INDUSTRY 4.0
PRODUCT ANNOUNCEMENT
•UPDATE•
2026

CHIPSURFER™

MILLING PRODUCTS

Tip Series (# of flutes):

45B_T (2)
46B_T (3)
47B_T (4)

Diameter Range:

.187"-1.000"
5.0-25.0 mm

Adaptions: NEW

T04, T05, T06, T08, T10, T12, & T15

Materials:

Steel, stainless steel, iron, aluminum, hi-temp alloys, titanium and hard steel

GENERAL END MILL (EM) TIPS



SPHERICAL EM TIPS



VARIABLE PITCH EM TIPS



ROUGHING EM TIPS



The Expansive ChipSurfer Ball Nose Line

ChipSurfer is a modular tip and shank system that resembles solid carbide but is designed to better ensure process quality, minimize set-up time and enhance productivity. The same shank can accommodate a diverse range of 90°, ball nose, chamfer, corner round, hi-feed, backdraft, circle segment, engraving, threading, plunging, dovetail and slotter milling tip styles; not to mention drill, spot, countersink and counterbore tips! That said, Ingersoll is pleased to feature a diverse and expansive ball nose end mill line for cutting many materials on a myriad of machines for many varied applications.

Features & Benefits:

- Tips repeat within +/-.0005" and can be indexed on the machine in seconds; ideal for high production environments
- Variable pitch geometries break up harmonics resulting in minimized vibration
- Progressive chip splitter geometries draw less horse power and offer optimal chip evacuation
- .7xD, 1xD, and 1.3xD flute length options
- Steel, heavy metal and carbide shank choices with different coolant delivery styles
- Solid ER, 40 taper, HSK and C-Adapter integral shanks offerings
- Feature variations can be quoted

Member IMC Group
Ingersoll Cutting Tools

CHIPSURFER™ PRODUCT SERIES FEATURES

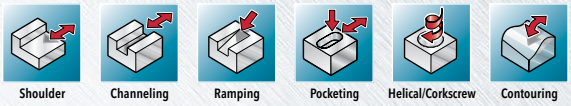
Product	Style	Features	Pgs
45B_T_RA 	• Ball nose - positive • 2-flute • 1xD cut length • 0° helix	• Ø.312-.625"; Ø8-16 mm • Positive radial rake • Ideal for soft materials and finishing in stable conditions • Pressed flute geometry offers economical benefit	4
45B_T_RW 	• Ball nose - neutral • 2-flute • 1xD cut length • 0° helix	• Ø.312-.625"; Ø8-16 mm • Neutral radial rake for edge strength and durability • Ideal for hard steel and finishing irregular stock conditions • Pressed flute geometry offers economical benefit	5
45X 	• Ball nose - spherical • 2-flute • 0° helix	• Ø.375-1.000"; Ø8-20 mm • 120° radius wrap • Pressed flute geometry offers economical benefit	6
45B_T_P 	• Ball nose for aluminum • 2-flute • .7xD cut length • 45° helix	• Ø.312-1.000"; Ø8-25 mm • Sharp edge and polished flutes for non-ferrous materials	7
46B-P 	• Ball nose for aluminum • 3-flute • .7xD cut length • 38° helix	• Ø.250-.750" • Sharp edge and polished flute for non-ferrous materials	8
45B_T_RB 	• Ball nose - helical • 2-flute • .7xD cut length • 30° helix	• Ø.312-.750"; Ø8-16 mm • 2 center-cutting flutes • Ideal for tip cutting on 3-axis machining	9

CHIPSURFER™ PRODUCT SERIES FEATURES (CONTINUED)

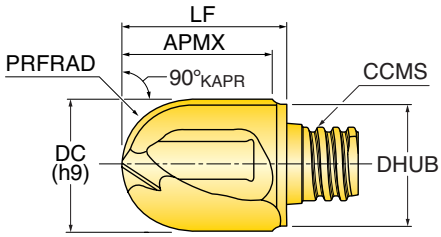
Product	Style	Features	Pgs
46B_T_RB 	• Ball nose - helical • 3-flute • .7xD cut length • 30° helix	• Ø8-20 mm • 1 center-cutting flute; breaks up harmonics • Ideal for picking out corners	10
47B_T_RB 	• Ball nose - helical • 4-flute • .7xD cut length • 30° helix	• Ø.312-1.000"; Ø6-25 mm • 2 center-cutting flutes	11
47B_T_RB 	• Ball nose - helical • 4-flute • 1.3xD cut length • 30° helix	• Ø.312-1.000" • 2 center-cutting flutes	12
47B_TQ 	• Ball nose - helical • 4-flute • 38° helix	• Ø.187-.250" • 2 center-cutting flutes	13
47B_T_RM 	• Roughing ball nose - helical • 4-flute • .7xD cut length • 35° helix	• Ø.500-1.000" • 2 center-cutting flutes • Variable pitch and progressive chip splitters break up harmonics resulting in small chips that can be evacuated with airblast	14
47B_T_RQ 	• Ball nose - helical • 4-flute • .7xD cut length • 45° helix • Variable pitch	• Ø.312-.750"; Ø8-20 mm • 4 center-cutting flutes • Variable pitch • Well suited for 5-axis machining • Ideal for hard steel	15
-		• Operating Guidelines	16
-		• Indexing ChipSurfer Tips	17

CHIPSURFER™ SERIES 45B_T_RA (2-FLUTE)

BALL NOSE - POSITIVE, 1XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
45B-3131TQRA04	0.312	0.156	0.310	0.390	2	0	ChipSurfer T05	0.300	•
45B-3738T6RA04	0.375	0.187	0.380	0.480	2	0	ChipSurfer T06	0.364	•
45B-5050T8RA06	0.500	0.250	0.500	0.640	2	0	ChipSurfer T08	0.480	•
45B-6263TRRA07	0.625	0.312	0.630	0.750	2	0	ChipSurfer T10	0.600	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
45B08008TQRA10	8.00 mm	4.00 mm	8.00 mm	10.00 mm	2	0	ChipSurfer T05	7.60 mm	•
45B10010T6RA12	10.00 mm	5.00 mm	10.00 mm	12.40 mm	2	0	ChipSurfer T06	9.60 mm	•
45B12011T8RA15	12.00 mm	6.00 mm	12.00 mm	15.30 mm	2	0	ChipSurfer T08	11.50 mm	•
45B16016TRRA19	16.00 mm	8.00 mm	16.00 mm	19.10 mm	2	0	ChipSurfer T10	15.20 mm	•

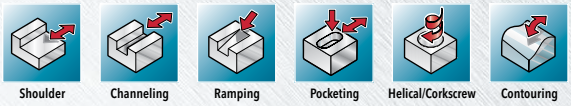
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

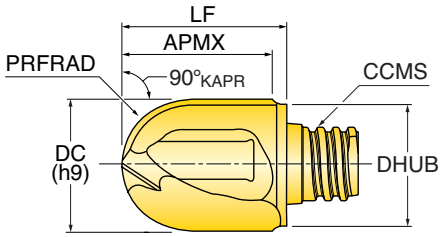
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	

CHIPSURFER™ SERIES 45B_T_RW (2-FLUTE)

BALL NOSE - NEUTRAL, 1XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2006
45B-3131TQRW04	0.312	0.156	0.310	0.390	2	0	ChipSurfer T05	0.300	•
45B-3738T6RW04	0.375	0.187	0.380	0.480	2	0	ChipSurfer T06	0.364	•
45B-5050T8RW06	0.500	0.250	0.500	0.640	2	0	ChipSurfer T08	0.480	•
45B-6263TRRW07	0.625	0.312	0.630	0.750	2	0	ChipSurfer T10	0.600	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2006
45B08008TQRA10	8.00 mm	4.00 mm	8.00 mm	10.00 mm	2	0	ChipSurfer T05	7.60 mm	•
45B10010T6RW12	10.00 mm	5.00 mm	10.00 mm	12.40 mm	2	0	ChipSurfer T06	9.61 mm	•
45B12011T8RW15	12.00 mm	6.00 mm	12.00 mm	15.30 mm	2	0	ChipSurfer T08	11.50 mm	•
45B16016TRRA19	16.00 mm	8.00 mm	16.00 mm	19.10 mm	2	0	ChipSurfer T10	15.20 mm	•

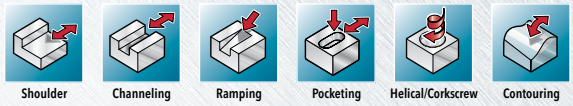
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

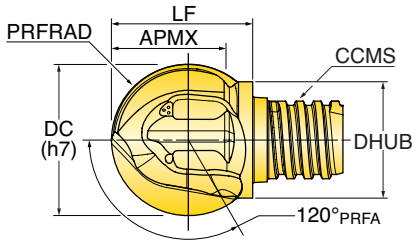
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	

CHIPSURFER™ SERIES 45X (2-FLUTE)

BALL NOSE - SPHERICAL







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
45X-3727TQRA03	0.375	0.187	0.330	0.380	2	0	ChipSurfer T05	0.300	•
45X-5037T6RA04	0.500	0.250	0.400	0.450	2	0	ChipSurfer T06	0.364	•
45X-6248T8RA06	0.625	0.312	0.550	0.600	2	0	ChipSurfer T08	0.480	•
45X-7560TRRA07	0.750	0.375	0.660	0.710	2	0	ChipSurfer T10	0.600	•
45X-1072TSRA09	1.000	0.500	0.740	0.921	2	0	ChipSurfer T12	0.720	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
NEW 45X08005TPRA08	8.00 mm	4.00 mm	6.32 mm	8.20 mm	2	0	ChipSurfer T04	5.80 mm	•
45X10007TQRA10	10.00 mm	5.00 mm	7.50 mm	10.10 mm	2	0	ChipSurfer T05	7.60 mm	•
45X12009T6RA12	12.00 mm	6.00 mm	9.00 mm	11.65 mm	2	0	ChipSurfer T06	9.60 mm	•
45X16012T8RA15	16.00 mm	8.00 mm	12.50 mm	15.40 mm	2	0	ChipSurfer T08	11.50 mm	•
45X20015TRRA19	20.00 mm	10.00 mm	15.50 mm	18.50 mm	2	0	ChipSurfer T10	15.20 mm	•

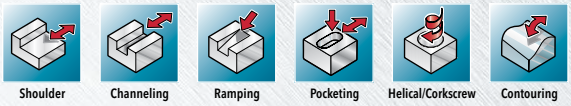
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

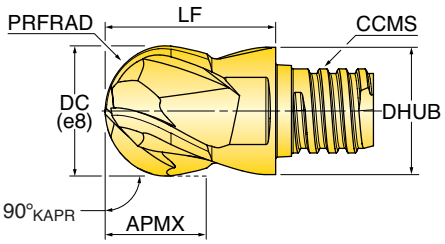
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value	
T04	WS-0074	-	42.5in/lbs	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	

CHIPSURFER™ SERIES 45B_T_P (2-FLUTE)

BALL NOSE FOR ALUMINUM, .7XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN05S
45B-3120TQRB03-P	0.312	0.156	0.200	0.390	2	45	ChipSurfer T05	0.300	•
45B-3727T6RB05-P	0.375	0.187	0.270	0.510	2	45	ChipSurfer T06	0.364	•
45B-5037T8RB06-P	0.500	0.250	0.370	0.650	2	45	ChipSurfer T08	0.480	•
45B-6247TRRB08-P	0.625	0.312	0.470	0.800	2	45	ChipSurfer T10	0.600	•
45B-7550TSRB10-P	0.750	0.375	0.500	1.000	2	45	ChipSurfer T12	0.720	•
45B-1086TURB14-P	1.000	0.500	0.860	1.450	2	45	ChipSurfer T15	0.940	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN05S
45B08005TQRB10	8.00 mm	4.00 mm	5.00 mm	10.00 mm	2	45	ChipSurfer T05	7.60 mm	•
45B10007T6RB13	10.00 mm	5.00 mm	7.00 mm	13.00 mm	2	45	ChipSurfer T06	9.50 mm	•
45B12009T8RB17	12.00 mm	6.00 mm	9.00 mm	16.50 mm	2	45	ChipSurfer T08	11.50 mm	•
45B16012TRRB21	16.00 mm	8.00 mm	12.00 mm	20.50 mm	2	45	ChipSurfer T10	15.20 mm	•
45B20015TSRB26	20.00 mm	10.00 mm	15.00 mm	25.50 mm	2	45	ChipSurfer T12	18.30 mm	•
45B25022TURB37	25.00 mm	12.50 mm	22.00 mm	37.00 mm	2	45	ChipSurfer T15	23.90 mm	•

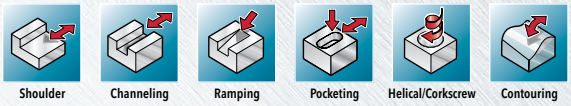
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

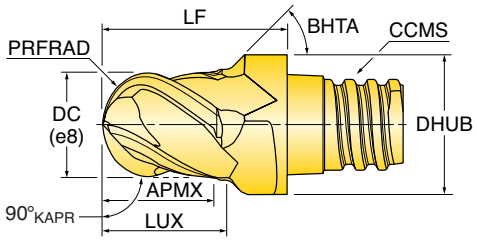
CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value
T05	WS-0043	DT-60-06	60in/lbs
T06	WS-0029	DT-90-08	90in/lbs
T08	WS-0030	DT-130-10	130in/lbs
T10	WS-0044	DT-250-13	250in/lbs
T12	WS-0059	DT-250-09	250in/lbs
T15	WS-0061	DT-350-20	350in/lbs

CHIPSURFER™ SERIES 46B-P (3-FLUTE)

BALL NOSE FOR ALUMINUM, .7XD FLUTE LENGTH



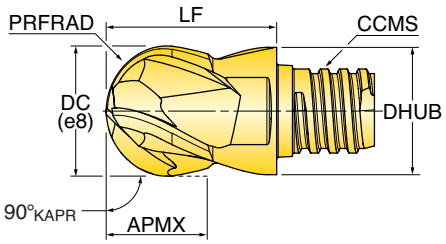




INCH (.250" CUTTING DIAMETER)

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	BHTA Body Half Taper Angle	CCMS Connection Code	DHUB Hub Dia.	Grade IN05S
46B-2520TQRC04-P	0.250	0.125	0.200	0.250	0.390	3	38	45	ChipSurfer T05	0.300	•





INCH (.312"–.750" CUTTING DIAMETER)

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN05S
46B-3120TQRC03-P	0.312	0.156	0.210	0.390	3	38	ChipSurfer T05	0.300	•
46B-3727T6RC05-P	0.375	0.187	0.285	0.510	3	38	ChipSurfer T06	0.364	•
46B-5037T8RC06-P	0.500	0.250	0.385	0.650	3	38	ChipSurfer T08	0.480	•
46B-7550TSRC10-P	0.750	0.375	0.500	0.650	3	38	ChipSurfer T12	0.720	•

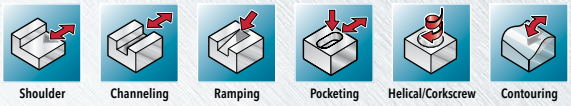
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

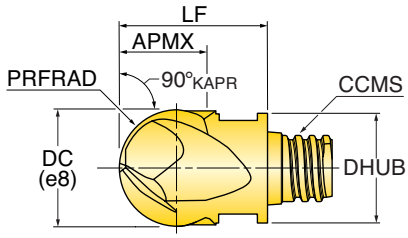
CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value
T05	WS-0043	DT-60-06	60in/lbs
T06	WS-0029	DT-90-08	90in/lbs
T08	WS-0030	DT-130-10	130in/lbs
T12	WS-0059	DT-250-09	250in/lbs

CHIPSURFER™ SERIES 45B_T_RB (2-FLUTE)

BALL NOSE - HELICAL, .7XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
45B-3120TQRB03	0.312	0.156	0.200	0.390	2	30	ChipSurfer T05	0.300	•
45B-3727T6RB05	0.375	0.187	0.270	0.510	2	30	ChipSurfer T06	0.364	•
45B-5037T8RB06	0.500	0.250	0.370	0.650	2	30	ChipSurfer T08	0.480	•
45B-7550TSRB10	0.750	0.375	0.500	1.000	2	30	ChipSurfer T12	0.720	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
45B08005TQRB10	8.00 mm	4.00 mm	5.00 mm	10.00 mm	2	30	ChipSurfer T05	7.60 mm	•
45B10007T6RB13	10.00 mm	5.00 mm	7.00 mm	13.00 mm	2	30	ChipSurfer T06	9.50 mm	•
45B12009T8RB17	12.00 mm	6.00 mm	9.00 mm	16.50 mm	2	30	ChipSurfer T08	11.50 mm	•
45B16012TRRB21	16.00 mm	8.00 mm	12.00 mm	20.50 mm	2	30	ChipSurfer T10	15.20 mm	•

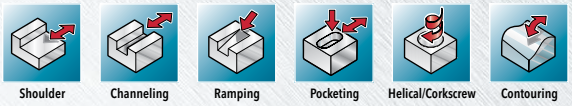
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

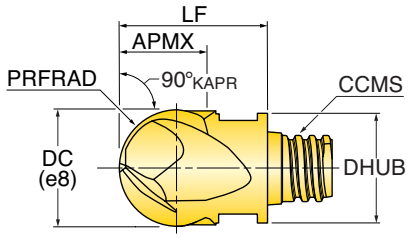
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	
T12	WS-0059	DT-250-09	250in/lbs	

CHIPSURFER™ SERIES 46B_T_RB (3-FLUTE)

BALL NOSE - HELICAL, .7XD FLUTE LENGTH







METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
46B08005TQRB10	8.00 mm	4.00 mm	5.00 mm	15.00 mm	3	30	ChipSurfer T05	7.60 mm	•
46B10007T6RB13	10.00 mm	5.00 mm	7.00 mm	19.00 mm	3	30	ChipSurfer T06	9.50 mm	•
46B12009T8RB17	12.00 mm	6.00 mm	9.00 mm	16.50 mm	3	30	ChipSurfer T08	11.50 mm	•
46B16012TRRB21	16.00 mm	8.00 mm	12.00 mm	20.50 mm	3	30	ChipSurfer T10	15.20 mm	•
46B20015TSRB26	20.00 mm	10.00 mm	15.00 mm	25.50 mm	3	30	ChipSurfer T12	18.30 mm	•

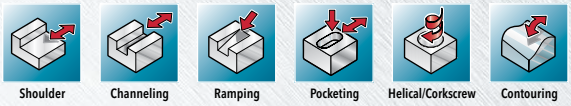
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

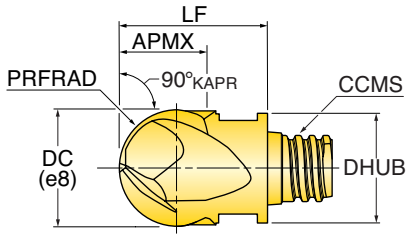
CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	
T12	WS-0059	DT-250-09	250in/lbs	

CHIPSURFER™ SERIES 47B_T_RB (4-FLUTE)

BALL NOSE - HELICAL, .7XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
47B-3120TQRB03	0.312	0.156	0.200	0.390	4	30	ChipSurfer T05	0.300	•
47B-3727T6RB05	0.375	0.187	0.270	0.510	4	30	ChipSurfer T06	0.364	•
47B-5037T8RB06	0.500	0.250	0.370	0.650	4	30	ChipSurfer T08	0.480	•
47B-6247TRRB08	0.625	0.312	0.470	0.800	4	30	ChipSurfer T10	0.600	•
47B-7562TSRB10	0.750	0.375	0.620	1.000	4	30	ChipSurfer T12	0.720	•
47B-1086TURB14	1.000	0.500	0.860	1.450	4	30	ChipSurfer T15	0.940	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
NEW 47B06004TPRB08	6.00 mm	3.00 mm	4.00 mm	8.50 mm	4	37	ChipSurfer T04	5.80 mm	•
47B08005TQRB10	8.00 mm	4.00 mm	5.00 mm	10.00 mm	4	30	ChipSurfer T05	7.60 mm	•
47B10007T6RB13	10.00 mm	5.00 mm	7.00 mm	13.00 mm	4	30	ChipSurfer T06	9.50 mm	•
47B12009T8RB17	12.00 mm	6.00 mm	9.00 mm	16.50 mm	4	30	ChipSurfer T08	11.50 mm	•
47B16012TRRB21	16.00 mm	8.00 mm	12.00 mm	20.50 mm	4	30	ChipSurfer T10	15.20 mm	•
47B20015TSRB26	20.00 mm	10.00 mm	15.00 mm	25.50 mm	4	30	ChipSurfer T12	18.30 mm	•
47B25022TURB37	25.00 mm	12.50 mm	22.00 mm	37.00 mm	4	30	ChipSurfer T15	23.90 mm	•

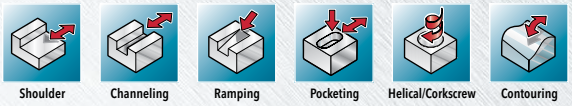
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

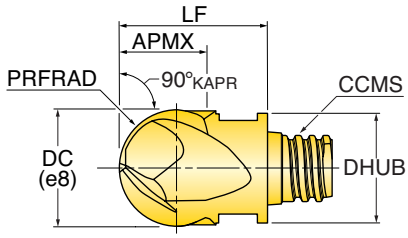
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value
T04	WS-0074	-	42.5in/lbs
T05	WS-0043	DT-60-06	60in/lbs
T06	WS-0029	DT-90-08	90in/lbs
T08	WS-0030	DT-130-10	130in/lbs
T10	WS-0044	DT-250-13	250in/lbs
T12	WS-0059	DT-250-09	250in/lbs
T15	WS-0061	DT-350-20	350in/lbs

CHIPSURFER™ SERIES 47B_T_RB (4-FLUTE)

BALL NOSE - HELICAL, 1.3XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
47B-3140TQRB05	0.312	0.156	0.400	0.590	4	30	ChipSurfer T05	0.300	•
47B-3751T6RB07	0.375	0.187	0.510	0.750	4	30	ChipSurfer T06	0.364	•
47B-5061T8RB08	0.500	0.250	0.610	0.890	4	30	ChipSurfer T08	0.480	•
47B-6277TRRB11	0.625	0.312	0.770	1.100	4	30	ChipSurfer T10	0.600	•
47B-7510TSRB13	0.750	0.375	1.000	1.380	4	30	ChipSurfer T12	0.720	•
47B-1010TURB16	1.000	0.500	1.000	1.600	4	30	ChipSurfer T15	0.940	•

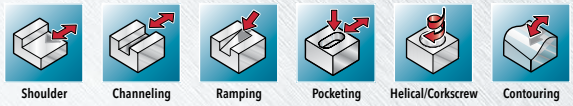
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

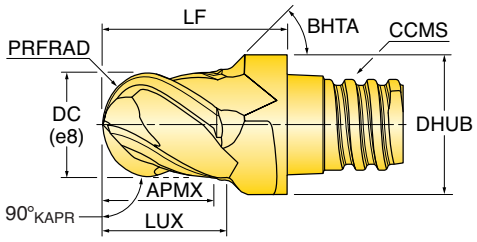
CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value
T05	WS-0043	DT-60-06	60in/lbs
T06	WS-0029	DT-90-08	90in/lbs
T08	WS-0030	DT-130-10	130in/lbs
T10	WS-0044	DT-250-13	250in/lbs
T12	WS-0059	DT-250-09	250in/lbs
T15	WS-0061	DT-350-20	350in/lbs

CHIPSURFER™ SERIES 47B_TQ (4-FLUTE)

BALL NOSE - HELICAL







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	BHTA Body Half Taper Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
47B-1828TQRB05	0.187	0.093	0.280	0.350	0.590	4	38	30	ChipSurfer T05	0.300	•
47B-2520TQRB03	0.250	0.125	0.200	0.210	0.390	4	38	45	ChipSurfer T05	0.300	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LUX Usable Length Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	BHTA Body Half Taper Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2005
47B05007TQRB15	5.00 mm	2.50 mm	7.00 mm	8.89 mm	15.00 mm	4	38	30	ChipSurfer T05	7.60 mm	•
47B06005TQRB10	6.00 mm	3.00 mm	5.00 mm	6.80 mm	10.00 mm	4	38	45	ChipSurfer T05	7.60 mm	•

When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

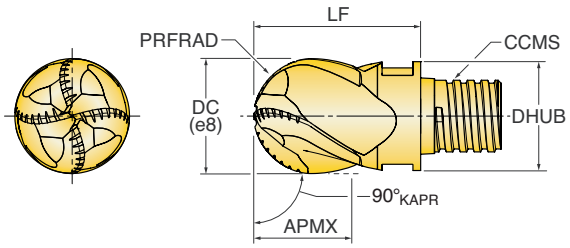
CCMS Connection Code	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	

CHIPSURFER™ SERIES 47B_T_RM (4-FLUTE)

ROUGHING BALL NOSE - HELICAL, .7XD FLUTE LENGTH







INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2505
47B-5037T8RM06	0.500	0.250	0.370	0.650	4	35	ChipSurfer T08	0.480	•
47B-7562TSRM10	0.750	0.375	0.620	1.000	4	35	ChipSurfer T12	0.720	•
47BE1086TURM14	1.000	0.500	0.860	1.450	4	35	ChipSurfer T15	0.940	•

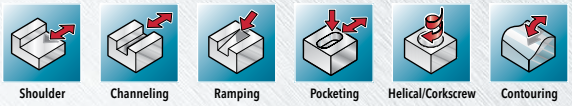
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

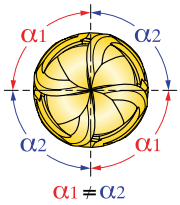
CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value
T08	WS-0030	DT-130-10	130in/lbs
T12	WS-0059	DT-250-09	250in/lbs
T15	WS-0061	DT-350-20	350in/lbs

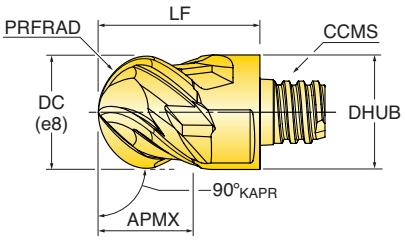
CHIPSURFER™ SERIES 47B_T_RQ (4-FLUTE)

BALL NOSE - HELICAL, VARIABLE PITCH, .7XD FLUTE LENGTH









INCH

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2006
47B-3120TQRQ03	0.312	0.156	0.200	0.390	4	45	ChipSurfer T05	0.300	•
47B-3727T6RQ05	0.375	0.187	0.270	0.510	4	45	ChipSurfer T06	0.364	•
47B-5037T8RQ06	0.500	0.250	0.370	0.650	4	45	ChipSurfer T08	0.480	•
47B-6247TRRQ08	0.625	0.312	0.470	0.800	4	45	ChipSurfer T10	0.600	•
47B-7562TURQ10	0.750	0.375	0.620	1.000	4	45	ChipSurfer T12	0.720	•

METRIC

Part Number	DC Cutting Diameter	PRFRAD Profile Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter	Grade IN2006
47B08005TQRQ10	8.00 mm	3.98 mm	5.40 mm	10.00 mm	4	45	ChipSurfer T05	7.70 mm	•
47B10007T6RQ13	10.00 mm	4.98 mm	7.40 mm	13.00 mm	4	45	ChipSurfer T06	9.60 mm	•
47B12009T8RQ17	12.00 mm	5.98 mm	9.30 mm	16.50 mm	4	45	ChipSurfer T08	11.70 mm	•
47B16012TRRQ21	16.00 mm	7.98 mm	12.40 mm	20.50 mm	4	45	ChipSurfer T10	15.30 mm	•
47B20016TSRQ26	20.00 mm	9.97 mm	16.00 mm	25.50 mm	4	45	ChipSurfer T12	18.45 mm	•

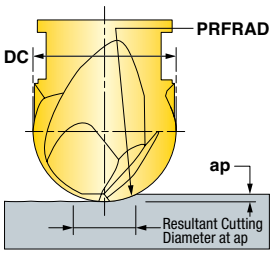
When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold seperately.

CHIPSURFER™ HARDWARE

CCMS Connection Code	**OPTIONAL** Wrench	**OPTIONAL** Torque Driver	Torque Value	
T05	WS-0043	DT-60-06	60in/lbs	
T06	WS-0029	DT-90-08	90in/lbs	
T08	WS-0030	DT-130-10	130in/lbs	
T10	WS-0044	DT-250-13	250in/lbs	
T12	WS-0059	DT-250-09	250in/lbs	

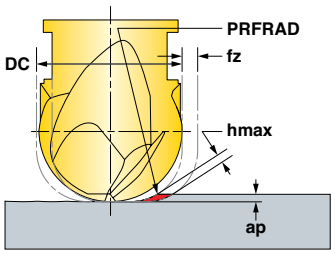
CHIPSURFER™ OPERATING GUIDELINES: BALL NOSE TIPS

RPM Calculation



RPM calculation is to be made using the resultant diameter at ap.

Chip Thinning



Chip Thinning Calculator is recommended to ensure hmax is in fz range.

Materials				Cutting Speed SFM	DC Cutting Dia. (inch)	fz Feed per Tooth (inch)	Harder <--------> Tougher			Coolant
ISO	Material Group	Type	Examples				IN2006	IN05S	IN2505 IN2005	
P	1-5	Non-alloy Steel	1018, A36, 1045, A572, 1070	400-1000	.187-.250	.0007-.0035	2	–	1	No
					.312-.500	.0010-.0040				
					.625-.750	.0010-.0045				
					1.000	.0010-.0050				
	6-9	Low-alloy Steel	4140, 4340, P20, 8620, 300M	350-700	.187-.250	.0007-.0030				
					.312-.500	.0010-.0035				
					.625-.750	.0010-.0040				
					1.000	.0010-.0045				
	10-11	High-alloy Steel	H13, A2, D2, M2, T1	300-600	.187-.250	.0007-.0025				
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
M	12-13	Stainless Steel (Ferritic & Martensitic)	410, 416, 440	350-600	.187-.250	.0007-.0025	–	–	1	Yes
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
	14	Stainless Steel (Austenitic)	303, 304, 316, 15-5, 17-4	300-550	.187-.250	.0007-.0025				May not be required at high speeds
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
K	15-16	Gray Cast Iron	CLS. 20, 30, 45	500-1000	.187-.250	.0007-.0030	–	–	1	No
					.312-.500	.0010-.0035				
					.625-.750	.0010-.0040				
					1.000	.0010-.0045				
	17-20	Nodular Cast Iron	60-40-18, 100-70-03	400-800	.187-.250	.0007-.0025				
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
N	21-30	Aluminum	7075, 6061	1000-3000	.187-.250	.0007-.0030	–	1	–	Yes
					.312-.500	.0010-.0040				
					.625-.750	.0010-.0050				
					1.000	.0010-.0060				
S	31-35	High-Temp Alloys	Inconel, Hastelloy, Nimonic, Monel	65-200	.187-.250	.0007-.0025	–	–	1	Yes
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
	36-37	Titanium Alloys	6Al-4V, 5Al-5Mo-5V-3Cr	85-200	.187-.250	.0007-.0025				
					.312-.500	.0010-.0030				
					.625-.750	.0010-.0035				
					1.000	.0010-.0040				
H	38-39	Hardened Steel >48	A2, O1, D2	130-250	.187-.250	.0007-.0015	1	–	2	No
					.312-.500	.0010-.0020				
					.625-.750	.0010-.0025				
					1.000	.0010-.0030				

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.

CHIPSURFER™ INDEXING CHIPSURFER TIPS

Step 1: Screw tip into shank until finger tight (Figure 1a). Note a .010" gap (Figure 1b).
Step 2: Use wrench to torque approximately 1/4 turn, creating a simultaneous fit (Figure 2).
Step 3: Use .001" shim stock to check the simultaneous fit at the intersection of the tip and the shank.
The shim should not be able to enter the intersection (Figure 3a).
If it does, tighten further with the wrench until there is no gap (Figure 3b).

Note: Pre-set torque wrenches (series DT-. . .) can be purchased.

Figure 1a. Finger tight



Figure 1b. .010" gap



Figure 2. 1/4 turn



Figure 3a. Shim should NOT enter intersection



Figure 3b. Proper fit



Series DT-. . . Optional Torque Wrench

