20 mA
 ■ 4 ... 20 mA, HART®
 ■ PROFIBUS® PA
 ■ FOUNDATION™ Fieldbus
 Data sheet: PE86.11

Mechanical and Mechatronic Pressure Measuring Instruments

For reliable, local indication of operating pressure, WIKA offers a range of mechanical instruments for sanitary and industrial applications to measure gauge, absolute and differential pressure. Our product line includes Bourdon tube, bellows, capsule and dry cell gauges, as well as sealgauges.

Benefits of All Stainless Steel Construction

With all stainless steel construction, internal and external, WIKA's gauges can withstand the harshest, most demanding environments. Typical applications include: water purification, steam generation, and transfer systems and gas delivery. Gauges constructed with certain types of brass alloy can corrode if moisture or cleaning solution get inside the case.

Plus, gauges constructed with a combination of metals, such as brass and stainless steel, can have different expansion and cooling effects, meaning calibration may be required more frequently.

If vibration or pulsation is an issue, WIKA also offers an economical dry or liquid-filled gauge case.

Mechatronic Measuring Instruments

With a combination of a mechanical measuring system and electronic signal processing, WIKA's intelliGAUGE® model PGT23 can provide local and remote pressure readings simultaneously and securely -- even if the power supply is lost.

Because WIKA's intelliGAUGE® model PGT23 meets the safety requirements for the on-site display of the working pressure vessels, an additional measuring point for a mechanical indicator is eliminated.

WIKA's mechatronic pressure gauges also work with switch contacts. This combination of instrumentation makes it possible to monitor equipment and switch circuits at the same time to control and regulate various processes.



Internal workings of a mechanical sanitary gauge
Type: M932.3A

The pressure measuring instruments on the following pages are recommended for use in sanitary applications and can be used in combination with diaphragm seals to meet sanitary connection requirements, including those for CIP and SIP processes.



131.11

Stainless steel version, standard



Nominal size: 1.5", 2" and 2.5"
 Scale range: 0 ... 15 to 0... 10,000 psi
 0 ... 1 to 0 ... 1,000 bar
 Accuracy class: 2.5 % FS
 Ingress protection: IP 54
 Data sheet: 131.11

700.04

Differential pressure gauge, piston type



Nominal size: 2½" and 4½"
 Scale range: 0 ... 5 to 0 ... 100 psid
 Accuracy class: ±2% of span (on increasing pressure)
 Ingress protection: IP 65
 Data sheet: 700.04

232.53, 233.53

Stainless steel, field liquid-fillable



Nominal size: 2", 2½", 4"
 Case: 304 SS
 Ring: Polished stainless steel, crimped-on
 Wetted parts: 316 SS
 Window: Polycarbonate
 Liquid fill: Dry (232.53); glycerine (233.53)
 Accuracy: ±2½% of span (2 and 2½")
 ± 1.0% of span (4")
 Data sheet: 23X.53

232.54, 233.54

Stainless steel, field repairable, field liquid-fillable



Nominal size: 2½", 4"
 Case: Stainless steel
 Ring: Stainless steel bayonet, twist-on
 Wetted parts: 316 SS
 Window: Safety glass
 Liquid fill: Dry (232.54); glycerine (233.54)
 Accuracy: ±2½% of span (2 and 2½")
 ± 1.0% of span (4")
 Data sheet: 23X.54

PGT23

Pressure gauge with electrical output signal



Nominal size: 2½", 4" and 6"
 Scale range: 0.9 to 0 ... 20,000 psi
 Accuracy class: 2% of span
 Ingress protection: IP 54, filled IP 65
 Data sheet: PGT23.100

PGS23.063

Pressure gauge with switch contacts



Nominal size: 2½"
 Scale range: 0 ... 60 to 0 ... 5,800 psi
 0 ... 4 to 0 ... 400 bar
 Accuracy class: 1.6
 Ingress protection: IP 54
 Data sheet: PV22.03

Sanitary Gauge Assemblies



Dry Cell Mechanical Pressure Gauges

In the sanitary industry where possible contamination of the process media can be costly, WIKA offers the dry cell mechanical pressure gauge, a unique sanitary gauge that has no fill fluid behind the diaphragm.

In this pioneering design, either a push rod or spring transfers the process pressure from the diaphragm to the instrument's movement and pointer.

With no system-fill fluid, the potential of contamination from a diaphragm seal breach is eliminated. External temperature error is also minimized because of the absence of fill fluid behind the diaphragm.

Additional advantages include:

- Overpressure protection 2X the full scale
- Complies with CIP, SIP and autoclaving requirements
- Easy zero point adjustment is available in some models
- Hygienic case design for easier, faster cleaning





PG43SA-C

Stainless steel version, with flush diaphragm element



Nominal size: 2½"
 Scale range: -30 inHg ... 30 psi to 0 inHg ... 145 psi
 Accuracy class: 2.5% of span
 Permissible: Max. 150°C
 Special feature: ■ Without transmission fluid
 Data sheet: PM04.15

PG43SA-D

Sanitary gauge with dual diaphragm monitoring system



Nominal size: 4"
 Scale range: -30 inHg ... 36 psi to 0 inHg ... 200 psi
 Accuracy class: ± 1.6% of span
 Permissible: Max. 150°C, autoclavable,
 Temperatures: 134°C, 20 min.
 Special feature: ■ Red warning sign will indicate breach of first barrier
 Data sheet: PM04.17

PG43SA-S

Stainless steel sanitary gauge, with dry flush diaphragm element



Nominal size: 4"
 Scale range: -30 inHg ... 30 psi to 0 ... 200 psi
 Permissible: Ambient: -20 ... +60°C
 Temperatures: Medium: +150°C
 Accuracy class: 1.6 of span
 Ingress protection: IP54
 Special feature: ■ Without transmission fluid

M93X.25

3A Sanitary fractional gauge*



Nominal size: 2 ½"
 Case: Polished stainless steel
 Ring: Polished stainless steel, crimped
 Wetted parts: 316 SS
 Window: Polycarbonate or polysulfonate
 Process connection: ¾", 1" Tri-clamp
 Accuracy: +2/1/2% of span
 Data sheet: M93X.25

M93X.3A

3A Sanitary gauge assembly*



Nominal size: 2 ½", 4"
 Case: Stainless steel, electropolished
 Ring: Stainless steel, electropolished
 Wetted parts: 316 SS
 Window: Electropolished
 Process connection: 1 ½" and larger Tri-clamp
 Accuracy: ±2½% of span (2½")
 ± 1.0% of span (4")
 Data sheet: M93X.3A

M932.2C

3A Sanitary fractional gauge*



Nominal size: 1 ½", 2"
 Case: Stainless steel
 Wetted parts: 316 SS
 Window: Glass or acrylic
 Process connection: ¾" Tri-clamp, lower or center black mount
 Accuracy: ±3/2/3% of span
 Data sheet: M932.2C

* Calibration conformance report and material conformance documents are supplied standard with each assembly.

Electrical Temperature Measurement

Resistance Thermometers and Thermocouples

In sanitary industries, Resistance Temperature Detectors (RTDs) and thermocouples work to provide highly accurate temperature readings. RTDs have metallic sensor elements, which change their electrical resistance in response to

temperature. Depending on the application, RTDs can be made with 2, 3 or 4-wire circuits and connected to devices such as transmitters, controllers or displays.

Design of an Electrical Thermometer

As a general rule, an electrical thermometer is a modular design consisting of a measuring sensor, connection head and thermowell (optional).

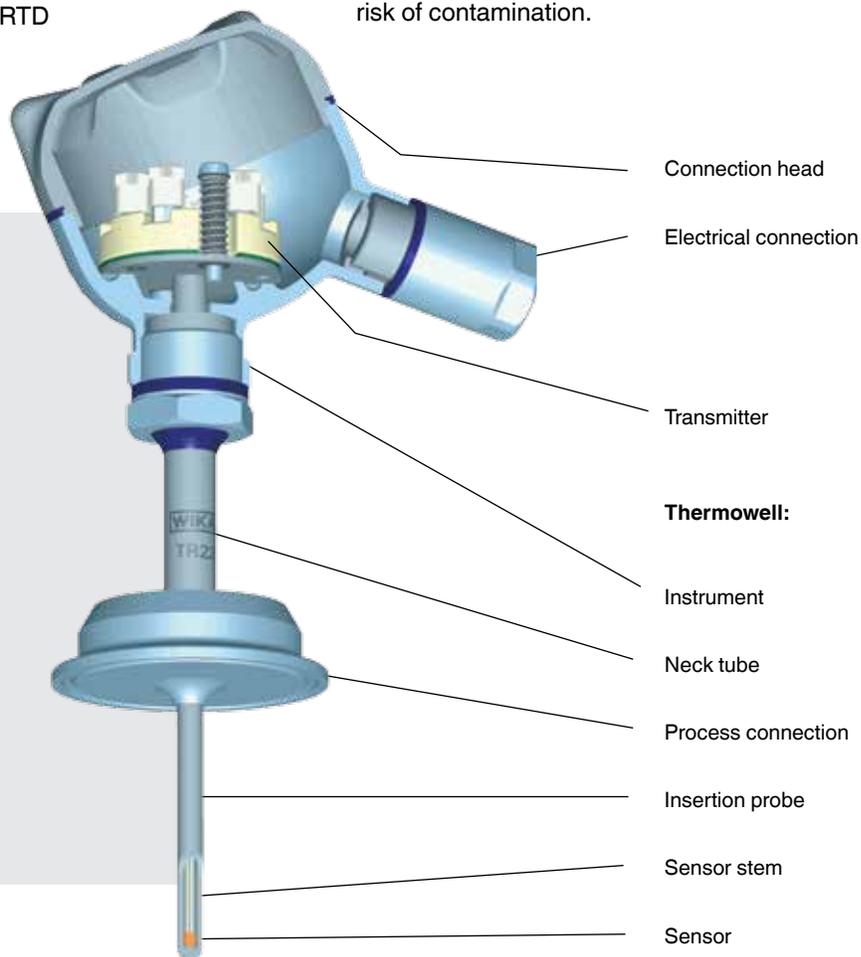
The connection head provides ingress protection to shield the measuring sensor -- the RTD and its housing. Additionally, the connection head provides a connection to the electrical interface, as well as a secure electrical connection to the control system.

If a temperature transmitter is used, the connection head also serves as a mounting surface for the transmitter, which converts the RTD

resistance to an electrical output, such as 4-20ma or other communication protocol.

When used, a thermowell adapts the RTD or thermocouple to the process and protects its metallic sensing element from harsh conditions.

A rotatable screw connection between the thermowell and the connection head, (model type TR22) allows the assembly to be rotated in the desired direction. Plus, it enables the connection head and the RTD to be removed for calibration and repair without opening the process, which minimizes the risk of contamination.



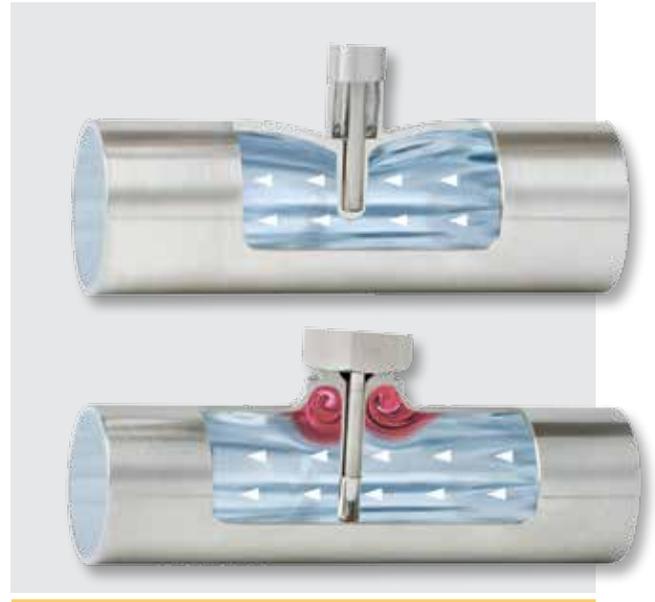
Sanitary Thermowells

In sanitary applications, thermowells serve three primary purposes:

- Adapting the threaded connections of electrical or mechanical thermometers to an industry-accepted sanitary process connection
- Providing additional protection for the measuring instrument to prevent damage from aggressive or rapidly flowing process media
- Allowing removal of the measuring instrument without opening the process to prevent contamination and minimize downtime

Sanitary thermowells are available in three designs – clamped connections, inline or welding ball.

- Clamped connection thermowells are installed using an instrument tee, elbow, or a welded sanitary fitting on a tank vessel.
- In-line thermowells are installed directly into the piping system by use of an orbital weld or two sanitary fittings. WIKA's patented In-line thermowell design helps eliminate dead space and minimize contamination risks. (See more information about this design on page 9.)
- The welding ball design, permits thermowell installation via the curved or flat wall of a vessel or tank. It can be welded in place at any angle to ensure the instrument can be inserted at the most desirable location.



WIKA's patented In-line thermowell design, featured at the top, provides a dead space free connection point to minimize contamination risk. On the former design, featured at the bottom, the red areas indicate pockets that are difficult to clean.



Thermowell TW22 with Varivent® flange



Thermowell TW61 for inline measurement



Thermowell TW22 with welding ball



Thermowell TW60 solid machined

Electrical Temperature Measuring Instruments

WIKA manufactures a comprehensive offering of electrical transmitters and thermocouples for sanitary temperature measurement. Our TR 21 and TR 22 series allow calibration and maintenance without opening the process to minimize the risk of contamination and reduce downtime. Flow-through thermowells can also be paired with TR21 and TR 22 models to minimize dead space.

TR21 Series

The TR21 series features a compact design and quick electrical connection. Depending on the model, other beneficial design features include:

- Spring-loaded design that eliminates the need for thermal paste, improving response time and accuracy
- Pipe sizes from ½" to 4" enabling standardization on one probe length to prevent installation errors and reduce SKUs
- Reduction in weight, eliminating the need for mounting brackets
- IP69K rating for autoclaving

TR22 Series

In this series, WIKA's proven temperature transmitters are used to provide reliable, accurate readings. Beneficial design features, depending on the model, include:

- Self-draining connection head option for easy cleaning
- Optional sealing combination to keep out impurities and humidity, as well as simplify cleaning

The TR 21 and TR 22 series meet 3-A and EHEDG standards for use in sanitary applications.

TR21-A

Miniature version with Tri-clamp connection



Sensor element: Pt100 DIN
 Measuring range: -50 ... 250 °C (-58 ... 482 °F)
 Output: Pt100, 4 ... 20 mA
 Connection to thermowell: Removable G ¾"
 Data sheet: TE60.26

TR21-B

Miniature version for inline measurement



Application: Invasive temperature measurement in the product stream
 Sensor element: Pt100 DIN
 Measuring range: -50 ... 250 °C (-58 ... 482 °F)
 Output: Pt100, 4 ... 20 mA
 Connection to thermowell: Removable G¾"
 Connection to pipe: Orbital welding or sanitary connections
 Data sheet: TE60.27

TR21-C

Miniature version with welded flange connection



Sensor element: Pt100 DIN
 Measuring range: -50 ... +250 °C (-58 ... 482 °F)
 Output: Pt100, 4 ... 20 mA
 Connection to thermowell: Sanitary connection
 Data sheet: TE60.18

TR22-A

With flange connection



Sensor element: Pt100 DIN
 Measuring range: -50 ... +250 °C (-58 ... 482 °F)
 Connection to thermowell: Removable M24
 Data sheet: TE60.22



TR22-B

In-line measurement



Application: Invasive temperature measurement in the product stream
 Sensor element: Pt100 DIN
 Measuring range: -50 ... +250 °C (-58 ... 482 °F)
 Connection to thermowell: Removable M24
 Connection to pipe: Orbital welding or sanitary connections
 Data sheet: TE60.23

TR25

In-line resistance thermometer



Application: For piggable systems
 Sensor element: Pt100 DIN
 Measuring range: -50 ... +250 °C (-58 ... 482 °F)
 Pin assignment: 3- or 4-wire
 Data sheet: TE 60.25

Model TR51

Pipe surface resistance thermometer



Sensor element: Pt100
 Output: Pt100, 4 ... 20 mA, HART®, FOUNDATION™ Fieldbus, PROFIBUS® PA
 Measuring insert: Exchangeable
 Process connection: For retrofitting into pipelines
 Data sheet: TE 60.51

TR60

Indoor resistance thermometer



Application: For refrigerators and storage rooms
 Sensor element: Pt100 DIN
 Measuring range: -40 ... +80 °C (-40 ... +176 °F)
 Pin assignment: 2-, 3- and 4-wire
 Data sheet: TE 60.60

TR75

DiwiTherm® with digital indicator



Measuring range: -40 ... +450 °C
 -40 ... +199.9 °C
 Power supply: Battery operation
 Data sheet: TE67.03

TSD-30

Electronic temperature switch



Sensor element: Pt1000
 Measuring range: -0 ... +80 °C
 Switching output: 1 or 2 (PNP or NPN), analogue output (optional)
 Data sheet: TE67.03

Temperature Transmitters

Transmitters convert the temperature-dependent change in resistance of the resistance thermometer (RTD), or the temperature-dependent voltage change in a thermocouple, into a proportional electrical output signal. The most commonly used output signal is the analog 4 ... 20 mA signal, though other digital signals (HART®) are gaining more acceptance.

The conversion and transmission of the output signal (analog or digital) is made over long distances and is completely fail-safe. A temperature transmitter can be mounted directly at the measuring point via the connection head or on a DIN rail in a cabinet.



T19

**Analogue transmitter 2-wire,
4 ... 20 mA**



Input: Pt100
Accuracy: < 0.50 %
Output: 4 ... 20 mA
Special feature: Excellent price/performance ratio
Data sheet: TE 19.03

T32

HART® transmitter



Input: Resistance thermometers, thermocouples, potentiometers
Accuracy: < 0.12 %
Output: 4 ... 20 mA with HART® protocol
Special feature: PC configurable
Data sheet: TE 32.04

T24

**Programmable analogue
transmitter**



Input: Pt100
Accuracy: < 0.20 %
Output: 4 ... 20 mA
Special feature: PC configurable
Data sheet: TE 24.01

T53

**FOUNDATION™ Fieldbus and
PROFIBUS® PA transmitter**



Input: Resistance thermometers, thermocouples
Accuracy: < 0.10 %
Special feature: PC configurable
Data sheet: TE 53.01

T12

**Universally programmable
digital transmitter**



Input: Resistance thermometers, thermocouples
Accuracy: < 0.25 %
Output: 4 ... 20 mA
Special feature: PC configurable
Data sheet: TE 12.03



Interoperability: Internal and external tests certify the compatibility of our transmitters with almost all open software and hardware tools.

Digital Indicators and Temperature Controllers

Digital indicators display measurements provided by electrical temperature sensors, or pressure or temperature transmitters. Digital indicators also have integrated alarm outputs, which enable the control of the measured process values. Even simple two-position control, such as level control, is possible with the switching outputs from digital indicators.

Temperature controllers are primarily used to regulate the temperature in production process, as well as the temperature of raw materials and finished products in storage and transport vessels. With the help of switchable set points, different set points can be easily programmed. And through optional serial interfaces, controllers can be connected to a network or the control room.

DI15

For panel mounting, 48 x 24 mm



Input: Multi-function input for resistance thermometers, thermocouples and standard signals
 Alarm output: 2 electronic contacts
 Power supply: DC 9 ... 28 V
 Data sheet: AC 80.01

DI25

For panel mounting, 96 x 48 mm



Input: Multi-function input for resistance thermometers, thermocouples and standard signals
 Alarm output: 3 relays
 2 relays for instruments with integrated transmitter power supply DC 24 V
 Power supply: AC 100 ... 240 V
 AC/DC 24 V
 Special feature: Analogue output signal
 Data sheet: AC 80.02

A-AS-1

Attachable indicator with LED and switching outputs



Dimensions: 38 x 29 mm
 Input: 4 ... 20 mA, 2-wire
 0 ... 5 V, 3-wire
 0 ... 10 V, 3-wire
 Power supply: DC 16 ... 30 V for 4 ... 20 mA
 DC 10 ... 30 V for 0 ... 5 V
 DC 15 ... 30 V for 0 ... 10 V
 Data sheet: AC 80.09

A-AI-1, A-IAI-1

Attachable indicators with LCD for transmitters



Dimensions: 50 x 50 mm (case)
 Input: 4 ... 20 mA, 2-wire
 Power supply: from the 4 ... 20 mA current loop
 Special feature: Model A-IAI-1 intrinsically safe per ATEX
 Data sheet: A-AI-1

CS4M, CS4H, CS4L and CS4R

For panel mounting, 48 x 24, 48 x 96, 96 x 96 mm, for rail mounting (only CS4R), 22.5 x 75 mm



Input: Multi-function input for resistance thermometers, thermocouples and standard signals
 Control characteristic: PID, PI, PD, P, ON/OFF (configurable)
 Control output: Relay or logic level DC 0/12 V to control an electronic switch relay (SSR) or analogue current signal 4 ... 20 mA
 Power supply: AC 100 ... 240 V
 AC/DC 24 V
 Data sheet: AC 85.06, AC 85.03, AC 85.04, AC 85.05

Mechanical Temperature Measuring Instruments

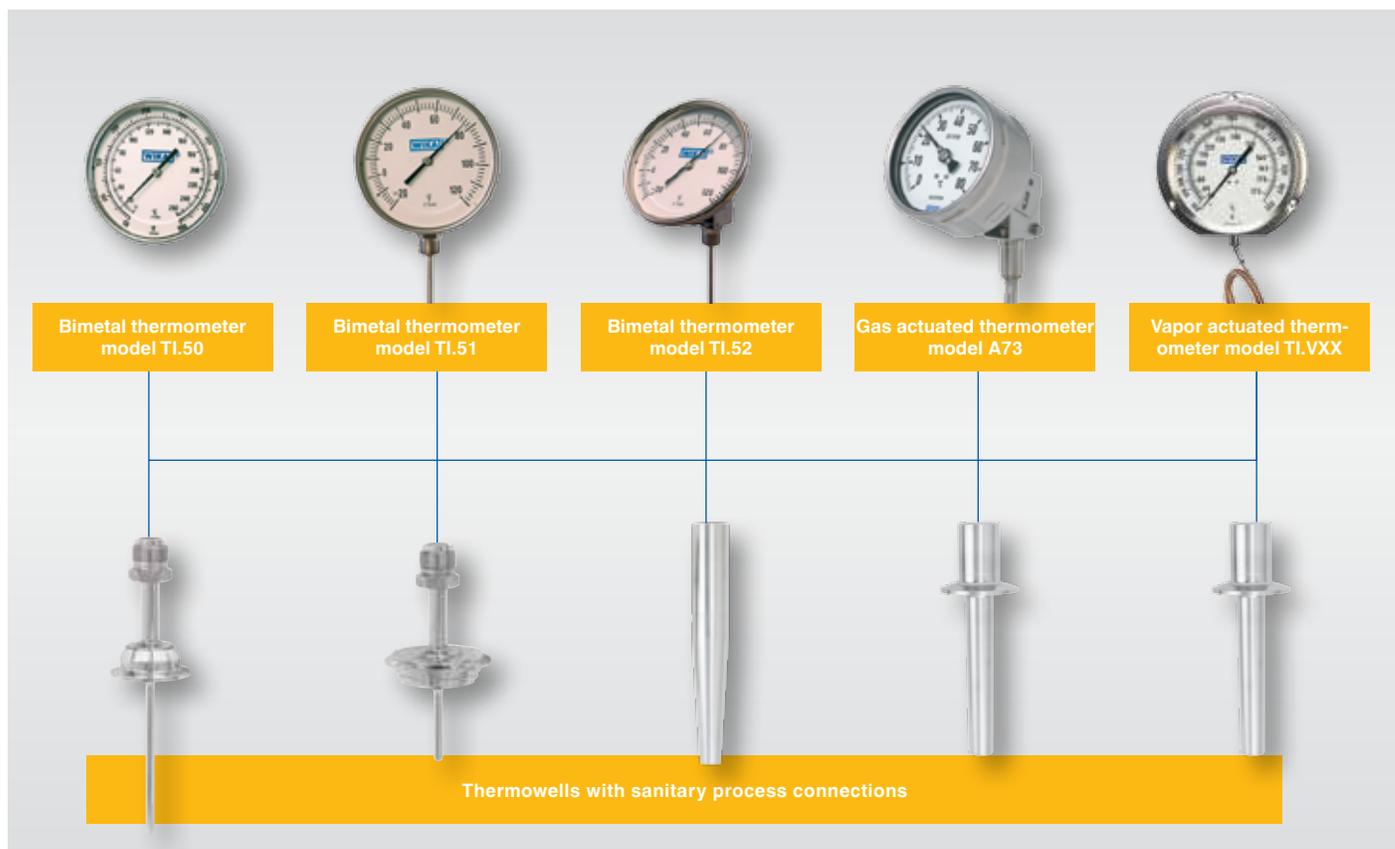
WIKA's mechanical temperature offering includes bimetal, vapor actuated and gas actuated thermometers.

Bimetal thermometers provided a local analog reading, while vapor actuated thermometers supply either a local or remote analog reading. Gas actuated thermometers are excellent for measuring temperatures extremes – cryogenic to +1,200° F – and provide either local or remote analog readings.

Twin-temp Thermometers – Reducing potential for contamination

The twin-temp thermometer provides both mechanical and electrical temperature measurement for local and remote readings. By combining two temperature instruments into one, WIKA's twin-temp thermometer minimizes the number of tapping points into the process, and as a result, reduces the potential for contamination.

Thermowells with sanitary connections are recommended for all mechanical temperature instrument installations.





TI30, TI.50

Process grade resettable, hermetically sealed, back connected with reset



Nominal size: 3", 5"
 Scale range: -100 ... 1,000 °F
 Wetted parts: Stainless steel
 Dampening: Inert gel
 Option: Non-standard stem lengths
 Min/max pointer

Data sheet: TI.30 , TI.50

TI.31, TI.51

Process grade resettable, hermetically sealed, bottom connected with reset



Nominal size: 3", 5"
 Scale range: -100 ... 1,000 °F/°C
 Wetted parts: Stainless steel
 Dampening: Inert gel
 Option: Non-standard stem lengths
 Sharp top

Data sheet: TI.31 , TI.51

TI.32, TI.52

Process grade, any angle adjustable dial, stainless steel case & screw



Nominal size: 3", 5"
 Scale range: -100 ... 1,000 °F
 Wetted parts: Stainless steel
 Dampening: Inert gel
 All angle case: Rotation of 360 grad and stem variation of more than 180 grad

Data sheet: TI.32 , TI.52

R73, S73, A73

Axial and radial, adjustable stem and dial



Nominal size: 4", 6"
 Scale range: -20 ... +60 to 0 ... +160 °C
 (-4 ... 140 to 32 ... +320 °F)
 Wetted parts: Stainless steel
 Option: Liquid damping (housing)
 Contact bulb



TM74

For sanitary applications



Nominal size: 4"
 Scale range: 0 ... 120 or 0 ... 160 °C
 (-4 ... 140 to 32 ... +320 °F)
 Wetted parts: Stainless steel
 Option: Liquid damping (housing)
 Wetted parts with electropolished surface

Data sheet: TM74.01



TT.30, TT.32, TT.50, TT.52 Twin-Temp

Bimetal thermometer with Pt100



Nominal size: 3", 5"
 Measuring range: -40 ... 750 °F
 Wetted parts: Stainless steel
 Option: Bimetal and Thermocouple or RTD Thermowells
 Back connection, bottom connection, any angle adjustable dial

Date sheet: TT.30, TT.32, TT.50, TT.52

Continuous Level and Fixed Switch Points

Float-based level measurement is not influenced by moving surfaces, electrical conductivity, dielectric constants, or foaming or boiling surfaces.

In float-based level measurement, a float with a permanent magnet moves along the liquid level on a guide tube. The guide tube is fitted with a reed contact (inert gas contact). As the float magnet approaches, the reed contact is activated. By using a magnet and reed contact, the switching operation is non-contact, free from wear and requires no power supply. Magnetic float switches are available with multiple switch points. The switch functions refer to a rising liquid level, such as normally open, normally closed or change-over contact.

Reed chain

FLR sensors with reed chain technology work on the float principle with magnetic transmission. The float's magnetic system actuates a resistance measuring chain that corresponds to a 3-wire potentiometer circuit. The measurement generated is proportional to the fill level. Because of the contact separation of the measuring chain, the measurement voltage is finely stepped and virtually continuous. Resolutions between 5 and 18 mm are available depending on application requirements.

Limit detection of filling levels

Magnetic float switches are available for the point-based monitoring of levels. Up to eight level limits can be monitored. Within the guide tube, the reed switches are set to pre-defined switching points and are activated magnetically without contact. Depending on requirements, it is possible to define a minimum and maximum alarm value, as well as an emergency shutdown level. Magnetic float switches are also maintenance-free and easy to mount.

FLR-H

Level sensor, with reed-chain technology



Process connection: All common process connections in hygienic design
Guide tube length: Max. 6,000 mm
Pressure: 0 ... 10 bar
Temperature: -40 ... +200 °C
Density: $\geq 400 \text{ kg/m}^3$
Contact separation: 5, 10, 15, 18 mm
Ingress protection: IP 68
Data sheet: LM 20.02

FLS-H

Magnetic float switch, for vertical installation



Process connection: All common process connections in hygienic design
Guide tube length: Max. 6,000 mm
Pressure: 0 ... 6 bar
Temperature: -40 ... +200 °C
Density: $\geq 300 \text{ kg/m}^3$
Pressure: 0 ... 10 bar
Switching function: Alternatively normally open, normally closed or change-over contact
Number of contacts: Max. 6 x normally open or normally closed, or 4 x change-over contact
Ingress protection: IP 68
Data sheet: LM 30.01

Magnetostriction

The FLM-H model magnetostrictive sensor is specifically designed for the requirements of the food, beverage, pharmaceutical and biotechnology industries, and is suited for CIP and SIP cleaning processes.

The guide tube is directly welded to the process connection, making it crevice-free and eliminating the need for additional sealings. The sensor is supplied with a DC voltage of 10 ... 30V, and is available with output signals 4 ... 20 mA or 4 ... 20 mA with HART®.

FLM-H

Level sensor, magnetostrictive, high-resolution measuring principle



Process connection: All common process connections in hygienic design
 Guide tube length: Max. 6,000 mm
 Pressure: 0 ... 10 bar
 Temperature: -40 ... +250 °C
 Density: > 715 kg/m³
 Output signal: 4 ... 20 mA
 Accuracy: < ±0.5 mm
 Resolution: < 0.1 mm
 Ingress protection: IP 68
 Data sheet: LM 20.03



Optical Level Switch

The optoelectronic sensor in model OLS-F1 consists of an infrared LED and light receptor, which work to monitor liquid levels in sanitary applications.

The light from the LED is directed into a prism, which forms the tip of the sensor. As long as the tip is not immersed in liquid, light is reflected back to the receptor. When the liquid rises and surrounds the tip, however, the light beam is not reflected back to the receptor, which triggers a switching operation.

Optoelectronic sensor model OLS-F1 was designed for sanitary applications and is suitable for various applications, including autoclaving up to 273° F.

OLS-F1

Optical level switch for vertical or horizontal installation



Process connection: Tri-clamp connection ¼" up to 2"
 Output signal: PNP transistor
 Accuracy: ±0.02 inches
 Max pressure: -30 ... +100 °C
 Insertion length: 1.2" to 11.8"
 Autoclaveable: +134°C
 Accuracy: < ±0.5 mm
 Ingress protection: up to IP 69K
 Data sheet: LM 31.05

Installation Examples for Pressure, Temperature Measuring Instruments



BioControl® Process Connection

The pharmaceutical BioControl® connects pressure and temperature measuring instruments to piping systems and vessels. There are various system designs and approved components to address the problems encountered in sanitary applications.

Flexibility is a key advantage of a BioControl system. The port can be fitted with a pressure or temperature measuring instrument. And because the system is modular with standard interfaces, design errors are easily avoided. Storage costs can also be minimized because only a few components need to be stocked.

Tuchenhagen VARIVENT® Process Connection

Sanitary fittings are required when connecting pressure and temperature measuring instruments to sanitary processes, such as those in the food industry.

A VARIVENT® connection is ideal because it ensures a dead-space free transition from the process line to the measurement instrument. WIKA provides pressure and temperature measurement solutions with VARIVENT connections to ensure a smooth fit into VARINLINE® access units.



BioControl® is a registered trademark of Neumo.
VARIVENT® and VARINLINE® are registered trademarks of GEA
Tuchenhagen

Mechanical Pressure Gauge for Homogenizers

This mechanical pressure gauge, model type M990.30, was especially designed for extremely high static and dynamic pressure loads typically present with homogenizing process.

This complex engineered solution allows static pressures up to 23,000 psi with pressure surges exceeding 30,000 psi to ensure a long service life of the instrument. This model is available with either a mechanical pressure gauge or an electronic pressure transmitter with a 4...20 mA output signal.



Weld Insert Adapter for Flush Pressure Transmitters

With a weld insert adapter, a pressure transmitter can be mounted in a convenient position toward the bottom of a vessel or tank to provide a hydrostatic level reading. It is installed flush to the internal vessel wall.

The weld insert adapter design removes dead-legs and is suitable for CIP and SIP. It is made in accordance with EHEDG guidelines and complies with 3-A standards.



Interior view of vessel

Installation Examples for Temperature Measuring Instruments

Thermowells for Orbital Welding

Flow-through housing

WIKA's flow-through thermowell (model TW61) provides a process connection for temperature measurement that is free from dead space to minimize contamination risks. It is used with WIKA transmitter models TR21-B and TR22-B.

Suited to support CIP and SIP cleaning, the flow-through thermowell can be installed into the process with integral sanitary connections or an orbital weld. The temperature transmitter can be removed for calibration or replacement without opening the process, which saves time and money.



Angular housing

When small pipe diameter and tight space present design or installation challenges, thermowells with angular housing can resolve the issue.

The mating temperature transmitter should be installed in either a horizontal or vertical position from the top to prevent pooling pockets in the thermowell cupola. The thermowell can be installed in the process with orbital welding or integral sanitary fittings.



Calibration services

-30 inHG ... 20,000 psi



ISO/IEC 17025

Our calibration laboratory for pressure has been accredited to ISO/IEC 17025 since 2014.

We calibrate your pressure measuring instruments quickly and precisely:

- in the range from -30 inHG ... 720,000 psi
- using high-precision reference standards (pressure balances) and working standards (precise electrical pressure measuring instruments)
- with an accuracy from 0.005 ... 0.025 % FS value of the measured value depending on the pressure range

-30... 400 °C



IEC 17025

Our calibration laboratory for temperature has been accredited to ISO/IEC 17025 since 2015.

We calibrate your temperature measuring instruments quickly and precisely:

- in the range from -30 ... 400 °C
- in calibration baths, dry block or at fixed points using appropriate reference thermometers
- with an accuracy from 0.016 ... 0.025 °C on temperature and the applied procedure
- For accredited calibrations, please refer to our Scope of Accreditation or contact WIKA

For accredited calibrations, please refer to our Scope of Accreditation or contact WIKA at 1-888-WIKA-USA.

Calibration technology

From Individual Components ...

WIKA is the ideal partner for solutions in calibration technology -- whether a single service instrument is required on-site quickly, or a fully automated

calibration system needs to be designed for laboratory or production use. We can offer the appropriate solution for your application.



Portable Pressure Generation

Test pumps serve as pressure generators for the comparative testing of measurements provided by mechanical and electronic pressure instruments. Pressure tests can be performed statically in the laboratory or workshop, or on-site at the measuring point.



Measuring Components

In industrial laboratories, high-precision pressure sensors and standard thermometers are ideal for reference applications. Because of their analog or digital interfaces, they can connect to existing evaluation instruments.



Hand-Helds, Calibrators

WIKA's hand-held measuring instruments (process tools) help you measure or simulate all established measurement parameters on-site. They can be operated with a variety of pressure sensors or thermometers.



-  Pressure
-  Temperature
-  Current, voltage, resistance

... to a Fully Automated System, WIKA is your Partner



Digital Indicating Precision Measuring Instruments

With high calibration accuracy, digital precision measuring instruments are ideal for applications in industrial laboratories to provide reference standards. They feature simple handling and an extensive range of functionality.



Digital Precision Instruments and Controllers

With an integrated controller, these instruments provide exceptional convenience. Typically, the required value can be set automatically using the interface.



Fully Automated Calibration Systems as Integrated Solutions

Fully automated calibration systems are customer-specific, turnkey installations. They can be fitted in laboratories, as well as in production environments. With integrated reference instruments and calibration software, calibration certificates can be generated and archived in a simple, reproducible way.



Pressure



Temperature



Current, voltage, resistance

Sanitary Design

Due to the increasing requirements on safety and cleanability in production, the quality requirements for measuring instruments are also increasing. Thus, in choosing the correct measuring instrument, the choice of material and surface finish quality is a significant deciding factor.

Materials

Austenitic 316L stainless steel is used as a standard material for wetted surfaces in food, beverage and pharmaceutical industry processes.

Stainless steels are inert to the majority of foods and pharmaceuticals and also offer solid corrosion protection against the disinfectant and cleaning media. For specific applications, special alloys are used, such as fully austenitic stainless steel or Hastelloy C, along with plastic coatings such as PFA (perfluoroalkoxy) or PTFE (poly-tetra-fluoro-ethylene).

WIKA uses stainless steel 316L as a standard material for all metallic surfaces that will come into contact with the process media.

Surfaces

The quality of the surfaces that come in contact with the process media are important in CIP and SIP cleaning process.

The wetted surfaces must be passive and free from microscopic flaws to ensure the measurement instruments can be easily cleaned and prevent biofilms from accumulating. In addition to the surface topography, surface roughness is also an important factor for cleanability.

Electropolishing

The cleanability of surfaces can be improved with electrolytic polishing, which works to decrease the roughness of the topographical structure. Electropolishing also increases the passive layer of stainless steel, thereby improving corrosion resistance – especially in processes involving aggressive media.



Sealing Materials

When selecting suitable sealing material, various process parameters, including the process media, must be taken into account. Sealing materials must be:

- Toxicologically harmless
- Resistant to abrasion
- Impervious to aggressive cleaning and disinfecting media
- Stable in superheated steam at high sterilization temperatures



Special compounds are commonly used for O-rings or gaskets. Examples include: fluororubber-based (FKM) materials such as VITON®; ethylene-propylene-diene (EPDM); and poly-tetra-fluoro-ethylene (PTFE). Materials used for sealing elements and their manufacturing process must conform to the rules of regulatory authorities and organizations, such as the FDA.



Process Connections

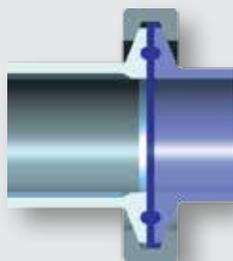
Sterilization should not be compromised by the process connections of CIP-capable equipment. Characteristics of viable connections include:

- Centering via a cylindrical guide
- Crevice-free sealing on the inside of the pipe

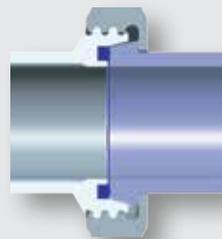
Neumo Bio-Connect®, BioControl® and Varivent® are connections that meet this criteria and comply with industry standards, such as ASME BPE and DIN 11864.

Tri-clamp connections are widely used and were developed to ensure plant components could be easily disassembled and reinstalled. Therefore, they are ideal connections for instruments that need to be removed for cleaning. The appropriate profile sealing gasket must be used with CIP cleaning operations.

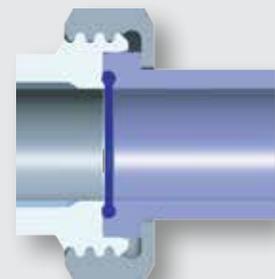
Process connections with metallic sealing components, such as a thread with sealing cone, form a gap at the sealing point. Therefore, cleanability is an issue, as is the recurrent sealing and fitting that is required after the calibration of the measuring instrument.



Clamp Connection
per ASME BPE



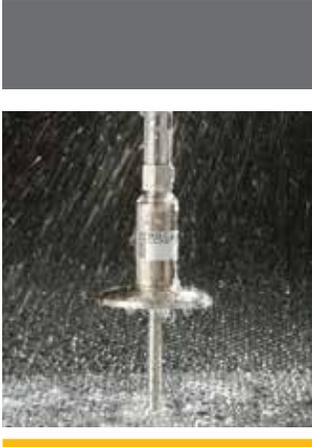
Threaded pipe connection
per DIN 11887



Threaded pipe connection
per DIN 11864-1, form A

Housing Designed for Cleanability

In open processes, such as those in food production, the machinery and equipment must be cleaned after production to prevent contamination. Therefore, the exteriors of instruments, or the non-wetted parts, need to be easy to clean. WIKA has developed hygienic housings that are free from cavities and sharp internal corners to ensure ease of cleaning and draining. These sanitary housings also have a high IP rating, meaning they can withstand the harsh conditions of wash-downs.



Sanitary Diaphragm Seal Design, Function

Sanitary diaphragm seals are an ideal option for hygienically connecting the measuring instrument to the process. They isolate the pressure gauge, pressure transmitter or pressure switch from the process media, providing a connection point that minimizes or eliminates dead spaces and makes cleaning easier and more efficient.



Function of the Metallic Diaphragm, System-Fill Fluid

The thin, flexible metallic diaphragm of the seal assembly provides isolation between the process and the instrument. The space in between the diaphragm and the pressure instrument is filled with an FDA-approved system fill

fluid. The process pressure is transmitted by the metallic diaphragm through the system fill fluid, which then applies the pressure to the measuring instrument.



Advantages of Metallic Sensing Elements

In comparison to ceramic measuring cells, the metallic sensing elements of diaphragm seals offer some key advantages. For instance, diaphragm seals:

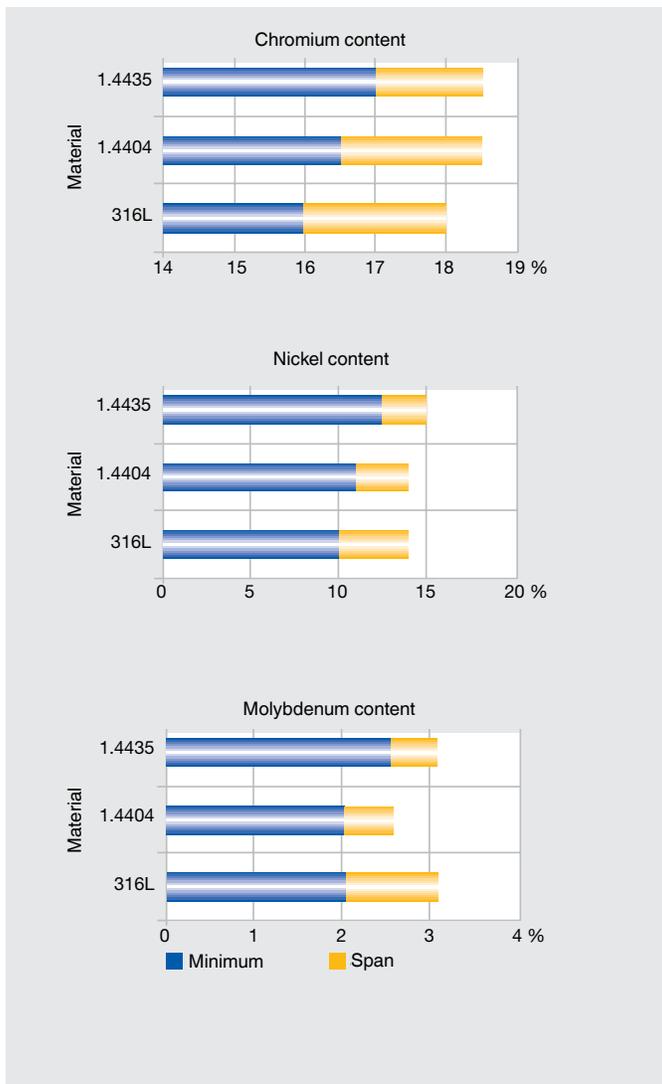
- Are less affected by condensation that occurs with changing ambient conditions
- Reduce maintenance and potential leak points with fewer sensing elements
- Better withstand sudden pressure spikes, which can destroy ceramic cells

See pages 10-15 for more information about WIKA's sanitary diaphragm seal solutions.

Material composition Pipe standards

In sterile engineering, it is preferable to use CrNiMo steels, of quality 1.4404 and 1.4435 or 316L. In regions which Comply with American standards, 316L is usually specified. In Europe 1.4404 and 1.4435 are used equally.

These three materials have different required tolerance ranges of the percentages of chromium, nickel and molybdenum in them. The tables shown here illustrate the relationships.



The following are those process connections most commonly-used today in sanitary applications as well as the dimensions for pipes to ASME BPE, DIN11850, DIN 11866, ISO 2037/BS 4825 part 1, DIN EN ISO 1127 and O.D. tube, displayed in tabular form.

Imperial pipes to ASME-BPE (O.D. tube) and DIN 11866-C

- Tri-clamp
- Aseptic clamp DIN 11864-3
- Weld ends with tube thermowell for orbital welding

Pipes per DIN 11850 and DIN 11866-A

- Milk thread fitting DIN 11851
- Aseptic threaded connection DIN 11864-1
- Aseptic flange DIN 11864-2
- Aseptic clamp DIN 11864-3
- Clamp connection DIN 32676 clamp
- Neumo BioConnect®
- Neumo BioControl®
- VARINLINE® access unit

Pipes per ISO 2037 (resp. BS 4825 Part 1)

- Aseptic threaded connection DIN 11864-1
- Aseptic flange DIN 11864-2
- Clamp ISO 2852

Pipes per ISO 1127 (resp. DIN 2463) and DIN 11866-B

- Aseptic threaded connection DIN 11864-1
- Aseptic flange DIN 11864-2
- Aseptic clamp DIN 11864-3
- Neumo BioConnect®
- Neumo BioControl®
- VARINLINE® access unit

The specifications of the tubing dimensions, especially the tube's inner diameter, are needed for the design of in-line instrumentation. This ensures a crevice-free, smooth transition from the process piping system to the measuring instrument.

The most common tubing used in North America is specified to ASME-BPE.

Imperial tubing to ASME-BPE (O.D. tube) and DIN 11866-C

| Nominal width DN/OD | Wall thickness s [inch] | Inner Ø d [inch] | Inner Ø d [mm] |
|------------------------|----------------------------|---------------------|-------------------|
| ½" | 0.065 | 0.37 | 9.4 |
| ¾" | 0.065 | 0.62 | 15.8 |
| 1" | 0.065 | 0.87 | 22.1 |
| 1½" | 0.065 | 1.37 | 34.8 |
| 2" | 0.065 | 1.87 | 47.5 |
| 2½" | 0.065 | 2.37 | 60.2 |
| 3" | 0.065 | 2.87 | 72.9 |
| 4" | 0.083 | 3.83 | 97.4 |

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