



# Top Entry Ball Valves

Providing world class valve solutions.



# Your Ideal Choice for Flow Control Solutions

In a short period of 20 years, Virgo Engineers has gained a position of prominence in the field of Process, Pipeline Ball Valves and Automation Systems for a host of applications in Chemical, Petrochemical, Oil & Gas, Fertilizer and Pharmaceutical Industries.

During this period, Virgo established its manufacturing facilities in India, in the United States of America and the Middle East. The next strategic step was taken in the year 2006 when Virgo set up a manufacturing facility in Milan, Italy to address the burgeoning market for large size ball valves and its high end variants. Introduction of Top Entry Ball Valves is another step in this direction.

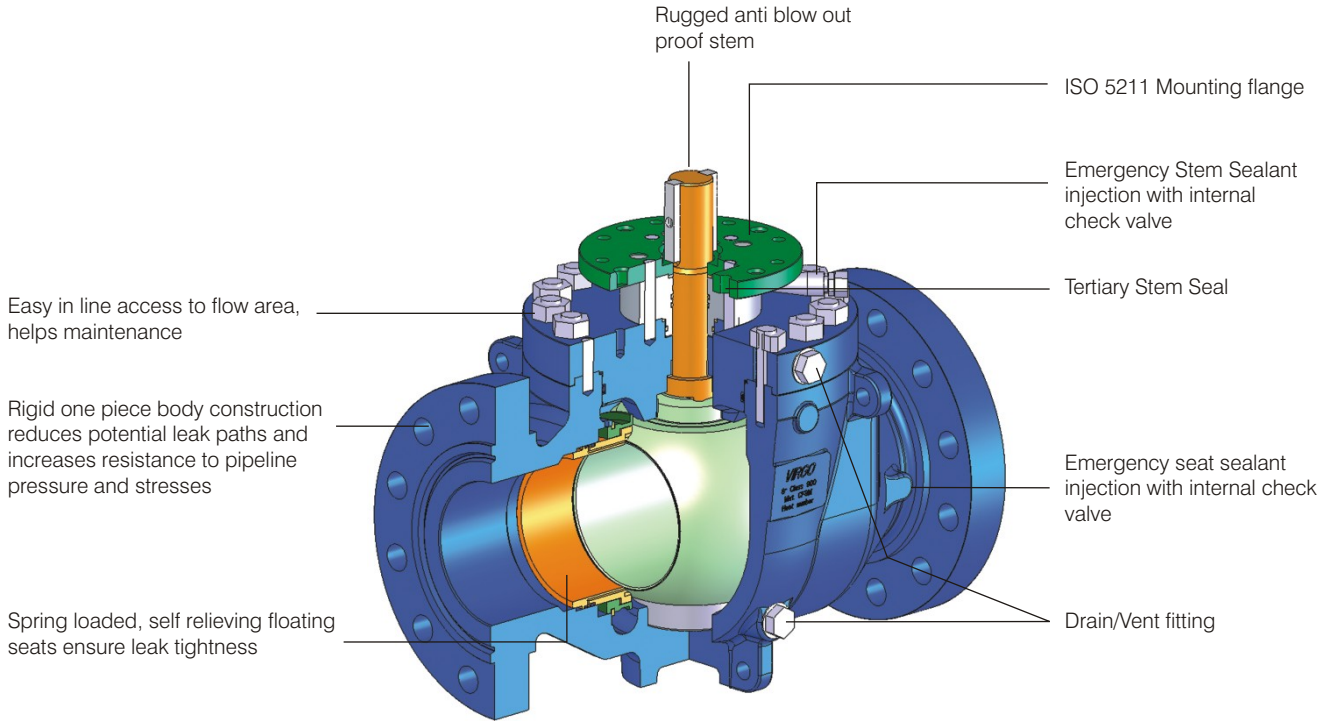
Virgo's E-Series Top Entry Ball Valves are available in size range of 2" to 60" and in pressure classes of ASME 150 to 2500. These valves are engineered for critical service applications with full in-line field reparability and designed to withstand severe pipeline stresses associated with the application.

E-Series Top Entry Ball Valves are widely used in Transmission Pipelines, Pumping, Compression and Re-injection Systems, Off-shore and On-shore Platforms, Pig Launchers, Metering Skids, Sub-Sea, LNG Plants, Sequencing Services, Abrasive Slurry and High Temperature Services.

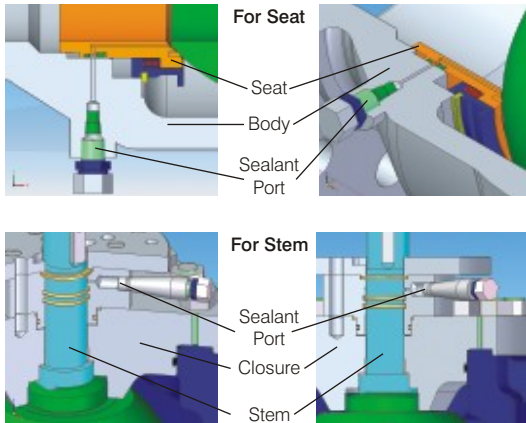


# Top Entry Ball Valves - E-Series

## Design Features



## Emergency Sealant Injection



### Standard Features :

- Double Block and Bleed
- Fire Safe Design
- Anti Blow Out Stem
- Anti-Static Device for Electrical Continuity
- Self Lubricated Bearings
- Multiple Stem Sealing
- Gear Operator

### Optional Features :

- Emergency Sealant Injection
- Stem Extension
- Pipe Extension (Pup Piece)
- Locking Arrangements
- Actuator and Accessories
- Weld Overlays
- Bolted and Adjustable Stem Packings

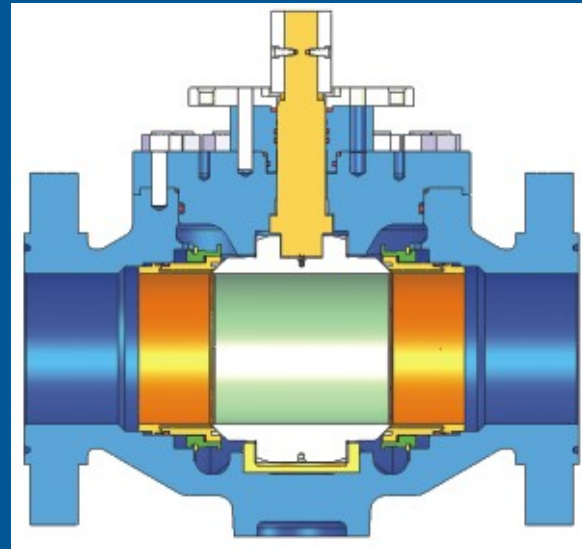
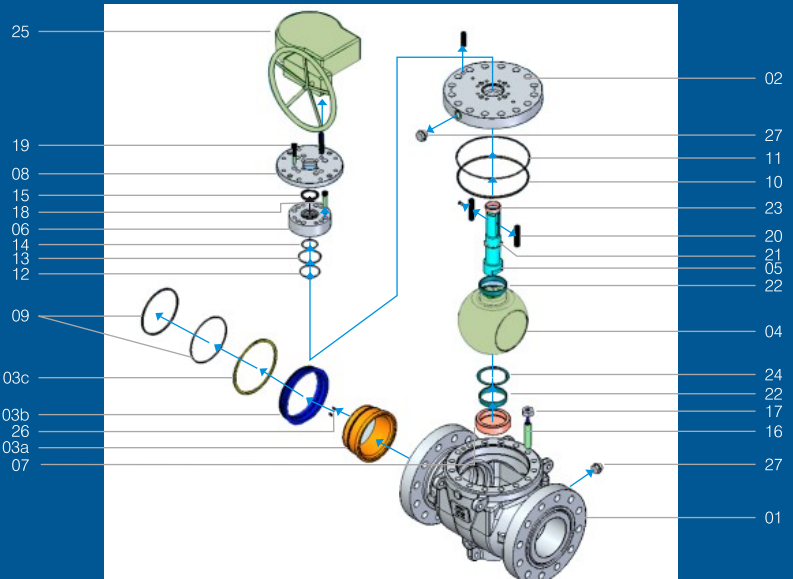
## Applications :

- Oil and Gas Product Pipelines and Transmissions
- Gas Storage
- Compressor Stations and Measuring Skids
- Onshore and Offshore Platforms
- Dehydration, Dryer, Gas Separation Systems
- Liquid Gas Launch and Receiving Stations

# Top Entry Ball Valves - E-Series

## Part List

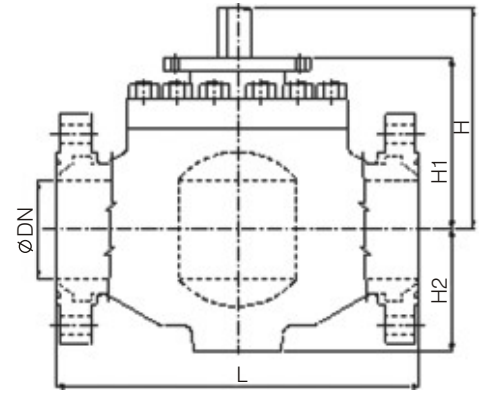
No.	Description
01	Body
02	Closure
03a	Seat + Insert
03b	Spring Holder
03c	Seat Retainer Ring
04	Ball
05	Stem
06	Gland Plate
07	Bearing Retainer
08	ISO Mounting Plate
09	O-Ring (Seat)
10	O-Ring (Body)
11	Gasket (Body)
12	O - Ring (Gland Plate)
13	Gasket (Gland Plate)
14	O-Ring (Stem)
15	Gasket (Stem)
16	Stud (Body)
17	Nut (Body)
18	Cap Screw (Gland Plate)
19	Cap Screw (Adapter Plate)
20	Stem Key
21	Stem Thrust Washer
22	DU Bearing (Ball)
23	DU Bearing (Stem)
24	Ball Thrust Washer
25	Gear Operator
26	Seat Springs
27	Drain Plug / Bleed Valve



## Design & Testing Standards

Design / Manufacturing	ASME B16.34, API 6D
Face to Face	ASME B16.10 / API 6D
Flange Dimensions	ASME B16.5 / B16.47
Butt Weld Ends	ASME B16.25 / B31.3 / B31.4 / B31.8
Pressure Test	API 6D / API 598 / BS EN 12266 PART 1 & 2
Fire Safe Test	API 607 / API 6FA / BS EN ISO 10497
Fugitive Emission Test	ISO 15848 / MESC 77/312
Material	NACE MR 01-75 compliant

# Top Entry Ball Valves - E-Series



## Dimensional Details

Size	ANSI Class 150						ANSI Class 300						ANSI Class 600					
	RF	BWE	RTJ	H	H1	H2	RF	BWE	RTJ	H	H1	H2	RF	BWE	RTJ	H	H1	H2
50 (2")	292	292	295	231	170	78	292	292	295	231	170	78	292	292	295	231	170	78
80 (3")	356	356	359	273	212	100	356	356	359	273	212	100	356	356	359	273	212	100
100 (4")	432	432	435	279	216	140	432	432	435	287	227	140	432	432	435	305	245	140
150 (6")	559	559	562	334	271	180	559	559	562	367	296	195	559	559	562	409	338	195
200 (8")	660	660	664	384	314	220	660	660	664	436	335	220	660	660	664	448	354	220
250 (10")	787	787	791	463	373	258	787	787	791	482	381	258	787	787	791	509	408	275
300 (12")	838	838	841	514	411	295	838	838	841	535	432	310	838	838	841	580	480	310
350 (14")	889	889	892	521	426	330	889	889	892	561	446	345	889	889	892	573	458	345
400 (16")	991	991	994	663	548	375	991	991	994	687	552	375	991	991	994	722	567	375
450 (18")	1092	1092	1095	682	567	435	1092	1092	1095	713	578	435	1092	1092	1095	745	590	435
500 (20")	1194	1194	1200	725	590	475	1194	1194	1200	760	605	475	1194	1194	1200	773	618	500
600 (24")	1397	1397	1407	810	630	540	1397	1397	1407	816	662	550	1397	1397	1407	871	717	580
750 (30")	1651	1651	1664	900	720	680	1651	1651	1664	925	720	690	1651	1651	1664	1058	865	700
900 (36")	2083	2083	2099	990	810	800	2083	2083	2099	1053	848	800	2083	2083	2099	1265	1020	900
1000 (40")	2337	*	*	1105	900	850	2337	*	*	1140	935	850	2337	2337	2366	1410	1165	960
1050 (42")	2437	*	*	1135	930	890	2437	*	*	1210	965	890	2439	2439	2467	1450	1205	1030
1200 (48")	2450	*	*	1324	1170	1030	2450	*	*	1408	1190	1150	2540	*	*	1587	1307	1130
1400 (56")	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1500 (60")	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

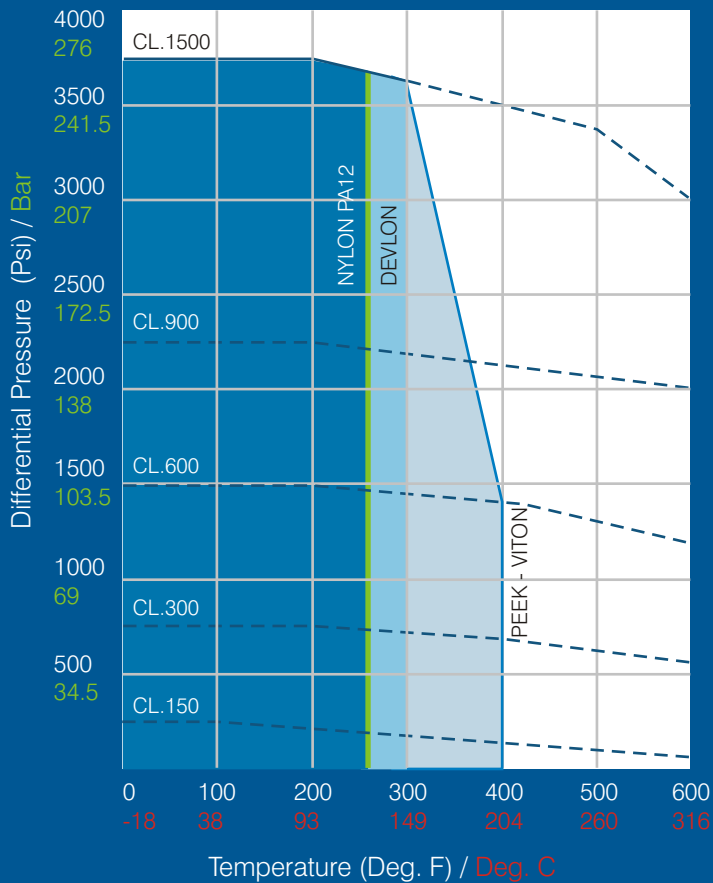
Size	ANSI Class 900						ANSI Class 1500						ANSI Class 2500					
	RF	BWE	RTJ	H	H1	H2	RF	BWE	RTJ	H	H1	H2	RF	BWE	RTJ	H	H1	H2
80 (3")	381	381	384	305	225	110	470	470	473	323	243	110	673	673	683	441	336	165
100 (4")	457	457	460	366	303	160	546	546	549	395	290	142	914	914	927	577	467	290
150 (6")	610	610	613	418	342	200	705	705	711	491	361	188	1022	1022	1038	693	539	350
200 (8")	737	737	740	446	356	250	832	832	841	585	430	250	1270	1270	1292	744	590	400
250 (10")	838	838	841	509	407	295	991	991	1000	648	493	300	1422	1422	1445	804	650	440
300 (12")	965	965	968	590	480	335	1130	1130	1146	708	553	350	1563	1563	1586	872	717	475
350 (14")	1029	1029	1038	597	487	360	1257	1257	1276	773	593	440	*	*	*	*	*	*
400 (16")	1130	1130	1140	677	567	450	1384	1384	1407	823	643	460	*	*	*	*	*	*
450 (18")	1219	1219	1232	744	590	490	1537	1537	1559	918	713	560	*	*	*	*	*	*
500 (20")	1321	1321	1334	771	615	500	1664	1664	1686	998	805	615	*	*	*	*	*	*
600 (24")	1549	1549	1568	968	775	580	1943	1943	1972	1043	850	620	*	*	*	*	*	*
750 (30")	1880	1880	1902	1143	950	830	*	*	*	*	*	*						
900 (36")	2286	2286	2315	1289	1096	960	*	*	*	*	*	*						
1000 (40")	*	*	*	*	*	*												
1200 (48")	*	*	*	*	*	*												

Note: All dimensions are in mm  
 Valve Bore (ØDN) according to API 6D  
 For \* marked dimensions consult Virgo  
 Shaded End to End dimensions as per API 6D class 600  
 Larger sizes not listed above, will be provided on request

# Top Entry Ball Valves - E-Series



## Pressure Temperature Ratings



Pressure - temperature seat ratings of valves are as given in the table for body material A 216 - WCB. All pressure containing parts comply to the pressure temperature ratings as specified in ANSI B 16.34.

Temperature Limits :  
Typical values for few materials

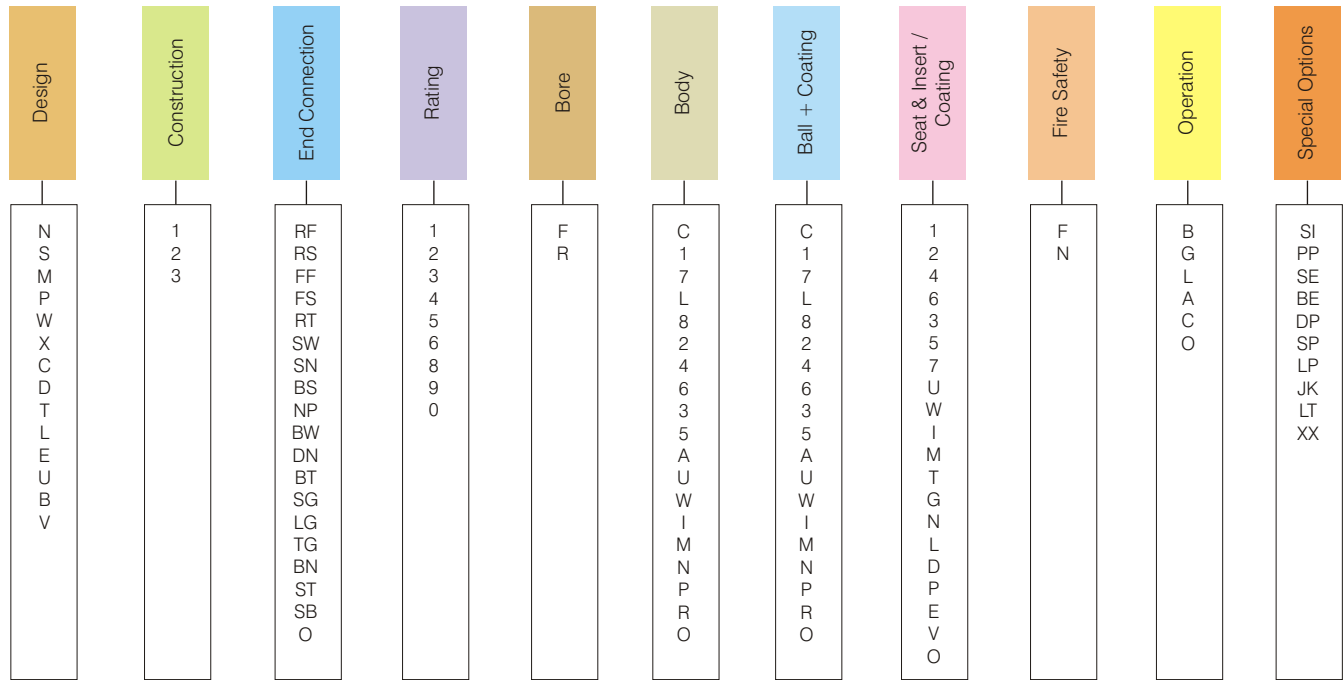
Body Matl.		Lower limit		Upper limit*	
		Deg.F	Deg.C	Deg.F	Deg.C
WCB	LCB	(-20)	(-29)	800	425
	CF8	(-425)	(-254)	1000	538
	SEAT				
SEAT	NYLON	(-50)	(-46)	As per Graph	
	DEVLON	(-50)	(-46)	As per Graph	
	PEEK	(-50)	(-46)	As per Graph	

\* Useful application limit.

For applications above 400° F (204° C) consult Virgo  
Other ratings on request.  
Metal to metal seats are also supplied on request.

Note : These ratings are a guide for general service.  
Please consult Virgo for specific recommendations.

# Product Selection Code



## Design

N - Side Entry Soft Seated Trunnion  
 S - Side Entry Soft Seated Floater  
 M - Side Entry Metal Seated Trunnion  
 P - Side Entry Metal Seated Floater  
 W - Side Entry Welded Body Trunnion  
 X - Side Entry Welded Body Floater  
 C - Side Entry Cryogenic Trunnion  
 D - Side Entry Cryogenic Floater  
 T - Side Entry Multi Port (T Port)  
 L - Side Entry Multi Port (L Port)  
 E - Top Entry Soft Seated Trunnion  
 U - Top Entry Metal Seated Trunnion  
 B - Top Entry Cryogenic Trunnion  
 V - Severe Service Ball Valve

## Construction

1 - One Piece  
 2 - Two Piece  
 3 - Three Piece

## End connection

RF - Flanged Raised Face Serrated  
 RS - Flanged Raised Face Smooth  
 FF - Flanged Flat Face Serrated  
 FS - Flanged Flat Face Smooth  
 RT - Flanged RTJ  
 SW - Socket Weld  
 SN - Socket Weld With Nipple Extension  
 BS - Screwed BSP  
 NP - Screwed NPT  
 BW - Butt Weld  
 DN - DIN  
 BT - Screwed BSPT

SG - Small Groove  
 LG - Large Groove  
 TG - Tongue & Groove  
 BN - Butt Weld + Nipple Ext.  
 ST - Socket Weld + NPT  
 SB - Socket Weld + Butt Weld  
 O - Other than above

## Rating

1 - 150# / PN16  
 2 - 1500#  
 3 - 300# / PN40  
 4 - 400# / PN64  
 5 - 2500#  
 6 - 600#  
 8 - 800#  
 9 - 900#  
 0 - Other than above

## Bore

F - Full  
 R - Reduced / Regular

## Body & Ball

C - WCB  
 1 - A105  
 7 - WCC  
 L - LCB  
 8 - LF2  
 2 - LCC  
 4 - CF8 / SS304 / F304  
 6 - CF8M / SS316 / F316  
 3 - CF3 / SS304L / F304L  
 5 - CF3M / SS316L / F316L

A - CA 15 / SS 410 / F6A  
 U - Duplex SS  
 W - Super Duplex  
 I - Inconel  
 M - Monel  
 N - F11 Cl.2  
 P - F22 Cl.3  
 R - F91  
 O - Other than above

## Ball/Seat Coating (if applicable)

e - ENP  
 w - Overlay  
 h - Hard Chrome  
 s - Stellite  
 c - Chrome Carbide  
 t - Tungsten Carbide  
 n - Chromium Nitride  
 o - Other than above

## Seat & Insert / Coating\*\*\*

1 - A105  
 2 - LF2  
 4 - F304  
 6 - F316  
 3 - F304L  
 5 - F316L  
 7 - CA 15 / SS 410 / F6A  
 U - Duplex SS  
 W - Super Duplex  
 I - Inconel  
 M - Monel  
 T - PTFE

G - RPTFE  
 N - Nylon-PA 12  
 L - Nylon-Devlon  
 D - Delrin  
 P - PEEK  
 E - PCTFE  
 V - VITON  
 O - Other than above

## Fire Safety

F - Fire Safe  
 N - Non - Fire Safe

## Operation

B - Bare Stem  
 G - Gear  
 L - Hand Lever  
 A - Actuated  
 C - Chain Wheel  
 O - Other than above

## Special Options

SI - Sealant Injection  
 PP - Pup Piece  
 SE - Stem Extension  
 BE - Bonnet Extension  
 DP - Double Piston Effect (Non Relieving)  
 SP - Short Pattern  
 LP - Long Pattern  
 JK - Jacketed  
 LT - Low Temp. (-46°C/-50°F)  
 XX - Special requirement to be specified

## Example

**E** **1** **RT** **9** **F** **C** **6** **6N** **F** **G** **SI, LP**

Above stands for Top Entry Soft Seated Trunnion, one piece body, RTJ ends, 900#, Full Bore, WCB Body, SS316 Ball, Nylon seats, Fire Safe, Gear Operated, Long pattern with Sealant injection facility.

**U** **1** **RF** **1** **F** **6** **6c** **6s** **F** **L** **BE**

Above stands for Top Entry Metal Seated Trunnion one piece body, Raised face serrated ends, 150#, Full Bore, SS316 Body, SS316 Ball with Chrome Carbide Coating, S316 Seat with Stellite coating, Fire safe, Lever Operated with Bonnet extension.

\*\*\* Insert option is applicable for Soft seated Trunnion designs  
 Insert/coating option is not applicable for soft seated floating design  
 Coating option is applicable for Metal seated design



**VIRGO EUROPE SPA,**

Via Sicilia, 96, 20020 Magnago (Milan) Italy

Tel: +39 0331 308 211, Fax: +39 0331 306299, E-mail: scalciolari@virgoeurope.com

**VIRGO ENGINEERS INC.**

10225 Mula Road, Suite 130, Stafford, Texas 77477, USA

Tel: +1 281 933 3100, Fax: +1 281 933 3110, E-mail: M.Malkarnekar@virgoengineers.com

**VIRGO ENGINEERS LIMITED / VIRGO VALVES & CONTROLS LIMITED**

277, Hinjewadi Phase II, Maan (Mulshi), Pune - 411 057, India.

Tel: +91 20 66744000, Fax: +91 20 66744021, Email: sales@virgoengineers.com

**VIRGO VALVES & CONTROLS (ME) FZE**

(Warehouse & Valve Automation Centre)

Unit – RA08 YA03/04, Jebel Ali Free Zone, P.O. Box - 18748, Dubai – UAE.

Tel: +971 4 8876697, Fax: +971 4 8876698, Email: salesuae@virgoengineers.com

**VIRGO VALVES & CONTROLS LIMITED**

Suite 1904, 19th floor, Kenanga International, Jalan Sultan Ismail, 50250 Kuala Lumpur, Malaysia.

Tel: +60 3 2161 8260, Fax: +60 3 2166 6489, Email: Aashish.Jagnade@virgoengineers.com

**BRANCH OFFICES IN INDIA :**

Mumbai : Tel (022) 40100700, Fax: (022) 40110701

New Delhi : Tel (011) 41729161 – 63, Fax: (011) 41729164

Kolkata : Tel (033) 22272269, 22272533, Fax: (033) 22272279

Chennai : Tel (044) 24404119, Fax : (044) 24410664

Vadodara : Tel (0265) 2342837, 2341053, 2355133, Fax: (0265) 2314449

**Disclaimer:**

1. The descriptions of all the products contained in this catalogue are general in nature and the products are subject to Virgo's Standard Warranty and other terms and conditions as contained in the applicable contract for such products.

2. We reserve the right to change or modify Product Design or construct without prior notice and without any obligation to make such modification / change on products previously or subsequently sold.

3. All Virgo Valves are designed and manufactured using good workmanship and materials and they meet all applicable industry standards. Virgo is very anxious to avoid injuries and property damage that might result from wrong application of the product.

Proper Valve selection for a given application is imperative. Examples of misapplication or misuse of a Valve include but are not limited to any service or application in which the pressure – temperature rating is exceeded or in a chemical service that is incompatible with valve materials, use of undersized actuator, use of extremely fast valve application and / or continuous valve cycling on standard valves, making modification to the product in any kind, failure to use caution in operating at high temperature, high pressure or highly hazardous services and failure to maintain valves as recommended.