

How do I set up gas line plumbing of a long pathlength gas cell?

This depends on how gas supplies are plumbed to be introduced into the internal gas cell cylinder area where the beam of light traverses between the internal mirrors for multiple passing to provide a long pathlength.

For a typical type of set up, Specac suggest that there is the possibility of having a valve switching system fitted on the inlet gas tube to introduce a purge gas (e.g. N₂) to pass and flow through the system and then the facility to switch to an analysis gas line to introduce a gas to measure.

On the outlet tube side of the gas flow line, a switchable "side-line" can be plumbed in (use a "T" piece) to a vacuum pump. If the gas cell is to be evacuated, the outlet flow line should be switched off (closed) by use of its own in-line valve tap, the inlet tube valve should be closed and the vacuum pump side-line valve tap is opened to switch on the vacuum pump.

From the outlet tube side, the flow line for the gases should be plumbed to a safe area to vent away. (e.g. a fume hood).

Therefore, in combination of such a plumbed set up and specific opening and closing of valves from the inlet and outlet sides, the gas cell can be operated for:

- 1) Introduction and flow of a purge gas (N₂).
- 2) Introduction and flow of an analysis gas (or mixture of gases).
- 3) Stop flow of an analysis gas to measure (static measurement).
- 4) Evacuation of the cell, prior to introduction of an analysis gas under low pressure conditions and then allowing for flow of a purge gas to "clean" the cell ready for a new sampling regime.

If operating the gas for flow, then a flowmeter is needed to be plumbed in-line (possibly from the outlet side), to know that e.g. 3 liters of gas per minute is set as a flow rate.

If the gas cell is pressurised from a stop flow analysis (static measurement) , unless some type of safety over-pressure burst device is plumbed in as an additional outlet line stream which also vents to a safe area (e.g. the fume hood), any gaseous introduction for stop flow measurement must be set at pressure of less than +15psi for glass bodied cells or +125psi for metal bodied cells. (This value can be set on the pressure regulator of any gas cylinder being used if this is plumbed in line as an inlet gas supply.)

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