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HTHP Filter Press for Cement Testing

with 175-mL, Double-Capped Test Cell and N₂ Pressuring Manifold

#170-182: (115 V)

#170-182-1: (230 V)

Instruction Manual

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Ver. 2.0

OFI Testing Equipment, Inc.

11302 Steeplecrest Dr. · Houston, Texas · 77065 · U.S.A.

Tele: 832.320.7300 · Fax: 713.880.9886 · www.ofite.com

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.

Both the 175 mL and the 500 mL heating jackets are capable of reaching 400°F (204°C), but 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):	400°F (204°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; 3/8"-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 1/2" 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 N₂

- #144-11 1/8" 90 Street Ell
- #144-15 Plate Brass Bushing; 1/4" NPT Male to 1/8" NPT Female
- #170-07 O-ring
- #170-28 Receiver Body
- #170-32 1/8" × 1/8" NPT Male Needle Valve
- #171-23-1 Safety Pin with Lanyard
- #170-19 Filter Paper; 2 1/2" (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
- #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

- #170-08 Regulator; Qty: 2
- #170-20 Manifold Block
- #170-32 1/8" x 1/8" NPT Male Needle Valve
- #171-22 Retainer Pin
- #171-24-1 Chrome Nut; R.H.; Reg Inlet CGA-580
- #171-24-2 Nipple with Filter
- #171-24-3 1/4" Flare x 1/8" FNPT Female
- #171-24-4 1/4" NPT Pipe Plug; 316 Stainless Steel
- #171-24-5 1/4" 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" x 3'; Qty: 2
- #171-28 Dual Manifold Body
- #171-38 1,000 PSI Gauge; 2 1/2"; 1/4" NPT Bottom
- #171-40 1,500 PSI Gauge; 2 1/2"; 1/4" NPT Bottom
- #171-42 3,000 PSI Gauge; 2 1/2"; 1/4" NPT Bottom
- #171-90-06 1/4" MNPT x 1/8" FNPT Reducing Bushing; 316 Stainless

Optional:

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

#170-182-SP Spare Parts Kit:

Part Number	Description	Qty.
#143-00-1	Diaphragm for Airco Regulator	1
#143-07	Repair Kit for Regulator (#143-00)	1
#153-14	Graduated Cylinder, 50 mL x 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	10
#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	1

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)



Cell Cap Removal Tool
(#170-33)
(Set Screw Cell Assemblies Only)



Cell Carrying Tool (#170-40)



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



Safety Shield (#171-06)



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



Thermocouple Assembly
(#171-45-1)
(Direct temperature measurement
Of the fluid Inside the Cell)