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GB/T 31554-2015 / ISO 21968:2005

Non-magnetic metallic coatings on metallic and non-metallic basis materials - Measurement of coating thickness - Phase-sensitive eddy-current method

金属和非金属基体上非磁性金属覆盖层

覆盖层厚度测量 相敏涡流法

（ISO 21968:2005, IDT）

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Standardization Administration of the People's Republic of China.

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Foreword

This Standard is drafted according to the rules given in GB/T 1.1-2009.

This Standard uses the translation method to equivalently adopt ISO 21968:2005 “Non-magnetic metallic coatings on metallic and non-metallic basis materials - Measurement of coating thickness - Phase-sensitive eddy-current method” (English version).

For easy use, this Standard has the following editorial modifications:

- DELETE the foreword of the International Standard;

- ADD the foreword of China’s national standard;

- The international standards in the standard text and the bibliography are replaced by identical China’s national standards.

This Standard is proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Metallic and Nonmetallic Coatings of Standardization Administration of China (SAC/TC 57).

Drafting organizations of this Standard: Guangdong Entry-Exit Inspection and Quarantine Bureau, Chongqing Institute of Measurement and Quality Testing, Wuhan Material Protection Institute, Wuhan Kangjie Technology Co., Ltd., Standardization Research and Development Center of Nanhai District, Dongguan Yian Technology Co., Ltd.

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Non-magnetic metallic coatings on metallic and non-metallic basis materials - Measurement of coating thickness - Phase-sensitive eddy-current method

1 Scope

This Standard describes a method of using phase-sensitive eddy-current instruments for nondestructive measurements of the thickness of non-magnetic metallic coatings on metallic and non-metallic basis materials, such as:

a) zinc, cadmium, copper, tin or chromium on steel;

b) copper or silver on composite materials.

The phase-sensitive method can be applied without thickness error to smaller surface areas and to stronger surface curvatures than the amplitude-sensitive eddy-current method described in GB/T 4957, and is less affected by the magnetic properties of the basis material. However, the phase-sensitive method is more affected by the electrical properties of the coating materials.

When measuring metallic coatings on metallic basis materials, the product of conductivity and permeability (σ, μ) of one of the materials should be at least a factor of 1.5 times the product of conductivity and permeability for the other material. Non-ferromagnetic materials have a relative permeability of 1.

2 Principle

An eddy-current probe (or integrated probe/instrument) is placed on (or near) the surface of the coating(s) to be measured, and the thickness is read from the instrument's readout.

For each instrument, there is a maximum measurable thickness of the coating.

Since this thickness range depends on both the applied frequency of the probe system and the electrical properties of the coating, the maximum thickness should be determined experimentally, unless otherwise specified by the manufacturer.

An explanation of eddy-current generation and the calculation of the maximum measurable coating thickness, d_{max} is given in Annex A.

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