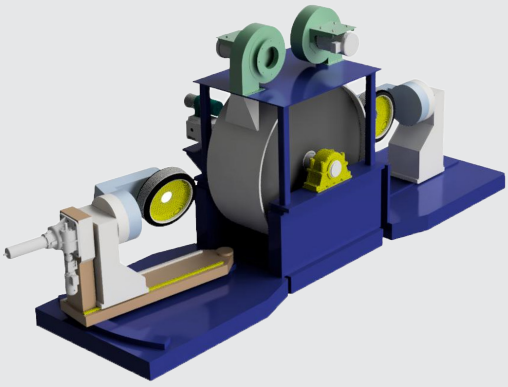
All-In-One Rolling Drum Machine

Link Engineering Company and Calspan have entered a strategic partnership with each other, combining Calspan's engineering know-how and experience in tire testing with LINK's ability to design and manufacture machinery will open the door for innovation. New equipment, including the jointly designed All-In-One drum machine, will be of the same caliber that the industry expects from LINK but supercharged with Calspan's expertise and experience in tire testing.



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Product **Overview**

Rolling drum machines are used for a large variety of standard tire testing procedures. The All-In-One drum machine is designed as the perfect middle-ground, offering reliable and accurate data for any type of drum test, all on one machine. The machine provides many benefits, including substantially lower capital costs, a smaller laboratory footprint, and reduced manpower. The user can optimize operation of the machine, adding additional capabilities as the business grows organically. This ensures optimal uptime and utilization, providing an unparalleled ROI.

Key Features

The All-In-One drum machine utilizes a precision drum roadway and two purpose-built stations.

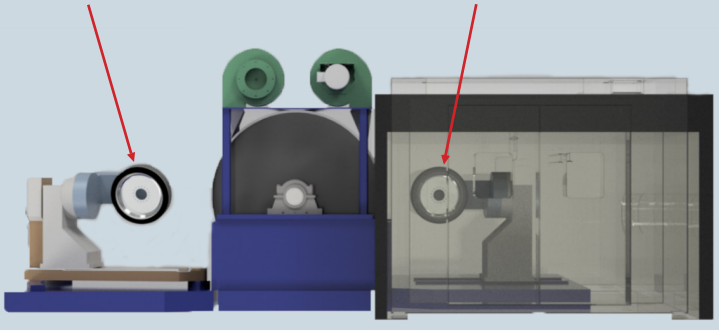
Station 1 includes a strain gauge head with dynamic slip and camber degrees of freedom. This station is therefore ideal for limited force and moment tests, wear tests, and durability.

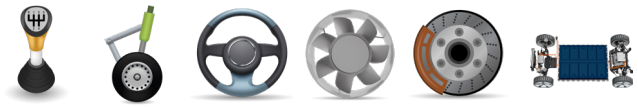
Station 2 utilizes a piezoelectric head mounted on an exceptionally stiff, lockable tailstock with zero slip angle and zero camber angle. This station is designed to have a high natural frequency such that it is ideal for cleat tests and high-speed uniformity tests. In addition, this station is appropriate for measuring rolling resistance and, with the optional semi-anechoic chamber, NVH (noise, vibration, and harshness) profiles.

- *Station 1: Strain-Gauge*
  - Controlled Z-axis, Camber, & Steer
  - Ideal for Rolling Resistance, Wear, Durability, and Playback tests
- *Station 2: Piezoelectric*
  - Controlled Z-axis
  - Ideal for High-Speed Uniformity and Cleat testing
  - Optional semi-anechoic chamber for NVH testing
- *Changeable surface shell*

STATION 1: Strain Gage Head
- Dynamic Slip and Camber
- Measurement of:
  - Limited Force and Moment
  - Indoor Tread Wear
  - Durability

STATION 2: Piezoelectric Head
- Stiff Structure With Locking Tailstock
- Precise Orientation, 0.0° Slip and Camber
- Measurement of:
  - High Speed Uniformity
  - Cleat Testing (for FTire, MF Swift, ect.)
  - Rolling Resistance (option)
  - NVH (with anechoic chamber option)
  - Road Simulation (with texture shells option)





Applications

As its name suggests, the All-In-One machine can do it all. The two-meter diameter drum reaches the perfect compromise between cyclic tests, such as cleat testing, and tests that desire a flat footprint, such as wear testing. The Piezoelectric station has higher stiffness, necessary for sensitive tests such as high-speed uniformity. The Strain-Gauge station allows additional control for camber and steer, necessary for drive file playback and force and moment testing.

Some of the common types of tests this machine can perform are listed below:

- Rolling Resistance
- Noise, Vibration and Harshness, with optional anechoic chamber
- High Speed Uniformity
- Cleat Testing – necessary for the creation of tire models such as FTire, MF Swift, etc.
- Durability
- Wear simulation, including convoy playback capabilities

Model 5600 All-In-One Rolling Drum Machine Specifications	
Tire Diameter Range	500 mm to 1000mm (19 in to 39 in)
Force Measurement	Fx: +/- 20kN Fy: +/- 20kN Fz: +/- 30kN
Moment Measurement	Mx: +/- 7.86kNm My: +/- 3.0kNm Mz: +/- 1.24kNm
Maximum Drum Speed	180 kph (112 mph)
Roadwheel Diameter	2.0 m (79 in)
Test Stations	Dual
Station 1	
Inclination Angle (Accuracy)	± 10.00° (± 0.05°)
Slip Angle (Accuracy)	± 20.00° (± 0.05°)
Station 2	Fixed head orientation for enhanced stiffness

About **LINK**

Link Group, Inc. (LINK), parent to Link Engineering Company, Link Industries and Tescor, consists of businesses that offer customized solutions, with a focus on delivering high value to each of their customers. Offerings consist of the design and manufacture of customized, high precision test, research, simulation, quality control and thermal solution equipment; comprehensive test services; and in the case of Link Industries, customized, high precision cutting tools. LINK's corporate headquarters are in Plymouth, Michigan (US), with manufacturing and design facilities, laboratory and vehicle test operations, and support teams around the world.

Established in 1935, we pride ourselves on being family-owned, currently led by the 2nd and 3rd generation of the Link family. As many of our team members have been with LINK for a generation or more, the LINK team is equipped with a wealth of knowledge, providing decades of hands-on experience, creativity and care, supporting our global customer base with highly technical solutions.

Contact LINK

+1 734.453.0800
www.linkeng.com
sales@linkeng.com

About **Calspan**

For over 75 years, Calspan has provided independent research, development, and testing services in the aerospace and transportation industries. Internationally recognized for safety research and innovation, Calspan works with leading aerospace and transportation companies domestically and globally. The company designs and manufactures wind tunnels, jet engine test cells, and test rigs, along with a variety of aerospace testing devices like wind tunnel models and balances. Company headquarters are in Buffalo, NY with additional operations in Niagara Falls, NY, Newport News, VA, San Diego, CA and St. Paul, MN.