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Metallic coatings — Electroplated coatings of nickel for engineering purposes

Revêtements métalliques — Dépôts électrolytiques de nickel pour usages industriels

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4526 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 3, *Electrodeposited coatings and related finishes*.

This second edition cancels and replaces the first edition (ISO 4526:1984), which has been technically revised.

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Introduction

Engineering nickel coatings are specified for various applications such as improved hardness, wear and corrosion resistance, load-bearing characteristics, heat-scaling resistance, corrosion fatigue resistance and other improvements in surface properties. Electrodeposited nickel is also, used in engineering applications to salvage worn or incorrectly machined manufactured articles, and function as diffusion barriers in combination with other metallic coatings. Engineering nickel coatings usually contain greater than 99 % nickel and are most frequently electrodeposited from additive-free Watts or nickel sulfamate solutions. Typical solution compositions, operating conditions and mechanical properties of electrodeposits from these solutions are given in Annex A.

When increased hardness, greater wear resistance, modified deposit internal stress values and enhanced levelling characteristics are required, particles of organic additives such as silicon carbide, tungsten carbide, aluminium oxide, chromium carbide and other substances may be introduced into these solutions. The use of sulfur-containing organic additives to increase hardness and to lower residual internal stress is feasible only when the end-use involves exposure to low or moderate temperatures. High temperature exposure of nickel coatings that contain sulfur may result in embrittlement and cracking of the coating. The effect is time-dependent and may become evident at 150 °C if the time of heating is sufficiently long.

A notable trend is the growing utilisation of nickel alloy electroplating processes for engineering applications. These include binary alloys of nickel with cobalt, iron, manganese, molybdenum, phosphorus and tungsten.

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