microfluidic high pressure homogenizer for pharma use

Microfluidic high pressure homogenizer is a small high-pressure processing equipment specially developed for nanoscale particle dispersion, cell crushing, emulsification mixing and other high-precision fields.

Microfluidic High Pressure Homogenizer Overview

Microfluidic high pressure homogenizer is driven by ultra-high pressure to produce strong shear, cavitation and impact of materials in the micro flow channel, so as to realize particle size refinement and distribution homogenization. Microfluidic high pressure homogenizer is suitable for small and medium trial in the fields of biopharmaceuticals, vaccine preparation, nutritious food, cosmetics and nano-materials development.

Performance Features

- Alternating drive system: equipped with double ceramic plunger pump head alternating pressure supply, to ensure continuous and stable pressure output. The plungers support the installation of lubrication and cooling devices to extend the life of seals and effectively reduce the maintenance frequency.

- Working Pressure: Standard rated pressure up to 2200bar, design peak up to 2500bar, 250MPa, 36250psi, to meet the needs of more efficient refinement and emulsification. Equipped with high-precision digital + pointer dual pressure gauge system to ensure safe and controllable operation.
- Sample processing volume and suction function: support 20ml starting sample processing, suitable for high value materials or experimental formula evaluation. With automatic suction function, no need for external feeding pump, to enhance the convenience of use. With online emptying design, realizing “zero residue” operation.
- Hygienic manufacturing standards: all parts in contact with materials are made of medical grade stainless steel and sealing materials in accordance with FDA and GMP standards, with optional CIP online cleaning and SIP online sterilization system, suitable for aseptic process environment.
- The core component advantage: homogenizing valve seat components are made of diamond material, with strong wear resistance and long life. The secondary homogenization system enhances the consistency of emulsification and particle distribution, with smaller particle size and more concentrated distribution.
- A wide range of material adaptability: the equipment can handle viscosity less than 2000 cps of low and medium viscosity fluids, suitable for a variety of biological, food and fine chemical samples. Allowable feed particle size of 300um, it is recommended that high particles of material pre-filtration treatment.

- Intelligent control and energy-saving operation: Built-in frequency conversion speed control system supports precise pressure regulation and energy efficiency optimization. Key components are selected from international brands to ensure equipment stability and operational reliability, while reducing energy consumption and improving overall energy efficiency.
- High temperature feeding design: support 90 °C feeding temperature, suitable for most of the heat-sensitive or heat-stable fluids, suitable for a variety of process requirements.

Working Principle

1. Micro-jet high-pressure homogenization technology is a kind of relying on hydraulic pressure to force the material through the micro-channel components, homogenization valve, the fluid particles, agglomerates or oil droplets in the way of strong crushing, dispersion and emulsification.
2. In the high-pressure plunger drive, the material hundreds of meters per second of high-speed impact in the homogenizing valve channel in the impact surface and nozzle area.
3. The material undergoes cavitation, shear, pressure drop, turbulence impact and other multiple effects.
4. The secondary homogenization structure to further strengthen the material's microscopic uniformity.
5. The formation of small particle size, distribution of concentrated stable suspension or emulsion, particle size up to nanometer level.

Typical Applications

- Pharmaceutical and biomedical: liposome, nano emulsion, mRNA vaccine preparation. Particle size control of protein drugs, antibodies, bioactives. Microsphere, slow release system homogenization pretreatment.
- Nutritional food and functional drinks: plant protein, collagen peptide nanosizing. Emulsification of fat-soluble vitamins and plant extracts. Stabilization of beverage suspending agent.
- Cosmetics and fine daily chemical: nano-serum, active ingredients carrier preparation. Microemulsion, cream formulation emulsification and stabilization.
- Material science and nanotechnology: nano-metal particles, graphene slurry dispersion. Silicon dioxide, zinc oxide and other inorganic nanomaterials preparation. Nano encapsulation liquid, coating material pretreatment.
- Higher education and research institutions: bioengineering, chemical synthesis, vaccine new process exploration. Multiphase system dispersibility assessment and nano-preparation optimization.

Model	**MH10-20**	**MH10-40**
Design flow	20L per hour	40L per hour
Processing Capacity	more or equal than 20ml	
Feed particle size	less than 300um	
Product Process Viscosity	less than 2000cps	

Model	MH10-20	MH10-40
Working Pressure Display	Digital, Pointer Pressure Gauge	
Control mode	manual operation	
Product feed temperature	less or equal than 90°C	
Max working pressure	2200bar, 31900psi	2200bar, 31900psi
Design max pressure	2500bar, 36250psi	2500bar, 36250psi
Number of plungers	2	
Power supply	380Vac, 50Hz	
Power	5.5kw	7.5kw
Note	In order to meet the needs of our users, we offer customized	