



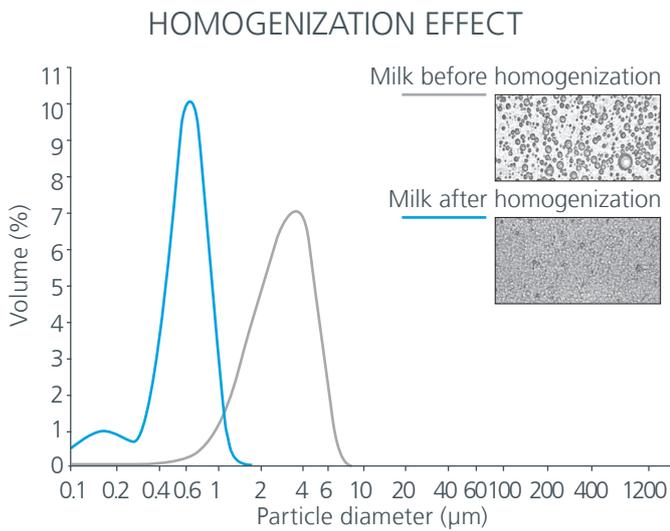
A Guide to Homogenization in the Dairy

All the advantages of
a leading process

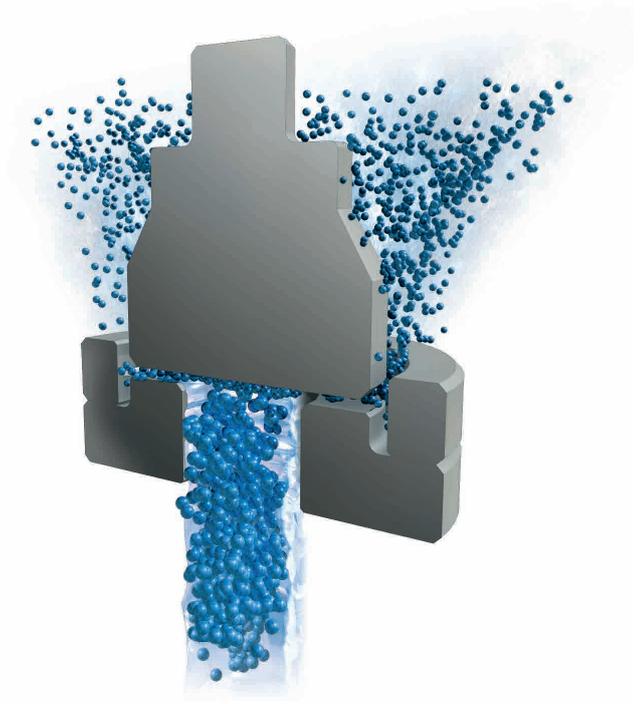
High pressure homogenization

The benefits of high pressure homogenization are well known in dairy applications.

The homogenizer uses dynamic high pressure energy to break the particles in the fluids down to the smallest possible size, the nanometre. This process creates an emulsion that is stable over time, which improves the organoleptic characteristics of the product: shelf-life, viscosity, taste and colour.



Homogenization effect: following homogenization, the particle diameters are smaller and uniformly distributed



Homogenizing valve: the particles are pushed through a very narrow orifice by the high pressure and are smaller when they exit

Why GEA?

There is much more than a simple machine behind a GEA homogenizer, there is:

- **Quality:** At the Parma site, the utmost care is taken in selecting the materials and in manufacturing the key components, resulting in absolute performance reliability and excellent finished product quality
- **Innovation:** A highly qualified staff can help customers develop new products and determine the most efficient process conditions
- **Result scalability:** The laboratory and the Innovation Center allow customers to assess the homogenization process performance on samples of their products to ensure scalability of the result even for industrial capacities.
- **Sustainability and efficiency:** Continuous improvement and technological innovation allow GEA to guarantee the best results in terms of efficiency and finished product quality, lowering energy costs and the consumption of water and oil.
- **Flexibility:** A full range of homogenizers from laboratory to industrial scales and the very high level of customisation offer producers the highest flexibility and efficiency.



Founded in 1947, the production site in Parma occupies an area of about 20,000 sq.m





- Certification and full traceability: The ISO 9001:2008 and OHSAS 18001 quality and safety certification, the 14001:2015 environmental certification and full traceability of all the components in contact with the product in accordance with the 1935 standard of 2004, allow GEA homogenizers to meet the rigid and strict standards in force, in both the food and pharmaceutical sectors and, more importantly, to satisfy our customers.

All this makes the difference and allows users to work safely and effectively, with advanced solutions that can satisfy their production needs and ensure the best results.

A laboratory and a test center are available to customers for developing new products

High quality aseptic

The growing attention to food quality goes hand in hand with a constant improvement in process hygienic standards. GEA aseptic homogenizers allow safe and genuine production, increasing shelf-life and preserving the original appearance and flavour of the product, allowing a significant reduction in preservatives and chemical additives.

The downside of many aseptic processes is their high energy and water consumption, combined with a high risk of contamination.

For this reason, it is very important to rely on a quality partner that can guarantee advanced technologies and energy savings.

Outstanding expertise in aseptic processes that comes from 70 years of experience and continuous technological development, complete traceability of the machine components in contact with the products that GEA offers in accordance with the certification 1935 del 2004, make GEA homogenizers a winning market choice.



Innovation aimed at improving sustainability and efficiency

Thanks to specific know-how that is constantly focused on innovation and close cooperation with customers' research centres, GEA can guarantee advanced and customized solutions.

In this way, GEA keeps its machines constantly updated and can guarantee the best results in terms of efficiency and finished product quality.

NiSoPURE: Advanced technology at the service of customers

To satisfy these requests, GEA has developed NiSoPURE, a machine that can produce sterile water, reducing water and steam consumption, and hence energy consumption, by up to 90% compared to traditional systems used in UHT processes. NiSoPURE can also be connected to existent homogenizers and those of other brands.

*Sterile Water: Heat treatment consists of heating the water for the time required to obtain a parameter $F_0=6$ (F_0 is obtained by bacterial spore inactivation techniques)



External unit for air cooling of the reduction gear lubrication oil

Keeping the lubrication oil temperature below 50°C is of primary importance both to protect the moving parts of the machine and to prolong the oil use. For this reason, the larger homogenizers are equipped with a built-in water-based cooling system.

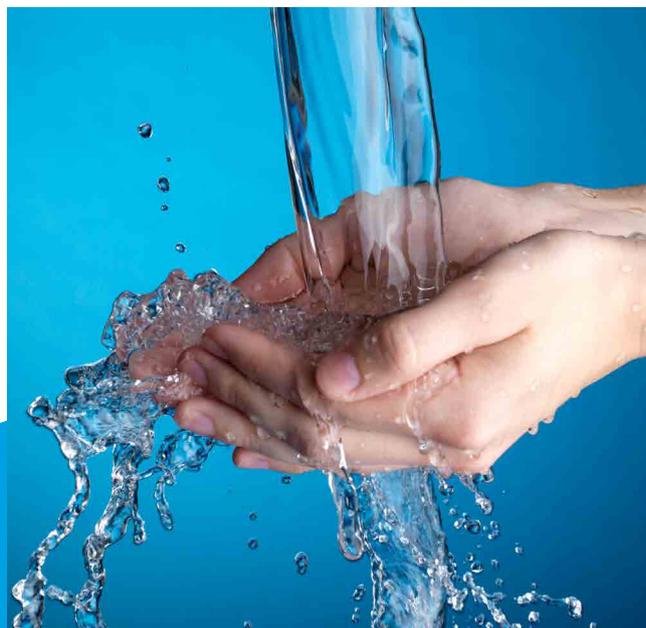
The external oil cooling unit offered by GEA uses air instead of water. This drastically reduces water and energy consumption as the unit only operates when a specific temperature threshold is reached.

It is available as an option on new machines for the Ariete series: Ariete Homogenizer 3110, Ariete Homogenizer 5132 and Ariete Homogenizer 5200 models.

The O.P.S. – Oil Purification System

The O.P.S. is the by-pass filtration unit that guarantees a continuous oil regeneration by removing particles, water and corrosive gases enhancing oil lifetime, quality and safety.

It is realized to operate in continuous independently from the homogenizer so the maintenance time doesn't compromise the machine operation and it allows great oil, time and cost saving for the customer.



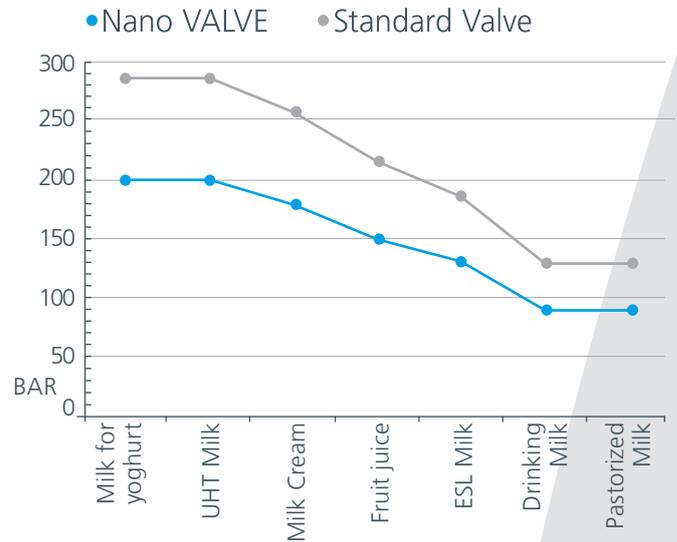
The homogenizing valve that makes a difference

Using dynamic high pressure and a specific homogenizing valve design reduces particle sizes to the required level of micronization and homogenizes the product ingredients at the lowest possible pressure, giving considerable cost and energy savings. For this reason, GEA offers milk producers specific high-efficiency valve designs.

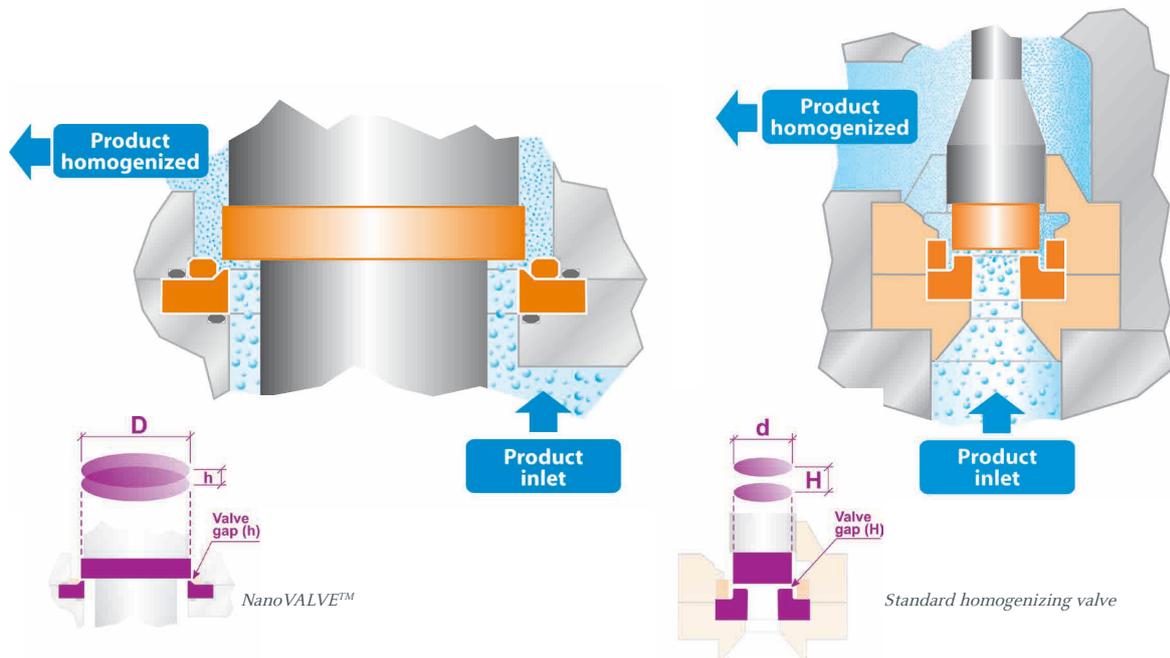
NanoVALVE™: the highest production efficiency

NanoVALVE™ is a high-efficiency homogenizing valve designed for high flow rates and moderate pressures. It was designed by carrying out a thorough fluid dynamic analysis to optimize the use of the pressure energy and improve the micronization effect on fluid emulsions. For the same operating conditions, homogenization is better when compared to standard valves, giving excellent product stability and better use of additives.

NanoVALVE™ is the ideal valve for high quality dairy products and beverages: milk, cream, cheese spreads and fruit juices. Depending on requirements, the 3G version can offer various size combinations for pressures up to 250 bar. NanoVALVE™ is available for the Ariete series or as a retrofit kit for other brands of homogenizers.



NanoVALVE™ optimizes the product results: reducing the operating pressure also improves the degree of particle homogenization





NanoVALVE™HP

Probiotics where NanoVALVE™HP makes a difference

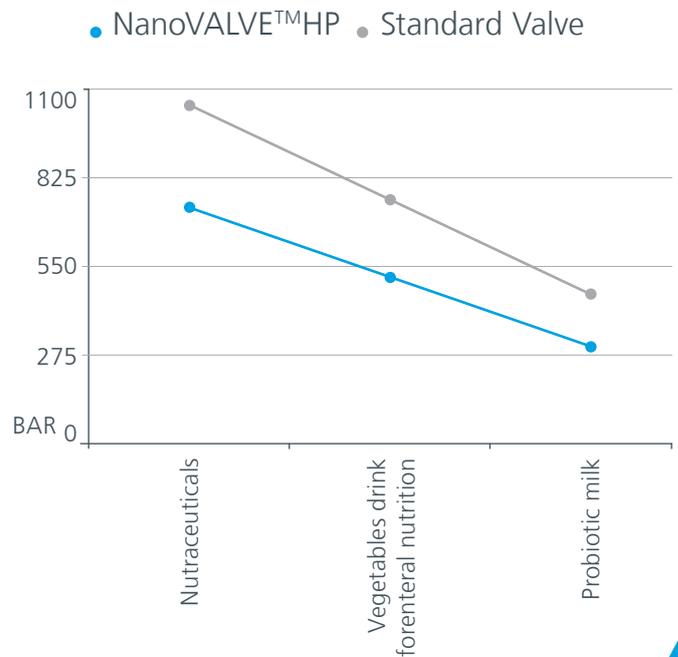
The special profile based on the highly efficient principle used in NanoVALVE™ 3G allows NanoVALVE™HP to offer the highest efficiency even at high and medium pressures. Suitable for process applications where large capacities and high pressures are required, NanoVALVE™HP offers clear benefits in terms of flexibility and performance, especially when treating complex products. NanoVALVE™HP is available for the Ariete series with operating pressures from 250 to 700 bar in healthcare and aseptic process systems. It can also be installed as a retrofit kit on other brands of homogenizers. Its design, which is covered by an international patent for fibrous products (PCI/IB 2014/058613), not only allows it to reduce the operating pressure and hence its energy consumption and, as a result, its environmental impact, but it also reduces spare parts consumption by improving the homogenization conditions.

Scientific and clinical studies of probiotics have shown that they help balance intestinal microflora and strengthen natural defences.

The high homogenization pressure applied to dairy products can

increase the vitality of added probiotic micro-organisms.

In fact, recent studies have shown that applying high homogenization pressures to strains of lactic bacteria can change their metabolic profiles and increase their resistance to passing through the gastro-intestinal tract for up to 14 days.



NanoVALVE™HP improves production efficiency: it can save energy (up to 30% less pressure) compared to standard valves and can reach levels of micronization that improve the vitality of added probiotic micro-organisms, thereby increasing their resistance to lactic bacteria.

Maximum flexibility

A full range of homogenizers
for the dairy industry

The Ariete Series

Homogenizers of the Ariete series incorporate the very latest technology in the field of high pressure machines and customizable solutions. Easily installed in remotely controlled systems and complete process lines, Ariete machines reach pressures of up to 1500 bar and very high flow rates that ensure very high reliability and the best homogenization performance: for this reason they are the first choice of the most demanding producers in every sector.

With over 300 options available, use of the best materials available and in-house production of key components, these machines guarantee absolute quality, full parts traceability and extensive scope for customization to meet any given set of production requirements. Designed for CIP and SIP, Ariete homogenizers are suitable for abrasive and viscous products, are available in both sanitary and aseptic versions and can reduce operating costs (water, oil energy) and environmental impact.



The One Series

Ideal for medium and small-sized processes, the One series of homogenizers combines convenience and quality and can guarantee excellent results, especially in dairy and beverage production.

The One series machines meet the criteria of simplicity, flexibility and reliability. In fact, they have a simple and

complete design, equipped with all the options needed for integration into the plant line. Thanks to their ease of use and maintenance, they can meet any production requirement (from 300 l/h up to 10,000 l/h at a maximum pressure of 250 bar). Moreover, constant technical improvements, the choice of materials and high manufacturing quality are the essential ingredients for making long-lasting and efficient homogenizers.



Lab homogenizers

Laboratory homogenizers can verify the effects of homogenization and optimise the use of pressure within the process. From concept through pilot testing and up to final analysis: this is the right way to go to ensure perfect product formulation and the best homogenization conditions.

Laboratory homogenizers help to quickly refine product composition and determine the most efficient process conditions to guarantee result scalability even at industrial capacities.





We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

GEA Italy

GEA Mechanical Equipment Italia S.p.A.

Via A. M. Da Erba Edoari, 29

43123 Parma, Italy

Tel +39 0521 965411

Fax +39 0521 242819

gea.com/contact