

ISO 16239:2013 Metric Series Wires for Measuring screw threads

What is ISO 16239:2013 Metric Series Wires for Measuring Screw Threads?

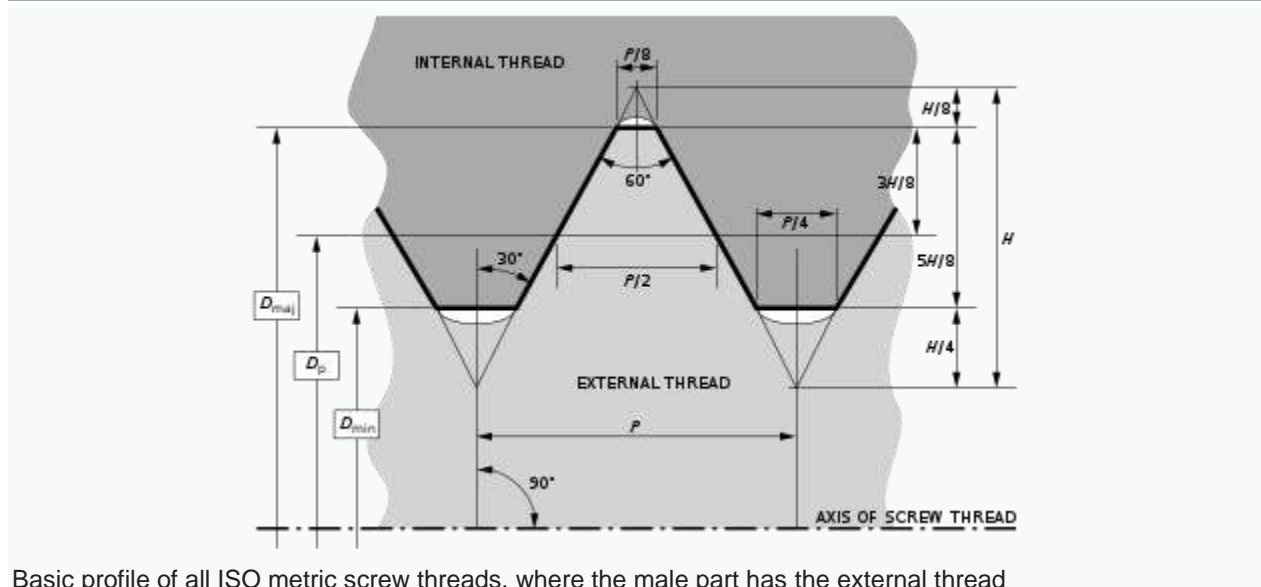
The **ISO metric screw thread** is the most commonly used type of general-purpose screw thread worldwide. They were one of the first international standards agreed when the International Organization for Standardization (ISO) was set up in 1947.

The "M" designation for metric screws indicates the nominal outer diameter of the screw thread, in millimetres. This is also referred to as the "major" diameter in the information below. It indicates the diameter of smooth-walled hole that a male thread (e.g. on a bolt) will pass through easily to create a well-located connection to an internally threaded component (e.g. a nut) on the other side. That is, an M6 screw has a nominal outer diameter of 6 millimetres and will therefore be a well-located, co-axial fit in a hole drilled to 6 mm diameter.

The *coarse* pitch is the commonly used default pitch for a given diameter. In addition, one or two smaller *fine* pitches are defined, for use in applications where the height of the normal *coarse* pitch would be unsuitable (e.g., threads in thin-walled pipes). The terms *coarse* and *fine* have (in this context) no relation to the manufacturing quality of the thread.

In addition to coarse and fine threads, there is another division of extra fine, or *superfine* threads, with a very fine pitch thread. Superfine pitch metric threads are occasionally used in automotive components, such as suspension struts, and are commonly used in the aviation manufacturing industry. This is because extra fine threads are more resistant to coming loose from vibrations. Fine and superfine threads also have a greater minor diameter than coarse threads, which means the bolt or stud has a greater cross-sectional area (and therefore greater load-carrying capability) for the same nominal diameter.

Basic profile



Basic profile of all ISO metric screw threads, where the male part has the external thread

The design principles of ISO general-purpose metric screw threads ("M" series threads) are defined in international standard ISO 68-1. Each thread is characterized by its major diameter, D (D_{maj} in the diagram), and its pitch, P . ISO metric threads consist of a symmetric V-shaped thread. In the plane of the thread axis, the flanks of the V have an angle of 60° to each other. The thread depth is $0.54125 \times$ pitch. The outermost $\frac{1}{8}$ and the innermost $\frac{1}{4}$ of the height H of the V-shape are cut off from the profile.

The relationship between the height H and the pitch P is found using the following equation where θ is half the included angle of the thread, in this case 30° .

or

In an external (male) thread (e.g., on a bolt), the major diameter D_{maj} and the minor diameter D_{min} define *maximum* dimensions of the thread. This means that the external thread must end flat at D_{maj} , but can be rounded out below the minor diameter D_{min} . Conversely, in an internal (female) thread (e.g., in a nut), the major and minor diameters are *minimum* dimensions; therefore the thread profile must end flat at D_{min} but may be rounded out beyond D_{maj} . In practice this means that one can measure the diameter over the threads of a bolt to find the nominal diameter D_{maj} , and the inner diameter of a nut is D_{min} .

The minor diameter D_{min} and effective pitch diameter D_p are derived from the major diameter and pitch as

Designation

A metric ISO screw thread is designated by the letter M followed by the value of the nominal diameter D (the maximum thread diameter) and the pitch P , both expressed in millimetres and

separated by the multiplication sign, \times (e.g., M8 \times 1.25). If the pitch is the normally used "coarse" pitch listed in ISO 261 or ISO 262, it can be omitted (e.g., M8).

The length of a machine screw or bolt is indicated by a following \times and the length expressed in millimetres (e.g., M8 \times 1.25 \times 30 or M8 \times 30).

Tolerance classes defined in ISO 965-1 can be appended to these designations, if required (e.g., M500–6g in external threads). External threads are designated by lowercase letter, g or h. Internal threads are designated by upper case letters, G or H.

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Spanner (wrench) sizes

Below are some common spanner (wrench) sizes for metric screw threads. Hexagonal (generally abbreviated to "hex") head widths (width across flats, spanner size) are for DIN 934 hex nuts and hex head bolts. Other (usually smaller) sizes may occur to reduce weight or cost.

This is a list of published International Organization for Standardization (ISO) standards and other deliverables. For a complete and up-to-date list of all the ISO standards, see the ISO catalogue.

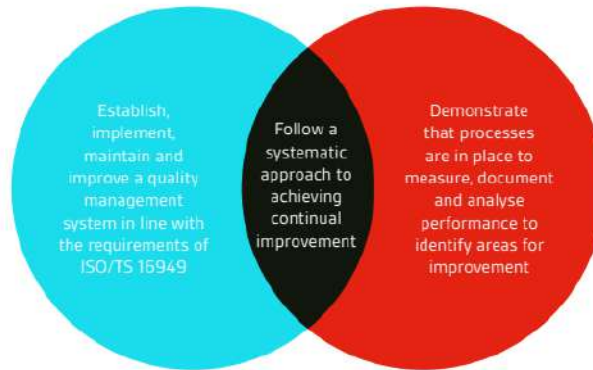
The standards are protected by copyright and most of them must be purchased. However, about 300 of the standards produced by ISO and IEC's Joint Technical Committee 1 (JTC 1) have been made freely and publicly available.



ISO Brand

This is a dynamic list and may never be able to satisfy particular standards for completeness. You can help by adding missing items with reliable source

The principal requirements of the standard are illustrated below:



The next few pages of the guide takes you through the Plan-Do-Check-Act (PDCA) methodology, common in all ISO management systems and how DCS can help and support you on your ISO/TS 16949 journey.

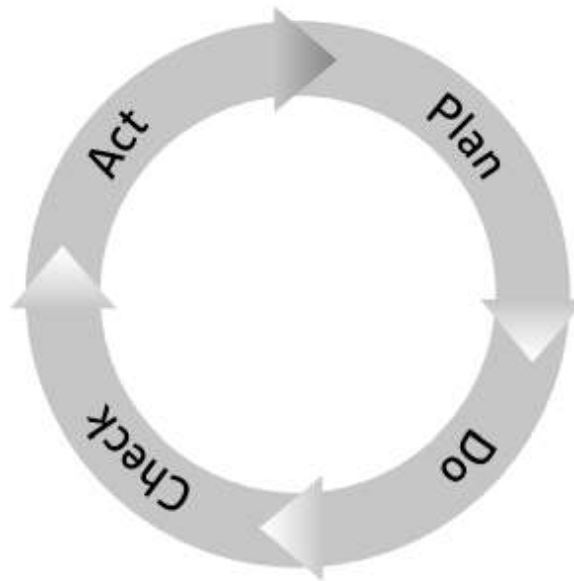
Understanding the principles of continual improvement

Act

Correct and improve your plans to meet and exceed your planned results

Check

Measure and monitor your actual results against your planned objectives



Plan

Establish objectives and draft your plans (analyse your organization's current systems, establish overall objectives, set interim targets for review and develop plans to achieve them)

Do

Implement your plans within a structured management framework