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Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 262, *Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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This fourth edition cancels and replaces the third edition (ISO 2080:2008), which has been technically revised.

The main changes compared to the previous edition are as follows:

— new terms have been introduced;

— previous entries have been rationalized;

— some entries have been deleted.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The terms and definitions in this document apply to electroplating and other related surface-finishing processes. The terms and definitions are not necessarily arranged in English alphabetical order. Related terms, giving different alternatives for a given process, have been grouped under a leading term, as, for example, in the case of “chemical plating”, “electrodeposition”, “blasting”, “cleaning” or “colour anodized aluminium”.

Basic terms and definitions relating to corrosion and electrochemical techniques used in corrosion science are given in ISO 8044 and are not included. Basic terms used in chemistry, electrochemistry or physics are also not included in this document. The definitions for such terms can be found in handbooks or dictionaries of chemistry or physics.

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Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary

1 Scope

This document defines the terms related to the general types of surface-finishing processes. Emphasis is placed on practical usage in surface-finishing technology in the metal-finishing field.

This document does not include terms for porcelain and vitreous enamel, thermally sprayed coatings and galvanising for which specialized vocabularies and glossaries exist. For the most part, basic terms that have the same meaning in surface finishing as in other fields of technology, and that are defined in handbooks and dictionaries of chemistry and physics, are not included.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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3.1 General types of surface-finishing processes and treatments

3.1.1
chemical plating
deposition of a metallic coating by chemical, non-electrolytic methods

3.1.1.1
autocatalytic plating
DEPRECATED: electroless plating
deposition of a metallic coating by a controlled chemical reduction that is catalysed by the metal or alloy being deposited

3.1.1.2
contact plating
deposition of a metal by use of an internal source of current by immersing the *work* (3.2.218) in contact with another metal in a solution containing a compound of the metal to be deposited

3.1.1.3
immersion coating
metallic coating produced by a displacement reaction in which one metal displaces another from a solution

EXAMPLE $Fe + Cu^{2+} \rightarrow Cu + Fe^{2+}$

3.1.2
chemical vapour deposition
CVD
deposition of a coating by a chemical reaction, induced by heat or gaseous reduction of vapour condensing on a *substrate* (3.2.205)

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3.1.3
conversion coating
conversion layer
coating obtained by *conversion treatment* (3.1.4)

3.1.4
conversion treatment
chemical or electrochemical process producing a superficial layer containing a compound of the *substrate* (3.2.205) metal

EXAMPLE *Passivation* (3.2.163) coatings on zinc and zinc alloys; aluminium and phosphate coatings on steel; *chromate conversion coatings* (3.2.72).

Note 1 to entry: *Anodizing* (3.2.10) although fulfilling the above definition, is not normally referred to as a conversion coating process.

3.1.5
diffusion treatment
diffusion coating
process of producing a surface layer (diffusion layer) by diffusion of another metal or non-metal into the surface of the *substrate* (3.2.205)

EXAMPLE For *electroplating* (3.1.6): Diffusion treatment to form an alloy coating from two or more different electroplated coatings.

For non-electroplating: *Galvanising* (3.1.7), nitriding, carburizing, *sherardizing* (3.1.15) are diffusion treatments.

Note 1 to entry: Post-coating *heat treatment* (3.2.128) after electroplating, for example, to remove hydrogen, is not normally designated as a diffusion treatment.

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3.1.6
electroplating
electrodeposition
deposition of an adherent coating of a metal or an alloy upon a *substrate* (3.2.205) by electrolysis for the purpose of imparting properties or dimensions to a surface different from those of the *basis material* (3.2.29)

3.1.7
galvanising
formation of either a coating of zinc or zinc-iron alloys, or both, on iron and steel products by dipping prepared steel or cast iron in a zinc melt

3.1.8
hot dip metal coating
metallic coating obtained by dipping the basis metal into a molten metal

Note 1 to entry: The traditional term "*galvanising*" (3.1.7) referring to zinc coatings obtained by immersion in a bath of molten zinc, should always be preceded by "hot dip". The term "spelter galvanising" should not be used for "hot dip metal coating". For details of terms and definitions concerning "hot dip galvanising", appropriate standards related to that process are to be consulted.

3.1.9
mechanical coating
mechanical plating
process whereby hard, small spherical objects such as a glass shot are tumbled against a metallic surface, in the presence of finely divided metal powder such as zinc dust and appropriate chemicals for the purpose of covering such surfaces with metal

Note 1 to entry: The terms "peen plating" and "mechanical *galvanising*" (3.1.7) are not recommended.

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3.1.10
metal cladding
application of a coating of one metal to another by mechanical fabrication techniques

3.1.11
metallizing
application of a metallic coating to the surface of non-metallic or non-conducting materials

Note 1 to entry: This term shall not be used as a synonym of *metal spraying* (3.1.12) or in the sense of depositing a metallic coating on a metal *substrate* (3.2.205).

3.1.12
metal spraying
application of a metal by thermal *spraying* (3.1.17)

3.1.13
porcelain enamelling
vitreous enamelling
process for applying a substantially vitreous or glassy inorganic coating bonded to metal by fusion at a temperature above approximately 425 °C

3.1.14
physical vapour deposition
PVD
process of depositing a coating by vaporizing and subsequently condensing an element or compound, usually in a high vacuum

Note 1 to entry: See *sputtering* (3.2.196) and *ion plating* (3.2.136).

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3.1.15
sherardizing
zinc *diffusion coating* (3.1.5) process or *diffusion treatment* (3.1.5) to form a zinc alloy with the basis metals by heating the *substrate* (3.2.205) with zinc

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Note 1 to entry: Mainly used to form a zinc-iron alloy layer on a steel substrate.

3.1.16
surface treatment
treatment involving a modification of the surface

3.1.17
thermal spraying
application of a coating by a process of projecting molten or heat-softened material from a source (gun) onto any *substrate* (3.2.205)

3.1.18
zinc flake coating
coating containing metallic flakes (predominantly zinc) in a suitable binder, non-electrolytically applied on fasteners and other parts by immersion or spraying, followed by *curing* (3.2.36)

Note 1 to entry: The term *base coat* (3.2.27) is often used as a synonym for zinc flake coating in cases where an additional *top coat* (3.1.19) is applied.

3.1.19
top coat
additional layer with or without integral *lubricant* (3.2.142) applied on the *substrate* (3.2.205) in order to achieve functional properties such as additional corrosion protection, torque-tension performance, colour, chemical resistance

Note 1 to entry: Thickness of top coat layer is usually about 3 µm to 10 µm.

Note 2 to entry: Application of a top coat requires totally dried substrate.

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Note 3 to entry: See *sealant* (3.2.186).

3.2 Terms used in the industry

3.2.1
acceleration
increase of the rate of a coating process by the use of chemical *additives* (3.2.3)

3.2.2
activation
elimination of a passive surface condition

3.2.3
addition agent
additive
substance added to a solution, usually in small amounts, to modify the characteristics of the solution or the properties of the deposit obtained from the solution

3.2.4
adhesion
amount of force required to separate different layers of a coating, or a coating from its *substrate* (3.2.205) and the area of the corresponding surface

3.2.5
anode corrosion
gradual dissolution or oxidation of a metal (known as anode), or dissolution of an anode material by the electrochemical action in the *electroplating* (3.1.6) cell

Note 1 to entry: The dissolution of the anode by chemical action of the *electrolyte* (3.2.112) without current is generally not called corrosion, but dissolution.

3.2.6
anode film
<anode itself> outer layer of the anode itself consisting of oxidation or reaction products of the anode metal

3.2.7
anode film
<solution in contact with the anode> layer of solution in contact with the anode that differs in composition from the bulk of the solution

3.2.8
anodic oxidation coating
protective, decorative or functional coating composed mainly of metal oxide formed on a metal surface (typically aluminium) by anodically polarising the metal in a suitable *electrolytic solution* (3.2.112)

3.2.9
anodic coating
metallic coating that is less noble than the basis metal

Note 1 to entry: Anodic coatings provide *cathodic protection* (3.2.35).

3.2.10
anodic oxidation
anodizing
electrolytic oxidation process in which the surface of a metal, when anodically treated, is converted to a coating having desirable protective, decorative or functional properties

Note 1 to entry: See *anodic oxidation coating* (3.2.8).

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3.2.11
anodic protection
anodic corrosion protection
protection of selected metals by externally applied current

EXAMPLE Stainless steel.

Note 1 to entry: The metal to be protected is polarized as the anode thus causing *passivity* (3.2.165) to the metal protecting it from corrosion.

Note 2 to entry: Anodic protection requires external current supply as contact between different metals (galvanic corrosion) cannot supply enough voltage. See *cathodic protection* (3.2.35).

3.2.12
anodizing line
total process on a production line which includes *anodic oxidation* (3.2.10)

3.2.13
anolyte
portion of the *electrolyte* (3.2.112) on the anode side of the *diaphragm* (3.2.99) in a *divided cell* (3.2.101)

3.2.14
anti-pitting agent
addition agent (3.2.3) for the specific purpose of preventing gas *pits* (3.2.170) in electrodeposits

Note 1 to entry: See *wetting agent* (3.2.216).

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3.2.15
automatic machine
conveyer
<electroplating> machine for mechanically processing parts through treatment cycles, such as *cleaning* (3.2.74), anodizing (3.2.10) or *electroplating* (3.1.6)

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3.2.16
fully-automatic treatment
automatic treatment in which the *work pieces* (3.2.218) are automatically conveyed through successive *cleaning* (3.2.74) and plating tanks

3.2.17
semi-automatic treatment
automatic treatment in which the *work pieces* (3.2.218) are conveyed automatically through only one plating tank

3.2.18
auxiliary anode
supplementary anode employed during *electrodeposition* (3.1.6) to achieve a desired thickness distribution of the electrodeposit

3.2.19
auxiliary cathode
thief
robber
cathode (3.2.64) placed so as to divert to itself some portion of the current from portions of the *work pieces* (3.2.218) which otherwise receive a too high *current density* (3.2.89)

3.2.20
hydrogen embrittlement relief treating
treatment to reduce the risk of the occurence of hydrogen embrittlement (3.2.130)

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3.2.21
mechanical barrel burnishing
smoothing of surfaces by *tumbling* (3.2.210) the *work pieces* (3.2.218) in rotary barrels in the presence of metallic or ceramic shots or balls, and in the absence of an abrasive

3.2.22
barrel electroplating
electroplating (3.1.6) process in which electrodeposits are applied to articles in bulk in a rotating, oscillating or otherwise moving container

3.2.23
barrel finishing
bulk processing in barrels, in either the presence or absence of abrasives or *burnishing* (3.2.60) shot for the purpose of improving the surface *finish* (3.2.119)

Note 1 to entry: See *tumbling* (3.2.210).

3.2.24
barrel processing
mechanical, chemical, autocatalytic or electrolytic treatment of articles in bulk in a rotating or otherwise oscillating container

3.2.25
barrier layer
<anodic oxidation coating> non-porous part of an *anodic oxidation coating* (3.2.8) that separates the *pores* (3.2.173) from the aluminium metal and has a thickness proportional to the bath voltage

3.2.26
barrier protection
coating of a *substrate* (3.2.205) by a more *noble metal* (3.2.157) than the substrate or other material (e.g. lacquer), thus protecting the *basis material* (3.2.29) of the *work* (3.2.218) from corrosion by a closed *barrier layer* (3.2.25), the protection is lost in case of coating damage

EXAMPLE Nickel and chromium on steel substrate; copper, nickel and chromium on steel or zinc substrate.

Note 1 to entry: See *anodic protection* (3.2.11).

3.2.27
base coat
<liquid> suspension of inorganic binder containing metal flakes as the first layer of a coating on to which other coatings are applied

3.2.28
base coat
<solid> layer of metal flakes and binders to which other coatings are applied

Note 1 to entry: Typical *substrates* (3.2.205) for *top coat* (3.1.19) application are *zinc flake coating* (3.1.18), zinc or zinc/nickel alloy coating with or without *passivation* (3.2.163), and/or *sealant* (3.2.186).

3.2.29
basis material
base metal
material upon which coatings are deposited

Note 1 to entry: See *substrate* (3.2.205).

3.2.30
bipolar electrode
electrode that is not directly connected to the power supply but is so placed in the solution between the anode and the *cathode* (3.2.64) that the part nearest to the anode becomes cathodic and the part nearest to the cathode becomes anodic

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