What Setting Plug Should Be Used to Properly Set-up a Tri-roll Thread Gage?

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.

Over the past twenty years Greenslade & Company, Inc. has sold hundreds of sets of Tri-roll thread gages to fastener manufacturers and fastener distributors. Tri-roll gages are easy to use, and when they are properly set-up and used, provide a great deal of valuable quality information during manufacturing as well as final inspection.

Any thread class set plug works fine for Tri-roll set-up.

The question, "Must the Tri-roll gage be set-up with the setting plug having the same class of thread as the threaded product being measured?" has come up many times over the years from both new, as well as experienced Tri-roll gage users. The answer is "no". One of the benefits of using Tri-roll gages is that the gage can be set-up using a setting plug of any thread class to measure a threaded product having any thread class. The only thing that must be the same is the thread size, i.e. a 1/4-28 setting plug must be used to set-up a set of 1/4-28 gaging rolls to measure a product having a 1/4-28 screw thread.

The photos in this article show a Tri-roll gage set-up initially using a high limit 3A GO setting plug with a pitch diameter of .2267, and later with a low limit 2A NOGO plug at .2247. After each set-up the same screw was measured. In both cases the screw's thread measured exactly the same value of .2249 inches.

Continued on p.228

1/4-28 3A GO setting plug with .2267 certified pitch diameter

1/4-28 screw measuring .2249 inches

1/4-28 2A NOGO setting plug with .2227 certified pitch diameter

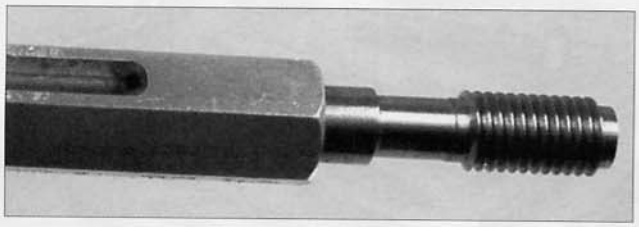
1/4-28 screw measuring .2249 inches

Tri-roll gages must have good "linearity".

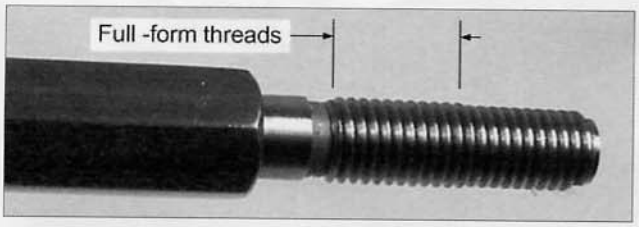
One of the calibration requirements for all variable thread gages such as Tri-roll gages is what is called "linearity". This means that the gage must read accurately within its entire operating range. Linearity is checked just as these pictures illustrate. When calibrating in inches, the thread gage must be set-up using a 3A GO plug and then a 2A NOGO plug must be measured. When calibrating in millimeters, the thread gage must be set-up using a 6h GO plug and then a 6g NOGO plug must be measured. The gage must measure the NOGO plug accurately within the gage maker's tolerance which is generally .0002 inches or .005 millimeters.

Tri-roll gages should be set-up using the plug gage's certified size.

One very important point overlooked by many Tri-roll gage users is that the number printed on the setting plug's handle is not necessarily the actual size of the pitch diameter of the setting plug. The size marked on the setting plug's handle is only a reference size and not intended to represent the actual certified size of the plug gage. The actual calibrated size of the setting plug's pitch diameter can vary from that marked size by up to .0002 inches in the case of inch plugs and .005 mm on metric setting plugs. For instance, a 1/4-28 3A GO sting plug handle is marked .2268 inches but the setting plug is within acceptable limits when its pitch diameter is between .2268 and .2266 inches. For this reason Tri-roll gages should always



Full-form thread setting plug



Truncated thread setting plug

be set-up using the pitch diameter size indicated on the setting plug's calibration certificate instead of the size marked on its handle.

Tri-roll gages can be set-up using either full-form or truncated setting plugs.

Tri-roll gages are customarily set-up using single end, full-form W tolerance 3A GO (inch) or single end, full-form W tolerance 6g GO (metric) setting plugs. However, Tri-roll gages can be successfully set-up using truncated ring gage setting plugs, provided the gaging rolls are sitting on the full-form portion of the plug. The full-formed threads are those closest to the gage's handle.

When they are properly set-up and properly used, Tri-roll gages are excellent thread inspection devises for monitoring the manufacturing threading process and for thread acceptance evaluation during final inspection. Keep in mind when setting up and using Tri-roll gages that any thread class setting plug can be used successfully provided the gaging rolls are resting on the full-form portion of the setting plug's thread and the gage's indicator is set using the setting plug's certified pitch diameter size.

END