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**Oorganiska ytbeläggningar – Metalliska
beläggningar på icke-metalliska underlag –
Mätning av beläggningstjocklek –
Mikroresistivitetmetod**

**Metallic coatings on nonmetallic basis
materials – Measurement of coating thickness –
Microresistivity method**

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English version

Metallic coatings on nonmetallic basis materials - Measurement of coating thickness - Microresistivity method

Revêtements métalliques sur matériaux non-métalliques -
Mesurage de l'épaisseur des revêtements - Méthode
utilisant la microrésistivité

Metallische Überzüge auf nichtmetallischen
Grundwerkstoffen - Schichtdickenmessung - Mikro-
Widerstand-Verfahren

This European Standard was approved by CEN on 3 March 2005.

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EN 14571:2005 (E)

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Foreword

This document (EN 14571:2005) has been prepared by Technical Committee CEN/TC 262 "Metallic and other inorganic coatings", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

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EN 14571:2005 (E)

1 Scope

This document describes a method for nondestructive measurements of the thickness of conductive coatings on nonconductive base materials. This method is based on the principle of the sheet resistivity measurement and is applicable to any conductive coatings and layers of metal and semiconductor materials. In general, the probe has to be adjusted to the conductivity and the thickness of the respective application. However, this document focusses on metallic coatings on nonconductive base materials (e.g. Copper on plastic substrates, printed circuit boards).

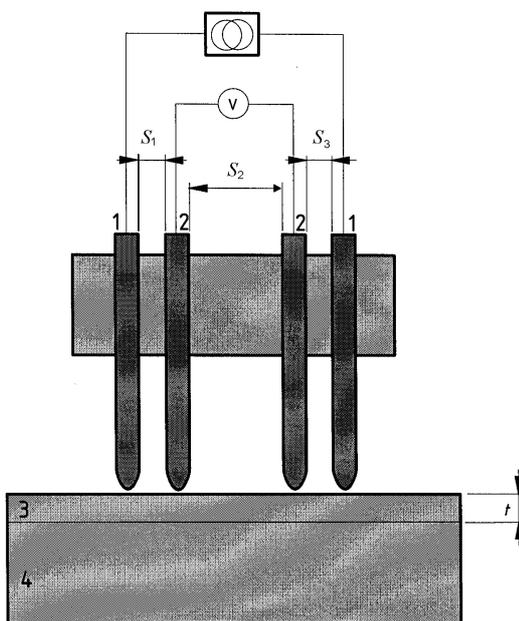
NOTE 1 This method also applies to the measurement of through-hole copper thickness of printed circuit boards. However, for this application a probe geometry different from the one described in this document is necessary.

NOTE 2 This method is also applicable for thickness measurements of conductive coatings on conductive base materials, if the resistivity of the coating and the base material is different. This case is not considered in this document.

2 Measurement principle

The sheet resistivity method uses the so called four-point probe as shown in Figure 1. A row of four spring-loaded metal tips are placed in contact with the surface of the conductive coating. The tip distances between the outer and inner tips S_1 and S_3 are equal. Usually a constant current is passed through the two outer contacts (4 and 7). The introduced current penetrates the conductive material of the coating with the resistivity ρ . The resulting voltage drop is measured across the two inner contacts (5 and 6).

In general, the flow of the introduced current is non-uniformly distributed over the cross-section of the coating and is not parallel to the coating (see Figure 2). The current density decreases with increasing distance from the direct line between the contacts 4 and 7 (with depth and width). If the current is effectively limited by the thickness of the coating, the voltage drop between 5 and 6 is a measure of the thickness.



- Key
- 1 Outer contact of the probe
 - 2 Inner contact of the probe
 - 3 Conductive coating
 - 4 Nonconductive base material
 - t* Coating thickness

Figure 1 — Schematic representation of the sheet resistivity method