



## Helium Bomb Testing Procedure

AUTHOR(S)	DATE	Document Change Notice, Release or Approval
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### 1 Purpose

This is a procedure to test the vacuum leak rate of small sealed units such as accelerometers. It is written as a combined helium leak test of the seal as well as a qualification of hydrocarbon cleanliness.

### 2 Equipment Required

(1) high pressure chamber for exposing the parts to helium, such as LACO Technologies model LBC083-60

(1) high purity, high pressure helium cylinder.

(1) LIGO Lab Vacuum Oven with a Residual Gas Assay (RGA) for helium leak and hydrocarbon outgassing measurement

### 3 Procedure

- 1) Chemically clean helium (He) test chamber (as though cleaning to Class B per E960022, but do not bake the chamber).
- 2) Place test unit(s) into the canister and seal the lid.
- 3) Evacuate the chamber to  $< 29$  in Hg.
- 4) Slowly fill the test chamber with high purity He gas to 60 psi. Take care not to exceed 60 psi for model LBC083-60!
- 5) Keep the He pressure at close to 60 psi ( $> 55$  psi) for 2 hours.
- 6) Disconnect the He line from chamber.
- 7) Slowly depressurize the test chamber to 0 psig (to atmospheric pressure).
- 8) Remove the test unit(s) and chemically clean them (to Class A per E960022)
- 9) Place the test unit(s) into a Vacuum Oven and pump down.
- 10) Open the argon (Ar) calibrated leak.
- 11) Set the RGA to measure pressure versus time for He, open the valve to the RGA head, close the valves to all pumps. Run and record this accumulation test for 10 minutes.
- 12) Configure the Vacuum Oven for baking (close the Ar calibrated leak, open the valve to the large pump, close the valve to the RGA head) and proceed with a normal vacuum bake per E960022. When the bake has been completed, measure the residual hydrocarbon outgassing rate.



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### 4 References

[E960022](#), LIGO Clean and Bake Methods and Procedures

[E080177](#), RGA Test Qualification

[T1400610](#), He Accumulation Test

[MIL-STD-883, method 1014.14](#)