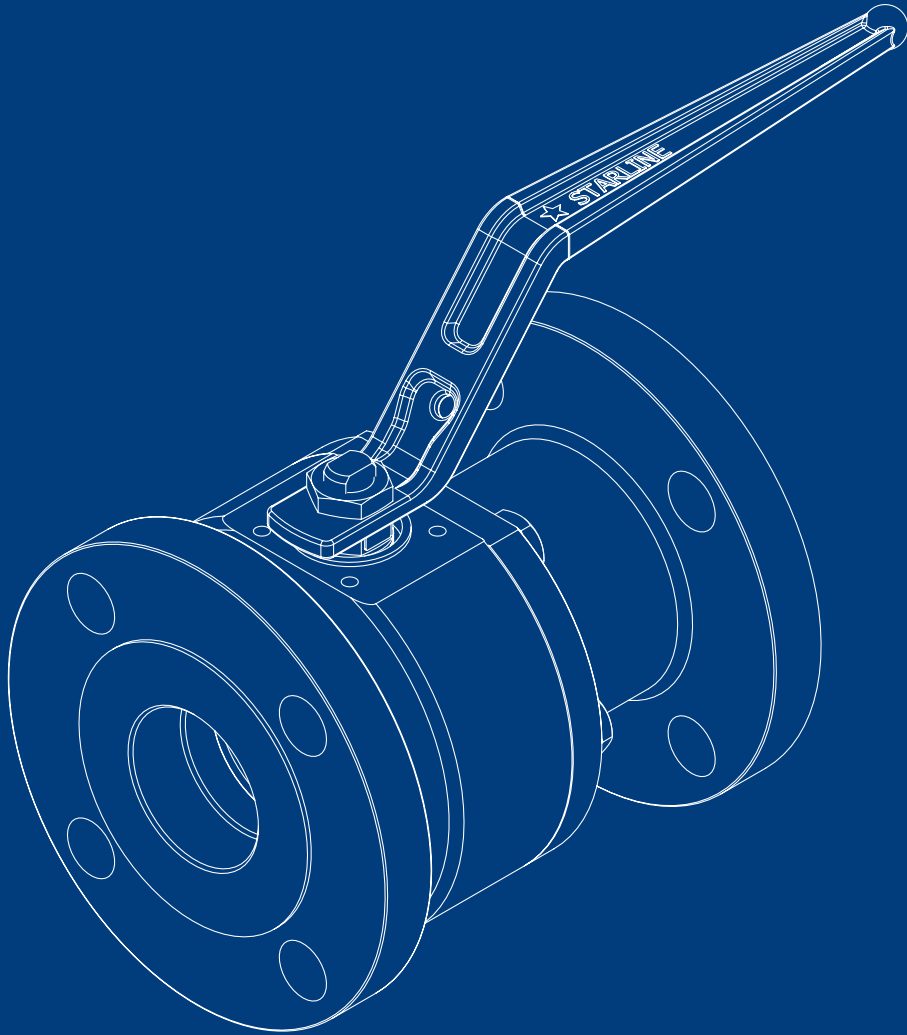
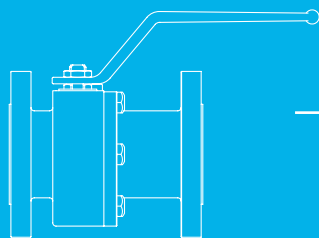


st STARLINE[®]
forged steel ball valves



STARLINE

FLOATING



BALL VALVES



Since its foundation on 1976 Starline has been focus only on production of Ball Valves in Forged Materials. After more than 40 years the imprinting philosophy is still present and the base for the company growth and success. Starting from the experience on the floating valves during the years, Starline has developed a wide and complete range of ball valves in different materials and executions introducing Trunnion Mounted design, Single and Double Block and Bleed, Metal to Metal, Cryogenic and High

temperature design. Today Starline with a production capacity of 250.000 valves/year, a complete size range and pressure ratings ½” to 36” – class 150- 2500lbs, API6A rate 3000-15000PSI in all the possible configurations and materials, is considered both by customers and other valve manufacturers one of the Worldwide Market Leaders in Upstream Oil & Gas Applications which represent more than 70% of the final products destination.

PHILOSOPHY

Starline's philosophy is based on the achievement of the standardization of the highest quality requirements in each single product. All materials used are mandatory produced in Western Europe and all forging companies are located in Italy.

A product **FULLY MADE IN ITALY**



REFERENCES

- ADCO
- ADGAS
- ADMA-OPCO
- BP
- DSME
- ENI
- EXXON MOBIL
- GASCO
- GRT GAZ
- GAZPROM
- HYUNDAI (HHI)
- INPEX
- JGC CORPORATION
- KBR
- KNPC
- KOC
- NIOC
- NISOC
- NPCC
- PDO
- PETROBRAS
- PETROFAC
- PTSC
- PTTEP
- QATARGAS
- SAIPEM
- SAMSUNG (SHI)
- SHELL CHEVRON
- SNAMPROGETTI
- STATOIL
- TECHNIP
- TECNIMONT
- TOTAL E&P
- TOYO
- ZADCO

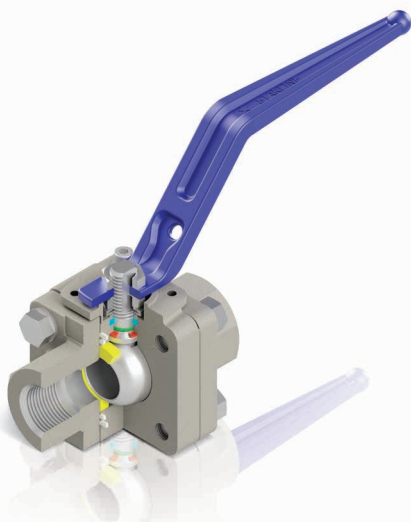
DESIGN AND CONSTRUCTION

All Starline forged steel ball valves are designed to meet the requirements of both ASME and EN standards as listed here below.

- ASME B16.34
- ASME B16.5
- ASME B16.10
- ASME B16.25
- API 598

- BS 6755/API607
- ISO 15848
- ISO 5208
- MS-SP-25

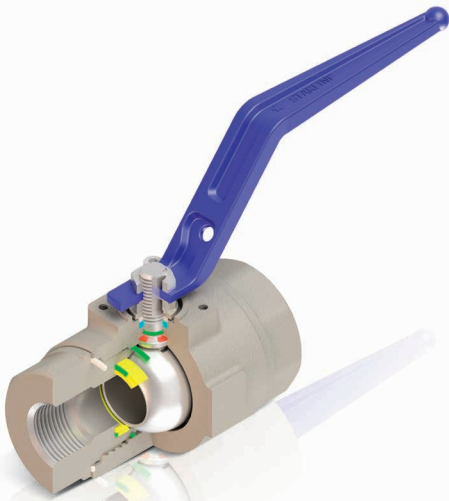
- ISO 17292
- API 6D/ ISO 14343
- PED 97/23/EC
- ATEX 94/9/EC



Starline ball valves are manufactured as **3 PIECES BOLTED CONSTRUCTION**. This allows easy maintenance in line due to the possibility of “swing-out” of the centre section, permits a flexibility in production due to the unlimited combinations of possible end connections and asymmetric construction. Not to count the possibilities of any distributor to change quickly the configuration of the valve available in stock to serve any market request.

In consideration of the market requirements, Starline has also developed a line of **2 PIECES BOLTED CONSTRUCTION** valves to cover flanged valves ASME CLASS 150/300 and DIN class PN 10/16/40.

The same construction has been developed for the **CRYOGENIC SERVICE** and **METAL SEATED HIGH TEMPERATURE**.



SCREWED CONSTRUCTION

Specifically for the **GAS MARKET**.

Available also with spot welded or seal welded ends.

SIZES AND PRESSURE RATINGS

PRESSURE RATING RANGE

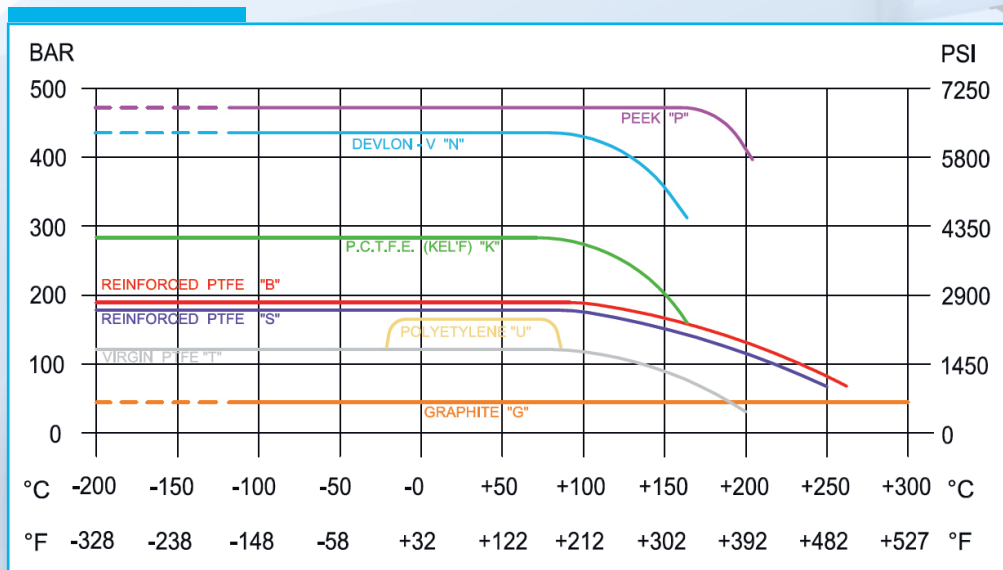
PRESSURE RATING RANGE									
FB		RB		150	300	600	900	1500	2500
DN 15	½"	DN 20	¾"						
DN 20	¾"	DN 25	1"						
DN 25	1"	DN 32	1 ¼"						
DN 32	1 ¼"	DN 40	1 ½"						
DN 40	1 ½"	DN 50	2"						
DN 50	2"	DN 65	2 ½"						
DN 65	2 ½"	DN 80	3"						
DN 80	3"	DN 100	4"						
DN 100	4"	DN 150	6"						
DN 150	6"	DN 200	8"						

Standard seat
 High pressure seat
 High temperature seat

Note: High pressure seats can also be available on low pressure valves if encapsulated.

SEAT PRESSURE/TEMPERATURE CURVE

This table express the Seat material resistance as declared by the original manufacturers. The values are to be combined with the other parameters such as size, seat design (standard or encapsulated) and temperature limitations as given by ASME B16.34



STANDARD FEATURES

BLOW-OUT PROOF STEM CONSTRUCTION

Stem is designed with integral T-type shoulder to provide effective blow-out proof action.

ANTISTATIC DESIGN

All Starline valves have been tested to ANTI-STATIC design. The antistatic device made by a small spring allocated at the bottom of the stem ensures electrical static-conduction to prevent risk of fire or explosion.

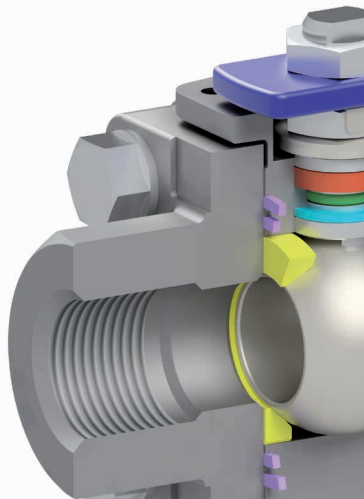
TRIPLE STEM SEALING

Stem sealing is made of 3 sealing barriers (O-ring, Thrust washer, Packing ring). Starline has been certified for LOW EMISSION requirements to ISO 15848 rate B on the standard execution valve.

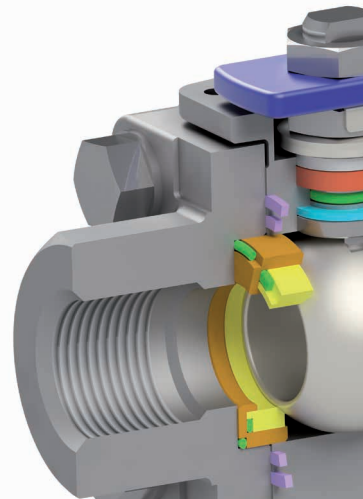
EXCLUSIVE SEAT DESIGN

Technologically advanced seat design allows easy interchangeability and upgraded performance to the same valve. All seats can be supplied in standard or encapsulated design which permits to the same seat material higher resistance to pressure and temperature.

STANDARD



ENCAPSULATED



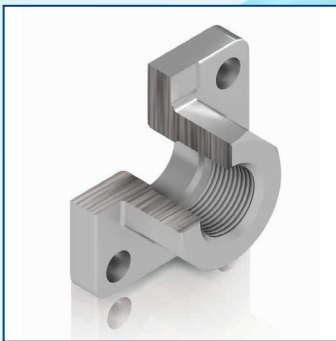
All Starline valves are bidirectional. A pressure balancing hole is helping the pressure to be equalized throughout the body cavity and guarantees a better performance to the valve. Starline seat design also allows automatic body cavity relief due to a special machining of the seat.

Nevertheless for quick expanding gases or other media (chlorine – oxygen..) Starline recommends the use of a supplementary venting hole in the ball (upstream side – unidirectional valves).

END CONNECTIONS

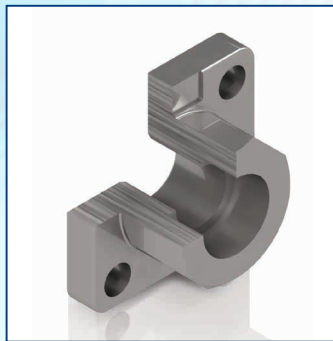
SCREWED ENDS

ASME B1.20.1 NPT/F or NPT/M
ISO 228/1 BSPP/F or BSPP/M
ISO 7/1 BSPT/F

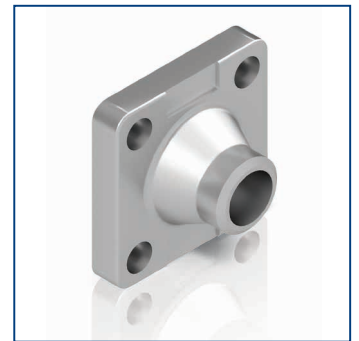


SHORT WELDING ENDS

ASME B16.11 SW



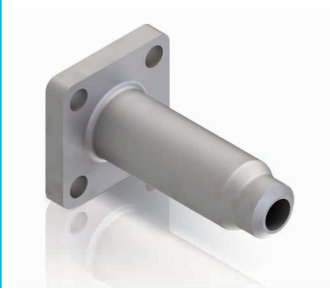
ASME B16.5 BW



LONG ENDS

Made out of SINGLE INTEGRAL FORGED PIECE, nipples are available with standard length, 100 mm or longer length on request.

BW



PE



SW

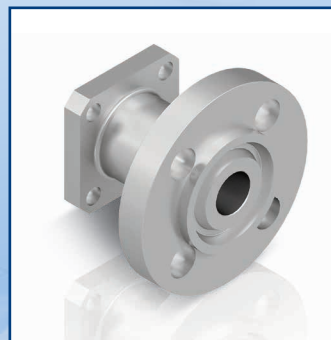
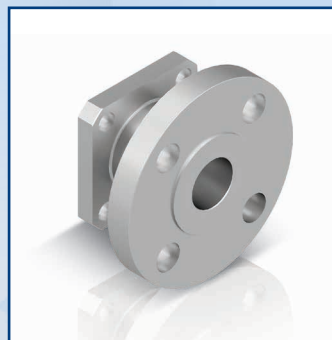


MALE THREADED

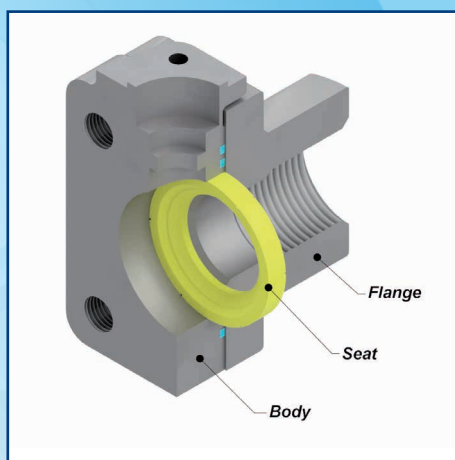
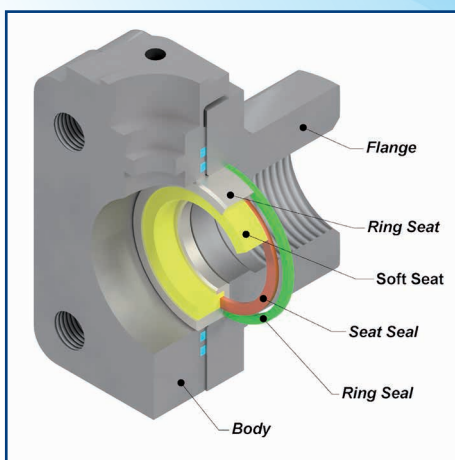
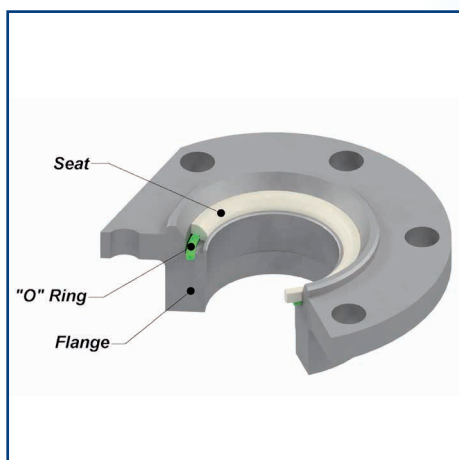


FLANGES to DIN and ASME/ANSI STANDARD

Flanges are available in several executions to DIN, EN and ASME standards, class from PN 16 to PN420 and class 150 to 2500. For any additional detailed information please refer to our technical data sheet available on request.



SEATS AND SEALS MATERIALS



SEAT INSERT MATERIAL

STARLINE CODE		SEAT INSERT MATERIALS	°C	°F	APPLICATION	NOTES
SOFT	S	REINFORCED PTFE 20% Carbon + 5% Graphite	-196 +280	-321 +536	Natural Gas, Steam Service, Diathermic Oil, Hydrocarbons, H2S, Medium Pressure, Low / High Temperature	Higher Temp. and Pressure than Virgin PTFE. Good for Steam Service
	T	VIRGIN PTFE	-196 +220	-321 +428	Hydrocarbons, H2S, All Chemicals, Natural Gas, low pressure	All services subject to temperature limitation
HARD	N	DEVLON - V POLYAMIDE - NYLON	-50 +155	-58 +311	Hydrocarbons, H2S, Natural Gas, High pressures	Good for high pressure applications not good for water
	K	KEL'F PCTFE	-196 +150	-319 +302	High pressure Low temperature	Like Virgin PTFE but improve resistance to nitric acid, hydrofluoric acid and liquid oxygen
	P	PEEK POLYETHER KETONE	-196 +220	-321 +428	Hydrocarbons. Nace. For Tobacco and Nuclear Service	High pressure High temperature
	X	REINFORCED PEEK REINFORCED POLYETHER KETONE	-196 +280	-321 +536	Hydrocarbons. Nace. For Tobacco and Nuclear Service	High pressure High temperature
	E	VESPEL SP 21 POLYIMIDE	-196 +350	-321 +662	Food and Tobacco industries Nuclear service	Low pressure Low torque
	U	UHMWPE POLYETHYLENE	-196 +95	-321 +203	Good Chemical Resistance Nuclear Service	Medium pressure Low temp. - High temp
	Y	PFA	-196 +260	-321 +500	Lower Porosity - Particularly Good to Avoid Polymerisation	Medium pressure Low/Medium Temper

SEAL MATERIAL

STARLINE CODE		SEAL MATERIALS	°C	°F	APPLICATION
"O" RINGS	N	Nitrile	-25 +120	-13 +248	Water Service
	H	Hydrogenated Nitrile (AED)	-35 +160	-31 +320	High Pressure Water
	E	Modified Hydrogenated Nitrile (AED)	-55 +160	-67 +320	Sweet gas mixture, Hydrogen Sulphide up to 10%, Amine Corrosion Inhibitors up to 5%, Methanol
	V	Fluoroelastomers (Viton B)	-20 +220	-4 +428	Standard Viton used on lower pressures
	V	Fluoroelastomers (Viton AED)	-27 +230	-17 +446	Sweet gas mixtures and aromatic hydrocarbons. ED service
	V	Fluoroelastomers (Viton GLT + AED)	-61 +225	-78 +437	Lower temperatures than standard Viton
	C	Perfluoroelastomers (Chemraz)	-25 +250	-13 +482	Good chemical resistance, High temperature, H2S, Xylene, Toluene contents
	K	Perfluoroelastomers (kalrez)	-20 +327	-4 621	Good extrusion and chemical resistance. Excellent resistance to Sour oil and Amine.
	A	Aflas (AED)	-20 +200	-4 392	Sour gas mixtures and amine based corrosion inhibitors. Good for hot water and steam.
	I	Silicon	-60 +200	-76 +392	Low temperature applications
	X	Silicon + PFA	-60 +260	-76 +500	Low temperature applications / Good Chemical Resistance
	M	EPDM	-40 +160	-40 +320	Chemical applications
SPECIAL	G	Expanded Graphite	-240 +680	-400 +1256	Used on Metal Seated High Temperature valves
	L	TFM + Elgiloy	-196 +280	-321 +536	Good for Chemical Resistance and Low Temperatures

FIRE SAFE TESTED AND CERTIFIED

All Starline floating ball valves are supplied with **DOUBLE BODY SEAL** and certified according to the most relevant firesafe norms for oil, petroleum and gas applications. First body seal normally working on service and emergency body seal in **GRAPHITE** to guarantee tightness as needed in case of fire.



PED REQUIREMENTS

All Starline valves are designed and certified to cover CAT III module H of the 97/23/EC to permit an easy handling of all available stock valves which are ready to be sold for any kind of application which falls within the PED restrictions and required CE marking. All valves outside the range of 97/23/EC (up to size 1") fulfill the S.E.P. (Sound Engineering Practice) requirements of PED.



ATEX CERTIFIED VALVES

All Starline valves have been certified to **ATEX** requirements. A supplementary name plate is available upon request for ATEX applications.

SIL 3 CERTIFICATION

In accordance with IEC 61508 Starline ball valves obtained SIL3 certification by demonstrating that all its range of products falls within the above 90% safe failure fraction considering a temperature range of -196° to +600°c.

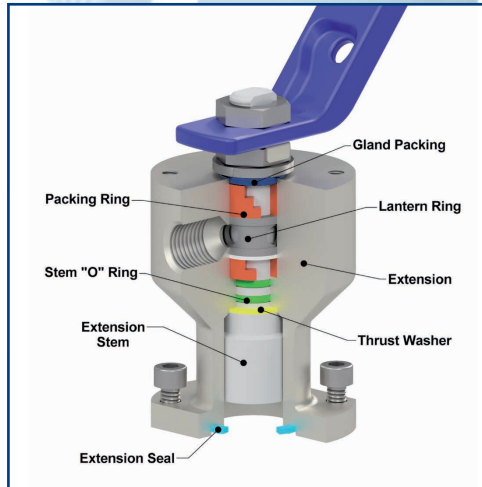
ACCESSORIES

T-HANDLE
for insulation



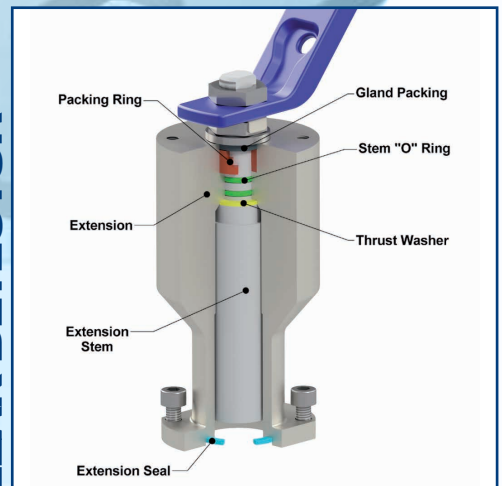
OVAL HANDLE
available up to 1" full bore

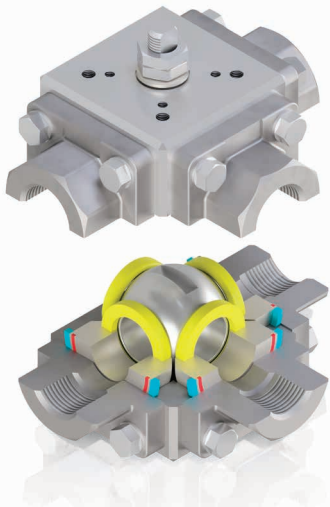
LOCK DEVICE



EXTENDED BONNET

VAPOUR SPACE LEAK DETECTOR



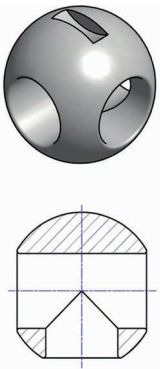


MULTI PORT VALVES

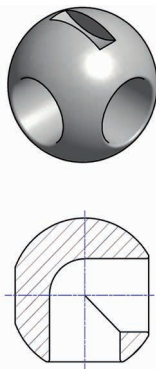
With the same criteria of the 2 way floating ball valves, Starline valves are available also in **MULTI PORT EXECUTION**.

Starline multiport valves are not a simple diverter but a proper multiport 4 seated valves which allow every combination of port and ball configuration (T bore – L bore – X bore – vertical port) with a perfect ball centering independently of the flow direction.

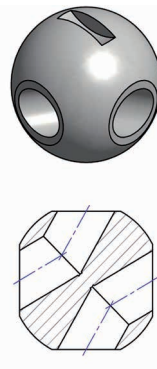
T PORT CONFIGURATION



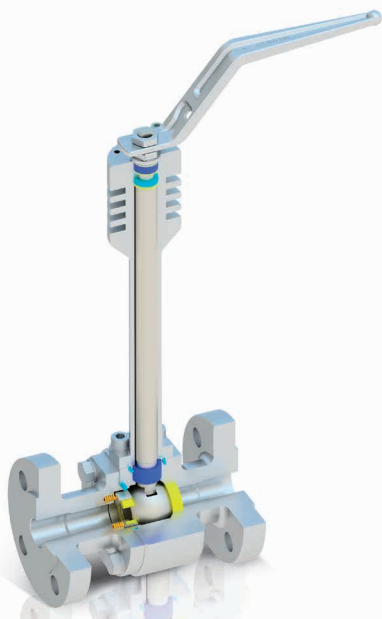
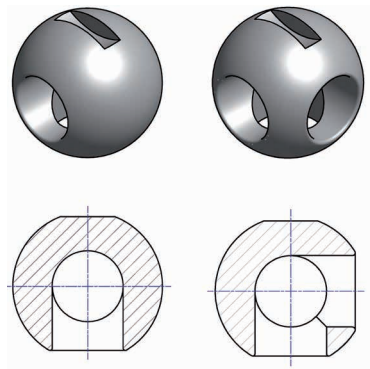
L PORT CONFIGURATION



X-BORE PORT CONFIGURATION



VERTICAL L PORT CONFIGURATION



CRYOGENIC FLOATING BALL VALVES

Size range:

from DN08 - 1/4" to DN100 - 4" full bore – DN20 - 3/4" to DN150 - 6" reduced bore

Pressure rating:

from ASME class 150 to 600 – PN 16 to PN 100

Up to DN25 - 1" also available up to ASME class 1500

Materials of construction:

Forged stainless steel 304, 316 and any special alloy

Leakage rate:

according to all the main international and Customer's Specifications

End connections:

All connections available (flanged, welded, screwed or other)

Fire safe:

ISO10497, API 607, API 6FA

Cryo test:

BS6364, TOTAL GS PW 150, SHELL SPE 77/306

METAL SEATED BALL VALVES HIGH TEMPERATURE

Starline manufactures a high performance floating ball metal seated suitable for high temperature applications.

Size range:

from DN15 - 1/2" to DN50 - 2" - full bore and reduced bore

Pressure class:

ASME class 150 to 600 – DIN PN 16 to 100

Temperature range:

Up to 600°C

Operation:

Lever operated up to DN40 - 1 1/2" class 150 and DN32 - 1 1/4" class 300 and above – bigger sizes are gear operated

Extended bonnet:

100 mm for temperature insulation

Ball / seats:

F316 hardened – Chrome Carbide or Tungsten Carbide

Stem material:

F51 up to 400°C – Inconel 625 or nitroniol 50 for higher temperatures

Sealing materials:

high performance graphite sealings

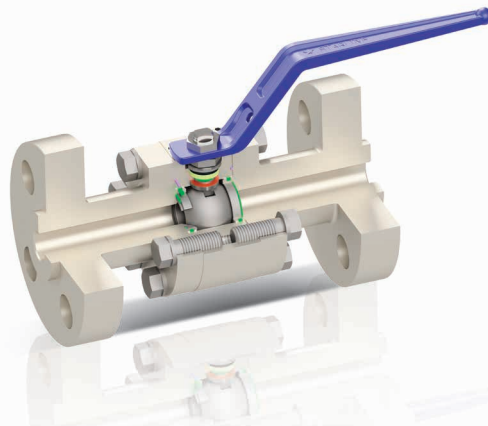
Tightness class:

According to ISO 5208 rate A or B even For gas services



METAL SEATED FOR ABRASION

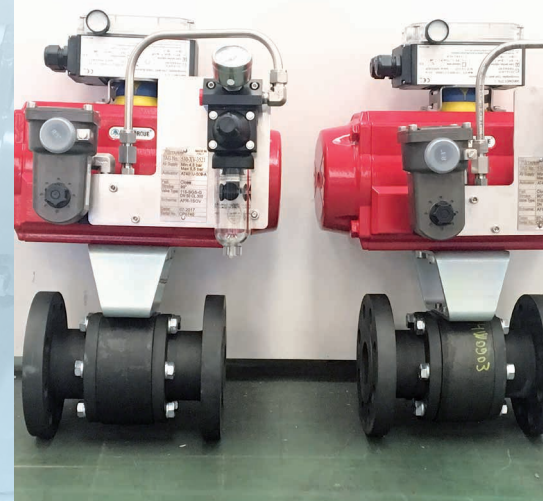
Starline has also developed a floating ball valve with metal seats for abrasion by working on the basic design of a standard soft seated floating valve, it is now possible to add metal seats with chrome carbide or tungsten carbide to obtain a perfect solution for abrasive services up to 220°C.



AUTOMATION

Starline is able to provide any kind of actuated ball valves starting from the customer requirement using the most suitable components according to needs (complete system with rack&pinion actuators, scotch&yoke actuators, compact actuators, SOV, AFR, POV, QQEV, positioner etc.).

The final control system is built into a control panel designed and manufactured completely by Starline. The complete system is tested in Starline facilities with a proper FAT according to Starline standards or customer specifications. Starline personnel is qualified to perform **SIL** certification on the complete unit.



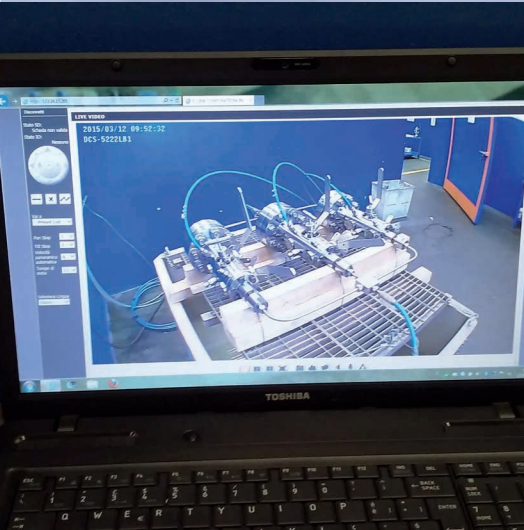
NDE AND TESTING FACILITIES

- **UT** Ultrasonic testing according to ASME V
- **PT** Dye Penetrant Inspection according to ASME VIII
- **MT** Magnetic Particole Inspection according to ASME V
- **PMI** Positive Material Identification (Alloy Verification) with Niton XL instrument
- **Ferrite Measurement**
- **HT** Hardness Test



Specific valve testing such as:

- Fugitive emission testing to **ISO 15848** and **SPE 77/312** with mass spectrometer Phonix L-300 and duly certified personnel.
- Cryogenic test bench for low temperature and cryogenic testing up to 196°C.
- High temperature oven for high temperature valve testing up to extreme temperatures such as 500 °C.
- Starline tests 100% of the valves manufactured according to **API 6D / API 598**.



Additional valve test available:

- High pressure gas test (shell and seat)
- Antistatic test
- Seat relief test

Standard tests carried out:

- Visual and dimensional check
- High pressure hydrostatic shell and seat test
- Low pressure air seat test
- Torque test



STANDARDS AND CERTIFICATIONS

- | | |
|----------------------------|-----------------------------------|
| ISO 9001: 2008 | API SPEC Q1 |
| ISO 18001 | API 6DSS |
| ISO 14001 | API 6A |
| PED 2014/68/EU MOD.H CAT.3 | FIRESAFE API607-API 6FA- ISO10497 |
| ATEX 2014/34/EU | BS 6364 |
| SIL 3 | NACE MR0175 – NACE MR0103 |
| CU-TR | SHELL TAT |
| API 6D | ISO 15848 |
| API SPEC Q1 | |





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