

## French Press (PSC 559, NSC 368, Kell 405)

**Every time you use the French Press, you MUST sign the log book.**  
**Overfill cylinder (3 ml for mini cell). This helps prevent bending of the piston.**  
**Watch pressure. Follow chart on Press for maximum pressure for each type of cell.**  
**Be very careful that the cell is sitting flat and that the bar is completely on the cell.**  
**Clean all cell parts with H<sub>2</sub>O and keep parts separate when not in use.**

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- A. How the French Pressure Cell works.** Internal French Pressure Cell pressure increases and at the same time intracellular pressure increases. As the sample is dispensed through the sample outlet tube, the external pressure on the cells' walls drops rapidly toward atmospheric pressure. The pressure within the cell drops as well but not as quickly as the pressure external to the cell. This pressure differential causes the cell wall membrane to burst. In order to ensure the best disruption of cell walls, it is important to release the sample slowly (~15 drops/minute).
- B. Pressure for Cells.** 40K Cell – Med. Range and High range can be used. Mini-cell – only Med. Range can be used. A spacer is also required with the mini-cell.
- C. Load cells into Cell**
1. Attach flow valve to big straight hole. Look at the nylon ball at the end and make sure it's not distorted and misshapen. Make sure valve is closed. Attach dispenser + small tubing to other hole (small and slanted).
  2. Examine the piston to make sure the o-rings aren't nicked or distorted. Push piston into cell to line.
  3. Remove cap on other end.
  4. Pour sample into cell. Fill completely (1 ml for small cell).
  5. Put cap on end. Firmly push the cap down – the best way is to use the heel of your hand and hit the cap hard until it's completely seated.
  6. Turn setup over. Put in Press with piston up.
  7. Mini cell can be loaded in your hand, but the large cell is too heavy to load this way. There is a black 3 columned stand next to the Press (may be pushed back on the counter). Put the large cell upside down (piston down). Fill cell the same as for mini cell.
- D. Run.**
1. Turn the Ratio Selector to Down position and turn the Pressure Increase control fully counterclockwise. The press needs to go down enough for the cell and extended piston.
  2. Pump on.
  3. Pressure Increase clockwise to 800 (turn knob) for mini cell and 1000 for large cell.
  4. Pump off.
  5. For small mini-cell turn Ratio Selector to medium.
  6. Put cell on stand – make sure you can turn the flow valve on the cell, that it's not blocked by anything. Make sure the cell is aligned properly so that the piston squarely strikes under the upper platen. Make sure the piston handles are

- perpendicular to the bar and it's screws (if it's not, as the piston is pushed down the handles will run into the screws and something will break). Swing the bar across the cell and make sure it is completely against the cell. If it's not, the cell could pop off the stand when pressure is applied. If the screws on the bar get in the way – unscrew them enough to slide over cell and then tighten them.
7. Pump on.
  8. When pressure gets to 800, slowly release cells by tapping (not hitting) the flow valve (black handle) with a pen – cells must come out slowly, drop by drop (pump on still), 15 drops/min. Several labs feel that tapping with a pen gives a more consistent and reproducible release of the cells. The drop rate tends to increase near the end of the run. As you approach the end of the run, you may want to close the flow valve slightly by turning it clockwise before opening it again. Also, there might be air bubbles in the sample and these tend to squirt into the collection tube and if you aren't careful where you hold your collection tube, you could lose your sample. Be very careful that the tubing is in your collection tube and not pointing towards your face.
  9. Pump off.
  10. Turn the Ratio Selector to down.
  11. If you are done for the day, turn the Pressure Increase control fully counterclockwise.
  12. Pump on.
  13. Wash cell with H<sub>2</sub>O.

#### **E. French Pressure Cells Care**

1. DO NOT STORE the cells assembled.
2. Clean with distilled H<sub>2</sub>O and dry all the parts after each use.
3. When you can't control the valve stem seal or the flow, replace the nylon ball (FA-924; pkg. Of 100). **When changing the nylon ball in the flow valve, be sure you have removed the old ball. If you don't, you will force the old one further up the valve and will completely clog up the valve.**
  - a. Try to remove the ball with fliers. If it is too tight, try heating the ball over an open flame until the ball starts to melt; flip the old ball out.
  - b. After the stem has cooled, make sure that all traces of the old ball are removed. Press a new ball into place. Use a resilient surface to prevent distortion of the ball when pressing into the stem.
4. O-rings (FA-936; pkg. of 10). Change the o-rings when the cell leaks or there is O-ring material in the sample.
  - a. Cut off the old O-ring and stretch on the replacement.