CHIP SURFER™

SMALL DIAMETER HI-FEED END MILL TIPS TAILORED FOR ANY APPLICATION

Tip Style:
Hi-Feed End Mills

Diameters:
.375"-1.000", 8mm-20mm

Geometry:
Positive & Neutral

Adaptions:
T05, T06, T08, T10, T12, T15

Materials:
Steel, Stainless Steel, Iron, Hi-Temp Alloys, Titanium, Hard Steel

6 Flute:

- Central Coolant Hole for efficient chip evacuation
- Fine Pitch Density for utmost feed rate capability
- Positive Rake Geometry and Keen Edge
- Ideal for Steel, Iron and Hardened Steel
- Programmer tip: Must "drive" corners when pocketing due to tooth engagement (90° turns not recommended)

4 Flute:

- Medium Pitch Density for elevated feed rate capability
- Positive Rake Geometry and Keen Edge
- Ideal for Hard Steel (external airblast); SS, Hi-Temps and Ti (external coolant)
- Programmer tip: Must "drive" corners when pocketing due to tooth engagement (90° turns not recommended)

2 Flute:

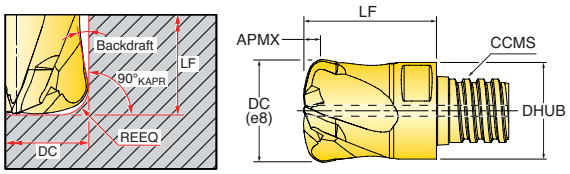
- Coarse Pitch Density ideal for tight pocket corners and low face pressure
- Neutral geometry and Strong Edge to survive mechanical shock and interruptions
- Ideal for long reach, chatter prone & abusive applications; Weld
- Programmer tip: 30-40% diameter radial step-overs recommended for best tool life

PRODUCT ANNOUNCEMENT
UPDATE
2018

Member IMC Group
Ingersoll Cutting Tools

CHIPSURFER™ SERIES 47A, 48A

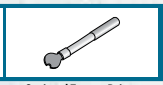
SOLID CARBIDE HIGH-FEED ROUGHING TIP (POSITIVE GEOMETRY)



Cutter Number	DC Cutting Diameter	REEQ Program Radius Equivalent	APMX Depth of Cut Max.	ZEFF Effective Flutes	LF Functional Length	CCMS Connection Code	DHUB Hub Diameter	CSP Coolant	RMPX Ramp Angle Max.
INCH	(inch)	(inch)	(inch)		(inch)		(inch)		
47A-5004T8RA09	0.500	0.100	0.023	4	0.649	Chip Surfer T08	0.480	No	5
47A-7504TSRA16	0.750	0.160	0.039	4	1.000	Chip Surfer T12	0.726	No	5
48A-1004TURA20	1.000	0.145	0.047	6	0.984	Chip Surfer T15	0.940	No	5
METRIC	(mm)	(mm)	(mm)		(mm)		(mm)		
47A08001TQRA16	8.00	1.62	0.40	4	10.00	Chip Surfer T05	7.50	No	5
NEW 48A10001T6RA101	10.00	1.00	0.45	6	10.00	Chip Surfer T06	9.50	Yes	3
47A10001T6RA20	10.00	2.01	0.50	4	13.00	Chip Surfer T06	9.50	No	5
47A12001T8RA24	12.00	2.47	0.60	4	16.50	Chip Surfer T08	11.50	No	5
NEW 48A12001T8RA121	12.00	1.20	0.65	6	12.50	Chip Surfer T08	11.50	Yes	3
47A16001TRRA32	16.00	3.25	0.80	4	20.50	Chip Surfer T10	15.40	No	5
NEW 48A16001TRRA201	16.00	2.00	1.08	6	16.00	Chip Surfer T10	15.40	Yes	3
47A20001TSRA40	20.00	4.02	1.00	4	25.50	Chip Surfer T12	18.45	No	5
NEW 48A20001TSRA221	20.00	2.20	1.28	6	20.00	Chip Surfer T12	18.45	Yes	3

NOTE: Program as a square bottom end mill with noted corner radius. This method will ensure and minimize remaining stock for secondary passes.

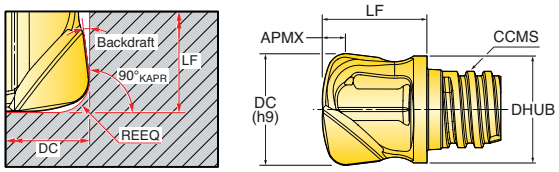
CHIPSURFER™ HARDWARE

CCMS Connection Code	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-250-16	250in/lbs
T15	WS-0059	DT-250-16	250in/lbs

When assembling, be sure carbide tip is seated firmly on shank with no gap.
Note: DO NOT apply lubricant to the thread connection. Wrench not included with carbide tip or shank purchase.

CHIPSURFER™ SERIES 45A

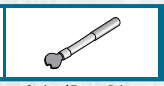
SOLID CARBIDE HIGH-FEED ROUGHING TIP (NEUTRAL GEOMETRY)



Cutter Number	DC Cutting Diameter	REEQ Program Radius Equivalent	APMX Depth of Cut Max.	ZEFF Effective Flutes	LF Functional Length	CCMS Connection Code	DHUB Hub Diameter	CSP Coolant	RMPX Ramp Angle Max.
INCH	(inch)	(inch)	(inch)		(inch)		(inch)		
45A-3703T6RA06	0.375	0.059	0.020	2	0.490	T06	0.360	No	7
45A-5004T8RA08	0.500	0.098	0.027	2	0.591	T08	0.453	No	7
45A-7506TSRA12	0.750	0.079	0.056	2	0.685	T12	0.726	No	7
METRIC	(mm)	(mm)	(mm)		(mm)		(mm)		
45A10001T6RA20	10.00	2.00	0.60	2	12.50	T06	9.60	No	7
45A12001T8RA25	12.00	2.50	0.68	2	11.10	T08	11.50	No	7
45A16001TRRA301	16.00	3.00	1.10	2	13.50	T10	15.20	No	7

NOTE: Program as a square bottom end mill with noted corner radius. This method will ensure and minimize remaining stock for secondary passes.

CHIPSURFER™ HARDWARE

CCMS Connection Code	Wrench	 Optional Torque Driver	Torque Value
T06	WS-0029	DT-90-05	90in/lbs
T08	WS-0030	DT-130-07	130in/lbs
T10	WS-0044	DT-250-08	250in/lbs
T12	WS-0059	-	-

When assembling, be sure carbide tip is seated firmly on shank with no gap.
Note: DO NOT apply lubricant to the thread connection. Wrench not included with carbide tip or shank purchase.

Workpiece Material	Diameter (Inch)	Cutting Speed SFM	Feed Per Tooth APT (Inch)
Unalloyed steel P	0.312	500 - 850	0.015-0.025
	0.375	500 - 850	0.018-0.028
	0.500	500 - 850	0.018-0.028
	0.625	500 - 850	0.020-0.030
	0.750	500 - 850	0.020-0.030
	1.000	500 - 850	0.025-0.035
High Carbon steel P	0.312	450 - 750	0.015-0.025
	0.375	450 - 750	0.018-0.028
	0.500	450 - 750	0.018-0.028
	0.625	450 - 750	0.020-0.030
	0.750	450 - 750	0.020-0.030
	1.000	450 - 750	0.025-0.035
Alloyed / Tool steel P	0.312	400 - 600	0.015-0.025
	0.375	400 - 600	0.018-0.028
	0.500	400 - 600	0.018-0.028
	0.625	400 - 600	0.020-0.030
	0.750	400 - 600	0.020-0.030
	1.000	400 - 600	0.025-0.035
Stainless steel M	0.312	300 - 550	0.015-0.025
	0.375	300 - 550	0.018-0.028
	0.500	300 - 550	0.018-0.028
	0.625	300 - 550	0.020-0.030
	0.750	300 - 550	0.020-0.030
	1.000	300 - 550	0.025-0.035
Gray cast iron K	0.312	500 - 850	0.015-0.025
	0.375	500 - 850	0.018-0.028
	0.500	500 - 850	0.018-0.028
	0.625	500 - 850	0.020-0.030
	0.750	500 - 850	0.020-0.030
	1.000	500 - 850	0.025-0.035
Nodular K	0.312	450 - 650	0.015-0.025
	0.375	450 - 650	0.018-0.028
	0.500	450 - 650	0.018-0.028
	0.625	450 - 650	0.020-0.030
	0.750	450 - 650	0.020-0.030
	1.000	450 - 650	0.025-0.035
Super alloys S	0.312	80 - 200	0.008-0.018
	0.375	80 - 200	0.012-0.022
	0.500	80 - 200	0.012-0.022
	0.625	80 - 200	0.015-0.025
	0.750	80 - 200	0.015-0.025
	1.000	80 - 200	0.018-0.028
Hardened steel < 50 HRC H	0.312	250 - 400	0.012-0.022
	0.375	250 - 400	0.015-0.025
	0.500	250 - 400	0.015-0.025
	0.625	250 - 400	0.020-0.030
	0.750	250 - 400	0.020-0.030
	1.000	250 - 400	0.020-0.030
Hardened steel < 58 HRC H	0.312	150 - 250	0.008-0.018
	0.375	150 - 250	0.012-0.022
	0.500	150 - 250	0.012-0.022
	0.625	150 - 250	0.015-0.025
	0.750	150 - 250	0.015-0.025
	1.000	150 - 250	0.018-0.028

CHIPSURFER™ TECHNICAL INFORMATION - SERIES 48A

Workpiece Material	Diameter (Inch)	aP	aR	Cutting Speed SFM	Feed Per Tooth APT (Inch)
Unalloyed steel P	0.312	.045xD	.7xD	500 - 850	0.015-0.025
	0.375	.045xD	.7xD	500 - 850	0.018-0.028
	0.500	.045xD	.7xD	500 - 850	0.018-0.028
	0.625	.045xD	.7xD	500 - 850	0.020-0.030
	0.750	.045xD	.7xD	500 - 850	0.020-0.030
	1.000	.045xD	.7xD	500 - 850	0.025-0.035
High Carbon steel P	0.312	.045xD	.7xD	450 - 750	0.015-0.025
	0.375	.045xD	.7xD	450 - 750	0.018-0.028
	0.500	.045xD	.7xD	450 - 750	0.018-0.028
	0.625	.045xD	.7xD	450 - 750	0.020-0.030
	0.750	.045xD	.7xD	450 - 750	0.020-0.030
	1.000	.045xD	.7xD	450 - 750	0.025-0.035
Alloyed / Tool steel P	0.312	.04xD	.6xD	400 - 600	0.015-0.025
	0.375	.04xD	.6xD	400 - 600	0.018-0.028
	0.500	.04xD	.6xD	400 - 600	0.018-0.028
	0.625	.04xD	.6xD	400 - 600	0.020-0.030
	0.750	.04xD	.6xD	400 - 600	0.020-0.030
	1.000	.04xD	.6xD	400 - 600	0.025-0.035
Gray cast iron K	0.312	apmx	.7xD	500 - 850	0.015-0.025
	0.375	apmx	.7xD	500 - 850	0.018-0.028
	0.500	apmx	.7xD	500 - 850	0.018-0.028
	0.625	apmx	.7xD	500 - 850	0.020-0.030
	0.750	apmx	.7xD	500 - 850	0.020-0.030
	1.000	apmx	.7xD	500 - 850	0.025-0.035
Nodular K	0.312	apmx	.7xD	450 - 650	0.015-0.025
	0.375	apmx	.7xD	450 - 650	0.018-0.028
	0.500	apmx	.7xD	450 - 650	0.018-0.028
	0.625	apmx	.7xD	450 - 650	0.020-0.030
	0.750	apmx	.7xD	450 - 650	0.020-0.030
	1.000	apmx	.7xD	450 - 650	0.025-0.035
Hardened steel < 50 HRC H	0.312	.03xD	.3xD	250 - 400	0.012-0.022
	0.375	.03xD	.3xD	250 - 400	0.015-0.025
	0.500	.03xD	.3xD	250 - 400	0.015-0.025
	0.625	.03xD	.3xD	250 - 400	0.020-0.030
	0.750	.03xD	.3xD	250 - 400	0.020-0.030
	1.000	.03xD	.3xD	250 - 400	0.020-0.030
Hardened steel < 58 HRC H	0.312	.02xD	.25xD	150 - 250	0.008-0.018
	0.375	.02xD	.25xD	150 - 250	0.012-0.022
	0.500	.02xD	.25xD	150 - 250	0.012-0.022
	0.625	.02xD	.25xD	150 - 250	0.015-0.025
	0.750	.02xD	.25xD	150 - 250	0.015-0.025
	1.000	.02xD	.25xD	150 - 250	0.018-0.028

CHIPoSURFER™ TECHNICAL INFORMATION - SERIES 45A

Workpiece Material	Diameter (Inch)	Cutting Speed SFM	Feed Per Tooth APT (Inch)
Unalloyed steel P	0.375	500 - 850	0.015 - 0.030
	0.500	500 - 850	0.020 - 0.040
	0.625	500 - 850	0.025 - 0.040
	0.750	500 - 850	0.025 - 0.040
High Carbon steel P	0.375	450 - 750	0.012 - 0.027
	0.500	450 - 750	0.015 - 0.030
	0.625	450 - 750	0.015 - 0.030
	0.750	450 - 750	0.020 - 0.030
Alloyed / Tool Steel P	0.375	400 - 600	0.012 - 0.027
	0.500	400 - 600	0.015 - 0.030
	0.625	400 - 600	0.015 - 0.030
	0.750	400 - 600	0.020 - 0.030
Stainless Steel M	0.375	300 - 550	0.012 - 0.025
	0.500	300 - 550	0.012 - 0.030
	0.625	300 - 550	0.020 - 0.030
	0.750	300 - 550	0.020 - 0.030
Gray Cast Iron K	0.375	500 - 850	0.015 - 0.030
	0.500	500 - 850	0.020 - 0.040
	0.625	500 - 850	0.025 - 0.040
	0.750	500 - 850	0.025 - 0.040
Nodular K	0.375	450 - 650	0.012 - 0.027
	0.500	450 - 650	0.015 - 0.030
	0.625	450 - 650	0.015 - 0.030
	0.750	450 - 650	0.020 - 0.030
Super alloys S	0.375	80 - 200	0.010 - 0.020
	0.500	80 - 200	0.010 - 0.020
	0.625	80 - 200	0.012 - 0.025
	0.750	80 - 200	0.012 - 0.025
Hardened steel < 50 HRC H	0.375	250 - 400	0.010 - 0.015
	0.500	250 - 400	0.010 - 0.015
	0.625	250 - 400	0.012 - 0.020
	0.750	250 - 400	0.012 - 0.020
Hardened steel < 58 HRC H	0.375	150 - 250	0.010 - 0.015
	0.500	150 - 250	0.010 - 0.015
	0.625	150 - 250	0.012 - 0.020
	0.750	150 - 250	0.012 - 0.020

CHIP SURFER™ INDEXING CHIP SURFER 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