The MTS Flat-Trac III CT (Cornering & Traction) Tire Test System is designed to perform force and moment testing of passenger car and light truck tires for the acquisition of high-quality cornering force data for vehicle handling models and tire qualification. Optimized for dynamic force and moment testing, this system is ideal for conducting tire tests that produce large lateral or longitudinal forces, such as slip angle sweep, sinusoidal slip angle, radial deflection, and tractive force tests. The Flat-Trac III CT also supports steady state force and moment tests, as well as lower force, effective rolling radius, tire wear, and simulation testing. Like all MTS Flat-Trac systems, the Flat-Trac III CT comprises a robust A-frame tire carriage on a stiff structure, advanced measurement devices, and a unique, revolving stainless steel roadway that provides a flat surface for unparalleled tire testing performance and features a patented water bearing to oppose tire loads and control temperatures.

**Principal Testing Capabilities:**
- Slip Angle Sweep
- Sinusoidal Slip Angle
- Radial Deflection
- Tractive Force Tests with Spindle Drive
- Steady State Force and Moment

**Additional Test Capabilities:**
- Effective Rolling Radius
- Tire Wear
- Simulation
- Uniformity Measurement
- Residual Pull

MTS has been delivering patented Flat-Trac tire testing technology to the worldwide automotive community for more than 25 years. This technology offers tire and vehicle makers a robust and accurate way to characterize tire behavior while operating at speed, with control of load, tire attitude, and inflation pressure during steady state, dynamic, or simulation tests. The knowledge gained from Flat-Trac tire testing is critical for understanding the forces and moments produced by tires while rolling on a flat surface under precisely controlled conditions.

- Tire designers employ this knowledge to meet the demands of specific markets or performance envelopes.
- Tire manufacturers use data from Flat-Trac systems for research and development and to provide their customers with accurate and reliable performance data.
- Vehicle manufacturers use Flat-Trac systems to capture high quality data for vehicle modeling and to qualify tires for vehicles.

The Flat-Trac III CT system is available in a standard configuration, or it can be customized to meet special customer requirements. The standard configuration employs a multi-axis Dynamic CT Load Transducer with a resonant frequency of greater than 200 Hz., a 192 kW Hydraulic Roadway Drive, and a 2800 Nm Hydraulic Spindle Drive. Other features include a real time control user interface, a robust system controller, and powerful test definition software and analysis tools.

**Standard Flat-Trac CT Specifications:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>± 250 kph</td>
</tr>
<tr>
<td>Vertical Force</td>
<td>± 25 kN</td>
</tr>
<tr>
<td>Lateral Force</td>
<td>± 15 kN</td>
</tr>
<tr>
<td>Spindle Torque</td>
<td>± 2800 Nm</td>
</tr>
<tr>
<td>Slip Angle</td>
<td>± 30 deg</td>
</tr>
<tr>
<td>Inclination Angle</td>
<td>-12 to +45 deg</td>
</tr>
<tr>
<td>Tire OD (mm)</td>
<td>≤ 910 mm</td>
</tr>
<tr>
<td>Tire Width (mm)</td>
<td>≤ 400 mm</td>
</tr>
</tbody>
</table>
Among this system’s most distinguishing traits is its high-capacity Flat-Trac CT load cell. Stronger, stiffer, and less massive than the steady state load cell, the dynamic CT load transducer is contained in a spindle housing that utilizes lubricated, oil-cooled bearings. This high-capacity load cell features accelerometers for inertial compensation during dynamic tests where inertial errors can be large. An alternate version of this load cell, the Flat-Trac CTWC load cell, features outboard water-cooled spindle bearings for enhanced thermal stability.

Another powerful attribute of the Flat-Trac III CT is its ability to control wheel torque or longitudinal slip. The system’s 2800 Nm spindle drive enables the measurement of tire longitudinal forces for tractive behavior when driving or braking torque is applied. Cornering force properties due to slip angle or camber angle can be measured during free rolling operation or in combination with tractive input.

The Flat-Trac III CT system supports a broad range of tire tests, accommodating both conventional steady state and dynamic force and moment tests. With the greatest dynamic testing capability of all MTS Flat-Trac systems, this system is particularly well suited for measuring the force and moment properties of tires at slip angles that are well beyond rated tire limits at highway speeds.

Although optimized for higher force, dynamic force and moment testing, the Flat-Trac III CT can achieve good results for low force residual pulling if steps are taken to compensate for its high-capacity load cell, these include: applying a special gain set to maximize resolution; employing the system’s tare rezero feature; and employing a dynamic test protocol when acquiring data.

The Flat-Trac III CT features an automated control system that allows you to use a conventional personal computer to configure tests and analyze results. Using spreadsheet software, this system allows you to configure both industry standard and unique, custom tire tests. The system’s wide range of available control parameters provides unprecedented flexibility to reproduce road conditions in the controlled conditions of your laboratory.

**Control Parameters:**
- Slip angle or lateral load
- Camber angle
- Roadway speed
- Loaded radius or vertical load
- Slip ratio or wheel torque
- Inflation air pressure
- Water bearing temperature

The Flat-Trac III CT can be employed to acquire a broad range of data on a wide variety of tire performance parameters. This data acquisition capability allows you to perform important standard tests and develop unique custom tests to meet your particular tire testing needs.

**Data Acquisition Parameters:**
- Tire forces and moments (SAE, ISO, or JASO)
- Slip angle, camber angle, and loaded radius
- Roadway speed
- Slip ratio and spindle speed
- Tire inflation pressure
- Ambient temperature
- Water bearing temperature

**For More Information:**
Contact your local MTS sales engineer or call MTS at 1-800-328-2255 or 1-952-937-4000.