

ZINC PLATE WITH TRIVALENT CHROMIUM PASSIVATE SPECIFICATION

This specification covers the change-over from Zinc Plate with Hexavalent Chromium conversion coating to Zinc Plate with Iridescent (Clear) Trivalent Chromium passivate coating. This transition must occur by the end of 2009.

All suppliers (and associated plate processors) must be qualified to the requirements below before supplying a Trivalent Chromium passivate coating. Any changes to the plating process including chemistry, plater, or top coat (if applicable) must be approved.

Section I: Beginning January 1, 2010 all parts must meet the requirements of Section I.

Section II: This section only applies to parts that were released prior to December 31, 2006. The intention is to allow for a transition period to a Trivalent Chromium passivate coating as specified in Section I before the end of 2009.

Section IV: Cross reference table for this specification to Legacy finishes and CODA surface finish numbers.

AFTER December 31, 2008:

New Drawings shall not use this specification. Only use the corporate specifications in Coda per FTR00025 and FTR00038. Request a new specification, if needed.

Revised Drawings managed in Symphony must have the CODA surface treatment identified on the Symphony Properties Part page and exported with the part drawing to suppliers.

Drawings NOT managed in Symphony will have the plating specification defined on the drawing to read:

Components (stampings, screw machine, castings, etc):

FINISH: ZINC PLATE WITH TRIVALENT CHROMIUM PASSIVATE PER ASTM B633, Type N, Fe/Zn X, yW/zR

N = finish type to be applied

I = As plated without supplementary treatments

III = with colorless chromium passivate coatings

X = number which denotes minimum Zinc thickness in micrometers

y = WHITE corrosion resistance (hrs) above requirements (optional – see Sec. 1J) **z** =

RED rust resistance (hrs) above SENA requirements (optional – see Sec. 1J)

Fasteners (screws, washers, rivets, springs, pins, etc):

FINISH: ZINC PLATE WITH TRIVALENT CHROMIUM PASSIVATE PER ASTM F1941, Fe/Zn X, AT, yW/zR

X = number which denotes minimum Zinc thickness in micrometers

AT = Transparent colorless Trivalent chromium passivate with slight iridescence

y = WHITE corrosion resistance (hrs) above SENA requirements (optional – see Sec. 1J)

z = RED rust resistance (hrs) above SENA requirements (optional – see Sec. 1J)

Range or family:	Designed by: JPT	Approved by: HA	Date: 09Nov2009	Application note: AN165940
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ZINC PLATE WITH TRIVALENT CHROMIUM PASSIVATE SPECIFICATION (Legacy Specification for RoHS)				
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I. ZINC PLATE WITH IRIDESCENT (CLEAR) TRIVALENT CHROMIUM PASSIVATE

This section provides a standard for specification and test methods for Zinc Plate of steel components with an Iridescent (Clear) Trivalent Chromium passivate. **Plate Supplier Requirements for Zinc Plate with Iridescent (Clear) Trivalent Chromium passivate coating:**

A. Reference Specifications:

1. ASTM F1941-07 – “Specification for Electrodeposited Coatings on Threaded Fasteners (UN/UNFR)”
2. ASTM B633-07 – “Specification for Electrodeposited Coatings of Zinc on Iron and Steel”
3. FTR00025 is the global specification for unalloyed Zinc electrolytic coatings.
4. FTR00038 is the global specification for screws, nuts, washers.

***Alignment of this specification with the FTR specifications is not assured**

B. Identification & Marking: The product or packaging must be marked to identify that the parts are Hexavalent Chromium Free with every shipment to identify that the parts are manufactured with the Trivalent Chromium passivate coating.

C. Thickness & Corrosion Resistance: Unless otherwise stated on the part print, Zinc Plate with a conversion coating shall conform to the corrosion resistance requirements listed below for fasteners and other components. Some of the zinc thicknesses are incompatible with small threaded fasteners; refer to ASTM F1941 Appendix X3.

Table 1 - Trivalent Chromium Passivate Performance Requirements (ASTM F1941 Type AT or ASTM B633 Type III)

Designation	Thickness Minimum (micro-inches)	Corrosion Resistance Minimum (hrs)		Typical Application	
		SENA Requirement		Fasteners	Components
		White	Red		
Fe/Zn3	100	3	12	X	
Fe/Zn5	175	24	72	X	X
Fe/Zn8	250	24	96	X	X
Fe/Zn12	480	24	120		X
Fe/Zn15	610	24	150		X

NOTE: For specific plating requirements refer to Section IV – Legacy Finish Specifications Cross-Reference Table.

The corrosion resistance 5% salt spray test is to be performed per ASTM B117 to determine the number of hours to visible white corrosion and red rust on the finished part. Acceptance criterion for the salt spray test is to be based on the appropriate ASTM standard:

Electroplated Components – ASTM B633 Section 7.4

Fasteners – ASTM F1941 Section 6.2

D. Adherence: The plating must adhere tightly to the base metal and must be evaluated for adherence per the “Bend Test” described in ASTM B571 Section 3.

E. Thickness Measurement: Significant surfaces for the location of the zinc thickness measurement should be specified. If a significant surface is not specified on the print refer to ASTM F1941 or ASTM B633 for the method to define the significant surface.

F. Incoming Inspection: Measurement of the zinc thickness should be made on a significant surface agreed to with the supplier per the appropriate ASTM standard. Corrosion resistance is not recommended to be evaluated at incoming receiving inspection, but could be considered for periodic audit or qualification testing.

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G. Plating Process: Choice of process, rack or barrel will affect the level of corrosion resistance. Refer to the ASTM standards and supplier recommendations when selecting a plating process.

H. Top coats: Top coats / sealers are any mineral, organic or organo-mineral supplementary finish to improve corrosion resistance, add color or improve the brightness properties of the surface treatment. If a top coat is required to meet specifications, the following must be complied with:

1. The trade name formulation and manufacturer of the top coat must be provided.
2. Lubricity and electrical resistance could be affected and shall be evaluated. Tests will be performed per Sections IIIA and IIIB respectively.
3. After qualification, no change in chemistry or removal of top coat is permissible and qualification and approval per steps 1 & 2 above.

I. Hydrogen Embrittlement Relief: All electroplated steel parts having a tensile strength greater than 1,000MPa (31 HRC) as well as surface hardened parts shall be baked to reduce the risk of hydrogen embrittlement. See ASTM B850 Table 1 to determine the appropriate heat treatment process for hydrogen embrittlement relief.

J. Additional Requirements: Any additional requirements such as color preference (i.e. yellow), alternate Zinc thickness, higher salt spray corrosion resistance, etc will be specified on the part print.

II. ZINC PLATE WITH CHROMATE (HEXAVALENT CHROMIUM) CONVERSION COATING

This section may **NOT** be used unless otherwise directed by Owner of the specification.

Plate Supplier Requirements for Zinc Plate with Chromate (Hexavalent Chromium) Conversion coating must pass the following salt spray test requirements:

Corrosion requirements to WHITE rust:

- Zinc plate & clear chromate bright dip - 24 hours salt spray performance.
- Zinc plate & chromate treat (yellow) - 96 hours salt spray performance.
- Zinc plate & chromate treat (olive drab) - 150 hours salt spray performance.

III. SNA IN-HOUSE PERFORMANCE TEST REQUIREMENTS

This section covers testing (not required of the supplier) to validate part performance as needed.

Additional Plate Performance Requirements to be performed, as required per product requirements, by the laboratory to initially qualify the supplier specific plate process being used for plated components.

A. Lubricity

For plated fastener parts, use strip-out torque test or other related test with the component in the product application. Compare proposed plated fastener torque to original plated part. Test results for proposed plated part to be approximately equivalent to original plated part in the product application. For other non-fastener parts with lubricity requirements, perform comparison tests in the product application.

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B. Electrical Resistance Test for Plated Current Carrying Parts

For current carrying parts, perform joint resistance test (i.e. low voltage, millivolt drop resistance test) at current levels approximating actual product use. Compare proposed plated part electrical resistance to original plated part. Test results for proposed plated part to be approximately equivalent to original plated part.

References for Grounding and Bonding:

UL 67

UL 845

UL 891

CSA 22.2 No. 0.4

C. Thermal Resistance Test of Coating/Sealers

Perform a comparative test of coatings by heating existing and newly plated samples in an oven at applicable UL temperature rise limits plus a 40°C ambient. The samples can then be subjected to comparative salt-spray tests to red rust or other related tests and review performance results. Other thermal tests may be required based upon application.

D. Sealer Residue Test

Perform a comparative test with existing and proposed samples exposed to anticipated situations of dust and material buildup in threads or other features of the part in the actual manufacturing process or product application and review performance results.

E. Reaction to Other Chemicals Test (such as adhesives, fungicides, varnishes)

Perform a comparative test with existing and proposed samples exposed to anticipated chemicals in the actual product application and review performance results.

F. Manufacturing Review

Perform PPEP (Product and Process Evaluation Plan) and FAIR (First Article Inspection Report). Perform pilot run assembly review of proposed plated part in actual production equipment to confirm acceptability for use in manufacturing processes. Archive Pilot Run documentation with part FAIR documentation.

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IV. LEGACY FINISH SPECIFICATIONS CROSS-REFERENCE TABLE

This section provides a cross-reference table between the legacy specifications and this new specification. If the new corrosion resistance specification does not meet the requirement for the application, the zinc thickness may need to be increased or the application of sealers may need to be investigated.

LEGACY SPECIFICATIONS		OWNER	COMPONENTS	CODA SPEC.	FASTENERS	CODA SPEC.
40004-017-01		Lexington	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn5, AT	HUA21935
30793-501	Type A	Raleigh	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
	Type B	Raleigh	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
	Type C	Raleigh	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
40004-003	-01	Lexington	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn8, AT	HUA21936
	-03	Lexington	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn8, AT	HUA21936
48057-003	-01	Cedar Rapids	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn3, AT	HUA21937
	-02	Cedar Rapids	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn5, AT	HUA21935
	-03	Cedar Rapids	ASTM B633, Type III, Fe/Zn3	HUA21937	ASTM F1941, Fe/Zn3, AT	HUA21937
65054-500		Raleigh	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
65054-516		Raleigh	ASTM B633, Type III, Fe/Zn15	HUA15550	N/A	N/A
65054-517		Raleigh	ASTM B633, Type III, Fe/Zn15	HUA15550	N/A	N/A
E27600		Smyrna	ASTM B633, Type III, Fe/Zn5	HUA21935	N/A	N/A
E27601		Smyrna	N/A	N/A	ASTM F1941, Fe/Zn5, AT	HUA21935
KDS-258-129		Lexington	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
KDS-258-136		Lexington	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn8, AT	HUA21936
MS100-016		Oxford	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
30794-503-01		Raleigh	ASTM B633, Type III, Fe/Zn5	HUA21935	ASTM F1941, Fe/Zn5, AT	HUA21935
700L0004		Waterman	ASTM B633, Type III, Fe/Zn8	HUA21936	ASTM F1941, Fe/Zn8, AT	HUA21936

LEGACY CODA PART NUMBER SERIES FINISH REQUIREMENTS

PART FAMILY	ACCEPTABLE MINIMUM FINISH
20XXX-XXXXXX	ASTM F1941, Fe/Zn5, AT
21XXX-XXXXXX	
22XXX-XXXXXX	
23XXX-XXXXXX	
24XXX-XXXXXX	
29XXX-XXXXXX	

***** Symphony exportable PDF file name must always be **FT40004-017-01.pdf**. Send to OCP Portal Webmaster for posting in the OCP Library. *****

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