



Solutions for the railway industry

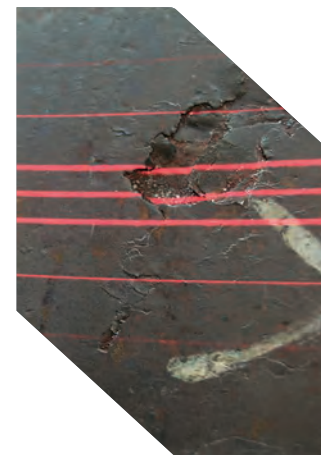
CALIPRI X



Railway wheelset
measurement



CALIPRI X



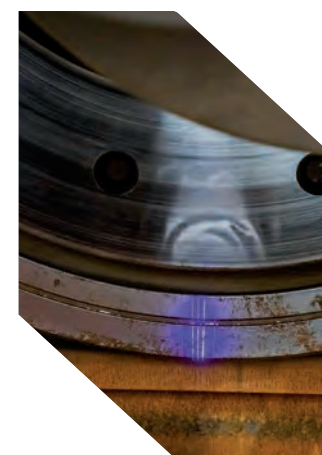
CALIPRI Prime



Spare parts
Accessories
Add-ons



CALIPRI C42



Track profile
measurement



Specialised solution for railway wheelset and track profile

Train wheelsets and rail infrastructure are typical wear parts that significantly affect passenger comfort, safety, noise and ride. The profiles of wheels, brake discs, rails and switches are therefore controlled by recurring measurement operations, which are performed in demanding operating conditions. The challenge lies in efficiently generating valid measurement data for the entire wheel-rail system. Efficient wheelset profile measurement can drive timely maintenance actions, help minimise train downtime and ensure a smooth and safe journey for rail passengers.

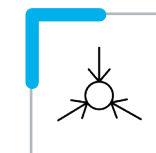
Hexagon's CALIPRI optical profile measuring instruments meet the specific demands of the railway industry by delivering accurate and reproducible results, independent of operator influence. These specialised rail profile measurement devices are widely used for wheel profile inspection, brake disc measurement, wheel distance measurement, wheel wear inspection and rail wear inspection.

Patented technology

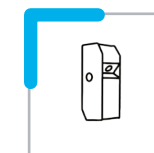
The unique CALIPRI Principle is a development of laser light section technology for non-contact dimension and profile measurements. It involves an innovative technology automatically correcting tilts and rotations of the measurement device. The result: Highly accurate, reproducible and user-independent measurement results – fully automated or by hand within seconds. Never again struggle with imprecise gauges: CALIPRI replaces error-prone and unreliable inspection devices.



High repeatability



Multifunctional application



Automatic correction of tilt and rotational errors



Real profile data

Automated wheel profile measurement system (WPMS)



Automated on-track measurement of wheelsets

Key benefits

- Designed for continuous 24/7 real-time monitoring and control
- Enables predictive maintenance
- Highly accurate and reliable results
- Very low maintenance effort
- Full digital workflow: measurement → cloud → analysis

Typical applications

- Capturing all critical wheelset parameters: wheel profile, diameter, back-to-back distance, equivalent conicity, camber and wheel toe
- Suitable for both indoor and outdoor use
- For heavy and light rail
- On-track measurement typically in front of depots, workshops, washing stations and sidings

Why CALIPRI X

- Measures all key wheelset parameters per EN 15313
- High accuracy in all environmental conditions (unique temperature compensation and stabilization)
- From interval-based to condition-based maintenance, enabling better planning and cost savings
- Temperature-normalized measurement results (ISO-1, 20°C)
- Cross-platform use within the CALIPRI product family

Digital integration

- Seamless connection to Wheel Sense (TrackForward)
- Measurement data instantly uploaded to customer database or cloud
- Results accessible from everywhere, immediately, all the time - fully traceable



Scope of supply and services

- Sensor system with automatic triggering of the measurement
- Mechanical components for stable connection of the sensor boxes
- Computer cabinet with measuring computer
- Uninterruptible power supply for controlled system shutdown in the event of a power failure
- 4G module (excl. SIM card)
- Chiller for temperature stabilisation of the measuring system and the computer cabinet
- Connecting cables and hoses
- Shelter to protect the peripherals against external influences, vandalism and damage
- 50 litre compressed air storage tank to support the compressed air supply provided by the customer
- Reference wheelset segment
- Services & software
- Installation and commissioning of system at customer prepared location
 - System calibration
 - Measurement application with remote serviceability



Technical Data

Measurement	
Process time	Ø approx. 10 s
Crossing speed during measurement	HR: < 30 km/h LR: depending on the visibility of the wheels by the sensors
Wheel diameter range	HR: 660 - 1260 mm LR: 500 – 1000 mm
Export format measurement data	XML
External signals	Track occupancy Vehicle identification
Lead time required	Always on
Distance until ready to measure	0 m

System	
Track gauges Standard gauge Narrow gauge Broad gauge	1435 mm 1000 mm, 1067 mm 1520 mm, 1668 mm, 1676 mm
Min. distance between rail top and sleeper	149 mm
System to cabinet distance	Max. 15 m
Required area for chiller & cabinet	Ca. 3.5 m x 1.5 m
Power supply	3 x 400 VAC / 16 A
Protection code	IP 54

Sensor box	
Laser class	3B visible, 450 nm and 640 nm 450 nm: 2M NOHD 3.3 m 640 nm: 2M NOHD 2.3 m

Environmental conditions	
Installation location	Suitable for outdoor use
Operating temperature	-20 °C to 50 °C
Others	No acids and alkalis in the environment





Value Proposition Reliability

Ambient temperature under control	
Sensor temperature stabilized	A chiller keeps the sensors' geometry, which directly influences the measurement results, at a constant temperature all year round.
Structure temperature compensated	The beam structure connecting the sensor boxes is made of steel and its temperature measured. Thus, the known temperature drift is compensated in software algorithms.
Copes with the environment	
Smooth outline design	No sticking of leaves or dirt.
Blow-off mechanism	An air stream to all sensor windows keeps away dirt or rain automatically. No obstacles can block its view.
No chance for snow and ice	Sensor boxes are heated to automatically let snow melt. Furthermore, icing cannot happen to the sensor windows.
Independent from loads and vibrations	
Rails decoupled	The system is mounted on screw foundations with no direct contact to the rails. Different axle loads or vibrations are not influencing the results. Long-term system availability.
Minimized maintenance efforts	
Automatic alert system	React fast in case of failures.
Maintenance free design	
No moving parts	No moving parts ensure a high system availability; nothing can break or block.
Measurement standards complaint	
Evaluation acc. to EN15313	All dimensional results are calculated according to the standard EN15313. The wheel profile alignment is done based on the profile, not relying on the wheelset's position above the system.
Results compareable (20°C)	All dimensional results are converted to a wheelset temperature of 20°C acc. to standard ISO-1. This allows the comparison of the results and to analyze wear trends.



Value Proposition Installation

Suitable product variant for every field of use	
Indoor Outdoor	Suitable for both indoor and outdoor use. Adapts to various environments.
Ballast Track Raised Track	Whether on ballast track or raised track, installation is easy on both types of tracks.
Heavy Rail Light Rail	Suitable for both heavy rail and light rail, providing maximum flexibility for different requirements.

Minimal construction requirements for installation	
No concrete foundations required	The installation does not require complex concrete foundations, saving both time and costs.
System on screw foundations	Uses screw foundations that can be quickly and easily installed—no major construction work necessary.
Installable on almost all tracks	Can be flexibly installed on nearly all types of tracks, allowing for easy integration into existing infrastructure.

Flexible installation options	
No straight track section required	There is no need for a straight track section prior to installation, allowing for flexible and space-efficient integration into existing track layouts.
Measurements in both directions	Provides reliable measurements regardless of travel direction, delivering precise and consistent results whether the vehicle is moving forward or backward.

Optional add-ons available	
Track occupancy signal	Reliable start-stop control of the measurement process.
RFID Reader	Train identification through the RFID Reader system.
Compressor	Constant and reliable compressed air supply, in case the customer does not provide it.

Delivered quickly and ready to use immediately	
Short delivery times	With fast delivery, work can begin without delay.
Turnkey from the factory	Pre-configured and tested before delivery – installation and use are possible immediately after arrival.
Quick installation and commissioning	Thanks to a well-thought-out design and simple assembly, the system is ready to use with minimal effort.



Measured parameters

Wheel profile	
Flange height	Fh
Flange width	Fw
Flange gradient	qR
Flange angle	FAI
Hollow tread	HT
Wheel width (without rollover)	L
Rollover	RO
Wheel width with rollover	W
Tyre thickness	TTr
Wheel arris	ARR
Wheel diameter	
Rolling circle diameter	D
Wheel gauge	
Back-to-back distance	I
Wheel gauge	SR
Others	
Equivalent conicity	Ec - calculated according to EN15302 and UIC519
Wheel camber	Cam
Wheel toe	Toe
Product ID	CX1BD01

All dimensions are evaluated according to the standard EN 15313

Values are temperature-compensated to 20 °C in accordance with ISO 1: Geo-metrical product specifications (GPS) — Standard reference temperature for the specification of geometrical and dimensional properties



CALIPRI X add-ons and services

Track occupancy signal	
Extension with additional sensors for detecting the track occupancy in the area of the CALIPRI X measuring system. This controls the start and end of a measurement.	
Product ID	CAO4502
Standalone compressor	
To supply CALIPRI X with compressed air continuously.	
Product ID	CAO4503
Train identification (RFID reader)	
Extension of a CALIPRI X measuring system with a vehicle identification system by RFID reader.	
Product ID	CAO4504
Service package standard	
Annual service flat rate for long-term availability of the CALIPRI X measuring system.	
Product ID	CSM1203



Hexagon is the global leader in measurement technologies. We provide the confidence that vital industries rely on to build, navigate, and innovate. From microns to Mars, our solutions ensure productivity, quality, safety, and sustainability in everything from manufacturing and construction to mining and autonomous systems.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 24,800 employees in 50 countries and net sales of approximately 5.4bn EUR.

Learn more at hexagon.com