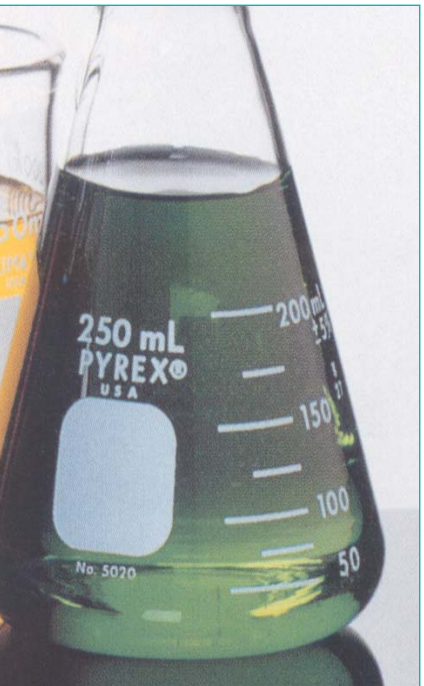
Microjet Fluid Systems

The M100 High Pressure Laboratory Processor

is recommended for:

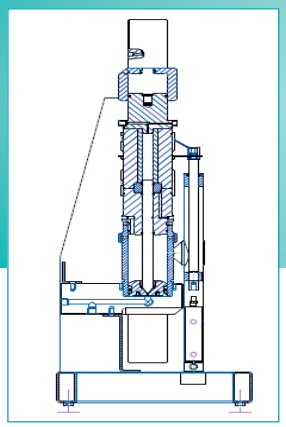
- Cell Rupture
- Emulsions and Nanoemulsions
- Dispersions, Nanodispersions
- Liposomes
- Microcapsules

Microjet Fluid Systems ultra-high shear processors overcome the limitations of conventional mixing and homogenising techniques by providing particle size reduction and process control capability that is second to none. Interaction chambers consist of diamond components with a 316SS body. Operating at up to 24,000 psi, these chambers produce extremely high levels of shear resulting in very fine, tight particle size disributions and small particle sizes of exceptional consistency thus ensuring better products, longer shelf life, increased yield and improved texture. This bench-top laboratory unit is portable, air powered and optionally autoclavable. It is ideal for batch, recirculation or continuous processing of samples as small as 12mls. Temperature control is an integral part of the device which is easy to “Clean In Place”, can be made fully cGMP compliant and is available with full IQ/OQ. The process is fully scaleable and is optionally available with electrically driven intensifier pumps



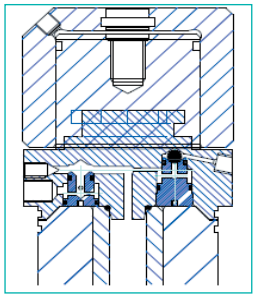
Microjet Technology

PILOT AND PRODUCTION PROCESSORS



Closed during processing

At larger scales Microjet processors utilise world acclaimed Stansted Fluid Power (*SFP)* rapid change and strip-down technology in all high pressure pump assemblies. There is a range of flow valve options to facilitate simple cleaning, inspection and maintenance. Options include non-return valves integrated into the clamped pump assembly and secured with a 1/6" turn quick release coupling. These can be removed/replaced quickly with minimum use of tools and without specialist technician skills. NRV modules are available with medium or high pressure configuration. The high pressure configuration is available up to a maximum operating pressure of 400 MPa (*58,000 psi*). The medium pressure configuration up to 172 MPa (*25,000 psi*) has quick release internal engineering allowing quick and easy strip-down, inspection, cleaning and assembly. Mechanically operated positive-action NRVs are available for viscous materials. This option ensures closing forces compatible with many suspensions which are usually unsuitable for typical NRV assemblies



Quick assembly medium pressure NRV configuration

Operation and Control

Open for cleaning, inspection and maintenance

The materials and engineering of the Hyd-Lok systems ensure they are simple to use, clean and maintain. Chemically resistant to a wide range of process fluids and cleaning agents, they are suitable for GMP applications. The system comprises of several primary elements including high pressure pump, interation chamber, drive power pack, control system and feed arrangement.

In standard operation, the power pack and control system operate to cycle the pumped product through the system where it is forced under pressure through the interaction chamber. Systems are fully safety interlocked to meet the highest safety standards and incorporate full shrouding covers for process modules. For cleaning and maintenance the internal logic controller cycles the system through a safety interlocked semi-automated sequence for opening and subsequent closing. Standard control interfacing is through an HMI (*human machine interface*) module with alphanumeric display and menu driven control. The HMI allows display of pressure and temperature.

Bench-top systems offer monitoring of process pressure and temperature, while pilot and production systems offer display of up to two process pressures and two process temperatures, depending on the chamber configuration and temperature monitoring options selected. The HMI includes a serial communications connector which allows the processor to be interfaced with data logging and SCADA software. For regulatory data presentation, there is a fully configured PC based SCADA package with encrypted, tamper-protected files which also produces pressure and temperature vs time plot.

Steaming cuffs in position

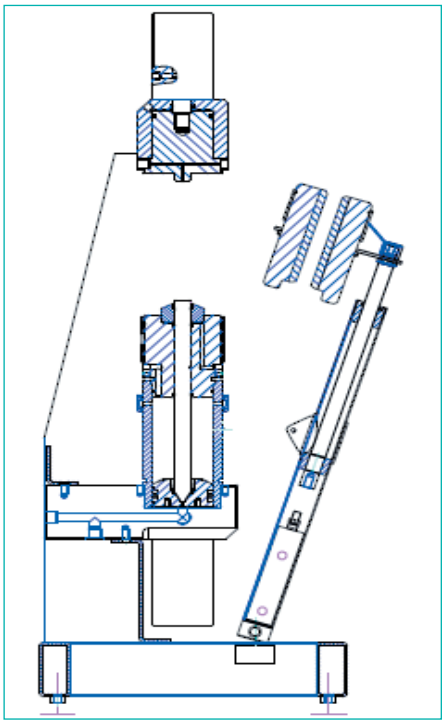
A temperature control circuit is fitted as standard to bench-top models and optionally available for pilot and production models. This allows principal process elements to be temperature maintained by circulation of temperature conditioning fluid.

Pilot and production scale models are offered in a modular form with the processing module designed with a small footprint for easy clean room installation and a service module which can be positioned remotely or adjacently, as required

Electrical	*Pilot/Production systems require 3ph supply (systems for most standards available)*
Air	*Low flow rate 5 barg (75 psig) air supply required*
Cooling	*Temperature conditioning circulation and cooling fluid requirements dependent on application*

Patented *Hyd-Lok* System

Provides a superlative technical solution to the requirements of laboratory, pilot and production applications. The *Hyd-Lok* system is a constructional technique where the main pressure generation assembly is retained by a hydraulic clamping assembly within a support frame. This unique construction has been further developed to provide a set of operational features combined with unsurpassed operational performance to suit the demanding and exacting requirements of today's high pressure applications where robust, reliable and hygienic operation is of the utmost importance.



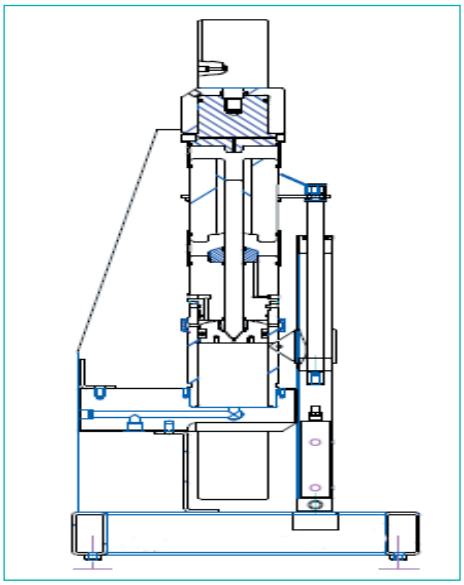
Open for cleaning, inspection and maintenance

Quick and Tool Free Access to Pump Assembly

The *Hyd-Lok* pump assembly may be simply maintained by operators without specialised skills and training in equipment maintenance. In a matter of seconds, the pump clamping pressure is released allowing removal, inspection, cleaning and/or replacement of principal operating elements of the pump unit. Operations are fully or semi-automated so that all product wetted parts of the intensifier assembly can be cleaned, visually inspected, reassembled and the system closed, simply and easily. The ease of cleaning and visual inspection are particularly useful where GMP protocols are required. The speed and ease with which these operations can be done ensures that cleaning and maintenance are expediently carried out without reliance on specialist mechanical technicians.

CIP and SIP with flow through intensifier during steaming

The particular design of the *Hyd-Lok* has been specifically developed to overcome the problems of traditional high pressure pumping systems; full inspection; cleaning; and effective steam sterilisation. In most pumping systems the combination of plunger or diaphragm housing with the cylinder creates a 'dead leg' or blind cavity which may cause condensate traps. These units have a special steaming position that allows the pump assembly to be completely steamed through with the ram and seal block disengaged. Whilst still sealed from the atmosphere the system can be clamped closed thus ensuring easy and verifiable cleaning.



Steaming Position

Quick change and fully inspectible valve assemblies

The range includes various configuration options to suit a wide variety of pressure, fluids and applications. For those systems, where ease of cleaning, inspection and speed of maintenance are required we offer valves which utilise the Hyd-Lok technique so that valves that can be removed, fully disassembled, cleaned, inspected, maintained and replaced in a matter of minutes

Additional features and advantages include:

SFP technology clamps the pump assembly in a way that resists axial movement of the high pressure components during processing and ensuring minimum seal wear and fatigue. Single intensifier systems are optimally suited to applications requiring minimal volume. The long stroke SFP systems ensure virtually all product passes through the homogenisation valve at a uniform pressure and flow rate. For high volumes and technically demanding applications the range of twin intensifier models give virtually pulse-free delivery thanks to the fact that the pump is electronically synchronised to compensate for high pressure fluid compressibility. This smooth flow and stable pressure is essential for microbial inactivation work and highly beneficial in uniform treatment of product in other applications

Microjet Technology

M100 Laboratory System

- Flow rate approx 200 - 400ml/min depending on product characteristics
  3,000 - 24,000 psi maximum operating pressure.
- Air supply requirements 57 scfm and 120 psi through 1/2” piping
- Requires no electrical supply

Standard Features

- Stainless steel and diamond interaction chambers for emulsions, dispersions, liposomes and cell rupture available in low, medium and high shear geometries.
- Removable 17ft cooling coil
- 1-litre stainless steel feed reservoir
- UHMWPE or Teflon plunger seal
- Viton static seals (alternatives include Kalrez and Chemraz)
- Mechanical pressure gauge
- Manual, tool kit and spares kit included
- 2 years warranty on all components including chambers, but excluding ‘0’ rings and seals

M100S Small Volume Processor

- Identical to the M100 Laboratory Processor but has only one interaction chamber and a very small hold-up volume of around 10 - 12mls

Options include

- Electronic pressure gauges and thermocouples
- 2-litre stainless steel inlet reservoir
- Zirconia plunger for hard or aggressive materials

Laboratory Processor

Operating Pressure:
3,000 - 24,000 psi

Flow Rate:
200 - 400ml/min

Pneumatic

Single Intensifier Lab/Pilot Scale Processor

Operating Pressure:
Up to 60,000 psi

Flow Rate:
up to 6 litres per hour

Hydraulic

Twin Intensifier Pilot Scale Processor

Operating Pressure:
Up to 60,000 psi

Flow Rate:
Up to 16 litres per hour

Hydraulic

Production Processor

Operating Pressure:
Up to 60,000 psi

Flow Rate:
Up to 200 litres per hour

Hydraulic

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