

®

**HPHT Filter Press  
Model 107C  
Instruction Manual**

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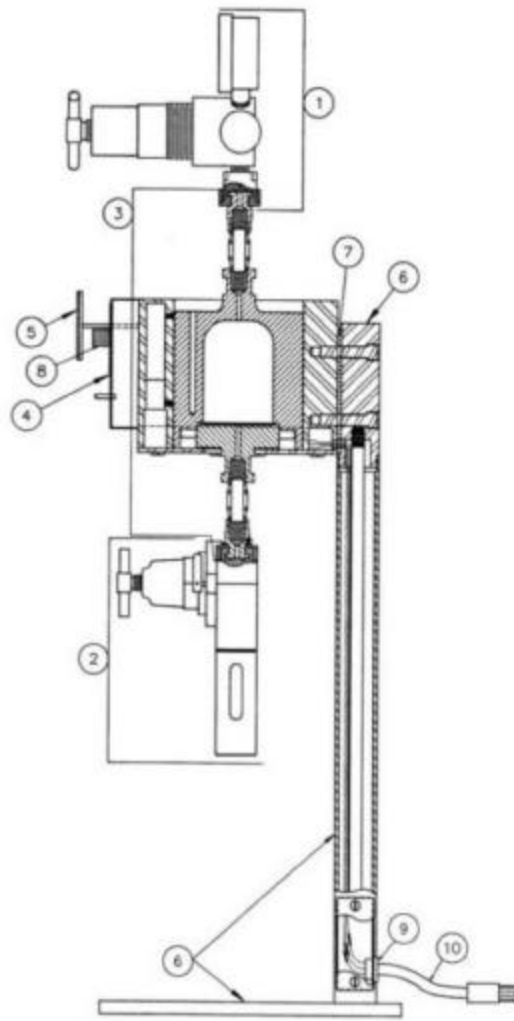
## SECTION 1 INTRODUCTION

High-pressure high-temperature filter presses provide an efficient means of evaluating the filtration properties of drilling fluids at high pressures and temperatures. The FANN® High-Pressure High-Temperature Filter Press is used for this purpose. The cell has a filtering area of 3.5 in<sup>2</sup> (22.6 cm<sup>2</sup>). The Filter Press can be operated at pressures up to 900 psi (6200 kPa) with the compact CO<sub>2</sub> pressuring unit provided. This Filter Press may be operated up to 200°F (93°C) using a graduate to collect filtrate. However, for temperatures above 200°F (93°C) a back pressure receiver must be used to prevent boiling of the filtrate. The standard back pressure receiver which has a separate CO<sub>2</sub> pressuring source can provide back pressures up to 150 psi (1035 kPa) to obtain the desired differential pressure across the filtration area. For temperature control on the high-pressure high-temperature filter press, the cell is encased in a thermostated aluminum well during heating and filtration. The heating chamber completely encloses the filtering area, assuring filtration at the desired temperature. The desired temperature is measured using a metal stem thermometer inserted in a well in the heating jacket. The thermostat knob has a scale of 1 to 10. After the desired temperature is once determined it may be repeated simply by setting the knob.

Power consumption of the 175 ml cell heating well is 800 watts.

The standard cells for these filter presses are made of Type 316 stainless steel. These cells have valves at top and bottom so they can be closed in for heat-up and cool-down. The 175 ml cell unit can be operated up to 350°F (177°C).

The procedure described below is used to measure filtration characteristics of a drilling fluid at 300°F and 500 psi differential. The data is recorded as double the number of cm<sup>3</sup> lost in 30 minutes. A CO<sub>2</sub> pressuring cartridge is used to pressure the test cell. The specifications tabulated in Section 4 are in accordance with API recommended practice RP13B.



**Fig. 1**  
**Model 107C HPHT Filter Press**

## SECTION 2 SAFETY CONSIDERATIONS

Safe operation of the Fann High Pressure High Temperature Filter Press requires that the operator understand and practice the correct assembly and operation of the equipment. Improper assembly, operation, or the use of defective parts poses the possibility of cell leakage or failure which could result in serious injury and damage.

The sample cell and the heating jacket are hot during operation. The operator should be aware of these hot areas and avoid contact with them which could result in possible burns.

Maintain the electrical wiring in good condition. If the insulation on the wiring is damaged (cracked, scrapped, burned, etc.) electrical shorts can occur causing damage to the instrument and possible injury to the operator. These instruments should always be used on a grounded circuit.

The following suggestions should be observed to assure safe operation and maintenance of the Fann High Pressure High Temperature Filter Press.

### A. Safe Pressurization

1. Always use Carbon Dioxide. Never connect the Filter Press to Compressed Air, Oxygen or other non-recommended gas. Carbon Dioxide is normally supplied in small cartridges which contain about 900 psi (6206 kPa) pressure. Do not allow these cartridges to be heated or exposed to fire. They can explode if overheated.
2. Maintain pressure regulators in good condition. Never use oil on pressure regulators. Leaking pressurization systems should be repaired or replaced. Gauges, fittings and hoses should be kept in good condition and leaks should be found and corrected. When pressurizing the Cell and the Back Pressure Assemblies always open the supply pressure first, then adjust the regulator. Do not attempt to pressurize higher than the equipment is rated. When depressurizing, shut off the supply pressure, bleed the system of pressure, then back out the regulator Tee screw.

### B. Safe Heating

1. Caution should be exercised by all laboratory personnel when the Fann HPHT Filter Press is in operation to avoid accidental injury by touching the heating jacket or cell assembly while these are hot. The heating jacket can operate at a temperature where it will cause burns if touched. Safeguard the equipment after the test ends long enough for it to cool. It can still cause burns even after it has been turned off.
2. The practice of removing the cell and cooling it under water is a very dangerous procedure and is not recommended because of the danger of severe burns if touched or accidentally dropped. Also use extreme caution when placing a hot cell in water. Hot steam generated when the water hits the hot cell can cause severe burns.

### C. Safe Electrical Operation

1. Make sure the electrical source is fused and grounded. Verify the power cord on the Filter Press is in good condition and has the proper ground connection.

2. Electrical problems in the wiring or heaters may not be obvious by looking at the equipment. If a malfunction is suspected by the unit blowing fuses or tripping breakers, the heating time seems too long or the thermostat control does not repeat, electrical repair may be indicated. Refer to Sec. 5 repair of the heating jacket. Always disconnect the power cable before attempting any repair.

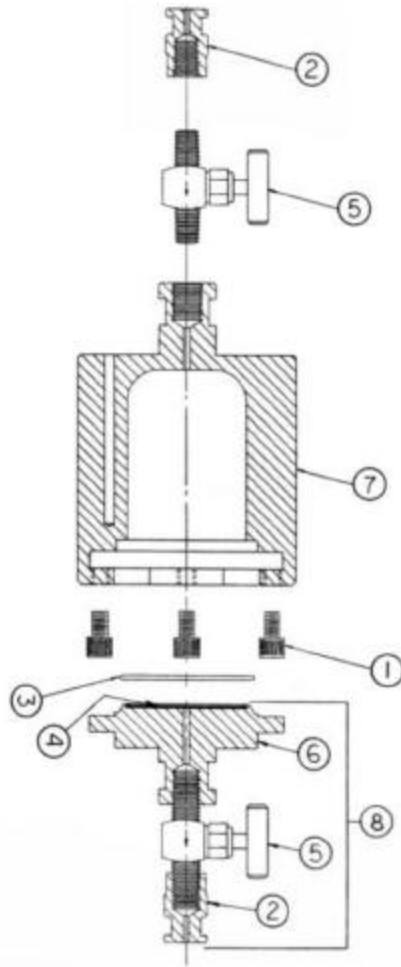
D. Safe Test Cell Maintenance

The filtration Cell Assembly constitutes a PRESSURE VESSEL. The following Safety Precautions should be followed to assure safe operation.

1. Cell material should be compatible with the test sample.
2. Cell bodies that show signs of stress cracking, severe pitting, or have damaged flanges must not be used.
3. Cell base plates showing evidence of damage especially the area that locks into the cell must not be used.

## SECTION 3 TEST PROCEDURE

- A. Preheat (Refer to Fig. 1.)
1. Disconnect and remove the Cell assembly (3) from the heating jacket (4).
  2. Plug heating jacket electrical cord (10) into the proper power source. Make sure the power source is properly grounded and that the power cable includes a ground wire.
  3. Set the thermostat knob (8) in the 5 to 7 range unless correct setting for the desired test temperature is known. The white and red pilot lamps should both be glowing.
  4. Place the stem thermometer (5) into the well of the heating jacket and preheat to 10°F (6°C) above desired testing temperature. The red pilot light will go out when the thermostat shuts off the heaters. Adjust thermostat knob as required to maintain the desired test temperature.
- B. Loading the Filtration Cell (Refer to Fig. 2.)
1. Stir the drilling fluid sample 10 minutes with a high speed mixer.
  2. Unlock the cell plate assembly (8) by loosening the three locking screws (1).
  3. Remove the cell plate assembly (8) by rotating it to align the slots and pulling it out of the cell (7).
  4. Close (Turn Clockwise) the valve (5) attached to the cell (7).
  5. Position the cell with the open end up. A jar or beaker may help hold it.
  6. Fill the cell to within 1/2 inch (1.3 cm) of the "O" ring groove.
  7. Place one circular disk of filter paper in the groove just above the sample.
  8. Place "O" ring (3) on top of paper.
  9. Make sure valve (5) on the cell plate assembly is open, (Turn Counterclockwise)
  10. Place cell plate assembly over the top of the cell and align then engage the locking lugs.
  11. Evenly tighten cap screws (1) finger tight.
  12. Close valve (5) on the cell plate assembly (Turn clockwise).
  13. Invert loaded cell assembly with cell plate assembly down, placing it in the heating jacket.
  14. Transfer the thermometer, (Fig 1 Item 5) to the cell thermometer well.



**Fig. 2**  
**Model 107C H.P.H.T Filter Press Cell**  
**Exploded View**

**CAUTION**  
**HIGH PRESSURE CONNECTIONS ARE**  
**CAPABLE OF CAUSING INJURY IF NOT**  
**PROPERLY ASSEMBLED**

C. Pressurizing the Filter Press (Refer to Fig. 4.)

1. Make sure the high pressure regulator tee screw is backed out, then place CO<sub>2</sub> cartridge into high pressure regulator assembly and tighten cartridge holder until cartridge seal is punctured.
2. Lift locking ring (4) on regulator assembly and place the regulator assembly onto the slip coupling on the top of the cell assembly and release lock ring. The high pressure regulator assembly is now ready for use.

D. Filtration tests at temperatures below 200°F (93°C).

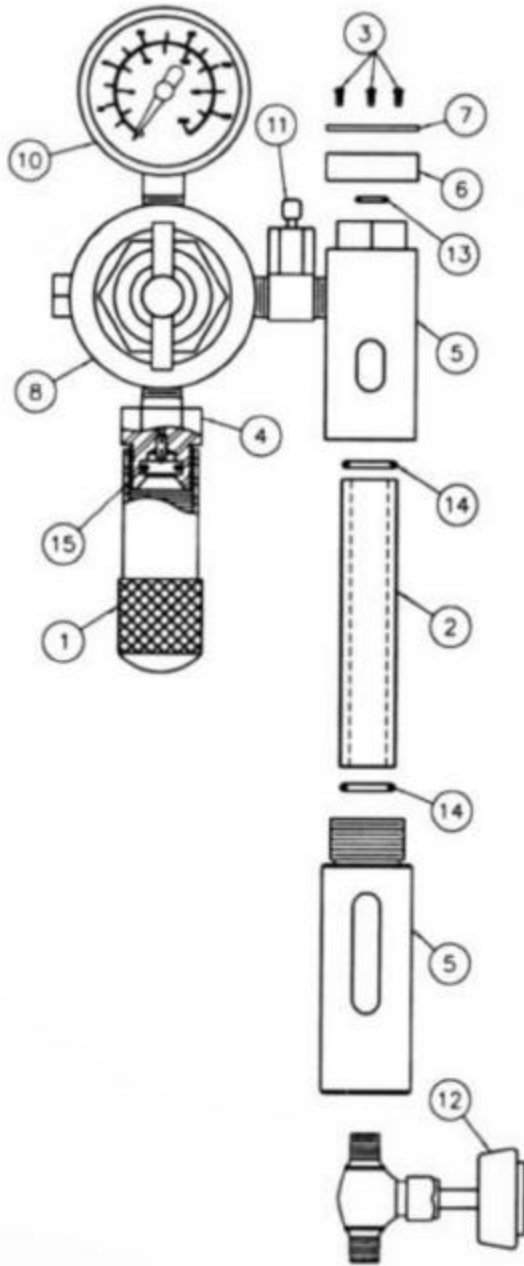
Low temperature tests may be performed without the use of a back pressure receiver. Run the low temperature test as follows:

1. Place a graduated cylinder under the slip coupling on the bottom, cell plate assembly end of the cell assembly.
2. Monitor the temperature of the cell by observing the thermometer in the cell thermometer well. When the cell temperature reaches the test temperature, the filtration test may be started. Observe the correct thermostat setting by the heater cycling off and on. This is indicated by the red light going off and on.
3. Adjust the regulator (Fig. 1, Item 1) to the test pressure.
4. Open the bottom cell plate valve (Fig. 2, Item 5), and start the timer. Filtration time is usually 30 minutes.

E. Filtration tests at temperatures to exceeding 200°F (93°C).

High temperature tests must be performed with the use of the back pressure receiver. Run high temperature tests as follows:

1. Attach the back pressure receiver to the bottom of the cell plate assembly. Push down on locking ring on the top of back pressure receiver, then slide the top of the back pressure receiver over the slip coupling on bottom of the cell plate assembly. (Refer to Fig. 1 and 3.)
2. Make sure the back pressure receiver regulator tee screw is backed out (turn counterclockwise). Verify the bleed valve (Fig. 3 item 12) is closed (turn clockwise). Place a CO<sub>2</sub> cartridge into the back pressure receiver cartridge holder and tighten until cartridge seal is punctured.
3. Make sure both the top and bottom cell valves (Fig. 2, Item 5) are closed. Turn top regulator tee screw (clockwise) to 100 psi (689 kPa). (Refer to Fig. 1, item 1).
4. Turn back pressure regulator tee screw (clockwise) to 100 psi (689 kPa). (Refer to Fig. 3, item 8).



**Fig. 3**  
**Back Pressure Receiver**  
**Exploded View**

5. Open top cell plate valve one full turn. (Refer to Fig. 2, item, 5 of assembly item 8.) This will pressurize the cell, eliminate boiling of water based samples heated above 212 °F (100 °C). (Refer to Table 1 for recommended minimum back pressures)
6. Monitor the cell temperature by observing the thermometer in the cell thermometer well. When the cell temperature reaches the test temperature, the filtration test may be started. Observe the correct thermostat setting by the heater cycling off and on. This is indicated by the red light going off and on.
7. Increase the pressure of the cell pressurizing unit to 600 psi (4134 kPa) or other desired test pressure and verify the back pressure is 100 psi (689 kPa) or as desired for the test.
3. Open bottom cell valve at least one full turn. (Refer to Fig. 2 item 5).n Start timing the test. Filtration time is usually 30 minutes.
4. If the receiver pressure rises above its setting during the test, cautiously reduce the pressure by drawing off a portion of the filtrate, maintaining the correct differential. Maintain the selected temperature. Continue for 30 minutes or other test period.

**TABLE 1**

**RECOMMENDED MINIMUM BACK PRESSURES**

TEMPERATURE RANGE		MINIMUM BACK-PRESSURE	
°F	°C	psi	kPa
Less than 200	93	0	0
200 - 300	93 - 149	100	689
301 - 350	150 - 177	150	1034

**CAUTION**

**THE TEMPERATURE OF THE SAMPLE IN THE CELL  
MUST BE REDUCED TO LESS THAN 200°F (93°)  
BEFORE THE CELL CAN SAFELY BE OPENED.**

**F. Test Conclusions and Disassembly**

1. Disconnect the filter press heating jacket from the power source.
2. Close both the bottom cell valve then the top cell plate valve. (turn clockwise), (Refer to Fig. 2, Item 5).

3. Back off the tee screws on both regulators (Turn counterclockwise until the tee screw turns freely meaning the regulator is closed).
4. Bleed the pressure from the back pressure receiver by opening the relief valve (11 Fig. 3).
5. Drain filtrate into a graduated cylinder and read the volume. Double the filtrate volume and record as fluid loss.
6. Disconnect the receiver assembly from the cell assembly. (Refer to Fig 1.)
7. Bleed pressure from cell assembly by opening bleed valve (7 of Fig. 4).
8. Disconnect cell pressure regulator assembly and disconnect it off of the top of the cell plate assembly. (Refer to Fig. 1 and Fig. 4).

### **CAUTION**

#### **CELL CONTAINS APPROXIMATELY 600 PSI (4134 kPa).**

9. The pressurized cell assembly preferably should be left in the heating jacket until it cools. If the hot cell must be moved for more rapid cooling use care in handling it. Maintain cell in the upright position until cool enough to open. Observe safety cautions, Section 2 B-2.
10. After the cell and the sample in the cell are cool, the cell may be opened. (Refer to Fig 2.)
11. Carefully bleed off the cell pressure. Carefully and slowly open the valve 5, Fig.2 on the cell end of the cell assembly. Point valve away in case some sample is blown out.

### **WARNING**

**DO NOT ATTEMPT TO REMOVE THE CELL CAP IF ANY PRESSURE REMAINS IN THE CELL.**

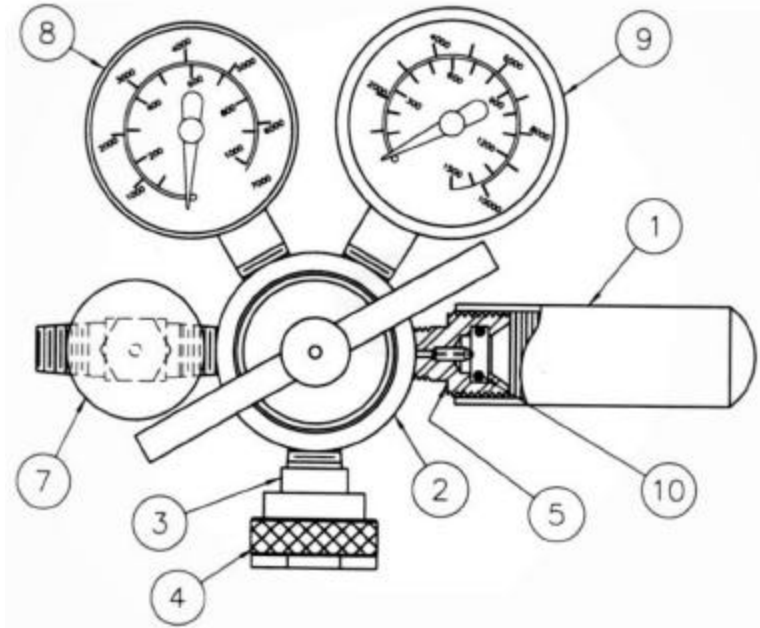
**REMOVING THE CELL CAP WHILE THE CELL IS PRESSURIZED COULD RESULT IN SERIOUS INJURY**

12. Invert cell and loosen cap screws (Fig. 2 item 1) (use hex socket wrench if necessary). If the cap screws seem to be under pressure DO NOT REMOVE UNTIL THE SOURCE OF THE PRESSURE HAS BEEN DETERMINED AND RELIEVED. USE EXTREME CAUTION. Sample may have clogged the bleed valve and although the valve is open, the cell may still be pressurized.
13. If the cap screws are free and the cell plate moves easily proceed to disassemble the cell.
14. After the cell plate (Fig. 2, item 8) is removed, the filter paper and the cake can be retrieved then the sample can be emptied from the cell.
15. Thoroughly clean and dry all parts.

**SECTION 4**  
**HIGH PRESSURE HIGH TEMPERATURE FILTER PRESS**  
**API DRILLING FLUID SPECIFICATIONS**

The Specifications listed below are the perimeters required to run a test in accordance with the API procedure. Refer to Section 3 for detailed instructions.

TEMPERATURE	Up to 200°F (93°C) - no back pressure required 200°F (93°C) to 300°F (149°C) - back pressure 100 psi (689 kPa) 300°F (149°C) and above - back pressure - Refer to Table 1
PRESSURE	Below 200°F (93°C) - 500 psi (3448 kPa) 200°F (93°C) - 300°F (149°C) - 100 psi (689 kPa) during heating 600 psi (4137 kPa) with 100 psi (689 kPa) back pressure during test
SAMPLE PREPARATION	Stir for 10 minutes with high speed mixer
EXPANSION ALLOWANCE	1/2" (12.7 mm) to 300°F (149°C) 1-1/2" (38.1 mm) 300°F (149°C) and above
SAMPLE VOLUME	175 cm <sup>3</sup> cell 130 to 145 cm <sup>3</sup> (up to 300°F (149°C))
FILTER	Paper -- Part No. N8800
TIME	Sample heating - less than 1 hour Duration of test - 30 minutes
FILTRATE COLLECTOR	25 cm <sup>3</sup> or 50 cm <sup>3</sup> TC graduated cylinder (test temperature of under 200°F (93°C)).  Back pressure receiver. Bleed into graduate during and at end of test. (Test temperature 200°F (93°C) and above.



**Fig. 4 - CO<sub>2</sub> REGULATOR (CELL)**

**SECTION 5**

## CLEANING, MAINTENANCE AND REPAIR

Standard laboratory procedures apply to the cleaning of the Fann Model 107C High Pressure-High Temperature Filter Press and Back Pressure Receiver. After each test, the cell assembly, (Fig. 1, Item 3), and the back pressure receiver assembly, (Fig. 1, Item 2) should be dis-assembled and thoroughly cleaned and dried of all sample and other contaminants, with particular attention to "O" rings and "O" ring grooves.

Wipe spilled sample or other debris from the heating jacket and stand. Some sample materials may damage the finish of these parts if allowed to remain on them for a long period of time.

### A. Cell Maintenance

#### 1. "O" Rings

Inspect all "O" rings as they are being cleaned for cuts or nicks and if the "O" rings have been subjected to over 300°F (149°C). Check for hardening or brittleness. Refer to Fig. 2 for location of cell "O" Rings and Fig. 3 for back pressure receiver "O" Rings. Replace any damaged "O" rings. Lubricate "O" rings before they are installed. For most applications, laboratory stop cock grease is satisfactory; however, since some "O" rings come into contact with the sample, care should be taken that the lubricant is compatible with the sample. "O" rings furnished with the instrument are suitable for testing up to 300°F (149°C).

#### 2. Cell Corrosion

### CAUTION

#### **CORROSION PITTING AND CRACKING CAN CAUSE RUPTURE OF CELLS**

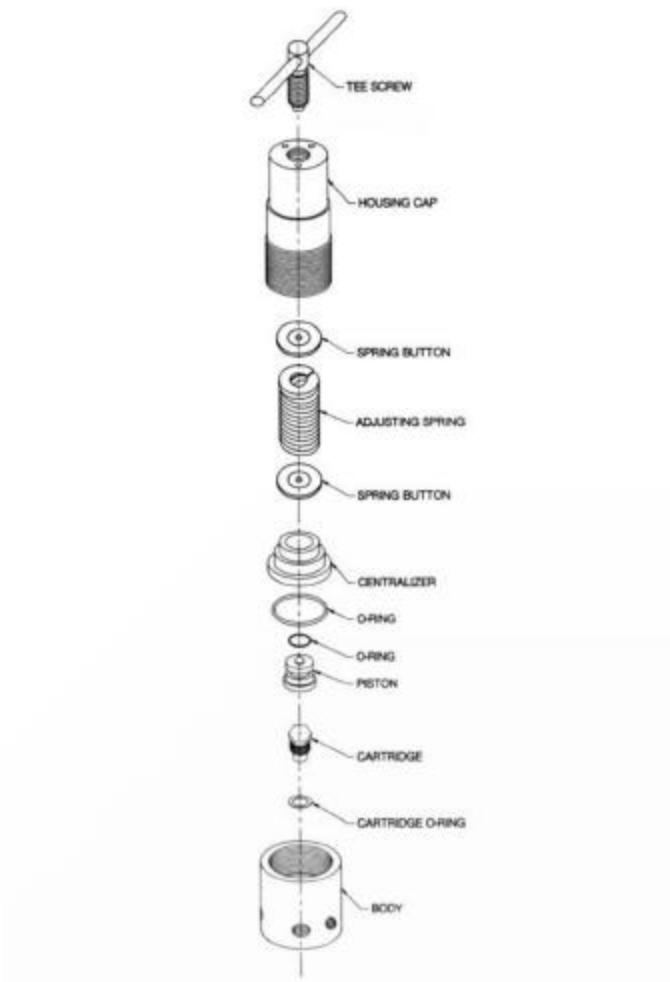
Sample fluids under the temperature and pressure conditions used in this type testing can, at times, cause corrosion of the test cell and cell plate. Standard cells are made of Type 316 Stainless Steel. Cells are available in other materials for use where the stainless steels are not suitable because of corrosion problems. An inspection of the inside of the cell for evidence of corrosion should be made periodically. Light corrosion may be removed using 320 or finer wet or dry sand paper. Deeper corrosion pitting may be removed by sand blasting the area of the corrosion. More severe corrosion will require re-machining or re-surfacing the inside of the cell. If machining to 0.020" (0.5 mm) oversize does not remove all corrosion, it is recommended the cell be replaced. If corrosion cracks are evident, the cell should be replaced.

## B. Pressure Regulator Assemblies (Refer to Fig. 4 and Fig. 5.)

### 1. Maintenance of Pressurization Systems

Operation of pressurized equipment requires the pressurizing system be properly maintained. Specific procedures for the proper use of pressure regulators are listed below:

- a. Never subject a regulator to inlet pressure greater than its rated inlet pressure, as shown on the regulator body.
- b. Never use the regulator for gases other than those for which it is intended.
- c. All connections to the regulator must be clean. Remove oil, grease, or other contaminants from external surfaces of the regulator and metal connecting parts.
- d. Never pressurize a regulator that has loose or damaged parts or is in questionable condition. Never loosen or attempt to tighten a connection or a part until the gas pressure has been relieved. Under pressure, gas can dangerously propel a loose part.
- e. Check regulator and all connections for leaks after installation, periodically thereafter, and after any service in which parts or connections were disconnected and reconnected, using a soap solution around fittings to find small leaks. Bubbles will indicate a leak.



**Fig. 5 - EXPLODED VIEW CO<sub>2</sub> REGULATOR (CELL)**

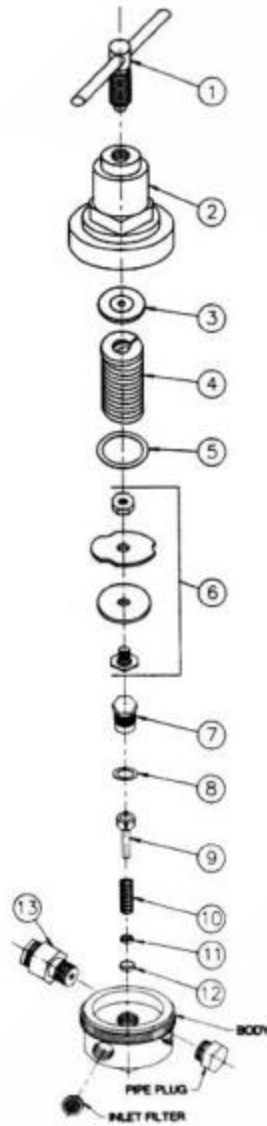


Fig. 6 - EXPLODED VIEW CO<sub>2</sub> REGULATOR (RECEIVER)

## 2. Regulator Assembly Troubleshooting

Two types of CO<sub>2</sub> pressure regulators are used on the Fann Model 107C High Pressure-High Temperature Filter Press. One is used with to pressurize the cell and the second is used to pressurize the Back Pressure Receiver. The primary causes of regulator problems with either of these regulators are caused by leaking fittings or faulty pins and seats. Rarely does a diaphragm rupture.

If a regulator assembly will not hold pressure the cause may be leaking fittings. Repair by disassembling and applying pipe sealant with teflon or with teflon tape thread sealant.

Check for leakage around fittings. Pressure the system and look for escaping gas in the form of bubbles.

- \* Apply soap suds to the possible leak area, or the regulator assembly.
- \* Except for the gauge, the regulator assembly may be submerged in water.

Check for a defective regulator. Some of the more common symptoms of a possibly defective regulator are listed below:

- \* Check for dirt or sample contamination in regulator.
- \* Gas leaking at the regulator outlet when the adjusting screw is completely released.
- \* With no flow through the system (downstream valves closed and adjusting screw in), working pressure increasing steadily above set pressure.
- \* Gas leakage from spring case (adjusting screw end of regulator).
- \* Excessive drop in working pressure with regulator flow open.

## 3. Regulator Repair

If it is determined a regulator is faulty, it must be disassembled, cleaned, and repaired as determined from the above symptom. Disassembly and reassembly are as shown in Fig. 5 for the CO<sub>2</sub> cell pressure regulator, and Fig. 6 for the back pressure regulator.

Using a wrench on the hex of the spring case, unscrew the spring case. All parts down to and including the diaphragm will remain in the spring case.

Remove the thrust plate, then unscrew the retainer and remove the seat with the pin.

Inspect the regulator as follows:

- a. Thorough cleaning of all parts is essential. Make sure that small orifices are open.
- b. Make sure all diaphragm, gaskets, "O" rings and other non-metal parts are not brittle, cracked or misshaped.
- c. Do not use any oil on the internal parts of the regulator.

- d. Use pipe thread sealant with teflon on all pipe threaded fittings as they are assembled.

Replace the seat and pin by installing the retrofit kit, then reassemble the regulator. Refer to Fig. 5 or Fig. 6. Always pressure test a regulator that has just been repaired. Use the list of symptoms above as a check list.

### C. Heating Jacket Assembly

The stand and heating jacket contain the thermostat, cartridge heaters, and indicator lights used to heat the cell. Most problems are caused by burned or broken wiring, defective thermostat or burned out heaters. Disassemble the heating jacket (11534, 115 Volt or 13534, 230 Volt). Use the following procedure to diagnose and repair either one.

1. Unplug the heating well power cable.
2. Remove Cell Assembly and Back Pressure receiver from Heating Jacket.
3. The Thermo Cutoff (over temperature safety disconnect) is replaced as follows.
  - a. Loosen the two set screws and remove thermostat knob (Fig.1, Item 8).
  - b. Remove the four 8-32 screws holding the Control Panel with pilot lights then remove the Control Panel letting it hang by the pilot light wires.
  - c. Remove and replace the Thermo Cutoff.
  - d. Replace the Control Panel and secure with the four 8-32 screws then replace the thermostat knob and tighten its set screws.
4. Thermostat Replacement.
  - a. Perform steps 1 through 3b above.
  - b. Remove the wires from the thermostat terminals, one wire from the top terminal and two on the bottom terminal.
  - c. Remove two 6-32 x 1/4 screws and lock washers holding the thermostat then remove the thermostat.
  - d. Inspect all components and replace any burned or broken wires. Inspect the crimp connections on the wire ends. Replace any faulty connections.
  - e. Verify the thermostat is faulty by connecting an ohmmeter, or continuity tester across the two screw terminals and noting whether connection is made, then broken by the rotation of the stem. If rotation of the stem does not result in a change on the meter or tester, replace the thermostat.

- f. Mount the new thermostat stem end up using the two 6-32 screws and lock washers.
- g. Replace the wires and secure with the two thermostat washers and nuts.
- h. Check to see that the stop is properly set. At room temperature, and the stem completely counterclockwise, the thermostat should not show continuity between the terminals. As the thermostat is turned clockwise, it should make connection to start the heating. As the heating jacket heats, the thermostat should stop the heating. The further clockwise the stem is set, the hotter the jacket will become. All the way clockwise should be about 350°F (177°C). Should the thermostat not shut off, or shut off too soon as determined by placing a thermometer in the heating well, the stop will require resetting. The stop may be removed from the stem and rotated one or two grooves then reinstalled and re-tested.
- i. Replace the thermostat cover and secure with four 8-32 screws then replace the thermostat knob and tighten its set screw.

## 5. Pilot light Replacement

Note: The pilot lights on the 230 volt heating jackets have resistors in series with the lamp. Verify these resistors are good before assuming a faulty pilot light.

- a. Perform steps 1 through 3b above.
- b. Check for defective resistors (230 volt). Un-solder the leads from the defective pilot light. Remove the pilot light from the thermostat cover by removing the bezel nut.
- c. Mount the new pilot light in the thermostat cover. Solder the leads onto the new pilot light.
- d. Replace the thermostat cover and secure with four 8-32 screws then replace the thermostat knob and tighten its set screws.

## 6. Heater Replacement

It is suggested the cold resistance of the heaters be measured to determine if one or more heaters have failed. Connect an ohmmeter across the two power prongs (not the ground) of the power plug. Make sure the thermostat knob is turned clockwise then measure the resistance. Good heaters will measure 15 to 18 ohms (115 volt jackets) and 30 to 36 ohms (230 volt jackets). If one or more heaters are shorted the reading will be lower. If one or more heaters are open the reading will be higher.

Replace one or more heaters as follows.

- a. Unplug the heater jacket and stand and turn it upside down on the bench.
- b. Remove four 10-32 screws then remove the bottom heater cover plate.
- c. Pull the two wire splices out of the recess in the bottom of the heating jacket so they can be opened and the heaters disconnected.  
There are four splices on the 230 volt model.
- d. Unwrap these places and disconnect the wires to the four heaters.

- e. Using an ohmmeter, test each heater one at a time. An open circuit (no connection between the leads) indicates a faulty heater. A shorted heater will show continuity (no resistance) between the leads. Also, test from each lead to the heater sheath or the heating jacket for ground. If the meter shows other than open (no connection) on this test, the heater is defective. Good heaters will show about 60-70 ohms resistance. Make this test to determine which heaters are good and which are defective.
  - f. If the heaters test good, do not attempt to remove them. If the heater tests defective, remove it by pulling it out of the heating jacket by its leads. If it is stuck remove the 10-32 screws in the top of the heating jacket. and use a punch and hammer to drive the heater out of the jacket. Also, it may be necessary to soak the surface between the heater and the heating jacket with penetrating oil or similar product.
  - g. Reassemble the heating jacket essentially in the reverse order of disassembly, taking note of the following items.
  - h. If new heaters were installed, the leads should be cut to the proper length to fit neatly into the wire splice. Leave enough wire to allow connection of the wire splice, and neat positioning of the wire splice in the recess in the heating jacket. Use new high temperature wire and wire lugs to make the splices.
  - i. Re-position the wire splices neatly in the recess in the heating jacket, then re-assemble the bottom plate with screws. If any of the 10-32 screws for access to remove heaters were removed, replace them.
7. Power Cable Replacement.
- a. Unplug the heating well power cable.
  - b. Remove two screws and the access cover near the base of the Filter Press.
  - c. For better access to the wire splices, remove the nut on the bottom of the base and remove the base.
  - d. Disconnect the defective power cable where it is spliced into the high temperature wires, and remove the cable from the grommet hole in the stand tube.
  - e. Feed new cable through grommet and splice to high temperature wires.
  - f. Replace base, base nut, access cover, and access cover screws.

## SECTION 6 PARTS LIST

The Fann High Temperature High Pressure Filter Press is Shown in Fig.1.  
Fig.1 describes the major components of the Filter Press as follows:

- A. Item 1 -Cell, High Pressure Regulator Assembly, Part No. 10838  
For Replacement Parts Identification Refer to Fig. 4 and 6

Fig.4 No	PART NO	DESCRIPTION
---	10838	Regulator Assembly - High Pressure
1	33606	Barrel, CO <sub>2</sub> Cartridge Holder
2	10779	Regulator [Refer to Fig. 4]
3	10790	Fitting, Top Valve
4	10791	Ring, Lock
5	33620	Adapter with Puncturing Pin, for CO <sub>2</sub> Cartridges
7	34900	Valve, Needle 1/4 x 1/4
8	38405	Gauge, 1000 PSI 2 inch dial
9	38408	Gauge, 1500 PSI 2 inch dial
10	11577	"O" Ring 5/16 x 1/8, Nitrile-46 #203-70

- B. Item 2 - Receiver Assembly, Part No. 10801 (Glass Tube), 10805 (SS Tube) For  
Replacement Parts Identification Refer to Fig. 3 and 6

Fig.3 No	PART NO	DESCRIPTION
---	10801	Receiver Assembly, 200 psi. with Glass Tube
---	10805	Receiver Assembly, 200 psi. with S.S. Tube
1	33606	Barrel, CO <sub>2</sub> Cartridge Holder
2	10802	Receiver Tube, Glass
2	10806	Receiver Tube, Stainless Steel
3	11472	Drive Screw, 0 x 3/16 long
4	33620	Adapter with puncturing pin, for CO <sub>2</sub> Cartridges
5	13526	Receiver housing [2 pieces]
6	13527	Ring, Receiver Lock
7	13528	Cap, Receiver
8	30159	Regulator Refer to Fig. 5
10	34252	Gauge, 200 PSI, 2 inch dial
11	34400	Bleeder Valve 1/4 NPT

Fig.3 No	PART NO	DESCRIPTION
12	35300	Valve, Needle, 1/8 x 1/8 NPT
13	L4506	"O" Ring 5/16 x 1/16 Nitrile, B-46 #011-70
14	L4511	"O" Ring 9/16 x 3/32 Nitrile, B-46 #113-70
15	11577	"O" Ring 5/16 x 1/8 Nitrile B-46 #203-70

- C. Item 3 - Cell Assembly Complete, Part No. 10789  
For Replacement Parts Identification Refer to Fig. 2

Fig.2 No	PART NO	DESCRIPTION
---	10789	Cell Assembly, Complete
1	10628	Socket Head Cap Screws 5/16 x 24 x 1/2 long
2	10792	Fitting Male
3	10798	"O" Ring 2-5/16 x 3/32 Viton V-14 #141-75
4	10803	Screen, 80 Mesh
5	10807	Valve, Needle, 1/4 NPT [Special Handle
6	11014	Lid, Cell 316 Stainless Steel
7	13524	Body, Cell 316 Stainless Steel

- D. Item 3 - Heating Jacket Assembly, 115 Volt AC, Part No. 11534  
Heating Jacket Assembly, 230 Volt AC, Part No. 13534  
For Replacement Parts Identification Refer to Parts List below.

PART NO	DESCRIPTION
11534	Heating Jacket, 115 Volt Refer to Drawing 11534
10727	Thermostat 0 to 500°F, 260°C
10796	Block, Heating
10800	Lamp, Neon, White
11004	Holder, Fuse
11026	Fuse, Thermo, 1-1/2 x 1 x 4
11602	Knob 3/4 Diameter, Temperature Control
33262	Lamp, Neon, Red
L6120	Cartridge Heater, 200 Watt, 115 Volt
L7124	Wire Appliance, High Temperature, 18 AWG.
13534	Heating Jacket, 230 Volt Refer to Drawing 13534

E. Stand and Miscellaneous Parts,  
For Replacement Parts Identification Refer to Fig. 1

Fig. No.	PART NO	DESCRIPTION
5	10810	Thermometer, 4 inch, 50 to 500°F
6	10809	Stand Assembly
7	11469	Spacer (Between Stand and Heating Jacket)
10	A7003	Power Cable, 6 Ft. Long - 115 Volt
10	35478	Power Cable, 6 Ft. Long - 230 Volt
9	L7110	Strain Relief for .325 to .360 Cable

F. Accessories

PART NO.	DESCRIPTION
11541	Hex Wrench, 1/4 inch
33601	CO <sub>2</sub> Cartridges, 10 per Box
35600	Instruction
L4060	Stop cock grease, 50 grams
N3000	Graduated Cylinder 25 ml, 0.2 ml divisions, "TC".
N8800	Filter Paper 2-1/2 inch (6.35 cm) diameter, 100 Box

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