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.
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**

**SALES ORGANIZATION**

Starline is organized with different offices and distribution points worldwide.

**REFERENCES**
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 - BS 6755/API607
- ASME B16.5 - ISO 15848
- ASME B16.10 - ISO 5208
- ASME B16.25 - MS-SP-25
- API 598 - 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

<table>
<thead>
<tr>
<th>FB</th>
<th>RB</th>
<th>150</th>
<th>300</th>
<th>600</th>
<th>900</th>
<th>1500</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 15</td>
<td>½”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 20</td>
<td>¾”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25</td>
<td>1”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 32</td>
<td>1 ½”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40</td>
<td>1 ½”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50</td>
<td>2”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 65</td>
<td>2 ½”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80</td>
<td>3”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 100</td>
<td>4”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6”</td>
<td></td>
</tr>
<tr>
<td>DN 150</td>
<td>6”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8”</td>
<td></td>
</tr>
</tbody>
</table>

- **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 expresses 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).
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.

**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**
- **LOCK DEVICE**
- **VAPOUR SPACE LEAK DETECTOR**
- **OVAL HANDLE** available up to 1” full bore
- **EXTENDED BONNET**

**ATEX CERTIFIED VALVES**

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

SEAT MATERIALS

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>TEMPERATURE RANGE °C</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S PAULON</td>
<td>-200 to +250</td>
<td>Low/High pressure, Low/High temperature</td>
</tr>
<tr>
<td>T PTFE</td>
<td>-200 to +250</td>
<td>Medium pressure, Low/High pressure</td>
</tr>
<tr>
<td>B TRIVALENT</td>
<td>-250 to +250</td>
<td>Low pressure, Low temperature</td>
</tr>
<tr>
<td>D DELRIN</td>
<td>-25 to +250</td>
<td>Low temperature, High temperature</td>
</tr>
<tr>
<td>E VITON</td>
<td>-20 to +120</td>
<td>Continuous use, Low temperature, High temperature</td>
</tr>
<tr>
<td>F TFE</td>
<td>-25 to +250</td>
<td>Continuous use, Low temperature, High temperature</td>
</tr>
<tr>
<td>G GRAPHITE</td>
<td>-130 to +250</td>
<td>Continuous use, Low temperature, High temperature</td>
</tr>
<tr>
<td>H METAL SEAT</td>
<td>-200 to +500</td>
<td>High pressure, Medium/Low temperature</td>
</tr>
</tbody>
</table>

SEAL MATERIALS

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>TEMPERATURE RANGE °C</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S SPIRO</td>
<td>-200 to +250</td>
<td>Low/High pressure, Low/High temperature</td>
</tr>
<tr>
<td>T VITON</td>
<td>-200 to +250</td>
<td>Medium pressure, Low/High pressure</td>
</tr>
<tr>
<td>B TFE</td>
<td>-250 to +250</td>
<td>Low pressure, Low temperature</td>
</tr>
<tr>
<td>D VITON</td>
<td>-250 to +250</td>
<td>Low pressure, Low temperature</td>
</tr>
<tr>
<td>E GRAPHITE</td>
<td>-130 to +250</td>
<td>Continuous use, Low temperature, High temperature</td>
</tr>
<tr>
<td>H STAINLESS</td>
<td>-200 to +250</td>
<td>Continuous use, Low temperature, High temperature</td>
</tr>
</tbody>
</table>

FIRE SAFE SEAL

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>TEMPERATURE RANGE °C</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G GRAPHITE</td>
<td>-200 to +400</td>
<td>Av. excluding clean services</td>
</tr>
</tbody>
</table>

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
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.
MULTIPORT VALVES

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

**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

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

**METAL SEATED BALL VALVES**

**HIGH TEMPERATURE**

<table>
<thead>
<tr>
<th>Size range:</th>
<th>from DN15 - ½” to DN50 - 2” - full bore and reduced bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure class:</td>
<td>ASME class 150 to 600 – DIN PN 16 to 100</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>up to 600°C</td>
</tr>
<tr>
<td>Operation:</td>
<td>lever operated up to DN40 - 1 ½” class 150 and DN32 - 1 ¼” class 300 and above – bigger sizes are gear operated</td>
</tr>
</tbody>
</table>

**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.
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**

<table>
<thead>
<tr>
<th>Process Media</th>
<th>Liquid, clean particle free</th>
<th>10%</th>
<th>Ambient -29°C - 38°C</th>
<th>10%</th>
<th>one per day to one per week</th>
<th>10%</th>
<th>gear</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid, dirty, rusty, raw water</td>
<td>60%</td>
<td></td>
<td>Low -29°C - 90°C</td>
<td>30%</td>
<td>one per week to one per month</td>
<td>20%</td>
<td>actuator</td>
<td>30%</td>
</tr>
<tr>
<td>Liquid, black liquor, lime slurry</td>
<td>80%</td>
<td></td>
<td>Cryogenic -90°C - 196°C</td>
<td>90%</td>
<td>ever one per month</td>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid, oil, lubricating</td>
<td>10%</td>
<td></td>
<td>Medium -38°C - 220°C</td>
<td>30%</td>
<td>Emergency shut down</td>
<td>70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid, viscous, molasses</td>
<td>30%</td>
<td></td>
<td>High +230°C - +760°C</td>
<td>90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas, clean &amp; wet, saturated steam</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas, dry, steam, natural gas</td>
<td>80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slurry service</td>
<td>90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen, chlorine, hydrogen, helium</td>
<td>80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**QUALITY STANDARDS**

All valves respond to the following technical requirements:

- ISO 9001:2008
- API 6D ISO 14313
- SHELL 77/100 - 77/130 - 77/300
- ISO 5211
- NACE MR0175 – NACE MR0103
- ASME B16.5 – ASME B16.10
- ASME B16.25 – ASME B16.34
- SIL 3
- FIRESAFE API607 – API 6FA – ISO10497
- TA-LUFT
- PED MOD H CAT.3
- FIRESAFE API607 – API 6FA – ISO10497
- AD 2000 - MERKBLATT
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