KES

Plating

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1. Scope of Application

This standard specifies the electroplating applied onto the effective surfaces of automobile parts for the purpose of corrosion resistance, decoration,carburization prevention, wear resistance and others.

2. Definition of Terminology

The principal terminologies used in this standard shall mean as follows:

(1) Vehicle interior:: Interior portion of automobile in which parts are furnished and used without direct or indirect exposure to the weather. However, in case of indirect exposure to the weather in normal used condition, it is regarded as exterior.

(2) Vehicle exterior: Portion which is furnished on the exterior of automobile and used while exposed directly or indirectly to the weather. However, in case that a portion of a certain part is exposed to the weather, such as wiper arm, it is regarded as exterior.

(3) Inside: Directly invisible portion of the one combined or integrated with 2 or more parts.

(4) Outside: Portion of 1 part or the one combined or integrated with 2 or more parts which is visible directly as it is or in used condition.

(5) Effective surface: Important surfaces for used as described below. (The detail shall be indicated in drawings.)

(a) Visible surface from the ordinary direction in used condition

(b) Surface easily worn or injured

(c) Surface ordinarily touched by hand

(d) Surface which corrosion or rust gives a functional change

(6) Glossiness: The glossiness shall be classified with the specular gloss measured by the Method 2 in JIS Z 8741, as follows:

(a) Gloss: 80% or more

(b) Semi-gloss: 20% to under 80%

(c) Dull: Less than 20%

(7) Roughness: The roughness shall be classified with the degree of surface unevenness, as follows:

(a) Smooth surface: Smooth condition without unevenness

(b) Semi-smooth surface: Condition of a little unevenness

(c) Rough surface: Condition of much unevenness

(d) Matte-finished surface: Condition of uniform and granular unevenness

(8) Standard sample: Completed article, test piece minimum acceptable sample, etc. preserved by containing in a dry case in a cool and dark place avoiding the influence of the sunbeam, temperature, humidity, dust and others for comparing with test sample observed and tested periodically, and approved by the inspection section of our company.

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3. Symbolization

The plating shall be symbolized according to the symbols specified in 3.1 to 3.9 and in the following order. However, a symbol unnecessary to be indicated can be omitted.

①	②	③	④	⑤	⑥
Symbol for indicating plating	Symbol for indicating kind of basis material	Symbol for indicating kind of plating	Symbol for indicating thickness	Symbol for indicating chromate treatment	Symbol for indicating hydrogen embrittlement removal treatment

⑦	⑧	⑨
Symbol for indicating surface condition	Symbol for indicating appearance grade	Symbol for indicating special specification

* For multi-layer plating, the final plating shall be indicated.

Example 1 M F Cr T2 - al

⑦ Surface condition of al
④ Thickness: min. 10μm of nickel or min. 0.15μm of chromium
③ Decorative chromium plating
② Basis material of iron or steel
① Plating

Example 2 M F Zn T1 - C - H1

⑥ Min. 2 h of hydrogen embrittlement removal time
⑤ Colored chromate
④ Thickness: Min. 5μm of zinc
③ Zinc plating
② Basis material of iron or steel
① Plating

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Example 3 M B ICr

③ Industrial chromium plating
② Basis material of copper
① Plating

* Refer to 3.3.

3.1 Symbol for indicating Plating: The plating shall be indicated with "M".

3.2 Symbols for indicating kinds of basis materials: The symbols for indicating basis materials shall be as shown in Table 1.

Table 1

Basis Material	Symbol
Aluminium and its alloy	A
Copper and its alloy	B
Iron and steel	F
Resin	P
Stainless steel	S
Zinc and its alloy	Z

3.3 Symbols for indicating kinds of plating: The symbols for indicating the kinds of plating shall be as shown in Table 2.

Table 2

Kind of Plating		Symbol
Decorative plating	Chromium	Cr
	Black chromium	CrB
	Nickel	Ni
Rust preventive plating	Zinc	Zn
	Zinc iron alloy	Zn • F
	Tin zinc alloy	Sn • Zn
	Zinc nickel alloy	Zn • Ni
Industrial Plating	Chromium	ICr *
	Copper	Cu

* It shall be discriminated by attaching the initial "I" of Industrial before Cr.

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3.4 Symbols for indicating plating thicknesses: The symbols for indicating plating thicknesses shall be as shown in Table 3.

Table 3

Symbol of Thickness	Plating Thickness (μm min.)
T1	The symbols differ according to the kind of plating. Refer to Tables 8 to 11.
T2	
T3	
T4	
T5	
T6	

Remark: In case of industrial plating, the thickness shall be indicated in drawing by using no thickness symbol. However, it shall be 5μm min.

3.5 Symbols for indicating chromate treatments: The symbols for indicating chromate treatments shall be as shown in Table 4.

Table 4

Chromate Treatment	Treatment Symbol	Color	Remarks
Black chromate	B	Black	Phosphoric acid process
	BD	Dark black	Acetic acid process
Colored chromate	C	Gold	
Green chromate (Olive chromate)	G	Green	
Gloss chromate	W	White	

3.6 Symbols for indicating hydrogen embrittlement removal treatment: The symbols for indicating hydrogen embrittlement removal treatment shall be based on the treating time, as shown in Table 5.

Table 5

Treating Time (Min.)	Treating Symbol	Examples of Application Parts
2 h	H1	8.8, 10.9 bolts
3 h	H2	12.9 bolt
4 h	H3	Spring, spring washer

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3.7 Symbols for indicating surface conditions: The symbols for indicating the surface conditions of decorative chromium and nickel platings shall be classified according to the condition of glossiness and roughness, as shown in Table 6.

Table 6

Roughness / Glossiness	1 (Smooth surface)	2 (Semi-smooth surface)	3 (Rough surface)	4 (Matte-finished surface)	Reference (Treating solution)
a (Gloss)	a1	a2	a3	a4	Gloss plating solution
b (Semi-gloss)	b1	b2	b3	b4	Semi-gloss plating solution
c (Dull)	c1	c2	c3	c4	No gloss liquid

Remarks 1. In case that the same part has 2 kinds of surface condition, the vertical combination (a,b,c) shall, as a rule, not be taken.

2. The glossiness c shall, generally, not be used.
3. The surface condition of other platings than decorative chromium and nickel platings is not specified. However, if it is required specially, it shall be in accordance with Table 5.

3.8 Symbols for indicating appearance grades: The symbols for indicating appearance grades shall be based on 4.1 Appearance grades as shown in Table 7.

Table 7

Appearance Grade	Grade Symbol
Class 1	①
Class 2	②
Class 3	③

3.9 Symbol for indicating special specification: When a specification not specified in this standard is required, the symbol "Z" shall be attached to the end of the symbol of plating and the detail shall be stated in drawing.

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4. Evaluation Standard

4.1 Appearance The evaluation standard of appearance shall be as shown in Table 8. For decorative chromium plating, improvement by buffing and others shall not be carried out after plating.

Table 8

<table>
<tr><th>Grade
Appearance Condition</th><th>Class 1</th><th>Class 2</th><th>Class 3</th></tr>
<tr><td>Exposure of basis material</td><td rowspan="3">Nil</td><td rowspan="3">Nil</td><td rowspan="3">Nil</td></tr>
<tr><td>Blister</td></tr>
<tr><td>Peeling</td></tr>
<tr><td>Pinhole</td><td rowspan="10">No easily distinguishable one.</td><td rowspan="8">No remarkable one.</td><td>No these cluster.</td></tr>
<tr><td>Pit</td></tr>
<tr><td>Rough surface</td><td rowspan="12">Not specified.</td></tr>
<tr><td>Stain</td></tr>
<tr><td>Spot</td></tr>
<tr><td>Scorch</td></tr>
<tr><td>Clouding</td></tr>
<tr><td>Hot water wrinkles</td></tr>
<tr><td>Unevenness</td></tr>
<tr><td>Polishing trace</td><td>No remarkable cluster.</td></tr>
<tr><td>Deformation due to polishing</td><td>No remarkable deformation.</td></tr>
<tr><td>Flaw on basis material</td><td colspan="2" rowspan="3">Accordign to remarks.</td></tr>
<tr><td>Ding</td></tr>
<tr><td>Scratch</td></tr>
<tr><td>Color unevenness</td><td>No easily distinguishable one.</td><td>No remarkable one.</td></tr>
<tr><td>Glossiness</td><td>To be uniform and beautiful.</td><td>No remarkable unevenness.</td></tr>
<tr><td>Sharp edge*</td><td>Nil</td><td>No remarkable one.</td></tr>
</table>

* The sharp edge means sharp end part.

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