

Gas system

The gas system for the Cerenkov counter is rudimentary. The counter system is filled from the bottom of the volume, where the Freon 114 slowly displaces the air. Once this vessel is full, the system is switched to “top off” the vessel. In E895, a large bladder volume provided most of the top off reservoir, allowing the Cerenkov to “breathe” as a function of atmospheric pressure. The pressure changes are conveyed to the gas volume through the front window, causing the gas level to rise and fall.

Figure 17 shows the original E690 gas system.

The possibility of recovering the Freon from the counter should be investigated, as single fills for the duration of the experimental run are likely to be the operating mode for E907. In the event that a pmt must be changed during a fill, some additional Freon will be required to refill the counter. Procedures for reducing the amount of leakage during a pmt change should be reviewed or developed for E907. The total volume of the gas volume is of order 120 cu. ft.



Figure 17. The E690 gas system (composite picture). The Freon pressure at the top and bottom of the vessel are measured by the two helix pressure gauges noted on either side of the stainless steel tubing. The original E766 plumbing system was made of white PVC tubing, which was found to be translucent (causing greatly increased noise rates in pmt's near the gas inlets). The Freon is supplied via the small black tube at the bottom of the counter. A bubbler/barometer allows the gas level to be detected within the vessel providing a check on the fill progress, and the level of the gas when full (but leaking). The two valves seen at the bottom of the counter allow the fill to occur either at the bottom of the vessel, as is the case on the original fill, or at the top of the counter, which is the "top off" mode. E895 added a large bladder at the top of the counter, which was partially filled and allowed the atmospheric pressure to change without emptying and filling the counter. The new back window and the addition of the bladder should make one fill possible, with no additional Freon required for the run.