

Brazed Carbide Tool Selection Chart

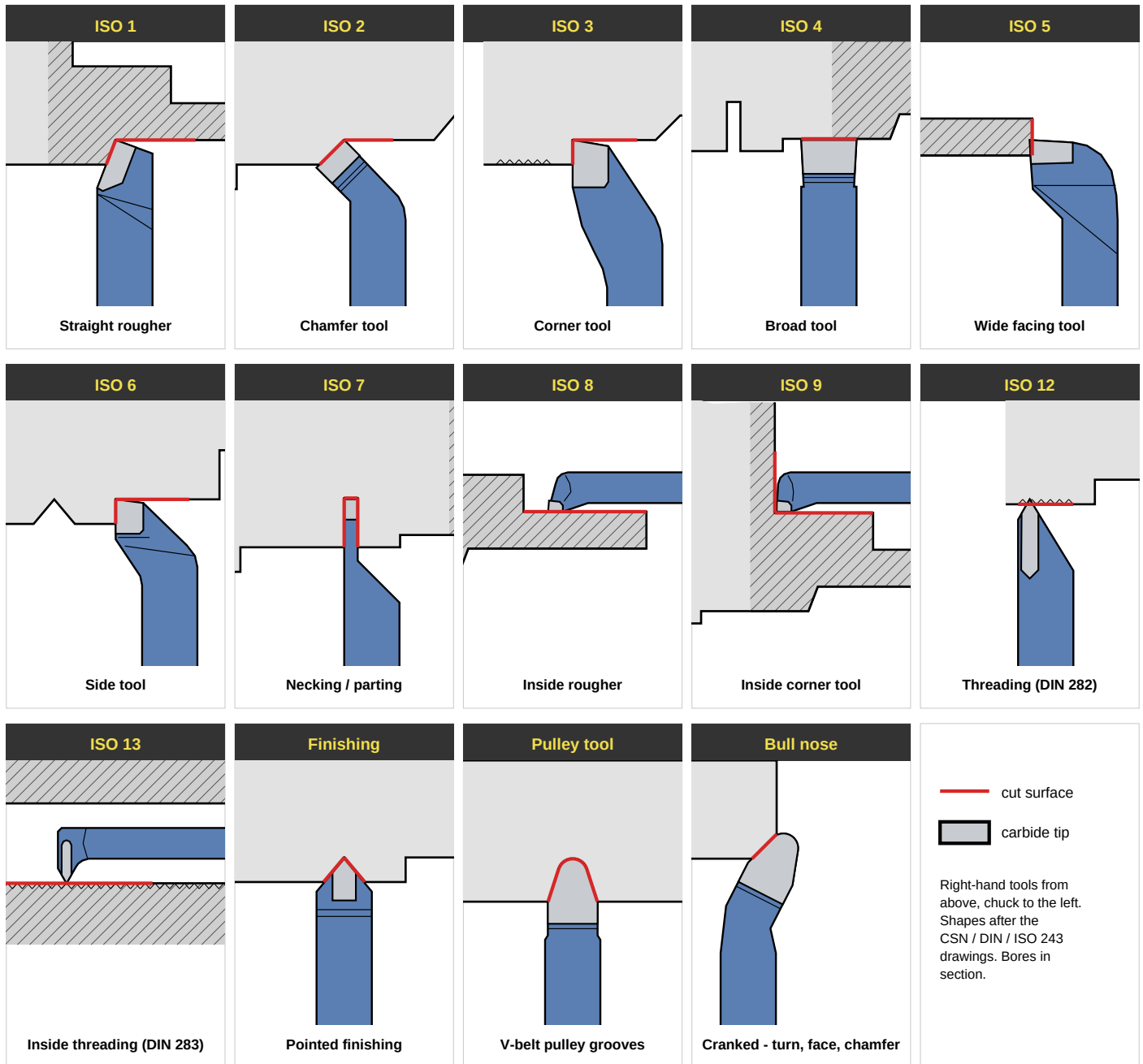
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Brazed carbide lathe tools (ISO 243) - which tool does which job.

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Tool types

ISO 243	Tool	Hand	Use it for
ISO 1	Straight rougher	R / L	Roughing and general turning
ISO 2	Chamfer tool (cranked 45°)	R / L	45° chamfers; also turning and facing from one setting
ISO 3	Corner tool	R / L	Turning right up to a shoulder and facing it
ISO 4	Broad (wide) tool	-	Finishing with a broad flat edge at low feed; flat-bottom grooves
ISO 5	Wide facing tool	R / L	Facing ends and shoulders
ISO 6	Side tool	R / L	Turning and facing to a square (90°) shoulder
ISO 7	Necking (parting) tool	R / L	Parting off, necking and grooving
ISO 8	Inside rougher	R / L	Boring through holes
ISO 9	Inside corner tool	R	Boring blind holes and to an inside shoulder
ISO 12	Threading tool (DIN 282; Denas ISO 13)	R / L	60° external threads (55° for Whitworth)
ISO 13	Inside threading tool (DIN 283; Denas ISO 14)	R	60° internal threads
-	Pointed finishing tool	-	Light finishing cuts and vee grooves (80° point)
-	Pulley tool	-	Form tool for V-belt pulley grooves (34 - 38° included)
-	Bull nose tool	R / L	Cranked head with a round nose - turning, facing and 45° chamfers

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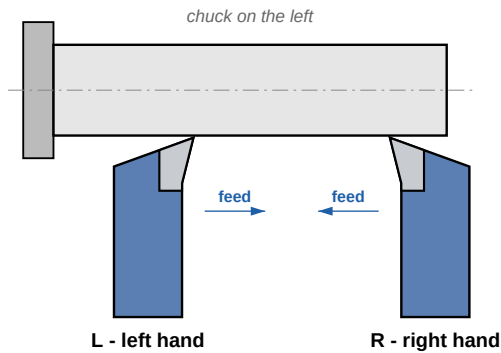
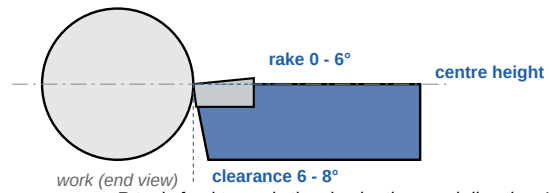
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Right and left hand, tip geometry, shank sizes, carbide grades, regrinding and problems.

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R tools feed towards the chuck - the usual direction. L tools feed away from it, towards the tailstock.
Set the tip exactly on centre height: too high rubs, too low digs in and leaves a pip when facing.
Brazed tools take the same speeds as carbide inserts (see the Cutting Speeds chart) - 3 to 5 times HSS.

Shank sizes and carbide grades

Shank h x b mm	Length L mm	Typical lathe
8 x 8	90	Mini and hobby lathes
10 x 10	90	Mini lathes, tool and cutter work
12 x 12	100	Bench lathes, 200 - 250 mm swing
16 x 16	110	Centre lathes up to 300 mm swing
20 x 20	125	Centre lathes 300 - 400 mm swing
25 x 25	140	Centre lathes 400 - 500 mm swing
32 x 32	170	Heavy lathes
16 x 10	110	Rectangular - more height for the same width
20 x 12	125	Rectangular
25 x 16	140	Rectangular
32 x 20	170	Rectangular

ISO grade	Shank colour (usual)	Material	Duty
P10	Blue	Steel, cast steel	Finishing, higher speed
P20	Blue	Steel, cast steel	General turning
P30	Blue	Steel, cast steel	Roughing, interrupted cuts
M10 / M20	Yellow	Stainless, manganese and heat-resistant steel	General
K10	Red	Cast iron, aluminium, brass, plastics	Finishing and general
K20	Red	Cast iron, hard woods, non-ferrous	Roughing, interrupted cuts

Regrinding a brazed tool

Step	How
1 Relieve the steel	Grind the steel shank under the tip on an aluminium oxide wheel, 10 - 12° clearance, so the carbide wheel only touches carbide
2 Rough the carbide	Green silicon carbide wheel, 60 - 80 grit; 6 - 8° clearance - more makes the edge weak
3 Finish	Diamond wheel (D91 - D64) or diamond lap for a sharp, long-lasting edge
4 Hone	A light touch with a diamond file takes off the wire edge
Never	Dip hot carbide in water - it cracks the tip and the braze

Problems

Problem	Likely cause	Fix
Tip chips on the edge	Grade too hard, tool above centre, chatter	Tougher grade (P30 / K20), set to centre height, shorter overhang
Tip cracks or comes off	Overheated grinding or quenching; heavy interrupted cut	Grind gently, let it cool in air; lighter cut
Rubs, no chip, burns	Blunt, too little clearance, too low feed	Regrind 6 - 8° clearance; more feed
Built-up edge, torn finish	Speed too low for carbide	Speed up - carbide wants 3 - 5 x HSS speed (see the cutting chart)
Pip left in the centre when facing	Tool not on centre height	Pack the tool to centre - check against the tailstock centre
Chatter	Too much overhang, too big a nose, loose gib	Shorter overhang, smaller nose radius, tighten the slides