

The American Society for Testing and Materials is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ASTM F2329 Zinc coating, hot dip, for bolts, screws, washers, nuts, and special threaded fasteners.

ASTM F2329 covers the requirements for hot-dip zinc coating applied to carbon steel and alloy steel bolts, screws, washers, nuts, and special threaded fasteners applied by the hot-dip coating process. It is intended to be applicable to fasteners that are centrifuged or otherwise handled to remove excess zinc. This specification was developed as a fastener specific standard in 2005, and is slowly replacing ASTM A153 as each individual fastener standard is updated. ASTM A123 is a related hot-dip galvanizing specification covering iron and steel products made from rolled pressed and forged shapes, castings, plates, bars, and strips.

### F2329 Coating Thickness

Dimension	Minimum Thickness on Surface		
	Average Thickness of all Specimens (Production lot)	Average Thickness of all Specimens (Batch lot)	Average Thickness of Individual Specimen
Fasteners over 3/8" in diameter	0.0020 in.	0.0017 in.	0.0017 in.
Washers 3/16" to 1/4" thick	0.0020 in.	0.0017 in.	0.0017 in.
Fasteners 3/8" and under in diameter	0.0017 in.	0.0015 in.	0.0015 in.
Washers under 3/16" thick	0.0017 in.	0.0015 in.	0.0015 in.

### Effects of Hot Dip Galvanizing on Mechanical Properties

#### Effect of Temperature on Mechanical Properties

- Unless otherwise specified, testing for mechanical properties is not necessary if the galvanizing process is carried out at a lower temperature than the stress relief or tempering temperature of the fasteners.
- Threaded fasteners made from carbon or alloy steel heat treated to a specified hardness of 40 HRC or above, or case hardened fasteners shall not be hot dip zinc coated.

#### Effect of Hydrogen on Mechanical Properties

- For fasteners having a specified minimum hardness of 33 HRC or higher, there is a risk of hydrogen embrittlement. If required by the product standard or purchaser, mechanical descaling or baking shall be conducted to reduce the risk of hydrogen embrittlement. Baking shall be after pickling and before hot dip galvanizing.