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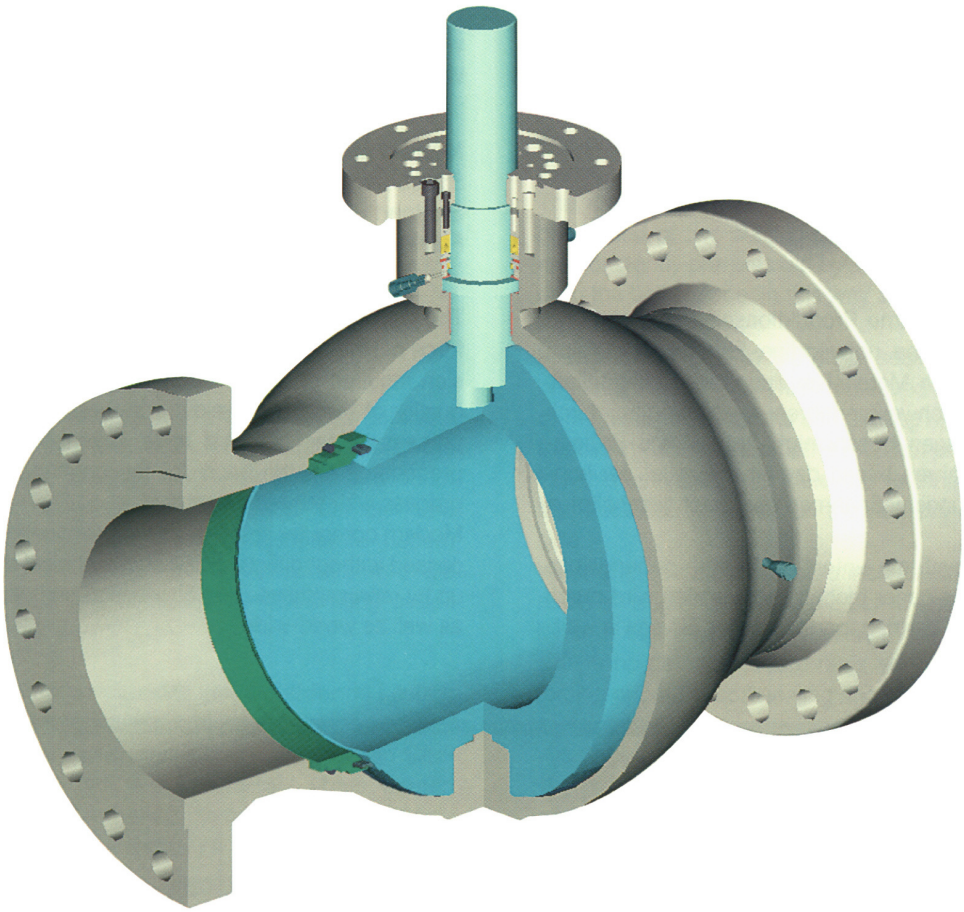
PIPELINE EQUIPMENT

BALL VALVE
Type HKSF-W



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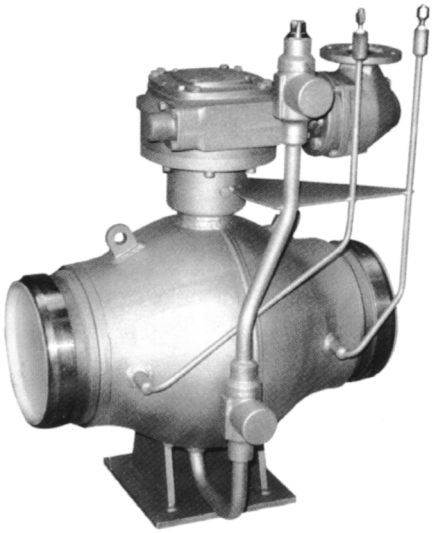
PIPELINE EQUIPMENT

Ball Valve
Type HKSF-W



Description of construction

The RMA ball valves of the HKSF-W type are of fully welded, maintenance-free design.

HKSF-W ball valves are available in three models:

Soft sealing
Primary metal and secondary soft sealing
Metal-to-metal sealing

In case of **soft sealing**, a special designed soft sealing ring provides the contact between the ball and the seating ring. The soft sealing ring is set into the seating ring and is held in place by an insert groove. The seating ring on both the inlet and the outlet side are pre-pressed by springs onto the ball. When the operating pressure increases, the contact force of the seating ring, and consequently the soft sealing, against the ball increases accordingly.

The **primary metal and secondary soft sealing** method, using the proven RMA sealing system, offers the following advantages: The metal seating rings on both the inlet and outlet sides are composed of sealing planes made of chrome steel. These are constantly pre-pressed by springs and the medium pressure onto the ball surface. In this way a pure metal sealing is formed.

In case of damage to the metal sealing planes, the soft sealing rings enters into effect. This is achieved by increasing the pressure of the reverse side of the soft sealing ring which is pressed onto the ball in dependence of the medium pressure.
For this activation it is irrelevant whether the leakage is due to the metal sealing plane on the housing side or on the medium side.
When the operating pressure increases the contact force of the metal sealing rings versus the ball also itensified.
Even at high operating pressures, the flexible soft sealing ring suffers no damage. Guard rings are used to prevent ejection or forcing out of the soft sealing ring at all pressure stages and in all switch positions.
The primary metal and secondary soft sealing principle is based on the precision machining of metal sealing ball valves (e.g. common lapping of ball and sealing rings).
In the **metal-to-metal sealing system**, the additional soft sealing in the seating rings is excluded. Sealing is achieved exclusively via the chrome steel seating plane and the ball.

On request, a third, **emergency sealing system** (sealing compound system) can be added to both seating rings as well as to the spindle sleeve. For this reason a special chambering groove is incorporated in the seating rings to enable a pre-defined emergency sealing.

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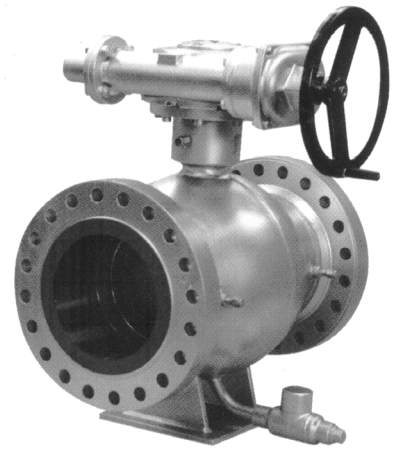
RMA
PIPELINE EQUIPMENT

Ball Valve
Type HKSF-W



Double block and bleed
Proof of sealing is provided in both end positions, even under maximum operating pressure of the ball valve, using a special, self-protected bleed nipple or, if required, using drain and vent pipes with an additional ball valve.
RMA ball valves are available in two sealing types: single-piston and double-piston seating ring systems.
In the **single-piston** system, the sealing ring on the outlet side raises when a pre-defined over-pressure is present inside the valve housing thus allowing this excess pressure to escape to the outlet side. The lack of pressure within the housing provides proof of sealing.
In the **double-piston** system, the seals and seating rings on the inlet and outlet side provide total sealing of the housing inner chamber in both end positions of the ball valve. The ball valve is tightening to the inlet and to the outlet side. In this way it is also possible to provide proof of sealing by pressurization from outside the housing.

Ball bearings
RMA ball valves are trunnion mounted with maintenance-free bearings in all sizes and pressure ratings.
The precision machining and special lowfriction bearings ensure minimum wear. This particularly advantageous for the resistance and smooth operating of ball valve as well as associated gearboxes and motors in high pressure zones when switching takes place in pipelines under full pressure.

Electrostatic charge
An electric conductive connection between ball and housing provides reliable prevention of electrostatic buildup.

Spindle/sealing
The antiblowout design prevents the spindle from being blown out by the medium transported or pulled out by the user himself.
The special double-screw design enables, on the one hand, correct squeezing or adjustment of the steel, PTFE and graphite sealing system manufactured by RMA and on the other hand, rapid replacement of sealing rings under full operating pressure.

Connection
Inline connection on site can be ensured either with flange ends, in accordance with standard requirements, or with all welding ends gauged to correspond to the pipes to be connected. Specific customer requirements may be taken into consideration.

Fire protection
RMA ball valves offer the high fire protection level required in oil, gas and supply pipelines.
(e.g. API 6FA, API 607, BS 6755 Part 2)

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RMA
PIPELINE EQUIPMENT

Ball Valve
Type HKSF-W

Materials
For the standard model of the type HKSF-W, materials in accordance with DIN, ASME and NACE MR 01 75 are used.

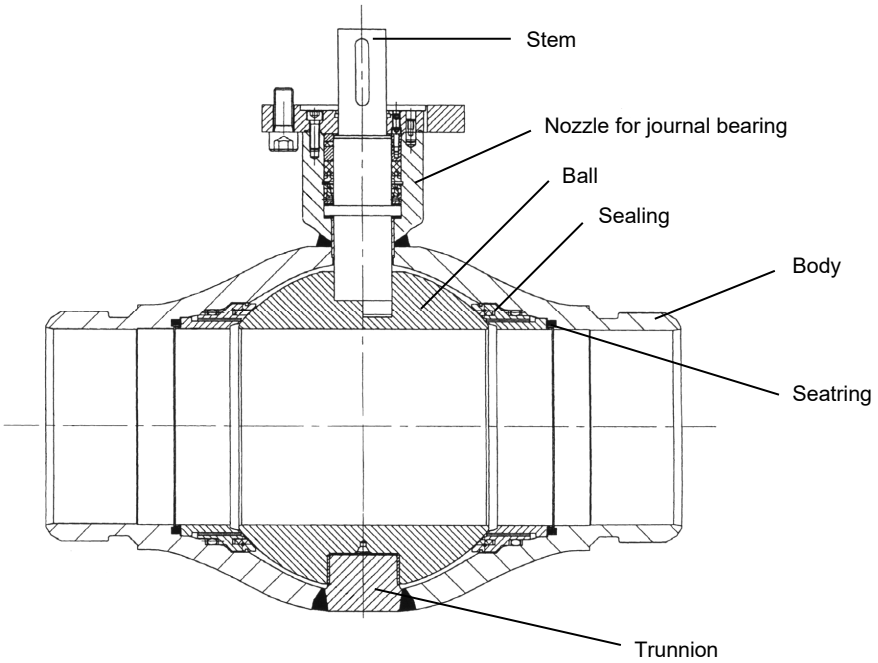
Vent and drain
In accordance with the known relevant group standards, RMA ball valves are equipped with vent and drain pipes with additional RMA ball valves, if needed with pressure resistance cap and/or with RMA rotary gate valves on request or due to technical necessity.

Scope of application
Surface or underground mounted, for use in:
Transport lines, compressor stations, measure and regulating stations, drain or vent pipes on pig traps or other installations. RMA ball valves are suitable for use within a wide range of mediums e.g.: gas, oil....

Design
The housing is extremely rigid thanks to its fully-welded ball design form.
The largely dimensioned ball diameter ensures a high level of overlapping of the sealing surface in the fully-closed position with a consequently high level of sealing security.
In addition, the design form revents turbulence in the medium transported which also helps limit premature ware.
The low weight and minimum number of weld seams are further advantages of this design.

Operating
RMA ball valves are available with hand, geared, electrical, electro-hydraulic, hydro-pneumatic or any other operating mechanism.
Diverse accessories, like position indicators, remote control operations etc. can be added.

Temperature range
The operating temperature for standard RMA ball valves extends from -29°C to +120°C.



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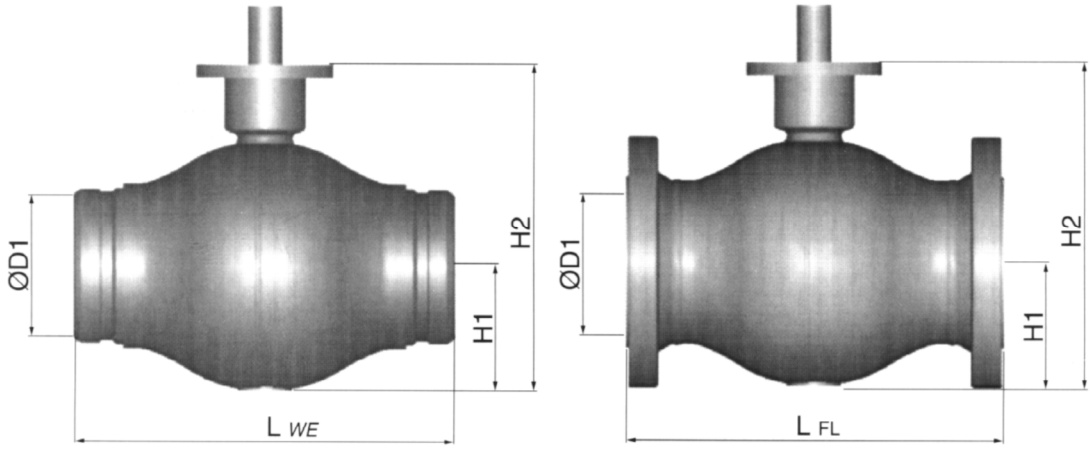
PIPELINE EQUIPMENT

ANSI Class 150
PN 16
Full bore



ANSI Class 150 - PN 16 Full bore					
Size	**Diameter**	**Height**	**Height**	**Length**	**Length**
DN mm/inch	**Ø D1 mm**	**H 1 mm**	**H 2 mm**	**L WE mm**	**L FL mm**
25/1”	25	45	90	126	160
50/2”	51	60	150	216	178
80/3”	76	110	220	283	203
100/4”	102	130	260	305	229
150/6”	152	190	380	457	394
200/8”	203	230	510	521	457
250/10”	254	290	610	559	53
300/12”	305	320	700	635	610
400/16”	387	350	840	838	762
500/20”	489	430	980	991	914
600/24”	591	490	1170	1143	1067
700/28”	686	560	1260	1346	1245
800/32”	781	635	1410	1524	1372
900/36”	876	710	1580	1727	1524
1000/40”	978	780	1740	1803	1727
1100/44”	1067	855	1895	1956	1905
1200/48”	1168	945	2085	2134	2057
1400/56”	1384	1110	2410	2489	2362
Continuous expanding of production range. Please ask for deviating sizes and dimensions.					

Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

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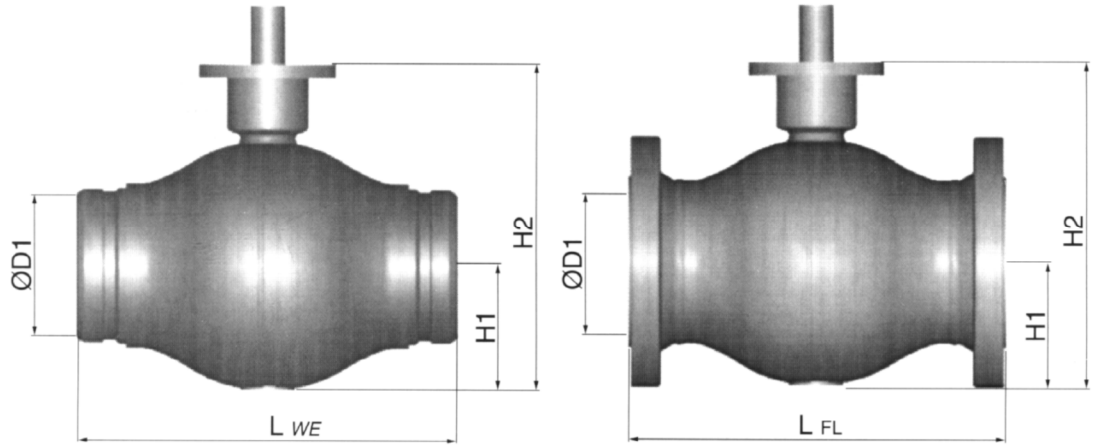
PIPELINE EQUIPMENT

ANSI Class 300
PN 40
Full bore



ANSI Class 300 - PN 40 Full bore					
Size	**Diameter**	**Height**	**Height**	**Length**	**Length**
DN mm/inch	**Ø D1 mm**	**H 1 mm**	**H 2 mm**	**L WE mm**	**L FL mm**
25/1”	25	70	155	216	216
50/2”	51	95	185	216	216
80/3”	76	110	240	285	283
100/4”	102	130	290	305	305
150/6”	152	190	395	457	403
200/8”	203	235	525	521	502
250/10”	254	290	630	559	568
300/12”	305	335	720	635	648
400/16”	387	380	880	838	838
500/20”	489	450	1060	991	991
600/24”	591	505	1200	1143	1143
700/28”	686	580	1280	1346	1346
800/32”	781	655	1440	1524	1524
900/36”	876	730	1590	1727	1727
1000/40”	978	790	1765	1803	1803
1100/44”	1067	870	1925	1956	1956
1200/48”	1168	950	2105	2134	2134
1400/56”	1384	1135	2455	2489	2489
Continuous expanding of production range. Please ask for deviating sizes and dimensions.					

Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

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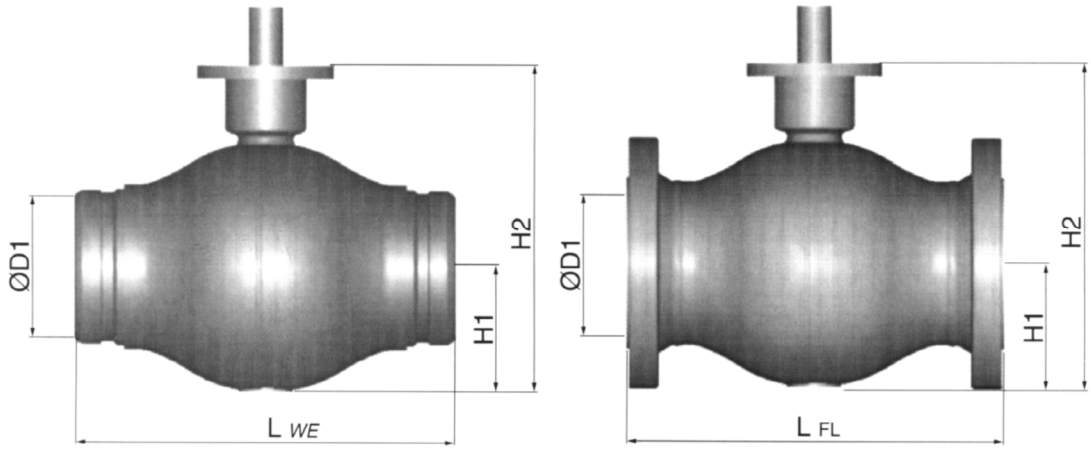
PIPELINE EQUIPMENT

ANSI Class 600
PN 100
Full bore



ANSI Class 600 - PN 100 Full bore					
Size	**Diameter**	**Height**	**Height**	**Length**	**Length**
DN mm/inch	**Ø D1 mm**	**H 1 mm**	**H 2 mm**	**L WE mm**	**L FL mm**
25/1”	25	70	155	216	216
50/2”	51	95	185	292	292
80/3”	76	110	240	356	356
100/4”	102	130	290	432	432
150/6”	152	190	395	559	559
200/8”	203	235	525	660	660
250/10”	254	290	630	787	787
300/12”	305	335	720	838	838
400/16”	387	380	880	991	991
500/20”	489	450	1060	1194	1194
600/24”	591	505	1200	1397	1397
700/28”	686	580	1280	1549	1549
800/32”	781	655	1440	1778	1778
900/36”	876	730	1590	2083	2083
1000/40”	978	790	1765	2159	2159
1100/44”	1067	870	1925	2311	2311
1200/48”	1168	950	2105	2489	2489
1400/56”	1384	1135	2455	2921	2921
Continuous expanding of production range. Please ask for deviating sizes and dimensions.					

Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

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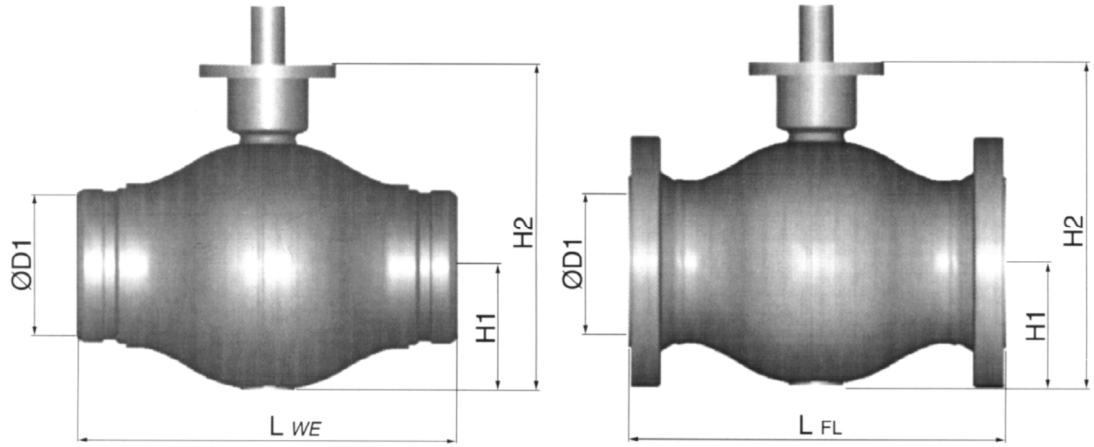
PIPELINE EQUIPMENT

ANSI Class 900
PN 150
Full bore



ANSI Class 900 - PN 150 Full bore					
Size	**Diameter**	**Height**	**Height**	**Length**	**Length**
DN mm/inch	**Ø D1 mm**	**H 1 mm**	**H 2 mm**	**L WE mm**	**L FL mm**
25/1”	25	70	155	216	216
50/2”	51	95	185	368	368
80/3”	76	110	240	381	381
100/4”	102	130	290	457	457
150/6”	152	190	395	610	610
200/8”	203	235	525	737	737
250/10”	254	290	630	838	838
300/12”	305	335	720	965	965
400/16”	375	410	880	1130	1130
500/20”	473	470	1080	1321	1321
600/24”	572	525	1210	1549	1549
700/28”	667	605	1340	1702	1702
800/32”	762	675	1470	1880	1880
900/36”	857	760	1625	2134	2134
Continuous expanding of production range. Please ask for deviating sizes and dimensions.					

Remarks

- Length act. To API 6D; as far as defined.
- Length of flanged model with ANSI flanges with flat sealing plane type RF.
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

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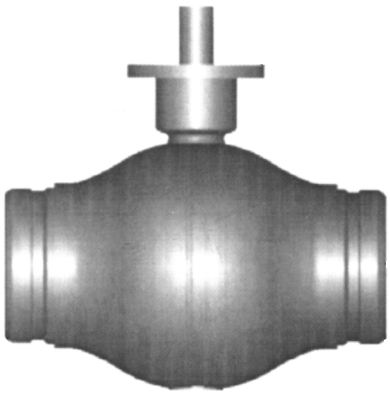
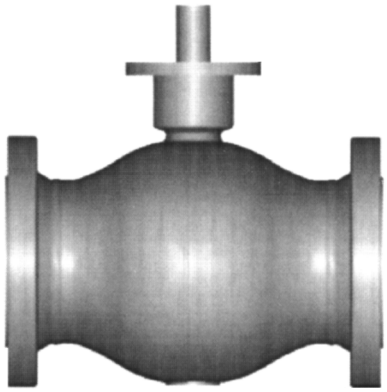
PIPELINE EQUIPMENT

Ball valve - weight





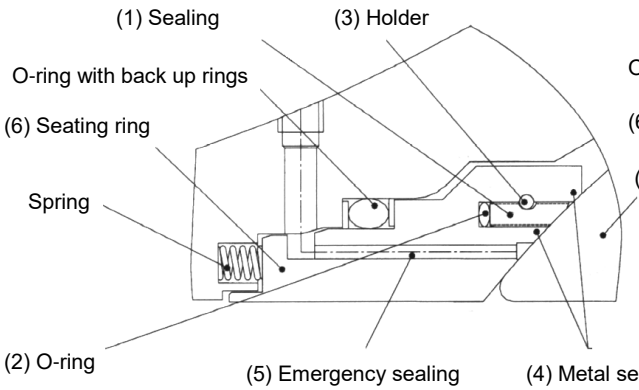
Weights								
Size	**ANSI Class 150 PN 25**		**ANSI Class 300 PN 40**		**ANSI Class 600 PN 100**		**ANSI Class 900 PN 160**	
DN mm/inch	**G WE kg**	**G ANSI FL kg**	**G WE kg**	**G ANSI FL kg**	**G WE kg**	**G ANSI FL kg**	**G WE kg**	**G ANSI FL kg**
25/1”	7	10	7	10	9	13	9	13
50/2”	10	12	10	13	14	19	14	19
80/3”	24	29	24	31	27	37	27	38
100/4”	34	49	34	51	35	69	35	70
150/6”	75	97	75	115	79	1540	85	175
200/8”	200	230	205	260	211	323	220	370
250/10”	335	375	340	433	351	539	420	610
300/12”	490	550	505	654	513	705	560	870
400/16”	625	721	655	836	836	1190	980	1350
500/20”	1092	1233	1123	1413	1238	1695	1710	2300
600/24”	1750	1971	1799	2220	1848	2660	2860	3950
700/28”	2730	2959	2806	3394	2870	3890	4250	5550
800/32”	3958	4314	4079	4823	4220	5561	6010	7880
900/36”	5680	6´078	5742	6686	6230	7720	8344	10850
1000/40”	7178	7832	7278	8342	9813	10485	-	-
1100/44”	9553	10439	9798	10684	11874	13680	-	-
1200/48”	12412	13504	12615	13707	15306	17722	-	-
1400/56”	21154	22432	21297	22995	24277	28433	-	-
Continuous expanding of production range. Please ask for deviating sizes and dimensions.								

Remarks

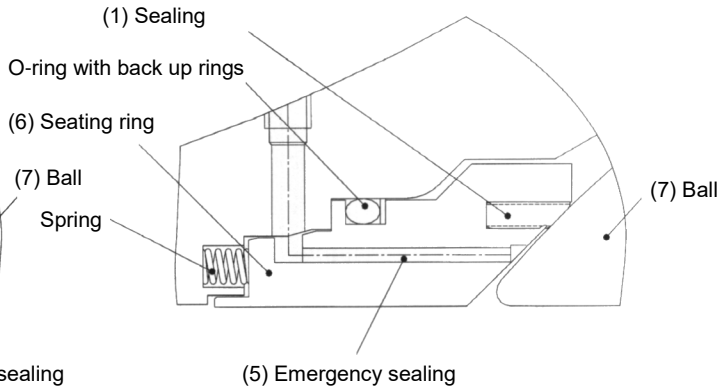
- Weights of flanged ball valves with ANSI flanges with flat sealing plane type RF
- When ordering flanged ball valves, please specify whether ANSI flanges type RF, type RTJ or DIN flanges are required.
- Ball valves according to ANSI Class 400 on request.
- Ball valves with reduced bore on request.
- WE = with welding ends.
- FL = with flange ends.

”Ball” Sealing system

with primary metal and secondary soft sealing



with soft sealing



The primary metal and secondary soft sealing system comprises

- 2 **metal sealing planes** (chrome steel), other types on request **(4)**
- 1 **flexible soft sealing ring** (PTFE/carbon), other types on request **(1)**
- 1 **emergency sealing** facility on request (special chamber in the seating ring) **(5)**

The **soft sealing (1)** is positioned in such a way that is first effective at low operating pressures. As the operating pressure increases, the application force of the **seating ring (6)** on the **ball (7)** increases accordingly (piston effect). The permanent spring force therefore receives additional support. In this case, the **soft sealing ring (1)** is pushed back so far that sealing is achieved entirely with the **metal sealing planes (4)**.
In case of damage to the **metal sealing planes (4)**, the **soft sealing ring (1)** enters into effect. This is achieved by increasing the pressure of the reverse side of the **soft sealing ring (1)**. The later is pressed into the **ball (7)**. For this activation it is irrelevant whether the leakage is due to the **metal sealing plane (4)** on the housing side or on the medium side.

Slipping, extraction, breaking off or other damages to the **soft sealing ring (1)** is virtually not possible.

The soft sealing comprises

- 1 **flexible soft sealing ring** (PTFE/carbon; other types on request) **(1)**
- **emergency sealing facility** on request (special chamber in the seating rings) **(5)**

The **soft sealing ring (1)** is positioned in such a way that it is effective over the entire pressure range. As the operating pressure increases, the application force of the **seating ring (6)** on the **ball (7)** increases accordingly (piston effect). The permanent spring force therefor receives additional support. The application force of the **soft sealing ring (1)** against the **ball (7)** increases proportionally.

Thanks to its *advantageous design form* and the *extremely fine tolerance limits*, sliding, extraction, braking off or any other type of damage to the **soft sealing ring (1)** is virtually not possible.

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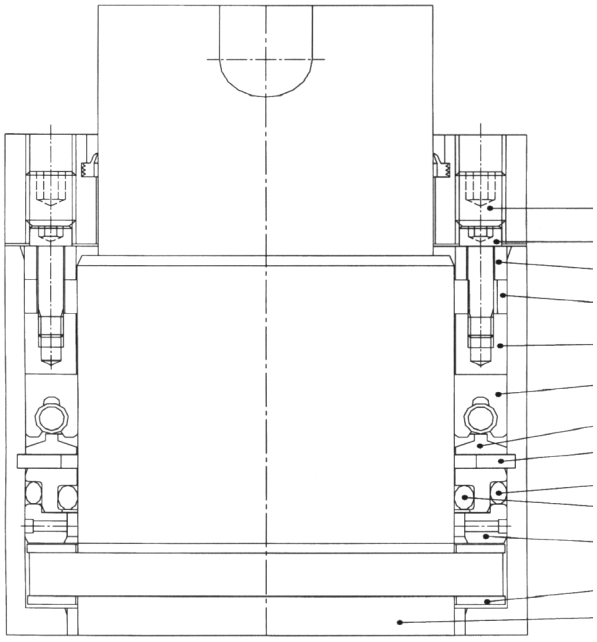
PIPELINE EQUIPMENT

”Operating spindel” Sealing system



The sealing system is composed of three seals:
- Graphite ring (4)
- Lip sealing ring (6)
- O-ring (9+10)

Radial re-tensioning of the lip **sealing ring (6)** is easily achieved by tightening the **threaded pins (1)**. The **graphite ring (4)** can also be re-tensioning by tightening the **cylinder screw (2)** (remove the threaded pins).
The **o-ring (10)** and the lip **sealing ring (6)** can be recharged by injecting a sealing compound.

Should it still prove necessary to replace the set of sealing rings, then this task can be carried out with the valve under pressure.

- unscrew the gearbox plate
- replace the set of **sealing rings (4/5/6)**

Note
Under no circumstances may the **fastening ring (8)** be removed as this is used to ensure axial clamping of the **operating spindle (13)**.

It is recommended that the **o-rings (9+10)** be refilled with a sealing compound before replacing the sealing rings.

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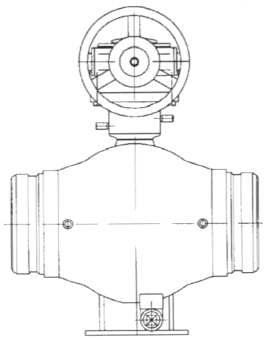
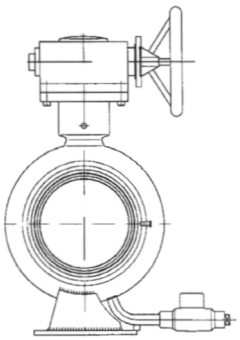
PIPELINE EQUIPMENT

Some examples for variations on equipment, manufactured according to customers needs

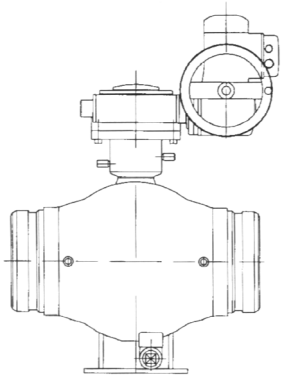
- for *above ground* installation

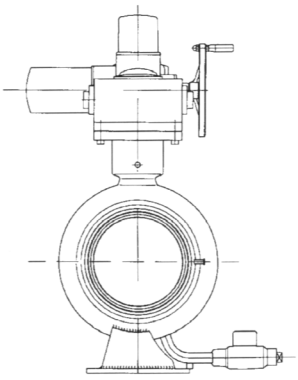




Example 1

- with welding ends
- incl. gear-box and handwheel
- incl. emergency sealing at
  a) ball/seating ring
  b) spindel bearing
- with ball valve for drain and vent
- with support





Example 2

- with welding ends
- incl. gear-box and motor, push buttons and handwheel for manual operating at side
- incl. emergency sealing at
  a) ball/seating ring
  b) spindel bearing
- with ball valve for drain and vent
- with support

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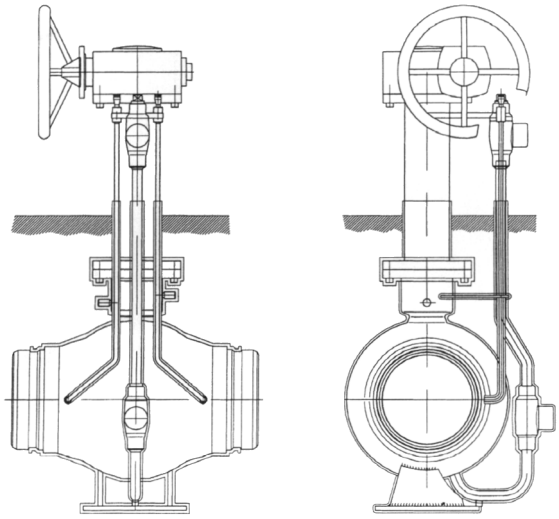
pipeline accessories

PIPELINE EQUIPMENT

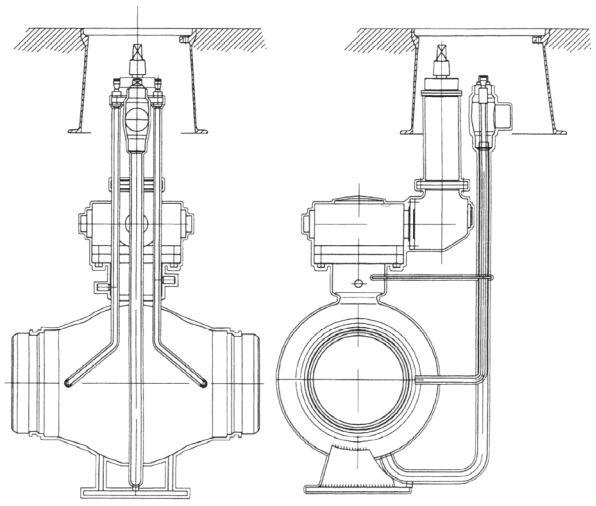
Some examples for variations on equipment, manufactured according to customers needs

- for *underground* installation



- with welding ends
- with stem extention up to operation hight
- incl. gear-box above ground and handwheel
- incl. emergency sealing at
  a) ball / seating ring
  (accessible above ground)
  b) spindel bearing
- with possibility of drain and vent above ground through vertical guided pipes with one ball valve above ground and one ball valve underground
- with support
- underground layed parts are coated with PUR. Parts above ground are coated with primer and painted on request.

Example 3



- with welding ends
- with stem extention and actuating square shaft in road cap (a position indicator is recommended)
- incl. gear-box underground
- incl. emergency sealing at
  a) ball / seating ring
  (accessible through road cap)
  b) spindel bearing
- with possibility of drain and vent through vertical guided pipes with one ball valve in box of road cap with support
- underground layed parts are coated with PUR.

Example 4

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