

Tool Tempering Temperatures and Colours

Tool	Temp C	Temp F	Colour see Note 6
Arbors	200	390	No Colour / Yellow
Axes	255	490	Reddish Dark Straw
Brass Turning Tools	170 - 190	340 - 375	No Colour
Chasers	230	445	Straw
Chilled Iron Turning	150	305	No Colour
Cold Chisel	260 - 280	500 - 535	Brown - Red
Counter Bore	220 - 240	430 - 465	Straw
Centers (Lathe)	215	420	Yellow
Dies (Screwing)	215 - 225	420 - 435	Yellow / Pale Straw
Dies (Drawing)	200	390	No Colour / Yellow
Drill (Very Small)	210	410	Yellow
Drill (Small)	220 - 240	430 - 465	Straw
Drill (Large)	245	475	Dark Straw
Engraving Tools	230 - 250	445 - 480	Straw - Reddish Dark Straw
Gauges	220	430	Pale Straw
Hammer Head	230 - 250	445 - 480	Straw - Dark Straw
Lathe Tools - See Note 1	200 - 220	390 - 430	No Colour - Pale Straw
Milling Cutters	210 - 230	410 - 445	Yellow - Straw
Planer Tools	215 - 225	420 - 435	Yellow - Pale Straw
Punches	260 - 280	500 - 535	Brown - Red
Reamers	230 - 240	445 - 465	Straw - Dark Straw
Scrapers	200	390	No Colour
Taps	210 - 220	410 - 430	Yellow
Screw Drivers	280 - 290	535 - 550	Dark Purple - Dark Blue
Shaper Tools	215 - 225	420 - 435	Yellow - Pale Straw
Springs	300 - 310	555	Blue - Pale Blue
Wood Chisels	215 - 225	420 - 435	Yellow - Pale Straw

Notes:

1. For Lathe Tools in the model engineer's workshop, where durability of the cutting edge is less important than the quality of the cutting edge and cut finish, Tubal Cain recommends considerably less tempering of the cutting edge. Temper the whole tool to 180 to 200C (355 to 390 OF) and then keep the cutting edge cool (via a water bath or sticking the cutting edge in a potato) and tempering the shank to 280C (535F). Tubal Cain claims works extremely well for most high carbon steels (0.95 to 1.15%).
2. Tempering in the model engineers workshop using a domestic oven (cooker) works well and controls temperature accurately (test accuracy of thermostat with a stand-alone bakers thermometer). For your convenience, using a domestic oven (stove), temperatures are provided in Fahrenheit. An alternative to the domestic stove for the lower tempering temperatures is the electric deep fryer.
3. Tempering using continuous heat in an oven for most applications is a better and more accurate method.
4. Tempering should occur as quickly as possible after hardening.
5. Tempering should be conducted at the rate of one hour per inch of thickness for an even and full temper.
6. Tempering colours provide very broad temperature bands, and unless one has tempered every day for years, is probably not advisable as a method, unless it is the only alternative available.

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