



DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY TO

9630
Ser 05P/278
02 AUG 2011

MEMORANDUM

From: SEA 05P
To: SEA 05D
SEA 05U
SEA 05V
SEA 05Z

Subj: AUTHORIZATION TO UTILIZE THERMO-DIFFUSION ZINC PROCESS AS
ALTERNATIVE TO ELECTRODEPOSITED AND HOT-DIP ZINC COATINGS

Ref: (a) ASTM A1059/A1059M "Standard Specification for Zinc Alloy
Thermo-Diffusion Coatings (TDC) on Steel Fasteners,
Hardware, and Other Products"

1. This letter provides Technical Warrant Holder, Coatings and Corrosion Control, authorization to substitute the recently promulgated reference (a) for other established, electrodeposited and hot-dip galvanized coating specifications on hardware to be installed in Navy ships having base-metal strength of <150 ksi. This authorization is based solely on the corrosion-control performance of the thermo-diffusion zinc coatings.
2. Activities seeking to make this change are obligated to examine issues associated with how the thermo-diffusion zinc coating influences part fit-up and influence of coating thickness on intended service life. The thermo-diffusion coating also shall not be used in parts that will be welded after coating. The intent of this letter is to provide options to shipbuilding and Fleet maintenance programs that may be able to incorporate thermo-diffusion zinc coatings into Navy equipment/parts to help reduce total ownership costs.
3. Historically, the Navy utilized Federal Standard QQ-Z-325C (cancelled on 9 March 1982) to specify electrodeposited zinc and Military Specification MIL-Z-17871A (cancelled on 22 December 1965) to specify hot-dip zinc coatings. In both cases, the government specifications were superseded with ASTM Standards as shown below:

QQ-Z-325C - ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

MIL-Z-17871A - ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

Thus, on drawings or requirements documents, and as per the comments in paragraph 1, this letter authorizes use of reference

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(a) as an alternative to any of the zinc coating specifications listed above.

4. The technical risk posed by substituting the ASTM A1059/A1059M for any of the specifications shown in Paragraph 2. is considered low for the following three reasons:

a. Data provided by Distek Corp., the supplier of an ASTM thermo-diffusion zinc coating process called "ArmorGalv," indicates that the process provides a longer service life than either electrodeposited or hot-dip galvanized coatings on a per unit thickness basis, and as such, parts coated with thermo-diffusion zinc should exhibit enhanced, life-cycle corrosion-control performance.

b. Ongoing performance tests of tie-down chains and tensioners on Landing Craft Air Cushion (LCAC) craft in Florida indicate the thermo-diffusion zinc coatings have effectively controlled substrate corrosion for 22 weeks, during which time the chains with electrodeposited zinc coatings serving as engineering controls have exhibited considerable red-rust due to coating loss.

c. The Navy has had active programs since the 1980s to replace electrodeposited and hot-dip galvanized coated parts with inherently corrosion-resistant alloy (e.g., stainless steel, Monel, etc.) parts in many applications, and as such the only remaining citations for zinc coatings in Navy drawings and specifications should be on parts that have performed adequately with zinc coatings. Thus, use of the new, higher performance thermo-diffusion zinc process on such parts should extend overall service life.

5. The thermo-diffusion zinc coating process shall not be specified for use on high-strength steel (e.g., steel with an ultimate tensile strength > 150 ksi) parts without performance verification testing in accordance with a NAVSEA approved test plan.

6. Given the technical approval to use thermo-diffusion zinc coatings, activities need to consider the following thermo-diffusion zinc coating processing issues:

a. The process cannot be conducted shipboard, but rather is conducted at a commercial metal-finishing plant.

b. The process heats parts to >700F and as such all non-metallic materials (e.g., gaskets, O-rings, etc.) must be removed before coating.

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c. The parts to be processed must fit into the 1.5-foot diameter x 7-foot cylindrical reactor currently used to apply the thermo-diffusion zinc coating.

7. Please distribute this letter to activities that you believe could utilize the thermo-diffusion zinc coating process to reduce total ownership costs. If you have any questions about part selection or thermo-diffusion zinc coating applicability, please contact Mr. Norm Clayton, NSWC-CD, Code 614 (215) 897-8435, norman.clayton@navy.mil. For questions or testing of high-strength steel parts that might be candidates for the thermo-diffusion zinc coating process, please contact Mr. Rick Kachele, NSWCCD Code 612, (215) 897-7923, fredrick.kachele@navy.mil



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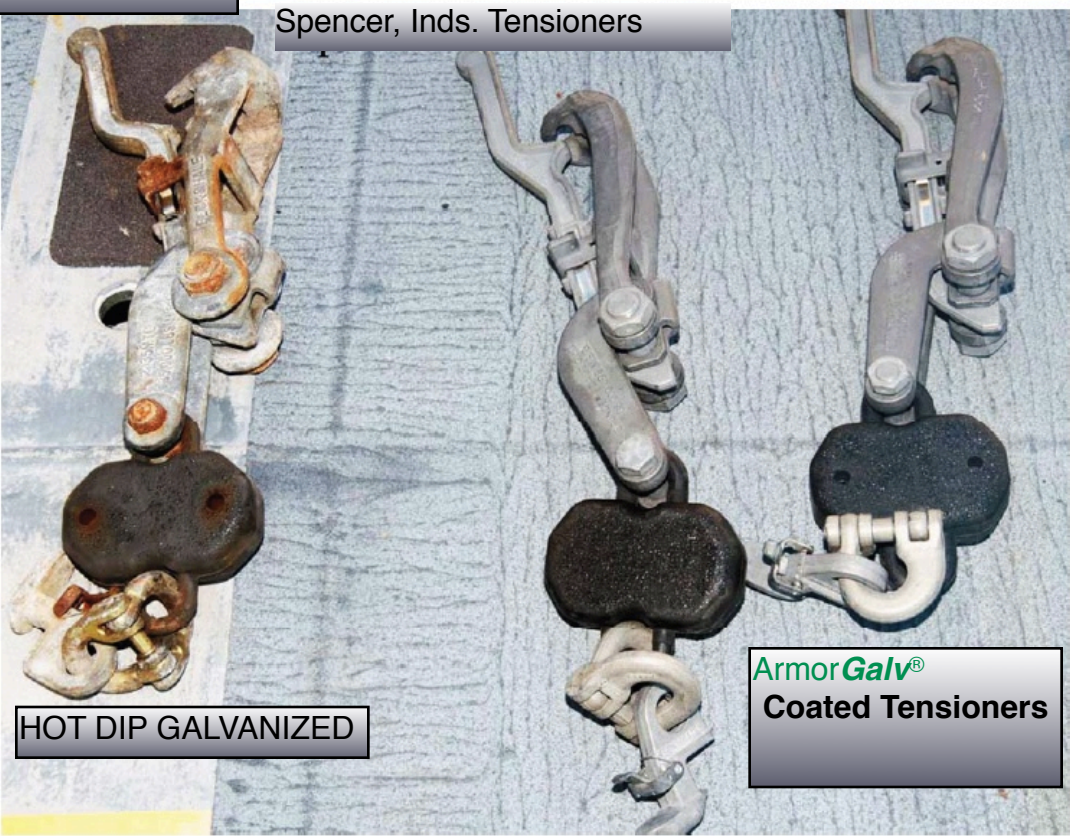


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