International Mg Society

International Mg Society

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Magnesium and Magnesium Alloys

-- Terms and definitions of surface treatment

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Magnesium and Magnesium Alloys — Terms and definitions of surface treatment

1 Scope

This document specifies the terms and definitions of surface treatment of magnesium and magnesium alloys, including basic terminology, surface treatment, performance, testing, and evaluation.

It applies to the surface treatment of magnesium and magnesium alloys.

2 Terms and definitions

For this document, the following terms and definitions apply.

2.1 Basic terminology

2.1.1 Chemical Conversion

Chemical conversion is the process of forming the chemical oxide coating of magnesium in an oxidizing chemical solution, formerly known as chemical oxidation.

2.1.2 Anodic Oxidation /Anodizing

Anodic oxidation /anodizing is an electrochemical oxidation process. In this process, a layer of ceramic oxide coating is generated on the surface of magnesium or magnesium alloy through electrochemical action including magnesium or magnesium alloy used as an anode and stainless steel or carbon used as cathode. The coating has protective, decorative, or other functional characteristics.

2.1.3 Micro-Arc Oxidation

Micro-arc oxidation (MAO) is the anodic oxidation of the high voltage area in the plasma discharge area. The micro-arc generated on the electrode surface is used to sinter the oxide coating on the electrode surface to form a ceramic oxide coating. In the micro-arc oxidation treatment, the obvious arc discharge appears at the interface between the electrode and the solution. It is also called plasma electrolytic oxidation (PEO), anodic spark deposition (ASD), or Arc-anodizing deposition (AAD).

2.1.4 Electroplating (electrodeposition)

Electroplating is the process of depositing metal or alloy coating on the substrate by electrolysis to obtain the properties or dimensions that the substrate metal does not have. It is also called electrodeposition.

2.1.5 Electroless Plating (chemical plating)

Electroless plating is the process of depositing metal or alloy coating by chemical method rather than electrolytic method. It is also called chemical plating.

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2.1.6 Painting

Painting is the process of paint coating on the substrate surface to form a protective, decorative, or specific functional coating.

2.1.7 Thermal Spraying

Thermal spraying is the process of forming a coating by spraying the heated spraying materials on the surface of the pretreated magnesium and magnesium alloy substrate.

Note 1: The spraying materials can be alloy materials, ceramic materials, or alloy-ceramic composite materials.

Note 2: The spraying materials are heated to a plastic or molten state inside or outside the spraying gun.

Note 3: To obtain special coating performance, post-spraying heat treatment, mechanical treatment, or sealing treatment can be adopted.

2.1.8 Activation

Activation is the process of removing the passivation surface conditions.

2.1.9 Stripping

Stripping is the process of removing anodic oxide coating, chemical conversion coating, or coating on the magnesium and its alloy surface.

2.1.10 Surface Preconditioning

Surface preconditioning refers to the mechanical and chemical treatment such as cleaning, activating, and polishing, of the surface of the substrate to adjust the surface state before pretreatment or coating.

2.1.11 Pretreatment

Pretreatment is the process of forming a thin coating layer on the substrate surface by physical, chemical, and electrochemical methods after conditioning. Generally, it can be used as the pretreatment of organic coating or used alone.

2.1.12 Self-healing Coating

The self-healing coating is the coating that can heal the morphology or performance by itself once the coating is broken.

2.1.13 Surface Composite Treatment

Surface composite treatment is the process that combining two or more surface treatment technologies in an appropriate order and method, or manufacturing composite coatings based on a certain surface technology.

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2.2 Surface treatment

2.2.1 Degreasing

Degreasing is the process of removing grease from magnesium and its alloy surfaces by mechanical, chemical, or electrolytic methods.

2.2.2 Emulsion Degreasing

Emulsion degreasing is the process of removing grease from magnesium and its alloy surfaces with emulsion cleaner.

2.2.3 Organic Solvent Degreasing

Organic solvent degreasing is the process of degreasing magnesium and its alloy surface with the organic solvent.

2.2.4 Mechanical Surface Treatment

Mechanical surface treatment is the process of removing foreign matter on the surface of magnesium and its alloy substrate by using manual tools, power tools, or spraying, shot blasting, granulation, etc.

2.2.5 Chemical Surface Treatment

Chemical surface treatment is the process of removing the oxide scale and oil stain on the surface of magnesium and its alloy by chemical reactions between acid alkali or alkaline solution and the oxide and oil stain on the surface of magnesium and its alloy.

2.2.6 Electrochemical Surface Treatment

Electrochemical surface treatment is the process of removing oxide and oil stains on the substrate surface or, form conversion coating by using electrochemical methods.

2.2.7 Pickling

Pickling is the process of removing oxides or other compounds on magnesium and its alloy surface through chemical action in acid solution.

2.2.8 Desmutting

Desmutting is the process of removing the "dirty ash" attached to the magnesium and its alloy surface (such as the treatment of magnesium and its alloy immersed in sulfuric acid or nitric acid solution after alkali washing), also known as light, acid washing, or neutralization.

2.2.9 Deoxidizing

Deoxidizing is the process of removing oxides on the magnesium and its alloy surface.

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2.2.10 Brushing

Brushing is a method of mechanical surface treatment, usually with a rotating brush.

2.2.11 Grinding

Grinding is the process of removing magnesium and its alloy surface materials with rigid or flexible carriers containing or attached to abrasives.

2.2.12 Belt Grinding

Belt grinding is a method of mechanical treatment of magnesium parts, in which the circular strip with abrasive is in contact with the surface of magnesium parts. (normally including dry type and wet type)

2.2.13 Tumbling

Tumbling is the process of improving the smoothness of magnesium and its alloy surface by batch processing of magnesium parts in the cylinder (with or without abrasive or shot).

2.2.14 Abrasive Blasting

Abrasive blasting is a method of mechanical surface treatment by using air flow or centrifugal force to blast abrasives such as corundum or glass sand to the surface of objects. Fine abrasives suspended in water or other liquids can also be used for treatment (wet jet grinding or steam jet grinding).

2.2.15 Shot Penning

Shot penning is a method of mechanical surface treatment by spraying hard and small spherical particles (such as metal shot) onto the magnesium and its alloy surface.

2.2.16 Glass Bead Blasting

Glass bead blasting is a method of mechanical surface treatment by spraying small spherical glass shots on the magnesium and its alloy surface to make it clean or hardened.

2.2.17 Sand Blasting

Sand blasting is a method of mechanical surface treatment by using compressed air or centrifugal force to blast abrasive particles such as sand or magnesium oxide to the magnesium and its alloy surface.

2.2.18 Wet Blasting

Wet blasting is a method of mechanical surface treatment by blasting the water slurry containing abrasive to the workpiece at high speed to clean or finish its surface.

2.2.19 Cleaning

Cleaning is the process of removing grease and dirt on the surface with weak acid, weak alkali solution, or solvent and steam. This treatment may be chemical or electrolytic.

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2.2.20 Rinsing

Rinsing is the process of using clean water to remove water-soluble acids, alkalis, and compounds on the surface of the workpiece.

2.2.21 Polishing

Polishing is the process of reducing the roughness of magnesium and its alloy surface.

2.2.22 Mechanical Polishing

Mechanical polishing is the process of slightly cutting and grinding the surface of magnesium and its alloy with a polishing wheel mounted on a polishing machine and coated with polishing paste.

2.2.23 Brightening

Brightening is the process of brightening the magnesium and its alloy surface by mechanical, chemical, or electrochemical methods.

2.2.24 Satin Finishing

Satin finishing is a surface treatment process that makes the surface have uniform discontinuous fine stripes.

2.2.25 Matte Finishing

Matte Finishing is a surface treatment process that uses mechanical or chemical treatment methods to form a non-directional and dull surface.

2.2.26 Bright Dipping

Bright dipping is the process of dipping magnesium in the proper solution to make the magnesium and its alloy surface bright.

2.2.27 Flocculation

Flocculation is the process of polymerizing into larger aggregates that can precipitate or help to precipitate.

2.2.28 Surface Wire Drawing

Surface wire drawing is a surface treatment process that forms lines on the surface of magnesium and its alloy by grinding products to achieve a decorative effect.

2.2.29 Buffing

Buffing is the process of polishing the magnesium and its alloy surface with a soft rotating wheel (usually made of cotton cloth or other flexible materials). The adhesive abrasive used on the wheel is suspension, paste, or grease containing fine abrasive particles.

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2.2.30 Chemical Polishing

Chemical polishing is a process in which magnesium and its alloy are immersed in a chemical solution.

2.2.31 Electropolishing

Electropolishing is the polishing treatment of magnesium and its alloy as the anode in the proper electrolyte.

2.2.32 Etching

Etching is the treatment of magnesium and its alloy surface roughening due to overall or selective dissolution in the acidic medium.

2.2.33 Electrolytic Etching

Electrolytic etching is the etching treatment of magnesium and its alloy in proper solution by electrolysis.

2.2.34 Chromate Process

The chromate process is a process of chemical conversion in chromate solution.

2.2.35 Phosphate Process

Phosphate process is a process of chemical conversion in phosphate solution.

2.2.36 Chromate Phosphate Process

The chromate phosphate process is a process of chemical conversion in phosphate/chromate solution.

2.2.37 Chromium-Free Conversion

Chromium-free conversion is a process of chemical conversion in the solution without chromate.

2.2.38 Combined Coating

Combined coating refers to superimposed different coating on magnesium and its alloy.

2.2.39 Phosphoric acid anodizing

Phosphoric acid anodizing is a process of anodizing in a phosphate solution.

2.2.40 DC Micro-Arc Oxidation

DC micro-arc oxidation is micro-arc oxidation conducted by the directive current.

2.2.41 AC Micro-Arc Oxidation

AC micro-arc oxidation is micro-arc oxidation conducted by alternating current.

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2.2.42 Pulsed Micro-arc Oxidation

Pulse micro-arc oxidation is micro-arc oxidation conducted by pulse electricity.

2.2.43 Constant Voltage Micro-Arc Oxidation

Constant voltage micro-arc oxidation is micro-arc oxidation conducted under a constant voltage.

2.2.44 Constant Current Micro-Arc Oxidation

Constant current micro-arc oxidation is micro-arc oxidation conducted under a constant current.

2.2.45 Self-sealing Micro-Arc Oxidation

Self-sealing micro-arc oxidation is micro-arc oxidation that can seal the micro holes of coatings in the process of micro-arc oxidation.

2.2.46 Anode

An anode is an electrode that generates positive ions or other oxidation reactions by discharging negative ions during electrolysis.

2.2.47 Cathode

The cathode is an electrode that generates negative ions or other reduction reactions by discharging positive ions during electrolysis.

2.2.48 Natural Oxidation

Natural oxidation is an oxidation process without artificial acceleration in the atmosphere.

2.2.49 Anodic Oxide Coating

Anodic oxide coating is a protective, decorative, or functional oxide coating formed on the surface of magnesium and magnesium alloys during anodic oxidation.

2.2.50 Combined Anodic Coating

Combined anodic coating is a combined coating formed after anodizing magnesium and magnesium alloy and then cover organic or different coating.

2.2.51 Organic Polymer Spraying Coating

Organic polymer spraying coating is an organic polymer coating formed by spraying on the surface of magnesium and magnesium alloy. Chemical conversion is usually required before spraying.

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2.2.52 Functional Oxide Coating

Functional oxide coating is an anodic oxide coating that can significantly improve performance (such as high hardness) or endow new functions (such as magnetism).

2.2.53 Auxiliary Electrode

An auxiliary electrode is an additional anode or cathode used to evenly distribute the current during electrolysis to obtain a uniform coating.

2.2.54 Current Density

Current density is the current intensity per unit area passing through the electrode surface. It is generally expressed in amperes per square meter (A/m2) or amperes per square decimeter (A/dm2).

2.2.55 Critical Current Density

Critical current density is a specific current density value during electrolysis.

2.2.56 Current Efficiency

Current efficiency is the ratio between the effective current consumed by the formation of the oxide coating in the anodic oxidation process and the theoretical current calculated according to Faraday's law, usually expressed in percentage.

2.2.57 Electrolysis

Electrolysis is a process in which current flows through electrolytes to produce an electrochemical reaction on the electrode.

2.2.58 Electrolyte

The electrolyte is a conductive liquid medium that transmits current by ions.

2.2.59 Throwing Power

Throwing power is the ability of the current to be evenly distributed on the irregular electrode surface during electrolysis.

2.2.60 Significant Surface

A significant surface is a surface that has been or is to be covered with oxide film or coating.

2.2.61 Rack (Jig)

A rack (jig) is a device for suspending and carrying workpieces during surface treatment. It can be made of magnesium during anodizing and of iron parts during spraying.

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2.2.62 Barrier Layer

The barrier layer is a very thin non-porous oxide layer close to the surface of magnesium and its alloy in the porous anodic oxide coating structure, which is different from the main part of the porous anodic oxide coating.

2.2.63 Micro Pore

The micro pore is a small hole in the coatings.

2.2.64 Color

Color is the appearance characteristic of an object determined by the composition of the incident spectrum, the reflection or transmission of light by the object, and the optical sense of the observer.

2.2.65 Periodic Reverse Electrolyzing

Periodic reverse electrolyzing is an electrolysis method in which the current is cyclically reversed.

2.2.66 Superimposed A.C.

Superimposed A.C. is the current form in which alternating current is superimposed on direct current during electrolysis.

2.2.67 Thief (Robber)

Thief (robber) is an auxiliary electrode placed at a specific position, which can transfer part of the current on some parts of the workpiece to avoid excessive local current density.

2.2.68 Bath Voltage (Tank Voltage)

Bath voltage (tank voltage) is the voltage between the anode and cathode in the electrolytic cell.

2.2.69 Bus Bar

The bus bar is a rigid metal conductor that leads current into an anode or cathode (such as in an anodic oxidation tank).

2.2.70 Filter Aid

Filter aid is a filter medium composed of inert materials with different particle sizes. It is used to prevent excessive accumulation of filter residue on the main filter during filtration.

2.2.71 Air Agitation

Air stirring is a stirring and mixing process in which air passes through the solution.

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2.2.72 Lapping

Lapping is the mechanical treatment (hard anodizing) of the coating surface. It is mainly to meet the dimensional tolerance and improve the surface quality.

2.2.73 Sealing

Sealing is the process of sealing the micropores in the coating to improve the coating's compactness and corrosion resistance.

2.2.74 Chromate (dichromate) sealing

Chromate (dichromate) sealing is the sealing treatment in the solution containing dichromate, which is often used to improve the corrosion resistance of the pretreatment layer.

2.2.75 Passivating

Passivating is the process of making the magnesium and its alloy surface or the surface of the electroplated coating passive.

2.2.76 Strip

Strip is a method of removing the coating from the substrate or the base coating.

2.2.77 Aging

Aging is the structural variation of the coating after a period of time.

2.2.78 Spraying

Spraying is a method of spraying paint onto the surface of magnesium and its alloy parts to form a coating.

2.2.79 Electrostatic Spraying

Electrostatic spraying is a method to spray charged paint onto magnesium and its alloy parts to form coatings under the action of a high DC electric field. Generally, the parts to be coated are the anode and the spraying device is the cathode.

2.2.80 Dip Painting

Dip painting is a method of immersing the parts to be coated in the aqueous solution or organic solution of paint to form a coating on the surface of the parts.

2.2.81 Powder Spraying

Powder spraying is a method of spraying dry fine powder without any water or solvent onto the substrate surface for thermal curing.

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2.2.82 Liquid Spraying

Liquid spraying is a method of spraying solvent-containing paint resin onto metal surfaces, also known as spray painting.

2.2.83 Multi-Layer Spraying

Multi-layer spraying refers to the coating treatment of more than one spraying and (or) curing.

2.2.84 Curing

Curing is a process in which the paint resin and curing agent cross-link reaction to form a polymer coating.

2.2.85 Rolling Painting

Roller painting is a method of continuously coating organic coatings on the surface of magnesium and its alloy sheet strip with paint rollers.

2.2.86 Heat Transformation

Heat transformation is a process in which the ink is transferred to form a texture or pattern on the surface of the coating after heat treatment.

2.2.87 Blue Scale

The blue scale is an international standard scale for determining the light fastness of dyes. It is composed of eight kinds of woollen fabrics with different blue degrees, each representing different lightfastness.

2.2.88 Grey Scale

The grey scale is an international standard scale with different intensities of grey on the surface, which is generally used to estimate the change of color.

2.2.89 PE/TGIC

PE/TGIC are paints based on saturated polyester resin and TGIC curing agent.

2.2.90 PE/HAA

PE/HAA are paints based on saturated polyester resin and hydroxyalkyl amide curing agent.

2.2.91 PU

PU are paints based on saturated polyester resin and isocyanate curing agent.

2.2.92 Acrylic Paints

Acrylic paints are paints based on acrylic resin and curing agents.

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2.2.93 Particle Size Distribution

Particle size distribution is the size and range of powder paint and the proportion of particles of various sizes in the total amount.

2.2.94 Solid Content

Solid content is the mass fraction of non-volatile matter in the paint under specified experimental conditions.

2.2.95 Volatile Content

Volatile content is the mass fraction of volatile matter under specified experimental conditions.

2.2.96 Ash Content

Ash content is the content of residue after the coating is burnt and ashed, generally expressed in mass fraction.

2.2.97 Levelling

Leveling is the process of reducing the surface unevenness of the coating and improving the flatness of the coating through liquid flow after coating.

2.2.98 Storage Stability

Storage stability refers to the ability of paint to maintain stable physical or chemical properties after storage.

2.3 Performance

2.3.1 Adhesion

The adhesion of coating refers to the bonding strength between the coating and the substrate (or intermediate coating), that is, the force required for the coating with unit surface area to detach from the substrate (or intermediate coating).

2.3.2 Thickness of Coating

The thickness of coating is the thickness from the coating surface to the substrate.

2.3.3 Local Thickness of Coating

The local thickness of the coating is the average value of the thickness obtained through several (generally 5) single measurements within the investigated area, which is also called the coating thickness at the measurement point.

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2.3.4 Average Thickness of Coating

The average thickness of the coating is the average coating thickness obtained from several measuring points or the thickness measured by the mass loss method.

2.3.5 Porosity

Porosity is the ratio of pore volume to total volume in the coating.

2.3.6 Appearance

Appearance refers to the visual result of the coating surface state, including the color, gloss, and appearance defects of the surface.

2.3.7 Hardness

Hardness is the ability of the coating to resist hard objects pressing into its surface. Hardness is an important performance to measure the hardness of the coating.

2.3.8 Corrosion Resistance

Corrosion resistance refers to the ability to withstand changes in various types of corrosive media, such as salt spray corrosion resistance, alkali resistance, acid resistance, etc.

2.3.9 Acid Resistance

Acid resistance is an accelerated corrosion test method with an acid solution of a specified concentration.

2.3.10 Detergent Resistance

Detergent resistance is the ability to withstand changes in detergent solutions. The test is usually carried out in a detergent solution of a specified concentration.

2.3.11 Weatherability

Weatherability is the ability of the coating to withstand long-term atmospheric exposure.

2.3.12 Self-Healing Performance

Under the action of external mechanical forces, the integrity of the structure and properties of coatings will be damaged to varying degrees. At the same time, the self-healing material in the coating could repair the defects of the crack with the help of a certain principle, and then achieve the goal of repairing without external assistance. The ability of the coating itself to identify, control, and restore the shortcomings is called self-healing performance.

2.3.13 Appearance Inspection

Appearance inspection refers to the visual inspection of the surface state under the specified lighting and observation conditions according to the specified requirements.

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2.3.14 Color Difference

Color difference refers to the color difference between sample and standard sample or between sample and sample.

2.3.15 Color Tolerance (Color Limits)

Color tolerance (Color limits) refers to the allowable color deviation of the sample compared with the standard sample under the specified lighting and observation conditions.

2.3.16 Brightness

Brightness is an imprecise term for the ability of an object's surface to reflect light.

2.3.17 Gloss

Gloss is an optical property of the coating surface characterized by the ability to reflect light, usually tested by a gloss meter.

2.3.18 Abrasion Resistance

Abrasion resistance is the resistance of the coating to the mechanical action of friction.

2.3.19 Light Fastness

Light fastness refers to the ability of the colored surface to resist light discoloration under long-term light (excluding the influence of the atmosphere).

2.3.20 Light Reflectivity

Light reflectivity is the ability of the surface to reflect light when an object is illuminated by light.

2.3.21 Reflectance

Reflectance is the ratio of reflected luminous flux to incident luminous flux.

2.3.22 Specular Reflectance

Specular reflectance is the ratio of the reflected light flux and the incident light flux in the specular reflection direction under the condition of specified light source and receiver angle.

2.3.23 Specular Gloss

Specular gloss is the ratio of the reflected light flux in the specular reflection direction to the reflected light flux of the glass standard in the specular reflection direction under the condition of the specified angle of the light source and receiver.

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2.3.24 Image Clarity

Image clarity refers to the surface optical performance of anodic oxide coating expressed by the image clarity or distortion reflected from the surface.

2.3.25 Gloss Retention

Gloss retention is the ability of the coating to maintain its original gloss, which is usually expressed by the ratio of the gloss change before and after the test.

2.3.26 Sealing Quality

Sealing quality is the sealing effect of micropores of anodic oxide coating, which is usually evaluated by the phosphoric acid immersion test, stain test, and admittance test.

2.3.27 Biocompatibility

Biocompatibility is one of the properties that living tissues react to inactive materials.

2.3.28 Electromagnetic Shielding

Electromagnetic shielding is the ability to prevent or reduce electromagnetic waves from invading some parts of space and the ability to limit electromagnetic interference to a certain range.

2.3.29 Thermal Control Performance

Thermal control performance is the ability to achieve thermal control through the thermal absorption performance and thermal radiation performance of the coating.

2.3.30 Conductivity

Conductivity is the ability of the coating to conduct current.

2.3.31 Wettability

Wettability is the ability or tendency of liquid to spread on a solid surface.

2.3.32 Resistance to Cracking by Deformation

Resistance to cracking by deformation is the ability of the coating to resist external forces and keep the coating unbroken.

2.3.33 Craze Resistance

Craze resistance is the ability of the coating to resist crack formation at high temperatures.

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2.3.34 Insulation

Insulation is a general term for the ability of insulating coating to withstand voltage impact, which is expressed by breakdown voltage, breakdown strength, and withstand voltage.

2.3.35 Surface Density

Surface density is the ratio of coating mass to apparent volume.

2.3.36 Boiling Water Resistance

Boiling water resistance is the resistance of the coating to boiling water immersion.

2.3.37 Solvent Resistance

Solvent resistance is the ability of the coating to resist swelling, dissolution, cracking, or deformation caused by solvent.

2.3.38 Impact Resistance

Impact resistance is the ability of the coating to resist the impact load.

2.3.39 Cupping Resistance

Cupping resistance is the ability of the coating to resist cracking or falling off in the cupping test.

2.3.40 Bending Resistance

Bending resistance is the ability of the coating to withstand deformation.

2.3.41 Thermal Conductivity

Thermal conductivity is the performance of the coating to conduct heat.

2.3.42 Breakdown Potential

Breakdown potential is the minimum voltage of the conductor when the voltage is applied at a constant rate of voltage increase, resulting in the loss of dielectric properties of the coating.

2.4 Testing and Evaluation

2.4.1 Thickness Test by Eddy Current

The thickness test by eddy current is a high-frequency induced current method used to measure the thickness of the non-conductive coating on the non-magnetic substrate.

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2.4.2 Thickness Test by Mass-Loss Method

The thickness test by mass-loss method is to calculate the average thickness of the anodic oxide coating through the loss of mass per unit area of the sample after removing the oxide coating. This method can also be used to detect the surface density of anodic oxide coating.

2.4.3 Thickness Test by Split-Beam Microscope Method

The thickness test by split-beam microscope method is a non-destructive method for measuring the thickness of a coating by split-beam microscope.

2.4.4 Thickness Test by Microscopical Method

The thickness test by the microscopical method is a cross-section microscopic measurement of the local thickness of the coating using a metallographic microscope.

2.4.5 Microhardness Test

Microhardness test is a test method to obtain the coating hardness by applying a certain load to the indenter and measuring the indentation size on the cross-section of the anodic oxide coating with a microhardness tester.

2.4.6 Hardness Test by Pencil Scratch

Hardness test by pencil scratch is a method to test the coating hardness by using pencils of various hardness to scratch or scratch the coating.

2.4.7 Indentation Test

The indentation test is a method to measure the size of the indentation with an indentation tester under specified conditions and test the coating hardness by the reciprocal of the indentation length.

2.4.8 Sand-Falling Test

The sand-falling test is a test method to check the abrasion resistance of the coating by using the abrasive particles to fall freely on the surface of the sample.

2.4.9 Abrasive Jet Test

The abrasion jet test is a test method that uses compressed air or inert gas to drive abrasive particles to shoot at the surface of the sample to inspect the coating.

2.4.10 Abrasive Wheel Wear Test

The abrasive wheel wear test is a test method to measure the wear resistance of the coating by using the reciprocating motion between the friction wheel under constant load and the surface of the sample.

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2.4.11 Taber Abrasive Resistance Test

Taber abrasive resistance test is a test method for measuring the wear resistance of coating when the flat sample is fixed on a horizontal rotating disc and the friction wheel contacts with the sample surface under a pre-set contact pressure.

2.4.12 Salt Spray Test

Salt spray test generally refers to the test method of accelerated corrosion in a salt spray medium of sodium chloride solution, including neutral salt spray test (NSS), acetic acid salt spray test (AASS), and copper accelerated acetic acid salt spray test (CASS).

2.4.13 NSS Test

The neutral salt spray test (NSS) is an accelerated corrosion test method using neutral sodium chloride solution spray.

2.4.14 AASS Test

Acetic acid salt spray test (AASS) is an accelerated corrosion test method using acetic acid acidified sodium chloride solution spray.

2.4.15 CASS Test

CASS test is an accelerated corrosion test method using acetic acid, copper chloride, and sodium chloride solution spray. CASS is the abbreviation of "copper accelerated acetic acid salt spray test".

2.4.16 Mortar Resistance Test

Mortar resistance test refers to an accelerated corrosion test method using mortar (used for the slurry group prepared in proportion with sand and lime or the slurry group prepared in proportion with sand, lime, and cement).

2.4.17 Acid Resistance Test

The acid resistance test is a test method for accelerated corrosion with an acid solution of a specified concentration.

2.4.18 Kesternish Test

The Kirschner test is an accelerated corrosion test method conducted in a high-temperature and humid atmosphere containing sulfur dioxide.

2.4.19 Humidity Resistance Test

A humidity resistance test is a test method for checking its resistance to humidity and heat in a constant temperature and humidity box.

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2.4.20 FACT Test

The FACT test is the anodized magnesium oxide corrosion test. This test is a corrosion test conducted by applying direct current to the oxide coating in a specific electrolytic cell.

2.4.21 Machu Test

The Machu test is an accelerated corrosion test conducted in Machu solution.

2.4.22 Natural Weathering Test

Natural weathering test is conducted under various atmospheric conditions at the atmospheric exposure test station to study the weather ability of materials in different environments.

2.4.23 Accelerated Weathering Test

The accelerated weathering test is an accelerated laboratory test that simulates and strengthens the destructive effect of natural atmospheric exposure conditions on samples.

2.4.24 Accelerated Light Fastness Test

The accelerated light fastness test (light fastness test) is a test method for testing the color durability of colored anodic oxide coating by irradiation of an artificial light source.

2.4.25 Phospho-Chrom Test

Phospho-Chrom test is a test method for determining the sealing quality by soaking in phosphoric acid/chromic acid solution. At present, there are two kinds of Phospho-Chrom tests: nitric-acid pre-immersion and nitric-acid-free pre-immersion, both of which belong to arbitration tests.

2.4.26 Dye Spot Test

A dye spot test is a test method to check the ability of anodic oxide coating to absorb dye under specified conditions. It is mainly used for online evaluation of the sealing quality of anodic oxide coating.

2.4.27 Admittance Test

The admittance test is a test method to measure the apparent admittance value of the oxide coating with an AC circuit and evaluate the sealing quality of the coating.

2.4.28 Bending Test

The bending test is a test method to determine the minimum bending radius (related to the thickness of the plate) of the coating without visible cracks.

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2.4.29 Exfoliation Corrosion Test

The exfoliation corrosion test is a test method to evaluate the sensitivity of materials to exfoliation corrosion through visual inspection or metallographic observation through the full immersion test of test materials in a corrosive solution for a certain time

2.4.30 Alternating Dry and Wet Test

The alternating dry and wet test is a test method to wet and dry the magnesium and its alloy sample at a given frequency in a certain experimental cycle.

2.4.31 Tensile Shear Test

The tensile shear test is a test method to test the adhesion between the coating and the substrate by using test tools or equipment to make the sample bear the tensile force perpendicular to the coating surface until the coating peels off.

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