



ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

PLATING, NICKEL/ZINC/CONVERSION
PLATING, NICKEL/ZINC - NICKEL/BLACK ORGANIC

WSF-M21P25-A1
WSF-M21P25-A2

1. SCOPE

The plating defined by this specification is a corrosion resistant electrodeposited nickel alloy/nickel-zinc alloy/conversion finish.

2. APPLICATION

This specification was released originally to define the performance requirements for coated fasteners.

3. REQUIREMENTS

The finish shall provide a uniform black color and shall not fill threads or recesses and shall not interfere with normal installation procedures.

3.1 STATISTICAL PROCESS

Suppliers must conform to the requirements of Ford Quality System Standard Q-101. A mutually acceptable Control Plan as described therein is required for material/source approval. Appropriate statistical tools must be used to analyze process/product data so that variation in the final product is continuously reduced.

3.2 Plating Thickness (ASTM B 659)

3.2.1	Nickel Alloy Layer, min	5.0 micrometres
3.2.2	Zn Ni Alloy Layer, min	12.5 micrometres
3.2.3	Zn Layer, min (WSF-M21P25-A1 only)	1.25 micrometres
3.2.4	Black Conversion Coating (WSF-M21P25-A1 only)	
3.2.5	Black Organic Topcoat, min (WSF-M21P25-A2 only)	8.0 micrometres

Note:

The zinc nickel alloy shall be 8 - 15 % nickel and 85 - 92 % zinc.

Date	Release No.	Release/Revision		
1993 10 29	NGA1E10269419009	Released -A2	J.Showalter	L. Rumao
1991 10 28	DF00E00107002080	Released		L. Rumao

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The plating thickness requirement identified above represent minimum values and apply to all significant surfaces unless otherwise specified on the Engineering Drawing.

Note: In case of dispute, the thickness measurement umpire method shall be metallographic sectioning per ASTM B 487.

Note: Threads, sharp edges, crevices, holes, and screwdriver slots or recesses are not to be used for finish thickness measurement.

3.3 CORROSION RESISTANCE (ASTM B 117)

3.3.1 White Corrosion, min 48 h

Also, no more than 10 % white corrosion after 144 h.

3.3.2 Base Metal Corrosion, min 500 h

Evidence of base metal red rust corrosion products on significant surfaces following testing when evaluated by the unaided eye at normal reading distance constitutes failure of the part.

Note:

- . All part testing requirements apply to those areas of the part identified as a significant surface per para 5.1 unless otherwise specified on the engineering drawing.
- . For these tests externally threaded fasteners shall be power driven into tapped hole or nut or steel panel, simulating production usage.

3.4 HYDROGEN EMBRITTLEMENT

Parts plated to this specification shall be free from the detrimental effects of hydrogen embrittlement or other factors which result in part brittleness. All parts shall meet the requirements of WSS-M99A3-A.

3.5 PLATING ADHESION (ASTM B 571)

Adhesion of the electroplate to the base metal must conform to the requirements of the following test methods per ASTM B 571 unless otherwise indicated.