THERMAL APPLICATIONS NOTE
PDSC PLUMBING GUIDELINES

The PDSC cell operates in two primary modes: Static Pressure and Dynamic Purge. The external plumbing requirements are different depending on the desired mode of operation and the DSC module. The following information has been compiled as a guide to facilitate switching from a Constant Pressure to a Dynamic Purge configuration.

Before Operating the PDSC Cell, Consult the Operator’s Manual for Operating Instructions.

DSC 2910, DSC 910

PDSC Operation - Static Pressure (No Purge Flow)
With all valves closed, open V5 and V11. Open either V3 or V4 to admit the desired gas into the system. Slowly open the IN valve (V9) to start filling. [To bleed the cell of any air (if nitrogen is used), displace the gas using a series of fill/release operations as described in the Operators Manual.] Adjust the gas regulator (R1 or R2 depending on purge gas) until the desired pressure is achieved. If the desired pressure is exceeded, the over pressure can be eliminated by slightly opening V12 and then completely closing the valve. Valve V9 may be left open to the cylinder pressure or closed.

PDSC Operation - Dynamic Purge
Proceed as above until the desired cell pressure is achieved. Close V9, V5, and V8. Open valves V6, V9, and V10. Slowly open V7 and wait for the flow measured at the flowmeter to stabilize. Adjust V9 until the flow meter indicates the desired rate. If the pressure drops, readjust the gas regulator (R1 or R2 depending on the purge gas) in small increments. [Note: A high surge of gas is apt to blow pans off platform.]

At experiment completion using either procedure, turn off the gas regulator (R1 or R2) and slowly bleed the pressure from the system using V12.

It is recommended that an accurate combination pressure vacuum gauge be installed with a tee between values 11 and 12.

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PDSC Operation - Static Pressure (No Purge Flow)

Close all valves. Open either V3 or V4 to admit the desired gas into the system. Set the PURGE/FILL valve to FILL. Slowly open the IN Valve (V6) to start filling. [To bleed the cell of any air (if nitrogen is used), displace the gas using a series of fill/release operations as described in the Operators Manual.] After gas replacement, adjust the gas regulator (R1 or R2 depending on the purge gas) until the desired pressure is achieved and close V6. If the desired pressure is exceeded, the over pressure can be eliminated by slightly opening V5 and then completely close the valve. Value V6 may be left open to the cylinder pressure or closed.

PDSC Operation - Dynamic Purge

Close all valves. Set the regulator at the source gas cylinder (R1 or R2) to an appropriate pressure. Open either V3 or V4. Set the PURGE/FILL valve to FILL. Slowly open the IN (V6) and OUT (V7) valves and wait for the flow measured at the flowmeter to stabilize. Adjust V7 until the flowmeter indicates the desired value. If the flow rate is too low with the V7 (OUT) value fully opened, check the position of V6. Carefully open V6 further, if necessary. Once the pressure and flow rate are at the desired values, turn the PURGE/FILL valve to PURGE.

At experiment completion using either procedure, turn off the gas regulator (R1 or R2) and slowly bleed the pressure from the system using V5.

Comments
• All tubing connecting your PDSC cell to other devices (cylinder, gauges, valves, regulators, etc.) should be 1/8” o.d. All plumbing, valves, gauges, and regulators must be rated for high pressure service to 3000 psig and be free of hydrocarbons.
• Periodically disassemble the PDSC cell and visually inspect the cell for oil or other organic contamination.
• Special instruction and precautions are required when using Oxygen. Consult your Operator’s Manual for details.

Acknowledgement: This applications note was submitted by Charles Schaumann of the Applications Laboratory (US).

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