SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS1338

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Aerospace Metric 60° Screw Thread Profile and Tolerance Classes

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

1. SCOPE:

This Aerospace Standard establishes the details of the maximum and minimum thread profile and tolerance classes for the metric 60° screw threads recommended for use in the aerospace industry for metric module bolts and nuts.

2. DEFINITION:

2.1 Basic Thread Profile:

The basic thread profile for the external and internal thread is shown in Fig. 1, and is the same as the maximum thread profiles shown in Fig. 2 and 3. It is the permanently established boundary between the provinces of the external and internal threads. This boundary is the permanent reference profile on which all clearances and interference fits must be based.

2.2 Maximum Thread Profile:

The maximum thread profile defines the theoretical maximum space which the external or internal thread is permitted to occupy.

2.3 Minimum Thread Profile:

The minimum thread profile defines the theoretical minimum space the external or internal thread is permitted to occupy.

2.4 Profile Tolerance Band:

The maximum and minimum material conditions described in Fig. 2 through 5 establishes the profile tolerance band within which all variations of thread form must be contained. Variations in thread form include lead, flank angle, helix, size, roundness and taper as well as pitch diameter, minor diameter, major diameter and root radius. The tolerance class applies for all temperature applications.

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2.5 External Thread Root Contour:

The contour of the root shall be such that no portion shall have a radius smaller than 0.15011P and shall have no reversals. The adjacent flanks may be connected by tangent radii of not less than 0.15011P that are connected by a tangent straight or a smoothly blended curve within the maximum-minimum material zone defined by Fig. 2 and 4.

3. REFERENCE DOCUMENTS:

The metric thread profile presented in this standard has been based on the following documents:

3.1 International Organization for Standardization:

ISO 68 - ISO General Purpose Screw Threads; ISO 965/1 ISO General Purpose Metric Screw Threads-Tolerances-Principles and Basic Data; proposed ISO/DIS3161-UNJ Screw Threads for Aerospace Applications; and is in agreement with ISO/TC20/SC4 Resolutions 93-1, 106, 200, 243, 244, and 257.

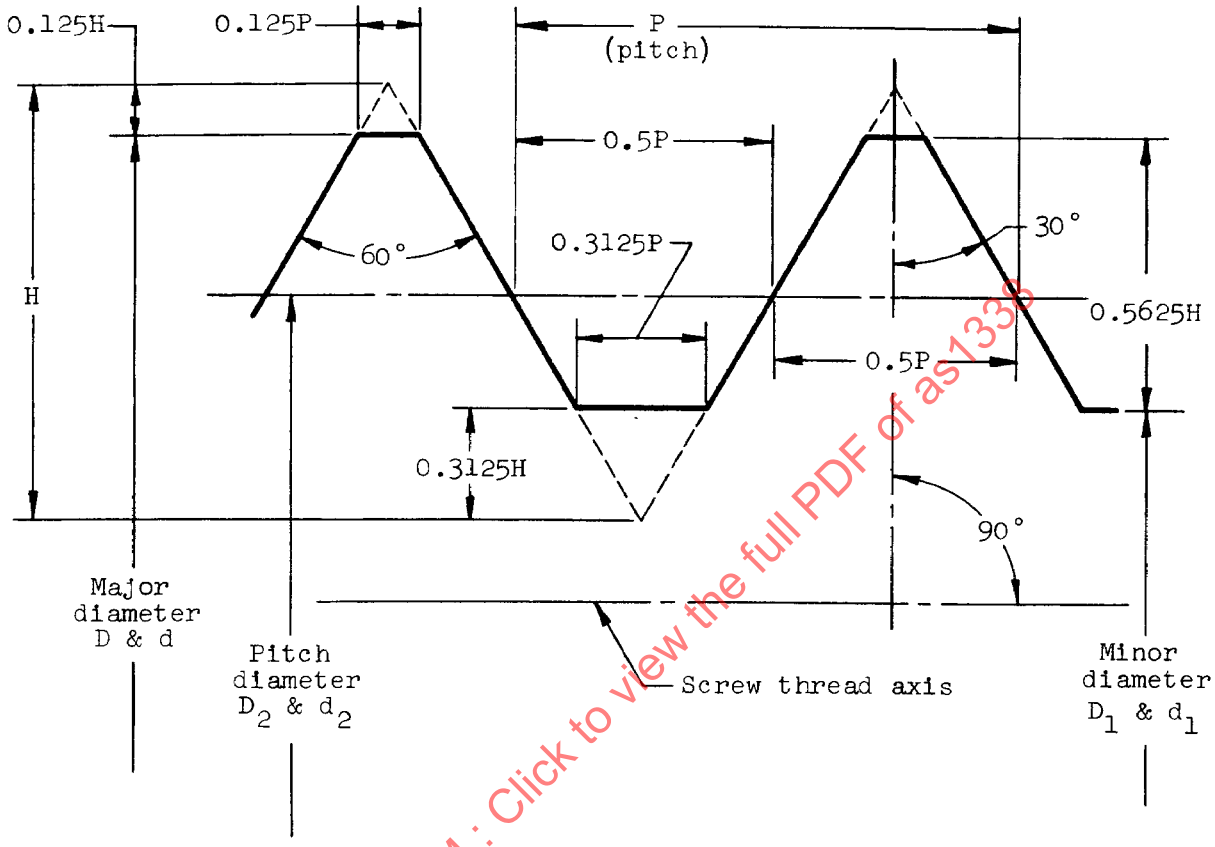
3.2 United States of America:

Handbook H28 (1969) Part 1 - Screw-Thread Standards for Federal Services; MIL-S-8879, General Specification for Screw Threads, Controlled Radius Root with Increased Minor Diameter; and ANSIB1 Report ISO Metric Screw Threads.

3.3 United Kingdom:

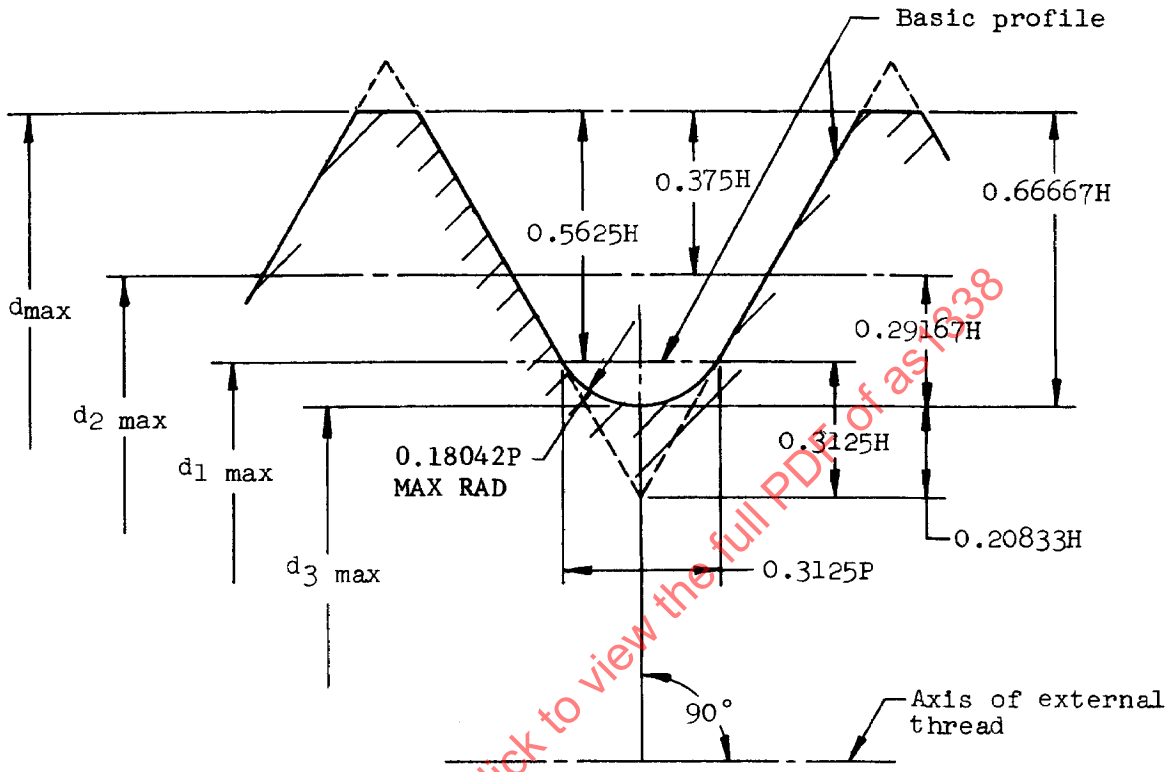
British Standards Institution B. S. 4084 Specification for Unified Screw Threads of "UNJ" Basic Profile and B. S. 3643 ISO Metric Screw Threads.

PREPARED BY SAE COMMITTEE E-25,
GENERAL STANDARDS FOR AEROSPACE PROPULSION SYSTEMS



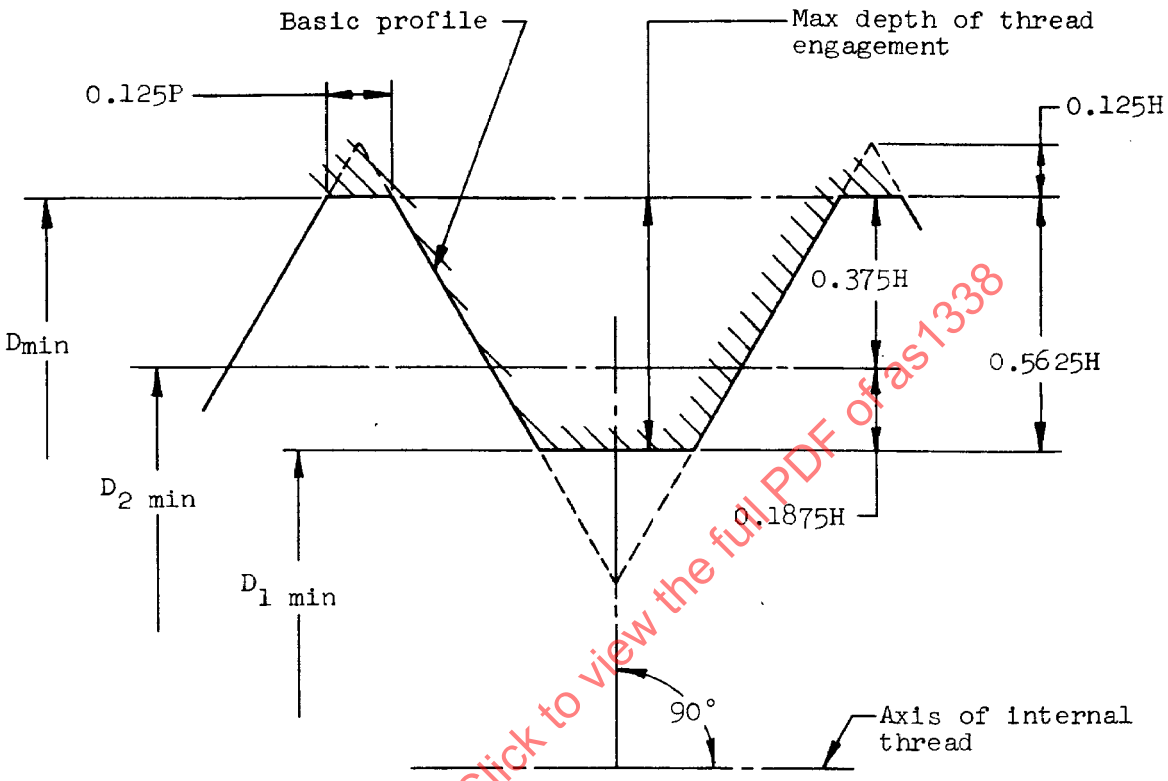
D = Basic major diameter of internal thread
D_2 = Basic pitch diameter of internal thread
D_1 = Basic minor diameter of internal thread
d = Basic major diameter of external thread
d_2 = Basic pitch diameter of external thread
d_1 = Basic minor diameter of external thread
H = Height of the fundamental triangle
P = Pitch

FIGURE 1 - Basic Thread Profile



P = pitch
H = 0.866025P
d_{max} = d = major diameter at maximum material condition
d_1 max = d_1 = minor diameter = d_{max} minus 1.125H
d_2 max = d_2 = pitch diameter = d_{max} minus 0.75H
d_3 max = design minor diameter = d_{max} minus 1.33334H

FIGURE 2 - External Thread Maximum Material Condition
(also basic profile)



P = pitch
H = 0.866025P
D_{min} = D = major diameter
$D_{1\ min}$ = D_1 = minor diameter = D_{min} minus 1.125H
$D_{2\ min}$ = D_2 = pitch diameter = D_{min} minus 0.75H

FIGURE 3 - Internal Thread Maximum Material Condition
(also basic profile)