BERTOLI HIGH-PRESSURE HOMOGENIZERS AND PISTON PUMPS

Bertoli Homogenizers

Company Presentation

www.bertolisrl.eu

Bertoli Homogenizers

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Bertoli Homogenizers in numbers

Founded 1974

2 facilities: Bertoli Homogenizers and Interpump Bertoli Tools

44 Countries in the World

70 tomato centrifugal pumps and chopper pumps per year

350 homogenizers and high pressure plunger pumps per year

4000 the installed base in operation

Bertoli 1974 – 2017 Milestones

1974 Bertoli foundation

1988 Machine serial number **S/N 500**

1990 Bertoli in **Rossi & Catelli Group**

2012 Machine serial number **S/N 3000**

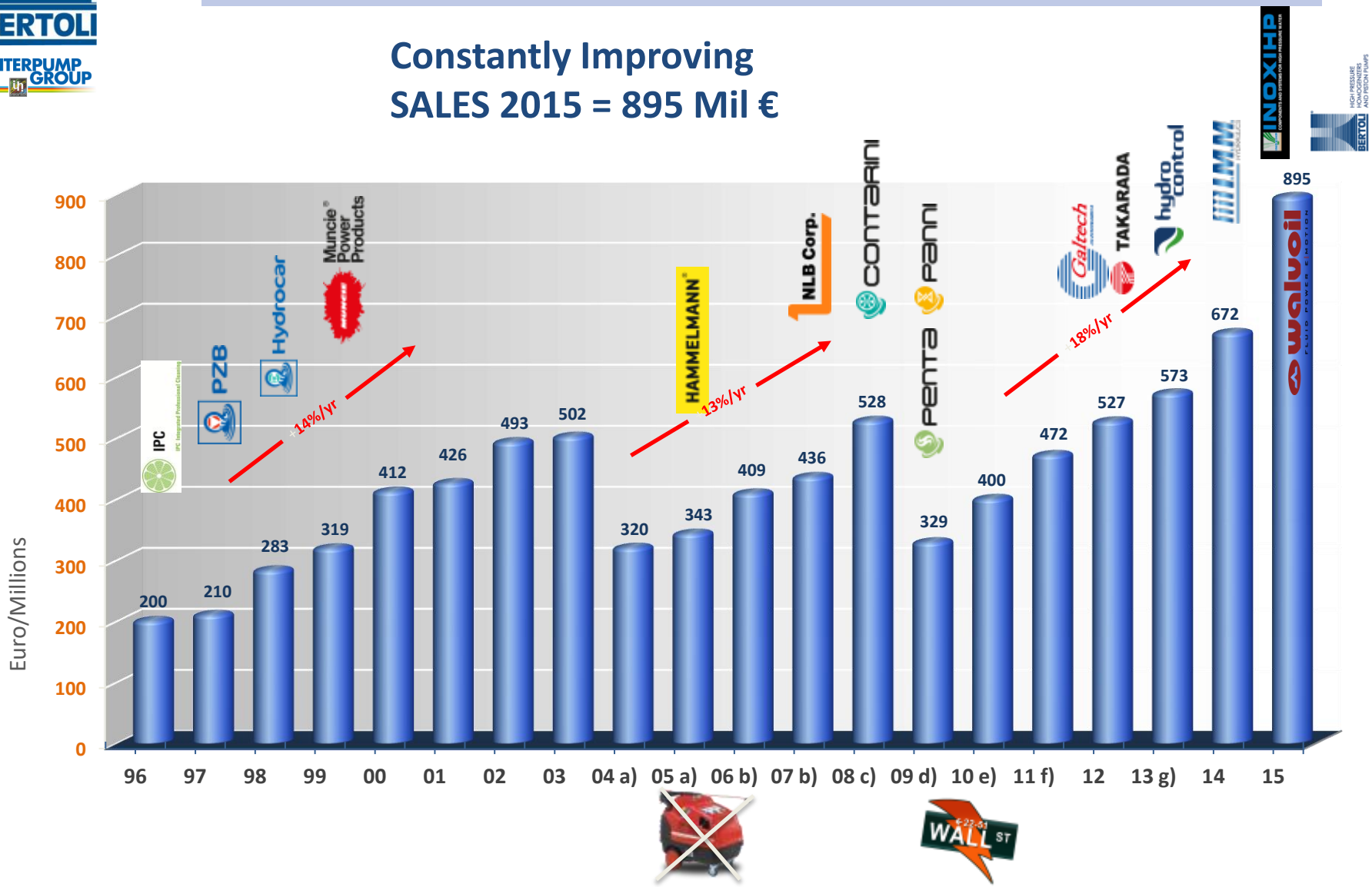
2015 Bertoli in Interpump Group

End of 2016 reached

S/N 4000

Interpump Group Trend

Constantly Improving
SALES 2015 = 895 Mil €



Interpump Group Water Jetting

The 'Prototype' and the Most Versatile in Semi Professional Applications

The Leader in Sewer Cleaning and Lightness

High Pressure Homogenizers. Innovative Solutions in Dairy , Food and Pharmaceutical Applications

Leader in Contractor Business in US

The Most Innovative Brand in Challenging Markets

Rolling-Mill Applications, Steel Industry

Bertoli network

Homogenization and Applications

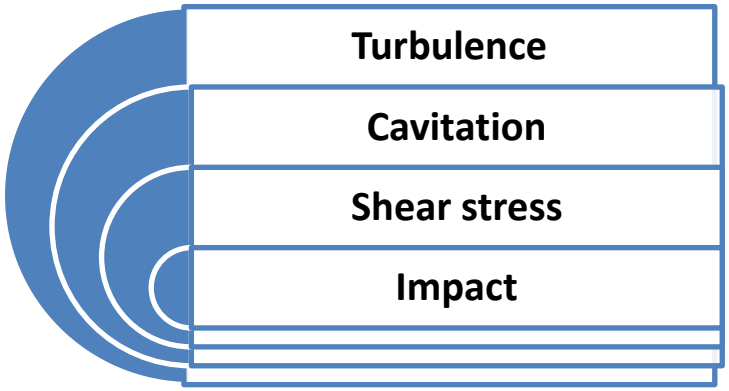
Homogenization

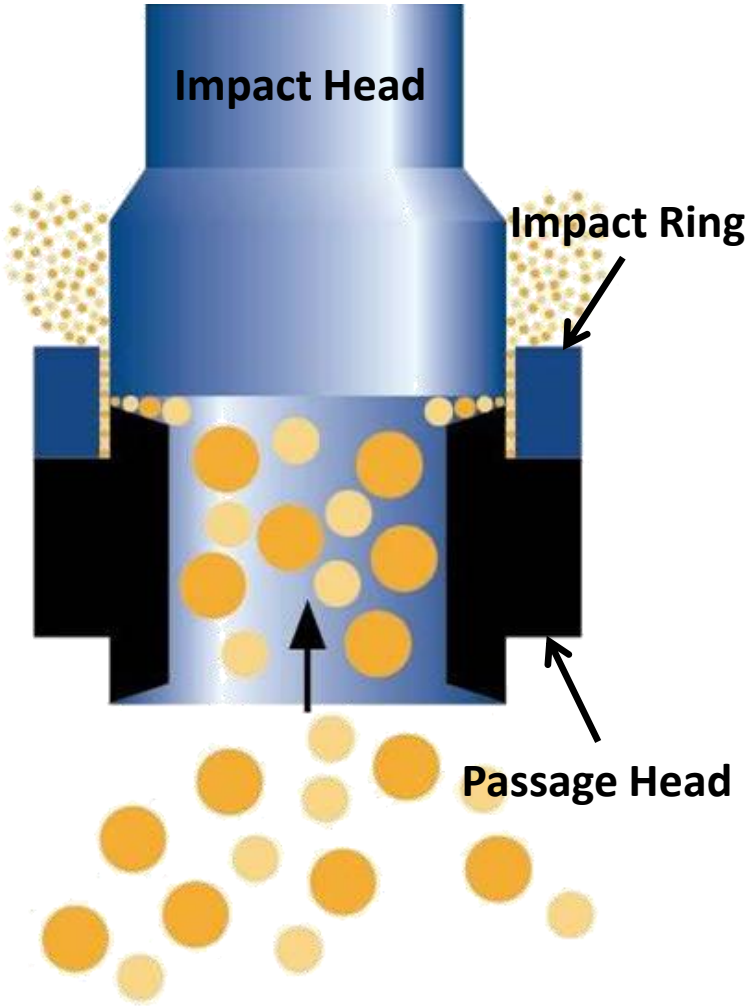
Homogenization principle

The homogenizer is used to create:
- stable Emulsion fat in water
- fine Dispersion solid in water

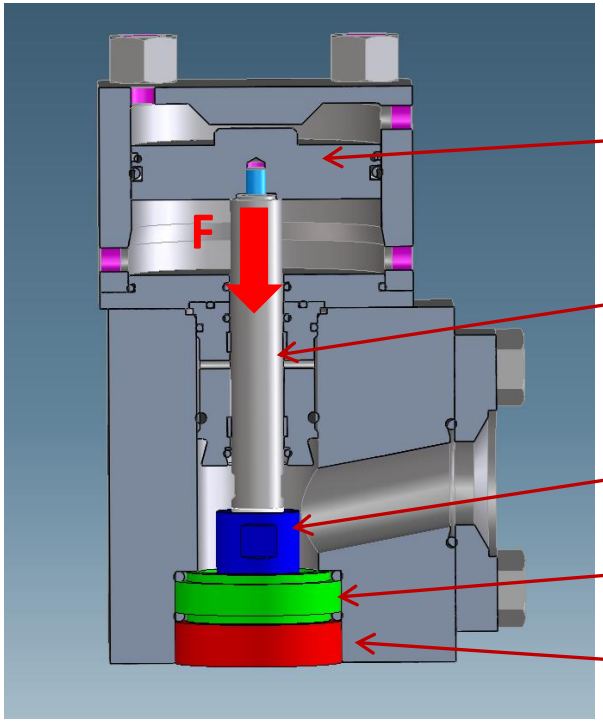
Stable emulsion and fine dispersion are made by Micronization of Particles.

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





Homogenizing Valve Group



Pneumatic Actuator

Impact head Shaft

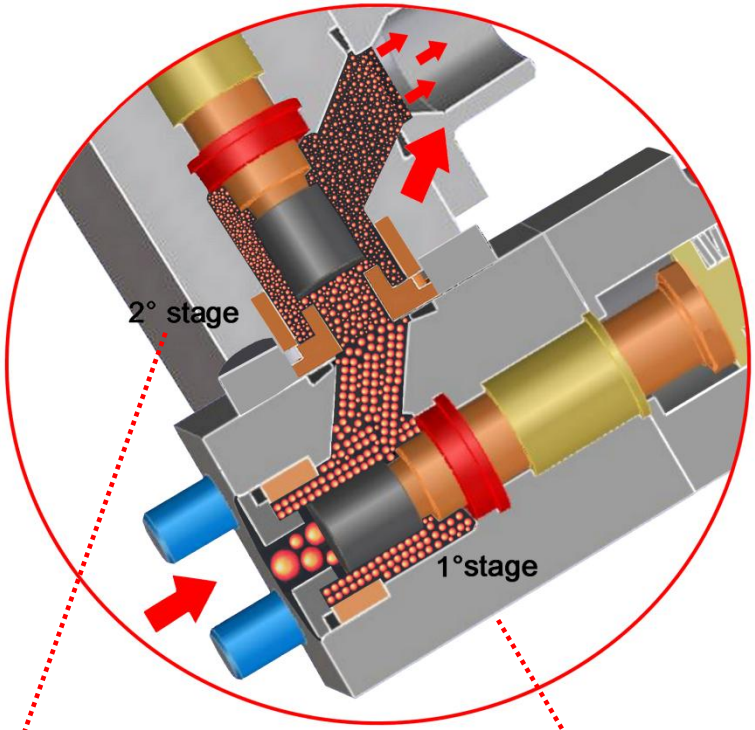
Impact Head

Impact Ring

Passage Head/Lower Head

$$F = p * A_{eff}$$

Double Stage Homogenizing Valve

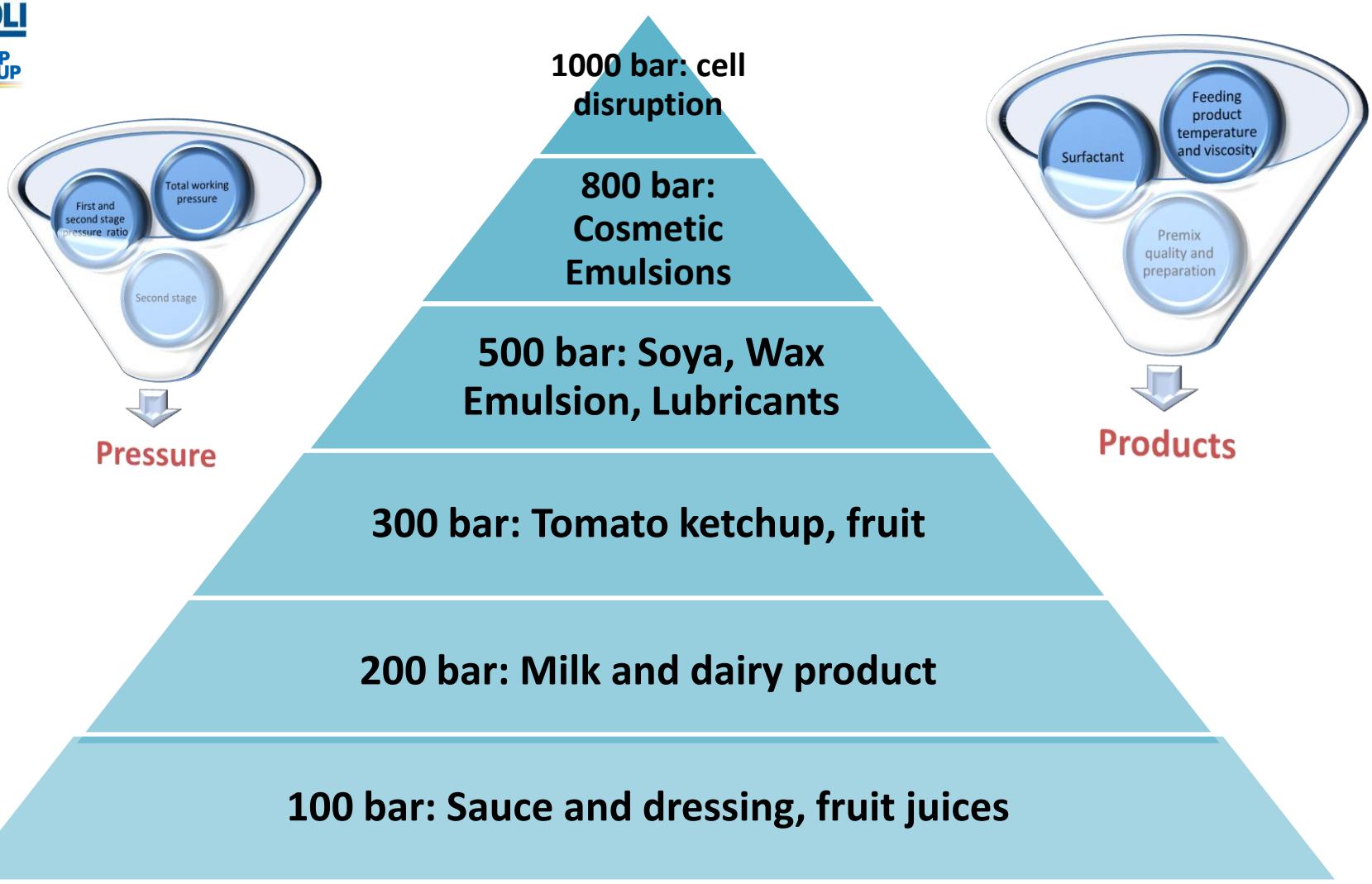


The particle reduction increases the separation time preventing floating and sedimentation.

The Second Stage is used to prevent fat clusters stabilizing the emulsion

The first stage is used to micronize fat particles

Pressures and applications



Dairy Applications

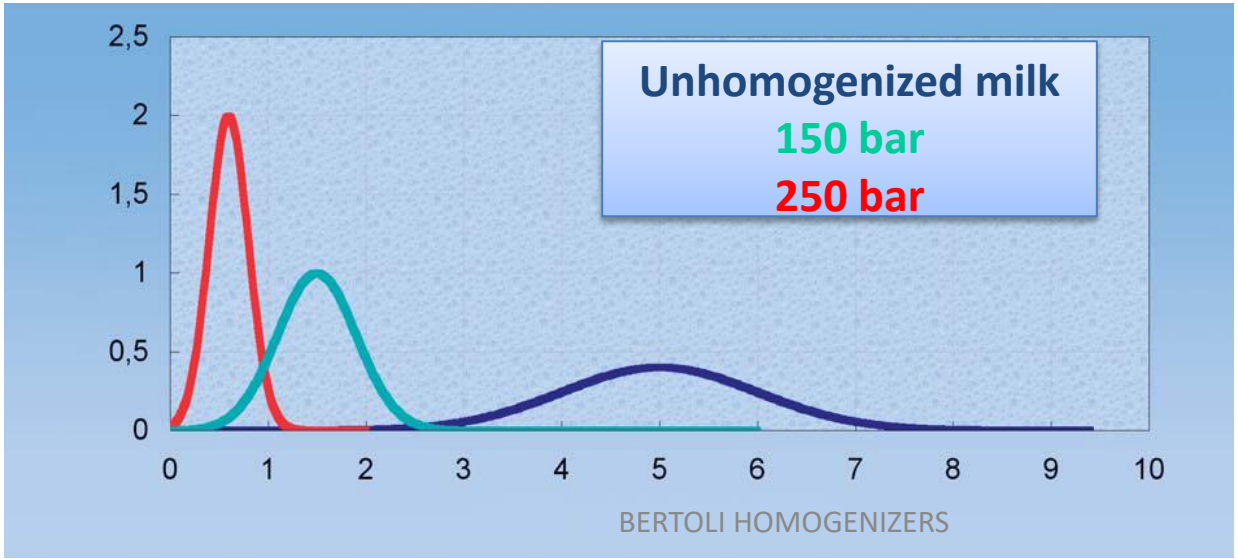
- Pasteurized milk
- UHT sterilized milk
- Condensed milk
- Reconstituted milk
- Desserts and derivatives
- Milk-based beverages
- Liqueurs with milk cream
- Whipping cream
- Cooking cream
- Puddings
- Cottage cheese
- Fresh cheese
- Yoghurt
- Powder Milk

Dairy Applications

Milk

Advantages of homogenisation

- ✓Prevent fat floating for extended shelf lifetime
- ✓Whiter and more appetizing colour
- ✓Taste improvement
- ✓Minimized usage of emulsifiers
- ✓Better stability of milk products. Homogenization of milk for yoghurt



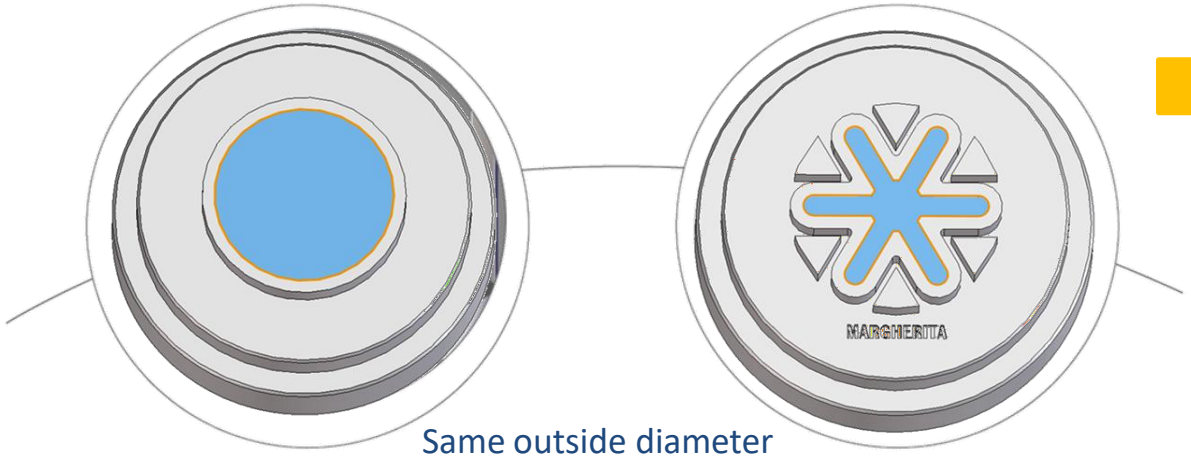
High Efficiency Valve Margherita

"MARGHERITA VALVE"
The latest evolution in Homogenizing Valves

Patented PIIT2 - PR2009A000023

- **The most compact**
- **The smallest in size**
- **The most stable**
- **The most simple**
- **Pneumatically controlled**
- **Up to 30% energy saving**
- **No addition of any special gasket to the normal standard**

"TRADITIONAL VALVE" **"MARGHERITA"**



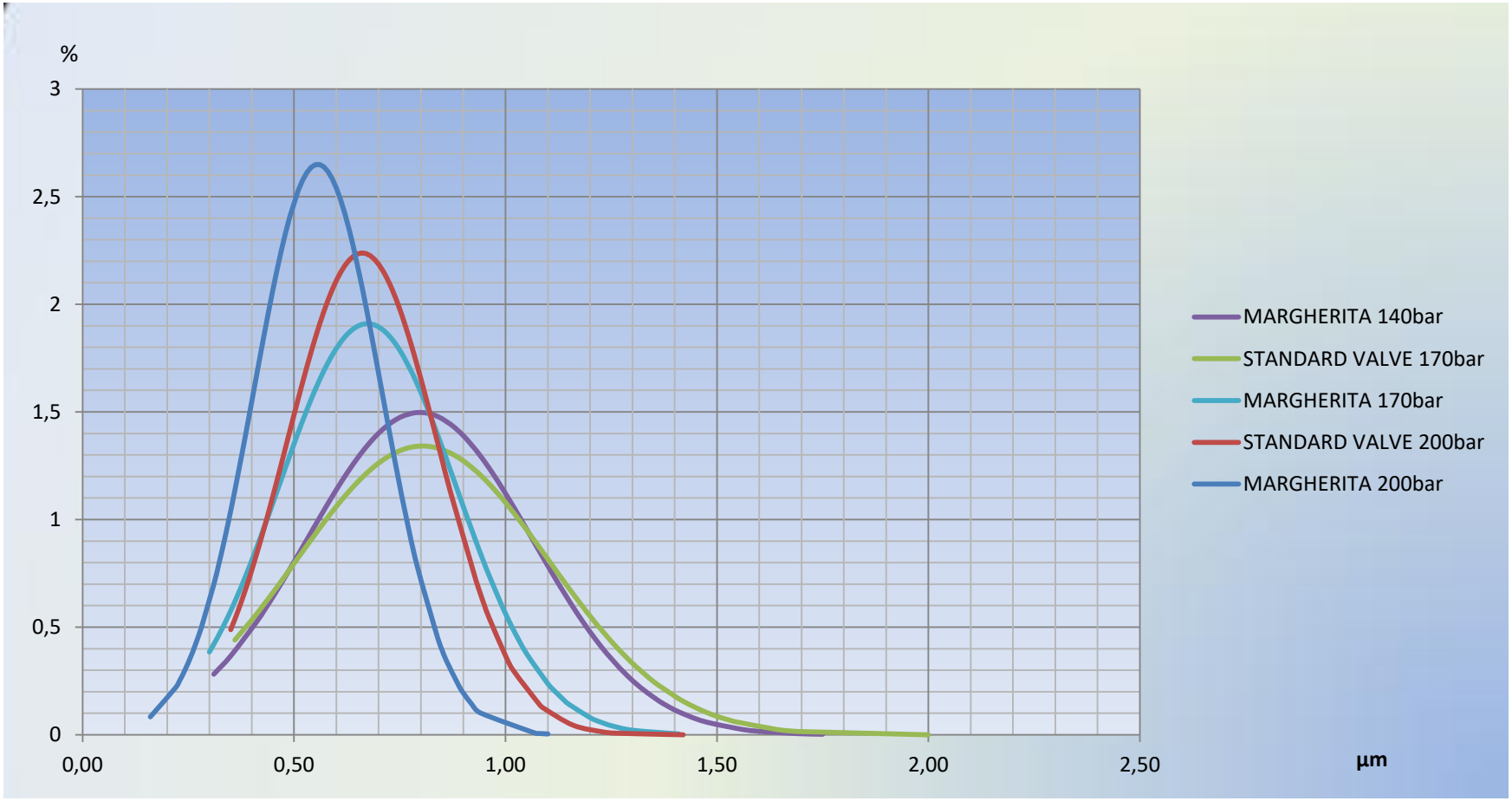
Same outside diameter

Outlet (lamination) perimeter: Margherita 200 % of traditional valve

Reaction Area: Margherita 30% of traditional valve

High Efficiency Valve for Milk

Homogenizing Group comparison: MARGHERITA vs. Standard Homogenizing valve



Ice-Cream

Advantages of homogenization

- ✓ Reduced Fat droplet size
- ✓ Stable emulsion
- ✓ Taste Improve
- ✓ Increasing available surface area
- ✓ Mix whiteness increase
- ✓ Enable interactions with soluble suspended proteins, stabilizers and emulsifiers
- ✓ Viscosity increase

Food and Beverage Applications

- Fruit juices and pulps
- Beverages
- Dressing
- Vegetables puree
- Baby-food
- Tomato puree and pulp
- Ketchup
- Eggs
- Whey
- Starch

Kechup

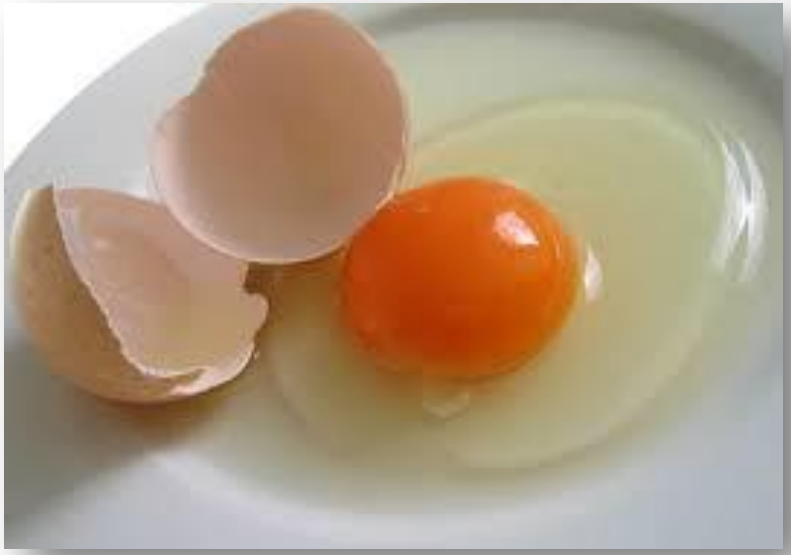
BENEFITS OF HIGH PRESSURE HOMOGENIZATION:

in relation to the complete process parameters and product recipe

- ✓ Reduced particle size to increase viscosity (reduced 4 – 5 Bostwick)
- ✓ Particles uniformly dispersed throughout the product
- ✓ Better mixing of all the ingredients
- ✓ Reduced separation
- ✓ More uniform color
- ✓ Increased yield less tomato, less sugar and less salt

Eggs

Advantages of homogenisation



- ✓ Viscosity Decrease
- ✓ Avoid separation during storage
- ✓ Foaming power and cake volume improve

Fruit Nectars and Purees

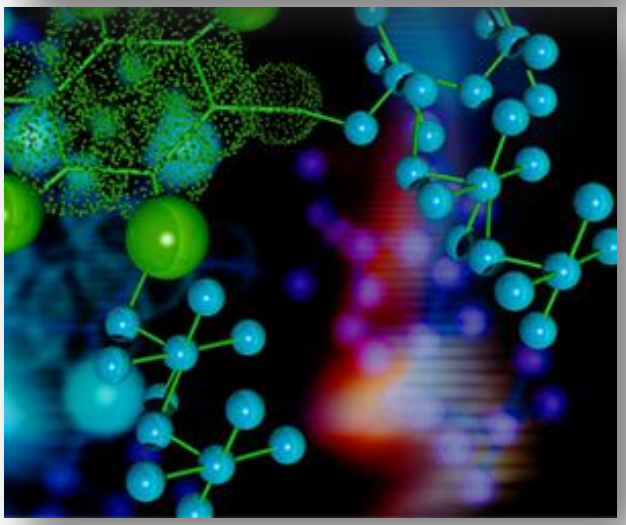
Advantages of homogenisation

- ✓ Viscosity Increase
- ✓ Avoid Sedimentation
- ✓ Enhance Flavor
- ✓ Less product more water

Pharmaceutical Applications

- Product for injection
- Fat emulsions
- Antibiotics
- Lotions
- Syrups
- Vaccines
- Vitamins
- Eye-drops
- Cell disruption
- Liposomes

Chemical and New Applications



Wax emulsions

Pigments and Inks

Monomers and polimers

Paraffines emulsions

Grease and lubricant

Natural Latex

Sintetic Latex

Silicone

Nano Cellulose

Carbon Nano-Tubes

Bertoli products Homogenizers and HPP

HA and BH Homogenizers

- Industrial and laboratory models
- From 10 l/h up to 60.000 l/h
- Pressure up to 1500 bar

PA Piston Pumps

- Low, medium, high pressure
- For low, medium, high viscosity products

PX Pumps for pieces

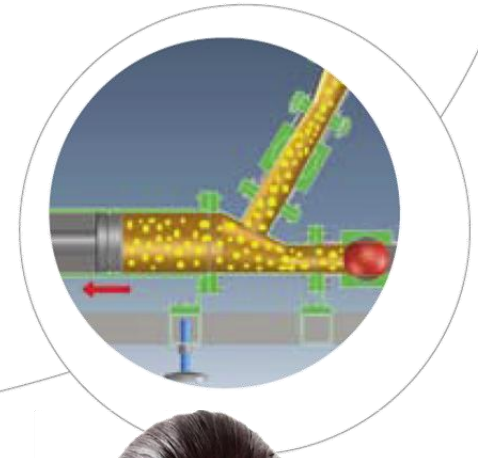
- For products with pieces or dry products

Bertoli homogenizers hydraulic domain

Models	100	150	200	250	400	600	1000	1200	1500
Raffaello HA30	1.500	1.500	1.400	1.100	600	400	200	150	100
Raffaello HA31	3.100	2.400	2.000	1.500	800	600	300	200	200
Raffaello HA32	5.500	3.700	2.900	2.200	1.100	800	400	350	250
Raffaello HA33	10.000	8.600	6.200	5.100	3.100	1.800	1.100	700	600
Raffaello HA34	12.900	12.900	12.900	9.900	6.300	5.800	2.100	1.400	1.200
Raffaello HA35	22.600	22.600	20.400	16.300	9.100	6.500	3.100	2.600	1.900
Leonardo HA51	24.100	24.100	24.100	18.400	10.900	7.300	3.900	2.700	2.200
Leonardo HA52	37.600	37.600	34.000	27.200	15.200	10.900	5.100	4.300	3.200
Leonardo HA53	50.400	50.400	50.400	41.200	24.600	15.700	7.900	5.800	4.900
Taurus BH30	1.100	1.100	1.000	1.000	/	/	/	/	/
Taurus BH31	6.100	4.100	3.200	2.500	/	/	/	/	/
Taurus BH32	10.000	8.100	6.100	4.900	/	/	/	/	/
Atomo 3.0	/	/	/		/	150	80	/	20
Molecola	/	/	/	120	120	120	120	120	120
Mago	150	150	150	150	/	/	/	/	/

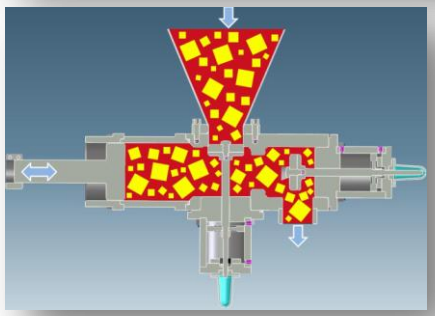
Plunger pump for product containing pieces

TP Pumps Series



PUMP UP TO 15 BAR
Volumetric sanitary two piston pump with total through pass valve commands by a servo pneumatic actuator. Pumping fluid products with pieces size up to 60 mm.

PX Pumps Series



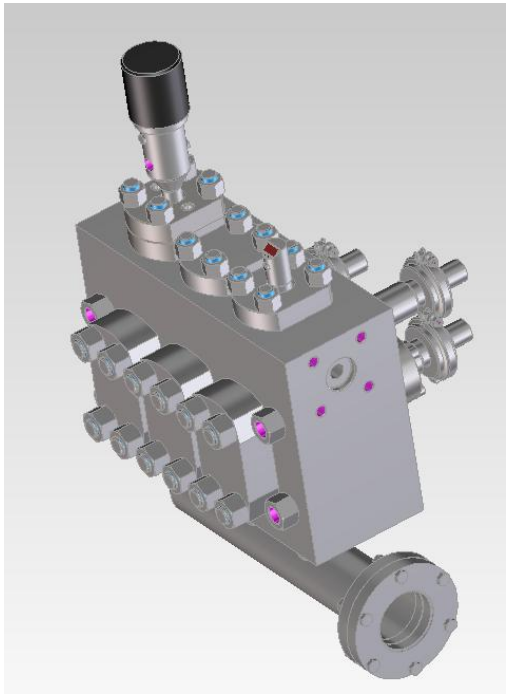
PUMP UP TO 80 BAR
from 2.800 up to 13.500 l/h. Pumping fluid products with pieces size up to 30 mm keeping their form, surface and structure.

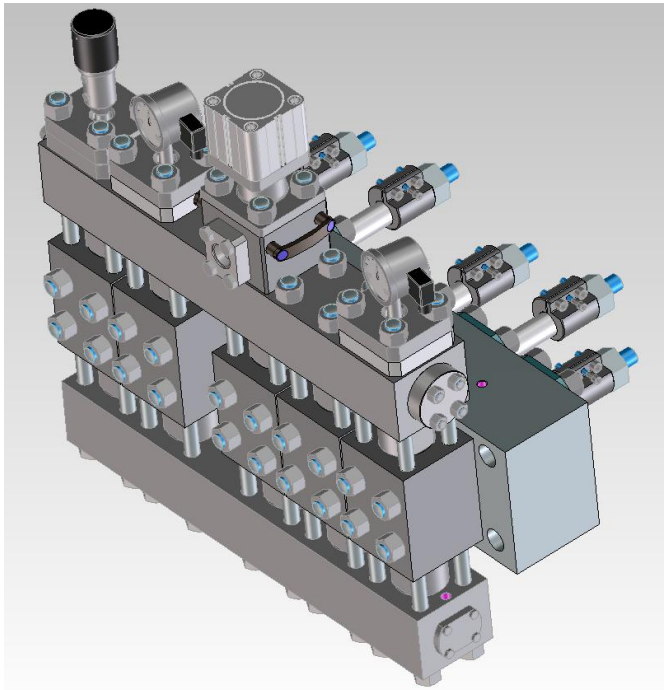
Best Practice in Quality

Quality in design, manufacturing, installation and service

- **ISO 9001 Quality Certification**
- **ISO 14001 Certification**
- **GOST Certification (Russia)**
- **3 A Certification (USA)**
- **OHSAS 18001 Certification**
- **FDA compliant wetted parts**
- **Manual of certificate for GMP Validation**
- **ATEX EX configuration available**
- **Design in accordance with EHEDG guidelines**

Monoblock and Ultra-High-Pressure Multiblock





Standard Monoblock

- Pressure up to 600 bar
- Easy maintenance

Standard Ultra-High Pressure Multiblock

- Pressure higher than 600 bar
- Very high material properties
- Lower roughness (~0.5µm)

High Pressure Homogenizers for Pharmaceutical Application

- Wetted Gaskets and Packings FDA compliant
- Wetted parts roughness Ra < 0,6 µm
- Sharp edge design for Homogenization Valves
- Multiblock Compression Head
- Ceramic Homogenization Valves and Pistons
- GMP compliant design
- Certification Manual for pharmaceutical validation – CGMP and hygienic risk assessment documentation
- Factory Acceptance Test (FAT)
- Option skid mounted units
- Cell Disruption:
- Low temperature ~10°C
- Temperature raise control by inlet or outlet heat exchanger and temperature probs
- Multiple passage for reducing particle dimension and Gaussian curve σ

Laboratory Applications

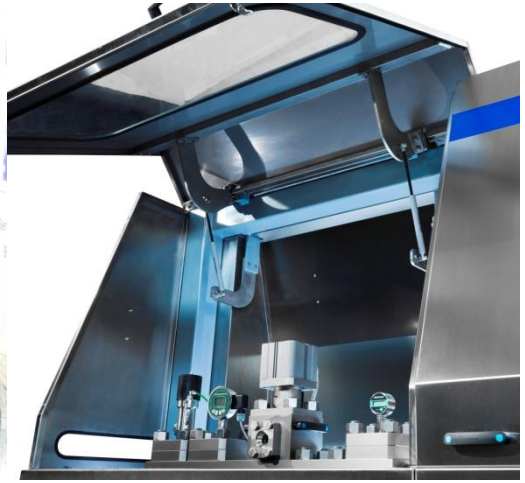
Molecola

Lab homogenizer Molecola is able to reach at operative pressures 1.500 bar

Atomo 3.0

Atomo 3.0 Capacity 20 l/h Pressure up to 1.500 bar the first small table top unit with three plungers

Leonardo Series



HA53200 – 20.000 l/h
300 bar – 250 kW

Up to 350 kW

Leonardo Series

Leonardo Series – 60.000 l/h Pressure up to 1.200 bar

Next generation of homogenisers

HA31 5,5 -15 kW Pressure 100 – 1500 bar and large range of capacity

Atomo 3.0 Capacity 20 l/h Pressure up to 1500 bar the first table top unit with three plungers

Thanks for your attention

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