

# Specialized Road Wheel Testing

## Horizontal Wheel Testing at Accelerated Conditions for Tire Safety Evaluation

The automotive industry is demanding more and more tailor-made tire testing procedures for sport utility, multipurpose and other types of vehicles, in order to meet the performance requirements based on various vehicle platforms and climatic conditions. This tougher demand has created a need for more accelerated functional tire testing at higher temperatures and with elevated environmental conditions. ARDL's engineering group has recently announced a new concept in endurance testing using a six-head tire-wheel testing machine with environmentally controlled stations. The ARDL "tire-wheel" testing rig integrates six separately controlled temperature/environmental chambers, one for each of the six tires. This approach will allow ARDL's engineering group to provide automotive companies with cost-effective research and development testing for tire safety.

ARDL's horizontal tire test rig features PLC closed-looped controls which offer very precise control of load, speed and temperature. The PLC interface will allow the test engineer to load the test profile and then data-log all key test parameters throughout the duration of a test.

### High Speed "Indoor" Wheel Testing

- Machine – 67.23" Diameter Drum
- Inflation – as per New ARDL Test Schedule
- Load – 88% of Maximum Load
- Break-In – 2 Hours at 50 mph; Cool to 100°F

### Tire Speed - 150 MPH (Maximum)

- Typical Chamber Aging Temperatures: -40°C, -10°C, 70°C, 80°C, 90°C and 100°C

### Tire Durability Development

- Cleated Wheel
- Accelerated Treadwear Testing
- Tire Slip and Camber

### Tire Mechanics (MTS)

- Tire Spring Rate
- Footprint Pressure Distribution
- Tire Dynamic Stiffness and Tangent Delta
- Whole Tire Hysteresis

### Tire Electrical Measurements

- Electrical Resistance

### Tire Modeling

- Finite Element Analysis (FEA)
- New Design Evaluation
- Stress Analysis



Rubber. Plastic. Latex.

# Tire Permeation Testing

## Air Permeation Testing

ARDL's air permeation room has a 50-tire capacity as per ASTM F 1112 and GM test specifications. For measuring, ARDL utilizes high accuracy pressure gauges that include custom made attachment stem valves. The controlled temperature chamber provides us with the capability of continuous monitoring. Throughout the 90-day or 180-day air permeation test, our qualified engineers perform extended data analysis and reporting utilizing per minute monitoring and calculations.

## Innerliner Permeation Testing

Innerliner permeation is conducted to evaluate the effect of air loss on rolling resistance and ultimately to determine fuel savings. Less air permeation yields greater fuel savings because the tires tend to provide the vehicle higher mileage. ARDL has the capability to test tires in different internal cavity gas environments, such as nitrogen or oxygen, with continuously controlled purity levels. ASTM D 1434 at 21°C and 65°C on innerliners extracted from tires can also be performed.



## Intercarcass Pressure Testing

Intercarcass pressure is tested to determine the carcass pressure buildup and to understand its effect on sidewall delamination in tires. ARDL has the ability to perform intercarrass pressure tests with a 10-tire capacity at controlled temperature and monitored barometric pressure. The capability to measure the whole tire permeation and intercarrass pressure variation simultaneously is also available.



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