



GEA homogenizing valves

Core components
in your process

The homogenizing valve: the heart of homogenization technology

Homogenization uses high pressure energy to reduce the particles contained in a fluid to required size, thereby obtaining a uniform emulsion that is stable over time. The particle size that can be achieved varies according to the application and product formulation, which is why there are various GEA homogenizing valve designs. The valve geometry is fundamental in obtaining specific results on the product and to ensure optimal use of the pressure.

Moreover, depending on the product and application, all of the valves can be configured with a second homogenizing stage and are available in sanitary (standard) and aseptic versions.



How does it work?

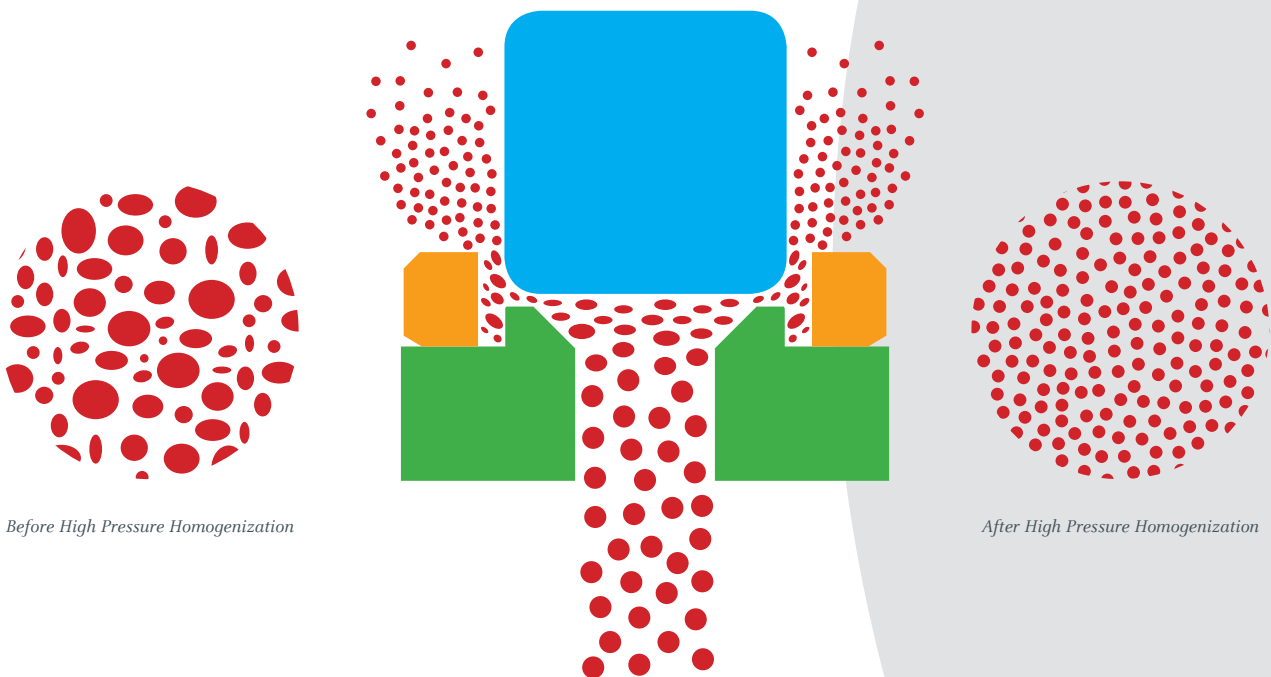
Homogenization is the only mechanical system among the high pressure technologies that uses high pressure in a continuous and variable manner.

Thanks to a piston head, the product is pumped into the homogenizing valve, where it is micronized down to the order of nanometres. Inside the valve, the product undergoes the typical effects of fluid dynamics: turbulence, cavitation, shear forces and impact speed.

When the product exits from the homogenizing valve, its physical properties have changed: the particles are smaller and are distributed uniformly within the product.

Maximum efficiency

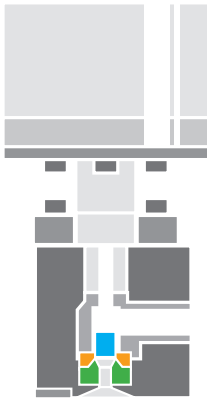
Thanks to more than 70 years of experience in high pressure homogenization, GEA is able to provide the optimal solution for any homogenization tasks. Different homogenizing valve designs allow an increase in efficiency and a reduction in operating pressure, providing energy savings and optimal use of the ingredients and resources.



Before High Pressure Homogenization

After High Pressure Homogenization

Our Valves



Standard Valve

The standard GEA valve can meet many market requirements because it is possible to customise its profile and the materials used. They can be varied according to the application and the required result on the final product. The valve is available in various versions, depending on the required gap and travel parameters. They cover a range from low to high pressures, allowing performance

optimization. The S-type (flat valve) and R-type (sharp edge) profiles, which can cover pressures of up to 1500 bar, meet different process requirements: the S-type is ideal for emulsions, while the R-type was designed for high performance where there is a need for higher cellular rupture capacity.

Up to	1,500 bar
Up to	60,000 l/h



Re+VALVE

The innovative design of the Re+VALVE makes it ideal for any applications that require high pressures. The symmetrical profile of the impact ring and the passage head ensure that the valve is reversible, doubling its lifetime compared to the current standard. The special flat profile of the work area increases its resistance and offers a greater number of operating combinations, which can be changed according to the type of product to be processed.



In the same way, it is possible to select the material that is most suited to the application process conditions, and certified materials are also available for use in the pharmaceutical field (FDA and 3-A). The special features of the Re+VALVE make it ideal for applications in the pharmaceutical, chemical and biotechnology sectors, for processing nanoparticles, nanodispersions and nanoemulsions. It is also perfectly

compliant with the specifications for neutreaceutical products and those that contain flavourings, proteins and probiotics.

Benefits:

- Greater mechanical stress resistance
- Longer lifetime
- Reversible impact ring and passage head
- More operating combinations thanks to the flat profile
- Possibility of choosing configurations according to the operating conditions and direct control of the main fluid dynamics parameters

From	600 bar up to 1500 bar
Up to	12,000 l/h

NanoVALVE™ (NVHC)

The patented NanoVALVE™ technology (EP 0810025B1, IT 1.282.765, US 5.887.971) offers a revolutionary design and profile: optimizing the gap between the fixed and moving elements, together with the “sharp edge” profile, allow the energy generated by the fluid dynamics phenomena to be released efficiently onto the particles.

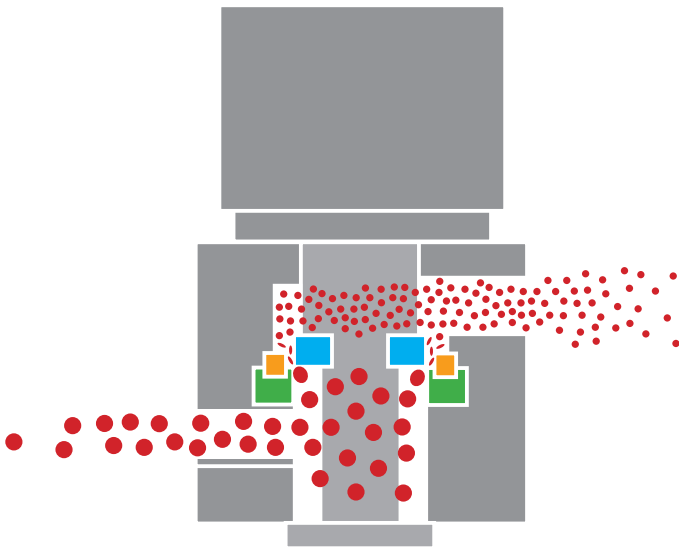
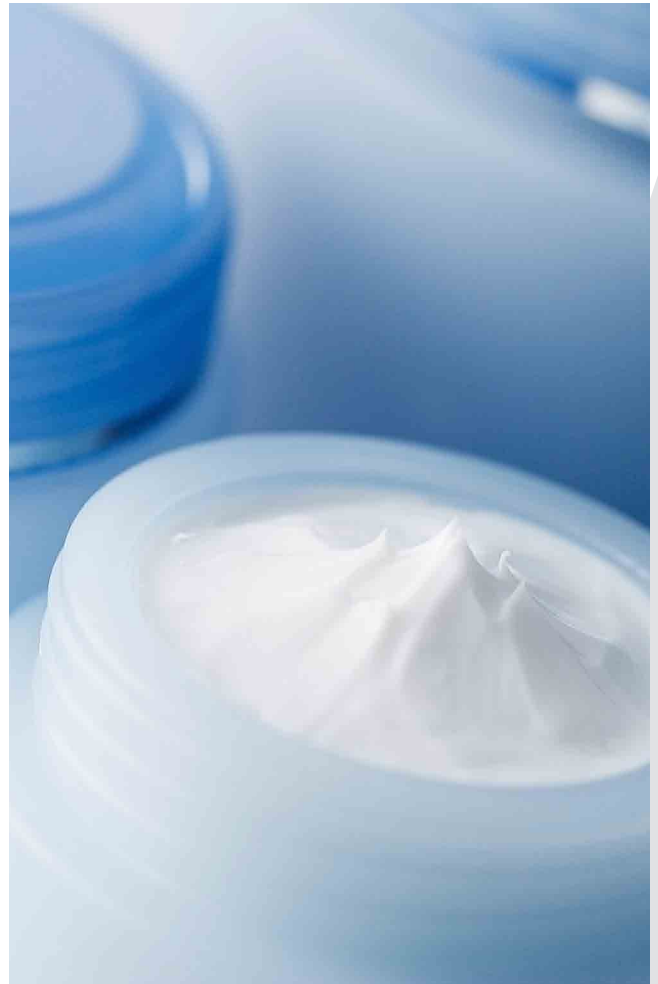
Every NanoVALVE™ is available in the latest 3G version, a configuration in which the impact head guide system has been perfected, resulting in improved pressure regulation and reduced valve sensitivity to the high operating temperatures.

Up to

250 bar

From

5,000 up to 80,000 l/h



NanoVALVE™HP (NVHP)

NanoVALVE™HP is ideal for processing antibiotics, additives and any production process up to 700 bar. Its design is covered by an international patent for fibrous product applications (PCI/IB 2014/058613). The special profile has been designed following the same high-efficiency principle used in the NanoVALVE™ 3G, which reduces energy and operating consumption while improving the homogenization conditions, even in the nutraceutical, probiotic and biotechnology markets. NanoVALVE™HP is the perfect solution for both latest-generation homogenizers and machines that are already in operation; it can be installed as a retrofit kit in sanitary and aseptic process systems.

Applications

NanoVALVE™HP can be used in various production processes, from food, including foodstuffs containing flavourings, probiotics and emulsions, to the chemical, pharmaceutical, cosmetics and biotechnology industries. NanoVALVE™HP is particularly suitable for applications that require high particle dispersion down to micron or nano level, such as:

- Vaccine preparation
- Parental nutrition
- Nanocellulose (NFC)
- Products containing additives, flavourings and stabilizers.

NanoVALVE™HP valves can be installed on Ariete models from the Ariete Homogenizer 3090 to the Ariete Homogenizer 5400 for operating pressures from 250 to 700 bar and for production capacities from 5,000 to 32,000 l/h.

Specifically designed for medium process pressures and to improve efficiency, the NanoVALVE™HP optimizes the degree of homogenization at lower pressures compared to traditional valves, reducing energy and spare parts consumption, and consequently reducing environmental impact.

The Revolutionary Features

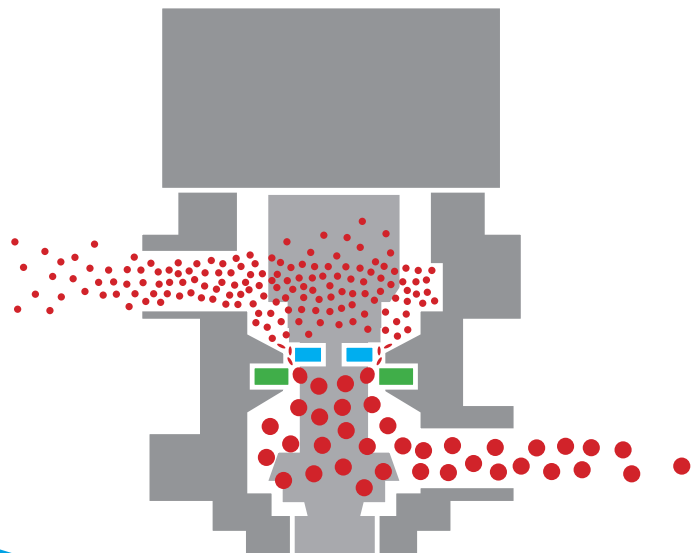
- Flexibility: different valve profiles and dimensions depending on the capacity
- Reversibility: the homogenizing valve is composed of two parts, both of which are reversible
- Ceramic version available
- Longer valve parts lifetime
- Aseptic version available
- Easy assembly and maintenance
- 3-A compliant
- Can be adapted to all homogenizer brands as a retrofit kit

Up to

700 bar

From

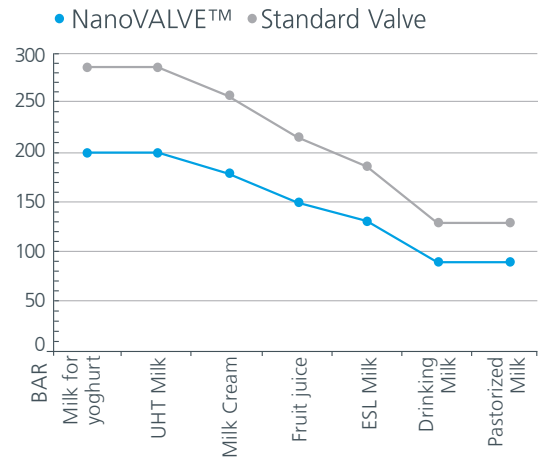
5,000 up to 32,000 l/h



Energy reduction

The effectiveness of the energy used can be maximized thanks to the advanced technology, allowing particle reduction with 30% less homogenizing pressure for the same performance on the product, which reduces both mechanical wear and energy consumption.

Tests on yoghurt have shown that, using the same pressure, it is possible to obtain 20% greater product viscosity, making it smooth and creamy with better flavour and colour, thanks also to a reduction in additive and protein quantities. NanoVALVE™ is suitable for pressures up to 250 bar, depending on the required capacity.



Materials

With the aim of providing specific solutions for any product type, GEA offers a variety of materials suitable for high-pressure processing. Based on comparative and lifetime tests, tungsten carbide has been chosen as the standard material, while two types of ceramic (Silicon Nitride and Zirconium Oxide) are recommended for abrasive products.

In fact, the homogenizing valve lifetime is greatly influenced by the product being processed and the operating pressure.

Std valve and Re+VALVE	Are available both in tungsten carbide and Ceramic (Silicon Nitride and Zirconium Oxide)
NanoVALVE™ (NVHC)	Tungsten Carbide
NanoVALVE™HP (NVHP)	Available in Tungsten Carbide and in Ceramic





We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

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