

## Datasheet Ball Valve Type 543



### Advantages

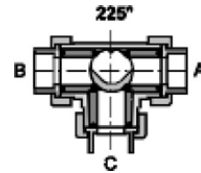
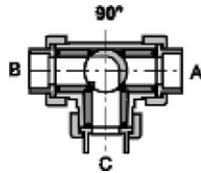
- Indicator for the position of the ball on the handle
- Integrated fixing system with mounting inserts (horizontal)
- Handle with integrated tool for removing of union bushings
- The horizontal version includes three ball seals
- 90° end stop attached for all horizontal valves

Dimensions			
d16DN 10 – d63DN 50, 3/8" – 2"			
Materials		Sealing materials	
<b>Valve body horizontal</b>	PVC-U, PVC-C, ABS, PP, PVDF	<b>O-Rings</b>	EPDM, FPM, FFPM
<b>Valve body vertical</b>	PVC-U, ABS	<b>Ball seal</b>	PTFE, PVDF
<b>Handle</b>	PPGF 30	Actuation horizontal	
Connectors		Manual operated	
Solvent cement / fusion sockets ISO, ASTM, JIS, BS		Electrically and pneumatically actuated	
Solvent cement / Fusion spigots ISO		Ball with L/T drilling	
Threaded socket Rp Rp, NPT, Rc		180° end stop if requested	
Butt fusion spigots PE100 or Butt fusion spigots SDR11		Multifunction handle	
Accessories		Actuation vertical	
Multifunction handle		Manual operated	
End stop 90°, 180°		Electrically or pneumatically actuated (only with three-foot ball )	
From the manual valve to the actuated ball valve with several options		Ball with L and three-foot Drilling	
		Multifunction handle	
		Approvals	
		DVGW, ACS, ABS, NSF, WRAS, DIBt, TA Luft, RINA, BV, FDA, SEPRO, TSSA	

## kv 100-Values

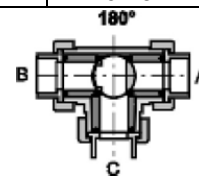
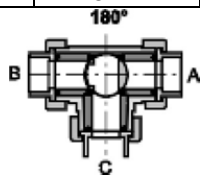
### Type 543 horizontal: Ball with L-Drilling

			Flow direction B → C, C → B; A → C, C → A			Flow direction B → A		
DN mm	Zoll Inch	d mm	kv 100 l/min (Δp=1 bar)	Cv 100 US gal./min (Δp=1 psi)	kv 100 m³/h (Δp=1 bar)	kv 100 l/min (Δp=1 bar)	Cv 100 US gal./min (Δp=1 psi)	kv 100 m³/h (Δp=1 bar)
10	3/8	16	50	3.5	3.0	10	0.7	0.6
15	1/2	20	75	5.3	4.5	15	1.1	0.9
20	3/4	25	150	10.5	9.0	30	2.1	1.8
25	1	32	280	19.6	16.8	50	3.5	3.0
32	1 1/4	40	480	33.6	28.8	90	6.3	5.4
40	1 1/2	50	620	43.4	37.0	110	7.7	6.6
50	2	63	1230	86.1	74.0	220	15.4	13.2



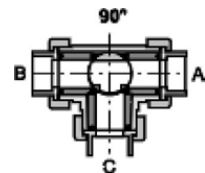
### Type 543 horizontal: Ball with T-Drilling

			Flow direction B → C			Flow direction C → B, C → A		
DN mm	Zoll Inch	d mm	kv 100 l/min (Δp=1 bar)	Cv 100 US gal./min (Δp=1 psi)	kv 100 m³/h (Δp=1 bar)	kv 100 l/min (Δp=1 bar)	Cv 100 US gal./min (Δp=1 psi)	kv 100 m³/h (Δp=1 bar)
10	3/8	16	40	2.8	2.4	35	2.5	2.1
15	1/2	20	70	4.9	4.2	50	3.5	3.0
20	3/4	25	150	10.5	9.0	130	9.1	7.8
25	1	32	250	17.5	15.0	200	14.0	12
32	1 1/4	40	470	32.9	28.0	380	26.6	23
40	1 1/2	50	600	42.0	36.0	470	32.9	28
50	2	63	1210	84.7	73.0	890	62.3	53



### Type 543 horizontal: Ball with T-Drilling

			Flow direction B → A		
DN mm	Zoll Inch	d mm	kv 100 l/min (Δp=1 bar)	Cv 100 US gal./min (Δp=1 psi)	kv 100 m³/h (Δp=1 bar)
10	3/8	16	140	9.8	8.4
15	1/2	20	200	14.0	12.0
20	3/4	25	470	32.9	28.2
25	1	32	793	55.5	47.8
32	1 1/4	40	1290	90.3	77.4
40	1 1/2	50	1910	133.7	115.0
50	2	63	3100	217.0	186.0



### Type 543 vertical: Ball with L-Drilling

DN mm	Zoll Inch	d mm	kv 100 l/min ( $\Delta p = 1$ bar)	kv 100 m <sup>3</sup> /h ( $\Delta p = 1$ bar)
10	3/8	16	50	3.0
15	1/2	20	80	4.8
20	3/4	25	140	8.4
25	1	32	250	15.0
32	1 1/4	40	430	26.0
40	1 1/2	50	700	42.0
50	2	63	1300	78.0

### Electric actuated Ball Valves

Ball valves type 185 - 188 are based on ball valve type 543 (d16DN10 to d63DN50) and electric actuator EA21. The type range 185-188 is designed as modular upgradeable 3-way ball valve for mixing and diverting applications which demand special process requirements.

Ball Valve electric	Electric actuator	Manual Ball Valve	Dimensions	Materials	Standards
Type 185	EA 21	Type 543 horizontal	DN 10-DN 50	PVC-U, PVC-C, ABS	All Standards
Type 186	EA 21	Type 543 horizontal	DN 10-DN 50	PROGEF	DIN/ISO, ASTM
Type 187	EA 21	Typ 543 horizontal	DN 10-DN 50	SYGEF	DIN/ISO, ASTM
Type 188	EA 21	Typ 543 vertical	DN 10-DN 50	PVC-U, ABS	DIN/ISO, JIS

Ball valves type 285 - 288 are based on ball valve type 543 (d16DN10 to d63DN50) and pneumatic actuator PA21. The type range 285-288 is designed as modular upgradeable 3-way ball valve for mixing and diverting applications which demand special process requirements



Ball Valve pneumatic	Pneumatic actuator	Manual Ball Valve	Dimensions	Materials	Standards
Type 285	PA 11 / PA 21	Type 543 horizontal	DN 10-DN 50	PVC-U, PVC-C, ABS	All standards
Type 286	PA 11 / PA 21	Type 543 horizontal	DN 10-DN 50	PROGEF	DIN/ISO, ASTM
Type 287	PA 11 / PA 21	Type 543 horizontal	DN 10-DN 50	SYGEF	DIN/ISO, ASTM
Type 288	PA 11 / PA 21	Type 543 vertical	DN 10-DN 50	PVC-U, ABS	DIN/ISO, JIS

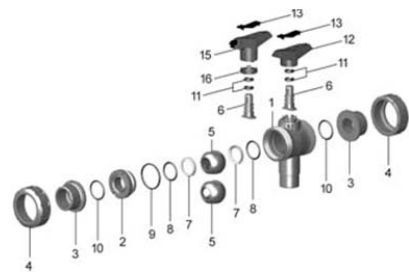
## Design

### Ball Valve horizontal



1. Body	2. Union nut
3. Connecting part	4. Union nut
5. Ball L/T	6. Stem
7. ball seal	8. Backing seal
9. Body seal	10. Union seal
11. Stem seal	12. Standard handle
13. Handle clip	

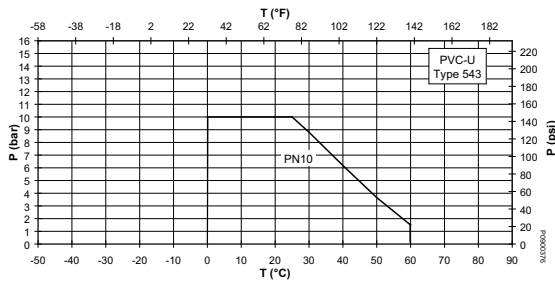
### Ball Valve vertical



1. Body	2. Union nut
3. Connecting part	4. Union nut
5. Ball	6. Stem
7. Ball seal	8. Backing seal
9. Body seal	10. Anschlusssteildichtung
11. Stem seal	12. Standard handle
13. Handle clip	15. Multifunction handle
16. Spacer	

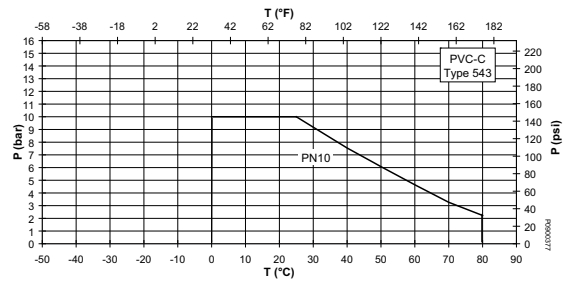
## P/ T-Diagrams

### PVC-U



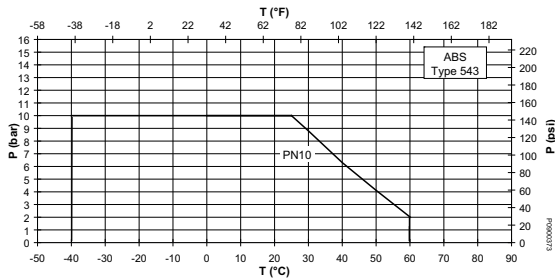
P: Permissible pressure in bar, psi, T: Temperature in °C, °F

### PVC-C



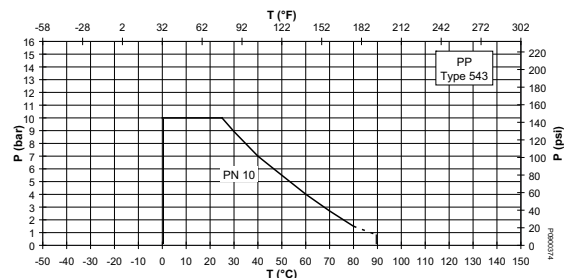
P: Permissible pressure in bar, psi, T: Temperature in °C, °F

### ABS



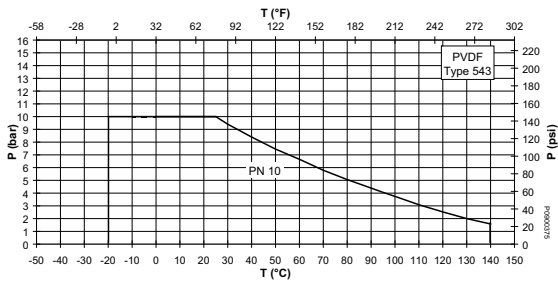
P: Permissible pressure in bar, psi, T: Temperature in °C, °F

### PP



P: Permissible pressure in bar, psi, T: Temperature in °C, °F

## PVDF

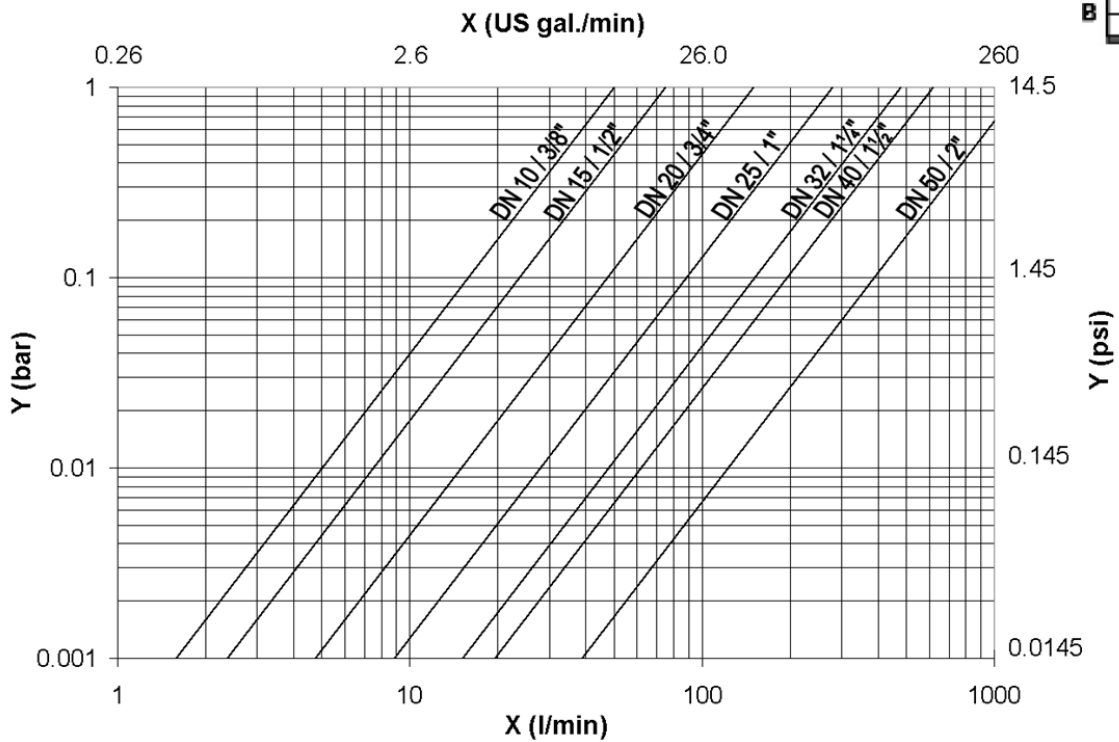


P: Permissible pressure in bar, psi; T: Temperature in °C, °F  
 EPDM-sealing up to max. 100° C

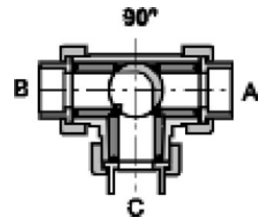
The pressure temperature diagrams are based on a lifetime of 25 years and the medium water or similar media.

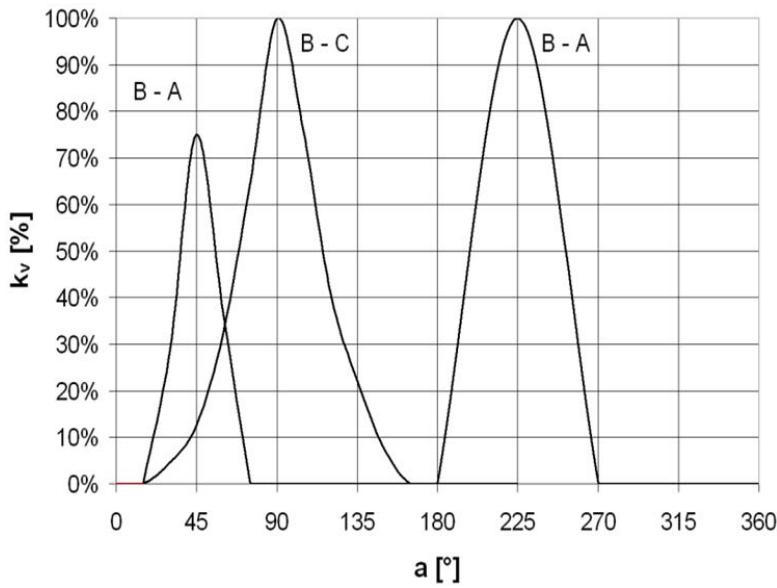
## Pressure loss diagrams and Flow-Characteristics

Type 543 horizontal: Ball with L-Drilling, Flow direction C → B

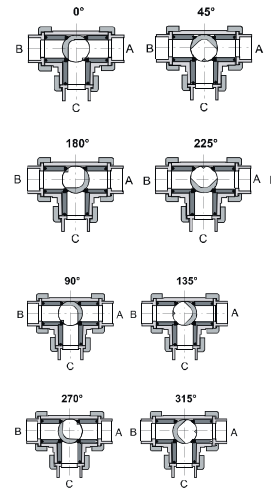


Media: water, 20 °C; X: Flow rate (l/min), (US gal./min); Y: Pressure loss Δp (bar), (psi)

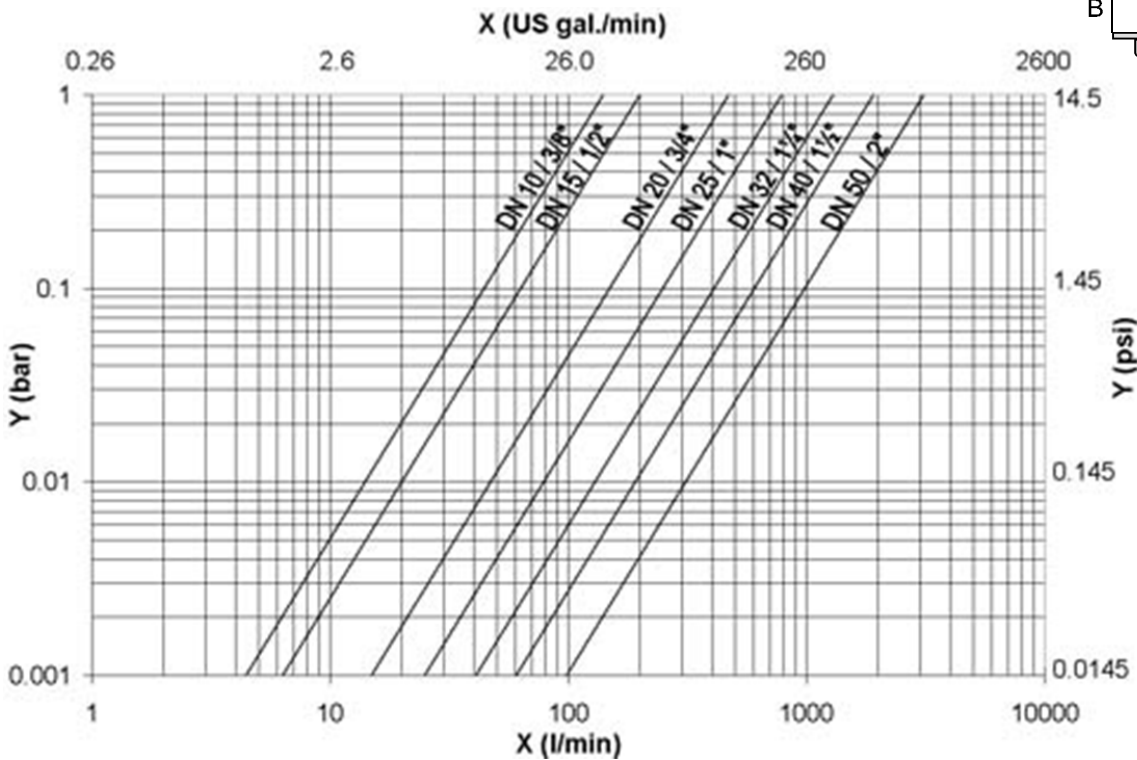




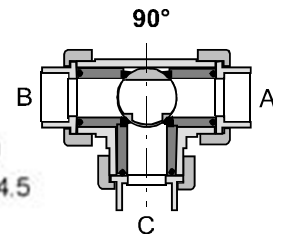
X: Open angle (%), Y: Flow factor  $k_v$ ,  $c_v$  (%)



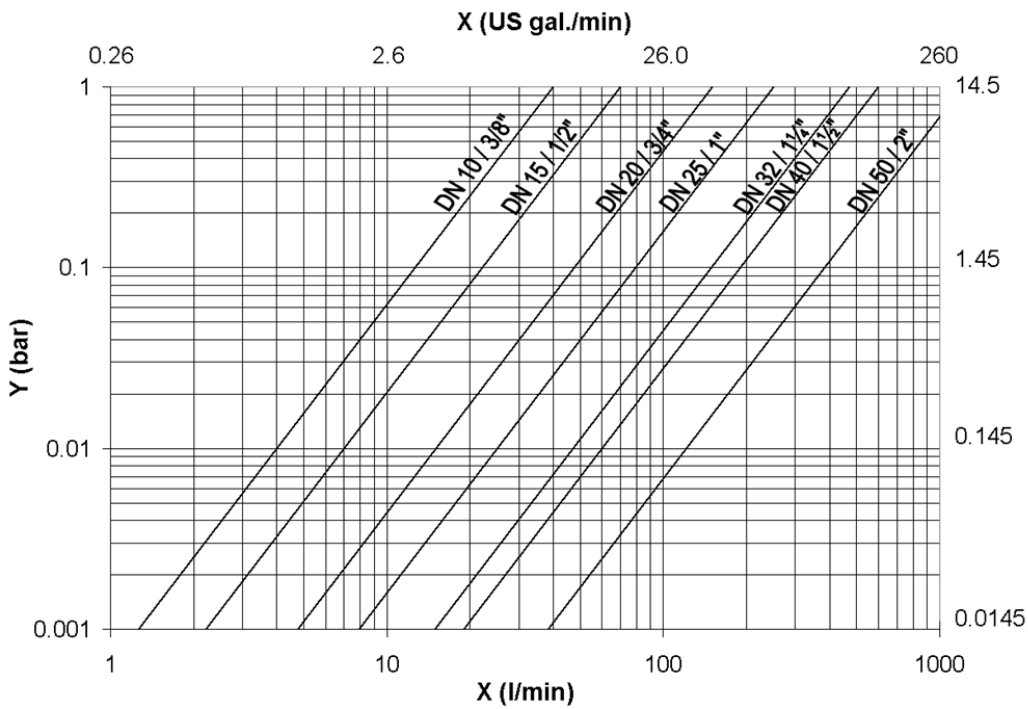
**Type 543 horizontal: Ball with T-Drilling, Flow direction B → A**



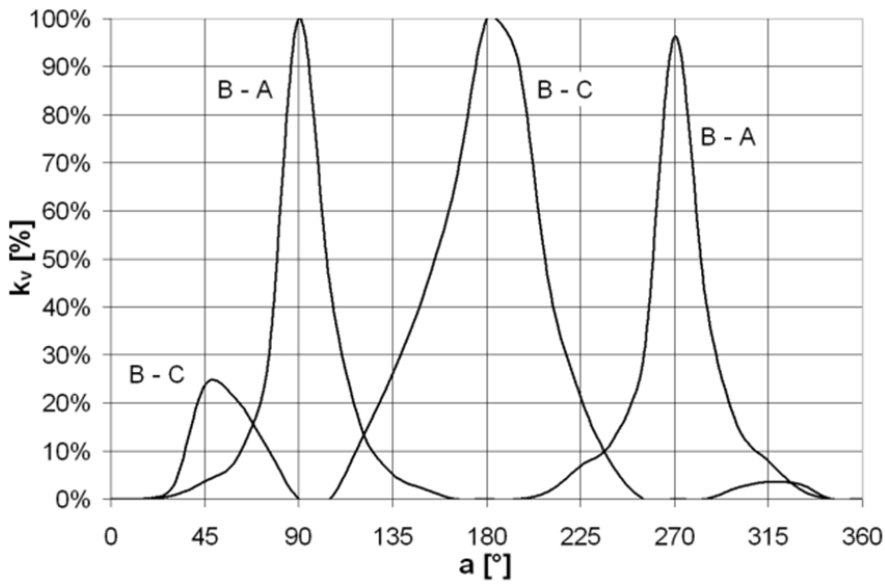
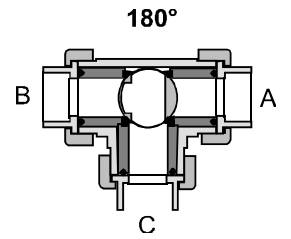
Media: water, 20 °C, X: Flow rate (l/min), (US gal./min), Y: Pressure loss  $\Delta p$  (bar), (psi)



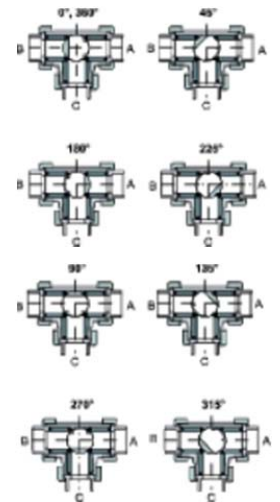
**Type 543 horizontal: Ball with T-Drilling, Flow direction B → C**



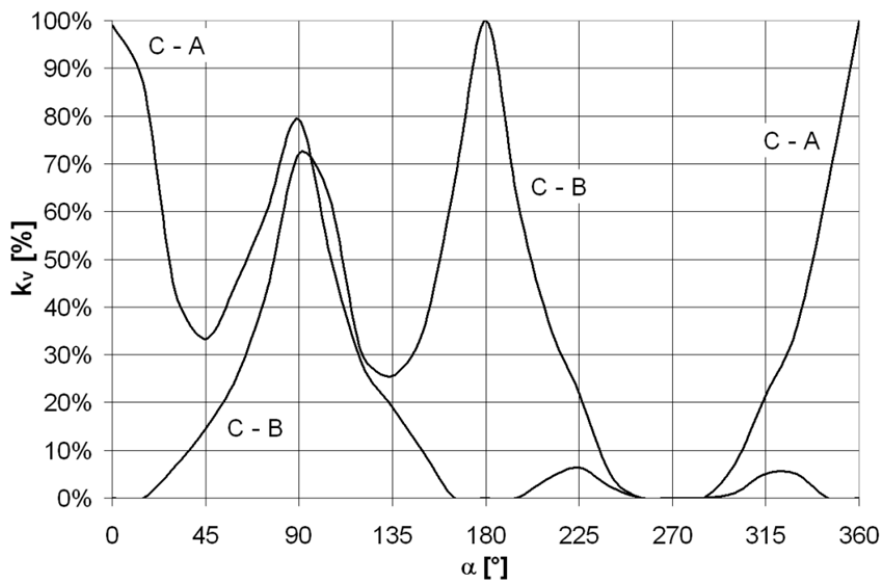
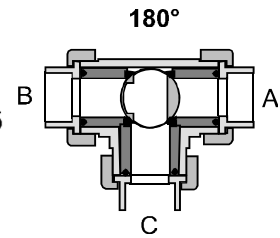
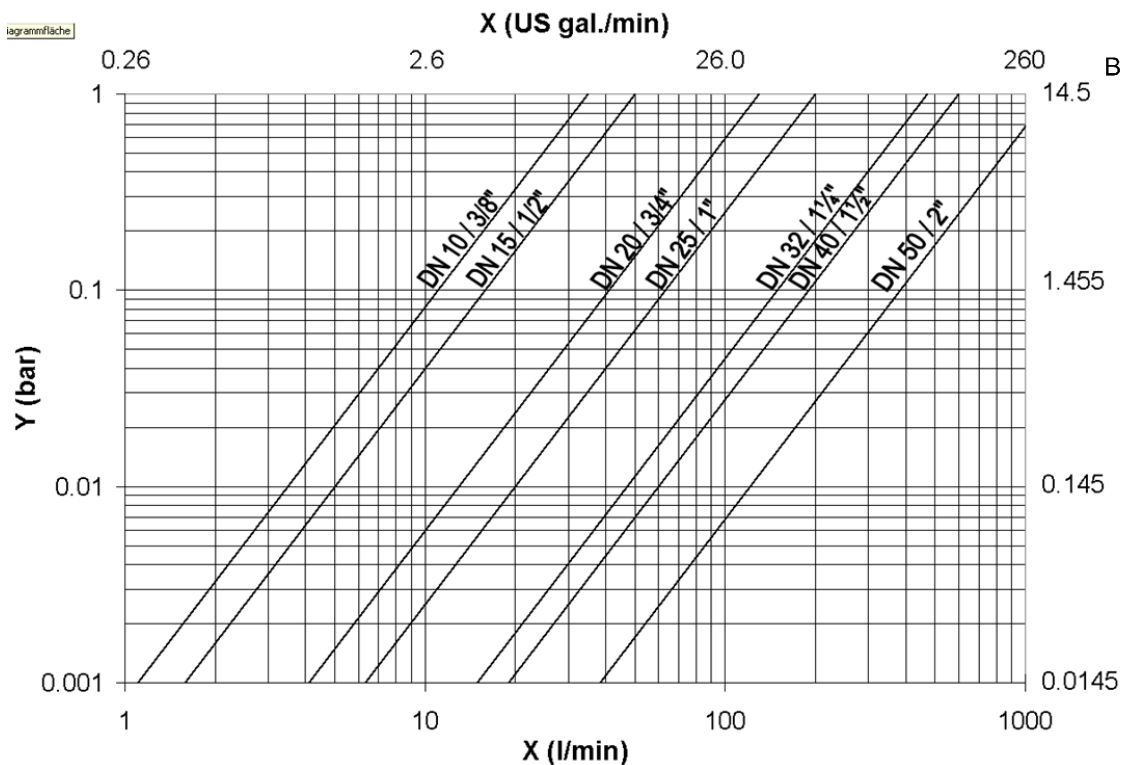
Media: water, 20 °C, X: Flow rate (l/min), (US gal./min), Y: Pressure loss  $\Delta p$  (bar), (psi)



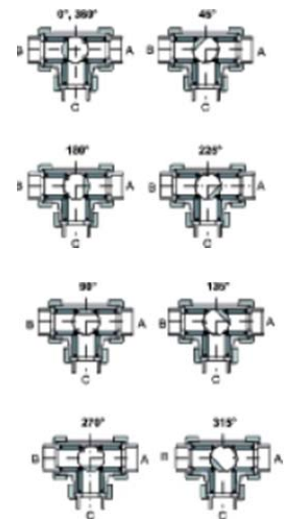
a: Open angle (°), Y: Flow factor  $k_v$ ,  $c_v$  (%)



**Type 543 horizontal: Ball with T-Drilling, Flow direction C → B; C → A**

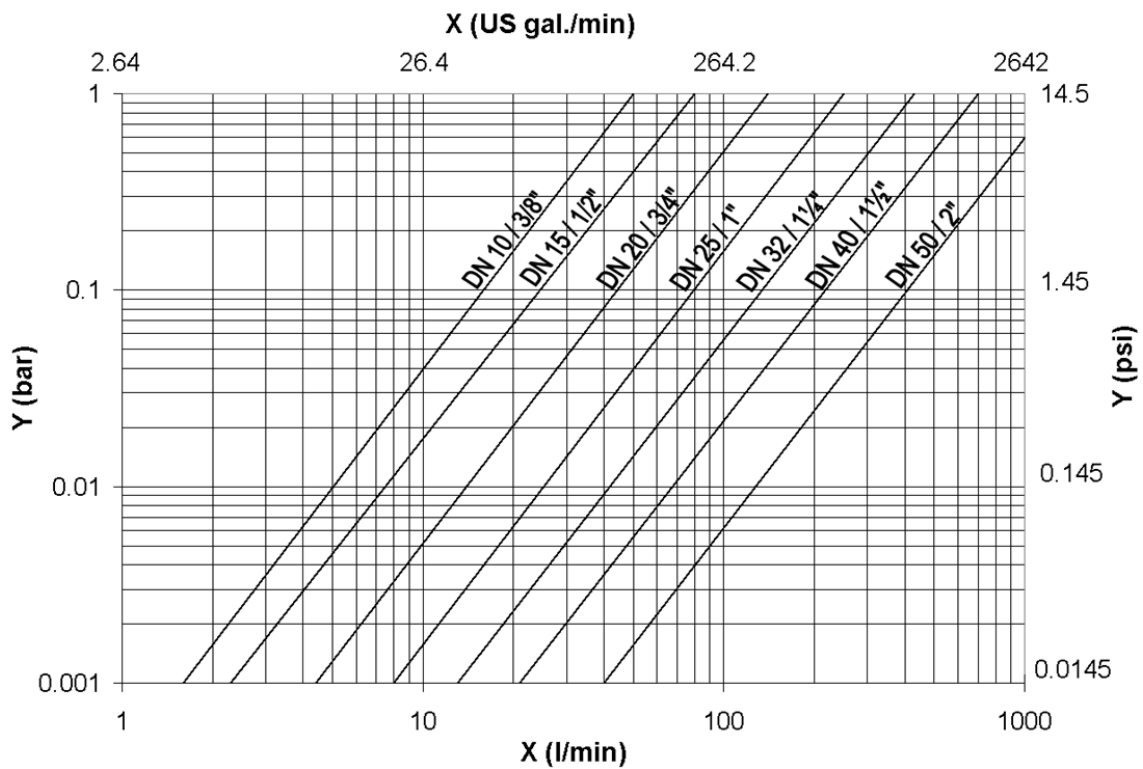


a: Open angle (%), Y: Flow factor kv, cv (%)

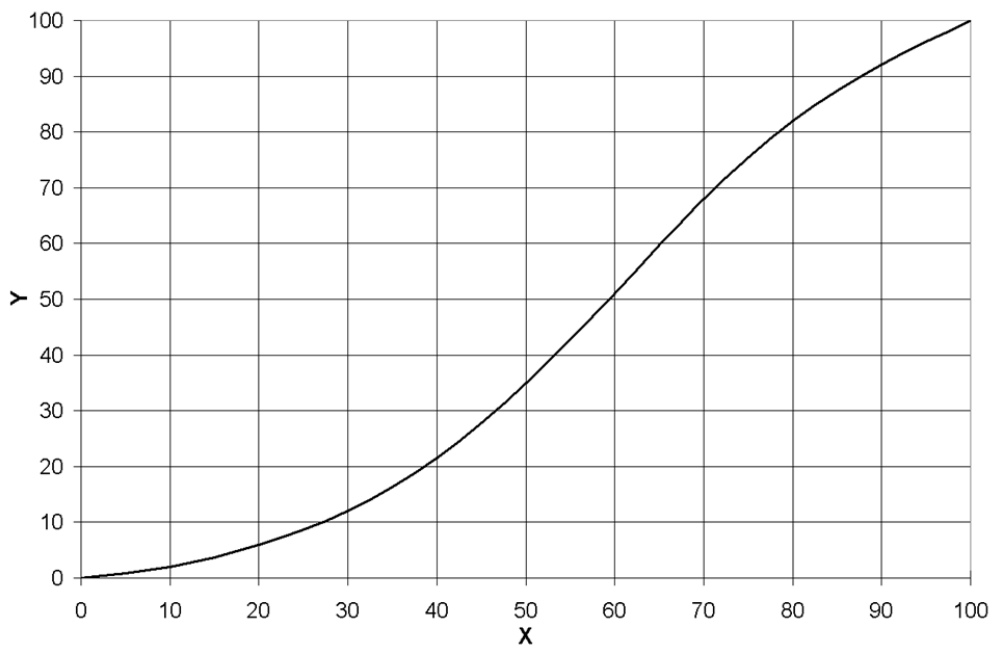




**Type 543 vertical: Ball with L-Drilling**



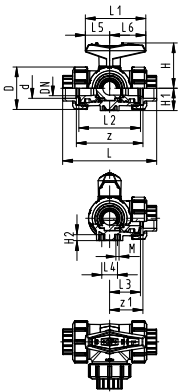
medium: water, 20 °C, X: Flow rate (l/min), (US gal./min), Y: Pressure loss  $\Delta p$  (bar), (psi)



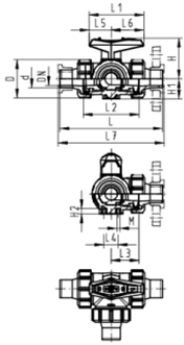
X: Open angle (%), Y: Flow factor kv, cv (%)

The kv values for each intermediate valve position can be determined using the flow value characteristic and kv 100 values..

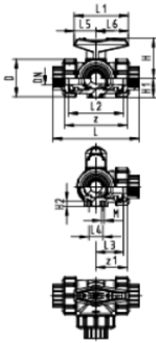
### Dimensions Ball Valve 543 horizontal with L-Drilling



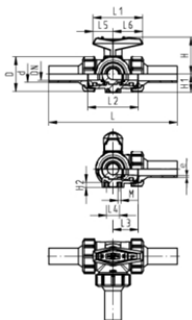
Cement sockets metric															
d	D	L	L1	L2	L3	L4	L5	L6	H	H1	H2	M	z	z1	closest
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	inch
16	50	109	77	73	36	25	32	45	57	28	8	6	81	40	3/8
20	50	112	77	73	36	25	32	45	57	28	8	6	81	40	1/2
25	58	131	97	86	43	25	39	58	67	32	8	6	94	47	3/4
32	68	151	97	99	50	25	39	58	73	36	8	6	107	54	1
40	84	181	128	120	60	45	54	74	90	45	9	8	130	65	1 1/4
50	97	205	128	137	69	45	54	74	97	51	9	8	143	72	1 1/2
63	124	261	152	179	89	45	66	87	116	65	9	8	185	92	2



Threaded sockets Rp															
Rp	D	L	L1	L2	L3	L4	L5	L6	H	H1	H2	M	z	z1	
Zoll	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
3/8	50	113	77	73	36	25	32	45	57	28	8	6	87	43	
1/2	50	117	77	73	36	25	32	45	57	28	8	6	85	42	
3/4	58	135	97	86	43	25	39	58	67	32	8	6	100	50	
1	68	155	97	99	50	25	39	58	73	36	8	6	113	57	
1 1/4	84	179	128	120	60	45	54	74	90	45	9	8	134	67	
1 1/2	97	201	128	137	69	45	54	74	97	51	9	8	155	78	
2	124	255	152	179	89	45	66	87	116	65	9	8	199	99	

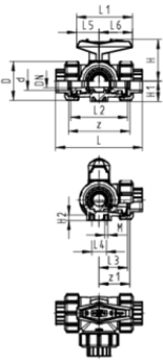


Cement spigots metric															
d	D	L	L1	L2	L3	L4	L5	L6	L7	H	H1	H2	M	closest	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch	
16	50	131	77	73	36	25	32	45	137	57	28	8	6	3/8	
20	50	141	77	73	36	25	32	45	147	57	28	8	6	1/2	
25	58	165	97	86	43	25	39	58	171	67	32	8	6	3/4	
32	68	182	97	99	50	25	39	58	188	73	36	8	6	1	
40	84	209	128	120	60	45	54	74	215	90	45	9	8	1 1/4	
50	97	242	128	137	69	45	54	74	248	97	51	9	8	1 1/2	
63	124	302	152	179	89	45	66	87	308	116	65	9	8	2	

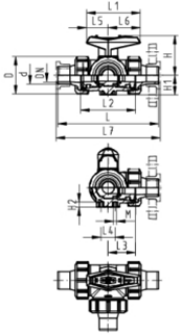


Butt fusion spigots long															
d	D	L	L1	L2	L3	L4	L5	L6	H	H1	H2	M	e	closest	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch	
20	50	210	77	73	36	25	32	45	57	28	8	6	2.3	1/2	
25	58	237	97	86	43	25	39	58	67	32	8	6	2.3	3/4	
32	68	251	97	99	50	25	39	58	73	36	8	6	3.0	1	
40	84	283	128	120	60	45	54	74	90	45	9	8	3.7	1 1/4	
50	97	319	128	137	69	45	54	74	97	51	9	8	4.6	1 1/2	
63	124	399	152	179	89	45	66	87	116	65	9	8	5.8	2	

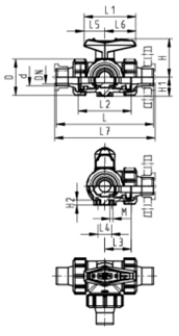
### Dimensions Ball Valve 543 horizontal with T-Drilling



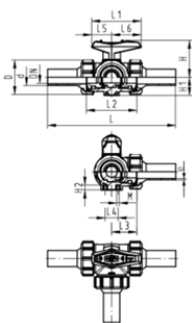
Cement sockets metric															
d	D	L	L1	L2	L3	L4	L5	L6	H	H1	H2	M	z	z1	closest
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	inch
16	50	109	77	73	36	25	32	45	57	28	8	6	81	40	3/8
20	50	112	77	73	36	25	32	45	57	28	8	6	81	40	1/2
25	58	131	97	86	43	25	39	58	67	32	8	6	94	47	3/4
32	68	151	97	99	50	25	39	58	73	36	8	6	107	54	1
40	84	181	128	120	60	45	54	74	90	45	9	8	130	65	1 1/4
50	97	205	128	137	69	45	54	74	97	51	9	8	143	72	1 1/2
63	124	261	152	179	89	45	66	87	116	65	9	8	185	92	2



Threaded sockets Rp															
Rp	D	L	L1	L	L3	L4	L5	L6	H	H1	H2	M	z	z1	
Zoll	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm
3/8	50	113	77	73	36	25	32	45	57	28	8	6	87	43	
1/2	50	117	77	73	36	25	32	45	57	28	8	6	85	42	
3/4	58	135	97	86	43	25	39	58	67	32	8	6	100	50	
1	68	155	97	99	50	25	39	58	73	36	8	6	113	57	
1 1/4	84	179	128	120	60	45	54	74	90	45	9	8	134	67	
1 1/2	97	201	128	137	69	45	54	74	97	51	9	8	155	78	
2	124	255	152	179	89	45	66	87	116	65	9	8	199	99	

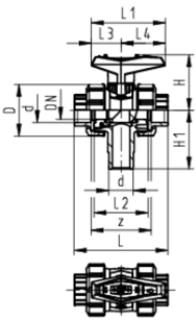


Cement spigots metric															
d	D	L	L1	L2	L3	L4	L5	L6	L7	H	H1	H2	M	closest	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		inch
16	50	131	77	73	36	25	32	45	137	57	28	8	6	3/8	
20	50	141	77	73	36	25	32	45	147	57	28	8	6	1/2	
25	58	165	97	86	43	25	39	58	171	67	32	8	6	3/4	
32	68	182	97	99	50	25	39	58	188	73	36	8	6	1	
40	84	209	128	120	60	45	54	74	215	90	45	9	8	1 1/4	
50	97	242	128	137	69	45	54	74	248	97	51	9	8	1 1/2	
63	124	302	152	179	89	45	66	87	308	116	65	9	8	2	

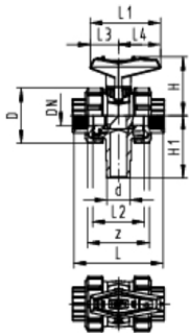


Butt fusion sockets long															
d	D	L	L1	L2	L3	L4	L5	L6	H	H1	H2	M	e	closest	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		inch
20	50	210	77	73	36	25	32	45	57	28	8	6	2.3	1/2	
25	58	237	97	86	43	25	39	58	67	32	8	6	2.3	3/4	
32	68	251	97	99	50	25	39	58	73	36	8	6	3	1	
40	84	283	128	120	60	45	54	74	90	45	9	8	3.7	1 1/4	
50	97	319	128	137	69	45	54	74	97	51	9	8	4.6	1 1/2	
63	124	399	152	179	89	45	66	87	116	65	9	8	5.8	2	

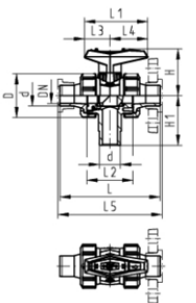
## Dimensions Ball Valve 543 vertical with L-Drilling



Solvent cement sockets metric										
d	D	L	L1	L2	L3	L4	H	H1	z	closest
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch
16	50	92	77	56	32	45	57	62	64	$\frac{3}{8}$
20	50	95	77	56	32	45	57	62	64	$\frac{1}{2}$
25	58	111	97	66	39	58	67	72	74	$\frac{3}{4}$
32	68	123	97	71	39	58	73	77	79	1
40	84	146	128	85	54	74	90	87	95	1 $\frac{1}{4}$
50	97	157	128	89	54	74	97	97	95	1 $\frac{1}{2}$
63	124	183	152	101	66	87	116	112	107	2



Threaded sockets Rp										
Rp	D	L	L1	L2	L3	L4	H	H1	z	
Zoll	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
$\frac{3}{8}$	50	96	77	56	32	45	57	62	69	
$\frac{1}{2}$	50	99	77	56	32	45	57	62	67	
$\frac{3}{4}$	58	115	97	66	39	58	67	72	78	
1	68	127	97	71	39	58	73	77	85	
1 $\frac{1}{4}$	84	144	128	85	54	74	90	87	100	
1 $\frac{1}{2}$	97	153	128	89	54	74	97	97	106	
2	124	177	152	101	66	87	116	112	121	



Solvent cement spigots metric										
d	D	L	L1	L2	L3	L4	L5	H	H1	closest
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch
16	50	114	77	56	32	45	120	57	62	$\frac{3}{8}$
20	50	124	77	56	32	45	130	57	62	$\frac{1}{2}$
25	58	144	97	66	39	58	150	67	72	$\frac{3}{4}$
32	68	154	97	71	39	58	160	73	77	1
40	84	174	128	85	54	74	180	90	87	1 $\frac{1}{4}$
50	97	194	128	89	54	74	200	97	97	1 $\frac{1}{2}$
63	124	224	152	101	66	87	230	116	112	2

## Specifications

All ball valves with metric sizes DN 10 - 50 mm, shall be manufactured with true triple union design in accordance with EN ISO 16135. Incorporated into its design shall be a safety stem with a predetermined breaking point above the upper O-ring, preventing any media leaking in the event of damage. The valve nut threads shall be buttress type to allow fast and safe radial mounting and dismounting of the valve during installation or maintenance work. Seats shall be PTFE with backing rings creating self-adjusting seals and constant operating torque. Backing rings and seals shall be EPDM or FPM. The handle shall include in its design an integrated tool for removal of the union bush. Union bushes shall have left-hand threads to prevent possible unscrewing when threaded end connectors are removed from pipe.

Following accessories shall be available:

- A Multi-Functional Model (MFM) in PPGF equipped with internal limit switches for reliable electrical position feedback, is mounted directly between the valve body and the valve handle. This MFM is also the necessary interface for later mounting of actuators.
- Mounting plate in PPGF with integrated inserts for later screw mounting on any support
- Lockable multi-functional handle

### Electric actuated Ball Valves

Electric actuators shall be either actuator 1 (sizes DN10-50 mm). It shall be manufactured in accordance with EN 61010-1, EC directives 2004/108/EC (EMC) and 2006/95/EC, LVD and needs to be CE marked. Actuator housing shall be made of PPGF (polypropylene glass fibre reinforced), flame retardant with external stainless steel screws. All electric actuators shall have an integrated emergency manual override and integrated optical position indication.

Electric actuator types shall have the following accessory options:

- Fail-safe unit
- Heating element
- Cycle extension, cycle time monitoring, and cycle counting
- Motor current monitoring
- Position signalisation
- Positioner
- Limit switch kits Ag-Ni, Au, NPN, PNP, NAMUR
- AS Interface Plug Module

<b>Electric actuator specifications of the actuators shall be as follows</b>	
<b>Specification</b>	<b>Actuator 1</b>
Nominal torque (Nm)	10
Control time (s/90°)*	5
Cycles at 20°C *	250,000
Duty cycles ED at 20°C	100%
Protection class	IP65 per EN 60529 - IP67 (for vertical cable mounting and wall feed through)
Voltage	100-230, 50-60 Hz or 24V=/24V, 50/60 Hz versions

\* = at nominal torque

### Pneumatic actuated Ball Valves

Pneumatic actuators shall be actuator 1 (for valve sizes DN 15-25 mm) or actuator 2 (for valve sizes DN 32-50 mm). Pneumatic actuators shall be available as fail safe close, fail safe open and double acting and have an integrated optical position indication. Actuator housing shall be made of Polypropylene fibre glass reinforced (PPGF) and flame retardant. Actuators shall contain a preloaded spring assembly to ensure safe actuator operation and maintenance. Actuators shall contain integrated Namur interface for the easy mounting of positioners, limit switches and accessories. The valve shall be equipped with a Multi-functional-module for reliable electric feedback, mounted directly between the valve body and the actuator as manufacturer standard.

All pneumatically actuated ball valves shall have the following accessories available:

- Pilot valve remote or direct mounted in voltages 24VDC/AC, 110VAC, 230VAC
- Positioner
- Limit switch kits Ag-Ni, Au, NPN, PNP
- Stroke limiter
- Manual override for all sizes up to d 63 mm
- AS Interface control module with incorporated position feedback and a solenoid pilot valve

### Planning Fundamentals

The following link will lead you to the Georg Fischer Planning Fundamentals. These detailed documents will support you by choosing the right valve for your application.

[http://www.gfps.com/content/gfps.com/en/support\\_and\\_services/planning\\_assistance/planning\\_fundamentals.html?lang=en](http://www.gfps.com/content/gfps.com/en/support_and_services/planning_assistance/planning_fundamentals.html?lang=en)