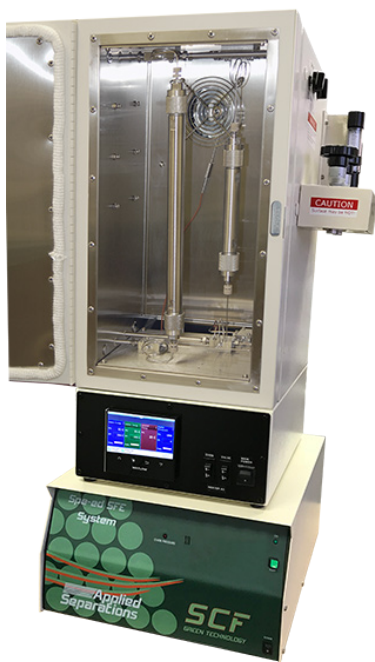
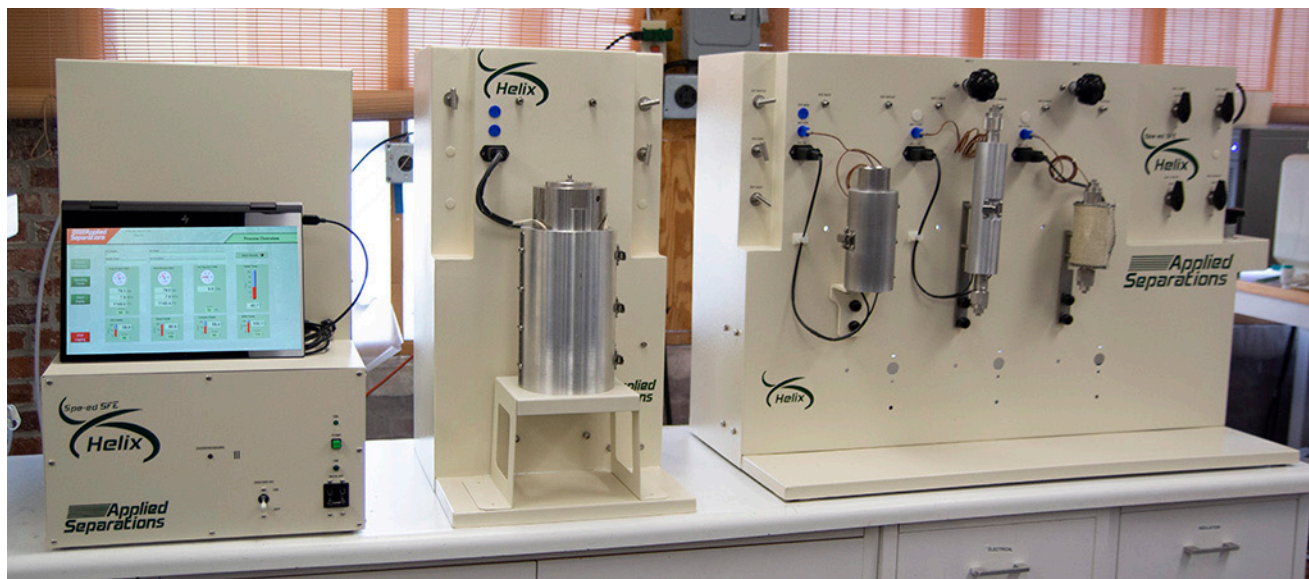


High Pressure Vessels for Extractions and Reactions with Supercritical CO₂ and Subcritical Water Systems

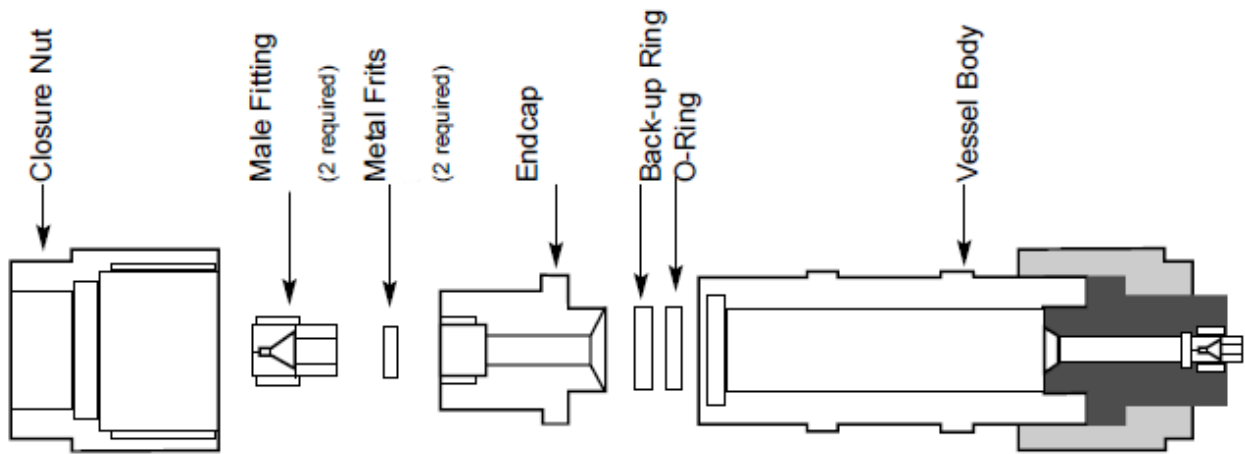


Stainless steel extractor vessels include endcaps and frits. All vessels are rated for 10,000 PSI (690 BAR) maximum.

Vessels rated at over 690 BAR and less than 10,000 PSI (690 BAR) are also available.

Standard sizes range from 5mL to 1L. Custom sizes are available.

10 - 50mL Hand-Tight SCF Vessels



The components shown are parts of a complete, standard vessel, and are included with purchase. Order parts shown only upon loss or maintenance replacement.

Note: Male fitting and metal frit assembly is done the first time the vessel is used, and thereafter, only when a part is to be replaced or cleaned.



Metal frit goes into endcap.



Male fitting goes into endcap.



Back-up ring and O-ring fit onto endcap.



Endcap goes into closure nut.



Closure nut finger-tightens onto the end of the vessel.



Vessel connector attaches to male fitting endcap on the assembled vessel.

10 - 50mL Hand-Tight SCF Vessels

Caution: Do not exceed maximum vessel specifications.

Vessel Specifications

Maximum Operating Pressure:

Low Temperature

10,000 PSI (690 BAR)

High Temperature

10,000 PSI (690 BAR)

Maximum Operating Temperature:

150°C

240°C (300°C by special order)

Material of Construction (ASTM):

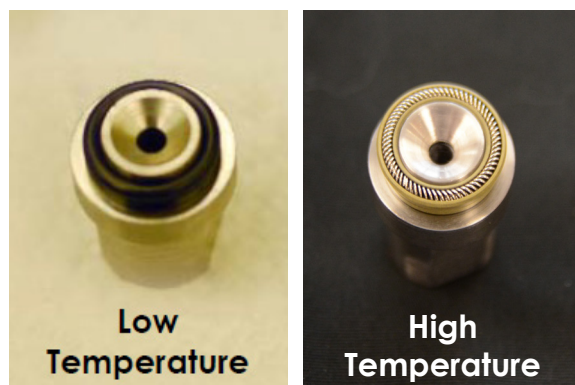
316 Stainless Steel

316 Stainless Steel

Assembly

The vessel will come loosely assembled. Please follow all steps to ensure durability of the vessel.

1. Make sure the metal frit is in the high pressure fitting. Tighten down the male nut with 3/8" and 5/8" wrenches. Do not over tighten.
2. The back-up ring is placed on the end cap, flat side towards the fitting. The O-ring is then placed on the back-up ring.
3. Place the end cap into the vessel tube, being careful not to damage the seal.
4. Screw the closure nut onto the assembly unit until it is hand-tight.



Directions for Use

1. To fill the vessel, remove one end-fitting assembly and fill with sample. Once the vessel is filled to the desired level, clean the surface to ensure the longest possible seal life.
2. Reassemble the end cap assembly.
3. Ensure all fittings are tight and place the vessel in-line.
4. The vessel can now be pressurized in the *Spe-ed* SFE oven module. Be sure to check for leaks at all pressures.

Important notes:

Vessels come complete with standard 1/16" female end-fittings for easy use with finger-tight vessel connectors. No wrenches are needed.

High pressure experiments must be conducted in a shielded area. Vessels are intended for extractions, not reactions. The pressure ratings are a guideline only. Final responsibility for safe use rests with the user.

Vessels will remain sealed after use until they cool to room temperature (20-30°C.) Do not try to open the vessel when it is still hot. If the closure nut seizes, wait until the vessel cools before removing by hand.

All vessels are individually tested.

Low Temperature Vessel to 150°C	High Temperature Vessel to 240°C	Polypropylene Frits ^a (50/pk)	Teflon Frits ^a (50/pk)	Tamping Rod ^a	Vessel Supports ^a	Seal Insertion Tool ^a	Metal Frit ^b	Spring Loaded Seal ^c	O-ring ^b
79720 5/10mL Vessel	70770 5/10mL Vessel	79562	79570	79300	Small Vessel Support 79320	79840	79420	79820	71410
79730 24mL Vessel	70780 24mL Vessel	79562	79570	79300	Small Vessel Support 79320	79840	79420	79820	71410
79740 32mL Vessel	70790 32mL Vessel	79562	79570	79300	Small Vessel Support 79320	79840	79420	79820	71410
79750 50mL Vessel	70870 50mL Vessel	79562	79570	79300	Small Vessel Support 79320	79840	79420	79820	71410

Inquire about special size vessels.

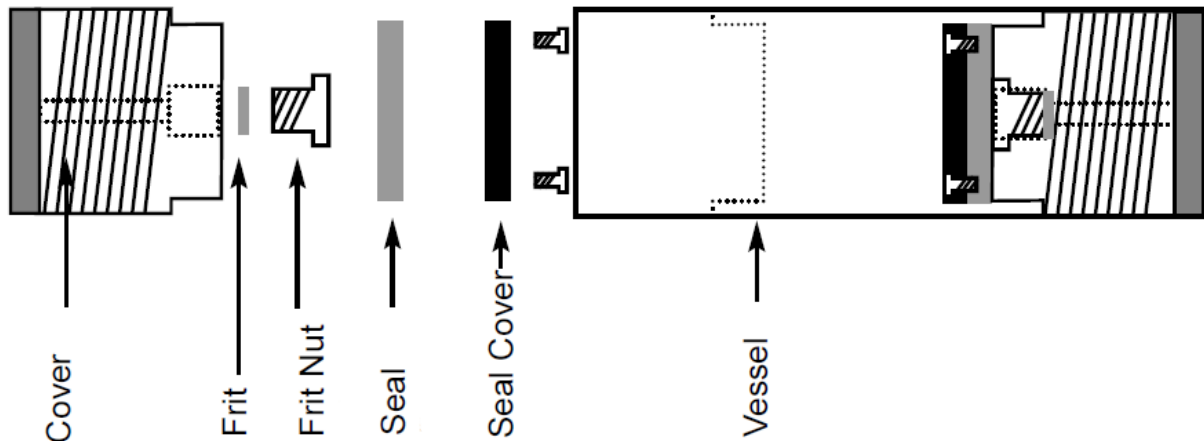
a Accessories to vessel - not included with vessel. Required for spring-loaded seals.

b These items are included with vessel at the time of purchase. These numbers are for ordering replacements.

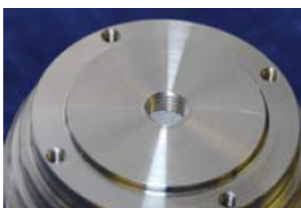
c Optional spring-loaded seat. MUST be installed using the Seal Insertion Tool (#79840.)

d Optional O-Ring seal.

Extraction Vessel Parts 100mL to 1000mL



The components shown are the parts of a complete, standard vessel, and are included with purchase. Order parts only upon loss or maintenance replacment.



Frit into cover.



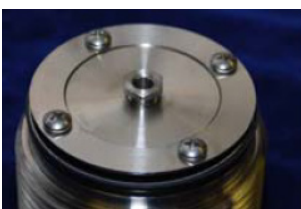
Frit nut screws into cover.



Cup seal fits onto cover.
100mL #75210
300mL #75250
500mL/1L #73180



Seal cover fits over seal.



Screws secure seal cover.



Cover screws onto vessel.



Apply PTFE tape to adaptor fitting 1/8" FNPT to 10-32 THD and attach to cover. (Not necessary to remove every use.)



Vessel connector attaches to closure nut.

Extraction Vessel Instructions / Maintenance

Caution: Do not exceed maximum vessel specifications!

Vessel Specifications

Maximum Operating Pressure:	10,000 PSI (690 BAR)
Maximum Operating Temperature:	240°C
Material of Construction (ASME):	17-4PH Stainless Steel, H1150 Heat Treatment

Instructions for Use

When using this Extraction Vessel, periodically use a small amount of the supplied PTFE Dry Release Agent (lubricant) on the vessel threads at each end of the vessel. Close each vessel cover until it stops threading, then back off approximately 1/8 of a turn. Do not back off.

IMPORTANT: Using this lubricant and method of closure will ensure that the vessel threads do not stick or seize after operation.

Vessels are supplied with a Cup Seal closure at each end. The Cup Seals at both ends of the vessel should be inspected regularly, and replaced when they are sufficiently worn, or if they begin to develop cracks or extrusions. To install a new Cup Seal, remove the four screws holding the stainless steel retainer to the inside of the vessel cover. Remove the retainer and the old Cup Seal. Place a new cup seal in the groove on the cover. Position the retainer over the Cup Seal and fasten the retainer to the cover with the four screws.



100mL Vessel Endcaps

Endcaps require replacement cup seal #75210



300mL Vessel Endcaps

Endcaps require replacement cup seal #75250

Vessels: Accessories

Vessels also contains a stainless steel porous frit, held in place with a hand tightened fitting nut, on the inside surface of each vessel cover (end cap). Periodically inspect these frits for cleanliness. If dirty, the frits should be cleaned with any solvent suitable for stainless steel, and can be ultrasonically cleaned if desired. It is recommended to put a small amount of Polypropylene Wool into each of the frit retaining nuts, after re-assembly of the frit is complete.

	100mL Vessel	300mL Vessel	.5 / 1 / 2L Vessel
<i>Supplied Parts</i>			
PTFE Dry Release Agent	61990		
<i>Replacement Parts</i>			
Cup Seal	75210	75250	73180
10 μ Frit, 2/pack	61980		
Nut, Frit Holder	62080		
O-Ring, 1L, 2/Pack			61970

5mL Vessel	1" O.D. x 5.125" O.L. .390" I.D. x 2.24" I.L.
10mL Vessel	1" O.D. x 5.125" O.L. .560" I.D. X 2.24" I.L.
24mL Vessel	1" O.D. x 8.875" O.L. .560" I.D. X 5.9" I.L.
32mL Vessel	1" O.D. x 10.5" O.L. .560" I.D. X 8" I.L.
50mL Vessel	1" O.D. x 15.25" O.L. .560" I.D. X 12.72" I.L.
100mL Vessel	2.25" O.D. x 9.57" O.L. 1.25 " I.D. x 4.97" I.L.
300mL Vessel	3.5" O.D. x 11.42" O.L. 2" I.D. X 5.87" I.L.
500mL Vessel	4.75" O.D. x 9.49" O.L. 3" I.D. X 4.49" I.L.
1000mL Vessel	4.75" O.D. x 13.63" O.L. 3" I.D. x 8.62" I.L.

Vessel Lids for 100mL, 300mL, 500mL and 1L Vessels

Applied Separations has pioneered in providing pressure vessels with the maximum flexibility. All vessels have threaded, removable, interchangeable top and bottom caps. All vessels caps have multiple ports.

100mL and 300mL vessel lids are available in one port or two port configurations.

All one liter and 500 mL SCF vessels have interchangeable caps. Choose between a 5-Port vessel lid, a 5-Port vessel lid with a large center port, and a single port vessel lid. This allows for great flexibility and control in processing samples.

The ports allow for the insertion of

- probes
- thermocouples
- fiber optics
- illumination, and more.

You can introduce a stirrer and/or meter in reactants and modifiers. You can "thief" samples from inside the vessel. When the ports are not needed, merely insert the threaded plug. The possibilities are endless.

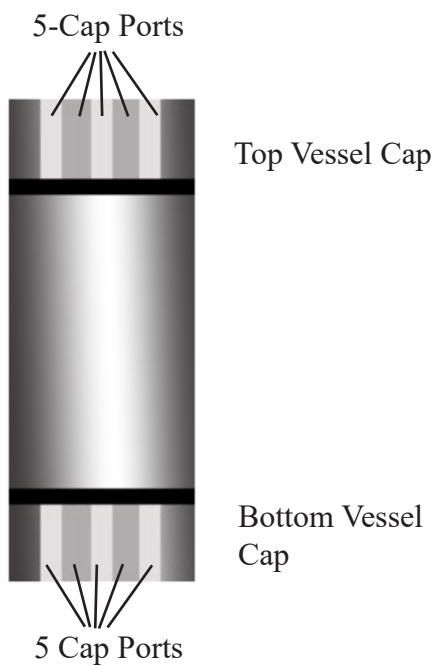
The 500mL and 1 L vessels can be purchased with any of the three different lids. The vessel lids are interchangeable. Additional lids can be purchased, and they will fit your 500mL or 1L vessel.



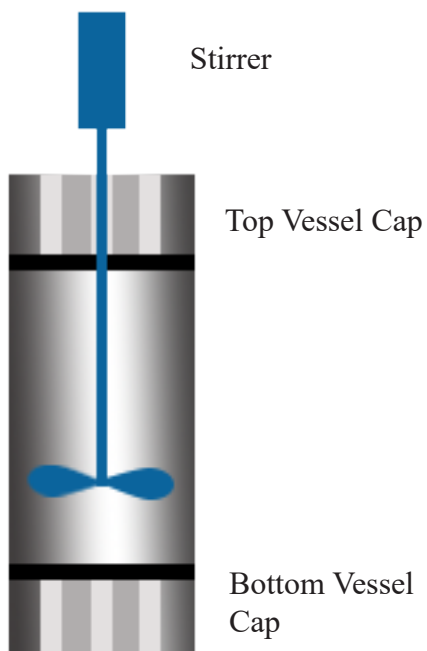
<i>Vessel</i>	<i>Ports</i>
100	2
300	2
500	5
1000	5



Introduce a stirrer into your vessel through the 5-Port Vessel Cap.



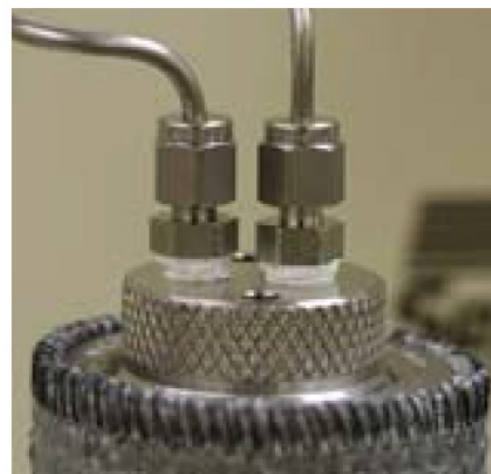
Stirrers are available to go up to 15,000 PSI at 650 degrees F and a maximum speed of 300 RPM.



SCF High Pressure Vessel with 5-Port Vessel Caps

Vessels, Vessel Accessories and Vessel Lids for 100mL to 1 L Vessels

	Vessel Supports ^a	Metal Frit ^b	Spring Loaded Seal	O-ring
79770 100mL Vessel	Large Vessel Support 79160	61980	75210	
79070 300mL Vessel	Large Vessel Support 79160	61980	75250	
79260 500mL Vessel (w/1 port lid)	Large Vessel Support 79160	61980	73180	61970
79080 1L Vessel (w/1 port lid)	Large Vessel Support 79160	61980	73180	61970
7065 500mL Vessel 5-Port Lid	7066 500mL Vessel 5-Port Lid, LG	79260 500mL Vessel 1-Port Lid		
7063 1L Vessel 5-Port Lid	7064 1L Vessel 5-Port Lid, LG	79080 1L Vessel 1-Port Lid		
7439 5-Port Lid for 500mL or 1L Ves- sel Top	7069 5-Port Lid for 500mL or 1L Vessel Top	7067 1-Port Lid for 500mL or 1L Vessel Top		



Inquire about special size vessels.

a Accessories to vessel -- not included with vessel.

b These items are included with vessel at time of purchase. These numbers are for ordering replacement parts only.

c Optional Spring-loaded seal. MUST be Installed using #7984 Seal Insertion Tool.

d Optional O-Ring Seal

Stainless Steel Vessel Baskets

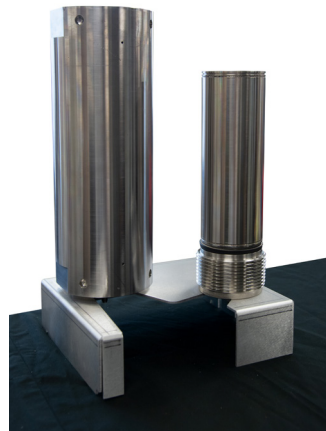


500mL Vessel and Basket

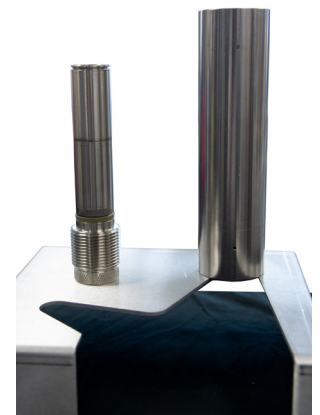


300mL Vessel and Basket

- Fits 100mL, 300mL, 500mL, and 1L size vessels
- Interchangeable stainless steel frits
- Frit pore sizes range from 5μ to 200μ
- Baskets fit snugly
- No bypass
- All CO_2 goes through the basket.



1L Vessel and Basket



100mL Vessel and Basket

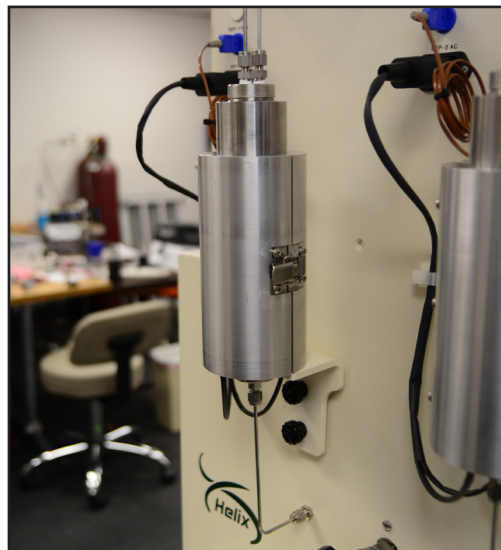
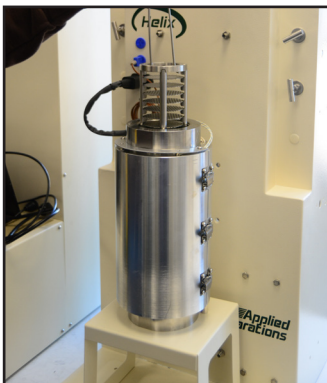


Vessel Assembly

Control in heating vessels is vital in dealing with supercritical fluid work. To this end has developed a robust, accurate heating mechanism: vessel assembly or a “clamshell”.

No more heating bands that break after using vessels in routine operations. The easy to buckle on “clamshells” shown here are used on all Applied Separations, laboratory pressure vessels when used with:

- *Spe-ed* SFE-Basic
- Zoran
- Helix



T.E.A. Bags

Sample Containment Bags

Applied Separations has developed an easier way to introduce samples into supercritical extraction vessels and extract the desired wanted compounds. Instead of using a basket, use a T.E.A. bag. As easy as brewing tea, extract compounds from a sample using the new Applied Separations' T.E.A. bag.

Take Extracts Agilely

Extracting a sample with $scCO_2$

- Put T.E.A. bag containing sample into vessel
- Introduce the $scCO_2$
- Static or dynamic flow of $scCO_2$
- Remove the TEA bag and sample
- Collect and analyze the extract



*It's almost
the same.*

Brewing tea

- Put the tea bag in a cup
- Add hot water
- Let the tea steep
- Remove the tea bag
- Drink the tea



Part Numbers

Extractor Vessels

Standard Vessels

5/10mL	79720
24mL	79730
32mL	79740
50mL	79750
100mL	79770
300mL	79070
500mL	79260
1L	79080



Tamping Rod

79300 for 5, 10, 24, 32, 50mL vessels.



Note: Seal insertion tools are not essential. They are tools to increase ease of use. Seal insertion tools used to more easily replace cup seals and are not necessary for use with O-Rings.

High Temperature Vessels

5/10mL	70770
24mL	70780
32mL	70790
50mL	70870

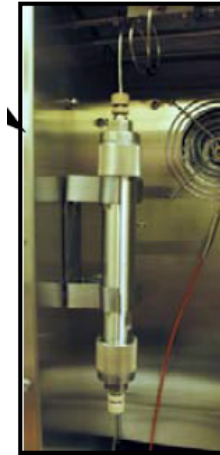


Seal Insertion Tool*

79840 for 5, 10, 24, 32, 50mL vessels.



Small Vessel Support*



79320 for 5, 10, 24, 32, 50mL vessels.

Provides means of hanging vessels on the oven wall.

Large Vessel Support*

79160 for 100, 300, 500mL and 1L vessels.



Spring Loaded Seal**

71410*** for 5, 10, 24, 32, 50mL
 75210 for 100mL
 75250 for 300mL
 61970****/7318 for 500mL/1L



* Accessories to vessel - not included with vessel.

** These items are included with vessel at time of purchase. These numbers are for ordering replacement parts only.

***O-Ring Backup Ring Set - Recommended seal for these vessels.

**** O-Ring

Vessel Cleanliness

As part of the Applied Separations, Inc.'s vessel safety protocol and QC performance testing, this vessel is hydrostatically tested to extremely high pressures with oils specially manufactured for this purpose. The vessel is then extensively cleaned in an ultrasonic solvent bath and then pressure tested with supercritical carbon dioxide. Although the cleanliness is sufficient for most applications, it is recommended that you further clean the vessel, especially if your application is for trace analysis.