



Caliper - Tool Inspection



Pipeline Inspection



Sede Legale:

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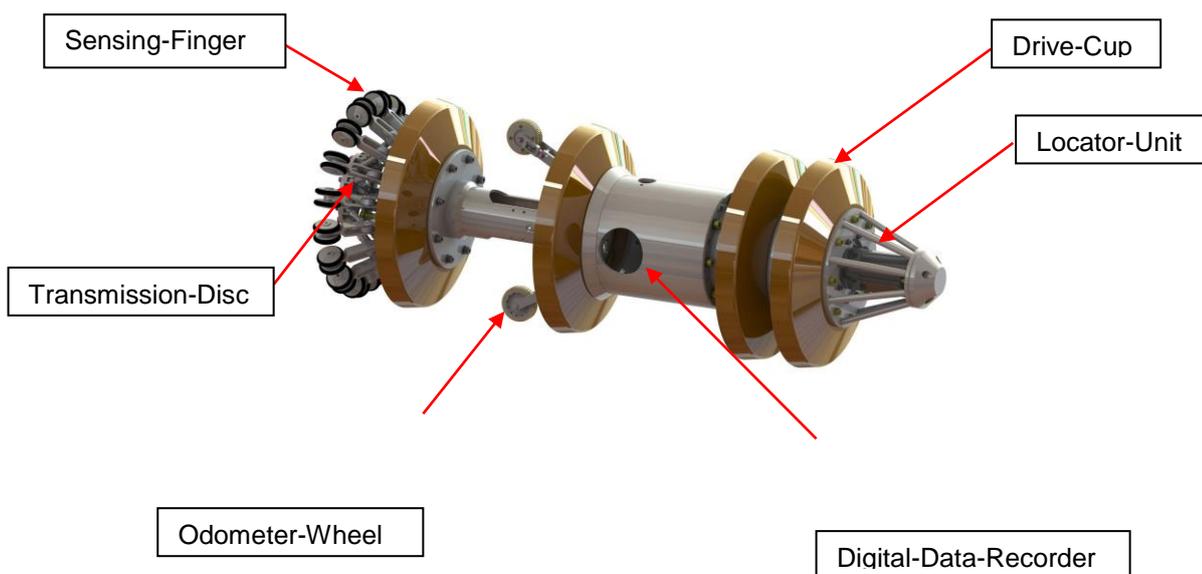
Caliper-Tool

To know details about the internal geometry of your pipeline, utilize our intelligent device to give you answers.

With the Caliper-Inspection-Device we offer you the complete job of caliper survey to get a clear picture of the inside diameter of your pipeline system.

Our team is a group of experienced and well trained professionals who know how to get things working. Although we are a young company, most of us have long time experience in working with intelligent pipeline tools.

a - Principle of Operation:



The Caliper-Tool measures diameter reductions in pipelines such as dents and ovalities. Even diameter variations like girth-welds, wall thickness changings, T-pieces, valves and other installations are detected.

b - Function:

The Caliper-Tool continuously measures the inside diameter of the pipeline through an array of sensing fingers –“spider“- that are spring loaded to hold them in contact with the pipe wall. A large number of sensing fingers provide optimum coverage of the inside circumference. Wheels at the end of each sensing-finger are in direct contact with the pipe wall. The extremely flexible polyurethane cups enable the Caliper-tool to be transported through the pipeline by the medium. The Caliper-Tool is able to pass reductions of at least 25%.



The spider is separate from the cup to eliminate effects from cup wear. As the Caliper-Tool moves through the pipeline, all radial sensor movements are detected and recorded. ID-reductions of 0.4% will be detected.

Odometer wheels generate the distance data which in addition to the measuring data from the spider is continuously collected and stored together with the correlative diameter values.

To locate the Caliper-tool in the launcher, receiver or during survey, a locator unit is used.

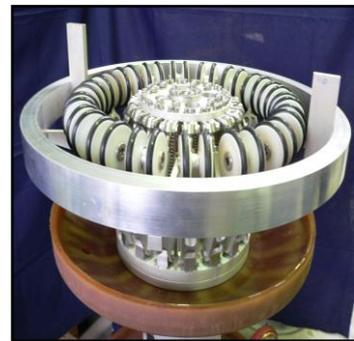
The locator unit transmits electromagnetic signals which will be detected by an external inspection tool locator. A pushing flange is used to push the Caliper-Tool into the launcher and to protect the spider against mechanical damage.



The data-recorder contains all power, processing and recording circuits in a sealed module within the central body of the Caliper-Tool.

c - Calibration:

Prior to the survey the Caliper-tool is calibrated by using a calibration ring and simulating dents and ovalities with small blocks of specified thickness. These calibration results are used to draw the calibration curve which forms the basis to determine the diameter reduction which corresponds to the deflection on the chart. The calibration will be done in 2,5 or 5 mm steps. Each survey chart shows a dent-calibration and a ovality-calibration at its beginning.



d - Data Analysis and Interpretation:

During the survey the Caliper-Tool data are gathered in the solid state memory inside the recorder.

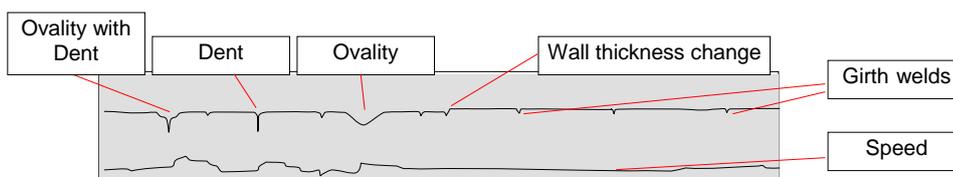


Feature Identification After the run a laptop computer is connected to the Caliper-tool for downloading the data. The visualization of the survey chart is done with the laptop too. The interpretation of the complete survey data will be done directly on screen. All interesting details are marked in the chart and a printout is added to the report.

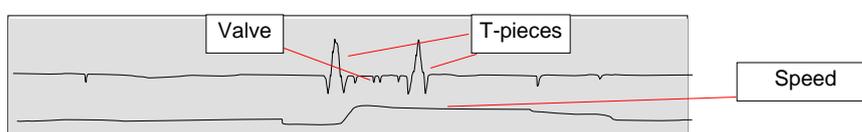
Before interpretation begins a minimum acceptable diameter reduction is agreed with the customer.

The interpreter scans the chart for deflections which exceed the agreed value and compiles a features list. All indications exceeding the agreed value and also pipeline features like valves, T-pieces, wall thickness-changes, girthwelds, bends and other installations are listed

The following examples show typical pipeline features.



Valve Station:

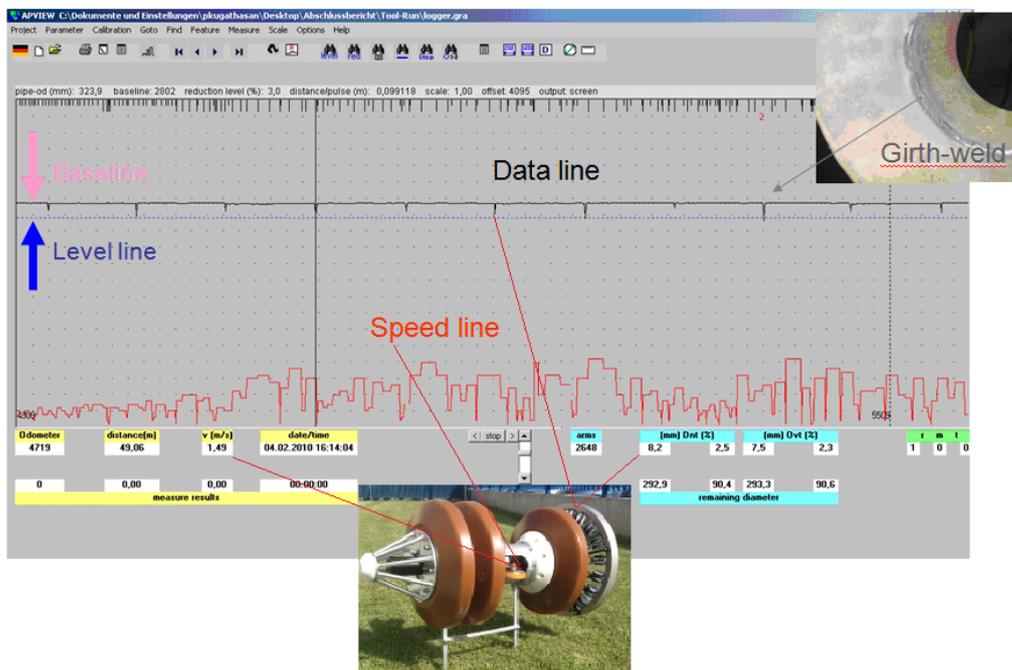


e - Final report

The Data Analysis Department consists of experienced people who work close together with the customer and service technicians.

The Final Report generally contains the following:

- General Information
- Technical Data
- Survey Procedures
- Results
- Features List
- Calibration Curves
- Printout of Chart



The General Information provides details like names of the pipeline owner, the surveyed pipeline and the names of representatives and technicians.

Technical Data shows all important data concerning the pipeline the Caliper-Tool and the survey run.

Details of how the job was carried out, principles of dates of the survey and progress of the job are given under Survey Procedures.

The Results are summarized in the features list. It contains several columns with all the important notes of the run.

Supplementary to the features list the calibration curves and the entire print out of the chart is provided.

General Technical Information

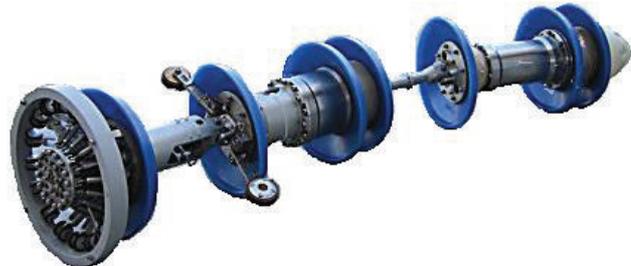
Sizes: 6" to 60"
Minimum ID For Passage: 75% of nominal diameter
Maximum Inspection Distance: 800 km
Battery Life: 400 h (more if required)
Minimum Bend Radius: 1.5xD, 90° bends
Maximum Operating Pressure: 120 bar (1700psi)
Temperature Range: -20°C to 80°C (-4°F to 148°F)
Velocity: 0.1m/s – 3m/s
Accuracy Of Odometer: ± 0.5 m from reference girth weld
Sensitivity Of Gauging System: Dent 0.2%
Ovality 0.2%
Resolution 0.5mm

10" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1500 mm
Weight:	approx. 30 kg
No. of Modules:	3
No. of Sensing Fingers with Double Wheels:	16
Active Range:	approx. 150 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to + 80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	205 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 0.5 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 0.5 mm
Ovality: ± 0.2 % / 0.5 mm
Girth welds: ± 0.2 % / 0.5 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s. We reserve the right to introduce technical changes and modifications without prior notice.

12" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1600 mm
Weight:	approx. 35 kg
No. of Modules:	3
No. of Sensing Fingers with Double Wheels:	16
Active Range:	approx. 150 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	243 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 0.6 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 0.6 mm
Ovality: ± 0.2 % / 0.6 mm
Girth welds: ± 0.2 % / 0.6 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

We reserve the right to introduce technical changes and modifications without prior notice.

14" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1250 mm
Weight:	approx. 35 kg
No. of Modules:	2
No. of Sensing Fingers with Double Wheels:	16
Active Range:	approx. 200 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	305 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 0.8 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 0.8 mm
Ovality: ± 0.2 % / 0.8 mm
Girth welds: ± 0.2 % / 0.8 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

We reserve the right to introduce technical changes and modifications without prior notice.

16" Caliper-Tool specifications:



General Information:

Total Length*:	approx. 1250 mm
Weight:	approx. 35 kg
No. of Modules:	2
No. of Sensing Fingers with Double Wheels:	16
Active Range:	approx. 200 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to + 80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	305 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.1 % from
± 0.1 % / 0.8 mm

Accuracy of defect Measurement:

Dent: ± 0.1 % / 0.8 mm
Ovality: ± 0.1 % / 0.8 mm
Girth welds: ± 0.1 % / 0.8 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

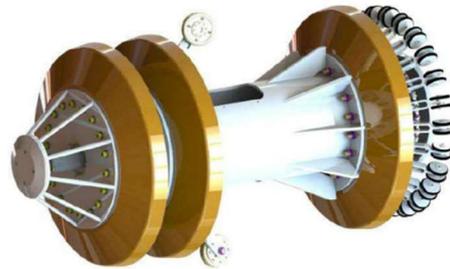
** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s. We reserve the right to introduce technical changes and modifications without prior notice.

20" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1020 mm
Weight:	approx. 60 kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	18
Active Range:	approx. 800 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	381 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 1.0 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 1.0 mm
Ovality: ± 0.2 % / 1.0 mm
Girth welds: ± 0.2 % / 1.0 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

We reserve the right to introduce technical changes and modifications without prior notice.

22" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1020 mm
Weight:	approx. 64 kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	18
Active Range:	approx. 800 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	381 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 1.0 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 1.0 mm
Ovality: ± 0.2 % / 1.0 mm
Girth welds: ± 0.2 % / 1.0 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

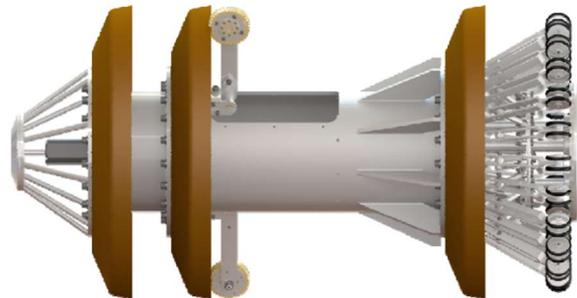
We reserve the right to introduce technical changes and modifications without prior notice.

24" Single-Channel Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1020 mm
Weight:	approx. 64 kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	18
Active Range:	approx. 800 mm
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5 D for 90° Bends
Minimum ID in Straight Pipe:	381 mm

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

± 0.2 % = 0.5 m
± 0.2 % / 1.0 mm

Accuracy of defect Measurement:

Dent: ± 0.2 % / 1.0 mm
Ovality: ± 0.2 % / 1.0 mm
Girth welds: ± 0.2 % / 1.0 mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

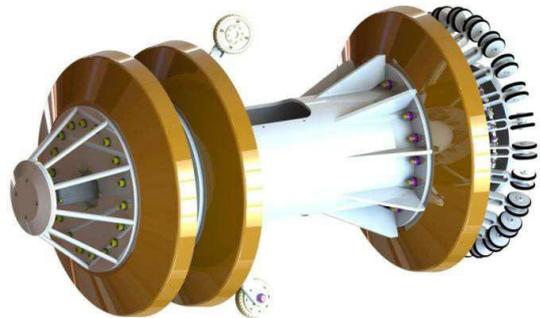
We reserve the right to introduce technical changes and modifications without prior notice.

36" HR Caliper-Tool specification:

Features / Installations that will be detected

The below mentioned will be detected, located (longitudinally) and identified by the Caliper-Tool.

- T-pieces
- Valves
- Bends
- Girth welds
- Dents
- Ovalities
- Internal Diameter changes



General Information:

Total Length*:	approx. 1800 mm
Weight:	approx. 230 kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	24
Active Range:	up to 800 km
Battery Capacity:	400 hrs
Recommended Tool Speed**:	0.1 – 3 m/s
Maximum Pressure:	120 bar
Temperature Range:	-20 to + 80 °C
Minimum Bend Radius:	1.5 D for 90° Bends

Accuracy of Measurement:

General Measurement:

Accuracy of distance information:
from reference girth weld
Accuracy of internal Diameter changes:

Accuracy:

$\pm 0.2 \% = 0.5 \text{ m}$
 $\pm 0.2 \% / 1.83 \text{ mm}$

Accuracy of defect Measurement:

Dent: $\pm 0.2 \% / 1.83 \text{ mm}$
Ovality: $\pm 0.2 \% / 1.83 \text{ mm}$
Girth welds: $\pm 0.2 \% / 1.83 \text{ mm}$

Note:

All given percentage values are related to the outer diameter (OD).
The above mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

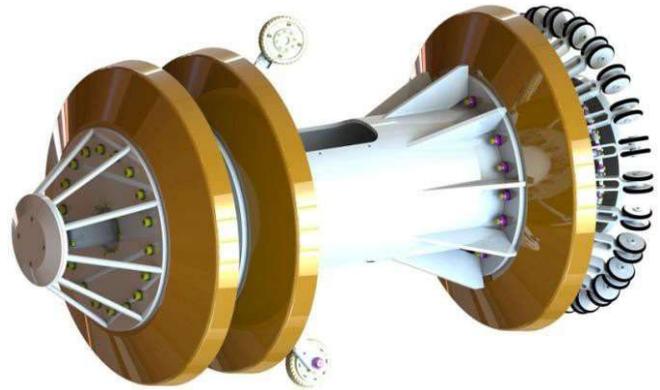
** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s. We reserve the right to introduce technical changes and modifications without prior notice.

48" Single-Channel Caliper-Tool Specification

Features / Installations that will be detected

The below mentioned Features/Indications will be detected, located (longitudinal) and identified by the Caliper-Tool.

- T-Pieces
- Valves
- Bends
- Girth Welds
- Dents
- Ovality
- Internal Diameter Changes



General Information

Total Length*:	approx. 2500mm
Weight:	approx. 450kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	32
Active Range:	up to 800km
Battery Capacity:	400hrs
Recommended Tool Speed**:	0.1 - 3m/s
Maximum Pressure:	120bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5D for 90° Bends

Accuracy of Measurement

Accuracy of distance information: reference girth weld	≤ 0.5m from
Accuracy of internal Diameter changes:	± 0.2% / 2.44mm
Accuracy of defect Measurement:	± 0.2% / 2.44mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

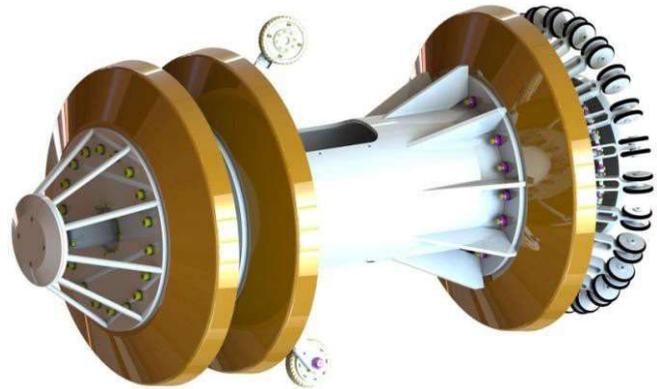
We reserve the right to introduce technical changes and modifications without prior notice.

56" Single-Channel Caliper-Tool Specification

Features / Installations that will be detected

The below mentioned Features/Indications will be detected, located (longitudinal) and identified by the Caliper-Tool.

- T-Pieces
- Valves
- Bends
- Girth Welds
- Dents
- Ovality
- Internal Diameter Changes



General Information

Total Length*:	approx. 2500mm
Weight:	approx. 450kg
No. of Modules:	1
No. of Sensing Fingers with Double Wheels:	36
Active Range:	up to 800km Battery
Capacity:	600hrs (more if required)
Recommended Tool Speed**:	0.1 - 3m/s
Maximum Pressure:	120bar
Temperature Range:	-20 to +80 °C
Minimum Bend Radius:	1.5D for 90° Bends

Accuracy of Measurement

Accuracy of distance information: reference girth weld	≤ 0.5m from
Accuracy of internal Diameter changes:	± 0.2% / 2.44mm
Accuracy of defect Measurement:	± 0.2% / 2.44mm

Note:

All given percentage values are related to the outer diameter (OD).
The above-mentioned accuracies depend on acceptable run conditions:

- Constant speed during inspection
- Clean pipe
- Pipe book given to evaluation department

When driving the tool with compressed air, the pipeline must have a back pressure of 5 bars.

* For shorter lengths contact

** At tool speeds above 3 m/s, the girth weld indications become inaccurate due to dynamic overreaction of the sensing fingers. For best results we recommend tool speeds between 0.1 and 1.5 m/s.

We reserve the right to introduce technical changes and modifications without prior notice.