Catalogue 45

High Performance Check Valves
for liquid and gaseous media

Check valves
Date: 06/2013

WEH® - We Engineer Hightech

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High Performance Check Valves

CHECK VALVES FOR YOUR APPLICATION

WEH can offer the right valve for your application. The TVR2 stainless steel check valves are suitable for demanding applications and the TVR60 in steel and TVR61 in brass are low-cost alternatives.

WEH® check valves are only designed for directional flow control, therefore they should never be used as safety valves. Only use original WEH® parts and never mix them with those of different manufacturers. Do not interchange original WEH® parts with parts of different manufacturers.

The check valves are manufactured to the quality assurance standard ISO 9001 and the pressure equipment directive (PED).

OVERVIEW TYPES

Type	Material	Connection	Nominal bore DN	Operating pressure PS
TVR2	Stainless steel	Double ferrule fitting on both sides	5 up to 14 mm	Max. 350 bar
TVR2	Stainless steel	Internal thread on both sides	3 up to 50 mm	Max. 400 bar
TVR2	Stainless steel	External thread on both sides	3 up to 20 mm	Max. 400 bar
TVR2	Stainless steel	External thread / internal thread	3 up to 20 mm	Max. 400 bar
TVR2	Stainless steel	Double ferrule fitting / internal thread	5 up to 14 mm	Max. 350 bar
TVR2	Stainless steel	Double ferrule fitting / external thread	3 up to 14 mm	Max. 350 bar
TVR60	Galvanised steel	Internal thread on both sides	4 up to 50 mm	Max. 300 bar
TVR61	Brass	Internal thread on both sides	10 up to 50 mm	Max. 48 bar

Our check valves type TVR2 in stainless steel are also available with these connection options. Please contact us if you need alternative connections.

Stainless steel check valves type TVR2
with double ferrule fitting
0 - 400 bar

Stainless steel check valves type TVR2
with internal thread
0 - 400 bar

Stainless steel check valves type TVR2
with external thread
0 - 400 bar

Steel check valves type TVR60
with internal thread
0 - 300 bar

Brass check valves type TVR61
with internal thread
0 - 48 bar

High Performance Check Valves

CONNECTION POSSIBILITIES

The check valves are available as standard or special solutions with different connection options.

- Internal and external threads from G1/8“ up to max. G3“
- Double ferrule fittings for pipe diameters 6 mm up to 50 mm
- NPT, UNF or metrical threads
- Flanges up to DN 125 mm
- Hose connections, pipe ends or cartridge styles

SPECIAL SOLUTIONS

WEH specializes in developing customer-tailored solutions. After a thorough analysis of your application our engineers can design a solution for you. With our know-how we can also solve many difficult connection problems. Contact us with your enquiry. You will find some examples in the section ‚special check valves‘.

Type TVR2 | Stainless Steel Check Valve

DESCRIPTION

Features
- Stainless steel 1.4305 (AISI 303)
- Extremely leak tight
- Seals are protected from the media flow
- Wear and corrosion resistant
- Low-noise opening and closing
- Low cracking pressure – starting from 0.01 bar
- Max. operating pressure – up to 1000 bar

High performance check valves for use with liquid and gaseous media
The seals are protected from the media flow thus minimizing the effect of dirt particles on the sealing components within the unit. The WEH check valves are constructed from high-grade materials achieving a very durable unit. The check valves are silent in use even under high flow requirements and offer minimum opening pressures from 0.01 bar onwards with high sealing integrity. The high performance sealing system ensures that the TVR2 is suitable for applications with gaseous media. WEH not only offer check valves with threaded connections but also with ferrule fittings, flanges, hose nozzles, nipples or custom designed cartridge valves, even for small quantities.

Application
TVR2 check valves are for use with liquid and gaseous media.
The WEH check valves can be used for a large range of applications in mechanical engineering and construction, chemical / pharmaceutical and food industry, materials-handling and medical technology etc.

OVERVIEW TYPES

WEH offer various types of TVR2 check valves:

TVR2 | Stainless steel check valves **with double ferrule fitting on both sides**

TVR2 | Stainless steel check valves **with external thread on both sides**

TVR2 | Stainless steel check valves **with internal thread on both sides**

TVR2 | Special solutions for stainless steel check valves, e.g. **with external thread and internal thread**

Type TVR2 | Stainless Steel Check Valve

TECHNICAL DATA

Characteristic	Basic version	Options
Inlet B1 / outlet B2	Double ferrule fitting: tube Ø 6 - tube Ø 16 mm Internal thread: G1/8" - G2" External thread: G1/8" - G1"	Double ferrule fitting: up to max. tube Ø 50 mm on request Internal thread: up to max. G3" on request External thread: up to max. G3" on request
Nominal bore DN	Acc. to design	On request
Operating pressure PS	Double ferrule fitting: max. 350 bar Internal thread: max. 400 bar (up to G3/4") max. 250 bar (from G1" onwards) External thread: max. 400 bar	Higher pressures on request
Cracking pressure PC	Approx. 0.1 bar / 0.5 bar / 1.0 bar, acc. to design	Approx. 0.01 bar / 0.1 bar / 0.2 / 0.5 / 1.0 bar Other cracking pressures on request.
Temperature range	-20 °C up to max. +120 °C	Depending on version and application temperature from -45 °C up to max. +300 °C. Other temperature ranges on request
Medium	Liquid or gaseous	On request
Material	Stainless steel 1.4305 (AISI 303) Up to DN 8 mm, some inner parts brass.	Stainless steel 1.4571 (AISI 316Ti) Other materials on request
Spring material	Stainless steel 1.4310 (AISI 301)	Stainless steel 1.4571 (AISI 316Ti) Other materials on request
Sealing material	FKM	FFKM, EPDM, Silicone, Urethane, PTFE, PEEK, NBR Other sealing materials on request.
Lubricant	Krytox® GPL 202	On request
Valve seat	Up to DN 6 mm ball sealing, larger dimensions cone sealing	On request
Approval	PED97/23/EC For automotive applications other approvals are available. Please contact us!	

Flow values

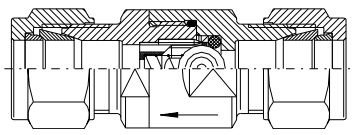
Please find in the table below flow rates for various nominal bores of the TVR2 stainless steel check valves.

Nominal bore DN	Kv (Cv) Value	Nominal bore DN	Kv (Cv) Value
4 mm	0.2 (0.2)	20 mm	10.7 (12.4)
5 mm	0.4 (0.5)	25 mm	14.7 (17.1)
6 mm	0.6 (0.7)	32 mm	27.8 (32.2)
10 mm	2.9 (3.4)	40 mm	38.1
14 mm	7.4 (8.6)	50 mm	57.4
16 mm	8.1 (9.4)		

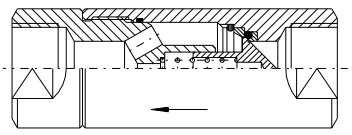
The flow curves (see 5.2 technical appendix, from page 20 onwards) were determined on the basis of the standards DIN/EN 60534-2 with water and refer to a cavitation free flow. The curves relate to unrestricted inlet and outlet.

Sealing types

Up to DN 6 mm ball sealing, larger dimensions cone sealing.



Ball seal construction

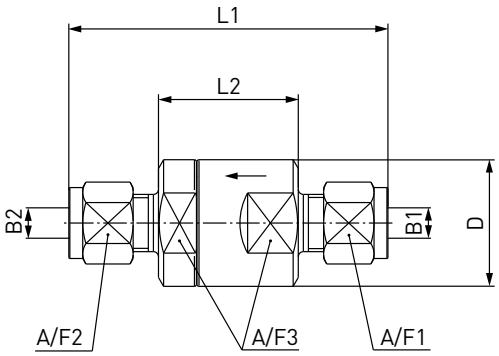


Cone seal construction

Type TVR2 | Stainless Steel Check Valve

ORDERING | TVR2 with double ferrule fitting on both sides

approx. dimensions (mm)



Type ball sealing

Part No.	DN	B1 / B2	PS (bar)	PC (bar)	D	L1	L2	A/F1 | A/F2	A/F3
C20010	5	Tube Ø 6	350	0.1	25.0	63.0	27.6	14	22
C20011	6	Tube Ø 8	350	0.1	25.0	65.6	24.5	16	22
C20012	6	Tube Ø 10	350	0.1	25.0	65.0	24.6	19	22
C20013	6	Tube Ø 12	350	0.1	25.0	69.0	24.5	22	22

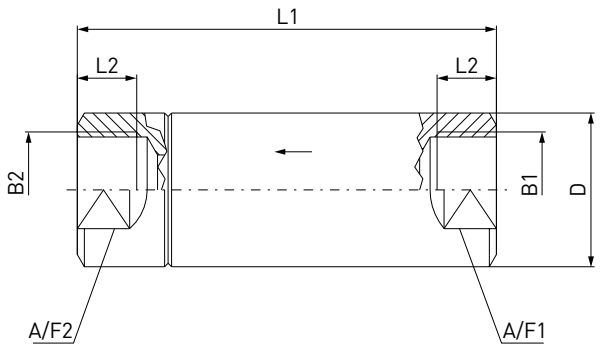
Type cone sealing

Part No.	DN	B1 / B2	PS (bar)	PC (bar)	D	L1	L2	A/F1 | A/F2	A/F3
C20014	10	Tube Ø 12	350	0.5	35.0	110.0	65.5	22	30
C20015	14	Tube Ø 16	350	0.5	35.0	110.0	65.5	25	30

Type TVR2 | Stainless Steel Check Valve

ORDERING | TVR2 with internal thread on both sides (DIN ISO 228-1)

approx. dimensions (mm)



Type ball sealing

Part No.	DN	B1 / B2 (internal thread)	PS (bar)	PC (bar)	D	L1	L2	A/F1 / A/F2
C20000	6	G1/8"	400	0.1	25.0	52.0	10.0	22
C20001	6	G1/4"	400	0.1	25.0	52.0	10.5	22

Type cone sealing

Part No.	DN	B1 / B2 (internal thread)	PS (bar)	PC (bar)	D	L1	L2	A/F1 / A/F2
C20002	14	G3/8"	400	0.1	35.0	95.0	17.0	30
C20003	14	G1/2"	400	0.5	35.0	95.0	17.0	30
C20004	16	G3/4"	400	0.5	39.0	110.0	17.0	34
C20005	20	G1"	250	1.0	48.0	120.0	18.0	41
C20006	25	G1 1/4"	250	1.0	60.0	125.0	21.5	50
C20007	32	G1 1/2"	250	1.0	65.0	130.0	22.0	55
C20008	40	G1 1/2"	250	1.0	69.0	145.0	22.0	60
C20009	50	G2"	250	1.0	88.0	152.0	24.0	75

ORDERING | TVR2 mini check valve with internal thread on both sides (DIN ISO 228-1)

approx. dimensions (mm)

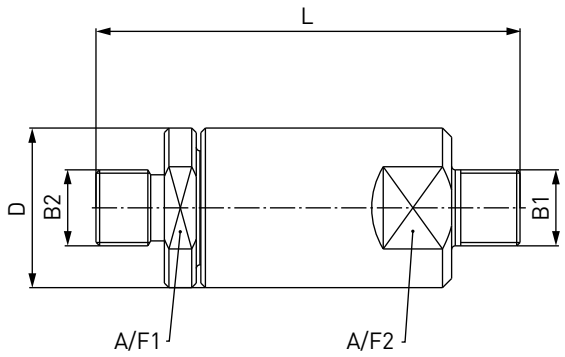
Part No.	DN	B1 / B2 (internal thread)	PS (bar)	PC (bar)	D	L1	L2	A/F1 / A/F2
C1-52584	3	G1/8"	100	0.2	15.0	45.0	10.5	13
C1-98954*	4	G1/4"	100	0.1	18.0	45.0	11.0	16

* C1-95705 for applications with ozone

Type TVR2 | Stainless Steel Check Valve

ORDERING | TVR2 with external thread on both sides (DIN ISO 228-1)

approx. dimensions (mm)



Type ball sealing

Part No.	DN	B1 / B2 (external thread)	PS (bar)	PC (bar)	D	L	A/F1 / A/F2
C20201	3	G1/8"	400	0.1	25.0	52.0	22
C20202	5	G1/4"	400	0.1	25.0	52.0	22

Type cone sealing

Part No.	DN	B1 / B2 (external thread)	PS (bar)	PC (bar)	D	L	A/F1 / A/F2
C20203	10	G3/8"	400	0.1	35.0	93.0	30
C20204	14	G1/2"	400	0.5	35.0	95.0	30
C20205	16	G3/4"	400	0.5	39.0	110.0	34
C20206	20	G1"	250	1.0	48.0	120.0	41

Type TVR2 | Stainless Steel special check valve examples

ORDERING | TVR2 with external thread and internal thread (DIN ISO 228-1)

approx. dimensions (mm)

Part No.	DN	Inlet B1 (external thread)	Outlet B2 (internal thread)	PS (bar)	PC (bar)	D	L	A/F1 / A/F2
C1-95696	14	G1/2"	G1/2"	400	0.1	35.0	95.0	30

ORDERING | TVR2 with double ferrule fitting and internal thread

approx. dimensions (mm)

Part No.	DN	Inlet B1	Outlet B2 (internal thread)	PS (bar)	PC (bar)	D	L	A/F1 / A/F2
C1-91624	6	Tube Ø 10	UNEF 9/16"-24	350	1.0	25.0	73.5	22

ORDERING | TVR2 with double ferrule fitting and external thread

approx. dimensions (mm)

Part No.	DN	Inlet B1	Outlet B2 (external thread)	PS (bar)	PC (bar)	D	L	A/F1 / A/F2
C1-81108	6	Tube Ø 8	G1/4"	350	0.05	25.0	58.6	22

Other connector sizes are available on request.

The following combinations are also possible:
- internal thread / external thread
- internal thread / double ferrule fitting
- external thread / double ferrule fitting

Type TVR60 | Steel Check Valve

DESCRIPTION

Features
- Galvanised steel
- Prevent fluid return in the circuit
- Metal-to-metal sealing system, without o-ring
- Highly resistant to stress during pressure peaks

The new series of steel check valves were developed specially for oil and hydraulic applications in industry and agriculture.

Application
Oil and hydraulic applications in industry, agriculture and construction machinery.

TECHNICAL DATA

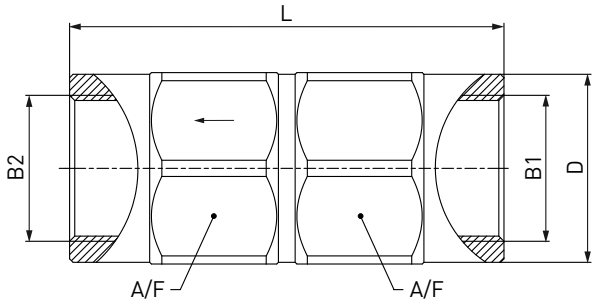
Characteristic	Basic version	Options
Inlet B1 / outlet B2	G1/8" - G2" internal thread	Inlet: external thread on request
Nominal bore DN	4 up to 50 mm	On request
Operating pressure PS	Max. 300 bar, acc. to body size	On request
Cracking pressure PC	Approx. 0.35 bar	Approx. 1 bar / 2.5 bar / 4.5 bar / 6 bar / 8 bar Other cracking pressures on request
Temperature range	-20 °C up to max. +135 °C	On request
Medium	On request	On request
Material	Housing in galvanised steel	On request
Valve seat	Metallic sealing cone seat, without o-ring	On request
Approval	PED97/23/EC	

Type TVR60 | Steel Check Valve

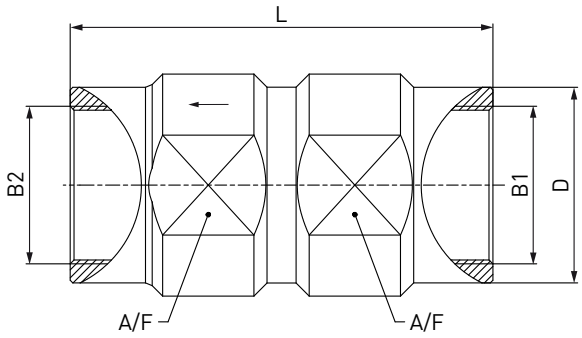
ORDERING | TVR60 with internal thread on both sides (DIN ISO 228-1)

approx. dimensions (mm)

Design 1



Design 2



Part No.	Design	DN	B1 / B2 (internal thread)	PS (bar)	PC (bar)	L	D	A/F
C1-90389	1	4	G1/8"	300	0.35	44.0	15.0	14
C1-90390	1	6	G1/4"	300	0.35	56.0	18.5	19
C1-90391	1	10	G3/8"	300	0.35	70.0	21.6	22
C1-90392	1	12	G1/2"	300	0.35	77.0	29.5	30
C1-90393	1	20	G3/4"	300	0.35	90.0	35.0	36
C1-90394	1	25	G1"	300	0.35	106.3	44.5	46
C1-90395	1	31	G1 1/4"	300	0.35	125.0	54.0	55
C1-90396	1	40	G1 1/2"	300	0.35	140.0	59.0	60
C1-90397	2	50	G2"	200	0.35	160.0	74.0	75

Other connector sizes and versions are available on request

Type TVR61 | Brass Check Valve

DESCRIPTION

Features
- Brass MS58 (CuZn39Pb3 / CZ121)
- Full flow, high flow rate
- Minimum pressure loss
- Compact dimensions
- Average leak tightness
- Low-noise opening and closing

The check valves of the series type TVR61 are featuring low-noise operation and have a high flow rate. The valves can be installed in any position. Only the flow direction must be considered.

Application
Hydraulic and pneumatic applications in plant engineerings, also suitable in applications with submersible pumps, pressure vessels, air conditioning systems, heating systems etc.

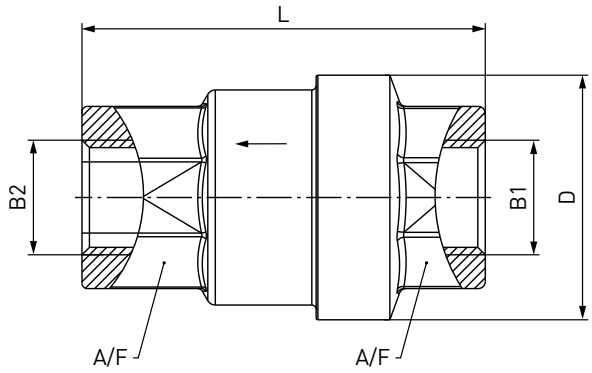
TECHNICAL DATA

Characteristic	Basic version	Options
Inlet B1 / outlet B2	G1/4" - G2" internal thread	Up to max. G3" internal thread on request
Nominal bore DN	10 up to 50 mm	On request
Nominal pressure PN	Min. 0.05 bar - max. 48 bar, acc. to body size	On request
Cracking pressure PC	Min. 0.03 bar	On request
Temperature range	-20 °C up to max. +135 °C	On request
Medium	Cold and hot water, compressed air, oils	On request
Material	Housing of brass MS58 (CuZn39Pb3 / CZ121), inner parts of POM	On request
Spring material	Stainless steel	On request
Sealing material	FKM	On request
Valve seat	Cone seal	On request

Type TVR61 | Brass Check Valve

ORDERING | TVR61 with internal thread on both sides (DIN ISO 228-1)

approx. dimensions (mm)



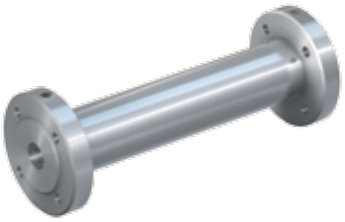
Part No.	DN	B1 / B2 (internal thread)	PN (bar)	PC (bar)	D	L	A/F
C1-89289	10	G1/4"	48	0.03	28.0	46.5	21
C1-89290	10	G3/8"	48	0.03	28.0	46.5	21
C1-89292	15	G1/2"	42	0.03	34.0	48.0	26
C1-89293	20	G3/4"	35	0.03	41.5	59.0	32
C1-89294	25	G1"	30	0.03	50.0	67.5	39
C1-89295	32	G 1 1/4"	25	0.03	60.5	76.0	49
C1-89296	40	G 1 1/2"	25	0.03	73.0	90.0	56
C1-89297	50	G2"	20	0.03x	88.5	100.0	68

Other connector sizes and versions are available on request

Special check valve examples

WEH specializes in developing customer-tailored solutions. Hereafter please find some examples showing a small selection of special valves. Over the years WEH have designed many special solutions together with our customers. We also have your solution. Please contact us!

FLANGE VALVE



- Flange connection acc. to DIN 1092-1 on both sides
- Material: all stainless steel 1.4539 (AISI 904)
- Sealing material: FFKM
- Cracking pressure: approx. 0.1 - 0.5 bar
- Nominal bore: approx. 25 mm
- Other designs on request

FLANGE INSERT VALVE

- Customer specific flange connection
- Material: Alloy C4
- Sealing material: metallic sealing
- Cracking pressure: 0.025 bar ± 0.01 bar
- Nominal bore: approx. 25 mm
- Other designs on request

CARTRIDGE CHECK VALVE

- Inlet: UNF 1/4"-28 internal thread
- Outlet: bore Ø 8 mm
- Material: all stainless steel 1.4305 (AISI 303), spring 1.4568 (AISI 631, 313)
- Sealing material: FFKM
- Cracking pressure: 0.14 bar - 0.35 bar
- Nominal bore: approx. 4 mm
- Other designs on request

Special check valve examples

SCREW-IN VALVE

- Connection: G1/4“ external thread
- Material: all stainless steel 1.4305 (AISI 303), spring 1.4310 (AISI 301)
- Sealing material: special FKM
- Cracking pressure: approx. 1 bar
- Nominal bore: approx. 4 mm
- Other designs on request

GAS CHECK VALVE

- UNF 1 3/8“-12 external thread on both sides
- Material: Brass 2.0401 (CZ121), partly stainless steel 1.4305 (AISI 303), spring 1.4310 (AISI 301)
- Sealing material: PEEK or copper
- Cracking pressure: 0.15 bar ± 0.05 bar
- Nominal bore: approx. 12 mm
- Other designs on request

Technical appendix

Definitions

Abbreviation	Definition	
Pressure specifications		
PN	Nominal pressure	Nominal pressure after temperature compensation at 15 °C
PS	Max. operating pressure	Maximum permissible operating pressure at 15 °C and normal conditions. The values mentioned in this catalogue have been measured at a temperature of 15 °C. Note: At higher operating temperatures the permissible operating pressure has to be reduced accordingly to compensate for the effect of heat weakening component materials. Example values see table: Technical notes → Pressure - temperature - compensation The admissible operating pressure has been determined as follows: 100,000 x cycles impacting the component with 125 % of PN The pressure wave is sinusoidal. The test is performed at a room temperature of approx. 20 °C.
PT	Test pressure	Test pressure to which the component is tested for structural integrity during acceptance testing (normally PS x 1.43 up to 1.5)
PC	Cracking pressure	The input pressure at which the first indication of flow occurs
Dimensions		
L1, L2, L3 ...	Length specification	
D1, D2, D3 ...	Diameter specification	
Ports		
B1, B2, B3 ...	Media ports	
Others		
DN	Nominal bore	

Technical notes

Term	Definition
Temperature range	The temperature ranges stated cover most common applications. The seal material used has higher or lower temperature limits dependant on material (e.g. NBR -30 °C up to +100 °C, FKM -20 °C up to +200 °C, EPDM -40 °C up to +150 °C). Under such extreme temperature conditions the suitability of WEH® products to the application has to be checked specifically. If necessary, we can develop special solutions.
Pressure - temperature - compensation	For higher temperatures the max. operating pressure needs to be reduced dependant on the application. Possible values therefore are: 50 °C - 5 %, 100 °C - 10 %, 150 °C - 20 %. In case of doubt, please contact us! When using certain materials, for example plastics, the valves need to be further derated.
Suitability for application	When selecting a component, the total system design must be considered to ensure safe, trouble free performance. The correct selection of a component, material, temperature, pressure range as well as proper installation, operation and maintenance are the responsibility of the customer.

Technical appendix

OVERVIEW SEALING MATERIAL

The WEH check valves can be adapted to your specific application. A large variety of sealing materials is available for this purpose. Together with the supplier of the sealing material we choose the right material suitable for your medium. If extremely high temperatures are prevailing we also use metallic seals.

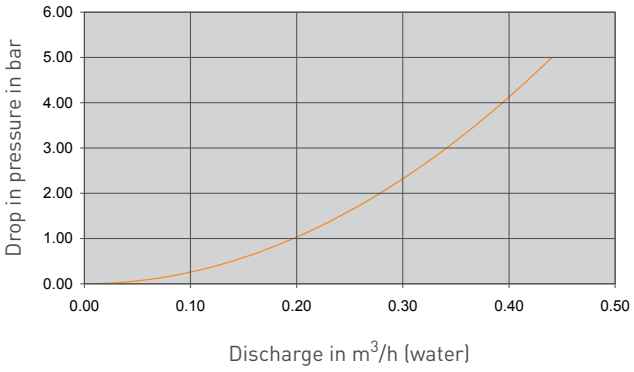
Sealing material	Suited for
FKM	Mineral oils, greases, petrol, super petrol, diesel oils, air
FFKM	Very aggressive media, resistant against nearly all media. Special types are applicable up to +325 °C
EPDM	Hot water, steam, brake fluid, media containing glycol

Other sealing materials: Silicone, Urethane, PTFE, PEEK, NBR, etc.

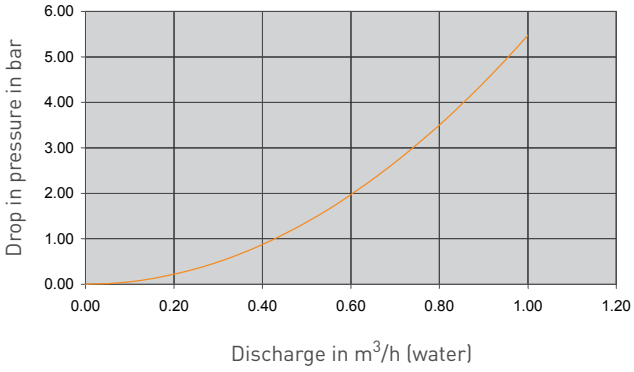
Flow curves

The flow curves were determined on the basis of the standards DIN/EN 60534-2. The curves refer to a cavitation free flow (water). The curves relate to unrestricted inlet and outlet.

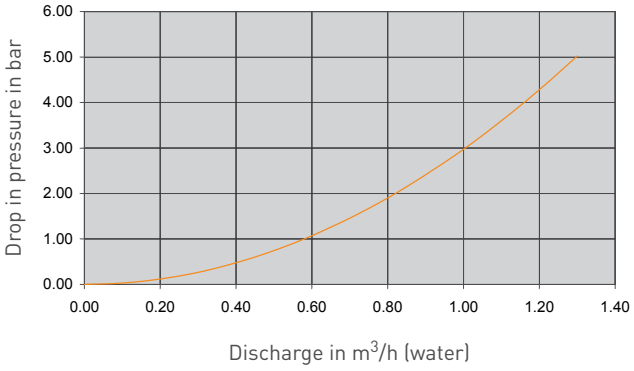
TVR2 (DN = 4 mm): Kv = 0.2 (Cv = 0.2)



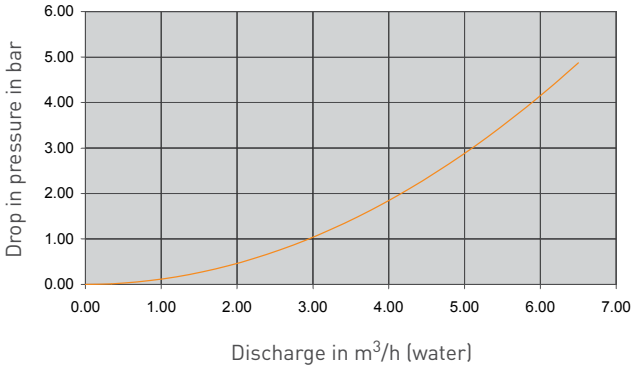
TVR2 (DN = 5 mm): Kv = 0.4 (Cv = 0.5)



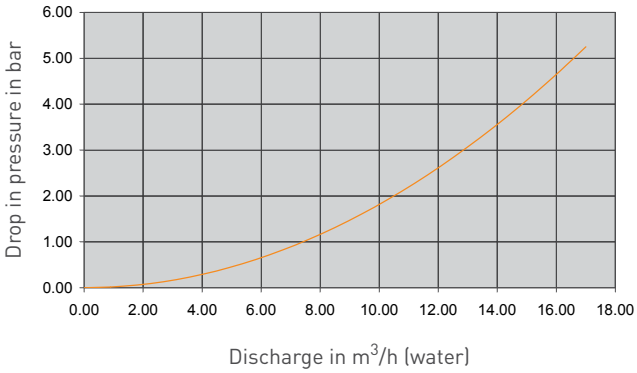
TVR2 (DN = 6 mm): Kv = 0.6 (Cv = 0.7)



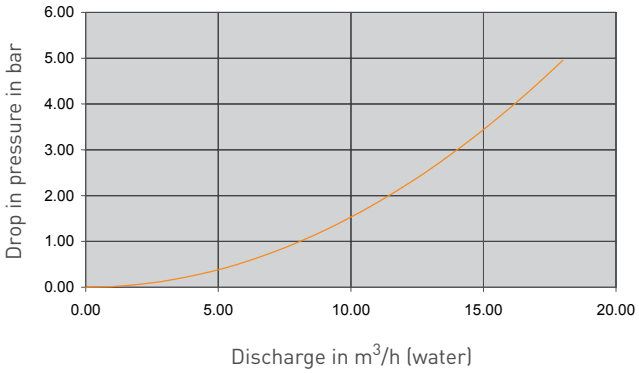
TVR2 (DN = 10 mm): Kv = 2.9 (Cv = 3.4)



TVR2 (DN = 14 mm): Kv = 7.4 (Cv = 8.6)

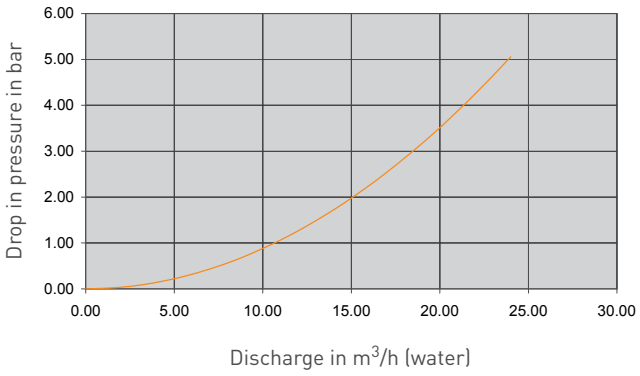


TVR2 (DN = 16 mm): Kv = 8.1 (Cv = 9.4)

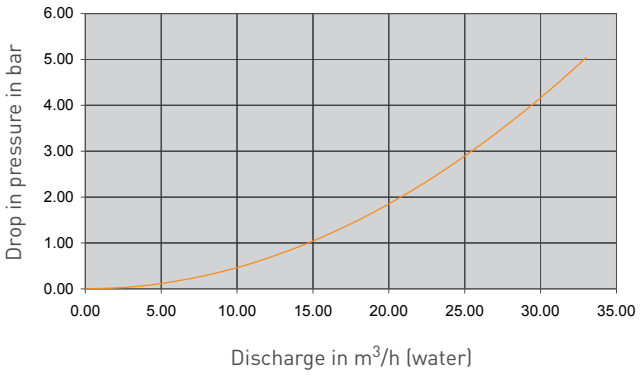


Flow curves

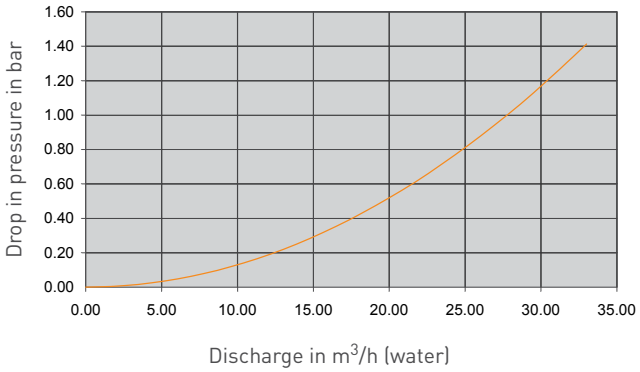
TVR2 (DN = 20 mm): Kv = 10.7 (Cv = 12.4)



TVR2 (DN = 25 mm): Kv = 14.7 (Cv = 17.1)



TVR2 (DN = 32 mm): Kv = 27.8 (Cv = 32.2)



Flow curves for DN = 40 and DN = 50 on request.

Brochure data

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Your check valve parameters:

Nominal bore		Required flow rate:	
Dimension / Inlet	Internal thread:	External thread:	Tube:
Dimension / Outlet	Internal thread:	External thread:	Tube:
Temperature	from:	up to:	
Pressure	Cracking pressure:	Max. operating pressure:	
Media			
Material	○ Stainless steel 1.4305 (AISI 303) ○ Stainless steel 1.4571 (AISI 316Ti)	○ Galvanised steel ○ Brass	Others:
Sealing material	○ FKM ○ FFKM ○ NBR	○ EPDM ○ PTFE / PEEK	Others:
Quantity			
Regular demand	○ Yes	○ No	
Application			
Remark			

Yes, I want to have more details

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○ Information about other products

○ Offer
(please describe application)

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