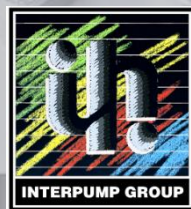


A BRAND OF



The Group

2,02

- Billions of € in turnover

8.000 +

- Employees

100 +

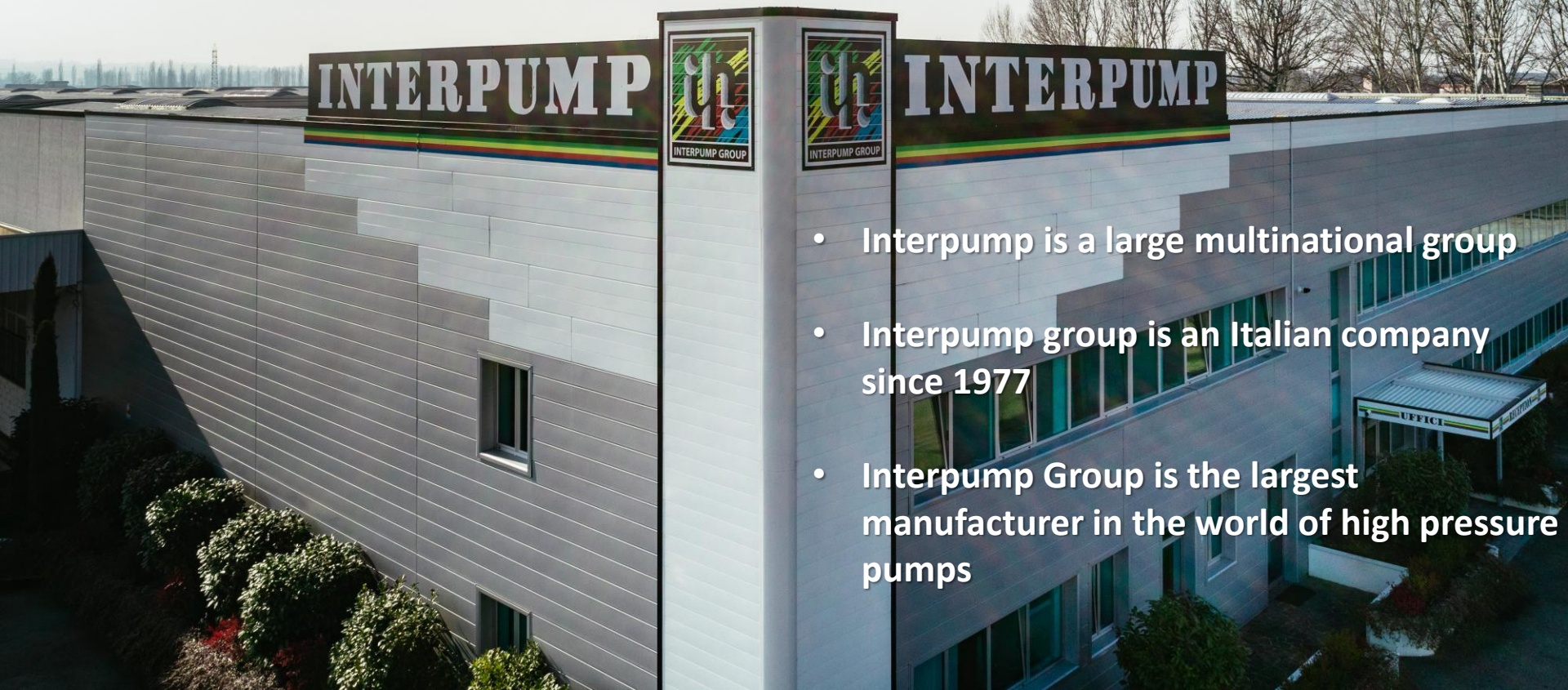
- Group companies

2 % +

- Turnover invested in R&D

30 +

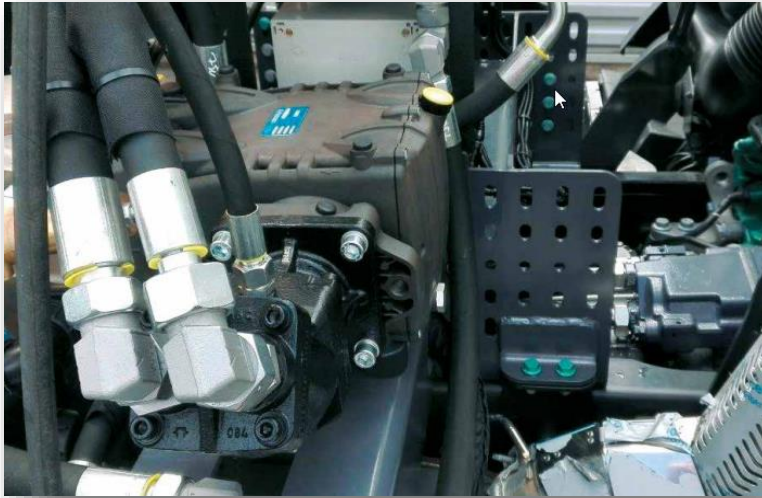
- Countries of the world where we sell directly



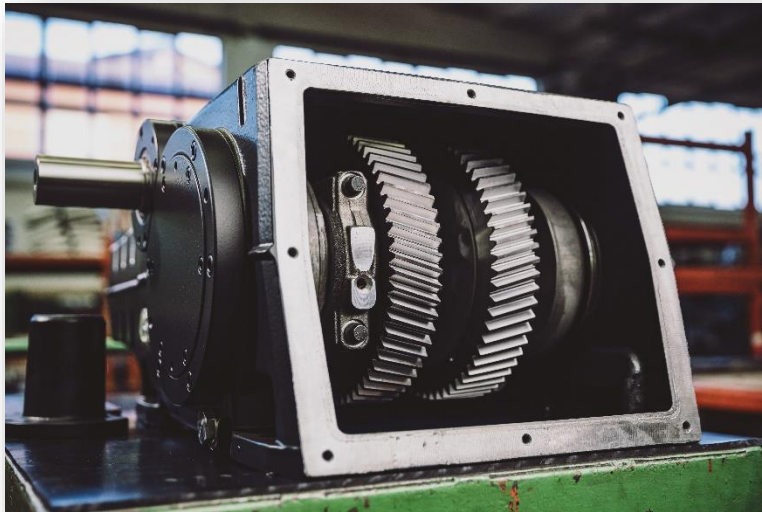
- Interpump is a large multinational group
- Interpump group is an Italian company since 1977
- Interpump Group is the largest manufacturer in the world of high pressure pumps

Sales Trend 2022

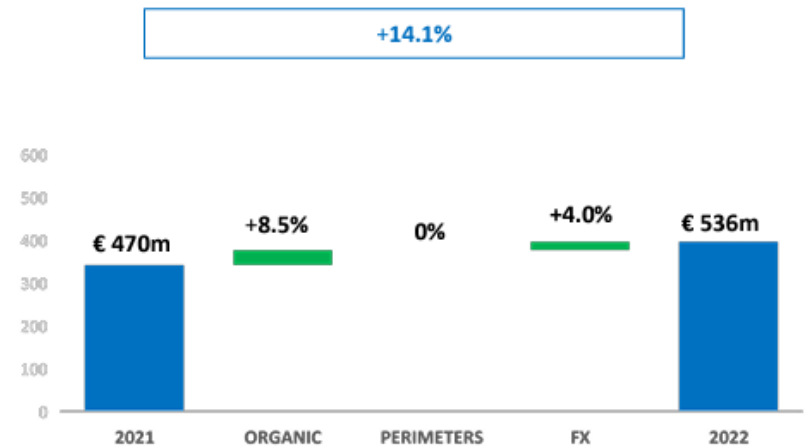
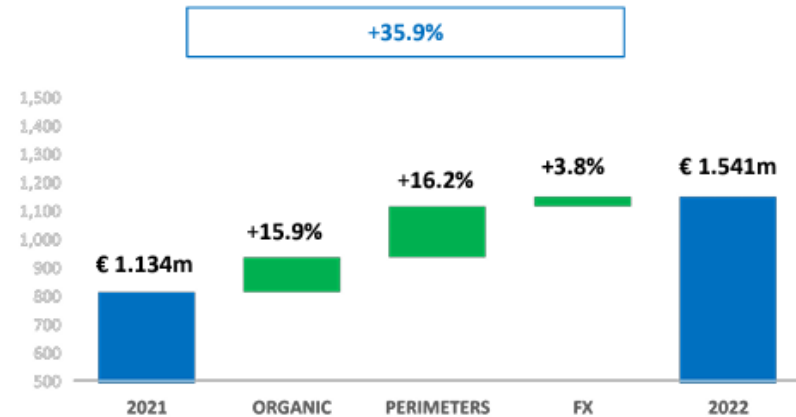
HYDRAULIC



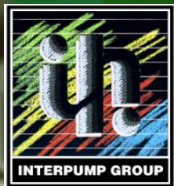
WATER-JETTING



2022 SALES EVOLUTION



Who we are



**Interpump Group
S.p.A.**

- Italian Company
- Listed at the Milan Stock exchange since 1996
- Employees 500+

Hydraulics

Water Jetting

- High Pressure plunger pumps for water and other fluids
- Up to 4.500 bar and 1.100 kW
- Product Range:
 - I. Industrial cleaning,
 - II. Chemical, Food, Pharma, Cosmetic processing
 - III. Fluid handling

Water Jetting Main Products & Companies

High-pressure Plunger Pumps and Systems



- ▶ Plunger pumps high flow/ high pressure (1~450 HP)

- ▶ Production and rental of high-pressure pumps and complete systems

- ▶ Specialized solutions for steel and mining industry

- ▶ High-pressure pumps (up to 1,500 HP - 6,000 bar/87K PSI)
- ▶ Design and supply of turnkey solutions

- ▶ Homogenizers for food, cosmetics, and pharmaceutical industry

- ▶ Pumps, mixers, components & systems for food, cosmetics and pharma

- ▶ Mixers and agitators (Magna-Safe® magnetic transmission)
- ▶ Centrifugal separators



**INTERPUMP
Pratisoli**

NLB

Inoxihp (53%)

Hammelmann

Bertoli

**INOXPA
Fluinox**

**Mariotti & Pecini
Macfuge**



- ▶ U.S. Distributor

General Pump

www.interpump.it
www.pratissolipompe.it
www.generalpump.com

www.nlbcorp.com

www.inoxihp.it

www.hammelmann.com

www.bertoli-homogenizers.com

www.inoxpa.com

www.mariotti-pecini.it
www.macfuge.com

International presence (plants and subsidiaries)

Italy, USA, China

USA, Poland

Italy

Germany, USA,
Australia, China, Spain

Italy

Spain, India, Portugal,
Italy, UK, USA, France,
Denmark, Sweden,
Russia, China, UAE,
Ukraine, Moldova,
South Africa, Australia,
Colombia

Italy

Bertoli Division

www.bertoli-homogenizers.com



TUBO 2" SAE 100 R13 - L=12 m



Headquarter



Via Giambattista Vico, 2

Reggio Emilia

Italy

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Our Numbers

+150

**Bertoli countries
Worldwide**

+5.000

**Bertoli
Installed Based**

Mission and Vision



Become your trusted partner!

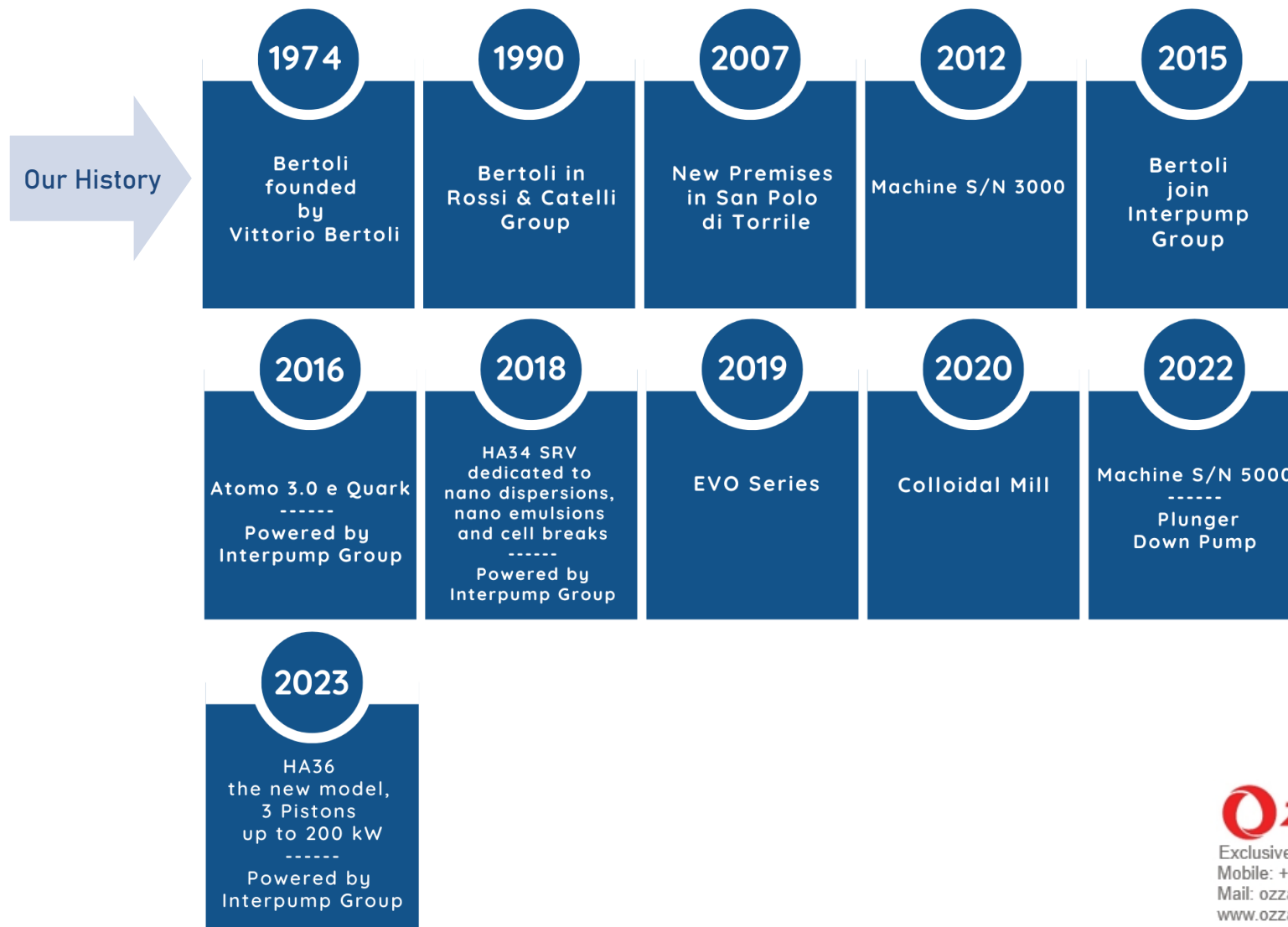
**We strive to create a long-term relationship
with our customer.**

**We study competitive solutions to meet your
needs**

Generate added value for our partners

**We innovate and develop new eco-friendly
technologies to generate added value to your
business**

Timeline

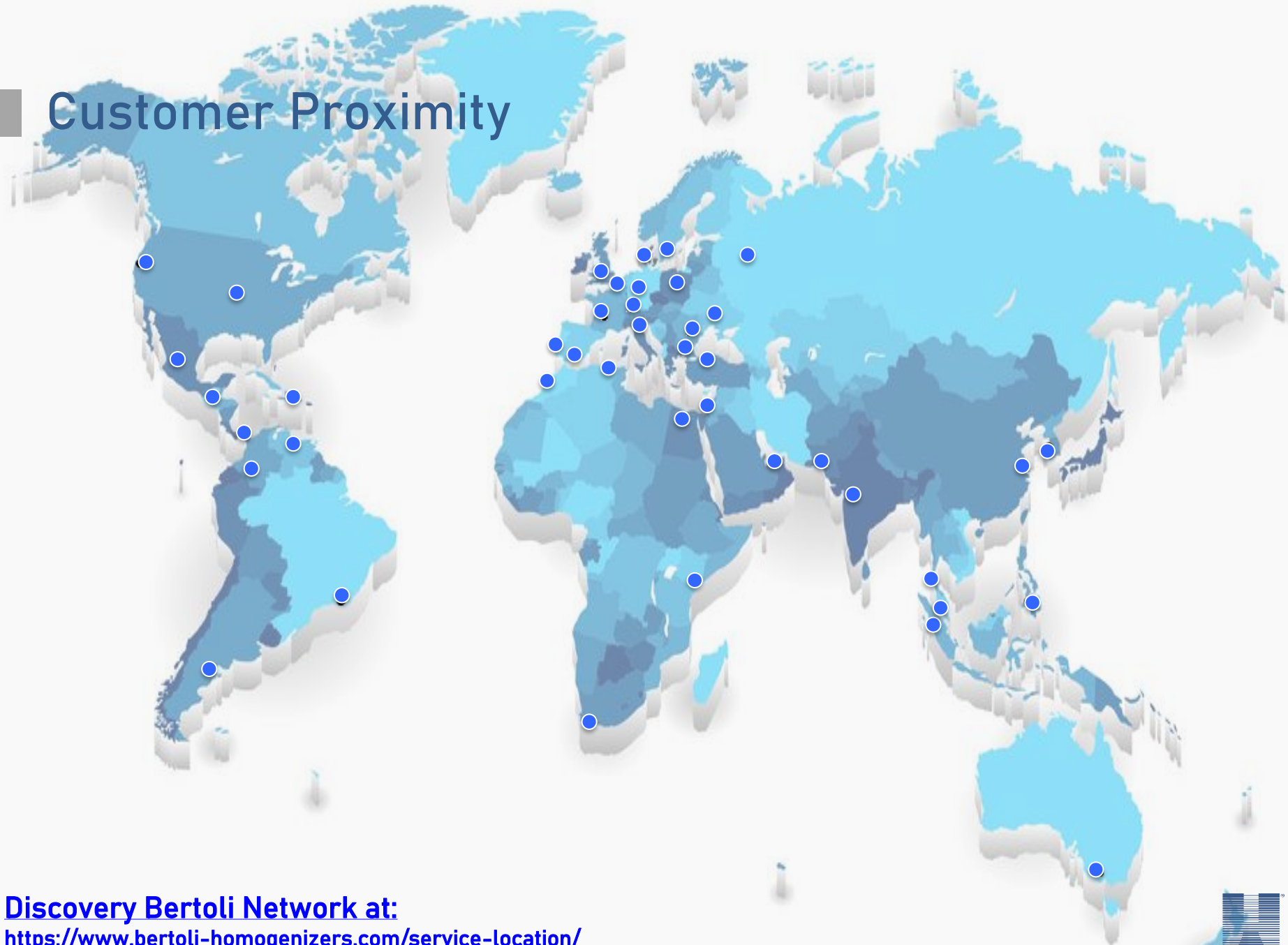


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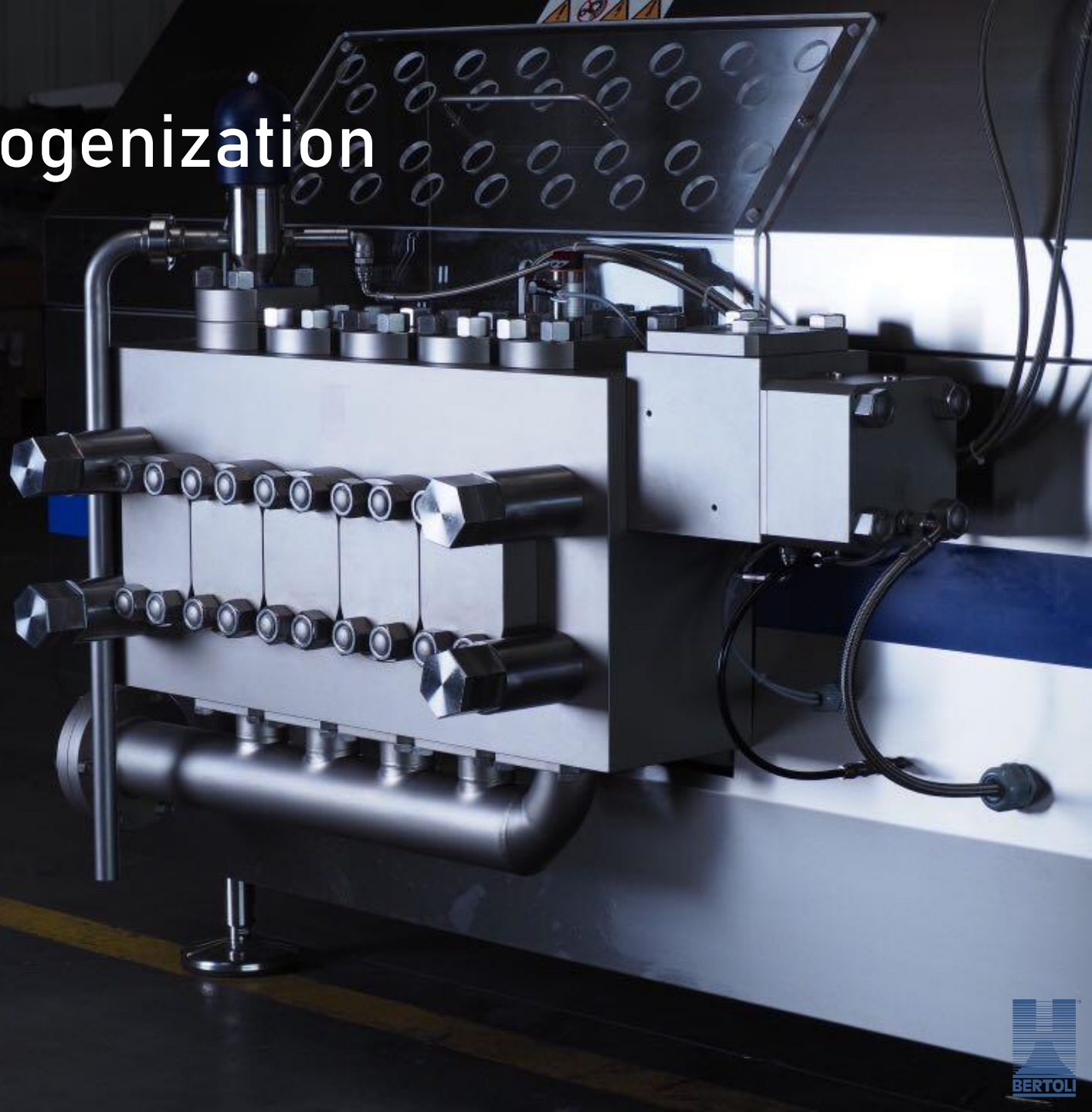
Customer Proximity



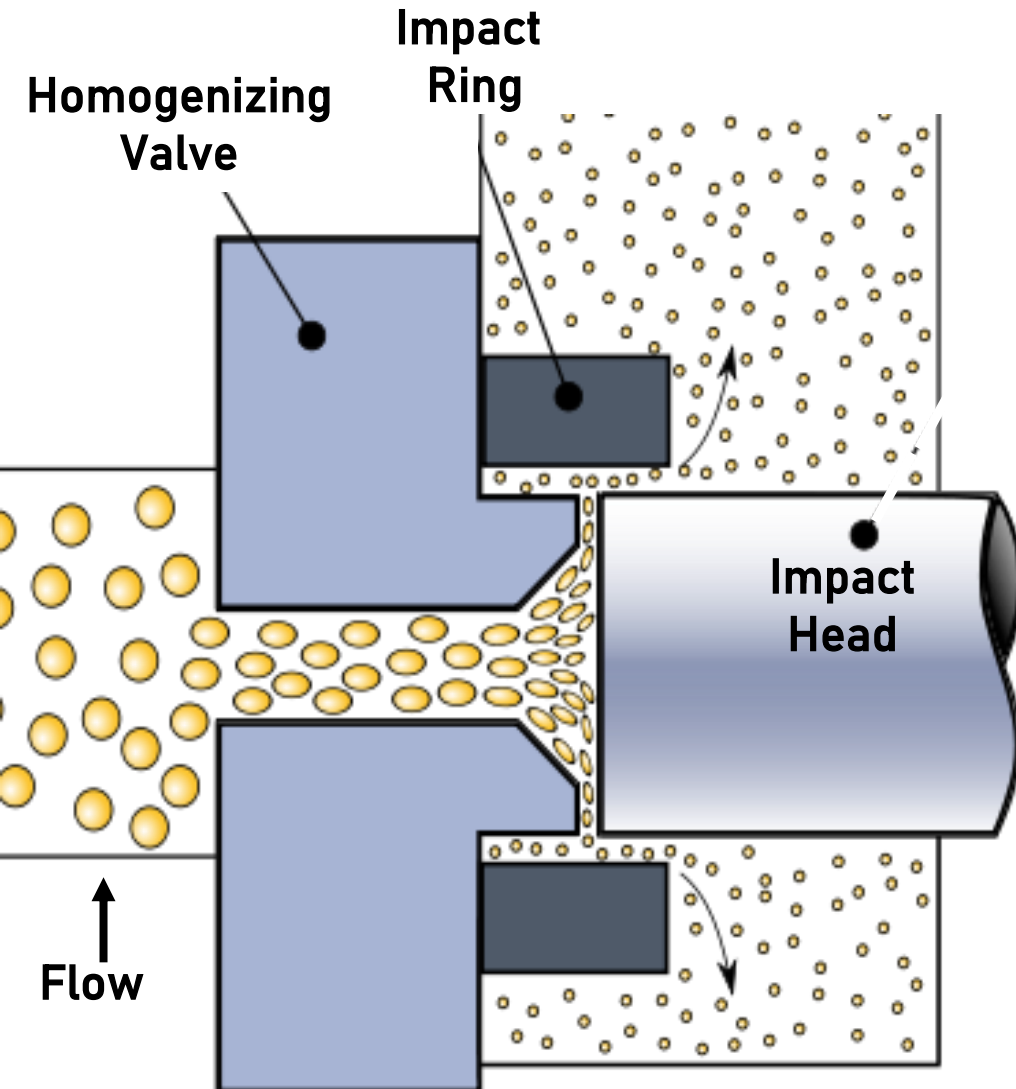
Discovery Bertoli Network at:
<https://www.bertoli-homogenizers.com/service-location/>



■ The Homogenization



Homogenization principle



The homogenizer is used to create:

Stable Emulsion $\Rightarrow$ fat in water

Fine Dispersion $\Rightarrow$ solid in water

Flow dynamic condition at high velocity
between Impact Head and Passage
Head generates micronization of
particles by:

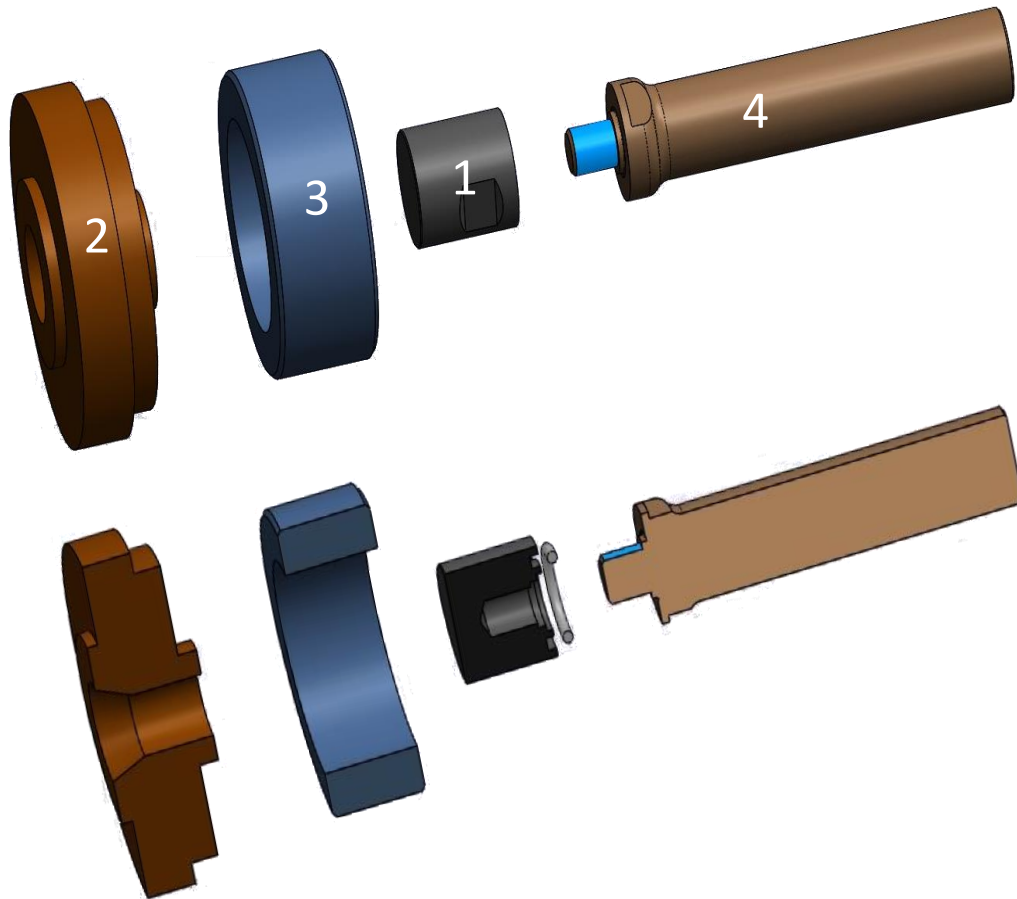
TURBULENCE

CAVITATION

SHEAR STRESS

IMPACT

Homogenization System



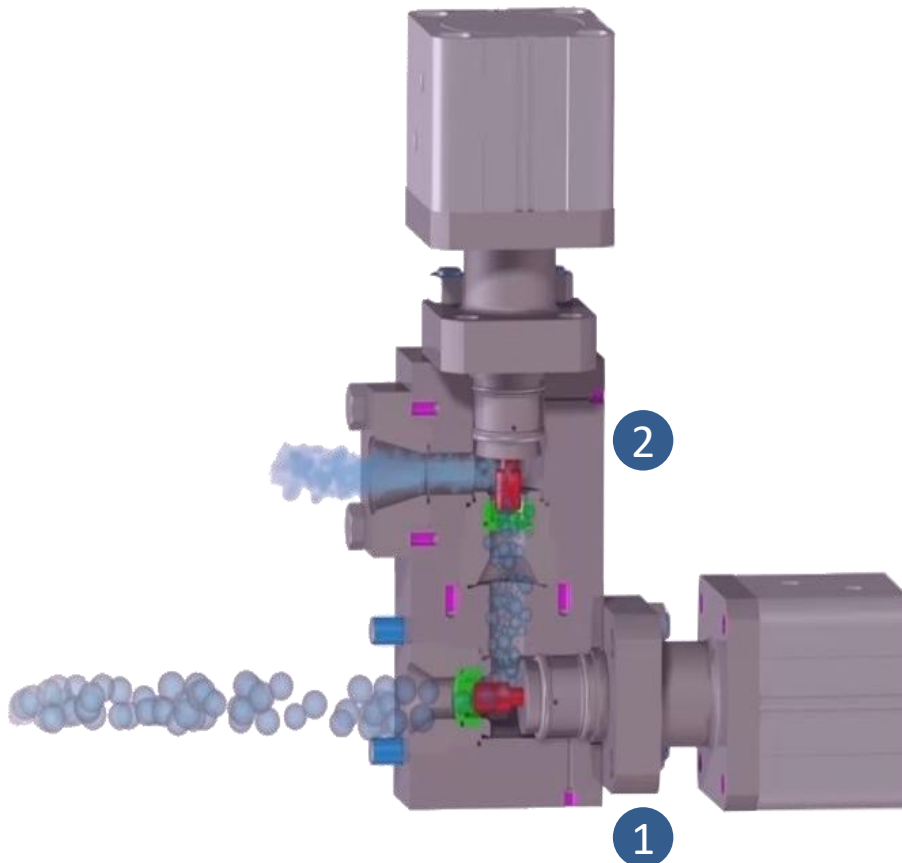
Homogenizing group in 3 pcs

- 1) Impact head
- 2) Homogenizing Valve
- 3) Impact ring
- 4) Impact head shaft

Available material according to the application

- ☐ Stellite 20
- ☐ Tungsten carbide
- ☐ Zirconia oxide ceramics
- ☐ Silicon Nitride

Homogenizing Valve System



Homogenizing group with hydro-pneumatic actuation for a great flexibility and stability of homogenization pressure

- 1 The First Stage is used to micronize particles
- 2 The Second Stage is used to prevent clusters stabilizing the emulsion, usually working at 20% of the 1^o stage

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Homogenizing Valve Type



Flat type

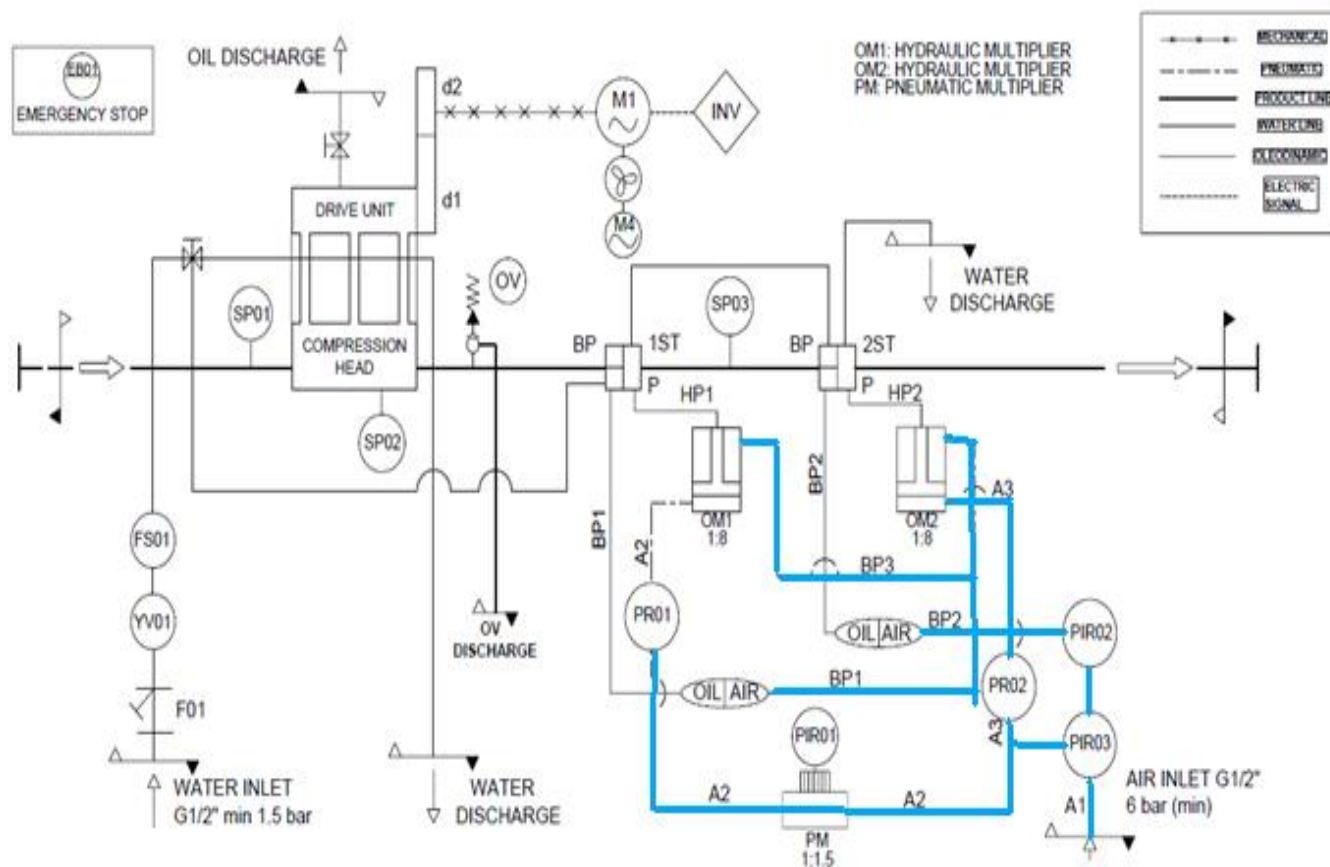
Sharp Edge type



The rupture valve, named sharp edge valve, has a shorter travel and a smaller gap between the impact head and the homogenizing valve.

In the chemical, pharma, cell rupture, nano-emulsion, and for all the applications over 600 bar, we install the homogenizing valve made of Zirconia oxide ceramics in order to have an higher resistance at the highest pressure.

Bertoli Pneumatic System



The homogenizing group uses oil to uniformly transmit the homogenizing pressure to the homogenizing valve.

The air needed to generate the homogenization pressure, while the oil that generates the counter pressure

The air coming from the blue tube pushes the cylinder, which in turn pushes the oil, which uniformly transmits the counter pressure to the homogenizing valve.

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Bertoli Aseptic Homogenizer



Aseptic barrier fluid manifold with needle valve for regulating the flow, by solenoid valve, Up to 90 kW, cooling water free,

- Stainless steel connection for the piston seals, in parallel and homogenizing groups and the Overpressure Discharge Valve
- The synergy with Interpump drive unit, means a saving of water and steam:
 - a. Water saving 750 m³ per year
 - b. Auxiliary plant energy saving 3.000 kWh per year (-1,5 tons CO₂)
 - c. Increment of mechanical efficiency 2,5 %
Saving di 3200 kWh per year (- 1,7 Tons CO₂)

Total 3,2 tons of CO₂ per year

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Homogenization Benefits



- ✓ Reduced Fat droplet size
- ✓ Stable emulsion
- ✓ Taste Improve
- ✓ Increasing available surface area
- ✓ Reduced particle size to increase viscosity
- ✓ Smoothness, body and colour
- ✓ Better mixing of all the ingredients
- ✓ Whiteness increase
- ✓ Less product more water
- ✓ Avoid sedimentation and separation
- ✓ Particles uniformly dispersed throughout the product

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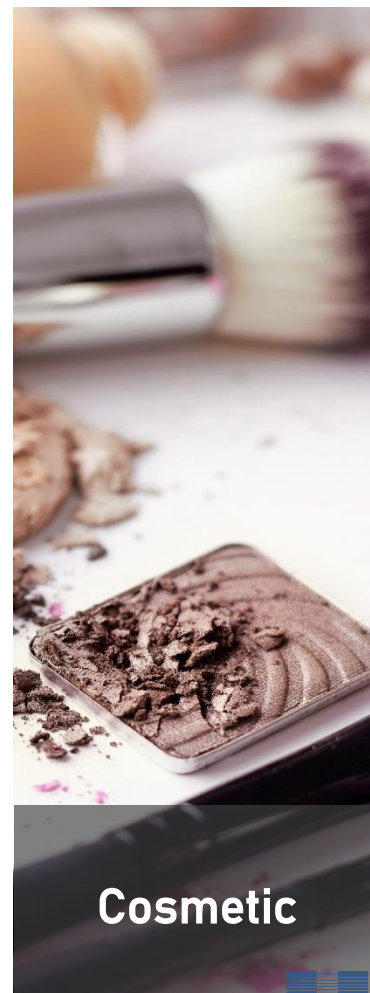
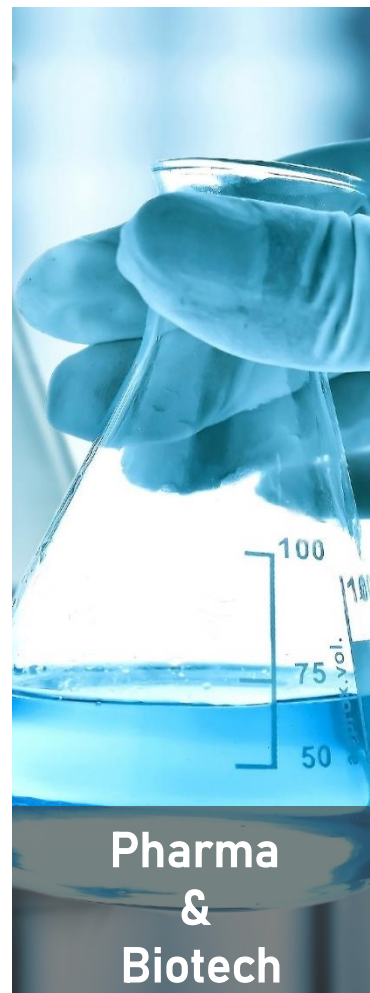
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Fields of Applications



Industries



Applications



- ✓ UHT milk
- ✓ Pasteurized milk
- ✓ Reconstituted milk
- ✓ Desserts
- ✓ Fresh cheese
- ✓ Whipping cream
- ✓ Yogurt
- ✓ Fresh cheese
- ✓ Fruit juices
- ✓ Ketchup
- ✓ Baby-food
- ✓ Eggs
- ✓ Dressing
- ✓ Syrups
- ✓ Vegetables
- ✓ Puree
- ✓ Cell disruption
- ✓ Vaccines
- ✓ Antibiotics
- ✓ Starch
- ✓ Fat emulsions
- ✓ Eye-drops
- ✓ Wax emulsions
- ✓ Carbon Nano-Tubes
- ✓ Nano Cellulose
- ✓ Silicone

...and more!

■ Pressures and Applications

- ❖ 1500 bar → Pharma and Chemical Application
- ❖ 1000 bar → Cell Disruption
- ❖ 800 bar → Cosmetic Emulsions
- ❖ 500 bar → Soya - Wax Emulsion - Lubricants
- ❖ 300 bar → Tomato ketchup
- ❖ 250 bar → Milk and Dairy products
- ❖ 100 bar → Sauce and Dressing - Fruit Juices



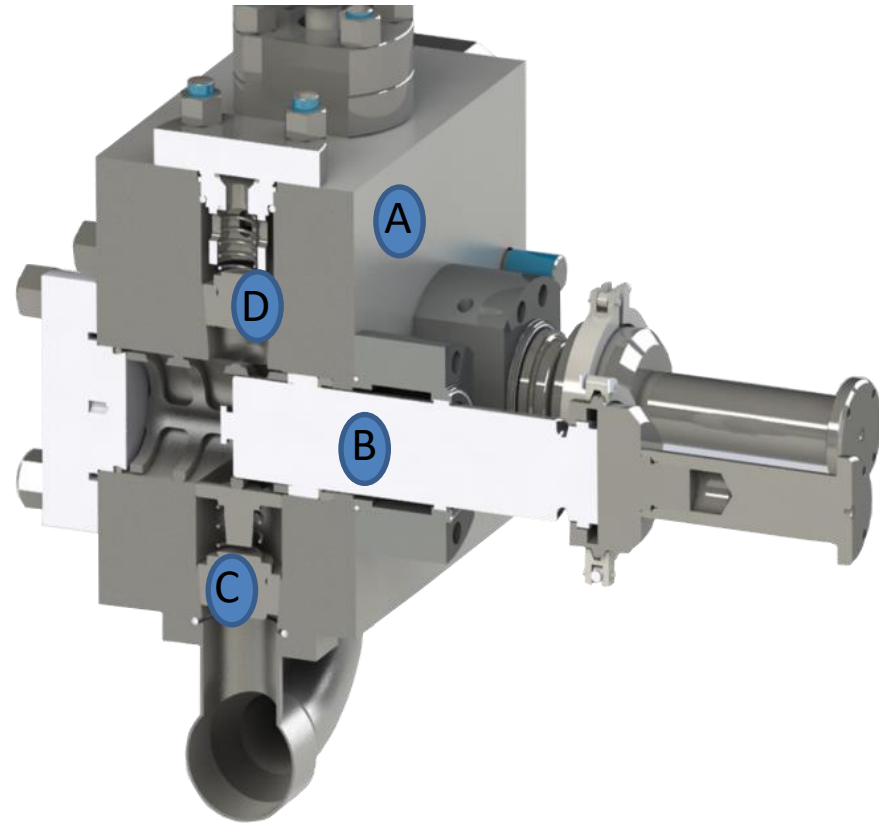
■ Bertoli Products



Bertoli Machines Performance										
Pressure bar	HA/PA 30	HA/PA 31	HA/PA 32	HA/PA 33	HA/PA 34	HA/PA 35	HA/PA 36	HA/PA 52	HA/PA 53	ATOMO 3.0
150	2.000	2.500	6.500	9.800	18.000	24.000	37.000	38.500	80.000	600
200	1.500	2.000	4.800	7.000	14.000	18.000	32.500	34.700	59.000	600
250	1.000	1.500	3.800	5.800	10.000	14.000	26.000	27.500	49.000	600
300	900	1.200	3.000	4.700	8.500	12.000	21.500	21.000	39.000	300
400	700	800	2.500	3.500	7.000	8.500	16.000	16.000	30.000	150
600	450	600	1.500	2.000	4.500	6.000	10.500	11.500	19.500	150
800	350	500	1.000	1.500	1.800	3.500	6.500	7.500	13.000	100
1.000	300	400	800	1.300	1.800	2.800	5.000	6.000	10.500	100
1.200	200	300	600	800	1.400	2.200	4.000	5.200	8.000	30
1.500	150	200	400	800	1.000	1.800	3.000	4.200	6.500	30

High Plunger Pumps

- ❑ Volumetric pump based on transmission from the crankshaft to piston rod and pumping piston.
- ❑ Composed by:
 - Compression head A
 - Plunger's chamber B
 - Inlet pumping valves C
 - Outlet pumping valves D



PA / Pumps

■ High Plunger Pumps

- ❑ Installation of ball valves beyond 1.000 cP
- ❑ Max. working pressure up to 1.500 bar
- ❑ Aseptic execution SIP able up to 140°C
- ❑ Viscosity up to 20.000 cP



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PA / Pumps

High Pressure Homogenizers

- ❑ Industrial and laboratory models, from 10 l/h up to 80.000 l/h
- ❑ Max. homogenizing pressure up to 2.000 bar
- ❑ Fully automatic version available with PLC e HMI installation
- ❑ Aseptic execution SIP able up to 140°C
- ❑ Viscosity up to 20.000 cP
- ❑ Homogenizing Group adjustment by pneumatic actuator with oil dampening system



HA / Homogenizers

SRV- Powered by Interpump Group

Ultra High-Pressure Homogenizers–up to 1.500 bar



“ The best engineering for chemical ”

- ❑ Homogenizing valve made of zirconia oxide ceramics or silicon nitride, with suitable design
- ❑ Valve seat made of High nitrogen Alloyed steel
- ❑ No cross design to increase lifetime of parts and in order to have a better feeding with high viscous product
- ❑ Vertical position of plungers to increase the lifetime of plunger seals - no piston system weight on the seals

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Laboratory Homogenizer



QUARK

Table Top Compact single plunger lab homogenizer.

Capacity up to 3 l/h - Pressure up to 2.000 bar

Powered By Torque motor and recirculating ball screw, VFD included

ATOMO 3.0

Three plungers table top suitable for lab and pilot plants

Pneumatic pressure regulation available

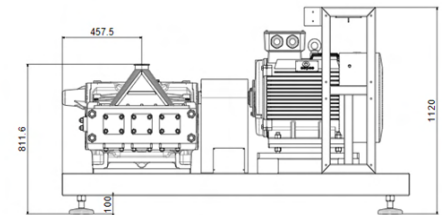
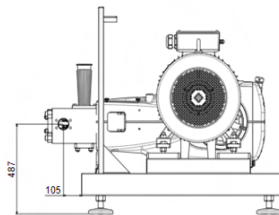
Capacity up to 600 l/h - Pressure up to 1.500 bar

Powered By Interpump Group
PLC + HMI 4"

Pump Smart, PS 34



- ❑ Back pressure up to 70 bar,
Flow rate up to 12.000 lph,
- ❑ Feeding by gravity,
- ❑ Suitable for CIP/SIP, up 24.000 lph,
no feeding pump necessary
- ❑ 3 Plungers made of integral ceramic
AL203, ECONOMOS S01P plunger seal
- ❑ Splash lubrication system



Pumps for Product with Pieces

Capacity up to 14.000 l/h Pressure up to 80 bar

Features:

- 1) Volumetric pump with gentle handling of fluid products containing pieces up to 30 mm.
- 2) Keeping shape and structure of solid parts
- 3) Pumping valves pneumatically controlled
- 4) Piston stroke retracted for a complete filling of the product
- 5) Very Low RPM



PX Model

Pumps for Product with Pieces

Capacity up to 12.000 l/h
Pressure up to 16 bar

Feature:

- 1) Handling of fluid products containing pieces up to 60 mm
- 2) Keeping shape and structure of solid parts
- 3) Two main motors and two VFD managed by a PLC for a constant asynchronized pumping solution
- 4) Specially dedicated for OHMIC heating



TP Model

Colloidal Mill - BMC

Capacity 25.000 l/h Pressure 6 bar

Features:

- 1) AISI 630 stainless steel rotor and stator
- 2) Hygienic dual cartridge tungsten carbide mechanical seal
- 3) User friendly PLC with recipes



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■ Sterile Water Unit

- ❑ Complete automatic solution thanks to PLC installation
- ❑ DFL filter reduction up to 2 μm
- ❑ FDA approved

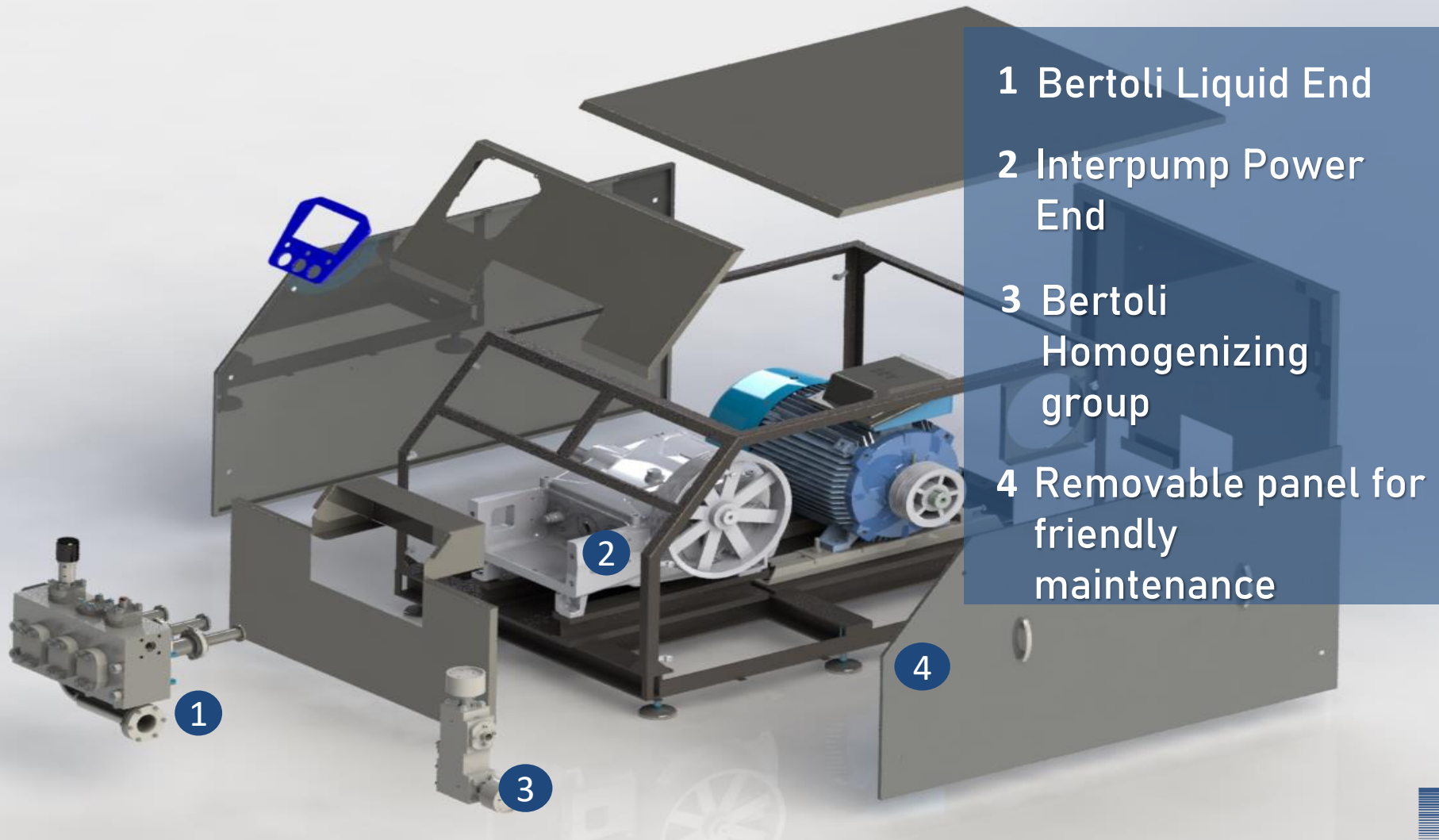
■ High Shear Mixer



■ EVolution Series



Bertoli Machine



■ Drive Unit up to 90 kW



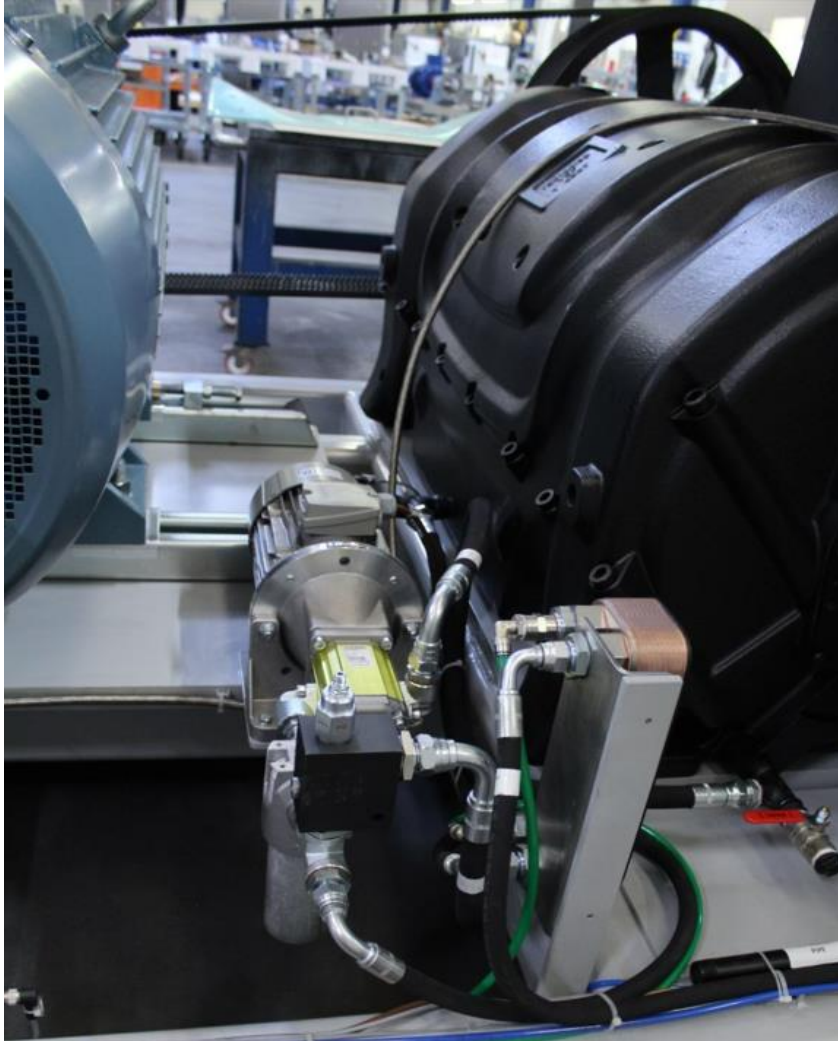
- ❑ The Interpump Splash lubrication system doesn't need oil/water cooling
- ❑ No external gearbox weight on the crankshaft
- ❑ No additional electrical motor for lubricating unit = less energy consumption
- ❑ No additional oil pump, less maintenance cost
- ❑ Nitrurized Crankshaft on all the models

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Drive Unit over 90 kW



- ❑ No external gear reducer
- ❑ No gear reducer cooling = less water consumption
- ❑ Only one lubrication oil type
- ❑ No external gearbox weight on the crankshaft
- ❑ Nitrurized Crankshaft on all the models



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Water and Oil Saving

Bertoli HA35110 Benchmark	Oil (kg/y)	Kg CO2 according to LCA methodology	Water (l/y)	m³ H2O
Old Bertoli Series	115	31,07	2.050.000	2050
EVO Bertoli Series	60	7,10	600.000	600

Water saving → 70%

Oil saving is due to the elimination of the hydraulic unit and external gear reducer, which is no more present in the new series → 48%

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Efficiency and Power Saving

Bertoli Series Benchmark	Mechanical Efficiency (%)
Old Bertoli Series	91
Evo Bertoli Series	93



Less power dispersion and less heat generation → reduced **carbon footprint**

Power saving in 110 kW homogenizer → $2,2 \text{ kW} * 5000 \text{ hours year}$ it is a saving of 11.000 kWh per year and **5,8 Tons of CO2 per year saved** using EVolution Series.

* Italian Ministry of Energy. Thermal power station produces 531 g of CO2 to deliver 1 kWh

■ Saving Summary

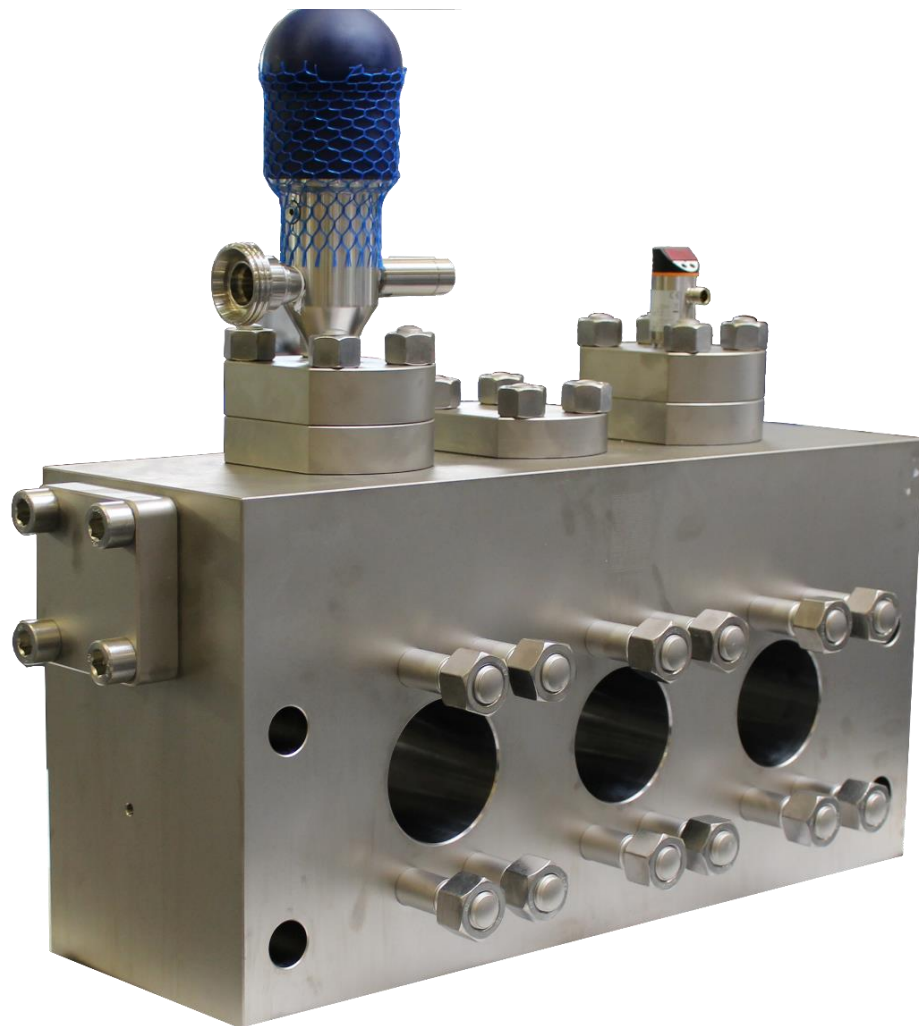
- ❑ Oil saving, 55 kg per year
- ❑ Water saving, 1.450 m³ per year
- ❑ Splash lubrication power saving, 0,37 kW on model up to 90 kW.
- ❑ Reduced Carbon Footprint, save 5,8 Tons of CO₂ for a 110 kW homogenizer in operation 5000 hour per year



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■ Compression Head



Standard DUPLEX Monoblock made of SAF 2205

- ❑ Pressure up to 600 bar
- ❑ Easy maintenance

Standard Ultra-High Pressure made of Super Duplex SAF 2507

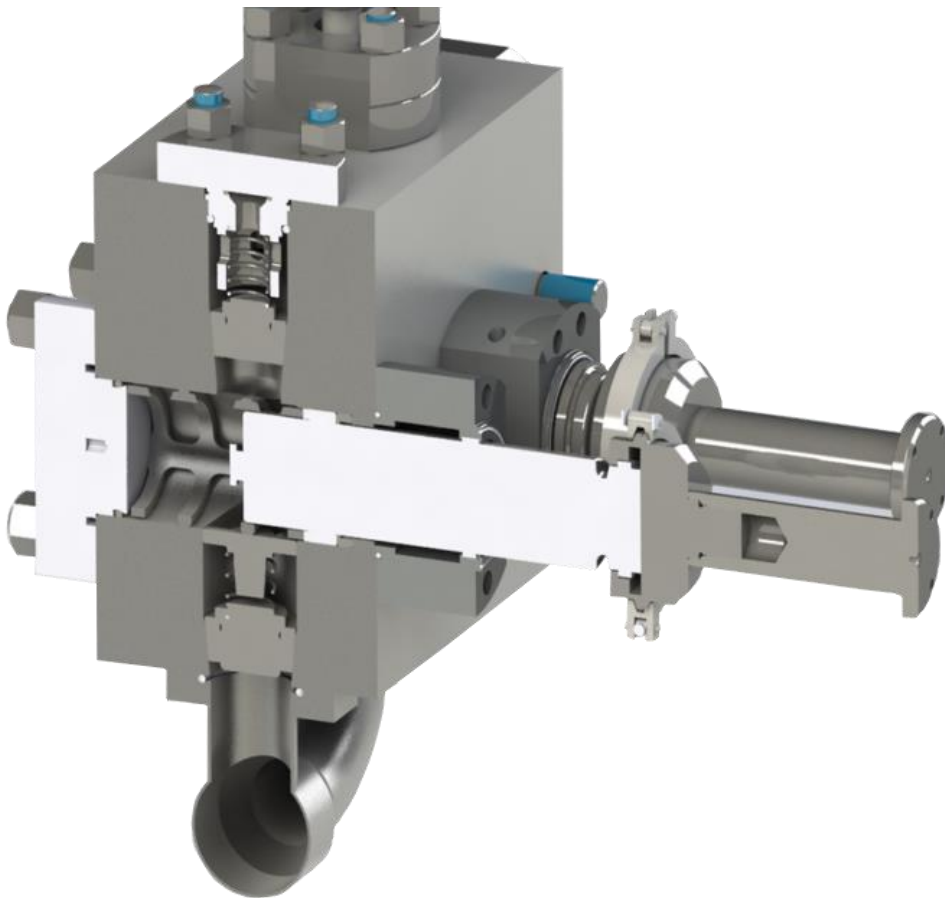
- ❑ Pressure higher than 600 bar
- ❑ Low internal volume



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■ Plunger Self-Alignment System



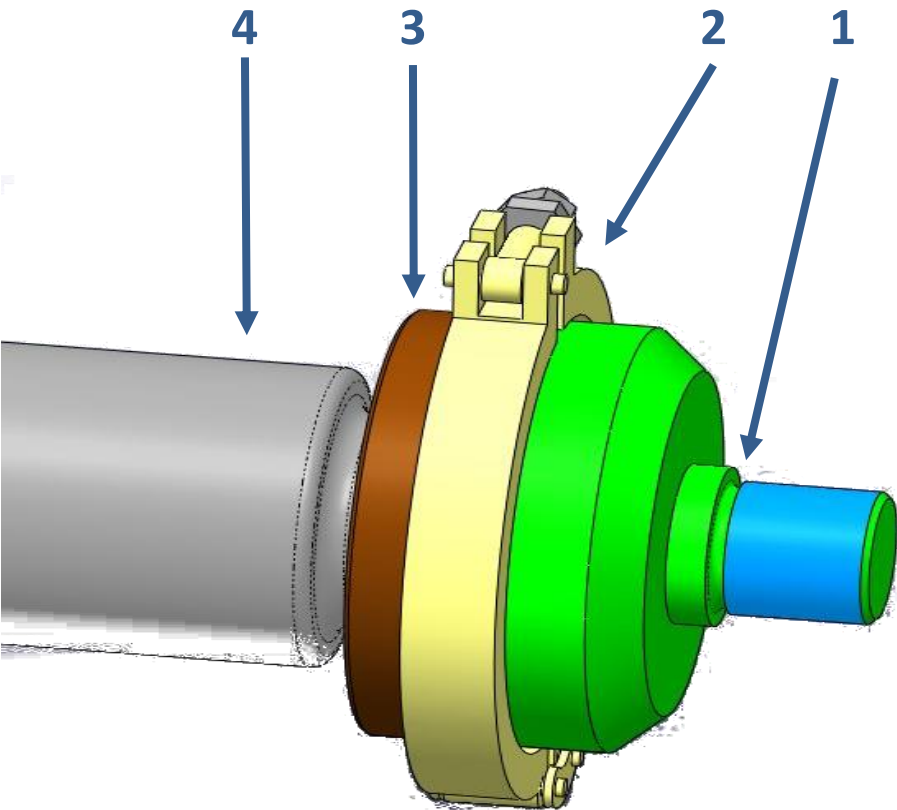
- Self centering plunger system – two peek washer guides located at equal distance to the plunger stroke in order to have a perfect alignment and zero deviation
- The combination of patented clamp and long arm between the washers reduces the lateral forces minimizing the wear of plunger and packing surfaces.

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Plunger Self-Alignment System



- 1) Connecting piston rod
- 2) Tri - Clamp connection
- 3) Flange
- 4) Plunger

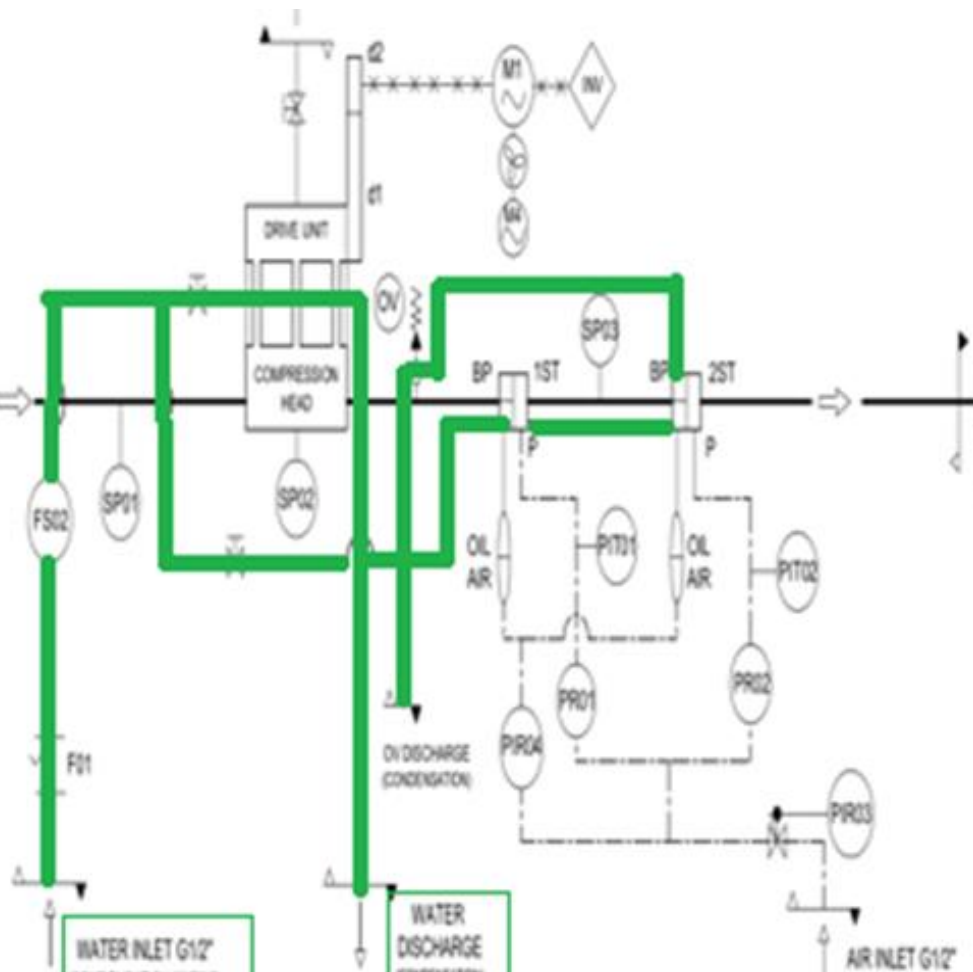
Patented system that extends the lifetime of plungers and packings. Lifetime of Chromium Carbide HVOF plungers over 20.000 working hours and Kevlar packing over 2.000 hours.

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Plunger Lubrication System



- Bertoli lubricating water chamber to lubricate and cooldown the plunger without sprayed water in the sump
- Better lubrication/cooldown of plunger for extended life of plunger and packing
- Solenoid valve and flow switch always included

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Details



Features



- ❑ Full ceramic Plungers with UHMW Packing seal for very high pressure, HVOF plungers with Kevlar packing
- ❑ Overpressure valve, flow switch alarm on water circuit
- ❑ Nitriding process on crankshaft
- ❑ Terminal box and control panel for local/remote control with PID control
- ❑ Second stage homogenizing group
- ❑ Explosion proof design
- ❑ Sound-proof design
- ❑ Vibration and temperature monitoring and alarms



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Why Join Us?



Services



Customer Care

- After sales assistance
- Spare Parts



Support

- Technical support
- On- site Intervention



Analysis

- Homogenization Test
- Particle Size Distribution Analysis

Certification



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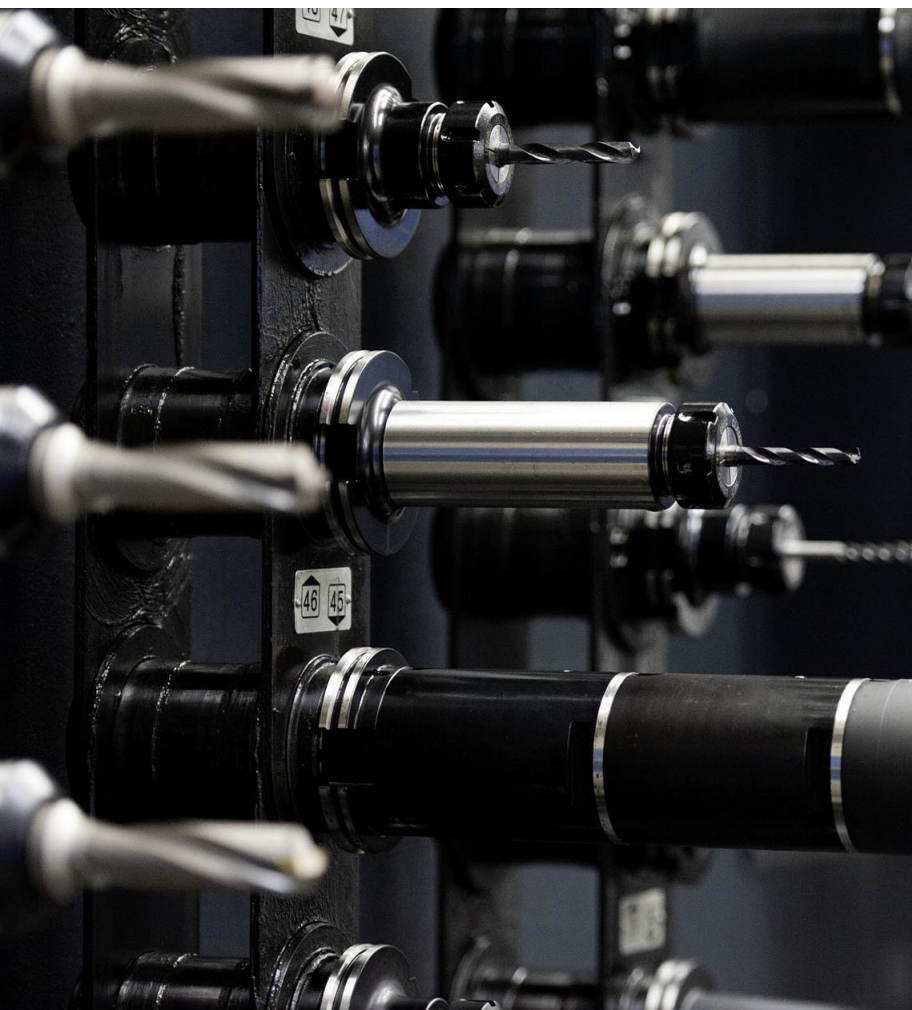
3A Certification

■ Highest Configuration



- ❑ Wetted Gaskets and Packings FDA compliant
- ❑ Wetted parts roughness $Ra < 0,6 \mu m$
- ❑ Sharp edge design for Homogenization Valves
- ❑ Compression Head made of Super Duplex
- ❑ Ceramic Homogenization Valves and Plungers
- ❑ Certification Manual for pharmaceutical validation
– CGMP and hygienic risk assessment documentation
- ❑ Factory Acceptance Test (FAT)
- ❑ Option skid mounted units including: inlet feeding pump, homogenizer and tubular heat exchanger
- ❑ Low temperature $\sim 10^{\circ}C$
- ❑ Compression head design suitable for a clean room installation
- ❑ Multiple passage for reducing particle dimension and Gaussian curve σ

Bertoli Add Value



- Homogenizing Group suitable design for a more stable adjustment of the pressure
- Hydro-pneumatic homogenizing system regulation
- Patented self alignment system
- Plungers made of chromium carbide HVOF over 250, integral ceramic over 600 bar
- New machine design up to 1.500 bar
- Interpump splash lubrication even at low for a minimal maintenance
- Friendly mainytnce for liquid end
- Easy opening panels
- CIP/SIP suitable
- Reliable technical support
- Tailor made machine configuration
- Dedicated after sales support and service assistance in a prompt manner

Credits



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Dairy

DANONE

SOREMARTEC
GRUPPO FERRERO

PINAR

Kraft

Arla

Jugos
del
Valle

1924
SANTA
CLARA

Amul

g
GRANAROLO



Unilever

Pascual
Dar lo mejor



Nestlé

parmalat

LACTALIS
INTERNATIONAL

서울F&B

CAPSA FOOD

Plasmon



FrieslandCampina

서울우유 서울우유



BERTOLI

Food & Beverage



KAGOME



Tomato Reference



tukas



KAGOME



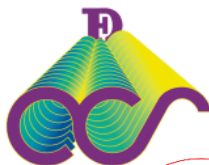
Eggs



Pharma



Paper



GE Healthcare



A close-up photograph of a person's chest and shoulders. They are wearing a dark-colored polo shirt. On the left side of the chest, there is a light blue embroidered logo that reads "BERTOLI" in a large, bold, sans-serif font, with "HOMOGENIZERS" in a smaller, similar font directly below it. The person's arms are crossed in front of them. The background is blurred and indistinct.

BERTOLI
HOMOGENIZERS

www.bertoli-homogenizers.com