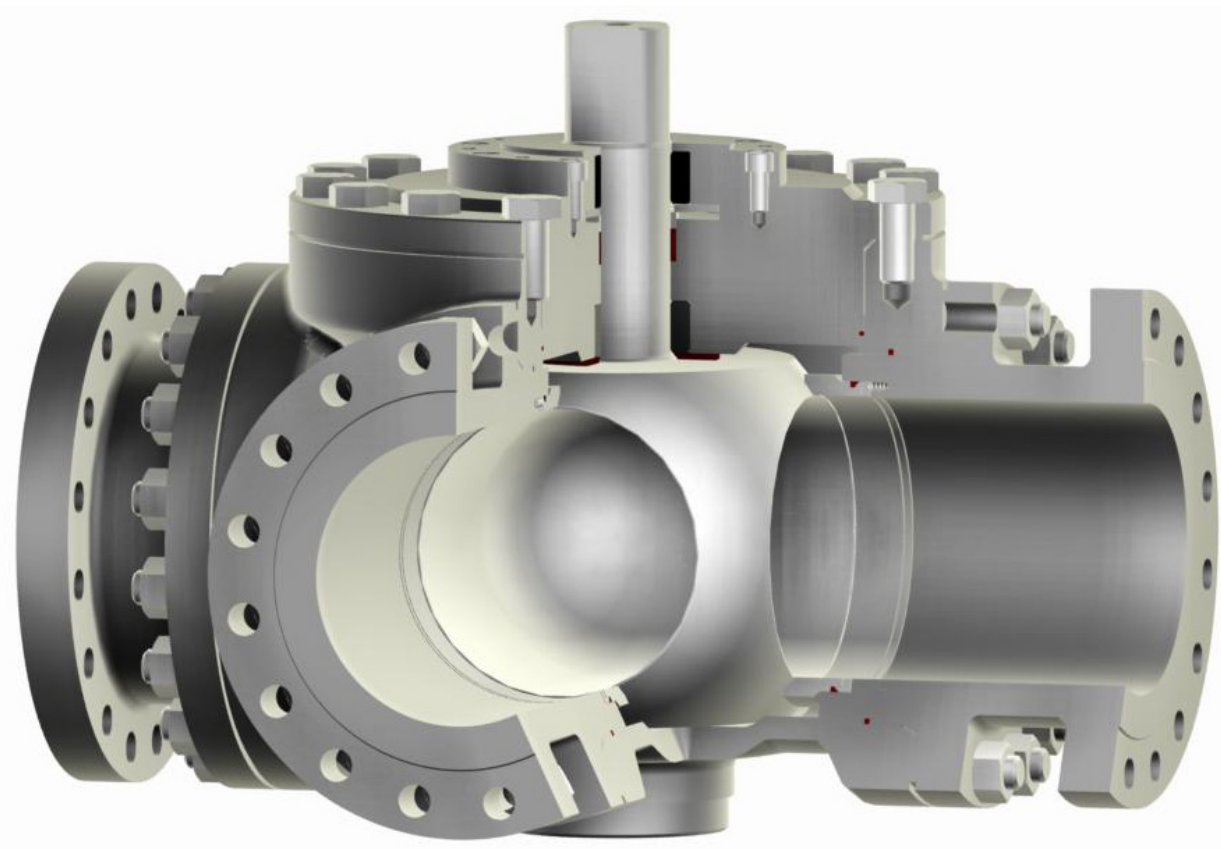




Three-Way Metal Seated Ball Valve Type 21-M



Design Characteristics

- ✓ Split body
- ✓ Trunnion mounted ball with L- or T-port and integral stem
- ✓ Live loaded stem packing
- ✓ Spring loaded seat system
- ✓ Fire Safe design optional

Design Standards

- ✓ EN 12516, EN 1983, ISO 5211, AD-2000
- ✓ ASME B16.34, API 608

Range of Application

- ✓ Diameter 1/2" to 20" / DN 15 to 500
- ✓ Class 150 to 1500 / PN 10 to 250
- ✓ -20°F to +1000°F / -60°C to +550°C

Approvals

- ✓ "TA-Luft" certified for low fugitive emissions

Testing Standards

- ✓ EN 12266-1/2
- ✓ API 598

Main Parts

- 1 Body
- 2 Body End Connection
- 4 Retainer Ring
- 5 Ball with Stem
- 8 Gland Washer
- 10 Bearing Cover
- 12 Cover
- 13 Bearing Ring
- 14 Distance Disc
- 16 Plate Spring
- 17 Coil Spring
- 20 Sealing Ring
- 21 Seat Ring
- 23 Body Gasket
- 24 Stem Packing
- 25 Bearing Ring
- 26 Bearing Ring
- 27 Sealing Ring
- 28.1 Stud Bolt
- 28.2 Nut
- 29 Socket Screw
- 30 Hexagonal Screw

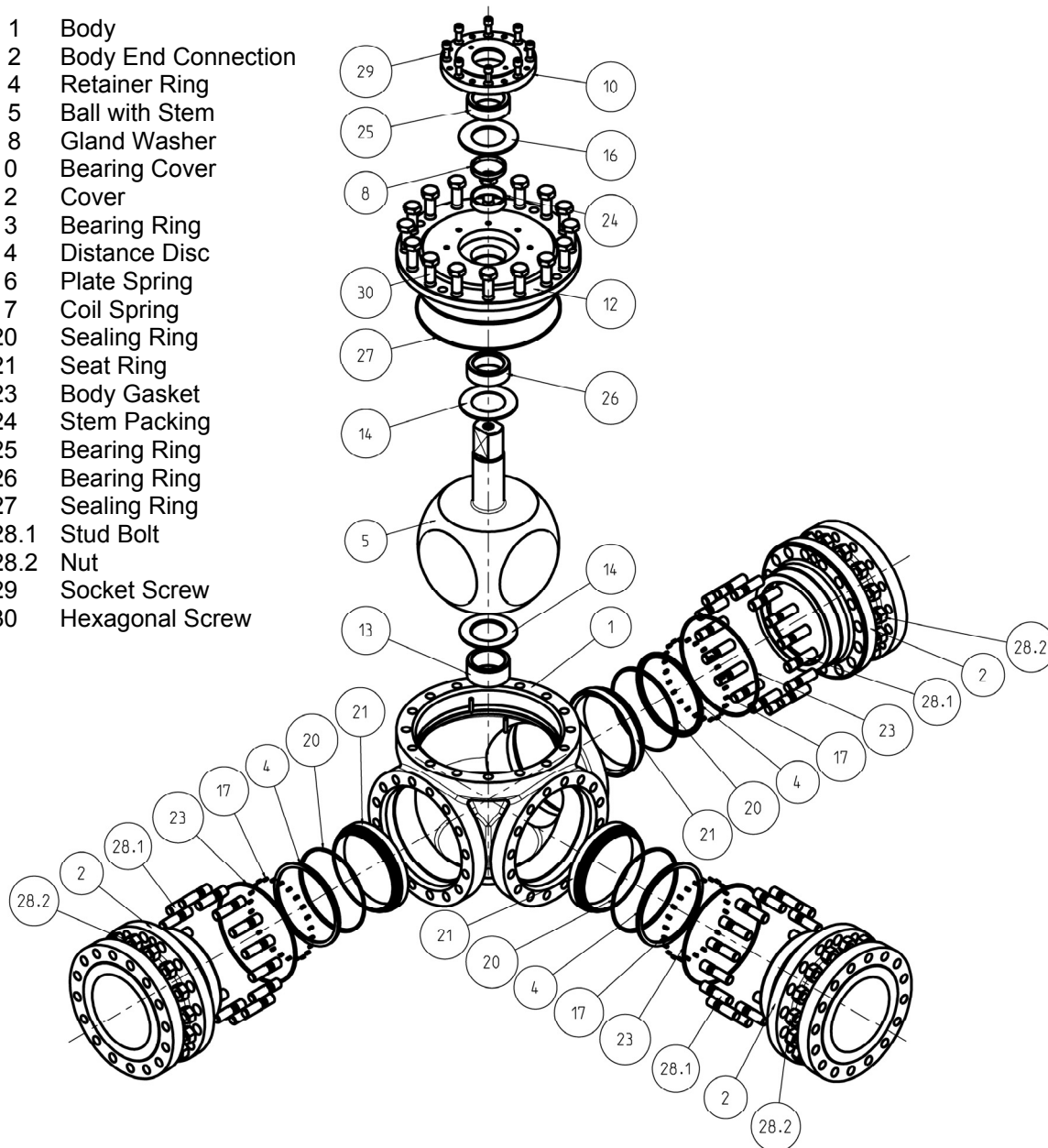


Fig.1

Description

This PERRIN ball valve is a trunnion mounted ball design with split body housing and integral stem. The spring loaded metallic seat system and live loaded stem packing also provide continuous tightness during rapid temperature changes. Ball valve can be designed as transflow or non-transflow (see options).

The valve is equipped with an integral actuator mounting flange for actuator connection according to ISO 5211 standard. Stem extensions, locking devices and actuators with accessories, can be attached without operating interruptions.

The ball valve has an antistatic design. The stem packing and sealings are "TA-Luft" certified for low fugitive emissions.

Parts List / Materials

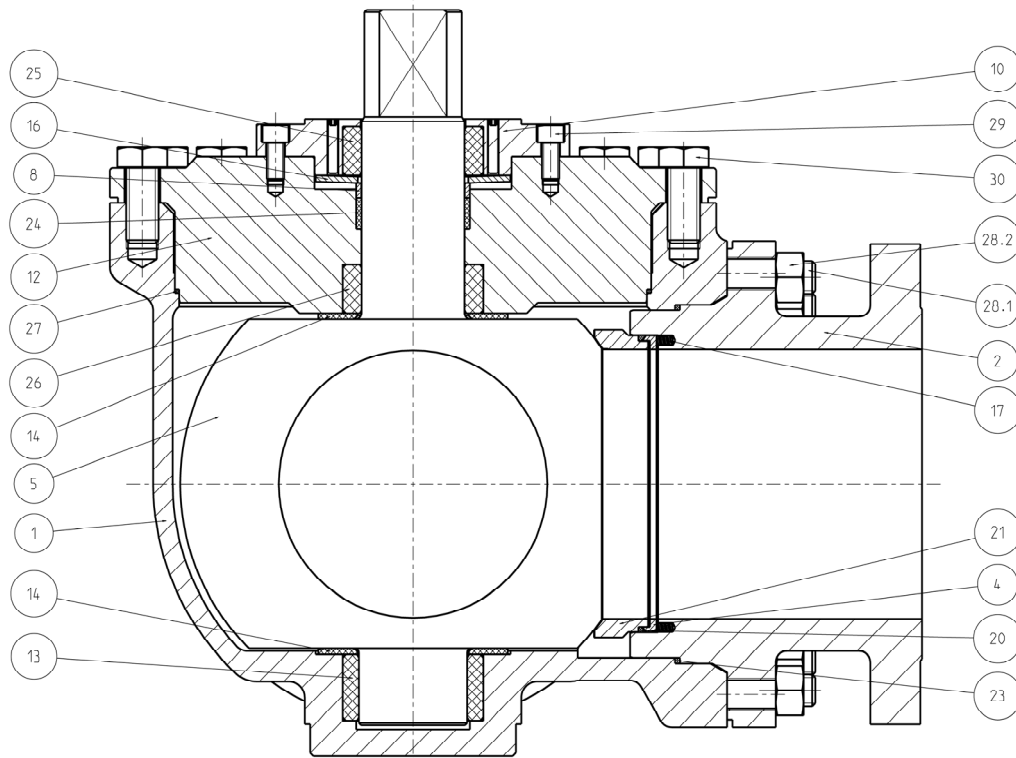


Fig.2

Item	Designation	ASME		DIN EN	
		-20°F up to +1000°F	-20°F up to +1000°F	-60°C up to +550°C	-10°C up to +450°C
1	Body	A351 CF8M	A216 WCB	1.4408 ¹⁾	1.0619
2	Body End Connection	Type 316 (up to 2")	A105 (up to 2")	1.4571 (up to 2")	1.0460 (up to 2")
4	Retainer Ring	Type 316	Type 316	1.4571	1.4571
5	Ball with Stem	Type 316 coated A351 CF8M coated	Type 316 coated A351 CF8M coated	1.4571 coated 1.4408 ¹⁾ coated	1.4571 coated 1.4408 ¹⁾ coated
8	Gland Washer	Type 316	Type 316	1.4571	1.4571
10	Bearing Cover	Type 316	A105	1.4571	1.0460
12	Cover	Type 316 A351 CF8M	A216 WCB A105	1.4571 1.4408 ¹⁾	1.0619 1.0460
13	Bearing Ring	Carbon-Antimony	Carbon-Antimony	Carbon-Antimony	Carbon-Antimony
14	Distance Disc	Type 316	Type 316	1.4571	1.4571
16	Plate Spring ²⁾	Type 301	AISI 6150	1.4310	1.8159
17	Coil Spring	Type 316	Type 316	1.4571	1.4571
20	Sealing Ring	Graphite	Graphite	Graphite	Graphite
21	Seat Ring	Type 316 coated	Type 316 coated	1.4571 coated	1.4571 coated
23	Body Gasket	Graphite	Graphite	Graphite	Graphite
24	Stem Packing				
25	Bearing Ring	Carbon	Carbon	Carbon	Carbon
26	Bearing Ring	Carbon-Antimony	Carbon-Antimony	Carbon-Antimony	Carbon-Antimony
27	Sealing Ring	Graphite	Graphite	Graphite	Graphite
28.1	Stud Bolt	SS	SS	SS	SS
28.2	Nut	SS	SS	SS	SS
29	Socket Screw	SS	SS	SS	SS
30	Hexagonal Screw	SS	SS	SS	SS

Tab.1

1) Temperature limitation 300°C [576°F] acc. to German technical rule AD-2000 W5 if intercrystalline corrosion resistant is required

2) Material 2.4668 (Inconel 718) is generally required for operating temperature over 200°C [392°F]

3) Materials for lower / higher temperature on request

Technical Data

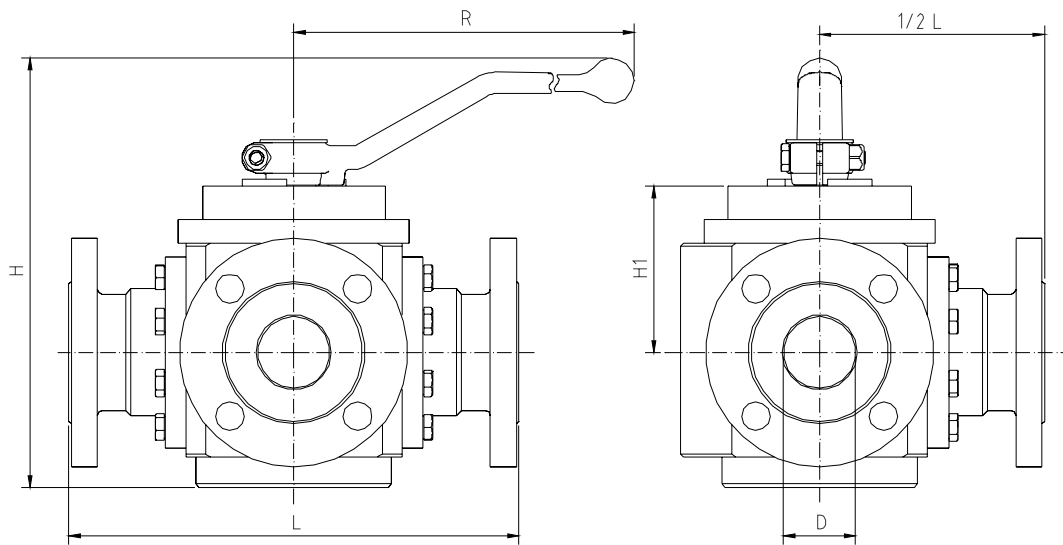


Fig.3

D = NPS = DN

Nominal Size		Class 150 - Full Bore Dimensions acc. to ASME Standards						Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	DN [mm]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	R [inch]	R [mm]	L [inch]	L [mm]		kg	lbs
½	15	4.9	124	2.3	58	7	180	8	210	23	8	18
¾	20	5.4	137	2.8	70	7	180	9	230	42	10	22
1	25	6	153	2.9	74	12	300	9	230	67	14	31
1¼	32	6.4	163	3.1	80	12	300	10	260	110	22	48
1½	40	8.4	213	3.9	100	18	450	10	260	173	31	68
2	50	9.1	230	4.4	112	18	450	12	300	270	43	95
2½	65	9.6	244	4.7	119	18	450	13	340	459	61	134
3	80	11.9	301	6	156	31	800	15	380	695	83	183
4	100	13	323	6.6	167	31	800	17	430	1087	115	253

Tab.2

Nominal Size		Class 150 - *Single Reduced Bore Dimensions acc. to ASME Standards						Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	*SRB [inch]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	R [inch]	R [mm]	L [inch]	L [mm]		kg	lbs
½	-	-	-	-	-	-	-	-	-	-	-	-
¾	½	4.9	124	2.3	58	7	180	9	230	23	9	20
1	¾	5.4	137	2.8	70	7	180	9	230	42	12	25
1¼	1	6	153	2.9	74	12	300	10	260	67	16	35
1½	1¼	6.4	163	3.1	80	12	300	10	260	110	25	56
2	1½	8.4	213	3.9	100	18	450	12	300	173	36	78
2½	2	9.1	230	4.4	112	18	450	13	340	270	49	109
3	2½	9.6	244	4.7	119	18	450	15	380	459	70	154
4	3	11.9	301	6	156	31	800	17	430	695	95	210

Tab.3



Nominal Size		Class 300 - Full Bore Dimensions acc. to ASME Standards						Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	DN [mm]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	R [inch]	R [mm]	L [inch]	L [mm]		kg	lbs
½	15	4.9	124	2.3	58	7	180	8	210	23	9	20
¾	20	5.4	137	2.8	70	7	180	9	230	42	12	26
1	25	6	153	2.9	74	12	300	9	230	67	16	35
1¼	32	6.4	163	3.1	80	12	300	10	260	110	25	55
1½	40	8.4	213	3.9	100	18	450	10	260	173	35	77
2	50	9.1	230	4.4	112	18	450	12	300	270	46	101
2½	65	9.6	244	4.7	119	18	450	13	340	459	65	143
3	80	11.9	301	6	156	31	800	15	380	695	90	198
4	100	13	323	6.6	167	31	800	17	430	1087	128	282

Tab.4

Nominal Size		Class 300 - *Single Reduced Bore Dimensions acc. to ASME Standards						Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	*SRB [inch]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	R [inch]	R [mm]	L [inch]	L [mm]		kg	lbs
½	-	-	-	-	-	-	-	-	-	-	-	-
¾	½	4.9	124	2.3	58	7	180	9	230	23	9	20
1	¾	5.4	137	2.8	70	7	180	9	230	42	12	25
1¼	1	6	153	2.9	74	12	300	10	260	67	16	35
1½	1¼	6.4	163	3.1	80	12	300	10	260	110	25	56
2	1½	8.4	213	3.9	100	18	450	12	300	173	36	78
2½	2	9.1	230	4.4	112	18	450	13	340	270	49	109
3	2½	9.6	244	4.7	119	18	450	15	380	459	70	154
4	3	11.9	301	6	156	31	800	17	430	695	95	210

Tab.5



Nominal Size	PN 16 Dimensions [mm] acc. to DIN EN Standards			Face to Face Perrin Standard	Kv [m ³ /h]	Weights [kg]
DN	H	H1	R	L		
15	124	58	180	210	20	8
20	137	70	180	230	36	10
25	153	74	300	230	57	14
32	163	80	300	260	94	22
40	213	100	450	260	148	31
50	230	112	450	300	231	43
65	244	119	450	340	392	61
80	301	156	800	380	594	83
100	323	167	800	430	929	115

Tab.6

Nominal Size	PN 40 Dimensions [mm] acc. to DIN EN Standards			Face to Face Perrin Standard	Kv [m ³ /h]	Weights [kg]
DN	H	H1	R	L		
15	124	58	180	210	20	8
20	137	70	180	230	36	10
25	153	74	300	230	57	14
32	163	80	300	260	94	22
40	213	100	450	260	148	31
50	230	112	450	300	231	47
65	244	119	450	340	392	66
80	301	156	800	380	594	90
100	323	167	800	430	929	127

Tab.7

Other dimensions and pressure classes on request.

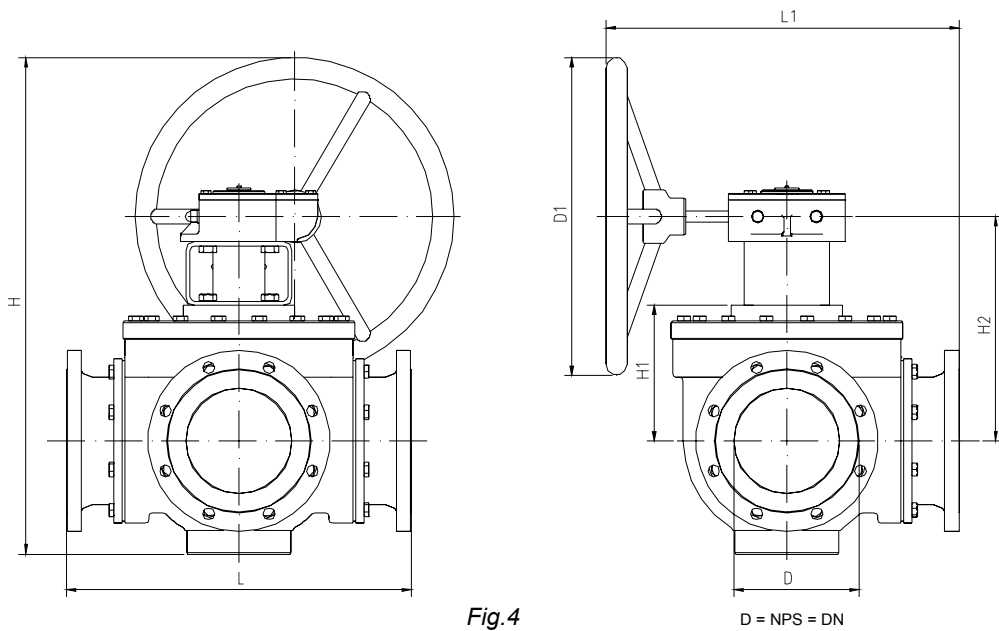


Fig.4

Nominal Size		Class 150 - Full Bore Dimensions acc. to ASME Standards										Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	DN [mm]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	H2 [inch]	H2 [mm]	L1 [inch]	L1 [mm]	D1 [inch]	D1 [mm]	L [inch]	L [mm]		kg	lbs
6	150	32.3	821	7.9	201	13	331	20.3	515	28	700	22	550	2448	160	352
8	200	34.5	877	10.5	266	18	456	23	588	20	500	26	650	4351	382	840
10	250	42	1057	11.2	284	19.8	504	29	725	28	700	31	775	7070	516	1135
12	300	41	1053	12	312	20.2	512	30	770	24	600	35	900	9789	941	2070
14	350	45.3	1152	13.6	345	25	635	39	995	20	500	40	1025	13324	1360	2992
16	400	55	1408	18.5	470	29.9	760	42	1075	28	700	45	1150	17405	1680	3696
20	500	78.2	1987	30	763	46.5	1181	47	1202	36	914	49	1250	27195	2462	5416

Tab.8

Nominal Size		Class 150 - *Single Reduced Bore Dimensions acc. to ASME Standards										Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	*SRB [inch]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	H2 [inch]	H2 [mm]	L1 [inch]	L1 [mm]	D1 [inch]	D1 [mm]	L [inch]	L [mm]		kg	lbs
6	4	27	687	6.6	167	12	297	19.4	492	20	500	22	550	1699	150	329
8	6	33.6	852	7.9	201	13	331	20.3	515	28	700	26	650	2448	184	405
10	8	35.8	909	10.5	266	18	456	23	588	20	500	31	775	4351	439	966
12	10	43	1095	11.2	284	19.8	504	29	725	28	700	35	900	7070	593	1305
14	12	42	1079	12	312	20.2	512	30	770	24	600	40	1025	9789	1082	2381
16	14	46.6	1183	13.6	345	25	635	39	995	20	500	45	1150	13324	1564	3441
20	16	57	1459	18.5	470	29.9	760	42	1075	28	700	49	1250	17405	2340	5148

Tab.9



Nominal Size		Class 300 - Full Bore Dimensions acc. to ASME Standards										Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	DN [mm]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	H2 [inch]	H2 [mm]	L1 [inch]	L1 [mm]	D1 [inch]	D1 [mm]	L [inch]	L [mm]		kg	lbs
6	150	33	840	12.1	307	17	431	24	610	20	500	22	550	2448	330	726
8	200	39.3	998	14.4	366	20	507	31	790	24	600	31	800	4351	635	1397
10	250	49	1255	17.8	452	24.9	633	28	718	31	800	37	940	7070	898	1976
12	300	52	1313	24	610	32.6	828	31	792	18	450	41	1050	9789	1174	2583
14	350	58.9	1495	23.6	600	35	898	37	937	24	610	45	1150	13324	1593	3505
16	400	61	1559	24.9	632	36.6	930	38	975	24	610	45	1150	17405	1835	4037
20	500	82.6	2097	34	863	49.3	1253	50	1278	36	914	49	1250	27195	2753	6057

Tab.10

Nominal Size		Class 300 - *Single Reduced Bore Dimensions acc. to ASME Standards										Face to Face Perrin Standard		Cv [gal/min]	Weights	
NPS [inch]	*SRB [inch]	H [inch]	H [mm]	H1 [inch]	H1 [mm]	H2 [inch]	H2 [mm]	L1 [inch]	L1 [mm]	D1 [inch]	D1 [mm]	L [inch]	L [mm]		kg	lbs
6	4	31	796	6.6	167	13	337	22	560	24	600	22	550	1699	308	678
8	6	34	872	12.1	307	17	431	24	610	20	500	31	800	2448	421	926
10	8	40.5	1029	14.4	366	20	507	31	790	24	600	37	940	4351	730	1607
12	10	51	1293	17.8	452	24.9	633	28	718	31	800	41	1050	7070	1033	2272
14	12	53	1345	24	610	32.6	828	31	792	18	450	45	1150	9789	1350	2970
16	14	60.1	1527	23.6	600	35	898	37	937	24	610	45	1150	13324	1756	3863
20	16	64	1622	24.9	632	36.6	930	38	975	24	610	49	1250	17405	2115	4653

Tab.11

Nominal Size	PN 16 Dimensions [mm] acc. to DIN EN Standards					Face to Face Perrin Standard	Kv [m³/h]	Weights [kg]
DN	H	H1	H2	L1	D1	L		
150	824	201	331	515	700	550	2092	139
200	1026	266	456	588	800	650	3719	332
250	1007	284	504	679	600	775	6043	449
300	992	312	512	770	500	900	8367	818
350	1145	345	635	888	500	1025	11388	1183
400	1275	470	760	953	450	1150	14876	1461
500	1996	763	1181	1202	914	1250	23244	2141

Tab.12

Nominal Size	PN 40 Dimensions [mm] acc. to DIN EN Standards					Face to Face Perrin Standard	Kv [m³/h]	Weights [kg]
DN	H	H1	H2	L1	D1	L		
150	924	307	431	515	700	550	2092	287
200	1077	366	507	588	800	650	3719	552
250	1136	452	633	679	600	775	6043	781
300	1308	610	828	770	500	900	8367	1021
350	1408	600	898	888	500	1025	11388	1385
400	1445	632	930	953	450	1150	14876	1596
500	2068	863	1253	1202	914	1250	23244	2394

Tab.13

Other dimensions and pressure classes on request.

Top Works

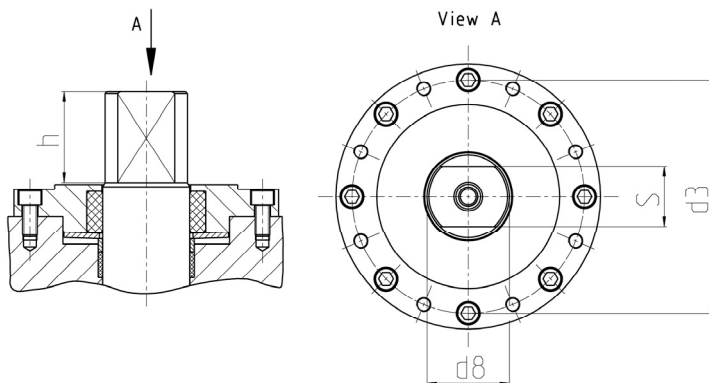


Fig.5

Dimensions								
F	h		s		d3		d8	
	mm	inch	mm	inch	mm	inch	mm	inch
F07	22	0.9	12	0.5	70	2.8	17	0.7
F10	27	1.1	18	0.7	102	4	27	1.1
F12	38	1.5	32	1.3	125	4.9	40	1.6
F14	38	1.5	38	1.5	140	5.5	57	2
F16	48	1.9	44	1.7	165	6.5	68	2.7
F25	48	1.9	55	2.2	254	10	82	3.2
F35	94	3.7	65	2.6	356	14	98	3.9

Tab.14

Nominal Size		Actuator-Connection ISO 5211 Full Bore		**Feather keyway	Nominal Size		Actuator-Connection ISO 5211	
NPS [inch]	DN [mm]				NPS [inch]	*SRB [inch]	*Single Reduced Bore	
		Class 150	Class 300		Class 150	Class 300		
½	15	F07	F07		½	-	-	-
¾	20	F07	F07		¾	-	-	-
1	25	F07	F07		1	¾	F07	F07
1¼	32	F07	F10		1¼	1	F07	F07
1½	40	F07	F10		1½	1¼	F07	F10
2	50	F10	F10		2	1½	F07	F10
2½	65	F10	F10		2½	2	F10	F10
3	80	F12	F12	3	2½	F10	F12	
4	100	F12	F12	4	3	F12	F12	
6	150	F12	F14	6	4	F12	F14	
8	200	F14	F16	8	6	F12	F14	
10	250	F16	F25	10	8	F14	F16	
12	300	F16	F25	12	10	F16	F25	
14	350	F25	F35**	14	12	F16	F25	
16	400	F25**	F35**	16	14	F25	F35**	
20	500	F35**	F40**	20	16	F25**	F35**	

Tab.15

Pressure / Temperature Diagram

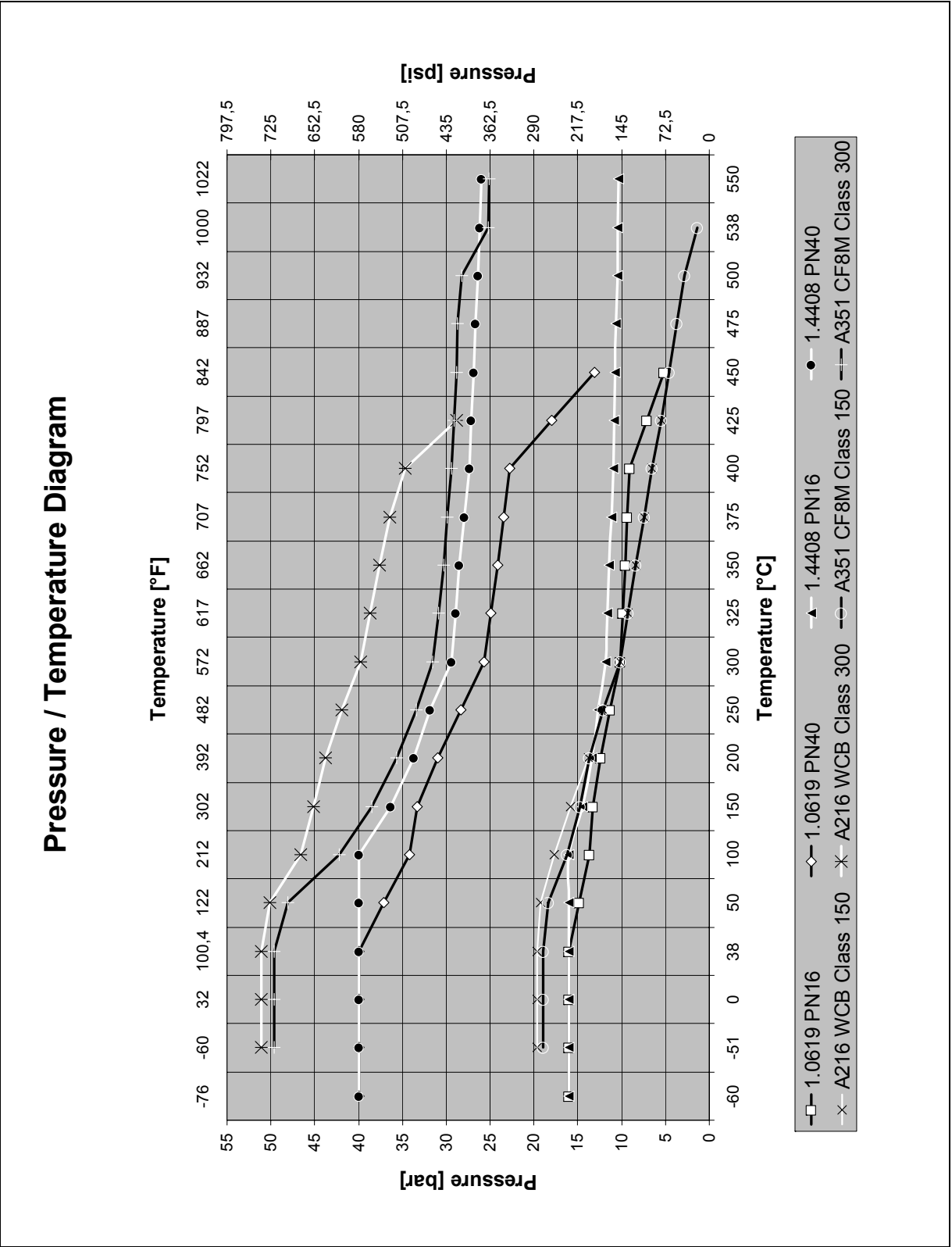


Fig. 6



Options

1) Seat system with protected spring area

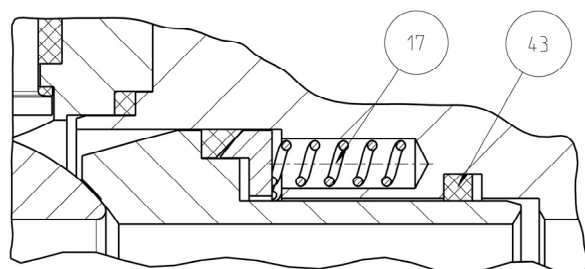


Fig.7

The area where the springs (17) are located is protected by graphite-based seal (43). This seal prevents material from entering the spring area or recess but allow the spring chamber to be energized by line pressure.

2) Adjustable stem packing

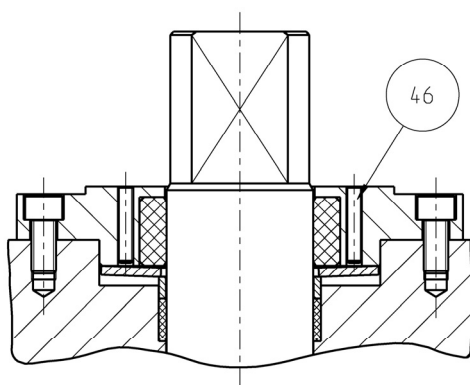


Fig.8

Additionally the live loaded stem packing may be equipped with hexagon socket screws (46). To fasten these screws it is possible to increase the spring force on the packing in the event of leakage.

3) Valve with heating jacket

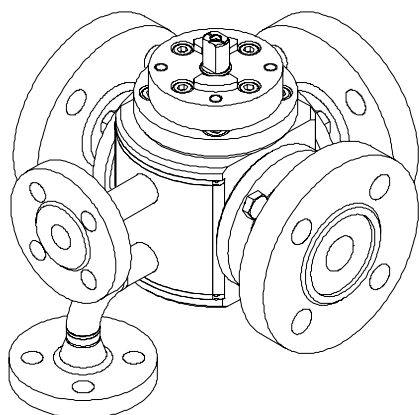


Fig.9



4) Ball options

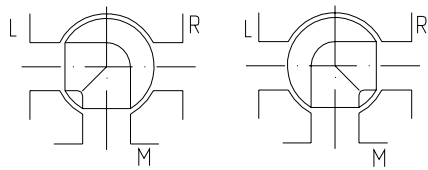


Fig. 10 L-port

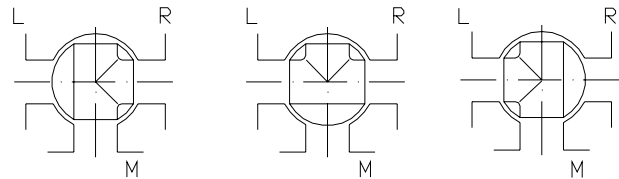


Fig. 11 T-port

5) Seat system for ball with T-port

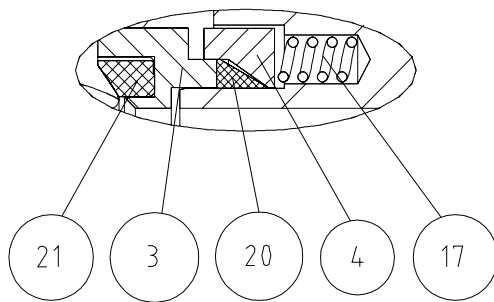


Fig. 12

6) Double-stage gland packing with purge connection

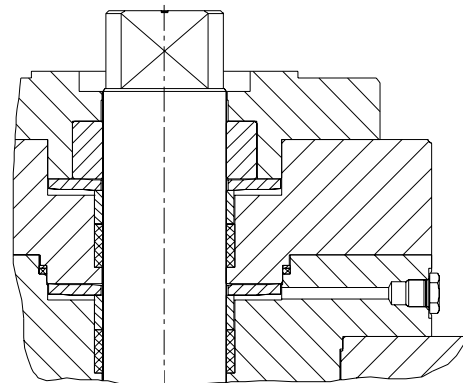


Fig. 13

7) Flow options

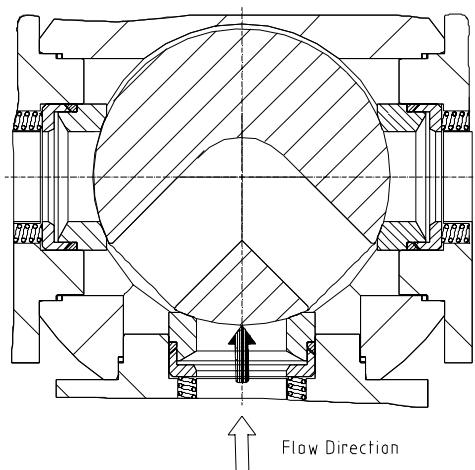


Fig. 14 Non-transflow

Direct flow cannot occur across run outlets during position change, and flow is completely blocked.

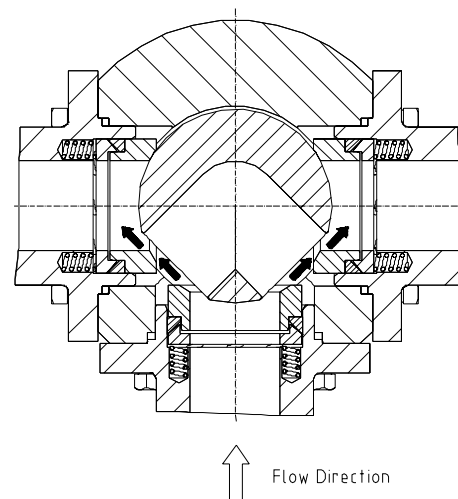


Fig. 15 Transflow

Inlet cannot be isolated from both outlets at the same time.

Technical modifications are reserved.



