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| **STANDARD OPERATING PROCEDURE** | | | |
| **LAB NAME** | Drilling Fluids and Cementing | **LAB NUMBER:** |  |
| **EQUIPMENT NAME:** | HPHT Filter Press | **PREPARED BY:** |  |

1. **EQUIPMENT SPECIFICATION**

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| **Model** | **Electrical** | **Specifications** | HPHT Filter Press |
| **#171** | 220V | Maximum Temperature: 400°F  Maximum Pressure: 2,000 PSI  Pressure Source: Nitrogen  Test Cell Capacity: 500 mL  Heater: 800 Watt |

**Definition:** The HTHP (High Temperature, High Pressure) Filter Press is designed for testing drilling fluids and cement under elevated temperatures and pressures. This simulates various down-hole conditions and provides a reliable method for determining the effectiveness of the material being tested.

1. **OPERATION**

* Plug unit into an appropriate electrical source. Place a thermometer into the heating jacket. Pilot light turns on when target temperature is reached.
* Inspect and install all o-rings into the cell body, cell caps and valve stems. Lubricate with silicone grease.
* Stir test sample for at least 10 minutes.
* Install and tighten the valve stem on the inlet end of the cell.
* Invert the cell and pour in the proper volume of test fluid, being careful not to spill liquid onto the o-ring in the cell body. Carefully place a circle of filter paper on top of the o-ring.
* Align the cell body and cap arrows. Gently push the cell cap into the cell body being careful not to damage the o-ring.
* Inspect the cap locking screws and the seats on the cell caps for deformities.
* Tighten completely the six cap locking screws. Ensure that all are completely tight.
* Install and tighten completely the valve stem.
* Invert the cell and place into the heating jacket so that the outlet end is positioned downward.
* Rotate the cell inside the jacket so that it seats into the pin.
* Move the thermometer from the heating jacket to the cell body.
* Heat for exactly one hour beginning now.
* Connect the back pressure receiver to the outlet valve stem and secure with the retainer pin and lanyard.
* Connect the high and low pressure lines to the appropriate ends of the assembly with the retainer pins and lanyards.
* Adjust both the inlet and outlet pressure to the recommended back pressure.
* Open the inlet valve stem to allow pressure inside the cell body. This will prevent evaporation of the liquid inside.
* After the 1 hour heat up time (no. 15), increase the pressure on the inlet side to 500 PSI above that of the back pressure.
* Open the outlet valve stem to initiate filtration. Set a timer for 30 minutes.
* Collect filtrate by opening the receiver outlet valve at intervals of 10 sec., 1, 7.5 and 30 minutes.
* After 30 minutes, close the inlet and outlet valve stems.
* Allow at least 5 minutes for the filtrate in the receiver to cool down.
* Blow out any remaining filtrate from the receiver into the graduate cylinder.
* Turn the manifold regulator T-screws counter clockwise until they turn freely.
* Open the inlet manifold needle valve to release any line pressure and remove the block from the valve stem.
* Remove the back pressure receiver assembly from the outlet valve stem.
* Remove the cell from the heating jacket.
* Air-cool or water-cool the cell until it may be safely handled.
* Position the cell with the inlet end upwards and release the cell pressure by loosening the inlet valve stem.
* Hand tighten the inlet valve stem.
* Invert the cell, loosen the 6 outlet cap locking screws, and remove the cell cap from the cell.
* Carefully remove the filter paper and filter cake.
* Discard the fluid inside the cell and thoroughly wash out the cell body.
* Inspect all o-rings for deformities. Replace all o-rings if the test was conducted above 350°F (176°C).
* Record the total filtrate volume by doubling the amount of filtrate collected in the graduate cylinder.
* Record the depth of the filter cake and describe its appearance.
* Leave the Filter Press in a condition so that it may be used again with no preparation or clean-up of the assembly. Unplug the electrical cord if not being immediately used.

1. **RISKS INVOLVED USING THE EQUIPMENT**

* High pressure and Temperature explosion
* Burn
* Leakage

1. **SAFETY PRECAUTIONS**

* Wear the proper hand protection
* Use proper gloves and lab coat while working on equipment.
* For pressure, use nitrogen, or carbon dioxide. Neven connect oxygen or natural gas as pressure source.
* Maintain pressure regulators in good condition. Never use oil on pressure regulators.
* Pressurization systems that leak should be repaired or replaced.
* Gauges, fittings and hoses should be kept in good condition and leaks should be
* corrected.
* Always use a safety retainer pin with an attached lanyard, and get in the habit of securing the cotter pin to the pin. Improper placement of retainer pins in the past have resulted in the pressure manifold separating from the filter press which can cause damage to the equipment.
* Periodically test the safety relief valves on the pressurization manifolds to verify they will relieve if excessive pressure should occur. Never plug or bypass
* these safety valves.
* When pressurizing the cell, always make sure that the regulator is closed (i.e., Tee screw backed all the way out, counterclockwise). Then open the supply pressure, and adjust the regulator.
* When depressurizing, first shut off the supply pressure. Then bleed the system of pressure, and back out the regulator Tee screw