Liquefied Natural Gas

Valves, Actuators & Special Solutions
Habonim is a leading manufacturer of ball valves & pneumatic actuators. With over 50 years experience, the company enjoys a worldwide reputation for its high quality, innovation and engineering expertise.

Habonim supplies a wide range of 3-piece and flanged ball valves, as well as tailor-made solutions, generating significant cost & space savings for its customers. All Habonim products meet international standards and are engineered to work safely and efficiently in a variety of applications.

LNG PROCESSING

- Raw gas feed
- Gas treatment
- Liquefaction
- Storage

Condensate
LPG/Ethane
LNG (Liquefied Natural Gas) production involves handling rough, unrefined materials in harsh conditions while adhering to strict safety and quality requirements. From coping with contaminants and high pressure during extraction of the raw gas from deep beneath the earth’s surface, to converting gas at extreme temperatures, Habonim valves provide high quality, durable and reliable solutions to the challenges inherent in LNG processing.

- **Extraction** - Habonim Metal to Metal (MTM) valves can withstand the high pressure extraction phase and remain unaffected by the abrasive content of the raw material, even at high process pressures.

- **Processing** - Habonim MTM valves are specially designed to handle the cleaning of the raw material and the filtering of unwanted gases and compounds prior to liquefaction.

- **Liquefaction** - Habonim Cryogenic valves are designed to endure the cooling and condensing process involved in turning natural gas into liquid form and most importantly, to ensure that the consistency and combustion characteristics of the material are not jeopardized.

- **Storage and Transport** - Habonim Cryogenic valves are used when transferring LNG from storage containers at Liquefaction plants to tankers for transport by sea or land, ensuring that the LNG maintains the desired cryogenic temperature of approximately -196°C (-320.8°F).

- **Regasification** - At the LNG import Terminal, Habonim Cryogenic valves are used to transfer LNG to special storage tanks, prior to regasification. Habonim’s fire-safe valves are critical during the regasification phase when the LNG is heated to convert it into the desired gaseous form for commercial distribution.
### Metal Seated Valves (MTM)

Habonim’s metal seated ball valves are designed to withstand extreme temperatures, high pressure, and abrasive media. The superior engineered design and rigid construction make Habonim MTM valves suitable for the industry’s toughest applications.

**Size Range:** 1/4”-8” (DN8-DN200)  
**Construction:** Uni-directional, Full-port  
**Series in Range:** 27 (High-pressure), 47 (3-piece), 73 / 74 (Full bore ANSI flange)  
**Press Range:** 77 / 78 (Full bore DIN flange)  
**Typical Service:** Super heated steam, hot gas, coal ash, high viscous media, molten metals  
**Pressure Range:** Vacuum 10-6 Torr to 414 bar (6000 psi)  
**Temperature Range:** -196°C to +650°C (-320°F to 1200°F)  
**Materials:** Carbon steel, Stainless Steel, Super Duplex  
**End connections:** Flanged, threaded, welded, extended welded  
**Standards:**  
ISO 10497 & API 607-5 or API 607 5th ed. Fire type-testing requirements  
ANSI/ASME B16.34 - 2004 - Valves Flanged, Threaded and Welding End  
BS EN ISO 17292 - Anti-static - Metal ball valves for the petroleum, petrochemical and allied industries  
API spec 6D - Specification for Pipeline Valves  
ISO 14313 - Petroleum and natural gas industries - Pipeline transportation systems - Pipeline valves  
**Operation:** Lever or gear operated, pneumatic or electrically actuated

### High Pressure - H27 Series

Habonim’s line of high pressure ball valves in ANSI classes up to 2500 are uniquely suited to demanding high pressure environments such as offshore, petrochemical and oil refining applications. The H27 series’ unique ball and seat configuration and long-life valve construction delivers reliable performance with a smooth two-way flow, a working pressure of up to 6,000 psi, tight shutoff and instant adaptability to changing pressures and temperature variations.

**Size Range:** ½” - 8” (DN15 - DN200)  
**Construction:**  
½” - 2½” (DN15-DN65) up to class 2500, PN(414 bar 6000 psi)  
3”-8” (DN85-DN200) up to class 1500, PN(255 bar 3700 psi)  
**End Connections:** Screwed, Socket weld, Butt weld, Flanged (ANSI, ISO, SAE, DIN)  
**Design:** ASME/ANSI B16.34  
**Application:** Offshore drilling, Oil & Gas production, Chemical, Petrochemical, Refining, Energy  
**Service:** Liquids & Gases  
**Materials:** Stainless Steel, Carbon Steel and Nickel Alloys  
**Certification:**  
Fire safe to API 607, ISO 10497  
PED 97/23/EC Module H  
Lloyds Type approved to ISO 17292 & API 6D DNV Certified 2.9 No. 5-794.4  
**Operation:** Hand or Gear operated, Pneumatic or Electric Actuated.
Cryogenic Valves

Operating in challenging environments at extremely low temperatures, Habonim Cryogenic valves consistently meet the requirements of industrial LNG processing. Active in the LNG liquefaction, storage and distribution phases, Habonim cryogenic valves ensure that the properties of the gas are maintained and that the process is carried out safely and effectively.

Specific design features that set the Habonim Cryogenic valve series apart include:

- **Proven Tongue and Groove Body Design** - A distinctive labyrinth design that ensures zero leakage to the atmosphere, accurate alignment of the body and ends, and the full compression of the expanded graphite body seal.

- **Pioneering Zero Leakage Stem Packing** - The unique geometry of Habonim’s patented HermetiX™ stem packing provides zero leakage and a maintenance-free product life. Its flexible X shape allows a dynamic sealing arrangement in case of stem side load occurrence. All stem links have a four year warranty.

- **Safest Valve in the Market** - Habonim Cryogenic valves are fire-safe, anti-static, and possess short bolts to avoid leaks between the bolts and the body. Cryogenic valves also have a relief hole in the valve ball on the upstream side, preventing pressure build up due to thermal expansion.

- **100% Compliance** - All Habonim Cryogenic valves comply to the BS6364 and EN1626 standards and EN12567 are produced under special conditions to ensure tight machining tolerances, a high quality surface finish and meticulous material selection.

<table>
<thead>
<tr>
<th>Size Range:</th>
<th>1/4”-6” (DN6-DN150)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application:</td>
<td>Air separation plants, LNG storage and distribution, LNG transportation, liquid and gaseous Oxygen for steel production</td>
</tr>
<tr>
<td>Service:</td>
<td>Helium, Hydrogen, Nitrogen, Argon, Oxygen, Methane, Carbon Dioxide, LNG</td>
</tr>
<tr>
<td>Pressure Range:</td>
<td>Vacuum 10-6 Torr to 100 Barg 1450 Psi</td>
</tr>
<tr>
<td>Temperature Range:</td>
<td>-452°F to +392°F (-269°C to +200°C)</td>
</tr>
<tr>
<td>Materials:</td>
<td>Austenitic stainless steel 316/316L</td>
</tr>
<tr>
<td>End Connections:</td>
<td>Flanged, Screwed, Butt weld, Extended Butt weld.</td>
</tr>
<tr>
<td>Standards:</td>
<td>BS 6364 &amp; BS EN1626 - valves for cryogenic service, API 607 5th edition &amp; ISO 10497 - Testing of valves - Fire type-testing requirements, EN 12567 Isolating Valves for LNG (optional), BS EN 1473 Installation and equipment for Liquefied natural gas (design for onshore installation)</td>
</tr>
<tr>
<td>Operation:</td>
<td>Lever or gear operated, pneumatic or electrically actuated (above 4”)</td>
</tr>
</tbody>
</table>
**Quick Shut-off Pneumatic Actuator - Compact II**

The patented 4-piston quarter turn actuator delivers twice the torque in a smaller housing. The fastest cycling, most reliable pneumatic actuator with the highest cycle life performance in the market today. The Compact actuator has emergency shutdown applications and comes with a 7-year warranty due to its high performances and superb reliability.

**3-piece ball valve**

Habonim’s 3-piece ball valve series is suitable for applications requiring high flow capacity and tight shutoff - where reliability, functionality and flexibility are essential for product quality. The valves meet the toughest industry requirements and international standards.

**Full Flanged Reduced Bore**

Habonim’s 1-piece ball valves in ANSI classes 150 and 300 offer tight shutoff, long service life, high durability and exceptional performance in many service applications under the most severe working conditions.

**Full Flanged Full Bore**

Habonim’s line of flanged full bore ball valves in ANSI classes 150 and 300 are ideal for conditions that require minimum pressure drop and reduced risk of clogging with solids or slurries. Flanged full bore valves offer tight shutoff, long service life, high durability and exceptional performance in many service applications and under the most severe working conditions.
Special Solutions

Custom Made Valves

Habonim provides custom valve assemblies for unique one-off applications or whole system solutions. Precision engineered to exacting tolerances, Habonim custom valves, manifolds and special solutions meet the highest demands of high pressure, corrosive and high temperature applications within a wide range of sizes and materials.

Cryogenic Double Block

Habonim’s Cryogenic Double Block & Bleed was developed to enable safer handling of Cryogenic high pressure liquids in applications requiring boiler, gas turbine, LNG and CNG feed. This product is suitable for Cryogenic service and isolation.

Revolutionizing Skid

Mounted Valve Systems: Habonim’s Multi-Valve Ensemble (MVE) is an innovative alternative to large, heavy skid-mounted valve assemblies that consume space and are loaded down with complex piping that make them vulnerable to leakage. The MVE eliminates up to 90% of the piping of conventional skids, and weighs 30% less.

Critical High Cycle Operations

Specialized valve assemblies that help operate and meet the rigorous demands of Pulsed Columns - a type of liquid-extraction equipment used mainly in mining and mineral processing. Features high-cycle (min. 2 seconds) operation over a wide range of pressures and temperatures, low cost maintenance and no shutdowns for crude cleaning.

Space-Saving Flexible Design

The small modular manifold uses multiple valves to enable precision distribution of process fluid or gas to multiple points. A flexible, space-saving configuration that can either be expanded or reduced to suit changing flow demands.
Solutions at Work

Habonim cryogenic valves at Coca-Cola
A Habonim cryogenic valve was installed in a gas phase separator designed for a cryogenic pipeline (Nexans, Germany) that feeds liquid nitrogen into bottling lines at a new Coca-Cola plant in the Moscow region. The gas separator unit includes a Habonim 47C series cryogenic ball valve. The valve is used to discharge the gas from the top of the cryogenic tank separator. A Habonim CompAct II actuator is operated when the nitrogen gas pressure is coming from the upper part of the separator. In the absence of pressure in the system, (piping and separator), the ball valve is closed, thus prohibiting moisture from the surrounding atmosphere from entering the system. When pressure is increased, the valve opens and the gas is released.

Habonim cryogenic control valves chosen for Cryonorm’s LOX application
Habonim was selected as the preferred vendor of cryogenic control valves for a LOX, (liquid oxygen), service facility designed by Cryonorm Projects bv for Messer, at a large steel plant in Bosnia.

The valves are equipped with a unique segmented ball which controls the flow of liquid oxygen to an evaporator at high differential pressure. At this critical phase of the process, a valve malfunction could freeze the evaporator and block the flow of oxygen gas necessary for the continuous operation of the furnace.

This project is one more important milestone on the road of continuing successes for the Habonim cryogenic line at air separation plants – GAN, GOX, LIN, LOX and LAR.

Leading LNG safety
Working with REPSOL Spain, an internationally recognized leader in LNG production, Habonim developed a special double block and bleed (DBB) cryogenic valve to improve the company’s safety practices when transferring gases in liquid form at very low temperatures in the most severe applications.

Part of Habonim’s ‘Dual Safe’ series, the DBB cryogenic valve is employed at key stages of LNG processing with a focus on safety and efficiency. The DBB technology ensures that upon completion of specific processes, there is no pressure remaining in the body between the valves. The DBB valve contains a bleeding port to release pressure buildup in the body and a special indicator to show if there is any remaining pressure once a process is complete.

Habonim’s DBB solution also features a single body construction, thereby reducing the number of body seals, and the potential for leakage, while at the same time saving space, and providing maximum safety at the most critical stages of LNG processing. Habonim’s DBB cryogenic valve can be operated manually or actuated.

Innovation for efficient LNG operations
In cooperation with Enric, a leading producer of LNG storage, transport, and processing equipment, Habonim developed a solution that addresses the company’s operational efficiency. Instead of the four units in their previous LNG transportation equipment, Habonim developed the Enric Valve Commutator which effectively condensed the old system into one unit. The result was operational improvements in a number of key areas:

- Eliminated 95% of required piping
- Reduced costs – lower equipment costs and simplified maintenance
- Reduced space – system consolidated into one unit
- Improved safety – less piping and sealing rings minimize the leakage path
- Flexible ‘plug and play’ system – allows for quick and easy expansion
- Reduced energy usage

Certificates & Approvals
PED 97/23EC, API, 607/856755 ISO 10479, ISO 15156-1/2/3, NACE MR-0175, BS 6364, EN12567, SIL 2-3 level optional, ISO 9001-2000, BS EN 10204