



1. Introduction

The gauges FSC1/7, see fig. 1, and FSC1000 can be used to non-destructively measure the paint thickness on carbon composite (CFRP), on CFRP with lightning protection, and on metal. When measuring on curved surfaces, special measures are required. For convex and predominantly cylindrical curvatures proceed as follows.



Figure1: FSC1/7 Paint thickness gauge

2. Principle of curvature correction

The distance between the lower edge of the hand-held module and the conductive surface below it, is essential for the determination of the coating thickness. The sensor averages over a circular area with a diameter of about 15 mm. In the case of a convex curved surface the gauge touches at only one point or line, respectively, see fig. 2. The average distance to the conductive layer below is enlarged. Accordingly, the FSC displays a value which is too large. To obtain the correct paint thickness a correction value has to be subtracted.

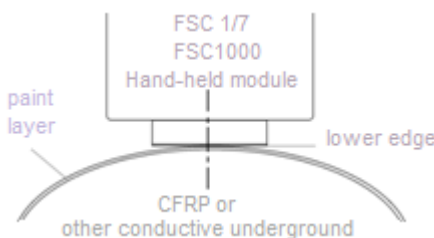


Figure 2: Principle of measurement on a curved surface

The size of the correction value depends on the degree of curvature. The curvature has to be measured separately. A dial gauge with appropriate attachment is suitable for this task, see fig. 3.



Figure 3: Dial gauge with attachment

Often, the degree of the surface curvature is described by the local curvature radius. Fig. 4 shows the relationship between the dial gauge display and the curvature radius.

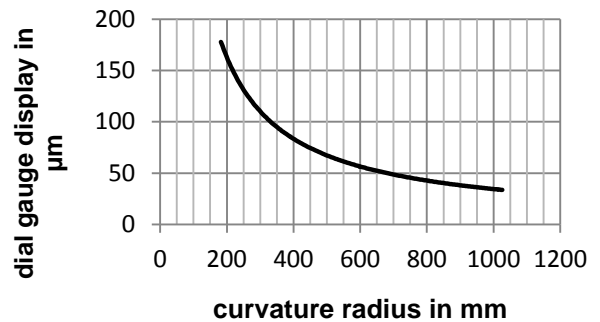


Figure 4: Relationship between display of dial gauge and curvature radius

3. Correction method

1. Calibrate the FSC on a flat sample of the substrate material
2. Measure with the FSC on the curved surface : Display V
3. Measure with the dial gauge at the same position: Display M.
4. Determine the correction value (KW) from fig. 5.
5. Correct the value according to:
Corrected paint thickness value $A = V - KW$

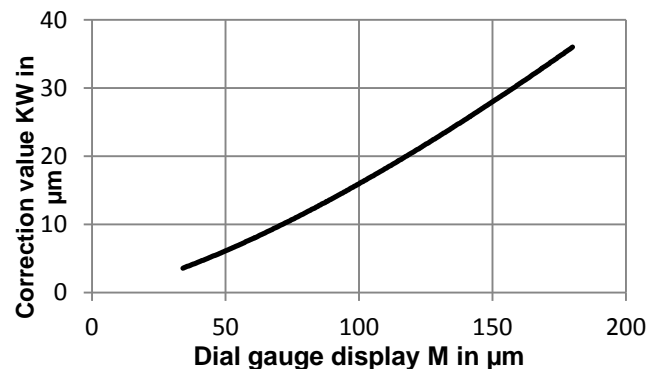


Figure 5: Relationship between correction value and dial gauge

4. Conclusion

This method is recommended for curvatures with radii of about 1000 mm and 200 mm or dial gauge displays between about 30 µm and 150 µm.

FI Test- und Messtechnik GmbH
 Breitscheidstr. 17
 D-39114 Magdeburg
 Germany
 Tel.: +49(0)391/50389430
 Fax: +49(0)391/50389439
 Mail: info@fitm.de, www.fitm.de