DIN EN ISO 21968:2020-02 (E)

Non-magnetic metallic coatings on metallic and non-metallic basis materials - Measurement of coating thickn ess - Phase-sensitive eddy-current method (ISO 21968:2019)

Contents

Page

European foreword ... **3**

Foreword ... **4**

1 Scope ... **5**

2 Normative references ... **5**

3 Terms and definitions ... **5**

4 Principle of measurement ... **6**

5 Factors affecting measurement uncertainty ... **9**
5.1 Basic influence of the coating thickness ... 9
5.2 Electrical properties of the coating ... 9
5.3 Geometry — Base material thickness ... 9
5.4 Geometry — Edge effects ... 9
5.5 Geometry — Surface curvature ... 10
5.6 Surface roughness ... 10
5.7 Lift-off effect ... 10
5.8 Probe pressure ... 12
5.9 Probe tilt ... 12
5.10 Temperature effects ... 12
5.11 Intermediate coatings ... 12
5.12 External electromagnetic fields ... 12

6 Calibration and adjustment of the instrument ... **12**
6.1 General ... 12
6.2 Thickness reference standards ... 13
6.3 Methods of adjustment ... 13

7 Measurement procedure and evaluation ... **14**
7.1 General ... 14
7.2 Number of measurements and evaluation ... 14

8 Uncertainty of the results ... **15**
8.1 General remarks ... 15
8.2 Uncertainty of the calibration of the instrument ... 15
8.3 Stochastic errors ... 16
8.4 Uncertainties caused by factors summarized in Clause 5 ... 17
8.5 Combined uncertainty, expanded uncertainty and final result ... 17

9 Precision ... **18**
9.1 General ... 18
9.2 Repeatability (r) ... 18
9.3 Reproducibility limit (R) ... 20

10 Test report ... **21**

Annex A (informative) **Eddy-current generation in a metallic conductor** ... **22**

Annex B (informative) **Basics of the determination of the uncertainty of a measurement of the used measurement method corresponding to ISO/IEC Guide 98-3** ... **28**

Annex C (informative) **Basic performance requirements for coating thickness gauges based on the phase-sensitive eddy-current method described in this document** ... **30**

Annex D (informative) **Examples for the experimental estimation of factors affecting the measurement accuracy** ... **32**

Annex E (informative) **Table of the student factor** **37**
Annex F (informative) **Example of uncertainty estimation** **38**
Annex G (informative) **Details on precision** **41**
Bibliography **43**