

# Saunders



Industrial Diaphragm Valves

CRANE<sup>®</sup>

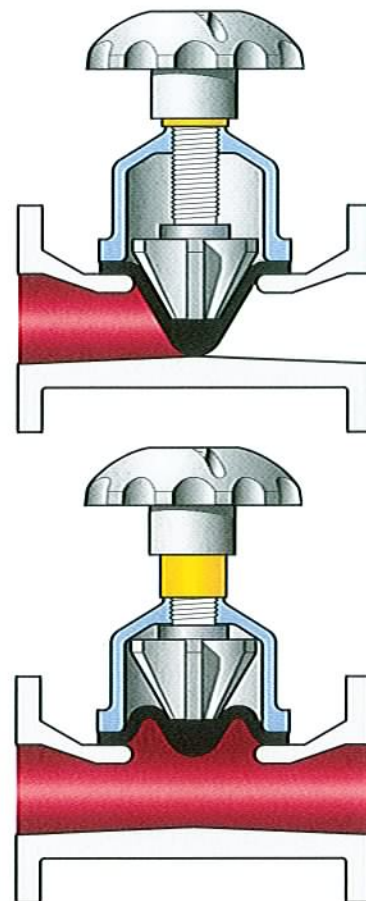
# Saunders KB Type Diaphragm Valves

## Straight Through Bores

Saunders full bore KB type diaphragm valves, with their smooth non-turbulent body design have proved to be outstanding in resisting the erosive effects of corrosive and corrosive/abrasive line media. In addition, the full bore concept is designed for minimum flow resistance whilst allowing rodding out and easy cleaning.

Low pressure drop and high flow characterise the efficiency of operation of these valves. The flexible diaphragm ensures consistent leak tightness even when solids, powders and dry media are present. Valve blockage and wear due to slurry build up on the valve internals are significantly reduced by the straight through design.

In addition to the range of unlined screwed and flanged bodies, rubber linings and glass coatings are available for the more exacting corrosive and abrasive applications to a maximum working pressure of 10 bar.



Features	Benefits
Straight through body, high flow	No obstruction, low pressure drop
Flexible closure even with solids present	Leaktight by design
Only two wetted parts	Better resistance to corrosion/abrasion and longer life
Specially developed linings and diaphragms available	Minimal maintenance

### Valve flow

Smooth bore straight through body gives high flow performance with minimum turbulence, while giving 100% leaktight closure.

### Lubrication

Bonnet assembly lubricated for long life. Needs no further grease. The indicator lip seal stops the ingress of dust, dirt and atmospheric contaminants.

### Ease of maintenance

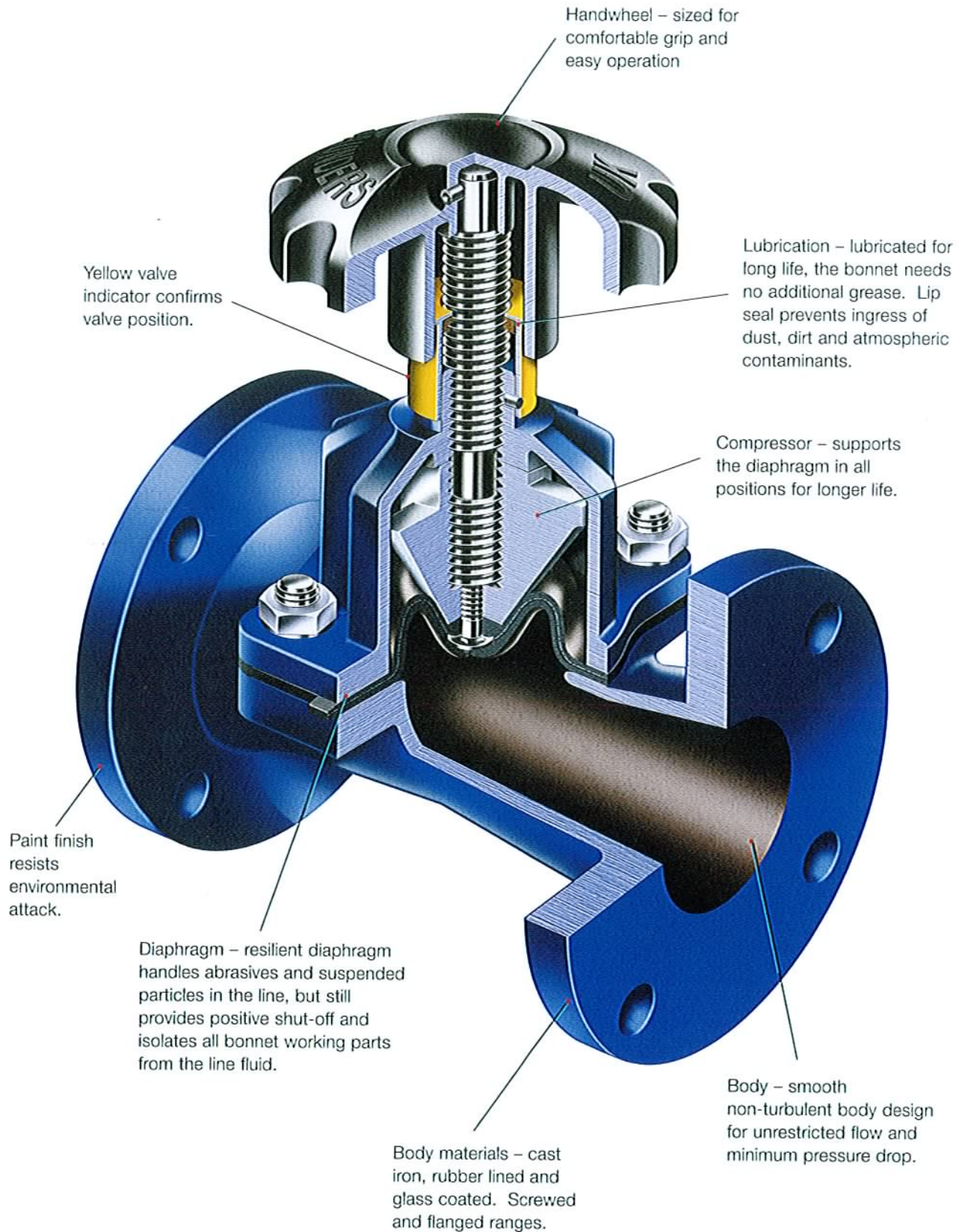
Three part design allows maintenance and actuator retrofitting without removing the valve body from the pipeline. Extended life, reliability and safety, combined with essentially simple design, result in low maintenance and low cost of ownership.

### Valve usable in any position

The KB valve can be installed in any position without affecting its operation. We recommend six times pipe diameter from pump or bend.

## Saunders KB Type Design Features

Contribute to low pressure drop high flow capability and long valve life



# Saunders KB Type Diaphragm Valves

## Materials of Construction

### Valve bodies

CAST IRON, GUNMETAL  
Screwed DN15 – DN50

CAST IRON, GUNMETAL  
Flanged DN15 – DN350\*

\* Contact us for materials range

### Rubber lined body data

- ◆ Soft rubber linings
  - Natural (Polyisoprene), 40–46° IRHD
  - Polychloroprene, 72–78° IRHD
  - Butyl (Isobutylene isoprene), 60–66° IRHD
- ◆ Hard ebonite rubber HRL, 75–85° Shore D
- ◆ Lining thickness range 2–4.5mm (DN20–DN350)

### Valve body lining – production tests

All Saunders lined valves have each body individually tested for lining integrity.

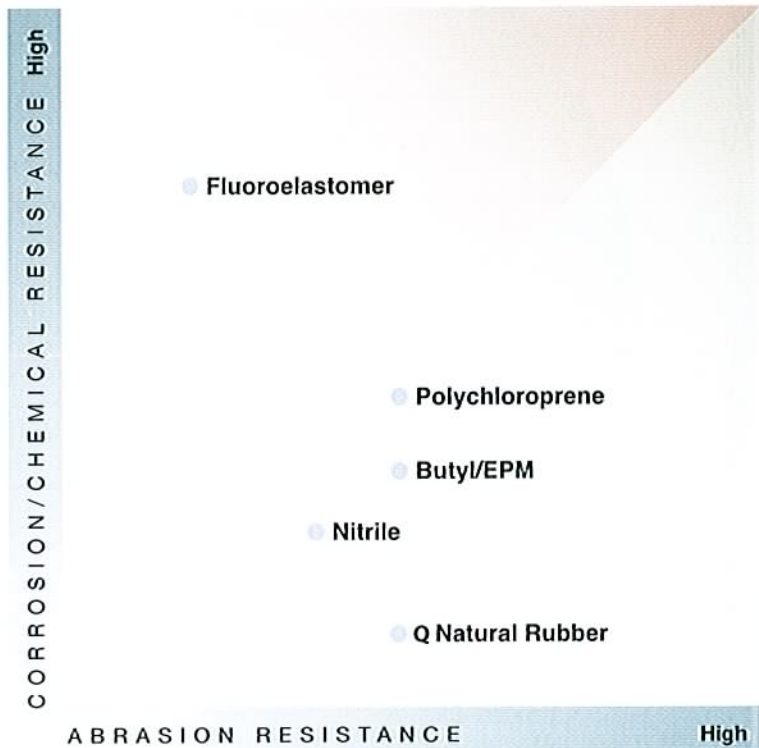
- ◆ Glass lining – Spark test 10kV ac
- ◆ Rubber, Butyl, Polychloroprene, Natural – Spark test 14kV ac/dc
- ◆ Rubber, HRL – Spark test 17kV ac/dc

Material	Grade
Fluoroelastomer	226
Polychloroprene	HT
Nitrile	C
Butyl	300
EPM	425
Natural Rubber	AA

### Diaphragm Materials

Grades	Elastomer Type	General Service & Approvals
AA	Natural rubber (polyisoprene) metal oxide pigmented – brown sulphur cured, black reinforced	Abrasives in slurry or dry powder form
C	Butadiene Acrylonitrile, (Nitrile) sulphur cured, black reinforced	Lubricating oil, cutting oils, paraffin, animal and vegetable oils, aviation kerosene
HT	Polychloroprene, sulphur cured, black reinforced	Abrasives slurries containing hydrocarbons
226	Fluoroelastomer, amine cured, black reinforced	Concentrated acids, aromatic solvents, chlorinated solvents, unleaded petroleum
300	Isobutylene Isoprene, resin cured black reinforced	Abrasive slurries, acid digested slurries, alkalis, dry powders
425	Ethylene propylene (EPM) organic peroxide cured, black reinforced	Abrasive slurries, acid digested slurries, alkalis, dry powders

### Diaphragm Materials – Visual Process Resistance Guide



### Type KB Valves – maximum working pressure in bar

Size DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350
Non-rising handwheel												3.5	3.5	3.5	1.5
Rising Handwheel	10	10	10	10	10	10	10	10	10	6	6				

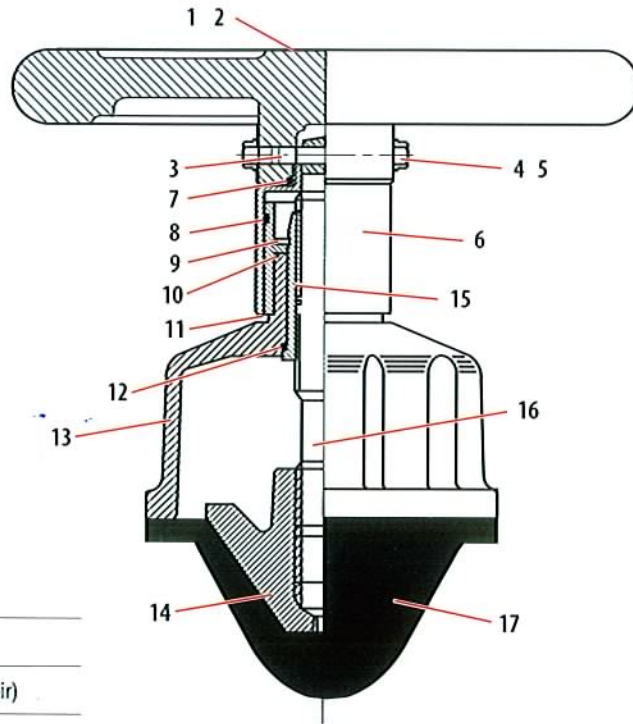
Maximum working pressure for KB valves shown is for manual valves, defined as the maximum line pressure against which valves may be operated to closed position up to and including 55°C. For ES actuators, please refer to appropriate actuator performance selection technical data sheets.

# Saunders KB Type Diaphragm Valves

## Endurance Bonnet

Saunders Endurance Bonnet is a serviceable bonnet assembly developed for the KB straight through diaphragm valve, specifically for the mineral processing industry, in particular the phosphate, and precious metal sector.

To meet market requirements, the bonnet was designed to allow easy replacement of a range of spare parts which protect the interior of the valve from the aggressive and corrosive environment.



### Features

- ◆ Rising handwheel
- ◆ Yellow visual indicator
- ◆ Indicator sleeve (lubrication reservoir)
- ◆ 'O' ring sealed
- ◆ Screw plug & 'O' ring protection
- ◆ Serviceable Insert
- ◆ Bonnet epoxy coated surface finish
- ◆ Spares kit

### Bonnet size range

- ◆ KB Type : DN65 to DN150

### MATERIALS OF CONSTRUCTION

Item	Component	Material	Finish
1	LABEL	Polyester	Bright silver
2	HANDWHEEL	Cast Iron	Alkyd paint
3	HANDWHEEL PIN	Steel	Zinc plate/passivate
4	SCREW PLUG	Plastic	Black HDPE
5	'O' RING	Nitrile	
6	HANDWHEEL BOSS	Polypropylene	Black
7	'O' RING	Nitrile	
8	'O' RING	Nitrile	
9	CIRCLIP	Steel	
10	'O' RING	Nitrile	
11	BONNET SLEEVE	Aquanyl	Yellow
12	'O' RING	Nitrile	
13	BONNET	Cast Iron	Epoxy paint
14	COMPRESSOR	Cast Iron	Phosphate
15	BONNET INSERT	Carbon Steel	Phosphate
16	SPINDLE	Carbon Steel	Phosphate
17	DIAPHRAGM	As specified	

# Saunders KB Type Diaphragm Valves

## Flow Co-efficients of Valve Range Cv (Kv)

DN 25	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	37.80	32.40	30.60	26.20	39.00	33.40
90	35.10	30.10	28.40	24.30	36.00	30.87
80	32.10	27.51	26.04	22.32	33.00	28.30
70	29.10	24.94	23.60	20.20	30.00	25.70
60	26.50	22.71	21.40	18.40	27.30	23.40
50	22.70	19.50	18.40	15.78	23.40	20.10
40	18.90	16.20	15.30	13.10	19.50	16.71
30	14.00	12.00	11.30	9.70	14.40	12.30
20	9.10	7.80	7.30	6.30	9.40	8.10
10	4.50	3.86	3.70	3.20	4.70	4.00
0	0	0	0	0	0	0

DN 50	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	128.00	110.00	107.00	91.70	138.00	118.00
90	119.00	102.00	99.00	85.00	128.00	110.00
80	109.00	93.00	91.00	78.00	117.00	100.00
70	99.00	85.00	82.00	70.00	106.00	90.90
60	90.00	77.00	75.00	64.00	97.00	83.00
50	77.00	66.00	64.00	55.00	83.00	71.00
40	64.00	55.00	53.00	45.00	69.00	59.00
30	47.00	40.00	40.00	34.00	51.00	44.00
20	31.00	27.00	26.00	22.00	33.00	28.00
10	15.00	12.86	12.80	11.00	16.60	14.00
0	0	0	0	0	0	0

DN 65	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	238	204	195	167	254	218
90	221	189	181	155	236	202
80	202	173	166	142	216	185
70	183	157	150	129	196	168
60	167	143	136	117	178	153
50	143	123	117	100	152	130
40	119	102	97	83	127	109
30	88	75	72	62	94	81
20	57	49	47	40	61	52
10	29	25	23	19	20	26
0	0	0	0	0	0	0

DN 80	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	330	293	264	226	342	293
90	307	263	246	211	318	273
80	281	241	224	192	291	249
70	254	218	203	174	263	225
60	231	198	185	159	239	205
50	198	170	159	136	205	176
40	165	141	132	113	171	146
30	122	105	98	84	127	109
20	79	68	63	54	82	70
10	40	34	32	27	41	35
0	0	0	0	0	0	0

DN 100	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	588	504	480	411	618	528
90	547	469	446	382	575	493
80	500	429	408	350	525	450
70	453	388	370	317	476	408
60	412	353	336	288	433	371
50	353	303	288	247	371	318
40	294	252	240	206	309	265
30	218	187	178	153	229	196
20	141	121	115	99	148	127
10	71	61	58	50	74	63
0	0	0	0	0	0	0

DN 125	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	924	792	720	617	960	823
90	859	736	670	574	893	765
80	785	673	612	525	816	699
70	711	609	554	475	739	633
60	647	555	504	432	672	576
50	555	475	432	370	576	494
40	462	396	360	309	480	411
30	342	293	266	228	355	304
20	222	190	173	148	230	197
10	111	95	86	74	115	99
0	0	0	0	0	0	0

DN 150	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	1680	1440	1260	1080	1800	1543
90	1562	1339	1172	1005	1674	1435
80	1428	1224	1071	918	1530	1311
70	1294	1109	970	831	1386	1188
60	1176	1008	882	756	1260	1080
50	1008	864	756	647	1080	926
40	840	720	630	540	900	771
30	622	533	466	399	666	571
20	403	345	302	259	432	370
10	202	173	151	129	216	185
0	0	0	0	0	0	0

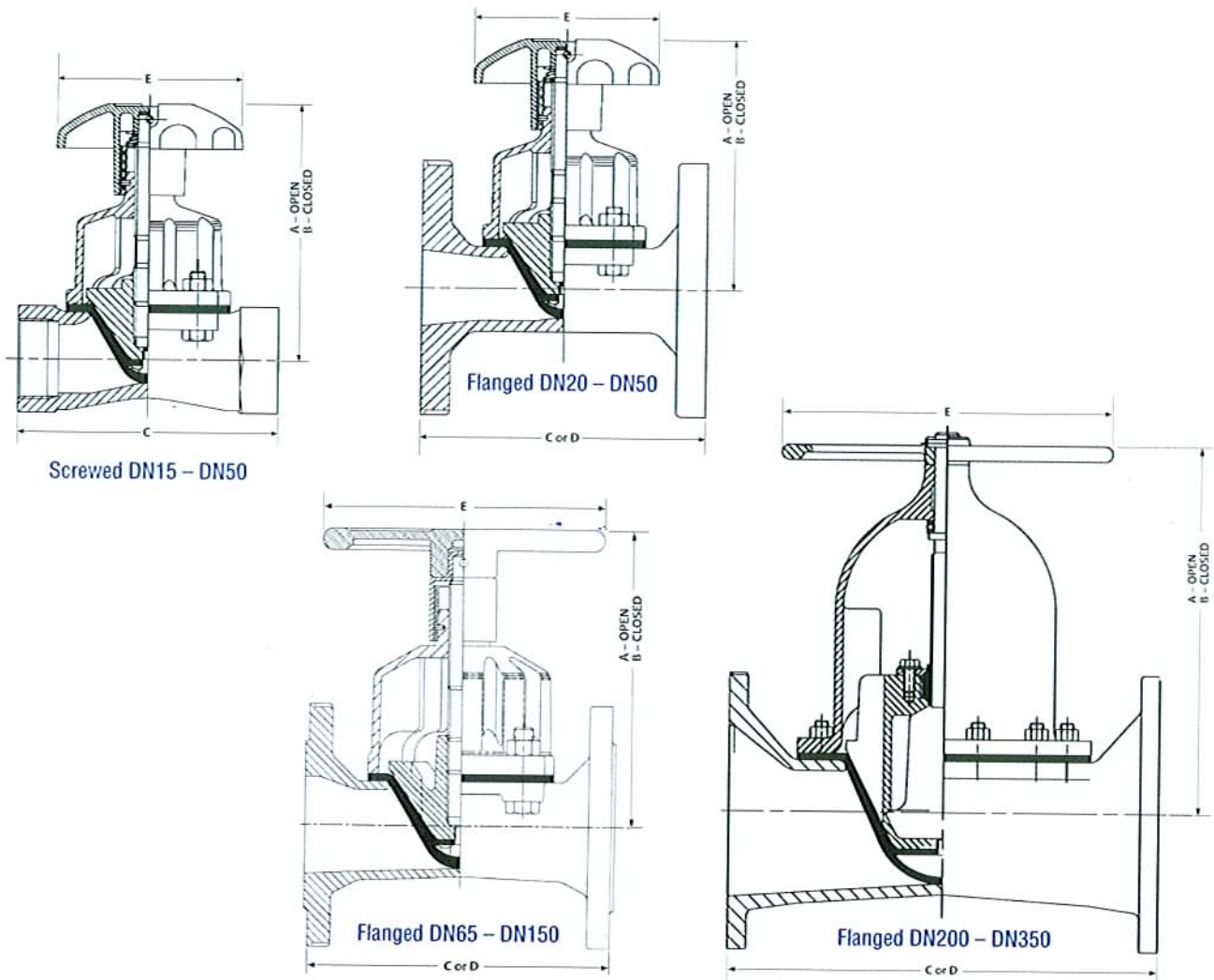
DN 200	BODY MATERIAL / LINING					
	Cast Iron		Rubber Lined		Glass	
	Cv	Kv	Cv	Kv	Cv	Kv
% Open						
100	2580	2211	2196	1882	2724	2335
90	2399	2056	2042	1750	2533	2171
80	2193	1880	1867	1600	2315	1985
70	1987	1703	1691	1449	2097	1797
60	1806	1548	1537	1318	1907	1634
50	1548	1327	1318	1130	1634	1401
40	1290	1106	1098	941	1362	1167
30	955	819	813	697	1008	864
20	619	531	527	452	653	560
10	310	266	264	226	327	280
0	0	0	0	0	0	0

Cv is flow in US gpm through valve at Δ P of 1 psi  
Kv is flow in m<sup>3</sup>/hr through valve at Δ P of 1 bar

For sizes DN115, 32 and 40, please contact customer service department for details.

# Saunders KB Type Diaphragm Valves

## Valve Dimensions and Weights



### Valve Diameter (DN)

	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	
<b>Screwed</b>	<b>A</b>	106	-	166	-	166	182	-	-	-	-	-	-	-	-	-
	<b>B</b>	98	-	159	-	159	162	-	-	-	-	-	-	-	-	-
	<b>C</b>	63.5	-	111	-	143	168	-	-	-	-	-	-	-	-	-
	<b>Weight</b>	0.82	-	2.0	-	2.7	4.8	-	-	-	-	-	-	-	-	-
<b>Flanged</b>	<b>A</b>	105	105	165	165	165	176	234	270	313	335	435	406	557	628	665
	<b>B</b>	97	97	159	159	159	156	210	238	277	293	379	-	-	-	-
	<b>C</b>	108	117	127	146	159	190	216	254	305	356	406	521	635	749	980
	<b>D</b>	130	150	160	180	200	230	290	310	350	400	480	600	730	850	980
	<b>Weight</b>	2.02	2.31	4.12	4.35	5.45	10.2	11.2	17.9	31.4	46.2	67.3	109	195	294	462
<b>Flanged Rubber Lined</b>	<b>A</b>	-	-	168	168	168	176	234	270	313	335	435	408	559	630	667
	<b>B</b>	-	-	162	162	162	156	210	238	277	293	379	-	-	-	-
	<b>C</b>	-	-	131	150	163	194	220	258	309	362	412	527	641	755	986
	<b>D</b>	-	-	160	180	200	230	290	310	350	400	480	600	730	850	980
	<b>Weight</b>	-	-	4.22	5.65	7.45	10.5	11.6	21.9	34.4	46.2	74.3	127	204	294	465
<b>Flanged Glass Lined</b>	<b>A</b>	-	106	166	166	166	177	235	271	314	336	436	407	558	629	666
	<b>B</b>	-	98	160	160	160	157	211	239	278	294	380	-	-	-	-
	<b>C</b>	-	119	133	148	165	196	222	260	311	364	414	523	637	751	982
	<b>D</b>	-	150	160	180	200	230	290	310	350	400	480	600	730	850	980
	<b>Weight</b>	-	2.52	4.2	5.05	6.95	10.3	11.4	20.3	33.9	46.1	71.6	118	201	294	462
<b>E</b>	80	80	120	120	120	120	170	230	280	280	368	368	483	584	699	

Weights in kg. **C** valve length = EN 558-1 Series 7 (ex BS 5156). **D** valve length = EN 558-1 Series 1 (ex DIN 3202 Series F1).

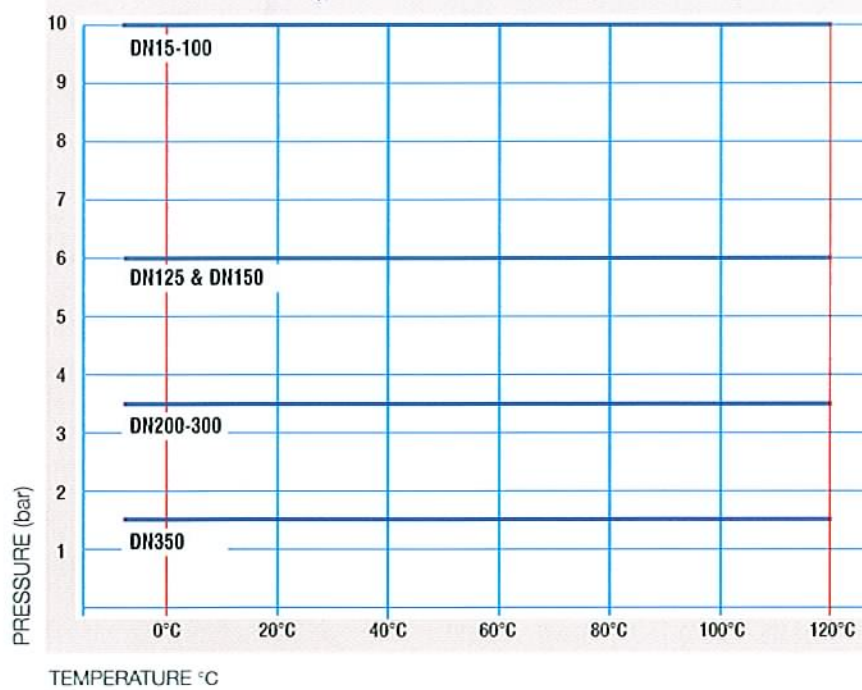
# Saunders KB Type Diaphragm Valve Performance

## Temperature and Pressure Relationship

**Diaphragm Temperatures Type KB (°C)**

-40°	AA	90°
-10°	C	90°
-20°	HT	90°
-5°	226	120°
-20°	300	100°
-40°	425	100°

### KB Valve Body Temperature/Pressure Relationship



**Body Temperature Limit (°C)**

-10°	CAST IRON	120°
-30°	STAINLESS STEEL /COPPER ALLOYS	120°
-10°	GLASS LINED	120°
-10°	HARD RUBBER LINED	85°
-10°	SOFT NATURAL RUBBER LINED	85°
-10°	BUTYL LINED	110°
-10°	POLYCHLOROPRENE LINED	105°

*For whole manual valves refer to 2/KB/005/UK/REV1 and for ES actuated valves refer to appropriate performance graphs.*