

The EP gas system

The pressure of the CO₂ gas inside the Cerenkov tanks is regulated between 10 and 15 mb over atmospheric pressure. The gas panel (above VME grate) regulates the CO₂ pressure by acting on two electro-valves; one at the entrance and one at the exit of the Cerenkov tanks.

So, the read-out pressure values must be between 10 and 15 mb; a value lower than 10 mb means a gas leakage or an empty gas bottle.

The safety valve is set at 35 mb. It is covered with a black texture to avoid the light to enter when the valve is open.

Two working modes for the Cerenkov :

The gas system can be used in two different modes. To change the mode, turn the button as it is labeled on the gas panel :

- *Pressure* mode is the normal mode for running the "EP" measurement,
- *Flow* mode is the rinsing mode when you want to be sure that Cerenkov tanks are only filled with CO₂ gas.

For Flow mode :

- flow-meter is open (ball goes up to a given height; for instance 55 mm corresponds to 100 liters/hour, see figure 1),
- set the "three ways valve" on *Exit C open*.

For Pressure mode :

- flow-meter is almost closed (ball is at the bottom),
- set the "three ways valve" on *Exit C closed*.

Before opening the Cerenkov tank window :

- stop the gas flow by closing the flow-meter faucet,
- set the "three ways valve" on *Exit C open* to evacuate the gas inside.

Procedure to restart after a Cerenkov opening :

To be sure that the gas is mainly CO₂ and to remove as much as possible air, you have to rinse the tanks. A rinsing of five times the volume of the tanks seems to be enough. Follow the prescriptions below :

- set on *flow mode*,
- set the "three ways valve" on position *Exit C open*,
- set the flow-meter at ~100 l/h (ball reading 55 mm),
- with such a debit, two days are necessary to flow five times the entire volume ($\sim 0.5m^3 \times 2 \times 5 = 5000$ l in 50 h at 100 l/h),
- once the rinsing is finished, set on *pressure mode*,
- set the "three ways valve" on position *Exit C closed*,
- regulation will begin now!

Check for empty gas bottle :

A high-pressure gauge ((1) in figure 2) indicates the gas bottle pressure. When this pressure is below 15 bars, bottle is almost empty and has to be changed. Two electronic contacts have been designed (but they are not yet connected) to provide the information in the counting room. To enhance the device, these two contacts could be connected to an alarm or a light.

- if the bottle pressure is above 15 bars, a connection is established between the black and the blue wire.
- if the bottle pressure is below 15 bars, a connection is established between the black and the brown wire.

How to proceed to change a bottle (outside of the hall) :

1. close valve (2) (see figure 2),
2. close bottle valve,
3. open slowly purge valve (3),
4. close purge valve,
5. disconnect the hose,
6. replace the bottle,
7. connect the hose (do not forget to change the o-ring),
8. open slowly bottle valve,
9. close bottle valve,
10. wait about 1 minute,
11. open slowly purge valve (3),
12. close purge valve,
13. redo twice this cycle from point (8) to (13),
14. open slowly the bottle valve (at least 2 turns),
15. open slowly inlet valve (2),
16. verify that the pressure after the pressure regulator is 3 bars (this is the standard pressure at the gas panel inside the hall).

Figure 2: schematic for the gas supply.

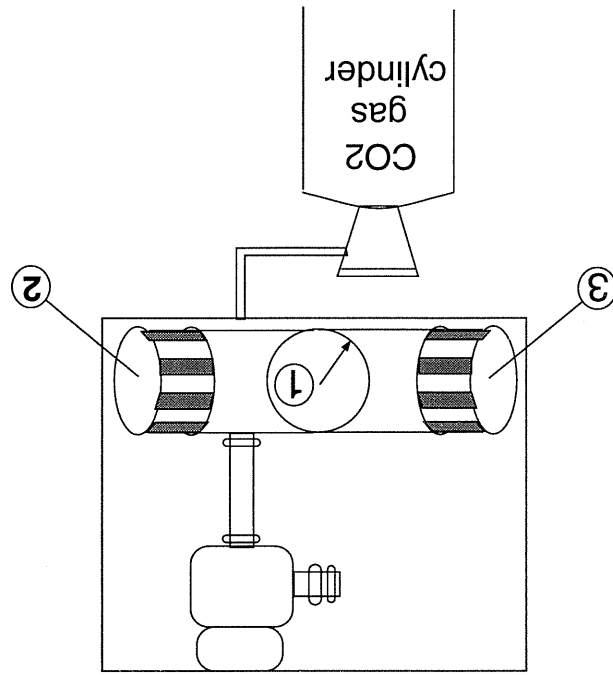


Figure 1: gas flow (litters/hour) versus flow-meter reading (mm).

