RIFTEK
Sensors & Instruments

# COMPANY GROUP

## Laser Systems for
## Inner Diameter Control

# RIFTEK Group of Companies.

RIFTEK LLC was founded in 1993. The enterprise specializes in development and fabrication of optoelectronic instruments for measuring of geometrical quantities.
The group also includes:
RIFTEK TECHNO – metalworking enterprise;
RIFTEK-SMT – automated assembling of printed circuit boards (PCB).
The basic product line includes:
laser triangulation position sensors; 2D and 3D laser scanners; optical micrometers; absolute linear encoders; hardware and software systems for welding robots; specialized systems for measurement dimensions displacements and distance, thickness, diameter, ID and etc.; measurement instruments for railway transport; machine vision systems.
RIFTEK products are delivered in more than 70 countries. Company has representatives in more than 47 countries.
RIFTEK company is certified according to ISO 9001:2015 in the field of management of quality of design and manufacture of optoelectronic measuring instruments.
We offer integrated solution to control and automation tasks – from measurement sensors to multifunctional measuring and control systems.

# Automated systems for Inner Diameter Control.

## PURPOSE OF SYSTEMS

The systems are designed for contactless measuring of inner diameter and profiles of cylindrical and taper pipes, gun barrels, extruders, progressive cavity stators, turbodrills and so on.

## MEASURED PARAMETERS

- ID, Ovality, Roundness, Cylindricity, Conicity, Concentricity

We offer systems based on

## TWO WORKING PRINCIPLES

- Multi-sensor measurement by stationary laser sensors
- Inner surface laser scanning with rotating sensors

## SYSTEMS PARAMETERS

- Measured ID – from 9 mm
- Up to ± 2 um accuracy
- Up to 32000 measured points on the surface in 3 seconds
- Calculation of ovality, roundness, conicity, cylindricity, wear
- Surface defects detection and measurement
- Construction of a 3D model of the inner surface and its comparison with the ideal one

# The basic elements of ID measurement systems.

THE SYSTEMS USUALLY CONTAIN:

- Laser measurement head with
  - stationary sensors
    or
  - rotating sensors (point or 2D)
- Translation module, intended for transportation of measurement head inside the pipe:
  - self propelled or
  - any kind of pulling machine or rod
- Software for PC
- Calibration master-rings

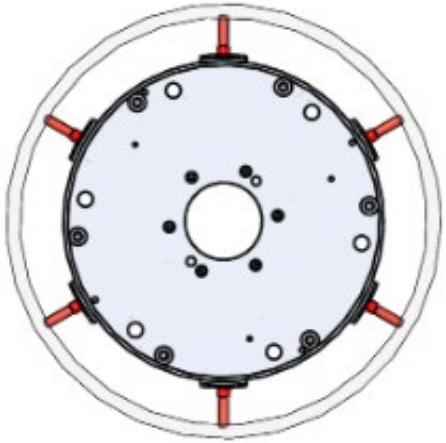
THE SYSTEMS CAN CONTAIN:

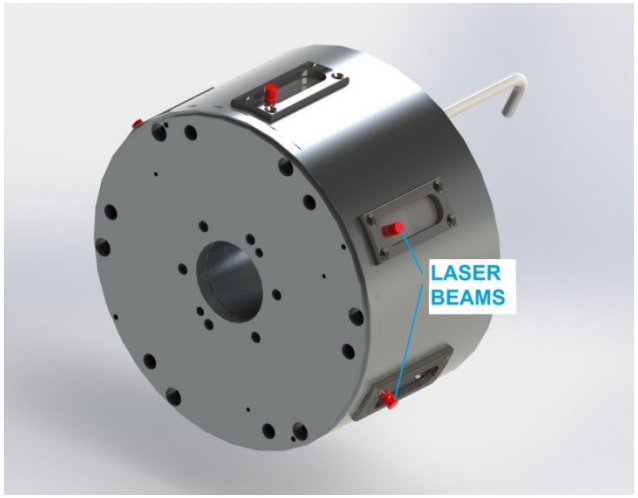
- Centering frame to hold measurement head near pipe axis

OPTIONS:

- Pipe straightness measurement module
- Video inspection module
- Wireless connection (Wi-Fi) module

# Multi-sensor measurement heads, RF040 Series. Structure and operational principle.






## THE MEASUREMENT head CONTAINS:

usually 6 laser triangulation sensors, located circumferentially in one housing at known fixed angles.

## THE SYSTEM OPERATES AS FOLLOWS

The measurement head is inserted into the pipe and moved by translation module to the definite position.

Calibrated laser sensors measure distances to the inner surface

Software calculates inner diameter of the pipe



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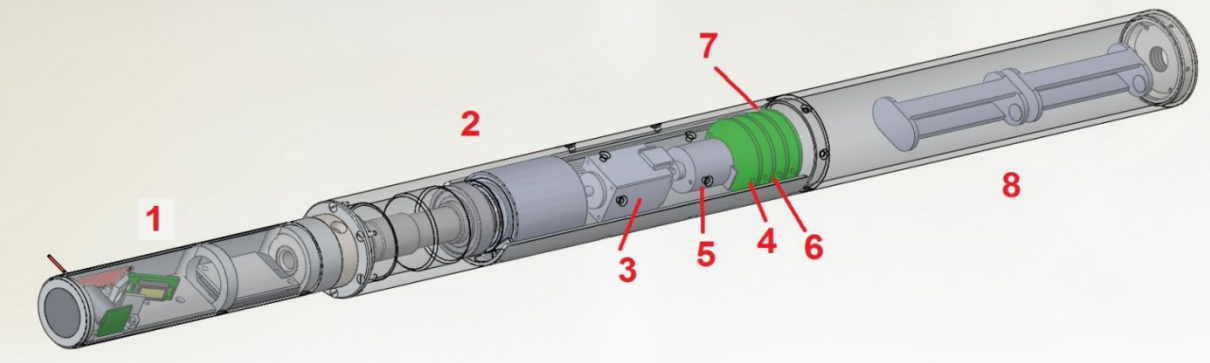
# Rotating laser measurement head. Structure.




THE MEASUREMENT HEAD USUALLY CONTAINS:
laser triangulation sensor 1 (one or several pieces with different measurement range and stand-off distance), mounted on rotating platform 2, with motor 3, electronic driver 4 and rotary encoder 5, coupled to the motor 3. The system can also includes a tilt sensor 6, intended for control of inclination of rotating platform during measurement.
Options: in-built Wi-Fi module 7 is used for communication between the system and PC; the system can be powered from internal batteries 8.
2D laser scanner can be installed instead of points sensor



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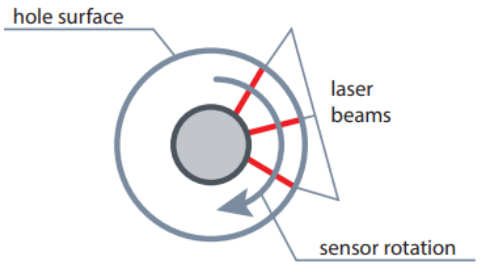
# Rotating sensors measurement heads RF096 Series. Operational principle.

THE SYSTEM OPERATES AS FOLLOWS:

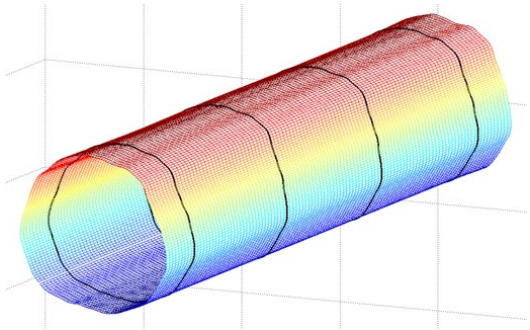
The measurement head is inserted into the pipe and moved to the definite position.

Rotating laser sensor scans inner surface of the pipe and the head transmits polar coordinates of the surface (distance from rotation axis, measured by triangulation sensor and a corresponding angle, measured by encoder).




**Software uses the set of transmitted coordinates to calculate**:

- ID of measured pipe
- ovality and roundness
  to find
- surface defects
  to design
- full profile in definite section.
- 3D model of the pipe inner surface.





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# ID measurement by Multi-sensors systems APPLICATIONS.

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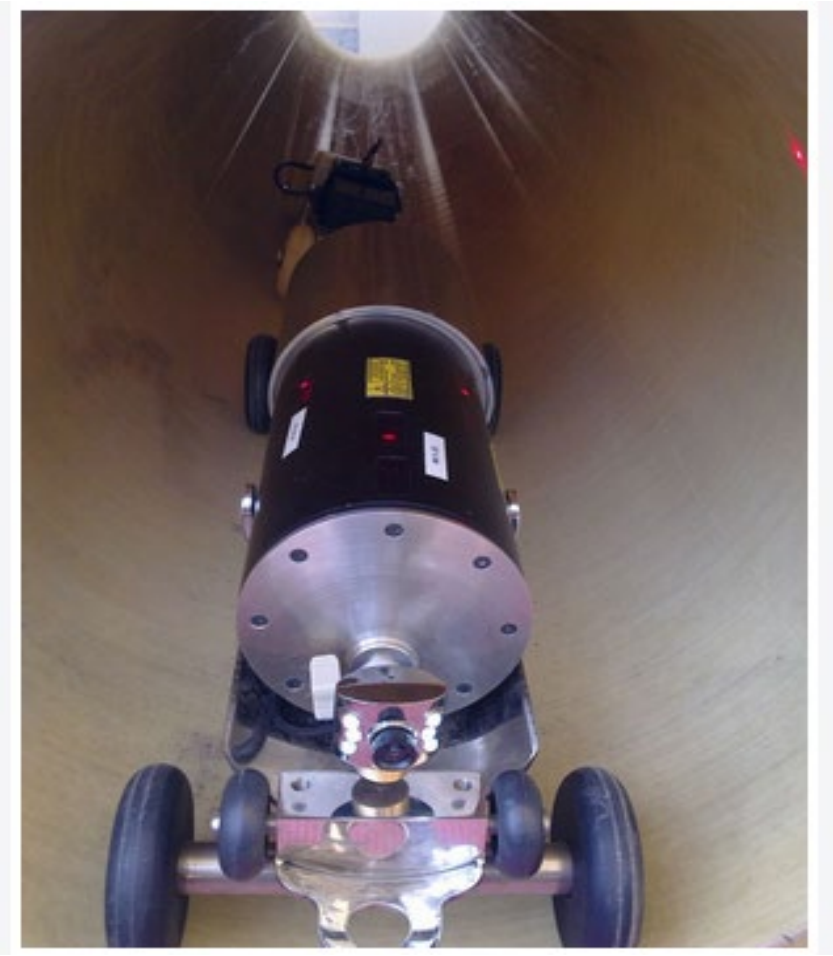
# Multi-sensor laser system for fiberglass pipes deformation measurement.



- Six triangulation sensors inside
- Diameter range – 500…1250 mm
- Accuracy - +\-2 mm



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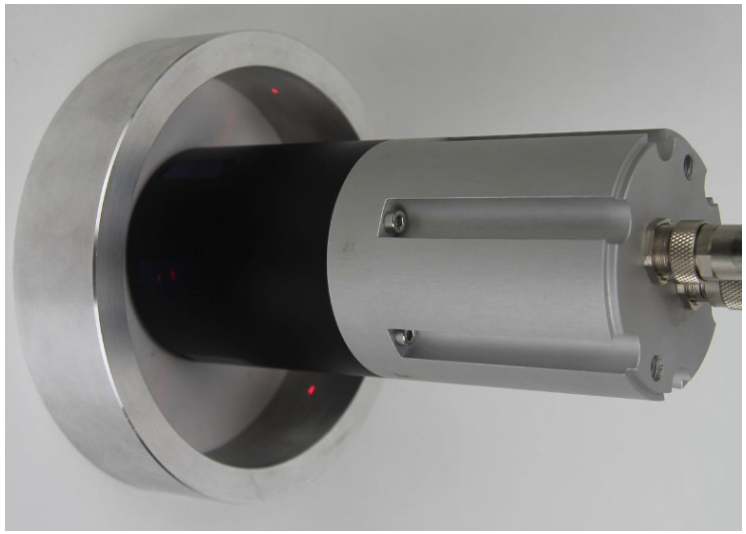
# Multi-sensors systems.

**Designed for ID measurement of nuclear Power station pipes**

- Four laser sensors inside
- Diameter of the module: 70 mm
- Measured diameters: 95…195 mm (main range), 160…300 mm (extended range)
- Accuracy: 0,05 mm (main range) and 0,2 mm (extended range)



**Designed for robotic measurement of engine cylinders ID**

- Six laser sensors inside
- Diameter of the module: 60 mm
- Measured diameters: 70…80 mm
- Accuracy: 0,005 mm

# Multi-sensors systems.

**Designed for ID measurement of pipes**

- Six laser sensors inside
- Diameter of the module:  60 mm
- Measured diameters:  65…115 mm,
- Accuracy: ±25 um

**Designed for honing machines**

- Six laser sensors inside
- In-built battery, Wi-Fi data transfer
- Measured diameters:  100…150 mm,
- Accuracy: ±25 um

# ID measurement by Laser Scanning. Sensors and Systems.

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# Triangulation laser sensors for ID measurement, RF609 Series.

- Smallest triangulation sensor on the market,

sensor body diameter = 8.5mm,
measured ID – from 9 mm

- Sensors with in-built slip-ring
- Sensors with battery supply and Wi-Fi data transfer



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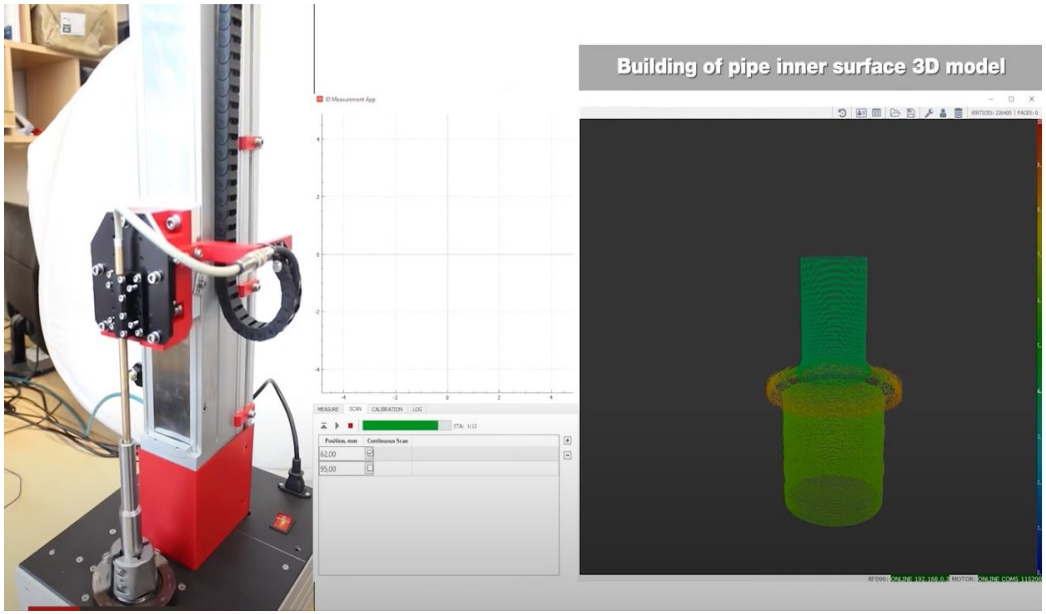
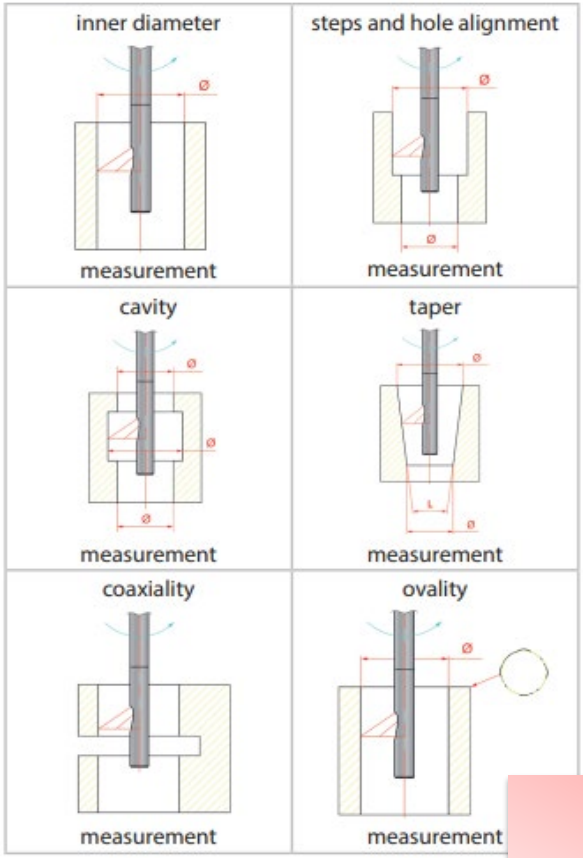
# Triangulation laser sensors for ID measurement, RF609 Series.

Measuring ID from 9 mm with ± 2 um accuracy




https://youtu.be/r8Z2b5nYNSc

https://cloud.riftek.com/s/2jMA6qrBX5nEHzr



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# Triangulation laser sensor RF609-Wi-Fi. ID measurement for CNC machines.


- ID range 9…19 mm or customized
- Accuracy ±2 um

**Sensor parameters can be changed on request**

https://youtu.be/17l7PqTGUpU

https://cloud.riftek.com/s/wEinDrs6byotLaS



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# Measurement kit for Heat Exchanger Tube Sheet control on the base of RF609-Wi-Fi sensors.

- ID range 9…19 mm and 16…46 mm
- Accuracy ±5 um and ±12 um
- Measurement cycle 5 s

**Sensor parameters can be changed on request**



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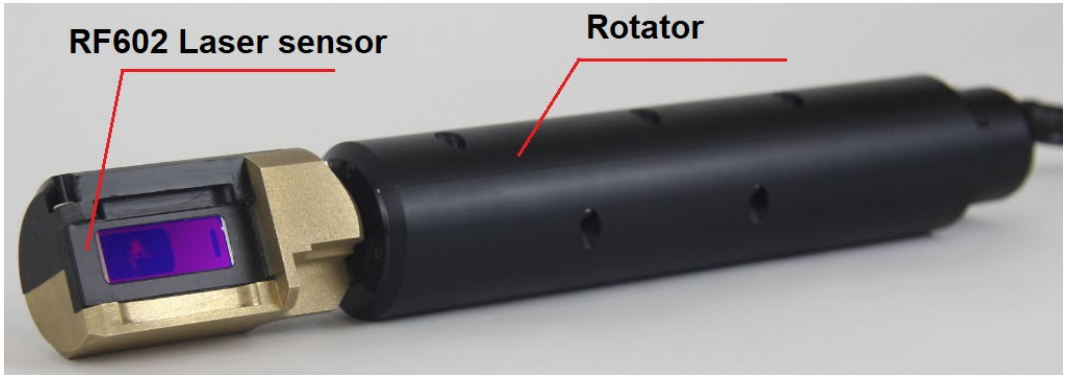
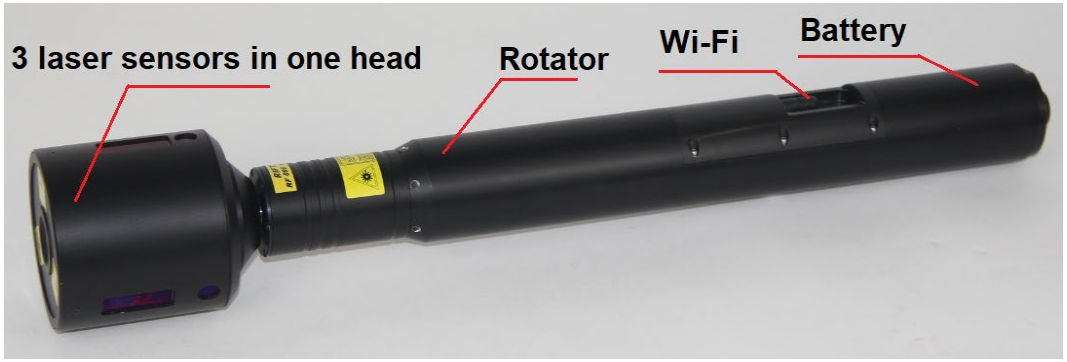
# RF096 systems for ID measurement. Customized versions for stationary or robotic solutions.




- ID range 70…160 mm
- Accuracy ±0.05 mm
- Resolution 2048 points for cross-section
- Measurement speed 4 cross-sections/s

https://youtu.be/UbF1E1Hjz5E

https://cloud.riftek.com/s/Kei5yrBLiHefLp8




- ID range 120…380 mm
- Accuracy ±0.05 mm
- Resolution 2048 points for cross-section
- Measurement speed 4 cross-sections/s

**Systems parameters can be changed on request**



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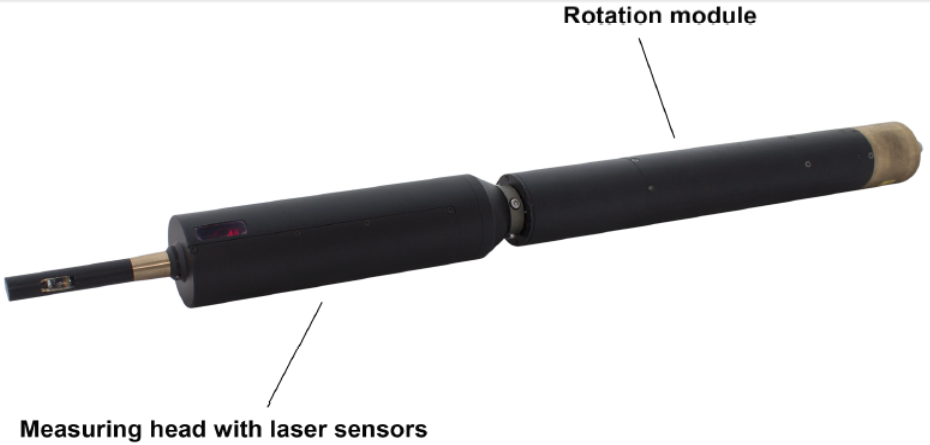
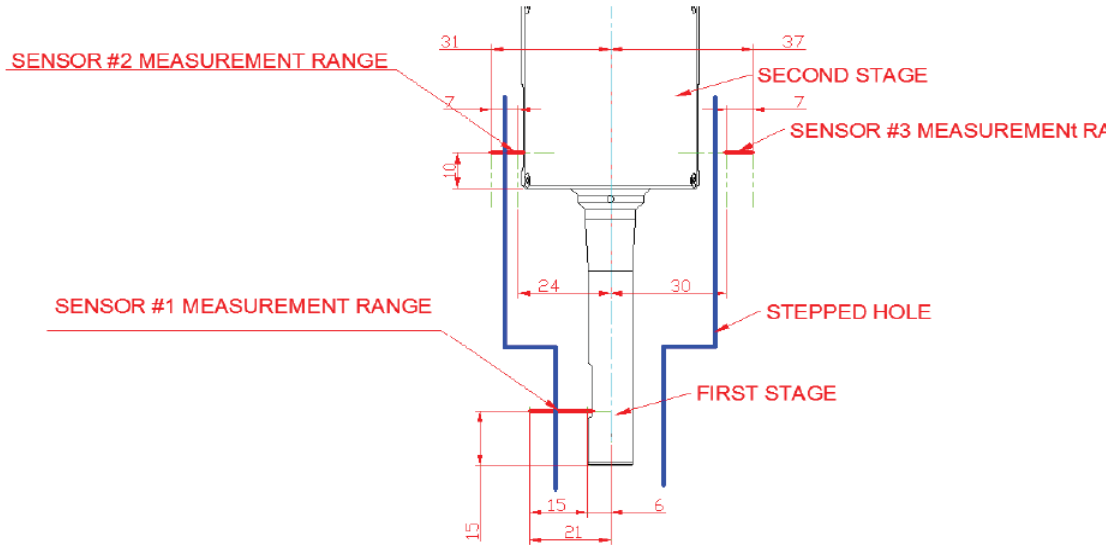
# Robotic measurement of Stepped holes RF096-15/40-50/70 system.




- two stages measuring head with three laser sensors inside
- Range 14…40 mm
- Accuracy ±20 um
- Range 50…70 mm
- Accuracy ±5 um



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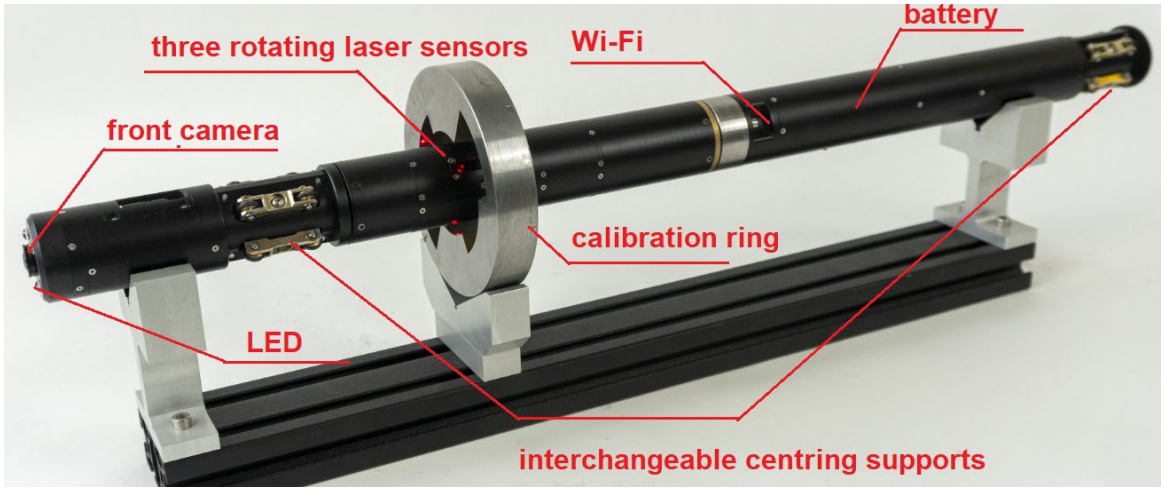
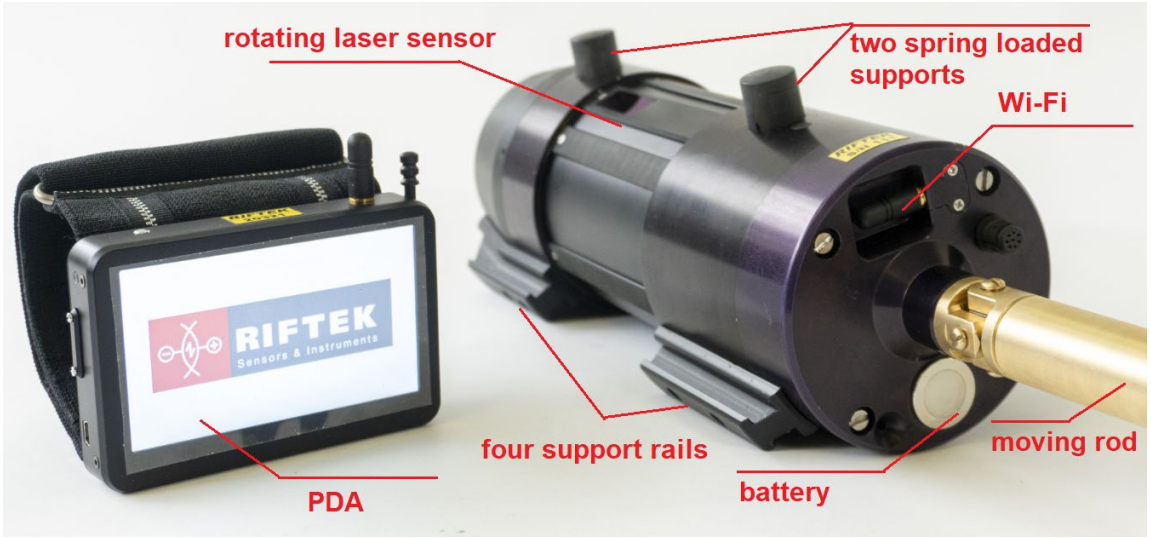
# RF096 systems for ID measurement. Customized versions with centering frames.




## Designed for extruder barrels inspection

- ID range 40…95 mm
- Accuracy ±0.005 mm
- Control of wearing status, roundness, ID

https://youtu.be/7dg-XJbSXJE

https://cloud.riftek.com/s/dmR5k4MJmytsCn2

## Designed for tubes inspection

- ID range 105…130 mm
- Accuracy ±0.01 mm
- Resolution (cross-section) 2048 points
- Speed 4 rps

https://youtu.be/FoGlh14Qpbg

https://cloud.riftek.com/s/wk69j9KJHcrcRQw



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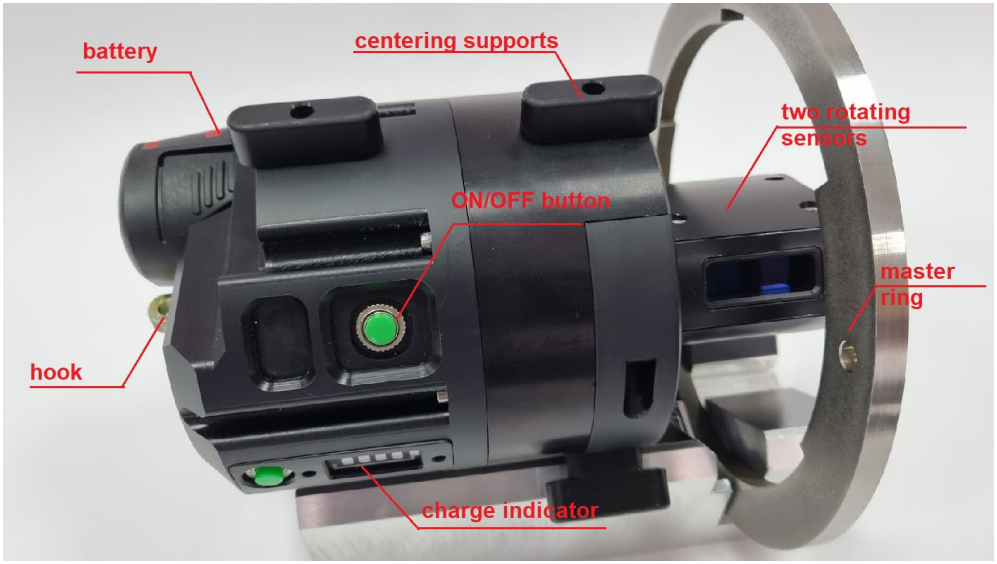
# RF096 systems for ID measurement. Customized versions with centering frames.

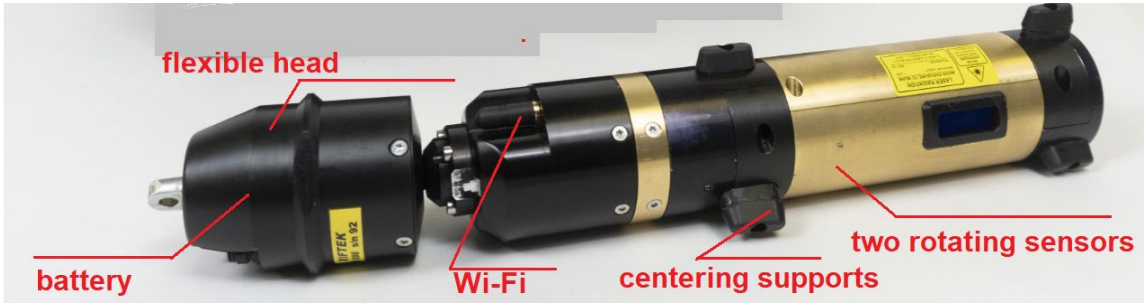



**Designed for curved pipes inspection**

- ID range 145…160 mm
- Accuracy ±0.005 mm
- Compact design

https://youtu.be/lwZNBtkAiOk

https://cloud.riftek.com/s/qp5fRDqGwBBrAQD




**Designed for curved pipes inspection**

- ID range 65…90 mm
- Accuracy ±0.005 mm
- Design with flexible head



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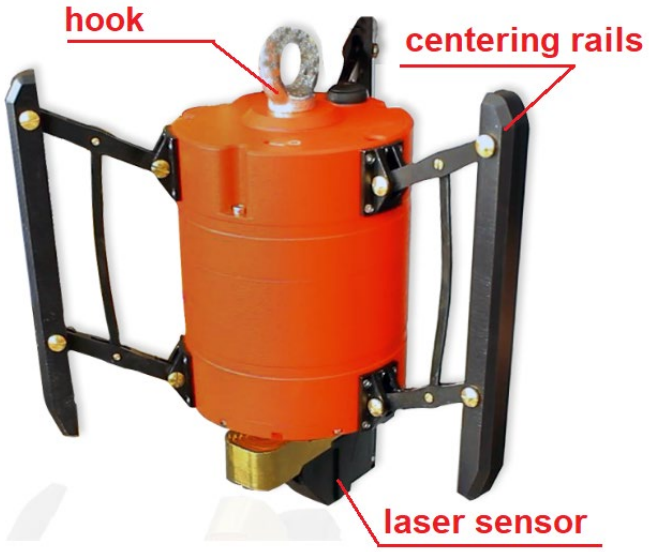
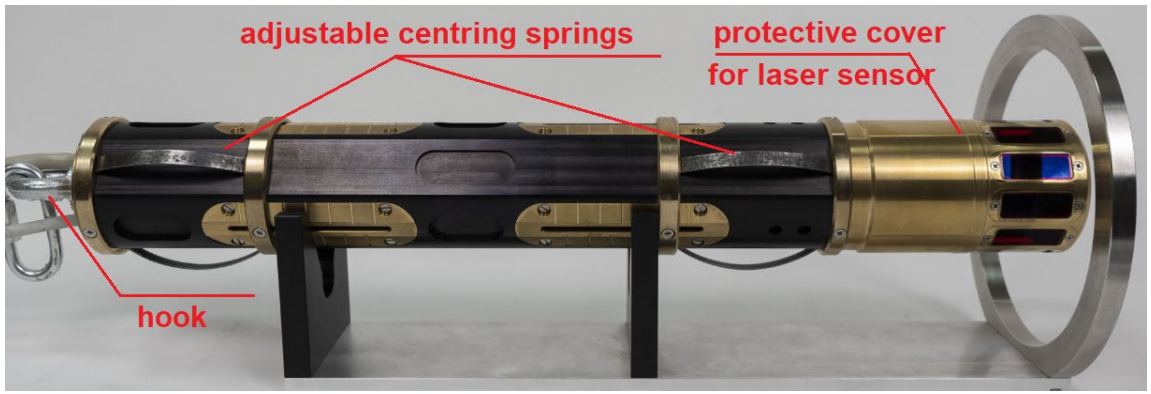
# RF096 systems for ID measurement. Customized versions with centering frames.




**Designed for pipes inspection**

- ID range 40…95 mm
- Accuracy ±0.005 mm




**Designed for boreholes inspection**

- ID range 105…130 mm
- Accuracy ±0.01 mm
- Speed 4 rps
- IP67 rate



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# Pipe ID Hand-held Measuring Gauges RF096-...-HH Series.

**Quick and precision measurement of Inner Diameters, Ovality, Roundness**

## RF096-100/250-87-HH

- ID range 100…250 mm
- Accuracy ±0.05 mm
- Space resolution 700 points/turnover
- Measurement depth 87 mm

https://youtu.be/vGm17wVlTqU

https://cloud.riftek.com/s/aC6PBa4rzPpeqtz

## RF096-100/250-56/106-HH

- Variable Measurement depth 56…106 mm

## RF096-18/30-155/307-HH

- ID range 18…30 mm
- Accuracy ±0.05 mm
- Measurement depth 155/307 mm

https://riftek.com/products/handheld_inner_diameter_measuring_gauge/



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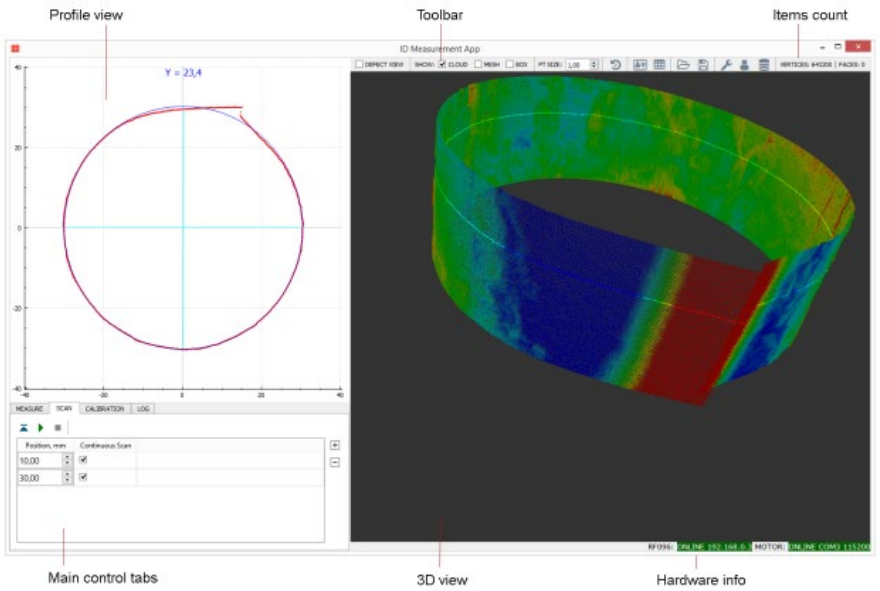
# LEAF SPRINGS HOLES ID MEASUREMENT MACHINE.




## Specification

- ID range 30…75 mm
- Accuracy ±0.02 mm
- Depth range 120 mm

**Machine parameters can be customised**

https://youtu.be/FqOlNs6VMTY

https://cloud.riftek.com/s/LwkqzX5gGkAtRZc



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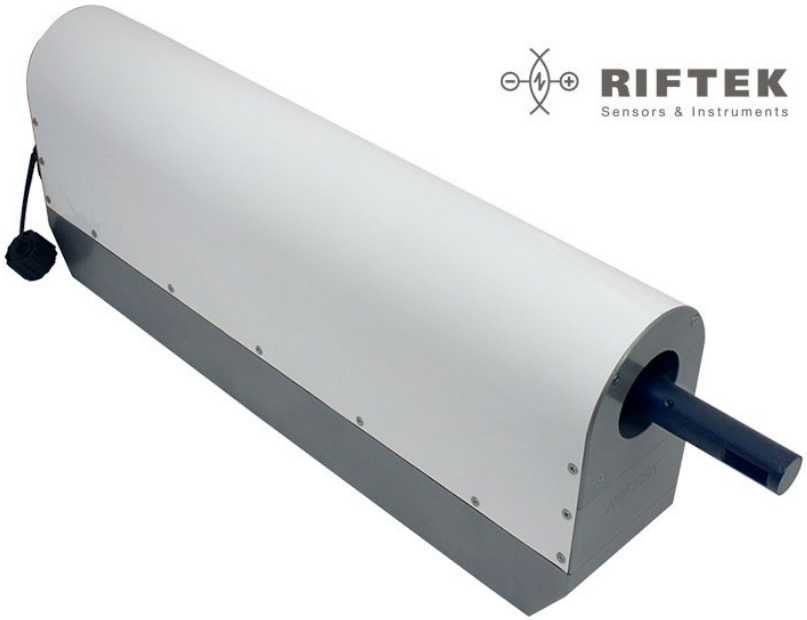
# PIPES ID MEASUREMENT MACHINE.




**Specification**

- ID range 30…75 mm
- Accuracy ±0.02 mm
- Depth range 120 mm

**Machine parameters can be customised**

https://youtu.be/wWDE2eXmnZ0

https://cloud.riftek.com/s/ADGmDWjo7ZBffZg



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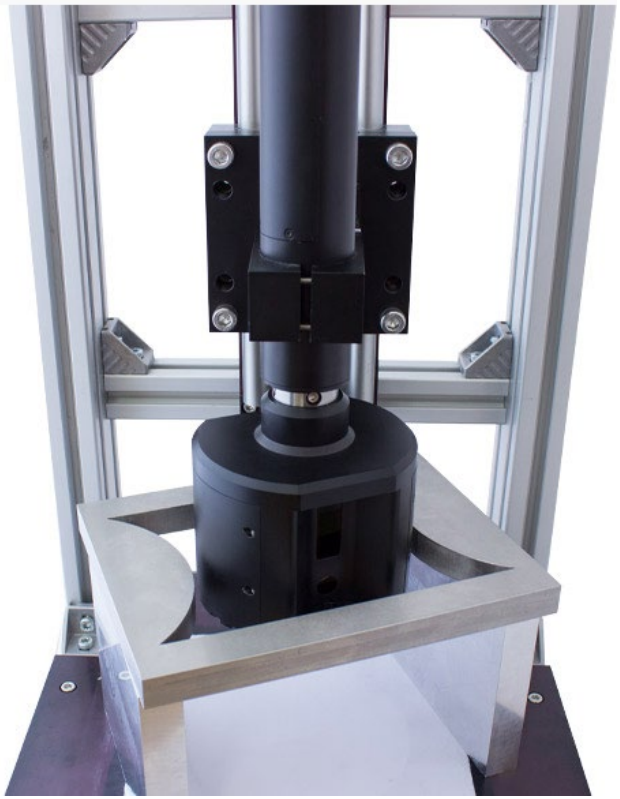
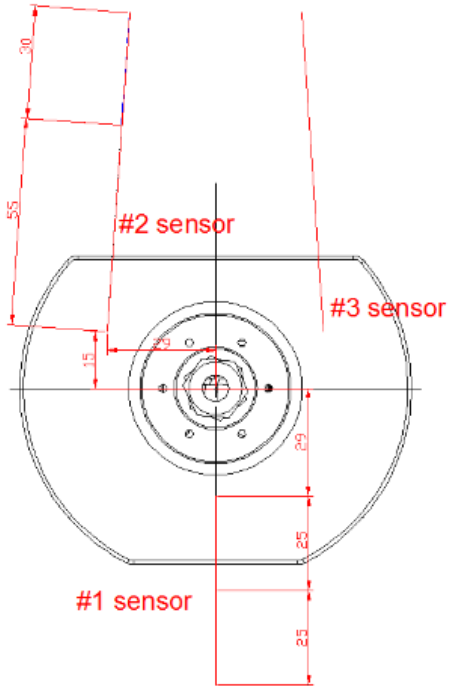
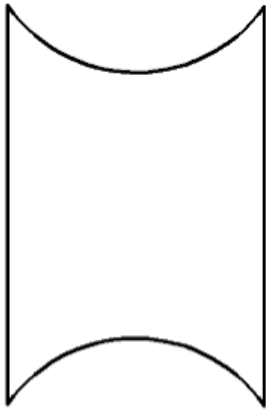
# Rectangular inner profile measurement machine.






Measurement head

- three laser sensors inside
- Accuracy ±20 um



Measured profile



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# Laser Debris Inspection System. RF096-Insp.

**Specification**

- Grooves ID range 35…53 mm
- Minimal size of detected debris 0.03x0.1x0.1 mm

https://youtu.be/ooVtGOnnQ5o

https://cloud.riftek.com/s/cK5gmnmPoGteRtR

# Sleeves ID Measurement Machine.

**Specification**

- ID range 32…2 mm
- Accuracy ±0.005 mm
- Depth range 80 mm

**Machine parameters can be customised**

https://youtu.be/QGFFOYDGWHI

https://cloud.riftek.com/s/5GRaD7iFmQBBdtN

# AUTOMATED SYSTEM FOR LAMINATED TUBES GEOMETRY MEASUREMENT.

**The system measures the following parameters:**

- tube length;
- outer diameter;
- inner diameter;
- foil thickness;
- foil thickness at tube seam;
- seam width.

**Specification**

| | |
|---|---|
| Tube length | 200 mm |
| ID/OD range | 13…50 mm |
| Accuracy | ±0.01 mm |

**Machine parameters can be customised**

https://youtu.be/Mw_-T0BwwoE

https://cloud.riftek.com/s/dL5HtfF6CcYW6XP



28

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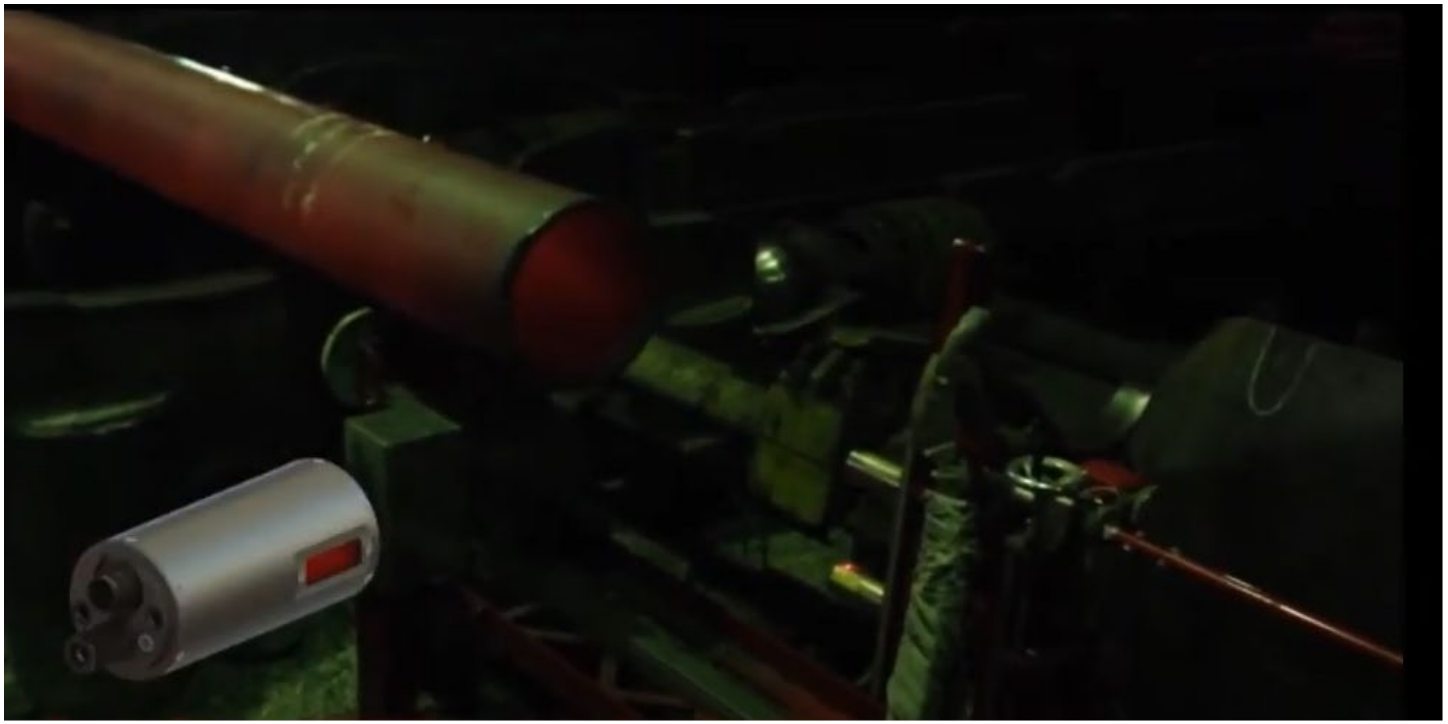
# The system for measurement of ID and OD high temperature pipes.



The system includes two triangulation laser sensors, placed inside air cooling housing.

**Measured parameters - on request**

http://youtu.be/tkf9jYPbr5M

https://cloud.riftek.com/s/XWPdPLDojjt455b



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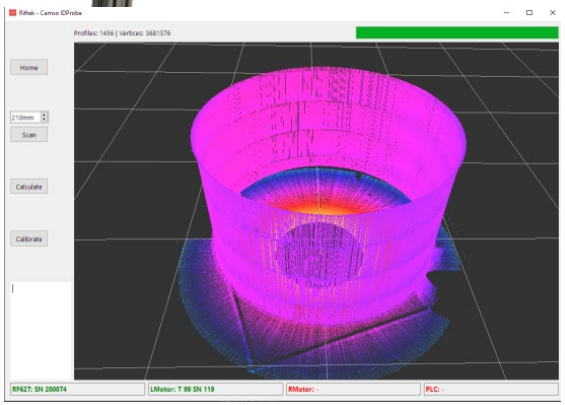
# 3D inspection machine for steel band rims.




**The system with rotating 2D profiler measures the following parameters:**

- average, maximum and minimum diameter;
- roundness;
- cylindricity;
- height, width and angle of chamfers
- outer diameter

## Specification

| | |
|---|---|
| ID range | 100…410 mm |
| Rim height | 70…305 mm |
| Accuracy | ±0.05 mm |

https://youtu.be/gfMf7hBrpqU

https://cloud.riftek.com/s/HNKceEn9yxd5DJY



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# Laser measurement (by rotating 2D profilers) of ID and OD of large diameter pipes.


https://youtu.be/I8P_C24kTY0

https://cloud.riftek.com/s/oaf9Hyt7dgK2XH6



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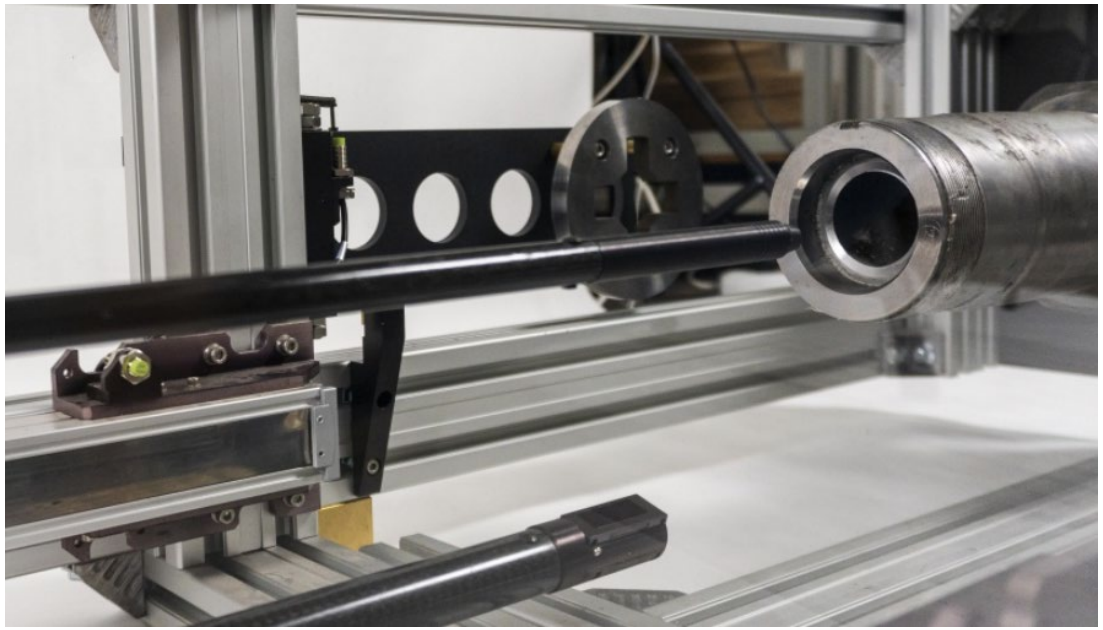
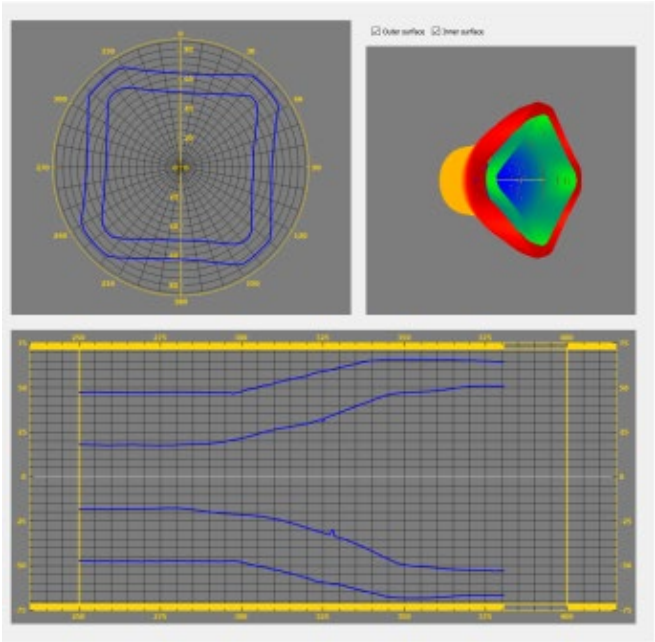
# 3D Laser machine for Hammered Axles shape control.





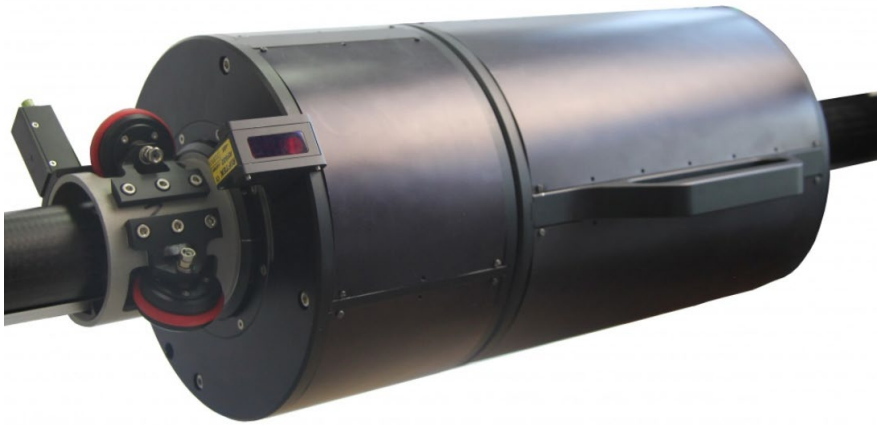
## Specification

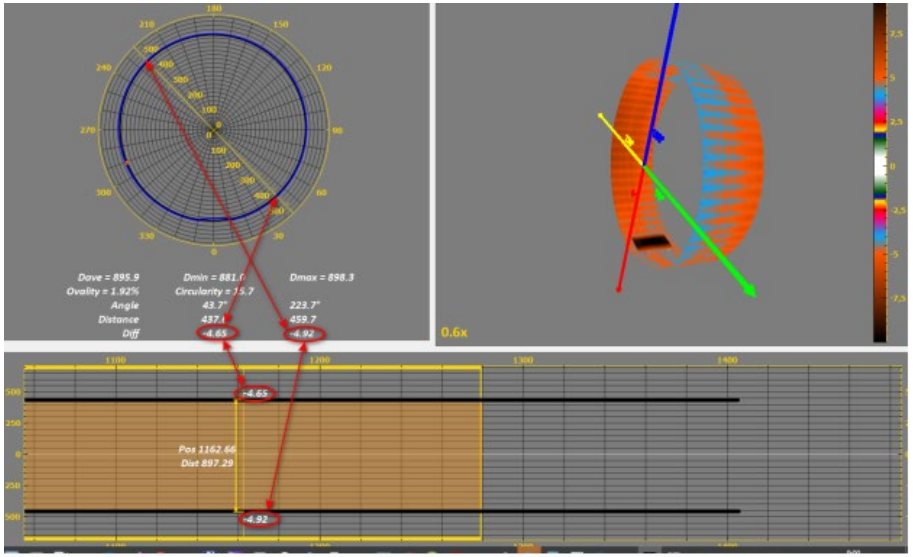
- ID range 30…143 mm
- ID accuracy ±0.05 mm
- OD range 62…180 mm
- OD accuracy ±0.1 mm
- Depth 500 mm

https://youtu.be/gSIw6KE20U0

https://cloud.riftek.com/s/jcEazDTDgfDp66i

# 3D inspection machine for large objects.






## Specification

- ID range 440…1440 mm
- ID accuracy ±0.5 mm
- Scanning depth 2000 mm

https://youtu.be/V7nUtKGkDfA

https://cloud.riftek.com/s/W5f3drsbRGWCqTR



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# THANK YOU
# FOR YOUR ATTENTION!

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