

# Surface Finish Guide

**Approximate Surface Finish in Micrometers (µm)R<sub>a</sub>**

Material	Abrasive Type	Grit Size									
		80	100	150	220	280	320	400	500	600	1200
Hard Steel	Aluminum Oxide/ Silicon Carbide	0,65	-	0,50	0,45	0,30	0,25	0,12	0,08	0,03	
	CBN	-	1,40*2,00	1,15	1,00	0,70	-	0,50	-	0,18	0,05
Soft Steel	Aluminum Oxide/ Silicon Carbide	2,00	-	0,90*1,40	0,65	0,50*0,90	0,40	0,18*0,25	0,10*0,20	0,05	
	CBN	-	1,60*2,50	-	1,25*2,00	-	-	0,65	-	0,40	0,12
Cast Iron	Silicon Carbide	2,50	-	0,75*1,00	0,50	0,30	0,25	0,15	0,12	0,08	
	Diamond	-	-	-	2,00	-	-	1,27	-	0,50	0,30
Aluminum, Brass, Bronze	Silicon Carbide	4,30	-	2,00	1,40	0,85	0,70	0,40	0,30	0,05	
Carbide	Diamond	-	-	0,75	0,50	-	-	0,18	-	0,08	0,03
Ceramic	Diamond	-	-	1,27	1,00	-	-	0,50	-	0,40	0,25
Glass	Diamond	-	-	2,40	1,80	-	-	0,75	-	0,40	0,20

**Surface Finish Conversions: Millimeter to Inch—**

To convert one unit of measure to the other use the following formulas.  
 Micrometer to microinch: Micrometer x 40 = Microinch

**Formulas for determining minimum stock removal required on diameter to achieve desired surface finish.**

**Surface Finish in Micrometers—(µm) Ra**

$$\frac{\text{Existing Finish} - \text{Desired Finish}}{100} = \text{Required Stock Removal}$$

Example: Existing Finish = 1.25 µm; Desired Finish = 0.25 µm

$$\frac{1.25 - 0.25}{100} = 0.01 \text{ mm}$$

**Approximate Surface Finish in Microinches (µ in)R<sub>a</sub>**

Material	Abrasive Type	Grit Size									
		80	100	150	220	280	320	400	500	600	1200
Hard Steel	Aluminum Oxide/ Silicon Carbide	25	-	20	18	12	10	5	3	1	
	CBN	-	55*80	45	40	28	-	20	-	7	2
Soft Steel	Aluminum Oxide/ Silicon Carbide	80	-	35*55	25	20*35	16	7*10	4*8	2	
	CBN	-	65*100	-	50*80	-	-	25	-	16	5
Cast Iron	Silicon Carbide	100	-	30*40	20	12	10	6	5	3	
	Diamond	-	-	-	80	-	-	50	-	20	12
Aluminum, Brass, Bronze	Silicon Carbide	170	-	80	55	33	27	16	12	2	
Carbide	Diamond	-	-	30	20	-	-	7	-	3	1
Ceramic	Diamond	-	-	50	40	-	-	20	-	15	10
Glass	Diamond	-	-	95	70	-	-	30	-	15	8

**Surface Finish Conversions: Inch to Millimeter—**

To convert one unit of measure to the other use the following formulas.  
 Microinch to micrometer: Microinch ÷ 40 = Micrometer

**Formulas for determining minimum stock removal required on diameter to achieve desired surface finish.**

**Surface Finish in Microinches—(µ") Ra**

$$\frac{\text{Existing Finish} - \text{Desired Finish}}{100,000} = \text{Required Stock Removal}$$

Example: Existing Finish = 50 µ"; Desired Finish = 10 µ"

$$\frac{50 - 10}{100,000} = 0.0004 \text{ inch}$$

\*If two values are shown: the first number is for small parts, honed on machines with one horsepower or less; the second number is for large parts, honed on machines with two or more horsepower