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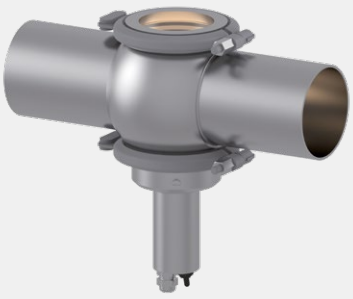
GEA VARINLINE®
GEA VARICOMP®

Hygienic Process Connections and Expansion Compensators





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Hygienic Valve Technology

Efficiency delivering perfect results
Hygienic valves from GEA form the core component of matrix-piped process plants. Thanks to a pioneering valve concept that sets standards for its flexibility, as well as the latest control and automation functions, our valves offer manufacturers maximum product safety and process reliability.

All GEA hygienic valves are designed to be efficient and costeffective for their particular applications, leading to sustainable operation and considerable savings potential.

GEA valve technology controls flow processes
Our hygienic valve technology ensures safe, efficient processes wherever sensitive liquid products are manufactured. In food production, the classic application areas range from milk processing (milk, yogurt, cheese ...) to liquid foods (sauces and pastes, instant products, baby food ...) and on to the brewing of beer and production of beverages. Further significant areas are biotechnology and pharmaceuticals, as well as care products and cleaning agents / detergents.

Regardless of the sector, the application or production specifications: Our hygienic valve technology is sure to meet the demands of our users.

Hygienic solutions for every task
Additional components in our portfolio are available to optimize the design of any process plant – from pigging systems for the recovery of valuable products, process connections, and expansion compensators for offsetting thermal stress, to tank safety systems for securing and cleaning tanks and containers.

Supported by our Research and Development Department we regularly launch new, technologically mature products on the markets. Our customers have high standards, which we continuously and systematically meet.

Hygienic Components – for Special Process Functions

Special components, free of dead spaces, for your process

Every process operator who processes valuable or sensitive liquids benefits from our hygienic, 100 % drainable components for important special functions in the process. All components were developed on the basis of the groundbreaking and proven GEA VARIVENT® design and guarantee extraordinary reliability and functionality for trouble-free, efficient processes.

GEA VARINLINE® Process Connections

The trademark VARINLINE® includes control and measuring instruments that meet the requirement of being CIP/SIP-able, thus enabling cleaning and sterilization without the need for dismantling. The instruments can be cleaned and sterilized without any residue in automatic cleaning and sterilizing process cycles. The core piece of the in-line control and measurement technology is the process connection fitting, the VARINLINE® housing. It is mainly an in-line housing with double vertical ports with two process connections.

The process connections in the VARINLINE® housing allow up to two control / measuring instruments, e.g. a sight glass with opposite illumination unit or different measuring mountings. They are available for all pipe sizes, with the VARIVENT® process connection designed for the nominal width of the respective components to be installed. VARINLINE® housings are self draining – also in the horizontal installation orientation – and thus permit instrumentation free of dead zones. VARINLINE® housings are 3A approved, according to the DGRL and are EHEDG-certified.

GEA VARICOMP® Expansion Compensators

VARICOMP® expansion compensators compensate for expansions and tensions in pipeline systems that result from temperature differences. Due to the dead-zone free design, they are able to be used in hygienic and aseptic processes.

GEA VARIVENT® pipe connections

The VARIVENT® flange connection is available as a complete connection including O-rings, screws and nuts, as well as in components (grooved and plain flanges).

Technical Characteristics

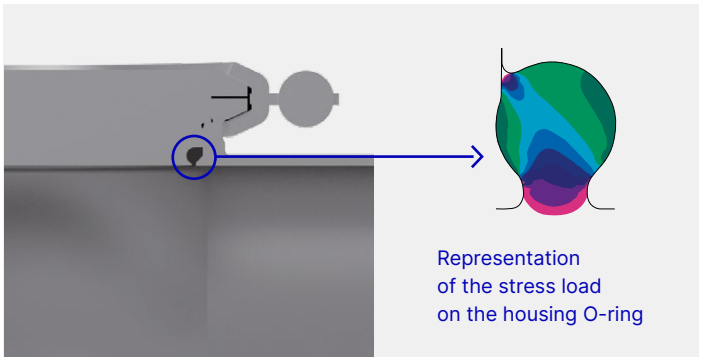
Hygienic Process Connections and Expansion Compensators
GEA VARINLINE® components are suitable for CIP/SIP, easy to maintain, offer reliable function and represent a significant factor in consistent product quality. Low costs with operation, maintenance and service ensure economical system productivity.

The highly flexible VARIVENT® modular system is the basis for the VARINLINE® components of GEA Tuchenhagen. The result is economic efficiency for the system operator, optimized stock keeping and low-cost spare parts production due to the reduced diversity of parts.

Modular system
Greater flexibility because of the ability to adapt
rapidly to process changes
High economic efficiency
Low spare part stocks

Hygienic design
Lower risk of contaminating the end product
Maximum efficiency in cleaning
Lower CIP costs

Sealing according to the VARIVENT® principle
The VARINLINE® components offered by GEA Tuchenhagen are characterized by special seal technology. A metallic stop results in defined seal deformation, ensuring long seal life. This allows for more time to pass between required maintenance services, thereby allowing for continuous production and shorter downtimes. The seal geometry was optimized by using FEM calculations.



Representation
of the stress load
on the housing O-ring

Seals
Long operating time
Vacuum-proof
Selection of FDA-compliant seal materials
• EPDM
• FKM
• HNBR
• PTFE

Available nominal widths for components

Nominal width	DN	10	15	25	40	50	65	80	100	125	150				
	OD			1"	1 ½"	2"	2 ½"	3"	4"		6"				
	IPS											2"	3"	4"	6"
Valve type															
VARINLINE® housings		•	•	•	•	•	•	•	•	•	•	•	•	•	•
VARINLINE® housing connection flange type U				•	•	•			•						
VARINLINE® housing connection flange type U-S				•	•	•			•						
VARINLINE® housing connection flange type T			•	•	•	•			•						
VARINLINE® housing connection flange type T-S				•	•	•			•						
VARINLINE® tank connection flange type P				•	•	•									
VARINLINE® sight glass type TXIA				•	•	•	•	•	•	•	•	•	•	•	•
VARINLINE® pressure gauge type TPIA		•	•	•	•	•	•	•	•	•	•	•	•	•	•
VARINLINE® thermometer type TTIA				•	•	•	•	•	•	•	•	•	•	•	•
GEA Tuchenhagen level probe type TNS															
VARIVENT® pipe connections				•	•	•	•	•	•	•	•	•	•	•	•
VARICOMP® expansion compensator						•	•	•	•	•			•	•	•

Nominal width	ISO	13.5	17.2	21.3	33.7	42.4	48.3	60.3	76.1	88.9	114.3
Component											
VARINLINE® housings		•	•	•	•	•	•	•	•	•	•
VARINLINE® sight glass type TXIA					•	•	•	•	•	•	•
VARINLINE® pressure gauge type TPIA		•	•	•	•	•	•	•	•	•	•
VARINLINE® thermometer type TTIA					•	•	•	•	•	•	•

Pipe classes

Standard VARIVENT® valve housings and VARINLINE® housings are supplied with welding ends, although the components can be delivered with various connection fittings as an option (see section 4).

The dimensions of the welding ends comply with the following standards:

Metric		Inch			ISO	
DIN	Outside diameter according to DIN 11866, series A	OD IPS	Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C	Outside diameter according to IPS schedule 5	ISO	Outside diameter according to DIN 11866, series B
10	13.0 × 1.50				13.5	13.5 × 1.6
15	19.0 × 1.50				17.2	17.2 × 1.6
25	29.0 × 1.50	1"	25.4 × 1.65		21.3	21.3 × 1.6
40	41.0 × 1.50	1 ½"	38.1 × 1.65		33.7	33.7 × 2.0
50	53.0 × 1.50	2"	50.8 × 1.65	60.3 × 2.00	42.4	42.4 × 2.0
65	70.0 × 2.00	2 ½"	63.5 × 1.65		48.3	48.3 × 2.0
80	85.0 × 2.00	3"	76.2 × 1.65	88.9 × 2.30	60.3	60.3 × 2.0
100	104.0 × 2.00	4"	101.6 × 2.11	114.3 × 2.30	76.1	76.1 × 2.0
125	129.0 × 2.00				88.9	88.9 × 2.3
150	154.0 × 2.00	6"	152.4 × 2.77	168.2 × 2.77	114.3	114.3 × 2.3

Technical Characteristics

Surfaces
The standard for surfaces in contact with the product depends on the particular nominal width standard:
- Metric, inch OD, inch IPS, ISO: $R_a \leq 0.8$ µm

Higher-quality surfaces are an available option (see section 4).

Surfaces not in contact with the product (housing) are matt blasted or metal ground as standard. Detailed information on surface designs can be taken from the respective sections.

Materials
Components in contact with the product are produced from 1.4404 (AISI 316L), while those not in contact with the product use 1.4301 (AISI 304). Other materials, e.g. for use when handling aggressive fluids, are available on request.

For detailed information about the properties of the materials, refer to the material properties table.

Test report and inspection certificate
Optionally, the valve housings and product wetted parts can be supplied with a test report 2.2 or an inspection certificate 3.1 according to EN 10204.

If 3.1 inspection certificates are required, please notify us of this when you place the order.

Seal materials
Seals in contact with the product are EPDM (standard), HNBR and FKM. NBR material is used for seals not in contact with the product.

The mixing constituents of our seal materials conform to the USP class VI and are contained in the FDA White List. In this the sealings fulfill FOOD and DRUG (FDA) guidelines 21 CFR Part 177.2600 or 21 CFR 177.1550: “Rubber articles intended for repeated use”.

The resistance of the seal material depends on the type and temperature of the product being transported. The contact time with certain products can negatively affect the service life of seals. The seal material PTFE is available for individual components as well.

For detailed information about the seal material properties, refer to the seal material properties table.

Ambient conditions
The valves can also be used outdoors. The product or operating temperature depends on the seal material and can be seen in the seal material properties table.

Installation
Hygienic components must be installed without stresses. Lateral forces such as expansion of the pipelines due to heat cannot be compensated in the valve, as a result valve damages are possible. In such cases, we recommend taking measures to compensate for the expansion, such as by using the VARICOMP® expansion compensator.

The required clearance for installing and removing a component is specified in the particular technical data and dimensional sheet.

Certificates
Components for special process applications in the GEA Hygienic Valve Technology portfolio have been designed according to the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as 3-A Sanitary Standards, Inc. (3-A SSI). Numerous components have been demonstrated to offer trouble-free and efficient cleaning ability not only in accordance with the above guidelines, but also in independent and standardized cleaning tests.

ATEX certificates, CRN and other additional certificates are available on request for many components in the GEA Hygienic Valve Technology portfolio.

Due to their refined design, the GEA VARINLINE® variants, also meet the essential health and safety requirements of the EC Pressure Equipment Directive 2014/68/EU.

GEA VARINLINE® components can come into contact with food. Components with the sealing material EPDM or FKM comply with Regulation (EC) No. 1935/2004 of the European Parliament and Council.

Material properties

						Main alloy elements in % by mass			
Material number	Short name			Similar materials	PREN***	Cr (Chrome)	Ni (Nickel)	Mo (Molybdenum)	C max. (Carbon)
1.4301*	X5CrNi18-10	AISI 304	BS 304S15	SS2332	18	17.5–19.5	8.0–10.5	–	0.07
1.4404**	X2 CrNiMo 17-12-2	AISI 316L	BS 316S11	SS2348	25	16.5–18.5	10.0–13.0	2.0–2.5	0.03
1.4435	X2 CrNiMo 18-14-3	AISI 316L	BS 316S11	SS2353	27	17.0–19.0	12.5–15.0	2.5–3.0	0.03
1.4462	X2 CrNiMoN 22-5-3	2205	BS 318S13	SS2377	37	21.0–23.0	4.5–6.5	2.5–3.5	0.03
1.4410	X2 CrNiMoN 25-7-4	SAF 2507®	–	SS2328	39	24.0–26.0	6.0–8.0	3.0–4.5	0.03
1.4529	X1 NiCrMoCuN 25-20-7	AISI 926	–	–	42	19.0–21.0	24.0–26.0	6.0–7.0	0.02
AL-6XN®	–	–	–	–	43	20.0–22.0	23.5–25.5	6.0–7.0	0.03
1.4539	X1 NiCrMoCu 25-20-5	AISI 904L	BS 904S13	SS2562	35	19.0–21.0	24.0–26.0	4.0–5.0	0.02
2.4602	NiCr21Mo14W HASTELLOY C-22	–	–	–	69	20.0–22.5	Rest	12.5–14.5	0.01
2.4819	NiMo16Cr15W HASTELLOY C-276	N 10276	–	–	75	14.5–16.5	Rest	15.0–17.0	0.01

* Standard material for components not in contact with the product

** Standard material for components in contact with the product (other materials available on request)

*** Pitting Resistance Equivalent Number = % Cr + 3.3 × (% Mo + 0.5 W) + 20 N

Seal material properties

Seal material			EPDM	FKM	HNBR	PTFE
General application temperature*			−40 to 135 °C −40 to 275 °F	−10 to 200 °C 14 to 392 °F	−25 to 140 °C −13 to 284 °F	−200 to 260 °C
Medium	Concentration	At permitted operating temperature				
Alkali	≤ 3 %	up to 80 °C	+	o	+	+
	≤ 5 %	up to 40 °C	+	o	o	+
	≤ 5 %	up to 80 °C	+	–	–	+
	> 5 %		o	–	–	+
Inorganic acid**	≤ 3 %	up to 80 °C	+	+	+	+
	≤ 5 %	up to 80 °C	o	+	o	+
	> 5 %	up to 100 °C	–	+	–	+
Water		up to 80 °C	+	+	+	+
		up to 100 °C	+	+	+	+
Steam		up to 135 °C	+	o	o	+
Steam, approx. 30 min		up to 150 °C	+	o	–	+
Hydrocarbons / fuels			–	+	o	+
Products containing grease	≤ 35 %		+	+	+	+
	> 35 %		–	+	+	+
Oils			–	+	+	+

Other applications on request

* Depending on the installation situation

** Inorganic acids are, for example, hydrochloric acid, nitric acid, sulphuric acid

\+ = Good resistance

O = Reduced service life

– = Not resistant

Selection Matrix

Catalogs
Hygienic Valve Technology

Catalogs
Hygienic Pump Technology

Catalogs
Aseptic Valve Technology

Catalogs
Cleaning Technology

GEA VARIVENT®
seat valves

GEA butterfly valves

GEA VARIVENT®
special application valves

GEA VARIVENT®
valves for the U.S. dairy market

GEA VARITOP®
tank safety systems

GEA VARINLINE® / GEA VARICOMP®
process connections and
expansion compensators

GEA VARICOVER®
product recovery systems

GEA Service
for hygienic valve technology

GEA valve automation
control and feedback systems


VARINLINE®
process connections
1
VARIVENT®
pipe connections
2
VARICOMP®
expansion compensators
3
Options
4

1 VARINLINE® PROCESS CONNECTIONS

Overview of VARINLINE® Housings

VARINLINE® instrumentation free of dead pockets
The matrix piping found in process technology makes it difficult for the operator to directly view his product. The installation of VARINLINE® housings into the pipeline system permits integration of measurement and control instruments in the process system and thus, structuring the production process transparently.

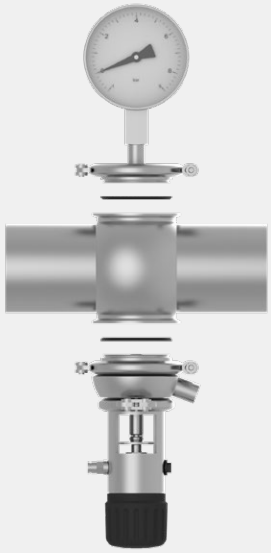
Cleaning and sterilization capacities in the CIP/SIP procedures have the highest priority, as well as to ensure hygienic production in the brewery and beverage industries, dairy processing operations and the chemical, pharmaceuticals and cosmetic industries.

General benefits
No domes, no sumps
Gap-free sealing according to the VARIVENT® principle
Rapid, accurate instrument installation with clamp connection
Connections for instrumentation independent
of nominal widths and process variables
Detection of the respective measuring values directly in the product flow
Perfect flow properties and cleaning ability

Overview of VARINLINE® Housings

Function of the VARINLINE® components

The adaptation of the measuring devices in the VARINLINE® housings takes place via VARINLINE® process connections. Many manufacturers have assumed this established process connection type and offer measuring instruments for installation in VARINLINE® fittings as standard. This ensures hygienic and quick integration of different devices into the process system.



The process connections offer the option of holding up to two VARINLINE® components in one housing

Formation of a dome by conventional adaptation at the T-piece

Holder in the VARINLINE® housing free of dead zones

Application examples

The VARINLINE® concept has proven its worth in hygienic processes. VARINLINE® housings permit installation of transmitters free of dead zones and thus, permit use of sensors in systems with high hygienic requirements. Note that the process connection of the housing must always point up- or downwards.

The VARINLINE® system comprises of components for process monitoring, such as pressure, temperature and flow measurement.

Optimized process circuits reduce product loss, e.g. by measurement of the color, clouding or conductivity of the product to divert the ejections.

The GEA level probe is used as media recognition to protect the pumps or control filling of tanks.

The GEA In-Line Sprayer type IS 25 can also be utilized in the respective process fittings for container and pipe cleaning.

For adapting measurement and control instruments in tanks, VARINLINE® housing connections and tank connection flanges for welding into wall, cone or dished bottoms are available.

Special features
Four different process connection sizes
Combination options of up to two devices in one VARINLINE® housing
Different adaptation options in tanks
VARINLINE® housing according to four different pipe standards

The VARINLINE® process connection is also the core element for the different GEA sampling valves. See catalog GEA VARIVENT® hygienic special application valves or GEA VESTA® sterile valves for further information.

VARINLINE®
Sampling valve type TSVN
installed into a VARINLINE® housing

VARIVENT®
Sampling valve type T/09
installed into a VARINLINE® housing
connection flange

VESTA®
Sampling valve type H_A
installed into a VARINLINE® housing

Overview of VARINLINE® Housings

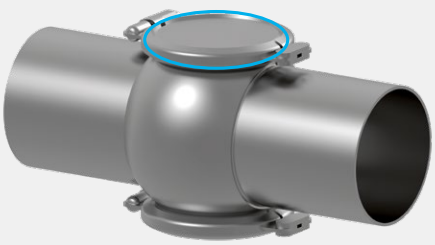
Process connection sizes

The process connections are available in four sizes.

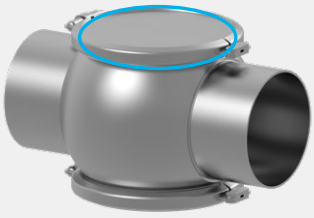
	Process connection			
	B	F	N	G
VARINLINE® housings	•	•	•	•
VARINLINE® housing connection flange type T	•	•	•	•
VARINLINE® housing connection flange type T-S		•	•	•
VARINLINE® housing connection flange type U		•	•	•
VARINLINE® housing connection flange type U-S		•	•	•
VARINLINE® tank connection flange type P		•	•	
VARINLINE® sight glass type TXIA		•	•	•
VARINLINE® pressure gauge type TPIA		•	•	
VARINLINE® thermometer type TTIA		•	•	
VARINLINE® sampling valve type TSVN		•	•	
VARINLINE® sampling valve type TSVU		•	•	
VARIVENT® double-seat sampling valve type T/09			•	
GEA Tuchenhagen level probe type TNS		•	•	
GEA Breconcherry in-line sprayer type IS 25			•	
VESTA® sampling valve type H_A/I 2/2 way seat valve		•	•	
Aseptomag® sampling valve type PV			•	

Process connection B

Process connection F

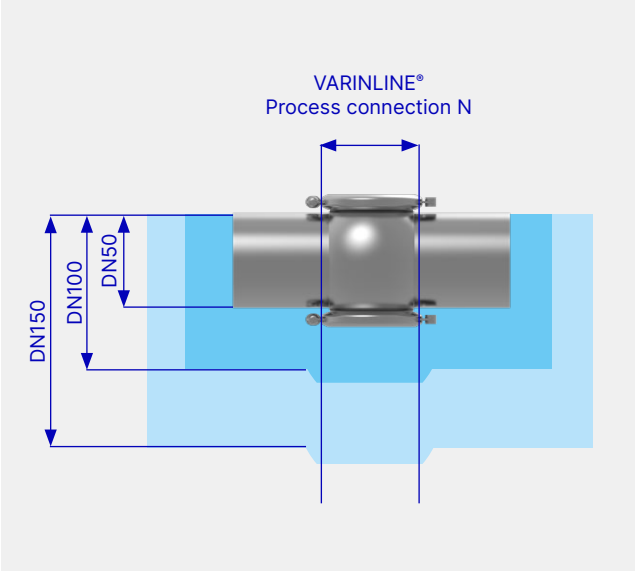


Process connection N

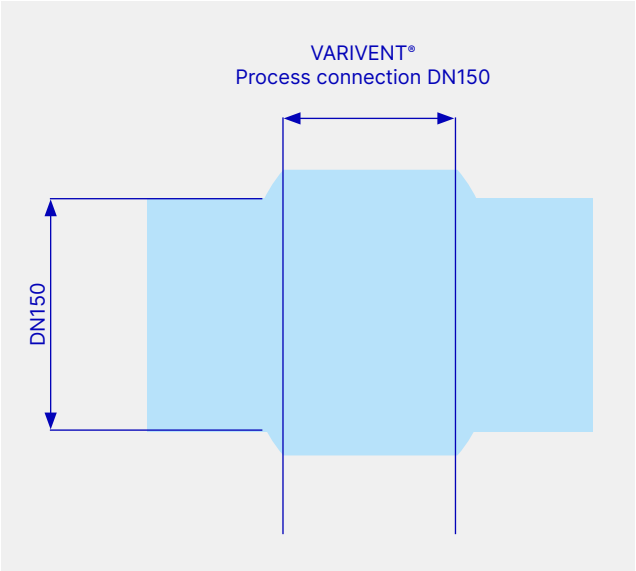


Process connection G

The following illustration shows an example of the VARINLINE® housing with process connection N, which covers the nominal sizes DN40–DN150. Regardless of the nominal pipe diameter, the process connection you choose is always the same, which is the main difference compared to the VARIVENT® housings.



In comparison, the VARIVENT® housing DN150 with the same process connection in nominal size DN150.

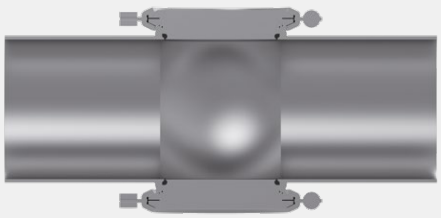


Overview of VARINLINE® Housings

VARINLINE® housings
The VARINLINE® housing is the process connection that is the core element to the control and measurement technology. It is free of dead zones in pipeline systems.

Depending on the housing rated width and the installation depth of the instrumentation, up to two control or measuring instruments can be adapted into the double vertical port in-line housing. Only the nominal widths DN 10 and 15 as well as ISO 13.5 to 21.3 are an exception with only one process connection.

To meet the nominal width of the pipeline, housings with four different process connection sizes are available.



The pipe inside diameter corresponds to the inner height of the housing

Materials
Components in contact with the product are produced from 1.4404 (AISI 316L), while those not in contact with the product use 1.4301 (AISI 304). Alternatively (standard for nominal width standard ISO and DN 10/15), VARINLINE® housings and housing connection flanges are also available in 1.4435 (AISI 316L). Other materials, e.g. for use when handling corrosive fluids, are available on request.

For detailed information about the properties of the materials, refer to the material properties table.

Operating pressure

VARINLINE® housings

Nominal width	Maximum permitted operating pressure (standard)
DN 10–65 OD 1"–2 ½" IPS 2" ISO 13.5–60.3	16 bar*
DN 80–150 OD 3"–6" IPS 3"–6" ISO 76.1–114.3	10 bar*

* Housings with increased pressure level are available as option, please see page 78/79.

VARINLINE® housing conections and tank connections flanges

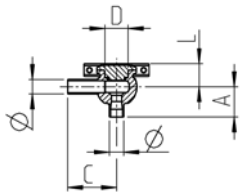
Nominal width	VARINLINE® process connection	Maximum permitted operating pressure		
		Type U and U-S	Type T and T-S	Type P
DN 25	F	PS 16 bar	PS 10 bar	PS 20 bar
DN 50/40	N	PS 16 bar	PS 10 bar	PS 20 bar
DN 100	G	PS 10 bar	PS 10 bar	–

VARINLINE® Housings, Process Connection B

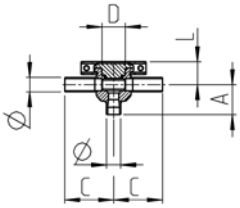
The in-line housing, usually with double vertical ports, permits hygienic holding of up to two in-line measurement and control instruments free of dead zones via process connections.

Technical data of the standard version		
Material in contact with the product		1.4435 (AISI 316L)
Seal material in contact with the product		EPDM, FKM, HNBR
Product pressure	DN 10–15, ISO 13.5–21.3	16 bar
Surface in contact with the product	DN, ISO	$R_a \leq 0.8$ µm
External housing surface	DN	Matt blasted
	ISO	Ground
Connection fittings		Welding end
Certificates		FDA

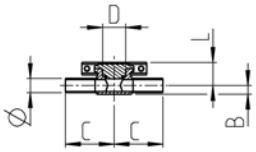
			Pipe					Dimension
Nominal width	Process connection	Housing design	Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
DN 10	B	L, T, G	13.00 × 1.50	40.0	9	65	31	26.0
DN 15	B	L, T, G	19.00 × 1.50	40.0	12	65	31	29.0
ISO 13.5	B	L, T, G	13.50 × 1.60	40.0	9	65	31	25.5
ISO 17.2	B	L, T, G	17.20 × 1.60	40.0	12	65	31	27.5
ISO 21.3	B	L, T, G	21.30 × 1.60	40.0	14	65	31	29.5



Housing design L



Housing design T



Housing design G

Position	Description of the order code		
1	**VARINLINE® system**		
	T	VARINLINE® housings	
2	**Nominal width**		
	DN 10		ISO 13.5
	DN 15		ISO 17.2
			ISO 21.3
3	**Housing design (only available for DN 10, DN 15, ISO 13.5, ISO 17.2 and ISO 21.3)**		
	L	T	G
4	**Process connection**		
	B		
5	**Blanking plates**		
	0	Without blanking plate	
	3	With one blanking plate 1.4435	
6	**Seal material**		
	1	EPDM (FDA)	
	2	FKM (FDA)	
	3	HNBR (FDA)	
	5	PTFE (FDA)	
7	**Surface quality of the housing**		
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted	
8	**Certificates**		
	K	Without	
	A	Inspection certificate 3.1/AD2000W2 according to EN 10204	
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204	
	W	Test report 2.2 according to EN 10204	
	Z	Inspection certificate EN 10204 – 3.1	
9	**Connection fittings**		
	N	Welding end	
10	**Material of the housings**		
	1.4435	1.4435 (AISI 316L)	
11	**Options**		
	See section options		

The code is composed as following, depending on the chosen configuration:

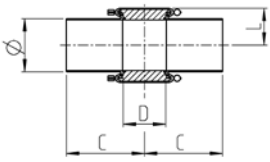
Position	1	2	3		4		5	6	7	8		9	10	11
Code	T			-	B	-			2		-	N		

For order codes differing from the standard version, please refer to section 4.

VARINLINE® Housings, Process Connection F / N / G

The in-line housing, usually with double vertical ports, permits hygienic holding of up to two in-line measurement and control instruments free of dead zones via process connections.

Technical data of the standard version		
Material in contact with the product		1.4435 (AISI 316L) 1.4404 (AISI 316L)
Seal material in contact with the product		EPDM, FKM, HNBR
Product pressure	DN 25–65, OD 1"–2 ½", IPS 2", ISO 33.7–60.3	16 bar
	DN 80–150, OD 3"–6", IPS 3"–6", ISO 76.1–114.3	10 bar
Surface in contact with the product		$R_a \leq 0.8$ µm
External housing surface	DN, OD, IPS	Matt blasted
	ISO	Ground
Connection fittings		Welding end
Certificates		FDA



		Pipe	Material		Dimension		
Nominal width	Process connection	Ø [mm]	1.4404 (316L)	1.4435 (316L)	C [mm]	D [mm]	L [mm]
DN 25	F	29.00 × 1.50	•	•	90.0	50	30.0
DN 40	N	41.00 × 1.50	•	•	90.0	68	36.0
DN 50	N	53.00 × 1.50	•	•	90.0	68	42.0
DN 65	N	70.00 × 2.00	•	•	125.0	68	50.0
DN 80	N	85.00 × 2.00	•	•	125.0	68	57.5
DN 100	N	104.00 × 2.00	•	•	125.0	68	67.0
DN 100	G	104.00 × 2.00	•	–	125.0	123	71.0
DN 125	N	129.00 × 2.00	•	–	125.0	68	79.5
DN 125	G	129.00 × 2.00	•	–	125.0	123	83.5
DN 150	N	154.00 × 2.00	•	–	150.0	68	92.0
DN 150	G	154.00 × 2.00	•	–	150.0	123	96.5
OD 1"	F	25.40 × 1.65	•	•	90.0	50	28.0
OD 1 ½"	N	38.10 × 1.65	•	•	90.0	68	34.5
OD 2"	N	50.80 × 1.65	•	•	90.0	68	40.8
OD 2 ½"	N	63.50 × 1.65	•	•	125.0	68	47.0
OD 3"	N	76.20 × 1.65	•	•	125.0	68	53.5
OD 4"	N	101.60 × 2.11	•	•	125.0	68	65.8
OD 4"	G	101.60 × 2.11	•	–	125.0	123	69.8
OD 6"	N	152.40 × 2.77	•	–	150.0	68	90.5
OD 6"	G	152.40 × 2.77	•	–	150.0	123	94.5
IPS 2"	N	60.30 × 2.00	•	–	114.3	68	45.5
IPS 3"	N	88.90 × 2.30	•	–	152.4	68	59.5
IPS 4"	N	114.30 × 2.30	•	–	152.4	68	72.0
IPS 4"	G	114.30 × 2.30	•	–	152.4	123	76.0
IPS 6"	N	168.30 × 2.77	•	–	152.4	68	98.0
IPS 6"	G	168.30 × 2.77	•	–	152.4	123	102.0
ISO 33.7	F	33.70 × 2.00	–	•	114.3	50	32.0
ISO 42.4	N	42.40 × 2.00	–	•	114.3	68	36.3
ISO 48.3	N	48.30 × 2.00	–	•	114.3	68	39.3
ISO 60.3	N	60.30 × 2.00	–	•	114.3	68	45.5
ISO 76.1	N	76.10 × 2.00	–	•	152.4	68	53.5
ISO 88.9	N	88.90 × 2.30	–	•	152.4	68	59.5
ISO 114.3	N	114.30 × 2.30	–	•	152.4	68	72.0

VARINLINE® Housings, Process Connection F / N / G

Position	Description of the order code			
1	**VARINLINE® system**			
	T	VARINLINE® housings		
2	**Nominal width**			
	DN 25	OD 1"		
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150	OD 6"	IPS 6"	ISO 114.3
3	**Process connection**			
	F	N	G	
4	**Blanking plates**			
	0	Without blanking plate		
	1	With one blanking plate 1.4404 (AISI 316L)		
	2	With two blanking plates 1.4404 (AISI 316L)		
	3	With one blanking plate 1.4435 (AISI 316L)		
	4	With two blanking plates 1.4435 (AISI 316L)		
	5	With one blanking plate 1.4404 / with one sight glass		
	6	With one blanking plate 1.4435 / with one sight glass		
	7	One side open / with one sight glass		
5	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	5	PTFE (FDA)		
6	**Surface quality of the housing**			
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted		
7	**Certificates**			
	K	Without		
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204		
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204		
	W	Test report 2.2 according to EN 10204		
	Z	Inspection certificate EN 10204 – 3.1		
8	**Connection fittings**			
	N	Welding end		
9	**Material of the housings**			
	1.4404	1.4404 (AISI 316L)		
	1.4435	1.4435 (AISI 316L)		
10	**Options**			
	See section options			

The code is composed as following, depending on the chosen configuration:

Position	1	2		3		4	5	6	7	8	9		10
Code	T		-		-			2		N		-	

For order codes differing from the standard version, please refer to section 4.

Overview of VARINLINE® Housing Connection Flanges

VARINLINE® housing connection flanges type U and U-S
The housing connection flange type U is used to adapt a measurement and control instrument free of dead zones, e.g. a VARINLINE® thermometer or a level probe. The housing connection flanges also serve to adapt VARIVENT® tank bottom valves to vessels. Preferably, the flange is welded into the tank or vessel wall front-flush, centrally in the cone or dished bottom or in extrusions with a wall thickness of up to 4 mm.

The housing connection flange type U-S is used for vertical holding of a measurement and control instrument free of dead zones. Its cylindrical shape allows the adjustment to the inclination of the cone or dished bottom and therefore allows for vertical installation of sight glasses and measuring instruments outside the vessel bottom. The housing connection flanges type U-S are particularly suitable for installation of measuring technology at jacketed tanks due to their cylindrical form.

Conical inner contour permits flat installation orientations

Cylindrical shape permits adjustment to the inner tank contours

VARINLINE® housing connection flange type T and T-S
The housing connection flanges type T and T-S serve to adapt measurement and control instruments free of dead zones, e.g. for installation of VARINLINE® pressure gauges and sight glasses. The housing connection flanges also serve to adapt VARIVENT® und ECOVENT® tank bottom valves to vessels. The connection flanges are designed for installation into vessels of a wall thickness up to 8 mm and are welded into the tank or vessel wall flush from the inside.

The housing connection flange type T is best suited for insertion in the cone or dished bottom. Welding into the vessel wall is also possible with larger vessels.

Due to its cylindrical shape, the housing connection flange of type T-S allows adjustment to the inclination or curve of the vessel bottom or vessel wall and is thus suitable for installation in tanks with smaller diameters.

The conical inner contour permits a flat installation orientation

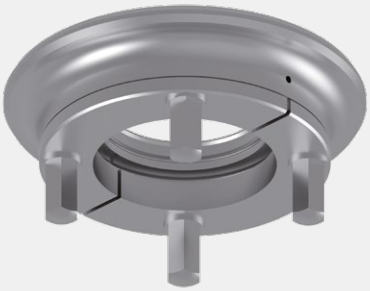
Cylindrical shape for adaptability to eccentric positions

VARINLINE® tank connection flange type P
The tank connection flange type P is used for front-flush installation with no dead zones of a measurement and control instrument. This flange type is suitable for installation into vessels of a wall thickness up to 20 mm.

The flange is equipped with pressure relief half-rings and a pressure relief bore for controlled discharge of the inner tank pressure for maintenance work.

Selection
For the selection of the suitable housing connection see the information on page 32–33.

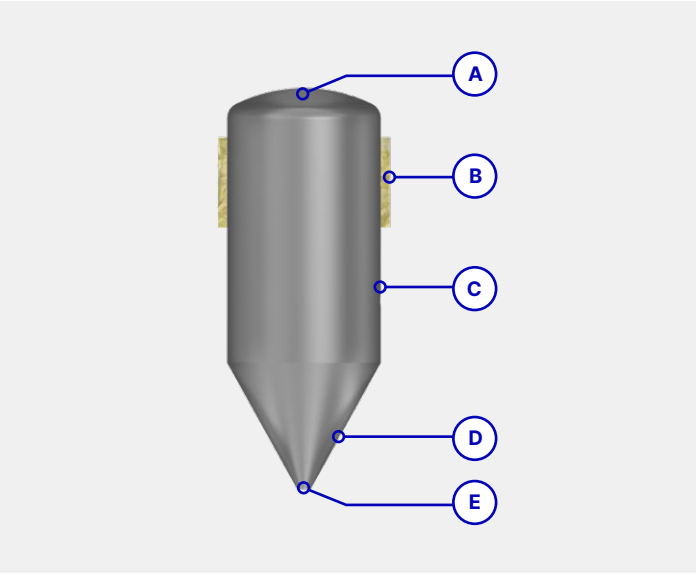
Required welding device
For stress-free installation, a welding device is available (available for rent as well). When welding in, the regulations of the weld must be complied with. This ensures the reliable and simple installation of the housing connections at the tank. For more information see page 34–35.

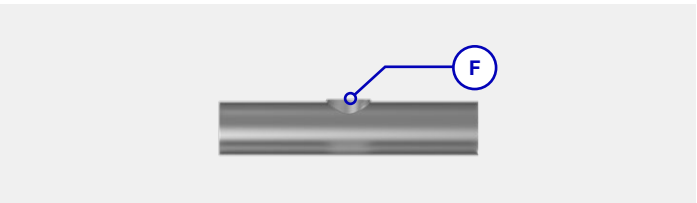


Possibility of pressure relief in the tank

Overview of VARINLINE® Housing Connection Flanges

Installation position
Depending on the installation situation and existing specifications there are different housing connection flanges that allow the adaption of control- and measuring instruments as well as Sampling Valves or VARIVENT® Tank bottom valves in a wide variety of positions.





	Suitable connection or tank flange				
Installation position at the tank	**Type U**	**Type U-S**	**Type T**	**Type T-S**	**Type P**
A	•		•	•	•
B		•		•	
C		•	•	•	•
D			•	•*	•
E	•		•		•
F	•				

* In this installation position, there may be slight accumulations of liquid.

The different connection positions on the tank make it necessary to adapt the contour of the welded joint from the inside of the tank. The housing connections U-S and T-S were developed for installation in tanks with smaller diameter or insulated tanks. Please refer to the tables below for the minmum tank diameter required for the adaption.

VARINLINE® housing connection type U

Minimum diameter at the relevant position on the tank (tank wall, tank bottom, cone, etc.)

Process connection	Wall thickness tank [mm]		
	2	3	4
F	500	500	500
N	750	750	750
G	2,000	2,000	2,000

VARINLINE® housing connection type U-S

Minimum diameter at the relevant position on the tank (tank wall, tank bottom, cone, etc.)

Process connection	Wall thickness tank [mm]		
	2	3	4
F	110	110	110
N	130	130	130
G	240	240	240

VARINLINE® housing connection type T

Minimum diameter at the relevant position on the tank (tank wall, tank bottom, cone, etc.)

Process connection	Wall thickness tank [mm]						
	2	3	4	5	6	7	8
B	500	600	750	1,050	1,600	1,600*	1,600*
F	950	1,150	1,450	1,950	3,050	3,050*	3,050*
N	1,200	1,450	1,850	2,500	3,900	3,900*	3,900*
G	2,250	2,700	3,400	4,650	7,250	7,250*	7,250*

* 0.5 –1 mm overhang at critical weld area

VARINLINE® housing connection type T-S

Minimum diameter at the relevant position on the tank (tank wall, tank bottom, cone, etc.)

Process connection	Wall thickness tank [mm]						
	2	3	4	5	6	7	8
F	290	300	310	320	330	350	370
N	360	370	380	400	420	440	460
G	620	650	680	710	740	780	830

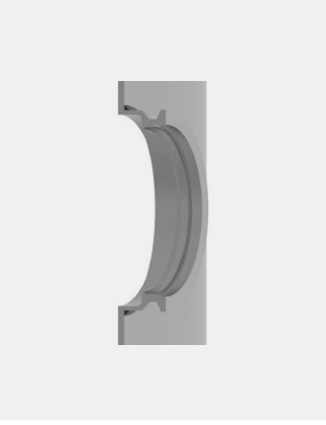
VARINLINE® housing connection type P

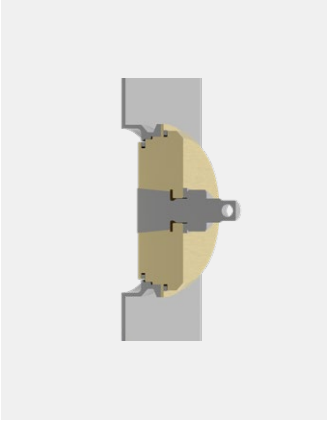
Minimum diameter at the relevant position on the tank (tank wall, tank bottom, cone, etc.)

Process connection	Wall thickness tank [mm]	
	up to 15	5 up to 20
F	2,150	–
N	–	2,850

Overview of VARINLINE® Housing Connection Flanges

The VARINLINE® housing connection flanges and VARINLINE® tank connection flanges are welded into the vessel wall or the vessel bottom with a welding jig to protect against distortion. Since the different heat introduction when welding may cause deformation of the flanges and thereby leaks, the flange with the installed welding jig must be allowed to cool off to 30 °C. All conditions required for welding (such as insert gas, cooling, welding additive) can be taken from the respective welding instructions.



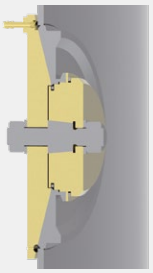


VARINLINE® housing connection U and U-S

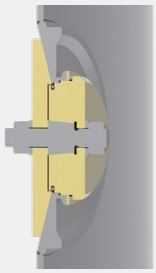
	VARINLINE® housing connection type U			VARINLINE® housing connection type U-S		
Process connection	Welding device		Welding instructions	Welding device		Welding instructions
	Standard	For rent		Standard	For rent	
F	229-104.91	229-104.97	221RLI002533EN	229-104.91	229-104.97	221RLI013845EN
N	229-104.92	229-104.98	221RLI002533EN	229-104.92	229-104.98	221RLI013845EN
G	229-104.94	229-104.100	221RLI002533EN	229-104.94	229-104.100	221RLI013845EN

VARINLINE® housing connection T and T-S

The welding jig and the welding instructions are requiered for stress-free installation. The welding jigs are also available for rent.



Outer weld with insert gas connection inside



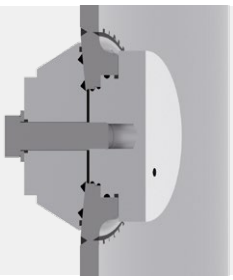
Inner weld

	VARINLINE® housing connection type T			VARINLINE® housing connection type T-S		
Process connection	Welding device		Welding instructions	Welding device		Welding instructions
	Standard	For rent		Standard	For rent	
B	221-144.15*	on request	221RLI013698EN	–	–	–
F	229-104.01	229-104.25	221RLI003025EN	229-104.29	229-104.80	221RLI013844EN
N	229-104.07	229-104.26	221RLI003025EN	229-104.30	229-104.81	221RLI013844EN
G	229-104.19	229-104.28	221RLI003025EN	229-104.32	229-104.83	221RLI013844EN

* The required welding jig corresponds to a blanking with a half-ring connection.

VARINLINE® tank connection flange type P

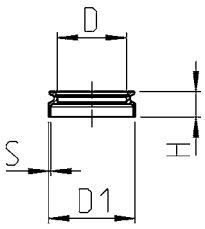
The welding jig and the welding instructioans are requiered for stress-free installation. The welding jigs are also available for rent.



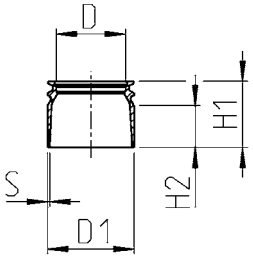
VARINLINE® housing connection type P			
Process connection	Welding device		Welding instructions
	Standard	For rent	
F	229-103.48	229-103.62	222RLI005453EN
N	229-103.45	229-103.61	222RLI005453EN

VARINLINE®
Housing Connection Flange, Type U and U-S

Housing connection flanges are used to connect measuring instruments without dead zones and are welded into the vessels. The Type U can be installed at the tank bottom or pipe extrusions. Type U-S is especially suitable for installation in jacketed tanks.



Type U



Type U-S

Technical data of the standard version		
Material in contact with the product		1.4404 (AISI 316L) 1.4435 (AISI 316L)
Material blanking plate		1.4404 (AISI 316L) 1.4435 (AISI 316L)
Seal material		EPDM, FKM, HNBR
Operating pressure		−10 °C up to 150 °C
Product pressure	Process connection F	16 bar
	Process connection N	16 bar
	Process connection G	10 bar
Surface in contact with the product		$R_a \leq 0.8$ µm
Outside surface		Ground
Wall thickness t		2; 2.5; 3; 4 mm
Certificates		FDA

Type U

		Material		Dimension			
Nominal width	Process connection	1.4404	1.4435	D [mm]	D1 [mm]	H [mm]	S [mm]
DN 25	F	•	•	50	70	25	2
DN 50/40	N	•	•	68	85	25	2
DN 100	G	•	–	123	154	30	2

Type U-S

		Material		Dimension				
Nominal width	Process connection	1.4404	1.4435	D [mm]	D1 [mm]	H1 [mm]	H2* [mm]	S [mm]
DN 25	F	•	–	50	70	65	Max. 40	2
DN 50/40	N	•	•	68	85	65	Max. 40	2
DN 100	G	•	–	123	154	70	Max. 40	2

* Allowed length to shorten.

Position	Description of the order code	
1	**VARINLINE® system**	
	TU	VARINLINE® housing connection flange type U
	TU-S	VARINLINE® housing connection flange type U-S
2	**Nominal width (process connection)**	
	DN 25	F
	DN 50/40	N
	DN 100	G
3	**Blanking plate**	
	0	Without blanking plate
	1	With blanking plate 1.4404
	3	with blanking plate 1.4435
4	**Seal material**	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
	5	PTFE (FDA)
5	**Surface quality of the housing**	
	3	Inside $R_a \leq 0.8$ µm, outside ground
6	**Certificates**	
	K	without
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204
	W	Test report 2.2 according to EN 10204
	Z	Inspection certificate 3.1 according to EN 10204
7	**Welding device[1)]**	
	K	Without
8	**Material**	
	1.4404	1.4404 (316L)
	1.4435	1.4435 (316L)

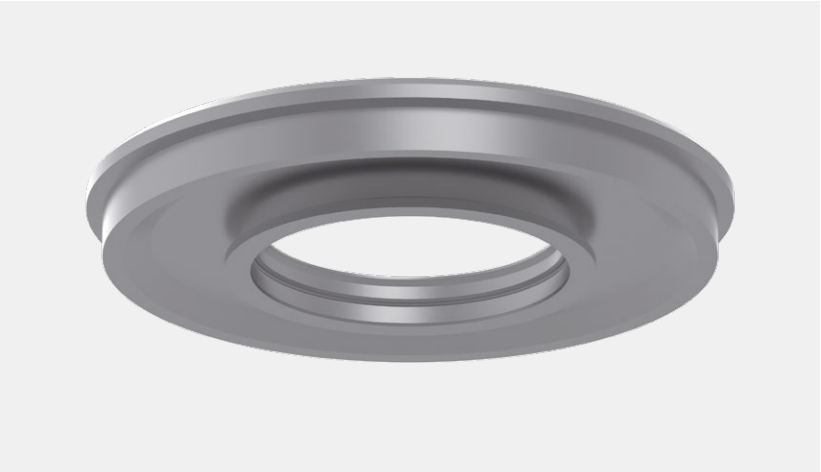
[1)] The welding device has to be ordered separatly, you can find the necessary part number on page 34–35.

The code is composed as following, depending on the chosen configuration:

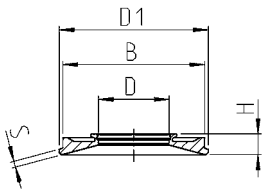
Position	1	2		3	4	5	6	7		8
Code			-			3		K	-	

For order codes differing from the standard version, please refer to section 4.

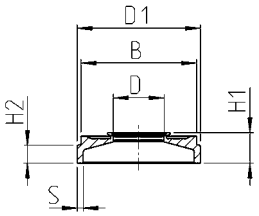
VARINLINE®
Housing Connection Flange, Type T and T-S



Housing connection flanges are used to connect measurement and control instruments frontflush and are welded into the vessel wall or the vessel bottom. Type T-S can be adjusted to the inclination or rounding of the vessel.



Type T



Type T-S

Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L) 1.4435 (AISI 316L)
Material blanking plate	1.4404 (AISI 316L) 1.4435 (AISI 316L)
Seal material	EPDM, FKM, HNBR
Operating pressure	−10 °C up to 150 °C
Product pressure	10 bar
Surface in contact with the product	$R_a \leq 0.8$ µm
Outside surface	Ground
Certificates	FDA

Type T

		Material		Dimension				
Nominal width	Process connection	1.4404	1.4435	D [mm]	B [mm]	D1 [mm]	H [mm]	S [mm]
DN 15	B	•	–	31	–	105	22.0	Max. 8
DN 25	F	•	–	50	135	145	24.0	Max. 8
DN 50/40	N	•	•	68	155	165	24.5	Max. 8
DN 100	G	•	•	123	215	225	27.5	Max. 8

Type T-S

		Material		Dimension					
Nominal width	Process connection	1.4404	1.4435	D [mm]	B [mm]	D1 [mm]	H1 [mm]	H2 [mm]	S [mm]
DN 25	F	•	–	50	135	145	41	25	8
DN 50/40	N	•	–	68	155	165	41	25	8
DN 100	G	•	–	123	215	225	45	25	8

Position	Description of the order code	
1	**VARINLINE® system**	
	TT	VARINLINE® housing connection flange type T
	TTS	VARINLINE® housing connection flange type T-S
2	**Nominal width (process connection)**	
	DN 15[1)]	B
	DN 25	F
	DN 50/40	N
	DN 100	G
3	**Blanking plate**	
	0	Without blanking plate
	1	With blanking plate 1.4404
	3	With blanking plate 1.4435
4	**Seal material**	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
	5	PTFE (FDA)
5	**Surface quality of the housing**	
	3	Inside $R_a \leq 0.8$ µm, outside ground
6	**Certificates**	
	K	Without
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204
	W	Test report 2.2 according to EN 10204
	Z	Inspection certificate 3.1 according to EN 10204
7	**Welding device**[2)]	
	K	Without
8	**Material**	
	1.4404	1.4404 (316L)
	1.4435	1.4435 (316L)

[1)] Only for type T
[2)] The welding device has to be ordered separatly, you can find the necessary part number on page 34–35.

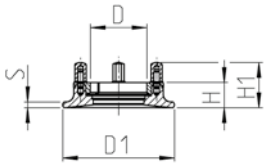
The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4	5	6	7		8
Code			-			3		K	-	

For order codes differing from the standard version, please refer to section 4.

VARINLINE®
Tank Connection Flange, Type P

The tank connection flange is welded into vessels with a wall thickness up to 20 mm and takes a measurement or control instrument free of dead zones. Pressure relief half-rings can be used for controlled relief of the inner tank pressure.



Technical data of the standard version	
Material in contact with the product	1.4435 (AISI 316L) 1.4539 (AISI 904L)
Material blanking plate	1.4404 (AISI 316L) 1.4435 (AISI 316L)
Seal material	EPDM, FKM, HNBR
Operating pressure	−10 °C up to 150 °C
Product pressure	10 bar
Surface in contact with the product	R_a ≤ 0.8 µm
Outside surface	Ground
Certificates	FDA

		Material		Tank connection				
Nominal width	Process connection	1.4435	1.4539	D1 [mm]	D [mm]	H [mm]	H1 [mm]	S [mm]
DN 25–15	F	•	–	130	58	34	61	15
DN 50–5	N	•	•	150	76	34	61	5
DN 50–6	N	•	•	150	76	34	61	6
DN 50–8	N	•	•	150	76	34	61	8
DN 50–10	N	•	•	150	76	34	61	10
DN 50–12	N	•	•	150	76	34	61	12
DN 50–15	N	•	•	150	76	34	61	15
DN 50–20	N	•	•	150	76	39	66	20

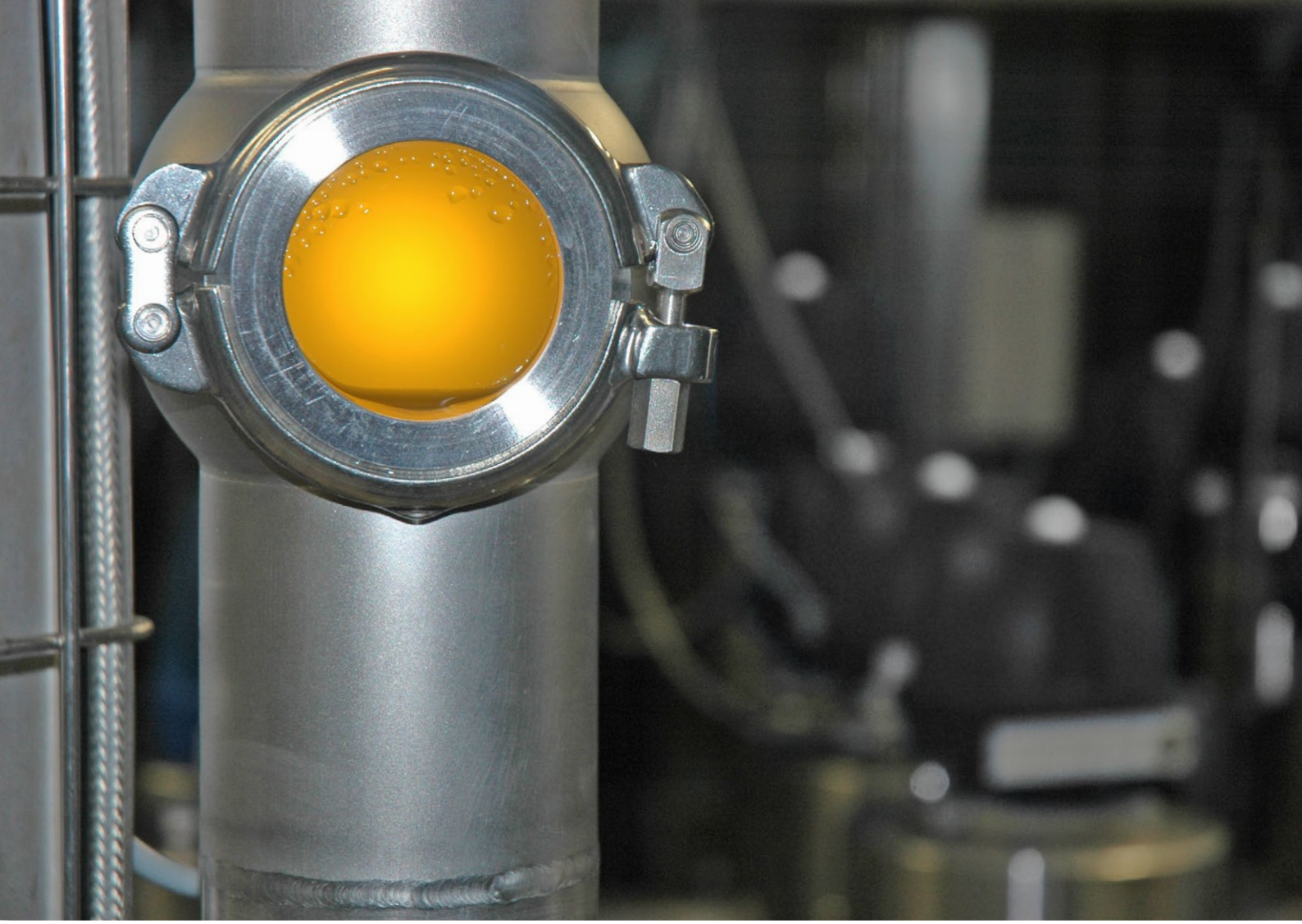
Position	Description of the order code	
1	**VARINLINE® system**	
	TP	VARINLINE® tank connection flange type P
2	**Nominal width (process connection)**	
	DN 25	F
	DN 50/40	N
3	**Tank wall thickness**	
	5	5 mm
	6	6 mm
	8	8 mm
	10	10 mm
	12	12 mm
	15	15 mm
	20	20 mm
4	**Blanking plate**	
	0	Without blanking plate
	1	With blanking plate 1.4404
	3	With blanking plate 1.4435
	8	With blanking plate 1.4539
5	**Seal material**	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
	5	PTFE (FDA)
6	**Surface quality of the housing**	
	3	Inside $R_a \leq 0.8$ µm, outside ground
7	**Certificates**	
	K	Without
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204
	W	Test report 2.2 according to EN 10204
	Z	Inspection certificate 3.1 according to EN 10204
8	**Welding device[1)]**	
	K	Without
9	**Material**	
	1.4435	1.4435 (316L)
	1.4539	1.4539 (904L)

[1)] The welding device has to be ordered separatly, you can find the necessary part number on page 34–35.

The code is composed as following, depending on the chosen configuration:

Position	1	2		3		4	5	6	7	8		9
Code	TP		-		-			3		K	-	

For order codes differing from the standard version, please refer to section 4.



Overview of VARINLINE® Sight Glass

VARINLINE® sight glass

The VARINLINE® sight glass can be inserted into the VARINLINE® housing or the housing connection flanges and serves visual product inspection. The glass closure of borosilicate glass can be used, depending on nominal width, for a pressure range of –1 bar to 25 bar: however, the pressure level of the installed fittings must be considered as well.

For good visual inspection even in cloudy media, an additional illumination is recommended. The durable LED illumination with 20 LED's and a 3-pole M8 connector optional disposes of a three-core connection cable with a length of 2 or 25 m. The 2W illumination can either be operated manually via an integrated tactile switch or automatically via the SPS. An ATEX lighting without a tactile switch can be delivered for use in potentially explosive atmospheres.

VARINLINE® sight glass with illumination

VARINLINE® sight glass without illumination

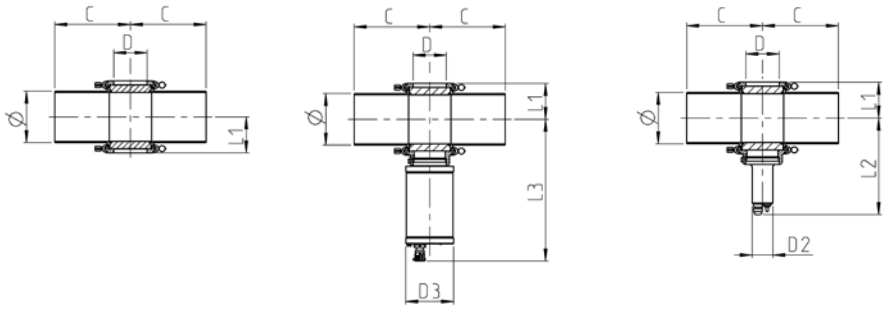
VARINLINE® sight glass with ATEX illumination

VARINLINE® Sight Glass, Type TXIA

Sight glasses inserted into the VARINLINE® housings or into the housing connection flange are used for visual monitoring of the product. In case of optically dense products in pipelines, an illumination device is recommended to be used with the sight glass.

Technical data	
Material in contact with the product	Borosilicate glass, thermally hardened
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Temperature resistance	−5 to 180 °C
Shock-resistant	Up to Δt approximately 140° C
Product pressure	10 bar (145 psi)
Surface in contact with the product	R_a ≤ 0.8 µm
External housing surface	Matt blasted
Connection fittings	Welding end

Technical data of the LED sight glass illumination	
Connection voltage	24 V AC/DC
Burning output nominal	2 W
Luminaire	LED-use with 20 LEDs
Protection class	IP65, ATEX variant IP67
Installation space	Insertion flange for VARINLINE® process connection
ATEX variant	Ex II 2 G + D Explosion Groups IIC / IIIC Temperature class G / D - T6 / T80 °C Ignition protection type Ex d IIC Gb, Ex t IIIC Db IP67
Certificates	FDA



		Pipe	Housing		Sight glass		Illumination	Illumination ATEX	
Nominal width	Process connection	Ø [mm]	C [mm]	D [mm]	L1 [mm]	D2 [mm]	L2 [mm]	D3 [mm]	L3 [mm]
DN 25	F	29.00 × 1.50	90.0	38	30.0	55	140.5	77	207
DN 40	N	41.00 × 1.50	90.0	55	36.0	55	138.5	77	209
DN 50	N	53.00 × 1.50	90.0	55	42.0	55	144.5	77	215
DN 65	N	70.00 × 2.00	125.0	55	50.0	55	152.5	77	223
DN 80	N	85.00 × 2.00	125.0	55	57.5	55	160.0	77	230
DN 100	N	104.00 × 2.00	125.0	55	67.0	55	169.5	77	240
DN 100	G	104.00 × 2.00	125.0	100	70.0	55	172.5	77	246
DN 125	N	129.00 × 2.00	125.0	55	79.5	55	182.0	77	252
DN 125	G	129.00 × 2.00	125.0	100	82.5	55	193.0	77	259
DN 150	N	154.00 × 2.00	150.0	55	92.0	55	194.5	77	265
DN 150	G	154.00 × 2.00	150.0	100	95.0	55	205.5	77	271
OD 1"	F	25.40 × 1.65	90.0	38	28.0	55	138.5	77	205
OD 1 ½"	N	38.10 × 1.65	90.0	55	34.5	55	137.0	77	207
OD 2"	N	50.80 × 1.65	90.0	55	40.8	55	143.5	77	214
OD 2 ½"	N	63.50 × 1.65	125.0	55	47.0	55	149.5	77	223
OD 3"	N	76.20 × 1.65	125.0	55	53.5	55	155.5	77	229
OD 4"	N	101.60 × 2.11	125.0	55	65.8	55	178.3	77	239
OD 4"	G	101.60 × 2.11	125.0	100	68.8	55	189.3	77	245
IPS 2"	N	60.30 × 2.00	114.3	55	45.5	55	148.0	77	218
IPS 3"	N	88.90 × 2.30	152.4	55	59.5	55	162.0	77	232
IPS 4"	N	114.30 × 2.30	152.4	55	72.0	55	184.5	77	245
IPS 4"	G	114.30 × 2.30	152.4	100	75.0	55	187.5	77	251
IPS 6"	N	168.30 × 2.77	152.4	55	98.0	55	210.5	77	271
IPS 6"	G	168.30 × 2.77	152.4	100	101.0	55	213.5	77	277
ISO 33.7	F	33.70 × 2.00	114.3	38	32.0	55	142.5	77	209
ISO 42.4	N	42.40 × 2.00	114.3	55	36.0	55	138.5	77	209
ISO 48.3	N	48.30 × 2.00	114.3	55	39.0	55	141.5	77	212
ISO 60.3	N	60.30 × 2.00	114.3	55	45.5	55	147.5	77	218
ISO 76.1	N	76.10 × 2.00	114.3	55	53.5	55	155.5	77	229
ISO 88.9	N	88.90 × 2.30	152.4	55	59.5	55	161.5	77	232
ISO 114.3	N	114.30 × 2.30	152.4	55	72.0	55	174.5	77	245

VARINLINE®
Sight Glass Type TXIA
with Housing

Position	Description of the order code			
1	**VARINLINE® system**			
	TXIA	VARINLINE® sight glass		
2	**Process connection**			
	F	N	G	
3	**Installation in VARINLINE® component**			
	–	Without VARINLINE® housing[1)]		
	T	VARINLINE® housings		
4	**Nominal width (housing)**			
	DN 25	OD 1"		
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
5	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	5	PTFE (FDA)		
6	**Surface quality of the housing**			
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted		
7	**Illumination**			
	K	Without		
	W	LED illumination, 24 V, 2 W, without cable, with connector M8		
	L	LED illumination, 24 V, 2 W, with 2 m cable, incl. connector M8		
	T	LED illumination, 24 V, 2 W, with 25 m cable, incl. connector M8		
	X	ATEX LED illumination, 24 V, 2 W		
8	**Certificates**			
	K	Without		
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204		
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204		
	W	Test report 2.2 according to EN 10204		
	Z	Inspection certificate EN 10204 – 3.1		
9	**Connection fittings**			
	N	Welding end		
10	**Material**			
	1.4404	1.4404 (AISI 316L)		
	1.4435	1.4435 (AISI 316L)		
11	**Number of sight glass[2)]**			
	1	with one sight glass		
	2	with two sight glass		
12	**Options**			
	See section options			

[1)] Position 4, 6, 9 and 10 in the code are omitted.
[2)] Only to be selected if without VARINLINE® housing has been choosen.

The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4		5	6	7	8	9		10	11	12
Code	TXIA		-			-		2			N	-			

For order codes differing from the standard version, please refer to section 4.

VARINLINE®
Sight Glass Type TXIA
with Housing Connection Flange

Position	Description of the order code		
1	**VARINLINE® system**		
	TXIA	VARINLINE® sight glass	
2	**Process connection**		
	F	N	G
3	**Installation in VARINLINE® component**		
	TT	VARINLINE® housing connection type T	
	TT-S	VARINLINE® housing connection type T-S	
	TU	VARINLINE® housing connection type U	
	TU-S	VARINLINE® housing connection type U-S	
4	**Nominal width (process connection)**		
	DN 25	F	
	DN 50/40	N	
	DN 100	G	
5	**Seal material**		
	1	EPDM (FDA)	
	2	FKM (FDA)	
	3	HNBR (FDA)	
	5	PTFE (FDA)	
6	**Surface quality**		
	3	Inside $R_a \leq 0.8$ µm, outside ground	
7	**Illumination**		
	K	Without	
	W	LED illumination, 24 V, 2 W, without cable, with connector M8	
	L	LED illumination, 24 V, 2 W, with 2 m cable, incl. connector M8	
	T	LED illumination, 24 V, 2 W, with 25 m cable, incl. connector M8	
	X	ATEX LED illumination, 24 V, 2 W	
8	**Certificates**		
	K	Without	
	A	Inspection certificate 3.1 / AD2000W2 according to EN 10204	
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204	
	W	Test report 2.2 according to EN 10204	
	Z	Inspection certificate EN 10204 – 3.1	
9	**Welding device[1)]**		
	K	Without	
10	**Material**		
	1.4404	1.4404 (AISI 316L)	
	1.4435	1.4435 (AISI 316L)	
11	**Options**		
	See section options		

[1)] The welding device has to be ordered separatly, you can find the necessary part number on page 34-35.

The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4		5	6	7	8	9		10	11
Code	TXIA		-			-		3			K	-		

For order codes differing from the standard version, please refer to section 4.

Overview of VARINLINE® Pressure Gauge and Thermometer

VARINLINE® pressure gauge

The Bourdon tube pressure gauge is equipped with a sealing diaphragm. A diaphragm provides separation from the measuring material and transmits the process pressure to the meter via a transmission medium. If pressure is applied from the measuring medium now, it is transmitted via the elastic diaphragm to the liquid and thus, to the meter.

The specifically constructed setup of this pressure gauge achieves a low temperature influence and permits use of the device for over- or under-pressure measurements.

According to the requirements of the FDA, the indicator is filled with certified glycerin (or insulation oil at equip with proximity switches) to permit dampening of the indicator under strong vibrations and to avoid formation of precipitation if the temperatures fluctuate strongly.

Thus, the pressure gauge is outstanding for use in the food industry. It is available for process connection sizes B, F and N. Depending on the installation position of the pressure gauge, different orientations are available for best reading of the display.

Pressure gauge for vertical installation

Thermometer with connection down

Thermometer with connection up

VARINLINE® thermometer

The precision gas system thermometer has a sturdy design and is characterized by its optimal and completely welded installation into the VARINLINE® process connection. It ideally meets the high requirements to hygienic process technology.

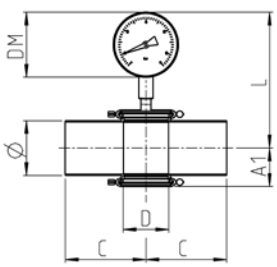
According to the requirements of the FDA, the indicator is filled with certified glycerin (or insulation oil at equip with proximity switches) to permit dampening of the indicator under strong vibrations and to avoid formation of precipitation if the temperatures fluctuate strongly.

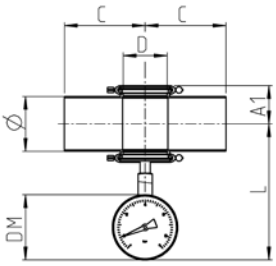
The VARINLINE® thermometer is ideal for use in the food industry. It is available for process connection sizes F and N. Depending on the installation position of the thermometer, different orientations are available for best reading of the display.

VARINLINE®
Pressure Gauge, Type TPIA

The Bourdon tube pressure gauge is equipped with a sealing diaphragm. A diaphragm separates it from the measured material and therefore is suitable for use in the food industry.

Technical data	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Diaphragm material	1.4435 (AISI 316L)
Window	Laminated safety glass (Polycarbonate)
Seal material in contact with the product	EPDM, FKM, HNBR
Damping liquid	Neobee® M-20 (FDA)
Liquid of the pressure gauge housing	Glycerin (FDA)
Process temperature	Max. 80 °C, during sterilisation (SIP) max. 130 °C
Ambient temperature	10 to 40 °C
Dial scale	bar and psi
Measuring ranges	Min. –1 bar (–14.5 psi), max. 25 bar (362.6 psi) Pressure resistant up to 1.3 times the measured value
Deviation at 20 °C	Max. ± 0.4%/10 K from the scale end value
Surface in contact with the product	$R_a \leq 0.8$ µm
External housing surface	Matt blasted
Protection class	IP65
Certificates	FDA





		Pipe					Dimension
Nominal width	Process connection	Ø [mm]	C [mm]	D [mm]	DM [mm]	L [mm]	A1 [mm]
DN 25	F	29.00 × 1.50	90.0	50	100	205.0	30.0
DN 40	N	41.00 × 1.50	90.0	68	100	211.0	36.0
DN 50	N	53.00 × 1.50	90.0	68	100	217.0	42.0
DN 65	N	70.00 × 2.00	125.0	68	100	225.0	50.0
DN 80	N	85.00 × 2.00	125.0	68	100	232.7	57.5
DN 100	N	104.00 × 2.00	125.0	68	100	242.0	67.0
DN 125	N	129.00 × 2.00	125.0	68	100	254.5	79.5
DN 150	N	154.00 × 2.00	150.0	68	100	267.0	92.0
OD 1"	F	25.40 × 1.65	90.0	50	100	203.0	28.0
OD 1 ½"	N	38.10 × 1.65	90.0	68	100	209.5	34.5
OD 2"	N	50.80 × 1.65	90.0	68	100	215.8	40.8
OD 2 ½"	N	63.50 × 1.65	125.0	68	100	222.0	47.0
OD 3"	N	76.20 × 1.65	125.0	68	100	228.5	53.5
OD 4"	N	101.60 × 2.11	125.0	68	100	240.8	65.8
IPS 2"	N	60.30 × 2.00	114.3	68	100	220.5	45.5
IPS 3"	N	88.90 × 2.30	152.4	68	100	234.5	59.5
IPS 4"	N	114.30 × 2.30	152.4	68	100	247.0	72.0
IPS 6"	N	168.30 × 2.77	152.4	68	100	273.0	98.0
ISO 33.7	F	33.70 × 2.00	114.3	50	100	207.0	32.0
ISO 42.4	N	42.40 × 2.00	114.3	68	100	211.3	36.3
ISO 48.3	N	48.30 × 2.00	114.3	68	100	214.3	39.3
ISO 60.3	N	60.30 × 2.00	114.3	68	100	220.5	45.5
ISO 76.1	N	76.10 × 2.00	152.4	68	100	228.5	53.5
ISO 88.9	N	88.90 × 2.30	152.4	68	100	234.5	59.5
ISO 114.3	N	114.30 × 2.30	152.4	68	100	247.0	72.0

VARINLINE®
Pressure Gauge, Type TPIA
with Housing

Position	Description of the order code			
1	**VARINLINE® system**			
	TPIA	VARINLINE® pressure gauge		
2	**Process connection**			
	F[1)]	N		
3	**Measuring range**			
	K	–1 to 9 bar		
	E	0 to 6 bar		
	F	0 to 10 bar		
	L	0 to 25 bar[2)]		
4	**Connection direction**			
	U	Down		
	H	Back[3)]		
	Z	Up[4)]		
5	**Installation in VARINLINE® component**			
	–	Without VARINLINE® housing[5)]		
	T	VARINLINE® housings		
6	**Nominal width (at delivery with VARINLINE® housing)**			
	DN 25	OD 1"		ISO 21.3
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
7	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	5	PTFE (FDA)		
8	**Surface quality of the housing**			
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted		
9	**Certificates**			
	K	Without		
	W	Test report EN 10204 – 2.2		
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204		
	Z	Inspection certificate EN 10204 – 3.1		
10	**Connection fittings**			
	N	Welding end		
11	**Material**			
	1.4404	1.4404 (AISI 316L)		
	1.4435	1.4435 (AISI 316L)		
12	**Options**			
	See section options			

The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4		5	6	7	8	9	10		11	12
Code	TPIA		-			-				2		N	-		

For order codes differing from the standard version, please refer to section 4.

[1)] Only available with measuring range F and connection direction U [2)] Option PS 20 bar (/37) required.
[3)] Only available with measuring range K, E, F. [4)] Only available with measuring range F.
[5)] Position 6, 7, 8, 10 and 11 in the code are omitted.

VARINLINE®
Pressure Gauge, Type TPIA
with Housing Connection Flange

Position	Description of the order code		
1	**VARINLINE® system**		
	TPIA	VARINLINE® pressure gauge	
2	**Process connection**		
	F[1)]	N	G
3	**Measuring range**		
	K	–1 to 9 bar	
	E	0 to 6 bar	
	F	0 to 10 bar	
	L	0 to 25 bar[2)]	
4	**Connection direction**		
	U	Down	
	H	Back[3)]	
	Z	Up[4)]	
5	**Installation in VARINLINE® component**		
	TT	VARINLINE® housing connection type T	
	TT-S	VARINLINE® housing connection type T-S	
	TU	VARINLINE® housing connection type U	
	TU-S	VARINLINE® housing connection type U-S	
6	**Nominal width (process connection)**		
	DN 25	F	
	DN 50/40	N	
	DN 100	G	
7	**Seal material**		
	1	EPDM (FDA)	
	2	FKM (FDA)	
	3	HNBR (FDA)	
	5	PTFE (FDA)	
8	**Surface quality**		
	3	Inside $R_a \leq 0.8$ µm, outside ground	
9	**Certificates**		
	K	Without	
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204	
	W	Test report EN 10204 – 2.2	
	Z	Inspection certificate EN 10204 – 3.1	
10	**Welding device[5)]**		
	K	Without	
11	**Material**		
	1.4404	1.4404 (AISI 316L)	
	1.4435	1.4435 (AISI 316L)	
12	**Options**		
	See section options		

The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4		5	6	7	8	9	10		11	12
Code	TPIA		-			-				3		K	-		

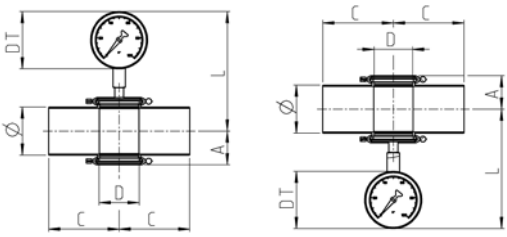
For order codes differing from the standard version, please refer to section 4.

[1)] Only available with measuring range F and connection direction U [2)] Option PS 20 bar (/37) required.
[3)] Only available with measuring range K, E, F. [4)] Only available with measuring range F.
[5)] The welding device has to be ordered separately, you can find the necessary part number on page 34–35.

VARINLINE®
Thermometer, Type TTIA

The robust gas system thermometer is characterized specifically by its optimal and complete welded installation in the VARINLINE® process connection and ideally meets the high requirements for hygienic processing technology.

Technical data	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Material Bourdon tube pressure gauge	1.4571 (AISI 316 Ti)
Window	Laminated safety glass (Polycarbonate)
Seal material in contact with the product	EPDM, FKM, HNBR
Damping liquid	Neobee® M-20 (FDA)
Liquid of the pressure gauge housing	Glycerin (FDA)
Ambient temperature	10 to 40 °C
Measuring ranges	–30 to 160 °C
Accuracy class	± 1 °C within the measuring range
Surface in contact with the product	R_a ≤ 0.8 µm
External housing surface	Matt blasted
Protection class	IP66
Certificates	FDA



		Pipe					Dimension
Nominal width	Process connection	Ø [mm]	C [mm]	D [mm]	DT [mm]	L [mm]	A [mm]
DN 25	F	29.00 × 1.50	90.0	50	100	162.0	30.0
DN 40	N	41.00 × 1.50	90.0	68	100	168.0	36.0
DN 50	N	53.00 × 1.50	90.0	68	100	174.0	42.0
DN 65	N	70.00 × 2.00	125.0	68	100	182.0	50.0
DN 80	N	85.00 × 2.00	125.0	68	100	189.5	57.5
DN 100	N	104.00 × 2.00	125.0	68	100	199.0	67.0
DN 125	N	129.00 × 2.00	125.0	68	100	211.5	79.5
DN 150	N	154.00 × 2.00	150.0	68	100	224.0	92.0
OD 1"	F	25.40 × 1.65	90.0	50	100	160.0	28.0
OD 1 ½"	N	38.10 × 1.65	90.0	68	100	166.5	34.5
OD 2"	N	50.80 × 1.65	90.0	68	100	172.8	40.8
OD 2 ½"	N	63.50 × 1.65	125.0	68	100	179.0	47.0
OD 3"	N	76.20 × 1.65	125.0	68	100	185.5	53.5
OD 4"	N	101.60 × 2.11	125.0	68	100	197.8	65.8
IPS 2"	N	60.30 × 2.00	114.3	68	100	177.5	45.5
IPS 3"	N	88.90 × 2.30	152.4	68	100	191.5	59.5
IPS 4"	N	114.30 × 2.30	152.4	68	100	204.0	72.0
IPS 6"	N	168.30 × 2.77	152.4	68	100	130.0	98.0
ISO 33.7	F	33.70 × 2.00	114.3	50	100	164.0	32.0
ISO 42.4	N	42.40 × 2.00	114.3	68	100	168.3	36.3
ISO 48.3	N	48.30 × 2.00	114.3	68	100	171.3	39.3
ISO 60.3	N	60.30 × 2.00	114.3	68	100	177.3	45.5
ISO 76.1	N	76.10 × 2.00	152.4	68	100	185.5	53.5
ISO 88.9	N	88.90 × 2.30	152.4	68	100	191.5	59.5
ISO 114.3	N	114.30 × 2.30	152.4	68	100	204.0	72.0

VARINLINE®
Thermometer, Type TTIA
with Housing

Position	Description of the order code			
1	**VARINLINE® system**			
	TTIA	VARINLINE® thermometer		
2	**Process connection**			
	F[1]	N		
3	**Measuring range**			
	U	0 to 120 °C		
	H	0 to 160 °C		
4	**Connection direction**			
	U	Down		
	H	Back		
	Z	Up[2]		
5	**Installation in VARINLINE® component**			
	–	Without VARINLINE® housing[3]		
	T	VARINLINE® housings		
6	**Nominal width (at delivery with VARINLINE® housing)**			
	DN 25	OD 1"		ISO 21.3
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
7	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	5	PTFE (FDA)		
8	**Surface quality of the housing**			
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted		
9	**Certificates**			
	K	Without		
	W	Test report EN 10204 – 2.2		
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204		
	Z	Inspection certificate EN 10204 – 3.1		
10	**Connection fittings**			
	N	Welding end		
11	**Material**			
	1.4404	1.4404 (AISI 316L)		
	1.4435	1.4435 (AISI 316L)		
12	**Options**			
	See section options			

The code is composed as following, depending on the chosen configuration:

Position	1	2		3	4		5	6	7	8	9	10		11	12
Code	TTIA		-			-				2		N	-		

For order codes differing from the standard version, please refer to section 4.

[1] Only available with measuring range H and connection direction U.
[2] Only available with measuring range U.
[3] Position 6, 7, 8, 10 and 11 in the Code are omitted.

VARINLINE®
Thermometer, Type TTIA
with Housing Connection Flange

Position	Description of the order code	
1	**VARINLINE® system**	
	TTIA	VARINLINE® thermometer
2	**Process connection**	
	F[1)]	N
3	**Measuring range**	
	U	0 to 120 °C
	H	0 to 160 °C
4	**Connection direction**	
	U	Down
	H	Back
	Z	Up[2)]
5	**Installation in VARINLINE® component**	
	TT	VARINLINE® housing connection type T
	TT-S	VARINLINE® housing connection type T-S
	TU	VARINLINE® housing connection type U
	TU-S	VARINLINE® housing connection type U-S
6	**Nominal width (process connection)**	
	DN 25	F
	DN 50/40	N
	DN 100	G
7	**Seal material**	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
	5	PTFE (FDA)
8	**Surface quality**	
	3	Inside $R_a \leq 0.8$ µm, outside ground
9	**Certificates**	
	K	Without
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204
	W	Test report EN 10204 – 2.2
	Z	Inspection certificate EN 10204 – 3.1
10	**Welding device[3)]**	
	K	Without
11	**Material**	
	1.4404	1.4404 (AISI 316L)
	1.4435	1.4435 (AISI 316L)
12	**Options**	
	See section options	

The code is composed as following, depending on the chosen configuration:

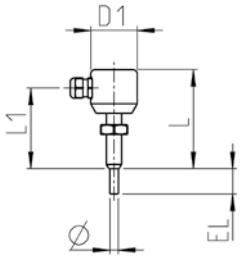
Position	1	2		3	4		5	6	7	8	9	10		11	12
Code	TTIA		-			-				3		K	-		

For order codes differing from the standard version, please refer to section 4.

[1)] Only available with measuring range H and connection direction U.
[2)] Only available with measuring range U.
[3)] The welding device has to be ordered separatly, you can find the necessary part number on page 34–35.

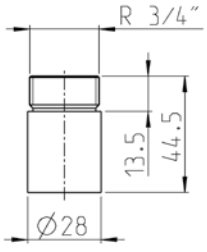
Level Probe, Type TNS

The level probe works conductively in connection with conventional evaluation electronics. The electrodes are mainly used in tanks for level control during vessel filling or emptying. The coated electrode rod (Ø 10 mm) can be shortened as required and also serves to collect media in pipelines, e.g. as pump protection. The required tightening torque for the sealing system is 10 – 20 Nm.



Technical data	
Material in contact with the product	1.4404, PEEK
Material not in contact with the product	1.4301 (AISI 304)
Material electrode rod	ETFE coating
Operating temperature	0 to 100 °C, short-time (30 min.) up to 140 °C
Ambient temperature	−10 to 70 °C
Product pressure	Max. 10 bar
Protection class	IP68
Certificates	FDA

	Dimension			
Length of the electrode EL [mm]	Ø [mm]	L [mm]	L1 [mm]	D1 [mm]
30	10	110	80	55
150	10	110	80	55
500	10	110	80	55
1,000	10	110	80	55
1,800	10	110	80	55



Electrode holder N

To hold the level probe in vessels or tanks, the electrode holder N is available.

Technical data	
Material	1.4404/316 L
Certificate	Optional inspection certificate EN 10204 – 3.1

Position	Description of the order code	
1	**Type**	
	TNS	Level probe
2	**Process connection**	
	WA	Without electrode holder
	ZA	Electrode holder N
	NA	VARINLINE® process connection size N with electrode holder N
3	**Cable gland**	
	M	M16×1.5
	U	4-pin M12/M16×1.5 plug
4	**Level module**	
	0	Without
	1	With
5	**Rod length in the product chamber**	
	30	30 mm
	31...149	31 up to 149 mm
	150	150 mm
	151...499	151 up to 499 mm
	500	500 mm
	501...999	501 up to 999 mm
	1000	1,000 mm
	1001...1799	1,001 up to 1,799 mm
	1800	1,800 mm
6	**Certificates**	
	K	Without
	W	Test report EN 10204 – 2.2
	M	Inspection certificate 3.1 and test report 2.2 according to EN 10204[1)]
	Z	Inspection certificate EN 10204 – 3.1[1)]
7	**Options**	
	See section options	

[1)] Certificate 3.1 only for Electrode Holder N

The code is composed as following, depending on the chosen configuration:

Position	1		2		3	4		5		6	7
Code	TNS	-		-			-		-		

For order codes differing from the standard version, please refer to section 4.

2 VARIVENT® PIPE CONNECTIONS

Overview

Use and function
An O-ring is used for sealing the VARIVENT® flange connection, and is given a defined range of compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates.

The VARIVENT® flange connection is available as a complete connection including O-rings, screws and nuts, as well as in components (grooved and plain flanges).

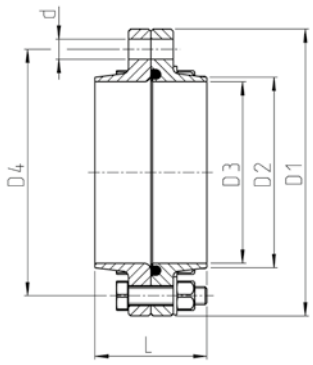
The range also contains VARIVENT® blind flanges that are also available as grooved and plain flanges. They are used for shutting off pipelines, e.g. when expansion of the system is only planned for a later time.

Complete connection including bolts and nuts

Grooved flange including connecting elements and O-ring

Plain Flange

VARIVENT®
Flange Connection



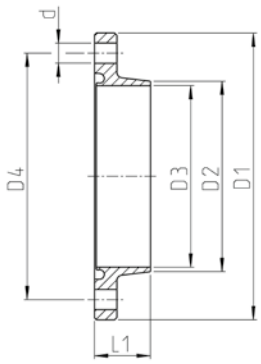
Technical data

Material	1.4404
Surface in contact with the product	$R_a \leq 0.8$ µm
Inspection	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	FDA

Flange

					Dimension		**O-ring**			**Article number**		
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]	[mm]	PS	Weight [kg]	Material EPDM	FKM	HNBR
DN 25	70	30.0	26.0	53	4 × Ø 9	50	25.0 × 5.0	16	0.6	752-828	752-838	752-848
DN 40	82	42.0	38.0	65	4 × Ø 9	50	36.0 × 5.0	16	0.7	752-830	752-840	752-849
DN 50	94	54.0	50.0	77	4 × Ø 9	50	47.0 × 5.0	16	0.9	752-831	752-841	752-850
DN 65	113	70.0	66.0	95	8 × Ø 9	50	62.0 × 5.0	16	1.2	752-832	752-842	752-851
DN 80	128	85.0	81.0	110	8 × Ø 9	50	75.0 × 5.0	10	1.5	752-833	752-843	752-852
DN 100	159	104.0	100.0	137	8 × Ø 11	50	92.0 × 5.0	10	2.3	752-834	752-844	752-853
DN 125	183	129.0	125.0	161	8 × Ø 11	50	115.0 × 5.0	10	2.7	752-835	752-845	752-854
DN 150	213	154.0	150.0	188	8 × Ø 14	60	134.2 × 5.7	10	4.8	752-836	752-846	752-878
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	22.0 × 5.0	16	0.6	752-858	752-864	752-872
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	33.5 × 5.0	16	0.7	752-859	752-865	752-873
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	45.0 × 5.0	16	0.9	752-860	752-866	752-874
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	56.0 × 5.0	16	1.0	752-861	752-867	752-875
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	68.0 × 5.0	10	1.3	752-862	752-868	752-876
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	90.0 × 5.0	10	2.3	752-863	752-869	752-877
OD 6"	211	152.4	146.5	186	8 × Ø 14	50	134.2 × 5.7	10	5.2	752-691	752-692	752-693
IPS 2"	101	60.5	57.0	84	8 × Ø 9	50	53.0 × 5.0	16	1.0	752-855	–	–
IPS 3"	132	89.0	85.0	114	8 × Ø 9	50	78.0 × 5.0	10	1.5	752-856	–	–
IPS 4"	169	114.0	110.0	147	8 × Ø 9	50	102.0 × 5.0	10	2.5	752-857	–	–
IPS 6"	227	168.0	162.0	202	8 × Ø14	60	149.0 × 5.7	10	5.4	752-837	752-847	–

VARIVENT®
Grooved Flange



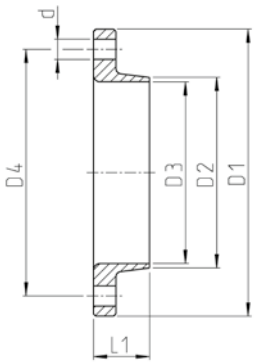
Grooved flange

O-ring

Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8$ µm
Inspection	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	FDA

	Grooved flange									O-ring			
	Dimensions								Article no.	Dimensions	Article no.		
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L1 [mm]	PS	Weight [kg]		D1 [mm]	Material		
											EPDM	FKM	HNBR
DN 25	70	30.0	26.0	53	4 × Ø 9	25	16	0.3	752-703	25.0 × 5.0	930-393	930-564	930-551
DN 40	82	42.0	38.0	65	4 × Ø 9	25	16	0.3	752-705	36.0 × 5.0	930-545	930-566	930-552
DN 50	94	54.0	50.0	77	4 × Ø 9	25	16	0.4	752-706	47.0 × 5.0	930-546	930-567	930-553
DN 65	113	70.0	66.0	95	8 × Ø 9	25	16	0.5	752-707	62.0 × 5.0	930-547	930-526	930-554
DN 80	128	85.0	81.0	110	8 × Ø 9	25	10	0.6	752-708	75.0 × 5.0	930-450	930-527	930-555
DN 100	159	104.0	100.0	137	8 × Ø 11	25	10	1.0	752-709	92.0 × 5.0	930-549	930-568	930-556
DN 125	183	129.0	125.0	161	8 × Ø 11	25	10	1.2	752-710	115.0 × 5.0	930-550	930-569	930-557
DN 150	213	154.0	150.0	188	8 × Ø 14	30	10	2.0	752-711	134.2 × 5.7	930-574	930-575	930-1053
OD 1"	66	25.5	22.0	49	4 × Ø 9	25	16	0.3	752-718	22.0 × 5.0	930-376	930-593	930-851
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	25	16	0.3	752-719	33.5 × 5.0	930-497	930-570	930-852
OD 2"	91	51.0	47.5	74	4 × Ø 9	25	16	0.4	752-720	45.0 × 5.0	930-559	930-571	930-853
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	25	16	0.5	752-721	56.0 × 5.0	930-560	930-572	930-854
OD 3"	119	76.5	73.0	101	8 × Ø 9	25	10	0.6	752-722	68.0 × 5.0	930-319	930-666	930-652
OD 4"	156	102.0	97.5	134	8 × Ø 11	25	10	1.0	752-723	90.0 × 5.0	930-561	930-573	930-855
OD 6"	211	152.4	146.5	186	8 × Ø 14	30	10	2.0	752-694	134.2 × 5.7	930-574	930-575	930-1053
IPS 2"	101	60.5	57.0	84	8 × Ø 9	25	16	0.4	752-715	53.0 × 5.0	930-562	–	–
IPS 3"	132	89.0	85.0	114	8 × Ø 9	25	10	0.6	752-716	78.0 × 5.0	930-563	–	–
IPS 4"	169	114.0	110.0	147	8 × Ø 9	25	10	1.0	752-717	102.0 × 5.0	930-154	930-667	930-654
IPS 6"	227	168.0	162.0	202	8 × Ø 14	30	10	2.3	752-712	149.0 × 5.7	930-403	930-404	–

VARIVENT®
Flange



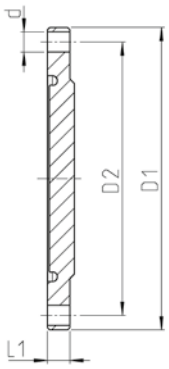
Technical data

Material	1.4404
Surface in contact with the product	$R_a \leq 0.8$ µm
Inspection	3.1/AD2000W2
Certificates	FDA

Flange

	Dimension							Article no.
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L1 [mm]	PS	Weight [kg]	
DN 25	70	30.0	26.0	53	4 × Ø 9	25	16	0.3	752-724
DN 40	82	42.0	38.0	65	4 × Ø 9	25	16	0.3	752-726
DN 50	94	54.0	50.0	77	4 × Ø 9	25	16	0.4	752-727
DN 65	113	70.0	66.0	95	8 × Ø 9	25	16	0.6	752-728
DN 80	128	85.0	81.0	110	8 × Ø 9	25	10	0.7	752-729
DN 100	159	104.0	100.0	137	8 × Ø 11	25	10	1.1	752-730
DN 125	183	129.0	125.0	161	8 × Ø 11	25	10	1.2	752-731
DN 150	213	154.0	150.0	188	8 × Ø 14	30	10	2.1	752-733
OD 1"	66	25.5	22.0	49	4 × Ø 9	25	16	0.2	752-739
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	25	16	0.3	752-740
OD 2"	91	51.0	47.5	74	4 × Ø 9	25	16	0.4	752-741
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	25	16	0.5	752-742
OD 3"	119	76.5	73.0	101	8 × Ø 9	25	10	0.6	752-743
OD 4"	156	102.0	97.5	134	8 × Ø 11	25	10	1.0	752-744
OD 6"	211	152.4	146.5	186	8 × Ø 14	30	10	2.4	752-695
IPS 2"	101	60.5	57.0	84	8 × Ø 9	25	16	0.4	752-736
IPS 3"	132	89.0	85.0	114	8 × Ø 9	25	10	0.7	752-737
IPS 4"	169	114.0	110.0	147	8 × Ø 9	25	10	1.1	752-738
IPS 6"	227	168.0	162.0	202	8 × Ø 14	30	10	2.4	752-734

VARIVENT®
Blind Grooved Flange



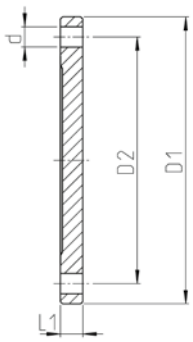
Blind grooved flange

O-ring

Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8$ µm
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	FDA

	Blind grooved flange							O-ring			
	Dimensions						Article no.	Dimensions	Article no.		
Nominal width	D1 [mm]	D2 [mm]	d [mm]	L1 [mm]	PS	Weight [kg]		D1 [mm]	Material EPDM	FKM	HNBR
DN 25	70	53	4 × Ø 9	10	16	0.3	752-763	25.0 × 5.0	930-393	930-564	930-551
DN 40	82	65	4 × Ø 9	10	16	0.4	752-766	36.0 × 5.0	930-545	930-566	930-552
DN 50	94	77	4 × Ø 9	10	16	0.5	752-792	47.0 × 5.0	930-546	930-567	930-553
DN 65	113	95	8 × Ø 9	10	16	0.7	752-790	62.0 × 5.0	930-547	930-526	930-554
DN 80	128	110	8 × Ø 9	10	10	0.9	752-770	75.0 × 5.0	930-450	930-527	930-555
DN 100	159	137	8 × Ø 11	10	10	1.4	752-772	92.0 × 5.0	930-549	930-568	930-556
DN 125	183	161	8 × Ø 11	10	10	2.0	752-773	115.0 × 5.0	930-550	930-569	930-557
DN 150	213	188	8 × Ø 14	15	10	4.1	752-638	134.2 × 5.7	930-574	930-575	930-1053
OD 1"	66	49	4 × Ø 9	25	16	0.2	752-762	22.0 × 5.0	930-376	930-593	930-851
OD 1 ½"	79	62	4 × Ø 9	25	16	0.4	752-765	33.5 × 5.0	930-497	930-570	930-852
OD 2"	91	74	4 × Ø 9	25	16	0.5	752-767	45.0 × 5.0	930-559	930-571	930-853
OD 2 ½"	106	88	8 × Ø 9	25	16	0.6	752-768	56.0 × 5.0	930-560	930-572	930-854
OD 3"	119	101	8 × Ø 9	25	10	0.8	752-769	68.0 × 5.0	930-319	930-666	930-652
OD 4"	156	134	8 × Ø 11	25	10	1.5	752-771	90.0 × 5.0	930-561	930-573	930-855
OD 6"	211	186	8 × Ø 14	30	10	4.2	752-070	134.2 × 5.7	930-574	930-575	930-1053
IPS 6"	227	202	8 × Ø 14	30	10	4.9	752-004	149.0 × 5.7	930-403	930-404	–

VARIVENT®
Blind Flange



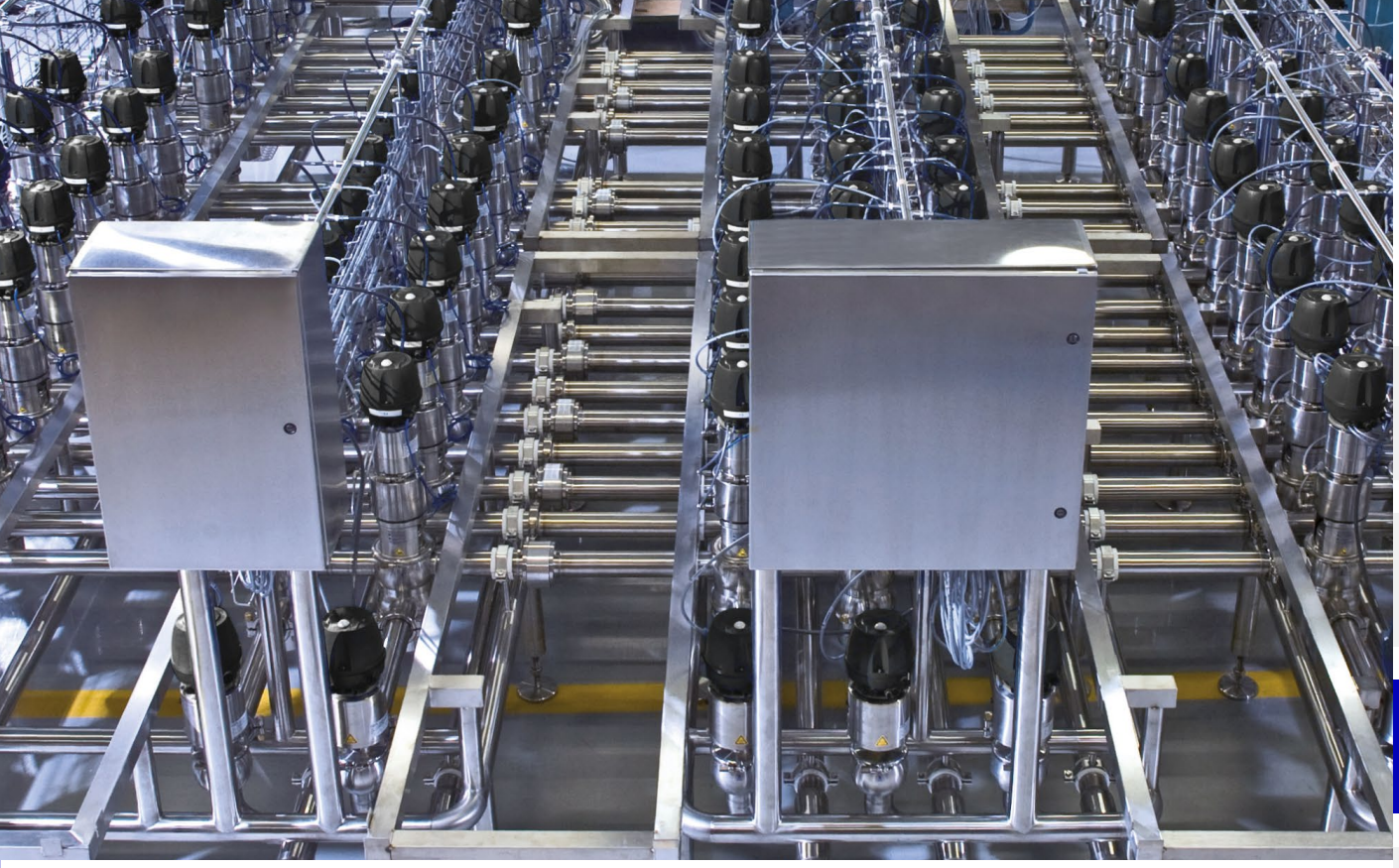
Technical data

Material	1.4404
Surface in contact with the product	$R_a \leq 0.8$ µm
Certificates	FDA

Blind flange

	Dimension					Article no.
Nominal width	D1 [mm]	D2 [mm]	d [mm]	L1 [mm]	PS	Weight [kg]	
DN 25	70	53	4 × Ø 9	10	16	0.3	752-774
DN 40	82	65	4 × Ø 9	10	16	0.4	752-777
DN 50	94	77	4 × Ø 9	10	16	0.5	752-779
DN 65	113	95	8 × Ø 9	10	16	0.7	752-782
DN 80	128	110	8 × Ø 9	10	10	0.9	752-784
DN 100	159	137	8 × Ø 11	10	10	1.4	752-787
DN 125	183	161	8 × Ø 11	10	10	2.0	752-788
DN 150	213	188	8 × Ø 14	15	10	4.1	752-791
OD 1"	66	49	4 × Ø 9	10	16	0.2	752-825
OD 1 ½"	79	62	4 × Ø 9	10	16	0.4	752-776
OD 2"	91	74	4 × Ø 9	10	16	0.5	752-778
OD 2 ½"	106	88	8 × Ø 9	10	16	0.6	752-781
OD 3"	119	101	8 × Ø 9	10	10	0.8	752-783
OD 4"	156	134	8 × Ø 11	10	10	1.5	752-786
OD 6"	211	186	8 × Ø 14	15	10	4.2	752-071
IPS 2"	101	84	8 × Ø 9	10	16	0.6	752-780
IPS 3"	132	114	8 × Ø 9	10	10	1.0	752-785
IPS 4"	169	147	8 × Ø 9	10	10	1.6	752-789
IPS 6"	227	202	8 × Ø 14	15	10	4.4	752-212

3 VARICOMP® EXPANSION COMPENSATORS



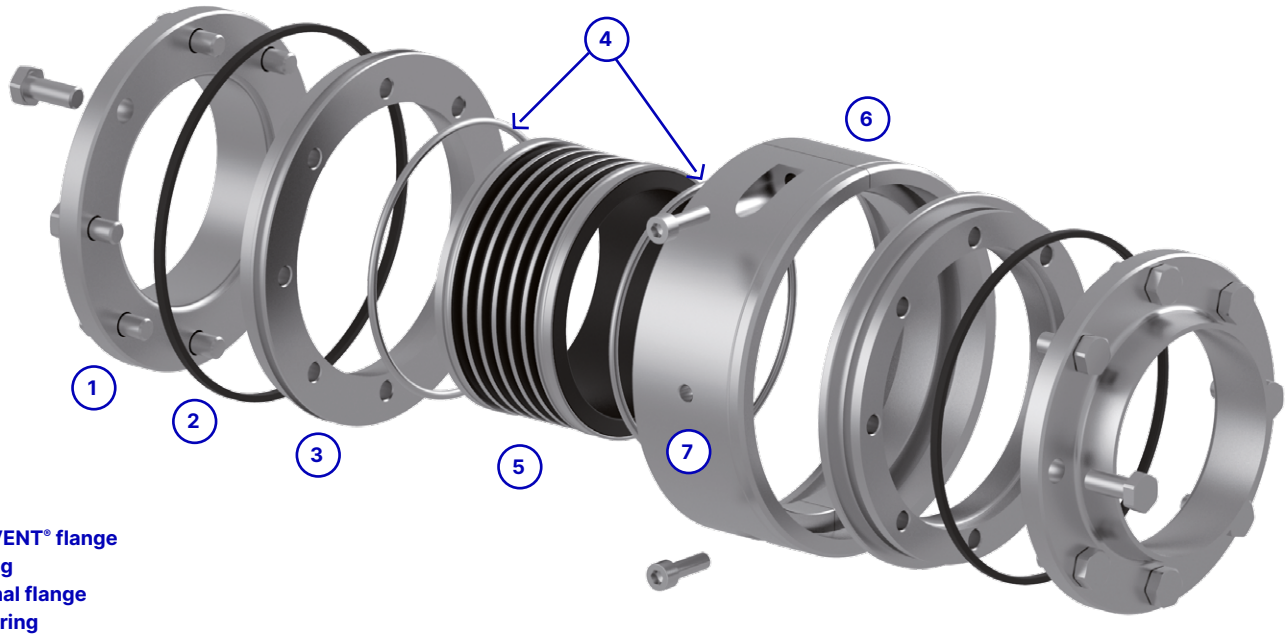
Overview

Function method of the expansion compensator
The innovative VARICOMP® expansion compensator compensates for expansions and tensions that result from temperature differences in the pipeline system. Its special design principles allow for use in aseptic processes as well.

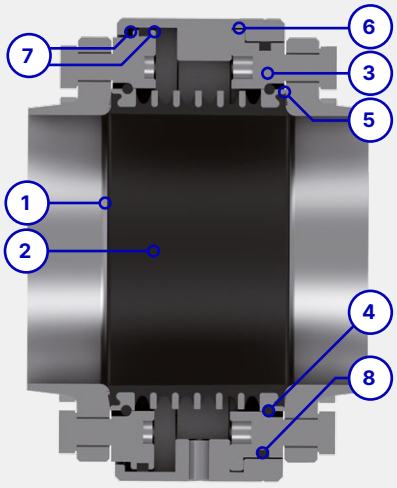
A decisive benefit of the VARICOMP® expansion compensator is its dead-zone free design with drain characteristics. This design meets the prerequisites for best cleaning in CIP/SIP-processes.

Special features
Suitable for hygienic and aseptic applications
Design with no dead zones
CIP/SIP-able
Short, compact design
Compensation element available in EPDM and FKM
Compensation distances limited by metallic stop
Compensation distance 7 mm compression, 1 mm tension
Compensation element with integral vulcanized support rings for high pressure loads

Overview



1 VARIVENT® flange
2 O-Ring
3 Internal flange
4 Snap ring
5 Compensation element
6 Half ring
7 Leakage display



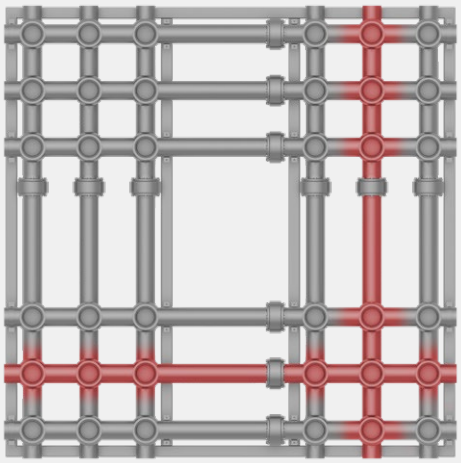
Technical features	
1	Gap-free sealing
2	Pipe-flush, even passage
3	Flange used to fix the compensation element
4	Snap ring for the transmission of force (sealing)
5	Metallic stop (defined sealing pressure, no excessive strain on the compensation element)
6	Fixing of the compensation element at the external ring
7	Defined compensation distance due to metallic stop (tensile/compressive stress) at the external ring, no excessive strain on the compensation element
8	Additional sealing to the outside provided by O-rings

Application ranges

VARICOMP® expansion compensators are used especially in valve blocks and matrix piped systems to compensate for thermal stress in pipeline systems resulting from thermal expansion. They are designed for hygienic and aseptic applications in the dairy, beverage and food industries, as well as in the pharmaceutical, fine chemical, biotechnological and cosmetic industries. The expansion compensators can be used as an alternative for Ω-bends.

Construction

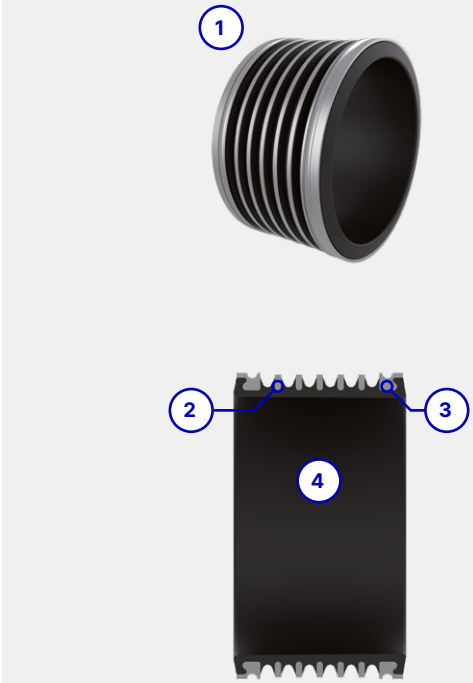
The number of compensators can be determined with the aid of a design tool. We will be happy to make this available to you.



Valve block with
VARICOMP® compensators

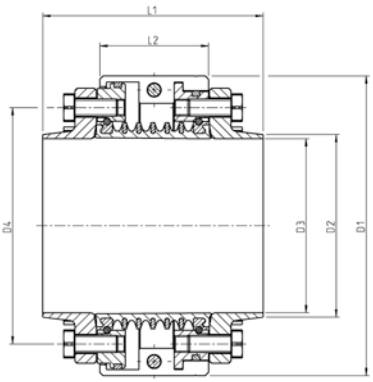
The compensation element

The elastomer compensation element takes up tensions as the core piece of the compensator and compensates for them.



Technical features	
1	Sprayed compensation element of elastomer (EPDM and FKM available)
2	Vulcanized-in support rings of stainless steel for support at pressure load (excess pressure and negative pressure)
3	Vulcanized-in carrying rings for fastening the compensation element
4	Smooth inner faces

VARICOMP®
Expansion Compensator



Technical data of the standard version	
Material in contact with the product	1.4404
Material not in contact with the product	1.4301
Seal material in contact with the product	EPDM (FDA), FKM (FDA)
Max. product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8$ µm
Connection fittings	VARIVENT® flange
Certificates	FDA

	Dimension						Article no.	
Nominal width	L1 [mm]	L2 [mm]	D1 [mm]	D4 [mm]	D3 [mm]	D2 [mm]	Material EPDM	Material FKM
DN 50	102.6	50.6	109.5	77.0	50.0	54.0	228-000126	228-000127
DN 65	102.6	50.6	124.5	95.0	66.0	70.0	228-000091	228-000136
DN 80	102.6	50.6	139.5	110.0	81.0	85.0	228-000132	228-000133
DN 100	102.6	52.6	171.3	137.0	100.0	105.0	228-000092	228-000137
DN 125	102.6	52.6	203.3	161.0	125.0	129.0	228-000115	228-000143
OD 2"	102.6	50.6	109.5	77.0	47.5	51.0	228-000128	228-000129
OD 2 ½"	102.6	50.6	124.5	88.0	60.0	63.5	228-000134	228-000135
OD 3"	102.6	50.6	124.5	101.0	73.0	76.5	228-000130	228-000131
OD 4"	102.6	50.6	171.3	137.0	97.5	102.0	228-000138	228-000139
IPS 3"	102.6	50.6	147.5	114.0	84.7	88.9	228-000140	–
IPS 4"	102.6	50.6	186.3	147.0	110.1	114.3	228-000141	–
IPS 6"	112.6	50.6	246.3	202.0	162.7	168.3	228-000142	–

Options

Installation of compensators, spacer
VARICOMP® Compensators enable the compensation of 7 mm pressure and 1 mm tension. The installation dimension is 51.6 mm for all nominal widths. A correction dimension of 2 × 0.5 mm = 1 mm for weld shrinkage has already been taken into account here.

You are welcome to contact us for deviating conditions.

		Article no.
Nominal width	Standard spacer	Spacer for rent
DN 50	229-000144	229-000156
DN 65	229-000145	229-000157
DN 80	229-000146	229-000158
DN 100	229-000147	229-000159
DN 125	229-000148	229-000160
OD 2"	229-000149	229-000161
OD 2 ½"	229-000150	229-000162
OD 3"	229-000151	229-000163
OD 4"	229-000152	229-000164
IPS 3"	229-000153	229-000165
IPS 4"	229-000154	229-000166
IPS 6"	229-000155	229-000167

Check List Compensators

Check List · Compensators

Engineering for a better world.

Check List Compensators

Contact Data

Company: _____

Contact Person: _____

Phone: _____

General Data

Length of pipeline (L0*) [m]: _____

Minimum product temperature (tmin) [°C]: _____

Maximum product temperature (tmax) [°C]: _____

Will the welding be done at customer site?

☐ No ☐ Yes:

Installation temperature (for welding, tinst) [°C]: _____

Correction welding distortion (Kfs**) [mm]: _____

Nominal Sizes

☐ DN 50	☐ 2" OD	
☐ DN 65	☐ 2½" OD	
☐ DN 80	☐ 3" OD	☐ 3" IPS
☐ DN 100	☐ 4" OD	☐ 4" IPS
☐ DN 125		☐ 6" IPS

Sealing Material

☐ EPDM

☐ FKM

Notes

* Length between two fixed points ** Standard: 0.5 mm per flange (in total: 1 mm)

11/2022

4 OPTIONS

VARINLINE® / VARICOMP®

Available Options

Options
Housings and Nominal Widths
VARINLINE® Housing with Increased Pressure Level

Description

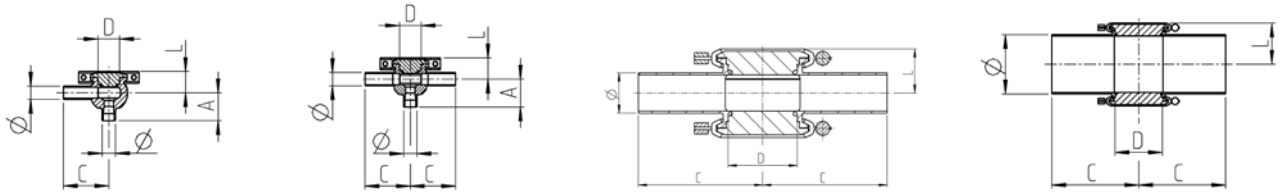
For the installations of In-Line control and measurement instruments into pipe systems the VARINLE® Housing with increased pressure level is recommended. For increasing the strength, the half rings on the VARINLINE® housings are made of cast material.

ATTENTION: The maximum permissible product pressure of the instrument must not be exceeded.

Available valve types
VARINLINE® Housings

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–6"
ISO	ISO	13.5–114.3

Technical data		
Material	1.4404 (AISI 316L)	DN 25–150; OD 1"–6"
	1.4435 (AISI 316L)	DN 10–15; ISO 13.5–114.3
Pressure range	DN 10–15; ISO 13.5–21.3	PS 25 bar
	DN 25–150; OD 1"–6", ISO 33.7–114.3	PS 20 bar



		Dimensions		
Nominal width	Process connection	Ø [mm]	C [mm]	L [mm]
DN 10	B	13.5 × 1.50	65.0	28.5
DN 15	B	19.0 × 1.50	65.0	31.5
DN 25	F	29.0 × 1.50	90.0	31.5
DN 40	N	41.0 × 1.50	90.0	37.5
DN 50	N	53.0 × 1.50	90.0	43.5
DN 65	N	70.0 × 2.00	125.0	51.5
DN 80	N	85.0 × 2.00	125.0	59.0
DN 100	N	104.0 × 2.00	125.0	68.5
DN 100	G	104.0 × 2.00	125.0	71.0
DN 125	N	129.0 × 2.00	125.0	81.0
DN 150	N	154.0 × 2.00	150.0	93.5
OD 1"	F	25.4 × 1.65	90.0	39.5
OD 1 ½"	N	38.1 × 1.65	90.0	36.0
OD 2"	N	50.8 × 1.65	90.0	42.3
OD 2 ½"	N	63.5 × 1.65	125.0	48.5
OD 3"	N	76.2 × 1.65	125.0	55.0
OD 4"	N	101.6 × 2.11	125.0	67.3
OD 4"	G	114.3 × 2.30	152.4	76.0
OD 6"	N	152.4 × 2.77	150.0	92.0
ISO 13.5	B	13.5 × 1.60	65.0	28.5
ISO 17.2	B	17.2 × 1.60	65.0	30.5
ISO 21.3	B	21.3 × 1.60	65.0	32.5
ISO 33.7	F	33.7 × 2.00	114.3	33.5
ISO 42.4	N	42.4 × 2.00	114.3	37.8
ISO 48.3	N	48.3 × 2.00	114.3	40.8
ISO 60.3	N	60.3 × 2.00	114.3	47.0
ISO 76.1	N	76.1 × 2.00	152.4	55.0
ISO 88.9	N	88.9 × 2.30	152.4	61.0
ISO 114.3	N	114.3 × 2.30	152.4	73.5

* For dimensions A, B and D see page 27.

Incorporation of the option in the order code and example

Position	Description of the order code for options
10	**Accessories**
	/37 PS 20 bar*

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	N	1.4404	-	/37

* DN 10–15; ISO 13.5–21.3; PS 25 bar

Options
Surface Qualities
Inner and Outer Surface of the Housings

Typical application and description

Deviating from the quality of the standard surface quality, different surface qualities are available up to a medium roughness for surfaces in contact with the product of $R_a \leq 0.4$ µm. The outer surface of the housings is matt blasted as standard. Optionally, it can also be supplied ground.

Incorporation of the option in the order code and example

Position	Description of the order code for options	
6	**Surface quality of the housing**	
	2	Inside $R_a \leq 0.8$ µm, outside matt blasted
	3	Inside $R_a \leq 0.8$ µm, outside ground
	4	Inside $R_a \leq 0.4$ µm, outside matt blasted
	8	Inside $R_a \leq 0.4$ µm, outside ground

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	4	K	N	1.4404	-	

Options
Surface Qualities
Electro-Polishing

Typical application and description

One process for improving the surface quality is electrochemical polishing, in which peaks on the surfaces of material are abraded by a galvanic process, resulting in an evened-out elevation profile.

This surface treatment makes it much less likely for contaminating substances and micro-organisms to stick to the surface. In addition, the smooth surface improves corrosion resistance by formation of an inert oxide layer.

Electropolishing of the housings is only available for housings that are outside grounded.

Incorporation of the option in the order code and example

Position		Description of the order code for options	
10		**Accessories**	
	🔍	/E	Surface finish electrolytically polished

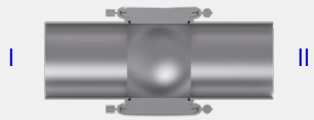
Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	N	1.4404	-	/E 🔍

Options
Connection Fittings
Overview

Typical application and description
The valve housings can be specified with a welded-on connection fitting. To find which connection fittings are available, please refer to the list on the following pages.

If the vertical ports within a valve do have different configurations, please inform us of the designation for the particular housing port including the required connection fitting (as in the example below). The seal which may be included corresponds to the sealing material of the valve.

Connection fittings	
TK	VARIVENT® flange connection, groove flange on housing
TN	VARIVENT® groove flange incl. O-ring and connecting parts
TF	VARIVENT® flange
GK	Pipe fitting, DIN 11851, male end on housing
GO	Male end SC, DIN 11851, incl. seal ring G
KO	Liner SD, DIN 11851, incl. groove nut
ASK	Hygienic flange connection, DIN 11853-2
NFK	Hygienic groove flange, DIN 11853-2
BFK	Hygienic flange, DIN 11853-2
CO	Clamp connection / TRI-Clamp, DIN 32676 (DN) / ISO 2852 (OD)



VARINLINE®
Housing

Example

Housing port	Connection fitting
I	TN
II	TF

Incorporation of the option in the order code and example

Position		Description of the order code for options
8		**Connection fittings**
	J	VARINLINE® Housings with connection fittings (required connection fitting according to list above, please state separately)

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	J	1.4404	-	TN

Options
Connection Fittings
VARIVENT® Flange Connection

Complete connection including bolts and nuts (TK)

Groove flange (TN), including connecting elements and seal ring

Flange (TF)

Typical application and description

An O-ring is used for sealing the VARIVENT® flange connection, and is given a defined compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates.

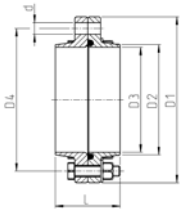
The VARIVENT® flange connection (TK) can be ordered either as a complete connection including bolts and nuts (TK) or a groove flange (TN)/flange (TF) as a connection fitting on a vertical port. If a complete connection is ordered as the connection fitting, the groove flange is welded onto the housing. The groove flange (TN) contains not only the O-ring but also the required connecting elements.

Available nominal widths

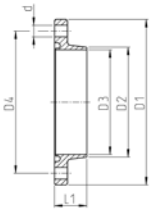
Metric	DN	25–150
Inch OD	OD	1"–6"
Inch IPS	IPS	2"–6"

Technical data

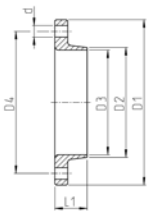
Material	1.4404
Surface in contact with the product	R_a ≤ 0.8 µm
Certificates	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Maximum pressure	DN 25–65, OD 1"–2½": 16 bar
	DN 80–150, OD 3"–6": 10 bar



TK = VARIVENT® flange connection



TN = VARIVENT® groove flange



TF = VARIVENT® flange

							Dimensions	O-ring	
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]	L1 [mm]	[mm]	PS
DN 25	70	30.0	26.0	53	4 × Ø 9	50	25	25.0 × 5.0	16
DN 40	82	42.0	38.0	65	4 × Ø 9	50	25	36.0 × 5.0	16
DN 50	94	54.0	50.0	77	4 × Ø 9	50	25	47.0 × 5.0	16
DN 65	113	70.0	66.0	95	8 × Ø 9	50	25	62.0 × 5.0	16
DN 80	128	85.0	81,0	110	8 × Ø 9	50	25	75.0 × 5.0	10
DN 100	159	104.0	100.0	137	8 × Ø 11	50	25	92.0 × 5.0	10
DN 125	183	129.0	125.0	161	8 × Ø 11	50	25	115.0 × 5.0	10
DN 150	213	154.0	150.0	188	8 × Ø 14	60	30	134.2 × 5.7	10
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	25	22.0 × 5.0	16
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	25	33.5 × 5.0	16
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	25	45.0 × 5.0	16
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	25	56.0 × 5.0	16
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	25	68.0 × 5.0	10
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	25	90.0 × 5.0	10
OD 6"	211	152.4	146.5	186	8 × Ø 11	60	30	134.0 × 5.7	10
IPS 2"*	101	60.5	57.0	84	4 × Ø 9	50	25	53.0 × 5.0	16
IPS 3"*	132	89.0	85.0	114	4 × Ø 9	50	25	78.0 × 5.0	10
IPS 4"	169	114.0	110.0	147	4 × Ø 9	50	25	102.0 × 5.0	10
IPS 6"**	227	168.0	162.0	202	8 × Ø 9	60	25	149.0 × 5.7	10

* only EPDM ** only EPDM and FKM

Incorporation of the option in the order code and example

Position	Description of the order code for options
8	**Accessories**
J	VARINLINE® Housings with connection fittings (please state option TK, TN or TF separately with reference to the connection)

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	J	1.4404	-	TN

Options
Connection Fittings
Pipe Fitting according to DIN 11851

Complete connection (GK)

Male end SC (GO), including seal ring G

Liner SD (KO), including groove nut

Typical application and description

A seal ring G is used for sealing the pipe fitting acc. to DIN 11851. The pipe fitting acc. to DIN 11851 can be ordered either as a complete connection (GK) or male end SC (GO)/liner SD (KO) as a connection fitting on a vertical port. If a complete connection is ordered on a housing port, the male end is welded onto the housing. The groove flange contains the seal ring G. The liner (KO) contains the groove nut.

GK – Complete connection, male end on housing

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Standard	DIN 11851
Seal Material	EPDM (FDA), FKM (FDA), HNBR (FDA)*
Maximum pressure	DN 10–40, OD 1"–1 ½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

* up to DN 100

GO – Male end SC, including seal ring G

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Standard	DIN 11851
Seal Material	EPDM (FDA), FKM (FDA), HNBR (FDA)*
Maximum pressure	DN 10–40, OD 1"–1 ½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

* up to DN 100

KO – Liner SD, including groove nut

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Standard	DIN 11851
Maximum pressure	DN 10–40, OD 1"–1 ½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

Incorporation of the option in the order code and example

Position		Description of the order code for options
8		**Accessories**
	J	VARINLINE® Housings with connection fittings (required connection fitting, please state separately)

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	J	1.4404	-	GK

Options
Connection Fittings
Hygienic Flange Connection according to DIN 11853-2

Complete hygienic flange connection (ASK)

Hygienic-groove flange (NFK), including connecting elements and seal ring

Hygienic flange (BFK)

Typical application and description

An O-ring is used for sealing the hygienic flange connection acc. to DIN 11853-2, and is given a defined compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates. Furthermore, the flange connection is centered by the design shape. The sealing geometry of the hygienic flange connection corresponds to the aseptic flange connection acc. to DIN 11864-2.

The hygienic flange connection (ASK) can be ordered either as a complete connection including bolts and nuts (ASK) or a hygienic groove flange (NFK)/hygienic flange (BFK) as a connection fitting on a vertical port. If a complete connection is ordered on a housing port, the groove flange is welded onto the housing. The groove flange (NFK) contains not only the O-Ring but also the required connecting elements.

ASK – Complete hygienic flange connection

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)*
Standard	DIN 11853-2
Maximum pressure	DN 10–40, OD 1"–1½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

* up to DN 100

NFK – Hygienic groove flange, including connecting elements and seal

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)*
Standard	DIN 11853-2
Maximum pressure	DN 10–40, OD 1"–1½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

* up to DN 100

BFK – Hygienic flange

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Standard	DIN 11853-2
Maximum pressure	DN 10–40, OD 1"–1½": 25 bar
	DN 50–100, OD 2"–4": 16 bar
	DN 125–150: 10 bar

Incorporation of the option in the order code and example

Position	Description of the order code for options
8	**Connection fittings**
	J VARINLINE® Housings with connection fittings (required connection fitting, please state separately)

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	J	1.4404	-	ASK

Options
Connection Fittings
Clamp Connection (Tri-Clamp)

Clamp
connection (CO)

Typical application and description

The clamp connection acc. to DIN 32676 is a widely used connection fitting, in the food, chemical and pharmaceutical industry, especially in North America. The connection uses a symmetrically structured clamp connection with a seal located in between it, and is secured by a clamp. The second clamp connection, the seal and the clamp are not supplied. Clamps with nominal width OD series are compatible to ASME BPE clamps.

Available nominal widths

Metric	DN	10–150
Inch OD	OD	1"–6"

Technical data

Material	DN	1.4404 (AISI 316L)
	OD	AISI 316L
Standard	DN	DIN 32676
	OD	DIN 32676*; Length 28.5 mm**
Inner diameter	DN	DIN 11866 row A
	OD	DIN 11866 row C
Certificates		3.1
Maximum pressure		DN 10–40, OD 1"–1½": 25 bar
		DN 50–65, OD 2"–3": 16 bar
		DN 80–150, OD 4"–6": 10 bar

* Similar to ASME BPE B ** OD 6" referred to DIN 32676

Incorporation of the option in the order code and example

Position		Description of the order code for options
8		Accessories
	J	VARINLINE® Housings with connection fittings (required connection fitting, please state separately)

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	J	1.4404	-	CO

Options
Additional Options
VARINLINE® Plugs

VARINLINE® plugs
The VARINLINE® plugs are needed to close the VARINLINE® housings or housing connections when no measuring or control instrument is used. Clamping connections are available to attach the closures in the fittings.

	Material		Dimension			O-ring	Clamping connection comp.
Process connection	1.4404	1.4435	D [mm]	Material			Article number
				EPDM	FKM	HNBR	
B	–	221-144.15	31	930-270	930-163	930-637	606-001
F	221-144.01	221-144.12	50	930-309	930-168	930-632	221-507.02
N	221-144.02	221-144.13	68	930-144	930-171	930-633	221-507.04
G	221-144.04	221-144.22	123	930-156	930-178	930-863	221-507.11

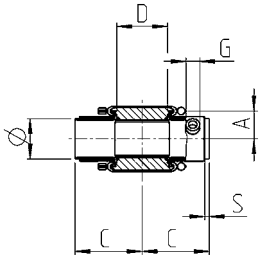
Options
Additional Options
Jacketed VARINLINE® Housings

Jacketed VARINLINE® housings

For keeping chocolate or margarine fluid or for cooling ice cream, jacketed VARINLINE® housings are available. For heating or cooling products, a hot or cooling medium is passed through the housing jacket in the opposite flow direction.

Technical data

Material		1.4404 (AISI 316L)
Max. product pressure	10 bar	DN 25–50, OD 1"–2"
	6 bar	DN 65–100, OD 2 ½"–4"
Jacket pressure resistance		3.5 bar
Surface in contact with the product		$R_a \leq 0.8$ µm
Outside surface		Matt blasted
Valve seat version		Clamped connection

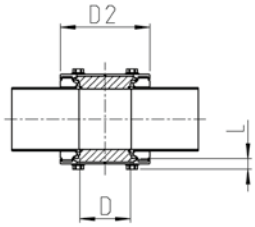


		Pipe	Dimension						
Nominal width	Process connection	Ø [mm]	D [mm]	C [mm]	A [mm]	S [mm]	G	Weight [kg]	Article no.
DN 25	F	29 × 1.50	50	90	25.0	5	¼"	0.7	221-631.01
DN 40	N	41 × 1.50	68	90	31.0	5	¼"	1.1	221-631.02
DN 50	N	53 × 1.50	68	90	37.0	5	¼"	1.1	221-631.03
DN 80	N	85 × 2.00	68	125	55.5	5	½"	2.3	221-631.08
DN 100	G	104 × 2.00	123	125	65.0	5	½"	4.4	221-631.06
OD 1"	F	25.4 × 1.65	50	90	43.0	5	¼"	0.6	221-631.09
OD 1 ½"	N	38.1 × 1.65	68	90	29.5	5	¼"	0.9	221-631.10
OD 2"	N	50.8 × 1.65	68	90	36.0	5	¼"	1.1	221-631.11
OD 4"	G	101.6 × 2.11	123	125	64.0	5	½"	4.0	221-631.14

Options
Additional Options
VARINLINE® Pressure Relief Half Rings

VARINLINE® pressure relief half rings

The VARINLINE® pressure relief half-rings are used for controlled channeling of the inner pipe pressure at maintenance or mounting work. The respective VARINLINE® process connection can also be used for taking up a measuring or control instrument*.



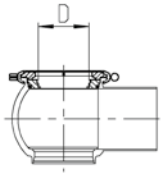
	Pipe	Dimension		
Process connection	Ø [mm]	D [mm]	L [mm]	Article no.
F	102	50	14	222-156.02
N	120	68	14	222-156.01

* Not suitable for installation of a VARINLINE® sampling valve type TSVN or TSVU.

Options
Additional Options
VARINLINE® Adapters

VARINLINE® adapters

The flexibility in the VARIVENT® system offers many advantages. Often, adjustments or modifications are required in existing valve systems of a process system. Use of a VARINLINE® adapter permits inserting a VARINLINE® process connection into a VARIVENT® housing, thereby integrating in-line control and measurement* free of dead zones in a valve housing.



		Dimension	O-ring			Seal disc INL	Locking ring INL	Clamping connection comp.
Nominal width	Process connection	Ø [mm]	Material			Article no.		
			EPDM	FKM	HNBR			
DN 65	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
DN 80	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
DN 100	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11
DN 125	N	68	930-372	930-409	–	222-108.06	222-108.05	221-507.13
OD 2 ½"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
OD 3"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
OD 4"	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11
IPS 3"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
IPS 4"	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11

* Not suitable for installation of a VARINLINE® sampling valve type TSVN or TSVU.

Options
Additional Options
Test Report and Inspection Certificate

Typical application and description

Optionally, the housings or all parts in contact with the product can be supplied with a test report 2.2 and/or an inspection certificate 3.1 acc. to EN 10204.

IMPORTANT: An inspection certificate for all components in contact with the product can only be produced if notification of this requirement is provided with the order. The inspection certificate 3.1 acc. to EN 10204 can only be issued subsequently for the housings. Unless special requirements are stated, the order code referred to below only covers issuing the inspection certificate 3.1 acc. to EN 10204 for the housings.

European standard EN 10204 in its 2004 edition defines the various types of test certificate that can be issued to the ordering party in accordance with the agreements in the order for delivery of metallic products.

Number	Type of test certificate	Content of the certificate	Confirmation of the certificate by
2.2	Test report	Confirmation of compliance with the order, specifying results of a non-specific test	The manufacturer
3.1	Inspection certificate 3.1*	Confirmation of compliance with the order, specifying results of a specific test	The manufacturer's acceptance officer independent of the production department

* Inspection certificates 3.1 can be selected either for the housing or for product wetted parts connection fittings, incl. connection fittings or ADW2 (please specify when ordering).

Incorporation of the option in the order code and example

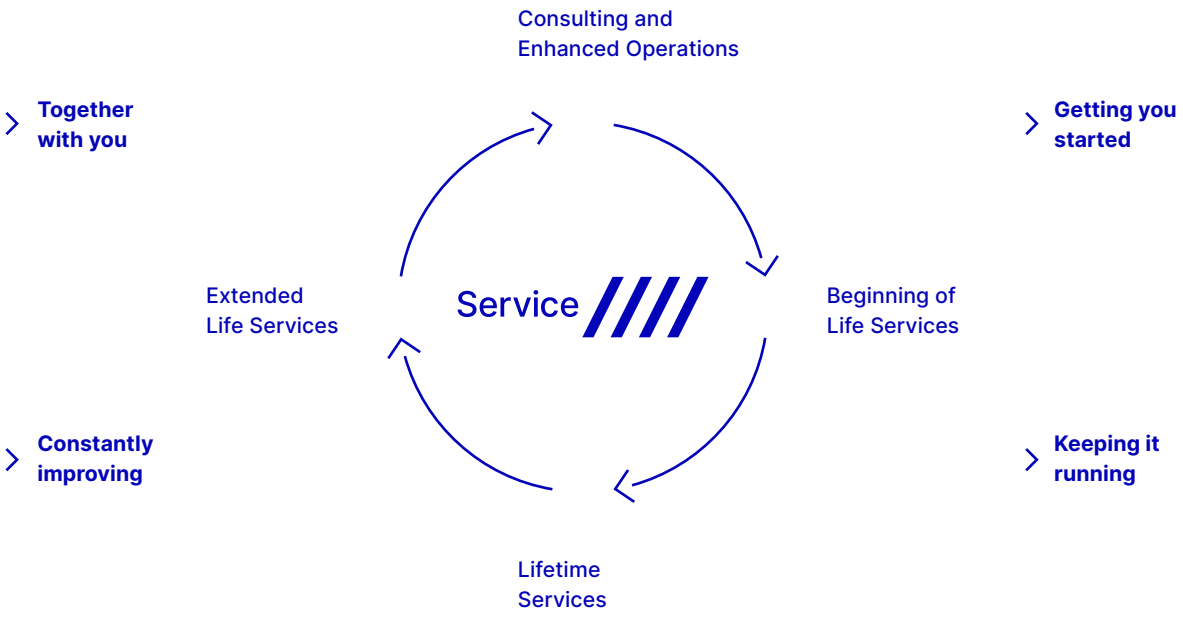
Position		Description of the order code for options	
10		**Surface quality of the housing**	
	🔍	/41	Test report 2.2
		/42	Inspection certificate 3.1 according to EN 10204

Position	1	2		3		4	5	6	7	8	9		10
Code	T	DN 50	-	N	-	1	2	2	K	N	1.4404	-	/41 🔍

Our service package for dependable valve technology

With a tailored service concept, you can extend the service life of your hygienic valve technology. Professional services and original spare parts from GEA help to ensure maximum system availability and security, smooth operation and precise process execution.

Our service specialists are here to help you in every phase of system utilization – from the initial process concept and throughout the entire performance period to advising on your best strategies for the future.



Beginning of life services
We draw on our decades of experience to support you in configuring your system and providing extensive employee training. Our consultations and training sessions take place in our Competence Centre in Büchen or, upon request, at your premises.

Lifetime services
We optimize your spare parts logistics by using our modular component system and our extensive service network. Preventive maintenance programmes based on comprehensive data, routine troubleshooting and efficient repair logistics keep downtimes to a minimum.

Extended life services
When upgrades are available to enhance your system, you benefit from our continuing advances in hygienic valve technology. We offer extensive advice and consultation.

Consulting and enhanced operations
Working in partnership with you, we support your enduring success and develop service strategies and Service Level Agreements for a profitable future operation.

Description of Certificates

3-A		3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.
24/7 PMO VALVE 2.0® NON-STOP PRODUCTION		24/7 PMO VALVE® is a registered trade mark of GEA Tuchenhagen GmbH. It describes double-seat valves that have been authorized for use in PMO-regulated systems for carrying out the seat lift in order to clean the leakage chamber while the other pipeline is carrying product. This grants system operators the possibility of cleaning all valve components in contact with the product in parallel with the production process. In this way, the valves permit uninterrupted production on a 24/7 basis.
AS-i		Actuator Sensor interface. BUS system for the lowest field level.
ATEX		Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. Complies with the applicable requirements of ATEX directives: 2014/34/EU.
CCCEx		Complies with the applicable requirements of CCCEx directives in China.
cCSAus		Test of a product by CSA according to applicable safety standards in Canada and the USA.
CE		Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives 765/2008 applicable to the specific product.
CSA		Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.
cULus		Test of a product by UL according to applicable safety standards in Canada and the USA.
DeviceNet		BUS system of the ODVA organization for complex communication on various field levels.
EG 1935/2004*		Materials in contact with the product used in valves from GEA Tuchenhagen GmbH are in accordance with EC regulation 1935/2004. This defines a general framework for materials and objects intended to come into contact with foodstuffs.
EHEDG		The guidelines drawn up by the European Hygienic Engineering and Design Group serve to implement food safety. The aim of the organisation is to improve compliance with the hygienic design of components and technical expertise in the industry. This also includes the ease of cleaning the equipment.
FDA		Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
IECEx		IECEx: International Electrotechnical Commission System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres. Complies with the applicable requirements according to IECEx directives.
ODVA		ODVA is a worldwide association comprising leading automation companies. It develops network protocols and standards in the joint interests of its members, which are used for the international interoperability of production systems.
TÜV		Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.
UKCA		UK Conformity Assessed. By affixing the UKCA marking, the manufacturer confirms that the product complies with the product-specific applicable UK regulations.
UKEx		UKEx includes the guidelines for Great Britain. Complies with applicable requirements acc. UKEx Directive: UKSI 2016: 1107.
UL		Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.

* not possible for HNBR

Abbreviations and Terms

Abbreviation	Explanation
°C	Degrees Celsius, unit of measurement for temperature
°F	Degrees Fahrenheit, unit of measurement for temperature
3-A	Standard of 3-A Sanitary Standards, Incorporated (3-A SSI)
3D	Three-dimensional
A	Ampere, unit of measurement of current intensity or Output, term used in automation
AC	Alternating Current
ADI free	All elastomer compounds are free of animal-derived ingredients
AISI	American Iron and Steel Institute, association of the American steel industry
ANSI	American National Standards Institute, American body for standardizing industrial processes
approx.	approximately
AS-i	Actuator Sensor interface, standard for fieldbus communication
ASME	American Society of Mechanical Engineers, professional association of mechanical engineers in the USA
ASME-BPE	Standard of the ASME's – bioprocessing equipment association
ATEX	Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas
bar	Unit of measurement for pressure. All pressure values [barg/psig] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
bar_g	Unit of measurement for pressure relative to atmospheric pressure
CAN	Controller Area Network; asynchronous serial bus system
CE	Conformité Européenne, administrative symbol for the free movement of industrial products
CIP	Cleaning In Place, designates a process for cleaning technical process systems.
CRN	The Canadian Registration Number is issued by a Canadian Jurisdiction and covers pressurized components. The authorization is needed to operate these components in Canada.
CSA	Canadian Standards Association, a non-governmental Canadian Standardization organization
dB	Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions
DC	Direct Current
DIN	Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization
DIP	Dual Inline Package, design of a switch
DN	Diameter Nominal, DIN nominal width
Device Net	Network system used in the automation industry to interconnect control devices for data exchange
E	Input, term used in automation
EAC	Certification of technical confirmity from the customs union of Russia/Balarus/Kazakhstan
EG No. 1935/2004	Regulation of the European Parliament which lays down common rules for materials which come, or may come, into contact with food, either directly or indirectly.
EHEDG	European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities
EN	European standard, rules of the European Committee for Standardization
EPDM	Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629
Ex	Synonym for ATEX
FB	Feedback
FDA	Food and Drug Administration, official foodstuffs monitoring in the United States
FEM calculation	Finite Element Method; calculation process for simulating solids
FKM	Fluorinated rubber, acronym acc. to DIN/ISO 1629
H	Henry, unit of measurement for inductance
HNBR	Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN / ISO 1629
Hz	Hertz, unit of frequency named after Heinrich Hertz
I	Formula symbol for electrical current
IEC	International Electrotechnical Commission, international standardization organization for electrical and electronic engineering
IP	Ingress Protection / International Protection, index of protection class acc. to IEC 60529
IPS	Iron Pipe Size, American pipe dimension
ISA	International Society of Automation, international US organization of the automation industry

Abbreviations and Terms

Abbreviation	Explanation
ISO	International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization
kg	Kilogram, unit of measurement for weight
Kv	The Kv value corresponds to the water flow rate through a valve (in m^3/h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.
Kvs	The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value
L	Conductive
LED	Light-Emitting Diode
LEFF®	Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop
LoTo	Abbreviation for lockout – tagout, is an occupational health and safety procedure in which all energies of systems that could be dangerous for employees are isolated, interlocked and marked
mm	Millimeter, unit of measurement for length
M	Metric, system of units based on the meter or Mega, one million times a unit
m^3/h	Cubic meters per hour, unit of measurement for volumetric flow
max.	Maximum
NAMUR	Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres
NC	Normally Closed; valve or solenoid valve control which is closed in idle status
NO	Normally Open; valve or solenoid valve control which is open in idle status
NOT-element	Logic element, NOT gate
NPN	Signal transmission against reference potential, current-consuming
NPT	National Pipe Thread, US thread standard for self-sealing pipe fittings
OD	Outside Diameter, pipe dimension
ODVA	Open DeviceNet Vendor Association, global association for network standards
PA 12/L	Polyamide
Pg	Armoured thread
PMO	Pasteurized Milk Ordinance
PN	Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)
PNP	Signal transmission against reference potential, current-supplying
Pressure Equipment Directive 2014/68/EU	Directive of the European Parliament and the Council Directive for layout and conformity evaluation for pressure equipment and assemblies with a maximim pressure (PS) of more than 0.5 bars.
PPO	Polyphenylene oxide, thermoplastic material
PS	Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)
psi	Unit of measurement for pressure, pound-force per square inch, 1 psi = 6894.75 Pa. All pressure values [bar/psi] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
psi_g	Unit of measurement for pressure relative to atmospheric pressure
PV	Solenoid valve
R_a in µm	Average roughness value, describes the roughness of a technical surface
International Protection-Code IP67, IP66, IP69	Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water
SET-UP	Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.
SIP	Sterilization in Place, refers to a process for cleaning technical process systems
SMS	Svensk Mjölk Standard, Scandinavian pipe dimension
SW	Indicates the size of a tool spanner, “Schlüsselweite”
TA-Luft VDI 2440	If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of 1.0× 10-4 mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.
TEFASEP® gold	Brand name for GEA's proprietary valve seat seal (hard sealing)
T.VIS®	GEA Tuchenhagen valve information system, control top system from GEA Tuchenhagen

Abbreviation	Explanation
TS	Maximum permitted operating temperature
UL	Underwriters Laboratories, a certification organization established in the USA
USP Class VI	The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.
UV	Ultraviolet, ultraviolet radiation is a wavelength of light
V	Volt, unit of measurement for voltage
VARICOMP®	Pipe expansion compensator from GEA Tuchenhagen
VMQ	High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym
W	Watt, unit of measurement for power
Y	Control air connection for the working cylinder, designation from pneumatic systems
µ	Micro, one millionth of a unit
Ω	Ohm, the unit of electrical resistance named after Georg Simon Ohm

CAD Files

Typical application and description
You can receive two-dimensional and/or three-dimensional drawing files of our components for making your piping planning. For this purpose, please send us your specific request, stating the particular order code and the required drawing format. The required files will then be individually prepared for you.

Available drawing formats:

	Format	Name
2D formats	drw	Native Pro/E
	igs (2D)	IGS file
	dxf	AutoCAD drawing exchange
	pdf (2D)	Adobe Acrobat document
	tif	TIFF (plot)
3D formats	asm	Native Pro/E
	igs (3D)	IGS file
	pdf (3D)	Adobe Acrobat document
	stp	STP file
	bmp (3D)	Bitmap image
	jpg (3D)	JPEG image
	tif (3D)	TIFF image
	sat	Standard ACIS

General Sales Terms and Condition of Delivery

Please note
All our sales and/or services are exclusively subject to our valid terms and conditions of sale and/or service applicable in the respective country of business, which can be found on our internet platform: www.gea.com.

If not available or if you otherwise wish to receive such terms and conditions directly from us, please contact us and we of course will send you the applicable version of our terms and conditions for the envisaged business.

Engineering for a better world.

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