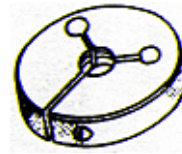
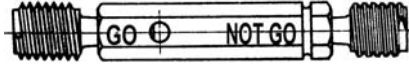


Hot-dip Zinc Structural Bolts and Nuts Require Special Thread Gage Sizes.



Users order many structural bolts and nuts with hot-dip zinc coating (galvanized) to increase the fastener's resistance to corrosion. The applicable American Society for Testing and Materials (ASTM) standards provide special thread allowances to accommodate the heavy hot-dip zinc coating. These heavy coatings can be a major source of assembly problems if the special thread size allowances are not understood and used by bolt and nut suppliers.

The standards for inch structural bolts are ASTM A307, A325, and A490. The standard for inch structural nuts is ASTM A563. Within these standards, the thread class specified for uncoated inch bolts is 2A. The thread class specified for nuts for use with **uncoated** bolts is 2B.

ASTM F2329 replaces ASTM A153 for hot-dip zinc coating

When A307 and A325 structural bolts are ordered coated the most commonly specified coating for hot-dip zinc coating has been ASTM A153. ASTM A153 is no longer recommended for the coating of structural bolts and nuts. The new hot-dip zinc specification for bolts and nuts is **ASTM F2329-05**. When bolts are ordered coated, it is a good practice to order the ASTM A563 nuts that go with those bolts with the same type finish. ASTM standards A490 does not allow any coating to be applied to bolts as a precaution against hydrogen embrittlement.

Hot-dip zinc coating deposits alter the size of the thread characteristics such as the pitch diameter, major diameter, and minor diameter by several thousandths of an inch. To prevent possible thread interference between the bolts and nuts at the time of assembly, the ASTM standards provide a clearance allowance for both bolt and nut threads to accommodate the size changes resulting from coating.

Chart make it easier to determine special thread size

These coating allowances are provided in a table in each standard, but only ASTM A563 provides the exact thread size limits when the allowances are added. In all other standards the supplier or user must calculate these special thread sizes if they wish to order thread gages to inspect their coated bolts and nuts. To make thread gage ordering easier and more consistent for those wanting to inspect coated structural bolts and nuts, the following chart is provided:

Thread specifications for hot-dip zinc ASTM A307 and A325 bolts and A-563 nuts						
Thread	Bolt		Nut			ASTM Allowance
	GO Size Max. Pitch Diameter	Maximum Major Diameter	GO Size Min. Pitch Diameter	No Go Size Max. Pitch Diameter	Minimum Minor Diameter	
1/2-13	0.4665	0.5165	0.4680	0.4745	0.4350	0.0180
5/8-11	0.5844	0.6434	0.5860	0.5932	0.5470	0.0200
3/4-10	0.7032	0.7682	0.7050	0.7127	0.6440	0.0200
7/8-9	0.8229	0.8951	0.8248	0.8330	0.7770	0.0220
1-8	0.9408	1.0220	0.9428	0.9516	0.8890	0.0240
1 1/8-8	1.0657	1.1469	1.0678	1.0768	1.0140	0.0240
1 1/4-8	1.1907	1.2719	1.1928	1.2020	1.1390	0.0240
1 3/8-8	1.3186	1.3998	1.3208	1.3301	1.2670	0.0270
1 1/2-8	1.4436	1.5248	1.4458	1.4553	1.3920	0.0270
Dimensions in inches						

Nuts are tapped after coating

Coated nuts must be tapped **AFTER** coating to achieve the special nut thread sizes indicated above. To be acceptable, coated nut threads must be within both these maximum and minimum size limits. For hot-dip zinc coated structural bolt threads to be acceptable, they must not exceed the maximum allowable sizes shown above. Thread inspection is to be performed using thread gages made to the sizes in this chart.

Light oil can be used on thread gages

When using thread gages to determine thread acceptability, it is permissible to apply a light machine oil film to the thread gages to prevent galling and excessive gage wear. Hot-dip zinc bolt threads are acceptable if the bolt enters the GO thread ring gage and the major diameter measures within specification. Nut threads must assemble on the threaded GO work plug gage using only hand effort and the NOGO minor diameter cylindrical plug gage must not enter the nut's thread at all..

For more details on inspecting coated structural bolts and nuts, or other fastener quality issues the author can be contacted by phone at 817-870-8888 or via e-mail at sales@greensladeandcompany.com.