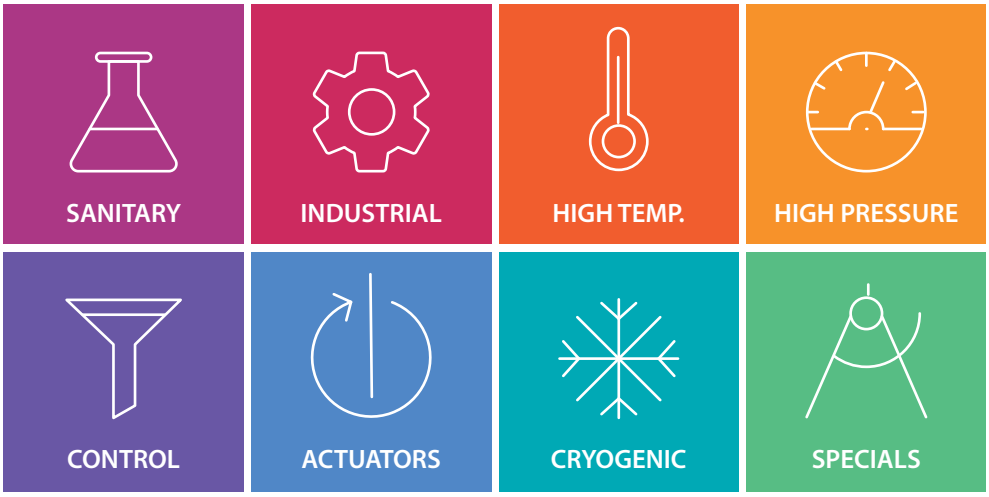
HABONIM
Industrial Valves & Actuators

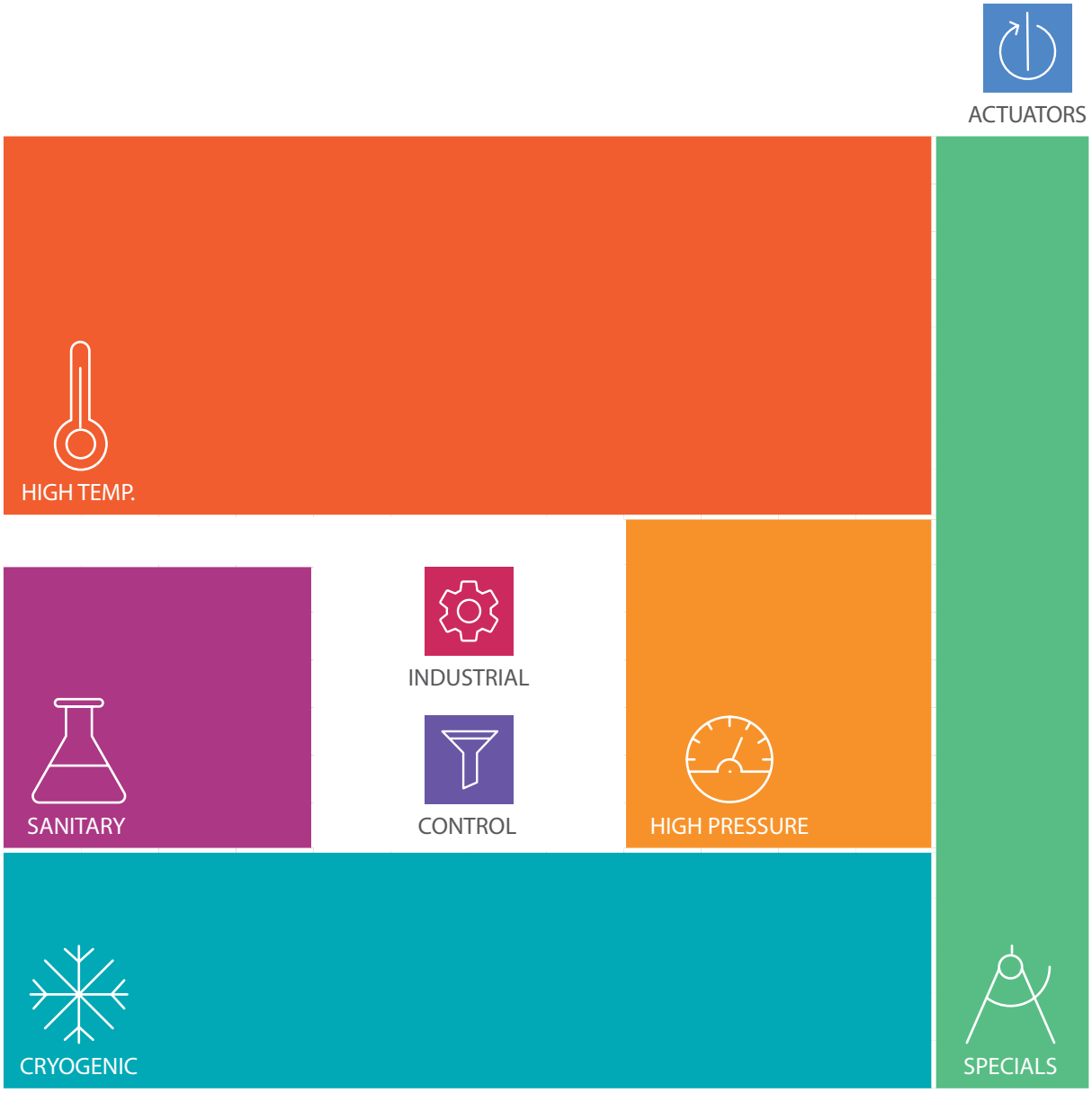


PRODUCT LINE

PERFORMING IN DEMANDING APPLICATIONS

PRODUCT FAMILIES

Temperature	
°C	°F
650	1200
600	1100
550	1000
500	900
450	800
400	750
350	650
300	550
250	480
200	390
150	300
100	200
50	120
0	32
-50	-58
-100	-148
-150	-230
-200	-300
-250	-400
-269	-450



ANSI Class			150		300	600	900	1500		2500		6000	
Pressure Bar	-1	0	16	20	40	50	100	150	200	250	350	420	700	1000
Pressure Psi	-14	0	230	290	580	750	1500	2250	3000	3750	5000	6000	10000	15000

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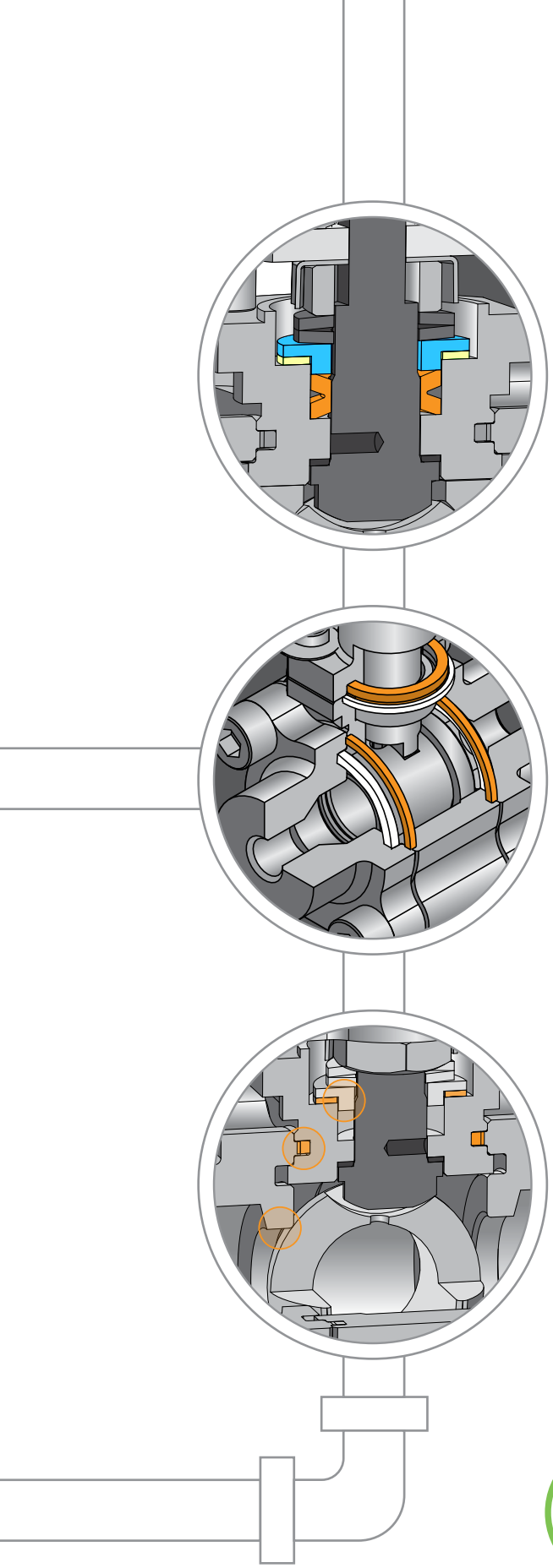
TOTAL HERMETIX

A HIGHER INTEGRITY LEVEL

100%
Materials & processing traceability

☆☆☆☆☆
Quality system approved for API 6D, PED/TPED, SIL, ISO 9001

100%
Tested



As a standard, most of HABONIM valves are equipped with the Total HermetiX integrity package comprised of three main elements and a superior inline sealing mechanisms in some of them:

Zero fugitive-emission no maintenance steam sealing

- Patented HermetiX™ steam sealing design with zero fugitive emission sealing capability.
- Tested or certified according to ISO 15848-1 and API641 standards.
- Up to 500,000 cycles of operation with no maintenance guaranteed.
- Field proven for millions of cycles continuous operation.

Double body sealing

- Body-to-ends & body-to-bonnet double sealing for superior atmospheric sealing.
- Selection of sealing materials for diverse applications.
- Fugitive emission prevention.

Fire safe

- Tested and certified according to API 607 K ISO 10497.
- Type-tested and certified by leading certification bodies for marine service.
- Clean fire-safe construction guarantees no graphite contamination of the media flow.

Superior In-line sealing

A variety of implemented mechanism provides extended in-line sealing capabilities such as:

- bidirectional sealing
- High pressure full Δp sealing
- High & low pressure sealing
- others

TOTAL HERMETIX™

CRYOGENIC VALVES

With our legacy wide range field-proven ball valve and control packages products line we have been successfully performing in the industry most demanding and evolving cryogenic applications over the last three decades.

From the most recent Small-Scale LNG systems to the traditional liquefied industrial gases supply, air separation plants, LNG storage, distribution and transportation, aerospace, petrochemical and medical applications, our products offer added values on safety, fugitive emission prevention, reliability, minimal & ease maintenance, space & weight savings and compatibility to regulations and special needs of end-users, governing bodies, OEM's, designers and system builders.

Features

Special mechanical design and construction

- Solid one-piece high torque durable stem.
- Tight stem-to-ball directional engagement, ensures relief hole alignment.
- Strict materials and manufacturing tolerances control.

Efficient heat transfer

- Narrow space between extension ID and stem OD allows the stem seal to remain at ambient temperature.

No trapped cavity

- Relief hole on the upstream sphere of the ball to prevent pressure buildup in the cavity.
- Single-side or self-pressure-relief sealing for bidirectional full pressure service.

Flexible bonnet installation angle

- Up to 45° from vertical for 12" bonnet (per BS6364 guidelines),
- Up to 15° from vertical 6" bonnet (not BS6364 compliant).

Flow direction indicators (for valves with preferred flow direction)

- Highly visible arrows on body and bonnet top.
- "T" mark on the stem, showing relief hole direction.

Double isolation / double block and bleed designs available upon request

Clean assembly and packing

Total HermetiX™ | Standard Port | Full Port | Tube Size

Temperature: Cryogenic Down to -269°C (-452°F)

Ball Valve Style	Design		Series						
Trunnion	Top Entry		C52						Special
	3 Piece		C91	C92	C93	C94	C95	C96	
	2 Piece		C81	C82	C83				
Floating	3 Piece		C47						
			C26			C28W			
	Diverter		DC47						
	2 Piece		C31	C32					
			C73	C74					
			C77	C78					
	Multiport		C61						
			C62						

ANSI Class	150	300	600	900	1500	2500	6000
Pressure Bar	-1 / 0 / 16 / 20	40 / 50	100	150	200 / 250	350 / 420	700 / 1000
Pressure Psi	-14 / 0 / 230 / 290	580 / 750	1500	2250	3000 / 3750	5800 / 6000	10000 / 15000

Certifications & Standards

Designed, tested and inspected according to BS 6364:1984 (amendment 3).

Type tested certified by leading certification bodies and other on request (for part of the series).

HIGH PRESSURE VALVES

Performing within high pressure systems is a significant part of our daily commitment over the last two decades. We design, manufacture and support our high-pressure ball valves and control packages that are specially built for safety, endurance and reliability to cover for gases and fluids control up to Class 2500 pressures rating and beyond.

Our customers trust allows us to offer a comprehensive standard catalogue product line alongside flexible tailor-made product offered to the most demanding applications.

Features

Materials

- Forged or rolled bars, sourced and stocked only from high quality mills.

High Δp (differential pressure)

- Up to 414bar (6,000psi) full Δp class 2500 depend on series and size.

Robust design

- Pressure containing parts are in compliance with ASME B16.34.
- A one-size-up stem made of high tensile material complies with ASME B16.34 and API 6D for drive train requirements provides sufficient safety factor during operation.
- A special hybrid seat design provides a higher metal seat stiffness and bubble tight shut-off (Rate A) combined with lower operating torque compared to equivalent similar valve solutions.

Pressure tested

- Designs are burst-proof tested for 4 times the maximal working pressure.

Designed and tested per EN 14432:2014

Type test certified by DNV-GL (for part of the series)

Total HermetiX™ | Standard Port | Full Port | Tube Size

Temperature: -60°C – 260°C (-76°F – 500°F)

Ball Valve Style	Design		Series		
Trunnion	3 Piece		95 ◎○	96 ◎○	Special
	DB/DBB		upon request		
Floating	3 Piece	⊗	28 ◎○		
	3 Piece	⊗	27 ◎○		
	2 Piece		24 ◎		
	DB/DBB		28 ◎○		
ANSI Class			1500	2500	6000
Pressure Bar			250	420	1000
Pressure Psi			3750	6000	15000

Durability and unique actuation capability combined within a tailor-made solution specially designed to meet strict space constrains, high speed and very high cycling requirements for marine high-pressure compressed air systems.

HIGH TEMP. VALVES

Metal To Metal (MTM)

Serving high-end applications with ball valves for High temperature, high pressure and abrasive medium is within Our unique expertise, developed over decades, serves high-end applications utilizing ball valves for high temperature, high pressure and abrasive mediums.

Meticulously engineered, constructed and tested, our metal seated ball valve is an important capability we are proud of. Careful metallurgical selection of all valve parts, using of special surface finishing and treatments, hard coatings, and thorough analyses of mechanical strength and thermal expansion ensure that our high temperature (Metal To Metal) valves are a proven choice for industry's toughest and most demanding applications.

We offer a very wide range of catalogue standard product for high temperature and abrasive medias using Metal To Metal sealing. In parallel, we offer a flexible tailor-made capability allowing us to offer even more comprehensive support for the O&G, chemical, petrochemical, energy and other industries.

Features

Materials:

- Stainless steel, alloys, carbon steel - selected to meet temperature and application. ASME B16.34 listed cast or forged material for the valve body and ends.
- Surface treatments & coatings - LTPN, HVOF Cr_3 C_2 (Chromium Carbide), HVOF WC-Co (Tungsten Carbide) and Stellite.

Robust design:

- Pressure containing parts are in compliance with ASME B16.34 (with modifications for some series).
- Leak rate to EN12266-1 Rate B (factory tested) is achieved by accurate grinding and lapping processes.
- Constant preloading of ball/seats set obtained by Inconel 718 Belleville spring.

Pressure tested:

- Designs are burst proof tested for 4 times the maximal working pressure.
- Designed and tested per testing & acceptance criteria ANSI/FCI 70-2.

Habonim's unique LTPN surface treatment improves mechanical wear properties of austenitic stainless steels without affecting their corrosion resistance.

Total HermetiX™ ◎ Standard Port ◎ Full Port ○ Tube Size

Temperature: -60°C - +650°C (-76 °F ÷ +200 °F)

Ball Valve Style	Design	Series													
Trunnion	3 Piece	Z91 ◎◎				Z92 ◎◎		Z93 ◎◎	Z94 ◎◎	Z95 ◎◎		Z96 ◎◎		Special	
	2 Piece	Z81 ◎				Z82 ◎		Z83 ◎							
	DB/DBB	upon request													
Floating	3 Piece	Z28/Z28T ◎◎													
	3 Piece	Z47/Z47T ◎◎													
	2 Piece	Z73/Z73T ◎				Z74/Z74T ◎									
	2 Piece	Z78/Z78T ◎													
	2 Piece	Z77/Z77T ◎													
	DB/DBB	upon request													

ANSI Class			150		300		600	900	1500		2500		6000	
Pressure Bar	-1	0	16	20	40	50	100	150	200	250	350	420	700	1000
Pressure Psi	-14	0	230	290	580	750	1500	2250	3000	3750	5800	6000	10000	15000

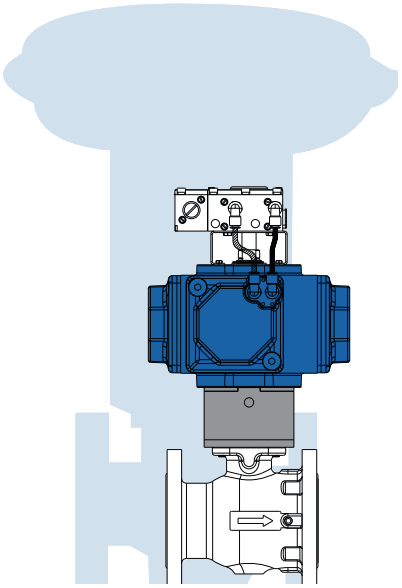
CONTROL VALVES

Habonim control valves are designed and meet industrial high demands for flow control in various systems and applications.

Accuracy, flexibility, cost effectiveness and maintainability are the added values our control valves provide with excellent performance in the most demanding environments for decades.

Habonim control packages are compact, lightweight, long-life solution with step-less characterized pressure and flow control for fast response times, wide rangeability, and bubble-tight shutoff.

Critical performance features include high pressure drop capacity with straight-through flow, high Cv, and large exhaust capacity. The package design features ensure ease of maintenance and zero backlash.



Features

Control valve construction

- Using standard valve construction with minimal adaptation to allow control features.
- V-Port, V-Ball or Slot Port control elements.
- Zero seat leakage - bubble-tight shut-off.
- Higher flow coefficient (Cv) compared with other valve designs.
- Rangeability of about 1:50, stability within 20%-80% open position.
- Line anti-cavity trims are available upon request.

Superior Control Package

- Higher Cv of valve allow smaller valve and pipes size selection with less weight.
- Minimum hysteresis / outstanding repeatability – superior adapter design for zero backlash, and virtually no hysteresis.
- CompAct actuator with superior control capabilities and minimal footprint.
- Overall accurate and cost-effective package designed, assembled & tested.
- Smaller footprint of the control package.

Testing & acceptance criteria ANSI/FCI 70-2

Temperature				Total HermetiX™	Standard Port	Full Port	Tube Size
°C	°F	Ball Valve Style	Design	Series			
650	1200			upon request			
600	1100						
550	1000						
500	900						
450	800						
400	750						
350	650						
300	550						
250	480						
200	390	Floating	3 Piece	N47			
150	300		2 Piece	N73	N74		
100	200		2 Piece	N31	N32		
50	120		2 Piece	N78			
0	32		2 Piece	N77			
-50	-58			upon request			
-100	-148						
-150	-230						
-200	-300						
-250	-400						
-300	-500						

	ANSI Class				150		300	600	900		1500
	Pressure Bar	-1	0	16	20	40	50	100	150	200	250
	Pressure Psi	-14	0	230	290	580	750	1500	2250	3000	3750

Habonim's Valve Sizing (HVS) software – available on our website.

SANITARY VALVES

Habonim sanitary ball valves are in service by the thousands for decades in leading bio-pharmaceutical, pharmaceutical, food and beverages manufacturing and processing facilities around the globe and by the leading companies of these industries.

A wide range of ball valves are offered by Habonim to support ASME BPE, European Sanitary Tubing, FDA standards and specification and are all fully tested and certified for fugitive-emission, fire-safe, PED, ATEX and other required standards that are mandatory in sanitary industries systems.

Habonim offers to sanitary systems and equipment operators and constructors a standardized valve series that meets all the required standards as a base design with a variety of end connections, handles and actuation allowing effective and cost-effective operation and maintenance management.

Features

Standardized designs:

- ASME BPE fully compliant series.
- Valves ends per ISO 1127 and DIN EN 10357 (DIN 11850) available.
- HermetiX stem sealing – fugitive emission certified for ISO 15848-1 and API 641.
- Clean Fire-Safe construction – no graphite contamination to media design.
- Nun-graphite construction available.

Materials:

- 316L stainless Steel as forge, cast or bar with controlled sulfur and ferrite levels for body and end connections.
- Mix of cast body and forge end connections is available as standard.
- 316L stainless Steel for Ball & Stem, bolts, nuts and handle.
- FDA and USP Class VI compliant polymers or elastomers only.
- Hasteloy-C22 castings, AL6XN, Alloy 20, other exotic alloys – upon request.

Surface finish:

- All body, ball, seat retainer and end connections are polished internally.
- Bar-stock made valves are externally polished.
- Standard polishing level is 0.625 µ-m (25 µ-in) Ra max, Up to 0.375 µ-m (15 µ-in) Ra max level is available.
- Mechanical or electro-polishing is used.

Sanitary & Cleaning features – available upon request:

- Cavity filler.
- Self-flush body, self-flush ball for Clean-In-Place and in-line cleaning.

Valve Styles:

- 3 pieces straight.
- Diverters & mixing bottom or side entry.
- Flush tank.
- Multi-ball manifolds.

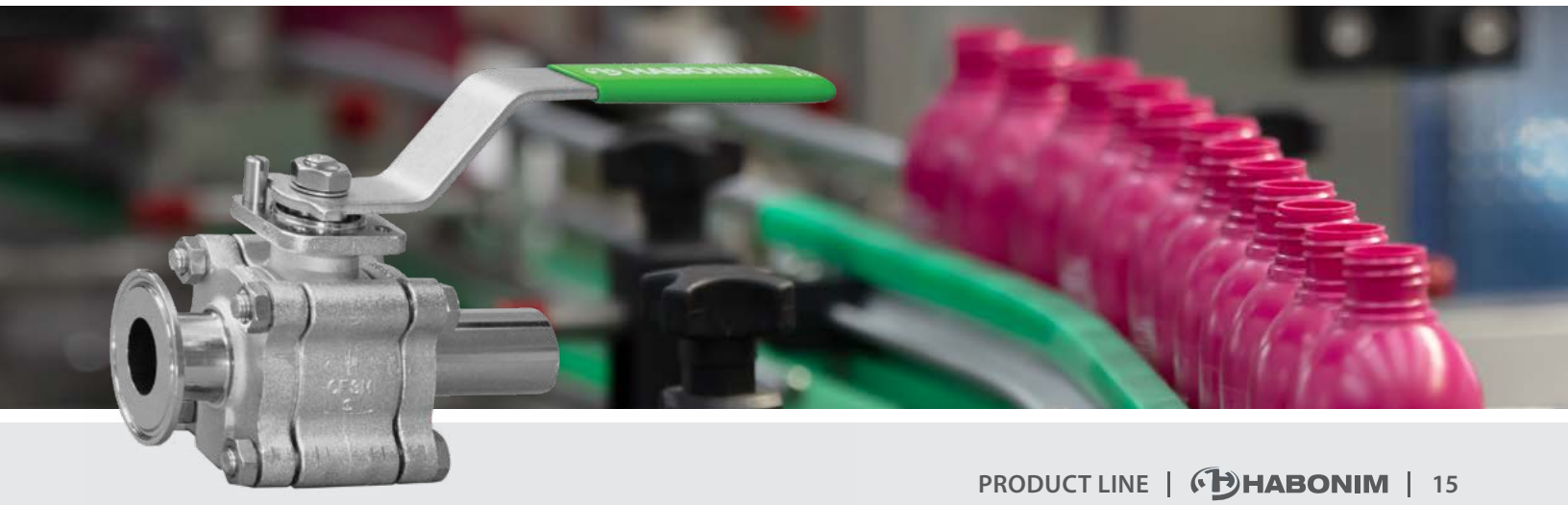
CompAct actuators tailored to sanitary systems with special painting, coating & material selection.

Testing & acceptance criteria for 48 series - inspection according to ASME –BPE: 2016.

Total HermetiX™ | Standard Port | Full Port | Tube Size

Temperature: -60°C – 260°C (-76°F – 500°F)

Ball Valve Style	Design	Series													
Floating	3 Piece	48													Special
		47													
ANSI Class					150		300	600	900		1500		2500		6000
Pressure Bar		-1	0	16	20	40	50	100	150	200	250	350	420	700	1000
Pressure Psi		-14	0	230	290	580	750	1500	2250	3000	3750	5800	6000	10000	15000



GENERAL USE INDUSTRIAL VALVES

Habonim's wide range of general-use industrial ball valves are in service for many decades and have been evolved to guarantee superb long-lasting performances in demanding applications as well as for general use. The standard basic valve construction offered by Habonim is an all-in-one high-end industrial valve that meets the latest safety, environmental, durability and maintainability requirements of modern industrial systems, piping and equipment.

Habonim's standard valves are supplied with the Total HermetiX integrity package that offers superior valve construction with a higher quality level and a unified design approach to allow minimal variants of valve parts to support a wider range of applications that guarantee higher availability, lower level of spare parts and reduced total cost of ownership.

Features

Total HermetiX:

- Zero fugitive-emission no maintenance stem sealing.
- Double body sealing.
- Fire safe.
- 100% tested.
- 100% materials & processing back-tracking.
- Quality system approved for API 6D, PED/TPED, SIL, ISO 9001.

End Connections variety:

- Wide range of end connections available for assembly on a generic center section in 3 pieces series, standard or full port.
- Flanged connections comply with ANSI B16.5 with standard or full port and EN 1092 with full port.

Materials:

- Carbon steel, stainless Steel, special alloys as cast, forge or bar stock.
- Variety of polymers and elastomers for wide range of applications.

Total HermetiX™ | Standard Port | Full Port | Tube Size

Temperature: -60°C - +260°C (-76 °F ÷ +500 °F)

Ball Valve Style	Design	Series							
Trunnion	Top Entry	52							Special
	3 Piece	91	92	93	94	95	96		
	2 Piece	81	82	83					
	DB/DBB	upon request							
Floating	3 Piece	47							
		26							
	2 Piece	31	32						
		73	74						
		78							
		77							
	DS/DBB	47DS							
		73DS	74DS						
		78DS							
		77DS							
Multiport	3 Piece	61/62							
Diverter	3 Piece	D47/S47							
	2 Piece	D31/S31	D32/S32						
Flush tank	3 Piece	R47	R48						

ANSI Class			150		300	600	900	1500		2500		6000	
Pressure Bar	-1	0	16	20	40	50	100	150	200	250	350	420	700	1000
Pressure Psi	-14	0	230	290	580	750	1500	2250	3000	3750	5800	6000	10000	15000

Certifications

Type tested certified by leading certification bodies and other on request (for part of the series).

SPECIAL USE

Solving the most challenging needs of our customers with ball valves and actuation systems inspired us in Habonim from the early days of the company more than 70 years ago.

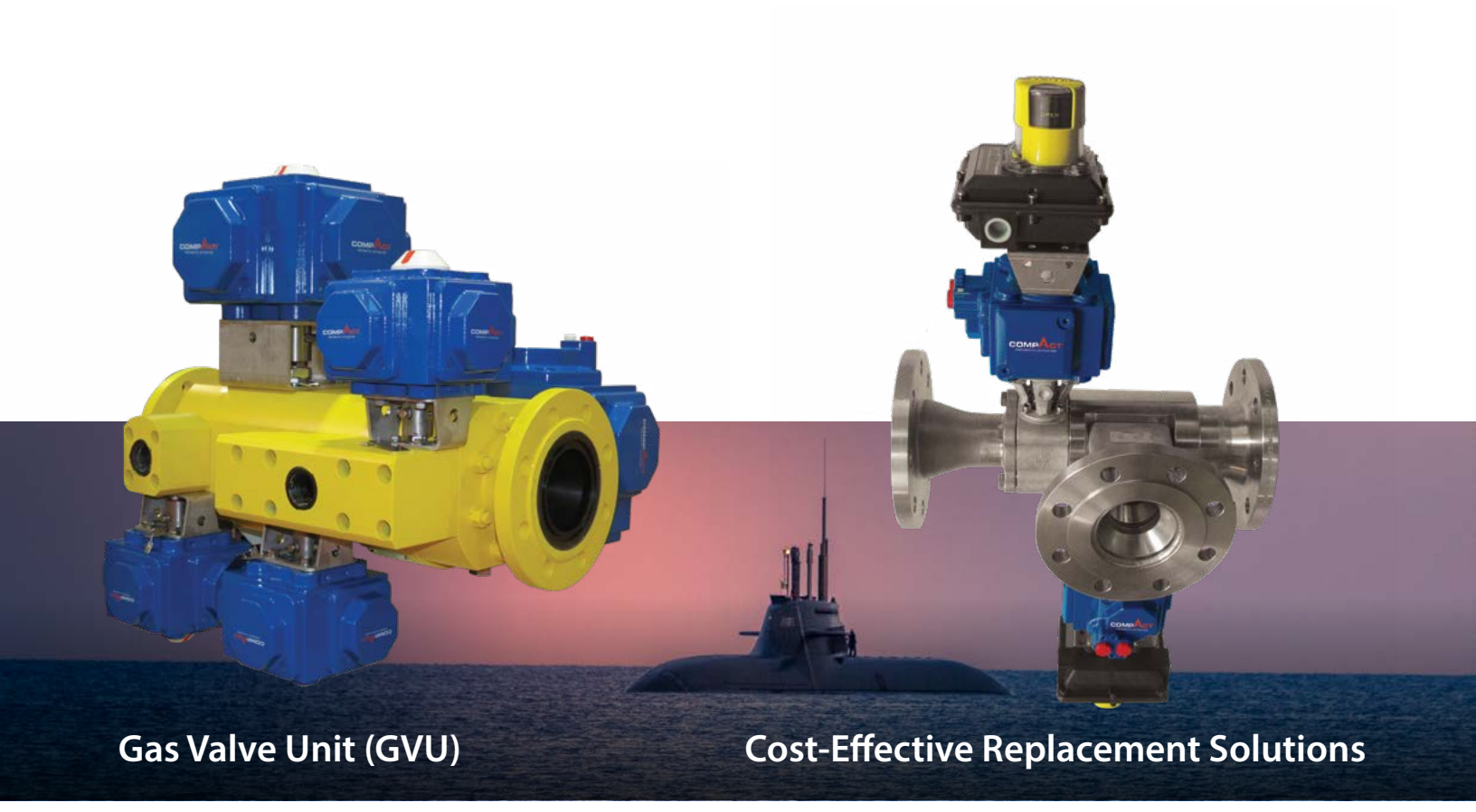
We develop, manufacture, test and support custom valves, manifolds and special solutions to meet the most stringent demands of extreme temperature, high pressure, corrosive and abrasive application with great success. At Habonim, we are committed to partner with our customers in their efforts to achieve their most demanding goals.

We are vastly experienced with:

- Complex skids and automated manifold designs.
- Lower weight and reduced volume of existing systems.
- Minimizing leak paths and introduction of fail-safe assemblies in hazardous applications.
- Fast closing (<0.5 sec) automated mechanism for ESD systems of high size, high pressure, high temperatures and more.
- Safety shut-off device for gas feeding systems.

We excel when no commercial product can satisfy your requirements. Our experienced engineering and R&D teams create special solutions that routinely meet the needs of our special customer.

At Habonim we will create a solution, verify and test it, supply it in demanding timelines and will be a partner for you as our customer till the mission completion.



Gas Valve Unit (GVU)

Cost-Effective Replacement Solutions

Gas Valve Unit (GVU)

Special manifold for dual fuel (diesel / LNG) ships reduce the amount of pollution generated by ship engines and increase air quality in harbor cities.

Cost-Effective Replacement Solutions

A custom valve used for diverting flow from a single source to multiple lines was designed to replace larger globe valves for the same application.

Multi-valve ensemble (MVE)

Habonim designed the revolutionary Multi-Valve-Ensemble (MVE) as an innovative alternative to large, heavy skid-mounted valve assemblies that take up so much space and are loaded down with complex piping; vulnerable to leakage. The MVE eliminates up to 90% of the piping required on conventional skids, and weighs 30% less.

Cryogenic Double Block & Bleed Valve (DBB)

Habonim's cryogenic DBB valve maximizes safety when handling high-pressure cryogenic liquids at the most critical stages of LNG and CNG processing that require a furnace feed (boiler, gas turbine, LNG or CNG feeder). The Habonim cryogenic DBB valve solution is comprised of a single body, which saves space and reduces the number of body seals, thereby reducing the potential for leakage.

Double Block & Bleed Ammonia service

Cryogenic double block & bleed valve

ACTUATORS

Habonim's unique quarter-turn COMPACT actuators have been proven for more than 30 years to have superior performance of double the torque per size, much longer cycling before any maintenance, high opening and closing speed and extraordinary durability in the most demanding industrial environments.

Our COMPACT actuators are successfully used to supply control packages in diverse industries and applications that are superior in overall smaller size, with less weight, less compressed-air consumption, much more reliable especially in high cyclic applications and with a very short acting times.

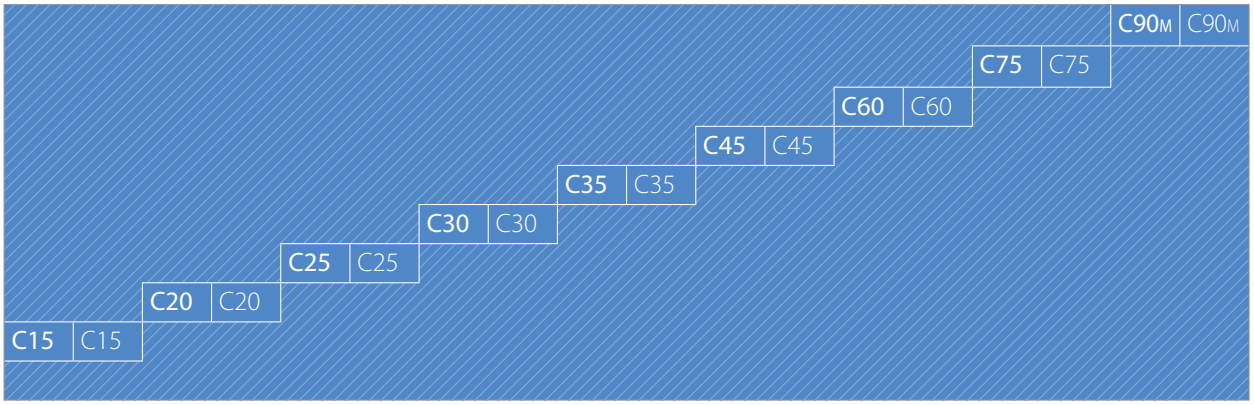
Habonim quarter-turn actuation offering includes:

- Double acting actuators (Air-air operated)
- Single acting actuators (air-Spring operated) as normally open/close options
- Shutoff valve and actuation packages
- Control valve and actuation packages
- Emergency Shut Down (ESD) and Fire Block Valve (FBV) packages

Wide range of accessories for operating, controlling and monitoring actuator and valve operation are offered as auxiliary for actuation packages.

Torque and Stroke Times for CompAct actuators

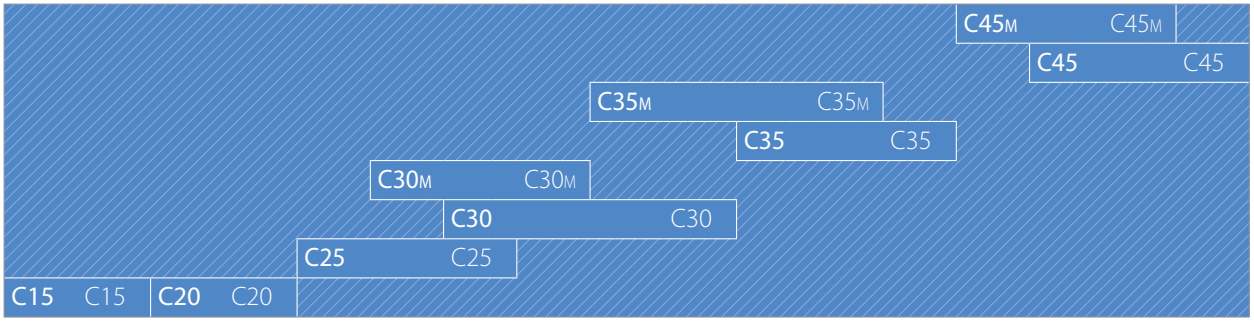
Double Acting - Torque*



Torque NM	19	27	35	51	72	105	119	176	208	304	408	593	967	1406	1768	2596	3268	4754
Torque in/lb	172	244	311	468	639	961	1052	1611	1848	2780	3622	5429	8585	12872	15856	23767	28922	42073

* Per operating pressure: **5.5 bar (80psi)**, 8.0 bar (120psi)

Spring Return - Start Torque*



Torque NM	12	18	22	30	45	59	73	102	103	120	133	176	211	215	260	357	414
Torque in/lb	106	165	195	275	398	522	668	912	934	1099	1177	1611	1903	1932	2301	3268	3790

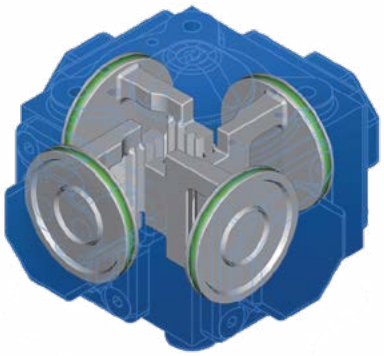
* Per operating pressure: **5.5 bar (80psi)**, 8.0 bar (120psi)

Torque NM	495	635	835	953	1003	1184	1575	1867	1869	3006
Torque in/lb	4381	5620	7645	8434	9183	10478	14419	17093	16541	22709

* Per operating pressure: **5.5 bar (80psi)**, 8.0 bar (120psi)

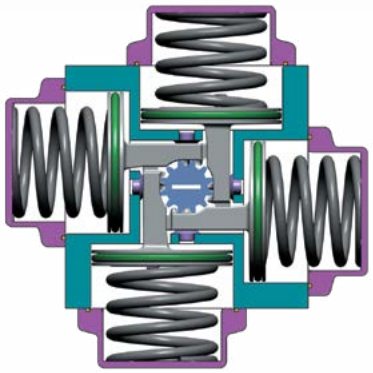
ACTUATORS (CONTINUED)

Features



Unique patented design

- Pistons with balanced centralized forces of pistons on pinion
  - Double the torque of same sized regular actuator
  - Less wear & tear on moving parts
  - Longer sealing with no maintenance
- Shorter and smaller pistons with shorter travel distance
  - Compact square shape with minimized footprint
  - Shorter open/close time – allows superior ESD functionality
  - Smaller air consumption
  - Lightweight
- Four short spring sets – up to three nested springs against each cylinder
  - Selection of springs mix to provide flexible spring torques for the available air supply pressure
  - Spring cartridge option provides higher torque with better characteristics for opening or closing
  - Redundancy in case of spring failure – the other three springs will maintain rotation



Meticulous material, treatment and coating selection

- Selection of body and moving parts materials to best support long lasting performance in harsh, controlled and clean environments
- Structure and surface treatments of part and special coatings to ensure long lasting safe operation in harsh environments
- Selection of sealing and greasing material to accommodate to low and high temperatures and application requirements

Standard interfaces:

- ISO 5211 Industrial valves - part-turn actuator attachments
- VDI/VDE 3845 (NAMUR) Industrial process control - pneumatic control valves - interfaces of valves and auxiliary equipment

Testing & acceptance criteria: 100% internal & external bubble leak tested.

IMPACT™

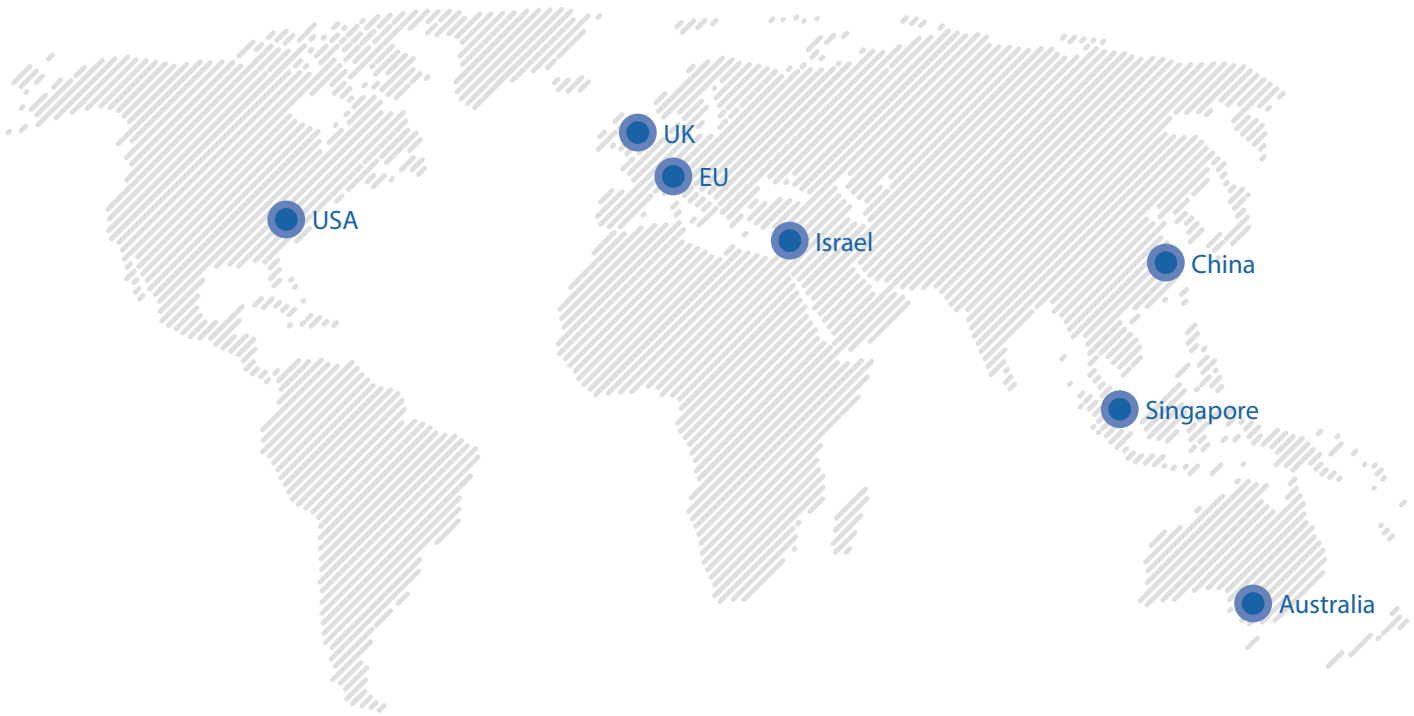
The patented IMPACT™ spring assist is a pneumatic device increases the spring closing torque on spring return actuators.

The usage of evacuating air pressure while actuator is closing to assist the springs with pushing the pistons to close increases the spring end torque by 50% and more.

IMPACT™ is easily installed on the NAMUR interface of the Compact actuator.

Boost the torque of any spring return actuator by 50% and more

- Allows one size down actuator for the same functionality
- Increase system reliability
- No external energy required



About Habonim

Ball Valves & Actuators for the most demanding, challenging and hazardous applications are our passion and profession for the last 70 years.

We believe in designing, manufacturing and supplying control and shutoff components and solutions that improves the overall safety, integrity and sustainability of the systems they are installed in.

Designed, manufactured and tested according to the highest standards, our products allow us to partner within systems that flow and control varied gases and liquids in diverse markets especially where extreme temperatures and pressures are involved, hazardous materials are used and system performances are critical.

We are leading in cryogenic ball valve-based control solutions, emergency shutoff and specially designed solutions.

Believing that supplying and developing the most effective, safe and reliable products for the global leaders in the LNG and Gas distribution market continually challenges us to improve our capabilities and products.

Best coping with our prestigious customers' most challenging requirements technically, operationally and commercially is our promise fulfilled for decades.

Performing in Demanding Applications.

HABONIM
Industrial Valves & Actuators

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