

# EMICO

**EMICO EA 900 SERIES TRUNNION BALL VALVES  
API 6D / FIRE SAFE**



**EMICO** A fast-growing ball valve manufacturer, EMICO supplies a line of forged 3-piece, bolted construction trunnion ball valves ranging from 2" (50mm) to 12" (300mm) and up to ASME Class 1500. EMICO ball valves are internationally distributed and widely used in the production, refining and transportation of oil, gas and chemical products. Modern facilities and equipment coupled with a long history of quality products ensure every valve is manufactured to exacting standards.

## QUALITY ASSURANCE & CERTIFICATION

- EMICO was the first ball valve manufacturer in Taiwan to implement the ISO 9002 Quality Assurance System. In 2000, it further obtained ISO 9001 Certification, cross-approved with TUV DIN EN ISO 9001.
- EMICO is an authorised licensee to use API 6D and certified to PED CE, ATEX, TA-Luft and is UL listed.
- EMICO is certified to Australian Gas Association (AGA) AG 201 for its range of EA 305 3-piece fire safe ball valves.
- Fire safe designs include: 1-pc EA 108, 2-pc EA 25A & EA 25J, 3-pc EA 305, EA 309, EA 310 & P 135. These valves are fire-safe to API 607 4th & 5th edition fire test requirements and tested and certified by Southwest Research Institute (SwRI) in Texas, USA and TUV.
- EMICO has an established Engineering Department of engineers, technicians and an R&D centre with many years experience in the manufacture of quality ball valves.
- All valves are fully traceable and certified to EN 10204-2004 3.1 (chemical, mechanical, hydrostatic & pneumatic pressure tests) and can be supplied with NDE performed to ASME B16.34 international standards. Valves are tested and certified to API 598.



## PRODUCTION, QUALITY CONTROL & SAFETY

We at EMICO believe that more end users are increasingly attaching importance to safety and quality of valves at a reasonable price. Precision high-quality trunnion ball valves call for precision production techniques and quality materials. We at EMICO go to all lengths to ensure that perfection is achieved in each and every ball valve before it leaves our factory.

All our valves are manufactured under a controlled QA system with documented procedures that meet industry specifications and customer requirements. QA and QC procedures cover the purchase and verification of raw material forgings & materials, machining and internal process controls, testing, packing and shipping.

All EMICO trunnion ball valves are manufactured from forgings to guarantee favourable microstructures and better mechanical properties than cast steel. Since EMICO use low temperature material A350 LF2 as standard for trunnion ball valves, they can be used at low temperatures - 46°C by merely modifying the O-rings and some parts.

Each trunnion ball valve manufactured by EMICO undergoes design validation through functional and pressure tests, ensuring conformance to International specifications and customer requirements. Torque tests are carried out to ensure that all EMICO valves comply with our low-torque requirements, ensuring that valves are safe to operate after installation and in long service.

All valves are certified to EN 10204-2004 3.1

## EMICO TRUNNION BALL VALVE FIGURE NUMBERING SYSTEM

Example for: 50mm, Class 600, Full Bore, RF Flanged, Ball Valve, LF2 Body, 316L Trim, Viton AED FR58/90 O-Ring, RPTFE Seat, Lever Operated, Cavity Sealant facility

20	906	F	R	2	3	4	1	L	1
1	2	3	4	5	6	7	8	9	10

### 1. Valve size

Code	Inch	mm
20	2"	50
30	3"	80
40	4"	100
60	6"	150
80	8"	200
AO	10"	250
A2	12"	300

### 2. Valve Series No. & ASME Class

Code	Class
901	150
903	300
906	600
909	900
915	1500
925	2500

### 3. Bore Design

Code	Class
F	Full Bore
R	Reduced Bore

### 4. End Connection

Code	Description
R	Raised Face
J	RTJ
W	BW

### 5. Shell Material

Code	Description
1	A105N
2	LF2
3	F316L
4	F53

### 6. Trim Material

Code	Description
1	A105N/LF2 +ENP
2	AISI 410
3	F316L
4	F51
5	F53

### 7. O-Ring Material

Code	Description
1	NBR
2	Viton
3	Viton AED FR25/90
4	Viton AED FR58/90
5	HNBR Elast-O-Lion101
6	HNBR Elast-O-Lion 985
7	FKM Viton GLT

### 8. Seat Material

Code	Description
1	RPTFE
2	Devlon V
3	Peek
4	Nylon PA12

### 9. Valve Operation

Code	Description
L	Lever Handle
W	Worm Gear
S	Spring Return Actuator
D	Double Acting Actuator
E	Electric Actuator

### 10. Other

Code	Description
1	Cavity Sealant
2	Seat Sealant Injection
3	Stem Sealant Injection
N	NACE

## DESIGN & INSPECTION STANDARDS

ITEM	STANDARD
Valve Design	API 6D/ISO 14313
Pressure/Temperature Rating for Body	ASME B16.34
Pressure/Temperature Rating for Soft Seal	Per Seat insert & O-ring material used
Shell Wall Thickness	ASME B16.34
Bore Dimensions	API 6D
Face to Face Dimensions	ASME B16.10
Flanged End Dimensions	ASME B16.5
Butt Weld End Dimensions	ASME B16.25
Pressure Tests	API 6D/API 598
Fire Safe Type Test	API 607 Ed.5/ISO 10497-5:2004
Nace	MR 0175
Materials	Per Relevant ASTM Standards
Material & Certificate	EN 10204-2004 3.1

## TYPICAL BILL OF MATERIALS

DESCRIPTION	STANDARD	LOW TEMPERATURE	STAINLESS STEEL
BODY	A105N	A350 LF2	F316/L
FLANGED ENDS	A105N	A350 LF2	F316/L
BALL	A105+ENP	A350 LF2+ENP/F316	F316/L
SEAT	A182 F6a	A182 F6a	F316/L
SEAT INSERT	RPTFE / DEVLON <sup>2</sup>	RPTFE / DEVLON <sup>2</sup>	RPTFE / DEVLON <sup>2</sup>
UPPER STEM	AISI 410 <sup>3</sup>	AISI 410 <sup>3</sup>	F316/L <sup>3</sup>
LOWER STEM	AISI 410 <sup>3</sup>	AISI 410 <sup>3</sup>	F316/L <sup>3</sup>
GLAND	A105	A350 LF2	F316/L
STOP PLATE	A105	A350 LF2	F316/L
STUDS	A193 B7M	A 194 L7M	A193 GR B8
NUTS	A194 2HM	A194 GR 7M	A194 GR 8
BODY PLUG	A105	A350 LF2	F316/L
LOWER STEM SCREW	AISI 304	AISI 304	AISI 304
STEM BEARING UPPER	S/STEEL+PTFE	S/STEEL+PTFE	S/STEEL+PTFE
STEM BEARING LOWER	S/STEEL+PTFE	S/STEEL+PTFE	S/STEEL+PTFE
SEAT SPRING	INCONEL X-750	INCONEL X-750	INCONEL X-750
GLAND PACKING	GRAPHITE	GRAPHITE	GRAPHITE
GASKET BODY / FLANGE	GRAPHITE	GRAPHITE	GRAPHITE
O-RING SEAT / FLANGE	FKM <sup>1</sup>	FKM <sup>1</sup>	FKM <sup>1</sup>
STOP PLATE	CARBON STEEL	A350 LF2	AISI 316/L
GASKET SEAT	GRAPHITE	GRAPHITE	GRAPHITE
LEVER HANDLE	CARBON STEEL	CARBON STEEL	CARBON STEEL
GEAR OPERATOR	DUCTILE IRON	DUCTILE IRON	DUCTILE IRON
O-RING BODY / FLANGE	FKM <sup>1</sup>	FKM <sup>1</sup>	FKM <sup>1</sup>
O-RING STEM / BODY	FKM <sup>1</sup>	FKM <sup>1</sup>	FKM <sup>1</sup>
O-RING LOWER STEM	FKM <sup>1</sup>	FKM <sup>1</sup>	FKM <sup>1</sup>
O-RING UPPER STEM	FKM <sup>1</sup>	FKM <sup>1</sup>	FKM <sup>1</sup>
ANTI-STATIC DEVICE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
SEALANT INJECTION FITTING	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
SAFETY CHECK VALVE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

### Notes:

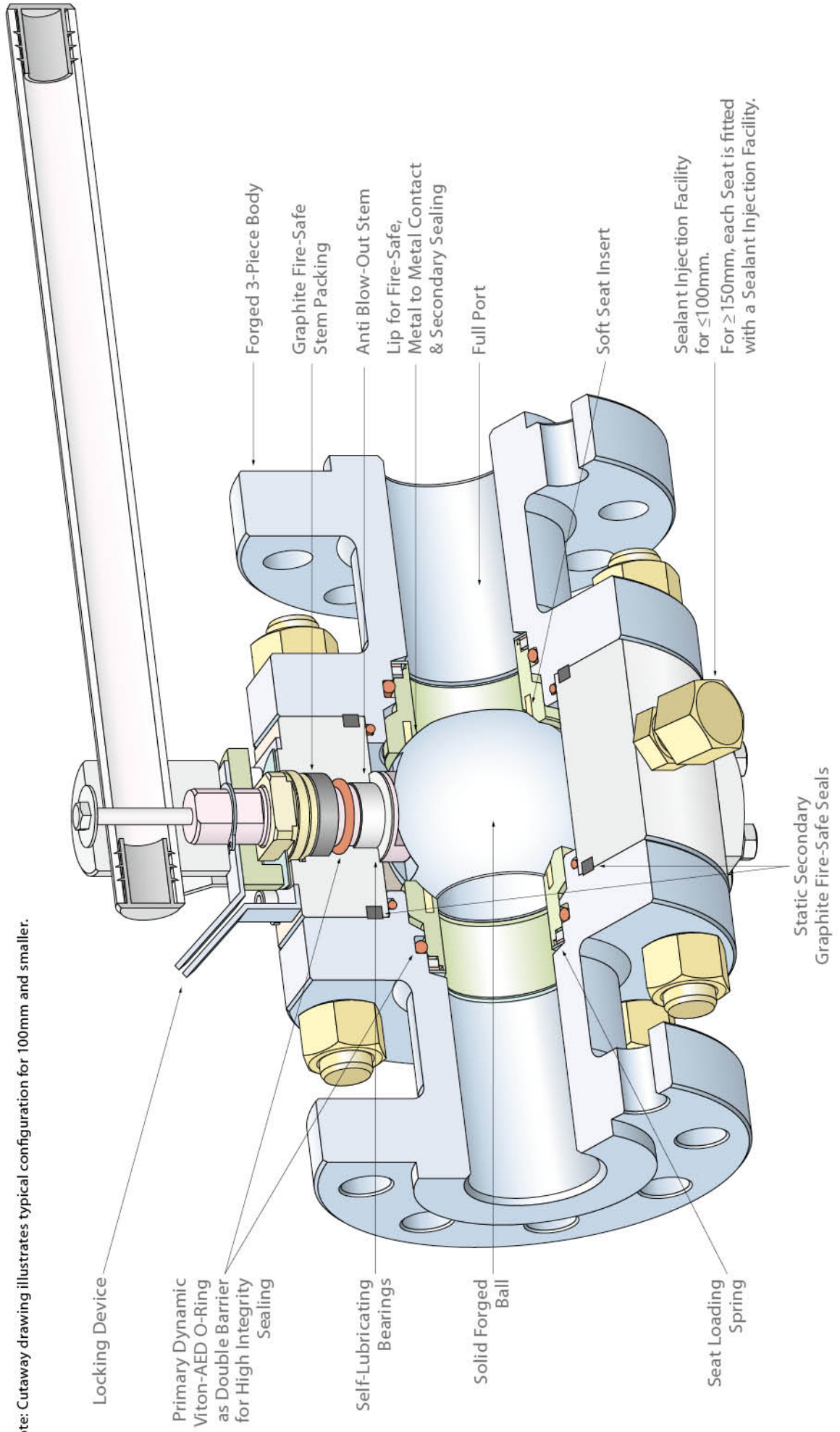
1. FKM (Fluoroelastomer): There are a number of fluoroelastomers which can be selected according to media, temperatures and other AED qualities.
2. Other materials are available depending on service conditions and pressure class.
3. Other materials are supplied dependant on pressure class and media.

EMICO			
Serial number	E106530		
NPS	2"x2"		
ASME B16.5/B16.34	CL 900		
MOP MPa	MOT °C	9	120
mOP MPa	mOT °C	15.3	-30
Body & Flanges (ASTM)	A105N		
Stem - Ball - Seat	SUS410	F316	F6a
Body Heat No.	D32311		
O-Ring - Seat Insert	Viton AED	RPTFE	
Face to face	mm	368	
Model / Fig No.	EA-909		
Test Pressure	Mpa	22.9	
Mfr date	Test date	2011/8	2011/8
Fire Safe	ISO-FI		
ISO 14313			



## EA 900 SERIES TRUNNION BALL VALVE

Note: Cutaway drawing illustrates typical configuration for 100mm and smaller.



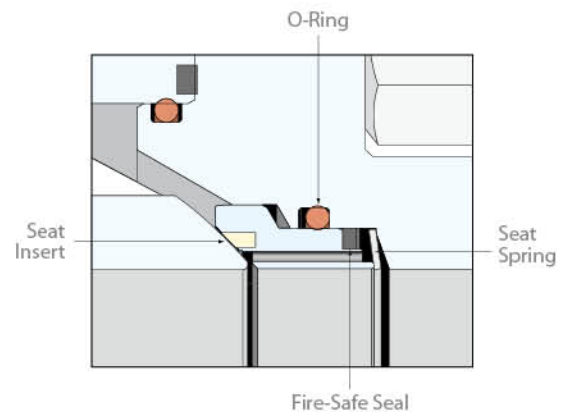
## DESIGN FEATURES

EMICO trunnion ball valves are suitable for use in various applications, including but not limited to:

- Oil & Gas Pipelines – Onshore & Offshore - manifolds, separator systems, filter systems, drying systems
- Transportation of Oil & Gas – pumping & compressor stations, pig launching stations
- Gas Distribution - measuring & metering stations, pressure regulation & reduction stations
- Gas Storage Plants
- Petrochemical – processes and storage facilities
- Chemical & Process Plants

### Seat Construction

**Soft Seals** – the resilient seat insert is the sealing contact between the ball and the seat and is securely locked into the stainless steel seat ring. O-ring and graphite fire-safe seal are the contact between the seat ring and the valve body.



### Fire Safe Design

EMICO valves are tested and certified fire-safe to API 607 Edition 5 / ISO 10497-5:2004.

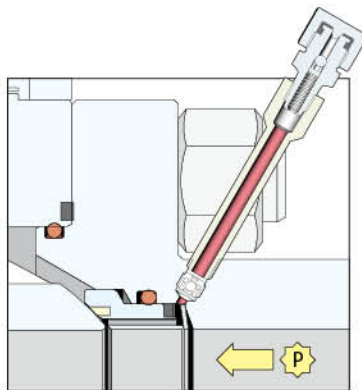
**External** – leakage to atmosphere is prevented by double sealing of O-ring and graphite gasket in the stem area and body joints. In the event of a fire damaging O-rings, the graphite packing and gaskets prevent / minimize leakage to atmosphere.

**Internal** – in the event of a fire, the seat resilient materials i.e. seat insert and O-rings burn, and the edge / metal lip of the seat, preloaded by the seat spring comes in contact with the ball and minimizes internal line fluid leakage. Leakage behind the seat is prevented by a graphite gasket.

### Trunnion Ball – Stem and Trunnion Bearings

EMICO design incorporates a solid forged ball with top and bottom trunnions fitted with self lubricated PTFE impregnated stainless steel bearings. This provides low friction and less torque. In the closed position, thrust generated by pressure is supported by the trunnions.

### Seat Sealing Mechanism

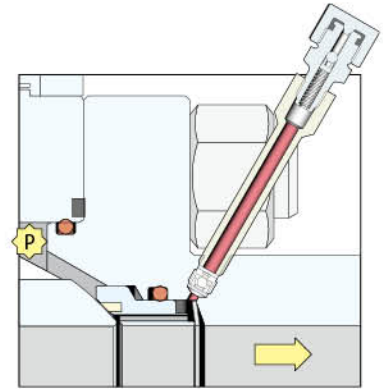


The floating seat design ensures the upstream and downstream seats are always in contact with the ball loaded by the seat spring and assisted by line pressure. Tight shut-off sealing is maintained independently by both seats at the same time.

Each seat is uni-directional depending on pressure and this allows a seal in both directions using one seat for each pressure direction. At low pressure, sealing is effected by the seat O-ring and spring that keep the seat in contact with the ball. As pressure increases, the seat reacts to the upstream seal, producing a proportional force in addition to the pre-loaded spring set to force the upstream seal tight against the ball. The total sealing force is the sum of the spring force plus the force resulting from the pressure which proportionally increases with line pressure.

### Double Block & Bleed Function & Self Relieving Seats

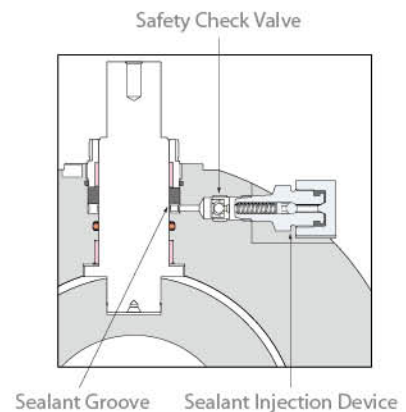
As each seat independently shuts off line fluid upstream and downstream of the ball, the valve bore and cavity are isolated from each other and the valve is ideal for double block and bleed service. The seats work independently of each other and two different media can be separated by the valve. As the seats are engineered to self-relieve, no pressure build-up can occur in the body cavity. The floating seat design allows the seat with the lowest pressure (downstream seat) to move slightly away from the ball to relieve excess cavity pressure into the valve bore, equalizing the pressure. This is done without the aid of external cavity relief or safety valves.



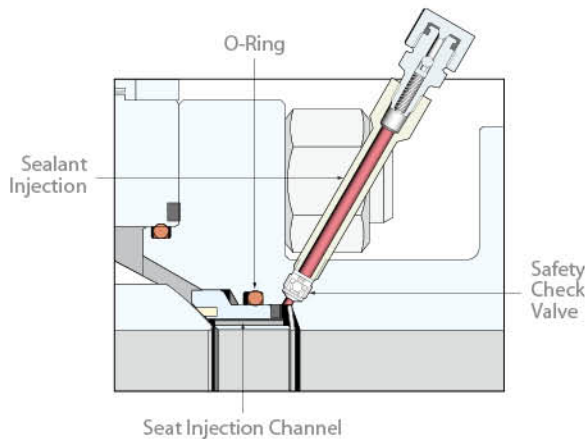
### Emergency Secondary Sealing System

EMICO ball valves are non-lubricated. Additional emergency sealing injection for seats and stem can be provided for temporary sealing if foreign matter should cause damage to the sealing areas. As the valve is closed, the sealant is forced into the sealing areas. This is not a long-term solution to restoring sealing, rather a short-term prevention till maintenance is carried out, as with each valve operation the sealant can be washed through the system. Sealant fittings include safety check valves which prevent reverse flow, due to internal valve pressure, of the injected grease.

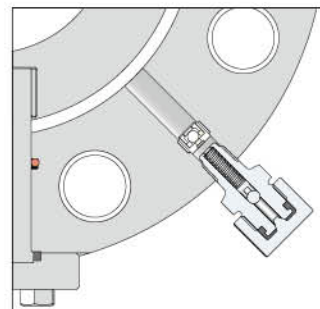
**Stem** – In the event of failure of the stem sealing system due to damage to O-rings and degradation of packing, an emergency sealant injection point ensures temporary sealing through the sealant groove. Seal restoration can be performed either with the valve open or closed.



**Seats** - Valves 6" (150mm) and larger can be supplied with seat sealant injection facilities to provide temporary sealing through the sealant grooves, in the event of damage to the seat insert. Valves 4" (100mm) and below can be supplied with a cavity sealant injection facility.



Seat Sealant System - 6" (150mm) and above



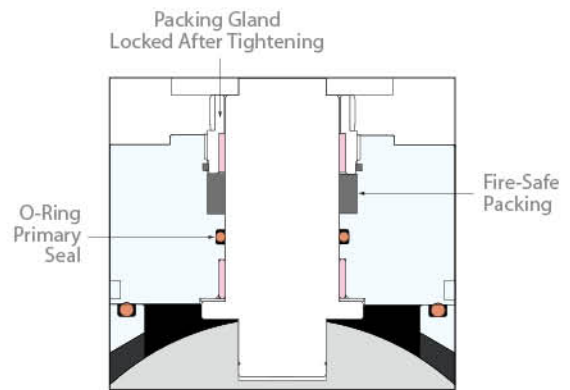
Cavity Sealant System - 4" (100mm) and below

### Double Barrier Seals

The body to end connections and stem sealing incorporates double barrier protection for maximum safety against pressure envelope leakage.

In the stem area, the primary sealing is an O-ring followed by a secondary fire-safe graphite gland packing.

Sealing between body and end flanges is by an O-ring followed by a fire safe graphite gasket inside the valve body.



### Operating Torque

EMICO trunnion ball valves are precision manufactured to ensure low operating torques, resulting in longer operational life. Low torques allow the use of smaller size actuators and are a cost advantage when sizing actuators. Contact EMICO for details.

### Anti-Static Device

Spring-loaded pin assembly ensures electric continuity between body, stem and ball.

### Drain

A drain plug is fitted as standard on all valves. This port can be used to verify valve seat leakage or to drain the valve if required.

### Stop Plate & Locking Device

EMICIO ball valves are equipped with a stop plate to ensure true open and closed positions. This also takes out the guess work at site should operators need to be changed. All lever and gear operated valves are supplied with a locking mechanism for open and closed positions.

### Anti Blow-Out Stem

Anti blow-out proof stem with collar fitted from inside the body.

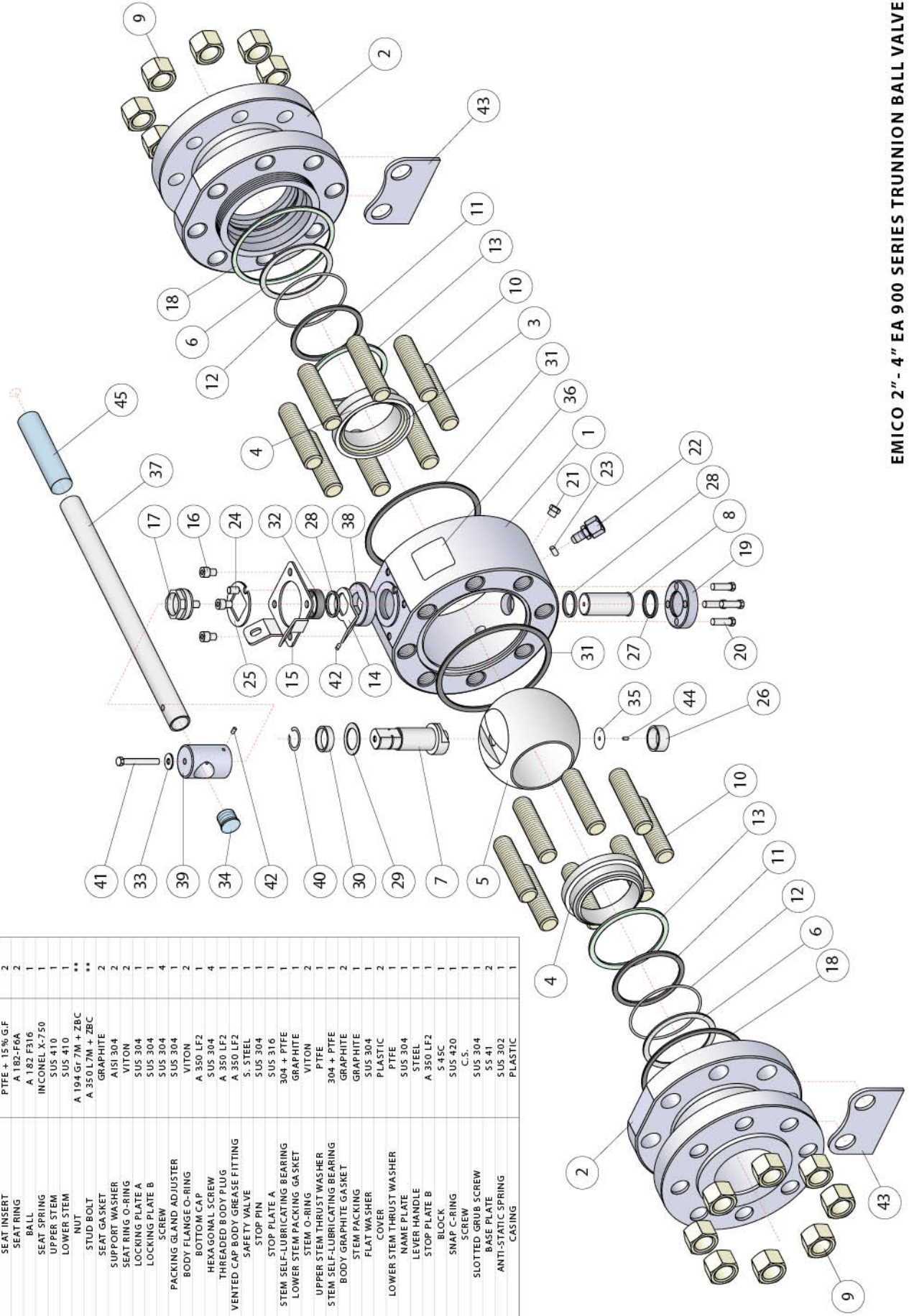
### Bore Dimensions

Valves are supplied in full as well as reduced bore. In addition, full bore valves can have pipe bore machined to match pipe bores of different schedules for optimum pigging.



\*Consult EMICO for alternative materials  
 \*\* As per Class Rating of Valve

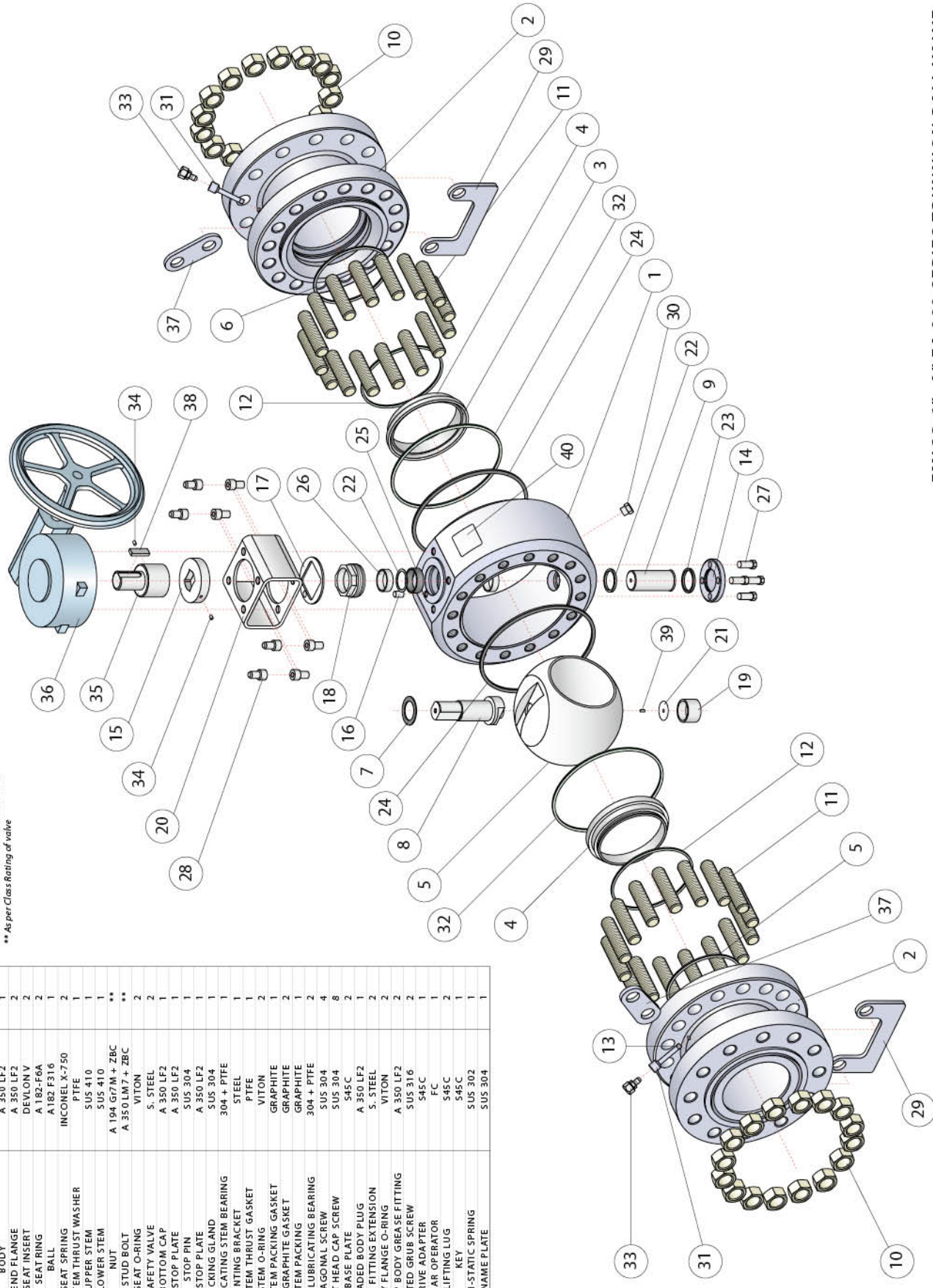
PART NO.	PART	MATERIAL*	QUANTITY
1	BODY	A 350 LF2	1
2	END FLANGE	A 350 LF2	2
3	SEAT INSERT	PTFE + 15% GF	2
4	SEAT RING	A 182-F6A	2
5	BALL	A 182 F316	1
6	SEAT SPRING	INCOEL X-750	1
7	UPPER STEM	SUS 410	1
8	LOWER STEM	SUS 410	1
9	NUT	A 194 Gr 7M + ZBC	**
10	STUD BOLT	A 350 L7M + ZBC	**
11	SEAT GASKET	GRAPHITE	2
12	SUPPORT WASHER	A151 304	2
13	SEAT RING O-RING	VITON	2
14	LOCKING PLATE A	SUS 304	1
15	LOCKING PLATE B	SUS 304	1
16	SCREW	SUS 304	4
17	PACKING GLAND ADJUSTER	SUS 304	2
18	BODY FLANGE O-RING	VITON	2
19	ROTTOM CAP	A 350 LF2	1
20	HEXAGONAL SCREW	SUS 304	4
21	THREADED BODY PLUG	A 350 LF2	1
22	VENTED CAP BODY GREASE FITTING	A 350 LF2	1
23	SAFETY VALVE	S. STEEL	1
24	STOP PIN	SUS 304	1
25	STOP PLATE A	SUS 316	1
26	STEM SELF-LUBRICATING BEARING	304 + PTFE	1
27	LOWER STEM PACKING GASKET	GRAPHITE	2
28	STEM O-RING	VITON	2
29	UPPER STEM THRUST WASHER	PTFE	1
30	STEM SELF-LUBRICATING BEARING	304 + PTFE	1
31	BODY GRAPHITE GASKET	GRAPHITE	2
32	STEM PACKING	GRAPHITE	1
33	FLAT WASHER	SUS 304	1
34	COVER	PLASTIC	2
35	LOWER STEM THRUST WASHER	PTFE	1
36	NAME PLATE	SUS 304	1
37	LEVER HANDLE	STEEL	1
38	STOP PLATE B	A 350 LF2	1
39	BLOCK	S-49C	1
40	SNAP C-RING	SUS 420	1
41	SCREW	C.S.	1
42	SLOTTED GRUB SCREW	SUS 304	1
43	BASE PLATE	S5 41	2
44	ANTI-STATIC SPRING	SUS 302	1
45	CASING	PLASTIC	1



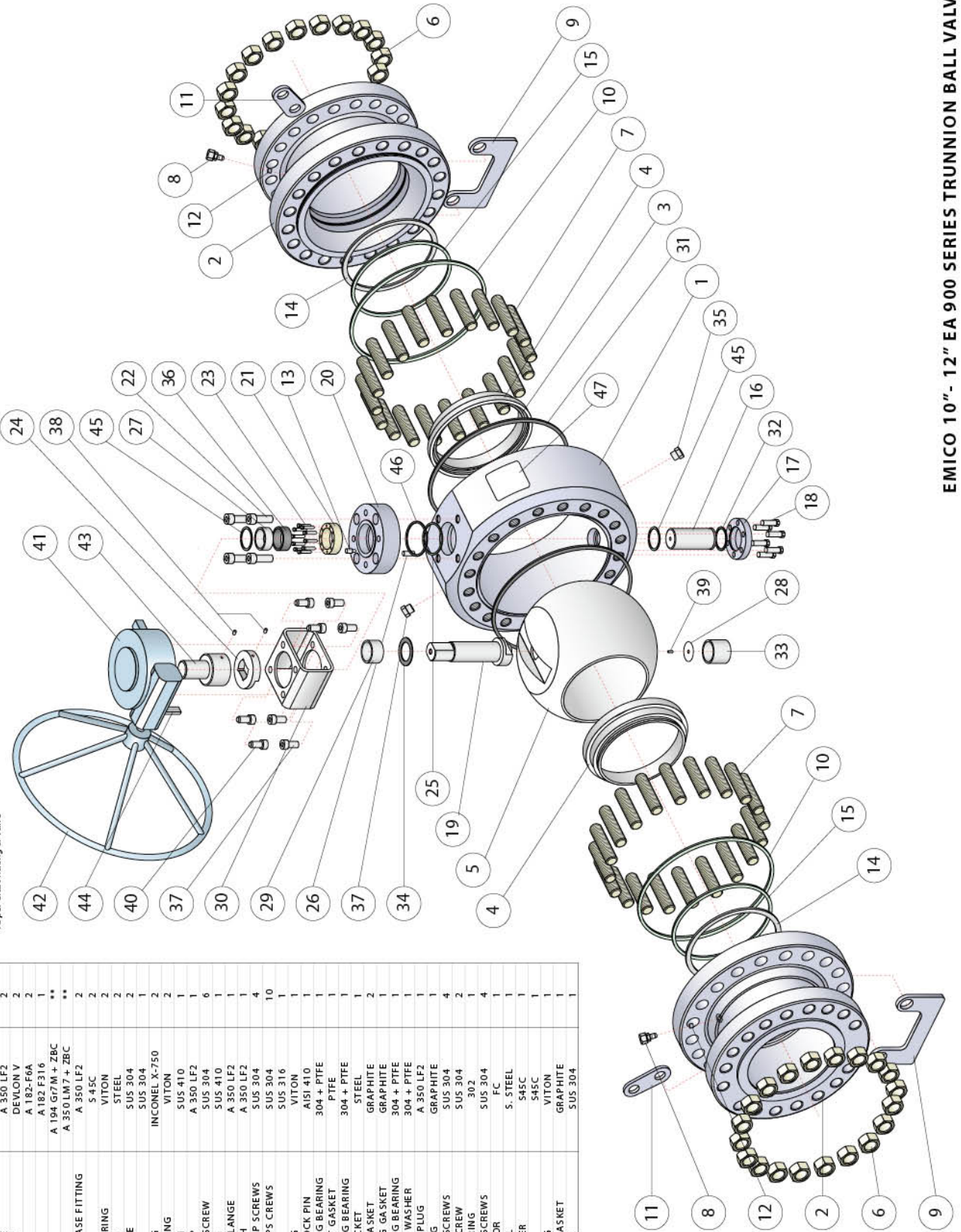
EMICO 6" - 8" EA 900 SERIES TRUNNION BALL VALVE

\* Consult EMICO for alternative materials  
 \*\* As per Class Rating of valve

PART NO.	PART	MATERIAL*	QUANTITY
1	BODY	A 350 LF2	1
2	END FLANGE	A 350 LF2	2
3	SEAT INSERT	DEVLONY	2
4	SEAT RING	A 182-FGA	2
5	BALL	A 182-F316	1
6	SEAT SPRING	INCONEL X-750	2
7	UPPER STEM THRUST WASHER	PTFE	1
8	UPPER STEM	SUS 410	1
9	LOWER STEM	SUS 410	1
10	NUT	A 194 G77M + ZBC	**
11	STUD BOLT	A 350 LM7 + ZBC	**
12	SEAT O-RING	VITON	2
13	SAFETY VALVE	S. STEEL	2
14	BOTTOM CAP	A 350 LF2	1
15	STOP PLATE	A 350 LF2	1
16	STOP PIN	SUS 304	1
17	STOP PLATE	A 350 LF2	1
18	PACKING GLAND	SUS 304	1
19	SELF-LUBRICATING STEM BEARING	SUS 304 + PIPE	1
20	MOUNTING BRACKET	STEEL	1
21	LOWER STEM THRUST GASKET	PTFE	1
22	STEM O-RING	VITON	2
23	LOWER STEM PACKING GASKET	GRAPHITE	1
24	BODY GRAPHITE GASKET	GRAPHITE	2
25	STEM PACKING	GRAPHITE	1
26	STEM SELF-LUBRICATING BEARING	304 + PTFE	2
27	HEXAGONAL SCREW	SUS 304	4
28	SOCKET HEAD CAP SCREW	SUS 304	8
29	BASE PLATE	S45C	2
30	THREADED BODY PLUG	A 350 LF2	1
31	SEALANT FITTING EXTENSION	S. STEEL	2
32	BODY FLANGE O-RING	VITON	2
33	VENTED CAP BODY GREASE FITTING	A 350 LF2	2
34	SLOTTED GRUB SCREW	SUS 316	2
35	DRIVE ADAPTER	S45C	1
36	GEAR OPERATOR	FC	1
37	LIFTING LUG	S45C	2
38	KEY	SUS 302	1
39	ANTI-STATIC SPRING	SUS 304	1
40	NAME PLATE	SUS 304	1

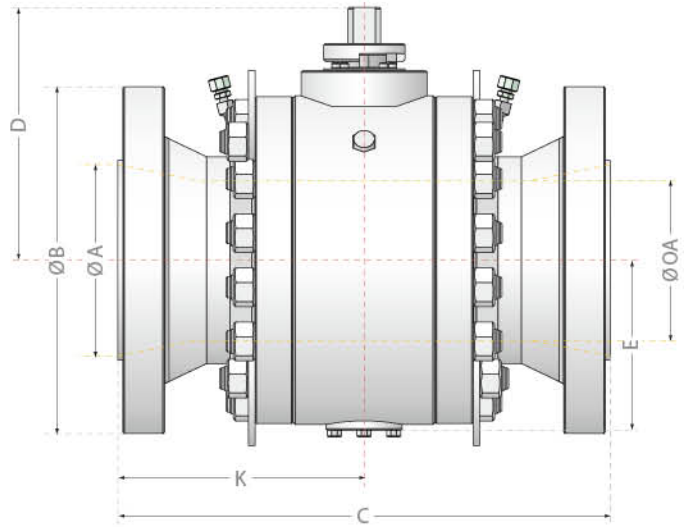
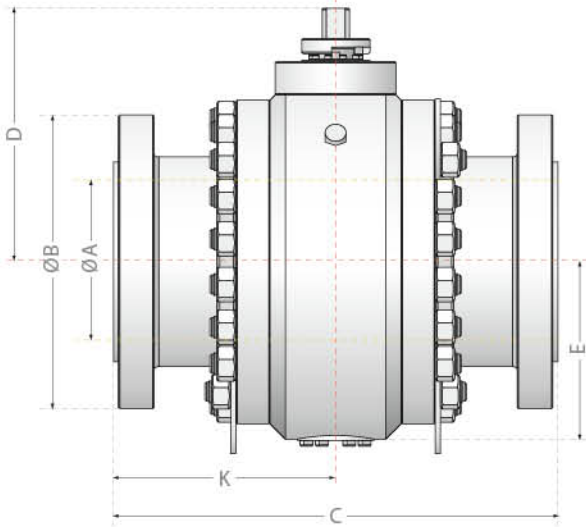


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 \*\* As per Class Rating of valve



PART NO.	PART	MATERIAL*	QUANTITY
1	BODY	A 350 LF2	1
2	END FLANGE	A 350 LF2	2
3	SEAT INSERT	DEVILON V	2
4	SEAT RING	A 182-F6A	2
5	BALL	A 182-F316	1
6	NUT	A 104 G7M + ZBC	**
7	STUD BOLT	A 350 LM7 + ZBC	**
8	VENTED CAP BODY GREASE FITTING	A 350 LF2	2
9	BASE PLATE	S 45C	2
10	BODY FLANGE O-RING	VITON	2
11	LIFTING LUG	STEEL	2
12	SAFETY VALVE	SUS 304	2
13	STOP PIN	SUS 304	1
14	SEAT SPRING	INCONEL X-750	2
15	SEAT RING O-RING	VITON	2
16	LOWER STEM	SUS 410	1
17	BOTTOM CAP	A 350 LF2	1
18	M16 HEXAGONAL SCREW	SUS 304	6
19	UPPER STEM	SUS 410	1
20	PACKING GLAND FLANGE	A 350 LF2	1
21	COLLAR BUSH	A 350 LF2	1
22	M24 SOCKET HEAD CAP SCREWS	SUS 304	4
23	M8 SOCKET HEAD CAP SCREWS	SUS 304	10
24	STOP PLATE	SUS 316	1
25	STEM O-RING	VITON	1
26	PACKING GLAND LOCK PIN	AISI 410	1
27	STEM SELF-LUBRICATING BEARING	304 + PTFE	1
28	LOWER STEM THRUST WASHER	PTFE	1
29	STEM SELF-LUBRICATING BEARING	304 + PTFE	1
30	MOUNTING BRACKET	STEEL	1
31	BODY GRAPHITE GASKET	GRAPHITE	2
32	LOWER STEM PACKING GASKET	GRAPHITE	1
33	STEM SELF-LUBRICATING BEARING	304 + PTFE	1
34	UPPER STEM THRUST WASHER	304 + PTFE	1
35	THREADED BODY PLUG	A 350 LF2	1
36	STEM PACKING	GRAPHITE	1
37	SOCKET HEAD CAP SCREWS	SUS 304	4
38	SLOTTED GRUB SCREW	SUS 304	2
39	ANTI-STATIC SPRING	302	1
40	SOCKET HEAD CAP SCREWS	SUS 304	4
41	GEAR OPERATOR	FC	1
42	HAND WHEEL	S-STEEL	1
43	DRIVE ADAPTER	S45C	1
44	KEY	S45C	1
45	STEM O-RING	VITON	1
46	PACKING GLAND GASKET	GRAPHITE	1
47	NAME PLATE	SUS 304	1

## DIMENSIONS & WEIGHTS



**ASME CLASS 150 / ISO PN20 FULL BORE**

DN		ØA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm		ØB	ØD	ØE	
2	50	50	178	152	115	95.5	17
3	80	76	203	190	135	120.5	31
4	100	100	229	229	167.5	140.5	52
6	150	150	394	279	227.5	190.4	145
8	200	201.4	457	343	268.5	227	270
10	250	252.4	533	406	339	272.3	460
12	300	303.4	610	483	406.5	329	750

**ASME CLASS 150 / ISO PN20 REDUCED BORE**

DN		ØA	ØOA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm	mm		ØB	ØD	ØE	
3x2	80	76	50	203	190	115	95.5	23
4x3	100	100	76	229	229	135	120.5	40
6x4	150	150	100	394	279	167.5	140.5	82
8x6	200	201.4	150	457	343	227.5	190.4	180
10x8	250	252.4	201.4	533	406	268.5	227	310
12x10	300	303.4	252.4	610	483	339	272.3	540
14x12	350	336	303.4	686	533	406	329	790

**ASME CLASS 300 / ISO PN50 FULL BORE**

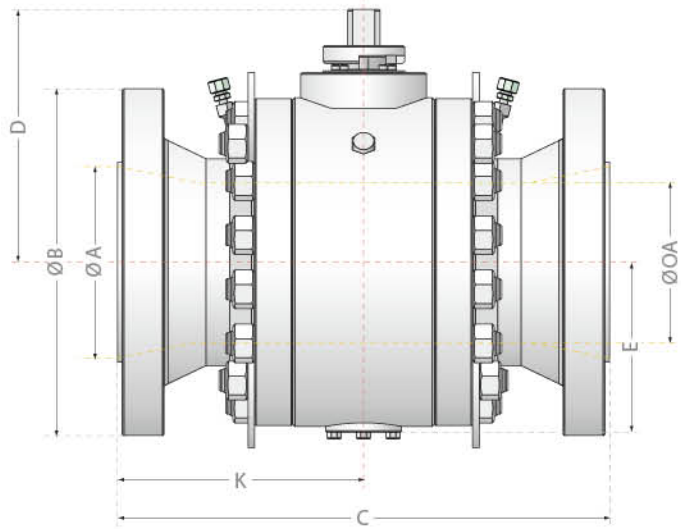
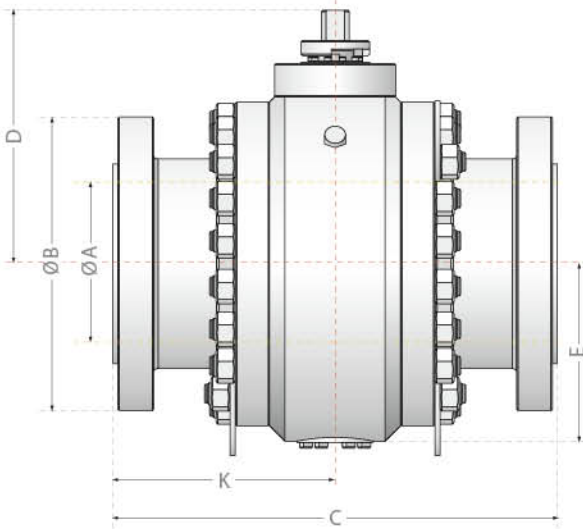
DN		ØA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm		ØB	ØD	ØE	
2	50	50	216	165	115	95.5	23
3	80	76	282.5	210	135	120.5	43
4	100	100	304.8	254	167.5	140.5	70
6	150	150	403.4	318	227.5	190.4	165
8	200	201.4	501.7	381	268.5	227	280
10	250	252.4	568.5	444	339	272.3	500
12	300	303.4	647.7	521	406.5	329	810

**ASME CLASS 300 / ISO PN50 REDUCED BORE**

DN		ØA	ØOA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm	mm		ØB	ØD	ØE	
3x2	80	76	50	282.5	210	115	95.5	35
4x3	100	100	76	304.8	254	135	120.5	58
6x4	150	150	100	403.4	318	167.5	140.5	95
8x6	200	201.4	150	501.7	381	227.5	190.4	210
10x8	250	252.4	201.4	568.5	444	268.5	227	360
12x10	300	303.4	252.4	647.7	521	339	272.3	600
14x12	350	336	303.4	762	584	406.5	329	920

For dimensions on valve sizes up to 24" (600mm), contact EMICO.

## DIMENSIONS & WEIGHTS



ASME CLASS 600 / ISO PN100 FULL BORE

DN		ØA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm		ØB	ØD	ØE	
2	50	50	292.1	165	115	95.5	30
3	80	76	355.6	210	151	126.3	65
4	100	100	431.8	273	192.5	157	125
6	150	150	558.8	356	265	198.8	280
8	200	201.4	660.4	419	334.5	261	500
10	250	252.4	787.4	508	378.5	307	750
12	300	303.4	838.2	559	444.2	361	1150

ASME CLASS 600 / ISO PN100 REDUCED BORE

DN		ØA	ØOA	C Face to Face (mm) RF	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm	mm		ØB	ØD	ØE	
3x2	80	76	50	355.6	210	115	95.5	42
4x3	100	100	76	431.8	273	150.8	126.3	92
6x4	150	150	100	558.8	356	192.6	157	175
8x6	200	201.4	150	660.4	419	265.1	198.8	350
10x8	250	252.4	201.4	787.4	508	334.2	261	620
12x10	300	303.4	252.4	838.2	559	378	307	850
14x12	350	336	303.4	889	603	444.2	361	1250

ASME CLASS 900 / ISO PN150 FULL BORE

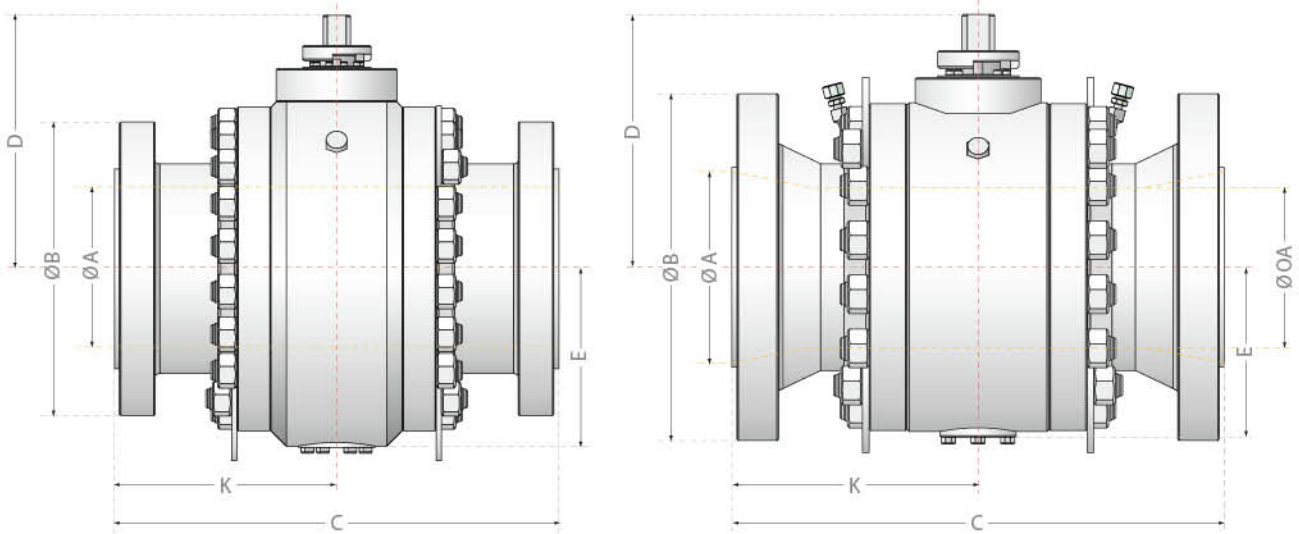
DN		ØA	C Face to Face (mm) RF	C Face to Face (mm) RTJ	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm			ØB	ØD	ØE	
2	50	50	368.3	371.3	216	115	95.5	45
3	80	76	381	384	241	151	126.3	70
4	100	100	457.2	460.2	292	192.5	157	135
6	150	150	609.6	612.6	381	265	198.8	310
8	200	201.4	736.6	739.6	470	334.5	261	580
10	250	252.4	838.2	841.2	546	403.2	335	900
12	300	303.4	965.2	968.2	610	476	411	1700

ASME CLASS 900 / ISO PN150 REDUCED BORE

DN		ØA	ØOA	C Face to Face (mm) RF	C Face to Face (mm) RTJ	Dimensions (mm)			Weight (kg) Flanged
Inch	mm	mm	mm			ØB	ØD	ØE	
3x2	80	76	50	381	384	241	115	95.5	55
4x3	100	100	76	457.2	460.2	292	151	126.3	100
6x4	150	150	100	609.6	612.6	381	192.5	157	215
8x6	200	201.4	150	736.6	739.6	470	265	198.8	430
10x8	250	252.4	201.4	838.2	841.2	546	334.5	261	730
12x10	300	303.4	252.4	965.2	968.2	610	403.2	335	1130
14x12	350	336	303.4	1028.7	1038.4	641	476	411	1800

For dimensions on valve sizes up to 24" (600mm), contact EMICO.

## DIMENSIONS & WEIGHTS



### ASME CLASS 1500 / ISO PN250 FULL BORE

DN	ØA	C	C	Dimensions (mm)			Weight (kg) Flanged	
				Face to Face (mm) RF	Face to Face (mm) RTJ	ØB		ØD
2	50	50	368.3	371.3	216	129.2	107	54
3	80	76	469.9	472.9	267	182.5	152	120
4	100	100	546.1	549.1	311	225	185	185
6	150	150	704.9	711.2	394	304	235	450
8	200	201.4	831.8	841.5	483	379.2	328	850
10	250	252.4	990.6	1000.3	584	435	390	1550
12	300	303.4	1130.3	1146	673	494	460	2300

### ASME CLASS 1500 / ISO PN250 REDUCED BORE

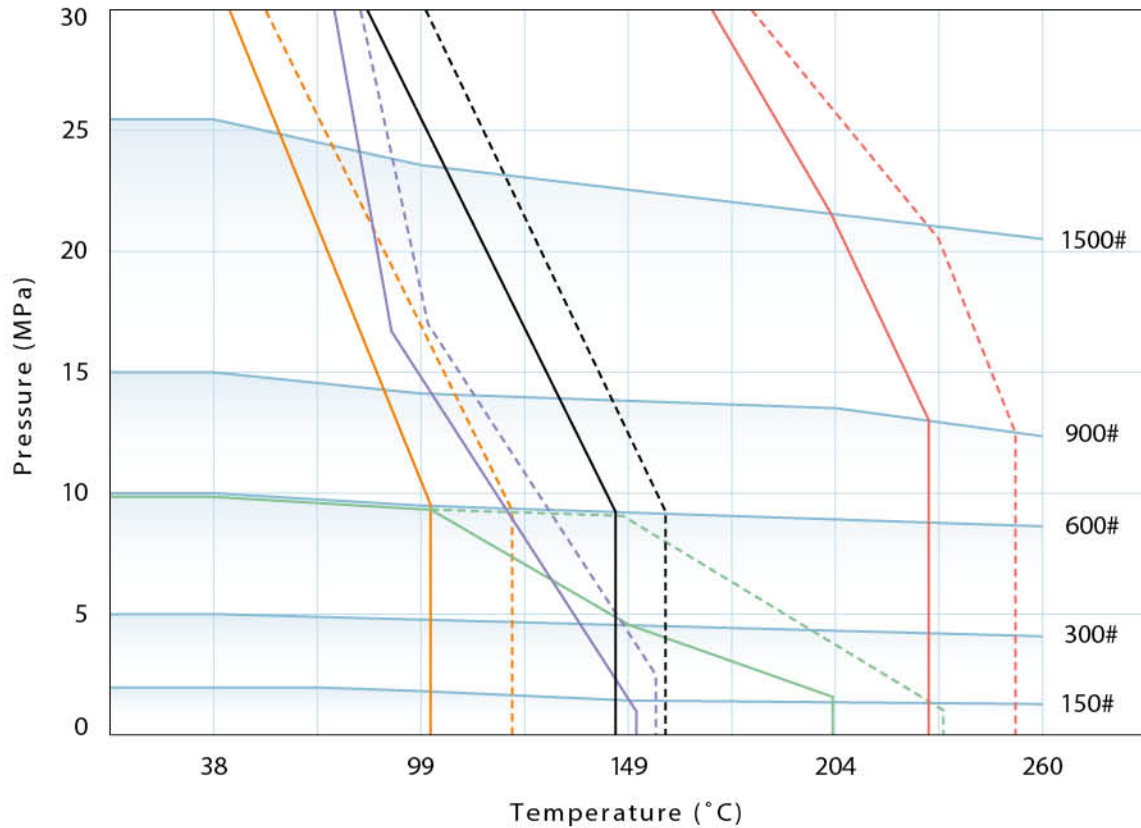
DN	ØA	ØOA	C	C	Dimensions (mm)			Weight (kg) Flanged	
					Face to Face (mm) RF	Face to Face (mm) RTJ	ØB		ØD
3x2	80	76	50	469.9	472.9	267	129.2	107	75
4x3	100	100	76	546.1	549.1	311	182.5	152	140
6x4	150	150	100	704.9	711.2	394	225	185	310
8x6	200	201.4	150	831.8	841.5	483	304	235	600
10x8	250	252.4	201.4	990.6	1000.3	584	379.2	328	1050
12x10	300	303.4	252.4	1130.3	1146	673	435	390	1800
14x12	350	318	303.4	1257.3	1276.4	749	494	460	2600

For dimensions on valve sizes up to 24" (600mm), contact EMICO.

## PRESSURE / TEMPERATURE RATINGS - SOFT SEATS

Pressure Temperature ratings of soft seated ball valves are determined by the sealing / soft materials used in the valve e.g. seat insert, O-rings, gland packing, gaskets. Choice of sealing materials used is determined by the service conditions including pressure, temperature, service media, etc. These curves are based on the limits of ASME B16.34 for standard classes and group materials 1-1, 1-2 & 1-3.

The P/T curves prepared below are representative of the manufacturer's experience and technical information and these have been adapted to EMICO's valves. If very high or very low temperatures are expected, please consult the manufacturer.



- NYLON PA 12
- RPTFE
- PCTFE
- DEVLON V
- PEEK

Solid Lines - Continuous Temperature  
Dotted Lines - Intermittent / Peak Temperatures

## COMPUTED FLOW COEFFICIENT (CV) VALUES

Size		ASME Class	ASME Class	ASME Class	ASME Class	ASME Class
Inch	mm	150/ ISO PN20	300/ ISO PN50	600/ ISO PN100	900/ ISO PN150	1500/ ISO PN250
2	50	500	430	370	320	320
3	80	1360	1100	1020	920	820
4	100	2500	2000	1850	1760	1600
5	150	5300	5250	4400	4300	4150
8	200	10750	10100	8450	8475	8010
10	250	17500	16820	14250	14160	13220
12	300	26750	25950	22550	21200	18800

## WORKING & TEST PRESSURES

### GROUP 1.1 CARBON STEELS (A105, A350 LF2, etc.)

Class		Maximum Working Pressure		Shell Test Pressure		Seat Test Pressure		Air Test	
ASME	ISO	Bar	psi	Bar	psi	Bar	psi	Bar	psi
150	PN20	20	285	30	425	22	300	5.6	80
300	PN50	54	740	78	110	57	800	5.6	80
600	PN100	102	1480	154	2175	113	1600	5.6	80
900	PN150	153	2220	230	3250	167	2400	5.6	80
1500	PN250	255	3705	383	5400	281	4000	5.6	80

### GROUP 2.3 AUSTENSTIC STEELS (F316L, etc.)

Class		Maximum Working Pressure		Shell Test Pressure		Seat Test Pressure		Air Test	
ASME	ISO	Bar	psi	Bar	psi	Bar	psi	Bar	psi
150	PN20	16	230	24	345	18	360	5.6	80
300	PN50	41	600	63	900	46	660	5.6	80
600	PN100	82.5	1200	125	1780	92	1310	5.6	80
900	PN150	124	1800	187	2660	137	1950	5.6	80
1500	PN250	206	3000	311	4425	228	3245	5.6	80

Note: Other group materials have different pressure ratings. Refer ASMI B16.34 for alternative materials and pressure ratings.

## TRUNNION BALL VALVE PRODUCTION FLOW



Forge Shop



Body & End Forgings



Mechanical Properties Testing



Machining



Component Cleaning



Assembly



Pressure Testing

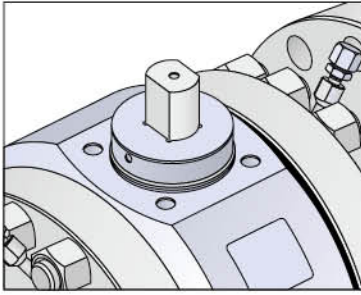


Painting



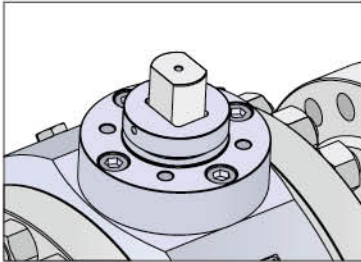
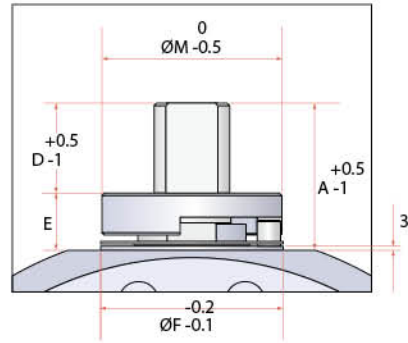
Packing

## ISO DIMENSIONS



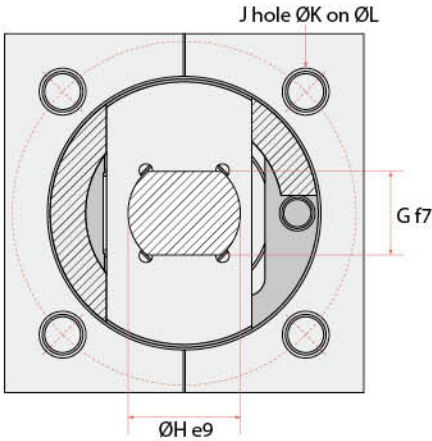
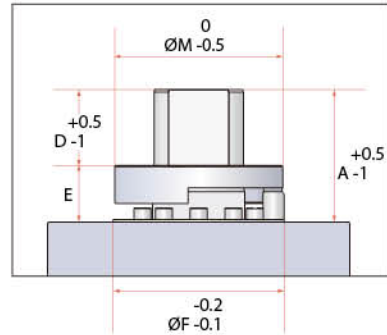
ISO TOP Flange Details

EA-901-4"~12"  
EA-903-4"~12"  
EA-906-2"~8"  
EA-909-2"~8"  
EA-915-2"~6"

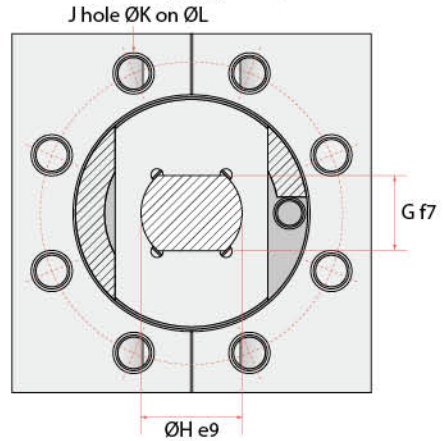


ISO TOP Flange Details

EA-906-10"~12"  
EA-909-10"~12"  
EA-915-8"~12"



ISO Top Flange F25 - F26



ISO Top Flange F25 - F26

### EA901 (Class 150)

FB	RB	A	D	E	F	G	H	J	K	L	M	ISO
2"x2"	3"x2"						21.0	4.0	M6	50.0	50.0	F05
3"x3"	4"x3"						21.0	4.0	M6	50.0	50.0	F05
4"x4"	6"x4"	48.8	26.0	22.8	55.0	19.0	23.9	4.0	M8	70.0	55.0	F07
6"x6"	8"x6"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
8"x8"	10"x8"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
10"x10"	12"x10"	73.4	38.0	35.4	100.0	36.0	43.9	4.0	M16	140.0	98.0	F14
12"x12"	14"x12"	97.0	55.6	41.4	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16

### EA903 (Class 300)

FB	RB	A	D	E	F	G	H	J	K	L	M	ISO
2"x2"	3"x2"						21.0	4.0	M6	50.0	50.0	F05
3"x3"	4"x3"						21.0	4.0	M6	50.0	50.0	F05
4"x4"	6"x4"	48.8	26.0	22.8	55.0	19.0	23.9	4.0	M8	70.0	55.0	F07
6"x6"	8"x6"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
8"x8"	10"x8"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
10"x10"	12"x10"	73.4	38.0	35.4	100.0	36.0	43.9	4.0	M16	140.0	98.0	F14
12"x12"	14"x12"	97.0	55.6	41.4	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16

**EA900 (Class 600)**

FB	RB	A	D	E	F	G	H	J	K	L	M	ISO
2"x2"	3"x2"	36.2	18.3	17.9	55.0	17.0	20.0	4.0	M8	70.0	55.0	F07
3"x3"	4"x3"	48.8	26.0	22.8	55.0	19.0	23.9	4.0	M8	70.0	55.0	F07
4"x4"	6"x4"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
6"x6"	8"x6"	73.4	38.0	35.4	100.0	36.0	43.9	4.0	M16	140.0	98.0	F14
8"x8"	10"x8"	97.0	55.6	41.4	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16
10"x10"	12"x10"	102.2	64.1	38.1	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16
12"x12"	14"x12"	101.5	57.7	43.8	130.0	50.0	68.0	4.0	M20	165.0	128.0	F16

**EA909 (Class 900)**

FB	RB	A	D	E	F	G	H	J	K	L	M	ISO
2"x2"	3"x2"	36.2	18.3	17.9	55.0	17.0	20.0	4.0	M8	70.0	55.0	F07
3"x3"	4"x3"	48.8	26.0	22.8	55.0	19.0	23.9	4.0	M8	70.0	55.0	F07
4"x4"	6"x4"	54.3	27.0	27.3	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
6"x6"	8"x6"	73.4	38.0	35.4	100.0	36.0	43.9	4.0	M16	140.0	98.0	F14
8"x8"	10"x8"	105.3	63.9	41.4	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16
10"x10"	12"x10"	103.7	61.7	42.0	130.0	50.0	68.0	4.0	M20	165.0	128.0	F16
12"x12"	14"x12"	105.8	66.0	39.8	200.0	60.0	83.9	8.0	M16	254.0	198.0	F25

**EA915 (Class 1500)**

FB	RB	A	D	E	F	G	H	J	K	L	M	ISO
2"x2"	3"x2"	44.2	22.7	21.5	55.0	19.0	23.9	4.0	M8	70.0	55.0	F07
3"x3"	4"x3"	55.4	28.4	27.0	70.0	27.0	32.9	4.0	M10	102.0	68.0	F10
4"x4"	6"x4"	74.0	38.0	36.0	100.0	36.0	43.9	4.0	M16	140.0	98.0	F14
6"x6"	8"x6"	99.9	59.5	40.4	130.0	40.0	53.9	4.0	M20	165.0	128.0	F16
8"x8"	10"x8"	101.8	58.7	43.1	130.0	50.0	68.0	4.0	M20	165.0	128.0	F16
10"x10"	12"x10"	105.8	66.0	39.8	200.0	60.0	83.9	8.0	M16	254.0	198.0	F25
12"x12"	14"x12"											

**FIRE TEST VALVE QUALIFICATION - API 607 5th Edition / ISO 10497-5:2004**

Size Qualification	
Size of Test Valve - NPS	Valve Sizes Qualified - NPS
2" (DN 50)	2" (DN 50) & below
	3" (DN 80)
	4" (DN 100)
6" (DN 150)	6" (DN 150)
	8" (DN 200)
	10" (DN 250)
	12" (DN 300)
8" (DN 200)	8" (DN 200) and larger

Pressure Rating Qualification	
Rating of Test Valve - Class	Valve Ratings Qualified - Class
150 (PN 20)	150 (PN 20)
	300 (PN 50)
600 (PN 100)	600 (PN 100)
	900 (PN 150)
900 (PN 150)	900 (PN 150)
	1500 (PN 250)



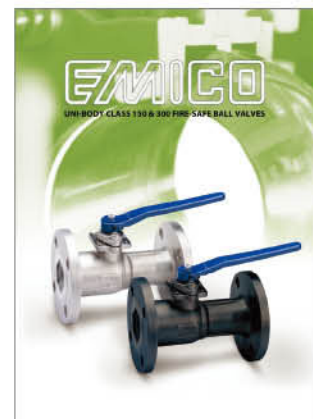
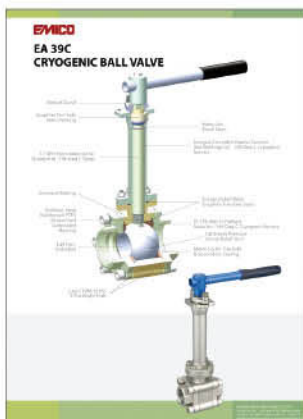
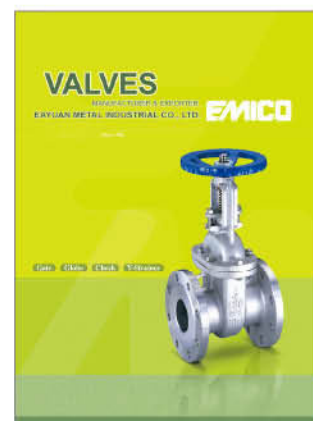
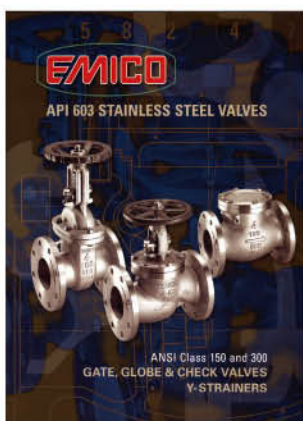
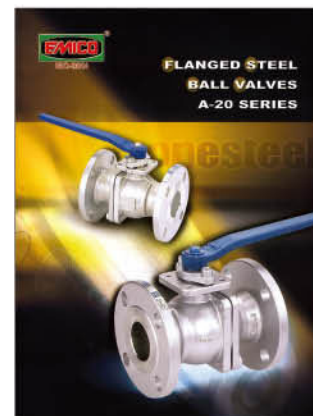
Marking: Valve Tag stamped "ISO-FT"

## A BRIEF HISTORY

- 1984** EMICO (Eayuan Metal Industrial Co. Ltd.) was incorporated at Lugang, Changhua (Taiwan) and began establishing itself as a professional ball valve manufacturer for the oil, petrochemical, natural gas, on-shore plants and water & processing markets.
- 2000** EMICO opened a second facility in Lugang to meet demands of the company's growth and increase its manufacturing capacity.
- 2002** EMICO set up its third manufacturing facility in Shanghai for the production of gate, globe & check valves in collaboration with Hitachi, Japan.
- 2007** EMICO combined both its manufacturing facilities in Changbin Industrial Park in Lugang and invested in state-of-the-art machining centres to further expand its production capacity in order to meet growing demands of its international clientele.
- 2007** EMICO added a new production facility in Shanghai to service the needs of its China market for ball valves.
- 2008** EMICO launched Class 800 EA 309 and Class 1500 EA310 3-piece floating ball valves.
- 2008** EMICO established a sales and marketing office in Melbourne, Australia: Emico Australia Pty. Ltd. to cover the Pacific region.
- 2009** EMICO launched trunnion mounted ball valves EA900 flanged ANSI 150 through 1500 and Cryogenic 3-piece EA39C floating ball valves.
- 2012** EMICO expanded in Taiwan with the establishment of a new foundry in Apr 2012



## OTHER EMICO PUBLICATIONS



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