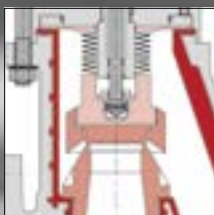


# Richter Overflow and Pressure Relief Valves



Lining PFA,  
optionally PFA-L, PFA-HP

Hermetically tight

ASME and ISO/DIN

-75 to +360 °F (-60 to +180 °C)



**RICHTER**  
Process Pumps & Valves  
IBEX

# Overflow valves with high discharge capacity

The spring-loaded Richter overflow valve GU is designed to protect against excessive pressure in pipes and plant equipment.

## Fields of application

- As an overflow valve to safeguard chemical plants against excessive pressure
- As a pressure relief valve to maintain plant pressures
- For corrosive media where metallic materials are not resistant enough or special metals cause high costs
- Predominantly for fluids

## Range of applications

- -75 to +360 °F (-60 to +180 °C) operating temperature, higher temperatures on request
- Set pressures up to 189 psi (13 bar), GUT up to 232 psi (16 bar), higher pressures on request

## Product features

- Direct acting, spring-loaded
- Gas-tight in the seat to DIN/EN 12266-1, leakage rate A
- 1" (DN 25) with certification for liquids, certification No. TÜV-SV 993 .../F
- Inline design with upright seat
- Relatively proportional performance and large mass fluctuations are corrected during opening and closing.
- Streamlined flow parts: high coefficients discharge and discharge capacity, see page 3.
- Back pressures  $p_{a0}$  in the valve outlet up to 50 % of the test gauge pressure (for liquids):
  - with test gauge pressures < 58 psi (4 bar),  
 $p_{a0 \max} = 14.5 \text{ psi (1 bar)}$
  - with test gauge pressures > 58 psi (4 bar),  
 $p_{a0 \max} = 43.5 \text{ psi (3 bar)}$
- Direct-acting weight-loaded for test pressures < 5.8 psi (0.4 bar), instead of spring-loaded
- For face-to-face and flanges drilled to ASME and ISO/DIN, see page 4
- Flanges with groove to DIN 2512 on request
- Identification: TRB 801 No. 45 and DIN EN 19
- High-quality external corrosion protection through epoxy coating of the valve; screws made of stainless steel; other materials optional

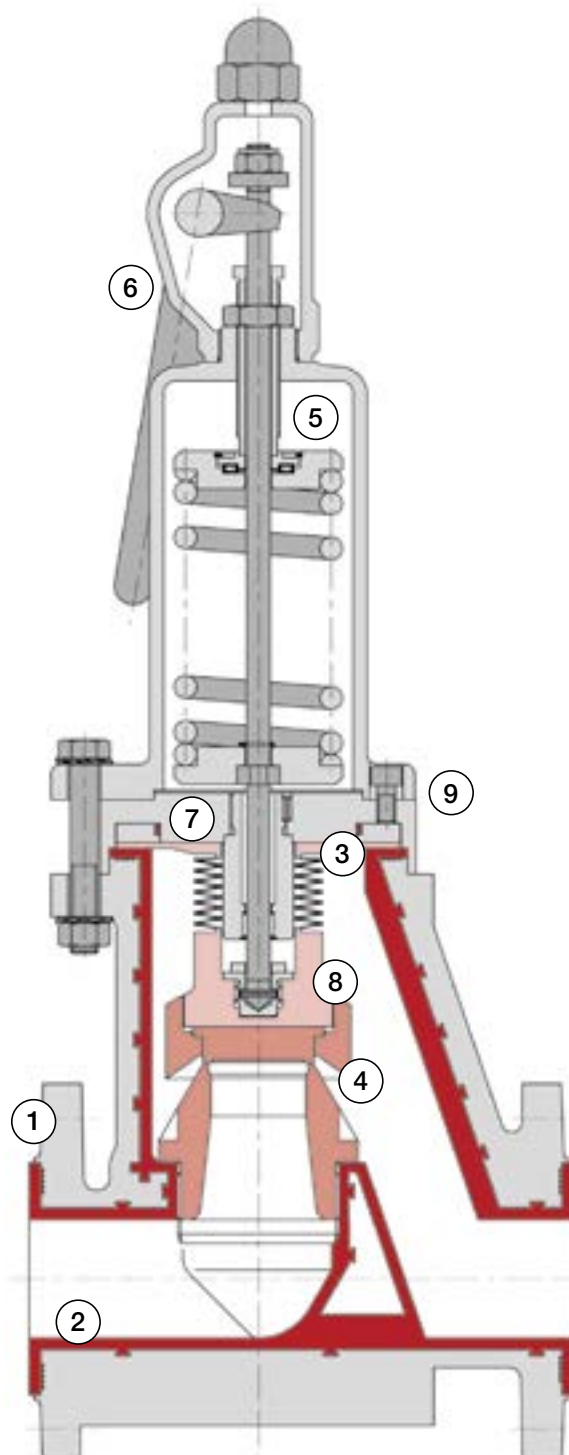
## Type Code

Overflow valve GU/..

## Lining

- PFA .../F
- Antistatic PFA-L .../F-L
- Ultrapure (e.g. pharma applications) PFA-HP .../F-HP

- ① **One-piece valve body** as well as spring bonnet and lifting cap made of ductile cast iron EN-JS 1049 (0.7043)/ASTM A395
  - For special cases cast steel 1.0619 (GS-C25)
  - Metallic support of seat area
- ② **Thick-walled thermoplastic PFA lining for maximum corrosion resistance**
  - Optionally antistatic lining PFA-L
  - Optionally ultrapure PFA-HP
  - Lining thickness  $\frac{1}{4}$ - $\frac{1}{5}$ " (5-6 mm)  
 (1" (DN 25):  $\frac{1}{6}$ - $\frac{1}{8}$ " (3-4 mm))
  - Vacuum-tight anchoring of the lining



### ③ Bellows modified PTFE

- Hermetic sealing to valve bonnet and atmosphere
- Corrosion protection of the valve spindle
- Back-pressure-balanced: back pressure has no effect on the set pressure, therefore operation also with variable back pressure
- Considerably more permeation-resistant than standard PTFE

### ④ Replaceable valve plug and seat

- Pressure-resistant PTFE carbon compound
- Optionally pure PTFE, Hastelloy®, etc.

### ⑤ Axial needle bearing in the upper spring plate

- No twisting of the bellows when setting the adjusting screw

### ⑥ Lifting cap

- Gas-tight on request
- Lifting lever positioned so that it is protected against unintentional activation

### ⑦ Precise guidance of the valve spindle

and constant travel due to metal-to-metal contact and centering

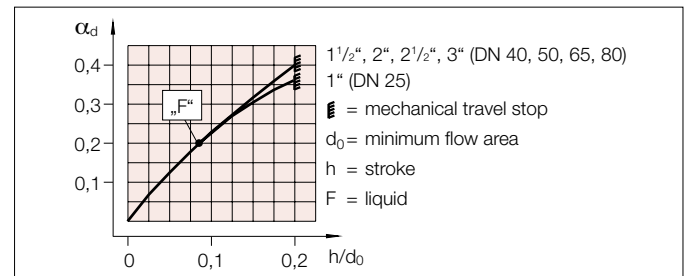
### ⑧ Valve plug can also be lifted without admission pressure:

positive-locking connection

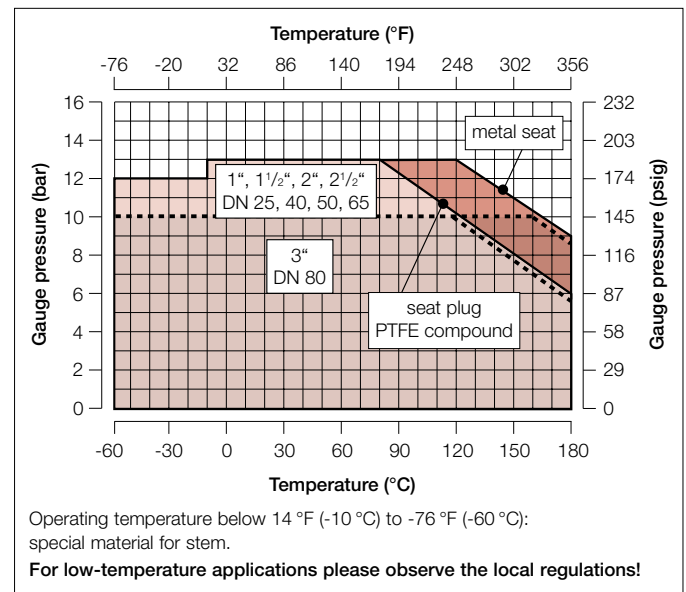
### ⑨ Fast and easy maintenance

of the wetted internals thanks to removable valve bonnet

### $\alpha_d$ by $h/d_0$ for liquids (1"-3"; DN 25-80)



### Pressure/temperature range series GU



### Set pressures and discharge coefficients $\alpha_d$

Series GU DN		Set pressure psi (bar)	Minimum flow area $A_0$ (mm <sup>2</sup> )	Liquids: $\alpha_d$ for $h/d_0$ $\geq 0.2$
inch	mm			
1"	25	3.6-189 (0.25-13)	380	0.36
1 1/2"	40	2.9-189 (0.2-13)	804	0.40
2"	50	1.45-189 (0.1-13)	1257	0.40
2 1/2"	65	1.45-189 (0.1-13)	1257	0.40
3"	80	1.45-145 (0.1-10)	1964	0.40
4"	100	on request		

Extended pressure range on request

### Adaption to the flow capacity

Can be carried out in case of oversizing by a travel stop.

Discharge coefficients; see diagram " $\alpha_d$  by  $h/d_0$  for liquids (1"-3"; DN 25-80)".

### Valve sizing for liquids

$$A_0 = 0.6211 \cdot \frac{q_m}{\alpha_d \cdot \sqrt{\Delta p \cdot \rho}}$$

$$A_0 = \frac{\pi \cdot d_0^2}{4} = \text{minimum flow area (mm}^2\text{)}$$

$q_m$  = mass flow to be discharged (kg/h)

$\alpha_d$  = certified discharge coefficient

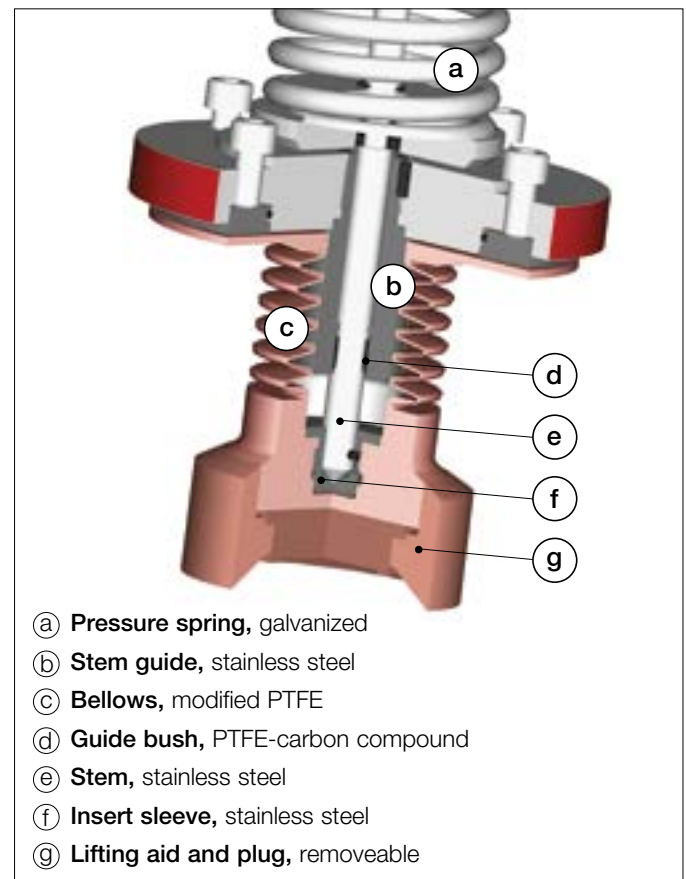
$\rho$  = density (kg/m<sup>3</sup>)

$p_0$  = abs. pressure in pressure chamber (bar abs.)

$p_{a0}$  = abs. back pressure in outlet nozzle (bar abs.)

$\Delta p = p_0 - p_{a0}$  pressure difference (bar)

### Component group bellows/plug with pressure spring and stem



## Dimensions and weights ISO/DIN

Face-to-face ISO 5752 series 1 (DIN 3202 F1), flanges ISO 7005-2

Series GU DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.52	115	2.68	68	3.55	85	4x0.55	4x14	0.67	22	6.3	160	16.7	425	4.72	120	33	15
1½"	40	5.9	150	3.46	88	4.33	110	4x0.71	4x18	1.26	32	7.87	200	20.7	525	4.72	120	55	25
2"	50	6.5	165	4.02	102	4.92	125	4x0.71	4x18	1.57	40	9.06	230	21.1	535	4.72	120	60	27
2½"	65	7.28	185	4.8	122	5.71	145	4x0.71	4x18	1.57	40	11.4	290	21.1	535	4.72	120	62	28
3"	80	7.87	200	5.43	138	6.23	160	8x0.71	8x18	1.97	50	12.2	310	27.8	705	5.51	140	110	50
4"	100	on request																	

Series GUT DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.52	115	2.68	68	3.55	85	4x0.55	4x14	0.47	12	6.3	160	11.42	290	4.33	110	23	10.5

## Dimensions and weights ASME

Face-to-face ANSI/ISA 75.08.01, Cl. 150, flanges ASME B16.5 Cl. 150 RF

Series GU DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.25	108	2.52	64	3.125	79.5	4x <sup>5</sup> / <sub>8</sub>	4x16	0.67	22	7.25	184	16.7	425	4.72	120	33	15
1½"	40	5	127	3.31	84	3.875	98.5	4x <sup>5</sup> / <sub>8</sub>	4x16	1.26	32	8.75	222	20.7	525	4.72	120	55	25
2"	50	6	153	3.86	98	4.75	120.5	4x <sup>3</sup> / <sub>4</sub>	4x19	1.57	40	10	254	21.1	535	4.72	120	60	27
3"	80	7.5	191	5.23	134	7.5	190.5	8x <sup>3</sup> / <sub>4</sub>	8x19	1.97	50	11.75	298	27.8	705	5.51	140	110	50

Series GUT DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.25	108	2.52	64	3.125	79.5	4x <sup>5</sup> / <sub>8</sub>	4x16	0.47	12	7.25	184	11.42	290	4.33	110	23	10.5

Face-to-face ANSI/ISA 75.08.01, Cl. 300, flanges ASME B16.5 Cl. 300 RF

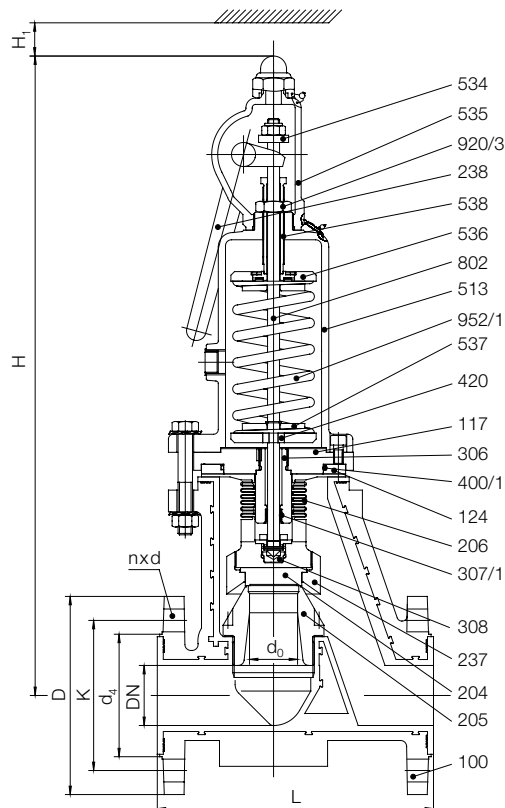
Series GU DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.87	124	2.28	58	3.5	89	4x <sup>3</sup> / <sub>4</sub>	4x19	0.67	22	7.75	197	16.7	425	4.72	120	33	15
1½"	40	6.14	156	2.87	73	4.5	114.5	4x <sup>7</sup> / <sub>8</sub>	4x22.5	1.26	32	9.25	235	20.7	525	4.72	120	55	25
2"	50	6.5	165	3.63	92	5	127	8x <sup>3</sup> / <sub>4</sub>	8x19	1.57	40	10.5	267	21.1	535	4.72	120	60	27

Series GUT DN4		D		d <sub>4</sub>		K		nxd		d <sub>0</sub>		L		H		H <sub>1</sub>		Weight	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lbs	kg
1"	25	4.87	124	2.28	58	3.5	89	4x <sup>3</sup> / <sub>4</sub>	4x19	0.47	12	7.75	197	11.42	290	4.33	110	23	10.5

## Components and materials series GU

Item	Designation	Material
100	Body	Ductile cast iron EN-JS 1049/ASTM A395, PFA-lined, optionally PFA-L, PFA-HP
117	Thrust flange	1.0460 carbon steel
124	Pressure ring	1.4308 Stainless steel
204	Plug	PTFE/carbon compound Optionally modified PTFE, Hastelloy® etc.
205	Seat	PTFE/carbon compound Optionally modified PTFE, Hastelloy® etc.
206	Bellows	modified PTFE
237	Lifting aid	PTFE/carbon compound Optionally modified PTFE, Hastelloy® etc.
238	Lifting lever	Ductile cast iron EN-JS 1049/ASTM A395
306	Stem guide	1.4301 Stainless steel
307/1	Guide bush	PTFE/carbon compound
308	Insert sleeve	1.4301 Stainless steel
400/1	O-ring	FKM (Viton® or equal)
420	Thrust ring, two-piece	1.0038 (R-St. 37)
513	Spring bonnet	Ductile cast iron EN-JS 1049/ASTM A395
534	Stem nut	1.0570 (R-St.52)
535	Lifting cap	Ductile cast iron EN-JS 1049/ASTM A395
536	Upper spring plate	1.4301 Stainless steel
537	Lower spring plate	1.4301 Stainless steel
538	Adjusting screw	1.4301 Stainless steel
802	Spindle	1.4104 Stainless steel
920/3	Hex. nut	1.0111
952/1	Pressure spring	EN-10270-1-SH, galvanized
w/o No.	Screws and Nuts	Stainless steel, other materials on request



## Overflow valves for very small mass flows; thermal Expansion

### Fields of application

The action of heat or chemical reactions may cause the medium to expand in piping systems and other plant components and so the system pressure can reach inadmissible values. In such cases the spring-loaded Richter overflow valve GUT reliably maintains a constant pressure, protecting the plant from damage. In view of the relatively small mass flows, the small, compact GUT, available in 1" (DN 25), is sufficient here. The GUT is not certified.

### Range of application

- -75 to +360 °F (-60 to +180 °C) operating temperature
- Set pressures: 14.5 to 232 psi (1 to 16 bar)

### Product features

- Can be used for liquids
- Proportional opening characteristic in accordance with German AD 2000 data sheet A2
- Minimum flow diameter  $d_0 = 12$  mm
- Back pressure in valve outlet  $p_{a0}$  up to 80 % of the test gauge pressure
- Face-to-face ISO 5752 Series 1 (DIN 3202/F1), flanges ISO 7005-2/PN 16
- Face-to-face and flanges to ASME Cl. 150, see page 4
- Inline design with upright seat
- Flanges with groove to DIN 2512 on request

### Type Code

Overflow valve GUT/...

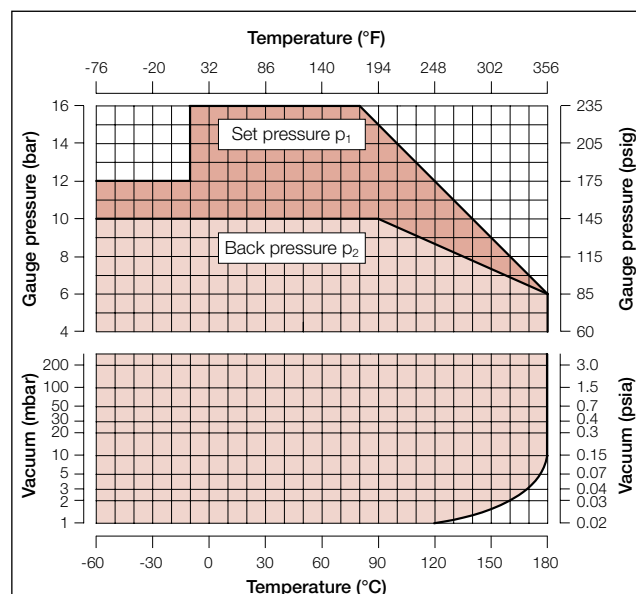
### Lining

- PFA .../F
- Antistatic PFA-L .../F-L
- Ultrapure (e.g. pharma applications) PFA-HP .../F-HP

### Components and materials series GUT

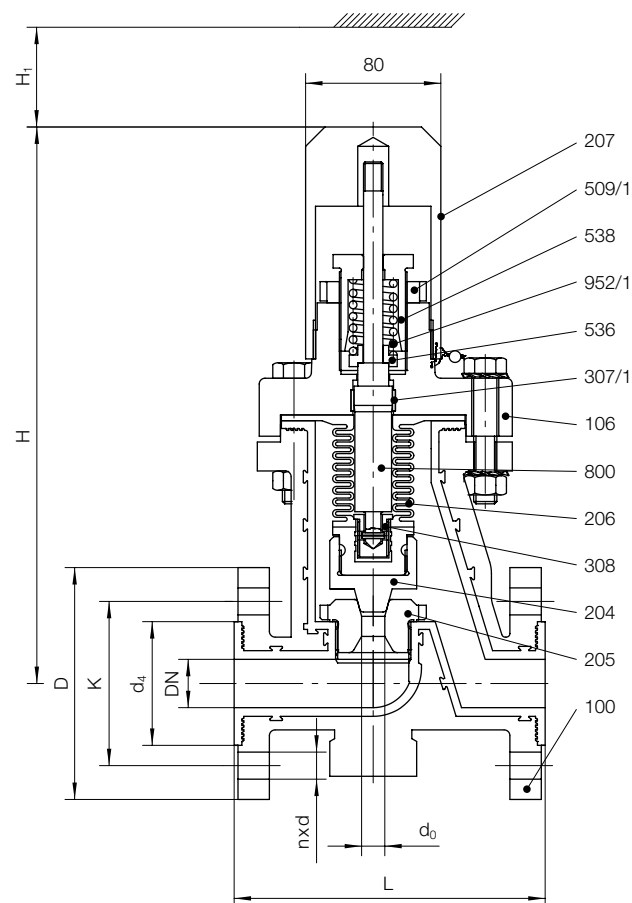
Item	Designation	Material
100	Body	Ductile cast iron EN-JS 1049/ASTM A395, PFA-lined, optionally PFA-L, PFA-HP
106	Cover	Ductile cast iron EN-JS 1049/ASTM A395
204	Plug	PTFE/carbon compound Optionally modified PTFE, Hastelloy® etc.
205	Seat	PTFE/carbon compound Optionally modified PTFE, Hastelloy® etc.
206	Bellows	modified PTFE
207	Cap	PE
307/1	Guide bush	PTFE/carbon compound
308	Insert sleeve	1.4301 Stainless steel
509/1	Groove nut	Stainless steel
536	Upper spring plate	1.4301 Stainless steel
538	Adjusting screw	1.4301 Stainless steel
800	Valve stem	1.4301 Stainless steel
952/1	Pressure spring	EN-10270-1-SH, galvanized

### Pressure/temperature range Series GUT



Operating temperature below 14 °F (-10 °C) to -76 °F (-60 °C): special material for stem.

For low-temperature applications please observe the local regulations!



Drillings drawn 45° offset



## Check and overflow valve for low differential pressures

### Fields of application

The overflow valve PRS has been developed to prevent the backflow of vapours, gases and liquids in systems with low differential pressures. For example, a backflow in feed pipes for nitrogen blanketing can be prevented.

### Range of application

- 11 psi (750 mbar) set pressure +/- 3 psi (200 mbar)
- Reseating pressure 5-6 psi (350-400 mbar)

### Product features

- Compact, inline overflow valve, 1" (DN 25)
- Can be used at gauge pressure and vacuum for vapours, gases, liquids – certification not required
- Gas-tight to DIN EN 12266-1, leakage rate A, test medium gas
- Proportional opening characteristic and stable function due to special bearing support of the plug
- Ductile cast iron shell EN-JS 1049 (0.7043)/ASTM A395
- Vacuum-resistant lining made of pure PFA, optionally antistatic (other linings on request)
- Spring-loaded, cup springs made of modified PTFE, maximum corrosion resistance on wetted side
- Internals can be easily maintained
- Face-to-face 160 mm to ISO 5752 Series 1 (DIN 3202/F1), flanges ISO 7005-2/PN 16, on request drilled to ASME B 16.5/Cl. 150

### Type Code

Overflow valve

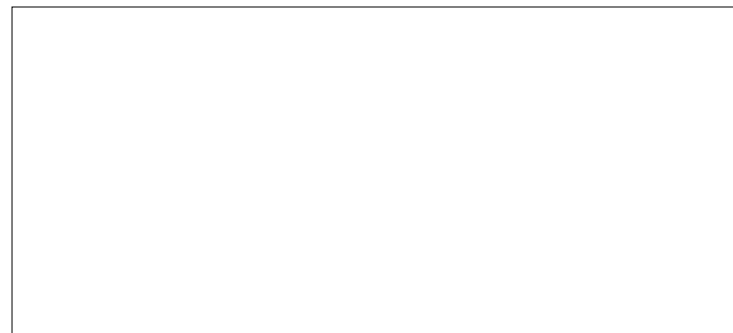
PRS/...

### Lining

- PFA .../F
- Antistatic PFA-L .../F-L

Richter = TM Richter Chemie-Technik GmbH  
Hastelloy® = TM Haynes  
Viton® = TM Du Pont

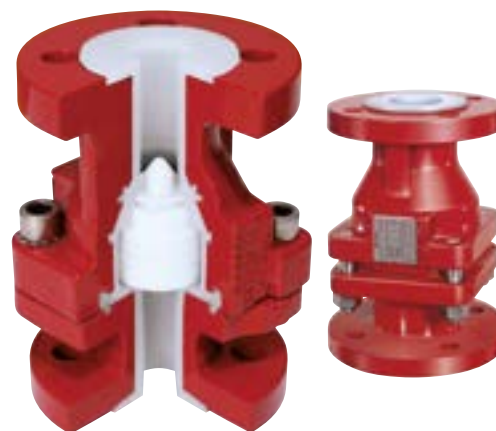
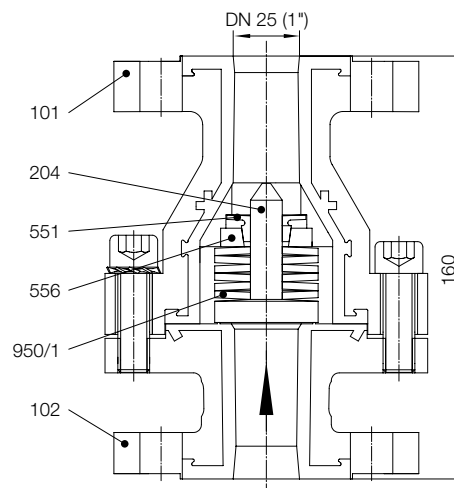
Presented by:



### Components and materials series PRS

Pos.	Benennung	Werkstoffe
101	Main body	Ductile cast iron EN-JS 1049/ASTM A395, PFA-lined, optionally PFA-L
102	Body end piece	Ductile cast iron EN-JS 1049/ASTM A395, PFA-lined, optionally PFA-L
204	Plug	PTFE
551	Tapered ring	modified PTFE
556	Bearing disc	modified PTFE
950/1	Cup spring	modified PTFE

Details for pressure/temperature range, dimensions etc. on request



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