Machine Screw Sizes

Ground Thread — Unified and American Form
Table 329 — Hand Taps (See page 55)

Lead Tolerance
A maximum lead error of plus or minus .0005" in one inch of thread is permitted.

Formulae
Max. Major Diameter = Basic Major Diameter plus A
Min. Major Diameter = Max. Major Diameter minus B

In the above formulae:
A = Constant to add:
45% of the theoretical truncation to nearest . 00005"
B = Major Diameter tolerance.

Angle Tolerance
20 to 80 threads per inch incl. = 30′ plus or minus in half angle.

Pitch Diameter Limits
H1 Limit = Basic to basic plus .0005"
H2 Limit = Basic plus .0005" to basic plus .001"
H3 Limit = Basic plus .001" to basic plus .0015"
H7 Limit = Basic plus .003" to basic plus .0035"

For values of A and B see Table 331.

Fractional Sizes

Ground Thread— Unified and American National Form
Table 327 — Hand Taps (see page 55)

Lead Tolerance
A maximum lead error of plus or minus .0005" in one inch of thread is permitted.

Pitch Diameter Limits for Taps Thru 1" Diameter.
H1 = Basic to basic plus .0005"
H2 = Basic plus .0005" to basic plus .001"
H3 = Basic plus .001" to basic plus .0015"
H4 = Basic plus .0015" to basic plus .002"
H5 = Basic plus .002" to basic plus .0025"
H6 = Basic plus .0025" to basic plus .003"

Pitch Diameter Limits for Taps over 1" Diameter Thru 11/2" Diameter:
H4 = Basic plus .001" to basic plus .002"

Angle Tolerance

Threads Per Inch	Error in Half Angle
6 to 9 incl.	25′ plus or minus
10 to 28 incl.	30′ plus or minus

Formulae (Approximate)
Max. Major Diameter = Basic Major Diameter plus A
Min. Major Diameter = Max. Major Diameter plus B

For values of A and B see Table 331.

ISO Metric

Ground Thread — Table 341 (see page 56)

The following tables and formulae are used in determining the limits and tolerances for ground thread metric taps having a thread lead angle not in excess of 5°, unless otherwise specified. They apply only to metric threads having a 60° form with a P/8 flat at the major diameter of the basic thread form. They apply to both standard and special metric taps.

ISO Metric (Continued)

Lead Tolerance
A maximum lead deviation of plus or minus .013 mm within any two threads not farther apart than 25 mm is permitted.

Angle Tolerance

Pitch mm	Deviation Half Angle
over 0.25 to 2.5 incl.	30′ plus or minus
over 2.5 to 4 incl.	25′ plus or minus
over 4 to 6 incl.	20′ plus or minus

Formulae
Min. Major Diameter = Basic plus W
Max. Major Diameter = Min. plus X
Max. Pitch Diameter = Basic plus Y
Min. Pitch Diameter = Max. minus Z
W = Constant to add to Basic Major Diameter*
X = Major Diameter Tolerance
Y = Amount over Basic for Maximum Pitch Diameter
Z = Pitch Diameter Tolerance
*W = .080P Converted to Inches

Note: When the tap major diameter must be determined from a specified tap pitch diameter, the minimum major diameter equals the maximum specified tap pitch diameter minus constant Y, plus the basic size height of thread (.64952P). For values of W, Y, X and Z see Table 341.

Special Taps

Ground Thread— Unified and American National Form
Table 331 — Special Taps (see page 56)

General
The following tables and formulae are used in determining the limits and tolerances for ground thread taps having special diameter or special pitch or both and having a thread lead angle not in excess of 5°, unless otherwise specified. This table does not apply to the diameter and pitch combinations shown in Tables 327 and 329.

Additional Standards and dimensions for tap sizes 15/8" to 4" incl. computed from Table 331 are available upon request.

Lead Tolerance
A maximum lead error of plus or minus .0005" in one inch of thread is permitted.

Angle Tolerance

Threads Per Inch	Error Half Angle
4 to 5 1/2 incl.	20′ plus or minus
6 to 9 incl.	25′ plus or minus
10 to 80 incl.	30′ plus or minus

Formulae
Max. Major Diameter = Basic Major Diameter plus A
Min. Major Diameter = Max. Major Diameter minus B
Max. Pitch Diameter = Min. Pitch Diameter plus D
Min. Pitch Diameter = Basic Pitch Diameter plus C
In the above formulae:
A = Constant to add:
35% of the theoretical truncation for 4 to 5 threads per inch
40% for 51/2 to 12 threads per inch
45% for 13 to 80 threads per inch
To nearest .005" for 8 or more threads per inch and to nearest .001" for less than 8 threads per inch
B = Major diameter tolerance
C = Amount over basic for minimum pitch diameter
D = Pitch diameter tolerance

Note: When the tap major diameter must be determined from a specific tap pitch diameter, the maximum major diameter equals the minimum specified pitch diameter minus constant C, 0.649528 plus constant A.

Taper Pipe Taps

Cut and Ground Thread
American Standard Pipe Form (NPT) (NPTF)
Table 338 — Taper Pipe Taps (See page 57)

Lead Tolerance

Cut Thread = A maximum lead deviation of plus or minus .003" in one inch of thread is permitted.

Ground Thread = A maximum lead deviation of plus or minus .0005" in one inch of thread is permitted.

Angle Tolerance

Threads Per Inch	Error in Half Angle		Full Angle
	Cut Thread	Ground Thread	Cut Thread
8	40′ plus or minus	25′ plus or minus	60′
11 1/2 to 27 Inclusive	45′ plus or minus	30′ plus or minus	60′

Notes:

Cut and Ground Thread Unified and American Standard Pipe Form Taps made to this table are to be marked NPT. Ground Thread Dryseal American Standard Pipe Taps made to this table are to be marked NPTF.

Additional Standards and Dimensions for essential dimensions of American Standard Pipe Threads are available upon request.

Straight Pipe Taps

Ground Thread
American Standard Straight Pipe Form (NPS) (NPSC) (NPSM)
Table 335 — Straight Pipe Taps (See page 57)
Table 335A — Dryseal (NPSF) Straight Pipe Taps (See page 57)

Lead Tolerance

Ground Thread = A maximum lead deviation of plus or minus .0005" within any two threads no further apart than 1" is permitted.

Angle Tolerance

Threads Per Inch	Error in Half Angle Ground Thread
8	25′ plus or minus
11 1/2 to 27 Inclusive	30′ plus or minus

Notes:

Taps made to the specifications in Table 335 are marked NPS, and used for NPSC and NPSM.

Additional Standards and Dimensions for essential dimensions of American Standard Straight Pipe Threads are available upon request.