



**CHIP-SURFER TAPER FORM TIPS
FINISH 3X FASTER THAN
A BALL NOSE... WITH
IMPROVED SURFACE QUALITY!**

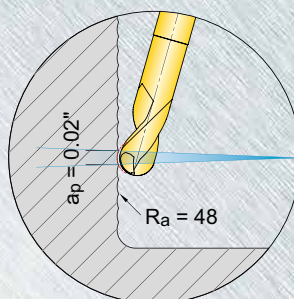
Tip Style:
Taper Form Ball Nose

Diameters:
8mm, 10mm, 12mm, 16mm

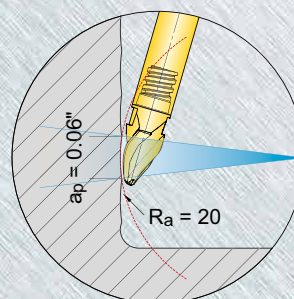
Ball Nose Tip Radius:
1.5mm, 2.0mm, 3.0mm, 4.0mm

Adaptions:
T5, T6, T8, T10

Materials:
Steel, Stainless Steel, Iron,
High-Temp Alloys, Aluminum and
Plastics



ball nose mill



Chip-Surfer™

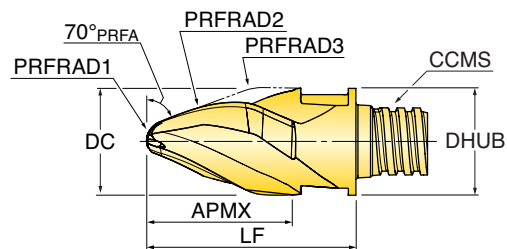
General Features:

- Large "crowned" cutting edge offers 3X cutting length when compared to ball nose; resulting in 3x productivity!
- Radius blends ensure minimum scallop height for utmost finish
- Precision cutting edge profile tolerance of ± 0.0004 "
- Tips repeat on and off the shank within ± 0.0005 "
- Sharp & polished tips for aluminum and non-ferrous materials
- Coated tips for Aerospace and Die-Mold materials
- Shanks offered in steel, carbide & heavy metal
- Ideal for finish milling blisks, impellers, turbine rotors & parts with shoulders $< 90^\circ$ using multi-axis machines

NEW
PRODUCT
ANNOUNCEMENT
2018

SERIES 46W_0

TAPER FORM TIP FOR STEELS AND HI-TEMPS

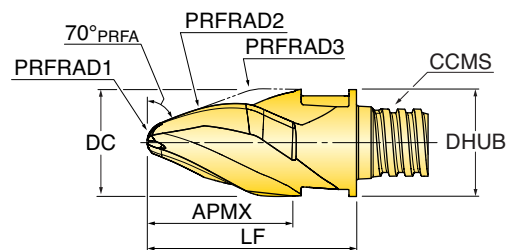


Part Number	DC Cutting Diameter	PRFRAD1 Profile Radius	PRFRAD2 Profile Radius	PRFRAD3 Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter
46W08009TQRB010	8.00 mm	1.50 mm	250.00 mm	4.00 mm	10 mm	15.40 mm	3	30	Chip Surfer T05	7.60 mm
46W10013T6RB020	10.00 mm	2.00 mm	250.00 mm	5.00 mm	14 mm	19.40 mm	3	30	Chip Surfer T06	9.30 mm
46W12013T8RB030	12.00 mm	3.00 mm	250.00 mm	6.00 mm	14 mm	23.40 mm	3	30	Chip Surfer T08	11.50 mm
46W16017TRRB040	16.00 mm	4.00 mm	500.00 mm	8.00 mm	17 mm	26.00 mm	3	30	Chip Surfer T10	15.20 mm

NOTE: When assembling, be sure tip is seated firmly on shank with no gap. Tightening Torque: T05=60in/lbs, T06=90in/lbs, T08=130in/lbs, T10=250in/lbs. No lubricant on adaption. Wrenches sold seperately.

SERIES 46W_1

TAPER FORM TIP FOR NON-FERROUS

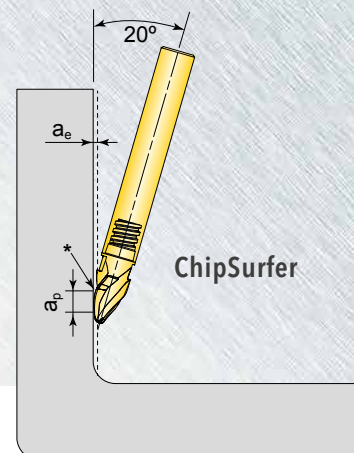


Part Number	DC Cutting Diameter	PRFRAD1 Profile Radius	PRFRAD2 Profile Radius	PRFRAD3 Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter
46W08009TQRB011	8.00 mm	1.50 mm	250.00 mm	4.00 mm	10 mm	15.40 mm	3	30	Chip Surfer T05	7.60 mm
46W10013T6RB021	10.00 mm	2.00 mm	250.00 mm	5.00 mm	14 mm	19.40 mm	3	30	Chip Surfer T06	9.30 mm
46W12013T8RB031	12.00 mm	3.00 mm	250.00 mm	6.00 mm	14 mm	23.40 mm	3	30	Chip Surfer T08	11.50 mm
46W16017TRRB041	16.00 mm	4.00 mm	500.00 mm	8.00 mm	17 mm	26.00 mm	3	30	Chip Surfer T10	15.20 mm

NOTE: When assembling, be sure tip is seated firmly on shank with no gap. Tightening Torque: T05=60in/lbs, T06=90in/lbs, T08=130in/lbs, T10=250in/lbs. No lubricant on adaption. Wrenches sold seperately.

HARDWARE

			CCMS Connection Code	Torque Value
	Thin Wrench	Optional Torque Driver		
46W08009TORB010	WS-0043	DT-60-06	T05	60in/lbs
46W08009TORB011	WS-0043	DT-60-06	T05	60in/lbs
46W10013T6RB020	WS-0029	DT-90-08	T06	90in/lbs
46W10013T6RB021	WS-0029	DT-90-08	T06	90in/lbs
46W12013T8RB030	WS-0030	DT-130-10	T08	130in/lbs
46W12013T8RB031	WS-0030	DT-130-10	T08	130in/lbs
46W16017TRRB040	WS-0044	DT-250-13	T10	250in/lbs
46W16017TRRB041	WS-0044	DT-250-13	T10	250in/lbs



TECHNICAL INFORMATION

	Material	Material Group #VDI 3323	Grade	DC (mm)	SFM *	Feed per Tooth (inch)	a _p * Axial Depth of Cut	a _e Radial Cutting Depth
P	Non-alloy Steel	1 thru 5	IN2005	8	450-650	.0010-.0020	.03-.06	.0015-.0060
				10	450-650	.0010-.0025	.03-.06	.0015-.0060
				12	450-650	.0010-.0030	.03-.06	.0015-.0060
				16	450-650	.0010-.0040	.03-.06	.0020-.0070
	Low-alloy Steel	6 thru 9		8	450-650	.0010-.0020	.03-.06	.0015-.0060
				10	450-650	.0010-.0025	.03-.06	.0015-.0060
				12	450-650	.0010-.0030	.03-.06	.0015-.0060
				16	450-650	.0010-.0040	.03-.06	.0020-.0070
	High-alloy Steel	10, 11		8	400-600	.0007-.0015	.03-.06	.0015-.0060
				10	400-600	.0007-.0025	.03-.06	.0015-.0060
				12	400-600	.0010-.0030	.03-.06	.0015-.0060
				16	400-600	.0010-.0040	.03-.06	.0020-.0070
M	Stainless Steel	12, 13, 14	8	200-350	.0007-.0015	.03-.06	.0015-.0060	
			10	200-350	.0007-.0025	.03-.06	.0015-.0060	
			12	200-350	.0010-.0030	.03-.06	.0015-.0060	
			16	200-350	.0010-.0040	.03-.06	.0020-.0070	
K	Iron	15 thru 20	8	500-700	.0010-.0020	.03-.06	.0015-.0060	
			10	500-700	.0010-.0025	.03-.06	.0015-.0060	
			12	500-700	.0010-.0030	.03-.06	.0015-.0060	
			16	500-700	.0010-.0040	.03-.06	.0020-.0070	
N	Non ferrous & Plastics	21 thru 30	8	1000-3000	.0015-.0025	.03-.06	.0015-.0060	
			10	1000-3000	.0015-.0030	.03-.06	.0015-.0060	
			12	1000-3000	.0015-.0035	.03-.06	.0015-.0060	
			16	1000-3000	.0015-.0045	.03-.06	.0020-.0070	
S	High-Temp, Ti	31 thru 37	8	80-250	.0007-.0015	.03-.06	.0015-.0060	
			10	80-250	.0007-.0025	.03-.06	.0015-.0060	
			12	80-250	.0010-.0030	.03-.06	.0015-.0060	
			16	80-250	.0010-.0040	.03-.06	.0020-.0070	

* RPM calculation is to be made using the resultant diameter at a_p

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.