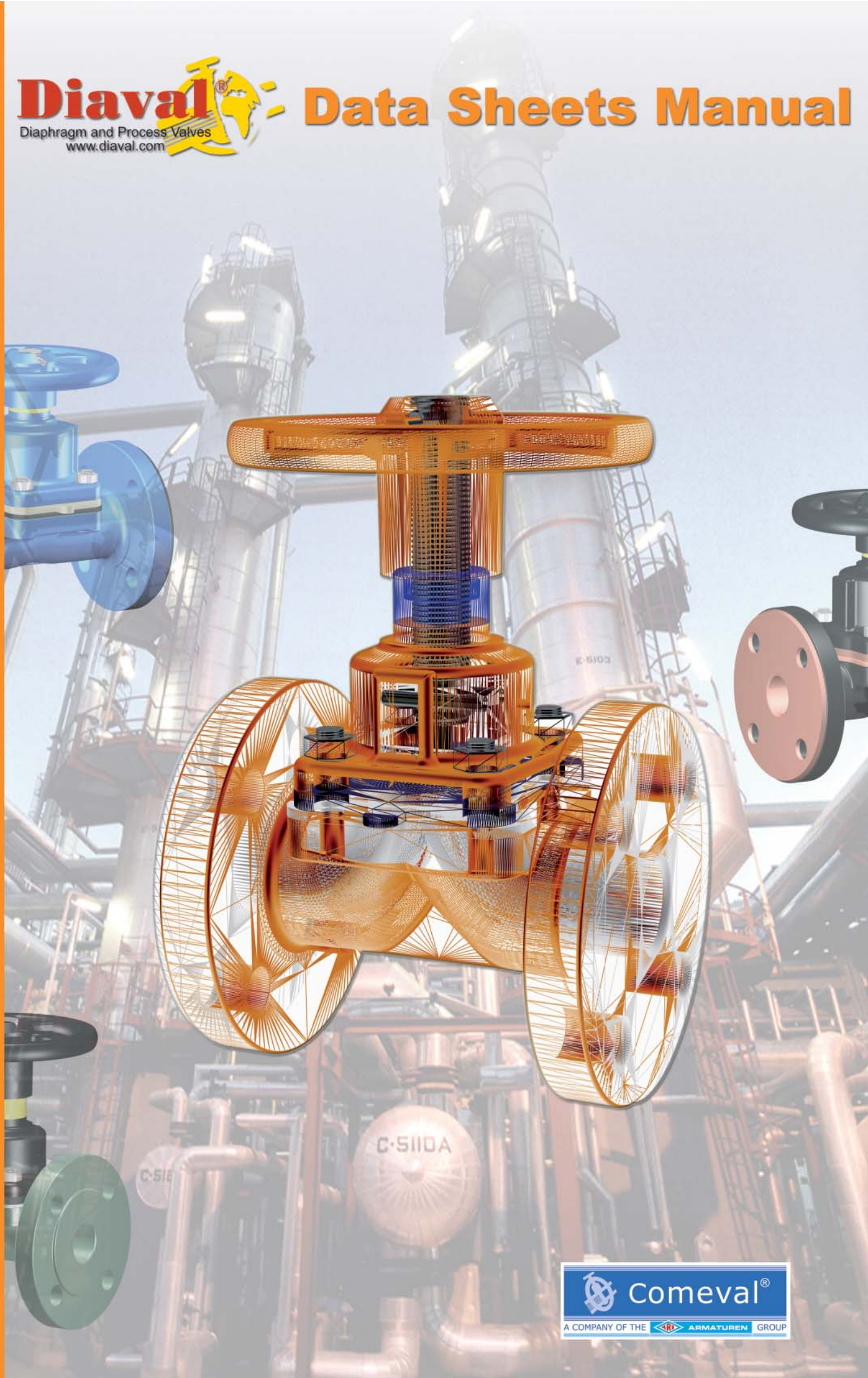
Diaval®
Diaphragm and Process Valves
www.diaval.com

Data Sheets Manual



Diaphragm Valves

Comeval®
A COMPANY OF THE ARMATUREN GROUP

DIAVAL® VALVES

DIAVAL® DIAPHRAGM VALVES

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DIAVAL® VALVES

Valve Coding

D	W	D	H	D	1	0	B	1	6	0	0	5	0

Style
D Diaphragm
P Plug Valve
C Check Valves

Body Design
0 Not applicable
W Weir
S Straight Through
F Full Flow
3 3 Way
R Reduced bore

Body Base Material
C Cast Iron
D Ductile Iron
A Carbon Steel
S St. Steel 316
I Chr. Iron 24%
J Chr. Iron 30%
B Bronze
K St. Steel 316L
E St. Steel 304
M Monel
H Hastelloy
X St. Steel 1.4435
Y St. Steel 1.4435 BN
Z Super Duplex St. Steel

Body Lining / Surface Finish
0 Unlined
H Hard Rubber
S Soft Rubber
L Linatex
M EPDM
B Butyl
N Neoprene
Y Hypalon
A Halar
P PFA
E FEP/ETFE
V PVDF
8 Polished Ra 0.8 (Micrometres)
6 Polished Ra 0.6 (Micrometres)
5 Polished Ra 0.5 (Micrometres)
4 Polished Ra 0.4 (Micrometres)
2 Polished Ra 0.2 (Micrometres)

Bonnet or Trim Material
See body codes

Diaphragm / Sealing
10 Natural Rubber
15 White Natural Rubber
20 EPDM
2V EPDM Vaccum service
30 Butyl
40 NBR
4V NBR Vaccumm Service
50 Neoprene
60 Hypalon
70 Viton
92 PTFE/EPDM
93 PTFE/Butyl
97 PTFE/Viton
LN Linatex
PT Pure PTFE (Sealing)
FV PTFE + 25% Glass Fiber (Sealing)
GR Graphite (Sealing)

F to F dimension
B BS5156
D DIN3202F1
A ASME

Connection
10 PN 10
16 PN16 (for DN>=20
15 ANSI
NT Undrilled
SP BSPP
ST BSPT
PT NPT
BF BLIND FLANGE

Options
1 St. Steel Bolting
2 Padlocking
3 Chainwheel
4 Extended Stem
5 Interlocking
6 Sealed bonnet
7 Silicon free
8 Special painting
F FF
R RF

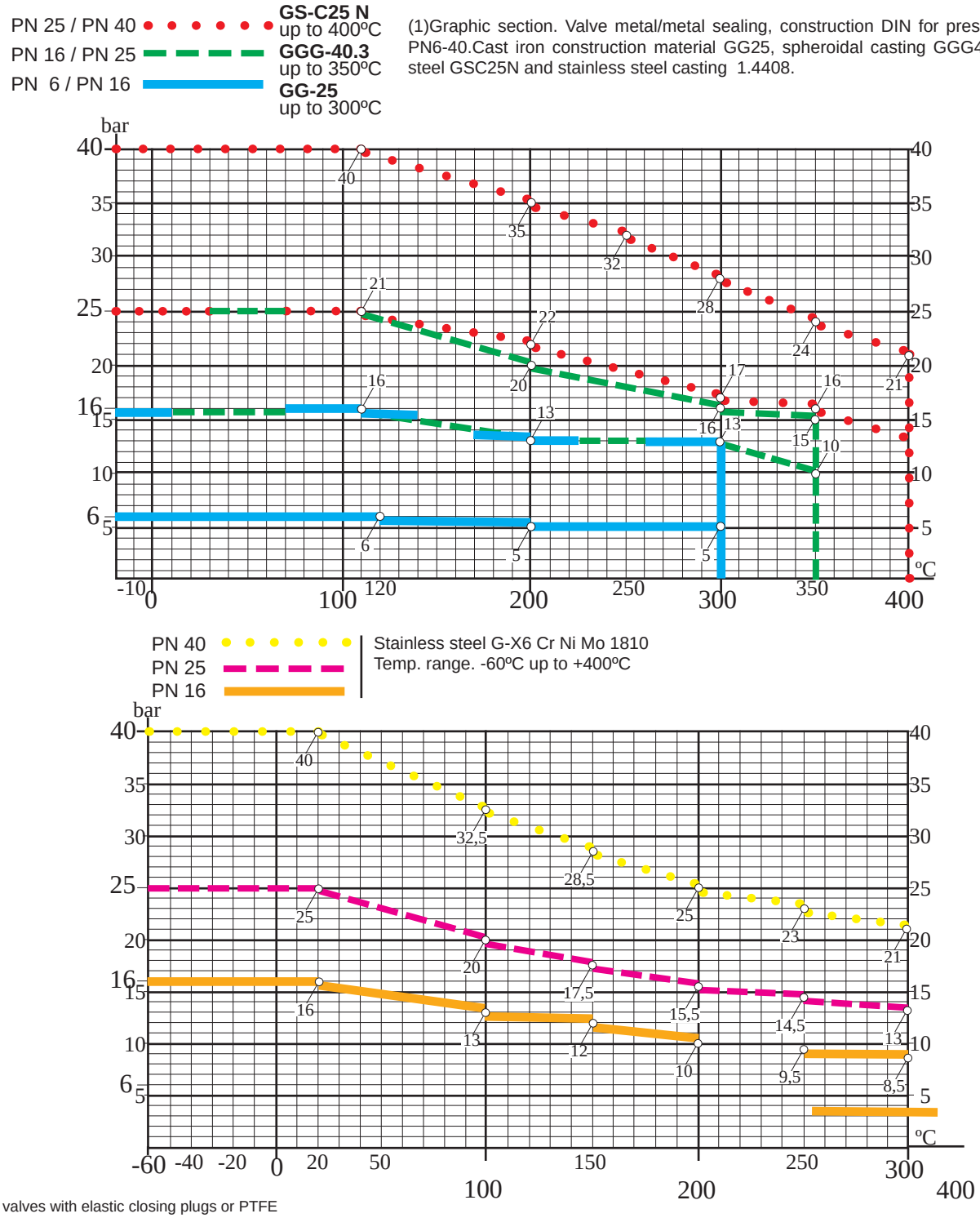
Size in mm

DIAVAL® DIAPHRAGM VALVES

Engineering Data

Pressure / Temperature Chart according to EN 1092-1/2

The following graphs represent the Temperature / Pressure relation for all metal seated valves, strainers and other flow control products made out in the following pressure retaining shell materials:
-Cast Iron EN-GJL-250
-Ductile Iron EN-GJL-400
-Carbon Steel 1.0619+N
-Stainless Steel 1.4408
-And for Design Pressures up to PN 40.
All products with resilient seat or other components are subject to temperature restrictions governed by these resilient materials.



(1)Graphic section. Valve metal/metal sealing, construction DIN for pressure ratings PN6-40.Cast iron construction material GG25, spheroidal casting GGG40.3, carbon steel GSC25N and stainless steel casting 1.4408.

(1) For valves with elastic closing plugs or PTFE
Notes: Check maximum recommended temperatures for elastomers as defined by each product's specification (see file).
(2) In those cases where there might occur some minor deviation or discrepency between the specific chart curves represented in each data sheet and the ones seen herein, generally, the product version should take precedence.

DIAVAL® DIAPHRAGM VALVES

Engineering Data

Pressure / Temperature Chart according to ASME B.1634 and ASME B16.1

The following graphs represent the Temperature / Pressure relation for all metal seated valves, strainers and other flow control products made out in the following pressure retaining shell materials:
-Carbon Steel A216WCB
-Alloy Steel A217WCC, A352 LCB; A35 LCC
-Stainless Steel A351CF8, A351CF8M, A351CF3M
-And for Design Pressures up to 2500 Lbs.
All products with resilient seat or other components are subject to temperature restrictions governed by these resilient materials.

***ASME B.16.34**

Temp		150lb							300lb						
		A216	A217	A352	A35	A351	A351	A351	A216	A217	A352	A35	A351	A351	A351
ºF	ºC	WCB	WC8	LCB	LCC	CF8	CF8M	CF3M	WCB	WC6	LCB	LCC	CF8	CF8M	CF3M
-20	-29	285	290	265	290	275	275	275	740	750	695	750	720	720	720
100	38														
200	93	360	260	250	260	235	240	240	675	710	655	750	600	620	620
300	149	230	230	230	230	205	215	215	655	675	640	730	530	560	560
400	204	200	200	200	200	180	195	195	635	660	620	705	470	515	515
500	260	170	170	170	170	170	170	170	600	640	585	665	435	480	480
600	316	140	140	140	140	140	140	140	550	605	535	605	415	450	450
650	343	125	125	125	125	125	125	125	535	590	525	590	410	445	445
700	371	110	110	....	110	110	110	110	535	570	....	570	405	430	430
750	399	95	95	...	....	95	95	95	505	530	....	....	400	425	425
800	427	80	80	....	....	80	80	80	410	510	....	....	395	415	415
850	454	....	65	....	....	65	65	65	....	485	....	....	390	405	405
900	482	....	50	....	....	50	50	....	....	450	....	....	385	395	....
950	510	....	35	....	....	35	35	....	....	380	....	....	375	385	....
1000	538	....	20	....	....	20	20	....	....	225	....	....	325	365	....

Temp		600lb							900lb						
		A216	A217	A352	A35	A351	A351	A351	A216	A217	A352	A35	A351	A351	A351
ºF	ºC	WCB	WC8	LCB	LCC	CF8	CF8M	CF3M	WCB	WC6	LCB	LCC	CF8	CF8M	CF3M
-20	-29	1480	1500	1390	1150	1440	1440	1440	2220	2250	2085	2250	2160	2160	2160
100	38														
200	93	1350	1425	1315	1150	1200	1240	1240	2025	2135	1970	2250	1800	1860	1860
300	149	1315	1345	1275	1455	1055	1120	1120	1970	2020	1915	2185	1585	1680	1680
400	204	1270	1315	1235	1410	940	1030	1030	1900	1975	1850	2115	1410	1540	1540
500	260	1200	1285	1165	1330	875	955	955	1795	1925	1745	1995	1310	1435	1435
600	316	1095	1210	1065	1210	830	905	905	1640	1815	1600	1825	1245	1355	1355
650	343	1075	1175	1045	1175	815	890	890	1610	1765	1570	1765	1225	1330	1330
700	371	1065	1135	....	1135	805	865	865	1600	1705	....	1705	1210	1295	1295
750	399	1010	1035	...	....	795	845	845	1510	1595	....	....	1195	1270	1270
800	427	825	1015	....	....	790	830	830	1235	1525	....	....	1180	1245	1245
850	454	....	975	....	....	780	810	810	....	1460	....	....	1165	1215	1215
900	482	....	900	....	....	770	790	....	....	1350	....	....	1150	1180	....
950	510	....	755	....	....	750	775	....	....	1130	....	....	1125	1160	....
1000	538	....	445	....	....	645	725	....	....	670	....	....	965	965	....

DIAVAL® DIAPHRAGM VALVES

Engineering Data

Pressure / Temperature Chart according to ASME B.1634 and ASME B16.1

The following graphs represent the Temperature / Pressure relation for all metal seated valves, strainers and other flow control products made out in the following pressure retaining shell materials:
-Carbon Steel A216WCB
-Alloy Steel A217WCC, A352 LCB; A35 LCC
-Stainless Steel A351CF8, A351CF8M, A351CF3M
-And for Design Pressures up to 2500 Lbs.
All products with resilient seat or other components are subject to temperature restrictions governed by these resilient materials.

***ASME B.16.34**

Temp		1500lb							2500lb						
		A216	A217	A352	A35	A351	A351	A351	A216	A217	A352	A35	A351	A351	A351
ºF	ºC	WCB	WC8	LCB	LCC	CF8	CF8M	CF3M	WCB	WC6	LCB	LCC	CF8	CF8M	CF3M
-20	-29	3705	2250	3740	3750	3600	3600	3600	6170	6250	5785	6250	6000	6000	6000
100	38														
200	93	3375	2135	3280	3750	3000	3095	3095	5625	5930	5470	6250	5000	5160	5160
300	149	3280	2020	3190	3640	2640	2795	2795	5470	5605	5315	6070	4400	4660	4660
400	204	3170	1975	3085	3530	2350	2570	2570	5280	5485	5145	5880	3920	4280	4280
500	260	2995	1925	2910	3325	2185	2390	2390	4990	5350	4850	5540	3640	3980	3980
600	316	2735	1815	2665	3025	2075	2255	2255	4560	5040	4440	5040	3460	3760	3760
650	343	2685	1765	....	2940	2040	2220	2220	4475	4905	4355	4905	3400	3700	3700
700	371	2665	1705	....	2840	2015	....	....	4440	4730	4320	4730	3360	3600	3600
750	399	2520	1595	...	....	1990	2110	2110	4200	4430	3945	4200	3320	3520	3520
800	427	2060	1525	....	....	1970	2075	2075	3430	4230	3260	3430	3280	3480	3480
850	454	....	1460	....	....	1945	2030	2030	2230	4060	2230	2230	3240	3380	3380
900	482	....	1350	....	....	1920	1970	....	1430	3745	1430	1430	3200	3280	....
950	510	....	1130	....	....	1870	1930	....	860	3145	860	860	3120	3220	....
1000	538	....	670	....	....	1610	1820	....	430	1860	430	430	2685	3030	....

***ASME B 16.1 Pressure-Temperature Rating: PSI**

Temp		125 lb				250 lb			
		A 126 Class-A		A 126 Class-B		A 126 Class-A		A 126 Class-B	
		NPS	NPS	NPS	NPS	NPS	NPS	NPS	NPS
ºF	ºC	1.5-12	1.5-12	14-24	30-48	1.5-12	1.5-12	14-24	30-48
-20	-29	175	200	150	150	400	500	300	300
100	66								
200	93	165	190	135	115	370	460	280	250
225	107	155	180	125	100	355	440	270	225
250	121	150	175	120	85	340	415	260	200
275	135	145	170	110	65	325	395	250	175
300	149	140	165	105	50	310	375	240	150
325	163	130	155	100	....	295	355	230	125
350	176	125	150	....	....	280	335	220	100
375	191	....	145	...	....	265	315	210	....
400	204	....	140	....	....	250	290	200	....
425	218	....	130	....	....	....	270	....	....
450	232	....	125	....	....	....	250	....	....

DIAVAL® DIAPHRAGM VALVES
Engineering Data

New Harmonized European Face to Face Length Standards / Standardized Face to Face Lengths

The following tables provide the equivalent length specification standard in accordance with the European Harmonization which came into effect from May 2002 (PED).

New European Material Standardization (DIN VALVES)

Material	EN (New Harmonization)	DIN (Old)
Cast iron	EN-GJL-250 DIN EN 1561	GG25 DIN 1619
Ductile	EN-GJL-400 18 U LT DIN EN 1563	GGG40.3 DIN 1693
Cast steel	1.0619+N DIN EN 10213-10-2	GSC25N DIN17245
Stainless steel	1.4408 DIN EN 10213-4	1.4408 DIN 17445

New standards will be of obligatory application from may 2002 when the New European Directives for pressure vessels come into effect.

These standards also affect other parameters habitualy used in this catalogue like construction lengths:

	EN	DIN	REF: For Valves
FACE TO FACE CONSTRUCTION LENGTH	DIN EN 558-1 LINE1	DIN 3202 F1	GLOBE,DIAPHRAGM, REGULATING
	DIN EN 558-1 LINE4	DIN 3202 F4	BALL GATE

(*) WAFER BUILT UNPUBLISHED IN THIS VOLUME (ASK FOR EQUIVALENTS FROM OUR TECHNICAL STAFF)

Flanged Valve Constructions Lengths

Size	DIN 3202 F1	DIN 3202 F4	DIN 3202 F5	ANSI / BS 5156
DN15	130	115	---	108
DN20	150	120	---	117
DN25	160	125	---	127
DN32	180	130	---	146
DN40	200	140	---	159
DN50	230	150	---	190
DN65	290	170	---	216
DN80	310	180	---	254
DN100	350	190	---	305
DN125	400	---	325	356
DN150	480	---	350	406
DN200	600	---	400	521
DN250	730	---	---	635
DN300	850	---	---	749

Wafer Valve Constructions Lengths

Size	DIN 3202 k3			DIN 3202 k4	DIN 3202 k5	API 6D
	PN16	PN25	PN40			
DN15	---	---	---	17	25	---
DN20	---	---	---	20	---	---
DN25	---	---	---	23	35,5	---
DN32	---	---	---	28	---	---
DN40	---	---	---	31,5	45	---
DN50	43	43	43	40	56	20
DN65	46	46	46	46	63	20
DN80	64	64	64	51	71	20
DN100	64	64	64	61	80	20
DN125	70	70	70	---	---	21
DN150	76	76	76	---	---	22
DN200	89	89	89	---	---	29
DN250	114	114	114	---	---	34

DIAVAL® DIAPHRAGM VALVES
Engineering Data

Equivalent DIN / ANSI Material Designation for Cast Valve Material

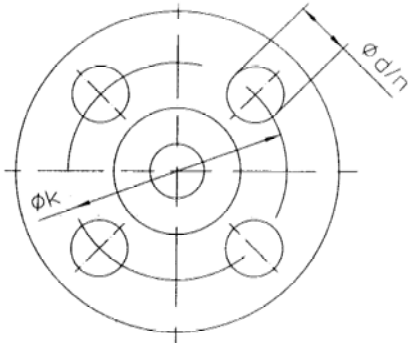
DIN	Nº Material	AISI / ASTM
GG20 EN JL 1030 EN GJL 200	0.5020	A48 30B
GG25 EN JL 1040 EN GJL 250	0.5020	A48 40B
GGG40.3 EN JS 1020 EN GJS 400-18	0.7043	60-40-18
GGG50 EN JS 1050 EN GJS 500-7 (A)	0.7050	65-45-12

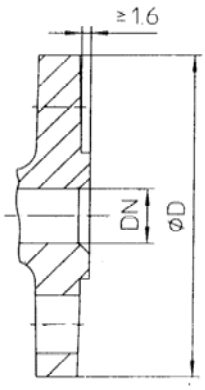
Specifications of Carbon Steel, Stainless and Exotic Materials ACC.ASTM Standards

Material	Specification
FORGED CARBON STEEL	ASTM 1105
CAST CARBON STEEL	ASTM A216WCB
LOW TEMPERATURE CARBON STEEL(ALLOY)	ASTM A352 LCB ASTM A352 LCC
CARBON STEEL(ALLOY) CrMo	ASTM A217 WC6
LOW ALLOY CARBON STEEL	ASTM A487 Gr4N ASTM A487 Gr4C
STAINLESS STEEL. 410	ASTM A217 CA15
STAINLESS STEEL. 9%Cr	ASTM A217 CA12
STAINLESS STEEL. 13%Cr	ASTM A352 CAGNM
HASTELLOY® C276	ASTM A494 CWRMN
MONEL	ASTM A494 M35-2
BRONZE ALUMINIUM-NIKEL	ASTM B148 GrWC9
STAINLESS STEEL 316	ASTM A 182 F 316 A 351 CF8M
STAINLESS STEEL 316	ASTM A 182 F 316L A 351 CF3M
STAINLESS STEEL 347 (HIGH TEMPERATURE)	ASTM A 351 CF8C
STAINLESS STEEL 304	ASTM A 351 CF8
STAINLESS STEEL 304 L	ASTM A 351 CF3
STAINLESS STEEL 317	ASTM A 351 CG8M
ALLOY 625	ASTM A 494 CW6MC
AVESTA 254 5Mo®	ASTM A351 CK3M CaN
TITANIUM	ASTM B367 C2

DIAVAL® DIAPHRAGM VALVES
Engineering Data

Dimensional Table for DIN Standard Flanges



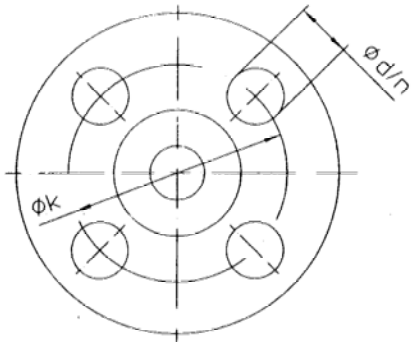


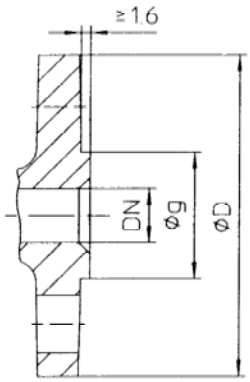
		PN10				PN16			
DIN	Inchs	ØD	Øk	Ød	n	ØD	Øk	Ød	n
10	3/8”	90	60	14	4	90	60	14	4
15	1/2”	95	65	14	4	95	65	14	4
20	3/4”	105	75	14	4	105	75	14	4
25	1”	115	85	14	4	115	85	14	4
32	1 1/4”	140	100	18	4	140	100	18	4
40	1 1/2”	150	110	18	4	150	110	18	4
50	2”	165	125	18	4	165	125	18	4
65	2 1/2”	185	145	18	4	185	145	18	4
80	3”	200	160	18	4	200	160	18	4
100	4”	220	180	18	8	220	180	18	8
125	5”	250	210	18	8	250	210	18	8
150	6”	285	240	22	8	285	240	22	8
200	8”	340	295	22	8	340	295	22	12
250	10”	395	350	22	12	405	355	26	12
300	12”	445	400	22	12	460	410	26	12
350	14”	505	460	22	12	520	470	26	12
400	16”	565	515	26	16	580	525	30	16
500	20”	670	620	26	20	715	620	33	20

		PN25				PN40			
DIN	Inchs	ØD	Øk	Ød	n	ØD	Øk	Ød	n
10	3/8”	90	60	14	4	90	60	14	4
15	1/2”	95	65	14	4	95	65	14	4
20	3/4”	105	75	14	4	105	75	14	4
25	1”	115	85	14	4	115	85	14	4
32	1 1/4”	140	100	18	4	140	100	18	4
40	1 1/2”	150	110	18	4	150	110	18	4
50	2”	165	125	18	4	165	125	18	4
65	2 1/2”	185	145	18	4	185	145	18	4
80	3”	200	160	18	4	200	160	18	4
100	4”	220	180	18	8	235	190	22	8
125	5”	250	210	18	8	270	220	26	8
150	6”	285	240	22	8	300	250	26	8
200	8”	360	310	26	12	375	320	30	12
250	10”	425	370	30	12	450	385	33	12
300	12”	485	430	30	16	515	450	33	12
350	14”	555	490	33	16	580	510	33	16
400	16”	620	550	36	16	660	585	36	16
500	20”	730	660	36	20	755	670	39	20

DIAVAL® DIAPHRAGM VALVES
Engineering Data

Dimensional Table for ANSI Standard Flanges

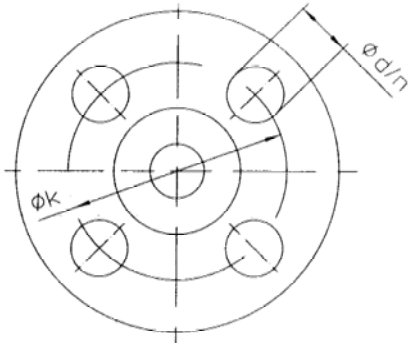


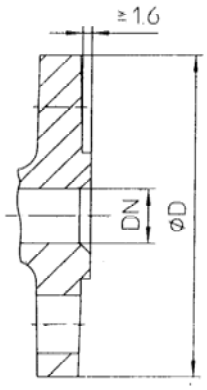


		ANSI 150					ANSI 300				
DIN	Inchs	ØD	Øg	Øk	Ød	n	ØD	Øg	Øk	Ød	n
15	1/2”	89	35	60	16	4	95	35	67	16	4
20	3/4”	99	43	70	16	4	117	43	82,5	19	4
25	1”	108	51	79	16	4	124	51	89	19	4
32	1 1/4”	118	64	89	16	4	133	64	99	19	4
40	1 1/2”	127	73	98	16	4	156	73	114	22	4
50	2”	153	92	121	19	4	165	92	127	19	8
65	2 1/2”	178	105	140	19	4	191	105	149	22	8
80	3”	191	127	152	19	4	210	127	168	22	8
100	4”	229	157	191	19	8	254	157	200	22	8
125	5”	254	186	216	22	8	279	186	235	22	8
150	6”	279	216	241	22	8	318	216	270	22	12
200	8”	343	270	298	22	8	381	270	330	25	12
250	10”	406	324	362	25	12	445	324	387	29	16
300	12”	483	381	432	25	12	521	381	451	32	16
350	14”	533	413	476	29	12	584	413	514	32	20
400	16”	597	470	540	29	16	648	470	572	35	20
500	20”	699	584	635	32	20	775	584	686	35	24

DIAVAL® DIAPHRAGM VALVES
Engineering Data

Dimensional Table for BS T. E, F, J, K Standard Flanges





		BS / E				BS / F			
DIN	Inchs	ØD	Øk	Ød	n	ØD	Øk	Ød	n
15	1/2”	95	67	14	4	95	67	14	4
20	3/4”	102	73	14	4	102	73	14	4
25	1”	114	83	14	4	121	87	18	4
32	1 1/4”	121	87	14	4	133	98	18	4
40	1 1/2”	133	98	14	4	140	105	18	4
50	2”	152	114	14	4	165	127	18	8
65	2 1/2”	165	127	18	4	184	146	18	8
80	3”	184	146	18	4	203	165	18	8
100	4”	216	178	18	8	229	191	18	8
125	5”	254	210	18	8	279	235	22	8
150	6”	279	235	22	8	305	260	22	12
200	8”	337	292	22	8	368	324	22	12

		BS / J				BS / K			
DIN	Inchs	ØD	Øk	Ød	n	ØD	Øk	Ød	n
15	1/2”	114	83	18	4	114	83	18	4
20	3/4”	114	83	18	4	114	83	18	4
25	1”	121	87	18	4	127	95	18	4
32	1 1/4”	133	98	18	4	133	98	18	4
40	1 1/2”	140	105	18	4	152	114	22	4
50	2”	165	127	22	4	165	127	18	8
65	2 1/2”	184	146	22	8	184	146	22	8
80	3”	203	165	22	8	203	165	22	8
100	4”	229	191	22	8	241	197	25	8
125	5”	279	235	25	8	279	235	25	12
150	6”	305	260	25	12	305	260	25	12
200	8”	368	324	25	12	368	318	29	12

DIAVAL® VALVES
Industry Applications

The DIAVAL range of Valves is encountered in many market sectors and process media applications. The process engineer should observe the material of valve bodies, Diaphragm grades, seals and other selection criteria to ensure that and matches to the actual plant duties.

When deciding to use any valve of the wide DIAVAL portfolio in a process plant, the following parameters should be observed: *Fluid Temperature* Fluid properties and Concentration * Line pressure ; if checked parameters allow for the use of Diaphragm Valves, Plug Valves or Butterfly Valves, then a second check list should be considered to select the most appropriate Valve: * Clean or dirty media, pressure drop and intended valve purpose to define the Valve style * Corrosion or abrasion duties will lead to the proper choice of materials, linings and diaphragms or gaskets * Finally process end connections will define the body end style*.

DIAVAL products are encountered in many applications of today's industry, this catalogue section describes the main fields where our products have been largely sold.

DIAVAL® VALVES
Industry Applications

Valves for Desalination Plants

What is desalination?
Desalination is the process of removing dissolved salts from water to make it drinkable or for human use. The two leading desalination technologies are thermal and membrane technologies. A major advantage of desalination of ocean water is that water is always available even in the most severe droughts.

A **thermal process or distillation** involves the heating of saline water to produce water vapour that is, in turn, condensed to form fresh water or low salt water concentration.

Membrane processes rely on permeable membranes to separate salts from water. Membrane processes can either be pressure-driven (reverse osmosis) which is now the most common method, or it could be voltage-driven (electro-dialysis).

Reverse Osmosis (RO). A process of desalination where pressure is applied continuously to the feed water, forcing water molecules through a semi permeable membrane. Water that passes through the membrane leaves the unit as product water; most of the dissolved impurities remain behind and are discharged in a waste stream.

Electro-dialysis. Most of the impurities in water are present in an ionized (electrically-charged) state. When an electric current is applied, the impurities migrate towards the positive and negative electrodes. The intermediate area becomes depleted of impurities and discharges a purified stream of product water. This technology is used for brackish waters but is not currently available for desalting seawater on a commercial scale.

Corrosion Control
The major problem in the efficient functioning of a Multi Stage Flash Desalination Plant is the lost downtime due to the ravages of corrosion. Whereas pipes and fittings are relatively inexpensive to repair or replace, the cost of a pump or valve can be very high. It is for this reason that the valves and pumps used must fall under the following criteria:

1.The valve must be corrosion resistant to the aggressive media and chemicals found on a Multi Stage Desalination Plant.
2.The Valve must be easy to maintain.
3.The valve must be highly reliable under the most arduous conditions.
4.The valve must be cost effective.

DIAVAL® valves offer a wide portfolio capable to meet all the above requirements in the desalination industry either with Diaphragm, Plug, Butterfly and Check Valves.
Corrosion is effectively managed with alloy materials such as **Super Duplex Stainless Steel** for unlined valves and in requirement of working pressures beyond the reach of elastomer lined valves. Should working parameters allow so, the use of Diaphragm Valves would reduce the ownership cost tremendously as can be observed from the following table:

Some of the valve combinations used on the **Multi-Stage Flash Desalination Plant:**

Service	Valve Type	Body Material	Body Lining	Diaphragm	Size Range
Sea Water	Diaval Diaphragm Valve	Ductile Iron	Natural Rubber	Natural Rubber	150 mm to 350 mm
Condensate	Diaval Diaphragm Valve	Ductile Iron	Butyl Rubber	Butyl Rubber	100mm to 250mm
Brine Discharge	Diaval Diaphragm Valve	Ductile Iron	Unlined	Butyl Rubber	200mm to 300mm
Caustic Addition	Diaval Diaphragm Valve	Ductile Iron	Butyl Lined	Butyl Lined	25mm to 50mm
Chlorine Injection	Diaval Diaphragm Valve	Ductile Iron	ETFE or PFA Lined	PTFE/Viton	25mm to 50mm

Valves must be reliable and not to be affected by the water impurities and suspended solids, hence the choice of plug valves or Straight Through Diaphragm Valves takes an important role for the proper plant functioning.

The DIAVAL portfolio offers the right product for each process conditions at Desalination Plants over the World.

DIAVAL® VALVES
Industry Applications

Valves for Hydrochloric Acid

Although not manufactured in as greater quantities as sulphuric acid, Hydrochloric acid is nevertheless an important raw material used in the chemical. petroleum and metal industries.

Hydrogen Chloride is a gas at room temperature and normal pressure and when dissolved in water is known as hydrochloric acid.

One of the major uses of hydrochloric is in the metal preparation industry where it is used to pickle steel plate to remove scale. In order to handle and control hydrochloric acid the choice of materials must be carefully chosen.

In the valve and pump applications, the use of rubber linings and 'plastic' materials are widely used. Should all metal valves or pumps be required then the cost rises dramatically due to need to use expensive nickel alloys.

The use of Diaval Diaphragm Valves has become widely accepted as the most economic way of handling Hydrochloric acid due to the fact that the body can easily be lined with suitable 'rubbers' which resist the attack of the acid.

The diaphragm isolates the acid from the operating mechanism thus reducing the need, and cost of employing an expensive all metal bonnet assembly.

On the surface the choice of lining seems a simple choice, however consideration must be given to the impurities in the acid which are 'picked up' by virtue of its method of manufacture. It is these impurities that can attack and destroy linings that theoretically should be resistant to the acid.

Hydrochloric acid can be manufactured in a number of ways each method containing different impurities:

* In the production of organic chemicals hydrochloric acid can be produced as a by-product containing aromatics.
The choice of Fluorocarbon linings and TFM (PTFE) diaphragms are required in this application.

* The Process of reacting sulphuric acid with sodium sulphate to produce hydrogen chloride gas and subsequently hydrochloric acid can introduce fluorides as the impurity which are best controlled by the use of EPDM or butyl materials. The fluorides attack glass linings.

* The manufacture of chlorinated hydrocarbons can produce hydrochloric acid containing chlorine gas. The use of natural rubber (because of the formation of the resistance layer of 'rubber hydrochloride on the natural rubber) and fluorocarbon materials are required.

Should the use of Plug Valves was the choice, it would be strongly recommended to look for Fluoropolymer coated valves in combination with the PTFE Sleeve plug.

DIAVAL® VALVES
Industry Applications

Valves for Sulphuric Acid

Sulphuric acid is perhaps the most widely used and most important technical products. Sulphuric acid is used in numerous industrial processes including fertiliser manufacture, metal plate, the dye stuffs industry, pharmaceuticals and countless others.

First discovered in 1831 by an Englishman whose patent for its manufacture has little changed over the years and is called the Contact Process. The Contact Process features the passing of a mixture of sulphur dioxide over a catalyst and passing the resultant sulphur trioxide into concentrated sulphuric acid. Sulphuric acid is a strong dibasic acid, with properties of an oxidising and dehydrating agent. Its dehydrating properties are important in absorbing water formed in such chemical processes as in nitration, etherification processes and saponification in the soap and detergent manufacture.

Sulphuric acid is sold in varying strengths or percentage of SO3 (sulphur trioxide) in H2SO4.The latter known as Oleums.

The commercially available strengths of sulphuric acid are as follows:

Strengths of Sulphuric Acid	Specific Gravity	% Sulphuric Acid
Battery Acid	1.250	33.3%
Fertiliser acid	1.525	62.2%
Oil of Vitriol	1.835	93.0%
Concentrated Oil Of Vitriol	1.841	98.0%
100% Sulphuric acid	1.835	100.0%
20% Oleum	1.915	105.0%
60% Oleum	1.992	114.7%

With its wide range of chemical properties the controlling of the various forms of sulphuric acid makes it extremely important that the correct material of construction for valve / pump is used.

In higher concentrations valves and pumps are often manufactured in plain cast iron or ductile iron, the chemical resistance of these materials is basically due to the fact that they contain a high content of combined carbon and a low content of free graphite.

The acceptable corrosion rates must be determined by the Corrosion Engineer since these vary with increase velocity of the acid.

Corrosion Rates for Grey Cast Iron

Temperature	% H2S04	mm per year
Ambient	65-98	<0.2
80 deg C	70-98	0.2 - 1.5
100 deg C	96-98	0.5 - 1.5

Corrosion Rates for Ductile (Nodular/SG) Cast Iron

Temperature	% H2S04	mm per year
Ambient	85%	0.40
50 deg C	85%	1.03
100 deg C	98%	0.28

It can clearly be seen that above a percentage of approximately 85% the corrosion rates start to fall which allows the use of cast irons as a favourable material for the construction of valves and pumps.

The one factor NOT taken into account in the above example is the effect of velocity which is considerable when considering the choice of materials to handle sulphuric acid.

This adverse effect is known as erosion - corrosion .

In its more dilute forms there are many polymers and inert linings that will offer the engineer a economical choice in the controlling of sulphuric acid.

Diaval Diaphragm valves, with its many linings and smooth flow characteristics has been the Corrosion Engineers and Plant Managers first choice for handling and controlling sulphuric acid on the grounds of economics, safety, easy of maintenance and availability.

Diaval

Diaphragm and Process Valves
www.diaval.com

Diaphragm Valves

DIAVAL® DIAPHRAGM VALVES

Design Advantages and Cost Saving Benefits

Diaphragm Valves proved to be the answer to many process engineers' greatest desire of reliability at an acceptable cost of ownership. Of simple and reliable design, diaphragm valves offer secure operation with full leaktight at the plant. The maintenance, when required, is limited to the replacement of the diaphragm, the bolted bonnet design permits to dismantle the valve without removing the valve body from the pipe work.
The body seatless design eases the internal lining, which opens a broad range to inexpensive options to process engineers when selecting materials resistant to corrosion and abrasion duties. Conventional isolating valves would demand expensive exotic materials to resist the effects of severe corrosion whereas a duly lined iron based material can do the job.

DIAVAL portfolio clearly meets the requirements of modern industrial processes and the needs of all engineers. Through constant product development and own polymer research technology, DIAVAL Diaphragm Valves are a reliable alternative to existing costly and expensive to maintain conventional valves.

DIAVAL INTERNATIONAL manufacture one of the largest Diaphragm Valves portfolio comprehensive of body linings, diaphragm grades and actuation currently available in the international market. Your DIAVAL Team is available to guide you along a great cost saving experience.

DIAVAL range of superior design and major cost saving benefits, for secure and full leaktight operation under the most severe circumstances.
The DIAVAL range is totally interchangeable with other diaphragm valves in the market thus easing the plant choice.

Valve stroke Indicator; a yellow position indicator gives clear and positive valve position from any angle.

Greased for life valve spindle; spindle chamber incorporates a grease reservoir that lubricates the spindle along operations thus avoiding valve spindle jamming. Sealed bonnet arrangements available for toxic and hazardous fluids.

Valve stroke stopper; the bonnet design prevents over closure of the valve thus avoiding early diaphragm rupture.

Ergonomically Design Hand wheel; great comfort and ease of operation. Other operation options such as actuators, padlocks, interlocking, extended spindle and others are available from DIAVAL.

Self draining; weir valves are self draining when installed at an angle of 20º above horizontal. ST and Full Flow valves are self cleaning with an unobstructed bore.

Diaphragms; wide range of diaphragm materials to meet the needs of today's industrial processes and standards. Resilient diaphragms provides 100% leak-tight shut off and isolates all bonnet parts from the line fluid.

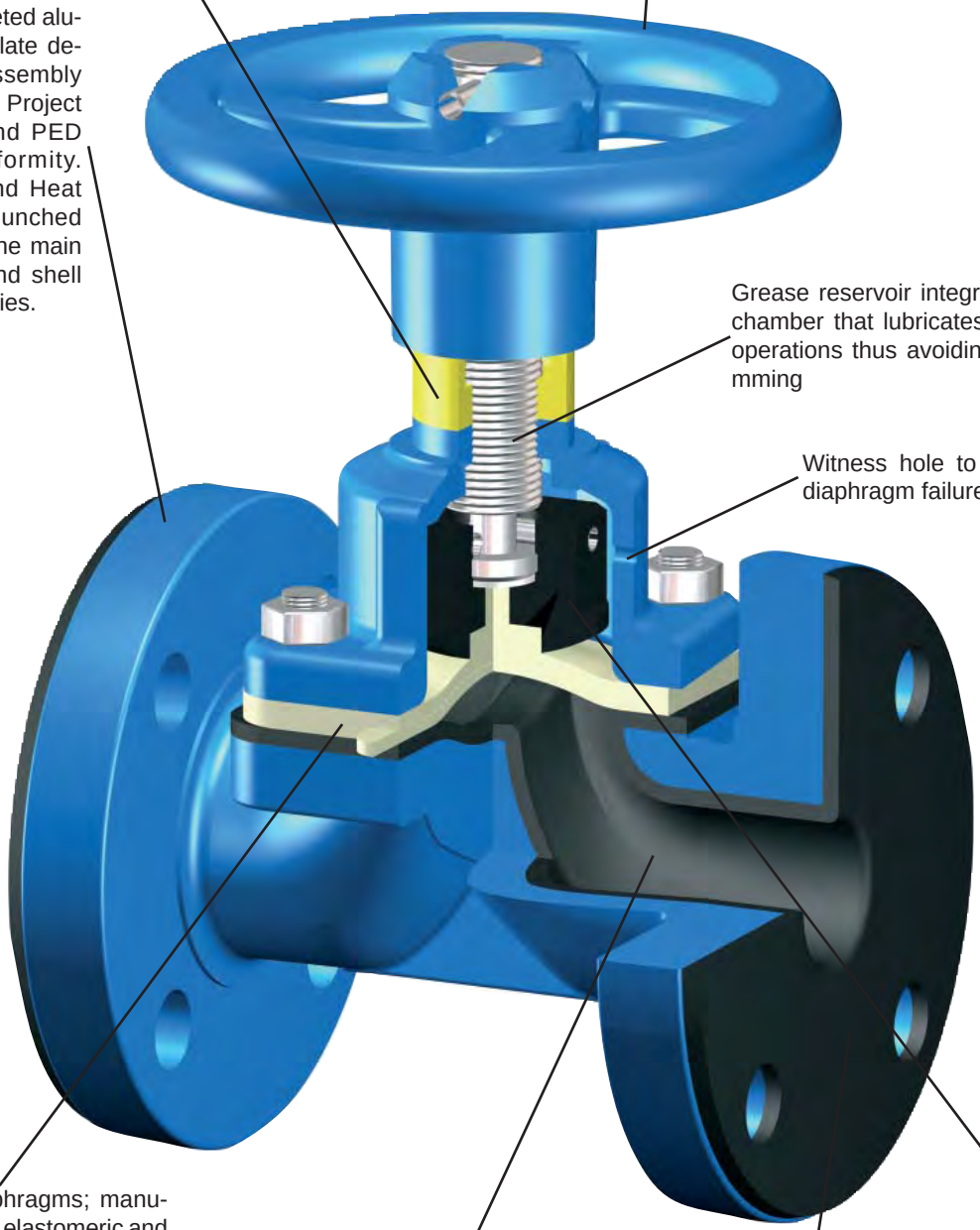
Safety; Optional Sealed bonnet arrangements available for toxic and hazardous fluids, Interlocking arrangement, padlocking and flange sealing coating.

Linings; porous free chemically resistant linings designed to eliminate the need of expensive metals. Wide range of polymers and fluoropolymers available to match all industrial needs. Full face rubber lining removes the need for gaskets unlike spigot face lining.

Body end connections; flanged and screwed ends to meet all European, Imperial and American standards. Other end styles available for the aseptic range.

DIAVAL® DIAPHRAGM VALVES

Design Attributes of Weir Valves



Ergonomic and Rugged Handwheel, great comfort and ease of operation

Yellow position indicator, for clear and positive valve position from any angle

Valve Identification and Traceability; riveted aluminium name plate denoting valve assembly code, assigned Project Tag number and PED 97/23/CE conformity. Valve Serial and Heat Numbers are punched and cast onto the main valve bodies and shell bonnet assemblies.

Grease reservoir integrated in the spindle chamber that lubricates the spindle along operations thus avoiding valve spindle jamming

Witness hole to detect leakage at diaphragm failure

Closure Diaphragms; manufactured from elastomeric and fluorocarbon materials; provide 100% seating tightness while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application.

Porous less linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials.

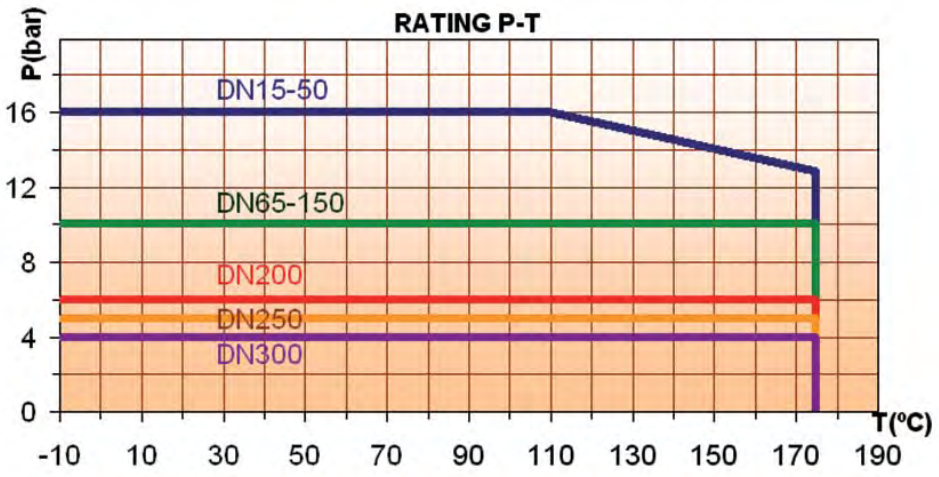
Full rubber flange face in all linedvalves as standard

Precise compressor plate; guide and operates the diaphragm up and down.

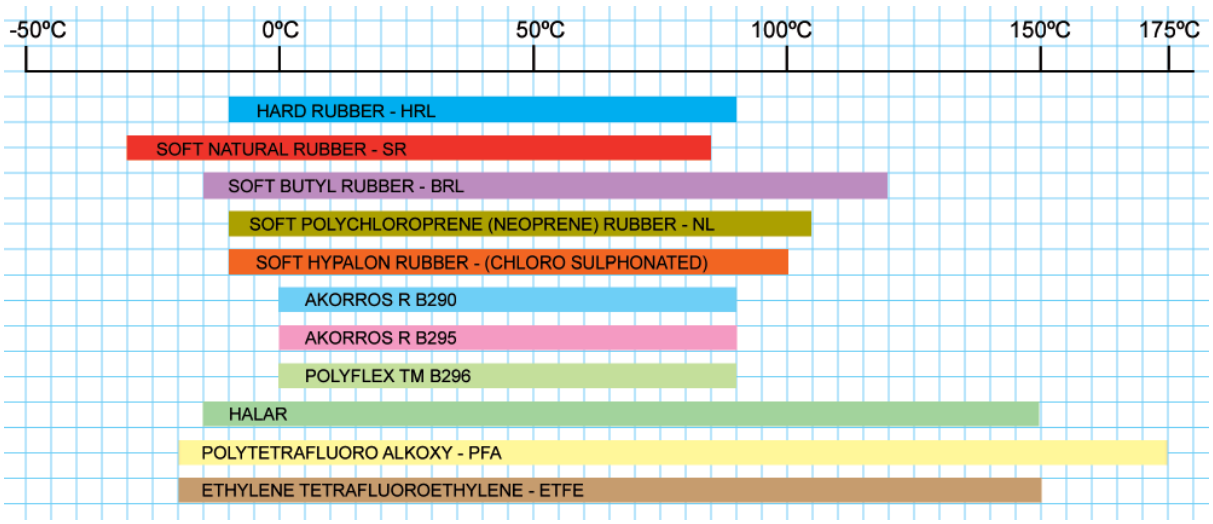
DIAVAL® W TYPE DIAPHRAGM VALVES

Operating Parameters

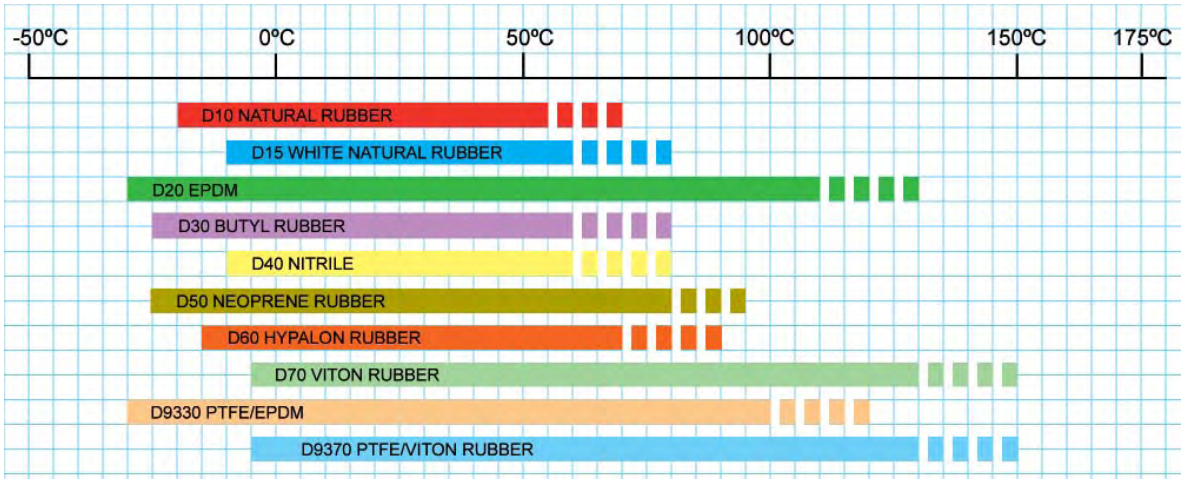
Bodies (Ductile iron)



Linings



Diaphragms



■■■ *Only for shorts periods of time*

Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

A valve flow coefficient represents the standard flow rate which flows through the valve at a given opening, referred to pre-established conditions:

* Kv value is the volume of water at 20ºC, in cubic meters per hour (m3/h), that will flow through the valve at a static pressure drop of 1 bar across the valve
* Cv value is the volume of water at 60ºF, in gallons per minute (gpm), that will flow through the valve at a static pressure drop of 1 psi across the valve

Conversion from Kv to Cv can be roughly calculated by means of the following expression:
Cv = Kv x 1,17

Flow rate through the valve with other liquids can be calculated with the following expressions

Kv = q (SG / dp)1/2
where
q = water flow (cubic meter per hour)
SG = specific gravity (1 for water)
dp = pressure drop (bar)

Cv = q (SG / dp)1/2
where
q = water flow (US gallons per minute)
SG = specific gravity (1 for water)
dp = pressure drop (psi)

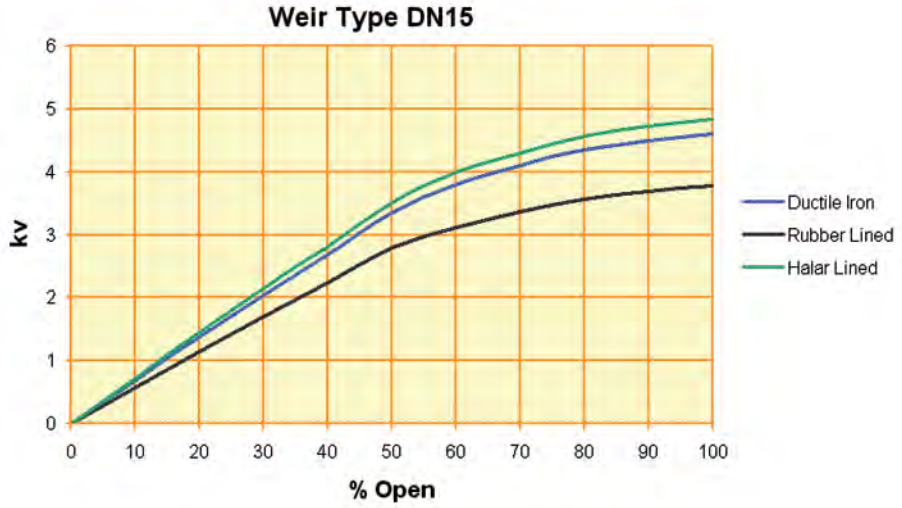
How to use the graphs:

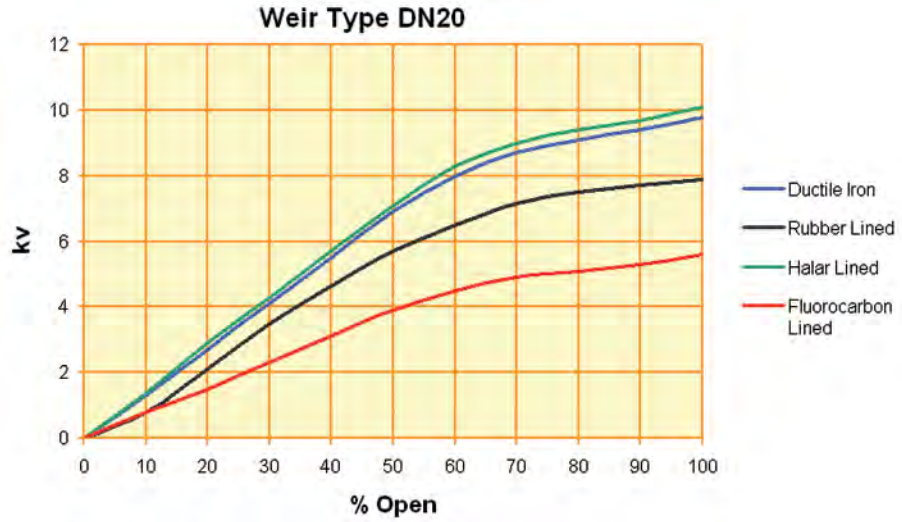
The flow graphs in the following sheets provide the valve flow rate across the valve body at a determine opening degree.
Choose the graph heading the valve Nominal Diametre which is being looked for; consider the valve inner lining features from a choice of unlined, rubber lined, ECTFE (Halar) lined or Fluoropolymer coated valve bodies and plot an intersection line upwards from the opening degree (in case of throttling) or full open to the colour representing the lining. The vertical axis will give the Kv value expressed in M3/h.

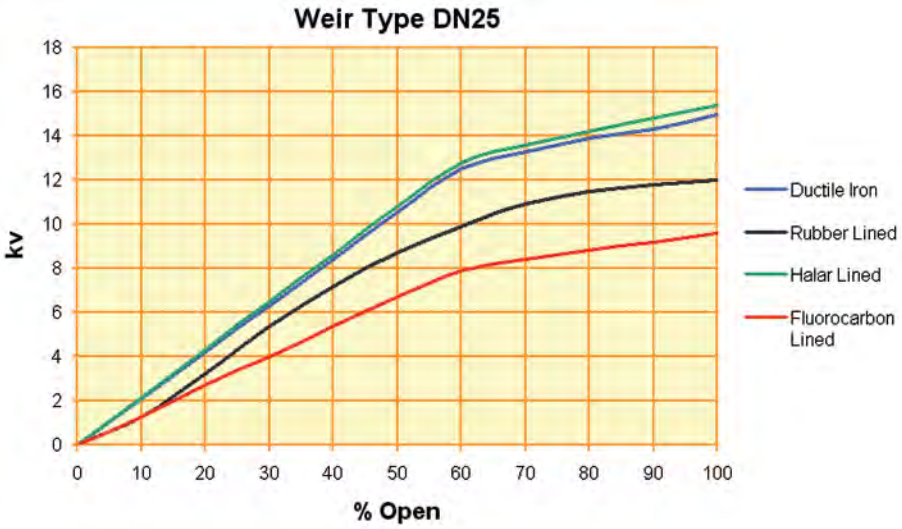
DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

Flow Coefficients Kv (m3/h)



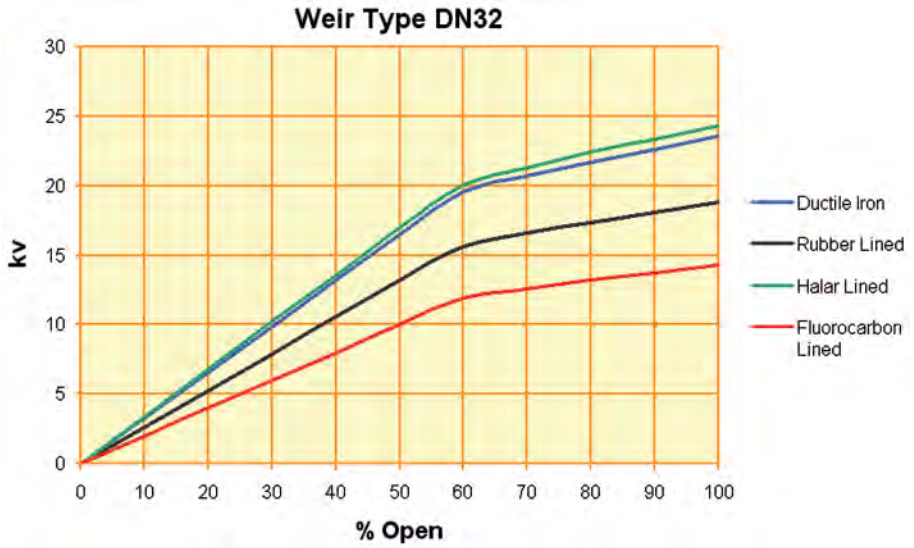


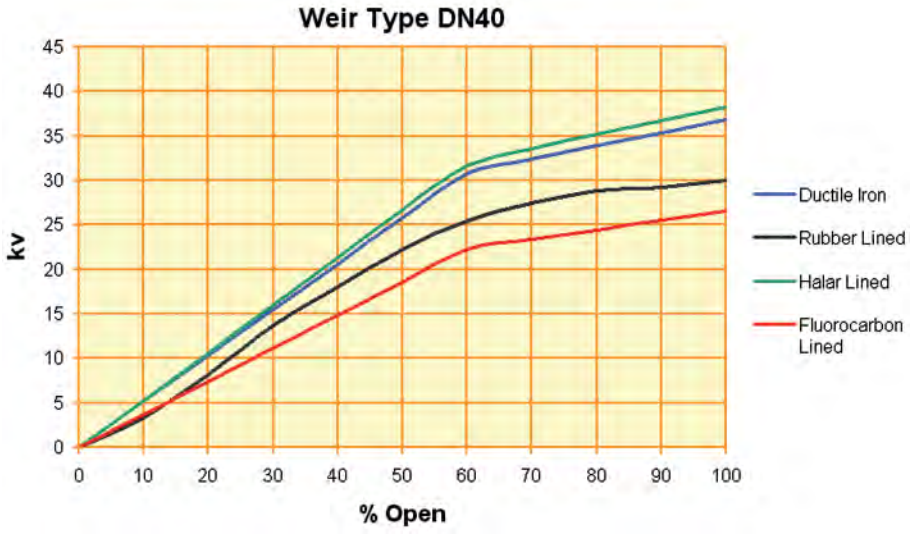


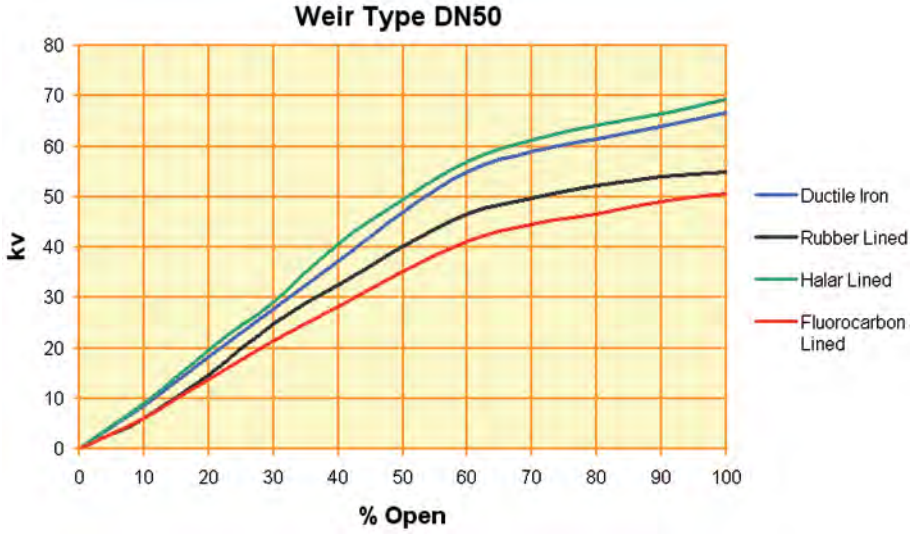
DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

Flow Coefficients Kv (m3/h)



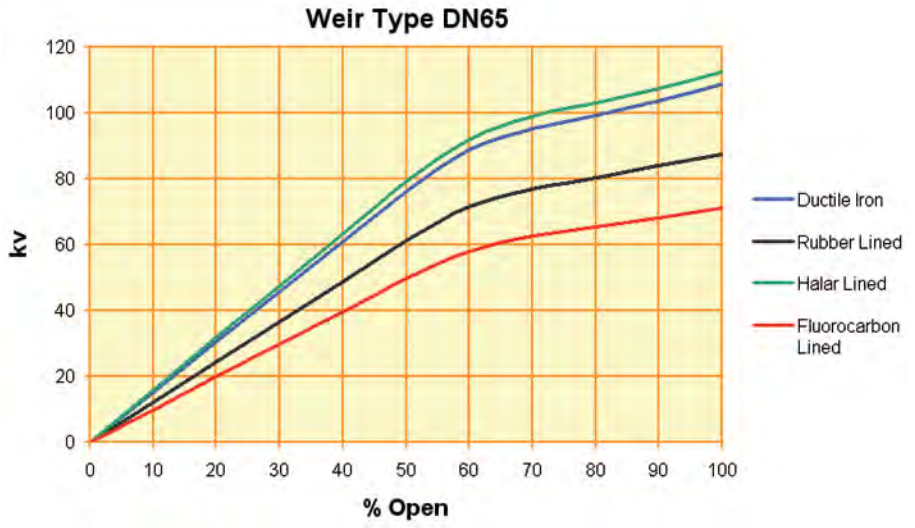


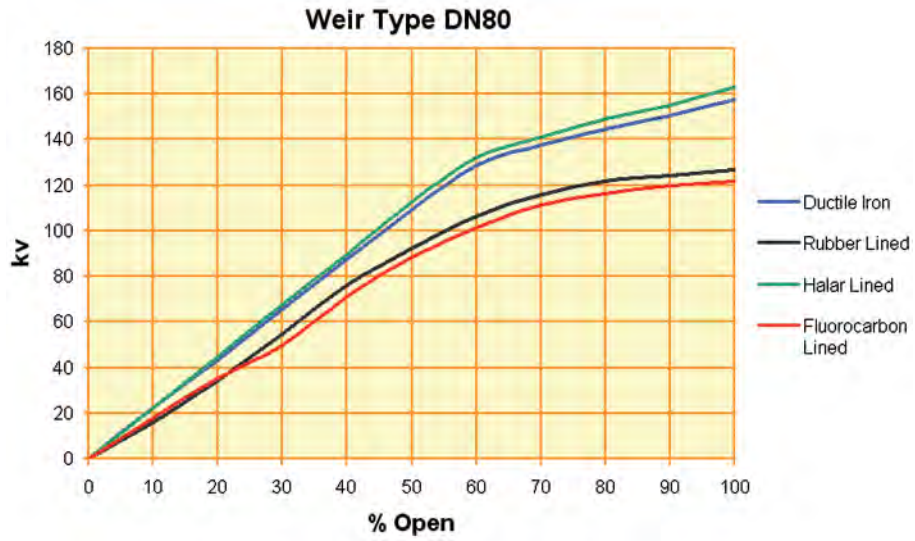


DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

Flow Coefficients Kv (m3/h)

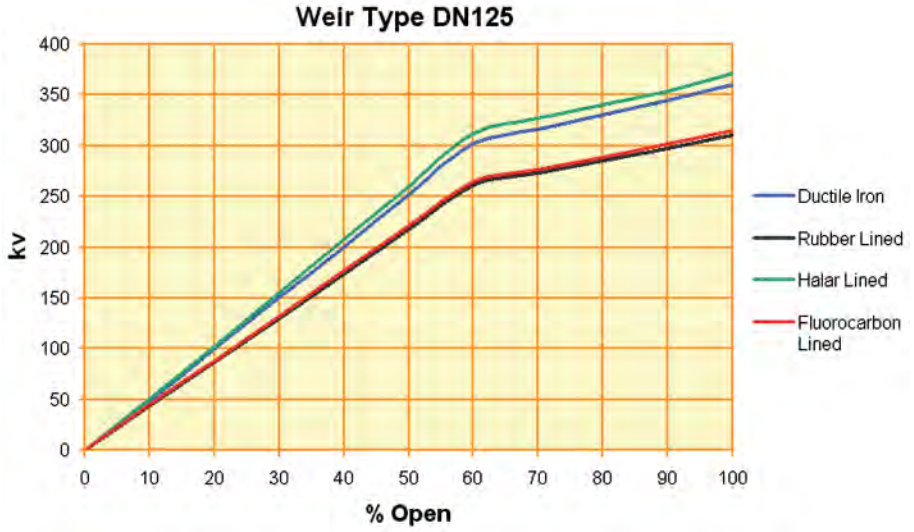


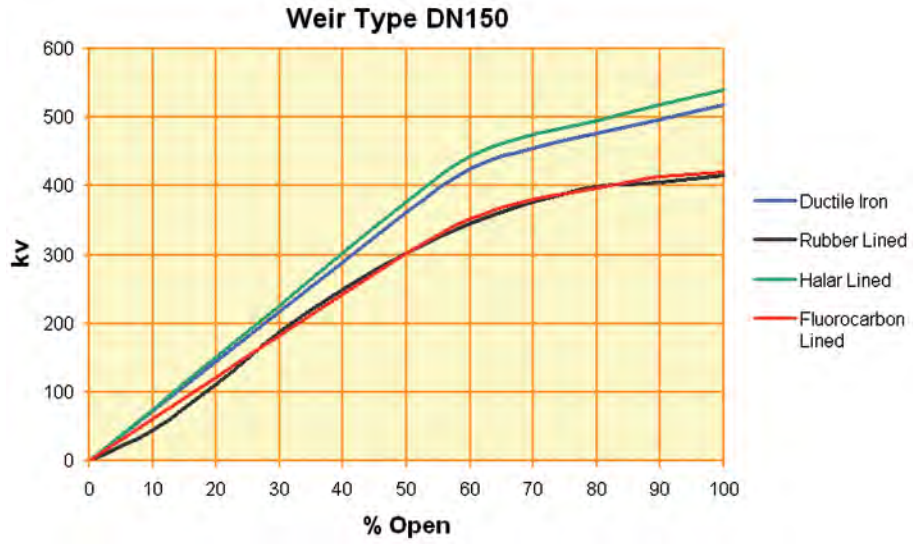


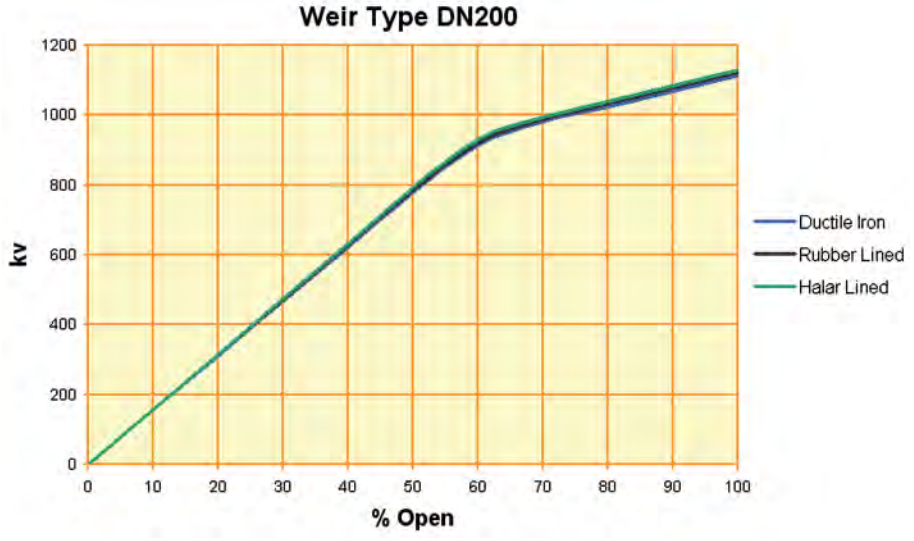
DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

Flow Coefficients Kv (m3/h)







DIAVAL® DIAPHRAGM VALVES

Weir Valves Flow Data

Flow Coefficients Kv (m3/h)

DIAVAL® DIAPHRAGM VALVES

Weir Valves Torque and Operating Data

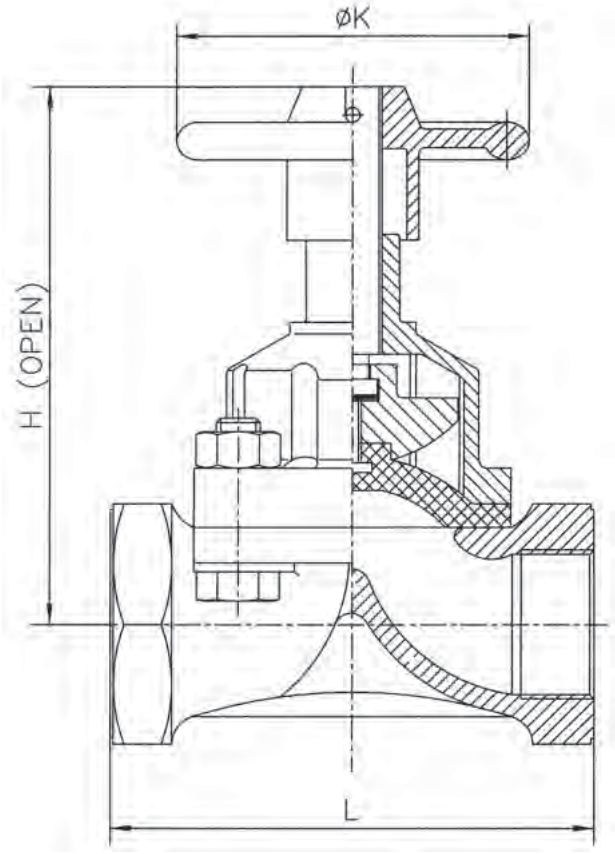
	Numbers of Turns from Open to Close	Valve Stroke	Torque & Closing Force Values (1)	
			100% ΔP (2)	
DN		(mm)	Torque (Nm)	Closing Force (N)
15	3,5	6	1,3	650
20	4,5	8	2,2	1103
25	5	10	3,1	1545
32	5,5	12	5,1	2529
40	10	20	7,6	2853
50	9,5	24	12	4464
65	14	35	16,2	6039
80	14	40	25,7	9502
100	14,5	51	39	14391
125	18	65	42,2	15638
150	22	78	72,5	21600
200	30	120	113	33852
250	32	145	115	34233
300	35	175	200	45868

1. Torque & Closing Force Values are for rated working pressure.
2. For 0% Multiply by 1,9 to the above values.

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Unlined Screwed valves

Main Dimensions



SIZE	DN	L	H (open)	ØK	Weight
3/8”	10	50	70	45	1.2
1/2”	15	66	95	75	1.5
3/4”	20	85	105	75	2.0
1”	25	110	122	85	3.2
1 1/4”	32	124	148	120	4.0
1 1/2”	40	140	155	120	6.0
2”	50	165	183	120	8.0
2 1/2”	65	203	212	165	10.5
3”	80	254	256	230	17.5

* Approx. Weight in kg, based on Cast Iron body material.
* Dimensions in mm, based on Cast Iron body material,only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to Diaval® standard
- Screwed ends to BSP (BS 21 parallel or taper), NPT (ANSI B1.20.1), other options on request

Operating parameters:
Valve bodies design pressure range: PN16 (DN10-50) PN10 (DN65-80)

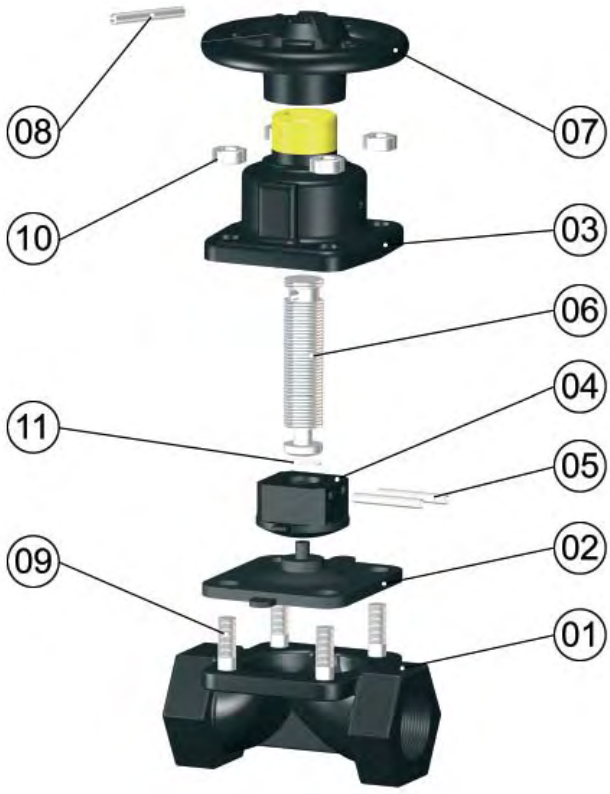
See Data Sheet nº OP for complete overview of operating parameters

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Unlined Screwed valves

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
02	Diaphragm	Rubber
03	Bonnet	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
09	Body studs (4 Nos)	Steel
10	Body nuts (4 Nos)	Steel
11	Thrust washer	Nylon



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)
EN1563	GJS-450-10 (GGG-40.3)
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

Diaphragm Options

Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	
PTFE/EPDM	D93/20
PTFE/Butyl Rubber	D93/30
PTFE/Viton®	D93/70

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

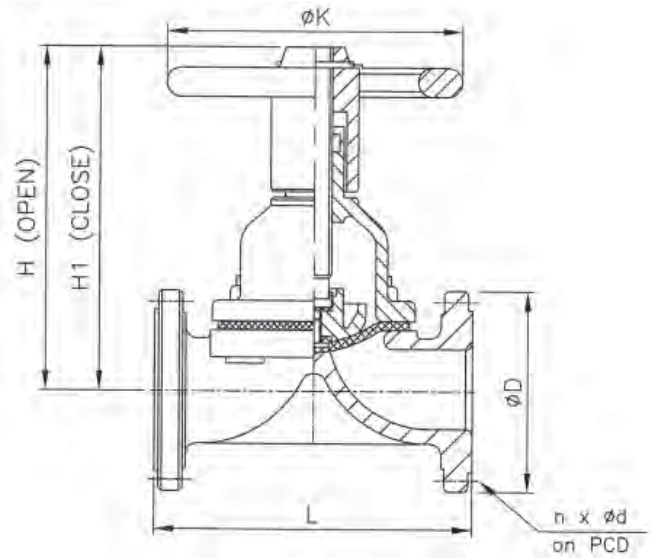
Other Material Options

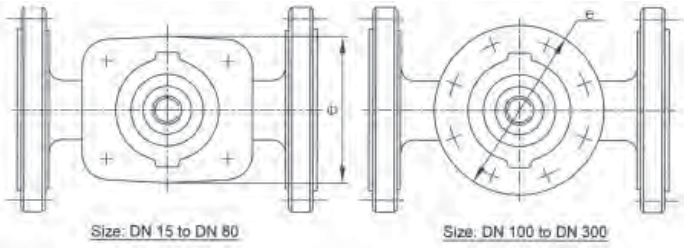
- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Main Dimensions





	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	130	2.7	108	2.3	109	103	95	65	4x14	89	60.3	4x16	100	52
20	150	3.5	117	3.2	117	109	105	75	4x14	98	69.8	4x16	100	67
25	160	4.4	127	4.2	140	130	115	85	4x14	108	79.4	4x16	120	75
32	180	6.6	146	6.4	143	131	140	100	4x18	117	88.9	4x16	120	88
40	200	8.5	159	7.5	172	152	150	110	4x18	127	98.4	4x16	120	110
50	230	12.5	190	12.0	190	166	165	125	4x18	152	120.6	4x19	164	127
65	290	19.0	216	18.0	230	195	185	145	4x18	178	139.7	4x19	220	146
80	310	25.0	254	23.0	242	202	200	160	8x18	191	152.4	4x19	240	188
100	350	36.0	305	34.0	326	275	220	180	8x18	229	190.5	8x19	270	Ø230
125	400	52.0	356	50,0	391	326	250	210	8x18	254	215.9	8x22	270	Ø260
150	480	75.0	406	69.0	468	390	285	240	8x22	279	241.3	8x22	360	Ø320
200	600	160.0	521	150.0	680	560	340	295	8x22	343	298.4	8x22	460	Ø420
250	730	235.0	635	220.0	802	657	395	350	12x22	406	361.9	12x26	600	Ø502
300	850	315.0	749	300.0	971	796	445	400	12x22	483	431.8	12x26	700	Ø569

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN16 (DN15-50) PN10 (DN65-150)
PN6 (DN200) PN5 (250) PN4 (DN300)

See Data Sheet nº OP for complete overview of operating parameters

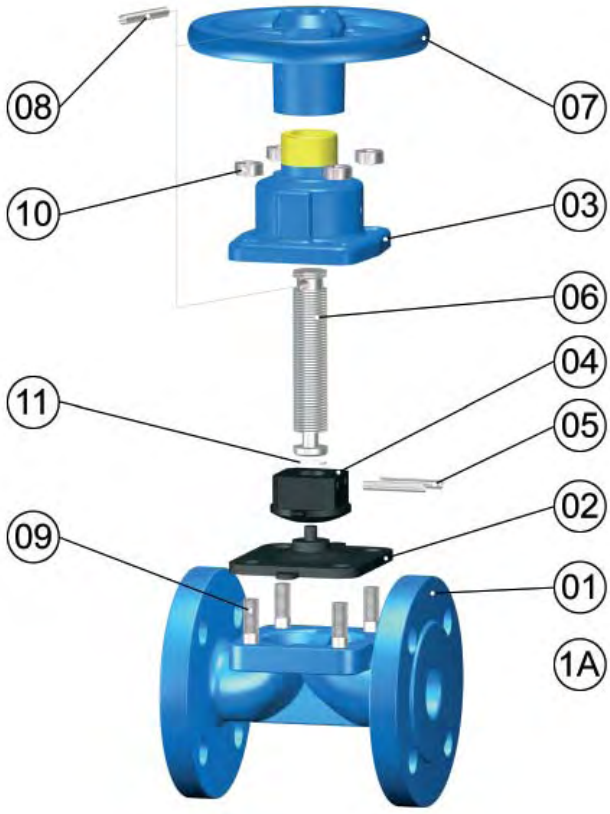
DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Unlined
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
09	Body studs **	Steel
10	Body nuts **	Steel
11	Thrust washer	Nylon

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100-125: 8 Nos / DN150: 10 Nos / DN200-300: 14Nos*



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

Body Lining Material Options

Rubber Lining	Fluoropolymer Lining
Hard Rubber - Ebonite (HR)	PFA®
Butyl Rubber (BR)	ETFE®
Soft Rubber (SR)	FEP®
Neoprene® Rubber	PVDF®
Hypalon® Rubber	Halar®
White Natural	
Linatex®	

Diaphragm Options

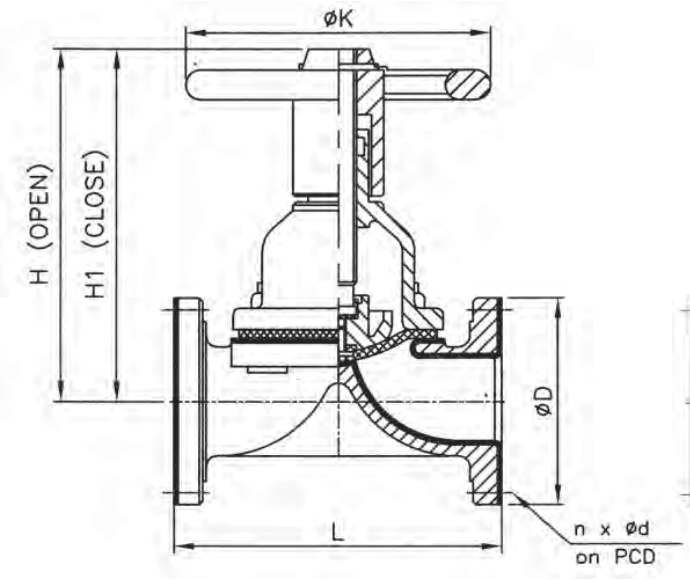
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	
PTFE/EPDM	D93/20
PTFE/Butyl Rubber	D93/30
PTFE/Viton®	D93/70

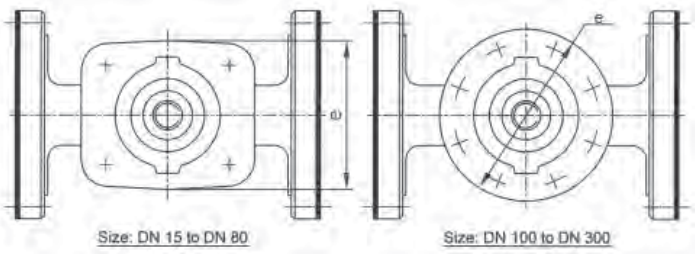
Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Rubber lined valves with flanged ends

Main Dimensions





	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	130	3.0	114	2.6	112	106	95	65	4x14	89	60.3	4x16	100	52
20	150	4.0	123	3.5	120	112	105	75	4x14	98	69.8	4x16	100	67
25	160	5.5	133	5.0	143	133	115	85	4x14	108	79.4	4x16	120	75
32	180	8.0	152	7.0	145	134	140	100	4x18	117	88.9	4x16	120	88
40	200	9.5	165	8.5	175	155	150	110	4x18	127	98.4	4x16	120	110
50	230	14.5	196	13.0	193	169	165	125	4x18	152	120.6	4x19	164	127
65	290	20.0	222	19.0	233	198	185	145	4x18	178	139.7	4x19	220	146
80	310	27.0	260	25.0	245	205	200	160	8x18	191	152.4	4x19	240	188
100	350	38.0	313	36.0	330	279	220	180	8x18	229	190.5	8x19	270	Ø230
125	400	55.0	364	53.0	395	330	250	210	8x18	254	215.9	8x22	270	Ø260
150	480	79.0	414	73.0	472	394	285	240	8x22	279	241.3	8x22	360	Ø320
200	600	165.0	529	155.0	684	564	340	295	8x22	343	298.4	8x22	460	Ø420
250	730	242.0	643	227.0	806	661	395	350	12x22	406	361.9	12x26	600	Ø502
300	850	342.0	757	307.0	975	800	445	400	12x22	483	431.8	12x26	700	Ø569

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN16 (DN15-50) PN10 (DN65-150)
PN6 (DN200) PN5 (250) PN4 (DN300)

See Data Sheet nº OP for complete overview of operating parameters

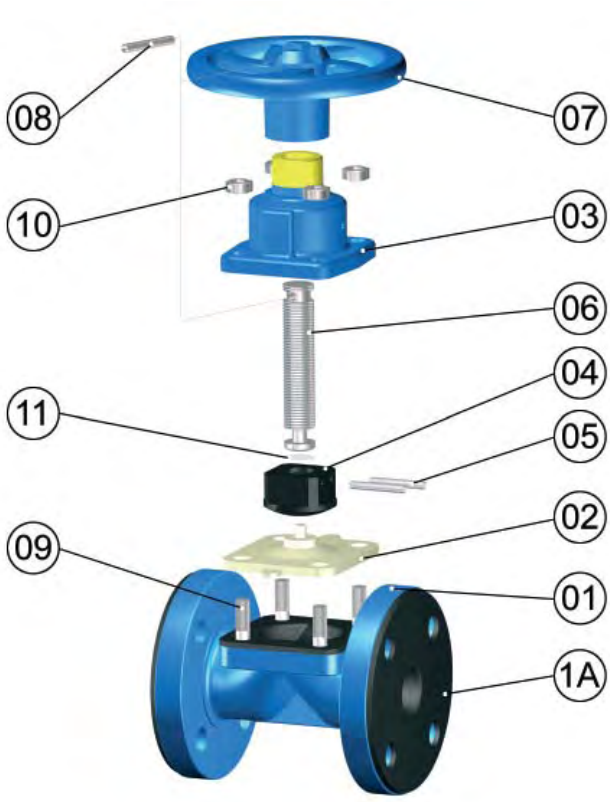
DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Rubber lined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Rubber lined
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
09	Body studs **	Steel
10	Body nuts **	Steel
11	Thrust washer	Nylon

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100-125: 8 Nos / DN150: 10 Nos / DN200-300: 14Nos*



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

Body Rubber Lining Material Options

Material	Identification
Hard Rubber - Ebonite (HR)	Sky Blue Spot
Butyl Rubber (BR)	Dark Blue Spot
Soft Rubber (SR)	White Spot
Neoprene® Rubber	Red Spot
Hypalon® Rubber	Green Spot
White Natural	
Linatex®	

Diaphragm Options

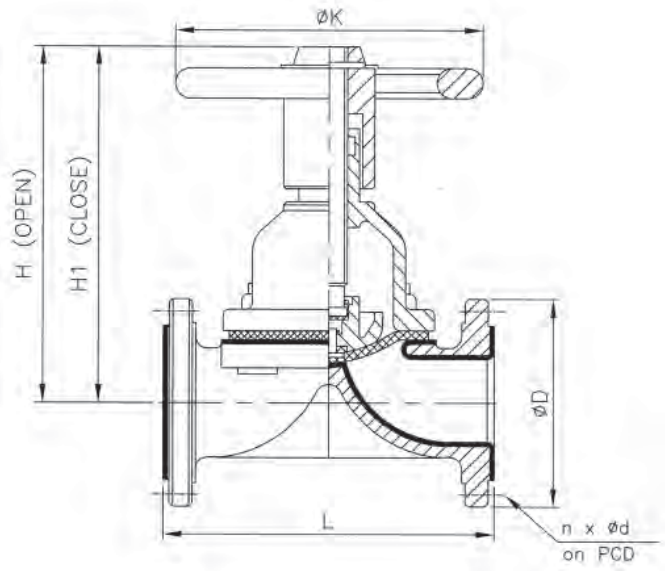
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	
PTFE/EPDM	D93/20
PTFE/Butyl Rubber	D93/30
PTFE/Viton®	D93/70

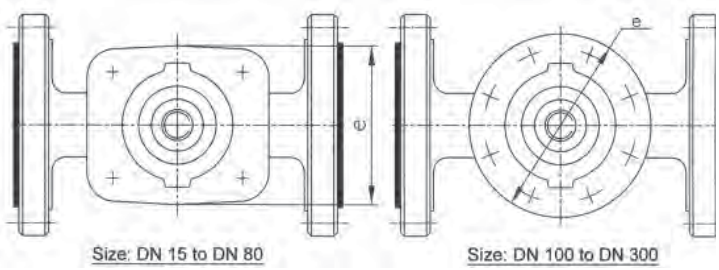
Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Fluoropolymer lined valves with flanged ends

Main Dimensions





	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	130	3.0	114	2.6	112	106	95	65	4x14	89	60.3	4x16	100	52
20	150	4.0	123	3.5	120	112	105	75	4x14	98	69.8	4x16	100	67
25	160	5.5	133	5.0	143	133	115	85	4x14	108	79.4	4x16	120	75
32	180	8.0	152	7.0	145	134	140	100	4x18	117	88.9	4x16	120	88
40	200	9.5	165	8.5	175	155	150	110	4x18	127	98.4	4x16	120	110
50	230	14.5	196	13.0	193	169	165	125	4x18	152	120.6	4x19	164	127
65	290	20.0	222	19.0	233	198	185	145	4x18	178	139.7	4x19	220	146
80	310	27.0	260	25.0	245	205	200	160	8x18	191	152.4	4x19	240	188
100	350	38.0	313	36.0	330	279	220	180	8x18	229	190.5	8x19	270	Ø230
125	400	55.0	364	53.0	395	330	250	210	8x18	254	215.9	8x22	270	Ø260
150	480	79.0	414	73.0	472	394	285	240	8x22	279	241.3	8x22	360	Ø320
200	600	165.0	529	155.0	684	564	340	295	8x22	343	298.4	8x22	460	Ø420
250	730	242.0	643	227.0	806	661	395	350	12x22	406	361.9	12x26	600	Ø502
300	850	342.0	757	307.0	975	800	445	400	12x22	483	431.8	12x26	700	Ø569

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN10 (DN15-125)
PN6 (DN150)

See Data Sheet nº OP for complete overview of operating parameters

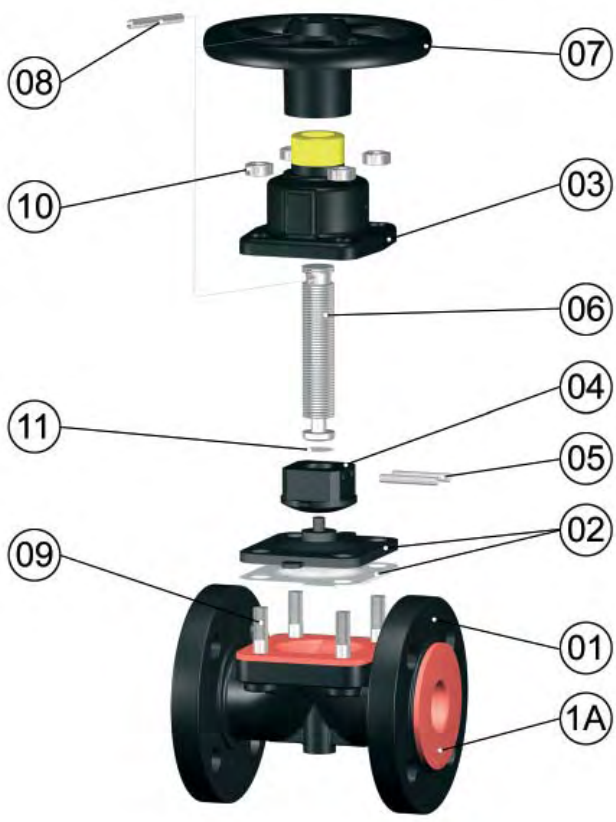
DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Fluoropolymer lined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile Iron
1A	Body lining	Fluoropolymer lined
02	Diaphragm	PTFE + Rubber Backing
03	Bonnet*	Ductile Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
09	Body studs **	St. Steel
10	Body nuts **	St. Steel
11	Thrust washer	Nylon

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100-125: 8 Nos / DN150: 10 Nos*
DN200-300: 14Nos



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

***a)** Standard for unlined and rubber lined valves*
***b)** Standard for fluoropolymer lined valves*

Other Material Options

- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

Body Fluoropolymer Linings Material Options

Material	Identification
PFA®	-
ETFE®	-
FEP®	-
PVDF®	-

Diaphragm Options

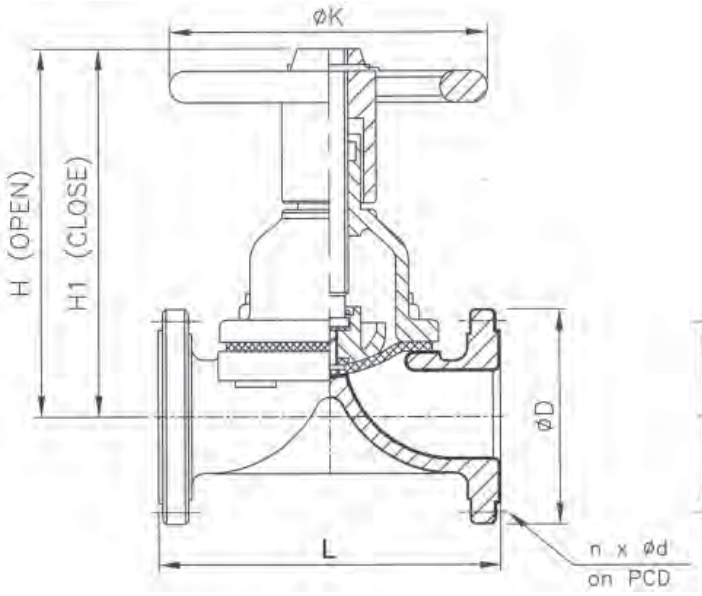
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	
PTFE/EPDM	D93/20
PTFE/Butyl Rubber	D93/30
PTFE/Viton®	D93/70

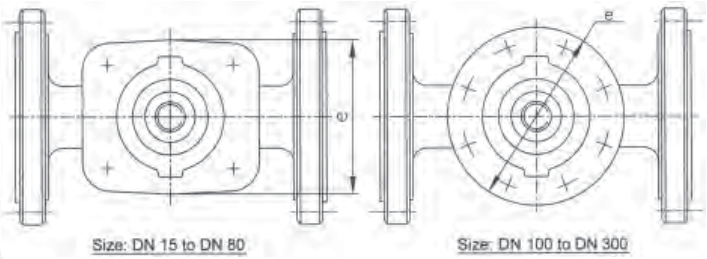
Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Halar® coated valves with flanged ends

Main Dimensions





	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	134	3.0	112	2.6	112	106	95	65	4x14	89	60.3	4x16	100	52
20	154	4.0	121	3.5	120	112	105	75	4x14	98	69.8	4x16	100	67
25	164	5.5	131	5.0	143	133	115	85	4x14	108	79.4	4x16	120	75
32	184	8.0	150	7.0	145	134	140	100	4x18	117	88.9	4x16	120	88
40	204	9.5	163	8.5	175	155	150	110	4x18	127	98.4	4x16	120	110
50	234	14.5	194	13.0	193	169	165	125	4x18	152	120.6	4x19	164	127
65	294	20.0	220	19.0	233	198	185	145	4x18	178	139.7	4x19	220	146
80	314	27.0	258	25.0	245	205	200	160	8x18	191	152.4	4x19	240	188
100	354	38.0	309	36.0	330	279	220	180	8x18	229	190.5	8x19	270	Ø230
125	404	55.0	360	53.0	395	330	250	210	8x18	254	215.9	8x22	270	Ø260
150	484	79.0	410	73.0	472	394	285	240	8x22	279	241.3	8x22	360	Ø320
200	604	165.0	525	155.0	684	564	340	295	8x22	343	298.4	8x22	460	Ø420
250	734	242.0	639	227.0	806	661	395	350	12x22	406	361.9	12x26	600	Ø502
300	854	342.0	753	307.0	975	800	445	400	12x22	483	431.8	12x26	700	Ø569

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN16 (DN15-50) PN10 (DN65-150)
PN6 (DN200) PN5 (250) PN4 (DN300)

See Data Sheet nº OP for complete overview of operating parameters

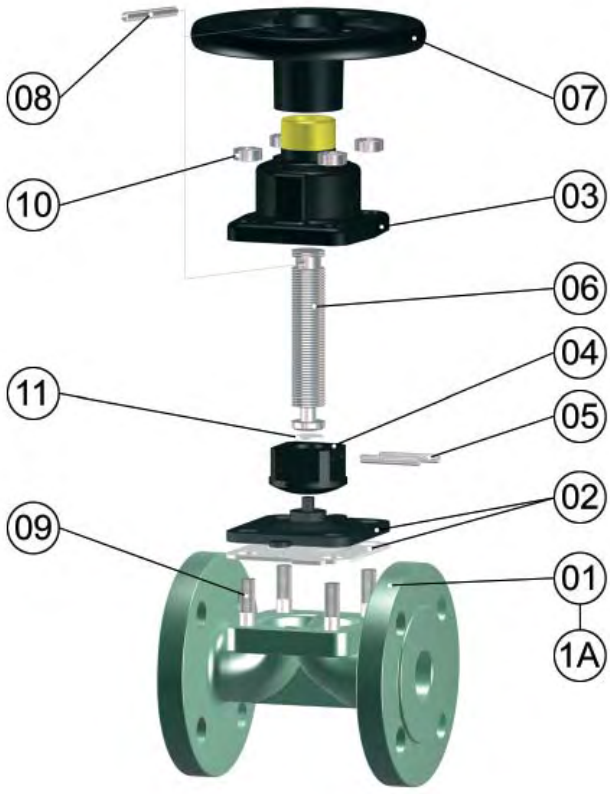
DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Halar® coated valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Halar® coated
02	Diaphragm	PTFE + Rubber Backing
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
09	Body studs **	St. Steel
10	Body nuts **	St. Steel
11	Thrust washer	Nylon

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100-125: 8 Nos / DN150: 10 Nos*
DN200-300: 14Nos



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

Other Body Lining Material Options

Material	
Hard Rubber - Ebonite (HR)	PFA®
Butyl Rubber (BR)	ETFE®
Soft Rubber (SR)	FEP®
Neoprene® Rubber	PVDF®
Hypalon® Rubber	
White Natural	
Linatex®	

Diaphragm Options

Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	
PTFE/EPDM	D93/20
PTFE/Butyl Rubber	D93/30
PTFE/Viton®	D93/70

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

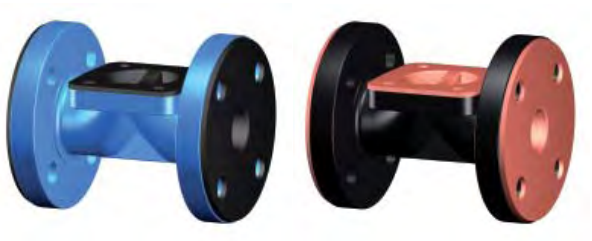
Rubber and Fluoropolymer Linings

Application Guide

Lining Material	Range Availability	Applications
Hard Rubber - HRL (Ebonite), sulphur cured, carbon black reinforced. Designated by a 'Sky Blue Spot' on end flange. Hardness 75 +/- 5° Shore 'D'	Weir type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Used for inorganic salt solutions, dilute mineral acids, chlorine water, deionised and potable water.
Soft Natural Rubber—SR Polyisoprene, sulphur cured, carbon black reinforced. Designated by a 'white spot' on end flange. Hardness 45 +/- 5º Shore 'A'	Weir type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Excellent abrasion resistance for powders, slurries such as clays, fly ash and cement products.
Soft Butyl Rubber—BL Isobutylene isoprene (IIR), sulphur cured carbon black reinforced. Designated by a 'Dark Blue Spot' on end flange. Hardness 65- +/- 5° Shore 'A'	Weir type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Good for corrosive and abrasive slurries, dilute mineral acids and acidic slurries. Avoid chlorine and chorine solutions.
Soft Polychloroprene (Neoprene) Rubber—NL Non-Sulphur cured carbon black reinforced. Designated by a 'Red Spot' on end flange. Hardness 65- +/- 5° Shore 'A'	Weir type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Used on abrasives and minerals processing where small percentages of hydrocarbons are present.
Soft Hypalon® Rubber - (Chloro sulphonated polyethylene) Non-Sulphur cured carbon black reinforced. Designated by a 'Green Spot' on the end flange. Hardness 65- +/- 5° Shore 'A'	Weir type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Chemical resistance to dilute / medium strength acids and chlorinated brine solutions and sodium hypochlorite
Speciality lining material for specific service		
AKORROS r B290 Hardness 75 +/- 5º Shore 'D'	Weir type, flanged DN 15 to DN 300	High purity lining (low Ca, Mg) for Chlor. Alkali Plant-Membrane Type
AKORROS r B295' Hardness 75 +/- 5º Shore 'D'	Weir type, flanged DN 15 to DN 300	For High Temperature Brine with chlorine (max 90ºC) for Chor. Alkali Plant-Membrane Type
POLYFLEX TM B296 Hardness 75 +/- 5º Shore 'D'	Weir type, flanged DN 15 to DN 300	For High Temperature (130ºC max.) for spinbath service for Rayon/Staple fibre plant
Halar® Co-polymer of ethylene and chlorotrifluoroethylene. Electrostatically applied coating.	Weir type, flanged DN 15 to DN 300.	Used for concentrated acids and salts containing hydrocarbons. Not suitable for dilute acids and inorganic salt solutions near to their boiling point. Minimal resistance to abrasive services.
Polytetrafluoro alkoxy—PFA® . Natural colour.	Weir type, flanged DN 15 to DN 300.	Most suitable for concentrated mineral acids at high temperature, aromatic and aliphatic and chlorinated solvents
Ethylene tetrafluoroethylene-ETFE® Natural colour.	Weir type, flanged DN 15 to DN 300.	Most suitable for concentrated mineral acids at high temperature, aromatic and aliphatic and chlorinated solvents
FEP & PVDF		Consult Diaval®

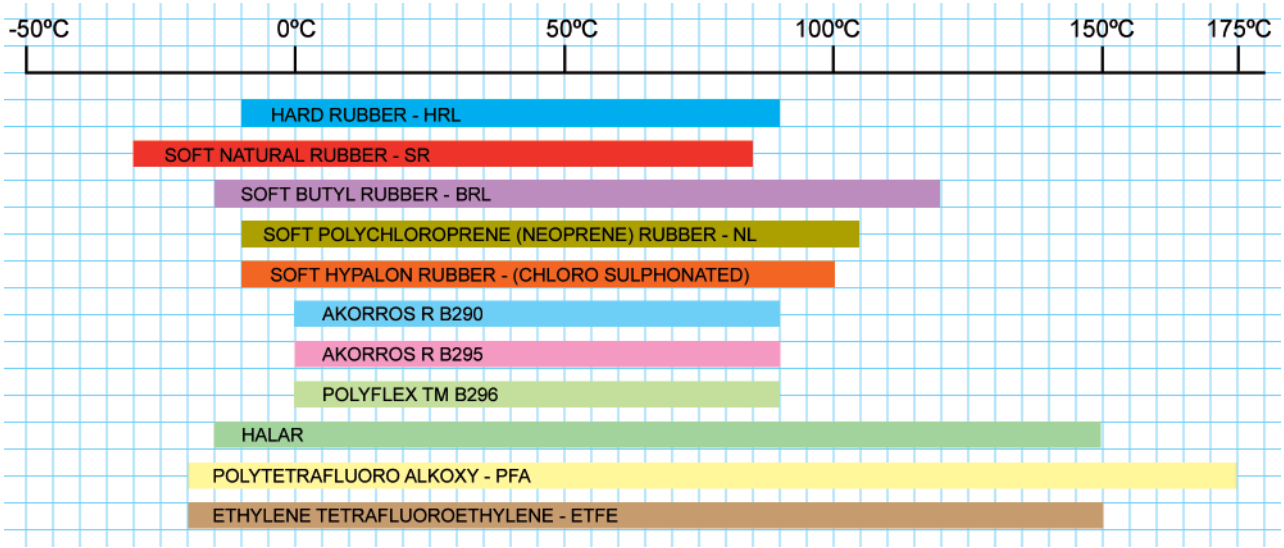
DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Rubber and Fluoropolymer Linings



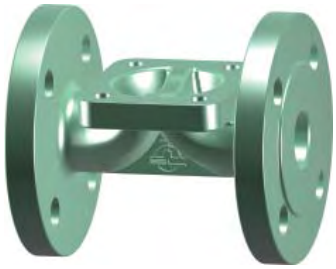
Operating Parameters

Lining Material	Valve Body Material	Temperature Range
Hard Rubber - HRL	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +85°C
Soft Natural Rubber—SR	Cast Iron, Ductile Iron and Cast carbon steel	-25°C - +85°C
Soft Butyl Rubber—BRL	Cast Iron, Ductile Iron and Cast carbon steel	-15°C - +120°C
Soft Polychloroprene (Neoprene) Rubber—NL	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +105°C
Soft Hypalon® Rubber - (Chloro sulphonated polyethylene)	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +100°C
Speciality lining material for specific service		
AKORROS r B290	Ductile Iron	(max 90ºC)
AKORROS r B295	Ductile Iron	(max 90ºC)
POLYFLEX TM B296	Ductile Iron	(max 130ºC)
Halar®	Cast Iron, Ductile Iron and Cast carbon steel	-15°C - +150°C
Polytetrafluoro alkoxy—PFA® .	Ductile Iron	-20°C - +175°C
Ethylene tetrafluoroethylene-ETFE®	Ductile Iron	-20°C - +150°C
FEP & PVDF	Ductile Iron	Consult Diaval®



Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

DIAVAL® DIAPHRAGM VALVES
Halar® ECTFE

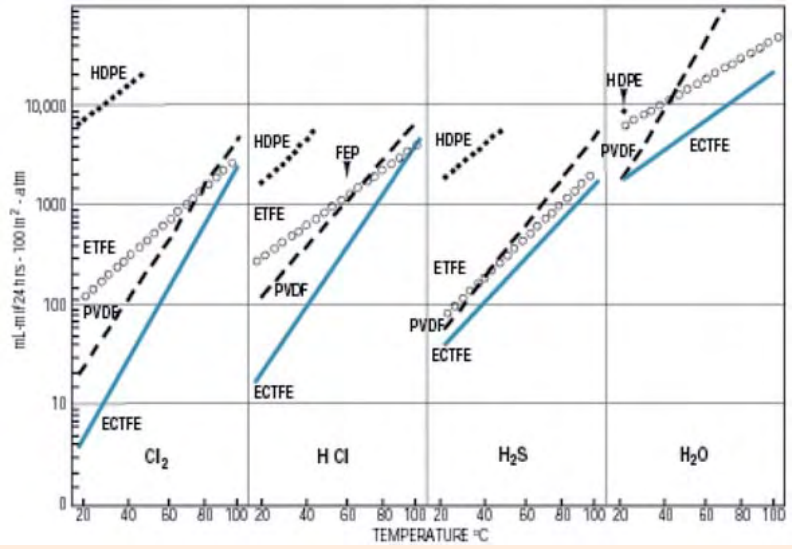


Halar® ECTFE; a versatile Fluoropolymer
Manufactured from ECTFE, is a melt processable Fluoropolymer. Halar® ECTFE is a partially fluorinated semi-crystalline polymer offering a unique combination of mechanical properties, thermal and chemical resistance with an outstanding ease of processability. It is a copolymer of ethylene and chlorotrifluoroethylene that brings advantages to valve application when compared to other Fluoropolymers. It is a very versatile polymer, available in all forms to meet processing needs. It offers excellent resistance to abrasion, harsh chemicals, and permeation. These characteristics have made of Halar® ECTFE a material of choice for several applications in the field of corrosion protection in the chemical industry. Halar® ECTFE is a high purity Fluoropolymer with a very smooth surface, which accounts for its extensive use in the semiconductor industry. Halar® meets the demands for fire-safe, non-fire propagating plastics. Halar® ECTFE powder coatings offer the greatest ease of processing, with the ability to be applied in high thickness when required.

Properties of Halar® ECTFE
Halar® offers a unique combination of properties especially as a coating and a liner. Halar Fluoropolymer coatings provide outstanding chemical resistance, good electrical properties, a broad-use temperature range from cryogenic to 150 ° C, and meet the requirements of UL-94 V-O vertical flame test in thicknesses as low as .007 (7mils). Halar® is resistant to strong mineral and oxidizing acids, alkalis, metal etchants, liquid oxygen, and essentially all organic solvents except hot amines.

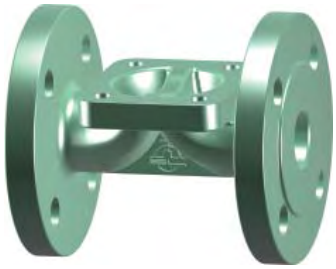
Halar® ECTFE the DIAVAL® choice of Fluoropolymers
It is the preferable DIAVAL® choice over other Fluoropolymers such as PVDF, PFA or PTFE in example. For those applications exceeding the capabilities of other Fluoropolymers, Halar® can be evaluated before resorting to a fully fluorinated polymer, offering a compromise between the mechanical properties of a partially fluorinated plastic (like PVDF in example) and the chemical and thermal resistance which is typical of totally fluorinated polymers.
Halar® present many other advantages over other Fluoropolymers as in example:
-Much better permeability properties.
-Smoother surface that precludes shedding of particles whilst avoid trapping.
-Environmental resistance properties.
-Thermal Properties and Chemical resistance properties.
-Electrical properties
-Mechanical Properties.

The graph shows how Halar® is rated in comparison to other Fluoropolymers in terms of permeation resistance to corrosive media at different temperatures.



The electrostatic powder coated Halar® shows superior performance than conventional Fluoropolymers that can be shown with more information available in our Data Base on request.

DIAVAL® DIAPHRAGM VALVES
Halar® ECTFE



Halar® ECTFE the Diaval® choice versus Glass Lining

DIAVAL® choose this Fluoropolymer as the alternative to glass lining for its great advantages over the former lining material. These advantages are not limited just to the manufacturing process where the rejection percentage is minimal in comparison to that given by Glass material but also noticeable at store and handling stage. Thermal changes affect glass lined valves integrity by crack stress. This is consequence of the glass hardness that frequently breaks along with valve metal contraction and expansion movements during storage. Handling shows another disadvantage to Glass versus Halar®, the delicate glass surface must be kept away from metal objects that could easily break its surface integrity.

Halar® ECTFE

Glass Lining

The above picture shows a typical glass lining stress cracking caused during storage at a warehouse situated in a typical four seasons country. Extreme thermal changes between day and night occurring in some geographical areas prove to be an ever more dangerous scenario for glass lining integrity.

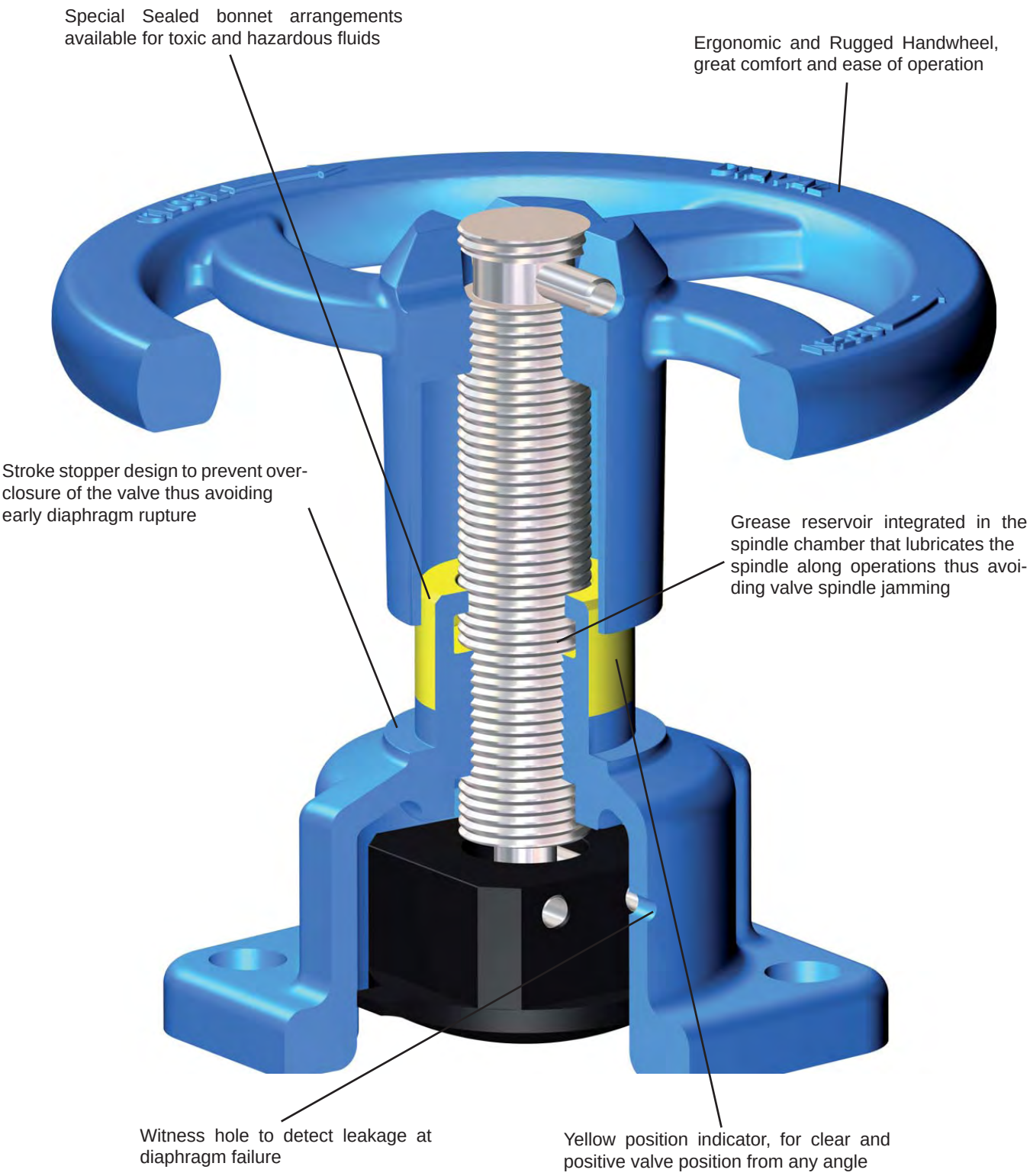
The production process require expensive handling in a temperature controlled room to ensure an uniform cooling down process of glass linings thus the high number of rejections involved in the manufacture. Some worldwide valve manufacturers and line applicators went for more friendly alternatives to avoid these described inconveniences.

There is virtually no fluid handled by Glass Lining that cannot actually be made by HALAR® with an absolute service temperature restriction of 150ºC instead of 160ºC as handled by Glass Lining.

DIAVAL® range of Weir and Straight Through Valves are coated by electrostatic powder applied Halar® with 800 microns minimum thickness. The green pigmentation gives this colour to the valve coated body as coating is also externally applied on valves up to DN 50 with larger sizes just slightly coated with remains. The minimum 800 microns are referred to the wet valve area. Flange facing is fully coated to ensure corrosion proof contact with the media.

DIAVAL® DIAPHRAGM VALVES

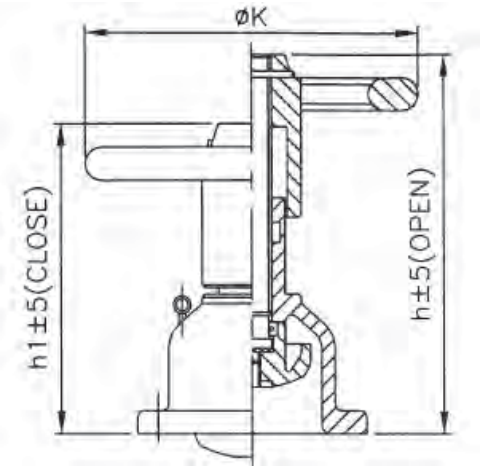
Design Attributes of Weir Type Bonnet

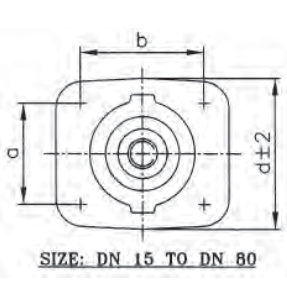


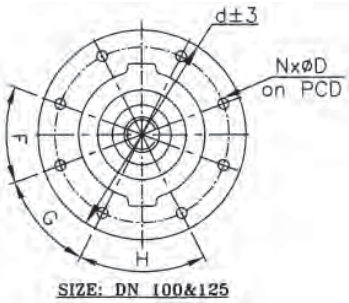
DIAVAL® DIAPHRAGM VALVES

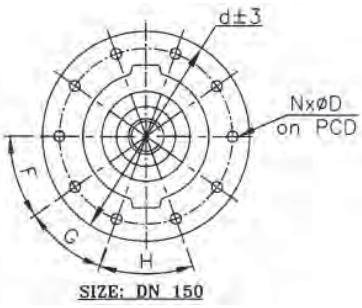
W Type Bonnet

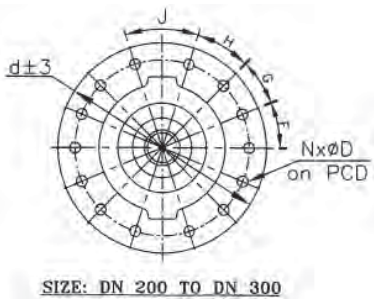
Main Dimensions











DN	a	b ØPCD	d	h	h1	ØK	Nº Holes	Weight	ANGLES BETWEEN THE HOLES F	G	H	J
15	33	37	52	84	78	100	4	0,9	---	---	---	---
20	40	44	67	90	82	100	4	1,1	---	---	---	---
25	46	54	75	115	105	120	4	2,0	---	---	---	---
32	60	67	88	117	106	120	4	2,0	---	---	---	---
40	65	70	110	133	113	120	4	2,5	---	---	---	---
50	78	83	127	155	131	164	4	4,5	---	---	---	---
65	95	102	146	194	159	220	4	8,5	---	---	---	---
80	114	127	190	201	161	240	4	9,5	---	---	---	---
100		Ø194	Ø230	258	207	270	8	14,5	40º	42º	56º	---
125		Ø222	Ø265	307	243	270	8	18,5	43º20’	43º20’	50º	---
150		Ø273	Ø320	358	280	360	10	27,0	35º	35º	40º	---
200		Ø381	Ø420	549	429	460	14	63,0	22º30’	22º30’	27º	36º
250		Ø438	Ø502	697	552	600	14	90,0	22º30’	22º30’	22º30’	45º
300		Ø508	Ø569	804	629	700	14	147,0	24º	24º	24º	36º

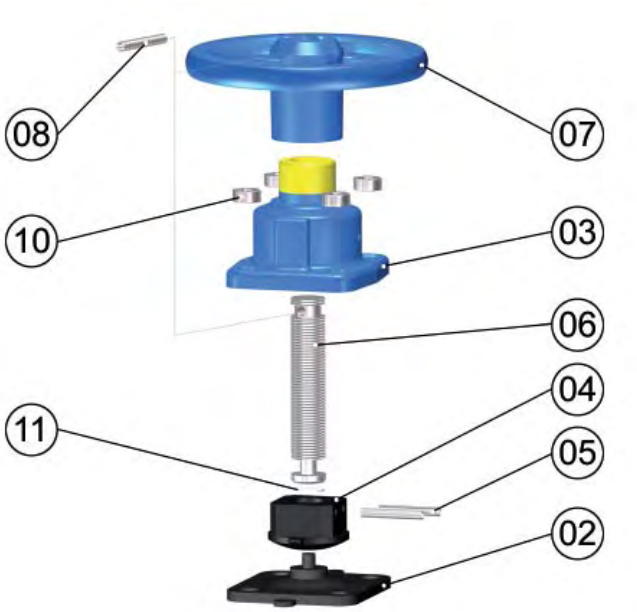
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

DIAVAL® DIAPHRAGM VALVES
W Type Bonnet

Standard Materials

Part	Description	Material
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Compressor pin	Steel
06	Spindle	Steel
07	Handwheel	Cast Iron
08	Handwheel pin	Steel
10	Body studs & nuts	Steel
11	Thrust washer	Nylon

** With eye bolts in DN 200-300 to ease handling*



Bonnet Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

Components Options

Studs, Bolts and Nuts

-Steel (standard)
-St. Steel 304 (A2)
-St. Steel 316 (A4)
-Exotic materials

Spindle

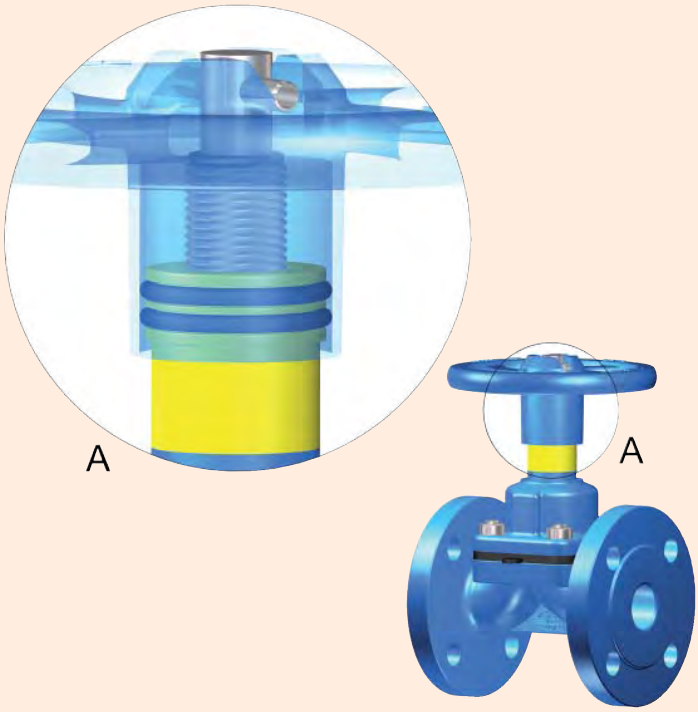
-Steel (standard)
-St. Steel 304
-St. Steel 316
-Exotic materials

- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

DIAVAL® DIAPHRAGM VALVES
Bonnet Options

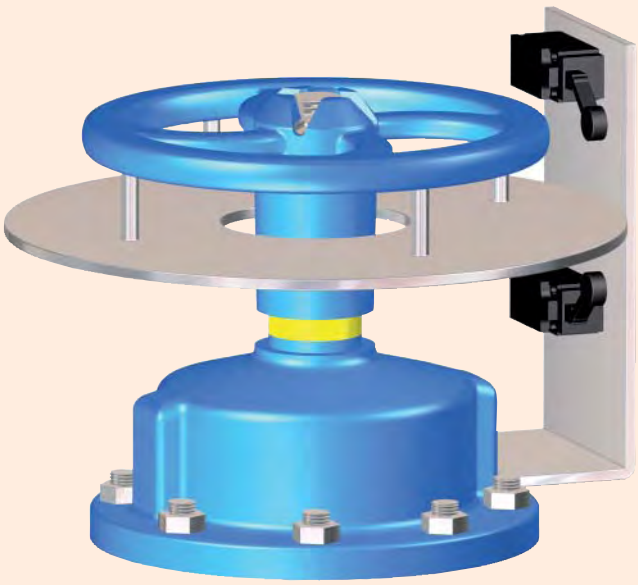
SEALED BONNET

Sealed bonnets mean an essential safety requirement when handling toxic or hazardous fluids. This design prevents fluid emissions in case of diaphragm rupture and, consequently, avoiding harmful risks to plant personnel. The bonnet is sealed off by two VITON O-rings across the bonnet neck. These rings are retaining the eventual leakage until a new diaphragm is mounted and thus service integrity restored.



LIMIT SWITCHES

Limit switches are often used to provide remote signal on the valve status. Electro mechanical limit switches can be provided on a special assembly consisting of a protruding rod angle plate (fix unit) where the switches are bolted and a round plate (moving unit) which moves up and down along with the hand wheel to activate the switches for open and closed position. If just a single signal is required, a single switch for open or closed signal should be mounted.



Bonnet options apply for manual operation. DIAVAL can engineer and provide further tailor made options on request.

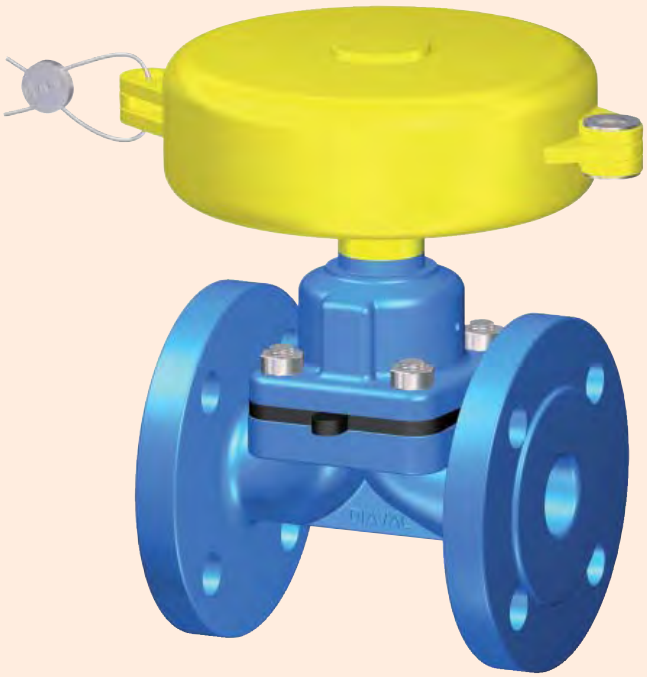
DIAVAL® DIAPHRAGM VALVES
Bonnet Options

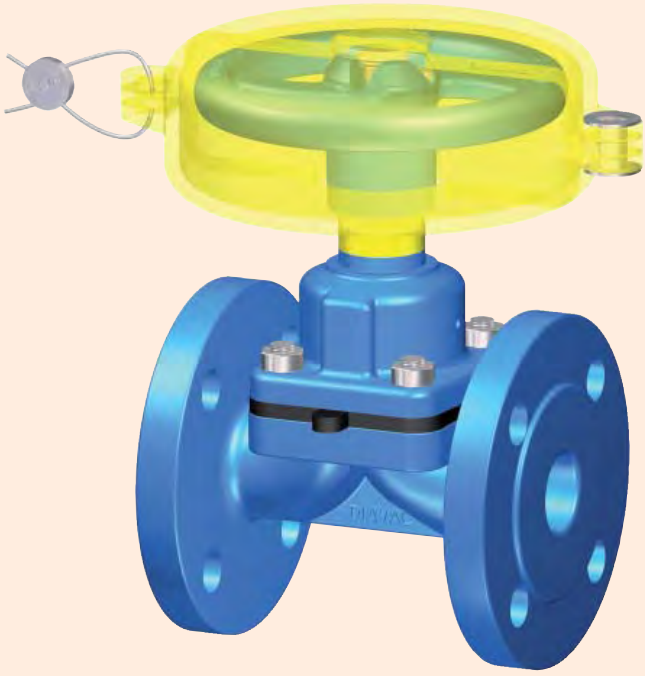
PADLOCKING DEVICE

Conventional padlocking device that prevents unauthorized valve operation; the complete set consists in two empty steel rolls interconnected by a rod where the padlock is held. The lower roll is fitted onto one of the bonnet union bolts whilst the upper one blocks the hand wheel free turn. A chain links both rolls thus making the integral set.

The device is provided with padlock and keys which are replaceable by the plant operator. No duplicate of padlock keys are kept at **DIAVAL**, therefore is plant owner responsibility to create their own set of keys and keeping procedure.
This system maybe provided as an option with new valves or, alternatively, can also be assembled in field on existing **DIAVAL** valves.

HAND WHEEL PROTECTING HOOD





Two halves plastic hood conveniently sealed to avoid valve operation by unauthorized personnel. There are several hoods in accordance with the hand wheel diameter. This hoods can be provided as an option with new valves or, alternatively, can also be assembled in field on existing **DIAVAL** valves.

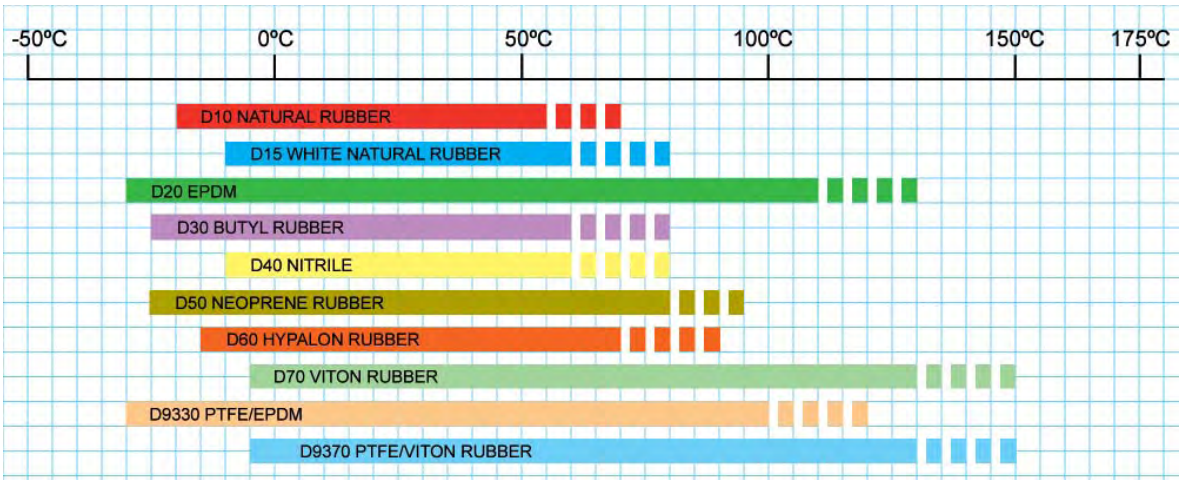
Bonnet options apply for manual operation. DIAVAL can engineer and provide further tailor made options on request.

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Spare Diaphragms

Operating Parameters

GRADE	POLYMER TYPE	TEMPERATURE RANGE
D10 **Natural Rubber**	**Natural Rubber Polyisoprene/SBR** Sulphur cured and carbon black reinforced	-20 to + 55...70ºC
D15 **White Natural Rubber**	**Natural Rubber Polyisoprene/SBR** Sulphur cured and white reinforced	-10 to + 60...80ºC
D20 **EPDM**	**Ethylene Propylene Diene (EPDM)** Organic peroxide cured, carbon black reinforced	-30 to + 110...130ºC
D30 **Butyl Rubber**	**Isobutylene Isoprene (IIR)** Sulphur cured and carbon black reinforced	-25 to + 60...80ºC
D40 **Nitrile**	**Butadiene Acrylonitrile**	-10 to + 60...80ºC
D50 **Neoprene r**	**Polychloroprene** Non sulphur cured carbon black reinforced	-25 to + 80...95ºC
D60 **Hypalon r**	**Chlorosuphonated polyethylene** Non sulphur cured carbon black reinforced	-15 to + 70...90ºC
D70 **Viton r**	**Vinylidenefluoride-hexafluoro propyleneco-polymer** Carbon black reinforced	-5 to + 130...150ºC
D9330 **PTFE/EPDM**	**Virgin PTFE + Ethylene Propylene Diene** Two piece Bayonet fitting	-30 to + 100...120ºC P max: 10 bar DN15-125 P max: 6 bar DN150
D9370 **PTFE/Viton r**	**Virgin PTFE + Fluoroelastomer** Two piece Bayonet fitting	-5 to + 130...150ºC P max: 10 bar DN15-125 P max: 6 bar DN150



■■■ *Only for shorts periods of time*

Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Spare Diaphragms

Application Guide

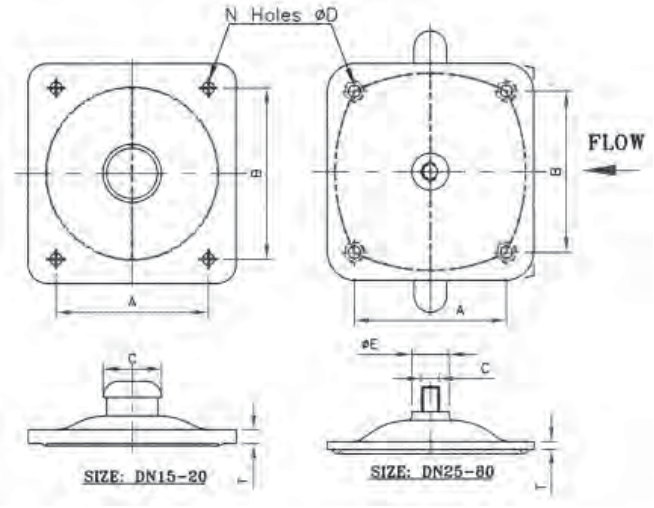
GRADE	POLYMER TYPE	GENERAL APPLICATION
D10 **Natural Rubber**	**Natural Rubber Polyisoprene/ SBR** Sulphur cured and carbon black reinforced	Inorganic salt solutions, dilute mineral acids, alkalies and salts. Abrasive services Not resistant to Oxidizing media, oils or most organic solvents will attack it.
D15 **White Natural Rubber**	**Natural Rubber Polyisoprene/ SBR** Sulphur cured and white reinforced	Food and pharmaceuticals, toothpaste, brewing, dairy
D20 **EPDM**	**Ethylene Propylene Diene (EPDM)** Organic peroxide cured, carbon black reinforced	Salts in water, acids and alkalies, ozone, intermitten steam. Sterilisation
D30 **Butyl Rubber**	**Isobutylene Isoprene (IIR)** Sulphur cured and carbon black reinforced	Dilute mineral acids and alkalies, gases, acidic slurries, chlorine free hydrochloric acid, resistance to concentrated acids is good with some important exceptions as nitric or sulphuric acids
D40 **Nitrile**	**Butadiene Acrylonitrile**	Oily air, lubricating oil, cutting oils, fuel oils, animal and vegetable oils, aviation kerosen, LPG Generally resistant to oils and solvents.
D50 **Neoprene r**	**Polychloroprene** Non sulphur cured carbon black reinforced	Abrasive slurries containing hydrocarbons, oily air, natural gas Resistant to attack by ozone, sunlight, oils, gasoline, and aromatic or halogenated solvents but easily permeated by water
D60 **Hypalon r**	**Chlorosuphonated polyethylene** Non sulphur cured carbon black reinforced	Outstanding resistance to ozone and oxidizing agents except fu-ming nitric and sulfuric acids. Oil resistance is good. Dilute / Medium acids, sodium hypochlorite, chlorine gas
D70 **Viton r**	**Vinylidenefluoride-hexafluoro propyleneco-polymer** Carbon black reinforced	Strong sulphuric acid, chlorine gas, oils, certain aromatic solvents
D9330 **PTFE/EPDM**	**Virgin PTFE + Ethylene Propylene Diene** Two piece Bayonet fitting	Strong acids, alkalies and salts in water at high temperature, Bio-pharmaceuticals
D9370 **PTFE/Viton r**	**Virgin PTFE + Fluoroelastomer** Two piece Bayonet fitting	Strong acids, solvents, chlorine, bromine at higher temperature

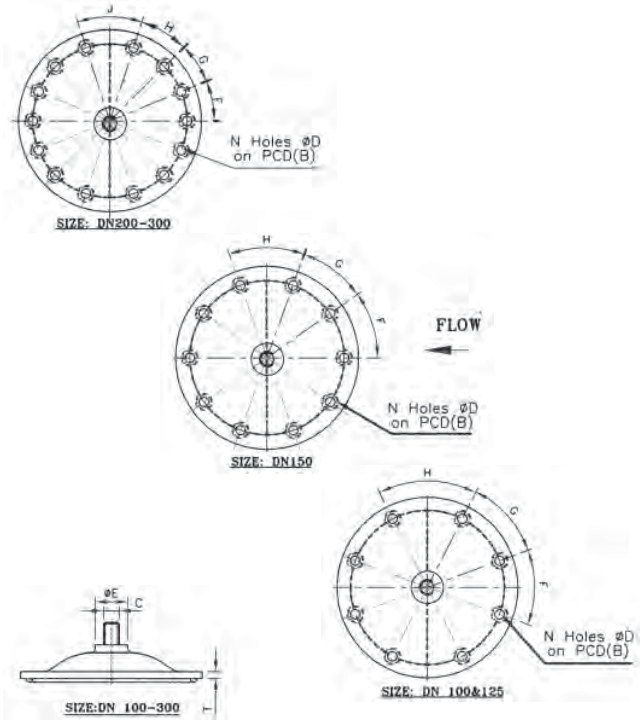
Vacuum reinforced diaphragms are available and will contain a steel stud and be designated by additional code letter (V) e.. D10V
Because of the steel stud these diaphragms can be used on services where conventional bronze studs are prohibited e.g. use of D40V on acetylene.
*Other speciality customised diaphragm material available to suit individual requirement made out of various polymers

DIAVAL® WEIR TYPE DIAPHRAGM VALVES

Spare Diaphragms

Main Dimensions





Diaphragm Options

Material	Code	Material	Code
Natural Rubber	D10	Hypalon® Rubber	D60
White Natural Rubber	D15	Viton® Rubber	D70
EPDM Rubber	D20	Linatex®	
Butyl Rubber	D30	PTFE/EPDM	D93/20
Nitrile Rubber	D40	PTFE/Butyl Rubber	D93/30
Neoprene® Rubber	D50	PTFE/Viton®	D93/70

* Special vacuum reinforced diaphragms add code letter [V] e.g. D10V
* Other speciality customised diaphragm material available to suit individual requirement.

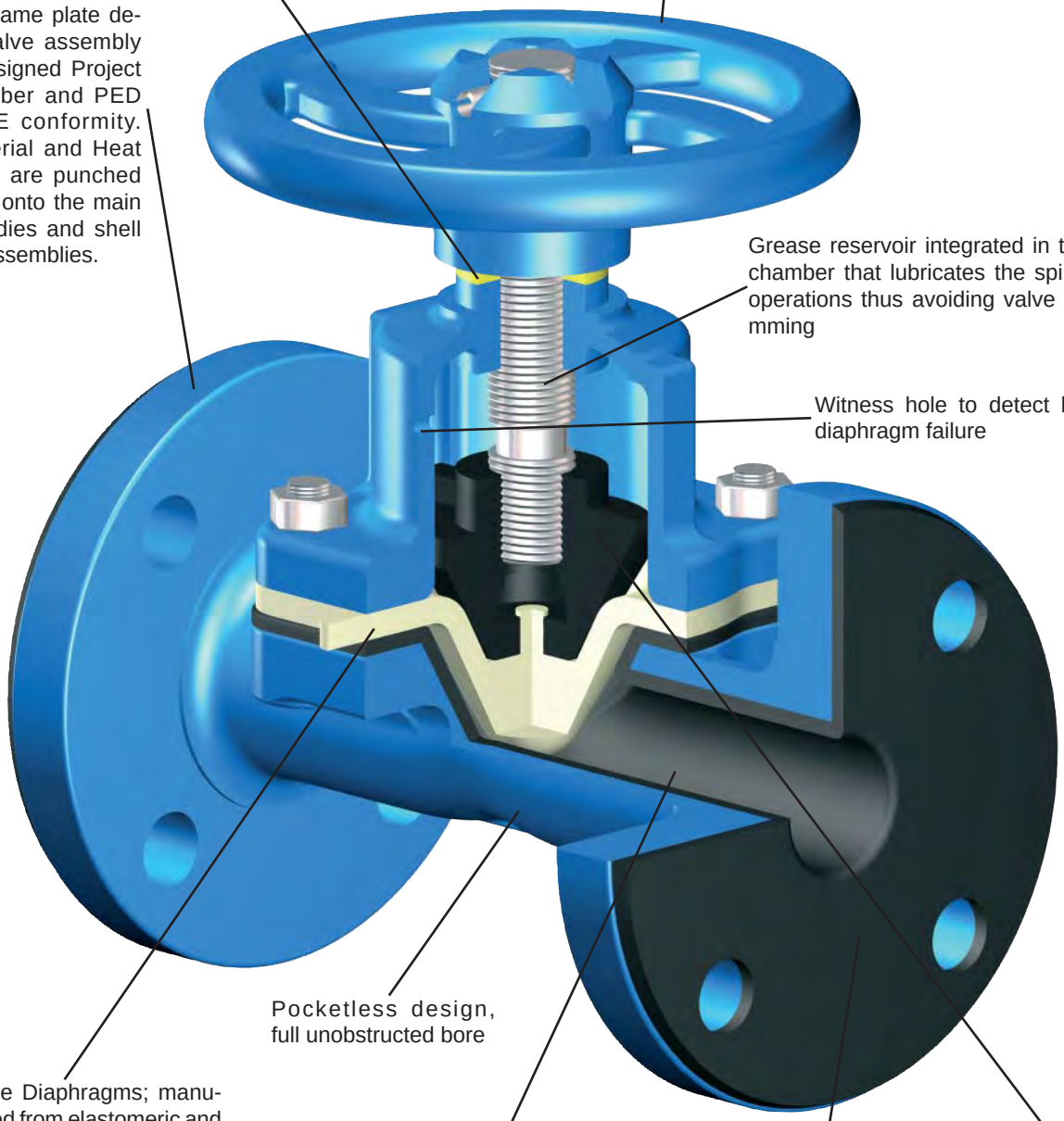
Polymer based diaphragms are in-house formulated and manufactured by the own DIAVAL specialist centre, the know how is not subject to external information.
All diaphragms are internally braided with nylon reinforcement to provide diaphragms with a long life cycle at diverse plant operating conditions.
Spare Diaphragms should be stored in a dry and proper place not exposed to ozone rays - please refer to the Operation and Maintenance Manual for details.

	DIMENSIONS OF DIAPHRAGM							ANGLES BETWEEN THE HOLES			
DN	A	B	C	ØE	ØD	Nº HOLES	T	F	G	H	J
15	33	37	Ø12.7	---	7.0	4	6.0	---	---	---	---
20	40	44	Ø12.7	---	8.5	4	6.5	---	---	---	---
25	46	54	1/4" BSW	18.0	9.5	4	6.5	---	---	---	---
32	60	67	1/4" BSW	18.0	10.0	4	7.5	---	---	---	---
40	65	70	1/4" BSW	22.2	11.5	4	7.5	---	---	---	---
50	78	83	1/4" BSW	25.6	11.5	4	7.5	---	---	---	---
65	95	102	5/16" BSW	29.0	14.0	4	7.5	---	---	---	---
80	114	127	5/16" BSW	32.0	18.0	4	8.0	---	---	---	---
100		Ø194	5/16" BSW	37.0	16.0	8	10.0	40º	42º	56º	---
125		Ø222	3/8" BSW	44.5	17.3	8	11.5	43º20'	43º20'	50º	---
150		Ø273	3/8" BSW	50.0	18.5	10	11.5	35º	35º	40º	---
200		Ø381	7/8" BSW	63.0	20.0	14	10.0	22º30'	22º30'	27º	36º
250		Ø438	7/8" BSW	76.0	22.0	14	14.0	22º30'	22º30'	22º30'	45º
300		Ø508	7/8" BSW	89.0	25.0	14	15.5	24º	24º	24º	36º

* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

DIAVAL® DIAPHRAGM VALVES

Design Attributes of Straight Through Valves



Ergonomic and Rugged Handwheel, great comfort and ease of operation

Yellow position indicator, for clear and positive valve position from any angle

Valve Identification and Traceability; riveted aluminium name plate denoting valve assembly code, assigned Project Tag number and PED 97/23/CE conformity. Valve Serial and Heat Numbers are punched and cast onto the main valve bodies and shell bonnet assemblies.

Grease reservoir integrated in the spindle chamber that lubricates the spindle along operations thus avoiding valve spindle jamming

Witness hole to detect leakage at diaphragm failure

Pocketless design, full unobstructed bore

Closure Diaphragms; manufactured from elastomeric and fluorocarbon materials; provide 100% seating tightness while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application.

Porous less linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials.

Full rubber flange face in all linedvalves as standard

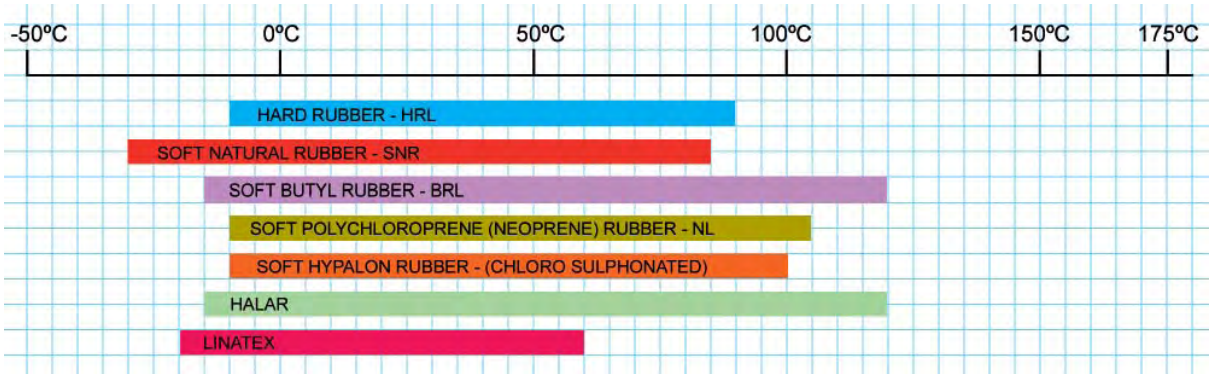
Precise compressor plate; guide and operates the diaphragm up and down.

DIAVAL® ST TYPE DIAPHRAGM VALVES

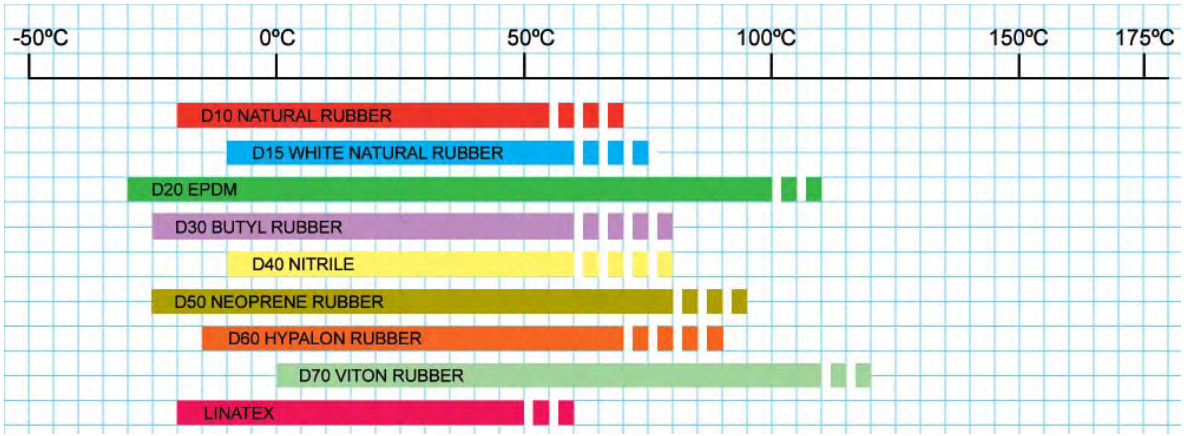
Operating Parameters

Bodies (Ductile iron)

Linings



Diaphragms



■■■ *Only for shorts periods of time*

Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

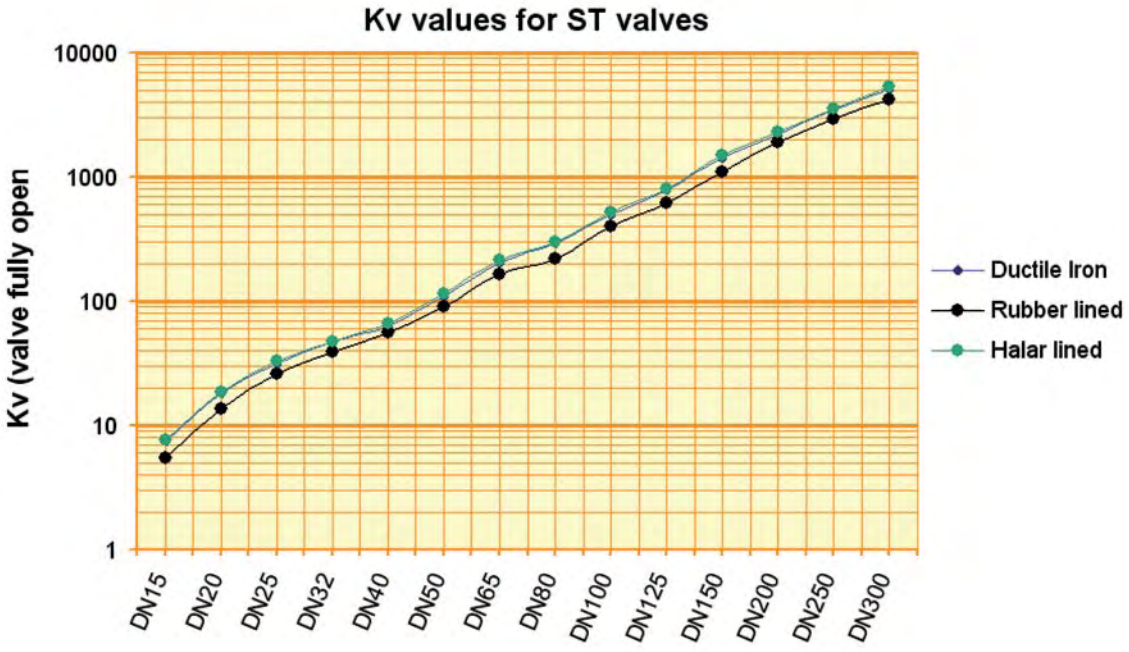
DIAVAL® DIAPHRAGM VALVES

ST Valves Flow Data

Straight Through Kv (m3/h) values with valve fully open*

DN mm	Ductile Iron	Rubber Lined	Halar Lined
15	7,5	5,5	7,6
20	18	13,5	18,5
25	32	26	33
32	47	39	48
40	64	56	67
50	110	90	116
65	204	165	214
80	293	222	302
100	504	406	524
125	792	618	813
150	1440	1105	1510
200	2211	1895	2290
250	3446	2960	3596
300	5168	4250	5314

*Since Straight Through Diaphragm Valves are only suitable for on/off service we only provide Kv values for valves fully open.



DIAVAL® DIAPHRAGM VALVES

ST Valves Torque and Operating Data

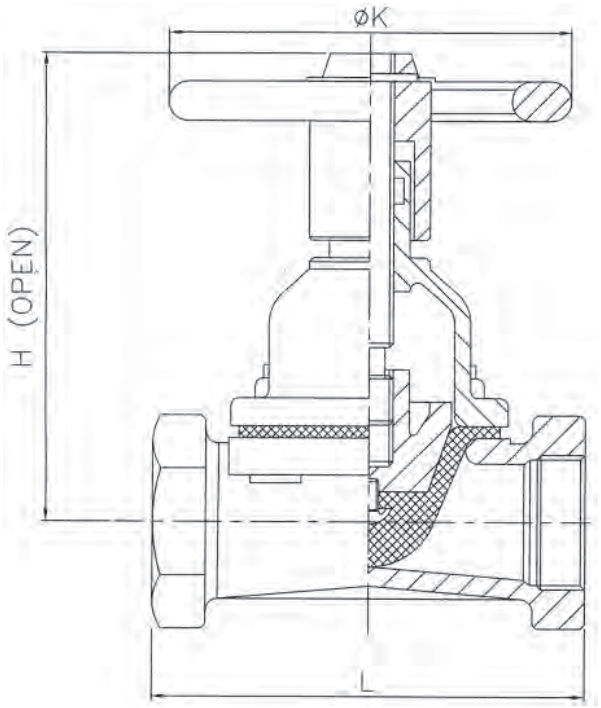
	Numbers of Turns from Open to Close	Valve Stroke	Torque & Closing Force Values (1)	
			100% ΔP (2)	
DN		(mm)	Torque (Nm)	Closing Force (N)
15	4	16	1,2	600
20	4	16	2	1000
25	6	25	2,6	1300
32	6	25	2,6	1300
40	6	25	2,6	1300
50	7	35	8,7	3200
65	9,5	48	12	4800
80	10	60	18	6200
100	9,5	65	26	9000
125	11	75	38	12000
150	14,5	102	48	14000
200	18	125	75	20000
250	16	145	90	24000
300	21	190	90	24000

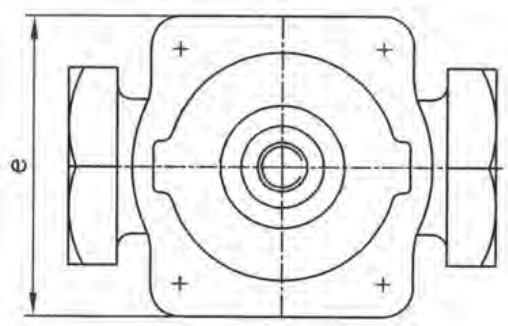
1. Torque & Closing Force Values are for rated working pressure.
2. For 0% Multiply by 1,9 to the above values.

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Unlined Screwed valves

Main Dimensions





SIZE	DN	L	H (open)	ØK	e	Weight
1/2”	15	64	112	100	71	1.8
3/4”	20	83	117	100	71	2.2
1”	25	108	142	120	85	3.0
1 1/4”	32	121	142	120	85	4.0
1 1/2”	40	140	142	120	85	5.0
2”	50	165	206	164	115	7.5

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, based on Ductile Iron body material, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to Diaval® standard
- Screwed ends to BSP (BS 21 parallel or taper), NPT (ANSI B1.20.1), other options on request

Operating parameters:
Valve bodies design pressure range: PN10 (DN15-50)

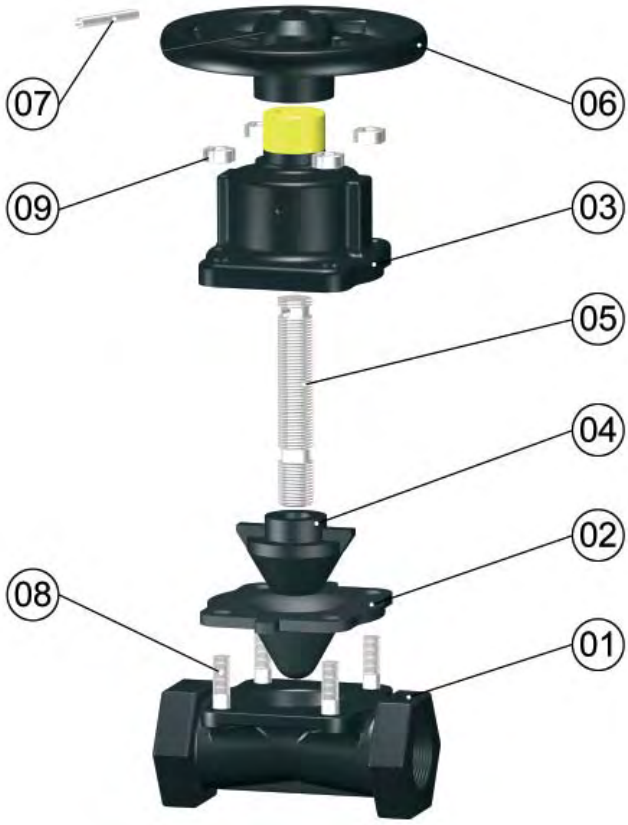
See Data Sheet nº OP for complete overview of operating parameters

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Unlined Screwed valves

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
02	Diaphragm	Rubber
03	Bonnet	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs (4 Nos)	Steel
09	Body nuts (4 Nos)	Steel



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)
EN1563	GJS-450-10 (GGG-40.3)
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

Diaphragm Options

Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

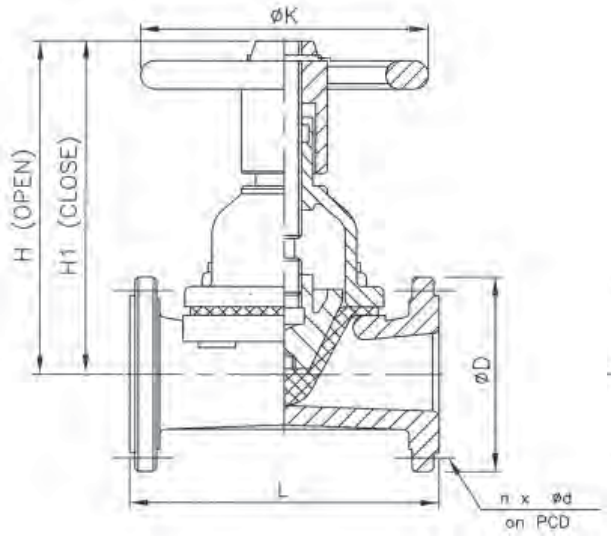
Other Material Options

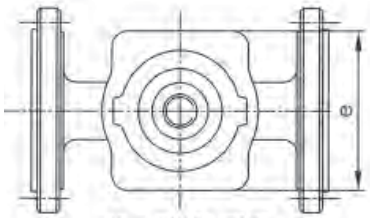
- *Body studs and nuts in St.Steel A2 or A4*
- *Further material options available on request*
- *Materials given to be understood as minimum standard provided under name designation*

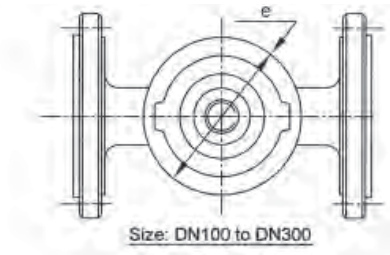
DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Main Dimensions







	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	130	3.8	108	3.3	110	102	95	65	4x14	89	60.3	4x16	100	71
20	150	4.0	117	3.6	110	102	105	75	4x14	98	69.8	4x16	100	71
25	160	4.8	127	4.3	133	120	115	85	4x14	108	79.4	4x16	120	85
32	180	7.5	146	6.5	133	120	140	100	4x18	117	88.9	4x16	120	85
40	200	8.0	159	7.0	133	120	150	110	4x18	127	98.4	4x16	120	85
50	230	11.5	190	10.5	150	177	165	125	4x18	152	120.6	4x19	164	115
65	290	16.5	216	15.5	220	196	185	145	4x18	178	139.7	4x19	220	130
80	310	25.5	254	22.5	279	249	200	160	8x18	191	152.4	4x19	240	170
100	350	32.0	305	30.0	294	261	220	180	8x18	229	190.5	8x19	270	Ø200
125	400	46.0	356	44.0	310	272	250	210	8x18	254	215.9	8x22	270	Ø234
150	480	69.0	406	63.0	413	362	285	240	8x22	279	241.3	8x22	360	Ø290
200	600	126.0	521	112.0	476	413	340	295	8x22	343	298.4	8x22	460	Ø350
250	730	185.0	635	170.0	596	523	395	350	12x22	406	361.9	12x26	525	Ø430
300	850	273.0	749	258.0	748	653	445	400	12x22	483	431.8	12x26	600	Ø512

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN10 (DN15-100) PN6 (DN125-150)
PN3,5 (DN200-300)

See Data Sheet nº OP for complete overview of operating parameters

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Unlined
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs **	Steel
09	Body nuts **	Steel

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100: 6 Nos / DN125-200: 8 Nos / DN250: 12 Nos / DN300: 16 Nos*

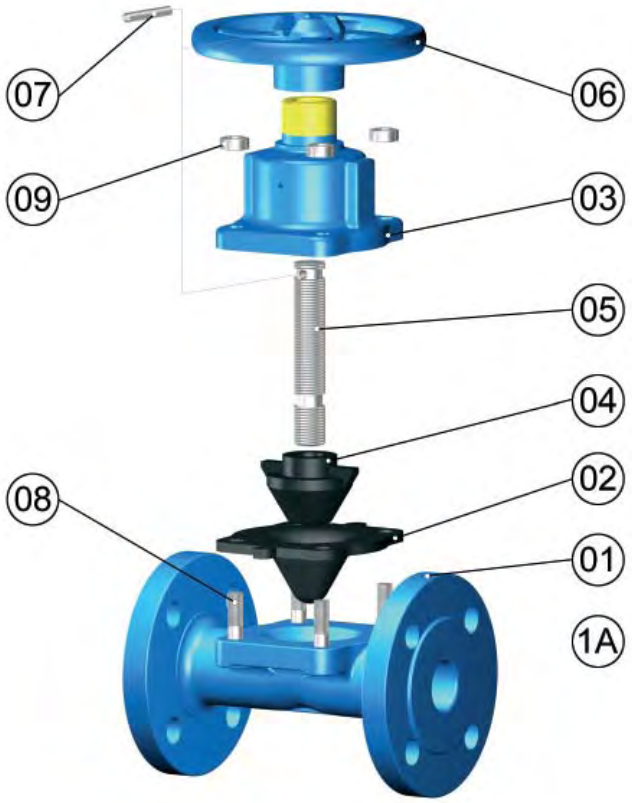
Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- *Body studs and nuts in St.Steel A2 or A4*
- *Further material options available on request*
- *Materials given to be understood as minimum standard provided under name designation*



Body Lining Material Options

Rubber Lining	Fluoropolymer Lining
Hard Rubber - Ebonite (HR)	PFA®
Butyl Rubber (BR)	ETFE®
Soft Rubber (SR)	FEP®
Neoprene® Rubber	PVDF®
Hypalon® Rubber	Halar®
White Natural	
Linatex®	

Diaphragm Options

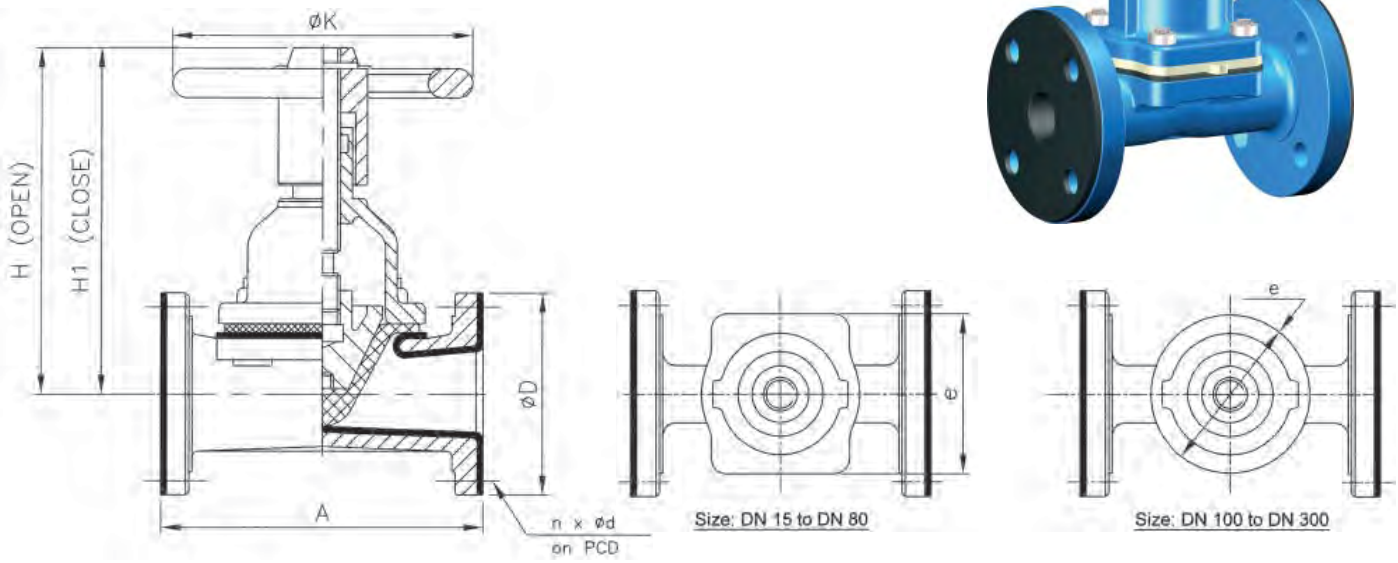
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Rubber lined valves with flanged ends

Main Dimensions



	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	130	4.1	114	3.6	113.0	105	95	65	4x14	89	60.3	4x16	100	71
20	150	4.5	123	4.0	113.0	105	105	75	4x14	98	69.8	4x16	100	71
25	160	5.0	133	4.5	135.5	123	115	85	4x14	108	79.4	4x16	120	85
32	180	8.0	152	7.0	135.5	123	140	100	4x18	117	88.9	4x16	120	85
40	200	9.0	165	8.0	135.5	123	150	110	4x18	127	98.4	4x16	120	85
50	230	13.5	196	12.0	197.5	180	165	125	4x18	152	120.6	4x19	164	115
65	290	18.0	222	17.0	223.0	199	185	145	4x18	178	139.7	4x19	220	130
80	310	27.0	260	24.0	282.0	252	200	160	8x18	191	152.4	4x19	240	170
100	350	34.0	313	32.0	297.5	265	220	180	8x18	229	190.5	8x19	270	Ø200
125	400	48.0	364	46.0	313.5	276	250	210	8x18	254	215.9	8x22	270	Ø234
150	480	71.0	414	65.0	417.0	366	285	240	8x22	279	241.3	8x22	360	Ø290
200	600	121.0	529	115.0	479.5	417	340	295	8x22	343	298.4	8x22	460	Ø350
250	730	190.0	643	175.0	599.5	527	395	350	12x22	406	361.9	12x26	525	Ø430
300	850	278.0	757	263.0	752.0	657	445	400	12x22	483	431.8	12x26	600	Ø512

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:
Valve bodies design pressure range: PN10 (DN15-100) PN6 (DN125-150)
PN3,5 (DN200-300)

See Data Sheet nº OP for complete overview of operating parameters

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Rubber lined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Rubber Lined
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs **	Steel
09	Body nuts **	Steel

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100: 6 Nos / DN125-200: 8 Nos / DN250: 12 Nos / DN300: 16 Nos*

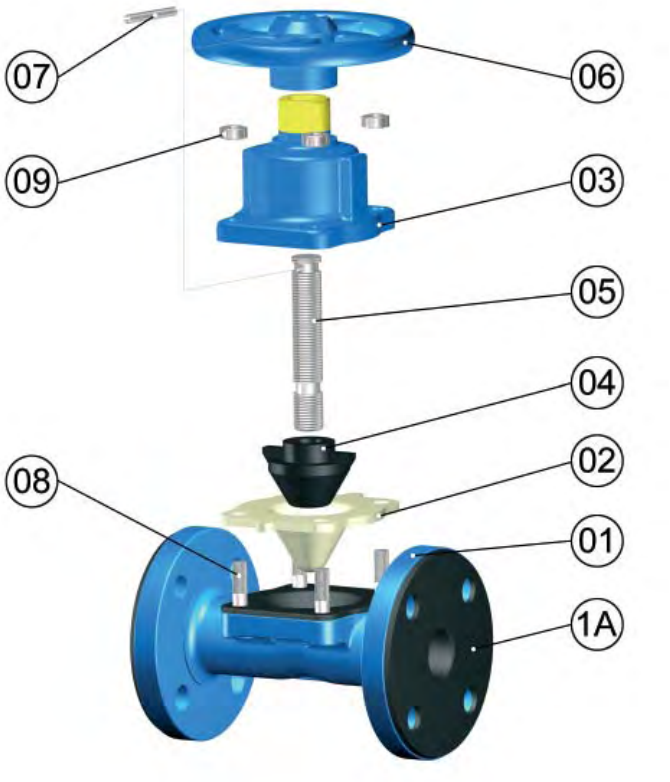
Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

***a)** Standard for unlined and rubber lined valves*
***b)** Standard for fluoropolymer lined valves*

Other Material Options

- Body studs and nuts in St.Steel A2 or A4
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation



Body Lining Material Options

Material	Identification
Hard Rubber - Ebonite (HR)	Sky Blue Spot
Butyl Rubber (BR)	Dark Blue Spot
Soft Rubber (SR)	White Spot
Neoprene® Rubber	Red Spot
Hypalon® Rubber	Green Spot
White Natural	
Linatex®	

Diaphragm Options

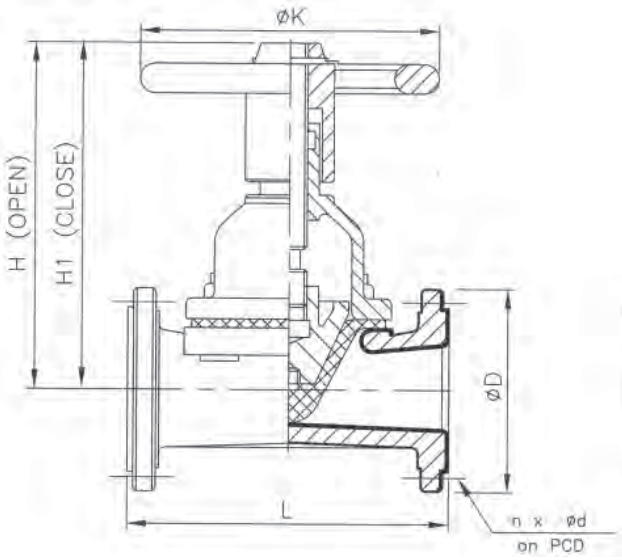
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

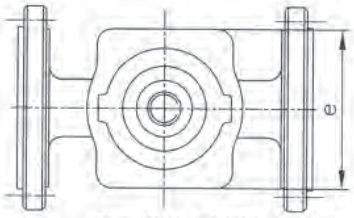
Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

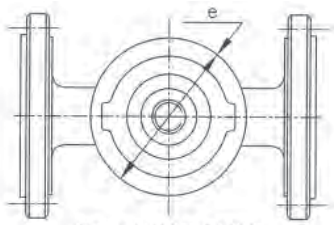
Halar® coated valves with flanged ends

Main Dimensions





Size: DN15 to DN80



Size: DN100 to DN300

	EN-558-1 S1 (DIN 3202F1)		EN-558-1 S7 (BS 5156)		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
15	134	4.1	112	3.6	113.0	105	95	65	4x14	89	60.3	4x16	100	71
20	154	4.5	121	4.0	113.0	105	105	75	4x14	98	69.8	4x16	100	71
25	164	5.0	131	4.5	135.5	123	115	85	4x14	108	79.4	4x16	120	85
32	184	8.0	150	7.0	135.5	123	140	100	4x18	117	88.9	4x16	120	85
40	204	9.0	163	8.0	135.5	123	150	110	4x18	127	98.4	4x16	120	85
50	234	13.5	194	12.0	197.5	180	165	125	4x18	152	120.6	4x19	164	115
65	294	18.0	220	17.0	223.0	199	185	145	4x18	178	139.7	4x19	220	130
80	314	27.0	258	24.0	282.0	252	200	160	8x18	191	152.4	4x19	240	170
100	354	34.0	309	32.0	297.5	265	220	180	8x18	229	190.5	8x19	270	Ø200
125	404	48.0	360	46.0	313.5	276	250	210	8x18	254	215.9	8x22	270	Ø234
150	484	71.0	410	65.0	417.0	366	285	240	8x22	279	241.3	8x22	360	Ø290
200	604	121.0	525	115.0	479.5	417	340	295	8x22	343	298.4	8x22	460	Ø350
250	734	190.0	639	175.0	599.5	527	395	350	12x22	406	361.9	12x26	525	Ø430
300	854	278.0	753	263.0	752.0	657	445	400	12x22	483	431.8	12x26	600	Ø512

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:

Valve bodies design pressure range: PN10 (DN15-100) PN6 (DN125-150)
PN3,5 (DN200-300)

See Data Sheet nº OP for complete overview of operating parameters

DIAVAL® STRAIGHT THROUGH TYPE DIAPHRAGM VALVES

Halar® coated valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Halar® coated
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs **	Steel
09	Body nuts **	Steel

** With eye bolts in DN 200-300 to ease handling*
*** DN15-80: 4 Nos / DN100: 6 Nos / DN125-200: 8 Nos / DN250: 12 Nos / DN300: 16 Nos*

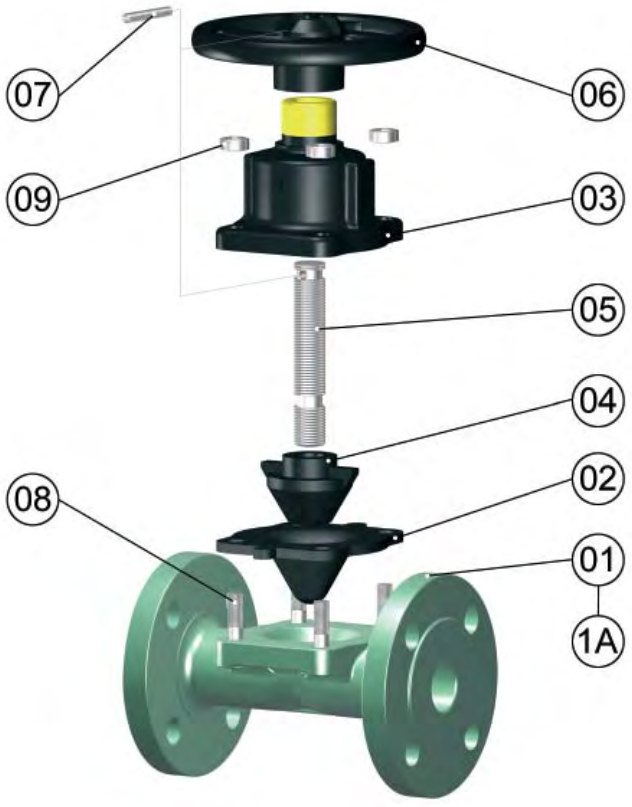
Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- *Body studs and nuts in St.Steel A2 or A4*
- *Further material options available on request*
- *Materials given to be understood as minimum standard provided under name designation*



Other Body Lining Material Options

Material	
Hard Rubber - Ebonite (HR)	PFA®
Butyl Rubber (BR)	ETFE®
Soft Rubber (SR)	FEP®
Neoprene® Rubber	PVDF®
Hypalon® Rubber	
White Natural	
Linatex®	

Diaphragm Options

Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® ST TYPE DIAPHRAGM VALVES

Rubber and Fluoropolymer Linings

Application Guide

Lining Material	Range Availability	Applications
Hard Rubber—HRL (Ebonite), sulphur cured, carbon black reinforced. Designated by a 'Sky Blue Spot' on end flange. Hardness 75 +/- 5° Shore 'D'	Straight Through type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Used for inorganic salt solutions, dilute mineral acids, chlorine water, deionised and potable water.
Soft Natural Rubber—SNR Polyisoprene, sulphur cured, carbon black reinforced. Designated by a 'white spot' on end flange. Hardness 45 +/- 5º Shore 'A'	Straight Through type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Excellent abrasion resistance for powders, slurries such as clays, fly ash and cement products.
Soft Butyl Rubber—BRL Isobutylene isoprene (IIR), sulphur cured carbon black reinforced. Designated by a 'Dark Blue Spot' on end flange. Hardness 65- +/- 5° Shore 'A'	Straight Through type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Good for corrosive and abrasive slurries, dilute mineral acids and acidic slurries. Avoid chlorine and chorine solutions.
Soft Polychloroprene (Neoprene) Rubber—NL Non-Sulphur cured carbon black reinforced. Designated by a 'Red Spot' on end flange. Hardness 65- +/- 5° Shore 'A'	Straight Through type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Used on abrasives and minerals processing where small percentages of hydrocarbons are present.
Soft Hypalon® Rubber **(Chloro sulphonated polyethylene)** Non-Sulphur cured carbon black reinforced. Designated by a 'Green Spot' on the end flange. Hardness 65- +/- 5° Shore 'A'	Straight Through type, flanged DN 15 to DN 300. (DN 350 Available under special manufacture)	Chemical resistance to dilute / medium strength acids and chlorinated brine solutions and sodium hypochlorite
Halar® Co-polymer of ethylene and chlorotrifluoroethylene. Electrostatically applied coating.	Straight Through type, flanged DN 15 to DN 200.	Used for concentrated acids and salts containing hydrocarbons. Not suitable for dilute acids and inorganic salt solutions near to their boiling point. Minimal resistance to abrasive services.
Linatex® Specially compounded "RED" coloured soft lining Hardness 45 +/- 5º Shore 'A'	Straight Through type, flanged DN 15 to DN 200.	Used for "WET" slurry applications

*Other speciality customised lining material available to suit individual requirement made out of various polymers

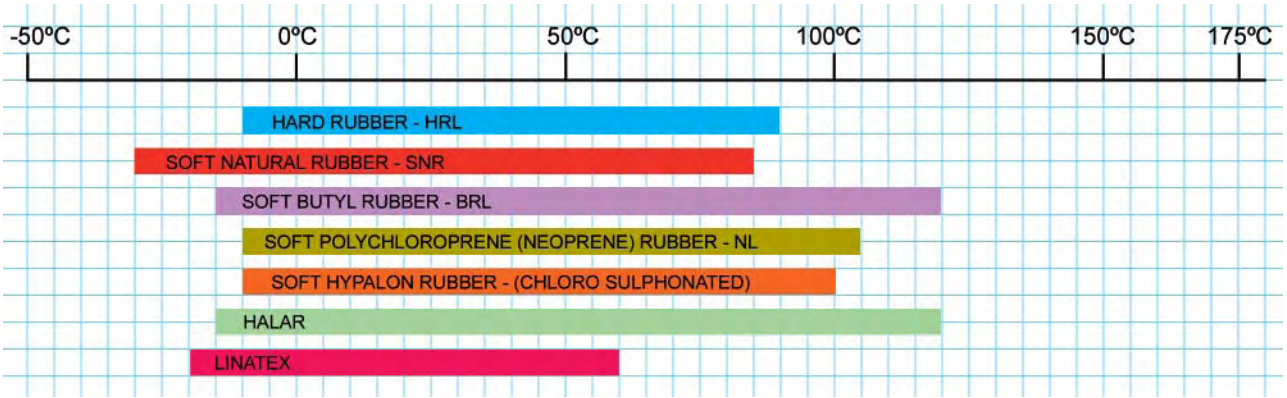
DIAVAL® ST TYPE DIAPHRAGM VALVES

Rubber and Fluoropolymer Linings

Operating Parameters

Lining Material	Valve Body Material	Temperature Range
Hard Rubber—HRL	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +85°C
Soft Natural Rubber—SNR	Cast Iron, Ductile Iron and Cast carbon steel	-25°C - +85°C
Soft Butyl Rubber—BRL	Cast Iron, Ductile Iron and Cast carbon steel	-15°C - +120°C
Soft Polychloroprene (Neoprene) Rubber—NL	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +105°C
Soft Hypalon® Rubber (Chloro sulphonated polyethylene)	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +100°C
Halar®	Cast Iron, Ductile Iron and Cast carbon steel	-15°C - +120°C
Linatex®	Cast Iron, Ductile Iron and Cast carbon steel	-20°C - +60ºC

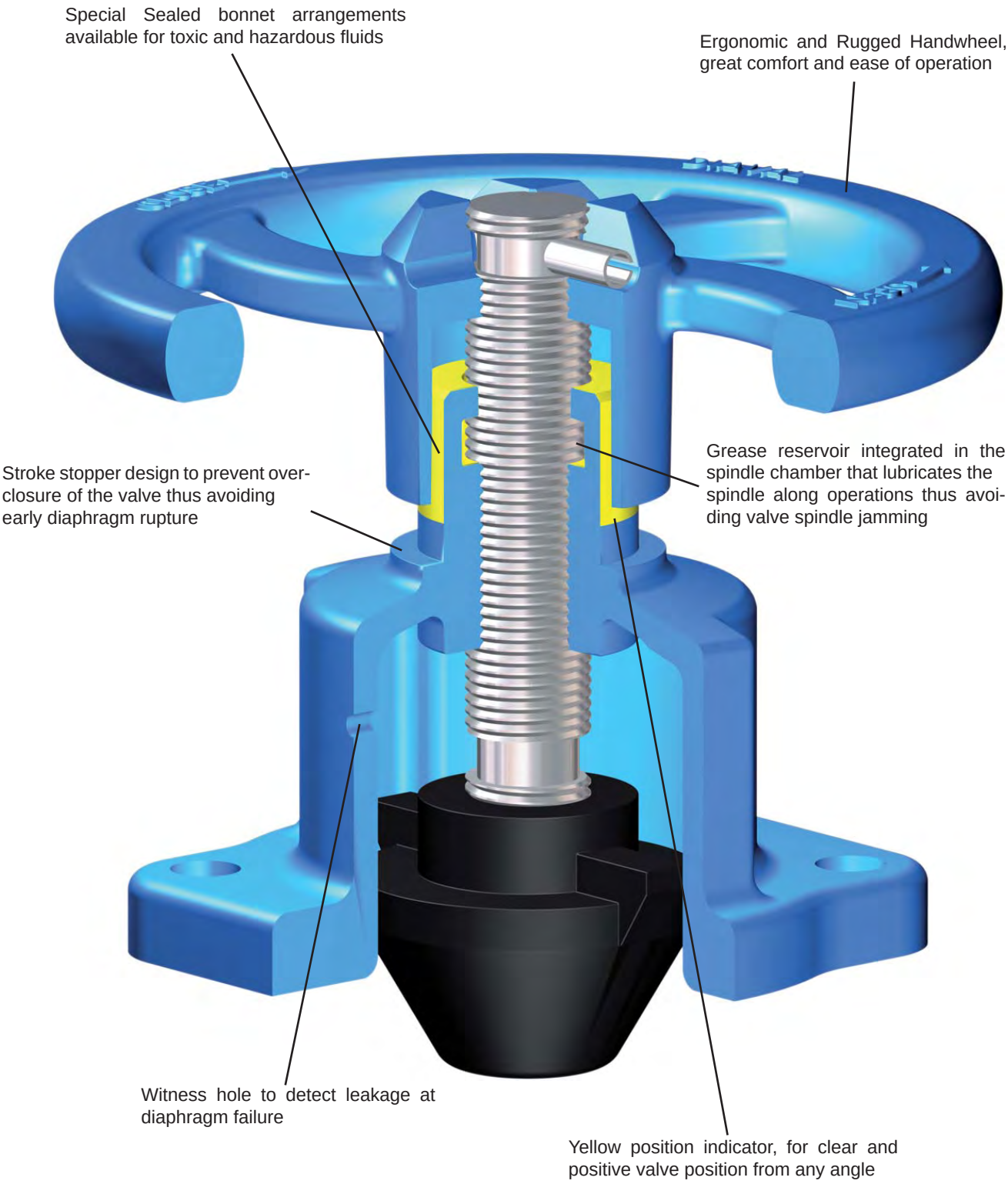
*Other speciality customised lining material available to suit individual requirement made out of various polymers



Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

DIAVAL® DIAPHRAGM VALVES

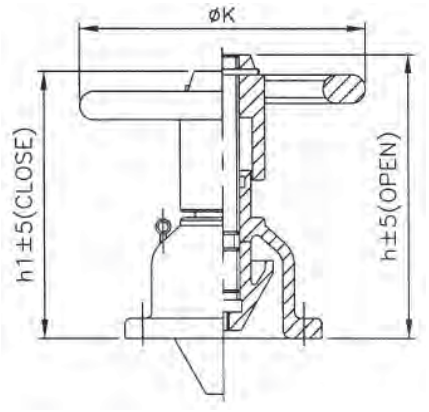
Design Attributes of ST Type Bonnet

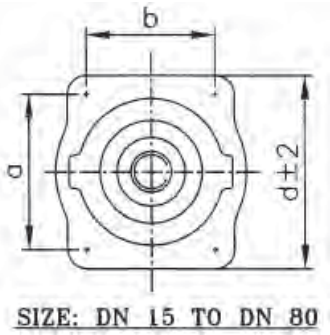


DIAVAL® DIAPHRAGM VALVES

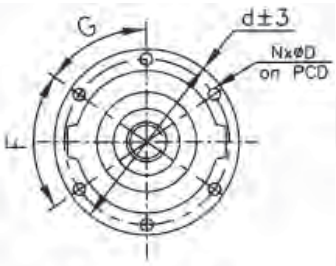
ST Type Bonnet

Main Dimensions

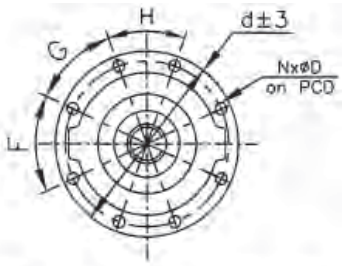




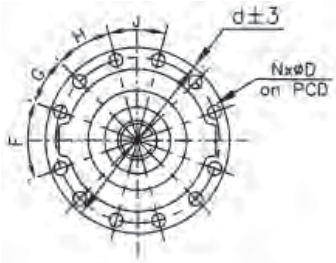
SIZE: DN 15 TO DN 80



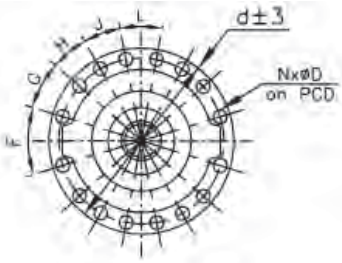
SIZE: DN 100



SIZE: DN 125 TO DN 200



SIZE: DN 250



SIZE: DN 300

DN	a	b ØPCD	d	h	h1	ØK	Nº Holes	Weight	ANGLES BETWEEN THE HOLES F	G	H	J	L
15	54	30	71	93,5	86,0	100	4	1,2	---	---	---	---	---
20	54	30	71	93,5	86,0	100	4	1,2	---	---	---	---	---
25	64	51	85	105,0	93,0	120	4	2,0	---	---	---	---	---
32	64	51	85	105,0	93,0	120	4	2,0	---	---	---	---	---
40	64	51	85	105,0	93,0	120	4	2,0	---	---	---	---	---
50	89	64	115	165,0	147,5	164	4	4,5	---	---	---	---	---
65	102	83	130	185,0	161,0	220	4	7,0	---	---	---	---	---
80	137	102	171	231,0	201,0	240	4	11,0	---	---	---	---	---
100	---	Ø171	Ø200	243,0	210,5	270	6	14,5	70º	55º	---	---	---
125	---	Ø205	Ø234	264,0	226,5	270	8	18,0	50º	45º	40º	---	---
150	---	Ø254	Ø290	346,0	295,0	360	8	31,0	60º	40º	40º	---	---
200	---	Ø305	Ø350	395,0	333,0	460	8	50,0	60º	40º	40º	---	---
250	---	Ø381	Ø430	507,0	434,5	525	12	79,0	40º	25º	30º	30º	---
300	---	Ø451	Ø512	641,0	546,0	600	16	115,0	34º	24º20'	19º	19º	21º20'

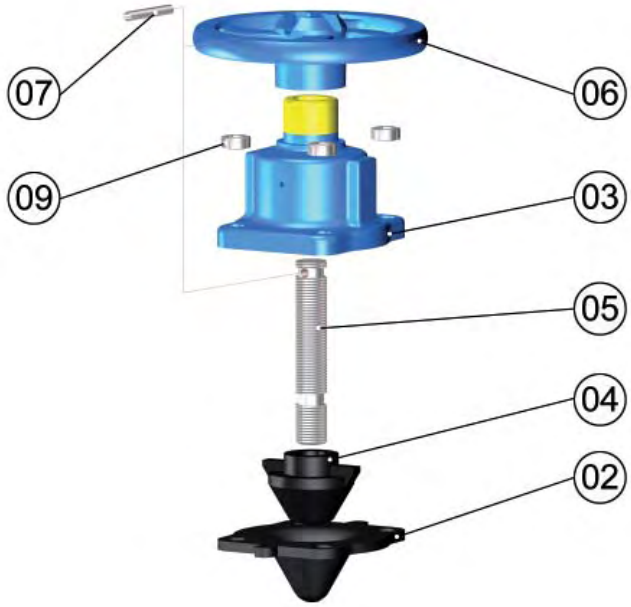
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

DIAVAL® DIAPHRAGM VALVES
ST Type Bonnet

Standard Materials

Part	Description	Material
02	Diaphragm	Rubber
03	Bonnet*	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
09	Body studs & nuts	Steel

** With eye bolts in DN 200-300 to ease handling*



Bonnet Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

Components Options

Studs, Bolts and Nuts

-Steel (standard)
-St. Steel 304 (A2)
-St. Steel 316 (A4)
-Exotic materials

Spindle

-Steel (standard)
-St. Steel 304
-St. Steel 316
-Exotic materials

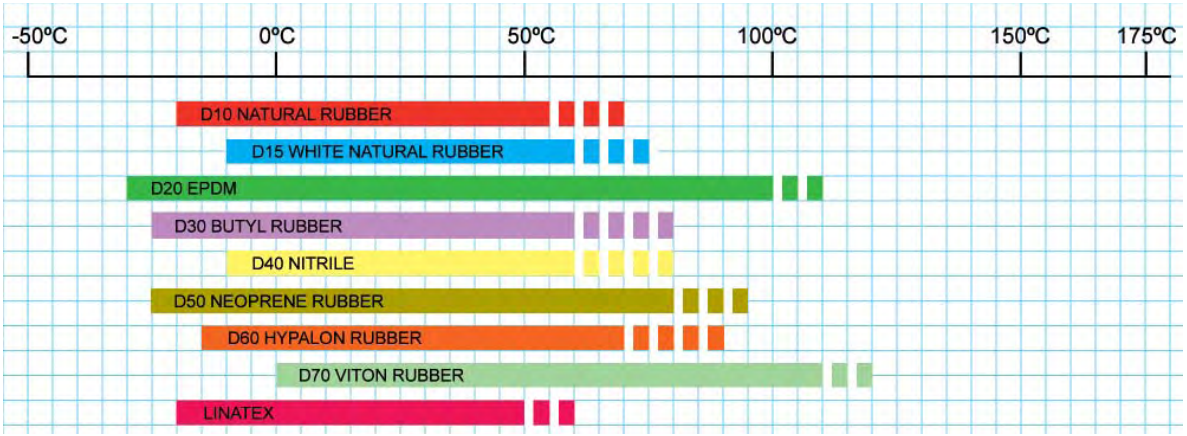
- Further material options available on request
- Materials given to be understood as minimum standard provided under name designation

DIAVAL® ST TYPE DIAPHRAGM VALVES

Spare Diaphragms

Operating Parameters

GRADE	POLYMER TYPE	TEMPERATURE RANGE
D10 Natural Rubber	**Natural Rubber Polyisoprene/SBR** Sulphur cured and carbon black reinforced	-20 to + 55...70ºC
D15 White Natural Rubber	**Natural Rubber Polyisoprene/SBR** Sulphur cured and white reinforced	-10 to + 60...75ºC
D20 EPDM	**Ethylene Propylene Diene (EPDM)** Organic peroxide cured, carbon black reinforced	-30 to + 100...110ºC
D30 Butyl Rubber	**Isobutylene Isoprene (IIR)** Sulphur cured and carbon black reinforced	-25 to + 60...80ºC
D40 Nitrile	**Butadiene Acrylonitrile**	-10 to + 60...80ºC
D50 Neoprene r	**Polychloroprene** Non sulphur cured carbon blackreinforced	-25 to + 80...95ºC
D60 Hypalon r	**Chlorosuphonated polyethylene** Non sulphur cured carbon blackreinforced	-15 to + 70...90ºC
D70 Viton r	**Vinylidenefluoride-hexafluoro propyleneco-polymer** Carbon black reinforced	0 to + 110...120ºC
Linatex®	Specially compounded “RED” coloured soft material	-20 to + 50...60ºC



▮▮▮ *Only for shorts periods of time*

Temperature Values are not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship. Temperature values also depends on medium through the valve.

DIAVAL® ST TYPE DIAPHRAGM VALVES

Spare Diaphragms

Application Guide

GRADE	POLYMER TYPE	GENERAL APPLICATION
D10 **Natural Rubber**	**Natural Rubber Polyisoprene/ SBR** Sulphur cured and carbon black reinforced	Inorganic salt solutions, dilute mineral acids, alkalies and salts. Abrasive services Not resistant to oxidizing media, oils or most organic solvents will attack it.
D15 **White Natural Rubber**	**Natural Rubber Polyisoprene/ SBR** Sulphur cured and white reinforced	Food and pharmaceuticals, toothpaste, brewing, dairy
D20 **EPDM**	**Ethylene Propylene Diene (EPDM)** Organic peroxide cured, carbon black reinforced	Salts in water, acids and alkalies, ozone, intermitten steam. Sterilisation
D30 **Butyl Rubber**	**Isobutylene Isoprene (IIR)** Sulphur cured and carbon black reinforced	Dilute mineral acids and alkalies, gases, acidic slurries, chlorine free hydrochloric acid, resistance to concentrated acids is good with some important exceptions as nitric or sulphuric acids
D40 **Nitrile**	**Butadiene Acrylonitrile**	Oily air, lubricating oil, cutting oils, fuel oils, animal and vegetable oils, aviation kerosen, LPG Generally resistant to oils and solvents.
D50 **Neoprene r**	**Polychloroprene** Non sulphur cured carbon blackre-inforced	Abrasive slurries containing hydrocarbons, oily air, natural gas Resistant to attack by ozone, sunlight, oils, gasoline, and aromatic or halogenated solvents but easily permeated by water
D60 **Hypalon r**	**Chlorosuphonated polyethylene** Non sulphur cured carbon blackre-inforced	Outstanding resistance to ozone and oxidizing agents except fu-ming nitric and sulfuric acids. Oil resistance is good. Dilute / Medium acids, sodium hypochlorite, chlorine gas
D70 **Viton r**	**Vinylidenefluoride-hexafluoro propyleneco-polymer** Carbon black reinforced	Strong sulphuric acid, chlorine gas, oils, certain aromatic solvents

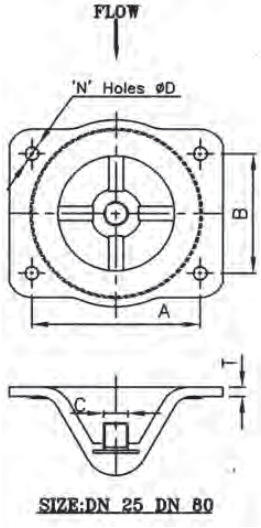
Vacuum reinforced diaphragms are available and will contain a steel stud and be designated by additional code letter (V) e.. D10V
Because of the steel stud these diaphragms can be used on services where conventional bronze studs are prohibited e.g. use of D40V on acetylene.
*Other speciality customised diaphragm material available to suit individual requirement made out of various polymers

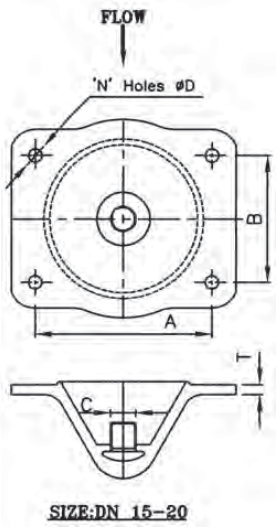
DIAVAL® ST TYPE DIAPHRAGM VALVES

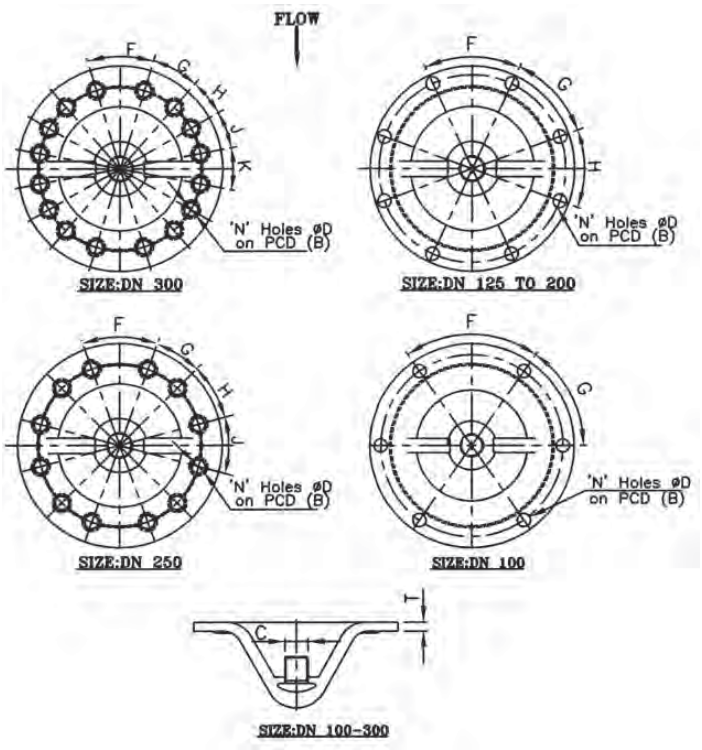
Spare Diaphragms

Main Dimensions







Diaphragm Options

Material	Code	Material	Code
Natural Rubber	D10	Hypalon® Rubber	D60
White Natural Rubber	D15	Viton® Rubber	D70
EPDM Rubber	D20	Linatex®	
Butyl Rubber	D30		
Nitrile Rubber	D40		
Neoprene® Rubber	D50		

* Special vacuum reinforced diaphragms add code letter [V] e.g. D10V
* Other speciality customised diaphragm material available to suit individual requirement.

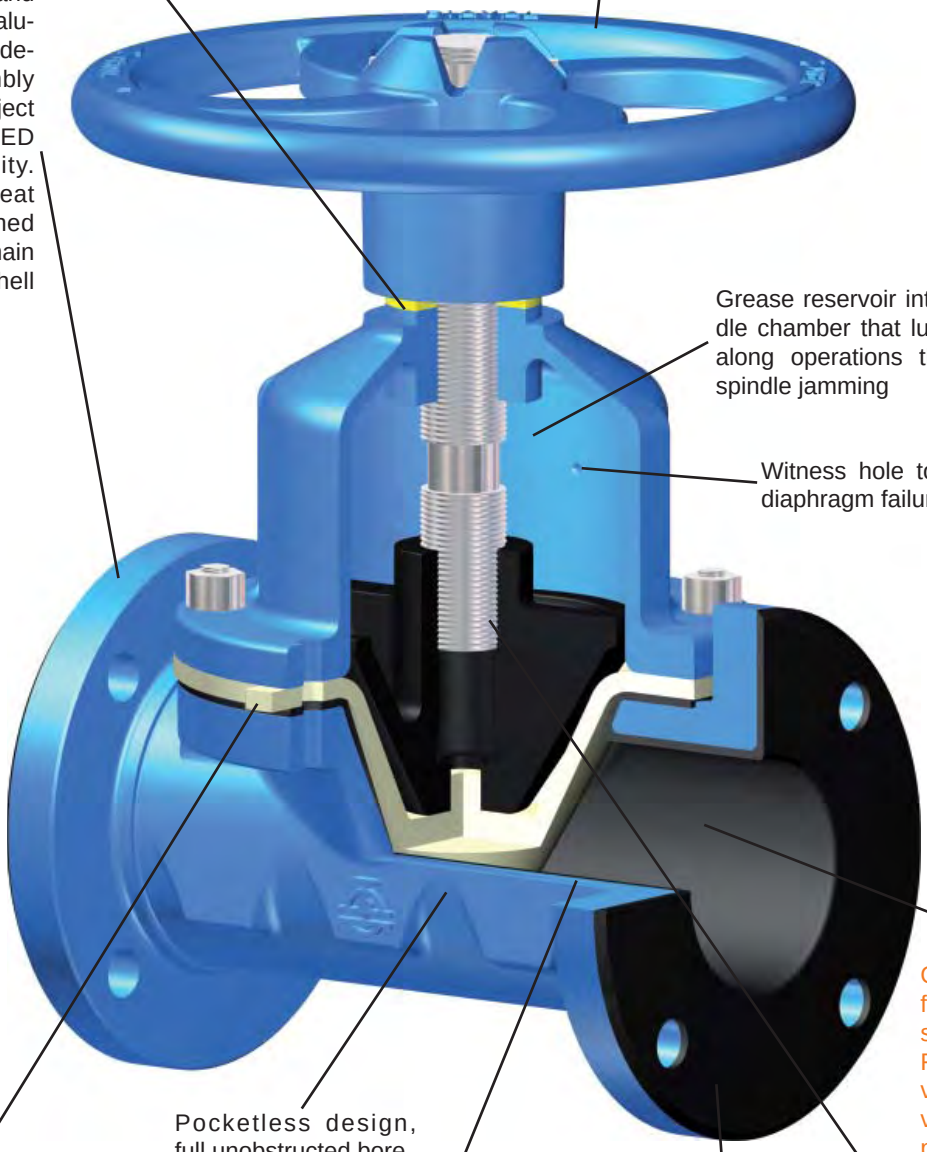
Polymer based diaphragms are in-house formulated and manufactured by the own DIAVAL specialist centre, the know how is not subject to external information.
All diaphragms are internally braided with nylon reinforcement to provide diaphragms with a long life cycle at diverse plant operating conditions.
Spare Diaphragms should be stored in a dry and proper place not exposed to ozone rays - please refer to the Operation and Maintenance Manual for details.

	DIMENSIONS OF DIAPHRAGM						ANGLES BETWEEN THE HOLES				
DN	A	B	C	ØD	Nº HOLES	T	F	G	H	J	K
15	54	30	3/16" BSW	7.0	4	2.5	---	---	---	---	---
20	54	30	3/16" BSW	7.0	4	2.5	---	---	---	---	---
25	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
32	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
40	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
50	89	64	1/4" BSW	12.0	4	5.0	---	---	---	---	---
65	102	83	5/16" BSW	14.0	4	5.5	---	---	---	---	---
80	137	102	3/8" BSW	18.0	4	5.5	---	---	---	---	---
100	---	Ø171	3/8" BSW	13.0	6	7.0	70º	55º	---	---	---
125	---	Ø205	3/8" BSW	14.0	8	7.5	50º	45º	40º	---	---
150	---	Ø254	5/8" BSW	14.0	8	8.0	60º	40º	40º	---	---
200	---	Ø305	5/8" BSW	20.0	8	8.5	60º	40º	40º	---	---
250	---	Ø381	5/8" BSW	20.0	12	10.0	40º	25º	30º	30º	---
300	---	Ø451	1" BSW	20.0	16	10.0	34º	24º20'	19º	19º	21º20'

* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

DIAVAL® FULL FLOW TYPE DIAPHRAGM VALVES

Design Attributes of Full Flow Valves



Ergonomic and Rugged Handwheel, great comfort and ease of operation

Yellow position indicator, for clear and positive valve position from any angle

Valve Identification and Traceability; riveted aluminium name plate denoting valve assembly code, assigned Project Tag number and PED 97/23/CE conformity. Valve Serial and Heat Numbers are punched and cast onto the main valve bodies and shell bonnet assemblies.

Grease reservoir integrated in the spindle chamber that lubricates the spindle along operations thus avoiding valve spindle jamming

Witness hole to detect leakage at diaphragm failure

Optimised flow configuration thanks to special DIAVAL® Full Flow design with provides maximum Kv-values and minimum pressure drop across the valve.

Pocketless design, full unobstructed bore

Closure Diaphragms; manufactured from elastomeric and fluorocarbon materials; provide 100% seating tightness while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application.

Porous less linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials.

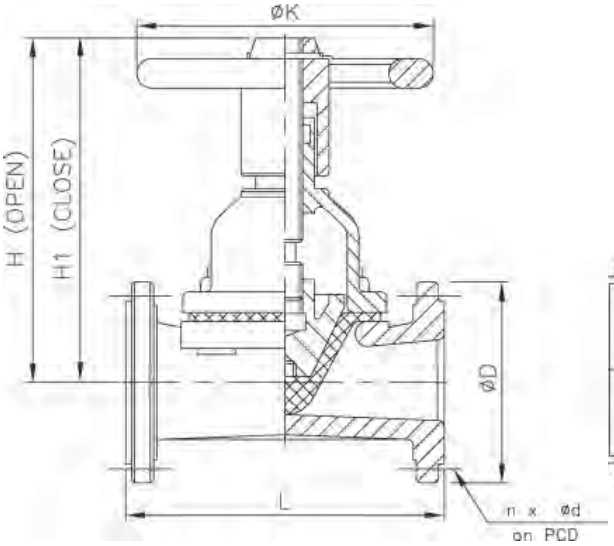
Full rubber flange face in all lined valves as standard

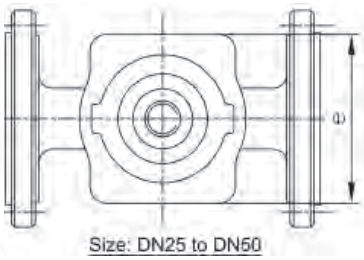
Precise compressor plate; guide and operates the diaphragm up and down.

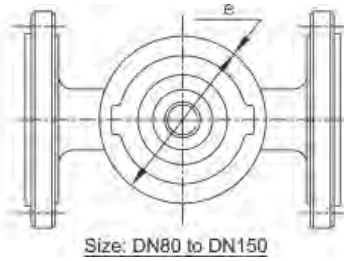
DIAVAL® FULL FLOW TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Main Dimensions







	EN-558-1 S1 (DIN 3202F1)		DIAVAL FF Std.		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	Ø K	e
25	160	4.8	127	4.0	135	123	115	85	4x14	108	79.4	4x16	120	85
40	200	110	165	9.5	198	181	150	110	4x18	127	98.4	4x16	164	115
50	230	16.0	191	13.0	222	198	165	125	4x18	152	120.6	4x19	220	130
80	310	31.0	254	25.0	286	253	200	160	8x18	191	152.4	4x19	270	Ø200
100	350	44.0	317	37.0	313	275	220	180	8x18	229	190.5	8x19	270	Ø234
150	480	106.0	450	85.0	464	401	285	240	8x22	279	241.3	8x22	460	Ø350

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:

Valve bodies design pressure range: PN10 (DN25-80) PN6 (DN100)
PN3,5 (DN150)

See Data Sheet nº OP for complete overview of operating parameters

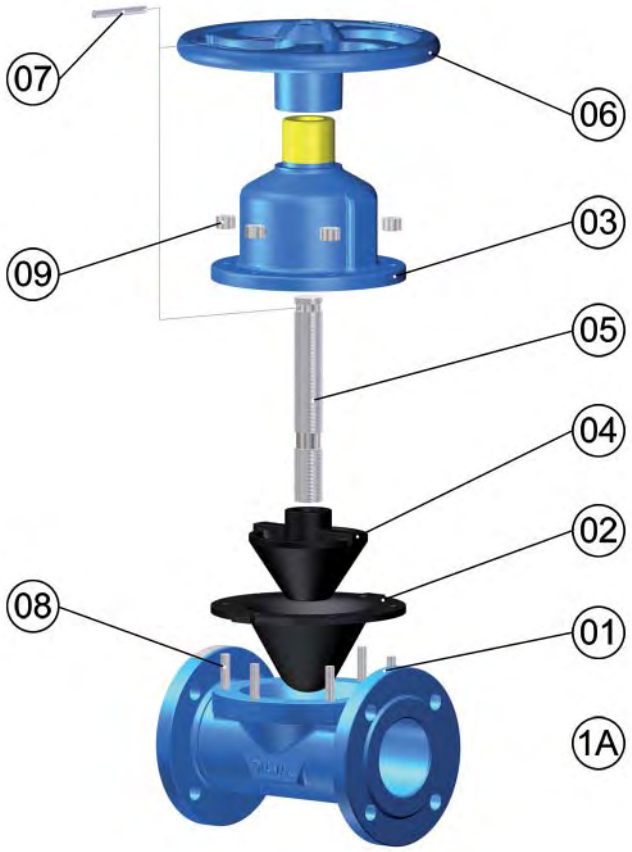
DIAVAL® FULL FLOW TYPE DIAPHRAGM VALVES

Unlined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Unlined
02	Diaphragm	Rubber
03	Bonnet	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs *	Steel
09	Body nuts *	Steel

** DN25-50: 4 Nos / DN80: 6 Nos / DN100-150: 8 Nos /*



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- *Body studs and nuts in St.Steel A2 or A4*
- *Further material options available on request*
- *Materials given to be understood as minimum standard provided under name designation*

Body Lining Material Options

Rubber Lining	Fluoropolymer Lining
Hard Rubber - Ebonite (HR)	PFA®
Butyl Rubber (BR)	ETFE®
Soft Rubber (SR)	FEP®
Neoprene® Rubber	PVDF®
Hypalon® Rubber	Halar®
White Natural	
Linatex®	

Diaphragm Options

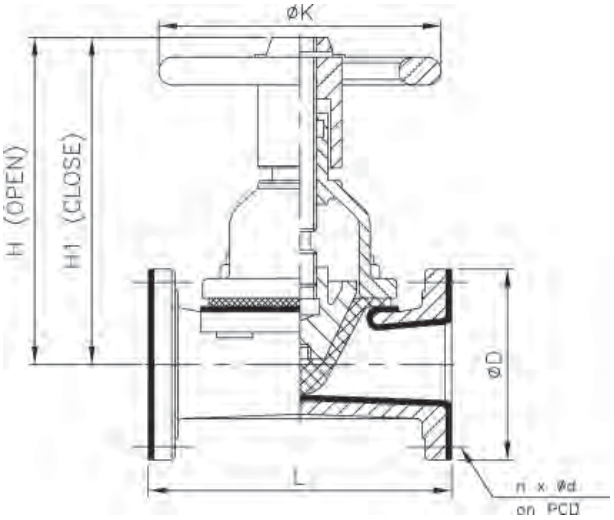
Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

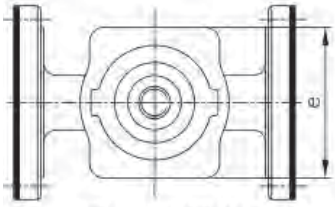
Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® FULL FLOW TYPE DIAPHRAGM VALVES

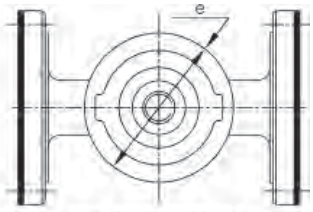
Rubber lined valves with flanged ends

Main Dimensions





Size: DN 25 to DN 50



Size: DN 80 to DN 150

	EN-558-1 S1 (DIN 3202F1)		DIAVAL FF Std.		H	H1	EN1092-1 PN10 BS 4504 T.10			ANSI 150#				
DN	L	Weight	L	Weight	(open)	(closed)	ØD	PCD	nxød	ØD	PCD	nxød	ØK	e
25	160	5.0	133	4.5	138	126	115	85	4x14	108	79.4	4x16	120	85
40	200	12.0	171	10.0	201	184	150	110	4x18	127	98.4	4x16	164	115
50	230	17.0	197	14.0	225	201	165	125	4x18	152	120.6	4x19	220	130
80	310	32.0	260	28.0	289	256	200	160	8x18	191	152.4	4x19	270	Ø200
100	350	45.0	325	40.0	317	279	220	180	8x18	229	190.5	8x19	270	Ø234
150	480	108.0	458	90.0	468	405	285	240	8x22	279	241.3	8x22	460	Ø350

* Approx. Weight in kg, based on Ductile Iron body material.
* Dimensions in mm, only orientative. Arrangement drawings for approval on request.

Manufacture Design Standards:
- Harmonised Standard EN13397 (November 2001), equivalent to MSS-SP-88-1993 (Reaffirmed 2001)
- QA certified to ISO 9001:2000
- According to Pressure Equipment Directive PED 97/23/EC Article 3 - Paragraph 3
- Testing standards EN12266-1 (March 2003) and BS6755 part 1 (1986)
- Marking according to EN 19 (April 2002)
- Face to face dimensions according to EN558-1 Series 1 (DIN 3202F1) or EN558-1 Series 7 (BS5156)
- Body end flanges according to EN 1092-1 PN10, BS 4504 T.10 or ANSI 150#

Operating parameters:

Valve bodies design pressure range: PN10 (DN25-80) PN6 (DN100)
PN3,5 (DN150)

See Data Sheet nº OP for complete overview of operating parameters

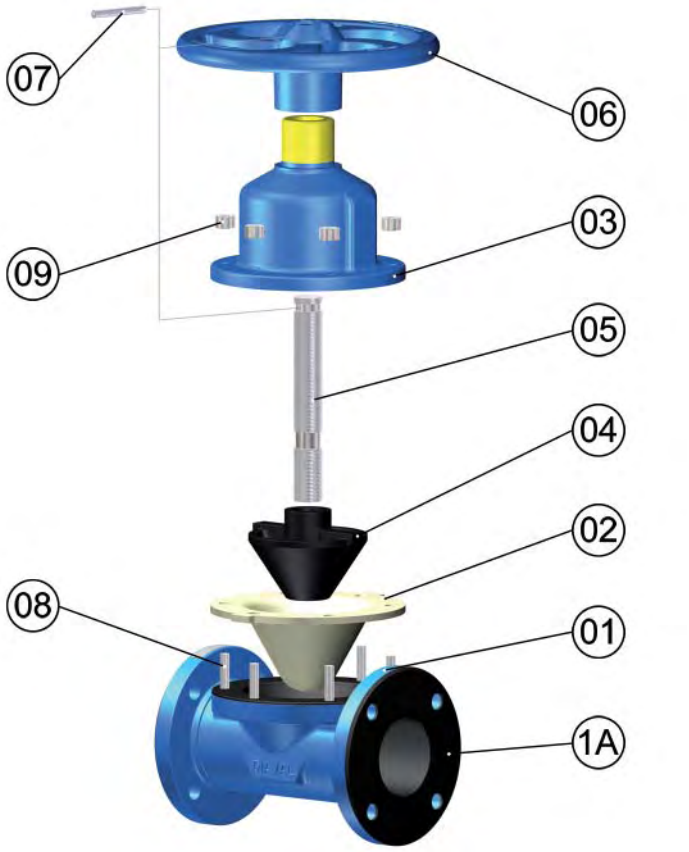
DIAVAL® FULL FLOW TYPE DIAPHRAGM VALVES

Rubber lined valves with flanged ends

Standard Materials

Part	Description	Material
01	Body	Ductile or Cast Iron
1A	Body lining	Unlined
02	Diaphragm	Rubber
03	Bonnet	Ductile or Cast Iron
04	Compressor	Cast Iron
05	Spindle	Steel
06	Handwheel	Cast Iron
07	Handwheel pin	Steel
08	Body studs *	Steel
09	Body nuts *	Steel

** DN25-50: 4 Nos / DN80: 6 Nos / DN100-150: 8 Nos /*



Body Material Options

Cast Iron (Grey)	
EN1561	GJL-250 (GG-25)
ASTM	A 126 Class B
Ductile Iron (SG Iron)	
EN1563	GJS-400-15 (GGG-40)[a]
EN1563	GJS-450-10 (GGG-40.3)[b]
ASTM	A536 Grade 65-45-12
Carbon Steel	
EN10213	GP240GH+N (1.0619+N)
ASTM	A 216 WCB
Stainless Steel 316	
EN10088-1	X5CrNiMo17-12-2 (1.4401)
ASTM	A 351 CF8M
Stainless Steel 316L	
EN10088-1	X2CrNiMo17-12-2 (1.4404)
ASTM	A 351 CF3M
Bronze	
EN1982	CuSn5Zn5Pb5-C (CC491K)
EN1982	CuSn7Zn2Pb3-C (CC492K)
ASTM	B62
Iron Alloys	
Chromium Iron 24%, 30%, etc.	

a) *Standard for unlined and rubber lined valves*
b) *Standard for fluoropolymer lined valves*

Other Material Options

- *Body studs and nuts in St.Steel A2 or A4*
- *Further material options available on request*
- *Materials given to be understood as minimum standard provided under name designation*

Body Lining Material Options

Material	Identification
Hard Rubber - Ebonite (HR)	Sky Blue Spot
Butyl Rubber (BR)	Dark Blue Spot
Soft Rubber (SR)	White Spot
Neoprene® Rubber	Red Spot
Hypalon® Rubber	Green Spot
White Natural	
Linatex®	

Diaphragm Options

Material	Code
Natural Rubber	D10
White Natural Rubber	D15
EPDM Rubber	D20
Butyl Rubber	D30
Nitrile Rubber	D40
Neoprene® Rubber	D50
Hypalon® Rubber	D60
Viton® Rubber	D70
Linatex®	

Special vacuum reinforced diaphragms add code letter [V] e.g. D10V

DIAVAL® DIAPHRAGM VALVES

Commissioning, Start-up and Maintenance Instructions of Manual Valves

GENERAL INFORMATION. WORKING PRINCIPLE AND DOCUMENTATION.

DIAVAL® Diaphragm Valves Weir type and Straight Through type are devised to stop fluids. Weir type diaphragm valves can also be used for throttling purposes by keeping the handwheel at intermediate positions, although it might accelerate erosion of diaphragm and body if position is near to the closed position. Turning the handwheel clockwise lowers the compressor which moves the diaphragm toward the bottom of the body to provide bubble-tight shutoff.

- They are designed, manufactured and tested in conformity to the most strict quality standards that the DIN EN ISO 9001 standard dictates.
- All valves are subject to individual hydro and leakage tests at our QC Dept. in conformity with EN 10.204/2.2. The testing medium is water at room temperature.
- Each manufactured batch is strictly controlled by the Diaval® Quality Section at the plant before dispatch. Extensive reports as per EN-10.204/3.1B are filled out and are submitted to the Purchaser if required. Moreover, witness testing carried out by 'Notify Bodies' are arranged upon request at our modern Testing Facilities.
- Valves are in conformity with PED 97/23/CE Article 3 Paragraph 3 Table 8.

They are many Diaval® valve combinations of body/bonnet/diaphragms which are subject to working pressure/temperature parameters. All operators should be aware of these parameters before installation of the valve. This information is contained in the Diaval® Technical Handbook which is freely available from www.diaval.com or by calling the Technical Section at Diaval®.

GUARANTEE.

DIAVAL® Diaphragm Valves are guaranteed against any manufacturing default in accordance to the 'Sound Engineering Practice' and provided the application, installation and maintenance operations have been properly followed and bearing in mind that:

- No claims derived from incorrect handling or use of the valve outside of technical parameters are accepted.
- The guarantee coverage does not apply to damages caused by operating the valve outside of the technical parameters and service conditions stated.
- The guarantee coverage does not cover for any commissioning or in site maintenance jobs or either products proved to have been tampered or faulted by material that has under gone fair wear and tear. It is to be pointed out that diaphragms are components clearly subject to a cycling wearing down depending on duties and it is advisable to foresee diaphragms as spares, specially if high number or cycles, high velocities, abrasive or corrosive media, or throttling services are foreseen.

ESSENTIAL SAFETY GUIDELINES.

- **DO NOT INSTALL** the valves before having carefully read this Operating Manual together with the Technical Handbook of the valve, in order to avoid prospective damages to people and property.
- Always use the valves within the scope of intended service and operating duties as per described in the Technical Handbook, essential safety working regulations are to be strictly kept.
- Only qualified personnel should start up and regularly follow maintenance jobs at the plant.
- Any deviation from the usual installation guidelines should be notified to us for recommendation and approval.

HANDLING.

- When loading or unloading the valves ensure that all procedures for correct lifting are strictly followed.
- When loading or unloading ensure that the valves are not subjected to any severe knocks.
- With heavy valves use the correct lifting equipment and ensure the valve is secure before lifting.
- In the case where a valve is dropped or subjected to a severe knock it should be thoroughly checked for external damage and replaced if necessary.
- Try not to damage external painting used to protect the valve during handling and storage.

STORAGE

Valve Spares: Diaphragms are manufactured to give long life under operating parameters for which the valve was designed. To achieve longevity, the following simple precautions should be adhered to when storing valves and components;

- Keep diaphragms in original packing and store in black bags on wooden shelving away from strong sunlight.
- Keep all protective packaging on spare valve bodies as supplied.

Complete Valves:

- Weir Type valves should be stored in their open position.
- Straight Through valves should be stored in the nearly closed position.

When valves are to be storaged for a while, it is a good practice to air blow the valves to remove the moisture that could have been adhered during carriage and could lead to external corrosion. Exposure to outdoors conditions, specially in industrial or marine atmospheres accelerates corrosion process and ageing of bodies and components.

VALVE BUILD-UP.

- Check that correct diaphragm matches the body style, i.e. Weir diaphragm fitted into a WeirType body and Straight Through diaphragm fitted into a Straight Through body.

Straight Through

Weir Type

DIAVAL® DIAPHRAGM VALVES

Commissioning, Start-up and Maintenance Instructions of Manual Valves

IMPORTANT NOTICE FOR ASSEMBLING BODY-BONNET:

Weir Type:

1. For elastomeric diaphragm (screwed connection), screw the diaphragm to the bonnet compressor until achieving contact between diaphragm and compressor. An excesive rotation strenght could lead to break the diaphragm screwed pin by torsion. Then loose some degrees of rotation until diaphragm and bonnet holes are aligned. For PTFE diaphragm (bayonet type connection), introduce the bayonet in the compressor hole and then turn the diaphragm 90º to get diaphragm and bonnet holes aligned. Make sure that PTFE diaphragm is provided with elastomeric safe that protects PTFE from the co mpressor action.
2. Ensure that diaphragm is in stand position (valve open once mounted).
3. Tight body-bonnet bolts in a crosswise, progressive and uniform manner, according to the recommended torque values in this manual.
4. Keep the valve in open position if storaged.

- Straight Through Type:

1. Screw elastomeric diaphragm to the bonnet compressor until achieving contact between diaphragm and compressor. An excesive rotation strenght could lead to break the diaphragm screwed pin by torsion. Then loose some degrees of rotation until diaphragm and bonnet holes are aligned.
2. Ensure that diaphragm is in stand position (valve closed once mounted).
3. Always check and adjust if necessary the maximum travel by turning the stem screw of the valve in relation to the bonnet in such a way that diaphragm rubber have enough contact with body seat surface. This allows to balance and avoid anormal wear of body linings and diaphragms sealing line.
4. Tight body-bonnet bolts slight, croswise and uniformly, making sure that diaphragm remains as centered as possible.
5. Proceed to make a complete travel of opening and closing of the valves to ensure the correct centering for the diaphragm.
6. Then retighten bolts according to the recommended torque values in this manual. Make sure that the valve is not completely closed to allow the tightening of the bolts without damaging the diaphragm.
7. Keep the valve near to close position if storaged.

INSTALLATION & START-UP.

When you make the choice of Diaval® Diaphragm Valves:

- Ensure that the specification of the valve and operating parameters are correct for the service.
- Ensure that the Diaphragm and Body Material are suitable for the line media.
- Ensure that the Line Pressure is within the valve specification.
- Check that the valve specification meets any standards and codes of practice applicable to the plant.
- Check that all pipe work is well placed, supported and aligned before installing the valve in order to prevent undue stress on the system and valve.
- All systems should be flushed to remove loose particles that could damage the valve lining and diaphragm.
- Remove the protective caps if they were still fit in.
- Stem can be installed at any position, better upwards and/or pointing far away from personnel in case of dangerous media.
- Before plant commissioning check that the body / bonnet nuts are tight to the correct torque above indicated.
- During initial plant start up, the body / bonnet nuts may, in a small number of cases, need to be re-torqued to allow for expansion / contraction of the diaphragm.
- Diaphragm Valves are bi-directional and not subject to any special restrictions.
- If the valves are to be re-painted after installation ensure that the valve is in the closed position and that the colour chosen does not cause confusion with the yellow colour of the indicator stem.

IT IS THE RESPONSIBILITY OF THE INSTALLER / OPERATOR TO ENSURE THAT ALL HEALTH & SAFETY REQUIREMENTS AS LAID DOWN BY THE CONTROLLING COMPANY ARE FOLLOWED.

VALVE OPERATING INSTRUCTIONS.

- Straight Through Diaphragm Valves are designed for On/Off operation only and should not be used for throttling or control.
- All valves are designed to give bubble-tight closure without any undue force.

DO NOT USE an extended lever, wrench or any other mechanical means to close the valve. Failure to observe this recommendation could lead to damage of the diaphragm and operating mechanism.

- Never exceed the maximum allowable working pressure/temperature of the valve and never install valves within 2-3 metres of bend and minimum 5 times valve diameter, specially on abrasive applications.

MAINTENANCE.

- Valves should be checked during use for signs of seepage and the need for maintenance.
- During planned shut down it is advisable to carry out routine maintenance of the valves.
- The valves can normally be dismantled in-situ whereupon valve linings and diaphragms should be checked for wear and / or damage.
- Replace worn bodies and diaphragms with genuine replacements from *DIAVAL®.*
- All pressure in the pipeline must be relieved before dismantling the valve.
- Appropriate safety clothing and precautions must be taken when dismantling valves that have been on toxic and corrosive duties.
- After removing any valve from the line ensure that it is decontaminated and made safe to handle. e.g. if the valve was handling inorganic acids wash thoroughly with copious amounts of cold water.
- During long periods of inactivity it is advisable to operate the valve to check for its correct performance.
- Before dismantling pneumatic actuators ensure the operator is aware of the type of actuator fitted i.e. spring closing / spring opening / double acting, and ensure spring tension inside the actuator is released, where necessary, before removing the actuator cover.

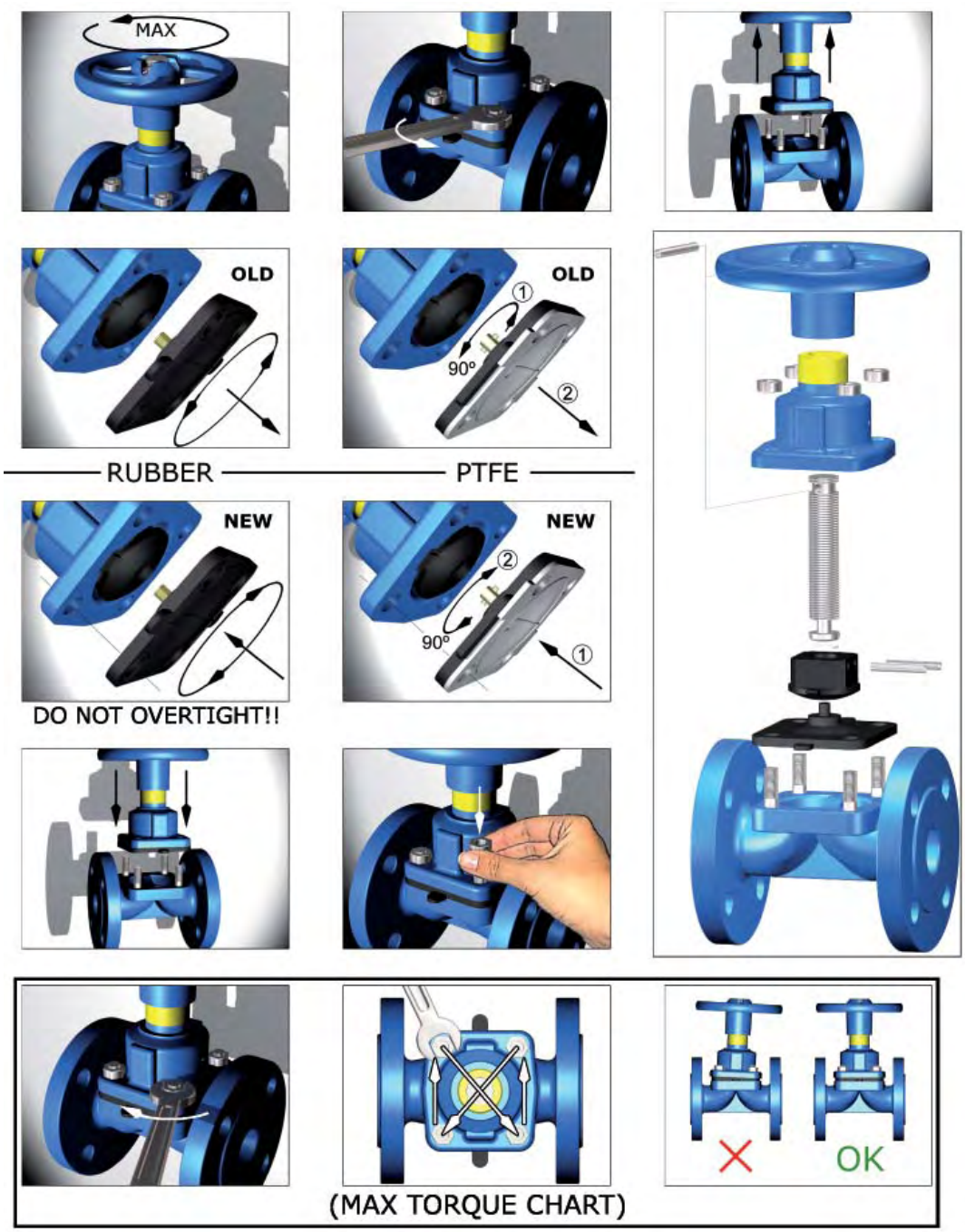
IMPORTANT

For maximum operating ratings and body/bonnet diaphragm combinations, refer to *DIAVAL®* Technical Handbook on its respective chapters (Weir Type and Straight Through Type).

Full Technical Support is always available from the Main Office in Valencia or from any of the International Offices.

DIAVAL® MANUAL VALVES

Brief Guide of Instructions (W Type)

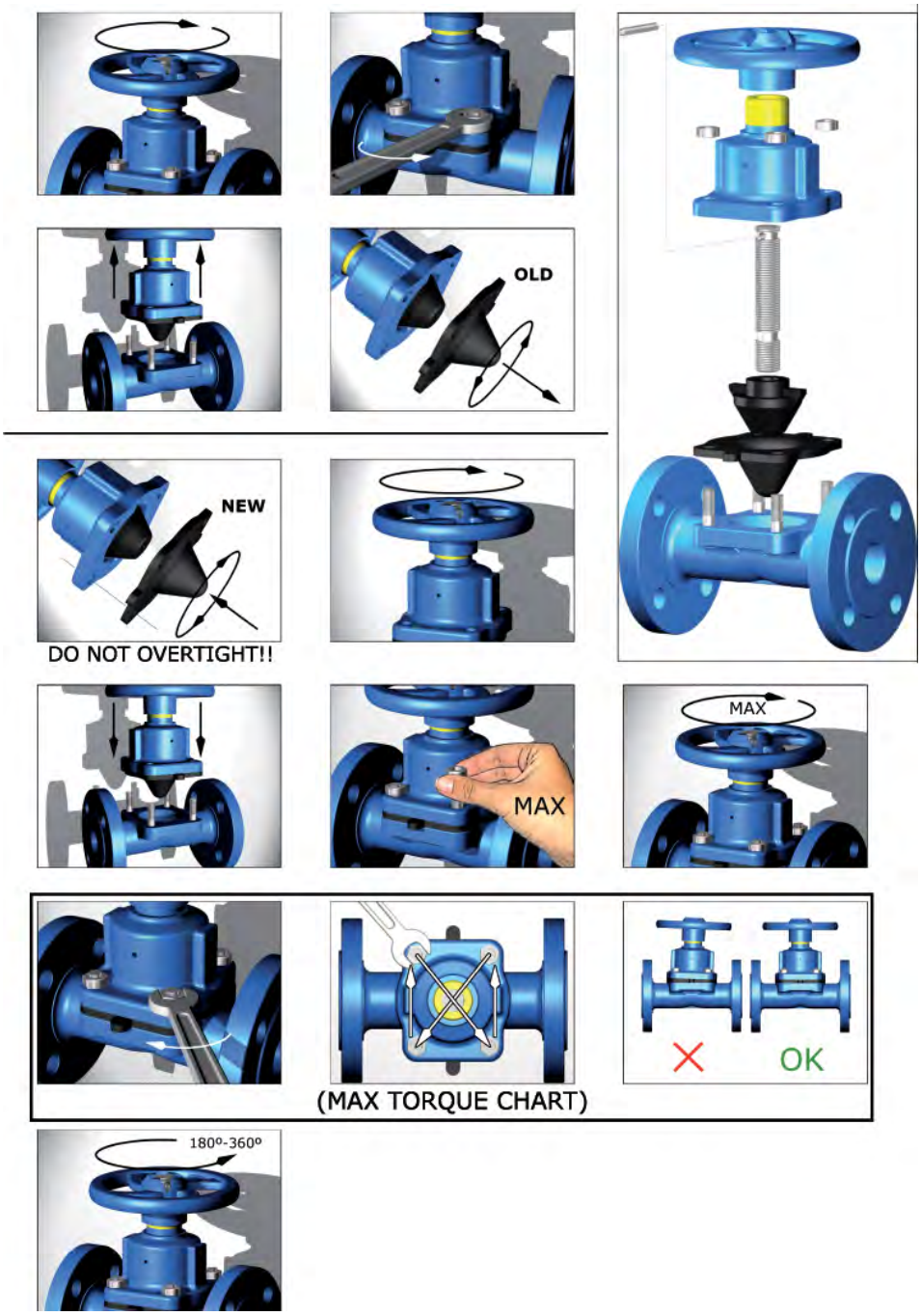


DN	lbs ft	Nm	DN	lbs ft	Nm	DN	lbs ft	Nm
15	4.0	5.0	50	18.5	26.0	150	60.0	81.0
20	4.0	5.0	65	26.0	36.0	200	74.0	100.5
25	4.5	6.5	80	37.0	50.0	250	82.0	111.0
32	6.0	8.2	100	30.0	40.0	300	93.0	126.0
40	10.0	12.5	125	34.0	45.0	350	93.0	126.0

STORAGE
-Keep diaphragms in original packing and protect against from sunlight.
REPLACEMENT PROCEDURE
-Select the right type of diaphragm i.e. W/ST/FF.
During valve build up:
-Check that valve & diaphragm material are compatible with the service (Check the tab on diaphragm for grade).
-Check that Body / bonnet fastenings are suitably tightened.
In case of trouble, contact your nearest dealer/distributor or www.diaval.com
Further operating and maintenance contractors are available at www.diaval.com

DIAVAL® MANUAL VALVES

Brief Guide of Instructions (ST Type)



DN	lbs ft	Nm	DN	lbs ft	Nm	DN	lbs ft	Nm
15	4.0	5.0	50	19.0	26.0	150	60.0	81.0
20	4.0	5.0	65	22.0	30.0	200	74.0	100.5
25	8.5	11.0	80	34.0	45.0	250	82.0	111.0
32	8.5	11.0	100	30.0	40.0	300	93.0	126.0
40	9.0	12.0	125	30.0	40.0			

STORAGE
-Keep diaphragms in original packing and protect against from sunlight.
REPLACEMENT PROCEDURE
-Select the right type of diaphragm i.e. W/ST/FF.
During valve build up:
-Check that valve & diaphragm material are compatible with the service (Check the tab on diaphragm for grade).
-Check that Body / bonnet fastenings are suitably tightened.
In case of trouble, contact your nearest dealer/distributor or www.diaval.com
Further operating and maintenance contractors are available at www.diaval.com

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct and Reverse Acting

Main Features

►Valid for all DIAVAL manufactured valves in weir and straight through type.
►To be operated with Rubber diaphragms and PTFE / rubber backed diaphragms.
►Rugged design, long life span at the plant.
►Rolling diaphragm design, allowing long cycle operations.
►Single acting (Direct and reverse actions) and double acting.
►Steel hot pressed actuator shell.
►Solid yoke material, no subject to breakages by plant vibrations, maintenance operations or fluid phenomena.
►High quality spring, large thrust.
►Visual position indicator for fully open, close and intermediate stroke.
►Solid actuator spindle.
►Top mounted emergency hand wheels for manual operation and thrust setting. Standard for single acting type.
►The open yoke style eases the assembly of control valve accessories.
►Easy and flexible maintenance.
►Fully traceable at the manufacture facility, identified by aluminum riveted plates.

Working Principle

Direct Acting actuator is designed to operate from a normally open position. Air pressure on the top side of actuator diaphragm closes the valve and the spring opens the valve when the air is released from the actuator.

Reverse Acting actuator is designed to operate from a normally closed position. Air pressure on the bottom side of the actuator diaphragm opens the valve. When air is released spring closes the valve.

Control Accesories

There is a number of control accessories available to be assembled on to the DIAVAL actuators. These accessories are comprehensive of Limit Switches (mechanical or inductive type), proximity sensors, solenoid valves, air speed regulator, positioner, air gauge set… and many other customized solutions.
Control accessories may be specified and provided by the customer or by DIAVAL, however, only those accessories installed and tested at any DIAVAL facilities are covered by a performance guarantee.

Tests - After Market

All actuators are tested after assembly and before dispatch. Tests are comprehensive of visual and functional tests as per DIN 3230 P.3 - EN.10.204/2.
Actuators can be serviced at DIAVAL facilities where a stock of common spares is permanently available. Off site service engineers are available on demand and against usual service rates.

Operating and Maintenance Instructions

Please ensure that the DIAVAL Operating and Maintenance Instructions are provided by your supplier along with the valves. Do not try to start maintenance without having read and understood the Essential Safety Guidelines. Operating and Maintenance Instructions can be downloaded from Internet at any time www.diaval.com

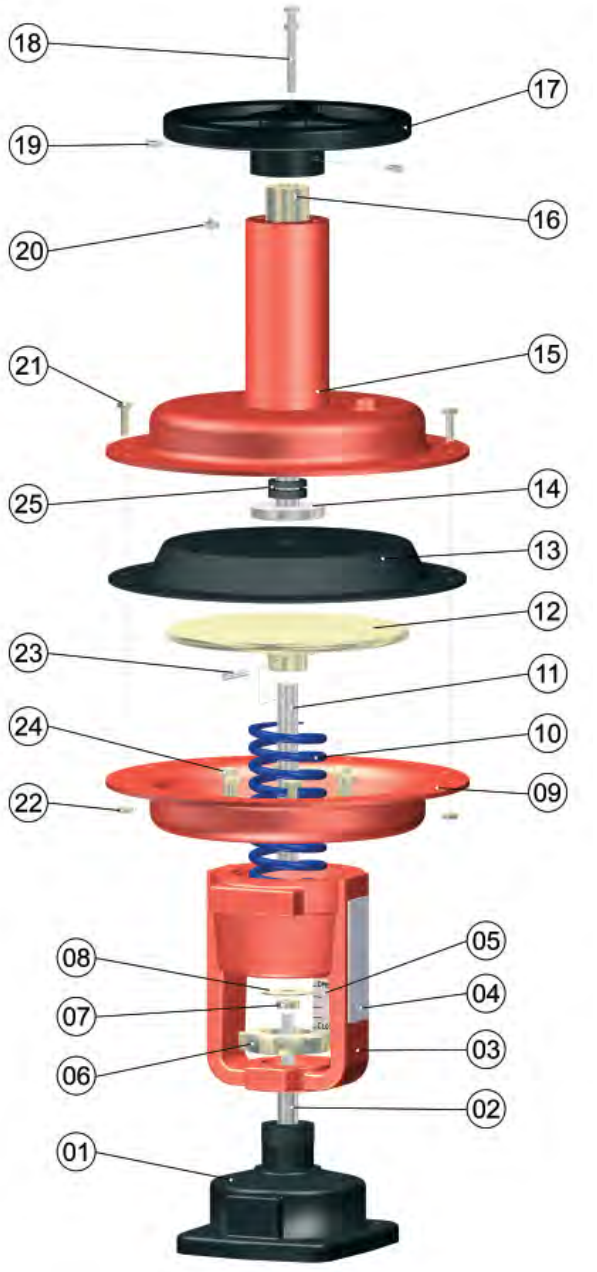
DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct Acting (spring to open, air to close)

Standard Materials

Only the best quality materials are incorporated to the DIAVAL manufacturing process and are subject to a strict quality control by our DIAVAL engineers at the assembly plant. The rubber diaphragm is manufactured by the associated Company Group – POLY RUBBER PRODUCTS – using their best experience on the polymer technology.
Any materials other than specified could be used on request.

Part	Description	Material
01	Valve Bonnet	--
02	Valve Spindle	--
03	Yoke	Ductile Iron
04	Label	Aluminium
05	Scale indicator	St. Steel SS304
06	Lock nut-yoke	Steel Plated
07	Lock nut valve spindle	Steel Plated
08	Travel indicator	St. Steel SS304
09	Lower casing assembly	Steel Pressing
10	Spring	Spring Steel
11	Actuator stem	St. Steel SS401
12	Diaphragm plate	Cast Iron
13	Actuator Diaphragm	Nitrile with nylon fabric.
14	Handwheel spindle	Steel Plated
15	Upper casing assembly	Steel Pressed
16	Handwheel bush	Steel
17	Handwheel	Cast Iron
18	Adjustable mech. stopper	Steel
19	Pin retainer (2 Nos)	Steel
20	Grease nipple	Steel
21	Actuator bolts	Steel
22	Actuator nuts	Steel
23	Cross pin	Steel
24	Lower casing bolts	Steel
25	U-seals	Neoprene



DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct Acting (spring to open, air to close) - For Weir Type Diaphragm Valves

Actuator Selection Chart

The below tabulation shows the complete manufacture range of actuators which are available at DIAVAL. Accurate selection can be done by plotting the valve DN with the line pressure column figure.
The air supply value of 3.5 barg is taken as average. Other parameters, please consult DIAVAL engineers.

MAX.WORKING PRESSURE (kg/cm²) at 0% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	**2,5**	**5**	**7,5**	**10**
15	109WT	109WT	109WT	1018WT
20	109WT	109WT	109WT	1018WT
25	109WT	109WT	109WT	1018WT
32	1018WT	1018WT	1035WT	1035WT
40	1018WT	1018WT	1035WT	1035WT
50	1018WT	1035WT	1035WT	1001WT
65	1035WT	1001WT	1002WT	1003WT
80	1035WT	1001WT	1002WT	1003WT
100	1002WT	1003WT	1004WT	1004WT
125	1003WT	1004WT	CONSULT DIAVAL	CONSULT DIAVAL
150	1005WT-S1	A1-300WT	1005DDWT	A1-300DDWT
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

MAX.WORKING PRESSURE (kg/cm²) at 100% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	**2,5**	**5**	**7,5**	**10**
15	109WT	109WT	109WT	109WT
20	109WT	109WT	109WT	109WT
25	109WT	109WT	109WT	109WT
32	1018WT	1018WT	1018WT	1018WT
40	1018WT	1018WT	1018WT	1018WT
50	1018WT	1018WT	1035WT	1035WT
65	1035WT	1001WT	1001WT	1002WT
80	1035WT	1001WT	1001WT	1002WT
100	1002WT	1002WT	1002WT	1003WT
125	1003WT	1003WT	1004WT	1004WT
150	1004WT	1005WT-S1	1005WT-S1	A1-300WT
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

Notes

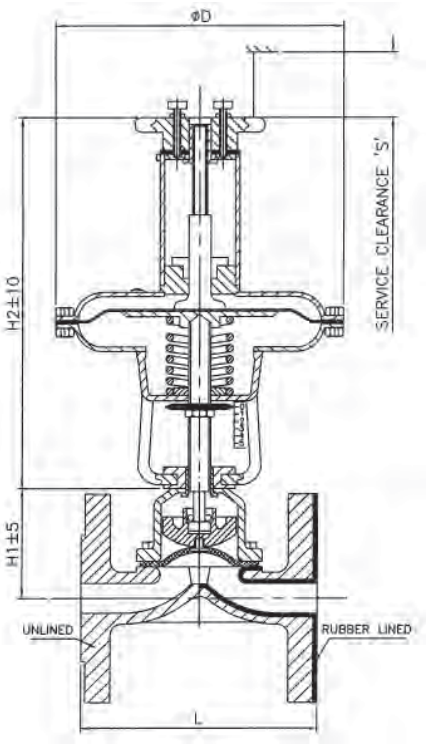
(1).- Some actuator models may be available in stock for ex-delivery, please allow more than a model in your selection.
(2).- R code denotes Reverse Acting.

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct Acting (spring to open, air to close)

Main Dimensions assembled with Weir Type Diaphragm Valves

	L				ACTUATOR				
	DIN* 3202F1	BS5156							
DN	UL/RL	UL	RL	H1	Model	H2	Ød	S	Weight
15	130	108	114	63	109WT	280	110	200	12
					1018WT	430	185	200	12
20	150	117	123	70	109WT	280	110	200	13
					1018WT	430	185	200	13
25	160	127	133	77	109WT	280	110	200	14
					1018WT	430	185	200	15
32	180	146	152	82	1018WT	430	185	200	17
					1035WT	440	235	200	20
40	200	159	165	109	1018WT	430	185	200	19
					1035WT	440	235	200	21
50	230	190	196	99	1018WT	430	185	200	24
					1035WT	440	235	200	26
					1001WT	470	276	200	32
65	290	216	222	126	1018WT	430	185	200	29
					1035WT	440	235	200	32
					1001WT	470	276	200	37
					1002WT	540	330	250	50
					1003WT	560	390	250	70
80	310	254	260	138	1035WT	440	235	200	39
					1001WT	470	276	200	44
					1002WT	540	330	250	54
					1003WT	560	390	250	62
100	350	305	313	165	1002WT	540	330	250	65
					1003WT	560	390	250	73
					1004WT	740	450	300	106
125	400	356	364	202	1003WT	560	390	250	90
					1004WT	740	450	300	123
150	480	406	414	252	1004WT	740	450	300	114
					1005WT	770	600	300	147
					A1-300WT	825	616	300	179
					1005DDWT	1010	600	350	199
					A1-300DDWT	1025	616	350	225
200	CONSULT DIAVAL								
250	CONSULT DIAVAL								
300	CONSULT DIAVAL								



Certified Drawings

Dimensions are based on the serialized manufacture and should be taken as preliminary. Our engineering section can issue certified drawings if required and on specific projects.
Please bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

* DIN 3202 F1: EN 558-1 Series 1

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct Acting (spring to open, air to close) - For Straight Through Type Diaphragm Valves

Actuator Selection Chart

The below tabulation shows the complete manufacture range of actuators which are available at DIAVAL. Accurate selection can be done by plotting the valve DN with the line pressure column figure.
The air supply value of 3.5 barg is taken as average. Other parameters, please consult DIAVAL engineers.

MAX.WORKING PRESSURE (kg/cm²) at 0% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	**2,5**	**5**	**7,5**	**10**
15	1018WT	1018WT	1035WT	1035WT
20	1018WT	1018WT	1035WT	1035WT
25	1018WT	1035WT	1035WT	1001WT
32	1018WT	1035WT	1035WT	1001WT
40	1018WT	1035WT	1035WT	1001WT
50	1035WT	1001WT	1002WT	1003WT
65	1002WT	1003WT	1004WT	1004WT
80	1003WT	1004WT	1005WT	A1-300WT
100	1003WT	10034WT	1005WT	A1-300WT
125	1005WT-S1	A1-300WT	1005DDWT	A1-300DDWT
150	CONSULT DIAVAL			
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

MAX.WORKING PRESSURE (kg/cm²) at 100% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	**2,5**	**5**	**7,5**	**10**
15	1018WT	1018WT	1018WT	1018WT
20	1018WT	1018WT	1018WT	1018WT
25	1018WT	1018WT	1035WT	1035WT
32	1018WT	1018WT	1035WT	1035WT
40	1018WT	1018WT	1035WT	1035WT
50	1035WT	1001WT	1001WT	1002WT
65	1002WT	1002WT	1002WT	1003WT
80	1003WT	1003WT	1004WT	1004WT
100	1003WT	1003WT	1004WT	1004WT
125	1004WT	1005WT-S1	1005WT-S1	A1-300WT
150	CONSULT DIAVAL			
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

Notes

(1).- Some actuator models may be available in stock for ex-delivery, please allow more than a model in your selection.
(2).- R code denotes Reverse Acting.

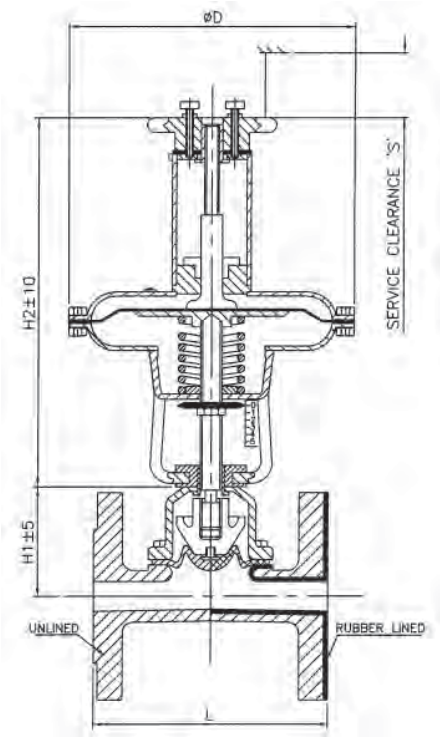
DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Direct Acting (spring to open, air to close)

Main Dimensions assembled with Straight Through Type Diaphragm Valves

	L				ACTUATOR				
	DIN* 3202F1	BS5156							
DN	UL/RL	UL	RL	H1	MODEL	H	Ød	S	Weight
15	130	108	114	68	1018WT	430	185	200	14
					1035WT	440	235	200	16
20	150	117	123	66	1018WT	430	185	200	14
					1035WT	440	235	200	16
25	160	127	133	96	1018WT	430	185	200	14
					1035WT	440	235	200	17
					1001WT	470	276	200	22
32	180	146	152	93	1018WT	430	185	200	17
					1035WT	440	235	200	20
					1001WT	470	276	200	25
40	200	159	165	96	1018WT	430	185	200	18
					1035WT	440	235	200	21
					1001WT	470	276	200	26
50	230	190	196	121	1035WT	440	235	200	25
					1001WT	470	276	200	31
					1002WT	540	330	250	41
					1003WT	560	390	250	49
65	290	216	222	139	1002WT	540	330	250	45
					1003WT	560	390	250	53
					1004WT	740	450	300	86
80	310	254	260	164,5	1003WT	560	390	250	62
					1004WT	740	450	300	95
					1005WT	770	600	300	127
					A1-300WT	825	616	300	147
100	350	305	313	183	1003WT	560	390	250	69
					1004WT	740	450	300	102
					1005WT	770	600	300	134
					A1-300WT	825	616	300	154
125	400	356	364	193,5	1004WT	740	450	300	116
					A1-300WT	825	616	300	168
					1005WT-S1	840	600	300	173
					A1-300DDWT	1025	616	350	183
					1005DDWT	1010	600	350	200
150	CONSULT DIAVAL								
200	CONSULT DIAVAL								
250	CONSULT DIAVAL								
300	CONSULT DIAVAL								

* DIN 3202 F1: EN 558-1 Series 1



Certified Drawings

Dimensions are based on the serialized manufacture and should be taken as preliminary. Our engineering section can issue certified drawings if required and on specific projects.
Please bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

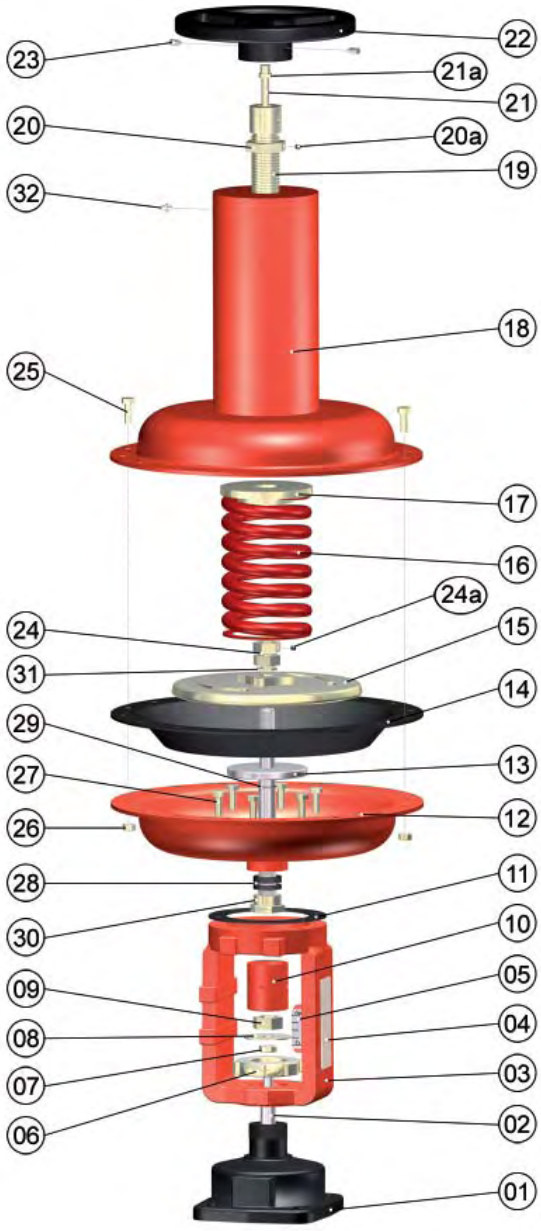
DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Reverse Acting (spring to close, air to open)

Standard Materials

Only the best quality materials are incorporated to the DIAVAL manufacturing process and are subject to a strict quality control by our DIAVAL engineers at the assembly plant. The rubber diaphragm is manufactured by the associated Company Group – POLY RUBBER PRODUCTS – using their best experience on the polymer technology.
Any materials other than specified could be used on request.

Part	Description	Material
01	Valve Bonnet	--
02	Valve spindle	--
03	Yoke	Ductile Iron
04	Label	Aluminium
05	Scale indicator	St. Steel SS304
06	Lock nut-yoke	Steel Plated
07	Lock nut valve spindle	Steel Plated
08	Travel indicator	St. Steel SS304
09	Stopped nut	Steel
10	Adjustable mech. Stop	Steel
11	Gasket	Neoprene
12	Lower casing assembly	Steel Pressed
13	Actuator stem	St. Steel SS410
14	Actuator Diaphragm	Nitrile with nylon fabric.
15	Diaphragm Plate	Cast Iron
16	Actuator Spring	Spring Steel
17	Spring retainer	Steel
18	Upper casing assly	Steel
19	Handwheel spindle	Steel Plated
20	Check nut	Steel
20a	Grub screw	Steel
21	Lifting screw	Steel Plated
22	Handwheel	Cast Iron
23	Retainers (2 Nos)	Steel
24	Actuator plate lock nut (2 Nos)	Steel
24a	Grub screw	Steel
25	Actuator bolts	Steel
26	Actuator nuts	Steel
27	Lower casing bolts	Steel
28	U-seals (2 Nos)	Neoprene
29	O ring	Neoprene
30	U-seals bush	Cast Iron
31	Split washer	Steel
32	Grease nipple	Steel



DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Reverse Acting (spring to close, air to open) - For Weir Type Diaphragm Valves

Actuator Selection Chart

The below tabulation shows the complete manufacture range of actuators which are available at DIAVAL. Accurate selection can be done by plotting the valve DN with the line pressure column figure.
The air supply value of 3.5 barg is taken as average. Other parameters, please consult DIAVAL engineers.

MAX.WORKING PRESSURE (kg/cm²) at 0% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	2,5	5	7,5	10
15	1018RWT	1018RWT	1018RWT	1018RWT
20	1018RWT	1018RWT	1018RWT	1018RWT
25	1018RWT	1018RWT	1018RWT	1018RWT
32	1018RWT	1035RWT	1035RWT	1035RWT
40	1018RWT	1035RWT	1035RWT	1035RWT
50	1035RWT	1035RWT	1002RWT	1002RWT
65	1001RWT	1002RWT	1003RWT	1004RWT
80	1002RWT	1003RWT	1004RWT	1005RWT
100	1003RWT	1004RWT	1005RWT	1005RWT
125	1004RWT	1005RWT	A2-300RWT	CONSULT DIAVAL
150	A2-300RWT-S1	1005DD-RWT	A2-300DD-RWT	CONSULT DIAVAL
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

MAX.WORKING PRESSURE (kg/cm²) at 100% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	2,5	5	7,5	10
15	1018RWT	1018RWT	1018RWT	1018RWT
20	1018RWT	1018RWT	1018RWT	1018RWT
25	1018RWT	1018RWT	1018RWT	1018RWT
32	1018RWT	1035RWT	1035RWT	1035RWT
40	1018RWT	1035RWT	1035RWT	1035RWT
50	1018RWT	1035RWT	1035RWT	1001RWT
65	1035RWT	1001RWT	1002RWT	1002RWT
80	1002RWT	1002RWT	1003RWT	1003RWT
100	1002RWT	1003RWT	1003RWT	1004RWT
125	1004RWT	1004RWT	1005RWT	1005RWT
150	1005RWT-S1	A2-300RWT-S1	CONSULT DIAVAL	1005DD-RWT
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

Notes

(1).- Some actuator models may be available in stock for ex-delivery, please allow more than a model in your selection.
(2).- R code denotes Reverse Acting.

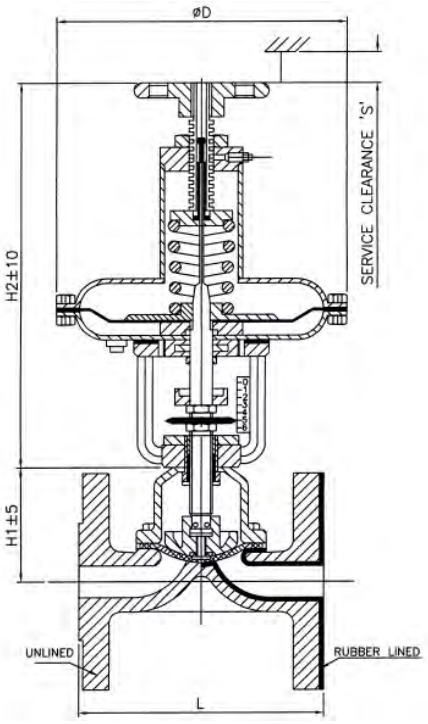
DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Reverse Acting (spring to close, air to open)

Main Dimensions assembled with Weir Type Diaphragm Valves

	L				ACTUATOR				
	DIN* 3202F1	BS5156							
DN	UL/RL	UL	RL	H1	Model	H2	Ød	S	Weight
15	130	108	114	63	1018RWT	470	185	200	14
20	150	117	123	70	1018RWT	470	185	200	15
25	160	127	133	77	1018RWT	470	185	200	16
32	180	146	152	82	1018RWT	470	185	200	19
					1035RWT	490	235	200	24
40	200	159	165	109	1018RWT	470	185	200	20
					1035RWT	490	235	200	25
50	230	190	196	99	1018RWT	470	185	200	25
					1035RWT	490	235	200	30
					1001RWT	540	276	250	38
					1002RWT	670	330	300	49
65	290	216	222	126	1035RWT	490	235	200	36
					1001RWT	540	276	250	43
					1002RWT	670	330	300	55
					1003RWT	740	390	300	61
					1004RWT	990	450	300	101
80	310	254	260	138	1002RWT	670	330	300	62
					1003RWT	740	390	300	68
					1004RWT	990	450	300	108
					1005RWT	1080	600	300	157
100	350	305	313	165	1002RWT	670	330	300	73
					1003RWT	740	390	300	79
					1004RWT	990	450	300	119
					1005RWT	1080	600	300	168
125	400	356	364	202	1004RWT	990	450	300	136
					1005RWT	1080	600	300	185
					A2-300RWT	1130	616	350	215
150	480	406	414	252	A2-300RWT-S1	1300	600	350	239
					1005DD-RWT	1290	600	500	279
					A2-300DD-RWT	1300	616	500	304
					1005RWT-S1	1120	600	350	320
200	CONSULT DIAVAL								
250	CONSULT DIAVAL								
300	CONSULT DIAVAL								

* DIN 3202 F1: EN 558-1 Series 1



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DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Reverse Acting (spring to close, air to open) - For Straight Through Type Diaphragm Valves

Actuator Selection Chart

The below tabulation shows the complete manufacture range of actuators which are available at DIAVAL. Accurate selection can be done by plotting the valve DN with the line pressure column figure.
The air supply value of 3.5 barg is taken as average. Other parameters, please consult DIAVAL engineers.

MAX.WORKING PRESSURE (kg/cm²) at 0% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	2,5	5	7,5	10
15	1018RWT	1035RWT	1035RWT	1035RWT
20	1018RWT	1035RWT	1035RWT	1035RWT
25	1035RWT	1035RWT	1035RWT	1035RWT
32	1035RWT	1035RWT	1002RWT	1002RWT
40	1035RWT	1035RWT	1002RWT	1002RWT
50	1001RWT	1002RWT	1003RWT	1004RWT
65	1003RWT	1004RWT	1005RWT	1005RWT
80	1004RWT	1005RWT	A2-300RWT	A2-300RWT
100	1004RWT	1005RWT	A2-300RWT	A2-300RWT
125	A2-300RWT-S1	1005DD-RWT	A2-300DD-RWT	A2-300DD-RWT
(*)150	CONSULT DIAVAL			
200	CONSULT DIAVAL			
250	CONSULT DIAVAL			
300	CONSULT DIAVAL			

(*) 90 mm max.stroke

MAX.WORKING PRESSURE (kg/cm²) at 100% ΔP - Air supply 3,5 to 4 kg/cm²				
DN	2,5	5	7,5	10
15	1018RWT	1035RWT	1035RWT	1035RWT
20	1018RWT	1035RWT	1035RWT	1035RWT
25	1018RWT	1035RWT	1035RWT	1001RWT
32	1018RWT	1035RWT	1035RWT	1001RWT
40	1018RWT	1035RWT	1035RWT	1001RWT
50	1035RWT	1001RWT	1002RWT	1002RWT
65	1002RWT	1003RWT	1003RWT	1004RWT
80	1004RWT	1004RWT	1005RWT	1005RWT
100	1004RWT	1004RWT	1005RWT	1005RWT
125	1005RWT-S1	A2-300RWT-S1	A2-300RWT-S1	1005DD-RWT
(*)150				
200				
250				
300				

(*) 90 mm max.stroke

Notes

(1).- Some actuator models may be available in stock for ex-delivery, please allow more than a model in your selection.
(2).- R code denotes Reverse Acting.

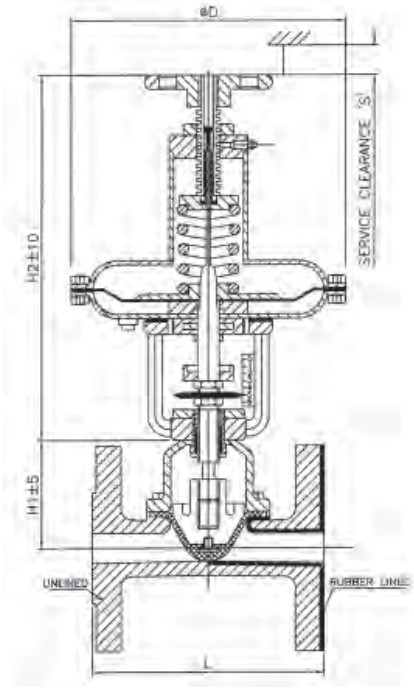
DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Reverse Acting (spring to close, air to open)

Main Dimensions assembled with Straight Through Type Diaphragm

	L				ACTUATOR				
	DIN* 3202F1	BS5156							
DN	UL/RL	UL	RL	H1	MODEL	H	Ød	S	Weight
15	130	108	114	68	1018RWT	470	185	200	15
					1035RWT	490	235	200	20
20	150	117	123	66	1018RWT	470	185	200	15
					1035RWT	490	235	200	20
25	160	127	133	96	1018RWT	470	185	200	16
					1035RWT	490	235	200	21
					1001RWT	540	276	250	28
					1002RWT	670	330	300	40
32	180	146	152	93	1018RWT	470	185	200	19
					1035RWT	490	235	200	24
					1001RWT	540	276	250	31
					1002RWT	670	330	300	43
40	200	159	165	96	1018RWT	470	185	200	20
					1035RWT	490	235	200	25
					1001RWT	540	276	250	32
					1002RWT	670	330	300	44
50	230	190	196	121	1035RWT	490	235	200	29
					1001RWT	540	276	250	37
					1002RWT	670	330	300	48
					1003RWT	740	390	300	55
					1004RWT	990	450	300	95
65	290	216	222	139	1002RWT	670	330	300	53
					1003RWT	740	390	300	59
					1004RWT	990	450	300	99
					1005RWT	1080	600	300	148
80	310	254	260	164,5	1004RWT	990	450	300	108
					1005RWT	1080	600	300	157
					A2-300RWT	1130	616	350	187
100	350	305	313	183	1004RWT	990	450	300	115
					1005RWT	1080	600	300	164
					A2-300RWT	1130	616	350	194
125	400	356	364	193,5	A2-300RWT-S1	1300	616	350	228
					1005RWT	1290	600	500	248
					A2-300DDRWT	1300	616	500	273
					1005RWT-S1	1120	450	350	183
150	CONSULT DIAVAL								
200	CONSULT DIAVAL								
250	CONSULT DIAVAL								
300	CONSULT DIAVAL								

* DIN 3202 F1: EN 558-1 Series 1



Certified Drawings

Dimensions are based on the serialized manufacture and should be taken as preliminary. Our engineering section can issue certified drawings if required and on specific projects.
Please bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Commissioning, Start-up and Maintenance Instructions of Actuated Valves

GENERAL INFORMATION. WORKING PRINCIPLE AND DOCUMENTATION.

- DIAVAL® Diaphragm Pneumatic Actuators are devised to operate diaphragm valves by means of an air supply to an enclosed cylinder which in turn expands or compresses a spring assembly. This spring assembly is connected by a spindle to the valve compressor to which the line diaphragm is attached.
- The range of Diaval® Pneumatic Actuators are manufactured and tested to conform to quality standards of DIN EN ISO 9001.
- Data Sheets are available detailing performance criteria of the full range of Diaval® Pneumatic Actuators.
- Diaval® reserves the right to modify any of all of the actuators due to development and improvement that may be deemed necessary at any time.
- Diaval® Pneumatic Actuator Data Sheets are freely available in .pdf format via the Diaval® website at www.diaval.com or by contacting the Diaval® Technical Sales Team on +34 96 147 90 06.

GUARANTEE.

- DIAVAL® Diaphragm Pneumatic Actuators are guaranteed for a period of one year from the date of purchase against any manufacturing defect that may have occurred in accordance to the 'Sound Engineering Practices' employed.
- DIAVAL® Diaphragm Pneumatic Actuators are guaranteed to perform in accordance with the operating criteria as stated in the available Data Sheets.
- The guaranteed becomes null and void should the actuator be subjected to mishandling, and operating parameters outside those detailed on the data sheets.
- The guarantee does not cover wear and tear of any actuator components of that have occurred and which are deemed to have been subjected to excess use.

ESSENTIAL SAFETY GUIDELINES.

It is essential that all Health and Safety Instructions which are in force and implemented by the purchaser and/or his/her Company are followed at all times.
These instructions may override any recommendations supplied by DIAVAL® which are considered necessary.

- DO NOT INSTALL the equipment before carefully reading and understanding the DIAVAL® Operating Instruction Sheets which are attached/ supplied with each valve.
- DO NOT USE the valve and/or actuator outside the operating parameters for which it is intended as described in our data sheets, essential safety working regulations are to be strictly kept.
- Only qualified personnel should start up and regularly follow maintenance jobs at the plant.
- Any deviation from the usual installation guidelines should be notified to us for recommendation and approval.

Operating parameters of the full range of DIAVAL® Diaphragm Valves and Actuators are available from the DIAVAL® Technical Department or via the DIAVAL® website at www.diaval.com.

STORAGE & HANDLING.

Should storage or decommissioning of the actuator be necessary, the following guidelines are recommended:

- Air connections should be covered or plugged to prevent ingress of dirt and other foreign material which could affect valve/actuator operation on start-up.
- Valve flanges should be protected using the end-cap protection covers supplied with the valve upon delivery.
- Exposed parts such as operating spindle, should be sprayed/coated with a film of grease to prevent corrosion from the environment.
- When dismantling the actuator and/or valve ensure all safety precautions relating to "the lifting of heavy objects" are followed.

INSTALLATION & START-UP.

Bear in mind the following guidelines along with general installation practices:

- Ensure that air supply to the actuator is within the recommendations and parameters as detailed in the Operating Data Sheets. Excess air pressure can be dangerous to the operators and easily damage the valve actuator and valve components.
- Ensure that actuator is not oversized to prevent premature valve diaphragm rupture.
- Check that actuator function is the correct regarding safe position at air failure (air to open, air to close or double acting).
- Allow for enough space to ease maintenance operations.
- Remove the protective covers if they were still fit.
- The actuated valve should preferably be installed in straight pipe runs, with a minimum distance of 5 times valve diameter away from pipe bends and 'T' connections.
- The preferred position is with actuator vertically above the valve body, at an angle of 15-20 degrees from the horizontal plane of the pipe to ensure self drainage if on the open position. It may installed in different position provided that sufficient support is given to the actuator.
- For Air to Open valve, refer to drawing 1:

Valve closes upon air failure. Before installing ensure that the scale indicator (5 & 7) is in its closed position. If the scale indicator is not in its closed position, rotate the handwheel (21) until the check nut (19) comes to rest on the spring chamber.
In this position the valve attains the 'factory set' position for the desired line pressure, and the position indicator will show 'the closed position'.

- For Air to Close valve, refer to drawing 2:

Valve opens upon air failure. Before installing the valve ensure that the scale indicator (5 & 8) is in its open position. If the scale indicator is not in its open position, rotate the handwheel (17) anticlockwise until the indicator shows that the valve is in its open position.

- Check performance of the valve and actuator assembly, by applying the correct operating air pressure to the actuator as specified on the attached label.
- Ensure that 100% leak-tightness is obtained with the valve in the closed position.
- When the valves are manually operated, it is essential that the air is vented/released from the valve actuator-diaphragm casing.

CAUTION: USE OF EMERGENCY HANDWHEEL (part 21(drawing 1) or 17 (drawing 2))

Handwheel is used either for adjustment of spring tension and for emergency operation. Never operate handwheel unless air is free released/vented from the actuator.
After use of handwheel for emergency operation, actuator adjustment has to be rechecked as per explained in the previous paragraphs.

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Commissioning, Start-up and Maintenance Instructions of Actuated Valves

MAINTENANCE AND SERVICE.
Preventative maintenance schedules as defined by the 'Codes of Practice" issued by the purchasing Company should be followed.
The following guidelines are also recommended:
- Actuated valves that are left normally closed or open for long periods of time should occasionally be operated in order to ensure movement of the operating parts.
- Greasing of the actuator stem should be periodically carried out.
- Ensure complete understanding of valve and actuator workings before attempting dismantling of the valve and/or actuator.
- Ensure valve and actuator is at ambient temperature before attempting to service.
- Ensure air is released from the actuator before attempting to service.
- Ensure operating line pressure is eliminated before attempting to dismantle or remove the valve from the line.
- Ensure full 'Health and Safety' instructions and procedures are followed in the event that the line fluid is classified as toxic, corrosive or flammable.
- If the valve was not assembled on the 'self-drawn' position, ensure caution is taken if valve is removed from the line due to the possibility of line fluid being present in the valve.

– Recommended Spare Parts. Replacement.

AIR TO OPEN PNEUMATIC ACTUATOR (drawing 1):
- Spring (15)
- Operating Diaphragm (13)
- Seals (set of 2) (27)
- Gasket (10)

To replace the above spare parts, please proceed as follows :

Spring (15), drawing 1:
1) Ensure that all operating air supplies are disconnected from the actuator.
   By means of rotating the handwheeel (21) in an anticlockwise direction ensure that the valve is in the open position and compression on the spring is removed.
2) Remove the handwheel (21) by means of unscrewing the two pin retainers (22).
3) Unscrew lifting screw (20) fully clockwise through the bore of the handwheel spindle (18) (use a long-blade screwdriver to achieve this).
4) Unscrew casing fastenings (24 & 25).
5) Remove upper casing (17), remove retainer (16) and finally remove spring-pack (15).
6) Replace new spring pack (15) onto the diaphragm plate (14) and refit spring retainer (16) ensuring that spring is vertical when in place.
   Replace the upper casing (17) and replace/tighten the casing fastenings (24 & 25).
   Rotate the handwheel (21) clockwise until the factory set check nut (19) locates on top of the housing.
   The check nut is pre-set at the factory in order to achieve correct tension on the spring-pack which in turn is dictated by the operating conditions and available operating air pressure.
   Screw the lifting screw (20) anticlockwise fully through the bore of the handwheel spindle (18).
   Finally carry out a leak test of the casing by connecting the air pressure to the actuator and applying correct pressure as specified on the label (4)
   The actuator, if dismantled from the valve, can then be remounted on the valve and connected to the valve spindle (2) by rotating clockwise until it reaches the scale indicator indicator (05).
   Finally tighten the yoke lock-nut (6).

Actuator Diaphragm (13), drawing 1:
Follow steps 1-5 as above.
Unscrew grub screw (23a) on the nut (23).
Unscrew the retaining nut (23), remove the spring washer (30) and diaphragm plate (14) and finally the actuator diaphragm (13).
Assembly: Before re-fitting the new actuator diaphragm, it is essential to examine it to ensure it is in good condition – no cracks in the rubber surface; no cut-marks; no damage to the outer sealing edge and bolt-holes-.
Inspect the old actuator diaphragm for signs of wear due to over-closure and *too much* operating air pressure.
After replacing the new actuator diaphragm, replace the diaphragm plate (14), and spring washer (30).
Finally tighten fully the nut (23) and lock with the grub screw (23a).
Proceed from step 6 above in order to complete reassembly of the valve.

Seals (27), drawing 1:
Follow steps 1-3 of spring replacement procedure. Then proceed as follows:
Unscrew the yoke lock-nut (6) to disconnect the actuator from the body. This is easily achieved by rotating the actuator anticlockwise until the valve spindle (2) disengages from the actuator stem (12).
Continue by following steps 4 and 5 of spring replacement procedure. After completion unscrew the grub screw (23a) on the lock nut (23) – used to tighten the actuator diaphragm (18), and the diaphragm plate (20) to the actuator stem (15). Unscrew the nut (23) fully to remove the spring washer (30), diaphragm plate (14) and actuator diaphragm (13).
Rotate anticlockwise the mechanical stop (9) with the nut (8) and then proceed to rotate and remove the bushing (29).
The seals (27) can now be easily removed.
Assembly: To assemble a new set, examine them to ensure they are not damaged in any way.
As with the fitting of any rubber seals/'o' rings, it is advisable to smear the item with grease.
When fitting ensure that the seal is fitted the correct way with the 'cup-side' facing down and flat side upper most. Refit the back bushing (29) and adjustable mechanical stop (9) and nut (8). Reassemble the actuator by following the instructions given for assembly of actuator diaphragm above.

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Commissioning, Start-up and Maintenance Instructions of Actuated Valves

Gasket (10), drawing 1:
Follow instructions for removal of seals (27) to the point that they have been removed.
Next remove the actuator stem (12) from the actuator assembly.
Remove the yoke studs (26) and separate the yoke from the lower casing assembly (11).
The gasket (10) can now be easily replaced.
Assembly: Assemble the lower casing (11) with the yoke (3) by tightening yoke studs (26) properly/fully and then proceed as per assembly instructions given above for seals.

IMPORTANT.AIR TO OPEN ACTUATOR SETTING :
Once maintenance service has been completed, adjustment of travel and tightness of the valve must be checked.

In case of need proceed as follows:
1. Unscrew the Locking Grub screw (19a) on the check nut (19).
2. Rotate the check nut (19) in anticlockwise direction.
3. Rotate the Handwheel (21) in clockwise direction till the valve seat tightness is achieved and travel indicator (5 & 7) is in its closed position.
4. Tighten the check nut (19) over upper casing (17).
5. Lock the grub screw (19a) fully.

AIR TO CLOSE PNEUMATIC ACTUATOR (drawing 2):
- Diaphragm (13)
- Spring (10)
- U-Seals, set of 2 (25)

Replacement of the above parts can be achieved as follows:

Diaphragm (13) Drawing 2
1) Ensure that the valve is in the fully open position - this is achieved when operating air is disconnected - if necessary further rotate the handwheel (21) anticlockwise with the air connection free in order to ensure valve is in its fully open position.
2) Unscrew fastenings of the actuator housing (22 & 21).
3) Remove the upper casing (15). Now the diaphragm (13) can be replaced.
4) After diaphragm replaced, reassemble the upper casing (15) by tightening fastenings of the actuator housing (22 & 21).
In case of need turn the handwheel fully anticlockwise to allow fastenings to be tightened.
Carry out leak test using an operating air pressure as specified on the label.

Spring (10) Drawing 2
Follow steps 1-3 above.
Remove the diaphragm (13), remove the cross pin (23) and then remove the plate (12).
Now the spring can be replaced.
Refix the plate (12) by means of cross pin (23), then place the diaphragm (13) (check it in order to make sure it is not damaged) and then follow step 4 above.

U-Seals (25) Drawing 2
Follow steps 1-3 above. (in this case it is not necessary to remove the diaphragm (13)).
Unscrew and remove the stem (14).
Now the U-Seals (25) can be reached inside the upper casing (15), and can be replaced.
To reassemble again, reinsert and fully screw the stem (14), and then follow step 4 above.

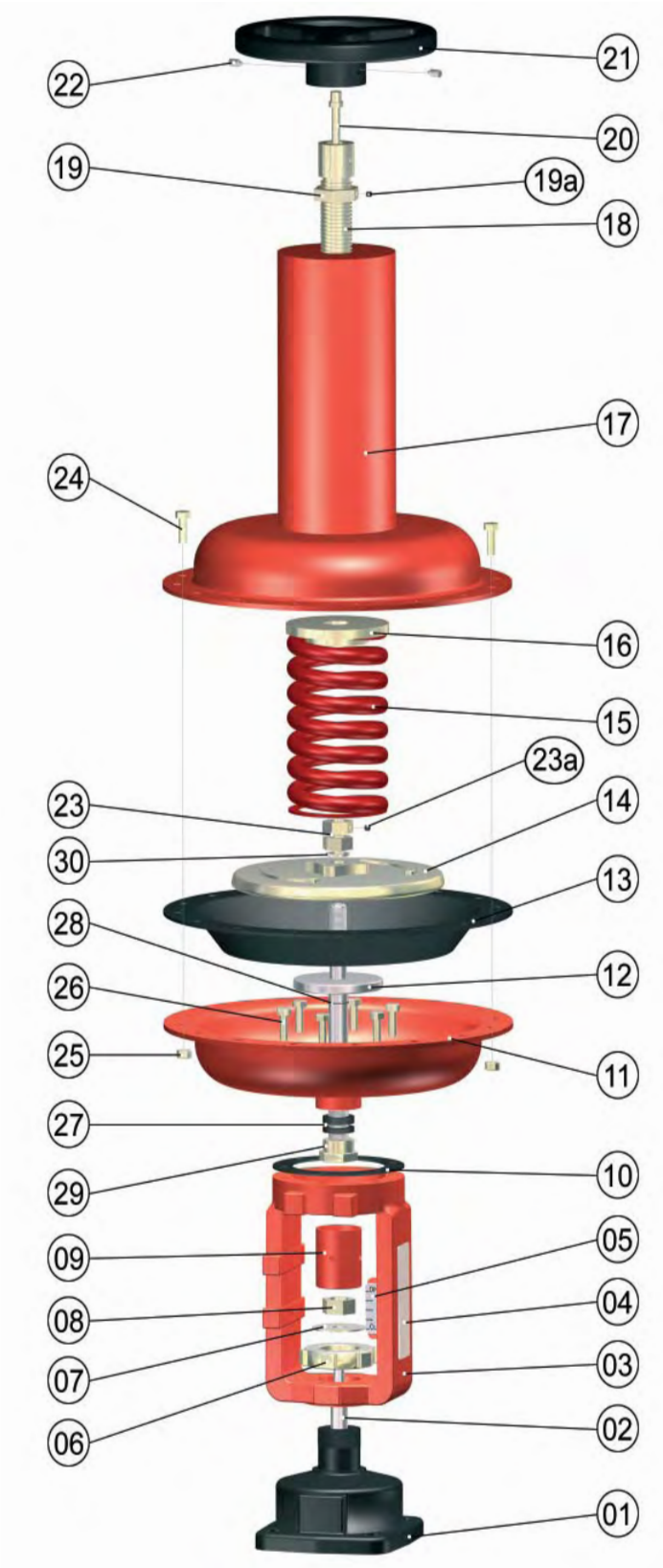
IMPORTANT.AIR TO CLOSE ACTUATOR SETTING:
Once maintenance service has been completed, adjustment of travel and tightness of the valve must be checked.
If the indicator (5 & 8) is not in the open position, rotate the handwheel (17) anticlockwise until the indicator shows that the valve is in its open position. Check performance of the valve and actuator assembly, by applying the correct operating air pressure to the actuator as specified on the label of the actuator. Ensure that 100% leak-tightness is obtained with the valve in the closed position. Opening of the valve can be limited by adjusting the Mechanical Stoppers (18) provided at the top of the handwheel (17).

Full Technical Support is always available from the Main Office in Valencia or from any of the International Offices.

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Commissioning, Start-up and Maintenance Instructions of Actuated Valves

DRAWING 1 - AIR TO OPEN

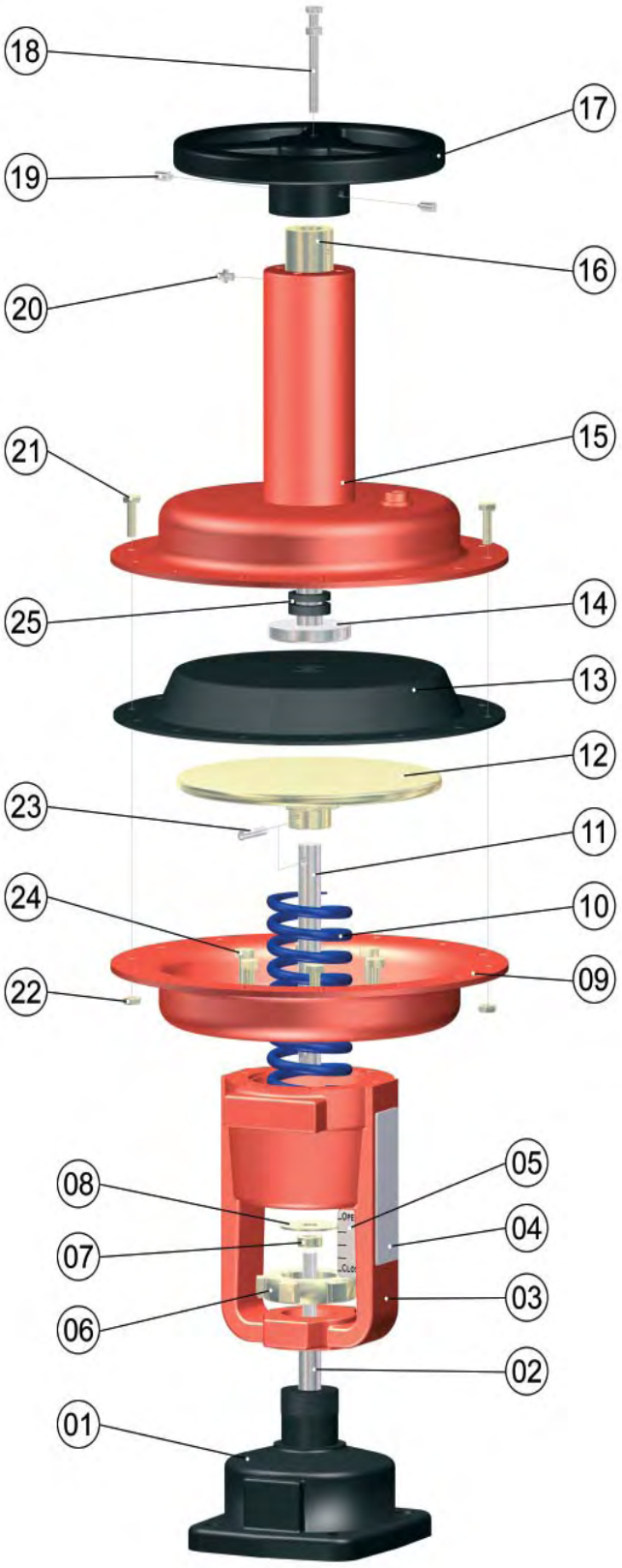


Nº	PART LIST
01	Valve Bonnet
02	Valve spindle
03	Yoke
04	Label
05	Scale indicator
06	Lock nut-yoke
07	Travel indicator
08	Lock nut valve spindle
09	Adjustable mech. Stop
10	Gasket
11	Lower casing assembly
12	Actuator stem
13	Actuator Diaphragm
14	Diaphragm Plate
15	Spring
16	Spring retainer
17	Upper casing assly
18	Handwheel spindle
19	Check nut
19a	Grub screw
20	Lifiting screw
21	Handwheel
22	Retainers (2 Nos)
23	Nut plate (2 Nos)
23a	Grub screw
24	Studs
25	Nuts
26	Studs
27	U-seals (2 uds)
28	O ring
29	U-seals bush
30	Washer

DIAVAL® DIAPHRAGM VALVES - PNEUMATIC ACTUATORS

Commissioning, Start-up and Maintenance Instructions of Actuated Valves

DRAWING 2 - AIR TO CLOSE



Nº	PART LIST
01	Valve Bonnet
02	Valve Spindle
03	Yoke
04	Label
05	Scale indicator
06	Lock nut-yoke
07	Lock nut valve spindle
08	Travel indicator
09	Lower casing assembly
10	Spring
11	Actuator stem
12	Diaphragm plate
13	Actuator Diaphragm
14	Handwheel spindle
15	Upper casing
16	Handwheel bush
17	Handwheel
18	Adjustable mech. stopper
19	Pin retainer (2 Nos)
20	Grease nipple
21	Studs
22	Nuts
23	Cross pin
24	Studs
25	U-seals

DIAVAL® DIAPHRAGM VALVES

Specification Data Sheet

PROJECT							PAGE Nº		
CUSTOMER							REF		
TAG									
LINE									
FLUID									
STATE									
CONCENTRATION %									
TEMPERATURE									
INLET PRESSURE									
FLOW RATE									
VALVE DATA									
SIZE									
DESIGN	WEIR	ST	FF	WEIR	ST	FF	WEIR	ST	FF
F/F LENGTH									
ENDS									
Kvs / Cv									
ΔP									
BODY MATERIAL									
LINING MATERIAL									
DIAPHRAGM MATERIAL									
BONNET ASSEMBLY									
STEM MATERIAL									
HANDWHEEL	YES / RISING STEM			YES / RISING STEM			YES / RISING STEM		
ACTUATOR DATA									
TYPE	▪ PNEUMATIC			▪ PNEUMATIC			▪ PNEUMATIC		
	▪ ELECTRIC			▪ ELECTRIC			▪ ELECTRIC		
ACTUATOR DESIGN	▪ spring diaphragm	▪ piston type		▪ spring diaphragm	▪ piston type		▪ spring diaphragm	▪ piston type	
FUNCTION									
DIAPHRAGM AREA									
MAX. AIR SUPPLY									
VOLTAGE									
POWER (Kn)									
EMERGENCY H/W	▪ YES	▪ NO		▪ YES	▪ NO		▪ YES	▪ NO	
CONTROL ACCESSORIES									
▪ SOLENOID VALVE	▪ 3/2 W.	▪ 5/2 W.		▪ 3/2 W.	▪ 5/2 W.		▪ 3/2 W.	▪ 5/2 W.	
VOLTAGE									
PROTECTION									
▪ POSITIONER (I/P)									
SIGNAL									
PROTECTION									
▪ SPEED FLOW VLV.	▪ YES	▪ NO		▪ YES	▪ NO		▪ YES	▪ NO	
▪ AIR SET	▪ YES	▪ NO		▪ YES	▪ NO		▪ YES	▪ NO	
▪ LIMIT SWITCH	▪ YES	▪ NO		▪ YES	▪ NO		▪ YES	▪ NO	
TYPE									
QUANTITY									
CONTACT	▪ OPEN	▪ CLOSE		▪ OPEN	▪ CLOSE		▪ OPEN	▪ CLOSE	
PROTECTION									
▪ TUBING									
OTHER									
VALVE AND ACTUATOR MODEL NR.									
MODEL Nº									
ACCESSORIES MODEL Nº									
SOLENOID									
POSITIONER									
LIMIT SWITCH/ES									
REMARKS									

DIAVAL® DIAPHRAGM VALVES

Material Selection

Information contained in the Material Selection Chart is a combination of theoretical and application data, and should be taken as a guide only.
With constant material / process changes, Diaval® cannot accept responsibility for diaphragm and/or body material performance resulting from such changes.

Fluid	Body Material		Diaphragm		Notes
Abrasive Slurry - Non Acidic	Soft Rubber Lined	Ductile Iron	D10	D20 or D30	
Abrasive Slurry - Acidic	Butyl Lined		D20 or D30		
Acetic Acid up to 50%	Halar Lined	FEP Lined	D20 or D30		
Acetic Acid over 50%	Halar Lined	FEP Lined	D20 or D30		
Acetic Acid (Glacial)	Halar Lined	FEP Lined	D20 or D30		Sealed Bonnet
Acetoacetic Ester	Halar Lined	Stainless Steel	D90		
Acetone	Ductile Iron		D20 or D30		
Acetylene	Ductile Iron	Cast Steel	D20 or D30		No Copper
Alum	Hard Rubber Lined	Soft Rubber Lined	D10	D20 or D30	
Alumina	Ductile Iron	Soft Rubber Lined	D20 or D30	D10	
Aluminium Sulphate	Hard Rubber Lined	Butyl Rubber Lined	D10	D20 or D30	
Ammonia, Aqueous	Ductile Iron	Stainless Steel	D10	D20 or D30	Sealed Bonnet
Ammonia Gaseous	Ductile Iron	Stainless Steel	D10	D20 or D30	Sealed Bonnet
Ammonium Nitrate	Butyl Rubber Lined	FEP Lined	D20 or D30	D93/20	
Ammonium Phosphate	Butyl Rubber Lined		D10	D20 or D30	
Ammonium Sulphate	Butyl Rubber Lined		D20 or D30	D10	
Aniline	FEP Lined	Stainless Steel	D93/70		
Antifreeze	Ductile Iron	Butyl Rubber Lined	D2 or D30	D10	
Apple Juice	Stainless steel		D15		
Asbestos Cement	Soft Rubber Lined	Ductile Iron	D10		
Ash Handling	Soft Rubber Lined	Ductile Iron	D10		
Asphalt	Ductile Iron	Cast Steel	D93/70		
Avcat	Stainless steel	Cast Steel	D70	D40	
Avgas	Stainless steel	Cast Steel	D70	D40	
Avtag	Stainless steel	Cast Steel	D70	D40	
Avtur	Stainless steel	Cast Steel	D70	D40	
Barium carbonate	Hard Rubber Lined	Stainless Steel	D20 or D30	D10	
Barium Sulphate	Soft Rubber Lined	Hard Rubber Lined	D20 or D30		
Barytes	Soft Rubber Lined	Hard Rubber Lined	D10	D20 or D30	
Basic Slag	Soft Rubber Lined	Ductile Iron	D10		
Battery Acid	Hard Rubber Lined	Butyl Rubber Lined	D20 or D30	D70	
Bauxite	Soft Rubber Lined		D10		
Beet Juice	Ductile Iron	Hard Rubber Lined	D20 or D30	D10	
Benzene	Ductile Iron	Halar Lined	D93/70	D70	
Benzyl Alcohol	FEP Lined	Halar Lined	D93/70		Sealed Bonnet
Bilge (ships)	Ductile Iron	Cast Steel	D40	D70	
Blast Furnace Gas	Ductile Iron	Cast Steel	D20 or D30	D50	
Bleaching Powder	Hard Rubber Lined	Hypalon lined	D60	D10	
Borax	Hard Rubber Lined		D10	D20 or D30	
Brine	Hard Rubber Lined	Stainless steel	D10	D20 or D30	
Brine, Chlorinated	Hard Rubber Lined	Hypalon lined	D60	D70	

DIAVAL® DIAPHRAGM VALVES

Material Selection

Fluid	Body Material		Diaphragm		Notes
Bromine	FEP Lined		D93/70		Sealed Bonnet
BCF	Ductile Iron		D93/20		
Butane	Ductile Iron	Cast Steel	D40	D50	Sealed Bonnet
Butanol	Ductile Iron	Casr Steel	D20 or D30		
Calcium Carbonate	Ductile Iron	Soft Rubber Lined	D10	D20 or D30	
Calcium Chloride	Hard Rubber Lined		D10	D20 or D30	
Calcium Hydroxide	Ductile Iron	Soft Rubber Lined	D10	D20 or D30	
Calcium Hypochlorie	Hard Rubber Lined	Ductile Iron	D60	D10	
Calcium Phosphate	Butyl Rubber Lined	Hard Rubber Lined	D10	D20 or D30	
Calcium Sulphate	Soft Rubber Lined	Ductile Iron	D10	D20 or D30	
Calor Gas	Ductile Iron		D40		
Cane Juice	Ductile Iron	Soft Rubber Lined	D20 or D30	D10	
Carbon Black	Soft Rubber Lined	Ductile Iron	D10		
Carbon Dioxide	Ductile Iron	Ductile Iron	D20 or D30		
Carbon Monoxide	Ductile Iron		D20 or D30		Sealed Bonnet
Carbon Tetrachloride	Ductile Iron	Ductile Iron	D93/20		
Castor Oil	Ductile Iron		D20 or D30		
Caustic Potash	Ductile Iron	Butyl Rubber Lined	D10	D20 or D30	Sealed Bonnet
Caustic Soda	Ductile Iron	Butyl Rubber Lined	D10	D20 or D30	Sealed Bonnet
Cement (Dry and Slurry)	Soft Rubber Lined	Ductile Iron	D10		
Chalk	Ductile Iron	Soft Rubber Lined	D10		
China Clay	Ductile Iron	Soft Rubber Lined	D10		
Chlorinated Brine	FEP Lined	Hard Rubber Lined	D60	D10	
Chorine Gas Dry	Ductile Iron	Halar Lined	D93/70		
Chorine Gas Moist	FEP Lined	Halar Lined	D93/70		
Chorine Gas Wet	FEP Lined	Halar Lined	D93/70		
Chlorine Water	Hard Rubber Lined	Halar Lined	D10		
Chloroform	FEP Lined	Stainless Steel	D93/70		
Chrome Alum	Butyl Rubber Lined	Halar Lined	D20 or D30		
Chrome Plating Solns	Butyl Rubber Lined	Halar Lined	D20 or D30		
Chrome Tanning Solns	Butyl Rubber Lined	Halar Lined	D20 or D30	D93/70	
Clays and Slips	Soft Rubber Lined	Ductile Iron	D10		
Coal Dust	Soft Rubber Lined	Ductile Iron	D10		
Coal Gas	Ductile Iron	Ductile Iron	D20 or D30	D40	
Coal Slurry	Soft Rubber Lined	Ductile Iron	D10		
Coke Oven Gas	Ductile Iron	Ductile Iron	D20 or D30	D40	
Compressed Air (Oil Free)	Ductile Iron	Cast steel	D40	D20 or D30	
Compressed Air (Oily)	Ductile Iron	Cast Steel	D40	D70	
Concrete	Soft Rubber Lined	Ductile Iron	D10		
Copper Plating Solutions	Butyl Rubber Lined	Halar Lined	D20 or D30		
Copper Sulphate	Butyl Rubber Lined	Halar Lined	D20 or D30		
Creosote	Ductile Iron	Halar Lined	D70		

DIAVAL® DIAPHRAGM VALVES

Material Selection

Fluid	Body Material		Diaphragm		Notes
Creosote	Ductile Iron	Halar Lined	D70		
Crude Oil	Cast Steel	Ductile Iron	D70	D93/70	
Cutting Oil	Ductile Iron		D40		
Demineralised Water	Hard Rubber Lined	Stainless Steel	D20 or D30	D93/70	
Detergents	Hard Rubber Lined	Halar Lined	D20 or D30	D10	
Dibutyl Phthalate	Halar Lined	Ductile Iron	D93/70		
Dichlorodifluoromethane	Ductile Iron	Cast steel	D93/70		
Diesel Oil	Ductile Iron	Cast steel	D70		
Diethyl Ether	Stainless Steel	Ductile Iron	D93/70		Sealed bonnet
Diethylene Glycol	Ductile Iron	Stainless Steel	D20 or D30		
Disinfectant (General)	Ductile Iron	Halar Lined	D50		
Dye Liquors	FEP Lined	Butyl Rubber Lined	EPDM	D20 or D30	
Electrolytic Tinplating Solutions	Butyl Rubber Lined	FEP Lined	D20 or D30		
Ethane	Ductile Iron	Cast Steel	D40	D50	
Ethanol	Ductile Iron	Stainless Steel	D20 or D30	D20 or D30	
Ether	Ductile Iron	Stainless Steel	D93/70		Sealed bonnet
Ethyl Acetate	Stainless Steel	Halar Lined	D20 or D30		
Ethyl Alcohol	Ductile Iron	Stainless Steel	D20 or D30		
Ethylene	Ductile Iron	Stainless Steel	D20 or D30		
Ethylene Glycol	Ductile Iron	Stainless Steel	D20 or D30		
Ferric Sulphate	Butyl Rubber Lined	Halar Lined	D10		
Fetilizers (Dry Powders)	Soft Rubber Lined	Ductile Iron	D10		
Fertilizer Slurries (Wet Process)	Butyl Rubber Lined	Ductile Iron	D20 or D30	D20 or D30	
Fire Foam	Ductile Iron	Cast steel	D40		
Flue Gas	Ductile Iron	Cast steel	D40	D20 or D30	
Fly Ash	Ductile Iron	Soft Rubber Lined	D10	Butyl	
Freon	Ductile Iron	Ductile Iron	D93/20	D50	
Fuel Oil	Ductile Iron	Cast steel	D40		
Gas (Coal)	Ductile Iron	Cast steel	D40		
Gas (Natural)	Ductile Iron	Cast steel	D40		
Gasoline	Cast Steel	Ductile Iron	D70		
Glucose	Stainless Steel	Stainless steel	D20 or D30		
Glycerine	Stainless Steel	Hard Rubber Lined	D20 or D30		
Gravel	Soft Rubber Lined	Ductile Iron	D10		
Grease	Ductile Iron	Cast steel	D40		
Gypsum	Soft Rubber Lined	Ductile Iron	D10		
Hydraulic Oils (Vegetable Based)	Ductile Iron	Ductile Iron	D20 or D30		
Hydraulic Oils (Mineral Based)	Ductile Iron	Ductile Iron	D40		
Hydrobromic Acid	FEP Lined	Halar Lined	D93/70		
Hydrochloric Acid	Hard Rubber Lined	Halar Lined	D10	D93/70	
Hydrofluoric Acid	Butyl Rubber Lined	Halar Lined	D20 or D30		
Hydrogen	Ductile Iron	Cast Steel	D20 or D30	D10	Sealed Bonnet

DIAVAL® DIAPHRAGM VALVES

Material Selection

Fluid	Body Material		Diaphragm		Notes
Hydrogen Peroxide	Hard Rubber Lined	Stainless Steel	PTFE/D70	D20 or D30	
Hypo	Hard Rubber Lined	Halar Lined	D10	D60	
Inert Gases	Ductile Iron	Ductile Iron	D20 or D30		
Inks	Stainless Steel	Halar Lined	D93/70	D20 or D30	
Insecticide Solutions	Ductile Iron	Ductile Iron	D40	D20 or D30	
Instrument Air	Ductile Iron	Stainless Steel	D20 or D30	D40	
Iron Oxide Slurry	Soft Rubber Lined	Ductile iron	D10		
Isopropanol	Ductile Iron	Hard Rubber Lined	D10	D20 or D30	
Kaolin	Soft Rubber Lined	Ductile Iron	D10		
Kerosene	Ductile Iron	Stainless Steel	D70	D93/70	
Laundry Bleach	Hard Rubber Lined	Halar Lined	D60	D10	
Lime	Ductile Iron	Soft Rubber Lined	D10		
Liquid Paraffin	Ductile Iron	Ductile Iron	D40	D70	
Liquid Petroleum Gases (L.P.G.)	Ductile Iron	Cast Steel	D40	D20 or D30	Sealed Bonnet
Lubricating Oils	Ductile Iron	Cast steel	D40	D70	
Magnesium Chloride	Hard Rubber Lined	Butyl Rubber Lined	D10	D20 or D30	
Magnesium Oxide	Ductile Iron	Hard Rubber Lined	D10	D20 or D30	
Magnesium Sulphate	Butyl Rubber Lined	Ductile Iron	D10	D20 or D30	
Magnetite	Soft Rubber Lined	Ductile Iron	D10		
Methane	Hard Rubber Lined	Ductile Iron	D20 or D30	D40	
Methanol	Ductile Iron	Stainless Steel	D20 or D30		
Methanol/Water Mixture	Ductile Iron	Hard Rubber Lined	D20 or D30	D10	
Methylated Spirits	Ductile Iron	Stainless Steel	D20 or D30		
Methyl Ethyl Ketone (MEK)	Stainless Steel	FEP Lined	D93/20		
Methyl Isobutyl Ketone	Stainless Steel	FEP Lined	D93/20	D20 or D30	
Milk	Stainless Steel		D15		
Mineral Oil	Ductile Iron	Cast Steel	D70	D40	
Molasses	Ductile Iron	Stainless Steel	D20 or D30		
Monosodium Glutamate	Hard Rubber Lined	Stainless Steel	D10		
Mortar and Cement	Soft Rubber Lined	Ductile Iron	D10	D20 or D30	
Naphtha	Ductile Iron	Cast steel	D70		
Napthalene	Ductile Iron	Cast Steel	D70		
Natural Gas	Ductile Iron	Stainless Steel	D40	D50	
Nickel Plating Solutions	Butyl Rubber Lined	Halar Lined	D20 or D30	D60	
Nickel Plating Sludge	Butyl Rubber Lined	Halar Lined	D20 or D30	D60	
Nitric Acid	FEP Lined	Stainless Steel	D93/20	D70	Check grade of S.S.
Nitric Acid / Hydrofluoric Acid Mix	FEP Lined	Halar Lined	D93/70		
Nitrogen	Ductile Iron	Stainless steel	D20 or D30		
Nitrous Oxide (Dry)	Stainless Steel	FEP Lined	D20 or D30		
Oils, Animal	Ductile Iron	Stainless steel	D40	D93/20	
Oils, Cutting	Ductile Iron	Stainless steel	D70	D40	

DIAVAL® DIAPHRAGM VALVES

Material Selection

Fluid	Body Material		Diaphragm		Notes
Oil Fuel	Ductile Iron	Stainless steel	D70	D40	
Oils, Lubricating	Ductile Iron	Stainless steel	D70	D40	
Oils, Mineral	Ductile Iron	Cast Steel	D70	D40	
Oil, Rolling	Ductile Iron	Cast Steel	D70	D40	
Oil, Transformer	Ductile Iron	Stainless Steel	D70	D40	
Oils, Vegetable	Stainless Steel	Ductile Iron	D40	D70	
Oleum	FEP Lined	Halar Lined	D93/70		
Olive Oil	Stainless Steel	Ductile Iron	D40	D93/20	
Oxygen	Ductile Iron	Stainless Steel	D50	D20 or D30	Degreased for Oxygen
Paint (Oil Based)	Ductile Iron	Stainless Steel	D40	D20 or D30	
Paint (Water Based)	Ductile Iron	Stainless Steel	D20 or D30	D93/20	
Paper Pulp	Hard Rubber Lined	Butyl Rubber Lined	D10	D20 or D30	
Paper Stock	Hard Rubber Lined	Butyl Rubber Lined	D10	D20 or D30	
Paraffin	Ductile Iron	Stainless Steel	D70	D40	
Paraffin Wax	Ductile Iron	Cast steel	D40	D70	
Paraquet	Ductile Iron	Halar Lined	D40		Sealed Bonnet
Pentane	Ductile Iron	Cast Steel	D70	D93/20	
Perchloroethylene	Ductile Iron	Cast Steel	D70	D93/70	
Petrol	Ductile Iron	Cast Steel	D70		Sealed Bonnet
Petroleum Jelly	Ductile Iron	Halar Lined	D70	D40	
Phosphoric Acid	Butyl Rubber Lined	Halar Lined	D20 or D30		
Photographic Developers	Halar Lined	FEP Lined	D20 or D30	D93/20	
Plating Solutions	Butyl Rubber Lined	Halar Lined	D20 or D30		
Polyethylene Glycol	Ductile Iron	Stainless Steel	D10	D20 or D30	
Potassium Chloride	Hard Rubber Lined	Halar Lined	D10	D20 or D30	
Potassium Cyanide	Hard Rubber Lined	Halar Lined	D10	D20 or D30	Sealed Bonnet
Potassium Ferricyanide	Hard Rubber Lined	Halar Lined	D20 or D30	D10	
Potassium Hydroxide	Ductile Iron	Hard Rubber Lined	D20 or D30	D10	Sealed Bonnet
Potassium Hypochlorite	Hard Rubber Lined	Halar Lined	D60	D10	
Potassium Phosphate	Hard Rubber Lined	Butyl Rubber Lined	D20 or D30	D10	
Pottery Slip	Soft Rubber Lined	Ductile Iron	D10		
Producer Gas	Ductile Iron	Cast steel	D20 or D30	D40	
Propane (Gas or Liquid)	Ductile Iron	Cast Steel	D40	D50	
Radioactive Effluents	Butyl Rubber Lined	Stainless Steel	D20 or D30		No Copper Parts
Rock Salt	Soft Rubber Lined	Hard Rubber Lined	D10	D20 or D30	
Rolling Oil	Ductile Iron	Cast Steel	D70	D10	
Salt	Soft Rubber Lined	Hard Rubber Lined	D10	D20 or D30	
Sand	Soft Rubber Lined	Ductile Iron	D10	D20 or D30	
Sea Water	Stainless steel	Hard Rubber Lined	D10	D20 or D30	
Sewage	Ductile Iron	Hard Rubber Lined	D10	D50	
Silver Plating Solutions	Butyl Rubber Lined	Halar Lined	D20 or D30		

DIAVAL® DIAPHRAGM VALVES

Material Selection

Fluid		Body Material		Diaphragm		Notes
Slaked Lime		Ductile Iron	Soft Rubber Lined	D10	D20 or D30	
Slip (Pottery)		Soft Rubber Lined	Ductile Iron	D10		
Soap Lye		Ductile Iron	Butyl Rubber Lined	D10	D20 or D30	
Soap Solutions		Ductile Iron	Butyl Rubber Lined	D10	D20 or D30	
Sodium Bicarbonate		Ductile Iron	Halar Lined	D20 or D30	D93/D20	
Sodium Chloride		Soft Rubber Lined	Hard Rubber Lined	D10	D20 or D30	
Sodium Hydroxide		Ductile Iron	Hard Rubber Lined	D20 or D30	D10	Sealed Bonnet
Sodium Hydroxide (Oily)		Ductile Iron	Stainless Steel	D50	D40	
Sodium Hypochlorite		Hard Rubber Lined	Halar Lined	D10	D70	
Solvent Naphtha		Ductile Iron	Cast Steel	D70	D40	
Stannic Chloride		Halar Lined	FEP Lined	D20 or D30	D93/D20	
Starch Solutions		Ductile Iron	Halar Lined	D20 or D30	D60	
Stearic Acid		Stainless Steel	Halar Lined	D93/2D20		Check Solvent
Sugar		Ductile Iron	Stainless steel	D20 or D30	D15	
Sulphur Dioxide		Butyl Rubber Lined	Hard Rubber Lined	D20 or D30		
Sulphuric Acid	Below 75%	Butyl Rubber Lined	Halar Lined	D20 or D30	D70	
Sulphuric Acid	75-95%	Halar Lined	FEP Lined	D93/70	D70	
Sulphuric Acid	95-99%	Ductile Iron	Halar Lined	D93/70	D70	Sealed Bonnet
Sulphuric Acid	Over 99%	FEP Lined	Halar Lined	D93/70		Sealed Bonnet
Syrups (Sugar)		Ductile Iron	Stainless steel	D20 or D30	D15	
Tetrachloroethane		Ductile Iron	Stainless Steel	D93/70	D70	Sealed Bonnet
Textile Dyes		Halar Lined	Butyl Rubber Lined	D20 or D30	D93/D20	
Tin Plating Solutions		Halar Lined	Butyl Rubber Lined	D93/D20	D20 or D30	
Titanium Dioxide		Butyl Rubber Lined	Hard Rubber Lined	D20 or D30	D10	
Toluene		Ductile Iron	Cast Steel	D93/70		
Transformer Oil		Stainless Steel	Ductile Iron	D70		
Trichloroethylene		Ductile Iron	Stainless Steel	D93/70	D70	Sealed Bonnet
Turpentine		Ductile Iron	FEP Lined	D40	D70	
Vegetable Oils		Ductile Iron	Stainless Steel	D70	D93/20	
Vinegar		Stainless Steel		D93/D20		
Water Cold		Ductile Iron	Stainless steel	D10	D20 or D30	
Water De-mineralised		Hard Rubber Lined	FEP Lined	D10	D93/20	
Water Drinking		Stainless steel	Stainless Steel	D20 or D30		
Water Oily		Ductile Iron	Gunmetal	D40	D50	
Water (Salt and Brackish)		Stainless steel	Hard Rubber Lined	D10	D20 or D30	
Wood Pulp		Ductile Iron	Soft Rubber Lined	D10	D20 or D30	
Wort		Ductile Iron	Stainless steel	D20 or D30		
Xylene		Ductile Iron	Cast Steel	D93/70	D70	
Zinc Oxide		Soft Rubber Lined	Stainless Steel	D10	D20 or D30	
Zinc Chloride		Stainless Steel	Butyl Rubber Lined	D20 or D30	D93/D20	
Zinc Plating Solutions		Butyl Rubber Lined	Hard Rubber Lined	D20 or D30		

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