

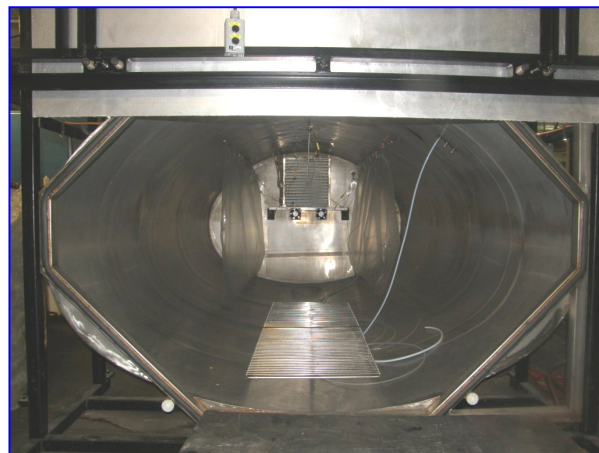


Independent Engineering Laboratories, Inc.

Innovation Beyond Limitation

PERMEATION TESTING

iEL offers the area's largest array of permeation testing capabilities. With a variety of SHED (Sealed Housing Evaporative Determination) configurations to accommodate parts from small hoses and valves to full vehicle fuel systems. *iEL* is prepared to assist our customers in their efforts to meet the significantly more stringent vehicle emissions rules and regulations of the future. These regulations are no longer only interested in hydrocarbon (HC) emissions from engine exhaust, but from any potential vehicle source. Hoses, plastic, vinyl components, fuel filling systems, tires, etc. have all been identified as sources of HC emissions. This testing is extremely precise with a period of conditioning (or soaking in fuel or other test fluids at elevated temperatures) and then enclosing the parts in a sealed SHED for periods of 24 to 72 hours and measure all HC emissions. PZEV, the rules promulgated for ZERO emissions for both California and Federal automobiles of the future, requires the development of new test methodologies. *iEL* has both the equipment and the engineering expertise to assist our customers in this important testing arena.



SHED CAPACITY AND CAPABILITY

(2) MiniSHED's (6.7 cuM and 9.4 cuM)

- fuel tanks, line packages, canisters, filler assemblies, and tank bucks
- Currently testing tanks ranging from 15g tanks to 55g tanks

(3) 0.36256 cuM (96 gallon) MicroSHED's

- Various component testing (canisters, fuel rails, line package, plastics, etc.)
- Able to run 3 independent SHED tests at once



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AVAILABLE TESTING SERVICES:

- 0 to 5000+ Hour Conditioning in Fuels (or other test fluids) and at Elevated Temperatures.
- 24 to 72 Hour Diurnal Testing with up to 3 Simultaneous Measurements (FID)
- Fuel filling of tanks, etc. while measuring HC emissions.
- Parts ranging in size from small fuel injectors to full vehicle fuel systems.
- Capable of fuel or vapor flow during testing.

All *iEL* SHED's are:

- Equipped with pressure compensation bags to prevent a pressure build on the system.
- Capable of fuel or vapor flow during testing.
- Equipped with continuous digital recording of temperature, SHED pressure, part pressure, barometric pressure, and more.
- Flexible for sampling of SHED PPM (hourly, ten minutes, continuous, etc.).



Additionally *iEL* Has:

- Numerous chambers available for component fuel soak / conditioning. Temperature range from -40C to 150C.
- Full system fuel soak chambers specially equipped with vapor management systems to ensure safety.
- The ability to Adapt to various testing schedules / soak time.
- On site fabrication of custom tank bucks and other fixturing.



Functionals Performed:

- Pressurized Helium leak checks performed before any testing is started.
- Pre- and Post-Diurnal FID sniff leak checks always performed.