

SURFACE PROFILE & COATING THICKNESS

with Helmut Fischer FMP-30. Probes, Profile FPR1 & Thickness V7FKB4



Advantage for the customer is to have one device with two probes which can be used for coating thickness measurement but also for Roughness test.

Profile Measurement

Why Measure Surface Profile?

- If profile is too low the adhesion of the coating to the surface will be affected. Too high and the profile peaks may not be coated.
- As profile increases, surface area increases which means more coating is required.
- Achieving correct profile enables the correct amount of coating to be applied thus saving costs.

Surface profile measurement according to ASTM 4417-11. Method B. Therefore, profile measurements of the surface by using the probe FPR1 are conform to many standards and guidance. ASTM D4417, Method B, SSPC PA17, AS 3894.5-C, U.S. NAVY NSI 009-32, SANS 5772 & others.

- Assessment of blasted surfaces whether they are appropriate for painting

Measuring Paint type Coatings on rough surfaces

Irregular surface structures, or “roughness” – as typically found on grey cast iron or sand-blasted steel complicate the process of measuring the thickness of overlying paint layers. The unevenness of the substrate’s surface can cause large fluctuations in the measured values. This leads to uncertainties in the interpretation of the results and makes it difficult to monitor the coating process.

Surface Profile Measurement

To ensure that protective coating layers adhere and are of correct thickness levels.

Probe FPR1

To ensure that protective layers adhere permanently, the surface roughness of the base material must comply with strict recommended standards. The FPR1 profile probe is the ideal solution in this case: When combined with the FMP10/40 series, the FPR1 profile probe is the ideal solution for testing polished or blasted surfaces before painting. For example, Abrasive blasted items, in ship construction, offshore structures or wind turbine production.



FPR1

Tactile measurement probes for exactly determining the surface profile before the coating process.

FPR1 – Scope of Supply;

- Probe – Glass Zero Plate – 2 Calibration shims – Calibration certificate
- Measurement range 0 ... 500 µm

Features:

- Durable and wear-resistant probe tip made of hard metal for extended usage times
- Compact; easily accesses hard-to-reach measurement points
- No supplementary costs for consumables
- Measurement performed with the proven FMP handheld devices from Fischer: both coating thickness and profile measurements carried out with the same instrument
- FMP's comprehensive set of functions available: automatic test reports, statistical evaluations and the storage of measurement values
- Measurement according ASTM D4417, Method B, SSPC PA17, AS 3894.5-C, U.S. NAVY NSI 009-32, SANS 5772 and other standards

Applications:

- Measurement of the surface profile of sand-blasted parts
- Onshore and offshore steel structures, infrastructure, ship construction, wind turbines
- A vast range of metal components that need corrosion protection

Trueness

based on factory calibration standards of the Helmut Fischer GmbH

500 ... 100 µm: ≤ 3 µm - 100 ... 500 µm: ≤ 3 % of nominal value

Repeatability precision

based on factory calibration standards of the Helmut Fischer GmbH; 5 single readings per standard

500 ... 100 µm: ≤ 1.5 µm - 100 ... 500 µm: ≤ 1.5 % of reading

Probe tip material Hard metal

Probe tip replaceable Yes, by customer using the probe tip replacement tool 605-434 (not Inc)

Probe tip 60° tip angle, probe tip radius: 50 µm

Number of measurements

- Perform a visual check before each measurement!
- After approximately 20,000 measurements the probe tip may show wear and can be replaced.

Probe V7FKB4

Measures nonferrous and non-metallic coatings on steel or iron substrates (NF, Iso/Fe). Higher repeatability precision than single tip probes when measuring rough surfaces. Spring loaded measuring system allows exact positioning and constant pressure force, which is advantageous when measuring soft coatings.

The underlying surface roughness always affects an overlying paint layer. However, it is difficult to make a quantitative assessment of the degree of interference because this depends on several parameters, such as the geometry of the roughness and the thickness of the lacquer. When measuring with a single-poled probe, measurement positions over roughness peaks or valleys may lead to different readings despite uniform paint thickness. The magnetic field lines are affected differently by the valleys and the peaks. In dual-poled probes this effect, and thus the influence of the roughness is significantly reduced – which consequently reduces the number of measurements required to assure an acceptable mean and standard deviation.

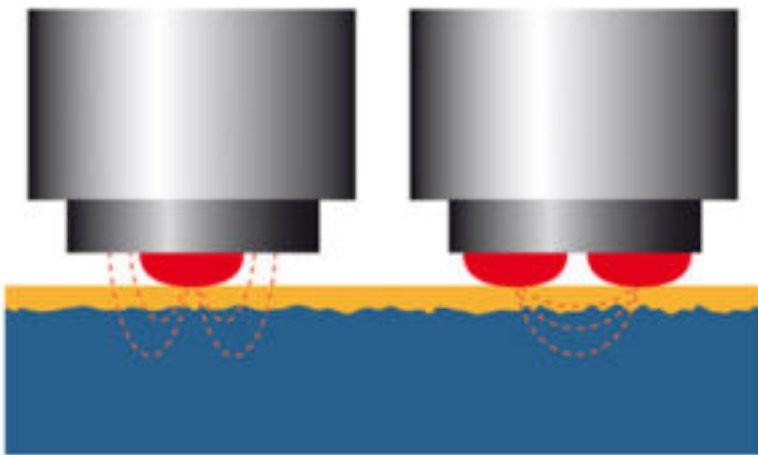


Fig.1: Left: single-poled probe; right: dual-poled probe

The dual-poled probe V7FKB4 used in combination with the FISCHER FMP-30 handheld instrument or with the table-top FISCHERSCOPE[®]MMS[®] PC2 (module PERMASCOPE[®]) is especially developed to accurately measure paint layers atop rough surfaces. Compared to those attained with single-poled probes, significantly lower coefficients of variation and higher repeatability precisions are achieved, as shown in Table 1.



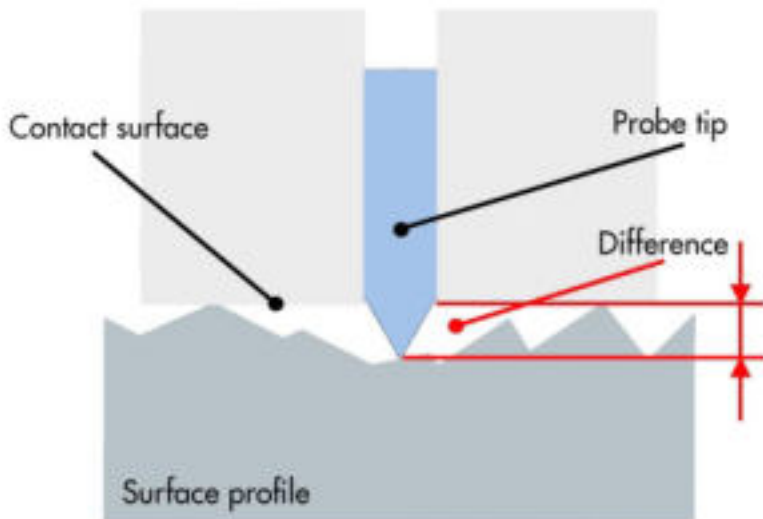
Fig.2: Measuring lacquer on a rough surface with the V7FKB4 probe

Comparison	Standard probe (single-poled)		Probe V7FKB4 (dual-poled)	
	sample 1 even	sample 2 rough	sample 1 even	sample 2 rough
1	126.4	241.6	125.8	237.2
2	125.2	263.0	125.6	245.4
3	125.7	232.6	125.2	248.7
4	125.3	250.3	126.2	241.6
5	126.2	252.3	126.0	252.4
6	125.5	244.3	125.6	251.3
Mean value (μm)	125.71	247.35	125.71	246.11
Standard deviation (μm)	0.47	10.38	0.36	5.90
Coefficient of variation (%)	0.37	4.20	0.28	2.40

Tab.1: Comparative measurements: single-poled standard probe vs. the dual-poled V7FKB4 probe, on even and rough surfaces

The measurement accuracy is very dependent on careful calibration. The V7FKB4 probe reduces not only the calibration effort on original pieces but also the number of measurements required to verify the results.

For precise measurement of paint layers on rough surfaces, the dual-poled magnetic induction probe V7FKB4 is ideal when used together with a FMP-30. The expansion of the magnetic field lines between the two poles minimises the measurement variations induced by the roughness, providing the levels of precision and accuracy you have come to expect from FISCHER.



Probe unsuitable for measurements on curved surfaces
Surface profile measurement according to ASTM 4417-11.

Surface Profile Measurement

To ensure that protective layers adhere permanently, the surface roughness of the base material must comply with strict recommended standards.

The profile probe FPR1 measures the height of the surface profiles; that is the tip to valley height difference according to ASTM 4417, Method B.

Probe FPR1 is therefore suitable for height measurements of surface profiles such as SSPC-PA17.

The profile height value is determined in 10 measurements

For more information;

www.kks.com.au