ECTO-Lab™ is a computer-controlled, multi-fueled burner system designed to simulate engine aging conditions. Southwest Research Institute® (SwRI®) designed the system to accommodate full-sized catalyst systems and provide programmable aging cycles, allowing users to create aging cycles to meet specific needs.

**ECTO-Lab Features**
- Temperature control (400–1200°C system outlet)
- Flow control (20–120 g/sec)
- Wide-range, closed-loop air/fuel ratio control (0.75 <\lambda <1.3)
- Capable of continuous operation at stoichiometric air/fuel ratios
- Programmable secondary air injection control
- Full FMEA (failure modes and effects analysis) safety monitoring and response
- Ability to add oil component to aging cycles
- Gasoline or natural gas fueled

**Engine-Based vs. Burner-Based Aging**

Aging cycles developed on engine benches have been used to accelerate the thermal effects of catalyst aging from about six months of intensive driving to about 100 hours of simulated aging. With today’s advanced emission solutions, however, the catalysts are moving closer to the engine, resulting in increased operating temperatures that require increased total aging time. This increases both the cost and the risk of part failure due to stand malfunction or lack of control.

The classical approach to catalyst aging has been to use an engine-based aging stand, with operating temperatures in the 800–900°C range. An alternative approach that can safely and efficiently reach higher temperatures can allow significant reductions in aging times.

The SwRI ECTO-Lab catalyst aging system is a burner-based solution that allows the system to achieve operating temperatures of 1200°C. Because ECTO-Lab can operate at higher temperatures than an engine-based system, aging costs can be reduced.

**SwRI Catalyst Performance Comparison**

In an internal study, SwRI conducted research on six catalysts which showed that burner-based aging provides results equivalent to engine-based aging (SAE 2003-01-0633). Three catalysts were aged using a gasoline-fueled engine, and three using the ECTO-Lab gasoline-fueled burner. The engine was configured to run a standardized cycle, and ECTO-Lab was programmed to run to the engine test cycle specifications. Aging was conducted using the same bed temperature, air/fuel ratios, and catalyst space velocity conditions in both systems.

Catalyst performance was measured at the beginning and end of the aging cycle and compared between the two methods. The ECTO-Lab burner-based system produced thermal aging results equivalent to the engine aging cycle.
ECTO-Lab Advantages

- Lower maintenance
- Higher efficiency system for fuel savings
- Fewer moving parts for reduced mechanical wear
- Power fault protection for operation during thunderstorms
- Wide-range lambda operation and control window
- Operation with or without lubricating oil (optional oil system add-on)
- Multiple fuels

ECTO-Lab sales and service are currently available for North America in the Detroit area, and will be available in Europe, both through an exclusive SwRI licensee.

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

Cary Henry, Ph.D.
Manager
Catalyst and Aftertreatment R&D
Diesel Engine and Emissions R&D Department
(210) 522-2424
chenry@swri.org

Engine, Emissions and Vehicle Research Division

swri.org
ecto-lab.swri.org
card.swri.org