SURFACE FINISH NOSE RADIUS & FEED RATE

The choice of nose radius is dependent on the workpiece design and the machining operation. The nose radius influences cutting data choice and the surface finish achieved. The maximum feed rate that can be used depends on a number of factors including machine power, stability, workpiece material, insert shape and size, nose radius, chipbreaker, grade and setting angle.

Small nose radius = universal machining, low cutting forces (less vibration risk).
Large nose radius = strong, suitable for high cutting data, good surface finish.

Surface finish Ra value (μ inch)	Nose radius, r_ε (inch)					
	0.008	0.016	0.032	0.047	0.062	0.094
	Feed rate, f (inch/rev)					
24	0.002	0.003	0.004	0.005	0.006	0.007
64	0.003	0.005	0.006	0.008	0.009	0.011
128	0.005	0.006	0.009	0.011	0.013	0.016
250	-	0.009	0.013	0.016	0.018	0.022
320	-	-	0.016	0.019	0.022	0.027

Find the feed recommendations for a chosen chipbreaker. Then look in the surface finish table above to be sure that the required surface finish can be achieved. The maximum feed rate should always be considerably smaller than the nose radius. A feed rate that is too low can result in poor chipbreaking and tool life.

SURFACE FINISH

WNMG433-M6, WNMG080412-M6 - Radius (r_ε)

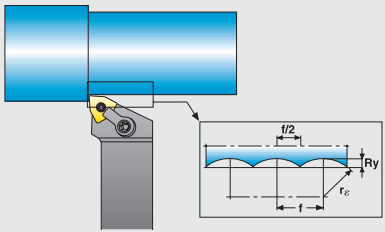
ANSI	ISO	Inch	Metric
V	M0	0	0
0.2	00	0.004	0.1
X		0.004	0.1
0.5		0.008	0.2
0	00	0.008	0.2
Y		0.008	0.2
1	04	0.016	0.4
	05	0.020	0.5
2	08	0.032	0.8
	10	0.040	1.0
3	12	0.047	1.2
4	16	0.062	1.6
5	20	0.078	2.0
6	24	0.094	2.4
7	29	0.109	2.8
8	32	0.125	3.2

The mean value R_a is often used as surface finish value and can be calculated from the formulas:

$R_a = (1/y)^2$ µin

$$y = \frac{0.001 \times \sqrt{21.6 \times r_\varepsilon}}{f}$$

R_y = profile height
f = feed rate (inch/rev)
r_ε = nose radius (inch)



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