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JAPANESE INDUSTRIAL STANDARD

Chromate conversion coatings on electroplated zinc and cadmium coatings

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Chromate conversion coatings on
electroplated zinc and cadmium coatings

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1. **Scope** This Japanese Industrial Standard specifies chromate conversion coatings on the significant surfaces ⁽¹⁾ of electroplated zinc coatings (JIS H 8610) and electroplated cadmium coatings (JIS H 8611) conducted for the purposes of corrosion prevention.

Notes ⁽¹⁾ The significant surface herein means a surface essential for serviceability and/or appearance.

Remarks 1. The following standards are cited in this Standard:

- JIS H 0400 Glossary of terms used in electroplating
- JIS H 0404 Graphical symbol for electroplated coating
- JIS H 8502 Methods of corrosion resistance test for metallic coatings
- JIS H 8610 Electroplated coatings of zinc on iron and steel
- JIS H 8611 Electroplated coatings of cadmium on steel
- JIS K 1404 Potassium dichromate
- JIS K 1432 Silver nitrate
- JIS K 1449 Phosphoric acid
- JIS K 8034 Acetone
- JIS K 8101 Ethanol (99.5) [ethyl alcohol (99.5)]
- JIS K 8252 Ammonium peroxodisulfate
- JIS K 8355 Acetic acid
- JIS K 8374 Lead (II) acetate trihydrate
- JIS K 8447 Sodium cyanide
- JIS K 8488 1,5-diphenylcarbonohydrazide
- JIS K 8576 Sodium hydroxide
- JIS K 8951 Sulfuric acid
- JIS Z 9031 Random sampling methods

2. The corresponding International Standards to this Standard are shown as follows:

- ISO 3613: 1980 Chromate conversion coatings on zinc and cadmium – Test methods
- ISO 3768: 1976 Metallic coatings – Neutral salt spray test (NSS test)
- ISO 3892: 1980 Conversion coatings on metallic materials – Determination of coating mass per unit area – Gravimetric methods
- ISO 4520: 1981 Chromate conversion-coatings on electroplated zinc and cadmium coatings

2. **Definitions** For the main terms used in this Standard the definitions in JIS H 0400 apply and the rest of the terms shall be as follows:

- (1) **chromate conversion coatings** Chromate conversion coatings are corrosion protective coatings provided onto electroplated zinc and cadmium coatings by chromating, which give gloss, light yellow, yellow, green, etc.

Informative reference

1. The tone varies according to the proportion of the composition and thickness of chromium chromate ($x\text{Cr}_2\text{O}_3 \cdot y\text{CrO}_3 \cdot z\text{H}_2\text{O}$) being the principal component of the coating.
 2. In the case of comparatively thin chromate conversion coatings, when light strikes on the surface of the thin transparent coating remaining on the electroplated coatings, reflected beams on the surface of the coating and the surface of the electroplated coatings interfere with each other to bring iridescent patterns.
 3. The chromate conversion coatings bring a difference in tone even for a lot of the same parts and for individual parts and further, uniform tone is difficult to be obtained even on the same surface to bring irregular color.
- (2) **white corrosion product** White corrosion products are white compounds of basic zinc carbonate, basic cadmium carbonate, etc. to be generated when chromate conversion coatings are broken and electroplated zinc and cadmium coatings are exposed to a corrosive environment.
3. **Grade, class and symbol** The grade, class and symbol of chromate conversion coatings shall be as given in Table 1.

Further, the symbol shall be fixed in accordance with JIS H 0404.

Table 1. Grade, class and symbol of chromate conversion coatings

Grade	Class	Symbol of grade and class	Coating mass per unit area g/m ²	Typical appearance (informative reference)
Grade 1	Gloss	CM1 A	0.5 or under	Transparency, sometimes with a bluish tinge
	Light yellow	CM1 B	1.0 or under	A slight iridescence
Grade 2	Yellow	CM2 C	Over 0.5 up to and incl. 1.5	A yellow iridescence
	Green	CM2 D	Over 1.5	Olive, green, bronze, brown

Remarks: Black chromate conversion coatings can be obtained by varying a treating liquid. The coating mass per unit area of the coating shall be as agreed upon between the purchaser and supplier.

4. Quality

4.1 Mass of chromate conversion coatings The mass of chromate conversion coatings shall be tested in accordance with 5.1, and the result shall conform to the requirements specified in Table 1.

4.2 Corrosion resistance of chromate conversion coatings The corrosion resistance of chromate conversion coatings shall be tested in accordance with 5.2, and the result shall conform to the requirements specified in Table 2.

Table 2. Corrosion resistance of chromate conversion coatings

Symbol of grade and class	Minimum time while white corrosion product shall not be generated h
CM1 A	6
CM1 B	24
CM2 C	72
CM2 D	96

4.3 Qualification and determination of chromate conversion coatings The qualification and determination of chromate conversion coatings shall be tested in accordance with 5.3, and their judgement shall be as agreed upon between the purchaser and supplier.

5. Tests

5.1 Mass test for chromate conversion coatings The mass test for chromate conversion coatings shall be as specified in Annex 1.

5.2 Corrosion resistance test for chromate conversion coatings The corrosion resistance test for chromate conversion coatings shall be carried out by the neutral salt spray test method specified in JIS H 8502, and the test shall be continuously carried out for the time as given in Table 2.

Further, the test shall be carried out after 24 h or longer has passed after chromating.

5.3 Test method for qualification and determination of chromate conversion coatings The test method for qualification and determination of chromate conversion coatings shall be as specified in Annex 2.

6. Inspection The inspection shall be carried out as follows:

- (1) A test piece shall be sampled from a lot of the same parts in accordance with JIS Z 9031.
- (2) Chromate conversion coatings shall be tested in accordance with 5., and that conformed to the requirements specified in 4. shall be accepted.