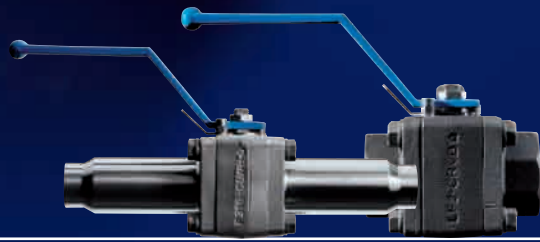


st STARLINE[®]
forged steel ball valves



FLOATING BALL VALVES

STARLINE

COMPANY PROFILE

Founded in 1976 by Mr. Santo Rota, **Starline S.p.A.** has grown to be one of the leading companies in the production of Forged ball valves in the world. Since the origin the target of the Company was to manufacture a quality product using Forged components and qualified high level suppliers for all the soft parts (seats and seals) most of which were specifically developed according to Starline design requirements.

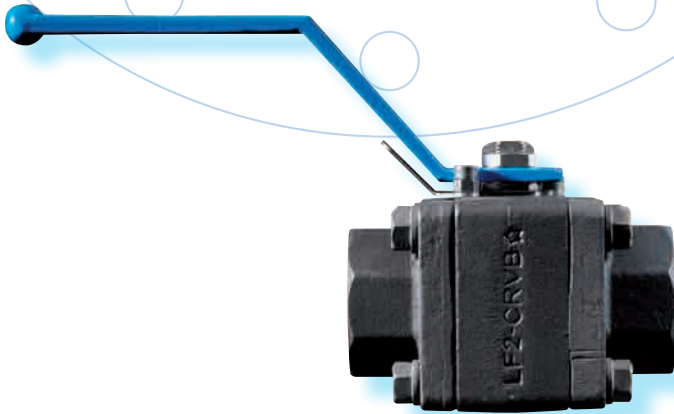
The small size valves and related models originally created are still today a masterpiece in the sector, well known by all the end users and manufacturers. Around year 2000 when most of the European manufacturers decided to move production and/or purchases to new Economies in Far East and China, Starline decided to step up the target of the quality and developed new products for critical applications. The range is now extended to larger sizes – Metal seated valves - Cryogenic applications and much more. Today Starline structure counts approximately 80 employees.

The new factory extends on an area of 31.700 square meters (of which 17.000 covered) and the production raised up to more than 300.000 valves per year – and still continues to grow.



An accurate R&D department is continuously looking for improvements in design and materials, sophisticated valve testing, dimensional and quality control as well as stocking and logistic systems.

Starline already counts now on the most sophisticated solutions for production management, stock and WMS. The new factory is an example of modern technologies applied to every industrial process.



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**



Manufacturing
Headquarter

STARLINE
forged steel ball valves

SALES ORGANIZATION

Starline is organized with different offices and distribution points worldwide.



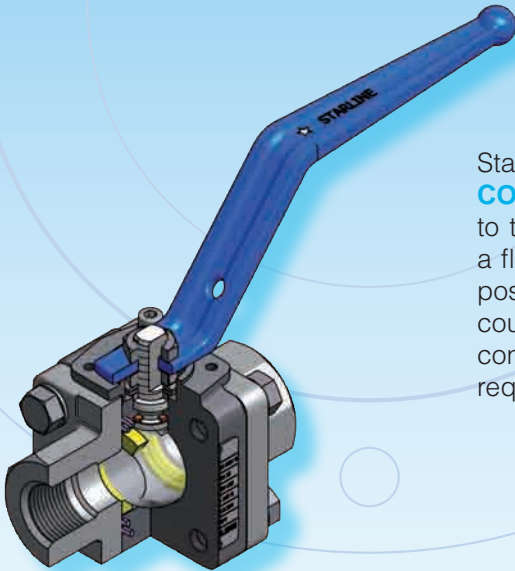
REFERENCES

ABB LUMMUS	ENAGAS	JGC CORPORATION	SAIPEM
ADCO	ENI	KBR	SAMSUNG OIL
ADGAS	ENPPI	KNPC	SBM
ADMA-OPCO	FLUXYS	KOC	SHELL INTERNATIONAL
ADNOC	FORSMARKS KRAFTS	LINDE	SNAMPROGETTI
AGA CRYO	GROUP	MARINO ROSETTI	SONATRACH
AIR LIQUIDE	FOSTER WHEELER	NESTE OIL	SPIE CAPAG
AKER	GASCO	NIGC	STATOIL
ALSTOM POWER	GAZ DE FRANCE	NIOC	TECHNIP
AURAMARINE	HYUNDAI	NPCC	TECNIMONT
BRITISH GAS	ILVA	PDO	TOTAL
CELLIER	INITEC	PETROBRAS	WINTERSHALL
CHEVRON	INTECSA	PHILLIPS PETROLEUM	ZADCO
DSME	J.RAY MCDERMOTT	PTTEP	

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.

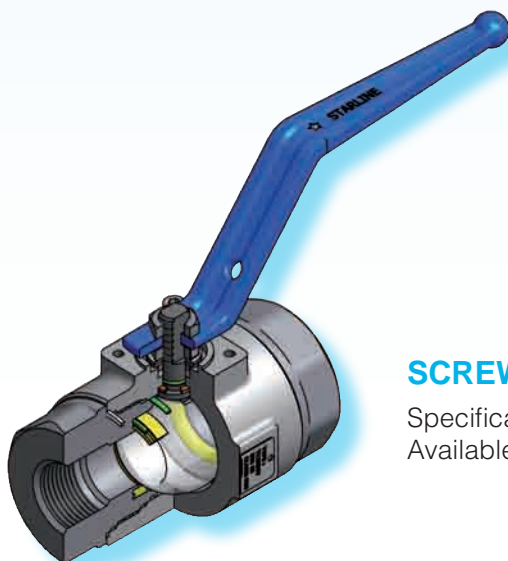
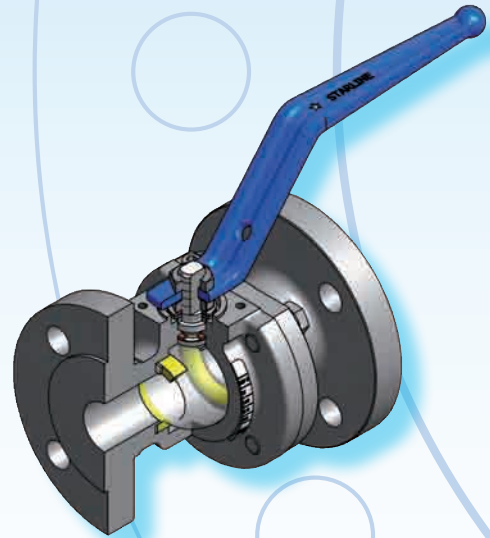
- ASME B16.34
 - ASME B16.5
 - ASME B16.10
 - ASME B16.25
 - API 598
- BS 6755/API607
 - ISO 15848
 - ISO 5208
 - MS-SP-25
- ISO 17292
 - API 6D/ ISO 14343
 - PED 97/23/EC
 - ATEX 94/9/EC



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

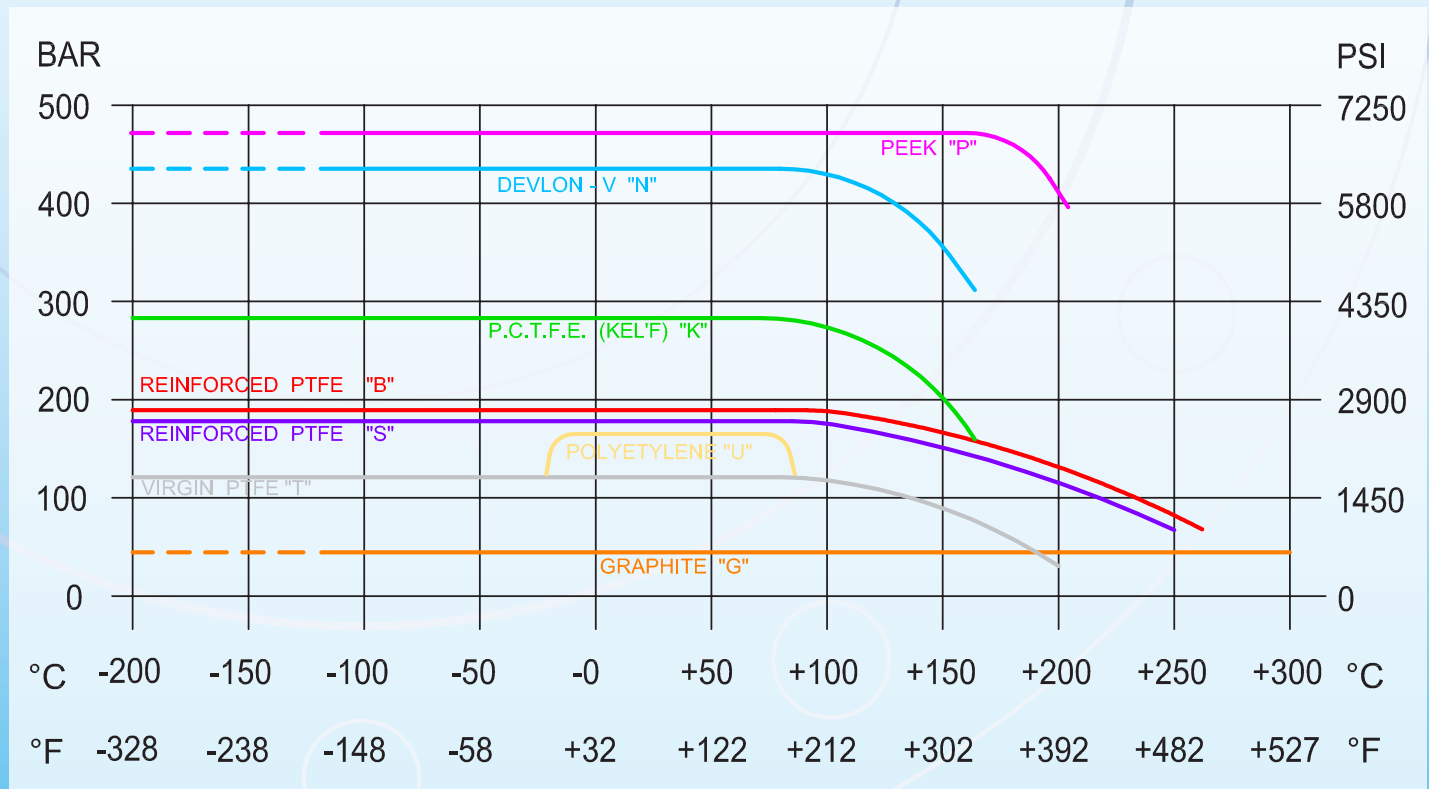
FB		RB		150	300	600	900	1500	2500
DN 15	½"	DN 20	¾"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 20	¾"	DN 25	1"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 25	1"	DN 32	1 ¼"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 32	1 ¼"	DN 40	1 ½"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 40	1 ½"	DN 50	2"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 50	2"	DN 65	2 ½"	Standard seat	High temperature seat	Standard seat	High pressure seat	High pressure seat	Standard seat
DN 65	2 ½"	DN 80	3"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 80	3"	DN 100	4"	Standard seat	High temperature seat	Standard seat	Standard seat	High pressure seat	Standard seat
DN 100	4"	DN 150	6"	Standard seat	High pressure seat	Standard seat	Standard seat	Standard seat	Standard seat
DN 150	6"	DN 200	8"	Standard seat	Standard seat	Standard seat	Standard seat	Standard seat	Standard seat

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 mixed 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

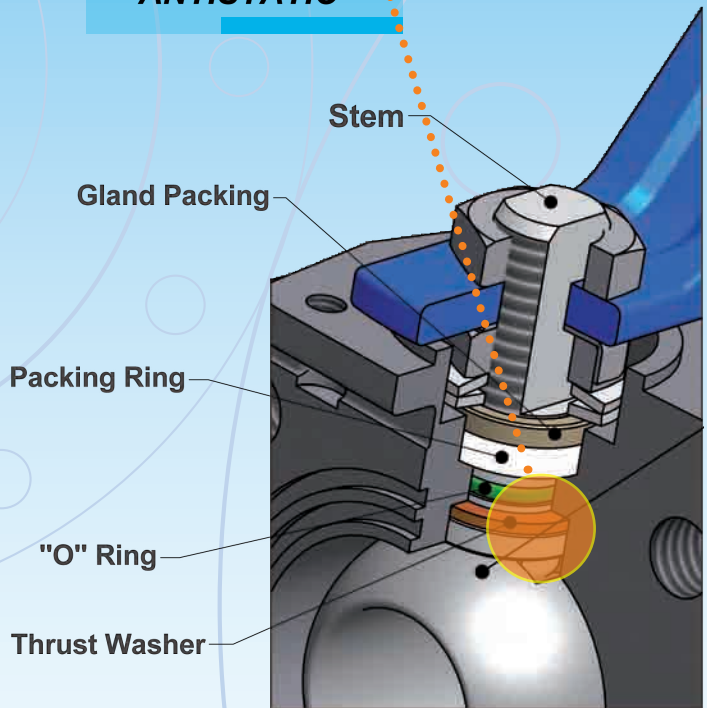
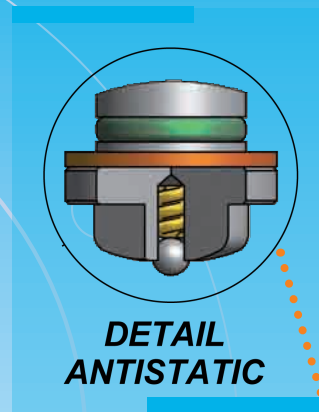
Stem is designed with integral T-type shoulder to provide effective blow-out proof action.

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.

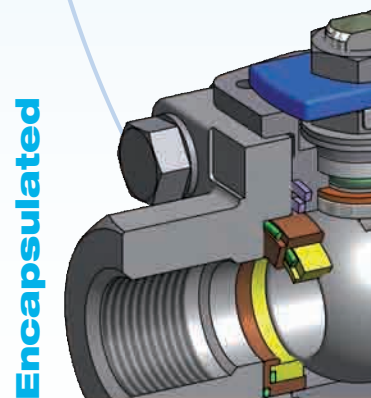
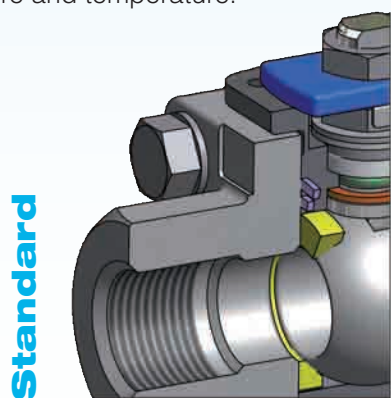
TRIPLE STEM SEALING

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.



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).

FIRE SAFE TESTED AND CERTIFIED

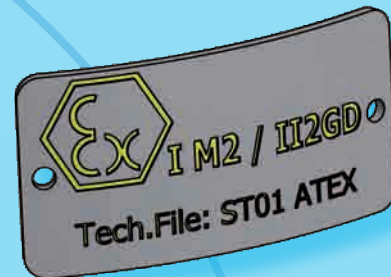
All Starline floating ball valves are supplied with **DOUBLE BODY SEAL** and certified according to the most relevant firesafe norms for oil, petroleum and gas applications. First body seal normally working on service and emergency body seal in **GRAPHITE** to guarantee tightness as needed in case of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

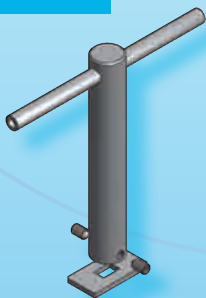


All Starline valves have been certified to **ATEX** requirements. A supplementary name plate is available upon request for ATEX applications.

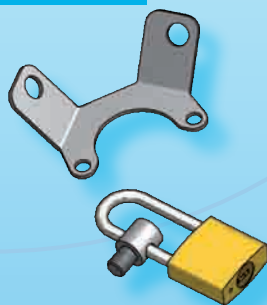
SIL 3 CERTIFICATION

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

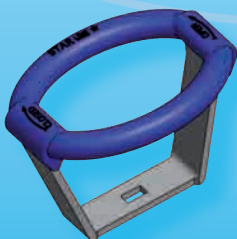
ACCESSORIES



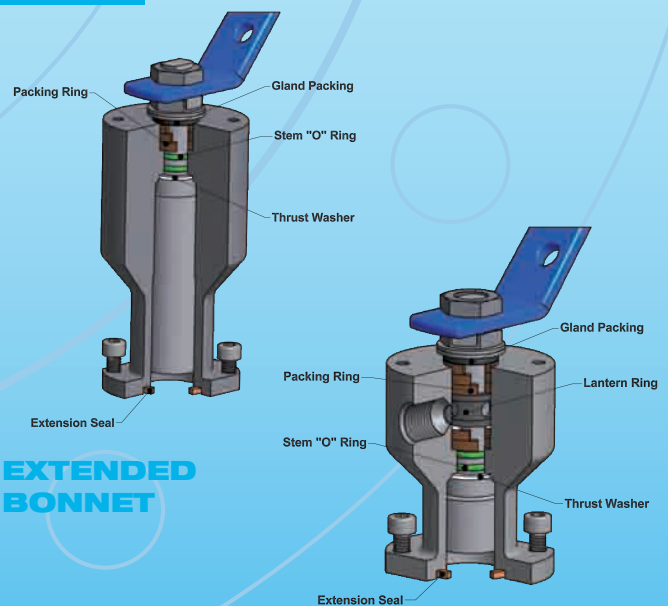
T HANDLE
for insulation



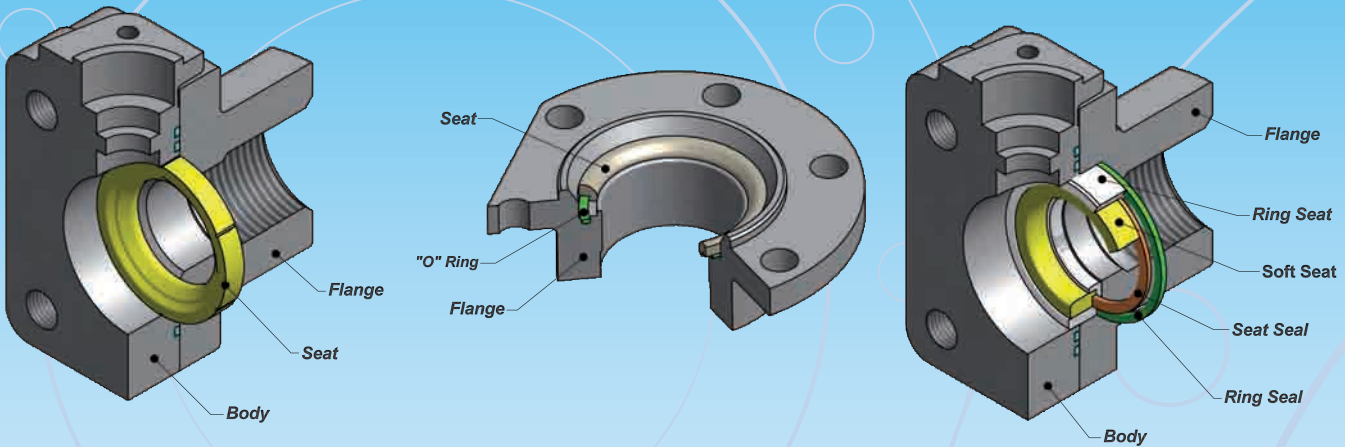
LOCK DEVICE



OVAL HANDLE
available up to 1"
full bore



SEATS AND SEALS MATERIALS



SEAT MATERIALS

STARLINE CODE	MATERIAL TYPE	TEMPERATURE RANGE		APPLICATION	RECCOMENDATIONS
		°C	°F		
STANDARD	S REINFORCED PTFE 20% Carbon + 5% Graphite	-190 +250	-310 +482	Medium pressure Low/High temperature	Higher temperature and Pressure than Virgin PTFE. Good for Steam Service
	T VIRGIN PTFE	-196 +200	-319 +392	Low pressure Low torque – Low temperature	All services subject to temperature limitation.
	B REINFORCED PTFE +BRONZE	-196 +250	-310 +482	Medium pressure Low/High temperature	Auto lubricant properties – recommended for steam
HIGH PERFORMANCE	N DEVLOX – V POLYAMIDE – NYLON	-100 +155	-148 +311	High pressure High temp – Low temperature	H2S and Hydrocarbons
	G GRAPHITE	-90 +350	-130 +662	Low pressure – High temperature	Not suitable for high cycles or automated valves.
	D DELTRIN ACETAL RESIN	-70 +95	-94 +203	High pressure Low temperature	Hydrocarbons. Nace. Co. Do not use for oxygen
	P PEEK POLYETHER KETONE	-80 +220	-62 +428	High pressure High temperature	Hydrocarbons. Nace. For Tobacco and Nuclear Service
	E VESPEL SP 21 POLYIMIDE	-200 +260	-328 +500	High pressure High temperature	Good Chemical Resistance. For Gas, Oil, Petroleum. Not for Steam
	U UHMWPE POLYETHYLENE	-150 +150	-240 +300	Low pressure Low torque	Food and Tobacco industries. Nuclear service
	K KELF POTFE	-196 +150	-319 +302	High pressure Low temperature	Like virgin pipe but improved resistance to nitric acid, hydrofluoric acid and liquid oxygen.
	Y PFA	-60 +250	-76 +482	Medium pressure Low/Medium temperature	Lower Porosity – Particularly Good to Avoid Polymerisation
	M METAL SEAT (tungsten carbide or chrome carbide)	-200 +500	-328 +932	High pressure – High temperature	Abrasion and high temperature applications

SEAL MATERIALS

STARLINE CODE	MATERIAL TYPE		TEMPERATURE RANGE °C		APPLICATION
"O" RINGS	N NITRILE	NBR	-30	+120 CONTINUOUS +150 INTERMITTENT	Water
	H HYDROGENATED NITRILE	HNBR	-30	+160 CONTINUOUS +180 INTERMITTENT	H2S, crude oil, hydrocarbons, small concentration of methanols
	E MODIFIED HYDROGENATED NITRILE	HNBR	-40	+160 CONTINUOUS +180 INTERMITTENT	H2S, crude oil, hydrocarbons, small concentrations of methanols
	V FLUOROELASTOMERS (VITON B)	FKM	-20	+220 CONTINUOUS +230 INTERMITTENT	Sour gas, hydrocarbons
	V FLUOROELASTOMERS (VITON AED)	FKM	-20	+220 CONTINUOUS +230 INTERMITTENT	Sour gas, hydrocarbons
	V FLUOROELASTOMERS (VITON GLT)	FKM	-40	+220 CONTINUOUS +230 INTERMITTENT	Sour gas, hydrocarbons
	C PERFLUOROELASTOMERS (CHEMRAZ 526)	FFKM	-25	+315 CONTINUOUS +350 INTERMITTENT	Sour gas, hydrocarbons, high % of methanol
	K PERFLUOROELASTOMERS (KALREZ)	FFKM	-25	+325	Sour gas and corrosive fluids
	A AFLAS	FEPM	+5	+200	Amine / Methanol service
	I SILICON+PFA		-60	+250	Low temperature applications/ Good Chemical Resistance
SPECIAL	G EXPANDED GRAPHITE		-240	+680	Used on Metal Sealed High Temperature valves
	L LIPSEAL		-196	+260	Good for Chemical Resistance

FIRE SAFE SEAL

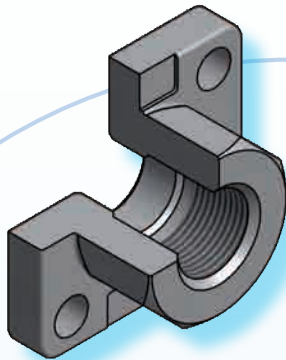
STARLINE CODE	MATERIAL TYPE	TEMPERATURE RANGE °C		APPLICATION
G	GRAPHITE	-200	+400	All - excluding clean services

Values indicated are the original values given by the manufacturers. Additional limitation to these values shall be considered based on the size of valve, seat construction and valve operating pressure.

END CONNECTIONS

SCREWED ENDS

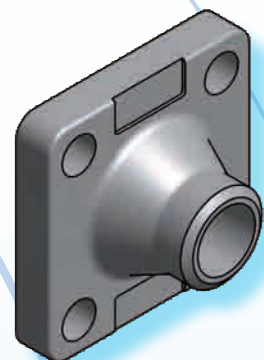
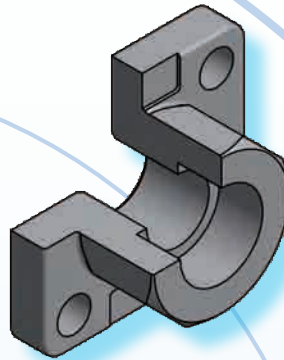
ASME B1.20.1 NPT/F or NPT/M
ISO 228/1 BSPP/F or BSPP/M
ISO 7/1 BSPT/F



SHORT WELDING ENDS

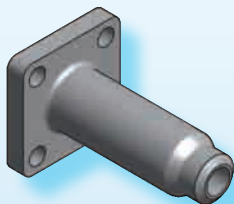
ASME B16.11 SW

ASME B16.5 BW

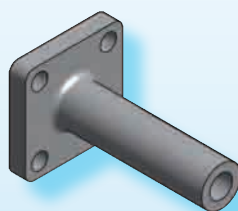


LONG ENDS

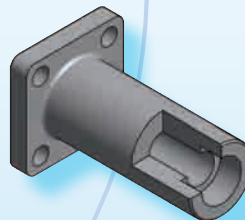
Made out of SINGLE INTEGRAL FORGED PIECE, nipples are available with standard length, 100 mm or longer length on request.



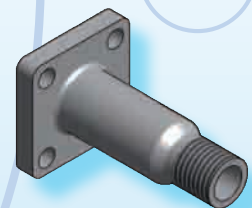
BW



PE



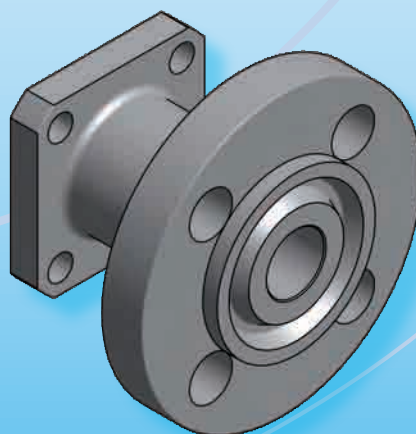
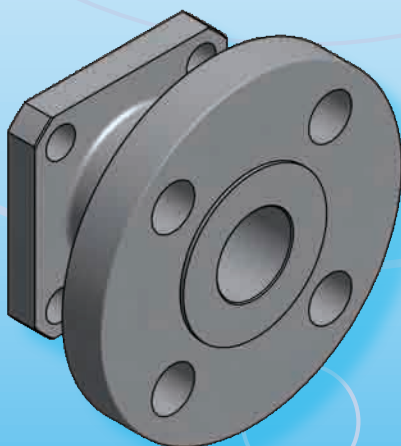
SW



MALE THREADED

FLANGES to DIN and ASME/ANSI STANDARD

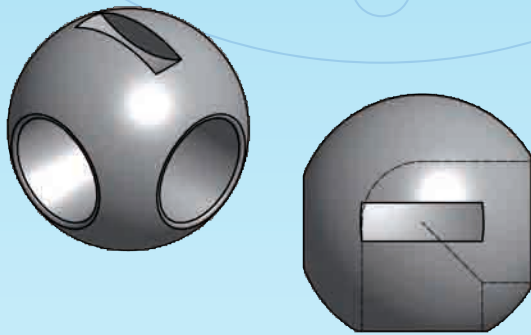
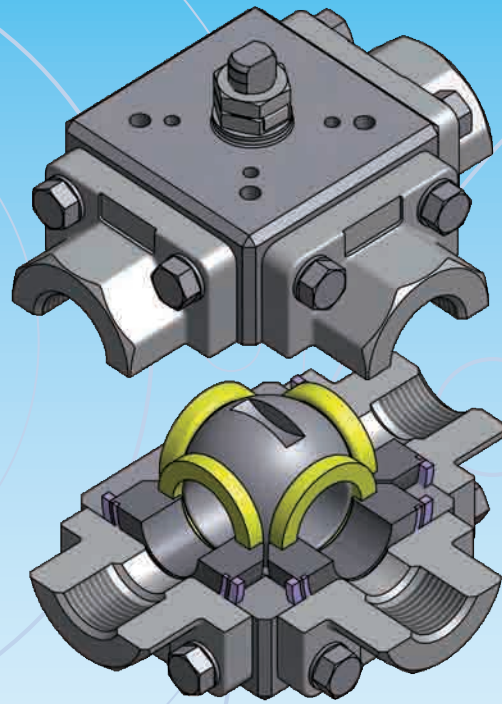
Flanges are available in several executions to DIN, EN and ASME standards, class from PN 16 to PN420 and class 150 to 2500. For any additional detailed information please refer to our technical data sheet available on request.



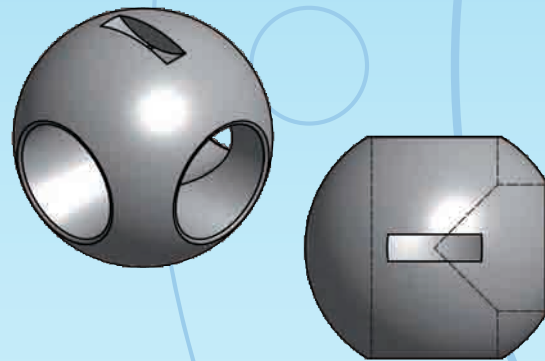
MULTIPOINT VALVES

With the same criteria of the 2 way floating ball valve, Starline valves are available also in **MULTIPOINT EXECUTION** with the following possible **PORT COMBINATIONS**.

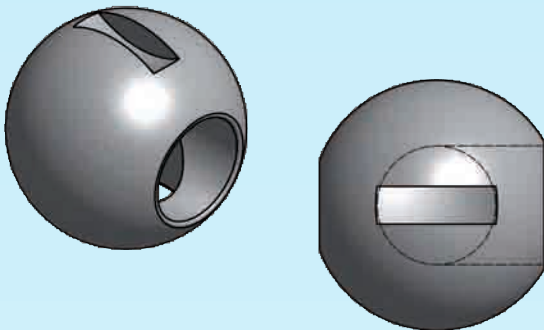
Starline multiport valves are not a simple diverter but a proper multiport 4 seated valves which allow every combination of port and ball configuration (T bore – L bore – double L bore – vertical port) with a perfect ball centering independently of the flow direction.



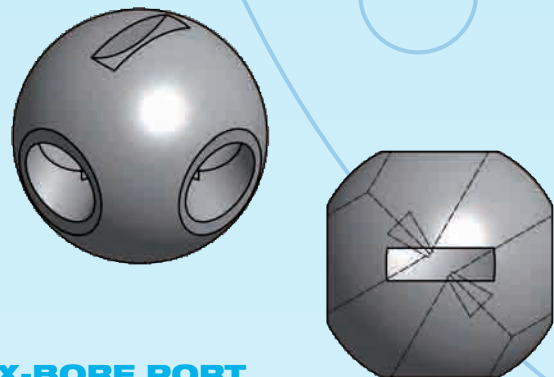
L PORT CONFIGURATION



T PORT CONFIGURATION

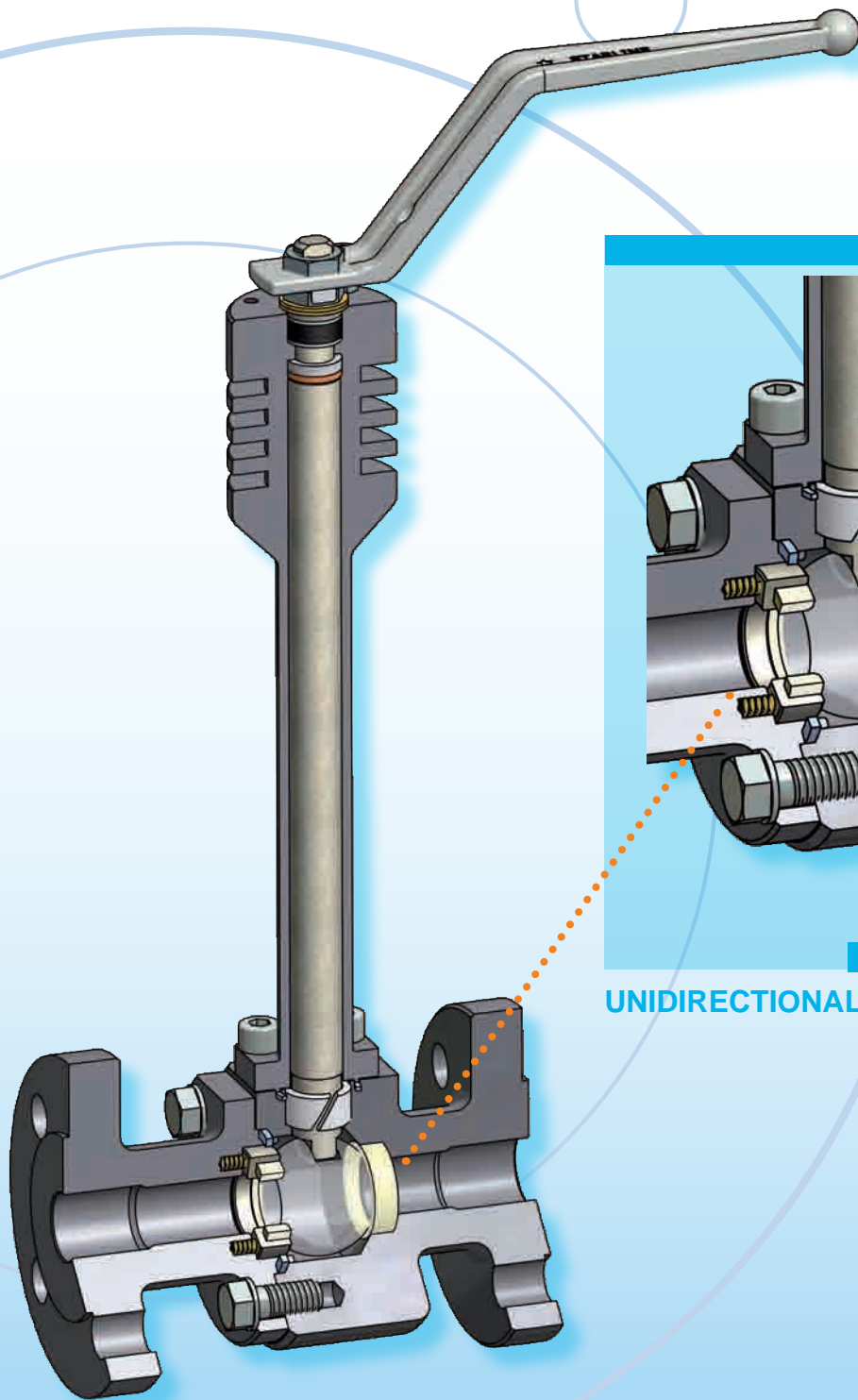


VERTICAL L PORT CONFIGURATION



X-BORE PORT CONFIGURATION

CRYOGENIC FLOATING BALL VALVES



UNIDIRECTIONAL VALVE

Size range:

Pressure rating:

Materials of construction:

Leakage rate:

End connections:

Fire safe:

Cryo test:

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

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

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

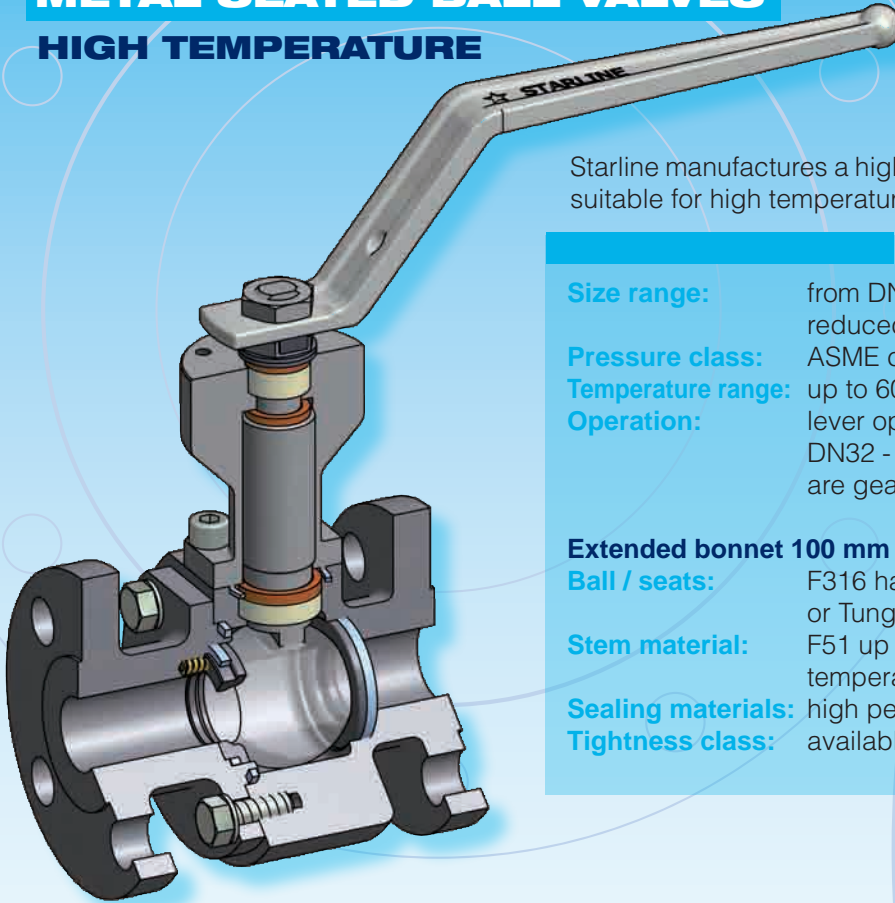
Forged stainless steel 304, 316 and any special alloy according to all the main international and Customer's Specifications

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

ISO10497, API 607, API 6FA

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

METAL SEATED BALL VALVES HIGH TEMPERATURE

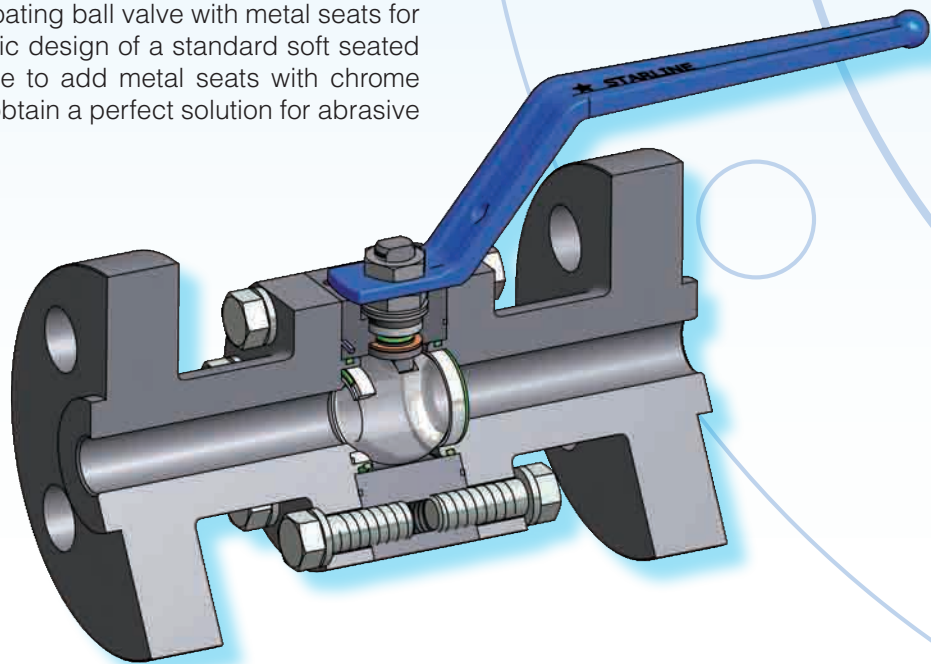


Starline manufactures a high performance floating ball metal seated suitable for high temperature applications.

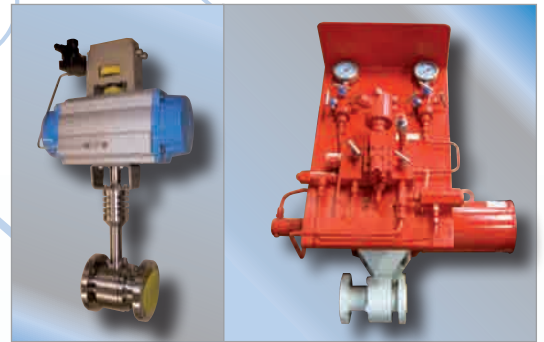
Size range:	from DN15 - 1/2" to DN50 - 2" - full bore and reduced bore
Pressure class:	ASME class 150 to 600 - DIN PN 16 to 100
Temperature range:	up to 600°C
Operation:	lever operated up to DN40 - 1 1/2" class 150 and DN32 - 1 1/4" class 300 and above - bigger sizes are gear operated
Extended bonnet 100 mm for temperature insulation	
Ball / seats:	F316 hardened - Chrome Carbide or Tungsten Carbide
Stem material:	F51 up to 400°C - Inconel 625 for higher temperatures
Sealing materials:	high performance graphite sealings
Tightness class:	available in class V or VI even for gas service.

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



All valves are ready to fit actuator – with **ISO 5211** top.

Testing facilities are available for functional tests with valve/actuator.

Valve torque values are available upon request and are calculated in a very accurate way and adjusted according to the following table:

SAFETY FACTOR CALCULATION

TORQUE ADJUSTEMENT TO SELECT ACTUATOR								
Multiplier factor can influence torque								
Net Break Away Torque of Valve	Process Media		Process temperature		Frequence of Operation		Suggested Safety Factor	Torque to Select Actuator
	Liquid, clean particle free	10%	Ambient -29°C + 38°C	10%	one per day to one per week	10%	gear	30%
	Liquid, dirty, slurry, raw water	60%	Low -29°C -90°C	30%	one per week to one per month	20%	actuator	30%
	Liquid, black liquor lime slurry	80%	Cryogenic -90°C -196°C	90%	over one per month	30%		
	Liquid, oil, lubricating	10%	Medium +38°C +200°C	30%	Emergency shut down	70%		
	Liquid, viscous, molasses	30%	High +200°C +700°C	90%				
	Gas, clean & wet, saturated steam	50%						
	Gas, dry, steam, natural gas	80%						
	Slurry service	90%						
	Oxygen, chlorine, hydrogen, helium	80%						

QUALITY STANDARDS

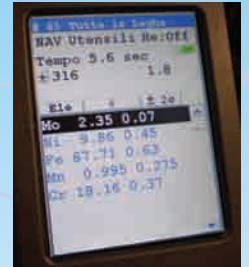
All valves respond to the following technical requirements:

- ★ **ISO 9001:2008**
- ★ **SIL 3**
- ★ **API6D ISO14313**
- ★ **FIRESAFE API607 – API 6FA – ISO10497**
- ★ **SHELL 77/100 - 77/130 - 77/300**
- ★ **TA-LUFT**
- ★ **ISO 5211**
- ★ **PED MOD H CAT.3**
- ★ **NACE MR0175 – NACE MR0103**
- ★ **ISO 15848**
- ★ **ASME B16.5 – ASME B16.10**
- ★ **ATEX 94/9 CE**
- ★ **ASME B16.25 – ASME B16.34**
- ★ **AD 2000 - MERKBLATT**



NDE AND TESTING FACILITIES

- **UT** Ultrasonic testing according to ASME V
- **DPI** Dye Penetrant Inspection according to ASME VIII
- **MPI** Magnetic Particulate Inspection according to ASME V
- **PMI** Positive Material Identification (Alloy Verification) with Niton XL instrument



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 down 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.

Standard tests carried out:

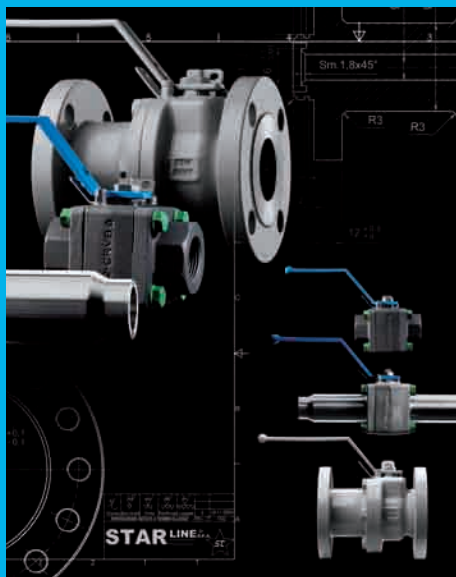
- Visual and dimensional check
- High pressure Hydrostatic shell and seat test
- Low pressure air seat test
- Stem torque check

Other valve test available:

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

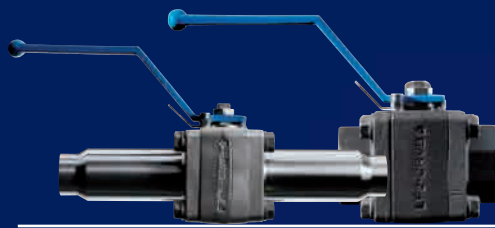


PHOTOGALLERY



STAR LINE
forged steel ball valves





 **STARLINE**[®]
forged steel ball valves

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