

## Driving tyre testing up a gear

In the competitive world of tyre manufacturing, staying ahead of the curve requires innovative solutions that provide detailed insights into tyre performance.



One of our customers, a leading tyre manufacturer, has significantly accelerated their product development process by leveraging the advanced capabilities of the XSensor Tyre Pressure Mapping System. This cutting-edge technology enables dynamic tyre testing, offering invaluable data that conventional methods simply cannot match.

### The Challenge

Our customer needed to collect tyre footprint data in a dynamic environment at speeds up to 80 km/h. While they had been successfully using the XSensor Tyre Pressure Mapping System since 2014 for static measurements, the challenge was to capture data under real-world driving conditions. Traditional methods, such as driving over a glass plate with a high-speed camera underneath, provided images but lacked the detailed pressure and load distribution data necessary for comprehensive analysis.

### The Solution: XSensor Dynamic Tyre Pressure Mapping System

The XSensor Dynamic Tyre Pressure Mapping System offers a portable and repeatable method for recording tyre footprints at speeds up to 140 km/h (86 mph). This system collects pressure distribution

data frame by frame as the vehicle passes over the sensor, providing a wealth of information that can be saved, replayed, analysed, and exported in various formats.

## System Components

1. **Sensor:** Measuring 40.6 x 40.6 cm with over 65,500 sensor points, capturing data at 450 frames per second and up to 206 Nm/cm<sup>2</sup> (300 psi).
2. **Sensor Packs:** Four packs that scan the sensor and connect to a high-speed data logger.
3. **High-Speed Data Logger:** Saves data to an SD card.
4. **Movement Sensor:** Triggers the data logger to start collecting data.
5. **HS Pro V8 Software:** A comprehensive software package for live viewing, data analysis, and export of numeric data, AVI files, and images.

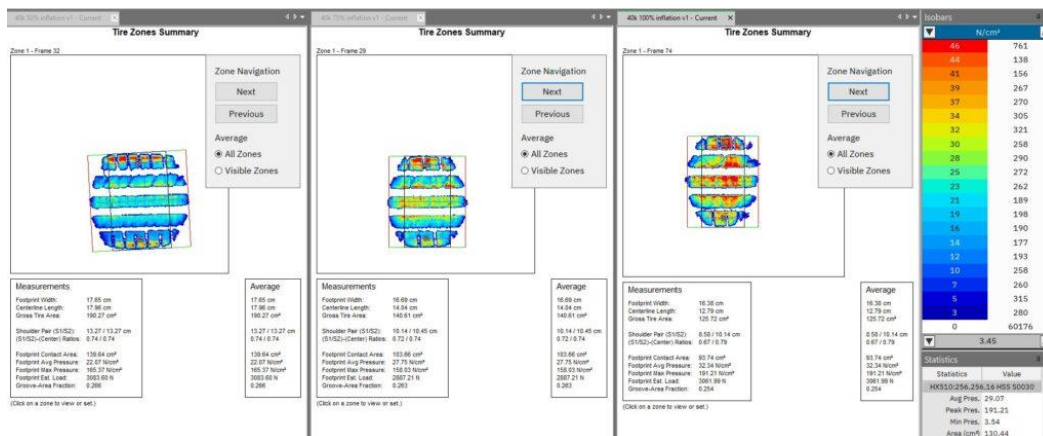
## Testing Process

The tests were conducted over two days, with dry runs on the first day and wet runs on the second. The goal was to measure a current production tyre, a prototype tyre, and a competitor's tyre at three different inflation pressures (100%, 75%, and 50% of normal inflation pressure) and two speeds (40 km/h and 80 km/h). Each test run was repeated to ensure accuracy and repeatability. See the short video below, showing the two tests in slow motion.

Dynamic tyre testing in action – watch video

*The video shows two consecutive tests – the XSensor system collects pressure distribution data frame by frame as the vehicle passes over the sensor.*

## Key Findings

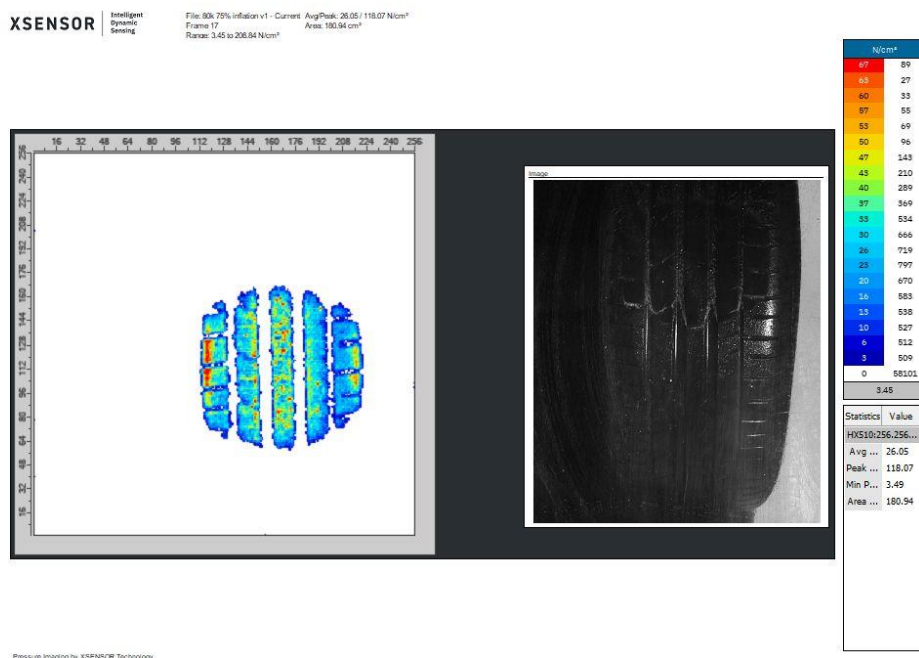


XSensor display

showing different pressure patterns for varying levels of tyre inflation.

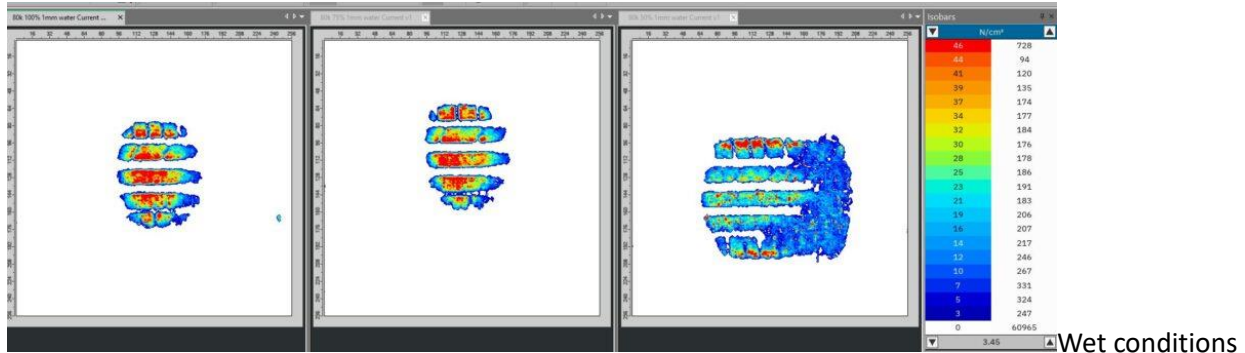
The dynamic testing provided detailed insights into how tyres perform under various conditions:

- **Load and Speed:** The system captured how the tyre footprint changes shape under dynamic load at different inflation pressures.
- **Pressure Distribution:** It measured the pressure and force generated, offering a clear picture of performance under different scenarios.
- **Water Clearance:** The wet tests highlighted the effectiveness of different tread patterns in clearing water, with visual evidence of water forming a bow wave at lower inflation pressures.



XSensor output alongside photo of tyre

Dry conditions –



– XSensor output

## Benefits

The XSensor system offers several advantages:

- **Enhanced Understanding:** Manufacturers gain a deeper understanding of tyre performance under a wide range of conditions.
- **Informed Development:** Data-driven insights enable informed decisions on changes to tyre dimensions, compound, sidewall rigidity, and tread patterns.
- **Cost and Time Efficiency:** The ability to conduct tests quickly and repeatedly speeds up product development and reduces costs.

## Conclusion

The XSensor Dynamic Tyre Pressure Mapping System is a game-changer for tyre manufacturers, providing unparalleled insights that drive innovation and improve product performance. By adopting this advanced technology, our customer has not only accelerated their development process but also gained a competitive edge in the market.

Dynamic tyre testing – find out more

- Learn more about the [XSensor Dynamic Tyre Pressure Mapping System](#).
- Download the [XSensor datasheet](#).
- [Contact us](#) to discuss your application for dynamic tyre testing.