



# ALCA TOOLS LIMITED

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 Email sales@alcatools.co.uk Web www.alcatools.co.uk

## Reference Values for Rake Angles and Speeds

Saw blade diameter mm	Materials											
	Steel up to 30 tons/in. <sup>2</sup>	Steel up to 50 tons/in. <sup>2</sup>	Steel up to 65 tons/in. <sup>2</sup>	Stainless Steel	Cast Iron	Brass, Bronze	Copper	Light Alloy, solids	Light Alloy, sections	Plastics		
20/25	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	320 800	190 480	128 320	89 240	190 400	1270 3000	760 3000	3000	3000	3000	R.P.M.
32/40	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	200 500	120 300	80 200	55 150	120 250	800 4000	480 2000	3000	3000	3000	R.P.M.
50/63	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	125 320	75 190	50 125	35 95	95 160	500 2250	300 1230	2040 3000	3000	3000	R.P.M.
80	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	100 200	60 120	40 80	30 60	60 100	400 1600	240 800	1500 3000	3000	2400 3000	R.P.M.

### Formula for feed and cutting speed:

$$s = s_z \cdot z \cdot n = \text{mm/min}$$

$$s_z = \frac{s}{z \cdot n} = \text{mm/tooth}$$

$$v = \frac{d \cdot \pi \cdot n}{1000} = \text{m/min}$$

$$n = \frac{v \cdot 1000}{d \cdot \pi} = \text{R.P.M.}$$



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100	from	18°	15°	8°	15°	8°	8°	15°	25°	25°	25°	Rake Angle γ	
	to	20°	18°	15°	20°	10°	15°	25°	25°	25°			
	from	8°	8°	6°	6°	6°	6°	8°	12°	12°	12°		Clearance Angle α
	to	10°	8°	8°	8°	6°	8°	10°	12°	12°			
from	25	15	10	7	15	100	60	400	800	600	Cutting speed m/min		
to	50	30	20	15	25	400	200	800	2000	2000			
from	80	48	32	22	48	320	190	1280	2560	1900	R.P.M.		
to	160	96	64	48	80	1280	640	2560	3000	3000			
125	from	18°	15°	8°	15°	8°	8°	15°	25°	25°	25°	Rake Angle γ	
	to	20°	18°	15°	20°	10°	15°	25°	25°	25°			
	from	8°	8°	6°	6°	6°	6°	8°	12°	12°	12°		Clearance Angle α
	to	10°	8°	8°	8°	6°	8°	10°	12°	12°			
from	25	15	10	7	15	100	60	400	800	600	Cutting speed m/min		
to	50	30	20	15	25	400	200	800	2000	2000			
from	64	38	25	18	38	255	150	1020	2040	1530	R.P.M.		
to	128	76	50	38	64	1000	500	2040	3000	3000			
160	from	18°	15°	8°	15°	8°	8°	15°	25°	25°	25°	Rake Angle γ	
	to	20°	18°	15°	20°	10°	15°	25°	25°	25°			
	from	8°	8°	6°	6°	6°	6°	8°	12°	12°	12°		Clearance Angle α
	to	10°	8°	8°	8°	6°	8°	10°	12°	12°			
from	25	15	10	7	15	100	60	400	800	600	Cutting speed m/min		
to	50	30	20	15	25	400	200	800	2000	2000			
from	50	30	20	14	30	200	240	800	1600	1200	R.P.M.		
to	100	60	40	30	50	800	800	1600	3000	3000			
200	from	18°	15°	8°	15°	8°	8°	15°	25°	25°	25°	Rake Angle γ	
	to	20°	18°	15°	20°	10°	15°	25°	25°	25°			
	from	8°	8°	6°	6°	6°	6°	8°	12°	12°	12°		Clearance Angle α
	to	10°	8°	8°	8°	6°	8°	10°	12°	12°			
from	25	15	10	7	15	100	60	400	800	600	Cutting speed m/min		
to	50	30	20	15	25	400	200	800	2000	2000			
from	40	24	16	11	24	160	95	640	1280	960	R.P.M.		
to	80	48	32	24	40	640	320	1280	3000	3000			

Use a saw blade having a diameter of 160 mm and 64 teeth for cutting steel bars of 30 mm dia. with a tensile strength of 50 tons/in.<sup>2</sup>. According to the table we should take an average value of 45 R.P.M. and, for this hard steel, a low feed of 0.01 mm per tooth.

$$\text{Feed (s): } 0.01 \text{ (feed)} \cdot 64 \text{ (teeth)} \cdot 45 \text{ (R.P.M.)} = 28,8 \text{ mm/min}$$

$$\text{Feed per tooth (s}_2\text{): } \frac{28 \text{ (feed in mm/min)}}{64 \text{ (teeth)} \cdot 45 \text{ (R.P.M.)}} = 0.01 \text{ mm/tooth}$$

$$\text{Cutting speed (v): } \frac{160 \text{ (saw blade dia.)} \cdot 3.14 \cdot 45 \text{ (R.P.M.)}}{1000} = 22.6 \text{ m/min}$$

$$\text{Revolutions per minute (n): } \frac{22.6 \text{ (m/min)} \cdot 1000}{160 \text{ (saw blade dia.)} \cdot 3.14} = 45 \text{ R.P.M.}$$



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	Steel up to 30 tons/in. <sup>2</sup>	Steel up to 50 tons/in. <sup>2</sup>	Steel up to 65 tons/in. <sup>2</sup>	Stainless Steel	Cast Iron	Brass, Bronze	Copper	Light Alloy, solids	Light Alloy, sections	Plastics		
225	from to	16° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6° 6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	35 70	21 42	14 28	10 21	21 35	140 560	85 280	560 1140	1120 2840	850 2840	R.P.M.
250	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6° 6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	32 64	19 38	13 26	9 19	19 32	130 510	76 250	510 1020	1020 2550	760 2550	R.P.M.
275	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6° 6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	28 56	17 35	12 24	8 17	17 28	116 460	70 230	460 920	920 2300	700 2300	R.P.M.
315	from to	18° 20°	15° 18°	8° 15°	15° 20°	8° 10°	8° 15°	15° 25°	25°	25°	25°	Rake Angle $\gamma$
	from to	8° 10°	8°	6° 8°	6° 8°	6° 6°	6° 8°	8° 10°	12°	12°	12°	Clearance Angle $\alpha$
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	Cutting speed m/min
	from to	25 50	15 30	10 20	7 15	15 25	100 400	60 200	400 800	800 2000	600 2000	R.P.M.

### Formula for feed and cutting speed:

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350	from to	18° to 20°	15° to 18°	8° to 15°	15° to 20°	8° to 10°	8° to 15°	15° to 25°	25°	25°	25°	Rake Angle γ
	from to	8° to 10°	8°	6° to 8°	6° to 8°	6°	6° to 8°	8° to 10°	12°	12°	12°	Clearance Angle α
	from to	25 to 50	15 to 30	10 to 20	7 to 15	15 to 25	100 to 400	60 to 200	400 to 800	800 to 2000	600 to 2000	Cutting speed m/min
	from to	22 to 45	14 to 28	9 to 18	6 to 14	14 to 22	90 to 360	55 to 180	360 to 720	720 to 1800	550 to 1800	R.P.M.
370	from to	18° to 20°	15° to 18°	8° to 15°	15° to 20°	8° to 10°	8° to 15°	15° to 25°	25°	25°	25°	Rake Angle γ
	from to	8° to 10°	8°	6° to 8°	6° to 8°	6°	6° to 8°	8° to 10°	12°	12°	12°	Clearance Angle α
	from to	25 to 50	15 to 30	10 to 20	7 to 15	15 to 25	100 to 400	60 to 200	400 to 800	800 to 2000	600 to 2000	Cutting speed m/min
	from to	21 to 45	13 to 26	8 to 17	6 to 13	13 to 21	86 to 340	52 to 170	340 to 680	680 to 1720	520 to 1720	R.P.M.
400	from to	18° to 20°	15° to 18°	8° to 15°	15° to 20°	8° to 10°	8° to 15°	15° to 25°	25°	25°	25°	Rake Angle γ
	from to	8° to 10°	8°	6° to 8°	6° to 8°	6°	6° to 8°	8° to 10°	12°	12°	12°	Clearance Angle α
	from to	25 to 50	15 to 30	10 to 20	7 to 15	15 to 25	100 to 400	60 to 200	400 to 800	800 to 2000	600 to 2000	Cutting speed m/min
	from to	20 to 40	12 to 24	8 to 16	5 to 12	12 to 20	80 to 320	48 to 160	320 to 640	640 to 1600	480 to 1600	R.P.M.
500	from to	18° to 20°	15° to 18°	8° to 15°	15° to 20°	8° to 10°	8° to 15°	15° to 25°	25°	25°	25°	Rake Angle γ
	from to	8° to 10°	8°	6° to 8°	6° to 8°	6°	6° to 8°	8° to 10°	12°	12°	12°	Clearance Angle α
	from to	25 to 50	15 to 30	10 to 20	7 to 15	15 to 25	100 to 400	60 to 200	400 to 800	800 to 2000	600 to 2000	Cutting speed m/min
	from to	16 to 32	10 to 20	6 to 12	4 to 10	10 to 16	64 to 250	38 to 128	250 to 500	500 to 1280	380 to 1280	R.P.M.

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