

## PHASCOPE® PAINT

Easy, Convenient, Fast and Non-destructive  
Coating Thickness Measurements with  
PHASCOPE PAINT  
and Smart Phone or Tablet



## Description

The PHASCOPE PAINT is a probe in pen design. Measure non-destructive the coating thickness of el. non-conductive coating materials on steel or iron and on non-ferrous metals by using the PHASCOPE PAINT. Use the probe PHASCOPE PAINT for measurement capturing. Use the App PHASCOPE PAINT for viewing, analyzing and reporting data on your smart phone or tablet. The measurements with the PHASCOPE PAINT be equivalent to measurements according to standards DIN EN ISO 2360, ASTM D7091, DIN EN ISO 2178 and DIN EN ISO 21968.

### Properties

- Ideal for on-site applications due to the small size, light weight and robust and durable probe design
- Easy operation of the App PHASCOPE PAINT on smart phone or tablet
- Conductivity compensation for measurements on non-magnetic substrate materials (NF)
- Automatically recognition of base material
- Applicable for measurements both smooth and rough surfaces

### Measurement capture

- Two measuring modes available:
  - Single value mode: After each placing of the probe PHASCOPE PAINT on the surface the measurement is captured automatically and the measuring reading is displayed
  - Continuous mode: Scanning surface area with the PHASCOPE PAINT probe with free running display. Measured readings are displayed continuously while scanning surface area. Manual measurement capture is possible.

## Applications

### Examples

#### Steel, iron, cast iron base materials (Fe)

- Paint, varnish or plastic coatings on steel, iron or cast iron (NC/Fe)

#### Non-ferrous metal base materials (NF)

- Paint, varnish or plastic coatings on aluminium, copper or brass (NC/NF)
- Anodized coatings on aluminium


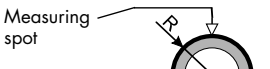
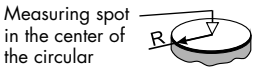
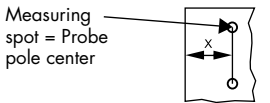
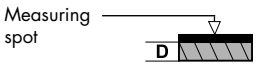
*The probe has a conductivity compensation feature so different electrical conductivities (particularly various aluminium alloys) have no effect on the coating thickness measurement.*

- Coating thickness measurement on both ferrous base material and on non-ferrous base material in one application

## App PHASCOPE PAINT, Properties

Block size	Preset block size or manual setting of block separation
Tolerance limits	Adjustable per batch (application file)
Unit of measurement	Selectable between dimensions metric (mm, µm) or imperial (inch, mils)
Measuring Modes	<ul style="list-style-type: none"> <li>• Single value mode: Automatic measurement capturing after placing the probe PHASCOPE PAINT on the surface and display of the measurement value in the App</li> <li>• Continuous mode: Measured readings are displayed continuously in the App PHASCOPE PAINT during scanning surface area by probe. Measurements must be captured manual.</li> </ul>
Measurement capturing	Indicated by phone vibration (default setting) and at the probe by flash up a LED
Normalization	Adaption to the base material and the shape of specimen
Calibration	<p><i>Factory calibration</i> Each individual PHASCOPE PAINT probe is factory calibrated at several reference points with the greatest care to ensure the highest possible degree of trueness</p> <p><i>Corrective calibration</i> Adaption to the base material, to the shape of specimen and to a thickness value using a calibration foil.</p>
Evaluation	Display of mean value, standard deviation, min. value, max. value, number of measurements per block, histogram
Language	English, German, French
Data memory	Data volume depending on the memory capacity of the used smart phone
System requirements for smart phone or tablet	<ul style="list-style-type: none"> <li>• Operating system Android 5.0 or higher or operating system IOS 9.0 or higher</li> <li>• Bluetooth® 4.0 (Low Energie, BLE 4.0) support</li> </ul>
App download	<ul style="list-style-type: none"> <li>• via Google Play Store and Apple App Store</li> </ul>

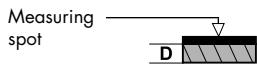
## Probe PHASCOPE PAINT, Features

Applications	Steel, iron, cast iron base materials (Fe)	Non-ferrous metal base materials (NF)
	NC/Fe or NF/Fe	NC/NF
Measurement ranges	<b>Steel, iron, cast iron base materials (Fe)</b> 0 ... 2500 $\mu\text{m}$ / 0 ... 98 mils	<b>Non-ferrous metal base materials (NF)</b> 0 ... 2500 $\mu\text{m}$ / 0 ... 98 mils
Trueness based on Fischer factory calibration standards	<b>Steel, iron, cast iron base materials (Fe)</b> 0 ... 250 $\mu\text{m}$ : $\leq 7.5 \mu\text{m}$ 250 ... 1000 $\mu\text{m}$ : $\leq 3 \%$ of nominal value 1000 ... 2500 $\mu\text{m}$ : $\leq 4 \%$ of nominal value  0 ... 9.84 mils: $\leq 0.295$ mils 9.84 ... 39.37 mils: $\leq 3 \%$ of nominal value 39.97 ... 98.43 mils: $\leq 4 \%$ of nominal value	<b>Non-ferrous metal base materials (NF)</b> 0 ... 100 $\mu\text{m}$ : $\leq 3 \mu\text{m}$ 100 ... 1000 $\mu\text{m}$ : $\leq 3 \%$ of nominal value 1000 ... 2500 $\mu\text{m}$ : $\leq 4 \%$ of nominal value  0 ... 3.94 mils: $\leq 0.12$ mils 3.94 ... 39.37 mils: $\leq 2 \%$ of nominal value 39.97 ... 98.43 mils: $\leq 4 \%$ of nominal value
Repeatability precision based on Fischer factory calibration standards, 5 single readings per standard	<b>Steel, iron, cast iron base materials (Fe)</b> 0 ... 400 $\mu\text{m}$ : $\leq 2 \mu\text{m}$ 400 ... 2500 $\mu\text{m}$ : $\leq 0.5 \%$ of reading  0 ... 15.7 mils: $\leq 0.08$ mils 15.7 ... 98.43 mils: $\leq 0.5 \%$ of reading	<b>Non-ferrous metal base materials (NF)</b> 0 ... 200 $\mu\text{m}$ : $\leq 1 \mu\text{m}$ 200 ... 2500 $\mu\text{m}$ : $\leq 0.5 \%$ of reading  0 ... 7.87 mils: $\leq 0.039$ mils 7.87 ... 98.43 mils: $\leq 0.5 \%$ of reading
Influence	<b>Steel, iron, cast iron base materials (Fe)</b>	<b>Non-ferrous metal base materials (NF)</b>
<p>The following values are valid for a coating thickness with a nominal value of 250 <math>\mu\text{m}</math> (9.84 mils). The quantity of influences are stated with the expanded measurement uncertainty U with the expanded factor of <math>k = 2</math> (defines an interval with the confidence level of 95.45 %) - according to ISO/IEC Guide 98-3:2008-09 "Guide to the expression of uncertainty in measurement".</p>		
Curvature (R), measurement error from nominal value with reference to master calibration on flat surface		
 <p>Measuring spot</p>	<p>No measurement error within the trueness as of <math>R = 45 \text{ mm} \pm 5 \text{ mm}</math> / <math>R = 1.77'' \pm 0.2''</math></p> <p>Measurement error of 10 % for <math>R &lt; 40 \text{ mm}</math> / <math>R &lt; 1.57''</math></p> <p>Probe requires a minimum of <math>R = 40 \text{ mm}</math> / <math>R = 1.57''</math></p>	<p>No measurement error within the trueness as of <math>R = 136 \text{ mm} \pm 16 \text{ mm}</math> / <math>R = 5.35'' \pm 0.63''</math></p> <p>Measurement error of 10 % for <math>R &lt; 40 \text{ mm}</math> / <math>R &lt; 1.57''</math></p> <p>Probe requires a minimum of <math>R = 40 \text{ mm}</math> / <math>R = 1.57''</math></p>
Curvature (R), measurement error from nominal value with reference to master calibration on flat surface		
 <p>Measuring spot</p>	<p>No measurement error within the trueness as of <math>R = 41 \text{ mm} \pm 6 \text{ mm}</math> / <math>R = 1.61'' \pm 0.24''</math></p> <p>Measurement error of 10 % for <math>R = 11 \text{ mm} \pm 1.5 \text{ mm}</math> / <math>R = 0.43'' \pm 0.06''</math></p> <p>Probe requires a minimum of <math>R = 2 \text{ mm}</math> / <math>R = 0.08''</math> (support stand necessary)</p>	<p>No measurement error within the trueness as of <math>R = 115 \text{ mm} \pm 3 \text{ mm}</math> / <math>R = 4.53'' \pm 0.12''</math></p> <p>Measurement error of 10 % for <math>R = 23 \text{ mm} \pm 0.5 \text{ mm}</math> / <math>R = 0.91'' \pm 0.02''</math></p> <p>Probe requires a minimum of <math>R = 2 \text{ mm}</math> / <math>R = 0.08''</math> (support stand necessary)</p>
Edge distance (R), specification from probe tip center, measurement error from nominal value		
 <p>Measuring spot in the center of the circular surface</p>	<p>No measurement error within the trueness as of <math>R = 5.1 \text{ mm} \pm 0.6 \text{ mm}</math> / <math>R = 0.20'' \pm 0.024''</math> (support stand necessary)</p> <p>Measurement error of 10 % for <math>R = 3.6 \text{ mm} \pm 0.13 \text{ mm}</math> / <math>R = 0.14'' \pm 0.05''</math> (support stand necessary)</p>	<p>No measurement error within the trueness as of <math>R = 3.8 \text{ mm} \pm 0.3 \text{ mm}</math> / <math>R = 0.15'' \pm 0.012''</math> (support stand necessary)</p> <p>Measurement error of 10 % for <math>R = 3.2 \text{ mm} \pm 0.2 \text{ mm}</math> / <math>R = 0.13'' \pm 0.008''</math> (support stand necessary)</p>
Edge distance (X), specification from probe tip center, measurement error from nominal value		
 <p>Measuring spot = Probe pole center</p>	<p>No measurement error within the trueness for <math>X \geq 2 \text{ mm}</math> / <math>X \geq 0.08''</math></p> <p>Measurement error <math>\geq 10 \%</math> for <math>X \leq 1 \text{ mm}</math> / <math>X \leq 0.04''</math></p>	<p>No measurement error within the trueness as of <math>X \geq 2 \text{ mm}</math> / <math>X \geq 0.08''</math></p> <p>Measurement error of 10 % for <math>X \leq 1 \text{ mm}</math> / <math>X \leq 0.04''</math></p>
Base material thickness (D), measurement error from nominal value		
 <p>Measuring spot</p>	<p><b>Steel, iron, cast iron base materials (Fe)</b></p> <p>No measurement error within the trueness as of <math>D = 0.14 \text{ mm} \pm 0.04 \text{ mm}</math> / <math>D = 5.5 \text{ mils} \pm 1.57 \text{ mils}</math></p>	<p>No measurement error within the trueness as of <math>D = 1.6 \text{ mm} \pm 0.2 \text{ mm}</math> / <math>D = 63 \text{ mils} \pm 7.87 \text{ mils}</math></p>

# PHASCOPE® PAINT

## Probe PHASCOPE PAINT, Features

Base material thickness (D), measurement error from nominal value



### Steel, iron, cast iron base materials (Fe)

Measurement error of 10 % for  
 $D = 0.1 \text{ mm} \pm 0.02 \text{ mm}$  /  
 $D = 3.94 \text{ mils} \pm 0.79 \text{ mils}$

### Aluminium base material

Measurement error of 10 % for  
 $D = 0.64 \text{ mm} \pm 0.02 \text{ mm}$  /  
 $D = 25.2 \text{ mils} \pm 0.79 \text{ mils}$

Base material

### Base material: In industry common used Fe sheets

Influence of the permeability of base material (Fe) for a coating thickness of  $250 \mu\text{m}$  ( $9.84 \text{ mils}$ ):  $\leq 7 \%$

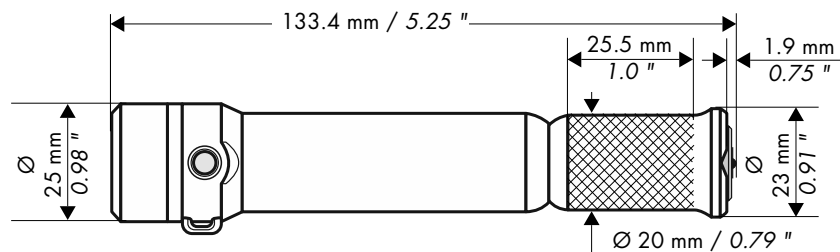
### Non-ferrous metal base materials (NF)

Influence of the el. conductivity of base material (NF) in the range from 15 to 100 % IACS: Measurement error  $\leq 5 \%$ , valid for coating thicknesses  $\geq 250 \mu\text{m}$  ( $9.84 \text{ mils}$ )

Min. lift distance	25 mm (0.98 "), minimum distance between probe tip and surface after measurement capture
Operation temperature	0 ... +45 °C (+32 ... +113 °F)
Storage temperature	-20 ... +80 °C (-4 ... +176 °F)
Humidity at 25 °C (77 °F)	5 % ... 95 %
Specimen surface temp.	max. +40 °C (max. +104 °F)
Type of protection	Probe tip side: IP65, dust-tight and water repellent and resistant USB port side: IP54, dust- and splash-water proof
Probe design	Single tip axial probe with spring-loaded measuring system
Measuring method	Eddy current test methods
Probe tip	not replaceable; Material: Hard metal; Radius: 2 mm / 78.7 mils
Power supply	Rechargeable Battery, operating time 4.5 h in continuous operation
USB charging port	<ul style="list-style-type: none"> <li>Charging inside rechargeable battery via micro USB socket, loading time about 3 h</li> <li>Charging rechargeable battery via PC or by commercial USB charger (Output: <math>5 V_{DC} \pm 5 \%</math>)</li> </ul>
Bluetooth® Interface	Bluetooth® 4.0 (Low Energy) for data transfer to smart phone or tablet
Weight Probe	77 g / 2.72 oz.
Illumination displays	State of the Bluetooth connection; State of charge of the rechargeable battery and indication if reading within (green) or outside (red) the limits

Dimensions

Area for holding/fixing the probe



Ordering data

605-873

Scope of delivery

Probe PHASCOPE PAINT, App PHASCOPE PAINT for download, calibration set 605-879 with 2 foils (605-337 (ca.  $75 \mu\text{m}$  ( $2.95 \text{ mils}$ )) and 601-485 (ca.  $250 \mu\text{m}$  ( $9.84 \text{ mils}$ ))) and also 2 metal plates for instrument check labeled with ISO/FE and ISO/NF, operator's manual, USB cable for charging battery, carrying strap, etui

Option

Calibration foils: Various foil thickness are available up to  $2500 \mu\text{m}$  / 98 mils

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