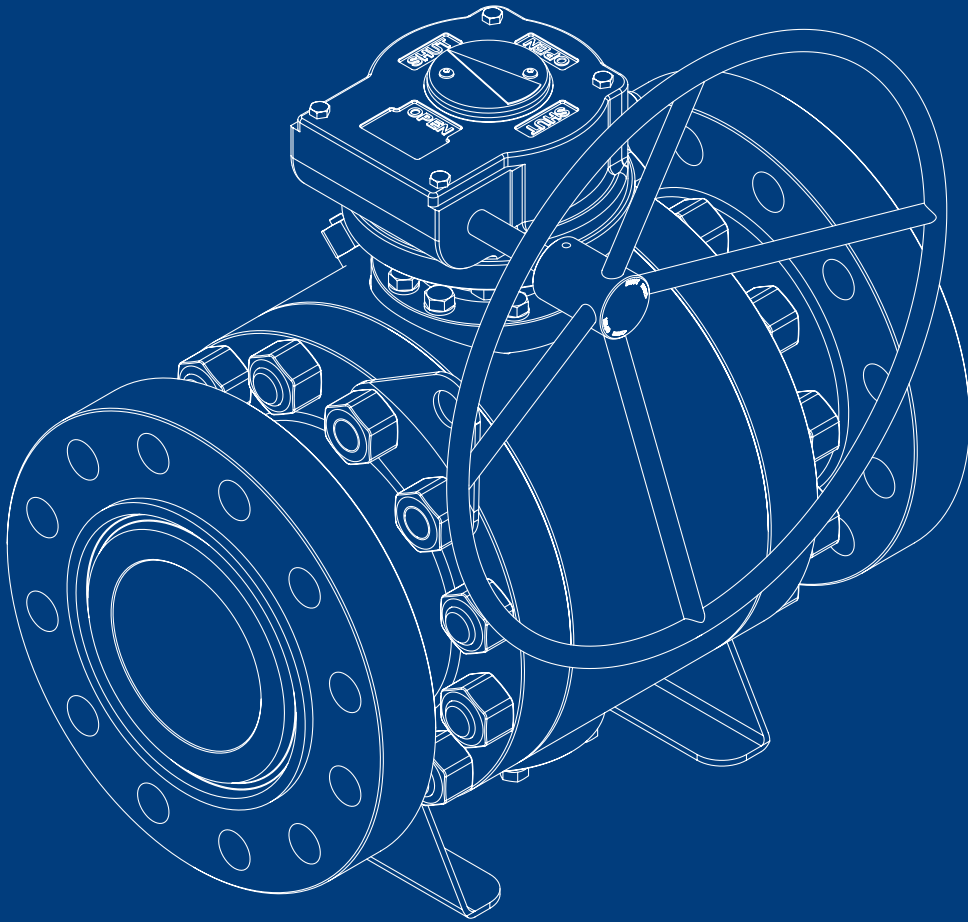


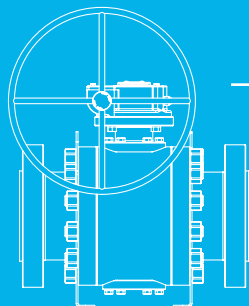
st STARLINE[®]
forged steel ball valves



STARLINE

TRUNNION

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

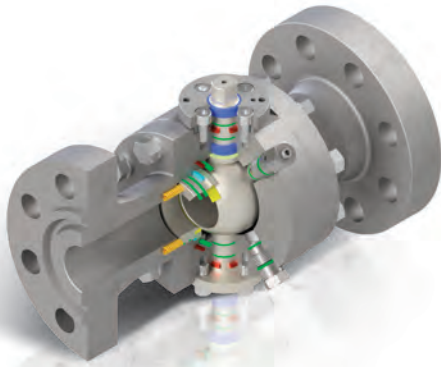
TRUNNION MOUNTED

INDEPENDENT BALL AND STEM

Ball and stem are manufactured in two separate pieces to reduce the effect of the side load generated by the pressure acting on the ball.

ANTI-STATIC DEVICE

All valves are guaranteed for electrical continuity between all the metal components type tests are duly executed and valves are certified.



Trunnion mounted ball valves are based on a system that provide a fixed ball and floating seat rings, moving along the valve axis.

The side load given by the pressure acting on the ball is absorbed by the bearings. At low pressure the sealing on the seats is obtained by the spring action on the seat rings. The more the pressure increases, the more it pushes the seats against the ball.

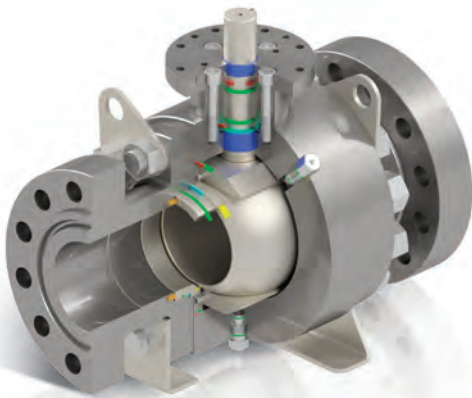
DOUBLE BLOCK AND BLEED

Starline valves are supplied as standard execution in DOUBLE BLOCK & BLEED Both seats hold the pressure independently from the body cavity pressure. Block and Bleed execution and Double Piston Effect execution are available as an option.

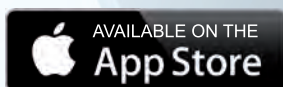
Starline trunnion mounted valves are available from 1/2" to 36" – ASME class 150 to 2500 – as well as API 6A 5000 and 15.000 – in several combinations of materials and execution to cover all possible service application from low temperature to high pressure.

3 PCS BOLTED CONSTRUCTION

The 3 pcs construction allows an infinite flexibility in the valve construction in terms of possible end connection combination.



↓
Type in 'StarlineAR'
and DOWNLOAD NOW





METAL SEATED ABRASIVE SERVICE

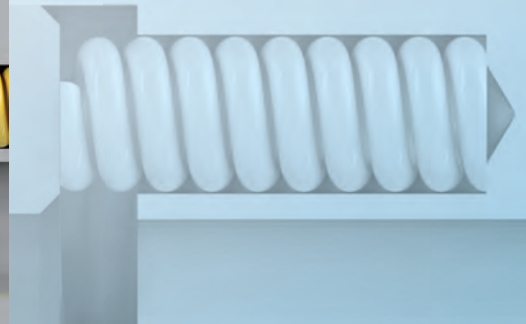
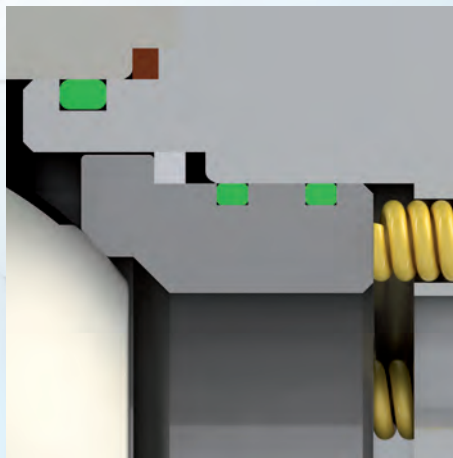
Valves designed for abrasive service and for resistance to wearing and abrasive media. This specific execution is using the same basic components of a normal **TRUNNION MOUNTED** valve and only modify the ball and seat material which are coated by min 150 microns of Tungsten and Chrome. On request this valve can be supplied with higher coating thickness up to 400 Microns. The coating treatment is fully certified according to the highest standard requirements. Starline can guarantee a tightness class according to ISO 5208 RATE A on all sizes and pressure ratings even with GAS TEST.

Tungsten Carbide Coating

Excellent resistance to wearing - good resistance to thermal shock. Max temperature +350°C. Do not use in presence of medium/high corrosion and water solutions.

Chrome Carbide Coating

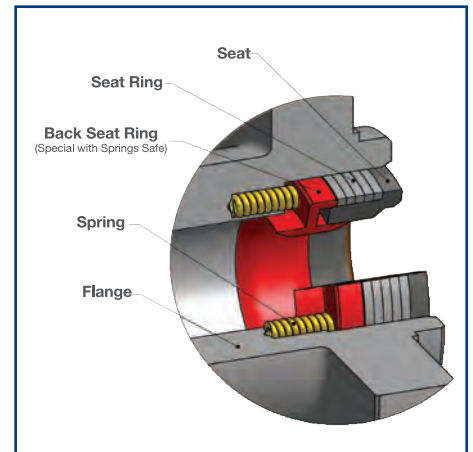
Excellent used for wearing, erosion and oxydation at high temperatures. Normally used on turbines. Max temperature +820°C.



Protected spring solution

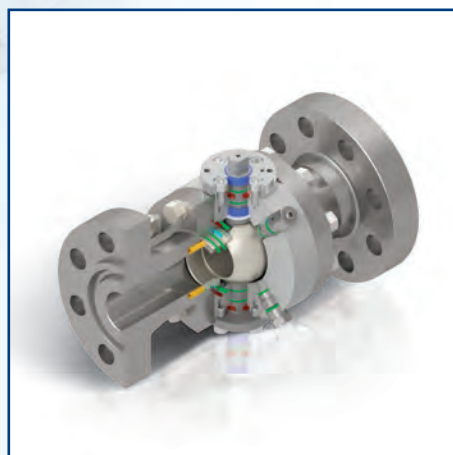
For specifically aggressive service, where there is a problem of polymerization or presence of solid components.

Starline has specifically created a solution with protected springs to guarantee full service of the springs throughout the valve life.



METAL SEATED HIGH TEMPERATURE

For operation in temperatures that do not allow the use of resilient material, Starline has developed a specific design for high temperature. Valve is specifically equipped with a stem extension for insulation and is available in many different specific materials to face even extreme temperatures. Starline can guarantee a tightness class according to ISO 5208 RATE A on all sizes and pressure ratings even with GAS TEST.

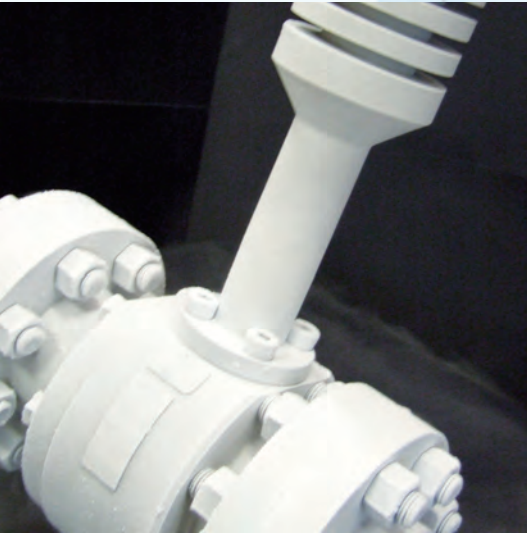
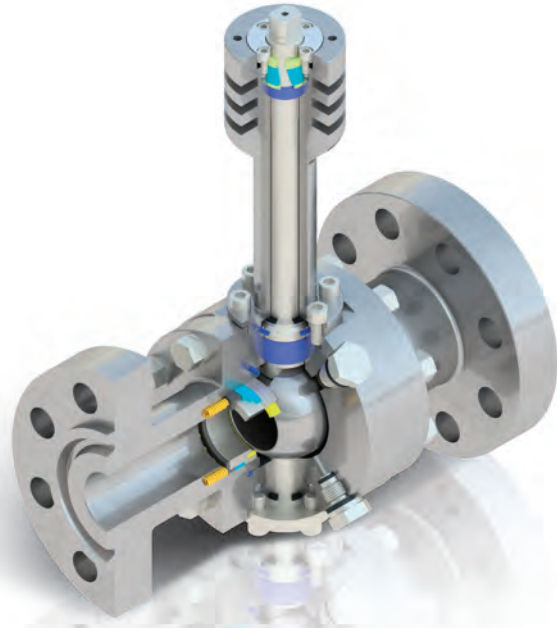


This specific valve design has been successfully used for steam applications – thermal oil and other typical high temperature services.

LOW TEMPERATURE CRYOGENIC VALVE

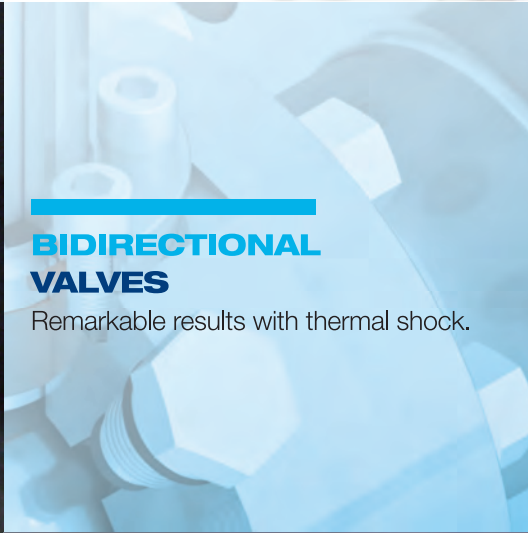
Fully designed to cover **BS6364** requirements for full tightness in medium and severe cryogenic service. This execution has been fully tested at -196° .

Extended stem length is adapted to the valve size according to **BS6364** – thermal fins isolate the stem tightness from the cold temperature.



BIDIRECTIONAL VALVES

Remarkable results with thermal shock.

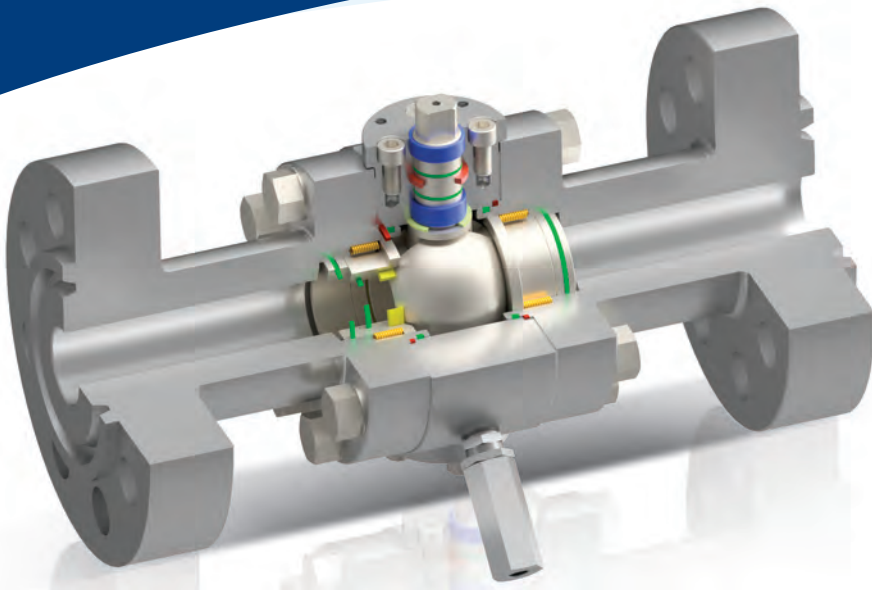


LIP SEAL CONSTRUCTION

Lip seal design guarantees a full capability to cover any possible service requirement with a good tightness and long life guarantee. Lip seal design made of **PTFE** sealing with **ELGILOY** springs.



Lip seal design is a good alternative where special O-rings are required to cover high percentages of amine or methanol, or where high or low temperatures are too stringent. Valves require a specific design with modified machining criteria to maintain a high quality performance at all levels. Available for temperatures from minus 100°C to plus 320°C .



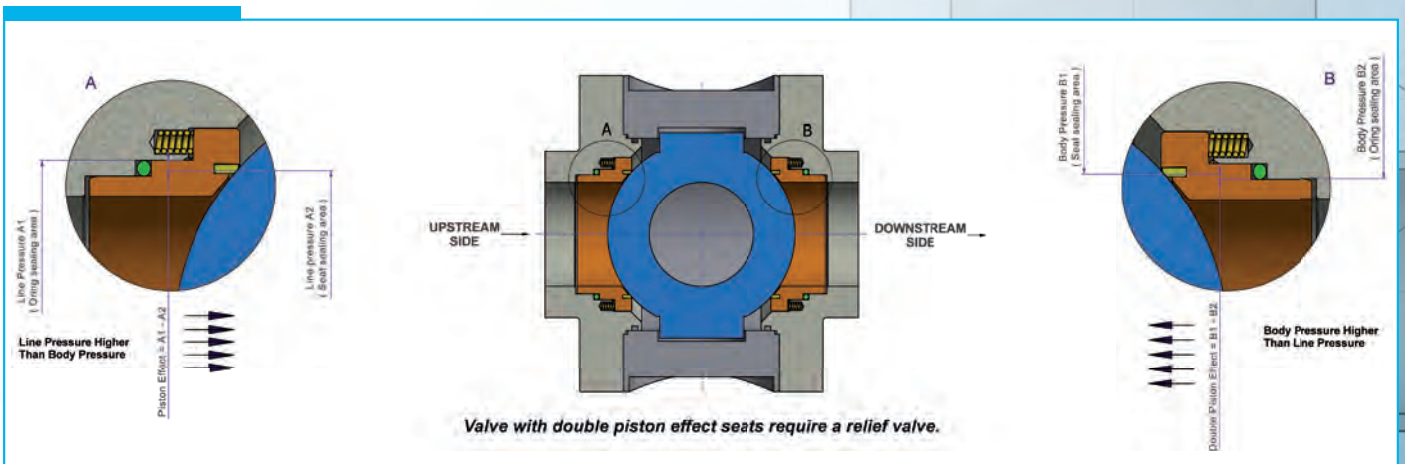
DOUBLE PISTON EFFECT

This valve is required only for special applications where the automatic body cavity relief of the trunnion mounted valves needs to be controlled, limited to upstream side or handled in every different way.

DPE seat design allows for both seats to seal with pressure acting from the same side of the valve. In the event of one seat becomes damaged, the used has the added advantage of the opposite seat sealing.

RELIEF DETAIL

Starline provide a personalized relief valve - designed and manufactured directly - fully tested for high cycle performance.



ACCESSORIES AVAILABLE

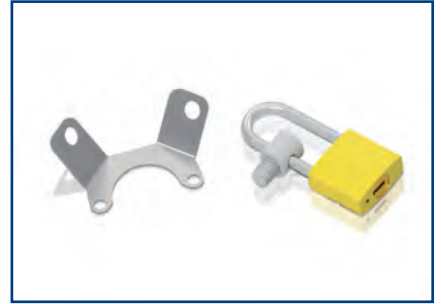
BLEEDER

Anti-blowout bleed plug with 2 orings as standard execution.



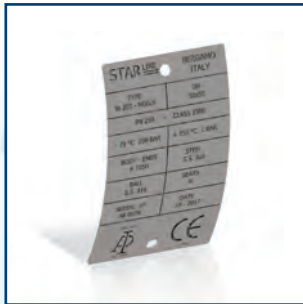
LOCKING DEVICE

Two different execution of locking device are available for these valves.



NAME PLATE

Starline provide a fully 316 stainless steel name plate as standard clear legible characters – fully in accordance with API 6D and ISO 14313

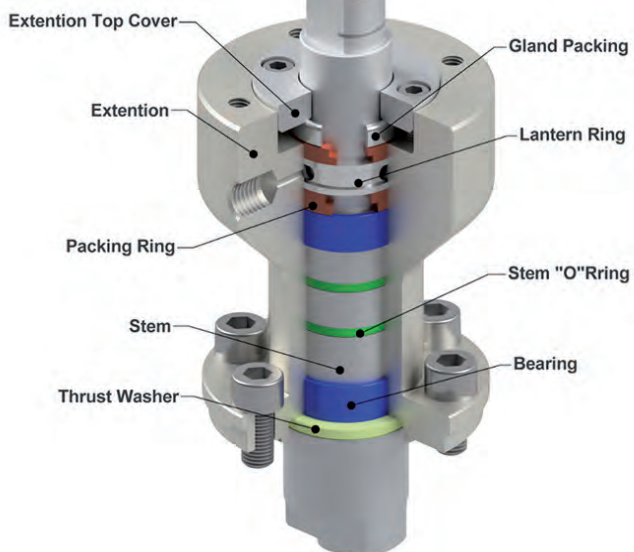


STEM/SEAT SEALING INJECTION

Typical execution of stem and seat grease injection for valves 2" and above.

T - HANDLE

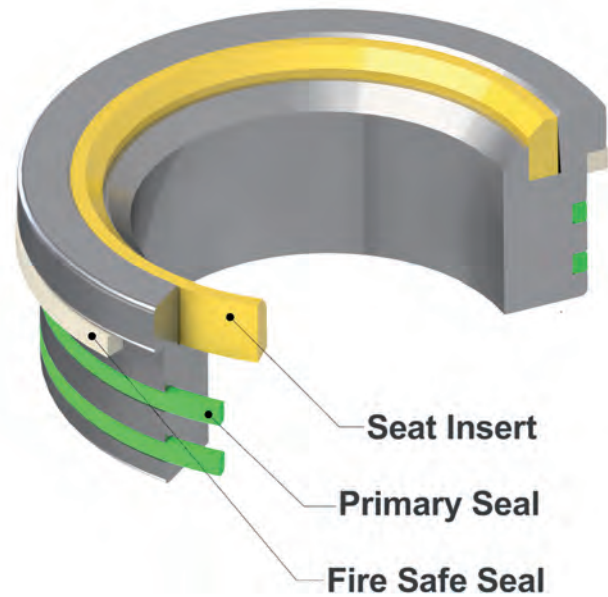
For thermal insulation.



EXTENDED STEM WITH LANTERN RING

For fugitive emission requirement, typical extended stem with leak detection.

AVAILABLE SEATS AND SEALINGS



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

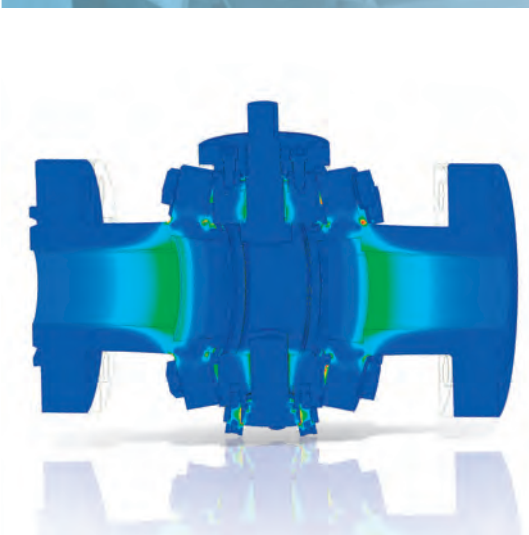
Values indicated are the original values given by the manufacturers. Additional limitation to these values shall be considered based on the size of valve, seat construction and valve operating pressure.



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.



CONTINUOUS RESEARCH AND DEVELOPMENT

Have you got a problem on a specific service application? Get in touch with us and we will certainly find a proper solution!

Starline uses the FEA for designing its trunnion mounted ball valves. Finite Element Analysis (FEA) is a very important step of the development phase and ensures the best possible performance requirements. Valves operational problems, pressure/temperature related deformations and flow related forces within a valve can be evaluated.

OPTIONS AVAILABLE

Trunnion mounted ball valves are also available in SBB/DBB, COMPACT and SUBSEA construction.

STANDARDS AND CERTIFICATIONS

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



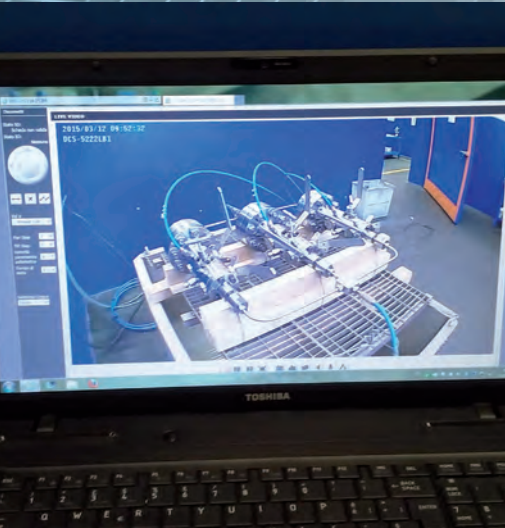
NDE AND TESTING FACILITIES

- **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
- **LT** Leak 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







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