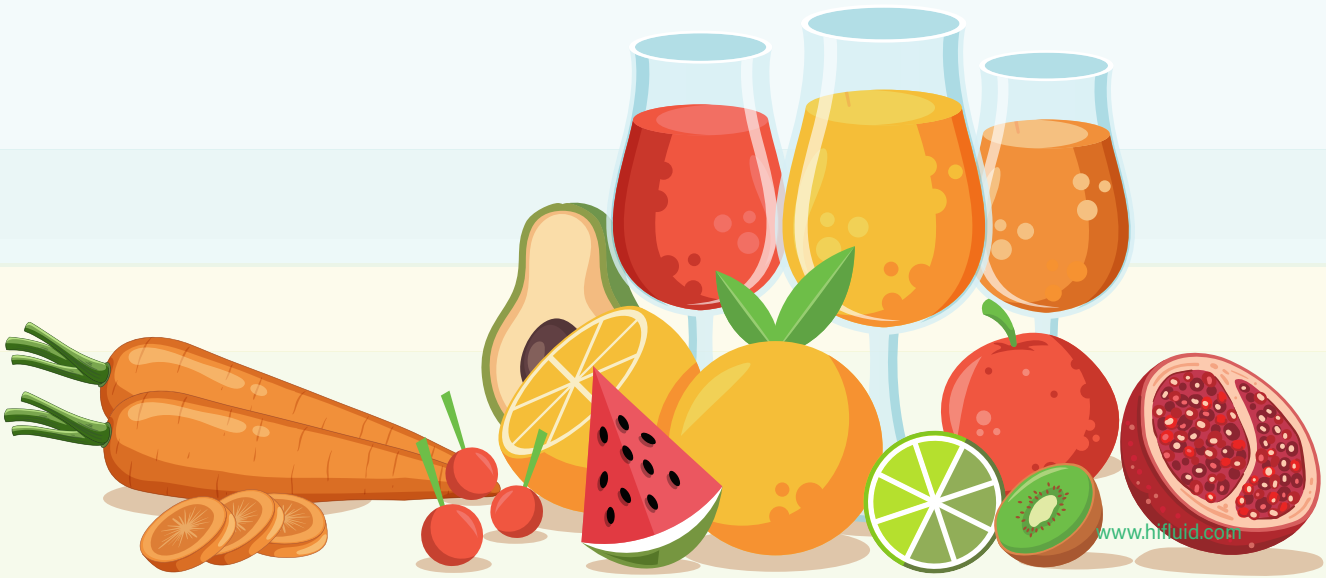
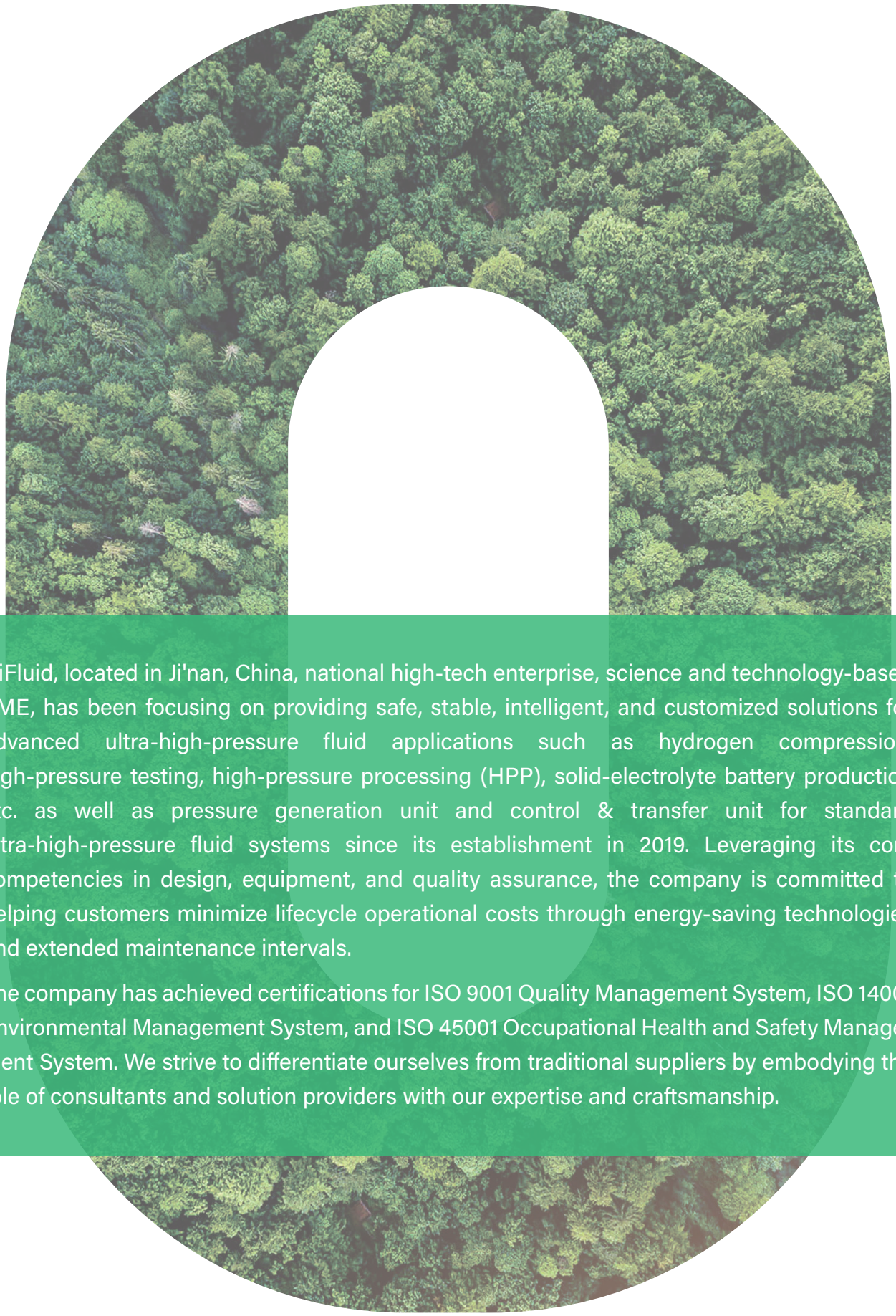
HiFluid
Driven by Reliability & Performance

High Pressure Processing





HiFluid, located in Ji'nan, China, national high-tech enterprise, science and technology-based SME, has been focusing on providing safe, stable, intelligent, and customized solutions for advanced ultra-high-pressure fluid applications such as hydrogen compression, high-pressure testing, high-pressure processing (HPP), solid-electrolyte battery production etc. as well as pressure generation unit and control & transfer unit for standard ultra-high-pressure fluid systems since its establishment in 2019. Leveraging its core competencies in design, equipment, and quality assurance, the company is committed to helping customers minimize lifecycle operational costs through energy-saving technologies and extended maintenance intervals.

The company has achieved certifications for ISO 9001 Quality Management System, ISO 14001 Environmental Management System, and ISO 45001 Occupational Health and Safety Management System. We strive to differentiate ourselves from traditional suppliers by embodying the role of consultants and solution providers with our expertise and craftsmanship.

All greatness comes from a brave beginning.

High Pressure Processing

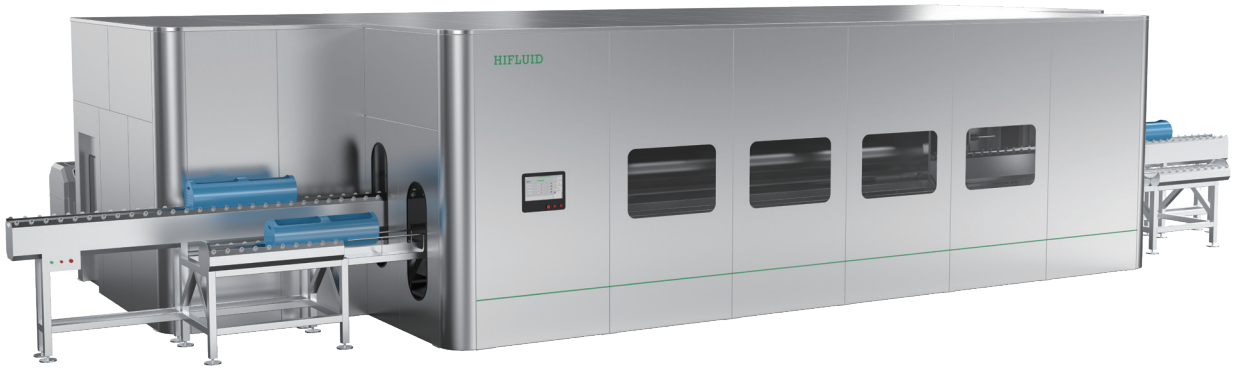
HIFLUID

Product Overview

HiFluid HPP Equipment is a new generation of non-thermal processing equipment integrating world-leading HPP technology. It caters to consumers' demand for natural, additive-free and fresh food, and meets the sustainable development needs of the food industry.

Based on ultra-high-pressure physical processing technology, the equipment efficiently inactivates pathogenic and spoilage microorganisms, greatly extends the refrigerated shelf life of food, and maximally retains its nutrition and original flavor.

It helps food enterprises develop differentiated products, seize the healthy consumption market, solve industry pain points including food waste and recall risks, and drive the food industry toward a safer and healthier future.



Development Milestones

1899 — American scientist Hite first discovered that high pressure at 450 MPa can extend the shelf life of milk.

1946 — American physicist Bridgman was awarded the Nobel Prize in Physics for his invention of ultra-high-pressure equipment.

1990 — Japan's Meidi-ya Food Co., Ltd. launched the world's first HPP jam.

1994 — HPP fresh orange juice appeared in the French market, marking one of the first industrialized applications in Europe.

1996 — HPP guacamole was introduced in the United States.

1998 — Spain began applying HPP technology to ready-to-eat meat products.

1999 — Spain's Hiperbaric was founded and developed the first prototype of industrial-scale HPP equipment.

2000 — Significant improvements in equipment reliability and return on investment accelerated global installations.
North America became the largest market, followed by Europe, Japan, and South Korea.

2009 — The International Non-Thermal Processing Conference was held in Beijing for the first time, marking China's entry into the global advanced technology landscape.

2015 — China developed commercial HPP equipment with over 95% localization, breaking the long-standing technological monopoly of foreign suppliers.

2020 — The global installed base of HPP equipment exceeded 400 units, with continuous market expansion.

2025 — The global HPP food market surpassed USD 4 billion, with China contributing approximately 30% of the total.
Applications expanded beyond food into pharmaceuticals, cosmetics, and biotechnology.

Outlook 2028 — The Codex Alimentarius Commission (FAO/WHO) is developing international standards for HPP technology, expected to be released in the near future.

High Pressure Processing

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Product Features

- Superior Nutrition & Fresh Flavor Retention:

  Unlike traditional thermal processing, ultra-high-pressure physical sterilization preserves vitamins and other bioactive compounds without degradation. The finished product maintains a fresh-like texture, perfectly retaining the original taste and nutritional value to meet consumer demand for natural, healthy foods.

- Extended Shelf Life & Enhanced Market Value:

  Greatly extends food shelf life while preserving bioactive components. It helps businesses expand their market reach and distribution radius, reduce waste and product recall risks from spoilage, and safeguard brand reputation.

- Clean Label Compatibility:

  It requires no added preservatives and simplifies ingredient lists, aligning with the global clean label trend. It supports brands in building a natural, healthy image and strengthening market competitiveness.

Compliance & Reference Standards

U.S. FDA Jurisdiction (Juice, Ready-to-Eat Products, Seafood, Eggs, Dairy Products)

- 21 CFR Part 120 Juice HACCP Regulation (5-log Pathogen Reduction)
- FDA Guidance for Integration of HPP into HACCP Validation and Monitoring Requirements for Non-Thermal Processing

U.S. USDA-FSIS Jurisdiction (Meat, Poultry, Processed Eggs)

- 9 CFR Part 417 HACCP System Requirements
- 9 CFR Part 430 Control of Listeria monocytogenes in Ready-to-Eat (RTE) Meat and Poultry Products
- FSIS Directive 6120.2 Specifications for HPP Application

Chinese National Standards & Industry Standards

- GB-T 41645-2022 General technical specification for quality control of foods treated by high pressure processing
- NY-T 4337-2023 Technical Specification for high pressure processing of fruit & vegetable Juice, puree and beverage

General Industry & International Reference Standards

- NACMCF Supplementary Technologies for Non-Thermal Pasteurization
- AOAC Microbiological Testing and Validation Methods

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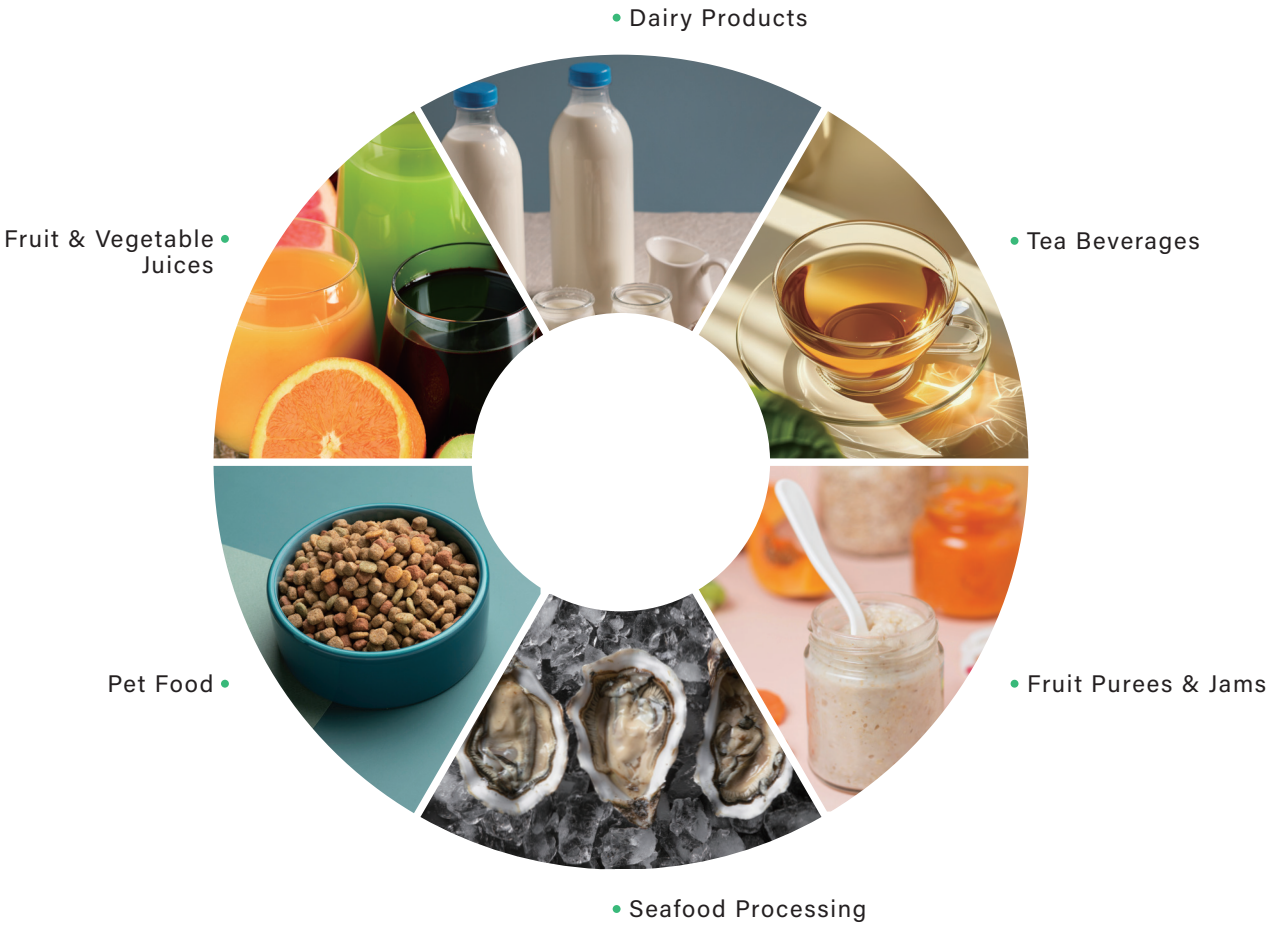
Applications



HiFluid HPP Overall Machine Parameter Table

Equipment Model	Working Pressure	Working Chamber Volume	Installed Power	Equipment Dimensions
HFLHPP-600-5	600MPa	5L	12kW	2000*1200*2000mm
HFLHPP-600-10	600MPa	10L	15kW	2600*1400*2300mm
HFLHPP-600-55	600MPa	55L	65kW	8000*3500*2600mm
HFLHPP-600-135	600MPa	135L	110kW	8000*4500*3000mm
HFLHPP-600-300	600MPa	300L	300kW	17600*4500*3000mm
HFLHPP-600-420	600MPa	420L	395kW	17000*5500*3200mm
HFLHPP-600-525	600MPa	525L	490kW	18500*5500*3200mm

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HiFluid HPP Product advantages

- **In-House R&D and Manufacturing Capabilities**

  HiFluid Industrial has established a fully integrated in-house R&D and manufacturing system, with comprehensive design capabilities covering the entire HPP system, including the HPP unit, pressure intensification system, high-pressure vessel, and yoke frame. The company has mastered the core manufacturing technologies for hydraulically driven liquid pumps, ultra-high-pressure hydraulic shut-off valves, and high-pressure fittings and tubing. HiFluid's self-developed hydraulically driven pump delivers a maximum flow rate of 7.6 L/min, representing a 110% improvement compared to mainstream industry solutions, while reducing the number of components in the intensification system by 50%.

  In addition, the high-pressure cylinder has been specially optimized, extending service life by 200% and significantly reducing failure rates.

- **Robust and Safety-Oriented Structural Design**

  HiFluid adopts internationally advanced wire-wound composite technology combined with a pre-stressed structural design, ensuring that the high-pressure vessel remains under compressive stress even at maximum working pressure. This effectively suppresses crack propagation and brittle fracture, significantly enhancing structural reliability.

  Multiple integrated safety protection mechanisms ensure safe equipment operation, and the system complies with international standards such as ASME U3 and CE (PED).

- **User-Friendly Intelligent Operation**

  For the 525L model, the filling rate for bottled fruit and vegetable beverages can reach up to 42%, with a maximum production capacity of 1764 kg/h, meeting the demands of large-scale production.

  The equipment features a compact layout that saves space and is flexibly adaptable to enterprises of different scales.

- **Customizable Functional Expansion**

  The system supports a range of customizable features, including temperature control, micro-precision pressurization and depressurization, and multi-stage pressurization and depressurization.

  These options enable precise adaptation to a wide variety of processing applications, including fruit juices, plant-based foods, meat products, dairy products, and pet food.

- **Lifecycle Cost Optimization**

  The system incorporates servo motor energy-saving technology, reducing standby power consumption and heat generation. Combined with an intelligent external cooling system, overall energy consumption can be reduced by approximately 30%.

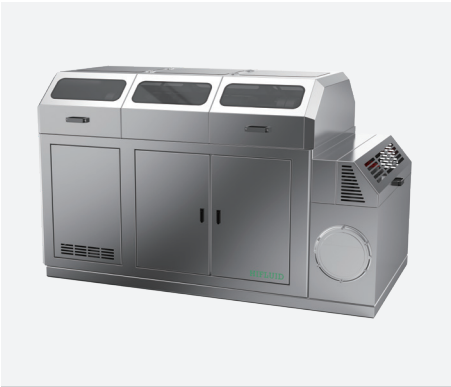
  Ultra-high-pressure components are designed with extended maintenance intervals, minimizing downtime and enabling customers to achieve lower total cost of ownership (TCO) throughout the equipment lifecycle.

- **Comprehensive Service and Support System**

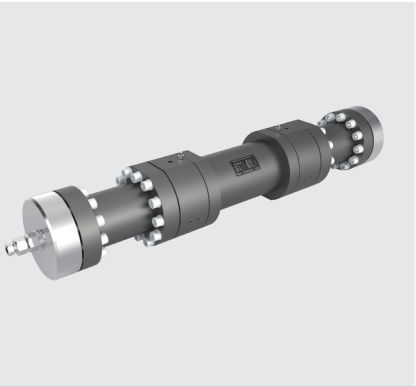
  HiFluid provides end-to-end professional support, covering project evaluation, equipment commissioning, and after-sales maintenance.

  An experienced technical team offers application consulting and operator training, supported by reliable spare parts supply, remote diagnostics, and on-site technical assistance, ensuring long-term stable operation of the equipment.

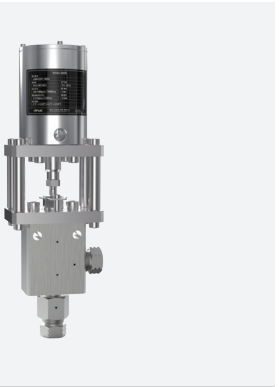
Maintenance, Repair and Operation



Pressurization Unit



Hydraulically Driven Liquid Pumps



Hydraulic Control Shut-off Valves

Valves

Fittings

Tubing

HPP Pressurization Unit Parameter Table

Model	Max. Outlet Pressure	Min. Inlet Pressure	Max. Flow Rate	Medium Inlet	Medium Outlet	Installed Power	Dimensions
HFEL-7.6-700	700MPa	0.2MPa	7.6L/min	NPT1/4	U9F	90kW	2300*1200*1380mm

HPP Hydraulically Driven Liquid Pumps Parameter Table

Model	Pressure Ratio	Displace-ment /Cycle (ml)	Pressure Limit				Max. Loop Count (/min)	Max. Flow Rate (L/min)	Connecting Interface				Weight (kg)
			Max. Outlet Pressure		Min. Inlet Pressure				Drive Port P	Medium Inlet A	Medium Outlet B	Leakage Test Port Y	
			MPa	psi	MPa	psi							
HFHL-27-700	1:27	350	700	101,500	0.2	29	22	7.6	SAE flange 1"	NPT 1/4"	U9F	NPT 1/8"	347

HPP Ultra-High-Pressure Hydraulic Control Shut-off Valves Parameter Table

Model	Bore Diameter	Design Pressure	Design Temperature	Actuator Cylinder Design Pressure	Cylinder Diameter	Cylinder Stroke
100V2U9-HHDA	5mm	700MPa	5°C~110°C	16MPa	63mm	15mm

HPP Ultra-high Pressure Autofrettaged Steel Tubing Parameter Table

Type	Tube Material	Connection Type	Tube Size in. (mm)		Working Pressure psi (bar)				
			O.D.	I.D.	-198°C to 37°C (-325°F to 100°F)	93°C (200°F)	204°C (400°F)	315°C (600°F)	426°C (799°F)
100T4-HP160	HP160	U4F	1/4 (6.35)	0.06 (1.59)	100,000 (6,896)	82,600 (5,695)	72,600 (5,006)	66,500 (4,585)	61,500 (4,240)
100T6-HP160	HP160	U6F	3/8 (9.53)	0.125 (3.20)	100,000 (6,896)	82,600 (5,695)	72,600 (5,006)	66,500 (4,585)	61,500 (4,240)
100T9-HP160	HP160	U9F	9/16 (14.29)	0.188 (4.77)	100,000 (6,896)	82,600 (5,695)	72,600 (5,006)	66,500 (4,585)	61,500 (4,240)

HiFluid 瀚孚工業

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