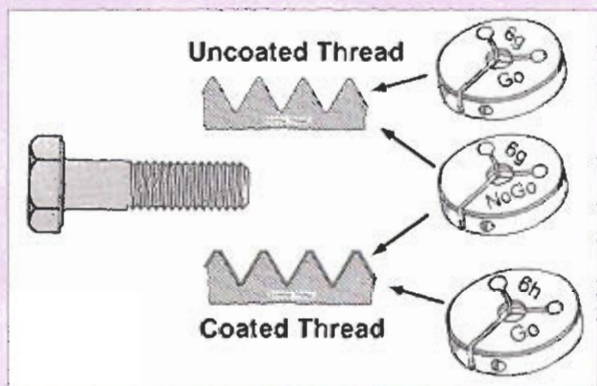




Only the GO Size is Different After Coating on External Metric Threads

Joe Greenslade is President of Greenslade and Company, Inc. His company specializes in providing manufacturing tooling and inspection equipment to suppliers of screws, bolts, rivets, and nuts throughout the world. Greenslade is an associate member of the Industrial Fastener Institute (IFI), a member of the American Society of Mechanical Engineers B1 Thread Specification Committee, and a member of the Public Law 101-592 Task Force.



Of all of the questions I answer each month, the one that still occurs with the greatest frequency is related to the proper gaging size requirements for external threads after they are plated or coated. In this article I will address the answers regarding external metric threads. A previous article (in *Fastener World* Jan./Feb., 2004) addressed this issue related to inch external threads.

The majority of screw and bolt drawings for metric parts designate "6g Threads" and then go on to specify plating somewhere else on the drawing. Herein lies the source of confusion. Below are the specific statements from the thread standards ISO 965/2 and ASME B1.13M which state which thread

gages should be used on standard threads before and after coating or plating.

ISO 965/2 statement about coated thread gaging:

3 Remarks

For coated threads, the tolerances apply to the parts before coating, unless otherwise stated. After coating, the actual thread profile shall not in any point transgress the maximum material limits for the position H or h respectively.

ASME B1.13 statement about coated thread gaging:

8.2 Material Limits for Coated Threads

Unless otherwise specified, size limits for standard external thread tolerance Class 6g and 4g6g apply prior to coating. The external thread allowance may thus be used to accommodate the coating thickness on coated parts, provided that the maximum coating thickness is no more than one-fourth of the allowance. Thus, a 6g thread after

coating is subject to acceptance using a basic size 6h and 4g6g GO thread, a 4h6h GO thread gage. Minimum material, LO or NOT GO gages would be 6g and 4g6g, respectively. Where external thread has no allowance, or allowance must be maintained after coating, and for standard internal threads, sufficient allowance must be provided prior to coating to assure that finished product threads do not exceed the maximum-material limits specified.

These statements mean that the threads described on a drawing as "6g" are to be inspected using the size limits for **6g BEFORE COATING OR PLATING**. This means that the Class 6g GO

and 6g NOGO limits and gages must be used to inspect and accept the before coated or plated threads.

After the threaded parts are coated or plated they must be inspected using the **6h GO** thread limits and gages and the **6g NOGO** limits and gages for inspection and acceptance.

A drawing designating a "6g" thread and also designating plating or coating must use the following limits and gages for accepting the threads before and after coating or plating:

Total Pitch Diameter Tolerance for Coated or Plated Metric Threads					
Thread Size	6g	6g	6g	Total Tolerance ¹	Maximum Coating ²
	NOGO	GO	GO		
	Min. PD	Max. PD Before Coating	Max. PD After Coating	mm	mm
M1.6x0.35	1.291	1.354	1.373	0.082	0.021
M2x0.4	1.654	1.721	1.740	0.086	0.022
M2.5x0.45	2.117	2.188	2.208	0.091	0.023
M3x0.5	2.580	2.655	2.675	0.095	0.024
M3.5x0.6	3.004	3.089	3.110	0.106	0.027
M4x0.7	3.433	3.523	3.545	0.112	0.028
M5x0.8	4.361	4.456	4.480	0.119	0.030
M6x1.0	5.212	5.324	5.350	0.138	0.035
M8x1.25	7.042	7.160	7.188	0.146	0.037
M10x1.5	8.862	8.994	9.026	0.164	0.041
M12x1.75	10.679	10.829	10.863	0.184	0.046
M14x2.0	12.503	12.633	12.701	0.198	0.050
M16x2.0	14.503	14.663	14.701	0.198	0.050
M20x2.5	18.134	18.334	18.376	0.242	0.061
M22x2.5	20.164	20.334	20.376	0.212	0.053
M24x3.0	21.803	22.003	22.051	0.248	0.062

Note 1. Total tolerance is the difference between 6g NOGO and 6h GO.
 Note 2. Maximum coating thickness is equal to 25% of the total tolerance.

The only exception to this rule is if the part drawing specifically states "**6g AFTER COATING/ PLATING**". In these rare cases the before-coat threads must be made smaller than the standard 6g size limits so that after they are coated or plated they will not exceed the standard 6g GO and 6g NOGO size specifications.

As stated in the beginning, this is the most

misunderstood rule regarding the inspection of screw threads. This misunderstanding is a major source of disputes between threaded product suppliers and purchasers each year. I hope this brief article will help to clarify this issue for all of those involved in the inspection and acceptance of externally threaded metric screws, bolts, and components