

Spe-ed™ Helix



**Applied
Separations**

www.appliedseparations.com

Helix



Basic Requirements for All Extractions

All extractions require at least these Applied Separations, Inc. components:

Base unit

CO₂ Pump
Pressure vessel assembly
Recirculating bath (chiller)

and these utilities:

A source of air delivered at 7 BAR
Electrical power: 240v or 120v
Source of liquid CO₂

The Helix is made up of several “base” components. The basic components are put together in a variety of standard or custom configurations to make a unit to perform a specific function.

With the base system you will be able to use the same components to do separations and extractions as well as make nanoparticles, but not at the same time. This means on one day you can do extractions and on another day you can make nanoparticles.

Base Unit

The compact Base Unit, measuring 10" w X 16" d X 34" h is the starting platform for operations. Pressure vessel assemblies up to 1 liter are placed on the base unit's shelf. Input, output and vent lines are controlled by shutoff valves located on the front of the unit. Digital temperature and pressure indicators also on the front of the unit show pressure and temperature.

Pressure vessels are heated by specially designed band heaters which are plugged into the front of the base unit making for easy access. An additional CO₂ preheater is employed to ensure that the CO₂ is at the designed temperature before entering the pressure vessel. A back pressure regulator controls the flow of gaseous CO₂ if exiting to ambient collection or regulating the pressure in a downstream pressure vessel (e.g. cyclone separator).

A base unit with its vessel assembly can be linked to other base units for additional processing capabilities: cyclone separators, precipitation vessel, expansion vessel, etc.

Helix

Helix Configuration Options

- Basic Configuration #7409
- Helix SCF Base Unit 240v #7305
- Touchpad Controller and
Standard CO₂ Pump Module 240v #7401
- 1 Liter Vessel Assembly with basket #7322
- 500mL Vessel Assembly #7323
- 300mL Vessel Assembly #7324
- 100mL Vessel Assembly #7329
- 50mL Vessel Assembly #6414
- 32mL Vessel Assembly #6413
- 24mL Vessel Assembly #6412
- Standard Flow Meter #7927
- Standard Collector Vessel #7735

Basic Configuration Options

- Modifier/Liquid Pump, Helix 240v #7172
- Recirculating Bath, Helix 240v #7027
- 800mL CO₂ Pump Module 240v #7316
- Stirring Assembly - stirrer, controller #7320

Variety of Flow Meters

- CO₂ Recycle Module #7399
- Chiller, Level Indicator, etc. #7027



Vessel with Stirrer Assembly



Collection



Pressure Relief Device



Touchpad System Control

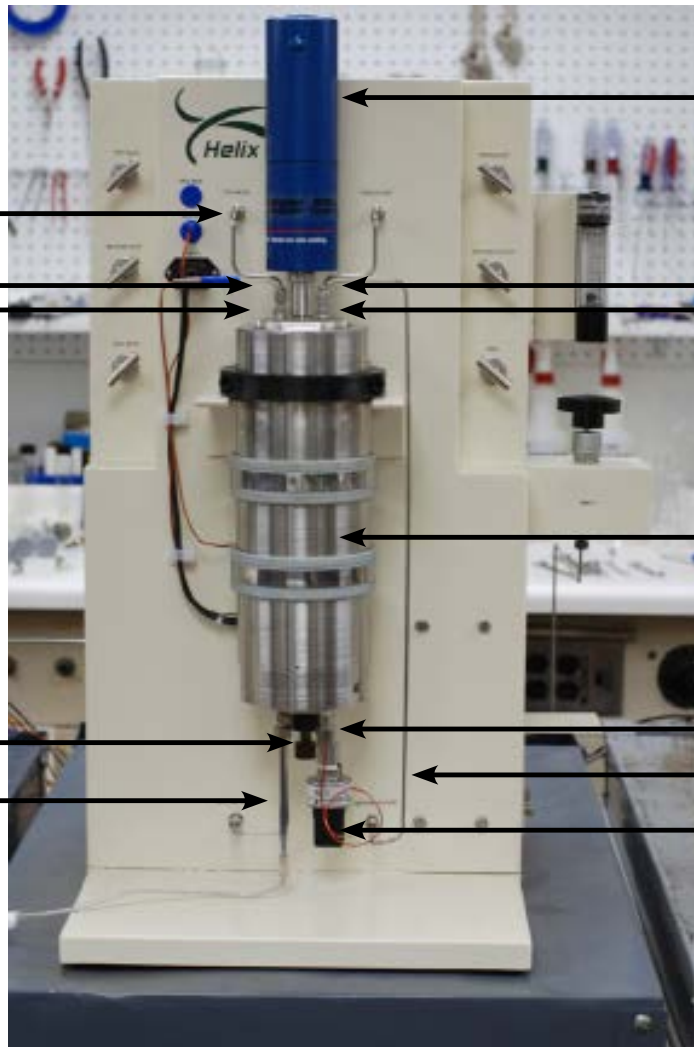


RESS collector



Basic Helix system with the separator module.

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CO₂ In

Light Port

Liquid Reactant In

Emergency Pressure Relief Device*

Endoscope
UV/IR
Particle Sizing
Turbidity

Stirrer

Pressure Probe

Gas Reactant In

- H₂
- O₂
- CO₂
- NH₃, etc.

Reactor Vessel with Agitator

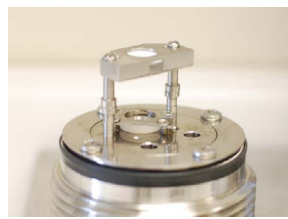
Electric In/Out
e.g. Ultrasound

Out

Temperature Probe



Endoscope



UV/IR



Monitor
Meters

- Spectrophotometer



Stirrer Shaft/Impeller

- Variable length
- Interchangeable impellers



Close-up of the top and bottom vessel ports.

*Patent Pending

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Cryo Cooler

Low pressure/ambient aluminum containers are available to collect a variety of extracts. Should the extract be highly viscous heat can be applied, or if volatile, chilling can be applied.



Pump Module

There are two standard CO₂ pumps (#7321 and #7316). These are air-driven, liquid pumps capable of delivering CO₂ from a cylinder (nominally 60 BAR at room temperature) to a pressure of 690 BAR. Because they are pneumatic, they are inherently more compact, safer, cleaner, quieter and requiring less maintenance than either electric or hydraulic pumps. In both pumps, the pressure is set and shown by a digital readout. There is another gauge to show the air pressure.

Recirculating Bath



The *Spe-ed* RCB for Helix (#7029) (820 BTU/hr, 15LPM, -10 C to +40C) is a specifically designed recirculating cooling bath that chills the CO₂ to liquidity. It is microprocessor controlled, with a small footprint and nearly noise free.

Pressure Vessel Assemblies

316 Stainless steel pressure vessels for the Helix are hand-tightened and range in size from 24ml to 1,000ml. The assembly is comprised of the pressure vessel, heating elements, electrical input cable, and insulation. Standard sizes are

| | | |
|------|---------------|---|
| 7972 | 5mL Vessel | 1" O.D. x 5.125" O.L. .390" I.D. x 2.24" I.L. |
| 7972 | 10mL Vessel | 1" O.D. x 5.125" O.L. .560" I.D. x 2.24" I.L. |
| 7973 | 24mL Vessel | 1" O.D. x 8.875" O.L. .560" I.D. x 5.9" I.L. |
| 7974 | 32mL Vessel | 1" O.D. x 10.5" O.L. .560" I.D. x 8" I.L. |
| 7975 | 50mL Vessel | 1" O.D. x 15.25" O.L. .560" I.D. x 12.72" I.L. |
| 7329 | 100mL Vessel | 2.25" O.D. x 9.57" O.L. 1.25" I.D. x 4.97" I.L. |
| 7324 | 300mL Vessel | 3.5" O.D. x 11.42" O.L. 2" I.D. x 5.87" I.L. |
| 7323 | 500mL Vessel | 4.75" O.D. x 9.49" O.L. 3" I.D. x 4.49" I.L. |
| 7322 | 1000mL Vessel | 4.75" O.D. x 13.63" O.L. 3" I.D. x 8.62" I.L. |

Stirrer

Applied Separations now offers new stirrers to go into their extraction/ reaction vessels via the 5-Port cap that allows access to the inside of the vessel during your process.



The stirrers are rated to 10,000 PSI, 650°F, and go up to 3,000 rpm. The instrument control panel includes a digital display to monitor rpm. Stirrers are available with different shaft lengths, with a wide variety of impellers available to attach to the bottom of the stirrer.

Modifier/Liquid Pump

Liquid pumps may be necessary in several operations when using the Helix: adding polar modifiers, introducing solvents during PCA and for the operation of the countercurrent column.

Spe-ed MAX (#7298)

is a microprocessor controlled pump delivering 690 BAR at adjustable flow rates up to 24 ml/min.

