ultra high pressure homogenizer for pilot-scale testing

UHP homogenizer can make the material particles fine to nano level through ultra-high pressure instantaneous shearing, impact and cavitation to improve the stability, homogeneity and absorption rate of the products.

Ultra-High Pressure Homogenizer Overview

The design of the ultra-high pressure homogenizer takes into account the flexibility of laboratory equipment and the stability of industrial equipment, and is an important bridge between laboratory and industrialized production.

Features

- High-pressure system design: three to four high-strength ceramic plungers are used to drive the system alternately, providing stable pulse output and significantly reducing material pressure fluctuations. The system comes standard with a lubrication and cooling system, which significantly extends the life of the plunger and sealing components.
- Intelligent control platform: equipped with high sensitivity touch screen control system, the main control components using the German Siemens brand, the interface is intuitive, support for recipe storage, automatic pressure adjustment, temperature monitoring, operation data traceability and other functions. It is equipped with three-level authority management, which is suitable for enterprise-level research development management needs.

- Safety and monitoring system: equipped with digital pressure and temperature sensors, real-time monitoring of key operating parameters. With over-voltage, over-temperature, no-load startup, abnormal power failure and other multiple protection alarm mechanisms to ensure the safety of equipment operation and personnel safety.
- Strong process adaptability: flexible range of processing volume, processing volume of 15 liters, suitable for pilot scale 100 liters to 500 liters of small batch continuous testing. Working pressure up to 1800bar, suitable for a variety of high shear requirements of the material.
- Clean process design: material contact parts are made of 316L stainless steel, ceramics, zirconia, diamond and other corrosion-resistant materials, in line with FDA and GMP certification requirements. It supports CIP online cleaning function to meet the demand of sterile and clean process.
- Cooling and temperature control technology: online cooling module combined with high efficiency sanitary tube heat exchanger to realize low temperature control in high pressure homogenization process, which is suitable for processing heat-sensitive active substances such as enzyme preparations, vaccines, biological products and so on.
- Energy saving and low maintenance: Adopting frequency conversion motor drive, matched with automatic energy-saving speed regulation mechanism, more stable operation, lower energy consumption and smaller maintenance cost. Modular design of components, easy to disassemble and replace.

Working Principle

1. Shear effect: when the high-pressure fluid passes through the narrower channel, the flow rate increases sharply, and strong shear occurs between the fluid layers, resulting in particle fracture and refinement.
2. Cavitation effect: in the homogeneous valve high-speed channel area, the instantaneous pressure difference caused by local cavitation, bubble bursting to form shock waves, destroying the particle structure.
3. Collision and impact: material high-speed impact homogeneous valve surface or collision with each other, the particle structure further depolymerization, to achieve micron to nanometer particle size distribution.
4. Through this series of physical processes, the solid particles in the material, liquid droplets or cell walls are quickly broken or emulsified, so as to achieve stable dispersion, particle size uniformity effect.

Applications

- Pharmaceutical industry: vaccine, liposome, nano drug, protein solution, cell lysis, injection, emulsion and so on.
- Biotechnology: enzyme preparation, microbial cell crushing, homogenization of biological fermentation liquid.
- Food and beverage: fruit juice, dairy products, plant protein drinks, condiments, sauces and other microemulsification treatment.
- Cosmetics and daily chemicals: nano emulsion, cream, serum, flavor emulsification, etc.
- Chemical and new energy: nano-paste, graphene dispersion, lithium battery materials, battery paste, coating ink, etc..

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Model	HL10-40	HL10-60	HL10-120	HL10-200	HL10-300	HL10-400	HL10-500
Design flow	40L per hour	60L per hour	120L per hour	200L per hour	300L per hour	400L per hour	500L per hour
Processing Capacity	more or equal than 200mL		more or equal than 5L				
Feed particle size	less than 300um		less than 500um				
Product Process Viscosity	less than 6000cps		less than 6000cps				
Working Pressure Display	Digital, Pointer Pressure Gauge		Digital Pressure Gauge				

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Model	**HL10-40**	**HL10-60**	**HL10-120**	**HL10-200**	**HL10-300**	**HL10-400**	**HL10-500**
Control mode	manual operation		Touch screen control, manual operation				
Product feed temperature	less or equal than 90°C						
Max working pressure	1500bar, 21750psi		1800bar, 26100psi		1600bar, 23200psi	1500bar, 21750psi	1200bar, 17400psi
Design max pressure	1800bar, 26100psi		2000bar, 29000psi		1800bar, 26100psi	1600bar, 23200psi	1400bar, 20300psi
Number of plungers	2		3	4			

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Model	**HL10-40**	**HL10-60**	**HL10-120**	**HL10-200**	**HL10-300**	**HL10-400**	**HL10-500**
Power supply	380Vac, 50Hz						
Power	5.5kw	7.5kw	11kw	15kw	15kw	18.5kw	18.5kw
Note	In order to meet the needs of our users, we offer customized						