



The new NiSoX-Valve

A new concept in
the homogenization technology

Improving product micronization and uniformity

The new NiSoX-Valve device introduces a revolutionary perspective in the field of high pressure homogenization technology – a complete change in the way that homogenizing valves are conceived and understood.

As of today, the main objective of homogenizing valves was to minimize the distance between the passage head and the impact head at every opportunity. GEA NiSoX-Valve heralds a new era in the homogenization technology thanks to its new configuration, which subordinates the flow-dynamic effects generated inside the device.

Laboratory trials with the NiSoX-Valve have shown how the liquid within the valve is channeled in such a way as to optimize the energy employed in the process, and consequently achieve an improvement in the micronization effect obtainable per unit of pressure applied.

The highly effective action of the NiSoX-Valve gives optimum results, with regard both to the average size of the particles analyzed, and to the standard deviation achieved.

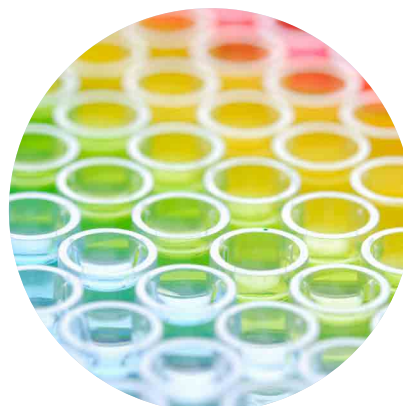
The new NiSoX-Valve geometry facilitates a better distribution of energy towards the middle of the valve, promoting a more effective micronization of the particles, and above all a significantly enhanced uniformity of the product.

Key advantages

- Smaller particle size
- Better particles distribution
- Lower energy consumption
- Low temperature increase
- Longer life span
- Reversible components
- Scalability consistency
- Easy and quick maintenance

Improvement in output

- Enhanced product quality
- Improved physical properties
- Improved transparency
- Improved glossy aspect and colours



Advanced design for energy optimization

The design of the new NiSoX-Valve derives from the adoption of a fresh approach to valves of this type. It takes into account four combined factors that are mainly important to optimize the energy generated inside the system:

1. Elongation stretching
2. Continuous acceleration along the passage
3. Radial impact towards the center of the valve
4. Tuned cloud cavitation phenomenon

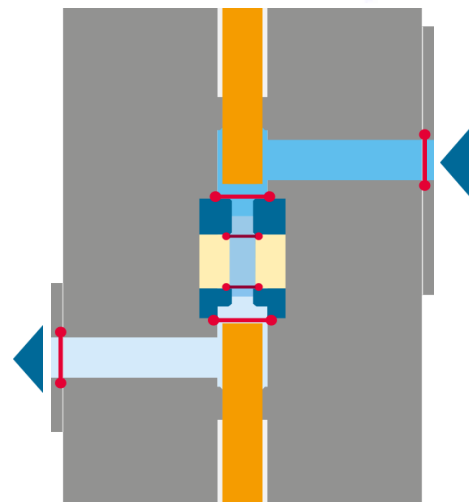
The effect of these factors on the flow is made possible by virtue of a new mechanical configuration, that allows the optimization of the energy.

The NiSoX-Valve is made up of only few active components: a deflector, a radial collider and a CCMS (Cavitation Cloud Modulating System).

New product flow

Entering the NiSoX-Valve, the product is brought into contact immediately with a deflector and forced to flow through a narrow gap, which has the effect of elongating the particles, before converging to the center of the valve. Passing through the deflector, the liquid accelerates to a velocity higher than that obtainable with conventional homogenizing valves, whereupon the radial impact occurring in the radial collider generates a powerful cavitation effect, micronizing the particles more effectively and achieving an improvement in the physical properties of products.

Thereafter, the product flows into the CCMS, which performs a mechanical tuning function in combination with the radial collider and has a stabilizing effect on the product as it passes through.



NiSoX-Valve process scheme

High reliability and performance

GEA NiSoX-Valve is designed as a stand-alone system, in other words a single and indivisible device capable of reducing particle sizes to a degree that ensures better homogenization than ever before.

The NiSoX-Valve has fewer component parts than those of a conventional homogenizing unit, which means that maintenance operations are made both simpler and quicker. GEA can ensure the reliability of the NiSoX-Valve to any of your product needs.

Main features

- FDA approved
- Available in sanitary execution
- Aseptic barrier option
- Pharma Skid configurations
- 3-A, Electropolished version
- CIP/SIP able
- Easy working operation
- Pneumatic adjusting
- Local/Manual – Remote/Automatic pneumatic regulation
- Available as retrofit for existing machines
- Available configuration with pressure gauge or transducer

The NiSoX-Valve is available for the complete GEA homogenizers range, from laboratory unit to industrial scale; both tungsten carbide and ceramic versions are available.



Excellent results on products

Target applications: pharma, cosmetic and chemicals

High pressure homogenization guarantees high performance in all sectors. The NiSoX-Valve has given excellent results especially with VHP applications in the 700 to 1,500 bar pressure range, which are particularly suitable for processing micro and nanoemulsions in pharma, cosmetic and chemical industries.

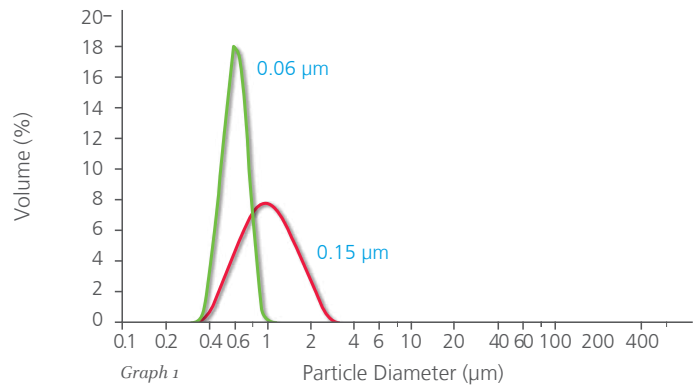
From the standpoint of effectiveness on the product, the NiSoX-Valve combines the main advantages of fixed-geometry homogenizing equipment and conventional high pressure homogenizers. When deployed in equipment for processing micro and nanoemulsions the NiSoX-Valve delivers unprecedented results in term of uniform particles distribution (standard deviation in Graph 1).

Laboratory tests on emulsions show just how effective the NiSoX-Valve can be in regards of particles size reduction, as well as significantly advantageous in enabling a reduction of energy consumption in terms of less operative pressure applied and low temperature increase on products. Graph 2 shows how, for a given particles dimension, the operative pressure used with NiSoX-Valve is lower than the one used with conventional valves.

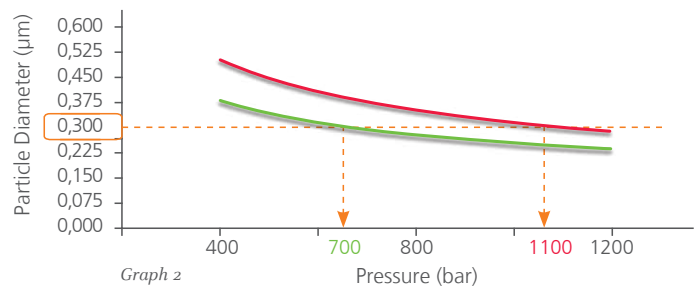
Adoption of the NiSoX-Valve also means less number of passes for the same particle size (Graph 3). In short, with the new device, a given micronization effect can be obtained with an optimization of the energy in terms of:

- reduction of operative pressure
- reduction of number of passes
- low temperature increase on the product

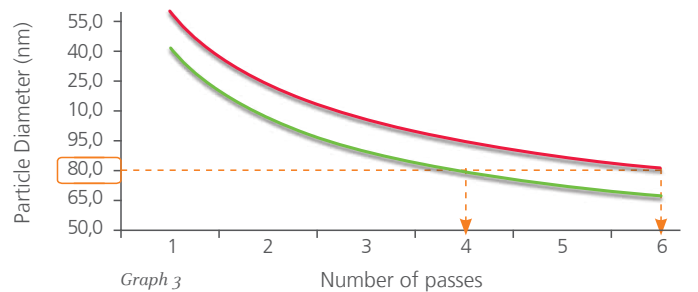
PARTICLES DISTRIBUTION, COMPARISON ON MICROEMULSION 1 PASS AT 1,200 BAR



COMPARISON ON MICROEMULSION NISOX-VALVE AT 700 BAR, CONVENTIONAL VALVE AT 1,100 BAR BOTH FOR 1 PASS



COMPARISON ON NANOEMULSION AT 1,000 BAR



- NiSoX-Valve
- Conventional valve





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