



MINIATURE SCREW THREAD HISTORY AND NOMENCLATURE

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MINIATURE SCREW THREAD HISTORY

Screw threads have been in use for centuries. The most commonly used standards at present are the U.S. Unified Screw Threads and the European ISO (International Standards Organization) Metric Screw Thread Standard. Other standards include British Association (B.A.) and Whitworth, German DIN and Japanese Industrial Standard (JIS). There was a great effort made in the second half of the 20th century to change the United States to metric, but was unsuccessful.

The Unified Screw Thread Standard was developed in the U.S. to replace the National Form Standard, which had been in use for many years and had evolved to bring order to the many different screw threads being used in this country. Many companies had developed their own standards to meet their unique requirements and also to thwart others from easily duplicating their products. The problem with the National Form was that it did not allow for coatings, which could prevent successful mating of parts. The Unified Screw Thread Standard overcame this by adding an allowance to the external thread for coating. This however added to the tolerance allowed.

When the need to develop a standard for miniature screw threads arose, a Swiss watch threads standard appeared to offer a base for modification and also to comply with the growing interest in metric measurements. A closer distance from minimum screw to maximum internal thread was required to ensure as full an engagement as possible of these tiny thread depths. The UNM (Unified Miniature) Standard was developed with only one class of fit to meet this need. Coatings were not considered as they were seldom used or were mainly surface penetrations or flash coatings, which would not interfere with the mating of parts. While the large number of sizes seemed superfluous, recent trends in miniaturization have called most of them into use.

While this new standard worked for military, aerospace and other critical uses, it presented problems to mass producers who needed less costly parts.

Earlier on, and especially during World War II, many users started to project downward the U.S. number series (sizes spaced in .013" increments), which started with 0 (0-80). 00-96, 000-120 and 0000-160 filled most of the needs. The optical industry used mainly 90 threads per inch for eyeglass frames and with their large proliferation eventually made .047-90 (00-90) the popular size. Tolerances were developed using National Form formulas which allowed closer limits, but were greater than UNM for lower manufacturing costs.



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The proper designation for screws made to the Unified Miniature Standard is UNM preceded by the body diameter in millimeters to 2 decimal places (i.e. 1.20UNM). Metric sizes named by diameter and pitch (i.e. M1x0.25) are from the ISO Standard which has a greater tolerance than UNM. UNM products are within the ISO limits so can be used interchangeably, but not vice-versa.

The correct designation for the number sizes projected downward is NS preceded by the size with a suffix of the tolerance class (i.e. 00-90NS2). No distinction is made for screws or internally threaded parts (i.e. UNS2A, UNS2B). Any other designation is incorrect, as these sizes are not made to the dimensional formulas indicated by that identification.

The use of miniature, small and other diminutive designations in describing screw products has different meanings from different perspectives. For instance, 1/4-20 looks pretty small to someone making 4 inch Locomotive screws. Since the smallest size in the larger screw thread standard is 0-80, the true diminutive designation should apply only to those that are smaller which includes all the UNM sizes and number sizes 00 and smaller. This probably eliminates most of those suppliers who list themselves in these categories.