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Old-Style Aging Cell

316 Stainless Steel - 500-mL Capacity

Part No. 175-70

Instruction Manual

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Ver. 1.7

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Table of Contents

Intro

The Old-Style Aging Cell is a 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.

These cells are constructed of 316 stainless steel and use a Teflon® gasket to form a pressure seal. They are used for high-temperature (up to 500°F / 260°C), high-pressure (up to 2,000 PSI / 13.8 MPa) testing and for prolonged exposure to elevated salinity (such as 20,000 mg/L chlorides at 350°F / 176.6°C). The aging cell walls may be protected against corrosive fluids by using the popular Teflon® liner (part no. 175-40), designed by OFITE. Refer to the Teflon® liner instruction manual for more details.

The Old-Style Aging Cell differs from the standard OFITE Aging Cell in the design of the inner cell cap. The old-style cell uses a Teflon® gasket embedded into the inner cap, while the OFITE cell uses an o-ring that sits on the rim of the cell body. Unlike the OFITE Aging Cell, the Old-Style Aging Cell is only available in 316 grade stainless steel.

Components

The following components are included with the aging cells:

#170-17	Valve Stem O-ring; Qty: 6
#175-04	Teflon® Gasket; Qty: 3
#175-05	Thrust Washer
#175-14	⅜" Diameter Set Screw; Qty: 3
#175-15	Wrench for ⅜" Set Screw
#175-16	Valve Stem
#175-47	O-ring for Outside of Aging Cell; Viton 90; Qty: 2

#175-70-SP Spare Parts Kit:

#165-44	High Temperature Thread Lubricant, 1 oz, Qty: 2
#170-17	Valve Stem O-ring; Qty: 36
#175-04	Teflon® Gasket; Qty: 12
#175-14	⅜" Diameter Set Screw; Qty: 6
#175-15	Wrench for ⅜" Set Screw
#175-16	Valve Stem; Qty: 4

Parts and Accessories

Caps:

#175-13 Outer Cap, 303 Stainless Steel

For tests below 400°F:

#175-18-2 Inner Cap, 316 Stainless Steel

For tests above 400°F:

#175-18-3 Inner Cap, Accepts Rupture Disk, 303 Stainless Steel
#175-56 ¼" Rupture Disk; 2,000 PSI
#175-57 ¼" Rupture Disk; 1,500 PSI

Important

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
#175-47 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:
#175-04 Teflon® Gasket for Inner Cap
#175-04-1 PEEK Gasket for Inner Cap
#175-46 Teflon® O-ring for Outside of Aging Cell

Important

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® or PEEK o-rings and gaskets 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)**	**Mud Volume in 500 mL Cell (mL)**
212 / 100	14.7	1.04	25 / 172	225	450
250 / 121	30	1.06	50 / 345	225	450
300 / 149	67	1.09	100 / 690	200	425
350 / 176	135	1.12	150 / 1,034	200	400
400 / 204	247	1.16	250 / 1,724	-	375
450 / 232	423	1.20	300 / 2,069	-	375
500 / 260	680	1.27	375 / 2,586	-	325

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.

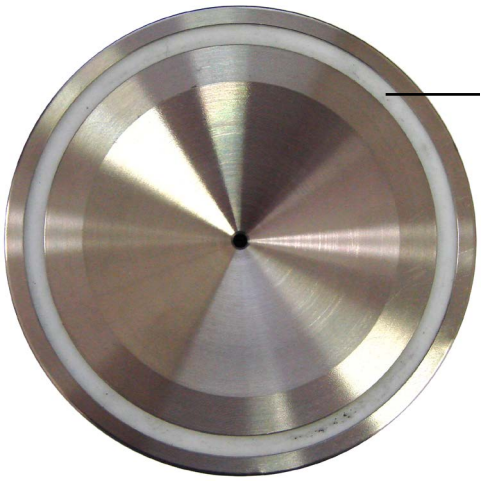
If the aging cells are going to be rolled in a roller oven during a test, install o-rings on the outer perimeter on the top and bottom of the cells. Failure to do so can damage the rollers in the oven. Teflon (#175-46), Viton® (#175-47), and Buna N (#175-54) o-rings are available.

Operation

Note

1. Carefully inspect the Teflon® gasket for defects and place it in the groove in the inner cap. Replace the gasket if it shows signs of wear or damage.

   The Teflon® gasket may have to be replaced after every test above 350°F (177°C).



2. Pour the fluid sample into a clean aging cell to within one-half inch of the lip. This will allow sufficient void space for the expansion of the fluid due to heating. Avoid getting fluid on the lip of the test cell.

3. Clean any spilled fluid from the edge of the cell and place the inner cap on top of the cell body so that it seats securely onto the lip on the cell body. Place the thrust washer on top of the inner cap. Hand tighten the outer cap in place. Using the Allen wrench, tighten the set screws in the outer cap.

4. Inspect the valve stem o-rings and replace them if they show signs of wear or damage.

5. Screw the valve stem into the hole in the center of the inner cap. Hand-tighten the valve stem, then loosen it ¼ turn before pressurizing.

6. When the desired pressure is reached, tighten the valve stem ¼ turn to seal the cell.

Important

Be sure to apply sufficient pressure to the sample to prevent evaporation. Refer to the chart on page 5 to determine the minimum required pressure based on the test temperature.

7. Place the Aging Cell inside the oven and adjust to the desired temperature.

8. After the desired aging time has elapsed, remove the cell from the oven.

Important

At this point, the cell is still pressurized. 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 or at least 10 minutes in cool water before depressurizing.

9. Loosen the valve stem very slowly to release the pressure.

Important

Always point the valve stem away from people and equipment when depressurizing the cell.

10. Once all pressure has been released, carefully unscrew the set screws and remove the outer and inner caps.

11. 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.

12. Thoroughly clean the entire cell with soap and water.

13. Clean out the valve stem with water. Blow air through the stem to remove any residual water.