The Exhaust Composition Transient Operation Laboratory (ECTO-Lab™) is a computer controlled, multi-fueled, burner-based, and continuous flow reactor system that duplicates the lean exhaust conditions of medium-duty to line-haul size truck engines. Invented and developed by Southwest Research Institute® (SwRI®), the ECTO-Lab is the first fully transient, full-size reactor type system available in the global market today.

The Ecto-Lab is primarily used for catalyst performance evaluation and screening, multidimensional mapping, control model calibration, engine/catalyst calibration integration, and engine cycle simulation. It can be applied to individual catalysts or complete exhaust aftertreatment systems and can be used for low temperature catalyst performance or high temperature catalyst aging.

**ECTO-Lab Features**

- Diesel-, gasoline-, or NG-fueled burner
- Independent control of:
  - NO\(_x\) (20-1200 ppm)
  - Temperature (70-800°C)
  - Flow (up to 2900 kg/hr)
- Optional water and oxygen control
- Heat recovery, minimized heat loss, and dilution for reduced fuel consumption

**Applications**

- Cold-flow work
- Catalyst aging
  - Durability evaluation
  - Poisoning
  - OBD part production
- Catalyst performance evaluation
  - Single stand for aging and evaluation
  - Transient cycle simulation
  - Full-size continuous gas reactor
- Model calibration
  - Wider range of available conditions
- Technology and strategy screening
- Engine calibration and strategy development
- Early technology screening before engine platform available

ECTO-Lab bridges the gap between core testing and engine testing, allowing full-size catalyst systems evaluation. The system can be used as a full-sized, fully transient continuous flow gas reactor as well as a transient engine simulator.
The independent control of variables and wide range of operation creates a test stand that can simulate a variety of engines and emission test cycles, enable multi-dimensional mapping for catalyst model calibration, elevated temperatures to allow accelerated catalyst aging and low temperature operation for cold-start simulation and cold operation calibration. One of the most exciting features, that may not be intuitively obvious, is that the ECTO-Lab can use engine model data as the input, enabling the catalyst calibration development engineer to begin working with catalysts for engines that have not yet been produced. Additionally, with one test stand, multiple engines can be simulated, allowing for work to shift from one catalyst platform to another without requiring engine removal/installation and instrumentation.

ECTO-Lab simulates the function of many different types of test stands, offering cost savings over purchasing various test rigs, a space savings as only one test cell is needed, and an operating savings by maximizing test stand utilization. Additionally, since the ECTO-Lab does not produce shaft work or have any water cooled parts, the system produces like exhaust gas conditions compared to an engine, but at more than 50 percent fuel savings.

Service and User Group

• One-year service contract for support
• One-year membership in ECTO-Lab User Group
  ◦ Continued expansion of capability
  ◦ Research pertaining to full-sized reactor bench – directed by members
  ◦ Access to SwRI Engine Library
  ◦ Bi-annual meeting of users
  ◦ Discounts on upgrades and added options

We welcome your inquiries. For more information, please contact:

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