STARLINE
forged steel ball valves

FLOATING BALL VALVES
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**

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.

**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
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**.

### 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.

### SCREWED CONSTRUCTION

Specifically for the **GAS MARKET**. Available also with spot welded or seal welded ends.
SIZES AND PRESSURE RATINGS

PRESSURE RATING RANGE

<table>
<thead>
<tr>
<th>FB</th>
<th>DN (mm)</th>
<th>½&quot;</th>
<th>¾&quot;</th>
<th>1&quot;</th>
<th>1¼&quot;</th>
<th>1½&quot;</th>
<th>2&quot;</th>
<th>2½&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15</td>
<td>15</td>
<td></td>
<td>¾&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 20</td>
<td>20</td>
<td>⅜&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25</td>
<td>25</td>
<td>⅝&quot;</td>
<td>1¼&quot;</td>
<td>1½&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 32</td>
<td>32</td>
<td>⅞&quot;</td>
<td>1¾&quot;</td>
<td>2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40</td>
<td>40</td>
<td>1&quot;</td>
<td>2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50</td>
<td>50</td>
<td>1½&quot;</td>
<td>2½&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 65</td>
<td>65</td>
<td>2&quot;</td>
<td>3&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80</td>
<td>80</td>
<td>2½&quot;</td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DN 100</td>
<td>100</td>
<td>3&quot;</td>
<td>5&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 150</td>
<td>150</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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
ISO 228/1
ISO 7/1
NPT/F or NPT/M
BSPP/F or BSPP/M
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.

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.
### SEAT INSERT MATERIAL

<table>
<thead>
<tr>
<th>STARLINE CODE</th>
<th>SEAT INSERT MATERIALS</th>
<th>°C</th>
<th>°F</th>
<th>APPLICATION</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>REINFORCED PTFE 20% Carbon + 5% Graphite</td>
<td>-196 to +260</td>
<td>-321 to +488</td>
<td>Natural Gas, Steam Service, Diatomic Oil, Hydrocarbons, H2S, Medium Pressure, Low / High Temperature</td>
<td>Higher Temp. and Pressure than Virgin PTFE. Good for Steam Service</td>
</tr>
<tr>
<td>T</td>
<td>VIRGIN PTFE</td>
<td>-196 to +220</td>
<td>-321 to +428</td>
<td>Hydrocarbons, H2S, All Chemicals, Natural Gas, low pressure</td>
<td>All services subject to temperature limitation</td>
</tr>
<tr>
<td>N</td>
<td>DEVLON – V POLYAMIDE – NYLON</td>
<td>-50 to +155</td>
<td>-58 to +311</td>
<td>Hydrocarbons, H2S, Natural Gas, High pressures</td>
<td>Good for high pressure applications not good for water</td>
</tr>
<tr>
<td>K</td>
<td>KEVL, PCTFE</td>
<td>-196 to +150</td>
<td>-319 to +302</td>
<td>High pressure, Low temperature</td>
<td>Like Virgin PTFE but improve resistance to nitric acid, hydrofluoric acid and liquid oxygen</td>
</tr>
<tr>
<td>P</td>
<td>PEEL PEYTER KETONE REINFORCED PEEL PEYTER KETONE</td>
<td>-196 to +220</td>
<td>-321 to +428</td>
<td>Hydrocarbons, H2S, Recall Service</td>
<td>High pressure, High temperature</td>
</tr>
<tr>
<td>X</td>
<td>VESEPOL SP 21 POLYIMIDE</td>
<td>-196 to +350</td>
<td>-321 to +662</td>
<td>Food and Tobacco industries Nuclear service</td>
<td>Medium pressure, Low temp. – High temp</td>
</tr>
<tr>
<td>E</td>
<td>UHMWPE POLYETHYLENE</td>
<td>-196 to +95</td>
<td>-321 to +203</td>
<td>Good Chemical Resistance Nuclear Service</td>
<td>Good Chemical Resistance Nuclear Service</td>
</tr>
<tr>
<td>Y</td>
<td>PFA</td>
<td>-196 to +260</td>
<td>-321 to +500</td>
<td>Lower Porosity – Particularly Good to Avoid Polymerisation</td>
<td>Medium pressure</td>
</tr>
</tbody>
</table>

### SEAL MATERIAL

<table>
<thead>
<tr>
<th>STARLINE CODE</th>
<th>SEAL MATERIALS</th>
<th>°C</th>
<th>°F</th>
<th>APPLICATION</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Nitrile</td>
<td>-25 to +120</td>
<td>-13 to +248</td>
<td>Water Service</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Hydrogenated Nitrile (AED)</td>
<td>-35 to +160</td>
<td>-31 to +303</td>
<td>High Pressure Water</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Modified Hydrogenated Nitrile (AED)</td>
<td>-50 to +160</td>
<td>-67 to +303</td>
<td>Sweet gas mixture, Hydrogen Sulphide up to 10%, Amine Corrosion Inhibitors up to 5%, Methanol</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Fluoroelastomers (Viton B)</td>
<td>-20 to +220</td>
<td>-4 to +428</td>
<td>Standard Viton used on lower pressures</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Fluoroelastomers (Viton GLT + AED)</td>
<td>-61 to +225</td>
<td>-78 to +437</td>
<td>Lower temperatures than standard Viton</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Perfluoroelastomers (Chemraz)</td>
<td>-25 to +250</td>
<td>-13 to +482</td>
<td>Good chemical resistance, High temperature, H2S, Xylene, Toluene contents</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Perfluoroelastomers (kalrez)</td>
<td>-20 to +327</td>
<td>-4 to +621</td>
<td>Good extrusion and chemical resistance. Excellent resistance to Sour oil and Amine.</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Atlas (AED)</td>
<td>-20 to +200</td>
<td>-4 to +392</td>
<td>Sour gas mixtures and amine based corrosion inhibitors, Good for hot water and steam.</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Silicon</td>
<td>-60 to +200</td>
<td>-76 to +392</td>
<td>Low temperature applications</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Silicon + PFA</td>
<td>-60 to +260</td>
<td>-76 to +503</td>
<td>Low temperature applications / Good Chemical Resistance</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>EPDM</td>
<td>-40 to +160</td>
<td>-40 to +320</td>
<td>Chemical applications</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Expanded Graphite</td>
<td>-240 to +680</td>
<td>-420 to +1256</td>
<td>Used on Metal Seated High Temperature valves</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>TFM + Eligiloy</td>
<td>-196 to +280</td>
<td>-321 to +536</td>
<td>Good for Chemical Resistance and Low Temperatures</td>
<td></td>
</tr>
</tbody>
</table>
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.

**SIL3 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**

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STARLINE

forged steel ball valves
**MULTIPOWER VALVES**

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

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**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 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 - ½” 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 ½” class 150 and DN32 - 1 ¼” 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&tube 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.
Standard tests carried out:
- Visual and dimensional check
- High pressure hydrostatic shell and seat test
- Low pressure air seat test
- Torque test

Additional valve test available:
- High pressure gas test (shell and seat)
- Antistatic test
- Seat relief 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.