GEA Engineering for a better world.

GEA.com

GEA VARIVENT® HYGIENIC VALVES FOR THE U.S. DAIRY MARKET

Legal notice
Publication date: June 2023

GEA Tuchenhagen GmbH
Am Industriepark 2–10, 21514 Büchen, Germany

CONTENTS

GEA VARIVENT®
Hygienic
seat valves

GEA
Hygienic
butterfly valves

GEA VARIVENT®
Hygienic special
application valves

GEA VARICOMP®
Hygienic expansion
compensators

GEA VARITOP®
Hygienic tank
safety systems

GEA VARINLINE®
Hygienic process
connections

GEA VARICOVER®
Hygienic product
recovery systems

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

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 Classes for Valves

Increasing variety of products, longer production cycles and changing market conditions are all factors that make the conception of new installations more complex for producers.

Additionally, there are higher expectations from the consumers as well as stricter regulations for producers and products. Therefore, engineers have many things to consider when creating suitable solutions for their customers. Our goal is to equip your installation with components that fit your product and your market. To better assist you, we have set up a guideline for choosing the right hygienic component technology according to the Association of German Food Processing Machinery and Packaging Machinery (VDMA).

The hygienic classes can be described by microbiological, physicochemical as well as the resulting organoleptic properties of the product. An important indicator for the classification is its desired shelf-life. The classification is based on the desired characteristics of the final product. Contamination risks and the ability to detect them are important factors for corresponding component designs.

Soft drink (still)*
MSL: several months
pH-value: > 4.5

Ice tea (still)*
MSL: > 12 months
pH-value: > 4.5

Babyfood / Nutrition*
MSL: several months
pH-value: > 4.5

UHT milk / UHT cream*
MSL: > 3 months
pH-value: > 4.5

Fruite juice*
MSL: several months
pH-value: ≤ 4.5

Ice tea (still)*
MSL: > 6 months
pH-value: ≤ 4.5

Fruit yogurt, heat-treated**
MSL: > 5 weeks
pH-value: ≤ 4.5

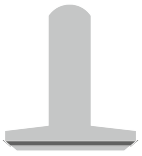
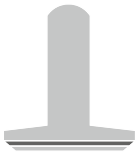
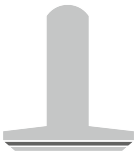
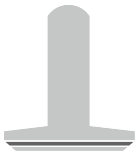
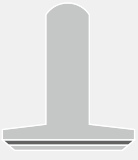
ESL milk**
MSL: 21–45 days
pH-value: > 4.5

Wine*
MSL: > 1 year
pH-value: ≤ 4.5

Beer*
MSL: > 6 months
pH-value: ≤ 4.5

Fruit yogurt / Natural yogurt**
MSL: 2–4 weeks
pH-value: ≤ 4.5

Fresh milk**
MSL: 7–10 days
pH-value: > 4.5

	Storage	Preparation	Preservation	Bottling
Aseptic (V)	 Seat valves	 Seat valves	 Stainless steel bellow	 Stainless steel bellow
UltraClean (IV)	 Seat valves	 Seat valves	 Diaphragm and stem diaphragm	 Diaphragm and stem diaphragm
Hygienic (I-III)	 Butterfly valves	 Seat valves	 Seat valves	 Seat valves

* unchilled
** chilled
MSL: Minimum Shelf Life

THE BENCHMARK.

GEA VARIVENT® Valve Unit

GEA VARIVENT® Valves

The standard for hygienic valve technology
Wherever future-proof product and process security is essential in liquid processes, the modular GEA VARIVENT® valve system is first choice for systems operators and engineers. Uncompromisingly hygienic valve technology, adaptable to any requirement, permits sustainably economic system and process solutions for a wide variety of the most demanding production tasks.

Safely to safe products
As a pioneering standard for premium quality valve technology, the GEA VARIVENT® modular system offers an unrivalled range of ever-reliable, pocket-free valves – from classic single-seat and mixproof double-seat valves to valves with special process functions. A nearly limitless choice and variety of customization, combination and materials options meet all hygiene, performance and stress requirements of individual customers. Systematically standardized modules with low parts diversity help cut the operating costs for maintenance and spare parts logistics.

Perfectly in tune: The GEA VARIVENT® valve unit
Pioneering mechanical valve technology and equally advanced options for electronic valve control and system communication combine to form a finely tuned valve unit, increasing valve functionality and safety as well as its cost-efficiency in operation.

- for every product – including complex, sensitive products in the brewing, beverage, food or pharmaceutical industry.
- for every process – including highly advanced, hygienically critical procedures and process stages.
- for digital strength – with the latest control top ready for intelligent valve control and Industry 4.0 operating and automation concepts.

Made in Germany – renowned worldwide

The invention of the mixproof valve by Otto Tuchenhagen in Büchen in 1967 set in motion the triumphant march of the modular VARIVENT® valve series shortly thereafter. To this day, GEA develops and manufactures every GEA VARIVENT® valve unit at the original Büchen location. The experience of GEA's engineers along with the huge installed base of valve units around the world offer the best guarantee of safety and total reliability. Users benefit continuously from international project developments and ground-breaking innovations which are incorporated into the valve design.

Every GEA VARIVENT® valve unit keeps the promise of "The Benchmark" – the bar for hygienic valve technology.

Die GEA VARIVENT® product range

GEA VARIVENT® seat valves: This range of single-seat and double-seat valves includes shut-off valves, divert valves and tank bottom valves that can be configured with exactly matching mechanical characteristics, dimensions and flow paths to suit all conceivable room, pressure and temperature conditions. These valves thus ensure maximum performance and reliability for the operator.

GEA ECOVENT® seat valves: ECOVENT® seat valves are characterized by their compact design. They have been developed on the basis of GEA VARIVENT® design principles, but with limited selection and adaptation options.

GEA VARIVENT® Hygienic valves with special functions: Numerous valves with special functions such as control valves, overflow valves and sample valves are available in the GEA VARIVENT® portfolio along with the hygienic seat valves.

Valve designs for the U.S. dairy market: Specially developed for the American dairy industry, these valve designs are available to meet 3-A design requirements.

GEA VARIVENT® Modular System

The VARIVENT® system is the first – and, to date, the only – valve module to feature a flexible design. Its modular concept offers numerous advantages, such as the standardized forms and connections across all valve types, thereby ensuring that all components can be removed, replaced, combined and expanded without any issues. The result? Cost-efficient system operation, optimized warehousing, economical spare parts and low parts diversity.

Existing valve systems in process plants can be modified or adjusted without the need to alter the overall system concept. The VARIVENT® system remains the benchmark others seek to emulate.

GEA VARIVENT® mixproof valve

1 Control and feedback system
Each control top enables intelligent valve control for easy commissioning and increased safety in the process sequence. Detectable valve positions make a decisive contribution to optimal system operation. All common connection types and control systems are available for technical communication in the plant.

2 Actuator
A process-specific selection of the actuator size according to the installation situation results in low air and energy consumption. Depending on the tasks of the valve, various actuator options are available and can be adapted optimally to customer requirements. All actuators can be used in Ex zones as standard, although the Ex-conformity of the electrical add-on components must be taken into account. Furthermore, the actuator contains an integrated interface for mounting a control and feedback system. The internal air supply reduces the risk of failure with external hoses.

3 Lifting actuator
Mixproof valves are optionally equipped with a lifting actuator, which enables individual lifting of a single valve disc when cleaning the respective pipe. This allows cleaning of the sealing surfaces in the seat area.

4 Lantern
The open lantern separates the actuator and product parts. It permits visual inspection of the stem seal, and is also used for indicating any leakages. Furthermore, heat transfer from the valve housing to the actuator is prevented. The VARIVENT® valve series enables the integration of additional valve options in the lantern, for example a limit stop or support of up to two proximity switches.

5 Valve disc
The VARIVENT® system offers an extensive number of different valve types for particular applications in process systems. These are mainly characterized by the different configurations of the valve disc. Mixproof separation of the media is achieved by two mutually independent valve discs, the double disc (upper disc) and the valve disc (lower disc).

6 Valve housing
The height of the dead-zone-free housing exactly corresponds to the inside diameter of the connection pipeline. This avoids domes and sumps with their negative effects such as oxidization damage or cleaning problems. The special ball shape of the housing offers the best flow profiles without flow separation. Depending on the valve design, different seat rings are installed between the valve housings. Optionally, numerous housing combinations are available with either clamped or welded seats.

1

2

3

4

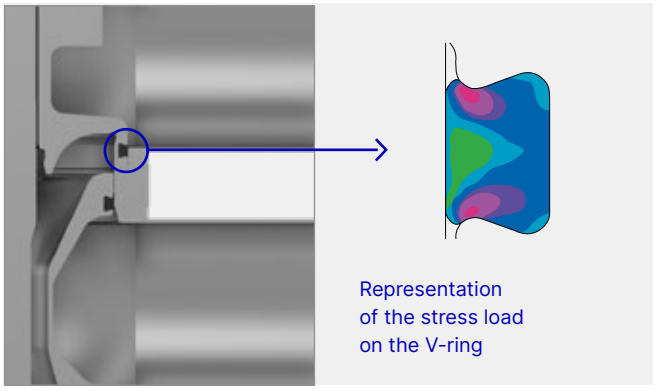
5

6

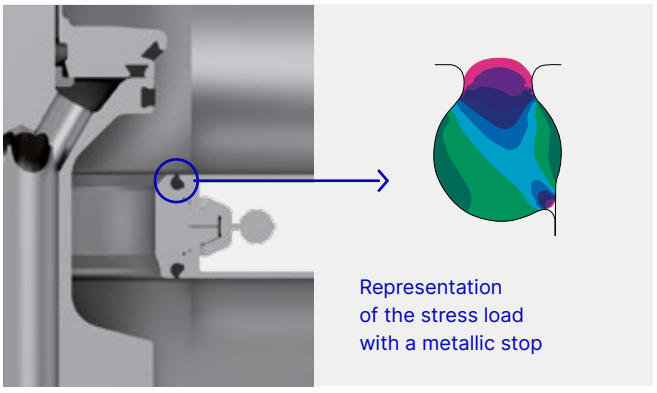
Hygienic Valves Technical Characteristics

VARIVENT® and ECOVENT® hygienic valves offer reliable function, are suitable for CIP / SIP, easy to maintain and represent a significant factor in consistent product quality. Low operating, maintenance and servicing costs ensure economical system productivity.

The VARIVENT® system has a modular structure, which means it offers a high level of flexibility. 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.



Representation of the stress load on the V-ring



Representation of the stress load with a metallic stop

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 hygienic valves 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 with the process system, thereby allowing for continuous production and shorter downtimes. The special groove shape in the valve disc makes sure the seal has a secure hold at all times up to a pressure differential of 10 bar during switching. The seal geometry was optimized using FEM calculations.

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

Available nominal widths for valve series

Nominal width	OD	1"	1 ½"	2"	2 ½"	3"	4"	6"
Valve type								
Angle valve type NI					•	•	•	
Flow diversion device type X_R		•	•	•	•	•	•	
24/7 PMO valve type M/2.0			•	•	•	•	•	•
24/7 PMO cheese curd valve type M_C/2.0							•	•
24/7 PMO tank valve type MT/T_R 08				•	•	•	•	

Hygienic Valves Technical Characteristics

Pipe classes
Standard VARIVENT® valve housings are supplied with welding ends, although the valves can be delivered with various connection fittings as an option (see section 2).

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

Inch	
OD	Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C
1"	25.4 × 1.65
1 ½"	38.1 × 1.65
2"	50.8 × 1.65
2 ½"	63.5 × 1.65
3"	76.2 × 1.65
4"	101.6 × 2.11
6"	152.4 × 2.77

Surfaces
The standard for surfaces in contact with the product is:
- Metric, inch OD, inch IPS: $R_a \leq 0.8$ µm

Higher-quality surfaces are an available option (see section 2).

Surfaces not in contact with the product (housing) are matte blasted as standard. Alternatively, a ground outer surface is available.

Materials
Components in contact with the product are produced from 1.4404 (AISI 316L), while those not in contact with the product are made from 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 internal components can be supplied with a test report 2.2 or an inspection certificate 3.1 acc. 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), FKM as well as HNBR. NBR material is used for seals not in contact with the product. Other materials for seals in contact with the product are available on request. EPDM will be supplied if no seal material is specified in the orders.

The mixing constituents of our seal materials confirm to the USP class VI and are contained in the FDA White List. In this the sealings are in accordance with 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 nature and temperature of the product being transported. The contact time with certain products can negatively affect the service life of seals.

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

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) + 20N

Seal material properties

Seal material			**EPDM**	**FKM**	**HNBR**
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
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 100 °C	+	+	+
Steam		up to 135 °C	+	o	o
Steam, approx. 30 min		up to 150 °C	+	o	–
		up to 160 °C	o	o	–
Hydrocarbons / fuels			–	+	o
Products containing grease	≤ 35 %		+	+	+
	> 35 %		–	+	+
Oils			–	+	+

Other applications on request

* The general resistance of the material does not correspond to the maximum possible operating temperature.

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

\+ = Good resistance

O = Reduced service life

– = Not resistant

Hygienic Valves Technical Characteristics

Housing combination

The valves are equipped with a welded housing combination. The advantage of the welded housing combination is that no seals at the seat ring are needed. As a result, the service work during maintenance of the valves is reduced. Also mixmatched housing combinations (see section 2) are available on request.

Welded housing combination:
Housing and seat ring welded

Installation

VARIVENT® and ECOVENT® valves 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 VARIVENT® or ECOVENT® valve is specified in the particular technical data and dimensional sheet.

Recommended flow direction

If possible, the valves should close against the flow direction in order to avoid water hammer.

Ambient conditions

Ambient temperatures	
VARIVENT® / ECOVENT® (with connection 0)	0 °C to 45 °C
	32 °F to 113 °F

The valves can also be used outdoors. However, in these application areas they must be protected against icing, or else de-iced before switching or lifting. In addition, the particular requirements on the control and feedback system must be taken into account in this case.

The product or operating temperature depends on the seal material and can be seen in the seal material properties table.

Air supply

The valve actuators are configured for operation with min. 4 bar and max. 8 bar air pressure. The standard actuator sizes are configured for an air supply pressure of min. 6 bar (with a product pressure of 5 bar). The quality of the air supply must meet the requirements of ISO 8573-1:2010.

ISO 8573-1:2010	
Solid content	Quality class 6
	Particle size max. 5 µm
	Particle density max. 5 mg/m³
Water content	Quality class 4
	Max. dew point 3 °C
	A correspondingly different dew point is required for applications at high altitude or with low ambient temperatures.
Oil content	Quality class 3
	Max. 1 mg oil per 1 m³ air, preferably oil-free

Operating pressure
The valves can be operated down to a negative pressure of –0.95 bar. As standard, the valves are configured for a product pressure up to max. 5 bar (all-round). The maximum product pressure for which the standard valves can be configured is 10 bar. Upon request, individual valve types can be supplied with the nominal pressure level of PS20. It should be noted in this case, however, that when switching the valve, the pressure differential between the upper and lower housing is only allowed to be 10 bar.

Actuator types
The modular structure of VARIVENT® valves makes it possible to equip them with different actuator types. As standard, the valves are supplied with a pneumatic actuator with spring return.

The pneumatic actuators are configured for long-term operation, and are maintenance-free. Optionally, additional actuator types are available (see section 2).

Feedback
In the control top
See catalog GEA Valve Automation

In the lantern (LAT)
Proximity switches of size M12×1 can detect the positions “open” and/or “closed”. In double-seat valves with lift actuator, it is also possible to detect the upper valve disc stroke in the lantern by means of a proximity switch (see catalog GEA Valve Automation).

For detecting the end positions by proximity switches in these valves, it is recommended to use the proximity switch holder (INA) on the actuator (see catalog GEA Valve Automation).

Certificates
Hygienic valves in the GEA VARIVENT® family, including ECOVENT® variants, meet the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as those of 3-A Sanitary Standards, Inc. (3-A SSI).

Numerous valves 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, EAC and other additional certificates are available on request for many GEA VARIVENT® valves and for other hygienic valves and components in the GEA portfolio.

GEA VARIVENT® and ECOVENT® valves comply with the EC Machinery Directive 2006/42/EC and bear the CE mark. They also fulfill the EN ISO 12100:2010 standard for the safety of machinery.

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

GEA VARIVENT® and ECOVENT® valves can come into contact with food. They comply with Regulation (EC) No. 1935/2004 of the European Parliament and Council.

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

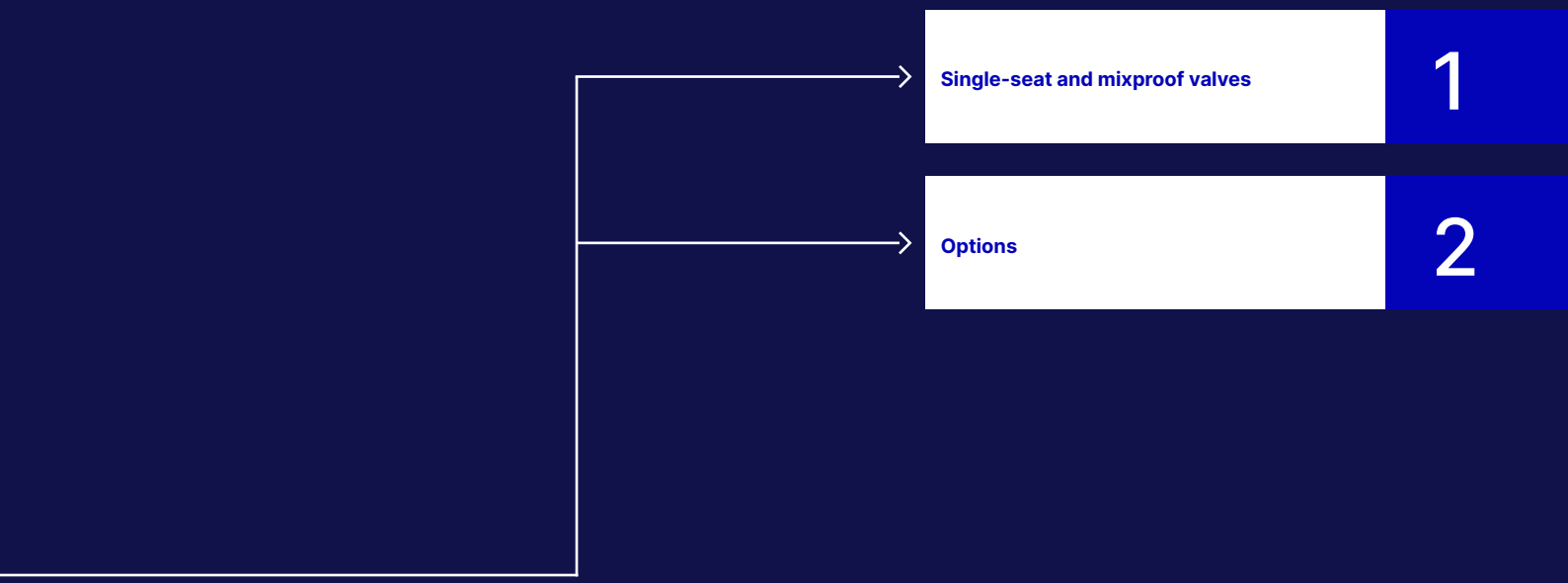
GEA VARITOP®
tank safety systems

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


Single-seat and mixproof valves
1
Options
2

1 VALVES FOR THE U.S. DAIRY MARKET

Overview

Valves for the U.S. Dairy Industry – highest demands encounter our best products

High productivity, cost-effective operation and consistently high product quality are the characteristics of our process components. The US dairy industry, however, requires strict hygienic and sterile manufacturing conditions for its products as standard. Thus, our basic configuration needs to be shifted to an even higher level.

For use in the U.S dairy industry our VARIVENT® 24/7 PMO Valve 2.0, our VARIVENT® 24/7 PMO Tank Valve and our mixproof divert valve combination (Flow Diversion Device – FDD) all meet the requirements of the 3-A standard and the Pasteurized Milk Ordinance (PMO). Additionally, GEA offers state-of-the-art process systems and technologies as well as constant quality monitoring from a highly qualified and committed team.

Overview

The VARIVENT® 24/7 PMO Valve 2.0 with smaller leakage outlet reduces weight and space demand, for even more economical retrofitting of systems.

Time for a revolution: VARIVENT® 24/7 PMO Valve 2.0
For decades, Pasteurized Milk Ordinance (PMO) regulations did not allow the cleaning of the seat(s) and the vent cavity of mixproof valves while product was present at the same time. Due to this, US dairy plants had been forced to shut down for several hours every day to clean the seats and vent cavities of these valves, significantly reducing dairy processors' flexibility and productivity.

With the introduction of GEA's innovative 24/7 PMO Valve Non-Stop Production in 2007, this was changed. For the first time ever, PMO regulation item 15p was lifted (by FDA Memorandum M-b-353), thus giving our customers the opportunity of true 24/7 productivity ever since. All this is based on our unique, patented valve seat design, generating a natural vacuum in the vent cavity to ensure product integrity while doing CIP at the same time.

The latest improvement of our 24/7 technology came in 2011 with the introduction of GEA's VARIVENT® 24/7 PMO Valve 2.0. Being the direct successor of our original 24/7 PMO Valve®, the altered design of the VARIVENT® 24/7 PMO Valve 2.0 provides proven technology in a much smaller shape.

Special features
Faster ROI
Hygienic and safe production: completely uncluttered cavity and easy to clean
Proven design and performance with all valve seats detectable
Easy maintenance: fewer gaskets and no complex spare parts

VARIVENT® 24/7 PMO Cheese Curd Valve 2.0 – protects cheese curd against stress during conveying

VARIVENT® 24/7 PMO Cheese Curd Valve 2.0 – The specialist for cheese curd

The VARIVENT® 24/7 PMO Cheese Curd Valve 2.0 completes the portfolio for the US dairy market. The valve was developed specifically to gently handle the flow of cheese curd and in turn to minimize the amount of fines created and it complies with the requirements of the PMO directives as well as being 3A-certified.

The valve allows non-stop production for all dairy applications and is based upon the well-proven technology of the VARIVENT® 24/7 PMO Valves 2.0. Thanks to a larger seat opening it is suitable for product particle sizes of 45 mm without damage.

The VARIVENT® 24/7 PMO Cheese Curd Valve 2.0 is available in sizes 4" OD and 6" OD. The upper valve housing is equipped with a reduced CIP return connection which is available in OD 2 ½", OD 3" and OD 4" sizes so that it meets all system requirements.

Special features
Gentle conveying of cheese curd with a max. particle size of up to 45 mm
Based on the well-proven VARIVENT® 24/7 PMO Valves 2.0 technology
CIP return port connection on the upper housing available in different sizes

VARIVENT® 24/7 PMO Tank Valve

VARIVENT® 24/7 PMO Tank Valve – Everything you asked for

The VARIVENT® 24/7 PMO Tank Valve is the first tank valve to be authorized by the FDA (under Memorandum M-b-359) to implement seat lifting cleaning while product is present in one housing of the valve – saving even more time, money and production downtime for US dairy plants.

Like the VARIVENT® 24/7 PMO Valve 2.0 from GEA, using simple geometry and the laws of science, the mixproof VARIVENT® 24/7 PMO Tank Valve generates a natural vacuum and ensures no CIP impingement on the opposite seat during seat lift cleaning. These two design features ensure that there can never be any cross-leakage of CIP liquid into the opposite valve housing during seat lifting.

Special features
Compact design: Completely drainable in horizontal or upside-down positions, saving floor space
Greatly simplified vessel pipework: Can be connected to the silo or vat
Increased process flexibility and reduced production downtime: Allows the vessel inlet/outlet header to be cleaned while product is present in the vessel

Overview

GEA Flow Diversion Device (FDD)

Flow Diversion Device

The GEA Flow Diversion Device (FDD) consists of two divert valves welded together to form an assembly. The assembly is used to enable the divert flow, leak detect or forward flow positions after a pasteurizer.

Special features
Speedy activation
Mixproof separation
Certified hygienic configuration

ECOVENT® Angle valve

ECOVENT® Angle valve

The Angle Valve is used to open and close segments of a pipe system. Due to its special design, a flow-through over the pipes' complete nominal width can be achieved.

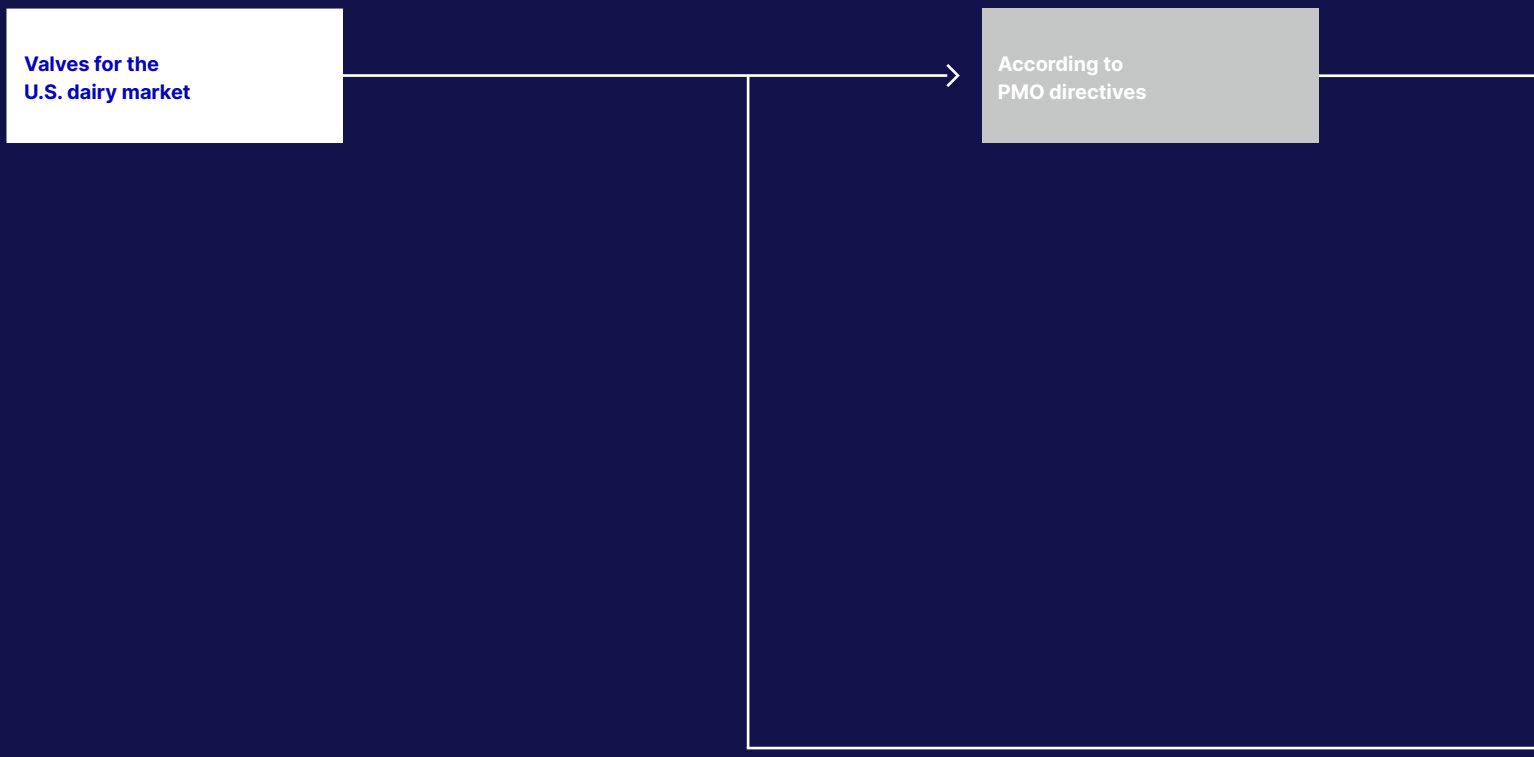
3-A Sanitary Standard
3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.

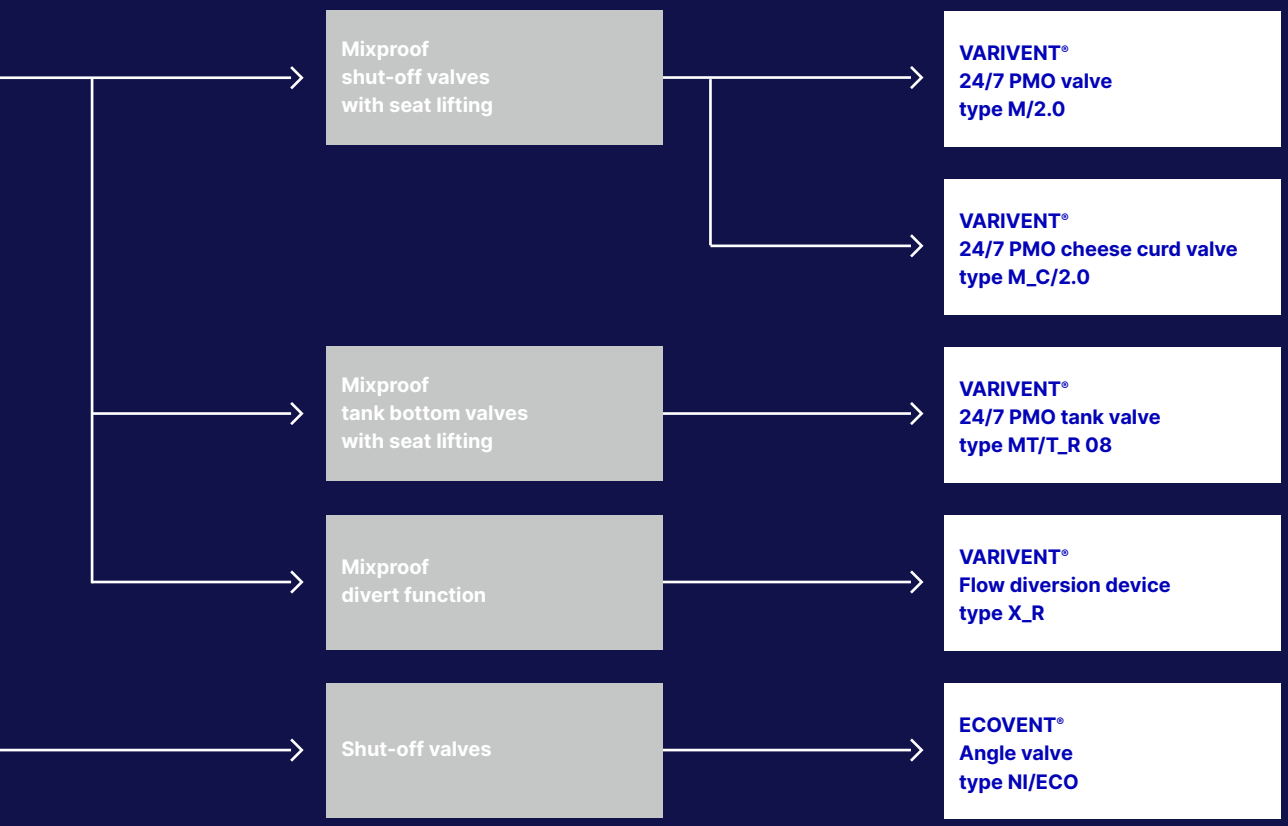
The 3-A certification symbol identifies equipment that meets 3-A Sanitary Standards for design and fabrication. The Symbol is integral to the inspection of dairy processing equipment used or sold in the United States, and signifies that the company of any origin or manufacturing location meets all the licensing requirements.

Food and Drug Administration (FDA)
The Food and Drug Administration is an 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.

In 1924 the U.S. Department of Health and Human Services developed a model regulation known as the Standard Milk Ordinance for voluntary adoption by State and Local Milk Control Agencies. This model milk regulation is now titled the Grade "A" Pasteurized Milk Ordinance (Grade "A" PMO). The 2013 revison comprises the provisions governing the processing, packaging, and sale of Grade "A" milk and milk products and incorporates new knowledge into public health practice. The Grade "A" PMO is incorporated by reference in Federal specifications for procurement of milk and milk products and is used as the sanitary regulation for milk and milk products.

Valve Selection Matrix




Mixproof
shut-off valves
with seat lifting
VARIVENT®
24/7 PMO valve
type M/2.0
VARIVENT®
24/7 PMO cheese curd valve
type M_C/2.0
Mixproof
tank bottom valves
with seat lifting
VARIVENT®
24/7 PMO tank valve
type MT/T_R 08
Mixproof
divert function
VARIVENT®
Flow diversion device
type X_R
Shut-off valves
ECOVENT®
Angle valve
type NI/ECO

1

2

Overview

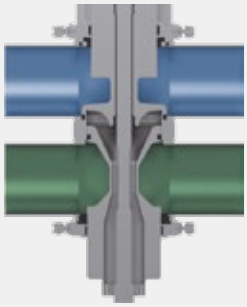
PMO Mixproof Shut-off and Tank Bottom Valve with Seat Lifting

VARIVENT®
The VARIVENT® 24/7 PMO Valve 2.0, the VARIVENT® 24/7 Cheese Curd Valve 2.0 and the VARIVENT® 24/7 PMO Tank Valve are subject to the regulations of the Pasteurized Milk Ordinance (PMO) and are used in all non-aseptic process areas, e.g. milk reception, raw milk storage tanks and distribution systems, pasteurizer supply and return as well as bottling lines.

Sizes	
VARIVENT® 24/7 PMO Valve 2.0	OD 1 ½"–OD 6"
VARIVENT® 24/7 Cheese Curd Valve 2.0	OD 2"–OD 4"
VARIVENT® 24/7 PMO Tank Valve	OD 2"–OD 4"

This ensures that there is no mixing between a product line and a cleaning-media line.

Mixproof separation
The VARIVENT® 24/7 PMO Valve 2.0, the VARIVENT® 24/7 Cheese Curd Valve 2.0 and the VARIVENT® 24/7 PMO Tank Valve ensure mixproof shut-off of incompatible products at pipeline junctions.



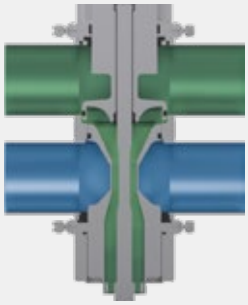
Mixproof separation by two seals

When the valve is closed (non-actuated position), there are always two seals between the separated pipelines. If one seal is defective, the resulting leakage will be directed through the leakage outlet into the periphery, without mixing with the product in the second pipeline.

Cleaning the leakage chamber

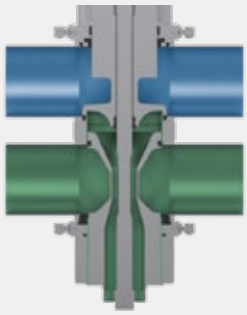
Lifting actuator

The valves are always equipped with a lifting actuator which permits individual lifting of an individual valve disc during the particular pipe cleaning. The VARIVENT® 24/7 PMO Valve 2.0 satisfies the strict requirements of the PMO (Pasteurized Milk Ordinance) and is certified acc. to 3-A Standard 85-02 for performing the lift function while milk or milk products are being transported in the other pipeline.



If there is cleaning media in the upper pipeline, the upper valve disc can be lifted up to allow the surface of the seal and the leakage chamber to be cleaned.

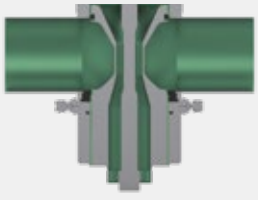
In this case, the cleaning media passes the seal of the lifted valve disc, cleans the leakage chamber and then flows out through the leakage outlet into the periphery. Therefore, it is possible to clean all surfaces that come into contact with the product, including the seal surfaces of the valve disc seals.



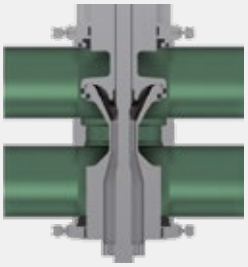
If there is cleaning media in the lower pipeline, the lower valve disc can be lowered downward to allow the surface of the seal and the leakage chamber to be cleaned.

Cleaning of the balancer surface

Article “Item 12p. Cleaning and sanitizing of containers and equipment” of the PMO stipulates that each surface that comes into contact with the product must be cleaned at least once a day. For this reason, the VARIVENT® 24/7 PMO Valve 2.0 and the VARIVENT® 24/7 Cheese Curd Valve 2.0 are equipped with a balancer cleaning device as standard. During lifting of the lower valve disc, a gap is automatically left open between the lower balancer seal and the valve disc. Cleaning media can thus get into the balancer cleaning device and clean the surface of the balancer. In this way, the valve meets the requirements of Item 12p. of the PMO without requiring further measures to be taken. Optionally, however, the valves can also be delivered without a balancer cleaning device if the surface will be cleaned in another way, e.g. by a full stroke during cleaning.



Cleaning of the balancer surface by the balancer cleaning device



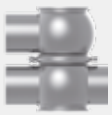
Cleaning of the balancer surface by a full stroke

VARIVENT® 24/7
PMO Valve Type M/2.0
PMO Mixproof Shut-off Valve with Seat Lifting

Housing combinations

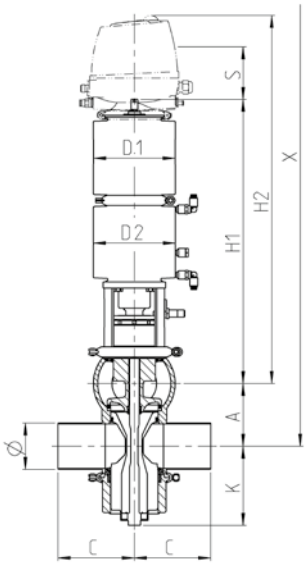
A

B



C

E



Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	6 bar (87 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8$ µm
External housing surface	Matte blasted
Control and feedback system	Selectable; the feedback of all valve positions is required acc. to PMO
Actuator type	Pneumatic actuator air / spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Welded seat ring
Marking / Certificates	

	Pipe			Housing		Actuator		Dimensions		Valve
Nominal width	Ø [mm]	A [mm]	C [mm]	K [mm]	D1 [mm]	D2 [mm]	H2 [mm]	Extension X [mm]	Stroke S [mm]	Weight [kg]
OD 1 ½"	38.1 × 1.65	59.0	90	94.5	110	110	564	789	27.5	17
OD 2"	50.8 × 1.65	71.5	90	108.5	110	110	570	795	35.0	20
OD 2 ½"	63.5 × 1.65	90.0	125	124.0	135	135	598	948	45.0	27
OD 3"	76.2 × 1.65	103.0	125	130.5	135	135	605	955	45.0	27
OD 4"	101.6 × 2.11	127.5	125	142.5	135	135	617	967	45.0	39
OD 6"	152.4 × 2.77	177.0	150	190.0	210	210	809	1,299	65.0	90

Position	Description of the order code for the standard version			
	Valve			
1	Valve type			
	M	VARIVENT® 24/7 PMO Valve 2.0		
2	Housing combinations			
	A B	C E		
3	Supplement to the valve type			
	O	With lifting actuator without spray cleaning		
4/5	Nominal width (upper housing/lower housing)			
	OD 1 ½"			
	OD 2"			
	OD 2 ½"			
	OD 3"			
	OD 4"			
	OD 6"			
6	Actuator type			
	S	Air/Spring		
7	Non-actuated position			
	Z	Spring-to-close (NC)		
8	Standard configuration with 6 bar air supply pressure for 10 bar product pressure			
	Actuator (spring-to-close)	/Lifting actuator	For nominal widths	
	BD	/BLM	OD 1 ½", OD 2"	
	CF5	/CLM	OD 2 ½", OD 3", OD 4"	
	EH6	/ELM	OD 6"	
9	Valve seat version		Housing combination	
			A B C E	
	V1	Welded seat ring/Port orientation 90°	• • • •	
	V2	Welded seat ring/Port orientation 180°	•	
	V3	Welded seat ring/Port orientation 270°	•	
10	Seal material in contact with the product			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA); (up to OD 4")		
11	Surface quality of the housing			
	5	Inside $R_a \leq 0.8$ µm, valve completely ground		
12	Connection fittings			
	N	Welding end		
13	Accessories			
	/3A/52/B/2.0	Valve after 3-A, adhesive ID tag, with outer balancer flushing (balancer cleaning device)		
	/3A/52/2.0	Valve after 3-A, adhesive ID tag, without outer balancer flushing (balancer cleaning device)		
+				
	Air connection/Control and feedback system			
14–19	XXXXX	Order code for control and feedback systems see catalog GEA Valve Automation		

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

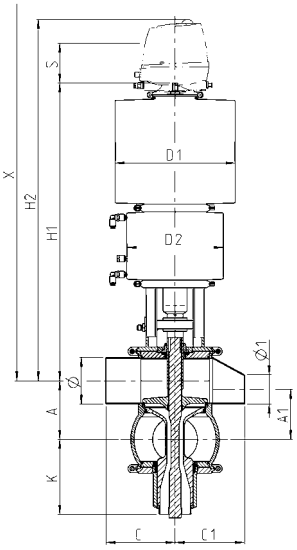
Position	**1**	**2**	**3**		**4/5**		**6**	**7**		**8**		**9**		**10**	**11**	**12**	**13**		**14 to 19**						
Code	M		O	-	/	-			-		-	CT	-		3			+							

For order codes differing from the standard version, please refer to section 2.

VARIVENT® 24/7 Cheese Curd Valve Type M_C/2.0 PMO Double-seat Valve with Lift Function

Housing combinations

E



Technical data of the standard version

Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM
Ambient temperature	0 to 45 °C
Air supply pressure	6 bar (87 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8$ µm
External housing surface	Matte blasted
Control and feedback system	Selectable; the feedback of all valve positions is required acc. to PMO
Actuator type	Pneumatic actuator air / spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Welded seat ring
Marking / Certificates	

	Pipe				Housing			Actuator		Dimensions		Valve		
Nominal width Valve-/CIP-Connection	Ø [mm]	Ø1 [mm]	A [mm]	A1 [mm]	C [mm]	C1 [mm]	K [mm]	D1 [mm]	D2 [mm]	H2 [mm]	Extension X [mm]	Stroke S [mm]	Particle size [mm]	Weight [kg]
OD 4"/2.5"	101.6 × 2.11	63.5 × 1.6	127.5	108.5	150	150.5	171	261	210	786.0	1,150	65	45	80
OD 4"/3"	101.6 × 2.11	76.2 × 1.6	127.5	115.0	150	150.0	171	261	210	786.0	1,150	65	45	80
OD 4"/4"	101.6 × 2.11	101.6 × 2.11	127.5	127.5	150	150.0	171	261	210	786.0	1,150	65	45	80
OD 6"/2.5"*	101.6 × 2.11	63.5 × 1.6	177.0	158.0	150	303.0	190	210	210	808.5	1,217	65	45	90
OD 6"/3"*	101.6 × 2.11	76.2 × 1.6	177.0	164.5	234	282.0	190	210	210	808.5	1,217	65	45	90
OD 6"/4"*	101.6 × 2.11	101.6 × 2.11	177.0	177.0	234	234.0	190	210	210	808.5	1,217	65	45	90
OD 6"/2.5"	152.4 × 2.77	63.5 × 1.6	177.0	132.5	150	303.0	190	210	644.5	808.5	1,217	65	45	90
OD 6"/3"	152.4 × 2.77	76.2 × 1.6	177.0	139.0	150	282.0	190	210	644.5	808.5	1,217	65	45	90
OD 6"/4"	152.4 × 2.77	101.6 × 2.11	177.0	151.5	150	234.0	190	210	644.5	808.5	1,217	65	45	90
OD 6"/6"	152.4 × 2.77	152.4 × 2.77	177.0	177.0	150	150.0	190	210	210	808.5	1,217	65	45	90

* Valve with 6" seat diameter, but 4" ports

Position	Description of the order code for the standard version				
	Valve				
1	Valve type				
	M	VARIVENT® 24/7 PMO Valve 2.0			
2	Housing combination				
	E				
3	Supplement to the valve type				For nominal widths
	C/CC	With lifting actuator without spray cleaning, only lower balancer			OD 4"
	O/CC	With lifting actuator without spray cleaning, double balanced			OD 6"
4/5	Nominal width (upper housing / lower housing)				
	Seat diameter	Port 1 (CIP port)	Port 2	Port 3	Port 4
	OD 4"	OD 2.5" OD 3" OD 4"	OD 4"	OD 4"	OD 4"
	OD 6"	OD 2.5" OD 3" OD 4"	OD 4"	OD 4"	OD 4"
	OD 6"	OD 2.5" OD 3" OD 4" OD 6"	OD 6"	OD 6"	OD 6"
6	Actuator type				
	S	Air / Spring			
7	Non-actuated position				
	Z	Spring-to-close (NC)			
8	Standard configuration with 6 bar air supply pressure for 10 bar product pressure				
	Actuator (spring-to-close)	/ Lifting actuator		For nominal widths	
	SN6	/ELMN6		OD 4"	
	EH6	/ELMN6		OD 6"	
9	Valve seat version			Housing combination E	
	V1	Welded seat ring / Port orientation 90°		•	
10	Seal material in contact with the product				
	1	EPDM (FDA)			
	2	FKM (FDA)			
11	Surface quality of the housing				
	5	Inside $R_a \leq 0.8$ µm, valve completely ground			
12	Connection fittings				
	N	Welding end			
13	Accessories				
	/3A/52/B	Valve after 3-A, adhesive ID tag, with outer balancer flushing (balancer cleaning device)			
	/3A/52	Valve after 3-A, adhesive ID tag, without outer balancer flushing (balancer cleaning device)			
+					
	Air connection / Control and feedback system				
14–19	XXXXX	Order code for control and feedback systems see catalog GEA Valve Automation			

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

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19						
Code	M	E		-	/	-	S	Z	-		-	V1	-		5	N		+							

For order codes differing from the standard version, please refer to section 2.

VARIVENT® 24/7 PMO Tank Valve Type MT/T PMO Mixproof Tank Bottom Valve with Seat Lifting

Housing combinations

L*

T*

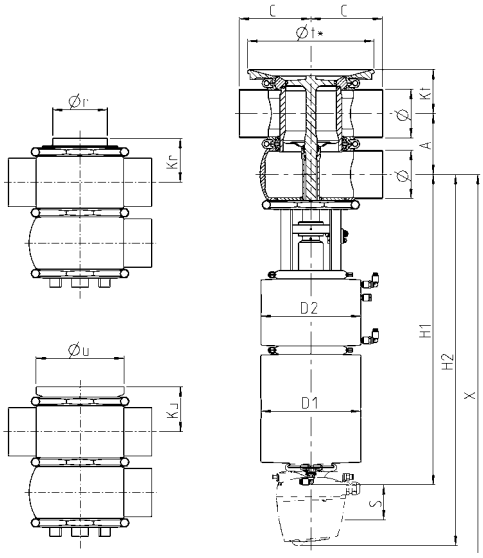
F

D

H

R

* only OD 2", 2 ½" and 3"



Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM
Ambient temperature	0 to 45 °C
Air supply pressure	Min. 4.8 bar (70 psi)
Product pressure	Max. 6 bar (87 psi)
Surface in contact with the product	OD R_a ≤ 0.8 µm
External housing surface	Matte blasted
Control and feedback system	T.VIS® M-15
Actuator type	Pneumatic actuator air / spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Welded or loose seat ring
Marking / Certificates	

	Pipe	Housing		Actuator		Dimensions			Housing connection U		Housing connection T		Housing connection R		Valve	
Nominal width	Ø [mm]	A [mm]	C [mm]	D1 [mm]	D2 [mm]	H1 [mm]	H2 [mm]	Extension X [mm]	Ku [mm]	Øu [mm]	Kt [mm]	Øt* [mm]	Kr [mm]	Ør [mm]	Stroke S [mm]	Weight [kg]
OD 2"	50.8 × 1.65	77.5	125.0	110	110	426	555	805	68.5	114	66.5	200	67.0	60.3	35	31.5
OD 2 ½"	63.5 × 1.65	90.0	125.0	170	135	492	621	871	75.0	154	73.0	225	73.0	88.9	45	32.5
OD 3"	76.2 × 1.65	103.0	125.0	210	210	637	766	1,016	81.5	154	79.5	225	79.5	88.9	65	57.5
OD 4"	101.6 × 2.11	127.5	150.0	210	210	649	778	1,028	93.0	184	–	–	92.0	114.3	65	65.5

* The maximum wall thickness of the tank can be 8 mm.

Position	Description of the order code for the standard version					
	Valve					
1	Valve type					
	MT/T	VARIVENT® 24/7 PMO Tank Valve				
2	Housing combinations					
	L*	T*	F	D	H	R
3	Supplement to the valve type					
	RC	Radial				
4/5	Nominal width (upper housing / lower housing)					
	OD 2"					
	OD 2 ½"					
	OD 3"					
	OD 4"					
6	Actuator type					
	S	Air / Spring				
7	Non-actuated position					
	Z	Closed				
8	Standard configuration with 4.8 bar air supply pressure for 6 bar product pressure					
	Actuator (spring-to-close)		/ Lifting actuator		For nominal widths	
	BD		/ BLT		OD 2"	
	DF5		/ CLR		OD 2 ½"	
	EK6		/ ELMT		OD 3", OD 4"	
9	Valve seat version					
	L0	Loose seat ring				
	V0	Welded seat ring (only for housing combinations H and R)				
10	Seal material in contact with the product					
	1	EPDM (FDA)				
	2	FKM (FDA)				
11	Surface quality of the housing					
	5	Inside $R_a \leq 0.8$ µm, valve completely ground blastet				
12	Connection fittings					
	J	With connection fittings				
	N	Welding end				
13	Accessories					
	/52	Identification label sticker				
	/3A	Valve design acc. to 3-A				
+						
	Air connection / Control and feedback system					
14–19	XXXXX	Order code for control and feedback systems see catalog GEA Valve Automation				

* only OD 2", 2 ½" and 3"

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

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19						
Code	MT/T		RC	-	/	-	S	Z	-		-		-		5			+							

For order codes differing from the standard version, please refer to section 2.

Overview

Mixproof Divert Function

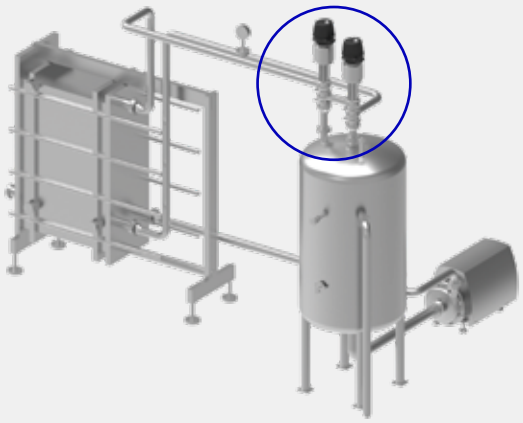
VARIVENT® Flow Diversion Device
The GEA Flow Diversion Device consists of two radial sealing divert valves of type XKR or XWR that form a module with fixed connection. The mixproof valve combination is used to permit the properties “flow division”, “leakage detection” or “forward flow” downstream of every pasteurizer. It is ensured that there are always two seals between pasteurized and non-pasteurized milk.

Sizes	
VARIVENT® Flow Diversion Device	OD 1"–OD 6"

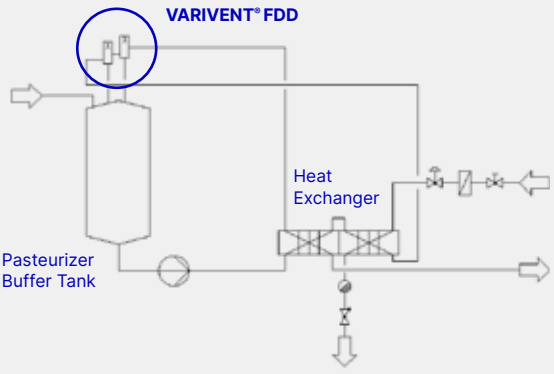
VARIVENT®
Flow Diversion Device

Application examples

The VARIVENT® Flow Diversion Device is designed to meet US PMO requirements. Due to the adaption of two divert valves, leak detection is ensured with a cavity in the same nominal size as the pipes diameter. The typical application is the divert function after a pasteurizer.



Mixproof divert function downstream of a pasteurizer

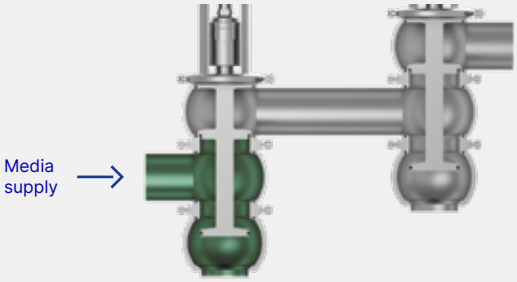


R & I diagram

Special features
Certified hygienic design
Metallic stop
Proven seal geometry
Mixproof separation

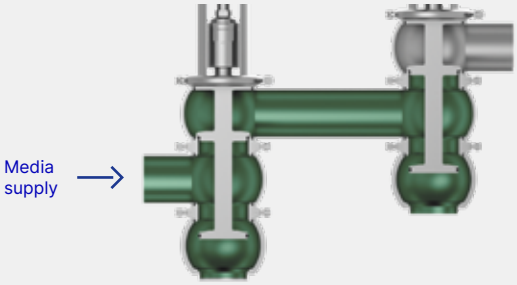
Flow Diversion

In the warm-up phase of the pasteurizer, the VARIVENT® Flow Diversion Device will reliably switch the product flow to the buffer tank, shown in green here.



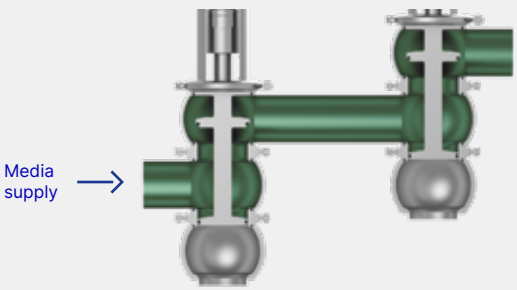
Leakage detection

In case of a seal defect, the product is still routed to the buffer tank through the leakage outlet of the second divert valve. The design without reduction of the nominal width does not permit pressure build-up in this area.

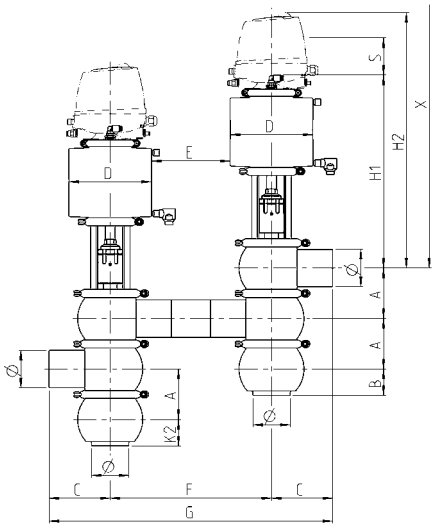


Forward flow rate

When the pasteurizer has reached the required temperature, the two divert valves of the VARIVENT® Flow Diversion Device will switch the product through to the filler. However, if the temperature drops below the required value, the FDD switches within one second. Thus, unpasteurized milk is always returned to the buffer tank.



VARIVENT®
Flow Diversion Device
Type XKR
Mixproof Divert Function



Technical data of the standard version

Recommended flow direction	Against the closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	6 bar (87 psi)
Product pressure	5 bar (73 psi)
Surface in contact with the product	$R_a \leq 0.8$ µm
External housing surface	Matte blasted
Control and feedback system	Connection 0 (without control top)
Actuator type	Pneumatic actuator air / spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Welded seat ring
Marking / Certificates	

	Pipe			Housing		Actuator						Dimensions		Valve
Nominal width	Ø [mm]	A [mm]	C [mm]	K1 [mm]	K2 [mm]	D1 [mm]	E [mm]	F [mm]	G [mm]	H1 [mm]	P [mm]	Extension X [mm]	Stroke S [mm]	Weight [kg]
OD 1"	25.4 × 1.60	46.0	90	30.0	29	110	70	180	360	456.0	50	570	–	80
OD 1 ½"	38.1 × 1.60	59.0	90	36.5	39	135	45	180	360	465.5	60	615	–	80
OD 2"	50.8 × 1.60	71.5	90	43.0	42	135	45	180	360	472.0	65	650	–	80
OD 2 ½"	63.5 × 1.65	90.0	125	52.0	54	170	80	250	500	515.0	75	740	17.5	90
OD 3"	76.2 × 1.65	103.0	125	58.5	54	170	80	250	500	521.5	80	780	18.5	90
OD 4"	101.6 × 2.00	127.5	125	71.0	69	210	40	250	500	530.0	95	850	40.0	90
OD 6"	152.4 × 2.77	177.0	150	95.5	94	260	40	300	600	707.0	120	1,150	–	90

Position	Description of the order code for the standard version		
	Valve		
1	Valve type		
	X	VARIVENT® divert valve	
2	Housing combinations		
	W K		
3	Supplement to the valve type		
	R	Lower radial seal	
4/5	Nominal width (upper housing / lower housing)		
	OD 1"		
	OD 1 ½"		
	OD 2"		
	OD 2 ½"		
	OD 3"		
	OD 4"		
	OD 6"		
6	Actuator type		
	Z	VARIVENT® Actuator Air/Spring, Air-assisted	
7	Non-actuated position		
	Z	Spring-to-close (NC)	
8	Standard configuration with 6 bar air supply pressure for 5 bar product pressure (higher pressures on request)		
	Actuator (spring-to-close)		For nominal widths
	Z/FDD CB		OD 1", OD 1 ½", OD 2"
	Z/FDD DD		OD 2 ½", OD 3"
	Z/FDD EF		OD 4"
	Z/FDD EH		OD 6"
9	Valve seat version		
	L0	Loose seat ring	
10	Seal material in contact with the product		
	1	EPDM (FDA)	
	2	FKM (FDA)	
	3	HNBR (FDA); (up to OD 4")	
11	Surface quality of the housing		
	3	Inside $R_a \leq 0.8$ µm, outside ground blasted	
12	Connection fittings		
	N	Welding end	
13	Accessories		
	/52	Adhesive ID tag	
+			
	Air connection / Control and feedback system		
14–19	XXXXX	Order code for control and feedback systems see catalog GEA Valve Automation	

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

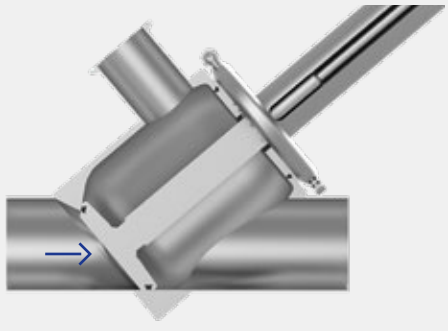
Position	**1**	**2**	**3**		**4/5**		**6**	**7**		**8**		**9**		**10**	**11**	**12**	**13**		**14 to 19**						
Code	X		R	-	/	-	Z	Z	-		-	L0	-		3	N	/52	**+**							

For order codes differing from the standard version, please refer to section 2.

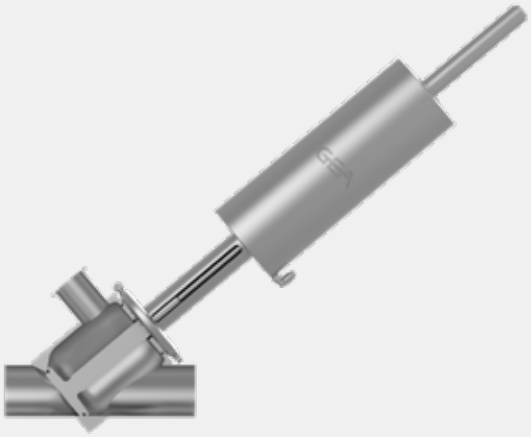
Overview

Shut-off Valves

ECOVENT® Angle Valve type NI/ECO
The angle valve implements a flow through the entire nominal width of the pipe. Due to its special design, a horizontal installation orientation of the housing and an upright valve position is absolutely required.



ECOVENT® Angle valve in the closed switching position

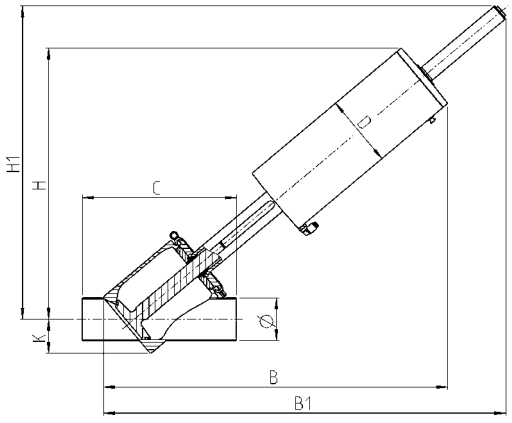


ECOVENT® Angle valve with CIP connection

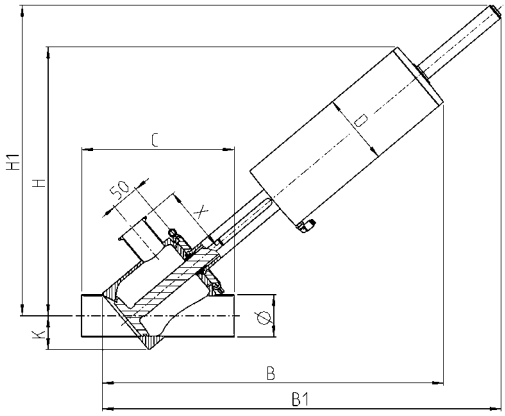
Recommended flow direction
To avoid water hammers when closing the valve while the product is flowing, ECOVENT® angele valves should be switched against the flow direction of the product.

Sizes	
ECOVENT® Angle valve type NI/ECO	OD 2½"–OD 4"

ECOVENT®
Type NI/ECO
PMO Double-seat Valve with Lift Function



Angle Valve



Angle Valve with CIP Connection

Housing combinations

I

Technical data of the standard version

Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	6 bar (87 psi)
Surface in contact with the product	R_a ≤ 0.8 µm
External housing surface	Matte blasted
Control and feedback system	Connection 0 (without control top)
Actuator type	Pneumatic actuator air / spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Welded seat ring
Marking / Certificates	CE FDA

	Pipe	Housing			Actuator	Dimensions				Valve	
Nominal width	Ø [mm]	B [mm]	B1 [mm]	C [mm]	D1 [mm]	H [mm]	H1 [mm]	K [mm]	X* [mm]	Stroke S [mm]	Weight [kg]
OD 2 ½"	63.5 × 1.65	491	586	250	129	454	549	50.3	123	67	18.5
OD 3"	76.2 × 1.65	618	727	275	129	489	568	61.5	123	120	19.5
OD 4"	101.6 × 2.11	733	829	360	170	576	641	79.5	143	155	40.0

* Dimension is valid for Angle Valve with CIP Connection

Position	Description of the order code for the standard version		
	Valve		
1	Valve type		
	N	ECOVENT® Angle valve	
2	Housing combination		
	I		
3	Supplement to the valve type		For nominal widths
	C/CC	With lifting actuator without spray cleaning, only lower balancer	OD 4"
	O/CC	With lifting actuator without spray cleaning, double balanced	OD 6"
4/5	Nominal width (upper housing/lower housing)		
	OD 2 ½"		
	OD 3"		
	OD 4"		
6	Actuator type		
	E	Air/Spring	
7	Non-actuated position		
	Z	Spring-to-close (NC)	
	A	Spring-to-open (NO)	
8	Standard configuration with 6 bar air supply pressure for 5 bar product pressure (higher pressures on request)		
	Actuator (spring-to-close)	/Lifting actuator	For nominal widths
	ECD/12	ECD/12	OD 2 ½"
	ECD/12	ECD/12	OD 3"
	EDF/16	EDF/16	OD 4"
9	Valve seat version		
	V0	Fixed port	
10	Seal material in contact with the product		
	1	EPDM (FDA)	
	2	FKM (FDA)	
	3	HNBR (FDA)	
11	Surface quality of the housing		
	2	Inside $R_a \leq 0.8$ µm, outside matte blasted	
12	Connection fittings		
	N	Welding end	
13	Accessories		
	/33	With CIP Housing (Housing combination I)	
	/52	Adhesive ID tag	
+			
	Air Connection		
14–19	0 0M	Metric for air hose Ø 6/4 mm	
	00000Z	Inch for air hose Ø OD ¼" (6.35/4.35 mm)	

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

Position	**1**	**2**	**3**		**4/5**		**6**	**7**		**8**		**9**		**10**	**11**	**12**	**13**		**14 to 19**					
Code	N	I	/ECO	-	/	-	E		-		-	V0	-		2	N		**+**	0	0	0	0	0	

For order codes differing from the standard version, please refer to section 2.

2 OPTIONS

GEA VARIVENT® Hygienic Valves for the U.S. Dairy Market

Available Options

Options
Housing and Nominal Widths
Mix-matched Housing Combinations

Typical application and description
Many mix-matched housings are already available. For technical reasons, however, a mix-matched combination is not possible for all valve types! If required, please contact GEA Tuchenhagen to ask about the feasibility.

The first mentioned nominal width indicates the upper valve housing, the second one is the nominal width of the lower valve housing. The larger housing in the mix-matched combination must always be configured as a housing with two vertical ports.

Available nominal widths

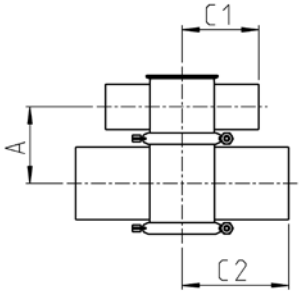
Inch OD	OD	1"–6"

Available valve types

Mixproof valves with shut-off function and seat lifting	M
Mixproof tank bottom valves with seat lifting	–
Mixproof divert function	–
Shut-off valves	–

Technical data

Material	1.4404 (AISI 316L)
Product pressure	10 bar
Valve seat version	Clamped or welded housing connection



Upper housing	OD 1 ½"			OD 2"			OD 2 ½"		
	A	C1	C2	A	C1	C2	A	C1	C2
Lower housing									
OD 1 ½"	59	90	90	65.25	90	90	on request	on request	on request
OD 2"	65.25	90	90	71.5	90	90	77.75	125	90
OD 2 ½"	on request	on request	on request	77.75	90	125	90	125	125
OD 3"	78	90	125	on request	on request	on request	on request	on request	on request
OD 4"	–	–	–	96.5	90	125	108.75	125	125
OD 6"	–	–	–	–	–	–	–	–	–

Upper housing	OD 3"			OD 4"			OD 6"		
	A	C1	C2	A	C1	C2	A	C1	C2
Lower housing									
OD 1 ½"	–	–	–	90.25	125	90	–	–	–
OD 2"	on request	on request	on request	on request	on request	on request	–	–	–
OD 2 ½"	96.5	125	125	on request	on request	on request	–	–	–
OD 3"	103	125	125	on request	on request	on request	–	–	–
OD 4"	115.25	125	125	127.5	125	125	–	–	–
OD 6"	–	–	–	–	–	–	177	150	150

Incorporation of the option in the order code and example

Position		Description of the order code for options
4/5		.../... Nominal width (upper housing/lower housing)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	5	N	/3A/52 /B/2.0	+	0	0	0	0	0	Z

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 matte blasted as standard. Optionally, it can also be supplied ground.

Housings that should comply with the 3-A standard are produced as standard with an inner surface of $R_a \leq 0.8$ µm with ground welds and a blasted outer surface. If a configuration with a ground outer surface is required, it is necessary to select not only option /3-A (position 13) but also the corresponding surface quality 3 (position 11).

Incorporation of the option in the order code and example

Position		Description of the order code for options	
11		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	
	5	Inside $R_a \leq 0.8$ µm, outside valve completely ground	
	8	Inside $R_a \leq 0.4$ µm, outside ground	

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	X	W	R	-	OD 4"/4"	-	Z	Z	-	Z/ FDD EF	-	L0	-	1	5	N	/21/52 /3A	+	0	0	0	0	0	Z

Options
Surface Qualities
Electropolishing of the Housings

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 olny available for housings that are outside grounded (order code position 11).

Incorporation of the option in the order code and example

Position	Description of the order code for options
13	Accessoires
	/E Surface finish electrolytically polished

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	X	W	R	-	OD 4"/4"	-	Z	Z	-	Z/ FDD EF	-	V0	-	1	5	N	/21/52 /3A/E	+	0	0	0	0	0	Z

Options
Connection Fittings
Overview

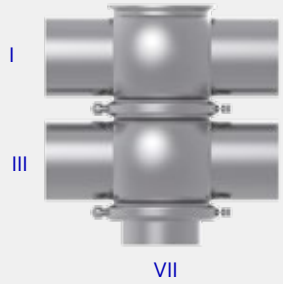
Typical application and description
The valve housings can be specified with a welded-on connection fitting. To find which connection fittings are available, please refer to the list on the following pages.

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.

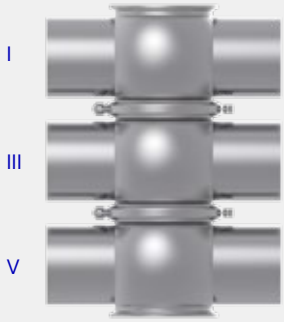
Connection fittings

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, ISO 2852 (OD; length: 28.5 mm)
CO	Clamp connection/TRI-Clamp, DIN 32676 (DN)/ISO 2852 (OD)

Valves with two housings



Valves with two housings and vertical port



Valves with three housings

Example

Housing port	Connection fitting
I	TN
II	TF
III	TK
IV	
V	
VI	
VII	

Incorporation of the option in the order code and example

Position	Description of the order code for options
12	Connection fittings
	J Valve with connection fittings (required connection fitting acc. to list above, please specify separately)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	J	/3A/52 /B/2.0	+	0	0	0	0	0	Z

Options
Connection Fittings
VARIVENT® Flange Connection

Complete connection including bolts and nuts (TK)

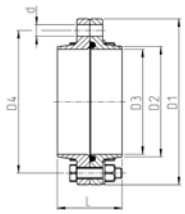
Groove flange (TN), including connecting elements and seal ring

Plain Flange (TF)

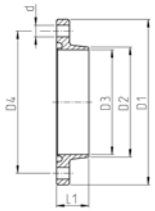
Typical application and description

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.

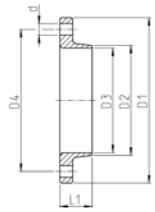
The VARIVENT® flange connection (TK) can be ordered either as a complete connection including bolts and nuts (TK) or a groove flange (TN)/flange (TF) as a connection fitting on a vertical port. If a complete connection is ordered as the connection fitting, the groove flange is welded onto the housing.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



TK = VARIVENT® flange connection



TN = VARIVENT® groove flange



TF = VARIVENT® flange

Available nominal widths

Inch OD	OD	1"–6"

Technical data

Material		1.4404 (AISI 304)
Surface in contact with the product		$R_a \leq 0.8$ µm
Certificates		3.1/AD2000W2
Max. pressure	DN 25 – DN 65 OD 1"–OD 2 ½"	16 bar
	DN 80 – DN 100 OD 3" – OD 4"	10 bar
Seal materials		EPDM (FDA), FKM (FDA), HNBR (FDA)

						Dimensions		O-Ring	
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]	L1 [mm]	[mm]	PS
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	25	25 × 5.0	16
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	25	36 × 5.0	16
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	25	47 × 5.0	16
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	25	62 × 5.0	16
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	25	75 × 5.0	10
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	25	95 × 5.0	10
OD 6"	211	152.4	146.5	186	8 × Ø 11	50	25	134 × 5.7	10

Incorporation of the option in the order code and example

Position		Description of the order code for options
12		Connection fittings
	J	Valve with connection fittings (please specify option TK, TN or TF separately with reference to the connection)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	J	/3A/52 /B/2.0	+	0	0	0	0	0	Z

Options
Connection Fittings
Pipe Fitting acc. 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		
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

GO – Male end SC, including seal ring G

Available nominal widths		
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

KO – Liner SD, including groove nut

Available nominal widths		
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

Incorporation of the option in the order code and example

Position		Description of the order code for options
12		Connection fittings
	J	Valve with connection fittings (required connection fitting, please specify separately)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	J	/3A/52 /B/2.0	+	0	0	0	0	0	Z

Options
Connection Fittings
Hygienic Flange Connection acc. 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

Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)
Standard	DIN 11853-2

NFK – Hygienic groove flange, including connecting elements and seal

Available nominal widths

Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)
Standard	DIN 11853-2

BFK – Hygienic flange

Available nominal widths

Inch OD	OD	1"–4"

Technical data

Material	1.4404 (AISI 316L)
Standard	DIN 11853-2

Incorporation of the option in the order code and example

Position		Description of the order code for options
12		Connection fittings
	J	Valve with connection fittings (required connection fitting, please specify separately)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	J	/3A/52 /B/2.0	+	0	0	0	0	0	Z

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

Inch OD	OD	1"–6"

Technical data

Material	OD	AISI 316L
Standard	OD	DIN 32676*; Length 28.5 mm**
Inner diameter	OD	DIN 11866 row C
Certificates	3.1	

*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
12		Connection fittings
	J	Valve with connection fittings (required connection fitting, please specify separately)

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	J	/3A/52 /B/2.0	+	0	0	0	0	0	Z

Options
Additional Options
3-A Symbol

Typical application and description

3-A Sanitary Standards, Inc. is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries. In particular, it represents the interests of three stakeholder groups in the US dairy industry with a common commitment to promoting food safety and the public health – regulatory sanitarians, equipment fabricators and processors. To achieve this purpose, it has produced guidelines which define various design requirements on components. In the area of seat valves, it is above all the standards 53-06 (compression type valves) and 85-02 (double-seat mixproof valves) that are relevant. Compliance with these design specifications is examined by an independent expert and confirmed by issuing a certificate. Almost the entire VARIVENT® and ECOVENT® valve series complies with these design specification in the standard design acc. to section 1.

If the 3-A option is selected, compliance of the valve with the requirements of the standard is confirmed by means of a sticker on the component. Consequently, if this option is selected, it is necessary to comply with the standard in terms of identification as well.

Furthermore, when this option is selected, the welds of the port connections are ground smooth. The standard does not specify that this is mandatory, but it is in line with customer's preferences in this market.

IMPORTANT: The standard surface when this option is selected is "inside surface $R_a \leq 0.8$ µm, outside matte". Many customers in this market ask for the alternative surface quality "inside surface $R_a \leq 0.8$ µm, outside ground". If this is required, it must be selected separately at position 11 in the order code as a non-standard surface.

Incorporation of the option in the order code and example

Position		Description of the order code for options
		Accessories
	🔍 /3A	Adhesive ID tag, configuration of the valve according to 3-A standard

Position	1	2	3		4/5		6	7		8		9		10	11	12	13		14 to 19					
Code	M	E	O	-	OD 2"/3"	-	S	Z	-	BD/ BLM	-	V1	-	1	4	N	/3A/52 /B/2.0 🔍	+	0	0	0	0	0	Z

GEA Valve Automation – Control and Feedback Systems

Valve automation for increased process reliability, efficiency and flexibility
GEA's valve technology sets the standards for reliable, safe and permanently efficient liquid processes. Leading-edge control and automation options enable operators to achieve optimum control and monitoring of the valve – thereby realizing state-of-the-art, highly flexible operating and automation concepts.

The key component is the latest generation of GEA control tops with reliable, ground-breaking control and feedback technology. Mechanical valve components and a control top specified for the particular application together to form a finely tuned valve unit capable of realizing advanced system concepts and enhancing process options.

The control top – integral part of the valve unit
The control top facilitates optimized production and cleaning processes with less expenditure on staff, energy and time. Valve functions can be automatically and continuously monitored, recorded, evaluated and if necessary, corrected. Detectable valve positions make a crucial contribution towards the achievement of optimum system operation. This ensures adherence to a smooth process flow, while also achieving the utmost in product safety.

Special priority is given to sustainability in intelligent valve control: Thanks to the selectable LEFF® function integrated in the T.VIS® A-15, up to 90 percent of cleaning agents can be saved by an optimized and PLC-independent pulsing of the valve discs during the cleaning process. The economical air guidance in the control top and the integrated solenoid valves with low power intake minimize energy consumption as well as the demand for compressed air and the number of hose connections.

In addition, the control top offers the best protection to components against adverse ambient conditions such as moisture, dust, liquids of any kind, vibrations and other mechanical impact.

Modern plant communication at the threshold to industry 4.0
The control tops in the current GEA range can be configured for all common types of connection and control systems to make future-oriented, pioneering automation functions possible. For example, users can ensure early digital integration of their system control setup in Industry 4.0 environments by way of the modern IO-Link technology. Digital exchange of data enables central setting of component parameters and lossless information transfer.

Diagnostic data from the valve can be processed and displayed in central control unit of the plant. The options even extend to networking the system controller with the company's ERP system for optimized resource utilization.

Easy start-up
Thanks to pre-configurable system parameters and a fully automatic SETUP, the installation for digital valve control is easy even also without extensive technical knowledge. Regional requirements, application-specific certificates (UL/CSA/PMO/ATEX) and other individual specifications can be provided as needed.

As a true pioneer with decades of experience in the development of valves and control tops for all processes, GEA offers the perfect symbiosis of mechanical and electronic engineering, largely with standardized components. Extensive tests and countless valve units installed around the world have continuously proved the reliability and cost-effectiveness for the user, always ensuring maximum safety of operation.

Recommended control and feedback systems for GEA VARIVENT® hygienic valves for the U.S. dairy market
For GEA VARIVENT® valves for the U.S. dairy market the T.VIS® A-15 is recommended for its extended functional scope and greater ease of operation. Besides the established types of communication, such as 24VDC, AS-i und DeviceNet, this control top also features the groundbreaking IO-Link technology, which allows users to set the parameters for components centrally in the system via digital data exchange and transfer all process data loss-free. Thanks to a fully automatic setup, commissioning can be quickly and easily carried out by means of the push buttons fitted on the hood. Additional functions such as the selection of different tolerance bands, signal attenuation and the resource-saving LEFF® function round off the T.VIS® A-15.

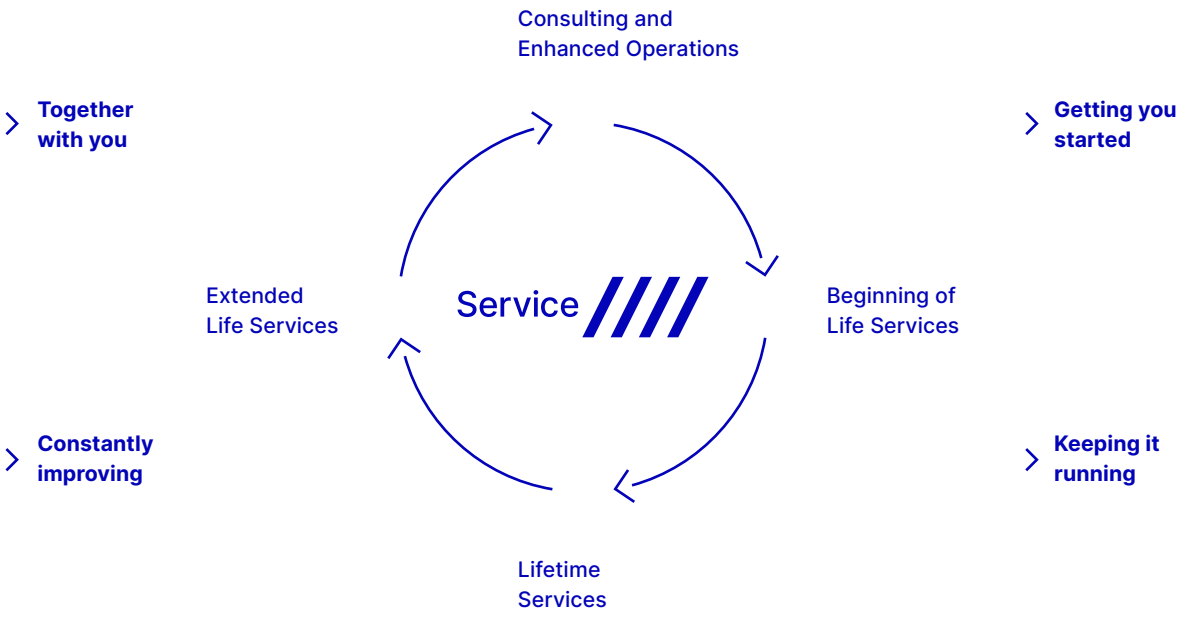
The T.VIS® M-15 offers for GEA VARIVENT® valves for the U.S. dairy market an attractively priced basic version of control and feedback technology. The T.VIS® M-15 is fitted with manually adjustable sensors and is available for all established types of communication such as 24VDC, As-i and DeviceNet.

Attention must be paid to regional requirements for use in explosive areas. The SES meets the requirements of the European ATEX Directive and can be used in Zones 1 and 20. The T.VIS® A-15 is certified in accordance with the Directive Class 1 / Div. 2 in compliance with the regulations in place for the North American market.

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		European Hygienic Engineering & Design Group. European 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.
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
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.
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
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
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
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
RM	Feedback
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
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

Abbreviation	Explanation
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.

GEA.com

GEA Tuchenhagen GmbH
Am Industriepark 2–10,
21514 Büchen, Germany

gea.com/flowcomponents