Dependable Products From People You Trust

HTHP Filter Press for Cement Testing

with 175-mL, Double-Capped Test Cell and N_2 Pressuring Manifold

#170-182: (115 V)
#170-182-1: (230 V)

Instruction Manual

Updated 4/30/2025
Ver. 7

OFI Testing Equipment, Inc.
11302 Steeplecrest Dr. · Houston, Texas · 77065 · U.S.A.
Tele: 832.320.7300 · Fax: 713.880.9886 · www.ofite.com

Table of Contents

Intro

The OFI Testing Equipment (OFITE) High Temperature High Pressure (HTHP) Filter Press is designed to evaluate the filtration characteristics of drilling fluids, cement slurries, fracturing fluids, and completion fluids under elevated temperatures and pressures. Evaluating fluids under HTHP conditions similar to the downhole environment is of paramount importance. Fluid properties must be monitored while under high temperatures and pressures as filtration behavior and wall cake building characteristics of permeable formations change with changing environments. These characteristics are affected by the shape, type, and quantities of solids present in the fluid and their physical and electro-chemical interactions, all of which are affected by changing temperatures and pressures.

OFITE manufactures and provides HTHP filtration units in two basic sizes, 175 mL and 500 mL capacities. Both are used extensively throughout the world and in all environments, but in general the 175 mL units are designed for field portability, while the larger 500 mL units are designed for laboratory usage at higher temperatures and pressures. All OFITE Filtration devices fully conform to American Petroleum Institute (API) specifications.

A complete HTHP Filter Press consists of a controlled pressure source, usually Nitrogen pressurization or Carbon Dioxide bulbs for the 175 mL units. Top and bottom pressure manifolds are provided to simulate the differential pressures found in a down-hole environment, and to prevent evaporation of the base fluid if exceeding the boiling point of that fluid. The test cells are provided in a variety of assemblies, depending upon the type of fluid tested, the filter media, and the temperatures and pressures desired. The test cells are encased inside a heating jacket, which is adjustable.

A variety of filter media are available, the most common being standard API filter paper, cement screens, and ceramic filters. The ceramic filters may be obtained to match the pore throat or permeability of the formation. Natural formation filters or cores may also be used of differing pore throat / permeability sizes. Slotted disks of varying sizes are frequently used for lost circulation materials studies.

The 175 mL has a maximum temperature of 350°F (177°C) and the 500 mL heating jackets are capable of reaching 400°F (204°C). However, lower fluid volumes due to fluid expansion at higher temperatures, limit the 175 mL units to a useful working temperature of 300°F (149°C). Anyone running tests above 350°F (177°C) must substitute a complete set of o-rings after each and every test.

Specifications

Size:	7.5" × 11" × 23.5" (19.1 × 27.9 × 59.7 cm)
Weight:	27 lbs. (12.3 kg)
Shipping Size:	17" × 23.5" × 12.5" (43.2 × 59.7 × 31.8 cm)
Shipping Weight:	38 lbs. (17.2 kg)
Maximum Temperature (Heating Jacket):	350°F (177°C)
Maximum Temperature (Cell):	500°F (260°C)
Maximum Pressure (Cell):	5,000 psi
Maximum Pressure (Receiver):	750 psi (5.1 MPa)
Pressure Source:	Nitrogen (at least 1,500 psi / 10,343 kPa) - Not Included
Test Cell Capacity:	175 mL
Receiver Volume:	15 mL
Heater:	400 Watt
Power Requirement:	115 VAC, 5 Amps, 50/60 Hz 230 VAC, 3 Amps, 50/60 Hz

Components

#153-14 Graduated Cylinder, 50 mL × 1 mL
#154-10 Dual-Scale Thermometer with Dial, 5" Stem, 50° - 500°F (0° - 260°C)
#165-44-2 Anti Seize Compound, Silver, 7g Pouch

#170-00-1 Heating Jacket (115V) -OR-
#170-01-1 Heating Jacket (230V):
- #130-10-52 Jam Nut, ⅜"-24, Stainless Steel, Qty: 2
- #164-32 Male Connector for Power Cable (For 170-01-1 230V ONLY)
- #170-05 Thermostat
- #170-09 Insulation Board
- #170-10 Thermostat Pilot Lot
- #170-11 Heating Element, 115V, 200W, Qty: 2
- #170-15 Base
- #170-21 Stand Support Rod, Qty: 2
- #170-25 Aluminum Well
- #170-30 Stainless Steel Thermostat Cover
- #170-44 ½" Rubber Foot, Qty: 4
- #171-32 Midget Knob
- #171-82 8' Power Cord with Male Plug 8, 16/3 SJ, Round (For 170-00-1 115V ONLY)

#170-06-1 Back Pressure Receiver, 15-mL Stainless Steel Tube for N_2
- #144-11 ⅛" 90 Street Ell
- #144-15 Plate Brass Bushing, ¼" NPT Male to ⅛" NPT Female
- #170-07 O-ring
- #170-28 Receiver Body
- #170-32 ⅛" × ⅛" NPT Male Needle Valve
- #171-23-1 Safety Pin with Lanyard

#170-19 Filter Paper, 2½" (6.35 cm), Specially Hardened for Filter Presses
#170-35 6" Adjustable Wrench

#170-182-S Test Cell, Stainless Steel (For Cement Testing)
- #120-910-028 O-ring for Rupture Disk, Viton 75D, Qty: 1
- #130-81-040 Retaining Ring, Qty: 2
- #165-44-2 Anti Seize Compound, Silver, 7g Pouch, Qty: 4
- #170-13-3 O-ring for Cell, Viton 75D, Qty: 4
- #170-16 Valve Stem, Qty: 2
- #170-17 O-ring for Valve Stem, Viton 75D, Qty: 4
- #170-18 Cement Screen, Qty: 2
- #170-180-020-S Cell Body, 175 mL, Qty: 1
- #171-190-023 Locking Ring, Qty: 2
- #171-190-027 Rupture Disk, Qty: 1
- #171-190-029 Cap Wrench, Qty: 1
- #171-190-032-S Cell Cap, Outlet, Cement, Qty: 1
- #171-190-033-S Cell Cap, Inlet, Cement, Qty: 1
- #171-190-057 O-ring for Valve Stem, Viton 90D, Qty: 4
- #171-190-058 O-ring for Rupture Disk, Viton 90D, Qty: 1
- #171-190-060 O-ring for Cell, Viton 90D, Qty: 4

#171-24 1350 / 750 psi (9,308 / 5,171 kPa) Nitrogen Manifold

#170-20	Manifold Block
#170-32	⅛" × ⅛" NPT Male Needle Valve
#171-23-1	Safety Pin with Lanyard
#171-24-002	Regulator, Qty: 2
#171-24-1	Chrome Nut, R.H., Reg Inlet CGA-580
#171-24-2	Nipple with Filter
#171-24-3	¼" Flare × ⅛" FNPT Female
#171-24-5	¼" NPT Street Tee, 316 Stainless Steel, Qty: 2
#171-25-1	Relief Valve set at 750 psi (5171 kPa)
#171-25-2	Relief Valve set at 1350 psi (9308 kPa)
#171-26	5000# Hose, 3⁄16" × 3', Qty: 2
#171-28	Dual Manifold Body
#171-38	1,000 psi Gauge, 2½", ¼" NPT Bottom
#171-40	1,500 psi Gauge, 2½", ¼" NPT Bottom
#171-42	3,000 psi Gauge, 2½", ¼" NPT Bottom

Optional:

#170-13	O-ring for Test Cell, Buna, For tests below 300°F
#170-37	Nitrogen Cylinder, 21" × 7", Right-hand Thread

#170-182-SP Spare Parts Kit:

Part Number	Description	Qty.
#153-14	Graduated Cylinder, 50 mL × 1 mL	2
#154-10	Dial Thermometer, 5" Stem, 50° - 500°F and 0 - 250°C	1
#170-07	O-ring for Back Pressure Receiver, Nitrile	3
#170-13-3	O-ring for Cell, Viton 75D	50
#170-16	Valve Stem	4
#170-17	Valve Stem O-ring	100
#170-18	Cement Screen	4
#171-190-057	O-ring for Valve Stem, Viton 90D	100
#171-190-060	O-ring for Test Cell, Viton®	50
#171-23-1	Safety Pin with Lanyard	2

Optional Items for HTHP Filtration Testing:
The items listed below are not included in the HTHP Filter Press, but they are items that will enable the technician to perform a more uniform and reproducible test while maintaining a high degree of safety. As optional items, the usage is not compulsory, but consideration should be given to these items when running tests at elevated temperatures and pressures.

Interval Timer, 60 minute
(#155-20)

HTHP Pressure Relief Tool
(#170-91)
(To release trapped pressure)

Cell Carrying Tool (#170-40)

Safety Shield (#171-06)

Stand for HTHP Cell Assembly
(#171-190-028)

Safety

Pressure and Temperature Considerations
Do not use or reconfigure this equipment in a manner not specified in this manual.

Pressure
There are two reasons for operating at elevated pressures when performing a filtration analysis.

1. To test fluids at temperatures above the boiling point, the vessel must be pressurized, which in turn elevates the vapor pressure (boiling point) so that the fluid remains liquid and does not turn to steam.
2. If testing for drilling applications, pressurization will more approximate down-hole conditions, enabling the technician to match both bottom hole temperatures and pressures.

HTHP Filter Presses are pressurized either with Carbon Dioxide or with Nitrogen gas. The OFITE 175 mL HTHP Filter Press, 170-00 Series, is small enough to be portable, so it is usually pressurized with small (65 mm length) Carbon Dioxide (CO_2) bulbs, which contain 10 cm^3 of CO_2 gas and weigh 8 grams. These bulbs are pressurized to approximately 1,000 psi and they contain plenty of carrier gas to run a complete 30 minute filtration test, if running the standard API 500 psi differential test, which is usually 600 psi on the top manifold and 100 psi on the bottom or back pressure.

For temperatures less than 200°F (93°C) a Back Pressure Receiver is not required as the filtrate will not reach the boiling point. However when operating above the boiling point of water, a suitable Back Pressure Receiver is required, otherwise the test fluid will turn to steam and the test is invalidated. The standard receiver tube supplied with the 175 mL HTHP Filter Press holds 15 mL of filtrate, so it is very important that the receiver outlet ball valve is opened after approximately ten seconds of filtrate collection, as a fluid with poor filtration qualities can easily fill the 15 mL receiver tube almost instantaneously. If this happens the filtrate hopefully will all be ejected from the safety bleeder valve, but if there is too much fluid volume, the liquid may end up inside the regulator rendering it useless which will require servicing by a knowledgeable technician.

Temperature
Normally when one experiences a loss of pressure it is not due to a failure of the metal alloy in the cell, but rather is a failure of the o-ring or elastomer, which provides the seal. These o-ring may deform or melt under elevated temperatures causing a pressurization failure of the cell, which is often sudden and catastrophic. For example, if the valve stem o-ring suddenly fails, then steam at 400°F and under great pressure may shoot outward horizontally in one or several directions. A safety shield should always be used when operating any HTHP Filter Press and especially when one is going to extreme temperatures and pressures. Above 350°F (176°C) All o-rings must be replaced after each and every test.

Heating Jacket

Turn the thermostat knob on the front of the metal plate to change the temperature of the heating jacket. The thermostat cover is marked from 1 to 10 and each whole number represents a separate temperature. Each filter press will heat up a little differently so it is a good idea to mark with a pen directly on the face-plate of the thermostat cover the temperature which corresponds with each number. The actual temperature of the heating jacket is measured with a stem thermometer and then the thermometer is placed into the cell body.

The heating jacket will get very hot during the test so be careful not to touch the outside of the jacket at any time during the heat-up period or the test. It is especially easy to get burned when installing or removing the Back Pressure Receiver as the technician is working in a very confined space. The power cord is supplied for either 115 Volts or 230 Volts and due to the various types of plug connectors around the world it may be necessary to change the plug on the end of the power cord. The power cable is 8 feet in length and the heating jacket should be placed no farther than 8 feet from the appropriate electrical outlet. The heat up time will vary from one instrument to the next and the pilot light will turn on when the set temperature has been reached. The temperature of the fluid inside the cell however will not be at the set temperature, so always allow one hour of heating time for the fluid, after the cell has been fully inserted into the heating jacket.

The HTHP Filter Press is a very safe instrument to operate as long as the instructions are strictly followed. It is imperative that the technician thoroughly understands the assembly and disassembly procedures and also why the order of steps is in place. Care should be taken to never use defective parts and that OFITE's temperature, pressure, and fluid volume limits are strictly adhered to at all times.

The heating jacket and cell will get very hot during the normal duration of the test so the operator should take care to avoid burns. The operator should be careful when attaching and removing pressure manifolds from the heating jacket, especially the Back Pressure Receiver assembly, which involves operating in a small confined space.

Safety Retainer Pin

Always use a Safety Retainer Pin with an attached lanyard, and get in the habit of securing the cotter pin to the pin. Improper placement of retainer pins in the past have resulted in the pressure manifold separating from the filter press which can cause damage to the equipment.

Retainer Pin with Lanyard

Safety Retainer Pin with Lanyard
(# 171-23-1)

Normally the 175 mL HTHP Filter Press uses CO_2 bulbs, for both portability and pressurization. Even though they are small and appear innocuous, they can contain pressures up to 1,000 psi (6,900 kPa). CO_2 bulbs should never be allowed to overheat. Exposure to fire or carelessly leaving a box of bulbs on an automobile dashboard in the sun may result in an explosion. Nitrous Oxide (NO_2) which is available in the same sized bulbs as the CO_2, should never be used as a pressure source for HTHP filtration. Under high temperatures and pressures, Nitrous Oxide can detonate in the presence of grease, oil or carbonaceous material.

Cell Corrosion

Test fluids under high tempreature and pressure can corrode the cell body and caps. Carefully inspect the cell body and calls for corrosion before and after each test.

Some materials are more susceptible to corrosion than other. Also, some fluids and additives are more corrosive than others. OFITE offers a variety of cell materials for different levels of corrosion resistance and cost.

Working Pressure
OFITE clearly stamps the working pressure of the cell assembly along with the assembly serial number on each cell body and cell cap. These pressure limits should never be exceeded on the pressure manifolds and fluid volumes inside the cell should strictly comply with instructions (see page 10). However, in the past HTHP cells and caps from various manufacturers were often not stamped, or in some cases, very old cell assemblies were stamped “2500”. Cell assemblies with set screw secured caps should never be taken to 2,500 psi, under any temperature or condition.

O-ring Seals
Two sets of o-rings are included with the Filter Press. The first set is made from Viton 75D. These o-rings are black and should be used for tests up to 400°F only. The second set is made from Viton 90D. OFITE suggests that all o-rings (cell caps, cell bodies, and valve stem) are changed each time after running a test of 350° F (176° C) or above.

Fluid Expansion Space
Cells should never be filled completely with fluid. Always leave some room for the fluid to expand under temperature. This keeps the cell caps from becoming overstressed and possibly leading to a cell pressure failure or even a loss of the cell cap completely.

Periodically check all gauges to ensure the proper pressures are in the cell, as the pressure often increases or decreases depending upon the test procedure and conditions.

API Recommended Void Space		
Fluid / Temperature	**Void Space**	**Fluid Volume**
Water-based drilling fluid. < 300°F	0.6" (1.5 cm)	138 mL
Water-based drilling fluid. > 300°F	1.5" (4.0 cm)	86 mL
Oil-based drilling fluid. < 350°F (176°C)	1" (2.5 cm)	115 mL
Oil-based drilling fluid. > 350°F (176°C)	Not Recommended- Use 500 mL Cell	

Void Space in a 1,500 psi rated cell body

Quick Start

1. Place the thermometer in the heating jacket.
2. Preheat the heating jacket to 10°F (6°C) above the test temperature. The pilot light will turn on at the target temperature.
3. Inspect all o-rings. Replace any that show signs of damage or wear.
4. Apply grease to all o-rings.
5. Assemble both cell caps. Place an o-ring in the groove around the cap.
6. Make sure all threads are clean and free of debris.
7. Apply anti seize compound (#165-44-2) to the threads of the cell locking rings and valve stems.
8. Place an o-ring in the groove in the inlet side of the cell.
9. Place cement screen on top of the o-ring.
10. Screw the inlet cell cap into the cell and tighten it completely.
11. Screw a valve stem into the inlet cell cap and tighten it completely.
12. Pour the test fluid into the cell. Leave adequate space for fluid expansion.
13. Place an o-ring in the groove inside the cell.
14. Place a cement screen on top of the o-ring.
15. Screw the outlet cell cap into the cell. Tighten it completely.
16. Screw a valve stem into the outlet cell cap and tighten it completely.
17. Invert the cell and place it in the heating jacket. Rotate the cell until it seats.
18. Transfer the thermometer to the cell body.
19. Connect the manifold block from the dual Nitrogen manifold to the top valve stem and secure it with the safety pin.
20. Screw the hose from the dual Nitrogen manifold into the back pressure receiver.
21. Connect the back pressure receiver to the bottom valve stem and secure it with the safety pin.
22. Connect a Nitrogen cylinder to the dual Nitrogen manifold.

23. Adjust both regulators to the target back pressure for the test.

24. Open the top valve stem ½ turn.

25. After heat time, increase the top pressure to 500 psi above the back pressure.

26. Open the bottom valve stem to initiate filtration.

27. Collect filtrate and record the volume at 1, 7.5, and 30 minutes.

28. After 30 minutes, close both valve stems.

29. Turn both regulator T-screws counterclockwise.

30. Open the outlet valve on the back pressure receiver to collect any remaining filtrate.

31. Open the valve on the manifold block to release any remaining pressure.

32. Remove the manifold block and back pressure receiver.

33. Allow the cell to cool in the heating jacket.

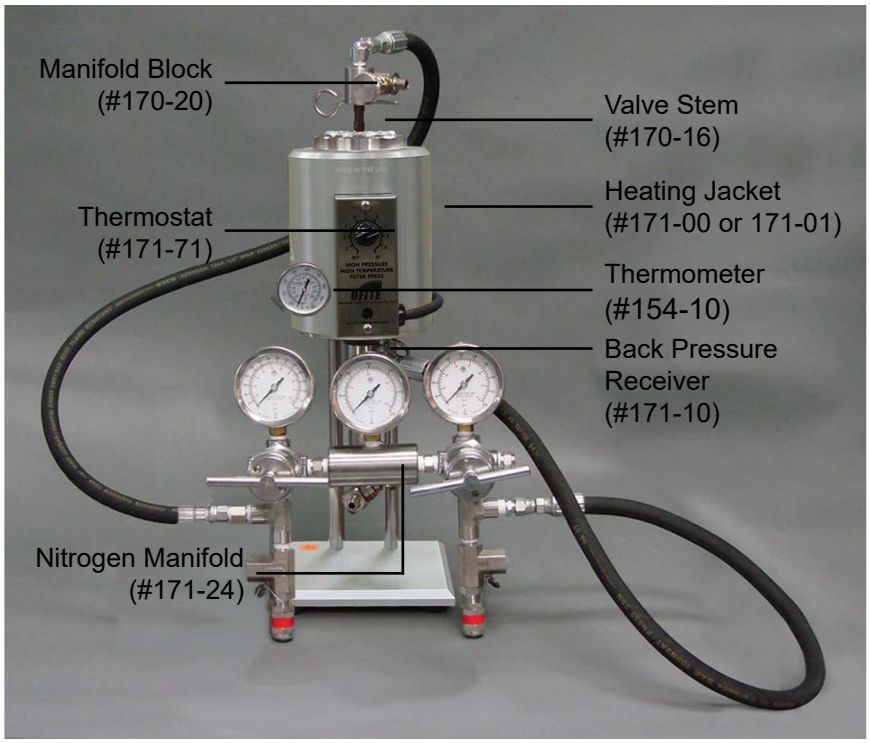
34. Once the cell has cooled to room temperature, remove it from the heating jacket.

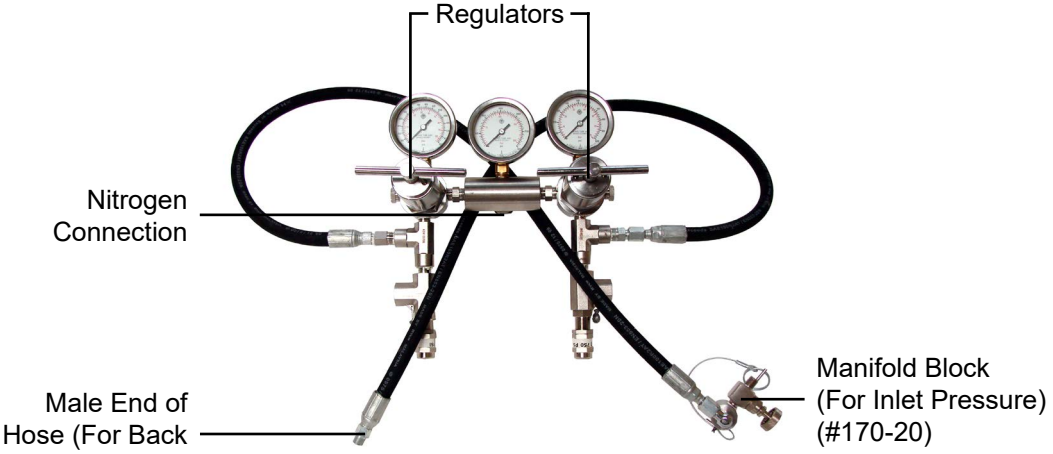
35. Slowly open the valve stem on the inlet side to release the pressure.

36. Unscrew the outlet cell cap.

37. Wash the filter cake and record the thickness to the nearest 1/32".

38. Clean and dry all components.





Nitrogen Manifold
(#171-24)

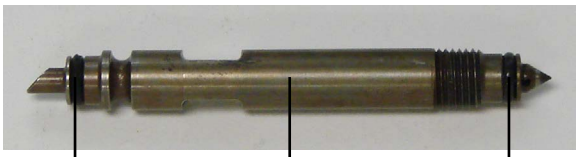
Operation

1. Plug the heating jacket into an appropriate power source. Place a thermometer (#154-20) into the heating well and preheat to 10°F (6°C) above the test temperature. A pilot light will come on when the heating jacket reaches the temperature set by the control knob.

2. If the cell caps are not already assembled, see page 20 for assembly instructions.

3. Inspect the cell cap and cell body. Discard any components that show signs of corrosion, damage, or wear.

4. Inspect all o-rings. Replace any that show signs of damage or wear. Looks for nicks, cuts, or brittle o-rings. Replace all o-rings after any test above 350°F (176.7°C). Place a thin film of silicone grease on all o-rings.



O-ring | Valve Stem (#170-16) | O-ring

5. Place an o-ring (#170-13-3) on the shoulder inside the cell body on the end marked “In”. Place another o-ring in the groove around the cell cap.

O-ring (#171-190-060)

Cement Screen (#170-18)

6. Place a cement screen on top of the o-ring.

7. Make sure all threads are clean and free of debris.

8. Apply anti seize compound (#165-44-2) to the threads of the cell locking rings and valve stems.

9. Screw the inlet cell cap into the cell body.


Note

The cell cap should turn smoothly in the threads and not require any tools for complete tightening. If you encounter resistance, carefully unscrew the cap and start over. Make sure the threads are properly seated before tightening completely.

10. Place an o-ring in each of the two o-ring grooves on both valve stems.

11. Screw one valve stem into the inlet cell cap. Tighten the valve stem completely.


Tip

To increase the life of the valve stem and cap, apply a thin layer of high-temperature thread lubricant (#165-44-1) to the tip of the valve stem.

12. Prepare the test fluid.

13. Invert the cell body and carefully pour the sample into the cell. Leave 2" (5.1 cm) void space for thermal expansion.


Note

Be careful not to spill fluid on the o-ring shoulder inside the cell.

14. Place an o-ring in the cell and another on the cell cap.

15. Place a cement screen on top of the cell o-ring.

16. Screw the outlet cap into the cell body.

17. Screw the other valve stem into the outlet cell cap and tighten it completely.

18. Invert the cell and place it in the heating jacket with the outlet (filter) side pointed down. Rotate the cell in the heating jacket so that the pin in the bottom of the heating well seats into the hole in the bottom of the test cell. This will anchor the cell in the well and prevent it from rotating as the valve stems are opened and closed.

19. Move the thermometer from the heating jacket to the hole in the test cell.

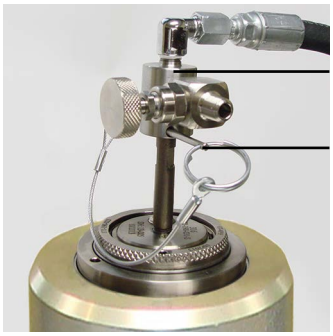

Note

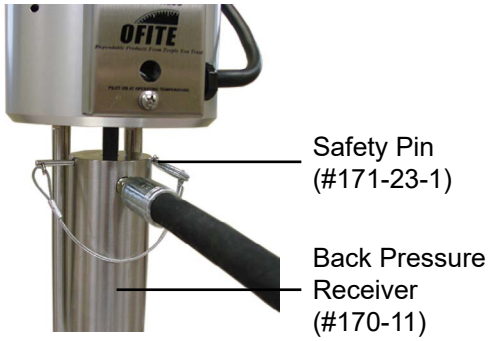
Allow the cell to heat for one hour. Start a 60 minute timer now.

Important

20. Connect the manifold block from the dual Nitrogen manifold to the top valve stem and lock it in place with the safety pin. Place the back pressure receiver on the bottom valve stem and lock it in place with the safety pin.

    The safety pin includes an attached lanyard. The lanyard secures the pin and prevents it from accidentally disengaging from the valve stem and pressure assembly. Always secure the pin with the lanyard.





21. Connect the male end of the pressure hose to the back pressure receiver (if it is not already connected). Make sure the needle valve on the back pressure receiver is closed.

22. Unscrew the regulator T-screws (counterclockwise) on the pressure manifold to make sure both regulators are completely closed.

23. Connect a Nitrogen cylinder (at least 1,500 psi) to the center inlet on the pressure manifold. Open the pressure release valve on the Nitrogen bottle and note the bottle pressure as registered on the middle manifold gauge.

24. Keeping the valve stems closed, adjust the top and bottom regulators to the recommended back pressure for your test (see chart below). Make sure the ball valves and bleeder valves are all closed.

Note

    The upper and lower limits of the test pressure differential are determined by the test temperature. As this temperature exceeds 212°F (100°C), the back pressure must be increased in order to prevent vaporization of the filtrate. The 500 psi differential pressure must be maintained, so the top pressure will have to be increased accordingly. The table below shows the pressures recommended for various test temperatures.

Recommended Minimum Back Pressure

Test Temperature		Vapor Pressure		Minimum Back Pressure	
°F	°C	psi	kPa	psi	kPa
200-299	95-149	12.1-67	84-462	100	700
300-374	150-189	67-184	462-1269	200	1400
375-399	190-199	184-247	1269-1704	275	1900
400-424	200-219	247-326	1704-2245	350	2500
425-450	220-230	326-422	2245-2912	450	3100

25. Open (loosen) the top valve stem ½ turn to pressurize the sample. Maintain this pressure on the fluid until the temperature has stabilized.

26. After the one hour heat up time, increase the pressure on the top pressure unit to 500 psi (3,448 kPa) more than the back pressure.

27. Open (loosen) the bottom valve stem ½ turn to initiate filtration as soon as possible.

    Tip

    Closely monitor the pressure gauges. If at any time during the test the pressure inside the cell rises above the setpoint, carefully open the needle valve on the top pressure assembly just enough to bleed off the excess pressure. Then close the valve. If the cell pressure decreases due to collection of filtrate, increase the pressure with the inlet regulator.

28. To collect filtrate, carefully open the ball valve on the bottom of the back pressure receiver while holding a graduated cylinder up to the valve port. Close the valve immediately after the pressure begins to decrease and the filtrate is collected.

    Note

    Collect filtrate at 10 seconds, 1 minute, 7.5 minutes, and 30 minutes. The initial 10 second collection is precautionary in nature, as a fluid with little filtration properties may fill up the 15 mL receiver tube almost immediately, potentially damaging the regulator. Do not record the 10 second collection as a separate notation, but do record the volume collected at the other time intervals.

    While collecting filtrate, maintain the test temperature within ± 5°F (±3°C). If the back pressure rises during the test, cautiously reduce the pressure by opening the valve on the receiver and drawing off some of the filtrate into the graduated cylinder.

29. At the end of the test, close (tighten) the top and bottom valve stems to seal off the cell.

30. Turn both regulator T-screws counterclockwise to close off the flow of pressurized gas.

31. Open the outlet valve on the back pressure receiver to collect all of the remaining filtrate.

32. Open the bleeder valve on the manifold block to release any remaining pressure in the line.

33. Remove the manifold block and the back pressure receiver. Drain any residual filtrate from the receiver into the graduated cylinder.

    Important

    The heating jacket will still be very hot. Be careful not to touch it while removing the back pressure receiver.

34. Allow the cell to cool to room temperature.

35. Remove the cell from the heating jacket after once again checking that the valve stems are tightly closed.

Tip

An optional Cell Carrying Tool (#170-40) makes this a simple and safe operation.

Important

The test cell will still be under approximately 600 psi (4.140 kPa) of pressure. To avoid possible injury, keep the cell upright and cool it to room temperature before disassembling. The cell must be cool for at least one hour at room temperature before removing the cell cap.

36. Using extreme care to save the filter cake, place the cooled cell upright with the outlet side down. Slowly open (loosen) the inlet valve stem to bleed off pressure from the cell body.

Tip

Pressure cannot be relieved from the cell by opening the outlet valve stem as the filter cake will seal off the cell. It is a good idea to open the valve stem with the cell inside a sink or with a rag over the valve stem in order to catch any liquid that might be ejected.

37. Once the pressure is released, tighten the valve stem again to keep the fluid inside. Then turn the cell over.

38. Loosen the valve stem and unscrew and remove the outlet cell cap. Use the supplied cell cap wrench to loosen the threads.

Important

If the cell cap is difficult to unscrew, the pressure port may be clogged. Use the HTHP Pressure Relief Tool (#170-91) to clear the obstruction.

39. Carefully remove the cement screen and deposited cake. Be careful not to damage the filter cake. Carefully wash any residual fluid from the surface of the filter cake.

40. Pour out the test fluid.

41. Clean and dry the apparatus thoroughly after each use. Inspect all of the o-rings and replace any that show signs of wear or damage.

Data

Filtrate Volume

The HTHP filter press has a filtration area of 3.55 in^2 (22.9 cm^2). This is half the area of a standard filtration test, which is 7.1 in^2 (45.8 cm^2). To compare the results of this test to a standard filtration test, double the total filtrate volume collected.

$$V_F = 2\ (V_{30})$$

Where:

V_F = Standard Filtrate Volume (mL)
$V_{7.5}$ = Filtrate volume collected after 7.5 minutes

Spurt Loss (Optional):

Spurt Loss is the amount of filtrate collected before the filter cake has had a chance to form and is expressed in millimeters. To calculate the spurt loss, use the following equation:

$$V_1 = 2\ [V_{7.5} - (V_{30} - V_{7.5})] = 2\ (2V_{7.5} - V_{30}) = 4V_{7.5} - 2V_{30}$$

Where:

V_1 = Spurt Loss
$V_{7.5}$ = Filtrate volume collected after 7.5 minutes
V_{30} = Filtrate volume collected after 30 minutes

Filter Cake

Wash the filter cake on the paper with a gentle stream of water. Measure and report the thickness of the filter cake to the nearest 1/32 in (0.8 mm). A ruler with the “zero mark” at the very edge of the ruler is useful here. Cake descriptions may be subjective and such notations such as hard, soft, rubbery, and fine, etc. convey adequate information on cake quality.

Cell Cap Assembly

☑ Tip

1. Choose the appropriate cap for your test:

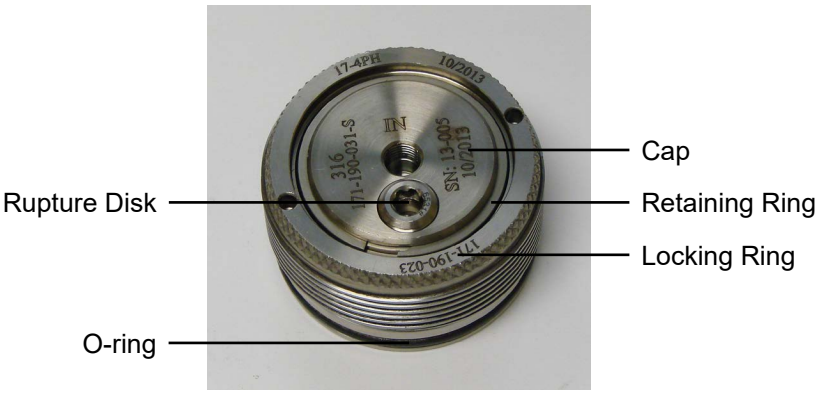
   - 171-190-032-S - Outlet, for Cement
   - 171-190-033-S - Inlet, for Cement

2. Place the locking ring (#171-190-023) around the cap.

3. Place the retaining ring (#130-81-040) into the groove around the outside of the cap. Make sure it engages completely around the circle.

   The cap should turn freely inside the locking ring.

4. Place an o-ring in the port in the cap. Wrap a rupture disk (#171-190-027) with nickel anti-seize tape (#171-190-040) and screw it into the port.



Maintenance

1. Thoroughly clean and dry all components with water and soap (or appropriate solvent).

2. Periodically check the cell assembly for leaks. Pressurize the cell and immerse it in water. Look for bubbles.

3. If the regulator loses pressure or steadily increases pressure, repair the regulator.

4. Power Cord

   a. Check the power cord for insulation wear and loose connections near the heating jacket and plug.

   b. Place the heating jacket no farther from the heating jacket than the length of the power cord.

   c. Keep the power cord away from the hot surface of the heating jacket.

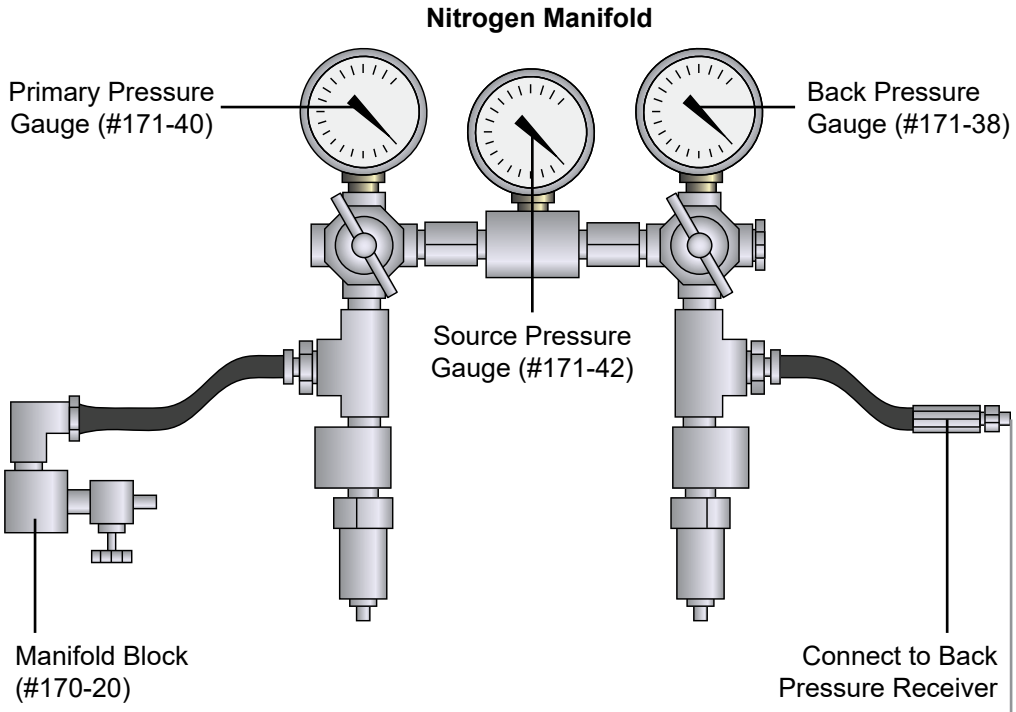
Note

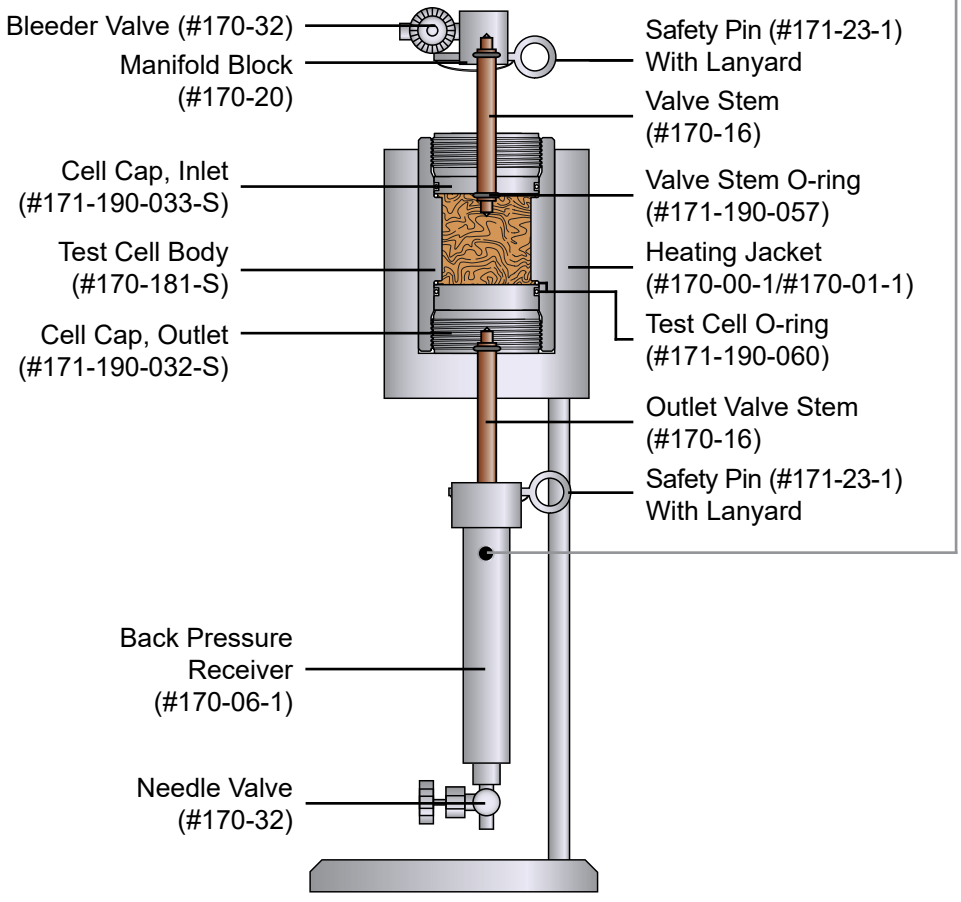
Installing wiring, power cords, or electrical connectors will void the warranty.

Symptoms	Cause: Resolution
Gas leak at the regulator outlet when the adjusting screw is loosened fully counterclockwise	Seat leak or *creep: Repair the regulator
Outlet pressure increases while downstream valves are closed	Seat leak or *creep: Repair the regulator
Gas leak from the spring housing case	Diaphragm failure: Repair the regulator
Excess drop in outlet pressure with the regulator flow open	Blocked seat assembly or inlet filter: Repair the regulator
Gas leak from any pipe thread joint	Loose fitting: Remove the connection. Clean the affected surfaces. Reapply Teflon tape and tighten.
Gas leak from relief valve	Faulty relief valve: replace the valve. Seat leak or *creep: Repair the regulator
Inconsistent repeat readings	Seat sticking: Repair the regulator. Bad pressure gauge: Replace the gauge.
Gauge does not return to zero with no pressure applied to the regulator.	Gauge has physical damage: Replace the gauge.

*Creep is an increase in outlet pressure that occurs when pressure escapes even when the valve is closed. Regulator seats can be compromised by particles in the process stream which can cause minor imperfections in the sealing surface. The high flow and small orifice created during pressure regulation combine to turn a very small particle into a fast projectile. This projectile can nick the sealing surface of the seat and cause leaks. Filtering particulates from the process stream should be a high priority, and a small filter can reduce the potential for creep and increase the life expectancy and accuracy of the regulator.

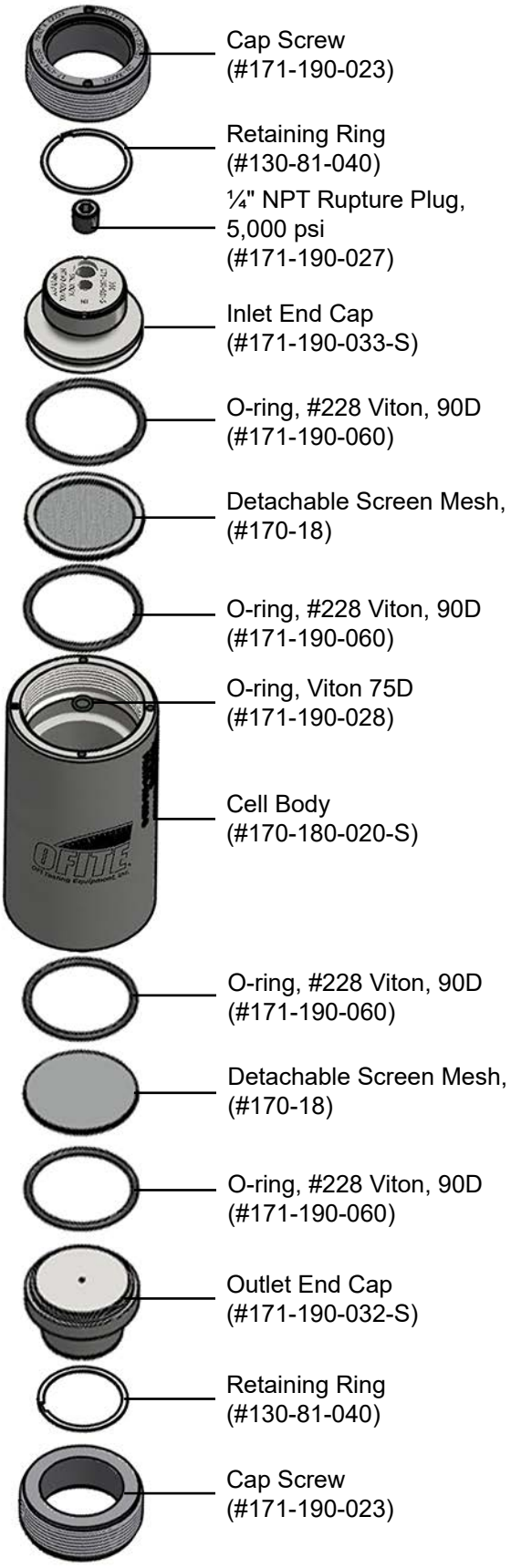
Diagrams


Nitrogen Manifold
Primary Pressure Gauge (#171-40)
Source Pressure Gauge (#171-42)
Back Pressure Gauge (#171-38)
Manifold Block (#170-20)
Connect to Back Pressure Receiver


Bleeder Valve (#170-32)
Manifold Block (#170-20)
Cell Cap, Inlet (#171-190-033-S)
Test Cell Body (#170-181-S)
Cell Cap, Outlet (#171-190-032-S)
Safety Pin (#171-23-1) With Lanyard
Valve Stem (#170-16)
Valve Stem O-ring (#171-190-057)
Heating Jacket (#170-00-1/#170-01-1)
Test Cell O-ring (#171-190-060)
Outlet Valve Stem (#170-16)
Safety Pin (#171-23-1) With Lanyard
Back Pressure Receiver (#170-06-1)
Needle Valve (#170-32)

Diagrams

Test Cell



Warranty and Return Policy

Warranty:

OFI Testing Equipment, Inc. (OFITE) warrants that the products shall be free from liens and defects in title, and shall conform in all respects to the terms of the sales order and the specifications applicable to the products. All products shall be furnished subject to OFITE's standard manufacturing variations and practices. Unless the warranty period is otherwise extended in writing, the following warranty shall apply: if, at any time prior to twelve (12) months from the date of invoice, the products, or any part thereof, do not conform to these warranties or to the specifications applicable thereto, and OFITE is so notified in writing upon discovery, OFITE shall promptly repair or replace the defective products. Notwithstanding the foregoing, OFITE's warranty obligations shall not extend to any use by the buyer of the products in conditions more severe than OFITE's recommendations, nor to any defects which were visually observable by the buyer but which are not promptly brought to OFITE's attention.

In the event that the buyer has purchased installation and commissioning services on applicable products, the above warranty shall extend for an additional period of twelve (12) months from the date of the original warranty expiration for such products.

In the event that OFITE is requested to provide customized research and development for the buyer, OFITE shall use its best efforts but makes no guarantees to the buyer that any products will be provided.

OFITE makes no other warranties or guarantees to the buyer, either express or implied, and the warranties provided in this clause shall be exclusive of any other warranties including ANY IMPLIED OR STATUTORY WARRANTIES OF FITNESS FOR PURPOSE, MERCHANTABILITY, AND OTHER STATUTORY REMEDIES WHICH ARE WAIVED.

This limited warranty does not cover any losses or damages that occur as a result of:

- Improper installation or maintenance of the products
- Misuse
- Neglect
- Adjustment by non-authorized sources
- Improper environment
- Excessive or inadequate heating or air conditioning or electrical power failures, surges, or other irregularities
- Equipment, products, or material not manufactured by OFITE
- Firmware or hardware that have been modified or altered by a third party
- Consumable parts (bearings, accessories, etc.)

Returns and Repairs:

Items being returned must be carefully packaged to prevent damage in shipment and insured against possible damage or loss. OFITE will not be responsible for equipment damaged due to insufficient packaging.

Any non-defective items returned to OFITE within ninety (90) days of invoice are subject to a 15% restocking fee. Items returned must be received by OFITE in original condition for it to be accepted. Reagents and special order items will not be accepted for return or refund.

OFITE employs experienced personnel to service and repair equipment manufactured by us, as well as other companies. To help expedite the repair process, please include a repair form with all equipment sent to OFITE for repair. Be sure to include your name, company name, phone number, email address, detailed description of work to be done, purchase order number, and a shipping address for returning the equipment. All repairs performed as "repair as needed" are subject to the ninety (90) day limited warranty. All "Certified Repairs" are subject to the twelve (12) month limited warranty.

Returns and potential warranty repairs require a Return Material Authorization (RMA) number. An RMA form is available from your sales or service representative.

Please ship all equipment (with the RMA number for returns or warranty repairs) to the following address:

OFI Testing Equipment, Inc.
Attn: Repair Department
11302 Steeplecrest Dr.
Houston, TX 77065
USA

OFITE also offers competitive service contracts for repairing and/or maintaining your lab equipment, including equipment from other manufacturers. For more information about our technical support and repair services, please contact techservice@ofite.com.