ELECTROPLATING ON FASTENERS

Southwestern Plating

ASTM F1941 is the standard specification for electrodeposited coatings on threaded fasteners. Southwestern Plating recommends using this specification when determining the proper application, performance, and dimensional requirements for electrodeposited coatings on threaded fasteners.

> Fortune 500 company Nucor Fasteners considers ASTM F1941 to be *"the preferred standard to use when specifying electroplating on fasteners".*[1]

It is worth noting that **ASTM B633** and **ASTM B766** were not written as fastener specific standards. They are standard specifications for electrodeposited coatings on Iron and Steel articles (i.e machined, ground, cold formed, or cold straightened parts and like articles).

Therefore, by specifying B633 or B766 instead of F1941, your material may be subjected to unnecessary stress relief or hydrogen embrittlement relief requirements. In addition, there may be other non-essential requirements or increased costs involved with using standards not specifically developed for fasteners.

Commercial Zinc Electroplating – Southwestern Plating offers Zinc electroplating with a minimum .0002" thickness (Fe/Zn 5).

Commercial Cadmium Electroplating – Southwestern Plating offers Cadmium electroplating with a minimum .0002" thickness (Fe/Cd 5).

Hydrogen Embrittlement Relief – ASTM F1941 recommends hydrogen embrittlement relief baking for fasteners of 40 HRC or above. Fasteners are to be baked within 4 hours after electroplating at temperatures of 350 to 450ºF. There is no specified baking duration for fasteners but 3 to 8 hours may be considered typical depending on the fasteners and processes involved.

> ASTM F1941: "Note 2—Fasteners with a specified maximum hardness of 34 HRC and below have a very low susceptibility to hydrogen embrittlement and **do not require baking**."

Commercial Hydrogen Embrittlement Relief – Southwestern Plating will consider 3 hours at 375ºF as a minimum for quoting purposes only. It is in the customer's interest that he/she specifies the exact time and temperature necessary for their parts, at which time re-quoting may be necessary.

[1] nucor-fastener.com

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ASTM F1941 – THREADED FASTENERS

Zinc Designation	Thickness µm (MIN)	Thickness Inch (MIN)
Fe/Zn 3	3	.0001
Fe/Zn 5	5	.0002
Fe/Zn 8	8	.0003
Fe/Zn 12	12	.0005

Cadmium Designation	Thickness µm (MIN)	Thickness Inch (MIN)
Fe/Cd 3	3	.0001
Fe/Cd 5	5	.0002
Fe/Cd 8	8	.0003
Fe/Cd 12	12	.0005

Designation	Type	Typical Appearance
A	Clear	Transparent colorless with slight iridescence
B	Blue-Bright*	Transparent with a bluish tinge and slight iridescence
C	Yellow	Yellow iridescent

*Blue-Bright is typically used in reference to Zinc

ASTM F1941 – ORDERING INFORMATION

1. DESIRED COATING:	Zinc (Fe/Zn)	Cadmium (Fe/Cd)
2. COATING THICKNESS: (*25 = .001 Inch and is not in F1941)	3 5	8 12 25*
3. CHROMATE FINISH	A B	C
4. STRESS RELIEF BEFORE PLATING (*If required by customer)	Time:	Temperature:
5. HYDROGEN EMBRITTLEMENT RELIEF (*If required by customer)	Time: HRC:	Temperature: Tensile Strength:
6. ELECTROPLATING PROCESS	Barrel	Rack
7. CERTIFICATION OF COMPLIANCE	Yes	No
8. ADDITIONAL REQUIREMENTS OR TESTING	List all that apply	

Note: Southwestern Plating will process and certify per customer instructions and cannot be held responsible beyond the information provided. It is in the customer's interest that he/she supplies complete and legible instruction with incoming material. Southwestern Plating will not certify material after processing.

ELECTROPLATING ON FASTENERS

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ASTM B633 & ASTM B766 – IRON AND STEEL ARTICLES

ASTM B633

Zinc Class Number	Service Condition	Thickness µm (Inch)
Fe/Zn 25	SC 4	25 (.001)
Fe/Zn 12	SC 3	12 (.0005)
Fe/Zn 8	SC 2	8 (.0003)
Fe/Zn 5	SC 1	5 (.0002)

ASTM B766

Cad Class Number	Service Condition	Thickness µm (Inch)
Fe/Cd 25	SC 4	25 (.001)
Fe/Cd 12	SC 3	12 (.0005)
Fe/Cd 8	SC 2	8 (.0003)
Fe/Cd 5	SC 1	5 (.0002)

Type	Typical Appearance
I	As-plated without treatments
II	With colored chromate coatings
III	With colorless chromate coatings
IV	With phosphate conversion coatings

Type	Typical Appearance
I	As-plated without treatment
II	With colored chromate treatment
III	With colorless chromate treatment

ASTM B633 & ASTM B766 – ORDERING INFORMATION

1. DESIRED COATING:	Zinc (B633)	Cadmium (B766)
2. COATING THICKNESS:	SC 1 SC 2	SC 3 SC 4
3. CHROMATE FINISH	I II	III IV
4. ULTIMATE TENSILE STRENGTH	HRC MPa	PSI
5. STRESS RELIEF BEFORE PLATING	Time:	Temperature:
6. HYDROGEN EMBRITTLEMENT RELIEF	Time:	Temperature:
7. ELECTROPLATING PROCESS	Barrel	Rack
8. CERTIFICATION OF COMPLIANCE	Yes	No
9. ADDITIONAL REQUIREMENTS OR TESTING	List all that apply	

Note: Southwestern Plating will process and certify per customer instructions and cannot be held responsible beyond the information provided. It is in the customer's interest that he/she supplies complete and legible instruction with incoming material. Southwestern Plating will not certify material after processing.