Dependable Products From People You Trust

Permeability Plugging Tester - P.P.T.

2,000 psi (13,800 kPa) - 500°F (260°C)

Part No. 171-90 (115V)
Part No. 171-90-01 (230V)

Instruction Manual

Updated 8/13/2026
Ver. 6

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Intro

The Permeability Plugging Tester (PPT) is a modification of the standard 500-mL HTHP Filter press. It may be used in the field or in a laboratory environment. The instrument is useful for performing filtration tests on plugging materials without the interference of particles settling on the filter medium during the heat up process. The PPT is very useful in predicting how a drilling fluid can form a low permeable filter cake to seal off depleted, under pressured intervals and help prevent differential sticking. Typical differential pressures are much higher than those seen in standard HTHP testing.

The pressure cell is similar to those seen in standard HTHP filtration testing, but it is inverted with the filter medium and the back pressure receiver on top of the assembly. The conventional cell may be operated to 2,000 psi by using hardened steel set screws to secure the cell cap. For elevated pressure, OFITE has designed a special cell with a working pressure of up to 4,000 psi, pressurized with the conventional hydraulic pump. The cell is pressurized with hydraulic oil and a floating piston separates the oil from the test fluid within the cell.

Description

The cell is furnished with a standard cell inlet cap, a floating piston, and a scribed outlet cap for the ceramic filter disks. The outlet end of the cell has a ¼" (6.35 mm) deeper recess than a standard cell to allow for the ceramic disk as a filter medium. The end cap used with the ¼" (6.35 mm) disk has a scribed concentric pattern rather than the conventional screen. Filter paper or other thin filter medium may be used with this cap by using the spacer ring (Part No. 170-72) to fill the extra ¼" (6.35 mm) space. Also, an extra thick end cap with a standard screen backup is furnished to use with thin filter media - paper or metal.

All of the end caps are designed to accept the standard valve stem. The inlet, or bottom, valve stem is fitted with a quick-connect for the connection to the hydraulic pressure manifold. The standard hydraulic pressure manifolds are equipped with a 2,000 psi (13,800 kPa) relief valve. The outlet, or upper, valve stem assembly consists of a dual valve stem with a ball valve in the middle, which facilitates the opening and closing of the outlet flow. Power consumption for the PPT heating jacket is 800 watts.

The 100 mL back pressure receiver is mounted on top of the heating jacket and upside down, when compared to the normal HTHP filter press configuration. It attaches to the cell outlet valve stem and is secured with the retainer pin (Part No. 171-23-1). The fittings on the receiver are reversed with the pressure inlet on the small end (the upper end). A flare fitting may be provided if it is desired to use the low-pressure side of a dual manifold on a nitrogen bottle instead of the standard CO_2 cartridges.

Specifications

- Weight: 58 lbs. (26.3 kg)
- Dimensions: 15" × 25" × 42" (38.1 × 63.5 × 106.7 cm)
- Shipping Weight: 84 lbs. (38.1 kg)
- Shipping Dimensions: 30" × 18" × 17" (76.2 × 45.7 × 43.2 cm)
- 800W Heater
- Test Cell
- Maximum Temperature: 500°F (260°C)
- Maximum Pressure: 2,000 psi (13,800 kPa)

Components

#153-14	Graduated Cylinder, 50 mL × 1 mL, Glass
#154-20	Thermometer with Metal Dial, 8" Stem, Dual Scale: 50° - 500°F / 0° - 250°C
#170-16	Valve Stem
#170-19	Filter Paper, 2.5" (6.35 cm), Grade #50, Box of 100
#170-53	Ceramic Filter Disk, 15 D, 50 µm

Heating Jacket:

#164-32	Male Connector for Power Cable (230 Volt Only)
#171-00	Heating Jacket, 800 Watt (115 Volt Only)
#171-01	Heating Jacket, 800 Watt (230 Volt Only)
#171-82	Power Cord (115 Volt Only)

Test Cell:

#170-13-3	O-ring, Viton 75D, Qty. 5
#170-26-1	Hardened Locking Screw, Qty. 12
#170-69	Cell Cap, Scribed
#170-72	Spacer for Filter Paper, ¼"
#170-73	Cell Cap, Extra Long for Filter Paper
#171-02	Cell Body, 10", 500 mL
#171-21	Cell Cap with Screen
#171-93	Piston
#171-95	T-handle for Piston

Inlet Pressuring:

#171-27	Hose, #5000, 6'
#171-42	Gauge, 3000 psi, 2½" Face, ¼" Bottom Connection
#171-84-02	Reducing Bushing, ⅛" MNPT × ⅛" FNPT
#171-90-02	Quick Coupler, Female
#171-90-03	Quick Coupler, Male
#171-90-04	Cross, ¼" NPT
#171-90-06	Reducing Bushing, ¼" MNPT × ⅛" FNPT
#171-90-07	Hex Nipple
#171-90-08	Valve Stem, Hydraulics Entry
#171-90-11	Elbow, Female, ⅛" NPT
#171-90-12	Elbow, Male, ¼" NPT
#171-90-13	Adapter, ¼" Flare × ¼" Male NPT
#171-90-14	Adapter, ⅛" NPT × ¼" Hose Barb
#171-92	Relief Valve, 2200 psi
#171-96	Handpump
#171-96-1	Hydraulic Oil, 1 Quart
#171-98	Ball Valve for Inlet Pressure Line, ¼"

Outlet Pressuring:

#170-04	CO_2 Pressurize Unit
#171-10	Back Pressure Receiver, 100 mL (Modified)
#171-11	O-ring for Back Pressure Receiver, 100 mL
#171-23-1	Safety Pin with Lanyard
#171-90-09	Valve Stem, Filtrate Outlet
#171-90-10	Valve Stem, Receiver Entry
#171-97	Ball Valve for Outlet Pressure, ⅛"

O-rings:

#170-13-3	O-ring for Cell
#170-17	O-ring for Valve Stem
#170-77	O-ring for Spacer
#171-99	O-ring for Piston

Optional:

#170-13	O-ring for Test Cell, Buna, For tests below 300°F

Tools:

#170-27	Allen Wrench, 5/32"
#171-90-15	6" Crescent Adjustable Wrench

#171-90-SP One Year Spare Parts for #171-90:

#143-02-13	O-ring for Puncture Pin Holder Assembly, CO_2 Cartridge, Qty: 2
#143-02-14	O-ring for Puncture Pin Assembly, Qty: 2
#143-05	*CO_2 Bulbs EZ Puncture, PKG/10, UN# 1013, Qty: 30
#153-14	Graduated Cylinder, 50 mL × 1 mL, Glass, Qty: 2
#154-20	Thermometer with Metal Dial, 8" Stem, Dual Scale: 50° - 500°F / 0° - 250°C
#165-44-2	High-Temperature Thread Lubricant, Qty: 2
#170-11	Heating Element, 200 Watt, Qty: 2
#170-13-2	O-ring for Cell, Qty: 50
#170-17	O-ring For Valve Stem, Qty: 24
#170-19	Filter Paper, 2.5" (6.35 cm), Grade #50, Box of 100, Qty: 5
#170-26-1	Hardened Locking Screw, Qty: 24
#170-27	Allen Wrench, 5/32"
#170-32	Needle Valve, Male, 1/8" × 1/8" NPT
#170-77	O-ring for Spacer, Qty: 4
#171-11	O-ring for Back Pressure Receiver, Qty: 4
#171-23-1	Safety Pin with Lanyard, Qty: 2
#171-90-08	Valve Stem, Hydraulics Entry
#171-90-09	Valve Stem, Filtrate Outlet
#171-90-10	Valve Stem, Receiver Entry, Qty: 2
#171-96-1	Hydraulic Oil, 1 Quart, Qty: 2
#171-99	O-ring for Piston, Qty: 12

Safety

1. For safe operation of the Hydraulic Pump Pressurization system, make sure the pressure has been released and the gauge on the pump reads zero before:

   a. Attempting to disconnect the pressure hose from the cell at the quick-connect.

   b. Attempting to remove the cell from the heating jacket.

   c. Reallocating or moving the PPT in the laboratory.

   d. Refilling the hydraulic pump.

   e. Performing any maintenance including tightening leaking fittings on the pump, hydraulic fittings, or cell assembly.

2. When refilling or repairing the hydraulic system make sure any spilled oil is cleaned. Oil on the floor is very slippery and can cause falls and injury. Oil spills on the bench can accumulate and become a fire hazard.

3. Always use either **nitrogen or carbon dioxide** to pressurize the back pressure receiver. Never connect it to compressed air, oxygen, or other non-recommended gas. If nitrogen is used it must be supplied in an approved nitrogen gas cylinder and it must be secured to meet safety standards. CO_2 is normally supplied in small bulbs, which contain about 900 psi, and are frequently used for field operations. Do not allow these bulbs to be heated or exposed to fire as they can explode if overheated.

4. When pressurizing the back pressure receiver always open the supply pressure first, then adjust the regulator. When de-pressurizing, shut off the supply pressure first, then bleed the system of pressure and then back out the regulator T-screw.

5. Cooling the hot cell under water is very dangerous. Be very careful to avoid touching or accidentally dropping the cell. Steam generated when the cell contacts water can cause severe burns.

6. Make sure the electrical source is fused and grounded. Verify the power cord on the heating jacket is in good condition and has the proper ground connection.

7. Electrical problems in the wiring or the heaters may not be obvious by looking at the equipment. A malfunction is indicated if the unit starts blowing fuses or tripping breakers, the heating time seems too long, or the thermostat control does not repeat. These conditions indicate an electrical repair job may be required. Always disconnect the power cables before attempting any repair.

8. The filtration cell assembly is a pressure vessel and these safety precautions should be followed:

    a. Cell bodies that show signs of stress cracking, severe pitting or have damaged locking screw holes must not be used.

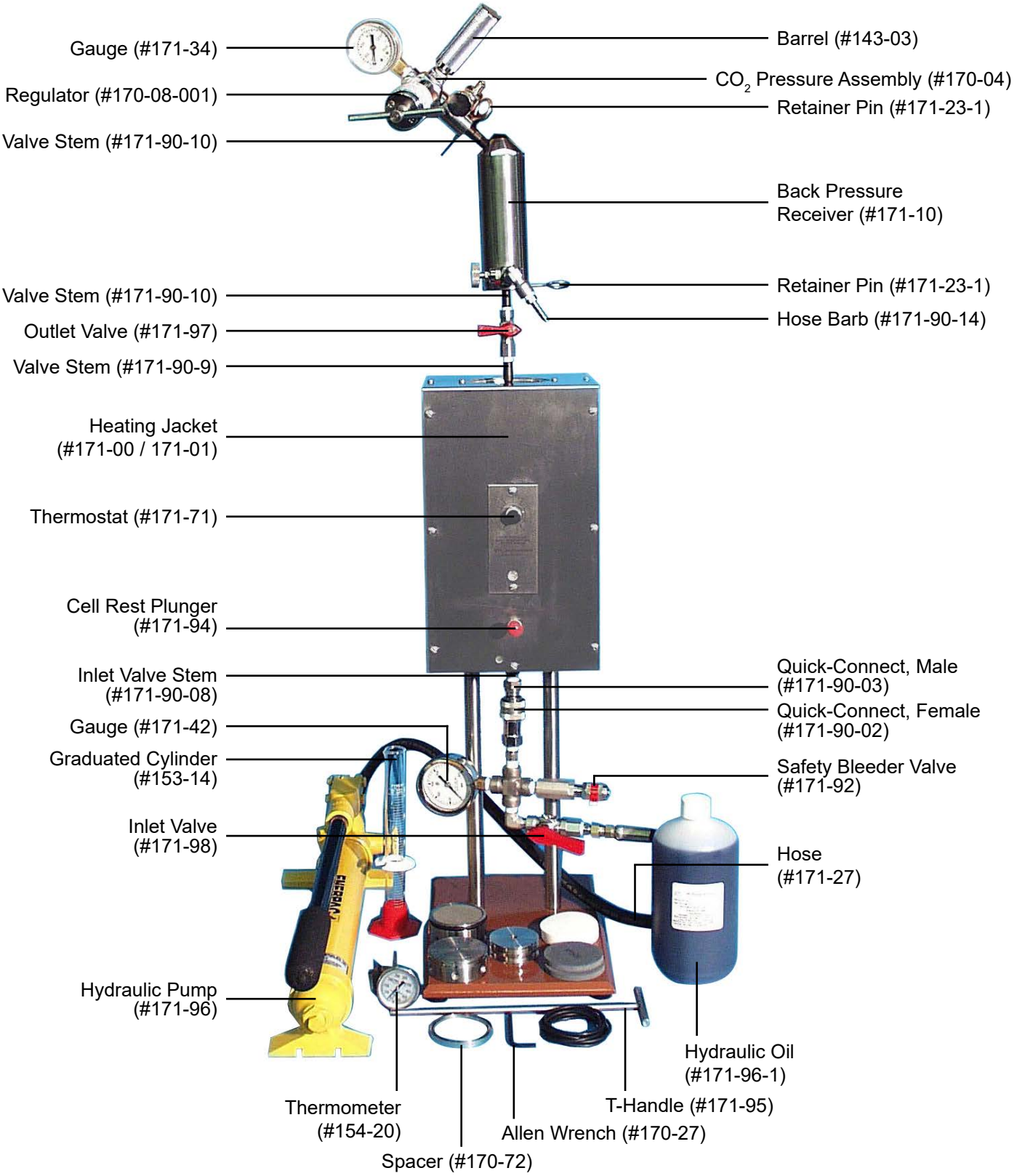
    b. Cell caps showing evidence of the locking screw holes being pulled or deformed must not be used.

    It is strongly recommended the instruction manual be attached to the apparatus and read completely prior to the initial operation by anyone unfamiliar with the equipment.

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.


Gauge (#171-34)
Regulator (#170-08-001)
Valve Stem (#171-90-10)
Valve Stem (#171-90-10)
Outlet Valve (#171-97)
Valve Stem (#171-90-9)
Heating Jacket (#171-00 / 171-01)
Thermostat (#171-71)
Cell Rest Plunger (#171-94)
Inlet Valve Stem (#171-90-08)
Gauge (#171-42)
Graduated Cylinder (#153-14)
Inlet Valve (#171-98)
Hydraulic Pump (#171-96)
Barrel (#143-03)
CO_2 Pressure Assembly (#170-04)
Retainer Pin (#171-23-1)
Back Pressure Receiver (#171-10)
Retainer Pin (#171-23-1)
Hose Barb (#171-90-14)
Quick-Connect, Male (#171-90-03)
Quick-Connect, Female (#171-90-02)
Safety Bleeder Valve (#171-92)
Hose (#171-27)
Hydraulic Oil (#171-96-1)
T-Handle (#171-95)
Allen Wrench (#170-27)
Thermometer (#154-20)
Spacer (#170-72)

Operation

Preparation

1. Before starting a test, close all valves and ensure that all regulators are rotated fully counter-clockwise.

2. Connect the heating well to a 110V or 220V AC power source as specified on the nameplate. The heating jacket requires an 800W power supply.

3. Turn the thermostat to about mid-scale to begin heating and place a metal dial thermometer in the thermometer well.

   ☑ **Tip**

   The pilot light will turn on when the heating well is at the temperature setpoint. The temperature should read 10°F (6°C) above the desired test temperature. If it is not, adjust the thermostat.

4. Before using the ceramic disk, soak it for at least 10 minutes in base fluid. Use water for freshwater-based fluids, brine for saltwater-based fluids, diesel for oil-based fluids, and a synthetic base for synthetic-based fluids. Never reuse a disk except for return permeability studies. Below is a list of ceramic disks available:

   #170-55 Ceramic Filter Disk, 775 milli-darcy, 10 micron, 2½" × ¼"
   #170-53-2 Ceramic Filter Disk, 850 milli-darcy, 12 micron, 2½" × ¼"
   #170-53-3 Ceramic Filter Disk, 3 darcy, 20 micron, 2½" × ¼"
   #170-51 Ceramic Filter Disk, 8 darcy, 40 micron, 2½" × ¼"
   #170-53 Ceramic Filter Disk, 15 darcy, 50 micron, 2½" × ¼"
   #170-53-1 Ceramic Filter Disk, 20 darcy, 55 micron, 2½" × ¼"
   #170-53-4 Ceramic Filter Disk, 40 darcy, 120 micron, 2½" × ¼"

Operation

Loading the Filtration Cell

1. Open the cell and check all of the o-rings. Replace any that appear worn or damaged. New o-rings are normally required after each test above 300°F (149°C).

2. Apply a thin coat of silicone grease around the o-rings used on the piston, valve stems, and the cell caps.

3. Position the cell upright with the inlet, or shallow, recess facing upwards. Check the o-ring recess to make sure it is clean. Carefully insert an o-ring (Part No. 170-13-3) inside the cell recess and cell caps.

4. Find the shorter, screened cell cap and place it into the test cell body. Make sure the arrow on the cell cap lines up with the arrow on the test cell body.

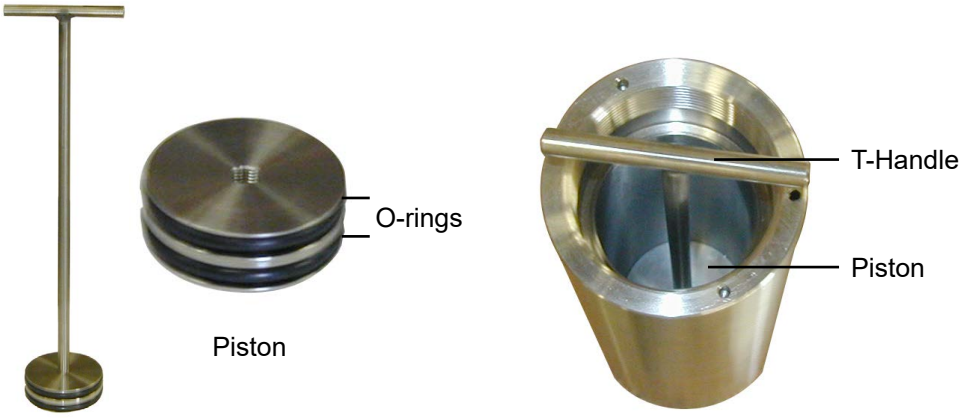
5. Place a locking screw into each of the holes around the top of the test cell body and tighten them with the provided Allen wrench.

6. Push in the red knob located just below the thermostat control on the heating jacket. This moves the stop plunger into position to support the cell while it is being filled with fluid and facilitates installing the outlet cell cap. Invert the cell and place it inside the heating jacket with the inlet cap facing downward.

7. Screw the inlet valve stem (with the Quick-Connect fitting) into the inlet cell cap and tighten it completely. Then, open the valve stem by turning it clockwise ½ to 1 complete turn. When connected, the Quick-Connect end of the valve stem should be pointed down.

8. Connect the hydraulic pump pressurizing hose with the ¾" (2.0 cm) ball valve and quick-connect fitting to the inlet valve stem assembly.

9. Screw the T-handle into the piston and place it inside the cell, working it up and down to ensure free movement. Position the piston with the T-handle so that it comes into contact with the inlet cell cap.



Piston with T-Handle

10. Open the inlet valve. Turn the pressure release knob on the hydraulic pump clockwise to close the pressure release valve. Stroke the hydraulic pump 6 to 8 times to add approximately 1½" (3.81 cm) of hydraulic fluid volume into the cell inlet. Close the inlet valve.

Tip

The best way to determine the volume hydraulic fluid in the cell is to observe the T-handle. When it has risen 1½" (3.81 cm), stop adding fluid.

11. Remove the T-handle from the piston and cell.

12. Prepare the test fluid according to API Specifications.

13. Add approximately 320 mL of test fluid to the cell. Be careful not to pour any fluid on the o-ring recess. The fluid level inside the cell should be flush with the bottom of the o-ring recess.

14. Place the viton o-ring (Part No. 170-13-3) in the recess and place the prepared ceramic disk on top of the o-ring.

15. Find the cell cap with the scribed flow lines in the surface. Screw the cell cap into the outlet end of the test cell. Coating the o-ring with a thin coat of high-temperature silicone grease will help.

    If you are using filter paper instead of a ceramic disk, use the provided screened cell cap to prevent tearing. The screened cap is ¼" thicker to account for the missing disk.

    If you prefer to use the scribed cell cap with filter paper, use the provided spacer ring to fill in the empty ¼". Place the spacer into the cell on top of the o-ring groove. The o-ring in the spacer should be facing up.

16. Place a locking screw into each of the holes around the top of the test cell body and tighten them with the provided Allen wrench.

Tip

Outlet Cell Cap (Screened) #170-73

Outlet Cell Cap (Scribed) #170-69

Spacer Ring #170-72

Inlet Cell Cap #171-21

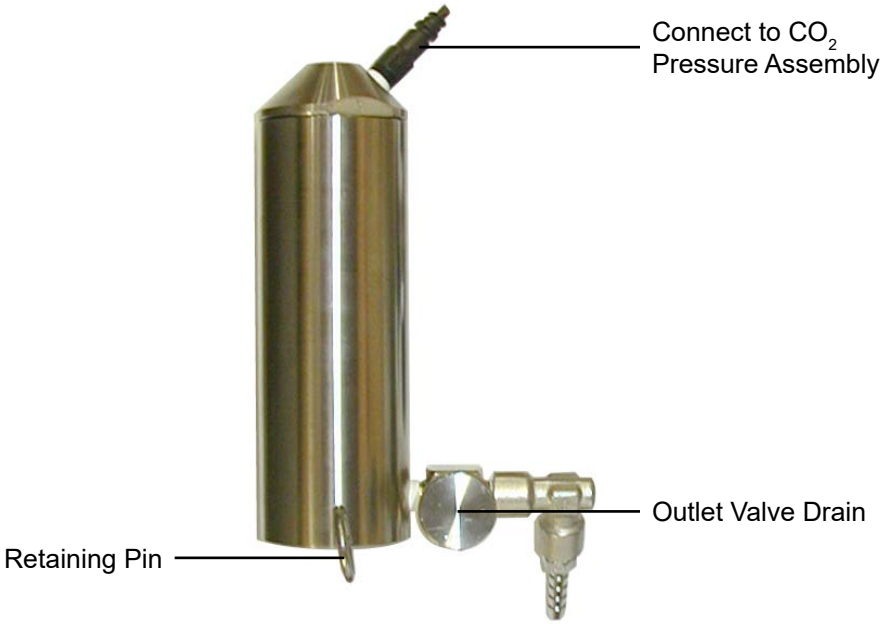
17. Using a 3-mL syringe, fill the outlet valve with base fluid (water or oil) which will enhance the accuracy of the test. The total dead space volume from the filter media to the back pressure receiver should be filled with the base fluid prior to the test. This will insure that the initial volume of filtrate passing through the filtering media will displace an equal volume of filtrate at the receiver end. In some configurations the dead space can exceed 1 - 2 mL, so erroneous filtrate volumes will result if this dead space is not filled.

18. Install and tighten the outlet valve stem assembly with the ⅛" (0.32 cm) ball valve into the outlet cell cap on top of the cell.

19. Hold the outlet valve assembly with one hand and pull the stop on the heating jacket out of the way to lower the cell fully inside the heating jacket. Rotate the cell until it locks in place over the alignment pin in the bottom of the heating jacket.

20. Close the outlet valve by turning the lever to the 90° position. Place a metal dial thermometer (Part No. 154-20) in the top of the cell in the small hole.

21. Attach the back pressure receiver to the top of the valve assembly. Be careful to not rotate the valve assembly. Lock the receiver in place with the retaining pin. Be sure that the pin is all the way in. The ⅛" (0.32 cm) outlet drain valve on the receiver should be in the closed position.



22. Attach the CO_2 pressure assembly to the valve stem on top of the back pressure receiver and make sure the retainer pin is all the way in.

23. Turn the T-handle on the air regulator counter-clockwise until approximately 6 threads are exposed. Puncture the CO_2 bulb and apply the appropriate amount of back pressure to the receiver for the desired test temperature.

24. While the cell is heating up to the desired temperature, open the inlet valve and apply the amount of pressure indicated in the “Recommended Minimum Back Pressure” table.

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

**For tests above 400°F, use Teflon o-rings.*

Tip

When the closed cell is heating in the jacket, the pressure in the cell will rise rapidly due to the thermal expansion of the sample and the hydraulic fluid. Use the pump to release hydraulic oil and prevent over-pressurization. Maintain the pressure on the fluid until the desired temperature is stabilized, as indicated by the thermometer. Use the hydraulic pump’s pressure release valve to regulate and maintain the pressure. The heating time of the sample should never exceed one hour.

Important

When working with heated pressurized vessels, always wear protective safety glasses.

Excessive pressure puts stress on four main areas of the cell:

1. End cap bending - may be observed either by eye or by measurement

2. End cap compression - may be observed by the ovalness on the locking screw seats or holes

3. Cylinder shear - elevated areas above the locking screw holes or damaged locking screw holes on the cell body

4. Cylinder stress - stress cracking or severe pitting will appear on the cell body

Operation

Test Procedure

Important

1. Once the cell has reached the required temperature, close the valve on the hydraulic pump and open the outlet valve. Operate the pump to increase the pressure in the cell to the desired test pressure to initiate filtration. Using the pump, maintain the desired differential pressure in the cell. The differential pressure is the cell pressure less the amount of back pressure.

   Do not exceed 2,000 psi as the primary or inlet pressure.

2. Set a timer for the desired test times. Filtrate should be collected at a minimum of 7.5 and 30 minute intervals. Collect and record the total amount of filtrate and/or mud for 30 minutes. Be sure to maintain the selected differential pressure and test temperature within ± 5°F (3°C).

3. During filtration collection, the pressure in the cell will tend to decrease, so it will be necessary to apply additional hydraulic pressure to maintain a constant pressure.

4. If the back pressure rises during the test, cautiously reduce the pressure by opening the drain valve on the receiver and drawing off some of the filtrate into the graduated cylinder. The filtrate will be at or near the test temperature and slowly opening the drain valve will minimize any spattering of the fluid and any potential contact with hands and fingers. Bleed only enough to reduce the back pressure to its initial setting.

5. After the 30 minute time period, close the outlet valve. Open the receiver drain valve and allow it to blow dry to remove any filtrate and/or mud from the receiver. Record the total amount of liquid recovered, including the spurt loss.

6. Turn the T-handle on the air regulator clockwise to stop adding pressure to the back pressure receiver.

Disassembly

1. Release the pressure on the hydraulic pump by turning the release valve on the pump counter-clockwise until the pressure gauge on the hydraulic pump manifold reads 0 psi (at least four complete turns). Close the inlet valve and remove the hydraulic hose and quick-connect from the inlet valve assembly. Leave the inlet valve assembly connected to the cell.

2. Remove the CO_2 pressuring assembly from the back pressure regulator.

3. Remove the back pressure regulator from the outlet valve assembly.

4. Allow the cell to cool or remove it from the heating jacket and cool it off with cold water.

The temperature of the sample in the cell must be reduced to less than 100° F (46.5° C) before the cell can be safely opened.

5. Hold the cell so that the inlet and outlet valves are pointing away from people and equipment. Slowly open the outlet valve stem by turning it one complete turn counter-clockwise. Slowly open the out valve to release the pressure in the cell. Repeat the process with the inlet valve and ensure that all of the pressure has been released from the cell.

The filter cake may block the release of pressure on the outlet side.

6. Turn the cell upside down or lay it on its side. Use either the spanner wrench to remove of the outlet cell cap. Remove the outlet valve assembly and cell cap. Inspect the valve stem to make sure it is not plugged by blowing air into the valve.

It may be necessary to completely remove any obstructions by inserting a small drill bit, wire, or straightened paper clip, into the valve stem. Make sure the opening is pointed away from people and equipment when inserting the wire.

7. Recover the ceramic disk and very lightly wash the filter cake with the type of base fluid used in the mud (fresh water, brine, diesel, synthetic, etc.) Measure the filter cake to the nearest 1/32" (0.8 mm).

   If the ceramic disk does not readily come out of the cell with the flow of fluid:

   a. Lay the cell on its side and over a sink.

   b. Install the hydraulic connector onto the inlet valve stem and open the stem by turning it 2 turns counter-clockwise.

c. Open the inlet valve and close the pressure relief valve on the hydraulic pump.

d. Stroke the pump handle 1 to 3 times until the piston pushes the fluid from the cell along with the ceramic disk.

Important

Do not try to pry or shake the ceramic disk from the cell as it may cause the disk to break.

8. To recover any remaining hydraulic fluid from the cell:

   a. Screw the T-bar wrench into the piston inside the cell.

   b. Open the inlet valve and turn the pressure release valve on the hydraulic pump 4 complete turns.

   c. Manually push the piston to the bottom of the cell.

   d. Close the pressure release valve on the hydraulic pump and close the inlet valve.

   e. Remove the hydraulic pump manifold from the inlet valve stem and remove the piston from the cell using the T-handle.

9. Completely disassemble the cell and clean and dry the entire apparatus with soap and water. Inspect all o-rings and replace them if necessary.

   If you are using brine fluids, clean the outlet valve stem assembly with freshwater and blow it dry with air before re-using.

Reporting Data

1. The filtrate volume collected should be corrected to a filter area of 7.1 in^2 (4580 mm^2) so the amount collected will have to be doubled.

2. The spurt loss is defined as the amount of mud and/or filtrate recovered from the collector immediately after the differential pressure is applied until the flow of fluid through the permeable disc stops and gas from the receiver blows out freely. The presence of whole mud in the spurt indicates that there was not an immediate seal of the mud when it passed through the filter. In most cases, the goal is to eliminate or minimize the amount of whole mud in the spurt and in the 30 minute test.

3. After the test is complete, remove the ceramic disk from the test cell and wash it very lightly with base fluid. Measure the filter cake thickness to the nearest 1/32" (0.8 mm). Although cake descriptions are subjective, such notations such as hard, soft, tough, rubbery, firm, etc. may convey important information of cake quality.

Calculations

Permeability Plugging Test Volume

$V_{PPT} = 2 \times V_{30}$

Where:

V_{PPT} = Permeability Plugging Test Volume

V_{30} = Filtrate volume after 30 minutes

Spurt Loss

$V_1 = 2 (2V_{7.5} - V_{30})$

Where:

V_1 = Spurt Loss

$V_{7.5}$ = Filtrate volume after 7.5 minutes

Static Filtration Rate

$V_{SF} = 2 (V_{30} - V_{7.5}) / 2.739$

Where:

V_{SF} = Static Filtration Rate (velocity of flow)

Maintenance

1. Clean the test cell, cell caps, valve stems, and all fittings thoroughly after each test. Make sure all threads are clean and free of debris. Blow air through all valve stems and fittings to clean out any remaining material.

2. Before each test, lubricate all o-rings with high-temperature grease to ensure a proper fit and increased life.

3. Periodically inspect valve stems and locking screws for damage or wear. Replace any that no longer have a sharp point on the end.

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.