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Dead-Weight Hydraulic Filter Press

Part No. 140-75

Instruction Manual

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Ver. 3.0

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Intro

Measurements of filtration behavior and wall cake-building characteristics of a drilling fluid are fundamental to control and treatment of drilling fluids, as are various characteristics of the filtrate such as oil, water, or emulsion content. These factors are affected by the types and quantities of the solids in the fluid and their physical and chemical interactions, which in turn are affected by changing temperatures and pressures.

The OFITE low pressure filter press helps determine filtration and wall cake-building properties of drilling fluids. The filter press design features a cell body to hold the mud sample, a pressure inlet, and a base cap with screen and filter paper.

The pressure cell is designed so that a 3½" (9 cm) sheet of filter paper can be placed in the bottom of the chamber to remove particles from the fluid. The filtration area is $7.1 \pm 0.1 \text{ in}^2$ ($4,580 \pm 60 \text{ mm}^2$). Pressure may be applied with any non-hazardous fluid medium, either gas or liquid. Some models are equipped with pressure regulators and may be pressurized with portable pressure cylinders, midjet pressure cartridges, or hydraulic pressure.

The Dead Weight Hydraulic Assembly provides the operator of a standard API Filter Press with a convenient source of hydraulic pressure. This alleviates the need for a regulator, separate pressure source, or outside connections.

The assembly is composed of a water reservoir that requires a pint of fresh water for each test, a piston and cylinder, a dead weight gauge, two check valves, and a bleed-off valve. When the system is closed, the dead weight causes the piston to exert a continuous pressure of 100 PSI against the fluid inside the filter press cell. Pressure on the cell is released promptly at the completion of the test with a bleed-off valve. The hydraulic system has sufficient volume to run the complete 30-minute filtration test without further attention from the operator, and the assembly requires a minimum amount of maintenance.

Components

#140-55 Filter Paper for Low Pressure; 3½" (9.0 cm); Box of 100

#140-70 Dead-Weight Hydraulic Assembly:

- #140-71 O-ring
- #141-13 Low-Pressure Air Hose; 15"
- #143-01 200-PSI Gauge; ⅛" Bottom Connection
- #144-14 ⅛" × ⅛" Hex Nipple; Plated
- #170-32 ⅛" × ⅛" NPT Male Needle Valve

- #141-00 Test Cell
- #141-01 Base Cap
- #141-02 Top Cap
- #141-04 Screen; 60 Mesh
- #141-05 Neoprene Gasket; Qty: 3
- #141-08 Bench-Mount Frame
- #141-09 Threaded Insert with Set Screw
- #141-10 T-Screw
- #141-11 Support For Graduated Cylinder
- #141-12 Support Rod
- #141-18 Thumb Screw
- #141-19 Air Hose Adapter
- #141-22 Felt Filter; Qty: 2
- #153-16 Graduated Cylinder; Glass; 25 mL × ⅓ mL

Optional:

#140-75-SP Spare Parts for #140-75:

- #140-55 3½" (9.0 cm) Filter Paper; Low Pressure; WLP; Box of 100; Qty: 3
- #140-71 O-ring; Qty: 6
- #141-04 60-Mesh Screen; Qty: 2
- #141-05 Neoprene Gasket; Qty: 9
- #141-22 Felt Filter; Qty: 4
- #153-16 Glass Graduated Cylinder; 25 mL × ⅓ mL

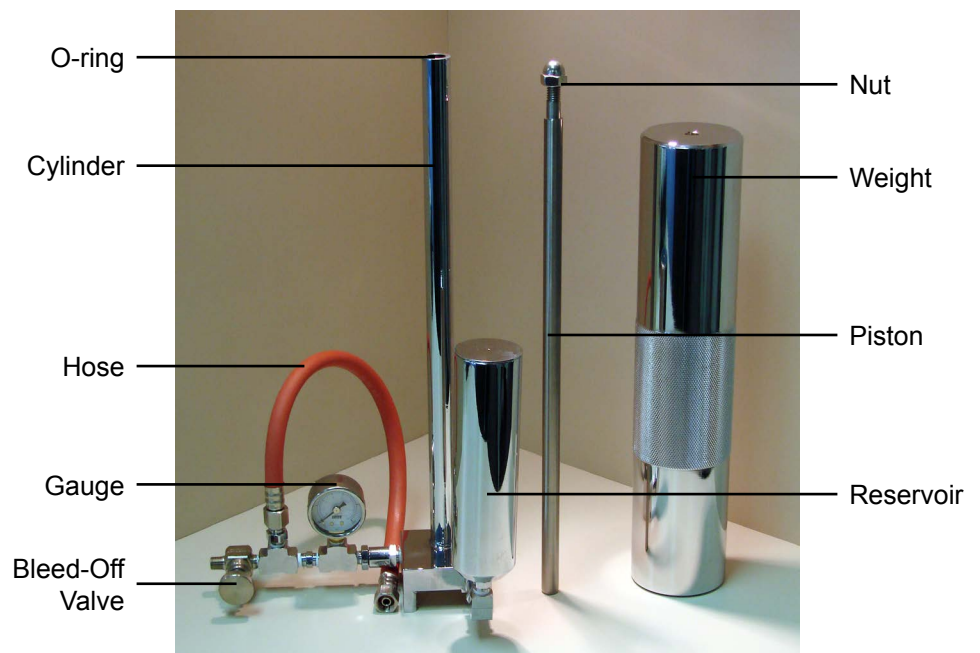
Setup

Before performing the first test, it will be necessary to assemble the dead-weight hydraulic assembly.

1. Remove the piston from the cylinder and remove the nut from the top.
2. Insert the piston into the bottom of the weight so that the threads protrude from the hole in the top.
3. Screw the nut onto the piston to secure it in place.
4. Inspect the o-ring in the top of the cylinder for wear or damage. Replace it with a new o-ring in necessary.
5. Insert the piston into the cylinder and slide it down until it rests at the bottom.

The o-ring at the top of the cylinder requires occasional lubrication. Perform the following procedure the first time you use the unit, and periodically thereafter.

1. Fill the water reservoir to the top with clean, fresh water.
2. Open the bleed-off valve.
3. Raise the weight to the top of the cylinder and release it, allowing it to travel a full stroke.
4. Refill the reservoir with clean, fresh water.
5. Close the bleed-off valve. The unit is now ready for operation.



Operation

1. Before beginning a test, make sure each part of the cell is clean and dry, particularly the screen. Examine the gaskets for distortion and wear. Make sure the screen is free of sharp edges, burrs, or tears.
2. Measure the initial temperature of the mud sample and record it for later analysis.
3. To assemble the test cell, begin by turning the base cap upside down and placing a rubber gasket inside it. Then, place the screen, one sheet of filter paper, and another gasket. Finally, place the cell body into the base cap and turn it to lock it in place.



Base Cap (#141-01)



Gasket (#141-05)



Screen (#141-04)



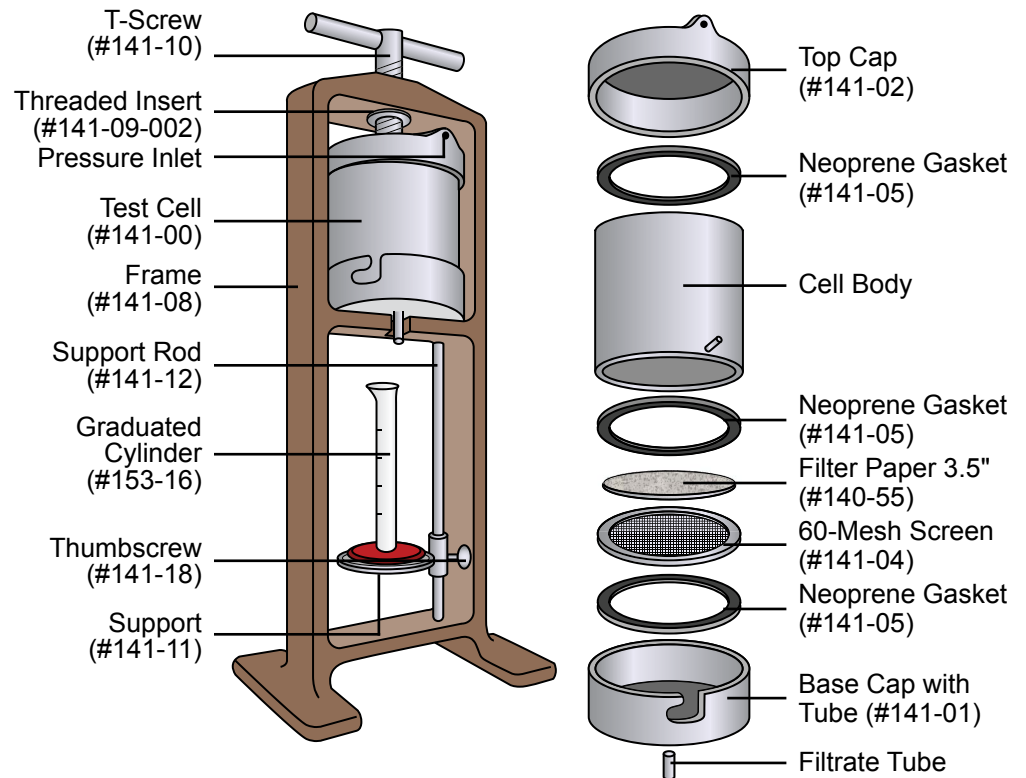
Top Cap (#141-02)



Assembled Test Cell

4. Pour the freshly stirred sample fluid into the cell, leaving 0.5" (13 mm) of empty space at the top.
5. Place a rubber gasket inside the top cap. Make sure it is seated all the way around the cap. Then place the top cap onto the cell body and place the entire cell into the frame. Secure the cell with the T-screw.
6. Place a clean, dry graduated cylinder under the filtrate tube.
7. Attached the hose from the dead-weight hydraulic pressure source to the inlet valve on the top cap.
8. Fill the reservoir on the dead-weight hydraulic assembly with clean, fresh water.

9. Make sure the bleeder valve is closed before pressurizing the cell.
10. Raise the dead weight about a foot and allow it to settle. In about two-thirds of a stroke, the pressure gauge will indicate 100 PSI, (689.5kPa).
11. Lift the dead-weight back to the top of the stroke. Timing of the test should begin now. One stroke of the piston allows a maximum filtration loss of approximately 30 mL.
12. After 30 minutes, measure the volume of filtrate collected. Shut off the flow from the pressure source.
13. Record the volume of filtrate collected in cubic centimeters to the nearest .1 cm³. Label this value "API Filtrate". Record the time interval and the initial mud temperature. Save the filtrate for chemical analysis.
14. At the end of the test, open the bleed-off valve, which releases the pressure on the filter press cell.
15. Make sure all pressure has been released from the cell. Remove the cell from the frame and disassemble it. Discard any remaining mud.





Tip

16. Carefully save the filter paper and deposited cake. Wash the excess filter cake on the paper with a gentle stream of water.

If you are testing oil mud, use diesel oil to clean the filter cake instead of water.

17. Measure and record the thickness of the filter cake to the nearest $\frac{1}{32}$ " (0.8 mm). A cake thickness less than $\frac{3}{32}$ " is usually considered acceptable. Observe and record the quality of the cake: hardness, softness, toughness, slickness, rubberiness, firmness, flexibility, sponginess, etc.

18. After each test, disassemble the test cell and thoroughly clean all surfaces with soap and water. Make sure all parts are clean and dry before storing the unit.

Maintenance

1. The fine mesh screen mounted in the bottom of the water reservoir should be examined and cleaned periodically.
2. The mirror finish of the stainless steel piston should always be carefully protected especially when moving the unit.
3. If the piston moves sluggishly during a test, remove the piston and o-ring (#140-71) from the cylinder. Clean the o-ring groove in the cylinder. Examine the o-ring carefully for torn or rough places. If the surface is damaged, replace it with a new o-ring. Before replacing the o-ring and the piston, grease them with a light film of good water repellent grease.
4. To operate in subfreezing weather, the water in the dead-weight assembly can be replaced with anti-freeze solutions such as ethylene glycol and water. This will not affect the operation of the unit. The ideal mixture is 60% glycol and 40% water.



Note

Glycol is available in pure form or in anti-freeze form. Pure glycol is almost clear. Anti-freeze is green and includes additives which inhibit scaling, corrosion, and bacterial growth.

Appendix

Threaded Insert

The threaded insert (#141-09) provides an anchor for the T-screw in the filter press frame. The insert is held in place with a set screw (#141-09-001). If the set screw is lost or damaged, it will be necessary to remove the threaded insert and replace the set screw.

1. Unscrew the set screw and let the threaded insert fall out of the frame.
2. Place the threaded insert into the hole in the frame with the collar pointed down.



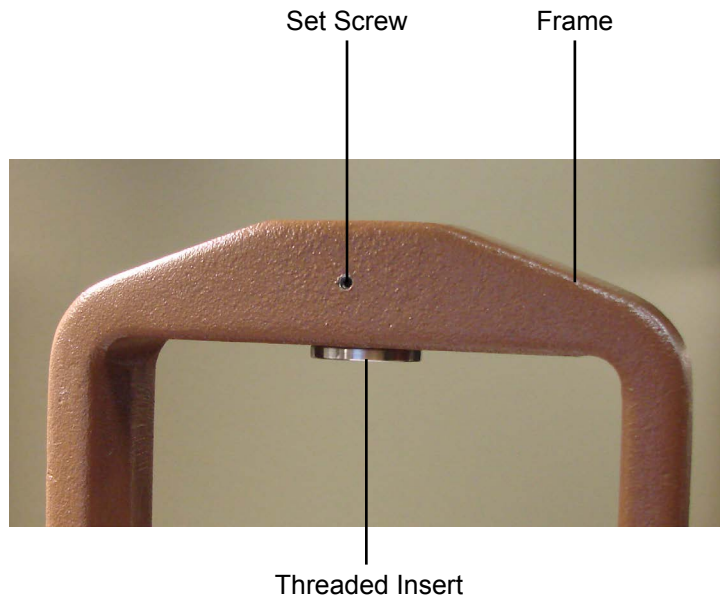
The threaded insert *must* be inserted from below the hole in the frame. Installing it from above will not provide enough strength to hold the pressure inside the test cell.

3. Turn the insert until the hole is aligned with the set screw hole in the frame.
4. Screw a set screw into the frame until it engages with the threaded insert.

The screw should not extend into the inner portion of the threaded insert. This will prevent the T-screw from screwing all the way in.



Note



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.