



DRILLING FLUIDS EQUIPMENT

For over 30 years OFI Testing Equipment (OFITE) has provided instruments and reagents for testing drilling fluids, well cements, completion fluids, and wastewater. In addition to these product lines we also offer a range of instruments for core analysis. From our manufacturing facility in Houston, TX we provide customers all over the world with quality products and exceptional service.

Our drilling fluids product line includes innovative designs such as the Model 900 Viscometer, which showcases our ability to develop new technology to meet customer and industry demands. We also offer Retorts, Aging Cells, Roller Ovens, Mud Balances, Filter Presses, and all other instruments required to evaluate drilling fluid properties according to API Recommended Practice 13B-1 and 13B-2.

As an independent manufacturer and supplier, OFITE has one priority, our customers.



Aging Cell, OFITE Style

Aging Cells are designed for pressurizing fluid samples for high-temperature aging in Roller Ovens. They are available in two sizes (260 mL and 500 mL) and three different materials (303 or 316 Stainless Steel and C-276 Hastelloy).

The patented (U.S. Patent No. 4,805,443) OFITE design features a removable gasket on the cell body.



Included Items

- #175-05 Thrust Washer
- #175-16 Valve Stem
- #170-17 O-ring for Valve Stem
- #175-14 Set Screw
- #175-15 Wrench for Set Screws
- #175-47 O-ring for Outside of Cell, Viton
- #175-09-1 O-ring for Inside Aging Cell, Teflon
- #175-09-2 O-ring for Inside Aging Cell, Viton

Technical Specifications and Requirements

- #175-25 260 mL, 303 Stainless Steel
- #175-25-03 260 mL, 316 Stainless Steel
- #175-25-H 260 mL, C-276 Hastelloy
- #175-30 500 mL, 303 Stainless Steel
- #175-50 500 mL, 316 Stainless Steel
- #175-30-H 500 mL, C-276 Hastelloy

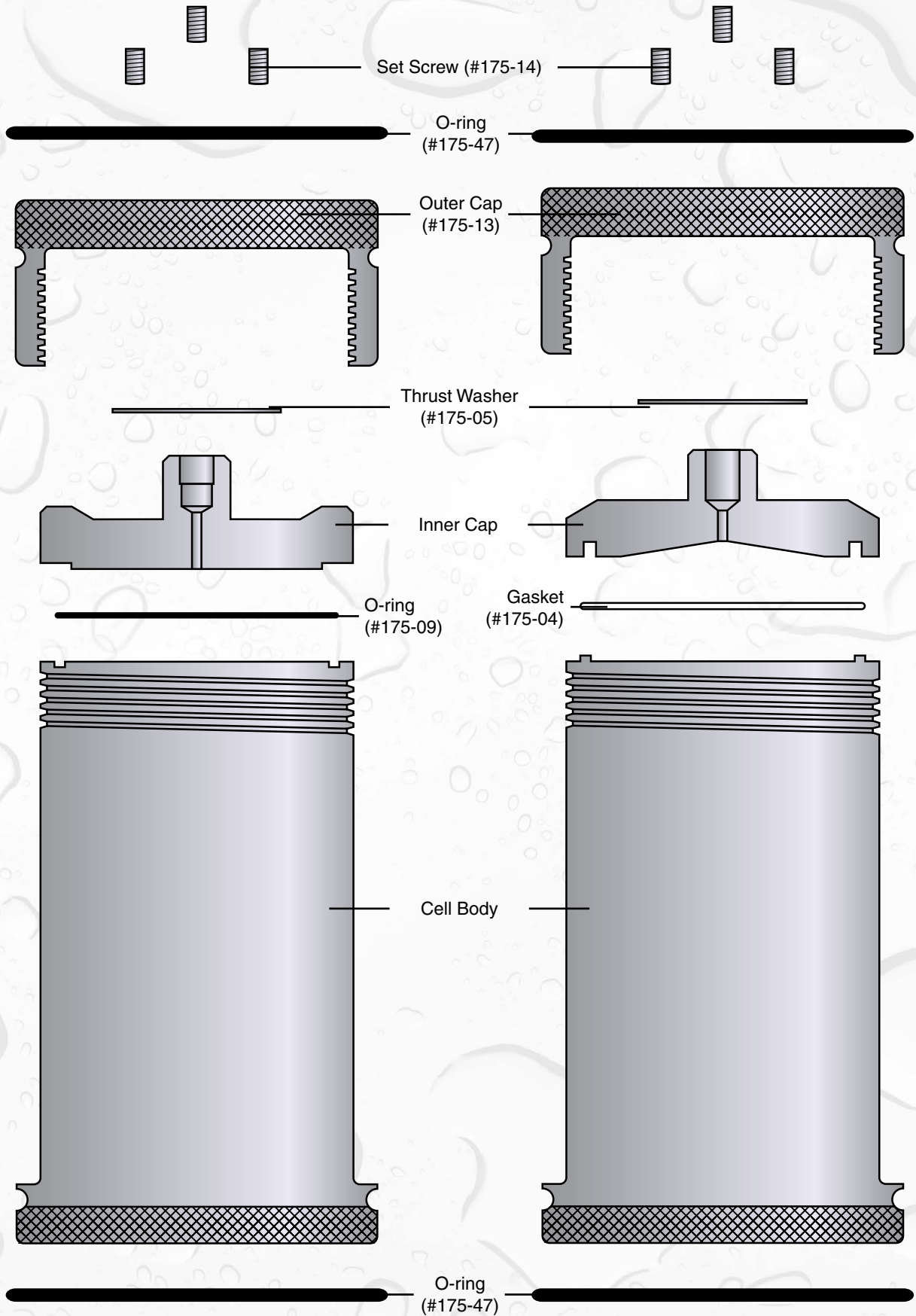
Specifications

- Maximum Temperature: 500°F (260°C)
- Maximum Pressure: 2,000 PSI (13.8 MPa)



OFITE Style Aging Cell

Old Style Aging Cell





Dependable Products From People You Trust



Aging Cells

#175-25 Stainless Steel Grade 303, 260 mL

#175-30 Stainless Steel Grade 303, 500 mL

#175-50 Stainless Steel Grade 316, 500 mL

Instruction Manual

Updated 8/21/2014

Ver. 2.13

OFI Testing Equipment, Inc.

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

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

©Copyright OFITE 2014

Table of Contents

| | |
|-----------------------------|---|
| Intro..... | 2 |
| Components | 3 |
| Parts and Accessories | 4 |
| Specifications | 5 |
| Operation..... | 6 |
| Maintenance..... | 8 |

Intro

The OFITE Aging Cell is a patented (U.S. Patent No. 4,805,443) pressure vessel that enables samples to be subjected to temperatures higher than the boiling point of water and still be maintained in a liquid state. The cells may be used for static temperature exposure or in a dynamic mode in a roller oven with a preset minimum aging time of 16 hours.

OFITE Aging Cells are available in 260 mL and 500 mL sizes and utilize both Viton® and Teflon® o-ring seals. Aging cells are typically constructed of stainless steel (grade 303 or grade 316) and are used for high-temperature testing (up to 500°F / 260°C). For prolonged exposure to elevated salinity at high temperatures (such as 20,000 mg/L chlorides at 350°F / 176.6°C), cells constructed from premium metals, such as Hastelloy® or Inconel® 600 are available. The aging cell walls may be protected against corrosive fluids by using the popular Teflon® liner (part no. 175-60), designed by OFITE. Refer to the Teflon® liner instruction manual for more details.

For corrosion testing, a special 500 mL, 303 alloy stainless steel Corrosion Test Cell is available with a modified inner cap designed to hold a corrosion coupon. Also available in Hastelloy® upon request.

An optional calibrated rupture disk is available which can be installed in the inner cap of the Aging Cells to rupture and release pressure at a predetermined set point. OFITE can retrofit the rupture disk to existing cells.

Components

The following components are included with OFITE Aging Cells:

- #170-17 Valve Stem O-ring, Viton, Qty: 6
- #175-05 Thrust Washer
- #175-09-1 Teflon® O-ring for Inside of Aging Cell Body (For Temperatures Above 400°F), Qty: 3
- #175-09-2 Viton® O-ring for Inside of Aging Cell Body (For Temperatures Below 400°F), Qty: 3
- #175-14 Set Screw, $\frac{3}{8}$ " Diameter, Qty: 3
- #175-15 Wrench for $\frac{3}{8}$ " Set Screw
- #175-16 Valve Stem
- #175-47 O-ring for Outside of Aging Cell Body, Viton 90, Qty: 2

#175-30-SP Spare Parts Kit

- #170-17 Valve Stem O-ring, Qty: 36
- #175-09-1 Teflon® O-ring for Inside of Aging Cell Body (For Temperatures Above 400°F), Qty: 12
- #175-09-2 Viton® O-ring for Inside of Aging Cell Body (For Temperatures Below 400°F), Qty: 12
- #175-14 Set Screw, $\frac{3}{8}$ " Diameter, Qty: 6
- #175-15 Wrench for $\frac{3}{8}$ " Set Screw
- #175-16 Valve Stem, Qty: 2
- #175-46 Teflon® O-ring for Outside of Aging Cell, Qty: 4

Parts and Accessories



Caps

#175-13 Outer Cap for Pressurized Aging Cells, 303 Stainless Steel

For tests below 400°F:

#175-18 Inner Cap for Pressurized Aging Cells, 303 Stainless Steel

#175-18-1 Inner Cap for Pressurized Aging Cells, 316 Stainless Steel

For tests above 400°F:

#175-00-3 Inner Cap, Accepts Rupture Disk, 316 Stainless Steel

#175-56 ¼" Rupture Disk; 2,000 PSI

#175-57 ¼" Rupture Disk; 1,500 PSI

For tests above 400°F, always use an inner cap with a rupture disk.

O-rings and Gaskets

For tests below 200°F:

#175-54 Buna N O-ring for Outside of Aging Cell

For tests up to 400°F:

#170-17 Viton® O-ring for Valve Stem

#175-09-2 Viton® O-ring for Inside of Aging Cell Body

#175-47 Viton® O-ring for Outside of Aging Cell

#175-62 Viton® O-ring for Teflon® Liner Plug

#175-63 Viton® O-ring for Teflon® Liner Lid (Piston)

For tests above 400°F:

#175-09-1 Teflon® O-ring for Inside of Aging Cell Body

#175-46 Teflon® O-ring for Outside of Aging Cell

#175-03 Peek O-ring for Inside of Aging Cell Body

Buna N O-rings should only be used for temperatures below 200°F.

Viton® O-rings can be used at temperatures up to 400°F.

Teflon® O-rings should be used for temperatures above 400°F.



Set Screws and Wrenches

#175-14 Set Screw for Pressurized Aging Cells; ⅜"

#175-15 Wrench for ⅜" Set Screw

#175-60 Teflon® Liner, for 500 mL Aging Cells with T-screw

#175-60-1 Liner

#175-60-2 Piston

#175-60-3 Plug

#175-60-4 T-screw

#175-62 Viton® O-ring for Teflon® Liner Plug

#175-63 Viton® O-ring for Teflon® Liner Piston

Specifications

Maximum Temperature: 500°F (260°C)
 Maximum Pressure: 2,000 PSI (13.8 MPa)

For tests above 200°F, refer to the chart below for the appropriate pressure.

| Mud Volume and Pressure for High-Temperature Aging | | | | | | | |
|--|----------------------------|-----------------------------------|--|--------------------------------|--------------------------|--------------------------------|--------------------------|
| Aging Temp. (°F / °C) | Water Vapor Pressure (PSI) | Coefficient of Expansion of Water | Suggested Applied Pressure (PSI / kPa) | Mud Volume in 260 mL Cell (mL) | Volume with Teflon Liner | Mud Volume in 500 mL Cell (mL) | Volume with Teflon Liner |
| 212 / 100 | 14.7 | 1.04 | 25 / 172 | 225 | 130 | 450 | 326 |
| 250 / 121 | 30 | 1.06 | 50 / 345 | 225 | 130 | 450 | 326 |
| 300 / 149 | 67 | 1.09 | 100 / 690 | 200 | 116 | 425 | 308 |
| 350 / 176 | 135 | 1.12 | 150 / 1,034 | 200 | 116 | 400 | 289 |
| 400 / 204 | 247 | 1.16 | 250 / 1,724 | - | - | 375 | 271 |
| 450 / 232 | 423 | 1.20 | 300 / 2,069 | - | - | 375 | 253 |
| 500 / 260 | 680 | 1.27 | 375 / 2,586 | - | - | 325 | 235 |



Do not use nitrous oxide cartridges as pressure sources for high-temperature, high-pressure (HTHP) aging. Under high temperature and pressure, nitrous oxide can detonate in the presence of grease, oil, or carbonaceous materials. Nitrous oxide cartridges are to be used only for Garrett Gas Train Carbonate Analysis.



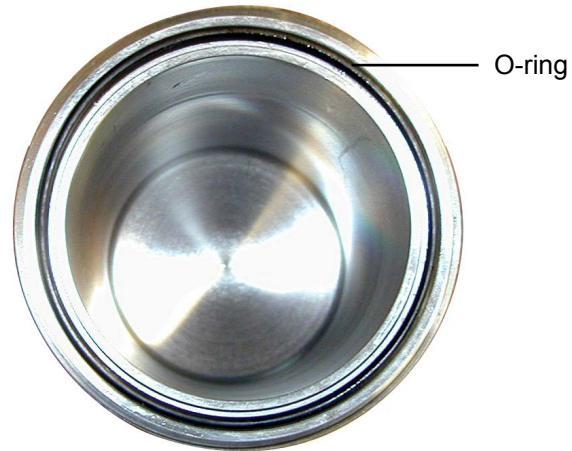
Carbon dioxide and nitrous oxide cartridges are pressurized to approximately 900 PSI at 1 atmosphere (sea level). Therefore, they should never be transported by airplane without proper packing because cabin de-pressurization may cause an explosion.



If the aging cells are going to be rolled in a roller oven during a test, install o-rings on the outer perimeter on the top and bottom of the cells. Failure to do so can damage the rollers in the oven. Teflon (#175-46), Viton® (#175-47), and Buna N (#175-54) o-rings are available.

Operation

1. Carefully inspect the o-ring for defects and place it in the groove in the cell body. Replace the o-ring if it is hard or has cuts and nicks. Blow air through the valve stem to make sure it is not plugged.

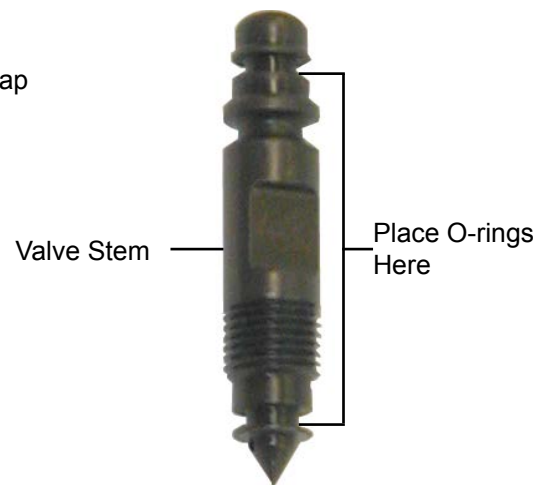


2. Determine a safe volume and safe initial pressure for the temperature at which the sample will be tested (refer to the chart on page 5). Place the correct volume of fluid into the cell. Be careful not to get fluid in the o-ring groove or on the o-ring.

Do not overfill the cell.



3. Clean any spilled fluid from the edge of the cell and place the inner cap on top of the cell body o-ring so that it seats in place. Hand tighten the outer cap in place. Using the Allen wrench, tighten the set screws in the outer cap. Insert the valve stem with the o-rings in place into the inner cap and tighten completely. Loosen the valve stem approximately one half turn before pressurizing.





4. When the desired pressure is reached, close the valve stem by tightening it with a wrench. To ensure there are no leaks, immerse the cell in water and check for any bubbles coming from the valve stem or cell cap.
5. Place the Aging Cell inside the oven and adjust to the desired temperature.
6. After the desired aging time has elapsed, remove the cell from the oven and allow it to air cool until the sample temperature is 300°F (149°C) or less. The cell may then be either air or water cooled.

The sample temperature must be equal to the ambient temperature before you release the pressure and open the cell.

7. Loosen the set screws, unscrew the outer cap, and remove the inner cap.
8. Clean out the valve stem with water. Blow air through the stem to remove any residual water.
9. Observe the aged fluid and record the condition as “fluid”, “gelled”, “plastic”, “hard”, etc. You may also want to test for viscosity, shear or gel strength, or filtration control.
10. Thoroughly clean the entire cell with soap and water.

Maintenance

Regular maintenance will extend the useful life of the aging cells.

After every test:

1. Thoroughly clean and dry all components including the cell body, inner cap, outer cap, valve stem, and o-rings.
2. Inspect all o-rings for damage or wear. Discard any that are nicked, cracked, or distorted from their original shape. Replace them with new o-rings.
3. Apply grease to the threads on the outer cap and cell body.

Every three years (yearly for highly corrosive conditions):

1. Sand blast the metal components (cell body, inner cap, outer cap).
2. Visually inspect the cell body and inner cap for pitting or other signs of corrosion. If any material loss is present, replace the damaged component.
3. Inspect the threads on the outer cap and cell body for burrs.
4. Replace all o-rings and apply grease to the threads on the outer cap and cell body.
5. Pressure test with water up to 4,000 PSI.

OFITE offers aging cell recertification that includes all of the above plus a one-year certificate. Contact your sales representative for more information.