

Technical Bulletin TB-1110

The use of TPMS on Process Machines with Tire-Driven Drums

Introduction

In many industrial sectors, tires are not only used for mobility — they are critical components in fixed or semi-fixed process machinery. Equipment such as trommels, de-barking machines and rotary dryers rely on large tires to support and drive rotating drums as part of continuous production processes.

Despite this, the condition of these tires is often overlooked.

A Tire Pressure Monitoring System (TPMS) provides continuous, real-time monitoring of tire pressure and temperature. While commonly associated with Off-The-Road (OTR) vehicles and road transport, TPMS is equally valuable — and in many cases essential — for process machines where tire failure can bring production to an immediate halt.

This bulletin explains where TPMS can be applied, how the technology works in these applications, and the operational benefits it delivers.

1. Where are Tire-Driven Process Machines Used?

Across multiple industries, rotating drum equipment supported by tires plays a vital role. These machines are typically high-value assets operating continuously in demanding environments.

Common examples include:

Material Processing & Mining

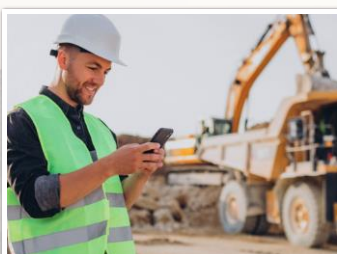
- Trommel screens (rotary screening drums)
- Rotary kilns
- Rotary dryers
- Agglomeration drums
- Granulation drums

Forestry & Timber Processing

- Log de-barkers
- Rotary log washers
- Wood chip dryers
- Bark processing drums

Recycling & Waste Processing

- Composting drums
- Waste trommels
- Soil remediation drums
- Scrap processing rotary systems



Bulk Handling & Industrial Processing

- Fertiliser granulators
- Cement kilns
- Lime kilns
- Pelletising drums

Ports, Quarrying & Construction Materials

- Aggregate washing drums
- Sand processing trommels
- Sludge drying drums

In all of these applications, the drum is typically supported and rotated by large industrial tires mounted on support wheels. These tires carry substantial loads and are subjected to continuous heat build-up and mechanical stress.

2. Why Tire Monitoring is Critical in These Applications

Unlike mobile equipment, these machines often operate:

- Continuously (24/7)
- Under constant load
- At relatively low rotational speeds but high torque

This creates a unique set of challenges:

Heat Build-Up

Continuous rotation generates heat within the tire. Without monitoring, overheating can go unnoticed until failure occurs.

Pressure Variation

Pressure changes directly affect load distribution and contact area. Incorrect pressure leads to uneven wear and excessive stress.

Hidden Failures

These tires are not routinely inspected during operation. Issues develop silently until they become critical.

Production Dependency

If a tire fails, the entire process stops. There is no “limp mode” — just downtime.

As highlighted in previous technical guidance, TPMS provides continuous monitoring of both pressure and temperature, allowing proactive maintenance rather than reactive repair.

Tire Monitor System

West Road House
West Road
Buxton
Derbyshire
SK17 6HF

T: +44 (0) 1298 77166
E: enquiry@tiremonitorsystem.com

www.tiremonitorsystem.com

3. How TPMS Works on Tire-Driven Process Equipment

The core principles remain the same as with OTR vehicles, but the application differs slightly.

System Overview

- Sensors are fitted either inside or on the valve stem of each tire
- Pressure are measured continuously (also temperature when using internal sensors)
- Data is transmitted wirelessly to a receiver
- Alerts are generated when thresholds are exceeded

This real-time visibility allows operators or maintenance teams to identify issues before they escalate.

Why Internal Sensors are Preferred

For process machines, internal sensors are typically the best option:

- Direct measurement of internal air temperature
- Protection from debris, dust and mechanical damage
- Reliable performance in high vibration environments

Internal sensors provide the most accurate and durable solution, particularly in harsh industrial environments.

4. Key Benefits of TPMS on Process Machinery

Preventing Catastrophic Downtime

A failed tire on a trommel or kiln can stop production instantly – often for hours or even days. TPMS provides early warning of:

- Slow pressure loss
- Rapid deflation
- Excessive temperature rise
- Can link into existing control systems to automatically shut down the process

This enables planned intervention rather than emergency shutdown and therefore huge cost savings

Extending Tire Life

Incorrect pressure is one of the primary causes of premature tire failure.

With TPMS:

- Tires operate within optimal pressure ranges
- Load is distributed correctly
- Heat generation is controlled

This results in longer tire life and improved return on investment.

Improving Operational Efficiency

Even small inefficiencies in drum rotation can have a significant impact on throughput.

Correct tire pressure ensures:

- Consistent rotational performance
- Reduced rolling resistance
- Stable drum alignment

All of which contribute to smoother, more efficient operation.

Tire Monitor System

West Road House
West Road
Buxton
Derbyshire
SK17 6HF

T: +44 (0) 1298 77166

E: enquiry@tiremonitorsystem.com

www.tiremonitorsystem.com

Enhancing Safety

Overheated or damaged tires can fail without warning, posing risks to nearby personnel and equipment.

TPMS provides:

- Immediate alerts
- Continuous monitoring during operation
- Reduced reliance on manual inspection

This significantly improves site safety.

Reducing Maintenance Burden

Manual pressure checks on these machines are:

- Time-consuming
- Not possible during machine operation so the machine would need to stop
- Inherently inconsistent
- Likely to be inaccurate using non-calibrated gauges

A calibrated TPMS eliminates the need for manual checks while providing a far more comprehensive dataset, capturing issues as they develop rather than at a single point in time .

Supporting Predictive Maintenance

As the TPMS would be continuously logging the tire data, this enables:

- Trend analysis of pressure and temperature
- Early identification of recurring issues
- Data-driven maintenance planning
- Post incident analysis to understand the root cause of any failures

This shifts maintenance from reactive to predictive — a key step in modern industrial operations.

Improving Sustainability

Running tires at the correct pressure:

- Reduces wear and waste
- Extends casing life (supporting re-use or re-treading where applicable)
- Minimises energy losses

These improvements contribute directly to lower operating costs and reduced environmental impact.

Tire Monitor System

West Road House
West Road
Buxton
Derbyshire
SK17 6HF

T: +44 (0) 1298 77166

E: enquiry@tiremonitorsystem.com

www.tiremonitorsystem.com

5. Typical Installation Considerations

While the concept is straightforward, successful implementation requires attention to detail:

Signal Transmission

Large steel structures and rotating drums can affect signal paths. A robust TPMS with strong radio frequency (RF) performance is essential. Such as used on large OTR vehicles

Sensor Positioning

Sensors must be securely mounted and correctly aligned to ensure accurate readings over long operating periods.

Environmental Conditions

Dust, moisture, heat and vibration are all common. Equipment must be designed specifically for these environments.

As seen in other industrial applications, reliable signal transmission and ruggedised components are critical to maintaining consistent performance .

6. A Logical Extension of TPMS Technology

TPMS is already widely used across:

- Mining vehicles
- Construction equipment
- Port handling machinery
- Mobile cranes

Applying the same proven technology to process machinery is a natural progression.

The principle is simple:

If the tire is critical to the operation, it should be monitored. This will inevitably lead to improved efficiency, reduced downtime and increased profitability

7. Conclusion

Tire-driven process machines such as trommels, rotary kilns and de-barking drums are essential assets in many industries. Yet the tires they rely on are often left unmonitored until failure occurs.

A properly specified TPMS provides:

- Continuous visibility of tire condition
- Early warning of developing issues
- Reduced downtime and maintenance costs
- Improved safety and operational efficiency

In short, it turns a previously hidden risk into a controlled and manageable part of your operation.

[Contact us](#) today if you want more information or a quotation on the TMS[®] range of TPMS systems for use on rotating process machinery.

Tire Monitor System

West Road House
West Road
Buxton
Derbyshire
SK17 6HF

T: +44 (0) 1298 77166

E: enquiry@tiremonitorsystem.com

www.tiremonitorsystem.com