

# TECHNICAL FORMULAS

## THREAD PERCENTAGE CALCULATIONS

The following formulas can be used to calculate thread percentages in tapped holes for the following conditions.

1. Cold formed threads: The after-tap minor diameter is created by the relationship between the pre-tap hole size and the cold forming tap "D" or "H" number, and is measured using cylindrical pin gages or other means.
2. Cut threads: The after-tap minor diameter is created directly by the drill and is measured using cylindrical pin gages or other means.

### MACHINE SCREW & FRACTIONAL SIZES

$$\text{Thread Percentage} = \frac{(\text{Thread Major Diameter [in.]} - \text{Minor Diameter [in.]})}{.01299} \times \text{TPI}$$

**EXAMPLE:** 1/4-20 thread with .201 inch minor diameter.

$$\text{Thread Percentage} = \frac{(.250 - .201)}{.01299} \times 20 = 75.44\%$$

### MACHINE SCREW MAJOR DIAMETERS

MACHINE SCREW #	0	1	2	3	4	5	6	8	10	12
MAJOR DIAMETER (in)	.060	.073	.086	.099	.112	.125	.138	.164	.190	.216

### METRIC SIZES

$$\text{Thread Percentage} = \frac{(\text{Thread Major Diameter [mm]} - \text{Minor Diameter [mm]})}{.01299 \times \text{Thread Pitch [mm]}}$$

Example: M8 x 1.25 with 6.80 mm minor diameter.

$$\text{Thread Percentage} = \frac{(8.0 - 6.80)}{.01299 \times 1.25} = 73.90\%$$

## HOW TO ADJUST FOR PLATING THICKNESSES

Standard cold forming or cutting tap "H" or "D" numbers must be increased to accommodate for the coating thickness. Platings or coatings that are very thick are not always uniformly applied to the threads and may cause gaging problems

regardless of the tap oversize condition. Heavy plating or coating thicknesses are especially difficult for fine pitch threads because they tend to fill in the thread profile rather than coat the thread flanks evenly.

INCHES	MILS	MICRONS	NUMBER OF "H" OR "D" NUMBERS TO ADD TO STANDARD TAP SELECTION
0.000125	0.125	3.2	1
0.000250	0.250	6.4	2
0.000375	0.375	9.5	3
0.000500	0.500	12.7	4
0.000625	0.625	15.9	5
0.000750	0.750	19.1	6
0.000875	0.875	22.2	7
0.001000	1.000	25.4	8