

EDS

Engineering,
GM DAEWOO Auto & Technology
Standards

METHOD OF PLATING THICKNESS MEASUREMENT

EDS-T-7136

ISSUED DATE: 1988. 07. 15

REVISED DATE: 2006. 06. 19

VERSION: 3

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1. PURPOSE

This standard aims at obtaining an accurate and objective test results by standardized test method.

2. SCOPE

This standard specifies the thickness measurement method of plating effective surface^{Note1)} (hereinafter referred to as the "plating") of plated products for automobile parts(hereinafter referred to as the "products").

Note 1) The effective surface means a portion that is used as a product.

3. TYPE OF TEST METHOD

Test methods shall be 4 types as follows.

Test method	Measuring range	Applicable materials
Microscopic cross-section test method	2 ~ 25 μm	General metals, Anodic plating on aluminum base
Electrolytic test method	Chromium: 0.15mm max. Others: 1.5 μm min.	General metals
Plating weight test method by mass measurement	-	General metals, Anodic plating on aluminum base
Magnetic type test	Within 10% of the actual value excluding thin plating with the accuracy of 5 μm or less	. General metals . Magnetic coating on non-metallic base

4. TEST SAMPLE

4.1. Test samples shall be taken from the effective surface of the product. However, when it is impossible, alternative test piece^{Note2)} may be used.

4.2. Foreign substances such as dusts and oil on the sample shall be removed before measurement to prevent damage on the coating.

Note 2) Test pieces shall represent the product, and the base and coating condition of test pieces shall be the same as those of the product.

4.3. For initial sample approval purposes, at least 3 test pieces shall be tested and for routine quality control, at least 1 test piece shall be tested.

5. TEST METHOD

5.1. Microscopic cross-section test method

5.1.1. General

It is a method of measuring film thickness by observing the cross-section of the test piece film under a microscope.

5.1.2. Device

A microscope device with the ocular scale or the one specified in KS B 5601[Micrometer Microscope] shall be used.

5.1.3. Test piece

(1) Sampling place: Test piece shall be sampled from the effective surface of the product. When it is impossible, alternative test piece may be used. ^{Note1)} In this case, the test piece shall be the one that represents the product, and the base material ^{Note1)} and coating condition ^{Note2)} of the test piece shall be the same as those of the product.

(2) Shape: For test piece, a portion of 5 ~ 30mm in length shall be sampled from the effective surface.

(3) Treatment prior to measurement: The test piece shall be cleaned with soft cloth soaked with appropriate solvent ^{Note3)} according to level of contamination prior to measurement.

* ^{Note 1)} Composition, manufacturing conditions(by kind and quality of material) and pre-treatment surface condition of the base material shall be, in principle, the same as those of the product.

²⁾ The same treatment solution and processing condition as that of the product, shall be applied on the test piece to reflect the effects of work condition such as pre-treatment and plating.

³⁾ For the solvent, acetone, ethyl alcohol, ethyl ether, methyl ether, etc. shall be used, but the one which corrodes the test piece and forms protection film on the test piece shall not be used.

5.1.4. Test

Mount the test piece which was polished beforehand or bury it vertically into resin or alloy with low melting point. Polish it vertically, while taking care not to damage the surface of the film. Measure at 3 points or more on the parallel portion of the section after magnifying it to an appropriate size with a micrometer microscope or projector. ^{Note4)} The minimum value among them shall be the film thickness.

* ^{Note 4)} The scale of microscope projector shall be corrected by a standard ruler.

5.1.5. Factors affecting precision of measurement

- (1) Surface roughness
- (2) Inclination of the section
- (3) Deformation of the film
- (4) Formation of round
- (5) Microscope magnification

5.2. Electrolytic test method

5.2.1. General

It is a method of measuring the plating thickness by applying the fact that the plating time is proportional to the time to remove the plating of a specified small area anodically using constant current electrolysis.

5.2.2. Device

It is composed of an electrolytic bath generating constant current and its accessories. Sufficient calibration of the