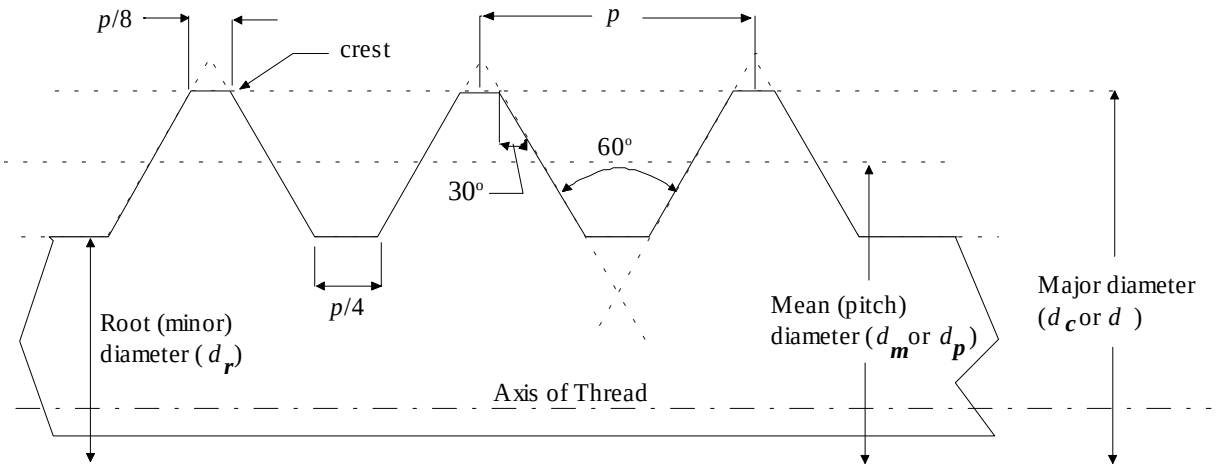
Thread Standards and Definitions

United States, Canada, and United Kingdom use the Unified of Unified Inch profile, in accordance with the Unified and American Screw Threads – ASA B1.1-1989.

UNC – Unified National Coarse
UNF – Unified National Fine
UNEF – Unified National Extra Fine
UNS – Unified National Special
UNR – Unified National Round (round root)
ISO – International Standards Organization (metric)

Two major Unified thread series are in use: UN and UNR. For the UN series, you specify C (coarse), F (fine), or EF (extra fine), as required. For the UNR series, the root radius must also be specified. The UNR series screws are better for fatigue because the root radius reduces stress concentrations. The basic thread geometry for ISO and Unified threads is shown below.

Unified and ISO Thread Geometry



Pitch (p) – The distance between adjacent thread forms measured parallel to the thread axis.
Lead (L) – The distance the nut moves parallel to the screw axis when the nut is given one turn.
TPI (n) – The number of Threads Per Inch, related to the pitch by $p = 1/n$.

Root (minor) Diameter – Smallest diameter of screw - d_r.

Major Diameter – Largest diameter of screw - d_c (sometimes designated as d).

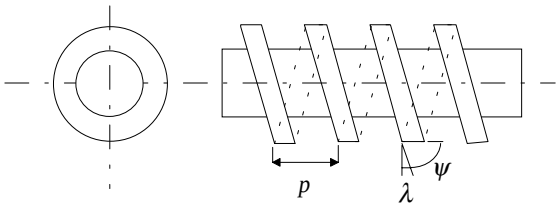
Mean (pitch) Diameter – Average diameter of screw - d_m (sometimes designated as d_p).

Lead Angle (λ) – The angle defining the inclination of the thread (see figure below).

Helix Angle (ψ) – The angle between the thread axis and the lead angle ($\psi + \lambda = 90^\circ$).

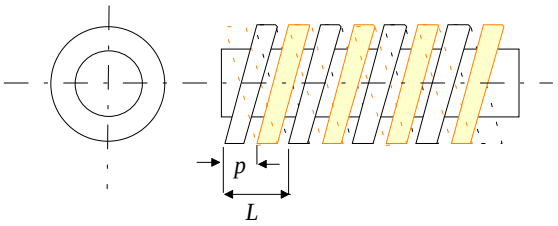
Lead, Helix, and Pitch for single thread

$L = p$



Lead and Pitch for double thread

$L = 2p$



Thread Classifications: There are three classes of thread fit;

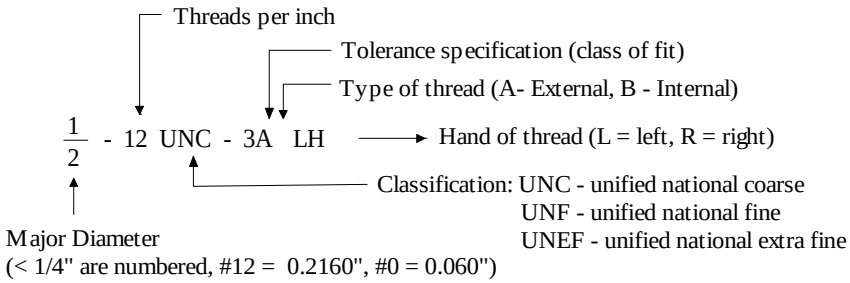
Loose (where the joint is frequently disassembled) – Class 1
Standard (general assembly) – Class 2
Close (high accuracy, fine fits) – Class 3

Designations for each class and the type of thread (inside or outside) for Unified and Metric are given below.

	Unified		Metric	
Class	External Thread	Internal Thread	External Thread	Internal Thread
Loose	1A	1B	8g	7h
Standard	2A	2B	6g	6h
Close	3A	3B	4g	5h

Nomenclature: Examples of the nomenclature for specifying a threaded fastener are given below for Unified National and Metric specifications

Unified National:



Metric: