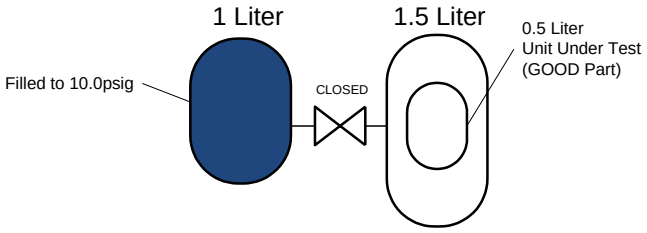
Chamber Test – Testing Theory

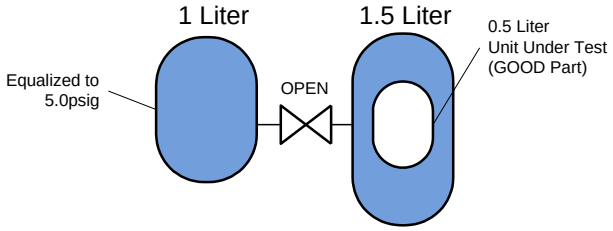
A chamber test is used to find leaks in sealed packaging or sealed devices without an opening to use for filling. To test the part a technique called metered volume fill must be employed. A reference volume is filled to a pressure, after pneumatic isolation the volume is then introduced to the test chamber. A know good part will fill to the desired test pressure, while a gross leaking part will not reach this same value due to a change in total volume. This difference between the test pressures will be set as the pressure tolerance. A part that doesn't fill to the test pressure within the pressure tolerance is a gross leak and will fail the test.
If the part passes this gross test, the testing will continue with the typical pressure decay test steps.

For example:

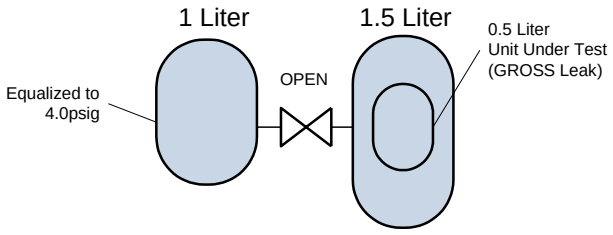
A reference volume of 1 liter, test chamber with a volume of 1.5 liters, and a part with a volume of 0.5liters isolated by a valve. The reference volume is pressurized to 10psig.



The valve separating the two chambers opens. With a good part in the test chamber the both chambers equalize to 5psig.



With a gross leaking part in the test chamber, and the equalization valve open, both chambers equalize to a lower pressure due to the change in volume.

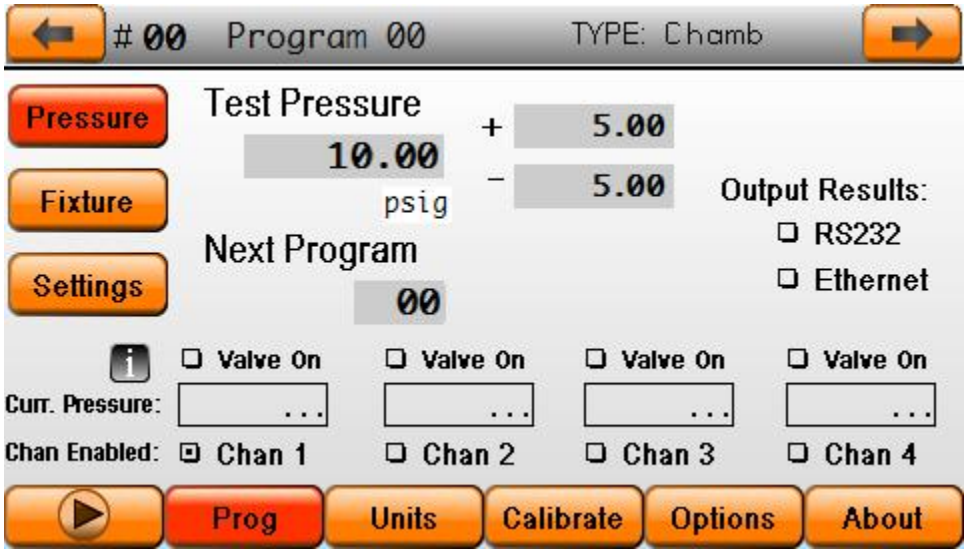


Setting Test Pressure

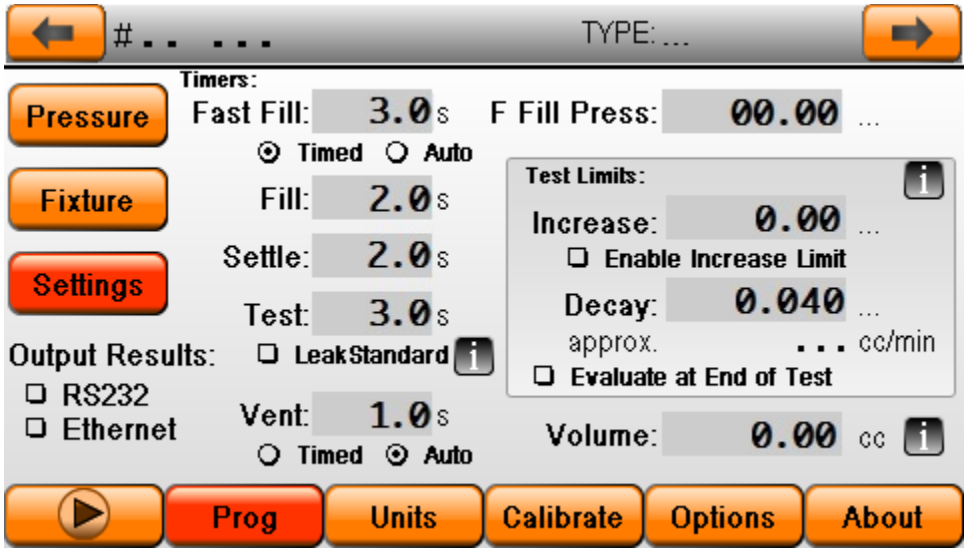
Setting the test pressure requires a onetime adjustment process to find the required reference volume pressure that will yield the desired test pressure.

First start by entering the desired test pressure in the program screen, this example will show 10.00psi.

Set the +,- to a value of half the test pressure. These values will be modified later to indicate when gross leak is present.



The filling of the reference volume is done during the 'Fast Fill' step, set times in the program to those below (or similar). The Fast Fill must be set to 'Timed'



Place a known good part into the test chamber. During the 'Fast Fill' time the reference volume pressure will be displayed in the lower right corner of the run screen. Adjust the regulator on the back of the machine until the good part yields the test pressure set in the 'Pressure' screen (10.00). This might take a couple of tries to fine tune the process. Do not worry if the test fails at this point, we are setting up the fill parameters for now.

Depending on the size of the reference volume and the free space around the part, the required reference volume pressure could be around 40-60psi.

Once the pressure has been adjusted, replace the part in the test chamber with a gross leaking device. Running the test without adjusting the regulator or test times should yield a lower test pressure result.

For example a good part gets to 10.0psi test pressure; a part with a gross leak might only get to 9.2psi due to the change of volume in the test chamber. This change of pressure will be used to set the +,- tolerance on the test pressure. In this example you could set the '-'tolerance to 0.7psi. Any part that doesn't reach 10.0psi ±0.7psi will fail the fill step and be considered a gross leaking failure.

A sampling of parts should be run to determine the ± tolerances.

With the fill step tolerances set, the settle and test step times and limits can be modified to reach the desired leak rate.

If there are any questions please feel free to contact Technical Support

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