

# Functional Testing Procedure Using Tire Sections for Failure Prediction *U.S. Patent 7,249,497*

## Functional Testing Procedure

Two 1" sections 180° apart in the tire are microphotographed for documentation of fundamental construction features, component dimensions and component placement, gauges of innerliner, wedge and skim compounds, and stock division lines in the crown and belt regions including tread, tread base, undertread, sidewall, skim and wedge components.

The tire is sectioned, the sections are aerobically aged, inflated and placed under dynamic cycling conditions for various specified times and temperatures. Tire sections are mounted in a special ARDL, Inc.-designed jig to effect a seal such that the section can be reliably pressurized and dynamically cycled at appropriate frequencies. The air permeation rate is measured during the test.

Tire section specimens will be prepared from control and aged sections for the following tests and analyses:

- Reverse Engineering on Individual Components
- Tread and Belt
- Undertread/Cushion
- Innerliner and Steelcord Wedge
- Skim Analysis
- Belt Wedge Analysis
- Tread Compounds
- Crosslink Density
- Type Sulfur Crosslinks
- Micro DeMattia Test

Adhesion specimens will be prepared from the control and aged sections for peel adhesion at both 23°C and 100°C. This type of analysis will simulate the effects of aging of a tire in the field.

