CALIPRI

C4X

MANY TASKS, ONE SOLUTION

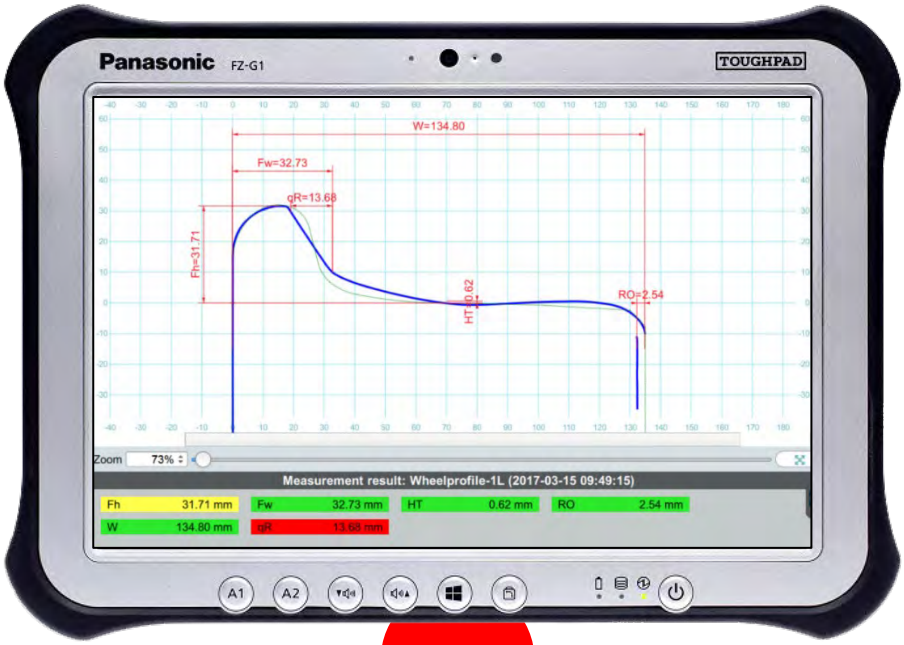
PROFILE MEASUREMENT FOR ROLLING STOCK

PART OF HEXAGON

NEXTSENSE

WHY CALIPRI?

- ✓ Highly accurate profile measurement gauge
- ✓ Non-contact laser technology -> No inaccurate mounting
- ✓ Patented roll and pitch correction -> User-independent results
- ✓ Digital measurement data -> No read-off errors or handwritten data transfer
- ✓ Multifunctional device and individual configuration:
  - o wheels
  - o brake disc
  - o back-to-back
  - o equivalent conicity
- ✓ Results as color-coded values and profile on sensor & tablet PC
- ✓ Unique calibration standard for self-test and autonomous recalibration
- ✓ Sensors for heavy & light rail
- ✓ Approved according to national and international standards
- ✓ International market presence with > 2000 devices in use
- ✓ Technical support and more than 40 sales partners worldwide



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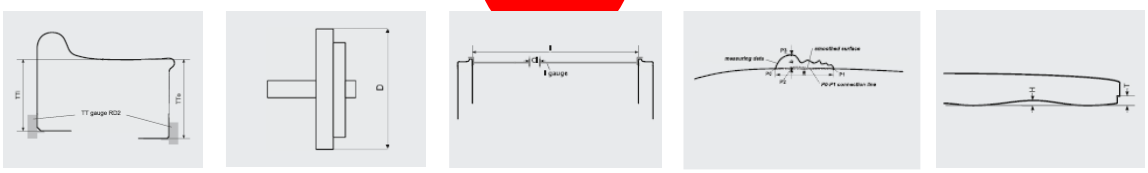


SCOPE OF SUPPLY & SERVICE

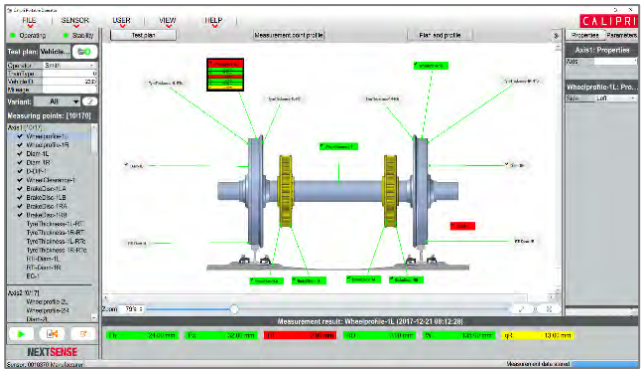
- ✓ Sensor of your choice
  - Calipri C41 (corded, small)
  - Calipri C42 (wireless)
- ✓ Tablet PC
- ✓ Calipri Software Suite
- ✓ Calibration standard
- ✓ Carrying strap & belt clip
- ✓ Hard-shell case
- ✓ Instruction manual
- \+ Measurement modules / features of your choice

Calibration Standard

Our calibration standard allows you to recalibrate the measuring device on site if required. This means that you benefit from a **measuring system with high availability.**

CALIPRI SOFTWARE SUITE

Define your measurement plan and tolerance classes in *Calipri Manager*. Use *Calipri Portable Operator* to execute the measurements and analyze the condition of your wheelsets (results displayed as numerical values, 2D profile and traffic light system). Print results as PDF reports or export to your data base.

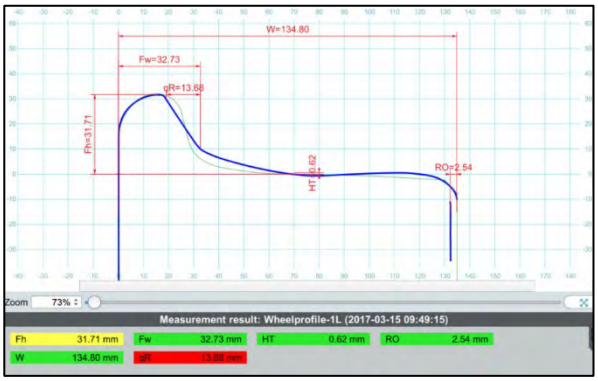


WHEEL PROFILE

APPLICATION

- Measurement of entire wheel profile cross-section
- Determining wheel flange height, flange width, qR as well as wheel width, hollow treat and rollover
- For heavy and light rail wheels
- Comparison of measured wheel profile with reference profile

MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Wheel Profile“
(Measurement methods: WheelProfile, WheelFlange)

✓ Supporting gauge “BR 600“ (Magnetic gauge for heavily worn wheels)

TECHNICAL DATA

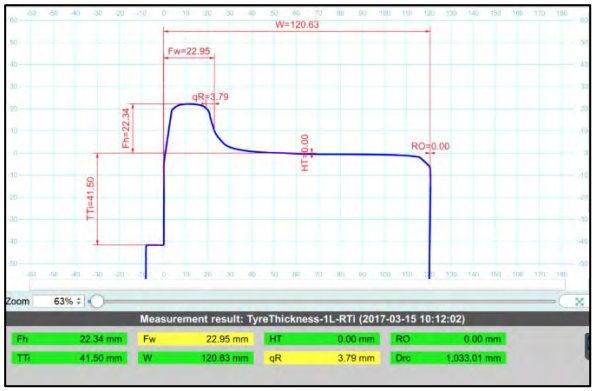
Compatibility	CALIPRI C41, CALIPRI C42
Accuracy	Absolute accuracy: < ± 80 µm Repeatability: < ± 35 µm
Scope of application	For all common heavy and light rail wheel profiles
Dimensions (Excerpt)	Flange height/width, wheel width, rollover, hollow tread
Standards & Certificates	This measuring module has been successfully tested according to JCGM100: 2008, DIN V ENV 13005: 1999-06, DIN EN 13715: 2001-01, DIN EN 15313: 2016-09 and DIN 27201-9: 2017-06.
Product ID	CMM1001

TYRE THICKNESS

APPLICATION

- Expansion of Wheel Profile measurement module
- Evaluation of tyre thickness of wheels
- Rolling circle diameter calculation possible if inner diameter is known
- For heavy and light rail wheels

MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Tyre Thickness“
(Measurement methods: WheelFlange_RTi, WheelFlange_RTo, WheelFlange_RTr)

✓ Tyre thickness gauges “RD2 820“ and “RD3 820“

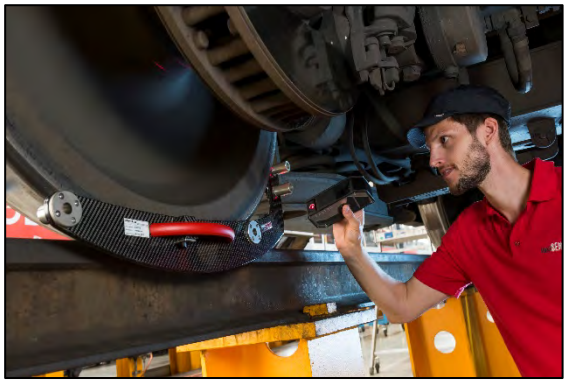
TECHNICAL DATA

Compatibility	CALIPRI C41, CALIPRI C42
System requirement	Measurement module “Wheel Profile” (CMM1001)
Accuracy	Absolute accuracy: < +/- 80 µm Repeatability: < +/- 35 µm
Accuracy of diameter calculation	Depends on manufacturing tolerances of reference diameter
Scope of application	For all common tyre thickness types (heavy rail and light rail)
Dimensions (Excerpt)	Tyre thickness outer/inner/groove, rolling circle diameter
Standards & certificates	This measuring module has been successfully tested according to JCGM100: 2008, DIN V ENV 13005: 1999-06, DIN EN 13715: 2001-01, DIN EN 15313: 2016-09 and DIN 27201-9: 2017-06.
Product ID	CMM1003

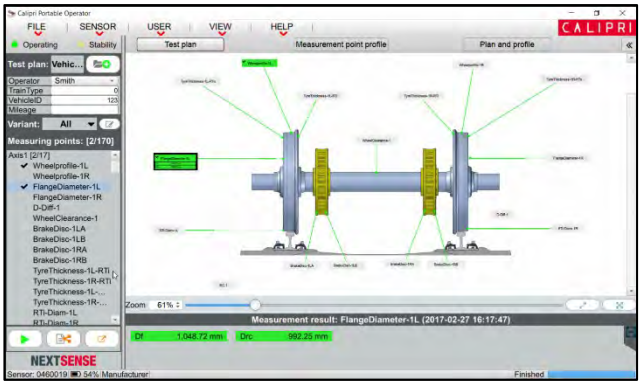
WHEEL DIAMETER

APPLICATION

- Wheel flange diameter measurement on installed or dismounted wheels
- Calculation of rolling circle diameter by measurement of wheel profile in addition
- Automatic calculation of diameter differences between axles, bogies and coaches
- For heavy and light rail wheels



MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Wheel Diameter“ (Measurement method: FlangeDiameter)

✓ Wheel diameter gauge (D-Gauge)

TECHNICAL DATA

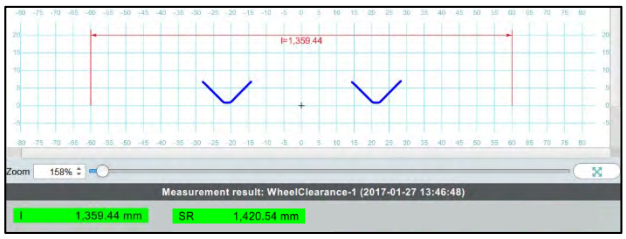
Compatibility	CALIPRI C41, CALIPRI C42
System requirement	Measurement module ”Wheel Profile”
Accuracy	Absolute accuracy: < +/- 200 µm Repeatability: < +/- 100 µm
D-Gauge versions (different measurement ranges)	D-750, D-1050, D-1350
Dimensions (Excerpt)	Flange diameter, rolling circle diameter, diameter difference axle/bogie/coach
Standards & certificates	This measuring module has been successfully tested according to JCGM100: 2008, DIN V ENV 13005: 1999-06, DIN EN 13715: 2001-01, DIN EN 15313: 2016-09 and DIN 27201-9: 2017-06.
Product ID	CMM1005

BACK-TO-BACK DISTANCE

APPLICATION

- Back to back distance measurement for wheelsets
- Calculation of check gauge (back-to-back + flange width left/right) by additional wheel profile measuring

MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Back To Back“ (Measurement method: BackToBack)

✓ Back to back gauge (AR-Gauge)

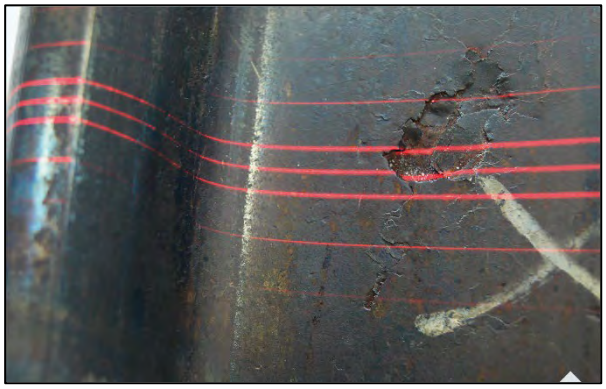
TECHNICAL DATA

Compatibility	CALIPRI C41, CALIPRI C42
Accuracy	Absolute accuracy: < +/- 200 µm Repeatability: < +/- 35 µm
Measurement range	Back to back: 1330-1380 mm (4’4’’ – 4’6’’)
AR-Gauge versions	AR1360EL (with clapping mechanism), AR1360 EL (mono gauge), Customer specific on request
Dimensions (Excerpt)	Back to back, flange width left, flange width right
Standards & certificates	This measuring module has been successfully tested according to JCGM100: 2008, DIN V ENV 13005: 1999-06, DIN EN 13715: 2001-01, DIN EN 15313: 2016-09 and DIN 27201-9: 2017-06.
Product ID	CMM1006

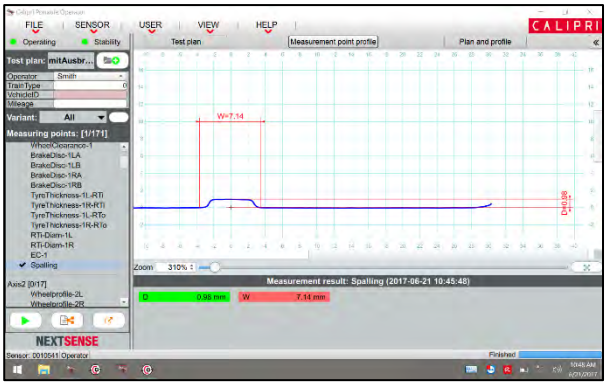
DEFECTS

APPLICATION

- Evaluate wheel flats, cracks and spallings on wheels
- Calculation of defect width and depth



MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Defects“
(Measurement methods: SlidFlat, Spalling)

TECHNICAL DATA

Compatibility	CALIPRI C41, CALIPRI C42
Measurement range (WxD)	Wheel flat: 15 x 0.1 mm to 80 x 2 mm | 0.6 x 0.004 in to 3.1 x 0.08 in Cracks & spalling: 1 x 0.5 to 50 x 5 mm | 0.04 x 0.02 in to 2.0 x 0.2 in
Application	For all common heavy and light rail wheels
Dimensions	Width, depth
Product ID	CMM1007

RADIAL/AXIAL RUN-OUT

APPLICATION

- Measurement of ovality and excentricity of wheels
- Detect lateral runouts
- Analyze captured data for any polygonization of the wheel

MEASUREMENT PROCESS

RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

- ✓ Software license measurement module “Radial/Axial Roun-Out“ (Measurement method: RunOut)
- ✓ Trigger wedge “IK1” (magnetic supporting gauge)
- ✓ Sensor holder (tripod for Calipri sensor)

TECHNICAL DATA

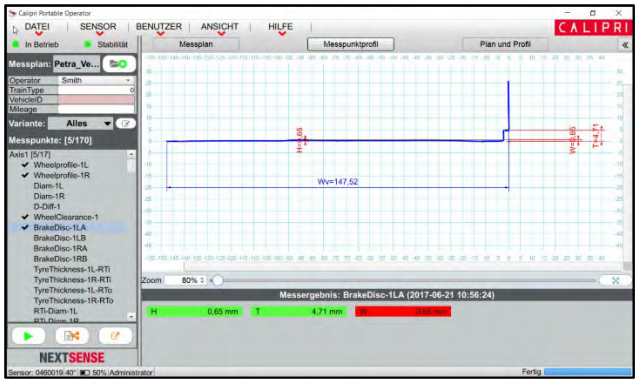
Compatibility	CALIPRI C41, CALIPRI C42
Accuracy	Absolute accuracy: < +/- 30 µm Repeatability: < +/- 20 µm
Requirements	Rigid alignment of sensor relative to axle bearing (a.o. by sensor holder) & uniform rotation of the wheel during the measurement
Dimensions (Excerpt)	Axial runout, radial runout, diameter difference
Product ID	CMM1008

BRAKE DISC

APPLICATION

- Measurement of wheel-mounted and axle-mounted brake discs
- Analyze hollow tread, thickness, wear stock and ripple
- Calculation of total thickness of an axle-mounted brake disc

MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license measurement module “Brake Disc“ (Measurement method: BrakeDisc)

✓ Brake disc gauge “BS1-500” (magnetic supporting gauge for worn or dirty reference edges)

TECHNICAL DATA

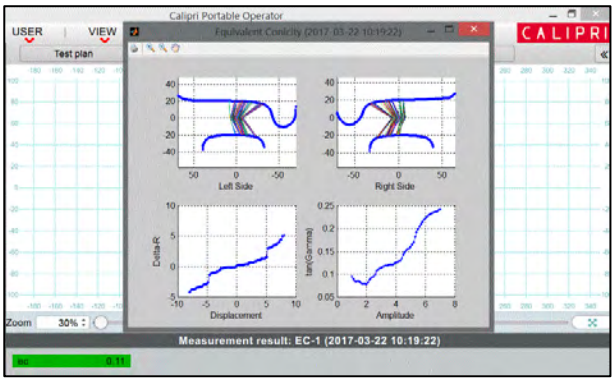
Compatibility	CALIPRI C41, CALIPRI C42
Accuracy	Absolute accuracy: < +/- 80 µm Repeatability: < +/- 35 µm
Application	For all common wheel- and axle-mounted brake discs with reference edge or reference notch
Dimensions (Excerpt)	Hollow tread, brake plate thickness, wear stock
Standards & certificates	This measuring module has been successfully tested according to JCGM100: 2008, DIN V ENV 13005: 1999-06, DIN EN 13715: 2001-01, DIN EN 15313: 2016-09 and DIN 27201-9: 2017-06.
Product ID	CMM1009

EQUIVALENT CONICITY

APPLICATION

- Analysis of wheel-rail-interface
- Basis for determining of possible vibrations and irregulations in vehicle dynamics & critical speed
- Calculation of conicity value (EC) according to UIC 519 and EN 15302
- Input data generated by manual input or Calipri measurement

MEASUREMENT PROCESS



RESULTS IN SOFTWARE

SCOPE OF SUPPLY & SERVICE

✓ Software license module “Equivalent Conicity“
(Measurement method: EquivalentConicity)

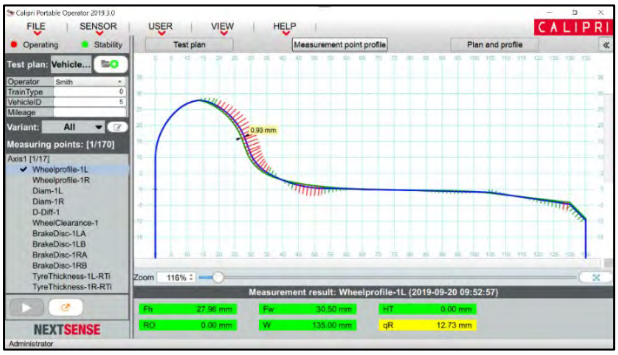
TECHNICAL DATA

Compatibility	CALIPRI C41, CALIPRI C42
Accuracy	Complies with UIC 519 and EN 15302
Field of application	For all common heavy and light rail wheel and rail profiles
Necessary Input Data	Wheel profile (measured or chosen from standard profiles), Wheel diameter and back-to-back distance (measured or manual input), Rail profile (measured or chosen from standard profiles), Track width & rail inclination (manual input)
Dimensions	Equivalent conicity
Product ID	CMM1011

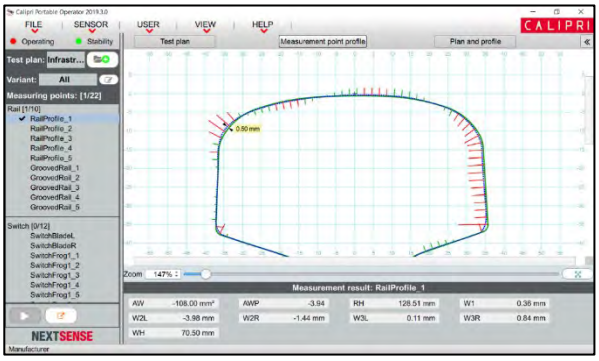
PROFILE COMPARE

APPLICATION

- Analyze wear evolution by comparing with previous measurements
- Wear analysis of worn wheels/rails against standard models (csv/dxf)
- Compare wear of e.g. left and right wheel
- Check correct grinding/reprofiling of wheels/rails against standard model
- Profile comparison with mouseover and elevated pins



WHEEL PROFILE COMPARISON



RAIL PROFILE COMPARISON

SCOPE OF SUPPLY & SERVICE

✓ Software license “ProfileCompare“

TECHNICAL DATA

Compatibility	CALIPRI C41, CALIPRI C42
System requirement	Calipri software version 2019.3 or higher
Reference profiles	CSV or DXF files Profile of other measurement point Stored template profile in measurement plan
Product ID	CMF9120/RAW