

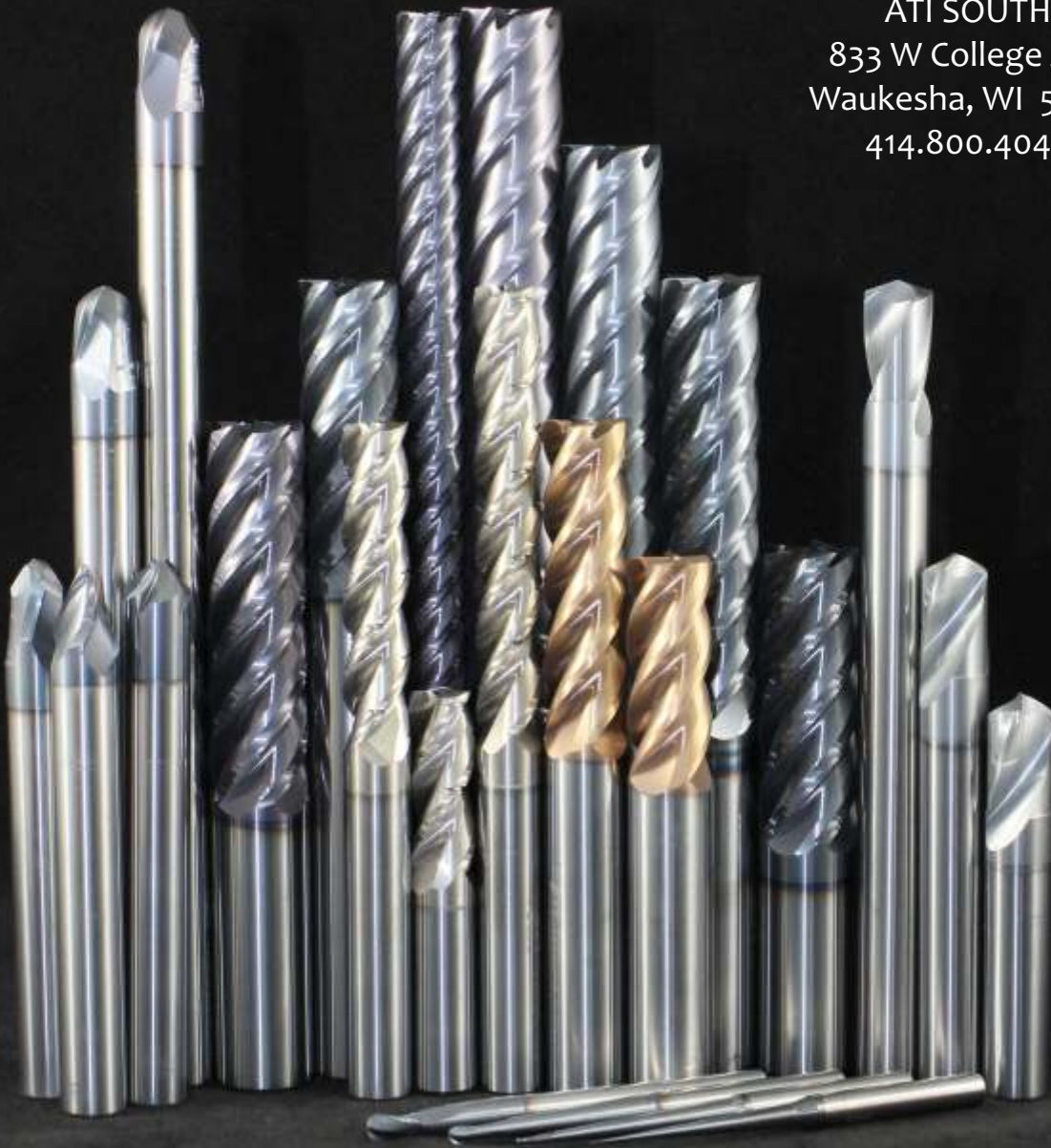
2021

***NEW TOOLS**



ATI NORTH
210 Kommers Street | PO Box 218
Mt. Calvary, WI 53057
920.753.2420

ATI SOUTH
833 W College Ave
Waukesha, WI 53186
414.800.4049



ADVANCED STATE-OF-THE-ART CUTTING TOOL MANUFACTURING
IN THE HEART OF WISCONSIN

www.advancedtoolinginc.net



CUTTING-EDGE TECHNOLOGY

Advanced Tooling, Inc. is committed to stay on the “Cutting Edge” of technology. We have over 40 state-of-the-art CNC cutter grinders, allowing Advanced Tooling, Inc. to produce high performance tooling that is second-to-none in quality and consistency. By utilizing the best and newest machines from WALTER, ANCA, ROLLOMATIC, UNISON and TRUTECH, we offer unmatched manufacturing versatility in the trade. We are able to manufacture any geometry required to maximize today’s high performance machine tools. To keep up with production and meet industry demands, we have incorporated 21 robots.

We’ve been adding some of the latest technologies to cutter grinding to our floor - linear motion machines. Linear machines produce a superior surface finish. To date, we have 7 linear ANCA grinders, 3 linear WALTER grinders, and have just installed our first linear ROLLOMATIC.

ATI has 3 off-line wheel dressers to maintain the diamond wheels used in the grinding process. We’ve recently added our second 21 vessel TRANSOR filtration system to deliver clean, chilled oil to the grinding machines (filters down to 1 micron). The clean, chilled oil creates a cleaner and cooler grind - creating a better cutting edge on the tool. We use HELICHECKs and a variety of other inspection machines to provide a non-contact measurement to maintain repeatability and edges throughout the manufacturing process. Additionally, a variety of coatings and edge-preps are offered for added performance and tool life.

We are very proud of our facilities and welcome visits at any time.

Our investment in technology is your gain. We'd like to hear about your individual applications. With our years of experience - we understand your needs and can both design and apply our tooling in a way that increases your output and production.

-Tom Pankratz, Owner

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* NEW SERIES
* NEW SIZES

ATI also stocks the following lines of tools:

- extended reach tapered shank
- milling tools for exotic materials • standard 2 and 4 flute endmills
- extra length 2 and 4 flute endmills

We would like to customize your tooling needs - ask for a IN-SHOP ASSESSMENT and one of our experienced sales and tooling experts will come to your production facility.

HOW TO ORDER

Phone | Fax | Email

- ATI North:
210 Kommers Street | PO Box 218
Mt. Calvary, WI 53057
Call: 920.753.2420
Fax: 920.753.2811
Email: sales@advancedtoolinginc.net
- ATI South:
833 W College Ave
Waukesha, WI 53186
414.800.4049
- Go to the website: www.advancedtoolinginc.net for special tooling /RFQ forms.

PAYMENT / ACCOUNT TERMS

- ALL NEW ACCOUNTS are due upon receipt unless other payment terms are arranged.
- NEW accounts are subject to office approval.
- Established / Approved accounts are NET 30, 2%/10 days
- Accounts not paid within the terms are subject to a 2% monthly finance charge.
- Visa / Mastercard accepted.



RECONDITIONING SERVICE

Reconditioning removes less of the diameter than re-grinding.

- Don't turn your expensive, high performance cutting tools into cheap re-grinds!
- Simply re-grinding the O.D. of tooling will make a tool sharp again however, with each re-grind, you lose a portion of its original geometry and performance.
- Loss of original design geometry leads to lost tool life and requires machining parameters to be slowed down to match the diminishing performance of re-ground cutting tools.
- High performance tooling has become very sophisticated and expensive.
Time lost on your machine is very expensive.

FOR A FRACTION OF THE COST OF NEW...

ATI will **RECONDITION** your tooling on the same state-of-the-art grinders that the tooling was originally made on. Geometry will be brought back to *original* design specs.

- Reconditioning in 2-3 weeks
- Special containers supplied for safe handling of high dollar tooling
- Pickup and delivery

REMANUFACTURING SERVICE

Remanufacturing maximizes the service life of your tooling.

Your tooling can go through the process of reconditioning several times before it needs to be cut-off and **REMANUFACTURED**.

Cut lengths specifically designated to allow for flute cutoff.

8" OAL tooling to 6" OAL

6" OAL tooling to 4" OAL

4" OAL tooling to 3" OAL

EXAMPLE

HB2 series - part# HB5002-80C03

- 1/2" diameter x 8" over all length and has 1.00" length of cut.
- When it can no longer be reconditioned, it's sent through **REMANUFACTURING**
- It's 1" LOC is cutoff and regenerated as a 1/2 x 6" OAL with 1" LOC.
- It can go through reconditioning until it is again **REMANUFACTURED**
as a 4" OAL tool with 1" LOC.

SW SERIES

4 & 5 FLUTE FLAT BOTTOM - TRUE STRAIGHT WALL GEOMETRY



- HIGH PERFORMANCE PROFILE / SIDEWALL MILLING ON APPLICATIONS WITH LIGHT STEP OVER
 - RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR MINIMAL DEFLECTION = STRAIGHT SIDE WALLS
 - 45 DEGREE HIGH HELIX AND VARIABLE FLUTE = EXCELLENT SURFACE FINISH
 - SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES
 - = INCREASED TOOL LIFE AND IMPROVED FINISH
 - THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- EXTRA LONG OAL AND FLUTE LENGTHS IN STOCK
 - STANDARD & CLEARANCE SHANK
 - H6 TOLERANCE SHANKS
 - CENTER CUTTING
 - UP TO 60 HRC

D1	L1	L2	L3	D2	FLUTES	PART #	PRICE
.005	2	.025	/	.125	2	SW0052-20C03	\$54.81
.010	2	.045	/	.125	2	SW0102-20C03	\$44.51
1/64"	2	.050	/	.125	4	SW0154-20C03	\$34.20
	2	.030	.250	.125	4	SWC0154-21C03	\$44.51
.020	2	.075	/	.125	4	SW0204-20C03	\$28.02
1/32"	2	.100	/	.125	4	SW0314-20C03	\$16.57
	2	.100	.500	.125	4	SWC0314-20C03	\$23.90
3/64"	2	.150	/	.125	4	SW0464-20C03	\$16.57
	2	.200	.400	.125	4	SWC0464-20C03	\$23.90
1/16"	2	.250	/	.125	4	SW0624-20C03	\$16.57
	2	.200	.400	.125	4	SWC0624-20C03	\$23.90
	3	.200	.400	.125	4	SWC0624-30C03	\$27.14
5/64"	2	.250	/	.125	4	SW0784-20C03	\$16.57
	2	.450	/	.125	4	SW0784-21C03	\$16.57
3/32"	2	.375	/	.125	4	SW0934-20C03	\$18.46
	3	1.00	/	.125	4	SW0934-30C03	\$19.64
1/8"	2	.500	/	.125	5	SW1255-20C03	\$18.46
	3	.500	/	.125	5	SW1255-30C03	\$19.64
	3	.750	/	.125	5	SW1255-31C03	\$21.47
	4	.750	/	.125	4	SW1254-40C03	\$24.60
	6	1.00	/	.125	4	SW1254-60C03	\$41.70
5/32"	2	.625	/	.187	5	SW1565-20C03	\$17.29
	2	.625	.875	.187	5	SWC1565-21C03	\$24.46
3/16"	2	.625	/	.187	5	SW1875-20C03	\$20.13
	3	.750	/	.187	5	SW1875-30C03	\$22.69
	4	1.00	/	.187	5	SW1875-40C03	\$26.58
	6	1.25	/	.187	5	SW1875-60C03	\$33.59
13/64"	3	1.00	/	.250	5	SW2035-30C03	\$31.46
7/32"	3	.800	/	.250	5	SW2185-30C03	\$31.46
1/4"	3	.800	/	.250	5	SW2505-30C03	\$27.42
	3	1.125	/	.250	5	SW2505-31C03	\$27.42
	4	1.00	/	.250	5	SW2505-40C03	\$30.04
	4	1.50	/	.250	5	SW2505-41C03	\$33.83
	6	1.50	/	.250	5	SW2505-60C03	\$39.68

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SW SERIES (continued)

D1	L1	L2	L3	D2	FLUTES	PART #	PRICE
5/16"	3	.900	/	.312	5	SW3125-30C03	\$39.97
	4	1.125	/	.312	5	SW3125-41C03	\$48.38
	4	1.50	/	.312	5	SW3125-40C03	\$48.38
	6	1.50	/	.312	5	SW3125-60C03	\$57.01
3/8"	3	1.00	/	.375	5	SW3755-30C03	\$43.33
	4	1.50	/	.375	5	SW3755-40C03	\$53.72
	6	2.00	/	.375	5	SW3755-60C03	\$63.42
	6	3.00	/	.375	5	SW3755-61C03	\$74.13
7/16"	3	1.25	/	.437	5	SW4375-30C03	\$49.18
	4	2.00	/	.437	5	SW4375-40C03	\$60.16
	6	1.50	/	.437	5	SW4375-60C03	\$73.41
1/2"	3	1.25	/	.500	5	SW5005-30C03	\$63.32
	4	2.00	/	.500	5	SW5005-40C03	\$76.73
	6	2.00	/	.500	5	SW5005-60C03	\$93.34
	6	3.25	/	.500	5	SWS5005-61C03	\$124.14
	6	4.00	/	.500	5	SWS5005-62C03	\$143.20
	8	5.50	/	.500	5	SWS5005-80C03	\$184.72
5/8"	4	2.125	/	.625	5	SW6255-40C03	\$92.18
	6	2.125	/	.625	5	SW6255-60C03	\$132.16
	6	3.125	/	.625	5	SWS6255-61C03	\$139.27
	8	2.125	/	.625	5	SW6255-80C03	\$163.82
	8	5.125	/	.625	5	SWS6255-81C03	\$225.02
3/4"	4	2.125	/	.750	5	SW7505-40C03	\$129.56
	5	2.750	/	.750	5	SW7505-50C03	\$153.24
	6	2.125	/	.750	5	SW7505-61C03	\$162.38
	6	3.25	/	.750	5	SW7505-60C03	\$178.97
	7	4.25	/	.750	5	SWS7505-70C03	\$225.45
	8	5.50	/	.750	5	SWS7505-80C03	\$298.33
1"	4	2.125	/	1.00	5	SW1005-40C03	\$189.04
	5	2.50	/	1.00	5	SW1005-50C03	\$219.45
	6	3.25	/	1.00	5	SW1005-60C03	\$267.48
	7	4.25	/	1.00	5	SWS1005-70C03	\$357.77
	8	5.50	/	1.00	5	SWS1005-80C03	\$421.52
	9	6.50	/	1.00	5	SWS1005-91C03	\$485.21
1-1/4"	6	3.25	/	1.25	5	SW12505-60C03	\$468.72
	9	6.50	/	1.25	5	SWS12505-90C03	\$755.57

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

HR4 SERIES

4 FLUTE CORNER RADIUS - AGGRESSIVE MILLING GEOMETRY



- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING IN MILD TO ALLOY STEEL AND IRON
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES = INCREASED TOOL LIFE AND IMPROVED FINISH
- VARIABLE FLUTE FOR STABLE CHATTER FREE MILLING = INCREASED TOOL LIFE AND METAL REMOVAL RATES AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE

• EXTRA LONG OAL SIZES
IN STOCK

- UP TO 60 HRC
- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/32"	2	.005	.050	.125	4	HR0314-20R005C03	\$16.57
	2	.010	.050	.125	4	HR0314-20R010C03	\$16.57
	3	.005	.050	.125	4	HR0314-30R005C03	\$17.74
	3	.010	.050	.125	4	HR0314-30R010C03	\$17.74
1/16"	2	.005	.125	.125	4	HR0624-20R005C03	\$16.57
	2	.010	.125	.125	4	HR0624-20R010C03	\$16.57
	2	.015	.125	.125	4	HR0624-20R015C03	\$16.57
	3	.005	.125	.125	4	HR0624-30R005C03	\$17.74
	3	.010	.125	.125	4	HR0624-30R010C03	\$17.74
	3	.015	.125	.125	4	HR0624-30R015C03	\$17.74
5/64"	2	.010	.312	.125	4	HR0784-20R010C03	\$16.57
3/32"	2	.015	.187	.125	4	HR0934-20R015C03	\$12.77
	2	.020	.187	.125	4	HR0934-20R020C03	\$12.77
	2	.031	.187	.125	4	HR0934-20R031C03	\$12.77
	3	.010	.187	.125	4	HR0934-30R010C03	\$13.95
	3	.015	.187	.125	4	HR0934-30R015C03	\$13.95
	3	.020	.187	.125	4	HR0934-30R020C03	\$13.95
	3	.031	.187	.125	4	HR0934-30R031C03	\$13.95
1/8"	2	.015	.250	.125	4	HR1254-20R015C03	\$12.77
	2	.031	.250	.125	4	HR1254-20R031C03	\$12.77
	3	.015	.250	.125	4	HR1254-30R015C03	\$13.95
	3	.031	.250	.125	4	HR1254-30R031C03	\$13.95
	4	.015	.250	.125	4	HR1254-40R015C03	\$15.12
	4	.031	.250	.125	4	HR1254-40R031C03	\$15.12
	6	.015	.250	.125	4	HR1254-60R015C03	\$32.37
	6	.031	.250	.125	4	HR1254-60R031C03	\$32.37
5/32"	2	.031	.625	.187	4	HR1564-20R031C03	\$16.34

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

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HR4 SERIES (continued)

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
3/16"	2	.015	.375	.187	4	HR1874-20R015C03	\$16.34
	2	.031	.375	.187	4	HR1874-20R031C03	\$16.34
	3	.015	.375	.187	4	HR1874-30R015C03	\$18.89
	3	.031	.375	.187	4	HR1874-30R031C03	\$18.89
	3	.062	.375	.187	4	HR1874-30R062C03	\$18.89
	4	.015	.375	.187	4	HR1874-40R015C03	\$20.73
	4	.031	.375	.187	4	HR1874-40R031C03	\$20.73
	4	.062	.375	.187	4	HR1874-40R062C03	\$20.73
	4	.062	1.00	.187	4	HR1874-41R062C03	\$22.83
	6	.015	.375	.187	4	HR1874-60R015C03	\$24.99
	6	.031	.375	.187	4	HR1874-60R031C03	\$24.99
	6	.062	.375	.187	4	HR1874-60R062C03	\$24.99
1/4"	3	.015	.500	.250	4	HR2504-30R015C03	\$23.63
	3	.031	.500	.250	4	HR2504-30R031C03	\$23.63
	3	.062	.500	.250	4	HR2504-30R062C03	\$23.63
	4	.015	.500	.250	4	HR2504-40R015C03	\$26.25
	4	.031	.500	.250	4	HR2504-40R031C03	\$26.25
	4	.062	.500	.250	4	HR2504-40R062C03	\$26.25
	6	.015	.500	.250	4	HR2504-60R015C03	\$32.10
	6	.015	1.50	.250	4	HR2504-61R015C03	\$38.28
	6	.031	.500	.250	4	HR2504-60R031C03	\$32.10
	6	.031	1.50	.250	4	HR2504-61R031C03	\$38.28
	6	.062	.500	.250	4	HR2504-60R062C03	\$32.10
	6	.062	1.50	.250	4	HR2504-61R062C03	\$38.28
5/16"	3	.015	.625	.3125	4	HR3124-30R015C03	\$30.49
	3	.031	.625	.3125	4	HR3124-30R031C03	\$30.49
	3	.062	.625	.3125	4	HR3124-30R062C03	\$30.49
	4	.015	.625	.3125	4	HR3124-40R015C03	\$35.11
	4	.031	.625	.3125	4	HR3124-40R031C03	\$35.11
	4	.062	.625	.3125	4	HR3124-40R062C03	\$35.11
	6	.015	.625	.3125	4	HR3124-60R015C03	\$43.74
	6	.015	1.25	.3125	4	HR3124-61R015C03	\$49.92
	6	.031	.625	.3125	4	HR3124-60R031C03	\$43.74
	6	.031	1.25	.3125	4	HR3124-61R031C03	\$49.92
	6	.062	.625	.3125	4	HR3124-60R062C03	\$43.74
	6	.062	1.25	.3125	4	HR3124-61R062C03	\$49.92

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

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HR4 SERIES (continued)

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
3/8"	3	.015	.750	.375	4	HR3754-30R015C03	\$35.75
	3	.020	.750	.375	4	HR3754-30R020C03	\$35.75
	3	.031	.750	.375	4	HR3754-30R031C03	\$35.75
	3	.062	.750	.375	4	HR3754-30R062C03	\$35.75
	4	.015	.750	.375	4	HR3754-40R015C03	\$42.34
	4	.031	.750	.375	4	HR3754-40R031C03	\$42.34
	4	.062	.750	.375	4	HR3754-40R062C03	\$42.34
	4	.125	.750	.375	4	HR3754-40R125C03	\$42.34
	6	.015	.750	.375	4	HR3754-60R015C03	\$52.05
	6	.015	2.00	.375	4	HR3754-61R015C03	\$60.29
	6	.031	.750	.375	4	HR3754-60R031C03	\$52.05
	6	.031	2.00	.375	4	HR3754-61R031C03	\$60.29
	6	.062	.750	.375	4	HR3754-60R062C03	\$52.05
	6	.062	2.00	.375	4	HR3754-61R062C03	\$60.29
	6	.125	.750	.375	4	HR3754-60R125C03	\$52.05
	6	.125	2.00	.375	4	HR3754-61R125C03	\$60.29
	8	.015	2.00	.375	4	HR3754-81R015C03	\$82.00
	8	.031	2.00	.375	4	HR3754-81R031C03	\$82.00
1/2"	3	.015	1.00	.500	4	HR5004-30R015C03	\$54.31
	3	.031	1.00	.500	4	HR5004-30R031C03	\$54.31
	3	.062	1.00	.500	4	HR5004-30R062C03	\$54.31
	3	.125	1.00	.500	4	HR5004-30R125C03	\$54.31
	4	.015	1.00	.500	4	HR5004-40R015C03	\$62.99
	4	.031	1.00	.500	4	HR5004-40R031C03	\$62.99
	4	.062	1.00	.500	4	HR5004-40R062C03	\$62.99
	4	.125	1.00	.500	4	HR5004-40R125C03	\$62.99
	6	.015	1.00	.500	4	HR5004-60R015C03	\$79.59
	6	.015	2.00	.500	4	HR5004-61R015C03	\$87.84
	6	.031	1.00	.500	4	HR5004-60R031C03	\$79.59
	6	.031	2.00	.500	4	HR5004-61R031C03	\$87.84
	6	.062	1.00	.500	4	HR5004-60R062C03	\$79.59
	6	.062	2.00	.500	4	HR5004-61R062C03	\$87.84
	6	.125	1.00	.500	4	HR5004-60R125C03	\$79.59
	6	.125	2.00	.500	4	HR5004-61R125C03	\$87.84
	8	.015	1.00	.500	4	HR5004-80R015C03	\$104.63
	8	.031	1.00	.500	4	HR5004-80R031C03	\$104.63
	8	.062	1.00	.500	4	HR5004-80R062C03	\$104.63
	8	.125	1.00	.500	4	HR5004-80R125C03	\$104.63

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

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HR4 SERIES (continued)

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
5/8"	4	.031	1.25	.625	4	HR6254-40R031C03	\$107.87
	4	.062	1.25	.625	4	HR6254-40R062C03	\$107.87
	4	.125	1.25	.625	4	HR6254-40R125C03	\$107.87
	6	.031	1.25	.625	4	HR6254-60R031C03	\$132.84
	6	.062	1.25	.625	4	HR6254-60R062C03	\$132.84
	6	.125	1.25	.625	4	HR6254-60R125C03	\$132.84
3/4"	4	.015	1.50	.750	4	HR7504-40R015C03	\$128.53
	4	.031	1.50	.750	4	HR7504-40R031C03	\$128.53
	4	.062	1.50	.750	4	HR7504-40R062C03	\$128.53
	4	.125	1.50	.750	4	HR7504-40R125C03	\$128.53
	6	.031	1.50	.750	4	HR7504-60R031C03	\$161.35
	6	.062	1.50	.750	4	HR7504-60R062C03	\$161.35
	6	.125	1.50	.750	4	HR7504-60R125C03	\$161.35
	8	.031	1.50	.750	4	HR7504-80R031C03	\$213.34
	8	.062	1.50	.750	4	HR7504-80R062C03	\$213.34
	8	.125	1.50	.750	4	HR7504-80R125C03	\$213.34
1"	4	.031	1.50	1.00	4	HR1004-40R031C03	\$183.89
	4	.062	1.50	1.00	4	HR1004-40R062C03	\$183.89
	4	.125	1.50	1.00	4	HR1004-40R125C03	\$183.89
	6	.031	1.50	1.00	4	HR1004-60R031C03	\$232.97
	6	.062	1.50	1.00	4	HR1004-60R062C03	\$232.97
	6	.125	1.50	1.00	4	HR1004-60R125C03	\$232.97
	8	.031	1.50	1.00	4	HR1004-80R031C03	\$304.08
	8	.062	1.50	1.00	4	HR1004-80R062C03	\$304.08
	8	.125	1.50	1.00	4	HR1004-80R125C03	\$304.08



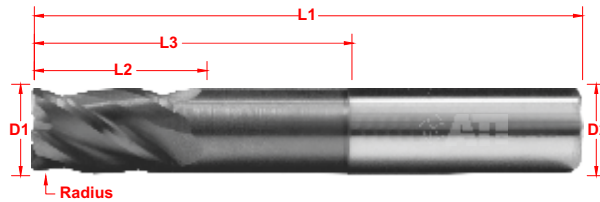
HRC4 SERIES:
 SAME GEOMETRY AS HR4 SERIES
 WITH CLEARANCE / RELIEVED SHANKS
 - ON NEXT PAGE

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

HRC4 SERIES

4 FLUTE CORNER RADIUS WITH CLEARANCE SHANK - AGGRESSIVE MILLING GEOMETRY FOR LONGER REACH APPLICATIONS



- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING IN MILD TO ALLOY STEEL AND IRON
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES = INCREASED TOOL LIFE AND IMPROVED FINISH
- VARIABLE FLUTE FOR STABLE CHATTER FREE MILLING = INCREASED TOOL LIFE, METAL REMOVAL RATES AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- UP TO 60 HRC
- CENTER CUTTING
- H6 TOL. SHANK

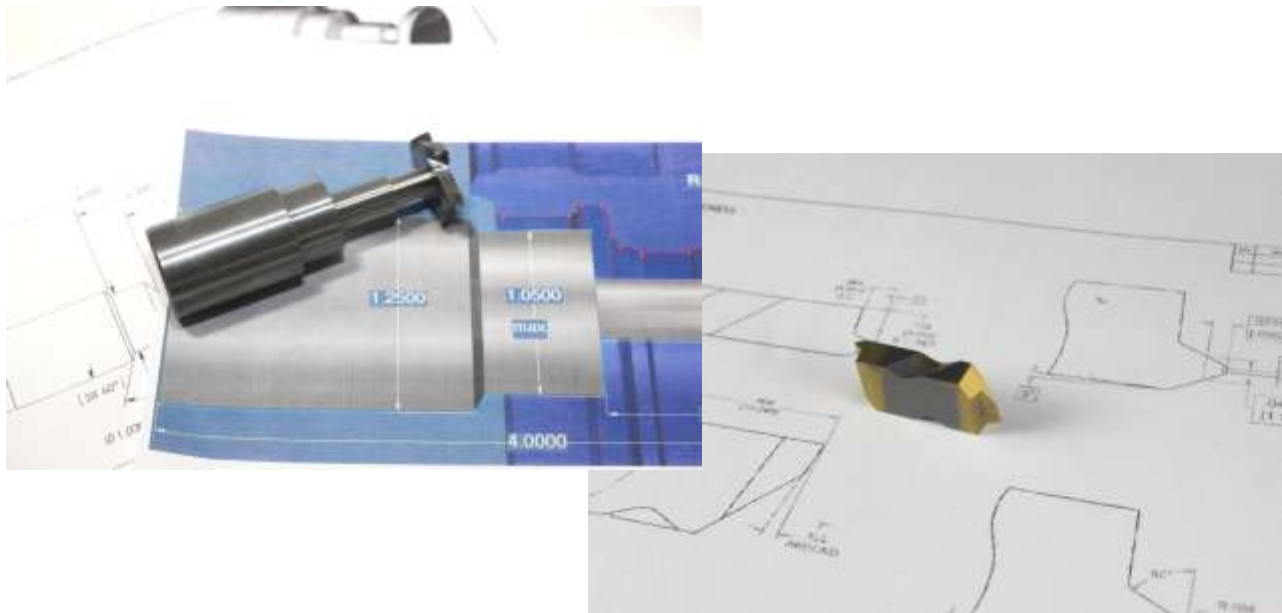
D1	L1	RADIUS	L2	L3	D2	FLUTES	ATI PART#	PRICE
1/32"	3	.005	.050	.125	.125	4	HRC0314-30R005C03	\$21.86
	3	.010	.050	.125	.125	4	HRC0314-30R010C03	\$21.86
	3	.005	.050	.250	.125	4	HRC0314-31R005C03	\$21.86
	3	.010	.050	.250	.125	4	HRC0314-31R010C03	\$21.86
1/16"	3	.005	.125	.375	.125	4	HRC0624-30R005C03	\$23.92
	3	.005	.125	.500	.125	4	HRC0624-31R005C03	\$25.98
	3	.005	.125	1.00	.125	4	HRC0624-32R005C03	\$30.10
	3	.010	.125	.375	.125	4	HRC0624-30R010C03	\$23.92
	3	.010	.125	.500	.125	4	HRC0624-31R010C03	\$25.98
	3	.010	.125	1.00	.125	4	HRC0624-32R010C03	\$30.10
	3	.015	.125	.375	.125	4	HRC0624-30R015C03	\$23.92
	3	.015	.125	.500	.125	4	HRC0624-31R015C03	\$25.98
	3	.015	.125	1.00	.125	4	HRC0624-32R015C03	\$30.10
5/64"	2	.020	.156	.600	.125	4	HRC0784-20R020C03	\$18.96
3/16"	3	.010	.187	.500	.125	4	HRC0934-30R010C03	\$20.13
	3	.010	.187	.750	.125	4	HRC0934-31R010C03	\$22.19
	3	.010	.187	1.125	.125	4	HRC0934-32R010C03	\$24.25
	3	.015	.187	.500	.125	4	HRC0934-30R015C03	\$20.13
	3	.015	.187	.750	.125	4	HRC0934-31R015C03	\$22.19
	3	.015	.187	1.125	.125	4	HRC0934-32R015C03	\$24.25
	3	.031	.187	.500	.125	4	HRC0934-30R031C03	\$20.13
	3	.031	.187	.750	.125	4	HRC0934-31R031C03	\$22.19
	3	.031	.187	1.125	.125	4	HRC0934-32R031C03	\$24.25
1/8"	2	.015	.250	1.00	.125	4	HRC1254-20R015C03	\$20.69
	2	.031	.250	1.00	.125	4	HRC1254-20R031C03	\$20.69
	3	.015	.250	1.00	.125	4	HRC1254-30R015C03	\$21.86
	3	.031	.250	1.00	.125	4	HRC1254-30R031C03	\$18.07
	3	.015	.250	1.50	.125	4	HRC1254-31R015C03	\$25.98
	3	.031	.250	1.50	.125	4	HRC1254-31R031C03	\$25.98

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

(CONTINUED NEXT PAGE)

HRC4 SERIES (continued)

D1	L1	RADIUS	L2	L3	D2	FLUTES	ATI PART#	PRICE
3/16"	3	.015	.375	1.25	.187	4	HRC1874-30R015C03	\$25.78
	3	.031	.375	1.25	.187	4	HRC1874-30R031C03	\$25.78
	4	.015	.375	1.80	.187	4	HRC1874-40R015C03	\$27.61
	4	.031	.375	1.80	.187	4	HRC1874-40R031C03	\$27.61
	4	.062	.375	1.80	.187	4	HRC1874-41R062C03	\$27.61
1/4"	3	.015	.500	1.60	.250	4	HRC2504-30R015C03	\$29.81
	3	.031	.500	1.60	.250	4	HRC2504-30R031C03	\$29.81
	3	.062	.500	1.60	.250	4	HRC2504-30R062C03	\$29.81
	4	.015	.500	2.10	.250	4	HRC2504-40R015C03	\$33.58
	4	.031	.500	2.10	.250	4	HRC2504-40R031C03	\$33.58
	4	.062	.500	2.10	.250	4	HRC2504-40R062C03	\$33.58
5/16"	4	.015	.625	2.30	.3125	4	HRC3124-40R015C03	\$41.29
	4	.031	.625	2.30	.3125	4	HRC3124-40R031C03	\$41.29
	4	.062	.625	2.30	.3125	4	HRC3124-40R062C03	\$41.29
3/8"	4	.015	1.00	2.30	.375	4	HRC3754-41R015C03	\$48.52
	4	.031	1.00	2.30	.375	4	HRC3754-41R031C03	\$48.52
	4	.062	1.00	2.30	.375	4	HRC3754-41R062C03	\$48.52
	4	.125	1.00	2.30	.375	4	HRC3754-41R125C03	\$48.52
1/2"	4	.015	1.00	2.30	.500	4	HRC5004-40R015C03	\$69.17
	4	.031	1.00	2.30	.500	4	HRC5004-40R031C03	\$69.17
	4	.062	1.00	2.30	.500	4	HRC5004-40R062C03	\$69.17
	4	.125	1.00	2.30	.500	4	HRC5004-40R125C03	\$69.17

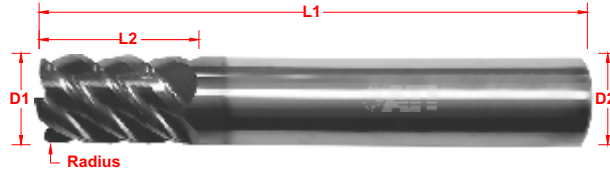


CUSTOM = We can DESIGN - or you can provide a PLAN.

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

HR5 SERIES

5 FLUTE CORNER RADIUS - AGGRESSIVE MILLING GEOMETRY



- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING IN MILD TO ALLOY STEEL AND IRON
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES
= INCREASED TOOL LIFE AND IMPROVED FINISH
- VARIABLE FLUTE FOR STABLE CHATTER FREE MILLING = INCREASED TOOL LIFE, METAL REMOVAL RATES AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- UP TO 60 HRC
- CENTER CUTTING
- H6 TOLERANCE SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
3/8"	3	.015	.750	.375	5	HR3755-30R015C03	\$39.32
	3	.031	.750	.375	5	HR3755-30R031C03	\$39.32
	3	.062	.750	.375	5	HR3755-30R062C03	\$39.32
	4	.015	.750	.375	5	HR3755-40R015C03	\$46.58
	4	.031	.750	.375	5	HR3755-40R031C03	\$46.58
	4	.062	.750	.375	5	HR3755-40R062C03	\$46.58
	4	.125	.750	.375	5	HR3755-40R125C03	\$46.58
	6	.015	.750	.375	5	HR3755-60R015C03	\$57.25
	6	.031	.750	.375	5	HR3755-60R031C03	\$57.25
	6	.062	.750	.375	5	HR3755-60R062C03	\$57.25
	6	.125	.750	.375	5	HR3755-60R125C03	\$57.25
1/2"	3	.015	1.00	.500	5	HR5005-30R015C03	\$59.74
	3	.031	1.00	.500	5	HR5005-30R031C03	\$59.74
	3	.062	1.00	.500	5	HR5005-30R062C03	\$59.74
	3	.125	1.00	.500	5	HR5005-30R125C03	\$59.74
	4	.015	1.00	.500	5	HR5005-40R015C03	\$69.29
	4	.031	1.00	.500	5	HR5005-40R031C03	\$69.29
	4	.062	1.00	.500	5	HR5005-40R062C03	\$69.29
	4	.125	1.00	.500	5	HR5005-40R125C03	\$69.29
	6	.015	1.00	.500	5	HR5005-60R015C03	\$87.55
	6	.031	1.00	.500	5	HR5005-60R031C03	\$87.55
	6	.062	1.00	.500	5	HR5005-60R062C03	\$87.55
	6	.125	1.00	.500	5	HR5005-60R125C03	\$87.55
	8	.015	1.00	.500	5	HR5005-80R015C03	\$115.09
	8	.031	1.00	.500	5	HR5005-80R031C03	\$115.09
	8	.062	1.00	.500	5	HR5005-80R062C03	\$115.09
	8	.125	1.00	.500	5	HR5005-80R125C03	\$115.09

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

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HR5 SERIES (continued)

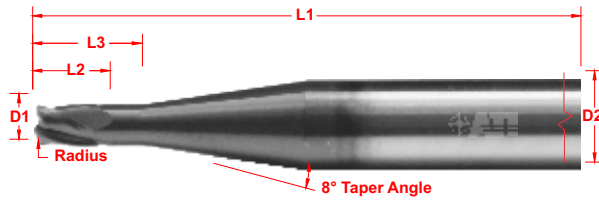
D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
5/8"	4	.015	1.25	.625	5	HR6255-40R015C03	\$118.65
	4	.031	1.25	.625	5	HR6255-40R031C03	\$118.65
	4	.062	1.25	.625	5	HR6255-40R062C03	\$118.65
	4	.125	1.25	.625	5	HR6255-40R125C03	\$118.65
	6	.015	2.00	.625	5	HR6255-60R015C03	\$157.46
	6	.031	2.00	.625	5	HR6255-61R031C03	\$157.46
	6	.062	2.00	.625	5	HR6255-60R062C03	\$157.46
	6	.125	2.00	.625	5	HR6255-60R125C03	\$157.46
3/4"	4	.015	1.50	.750	5	HR7505-40R015C03	\$141.38
	4	.031	1.50	.750	5	HR7505-40R031C03	\$141.38
	4	.062	1.50	.750	5	HR7505-40R062C03	\$141.38
	4	.125	1.50	.750	5	HR7505-40R125C03	\$141.38
	6	.031	2.00	.750	5	HR7505-60R031C03	\$177.49
	6	.062	2.00	.750	5	HR7505-60R062C03	\$177.49
	6	.125	2.00	.750	5	HR7505-60R125C03	\$177.49
	6	.125	3.00	.750	5	HR7505-61R125C03	\$205.82
	8	.031	1.50	.750	5	HR7505-80R031C03	\$234.67
	8	.062	1.50	.750	5	HR7505-80R062C03	\$234.67
	8	.125	1.50	.750	5	HR7505-80R125C03	\$234.67
1"	4	.015	1.50	1.00	5	HR1005-40R015C03	\$202.28
	4	.031	1.50	1.00	5	HR1005-40R031C03	\$202.28
	4	.062	1.50	1.00	5	HR1005-40R062C03	\$202.28
	4	.125	1.50	1.00	5	HR1005-40R125C03	\$202.28
	6	.031	1.50	1.00	5	HR1005-60R031C03	\$256.27
	6	.031	3.25	1.00	5	HR1005-61R031C03	\$312.93
	6	.062	1.50	1.00	5	HR1005-60R062C03	\$256.27
	6	.062	3.25	1.00	5	HR1005-61R062C03	\$312.93
	6	.125	1.50	1.00	5	HR1005-60R125C03	\$256.27
	6	.125	3.25	1.00	5	HR1005-61R125C03	\$312.93
	8	.031	2.00	1.00	5	HR1005-80R031C03	\$368.48
	8	.062	2.00	1.00	5	HR1005-80R062C03	\$368.48
	8	.125	2.00	1.00	5	HR1005-80R125C03	\$368.48

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

HRX4 SERIES

**4 FLUTE CORNER RADIUS WITH LARGE DIAMETER RIGID SHANK
AGGRESSIVE MILLING GEOMETRY**



- EXTRA RIGID – LARGE SHANK DIAMETERS AND RIGID FLUTE, HEAVY CORE PROVIDE EFFICIENT MILLING WITH AGGRESSIVE SPEEDS AND FEEDS
- VARIABLE FLUTE FOR STABLE CHATTER FREE MILLING = INCREASED TOOL LIFE AND METAL REMOVAL RATES
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE

- UP TO 60 HRC
- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	RADIUS	L2	L3	D2	FLUTES	ATI PART#	PRICE
1/32"	3	.005	.062	.093	.250	4	HRX0314-30R005C03	\$27.75
	3	.010	.062	.093	.250	4	HRX0314-30R010C03	\$27.75
1/16"	3	.005	.125	.187	.250	4	HRX0624-30R005C03	\$27.75
	3	.010	.125	.187	.250	4	HRX0624-30R010C03	\$27.75
	3	.015	.125	.187	.250	4	HRX0624-30R015C03	\$27.75
3/32	3	.005	.187	.280	.250	4	HRX0934-30R005C03	\$27.75
	3	.010	.187	.280	.250	4	HRX0934-30R010C03	\$27.75
	3	.015	.187	.280	.250	4	HRX0934-30R015C03	\$27.75
1/8"	3	.015	.250	.375	.250	4	HRX1254-30R015C03	\$27.75
	3	.031	.250	.375	.250	4	HRX1254-30R031C03	\$27.75
3/16"	3	.015	.375	.375	.250	4	HRX1874-30R015C03	\$27.75
	3	.031	.375	.375	.250	4	HRX1874-30R031C03	\$27.75



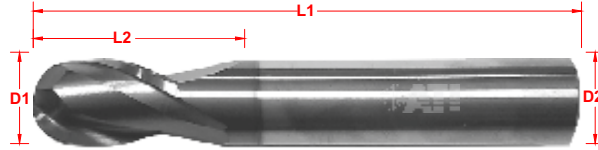
HRX GEOMETRY = MINIMAL TOOL DEFLECTION

VARIABLE PITCH = MINIMAL CHATTER FOR HIGH SURFACE FINISH

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

HB2 SERIES

2 FLUTE BALL NOSE - AGGRESSIVE MILLING GEOMETRY



- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING IN MILD TO ALLOY STEEL AND IRON
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES
= INCREASED TOOL LIFE AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE



- EXTRA LONG OAL
SIZES IN STOCK
- UP TO 60 HRC
- H6 TOL. SHANK

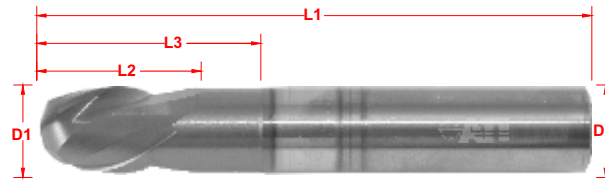
D1	L1	L2	D2	FLUTES	PART #	PRICE
1/64"	2	.031	.125	2	HB0152-20C03	\$26.87
1/32"	2	.0625	.125	2	HB0312-20C03	\$16.57
3/64"	2	.093	.125	2	HB0462-20C03	\$16.57
1/16"	2	.125	.125	2	HB0622-20C03	\$16.57
5/64"	2	.156	.125	2	HB0782-20C03	\$16.57
3/32"	2	.187	.125	2	HB0932-20C03	\$16.57
1/8"	2	.250	.125	2	HB1252-20C03	\$12.77
	3	.250	.125	2	HB1252-30C03	\$13.95
	4	.250	.125	2	HB1252-40C03	\$15.12
	6	.250	.125	2	HB1252-60C03	\$30.57
5/32"	2	.375	.187	2	HB1562-20C03	\$16.34
3/16"	2	.375	.187	2	HB1872-20C03	\$16.34
	3	.375	.187	2	HB1872-30C03	\$18.89
	4	.375	.187	2	HB1872-40C03	\$20.73
	6	.375	.187	2	HB1872-60C03	\$24.99
13/64	3	.400	.250	2	HB2032-30C03	\$25.96
7/32	3	.436	.250	2	HB2182-30C03	\$25.96
9/32	3	.562	.250	2	HB2812-30C03	\$25.96
1/4"	3	.500	.250	2	HB2502-30C03	\$23.63
	4	.500	.250	2	HB2502-40C03	\$26.25
	6	.500	.250	2	HB2502-60C03	\$32.10
5/16"	3	.625	.312	2	HB3122-30C03	\$30.49
	4	.625	.312	2	HB3122-40C03	\$35.11
	6	.625	.312	2	HB3122-60C03	\$43.74
3/8"	3	.750	.375	2	HB3752-30C03	\$35.75
	4	.750	.375	2	HB3752-40C03	\$42.34
	6	.750	.375	2	HB3752-60C03	\$52.05
1/2"	3	1.00	.500	2	HB5002-30C03	\$60.95
	4	1.00	.500	2	HB5002-40C03	\$69.62
	6	1.00	.500	2	HB5002-60C03	\$86.23
	8	1.00	.500	2	HB5002-80C03	\$118.37
3/4"	4	1.50	.750	2	HB7502-40C03	\$159.44
	6	1.50	.750	2	HB7502-60C03	\$192.26

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

HBC2 SERIES

2 FLUTE BALL NOSE WITH CLEARANCE SHANK - AGGRESSIVE MILLING GEOMETRY FOR LONGER REACH APPLICATIONS



- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING IN MILD TO ALLOY STEEL AND IRON
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES
= INCREASED TOOL LIFE AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE

- UP TO 60 HRC
- H6 TOL. SHANK

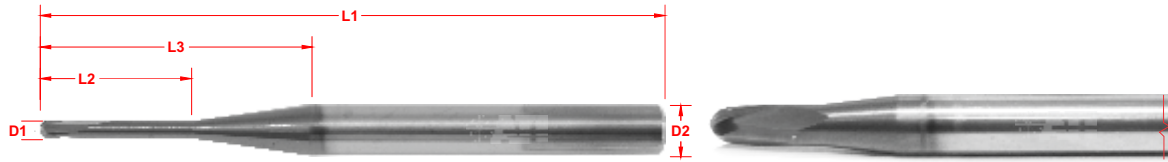
D1	L1	L2	L3	D2	FLUTES	PART #	PRICE
1/32"	3	.050	.125	.125	2	HBC0312-30C03	\$21.86
	3	.050	.250	.125	2	HBC0312-31C03	\$21.86
	3	.050	.375	.125	2	HBC0312-32C03	\$21.86
3/64"	2	.075	.125	.125	2	HBC0462-20C03	\$20.69
	2	.075	.250	.125	2	HBC0462-21C03	\$21.86
	3	.075	.350	.125	2	HBC0462-30C03	\$21.86
1/16"	3	.125	.250	.125	2	HBC0622-30C03	\$21.86
	3	.125	.375	.125	2	HBC0622-31C03	\$21.86
	3	.125	.500	.125	2	HBC0622-32C03	\$21.86
	3	.125	.750	.125	2	HBC0622-34C03	\$25.98
	3	.125	1.00	.125	2	HBC0622-33C03	\$28.04
5/64"	2	.156	.250	.125	2	HBC0782-20C03	\$20.69
	3	.156	.500	.125	2	HBC0782-30C03	\$21.86
3/32"	3	.187	.312	.125	2	HBC0932-31C03	\$21.86
	3	.187	.500	.125	2	HBC0932-32C03	\$21.86
	3	.187	.750	.125	2	HBC0932-33C03	\$25.98
	3	.187	1.00	.125	2	HBC0932-34C03	\$25.98
1/8"	2	.250	1.00	.125	2	HBC1252-20C03	\$20.69
	3	.250	1.00	.125	2	HBC1252-30C03	\$21.86
	3	.250	1.60	.125	2	HBC1252-31C03	\$27.16
3/16"	3	.375	1.00	.187	2	HBC1872-30C03	\$26.97
	3	.375	1.60	.187	2	HBC1872-31C03	\$29.03
	4	.375	2.30	.187	2	HBC1872-40C03	\$34.99
1/4"	3	.500	1.60	.250	2	HBC2502-30C03	\$29.81
	4	.500	1.60	.250	2	HBC2502-40C03	\$32.43
	4	.500	2.10	.250	2	HBC2502-41C03	\$32.43
5/16"	3	.625	1.60	.312	2	HBC3122-30C03	\$36.68
	4	.625	1.60	.312	2	HBC3122-40C03	\$41.29
	4	.625	2.10	.312	2	HBC3122-41C03	\$41.29
3/8"	3	.750	1.30	.375	2	HBC3752-30C03	\$41.93
	4	.750	1.60	.375	2	HBC3752-40C03	\$48.52
	4	.750	2.30	.375	2	HBC3752-41C03	\$48.52
1/2"	4	1.00	2.30	.500	2	HBC5002-40C03	\$77.35

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

HBX2 SERIES

***NEW SERIES**

2 FLUTE BALL NOSE WITH EXTRA HEAVY CORE - AGGRESSIVE MILLING GEOMETRY



- SHORT LOC WITH EXTRA HEAVY CORE GEOMETRY EXCELS ON APPLICATIONS WITH POOR SETUP AND MACHINE RIGIDITY
- SMALL DIAMETERS ARE ON 1/2" SHANKS FOR ADDED RIGIDITY
- SPECIAL SMOOTH CUTTING EDGES AND FLUTES DESIGNED FOR CHIP FLOW FROM CRITICAL CUTTING ZONES = INCREASED TOOL LIFE AND IMPROVED FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE



• EXTRA LONG OAL SIZES IN STOCK

- UP TO 60 HRC
- H6 TOL. SHANK

D1	L1	L2	L3	D2	FLUTES	PART #	PRICE
1/32"	3	.031	.062	.187	2	HBX0312-31C03	\$24.91
	3	.031	.062	.250	2	HBX0312-30C03	\$27.75
	3	.031	.187	.250	2	HBX0312-32C03	\$33.48
	3	.031	.312	.250	2	HBX0312-33C03	\$33.48
	3	.031	.500	.250	2	HBX0312-34C03	\$35.71
.040	3	.040	.320	.250	2	HBX0402-32C03	\$33.48
3/64	3	.046	.093	.250	2	HBX0462-30C03	\$27.75
1/16	3	.062	.125	.187	2	HBX0622-31C03	\$24.91
	3	.062	.125	.250	2	HBX0622-30C03	\$27.75
	3	.062	.312	.250	2	HBX0622-32C03	\$33.48
	3	.062	.500	.250	2	HBX0622-33C03	\$33.48
	3	.062	.625	.250	2	HBX0622-34C03	\$35.72
	3	.062	.750	.250	2	HBX0622-35C03	\$35.72
	3	.062	1.00	.250	2	HBX0622-36C03	\$35.72
5/64"	3	.078	.156	.250	2	HBX0782-30C03	\$27.75
3/32"	3	.093	.187	.187	2	HBX0932-31C03	\$24.91
	3	.093	.187	.250	2	HBX0932-30C03	\$27.75
	3	.093	.312	.250	2	HBX0932-32C03	\$33.48
	3	.093	.500	.250	2	HBX0932-33C03	\$33.94
	3	.093	.750	.250	2	HBX0932-34C03	\$35.72
	3	.093	1.00	.250	2	HBX0932-35C03	\$35.72
1/8"	3	.125	.250	.187	2	HBX1252-31C03	\$24.91
	3	.125	.250	.250	2	HBX1252-30C03	\$27.75
	3	.125	.500	.250	2	HBX1252-32C03	\$33.94
	3	.125	.625	.250	2	HBX1252-33C03	\$33.94
	3	.125	.750	.250	2	HBX1252-34C03	\$36.00
	3	.125	1.00	.250	2	HBX1252-35C03	\$36.00
	3	.125	1.25	.250	2	HBX1252-36C03	\$36.00
5/32"	3	.156	.312	.250	2	HBX1562-30C03	\$26.52
	3	.156	.875	.250	2	HBX1562-32C03	\$32.70

*WELDON FLATS - ADDED WITHIN 48 HOURS / *CLEARANCE - ADDED WITHIN 48 HOURS

(CONTINUED NEXT PAGE)

HBX2 SERIES (continued)

D1	L1	L2	L3	D2	FLUTES	PART #	PRICE
3/16"	2	.187	X	.187	2	HBX1872-20C03	\$18.89
	3	.187	.375	.250	2	HBX1872-30C03	\$27.59
	3	.187	.500	.250	2	HBX1872-31C03	\$33.77
	3	.187	.750	.250	2	HBX1872-32C03	\$35.72
	3	.187	1.00	.250	2	HBX1872-35C03	\$35.72
	4	.187	X	.187	2	HBX1872-40C03	\$20.73
	6	.187	X	.187	2	HBX1872-60C03	\$24.99
13/64"	3	.203	.406	.250	2	HBX2032-30C03	\$27.59
7/32"	3	.218	.436	.250	2	HBX2182-30C03	\$27.59
1/4"	3	.250	X	.250	2	HBX2502-30C03	\$23.63
	4	.250	X	.250	2	HBX2502-40C03	\$26.25
	6	.250	X	.250	2	HBX2502-60C03	\$32.10
9/32"	3	.281	.562	.312	2	HBX2812-30C03	\$32.84
5/16"	3	.312	X	.312	2	HBX3122-30C03	\$30.49
	4	.312	X	.312	2	HBX3122-40C03	\$35.11
	6	.312	X	.312	2	HBX3122-60C03	\$43.74
3/8"	4	.375	X	.375	2	HBX3752-40C03	\$42.34
	6	.375	X	.375	2	HBX3752-60C03	\$52.05
	8	.375	X	.375	2	HBX3752-80C03	\$82.00
1/2"	4	.500	X	.500	2	HBX5002-40C03	\$69.62
	6	.500	X	.500	2	HBX5002-60C03	\$86.23
	8	.500	X	.500	2	HBX5002-80C03	\$118.37



HBX

Shallow flute and heavy core.

Extremely tough in applications prone to vibration.

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

HB4 SERIES

4 FLUTE HELICAL BALL NOSE - AGGRESSIVE MILLING GEOMETRY



- 4 FLUTE AGGRESSIVE MILLING DESIGN FOR INCREASED FEEDS
- VARIABLE FLUTE FOR STABLE CHATTER FREE MILLING = INCREASED TOOL LIFE, METAL REMOVAL RATES AND SURFACE FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE

• EXTRA LONG OAL SIZES IN STOCK

- UP TO 60 HRC
- H6 TOL. SHANK

D1	L1	L2	D2	FLUTES	PART #	PRICE
1/32"	2	.062	.125	4	HB0314-20C03	\$16.57
3/64"	2	.093	.125	4	HB0464-20C03	\$16.57
1/16"	2	.250	.125	4	HB0624-20C03	\$16.57
5/64"	2	.312	.125	4	HB0784-20C03	\$16.57
3/32"	2	.375	.125	4	HB0934-20C03	\$12.77
1/8"	2	.250	.125	4	HB1254-20C03	\$12.77
	3	.250	.125	4	HB1254-30C03	\$13.95
	4	.250	.125	4	HB1254-40C03	\$15.12
5/32"	2	.625	.187	4	HB1564-20C03	\$17.20
3/16"	2	.375	.187	4	HB1874-20C03	\$16.34
	3	.375	.187	4	HB1874-30C03	\$18.89
	4	.375	.187	4	HB1874-40C03	\$20.73
1/4"	3	.500	.250	4	HB2504-30C03	\$23.63
	4	.500	.250	4	HB2504-40C03	\$26.25
	6	.500	.250	4	HB2504-60C03	\$32.10
5/16"	3	.625	.312	4	HB3124-30C03	\$30.49
	4	.625	.312	4	HB3124-40C03	\$35.11
	6	.625	.312	4	HB3124-60C03	\$43.74
3/8"	3	.750	.375	4	HB3754-30C03	\$35.75
	4	.750	.375	4	HB3754-40C03	\$42.34
	6	.750	.375	4	HB3754-60C03	\$52.05
1/2"	3	1.00	.500	4	HB5004-30C03	\$60.95
	4	1.00	.500	4	HB5004-40C03	\$69.62
	6	1.00	.500	4	HB5004-60C03	\$86.23
	8	1.00	.500	4	HB5004-80C03	\$118.37
5/8"	4	1.25	.625	4	HB6254-40C03	\$107.87
	6	1.25	.625	4	HB6254-60C03	\$132.84
	8	1.25	.625	4	HB6254-80C03	\$167.66
3/4"	4	1.50	.750	4	HB7504-40C03	\$141.41
	6	1.50	.750	4	HB7504-60C03	\$174.23
	8	1.50	.750	4	HB7504-80C03	\$226.21
1"	4	1.50	1.00	4	HB1004-40C03	\$202.28
	6	1.50	1.00	4	HB1004-60C03	\$256.27
	8	1.50	1.00	4	HB1004-80C03	\$368.48

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

T3HB2 SERIES

2 FLUTE BALL NOSE WITH 3 DEGREE TAPERED SHANK AGGRESSIVE MILLING GEOMETRY



- 3 DEGREE TAPERED SHANK PROVIDES EXTRA RIGIDITY ON APPLICATIONS WHERE LONG REACH IS REQUIRED
- RIGID FLUTE / HEAVY CORE GEOMETRY DESIGNED FOR AGGRESSIVE PROFILE MILLING
IN MILD TO ALLOY STEEL AND IRON
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE



- UP TO 60 HRC
- H6 TOL. SHANK

D1	L1	L2	L3	D2	FLUTES	ATI PART#	PRICE
1/64"	3	.031	1.50	.250	2	T3HB0152-30C03	\$48.36
1/32"	3	.062	1.50	.250	2	T3HB0312-30C03	\$38.06
3/64"	3	.093	1.50	.250	2	T3HB0462-30C03	\$38.06
1/16"	3	.125	1.50	.250	2	T3HB0622-30C03	\$38.06
5/64"	3	.156	1.50	.250	2	T3HB0782-30C03	\$38.06
3/32"	3	.200	1.50	.250	2	T3HB0932-30C03	\$38.06
1/8"	3	.200	1.393	.250	2	T3HB1252-30C03	\$38.06
5/32"	3	.300	1.194	.250	2	T3HB1562-30C03	\$38.06
3/16"	3	.300	.896	.250	2	T3HB1872-30C03	\$38.06



T3HB2

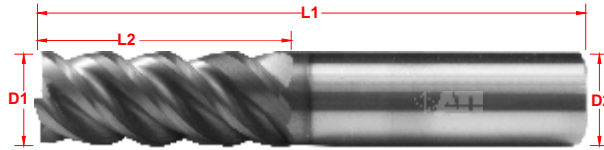
Rigid tapered shank for effective milling on long reach applications.

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

TF4 SERIES

***NEW SIZES**

TSUNAMI 4 FLUTE FLAT – HIGH VOLUME METAL REMOVAL



- SPECIALLY DESIGNED FOR HIGH VOLUME METAL REMOVAL
 - FULL SLOTTING AT 1XD DOC
 - HEAVY ENGAGEMENT PROFILE CUTS AT 1.5XD DOC
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
 - EXCELLENT SURFACE FINISH
- DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS

- H6 TOL. SHANK
- CENTER CUTTING

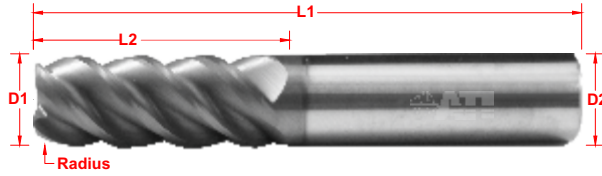
D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/8"	2	FLAT	.250	.125	4	TF1254-20C14	\$13.04
	2	FLAT	.500	.125	4	TF1254-21C14	\$13.68
	3	FLAT	.375	.125	4	TF1254-30C14	\$15.16
5/32"	2	FLAT	.450	.187	4	TF1564-20C14	\$17.37
	2	FLAT	.750	.187	4	TF1564-21C14	\$19.52
3/16"	2	FLAT	.375	.187	4	TF1874-20C14	\$16.34
	2	FLAT	.625	.187	4	TF1874-21C14	\$17.37
	3	FLAT	.625	.187	4	TF1874-30C14	\$19.29
1/4"	3	FLAT	.500	.250	4	TF2504-30C14	\$25.59
	3	FLAT	.875	.250	4	TF2504-31C14	\$25.59
	3	FLAT	1.25	.250	4	TF2504-32C14	\$27.74
5/16"	3	FLAT	.500	.312	4	TF3124-30C14	\$33.13
	3	FLAT	.875	.312	4	TF3124-31C14	\$34.51
3/8"	3	FLAT	.875	.375	4	TF3754-30C14	\$41.13
	3	FLAT	1.25	.375	4	TF3754-31C14	\$42.68
	4	FLAT	2.00	.375	4	TF3754-40C14	\$52.35
1/2"	3	FLAT	1.25	.500	4	TF5004-30C14	\$61.83
	4	FLAT	1.75	.500	4	TF5004-40C14	\$72.15
	5	FLAT	2.25	.500	4	TF5004-50C14	\$85.36
	6	FLAT	3.25	.500	4	TF5004-60C14	\$103.55
5/8"	4	FLAT	1.625	.625	4	TF6254-40C14	\$118.96
	5	FLAT	2.25	.625	4	TF6254-50C14	\$133.45
	6	FLAT	3.25	.625	4	TF6254-61C14	\$149.04
3/4"	4	FLAT	1.75	.750	4	TF7504-40C14	\$135.03
	5	FLAT	2.25	.750	4	TF7504-50C14	\$168.95
	5	FLAT	2.25	.750	4	TF7504-50C14	\$168.95
	6	FLAT	3.25	.750	4	TF7504-60C14	\$208.29
1"	4	FLAT	1.75	1.00	4	TF1004-40C14	\$228.74
	5	FLAT	2.625	1.00	4	TF1004-50C14	\$279.31
	6	FLAT	3.25	1.00	4	TF1004-60C14	\$322.63

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

***NEW SIZES**

TR4 SERIES

TSUNAMI 4 FLUTE CORNER RADIUS – HIGH VOLUME METAL REMOVAL



- SPECIALLY DESIGNED FOR HIGH VOLUME METAL REMOVAL
 - FULL SLOTTING AT 1XD DOC
 - HEAVY ENGAGEMENT PROFILE CUTS AT 1.5XD DOC
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
 - EXCELLENT SURFACE FINISH
- DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS

- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/8"	2	.010	.250	.125	4	TR1254-20R010C14	\$14.15
	2	.015	.250	.125	4	TR1254-20R015C14	\$14.15
	2	.031	.250	.125	4	TR1254-20R031C14	\$14.15
	3	.015	.375	.125	4	TR1254-30R015C14	\$15.91
	3	.031	.375	.125	4	TR1254-30R031C14	\$15.91
5/32"	2	.015	.450	.187	4	TR1564-20R015C14	\$21.44
	3	.015	.450	.187	4	TR1564-30R015C14	\$22.29
	3	.031	.450	.187	4	TR1564-30R031C14	\$22.29
3/16"	2	.010	.375	.187	4	TR1874-20R010C14	\$18.14
	2	.015	.375	.187	4	TR1874-20R015C14	\$18.14
	2	.015	.750	.187	4	TR1874-21R015C14	\$20.30
	2	.031	.375	.187	4	TR1874-20R031C14	\$18.14
	3	.015	.625	.187	4	TR1874-30R015C14	\$21.43
	3	.031	.625	.187	4	TR1874-30R031C14	\$21.43
1/4"	3	.015	.500	.250	4	TR2504-30R015C14	\$27.74
	3	.031	.500	.250	4	TR2504-30R031C14	\$27.74
	3	.062	.500	.250	4	TR2504-30R062C14	\$27.74
	3	.015	.875	.250	4	TR2504-31R015C14	\$27.74
	3	.031	.875	.250	4	TR2504-31R031C14	\$27.74
	3	.062	.875	.250	4	TR2504-31R062C14	\$27.74
	3	.031	1.25	.250	4	TR2504-32R031C14	\$28.95
5/16"	3	.031	.500	.312	4	TR3124-30R031C14	\$35.27
	3	.031	.875	.312	4	TR3124-31R031C14	\$36.65
3/8"	3	.015	.875	.375	4	TR3754-30R015C14	\$43.27
	3	.031	.875	.375	4	TR3754-30R031C14	\$43.27
	3	.062	.875	.375	4	TR3754-30R062C14	\$43.27
	3	.015	1.25	.375	4	TR3754-31R015C14	\$44.82
	3	.031	1.25	.375	4	TR3754-31R031C14	\$44.82
	3	.062	1.25	.375	4	TR3754-31R062C14	\$44.82

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

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TR4 SERIES (continued)

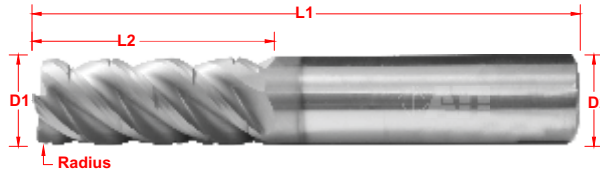
D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/2"	3	.015	1.25	.500	4	TR5004-30R015C14	\$64.16
	3	.031	1.25	.500	4	TR5004-30R031C14	\$64.16
	3	.062	1.25	.500	4	TR5004-30R062C14	\$64.16
	3	.125	1.25	.500	4	TR5004-30R125C14	\$64.16
	4	.015	1.625	.500	4	TR5004-40R015C14	\$74.16
	4	.031	1.625	.500	4	TR5004-40R031C14	\$74.16
	4	.062	1.625	.500	4	TR5004-40R062C14	\$74.16
	4	.125	1.625	.500	4	TR5004-40R125C14	\$74.16
	5	.015	2.25	.500	4	TR5004-50R015C14	\$100.38
	5	.031	2.25	.500	4	TR5004-50R031C14	\$100.38
	6	.031	3.25	.500	4	TR5004-60R031C14	\$105.08
5/8"	4	.015	1.625	.625	4	TR6254-40R015C14	\$121.28
	4	.031	1.625	.625	4	TR6254-40R031C14	\$121.28
	6	.031	2.25	.625	4	TR6254-60R031C14	\$151.54
3/4"	4	.015	1.625	.750	4	TR7504-40R015C14	\$142.55
	4	.031	1.625	.750	4	TR7504-40R031C14	\$142.55
	4	.062	1.625	.750	4	TR7504-40R062C14	\$142.55
	4	.125	1.625	.750	4	TR7504-40R125C14	\$142.55
	5	.031	2.25	.750	4	TR7504-50R031C14	\$178.19
	6	.031	2.25	.750	4	TR7504-60R031C14	\$198.62
	6	.031	3.25	.750	4	TR7504-61R031C14	\$210.44
	7	.031	4.25	.750	4	TR7504-70R031C14	\$240.76
7/8"	4	.031	1.625	.875	4	TR8754-40R031C14	\$194.30
	6	.031	3.25	.875	4	TR8754-60R031C14	\$245.40
1"	4	.031	1.625	1.00	4	TR1004-40R031C14	\$239.51
	5	.031	2.625	1.00	4	TR1004-50R031C14	\$286.70
	5	.062	2.625	1.00	4	TR1004-50R062C14	\$286.70
	5	.250	2.625	1.00	4	TR1004-50R250C14	\$286.70
	6	.031	3.25	1.00	4	TR1004-60R031C14	\$333.38
	7	.031	2.25	1.00	4	TR1004-70R031C14	\$371.67
	7	.031	4.25	1.00	4	TR1004-71R031C14	\$393.71

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

TR4CB SERIES

TSUNAMI 4 FLUTE CORNER RADIUS with CHIP BREAKERS
HIGH VOLUME METAL REMOVAL



- CHIP BREAKERS FOR EFFICIENT CHIP MANAGEMENT
- CHIP BREAKERS DECREASE TOOL PRESSURE AND DEFLECTION
- CHIP BREAKERS ARE STAGGERED SO THE FOLLOWING FLUTE CLEANS UP WITNESS LINES
- SPECIALLY DESIGNED FOR HIGH VOLUME METAL REMOVAL
 - FULL SLOTTING AT 1XD DOC
 - HEAVY ENGAGEMENT PROFILE CUTS AT 1.5XD DOC
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
- DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS

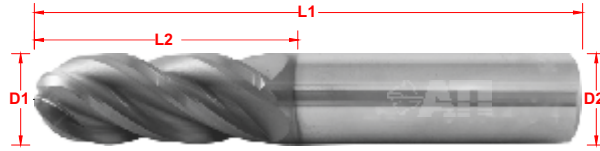
- CENTER CUTTING
- H6 TOL. SHANK

DIAMETER	OAL	RADIUS	LOC	SHANK	FLUTE #	ATI PART#	PRICE
1/4"	3	.015	.800	.250	4	TR2504-30R015C14CB	\$36.34
	3	.015	1.25	.250	4	TR2504-31R015C14CB	\$38.08
5/16"	3	.015	.875	.3125	4	TR3124-30R015C14CB	\$43.87
	3	.015	1.25	.3125	4	TR3124-31R015C14CB	\$45.25
3/8"	3	.015	1.00	.375	4	TR3754-30R015C14CB	\$49.61
	3	.015	1.25	.375	4	TR3754-31R015C14CB	\$51.16
	4	.015	1.25	.375	4	TR3754-40R015C14CB	\$53.42
1/2"	3	.031	1.25	.500	4	TR5004-30R031C14CB	\$74.91
	4	.031	1.625	.500	4	TR5004-40R031C14CB	\$85.99
	5	.031	2.50	.500	4	TR5004-50R031C14CB	\$113.28
	6	.031	3.25	.500	4	TR5004-60R031C14CB	\$119.06
5/8"	4	.031	1.625	.625	4	TR6254-40R031C14CB	\$133.11
	5	.031	2.50	.625	4	TR6254-50R031C14CB	\$144.54
	6	.031	3.25	.625	4	TR6254-60R031C14CB	\$176.99
3/4"	4	.031	1.625	.750	4	TR7504-40R031C14CB	\$156.53
	5	.031	2.50	.750	4	TR7504-50R031C14CB	\$194.32
	6	.031	3.25	.750	4	TR7504-61R031C14CB	\$230.87
	6	.062	2.25	.750	4	TR7504-60R062C14CB	\$214.74
1"	4	.031	1.625	1.00	4	TR1004-40R031C14CB	\$255.64
	5	.031	2.625	1.00	4	TR1004-50R031C14CB	\$306.05
	6	.031	3.25	1.00	4	TR1004-60R031C14CB	\$355.95

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

TB4 SERIES

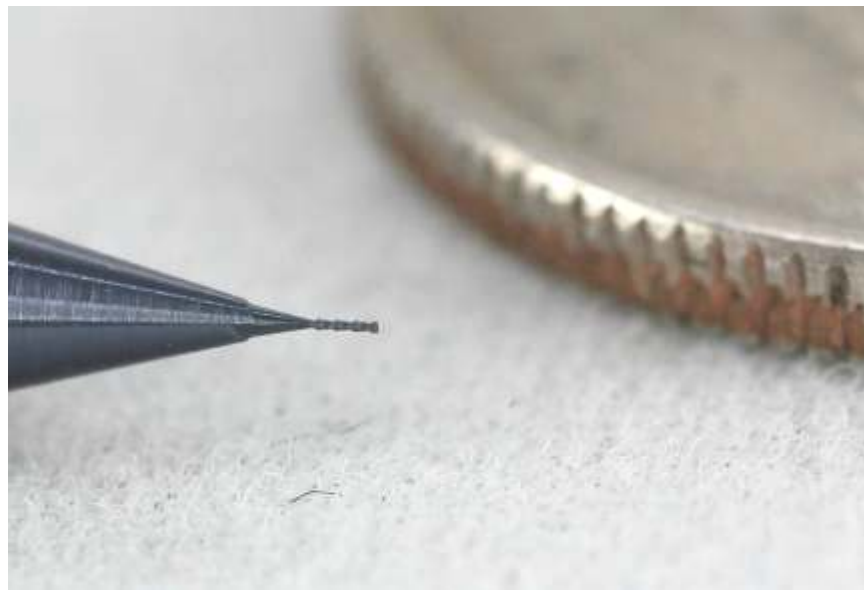
TSUNAMI 4 FLUTE BALL NOSE – HIGH VOLUME METAL REMOVAL



- SPECIALLY DESIGNED FOR HIGH VOLUME METAL REMOVAL
 - FULL SLOTTING AT 1XD DOC
 - HEAVY ENGAGEMENT PROFILE CUTS AT 1.5XD DOC
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
 - DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS

- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	L2	D2	FLUTES	PART #	PRICE
1/8"	2	.375	.125	4	TB1254-20C14	\$15.63
1/4"	3	.500	.250	4	TB2504-30C14	\$27.74
	3	.750	.250	4	TB2504-31C14	\$28.95
3/8"	3	.500	.375	4	TB3754-30C14	\$41.12
1/2"	3	1.250	.500	4	TB5004-30C14	\$64.17
	4	1.625	.500	4	TB5004-40C14	\$74.16
5/8"	4	1.625	.625	4	TB6254-40C14	\$121.28
3/4"	4	1.625	.750	4	TB7504-40C14	\$141.82
1"	4	1.625	1.00	4	TB1004-40C14	\$238.20
	5	2.625	1.00	4	TB1004-50C14	\$271.35

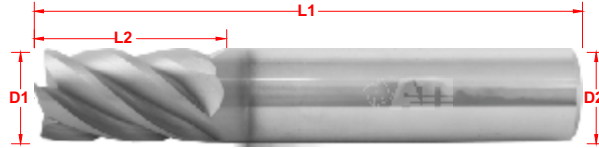


.003 diameter endmill

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

RT5 SERIES

RIPTIDE 5 FLUTE FLAT BOTTOM – HIGH VOLUME METAL REMOVAL

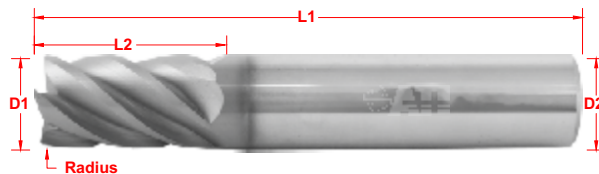


- DESIGNED FOR AGGRESSIVE PERIPHERAL MILLING IN A WIDE VARIETY OF MATERIAL INCLUDING EXOTICS
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
- DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS
- EXCELLENT SURFACE FINISH

- AGGRESSIVE SIDE MILLING
- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	L2	D2	FLUTES	ATI PART#	PRICE
3/8"	3	.875	.375	5	RT3755-30C14	\$41.73
	3	1.125	.375	5	RT3755-31C14	\$45.58
1/2"	3	1.25	.500	5	RT5005-30C14	\$68.60
	4	1.625	.500	5	RT5005-40C14	\$81.20
5/8"	4	1.25	.625	5	RT6255-40C14	\$128.39
	4	1.625	.625	5	RT6255-41C14	\$128.39
3/4"	4	1.25	.750	5	RT7505-40C14	\$166.50
	4	1.625	.750	5	RT7505-41C14	\$169.80

RIPTIDE 5 FLUTE CORNER RADIUS – HIGH VOLUME METAL REMOVAL



- DESIGNED FOR AGGRESSIVE PERIPHERAL MILLING IN A WIDE VARIETY OF MATERIAL INCLUDING EXOTICS
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
- DURABLE HEAT AND WEAR RESISTANT COATING SUITED FOR HEAVY ROUGHING APPLICATIONS
- EXCELLENT SURFACE FINISH

- AGGRESSIVE SIDE MILLING
- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
3/8"	3	.031	.875	.375	5	RT3755-30R031C14	\$45.65
	3	.031	1.125	.375	5	RT3755-31R031C14	\$49.43
1/2"	3	.031	1.25	.500	5	RT5005-30R031C14	\$70.65
	4	.031	1.625	.500	5	RT5005-40R031C14	\$83.26
5/8"	4	.031	1.25	.625	5	RT6255-40R031C14	\$134.99
	4	.031	1.625	.625	5	RT6255-41R031C14	\$134.99
3/4"	4	.031	1.25	.750	5	RT7505-40R031C14	\$175.30
	4	.031	1.625	.750	5	RT7505-41R031C14	\$177.50

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

TSF4 SERIES

***NEW SERIES**

TSUNAMI SS 4 FLUTE FLAT BOTTOM – HIGH VOLUME STAINLESS STEEL MILLING



- DESIGNED FOR SLOTTING AND AGGRESSIVE PERIPHERAL MILLING IN STAINLESS STEEL
- EXCEPTIONAL RESULTS IN NITRONIC STAINLESS APPLICATIONS.
- EXOTIC MATERIALS
- SPECIAL SURFACE TREATMENT = SMOOTH CHIP EVACUATION
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
- NEW, HIGH HARD, WEAR RESISTANT COATING FOR EXCEPTIONAL TOOL LIFE
- EXCELLENT SURFACE FINISH



- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	L2	D2	FLUTES	PART #	PRICE
1/4"	3	.500	.250	4	TSF2504-30C15	\$26.51
	3	1.00	.250	4	TSF2504-31C15	\$26.51
3/8"	3	.750	.375	4	TSF3754-30C15	\$41.77
	3	1.25	.375	4	TSF3754-31C15	\$43.32
1/2"	3	1.25	.500	4	TSF5004-30C15	\$62.31
	4	1.75	.500	4	TSF5004-40C15	\$73.72
5/8"	4	1.50	.625	4	TSF6254-40C15	\$114.36
	5	2.25	.625	4	TSF6254-50C15	\$133.34
3/4"	4	1.75	.750	4	TSF7504-40C15	\$140.20
	5	2.50	.750	4	TSF7504-50C15	\$171.85
1"	5	2.00	1.00	4	TSF1004-50C15	\$292.03
	6	2.75	1.00	4	TSF1004-60C15	\$317.75



Unique geometry excels in stainless steel and exotic materials.

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

TSR4 SERIES

TSUNAMI SS 4 FLUTE CORNER RADIUS – HIGH VOLUME STAINLESS STEEL MILLING



- DESIGNED FOR SLOTTING AND AGGRESSIVE PERIPHERAL MILLING IN STAINLESS STEEL
- EXCEPTIONAL RESULTS IN NITRONIC STAINLESS APPLICATIONS
 - EXOTIC MATERIALS
- SPECIAL SURFACE TREATMENT = SMOOTH CHIP EVACUATION
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP = DURABILITY FOR HEAVY TOOL ENGAGEMENT
 - NEW, HIGH HARD, WEAR RESISTANT COATING FOR EXCEPTIONAL TOOL LIFE
 - EXCELLENT SURFACE FINISH

- CENTER CUTTING
- H6 TOL. SHANK

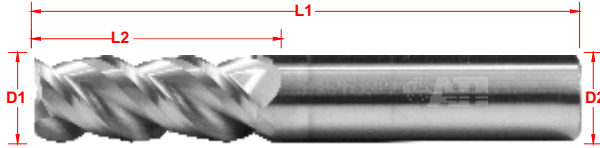
D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/4"	3	.031	.500	.250	4	TSR2504-30R031C15	\$28.66
	3	.062	.500	.250	4	TSR2504-30R062C15	\$28.66
	3	.031	1.00	.250	4	TSR2504-31R031C15	\$29.61
	3	.062	1.00	.250	4	TSR2504-31R062C15	\$29.61
3/8"	3	.031	.750	.375	4	TSR3754-30R031C15	\$43.92
	3	.062	.750	.375	4	TSR3754-30R062C15	\$43.92
	3	.031	1.25	.375	4	TSR3754-31R031C15	\$45.47
	3	.062	1.25	.375	4	TSR3754-31R062C15	\$45.47
1/2"	3	.031	1.25	.500	4	TSR5004-30R031C15	\$64.33
	3	.062	1.25	.500	4	TSR5004-30R062C15	\$64.33
	4	.031	1.75	.500	4	TSR5004-40R031C15	\$75.21
	4	.062	1.75	.500	4	TSR5004-40R062C15	\$75.21
5/8"	4	.031	1.50	.625	4	TSR6254-40R031C15	\$122.12
	4	.062	1.50	.625	4	TSR6254-40R062C15	\$122.12
	5	.031	2.25	.625	4	TSR6254-50R031C15	\$137.99
	5	.062	2.25	.625	4	TSR6254-50R062C15	\$137.99
3/4"	4	.031	1.75	.750	4	TSR7504-40R031C15	\$143.43
	4	.062	1.75	.750	4	TSR7504-40R062C15	\$143.43
	5	.031	2.50	.750	4	TSR7504-50R031C15	\$171.85
	5	.062	2.50	.750	4	TSR7504-50R062C15	\$171.85
1"	5	.031	2.00	1.00	4	TSR1004-50R031C15	\$302.55
	5	.062	2.00	1.00	4	TSR1004-50R062C15	\$302.55
	6	.031	2.75	1.00	4	TSR1004-60R031C15	\$334.41
	6	.062	2.75	1.00	4	TSR1004-60R062C15	\$334.41

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

TA3 SERIES

***NEW SIZES**

TSUNAMI 3 FLUTE FLAT BOTTOM - NON-FERROUS HIGH VOLUME MATERIAL REMOVAL



- SPECIFICALLY DESIGNED FOR NON-FERROUS HIGH VOLUME MILLING
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP FOR SMOOTH ENGAGEMENT
- NEW COATING ELIMINATES NON-FERROUS CHIP WELDING
- EXCELLENT SURFACE FINISH



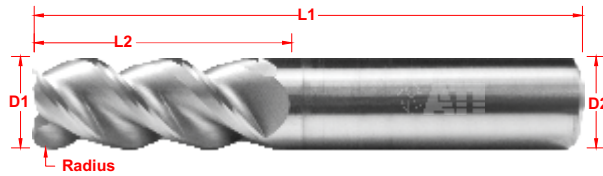
- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	L2	D2	FLUTES	ATI PART#	PRICE
1/8"	2	.250	.125	3	TA1253-20C11	\$13.66
	2	.525	.125	3	TA1253-21C11	\$12.71
	3	.525	.125	3	TA1253-30C11	\$14.26
	3	1.125	.125	3	TA1253-31C11	\$16.18
3/16"	2	.312	.1875	3	TA1873-20C11	\$16.50
	3	.750	.1875	3	TA1873-30C11	\$20.30
1/4"	2	.550	.250	3	TA2503-20C11	\$25.63
	3	.800	.250	3	TA2503-31C11	\$26.93
	3	1.125	.250	3	TA2503-30C11	\$28.08
	4	1.375	.250	3	TA2503-40C11	\$30.89
5/16"	3	1.125	.3125	3	TA3123-30C11	\$34.29
3/8"	3	1.25	.375	3	TA3753-31C11	\$37.83
	4	2.125	.375	3	TA3753-40C11	\$41.95
7/16"	3	1.25	.437	3	TA4373-30C11	\$51.63
	4.75	2.25	.437	3	TA4373-47C11	\$71.00
1/2"	3	1.25	.500	3	TA5003-30C11	\$62.68
	4	1.625	.500	3	TA5003-40C11	\$73.21
	5	2.25	.500	3	TA5003-50C11	\$80.67
5/8"	4	1.625	.625	3	TA6253-40C11	\$110.44
	6	3.25	.625	3	TA6253-60C11	\$147.46
3/4"	4	1.625	.750	3	TA7503-40C11	\$136.81
	5	2.25	.750	3	TA7503-50C11	\$154.86
	6	3.50	.750	3	TA7503-60C11	\$192.44
1"	4	1.625	1.00	3	TA1003-40C11	\$225.82
	5	2.625	1.00	3	TA1003-50C11	\$258.77
	6	3.50	1.00	3	TA1003-60C11	\$295.96

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

***NEW SIZES**

TAR3 SERIES

**TSUNAMI 3 FLUTE CORNER RADIUS
NON-FERROUS HIGH VOLUME MATERIAL REMOVAL**

- SPECIFICALLY DESIGNED FOR NON-FERROUS HIGH VOLUME MILLING
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP FOR SMOOTH ENGAGEMENT
- NEW COATING ELIMINATES NON-FERROUS CHIP WELDING
- EXCELLENT SURFACE FINISH

- CENTER CUTTING
- H6 TOL. SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/8"	2	.015	.250	.125	3	TAR1253-20R015C11	\$14.22
	2	.031	.250	.125	3	TAR1253-20R031C11	\$14.22
	3	.015	.500	.125	3	TAR1253-30R015C11	\$15.80
	3	.031	.500	.125	3	TAR1253-30R031C11	\$15.80
5/32"	3	.015	.450	.1875	3	TAR1563-30R015C11	\$21.82
3/16"	2	.015	.312	.1875	3	TAR1873-20R015C11	\$18.21
	2	.031	.312	.1875	3	TAR1873-20R031C11	\$18.21
	3	.015	.500	.1875	3	TAR1873-30R015C11	\$21.82
	3	.031	.500	.1875	3	TAR1873-30R031C11	\$21.82
1/4"	3	.015	1.125	.250	3	TAR2503-30R015C11	\$28.27
	3	.031	1.125	.250	3	TAR2503-30R031C11	\$28.27
	4	.015	1.375	.250	3	TAR2503-40R015C11	\$30.23
	4	.031	1.375	.250	3	TAR2503-40R031C11	\$30.23
5/16"	3	.015	1.125	.3125	3	TAR3123-30R015C11	\$36.35
	4	.015	1.375	.3125	3	TAR3123-40R015C11	\$42.61
3/8"	3	.015	1.25	.375	3	TAR3753-30R015C11	\$41.95
	3	.031	1.25	.375	3	TAR3753-30R031C11	\$41.95
	4	.015	1.625	.375	3	TAR3753-40R015C11	\$52.36
	4	.031	1.625	.375	3	TAR3753-40R031C11	\$52.36
	4	.062	1.625	.375	3	TAR3753-40R062C11	\$52.36
1/2"	3	.031	.875	.500	3	TAR5003-31R031C11	\$64.60
	3	.015	1.25	.500	3	TAR5003-30R015C11	\$64.60
	3	.031	1.25	.500	3	TAR5003-30R031C11	\$64.60
	3	.125	1.25	.500	3	TAR5003-30R125C11	\$64.60
	4	.015	1.625	.500	3	TAR5003-40R015C11	\$75.13
	4	.031	1.625	.500	3	TAR5003-40R031C11	\$75.13
	4	.062	1.625	.500	3	TAR5003-40R062C11	\$75.13
	5	.031	2.25	.500	3	TAR5004-50R031C11	\$88.99
5/8"	4	.031	1.625	.625	3	TAR6253-40R031C11	\$120.74
	6	.031	3.25	.625	3	TAR6253-60R031C11	\$157.77

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

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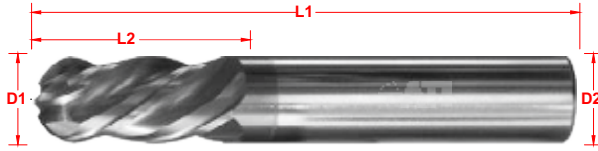
TAR3 SERIES (continued)

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
3/4"	4	.015	1.625	.750	3	TAR7503-40R015C11	\$147.11
	4	.031	1.625	.750	3	TAR7503-40R031C11	\$147.11
	4	.062	1.625	.750	3	TAR7503-40R062C11	\$147.11
	4	.125	1.625	.750	3	TAR7503-40R125C11	\$147.11
	5	.031	2.25	.750	3	TAR7503-50R031C11	\$165.16
	5	.062	2.25	.750	3	TAR7503-50R062C11	\$165.16
	6	.015	2.25	.750	3	TAR7503-60R015C11	\$195.53
	6	.015	3.50	.750	3	TAR7503-61R015C11	\$202.75
	6	.031	3.50	.750	3	TAR7503-60R031C11	\$202.75
	6	.125	3.50	.750	3	TAR7503-60R125C11	\$202.75
1"	4	.015	1.625	1.00	3	TAR1003-40R015C11	\$236.12
	4	.062	1.625	1.00	3	TAR1003-40R062C11	\$236.12
	5	.015	2.625	1.00	3	TAR1003-50R015C11	\$269.07
	6	.015	3.50	1.00	3	TAR1003-60R015C11	\$329.56

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

TAB3 SERIES

TSUNAMI 3 FLUTE BALL NOSE - NON-FERROUS HIGH VOLUME MATERIAL REMOVAL



- SPECIFICALLY DESIGNED FOR NON-FERROUS HIGH VOLUME MILLING
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP FOR SMOOTH ENGAGEMENT
- NEW COATING ELIMINATES NON-FERROUS CHIP WELDING
- EXCELLENT SURFACE FINISH



- H6 TOL. SHANK

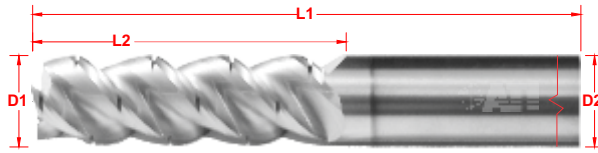
D1	L1	L2	D1	FLUTES	ATI PART#	PRICE
1/8"	2	.375	.125	3	TAB1253-20C11	\$14.92
1/4"	3	.500	.250	3	TAB2503-30C11	\$28.27
	4	.500	.250	3	TAB2503-40C11	\$30.23
3/8"	3	.500	.375	3	TAB3753-30C11	\$41.95
	4	.750	.375	3	TAB3753-40C11	\$48.41
1/2"	3	1.25	.500	3	TAB5003-30C11	\$64.60
	4	1.00	.500	3	TAB5003-41C11	\$75.13
	4	1.625	.500	3	TAB5003-40C11	\$75.13
	6	2.25	.500	3	TAB5003-60C11	\$95.54
5/8"	4	1.625	.625	3	TAB6253-40C11	\$120.74
3/4"	4	1.625	.750	3	TAB7503-40C11	\$147.11
	6	3.50	.750	3	TAB7503-60C11	\$190.05
	8	1.50	.750	3	TAB7503-81C11	\$245.89
1"	4	1.625	1.00	3	TAB1003-40C11	\$236.12
	6	3.50	1.00	3	TAB1003-60C11	\$316.48

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

TA3CB SERIES

***NEW SERIES**

TSUNAMI 3 FLUTE FLAT BOTTOM WITH CHIP BREAKERS NON-FERROUS HIGH VOLUME MATERIAL REMOVAL



• H6 TOL. SHANK

- CHIP BREAKERS FOR EFFICIENT CHIP MANAGEMENT
- CHIP BREAKERS DECREASE TOOL PRESSURE AND DEFLECTION
- CHIP BREAKERS ARE STAGGERED SO THE FOLLOWING FLUTE CLEANS UP WITNESS LINES
 - SPECIFICALLY DESIGNED FOR NON-FERROUS HIGH VOLUME MILLING
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP FOR SMOOTH ENGAGEMENT
 - NEW COATNG ELIMINATES NON-FERROUS CHIP WELDING

D1	L1	L2	D2	FLUTES	ATI PART#	PRICE
1/4"	3	1.30	.250	3	TA2503-30C11CB	\$36.33
	4	1.625	.250	3	TA2503-40C11CB	\$40.96
3/8"	3	1.30	.375	3	TA3753-30C11CB	\$47.55
	5	2.25	.375	3	TA3753-50C11CB	\$62.43
1/2"	3	1.30	.500	3	TA5003-30C11CB	\$72.98
	5	2.30	.500	3	TA5003-50C11CB	\$89.09
	6	3.25	.500	3	TA5003-61C11CB	\$107.33
5/8"	5	2.30	.625	3	TA6253-50C11CB	\$134.75
	6	3.25	.625	3	TA6253-61C11CB	\$160.86
3/4"	5	2.625	.625	3	TA7503-50C11CB	\$170.31
	6	3.50	.625	3	TA7503-61C11CB	\$212.02
1"	5	2.625	1.00	3	TA1003-50C11CB	\$277.31
	6	3.50	1.00	3	TA1003-61C11CB	\$317.59

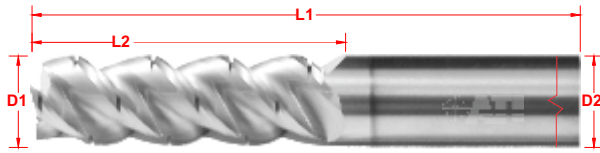


Chip breakers - for effective chip management

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

TAR3CB SERIES

TSUNAMI 3 FLUTE CORNER RADIUS WITH CHIP BREAKERS NON-FERROUS HIGH VOLUME MATERIAL REMOVAL



- CHIP BREAKERS FOR EFFICIENT CHIP MANAGEMENT
- CHIP BREAKERS DECREASE TOOL PRESSURE AND DEFLECTION
- CHIP BREAKERS ARE STAGGERED SO THE FOLLOWING FLUTE CLEANS UP WITNESS LINES
 - SPECIFICALLY DESIGNED FOR NON-FERROUS HIGH VOLUME MILLING
- VARIABLE HELIX AND INDEX WITH SPECIAL EDGE PREP FOR SMOOTH ENGAGEMENT
 - NEW COATNG ELIMINATES NON-FERROUS CHIP WELDING

• H6 TOL. SHANK

D1	L1	RADIUS	L2	D2	FLUTES	ATI PART#	PRICE
1/4"	3	.015	1.30	.250	3	TAR2503-30R015C11CB	\$36.51
	4	.015	1.625	.250	3	TAR2503-40R015C11CB	\$41.17
3/8"	3	.015	1.30	.375	3	TAR3753-30R015C11CB	\$50.19
	3	.031	1.30	.375	3	TAR3753-30R031C11CB	\$50.19
	4	.015	1.625	.375	3	TAR3753-40R015C11CB	\$61.63
	4	.031	1.625	.375	3	TAR3753-40R031C11CB	\$61.63
	5	.015	2.25	.375	3	TAR3753-50R015C11CB	\$69.13
	5	.031	2.25	.375	3	TAR3753-50R031C11CB	\$69.13
1/2"	3	.031	1.30	.500	3	TAR5003-30R031C11CB	\$79.88
	5	.031	2.30	.500	3	TAR5003-51R031C11CB	\$104.73
	6	.031	3.125	.500	3	TAR5004-61R031C11CB	\$113.51
5/8"	5	.031	2.30	.625	3	TAR6253-50R031C11CB	\$129.50
	6	.031	3.25	.625	3	TAR6253-61R031C11CB	\$160.86
3/4"	4	.062	1.625	.750	3	TAR7503-40R062C11CB	\$161.54
	5	.031	2.625	.750	3	TAR7503-50R031C11CB	\$180.62
	5	.062	2.625	.750	3	TAR7503-50R062C11CB	\$180.62
	6	.031	3.25	.750	3	TAR7503-61R031C11CB	\$212.02
	6	.062	1.625	.750	3	TAR7503-60R062C11CB	\$205.84
1"	5	.031	2.625	1.00	3	TAR1003-50R031C11CB	\$287.61
	6	.031	3.50	1.00	3	TAR1003-61R031C11CB	\$327.89



*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

CM SERIES

3, 4, 5, 6 FLUTE HELICAL CHAMFER MILLS



- HELICAL FLUTES PROVIDE SMOOTH MATERIAL ENGAGEMENT
- BETTER FINISH THAN STRAIGHT FLUTE CHAMFER MILLS
- LONGER TOOL LIFE AND HIGHER FEED RATES THAN STRAIGHT FLUTE TOOLS
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE

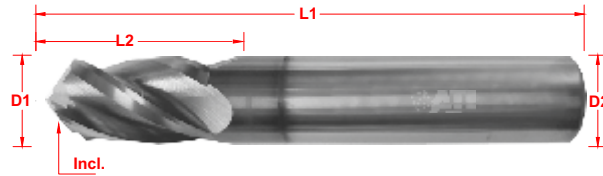
• H6 TOL. SHANK

D1	ANGLE	D3	L1	D2	FLUTES	ATI PART #	PRICE
1/4"	30	.045	3	.250	3	CM2503-30C03	\$24.68
	30	.045	3	.250	4	CM2504-30C03	\$24.68
	45	.045	3	.250	3	CM2503-45C03	\$24.68
	45	.045	3	.250	4	CM2504-45C03	\$24.68
	60	.045	3	.250	3	CM2503-60C03	\$24.68
	60	.045	3	.250	4	CM2504-60C03	\$24.68
	90	.045	3	.250	3	CM2503-90C03	\$24.68
	90	.045	3	.250	4	CM2504-90C03	\$24.68
3/8"	30	.055	3	.375	3	CM3753-30C03	\$37.79
	30	.055	3	.375	5	CM3755-30C03	\$37.79
	45	.055	3	.375	3	CM3753-45C03	\$37.79
	45	.055	3	.375	5	CM3755-45C03	\$37.79
	60	.055	3	.375	3	CM3753-60C03	\$37.79
	60	.055	3	.375	5	CM3755-60C03	\$37.79
	90	.055	3	.375	3	CM3753-90C03	\$37.79
	90	.055	3	.375	5	CM3755-90C03	\$37.79
1/2"	30	.070	4	.500	3	CM5003-30C03	\$67.03
	30	.070	4	.500	5	CM5005-30C03	\$67.03
	45	.070	4	.500	3	CM5003-45C03	\$67.03
	45	.070	4	.500	5	CM5005-45C03	\$67.03
	60	.070	4	.500	3	CM5003-60C03	\$67.03
	60	.070	4	.500	5	CM5005-60C03	\$67.03
	90	.070	4	.500	3	CM5003-90C03	\$67.03
	90	.070	4	.500	5	CM5005-90C03	\$67.03
5/8"	30	.090	4	.625	6	CM6255-30C03	\$129.33
	45	.090	4	.625	6	CM6255-45C03	\$129.33
	60	.090	4	.625	6	CM6255-60C03	\$129.33
	90	.090	4	.625	6	CM6255-90C03	\$129.33
3/4"	30	.110	4	.750	6	CM7505-30C03	\$135.29
	45	.110	4	.750	6	CM7505-45C03	\$135.29
	90	.110	4	.750	6	CM7505-90C03	\$135.29

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

DM SERIES

2 AND 4 FLUTE 90 DEGREE DRILL MILLS



- DRILL, MILL, CHAMFER AND SPOT DRILL WITH ONE TOOL
- VARIABLE INDEX FOR SMOOTH TOOL ENGAGEMENT FOR INCREASED TOOL LIFE AND FINISH
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- H6 TOL. SHANK

D1	L1	L2	ANGLE	D2	FLUTES	ATI PART#	PRICE
1/8"	2	.500	90	.125	2 FLUTE	DM1252-2-90C03	\$16.92
	2	.500	90	.125	4 FLUTE	DM1254-2-90C03	\$20.45
3/16"	2	.625	90	.187	2 FLUTE	DM1872-2-90C03	\$19.22
	2	.625	90	.187	4 FLUTE	DM1874-2-90C03	\$22.75
1/4"	3	.750	90	.250	2 FLUTE	DM2502-3-90C03	\$28.37
	3	.750	90	.250	4 FLUTE	DM2504-3-90C03	\$31.89
5/16"	3	.812	90	.312	2 FLUTE	DM3122-3-90C03	\$37.03
	3	.812	90	.312	4 FLUTE	DM3124-3-90C03	\$40.56
3/8"	3	1	90	.375	2 FLUTE	DM3752-3-90C03	\$40.90
	3	1	90	.375	4 FLUTE	DM3754-3-90C03	\$44.42
1/2"	4	1.25	90	.500	2 FLUTE	DM5002-4-90C03	\$65.46
	4	1.25	90	.500	4 FLUTE	DM5004-4-90C03	\$70.75
5/8"	4	1.5	90	.625	2 FLUTE	DM6252-4-90C03	\$86.31
	4	1.5	90	.625	4 FLUTE	DM6254-4-90C03	\$91.60
3/4"	4	1.5	90	.750	2 FLUTE	DM7502-4-90C03	\$109.68
	4	1.5	90	.750	4 FLUTE	DM7504-4-90C03	\$118.50



SW SERIES *SW geometry excels in long reach sidewall applications and is available in an AMAZING variety of sizes!*
 (page 1 & 2)

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

SD SERIES

NC SPOT DRILLS – 90, 120 AND 142 DEGREE POINT



- SPOT ANGLES IN 90, 120 AND 142 DEGREES
- AVAILABLE IN 3", 4" AND 6" OAL
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- SPOT ANGLE SHOULD BE GREATER THAN THE ANGLE OF THE DRILL POINT
- H6 TOL. SHANK

D1	ANGLE	L1	D2	L2	ATI PART #	PRICE
1/4"	90	3	.250	.500	SD2502-3-90C02	\$11.74
	90	4	.250	.500	SD2502-4-90C02	\$14.81
	90	6	.250	.500	SD2502-6-90C02	\$21.56
	120	3	.250	.500	SD2502-3-120C02	\$11.74
	120	4	.250	.500	SD2502-4-120C02	\$14.81
	120	6	.250	.500	SD2502-6-120C02	\$21.56
	142	3	.250	.500	SD2502-3-142C02	\$11.74
	142	4	.250	.500	SD2502-4-142C02	\$14.81
	142	6	.250	.500	SD2502-6-142C02	\$21.56
3/8"	90	3	.375	.750	SD3752-3-90C02	\$21.61
	90	4	.375	.750	SD3752-4-90C02	\$29.35
	90	6	.375	.750	SD3752-6-90C02	\$40.63
	120	3	.375	.750	SD3752-3-120C02	\$21.61
	120	4	.375	.750	SD3752-4-120C02	\$29.35
	120	6	.375	.750	SD3752-6-120C02	\$40.63
	142	3	.375	.750	SD3752-3-142C02	\$21.61
	142	4	.375	.750	SD3752-4-142C02	\$29.35
	142	6	.375	.750	SD3752-6-142C02	\$40.63
1/2"	90	3	.500	1	SD5002-3-90C02	\$32.07
	90	4	.500	1	SD5002-4-90C02	\$42.75
	90	6	.500	1	SD5002-6-90C02	\$62.36
	120	3	.500	1	SD5002-3-120C02	\$32.07
	120	4	.500	1	SD5002-4-120C02	\$42.75
	120	6	.500	1	SD5002-6-120C02	\$62.36
	142	3	.500	1	SD5002-3-142C02	\$32.07
	142	4	.500	1	SD5002-4-142C02	\$42.75
	142	6	.500	1	SD5002-6-142C02	\$62.36

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SERIES**

ET SERIES

HELICAL FLUTE ENGRAVING MILLS



- HELICAL FLUTES FOR SUPERIOR PERFORMANCE COMPARED TO STRAIGHT FLUTE ENGRAVING TOOLS
- THE LATEST NANO COATING TECHNOLOGY = EXTREME HEAT AND WEAR RESISTANCE
- H6 TOLERANCE SHANKS

D1	ANGLE/SIDE	L1	RADIUS	D2	FLUTES	ATI PART#	PRICE
.015	10	2	.0075	.125	2	ET10152-20C03	\$15.66
	15	2	.0075	.125	2	ET15152-20C03	\$15.66
	20	2	.0075	.125	2	ET20152-20C03	\$15.66
	30	2	.0075	.125	2	ET30152-20C03	\$15.66
	10	2.5	.0075	.250	2	ET10152-25C03	\$26.19
	15	2.5	.0075	.250	2	ET15152-25C03	\$26.19
	20	2.5	.0075	.250	2	ET20152-25C03	\$26.19
	30	2.5	.0075	.250	2	ET30152-25C03	\$26.19



Tool life increases drastically by using a helical flute and not a straight flute.

**WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS*

DF4 SERIES

***NEW SIZES**

2 AND 4 FLUTE FLAT BOTTOM - CVD DIAMOND COATED END MILLS



- STANDARD AND EXTENDED REACH with CLEARANCE SHANKS
- VARIABLE FLUTE ALLOWS FOR ACCELERATED FEEDRATES
- H6 TOLERANCE SHANKS



CVD DIAMOND COATING BY Sp3 DIAMOND

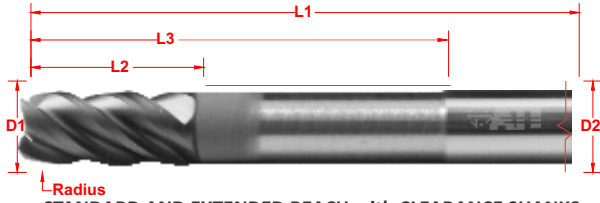
D1	L1	L2	L3	D2	FLUTES	ATI PART#	PRICE
.010	2	.020	.050	.125	2	DFC0102-20D2	\$71.49
	3	.020	.050	.125	2	DFC0102-30D2	\$71.49
.015	3	.030	.125	.125	2	DFC0152-30D2	\$64.32
	3	.047	.312	.125	2	DFC0152-31D2	\$69.70
.020	2	.050	.187	.125	2	DFC0202-20D2	\$53.57
	2	.050	.300	.125	2	DFC0202-21D2	\$62.53
1/32"	2	.062	.250	.125	4	DFC0314-20D2	\$41.03
	2	.062	.500	.125	4	DFC0314-22D2	\$42.82
	2	.062	.625	.125	4	DFC0314-21D2	\$42.82
3/64"	2	.125	.500	.125	4	DFC0464-20D2	\$36.73
	2	.125	.750	.125	4	DFC0464-21D2	\$40.31
1/16"	2	.125	.500	.125	4	DFC0624-20D2	\$36.73
	2	.125	.750	.125	4	DFC0624-21D2	\$40.31
	2	.125	1.00	.125	4	DFC0624-22D2	\$42.10
3/32"	2	.250	.750	.125	4	DFC0934-20D2	\$36.73
	3	1.00	X	.125	4	DF0934-30D2	\$47.48
1/8"	3	.250	1.00	.125	4	DFVC1254-30D2	\$39.42
3/16"	3	.375	1.50	.187	4	DFVC1874-30D4	\$78.53
1/4"	3	.500	1.50	.250	4	DFVC2504-30D4	\$100.24
	4	1.50	X	.250	4	DFV2504-40D4	\$94.87
	4	.500	1.50	.250	4	DFVC2504-40D4	\$107.41
1/2"	3	1.00	X	.500	4	DFV5004-30D4	\$168.42

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

***NEW SIZES**

DR4 SERIES

2 AND 4 FLUTE CORNER RADIUS - CVD DIAMOND COATED END MILLS



- STANDARD AND EXTENDED REACH with CLEARANCE SHANKS
- VARIABLE FLUTE ALLOWS FOR ACCELERATED FEEDRATES
- H6 TOL. SHANK



CVD DIAMOND COATING BY Sp3 DIAMOND

D1	L1	RADIUS	L2	L3	D2	FLUTES	ATI PART#	PRICE
1/32"	2	.005	.062	.312	.125	4	DRC0314-30R005D2	\$42.82
1/16"	2	.010	.125	.500	.125	4	DRC0624-20R010D2	\$38.52
1/8"	3	.015	.250	1.00	.125	4	DRVC1254-30R015D2	\$41.21
	3	.015	.250	1.50	.125	4	DRVC1254-31R015D2	\$45.69
3/16"	2	.015	.375	X	.187	4	DRV1874-20R015D4	\$77.27
	3	.015	.375	1.50	.187	4	DRVC1874-30R015D4	\$82.11
1/4"	3	.015	.500	1.50	.250	4	DRVC2504-30R015D4	\$103.83
	3	.015	.500	X	.250	4	DRV2504-30R015D4	\$98.45
	4	.015	.500	1.50	.250	4	DRVC2504-40R015D4	\$110.99
3/8"	6	.020	.500	3.00	.375	4	DRVC3754-61R020D4	\$152.29
1/2"	4	.030	1.50	X	.500	4	DRV5004-41R030D4	\$179.17
	6	.020	.500	3.00	.500	4	DRVC5004-60R020D4	\$198.88

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

DB4 SERIES

***NEW SIZES**

2 AND 4 FLUTE BALL BOTTOM - CVD DIAMOND COATED END MILLS



- STANDARD AND EXTENDED REACH with CLEARANCE SHANKS
- VARIABLE PITCH ALLOWS FOR ACCELERATED FEEDRATES
- H6 TOL. SHANK



CVD DIAMOND COATING BY Sp3 DIAMOND

D1	L1	L2	L3	D2	FLUTES	ATI PART#	PRICE
.010	2	.020	.050	.125	2	DBC0102-20D2	\$75.07
	3	.020	.050	.125	2	DBC0102-30D2	\$76.86
.020	2	.050	.187	.125	2	DBC0202-20D2	\$57.15
	2	.050	.300	.125	2	DBC0202-21D2	\$66.11
1/32"	2	.062	.250	.125	4	DBC0314-20D2	\$42.82
	2	.062	.500	.125	4	DBC0314-22D2	\$42.82
	2	.062	.625	.125	4	DBC0314-23D2	\$42.82
	3	.062	.250	.125	4	DB0314-32D2	\$39.24
	3	.062	.625	.125	4	DBC0314-30D2	\$44.61
	3	.062	.900	.125	4	DBC0314-31D2	\$49.99
3/64"	2	.125	.500	.125	4	DBC0464-20D2	\$36.73
	2	.125	.750	.125	4	DBC0464-21D2	\$40.31
	2	.125	1.00	.125	4	DBC0464-22D2	\$43.90
1/16"	2	.125	.500	.125	4	DBC0624-20D2	\$38.52
	2	.125	.750	.125	4	DBC0624-21D2	\$40.31
	2	.125	1.00	.125	4	DBC0624-22D2	\$43.90
	3	.500	X	.125	4	DB0624-30D2	\$41.21
	3	.125	.750	.125	4	DBC0624-32D2	\$46.58
	3	.125	1.050	.125	4	DBC0624-33D2	\$46.58
	3	.125	2.050	.125	4	DBC0624-34D2	\$52.85
3/32"	2	.250	.750	.125	4	DBC0934-20D2	\$36.73
	2	.250	1.050	.125	4	DBC0934-21D2	\$40.31
	3	.250	2.050	.125	4	DBC0934-32D2	\$52.85
1/8"	2	.500	X	.125	4	DB1254-20D2	\$39.42
	3	1.00	X	.125	4	DB1254-30D2	\$42.10
	3	.250	1.00	.125	4	DBC1254-30D2	\$44.79
	4	.250	1.50	.125	4	DBC1254-40D2	\$54.65
3/16"	2	.375	X	.187	4	DBV1874-20D4	\$77.27
	3	.375	1.50	.187	4	DBVC1874-30D4	\$82.11
	4	.375	1.50	.187	4	DBVC1874-40D4	\$89.82
1/4"	3	.500	1.50	.250	4	DBVC2504-30D4	\$103.83
	4	.500	1.50	.250	4	DBVC2504-40D4	\$110.99
	4	.500	2.00	.250	4	DBVC2504-41D4	\$112.79
1/2"	4	1.50	X	.500	4	DBV5004-40D4	\$179.17

*WELDON FLATS - ADDED WITHIN 48 HOURS | *CLEARANCE - ADDED WITHIN 48 HOURS

Recommended Speeds & Feeds for Variable Endmills 1 of 2

			Radial WOC up to 10% of dia.									Radial WOC 10%-30% of tool dia.							
			Feed rate, IPT (Inch per Tooth)									Feed rate, IPT (Inch per Tooth)							
Material	Hardness R/C	Starting SFM	Endmill Diameter								Starting SFM	Endmill Diameter							
Low Carbon Steel 1006, 1008, 1018, 1020, 1022, 1025, 1117, 1140, 1215, 1330	Up to 30	1400	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1300-750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0013	.003	.004	.005	.006	.007	.009	.011		.001	.0025	.0032	.004	.0047	.0055	.007	.0085
Medium Carbon and High Carbon, Steels 1030, 1040, 1050, 1060, 1085, 1095, 1541, 1551, 9255, 3135, 3415, 4130, 4140, 4150, 4320, 4520, 5015, 5120, 5140, 8620,	30-40 RC	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700-400	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0013	.003	.004	.005	.006	.007	.009	.011		.001	.0025	.0032	.004	.0047	.0055	.007	.0085
Tool Steels T1, T2, T15, A2, A7, H13, P20, S7, D2	30-44 RC	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500-300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0011	.0027	.0035	.004	.005	.006	.0078	.0087		.0009	.002	.0028	.0033	.004	.0047	.006	.007
Hardened Steels Hardened Carbon Steels and Tool steels	42-54 RC	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0007	.0016	.0023	.0027	.0034	.0046	.0055	.007		.0005	.0012	.0018	.002	.0027	.0036	.0043	.0054
	54-62 RC	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0005	.0009	.0016	.0025	.0028	.004	.0046	.006		.0004	.0007	.0012	.0018	.0022	.003	.0036	.0045
Stainless Steel 430F, 301, 303, 410, 416, 420F, 430, 430F	Up to 30 RC	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	750-450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0014	.0033	.004	.004	.0047	.007	.0092	.011		.0011	.0025	.0033	.004	.0047	.055	.007	.0085
Stainless Steel 301, 302, 303, 304, 305, 420, 15-5PH, 17-4PH, 17-7PH	Up to 30 RC	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500-300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0011	.0028	.0035	.0043	.005	.006	.007	.085		.0009	.0022	.0028	.0033	.004	.0047	.0055	.0067
Stainless Steel 302B, 304B, 309, 310, 316, 316B, 316L, 317, 317L, 321, Nitronic	Over 30 RC	450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	450-250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.011	.0023	.0028	.0037	.0042	.0055	.0065	.0085		.0009	.0018	.0022	.0029	.0033	.0044	.005	.0067
High Temp alloys Inconel, Monel, Hastelloy	Up to 42 RC	125	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	110	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0007	.0016	.0023	.0027	.0035	.0046	.0055	.007		.0005	.0012	.0018	.0022	.0027	.0036	.0043	.0055
Titanium	Up to 42 RC	375	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	375-275	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0011	.0028	.0035	.0043	.005	.006	.007	.085		.0009	.0022	.0028	.0033	.004	.0047	.0055	.0067
Gray Cast iron ASTM A48, Class 20,25,30,35, SAE J431C, Grades G1800,G3000,G3500, GG10,15,20,25,30,35,40	—	1200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1200-800	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0015	.0035	.0042	.0052	.0062	.0072	.0095	.011		.0011	.0026	.0035	.0042	.005	.0055	.0075	.0085
Ductile Cast Iron 60-40-18, 65-45-12, D40148, D4512, 32510, 35108, M3210, M4504, M5503, 2502, 300, 350, 400, 450	—	700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700-450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0015	.0035	.0042	.0052	.0062	.0072	.0095	.011		.0011	.0026	.0035	.0042	.005	.0055	.0075	.0085
Aluminum 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	Up to 3% Si	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0025	.0055	.007	.0085	.011	.014	.016	.022		.002	.0045	.0055	.0065	.0085	.0105	.0125	.0165
Cast Aluminum High Silicon A380, Castings	Over 3% Si	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1500-1200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.002	.0045	.0055	.0065	.0085	.011	.0125	.017		.0015	.0035	.0045	.0055	.007	.0085	.010	.013
Magnesium	—	1700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1700-900	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0015	.0035	.0045	.005	.007	.009	.010	.014		.001	.003	.0035	.004	.005	.007	.008	.010
Non Ferrous Copper, Brass, Bronze	Up to 30 RC	1200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1200-650	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
			.0015	.0025	.003	.004	.005	.0065	.008	.011		.001	.002	.003	.004	.005	.006	.007	.009

Recommended Speeds & Feeds for Variable Endmills 2 of 2

			Radial WOC 30%-50% of tool dia.										Slotting							
			Endmill Diameter										Endmill Diameter							
Material	Hardness R/C	Starting SFM	Feed rate, IPT (Inch per Tooth)									Starting SFM	Feed rate, IPT (Inch per Tooth)							
Low Carbon Steel 1006, 1008, 1018, 1020, 1022, 1025, 1117, 1140, 1215, 1330	Up to 30	750-450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0015	.002	.0025	.003	.0035	.005	.006		.0006	.0015	.0018	.0023	.0026	.003	.004	.005	
Medium Carbon and High Carbon, Steels 1030, 1040, 1050, 1060, 1085, 1095, 1541, 1551, 9255, 3135, 3415, 4130, 4140, 4150, 4320, 4520, 5015, 5120, 5140, 8620	30-40 RC	350-275									300									
			1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0015	.002	.0025	.003	.0035	.005	.006		.0006	.0015	.0018	.0023	.0026	.003	.004	.005	
Tool Steels T1, T2, T15, A2, A7, H13, P20, S7, D2	30-44 RC	350-250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0006	.0013	.0017	.002	.0025	.003	.004	.005		.005	.0012	.0015	.0018	.0023	.0027	.0035	.004	
Hardened Steels Hardened Carbon Steels and Tool steels	42-54 RC	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0004	.0008	.0011	.0014	.0017	.0025	.003	.004		.0003	.0007	.001	.0012	.0015	.002	.0025	.003	
	54-62 RC	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0003	.0005	.0008	.0011	.0015	.002	.0025	.003		.0002	.0004	.0007	.001	.0012	.0017	.002	.0025	
Stainless Steel 430F, 301, 303, 410, 416, 420F, 430, 430F	Up to 30 RC	425-350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0015	.002	.0025	.003	.0035	.005	.006		.0006	.0015	.0018	.0023	.0026	.003	.004	.005	
Stainless Steel 301, 302, 303, 304, 305, 420, 15-SPH, 17-4PH, 17-7PH	Up to 30 RC	200-300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	225	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0006	.0013	.0017	.002	.0025	.003	.004	.005		.0005	.0012	.0015	.0018	.0023	.0027	.0035	.004	
Stainless Steel 302B, 304B, 309, 310, 316, 316B, 316L, 317, 317L, 321, Nitronic	Over 30 RC	175-275	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0006	.0012	.0015	.0018	.002	.0027	.0032	.004		.0005	.001	.0012	.0016	.0018	.0025	.0028	.0038	
High Temp alloys Inconel, Monel, Hastelloy	Up to 42 RC	125-100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0004	.0008	.0012	.0014	.0017	.0023	.0027	.0033		.0003	.0007	.001	.0012	.0015	.002	.0025	.003	
Titanium	Up to 42 RC	375	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	150	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0006	.0013	.0017	.002	.0025	.003	.004	.005		.005	.0012	.0015	.0018	.0023	.0027	.0035	.004	
Gray Cast iron ASTM A48, Class 20,25,30,35, SAE J431C, Grades G1800,G3000,G3500, GG10,15,20,25,30,35,40	————	800-400	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	400	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0015	.002	.0025	.003	.0035	.005	.006		.0006	.0015	.0018	.0023	.0026	.003	.004	.005	
Ductile Cast Iron 60-40-18, 65-45-12, D40148, D4512, 32510, 35108, M3210, M4504, M5503, 2502, 300, 350, 400, 450	————	450-300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0015	.002	.0025	.003	.0035	.005	.006		.0006	.0015	.0018	.0023	.0026	.003	.004	.005	
Aluminum 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	Up to 3% Si	1500-1000	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1000	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0012	.0025	.0035	.004	.005	.0065	.0075	.010		.001	.0023	.003	.0035	.0045	.006	.007	.009	
Cast Aluminum High Silicon A380, Castings	Over 3% Si	1300-750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.001	.002	.0025	.003	.004	.005	.006	.008		.0008	.0018	.0023	.0028	.0036	.0046	.0055	.0075	
Magnesium	————	850-650	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0007	.0017	.002	.0025	.0035	.004	.005	.0065		.0006	.0015	.002	.0023	.003	.004	.0045	.006	
Non Ferrous Copper, Brass, Bronze	Up to 30 RC	600-450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0006	.0012	.0016	.002	.0025	.0032	.0038	.005		.0005	.001	.0015	.002	.0025	.003	.0035	.005	

Recommended Speeds & Feeds for Spot Drills

		Starting SFM	<i>Feed rate, IPR (Inch per Revolution)</i>							
Material	Hardness R/C	Starting SFM								
Low Carbon Steel 1006, 1008, 1018, 1020, 1022, 1025, 1117, 1140, 1215, 1330	Up to 30	250	1/8 .0025	1/4 .004	5/16 .005	3/8 .006	1/2 .007	5/8 .008	3/4 .010	1 .012
Medium Carbon and High Carbon, Steels 1030, 1040, 1050, 1060, 1085, 1095, 1541, 1551, 9255, 3135, 3415, 4130, 4140, 4150, 4320, 4520, 5015, 5120, 5140, 8620	30-40 RC	200	1/8 .002	1/4 .003	5/16 .004	3/8 .005	1/2 .006	5/8 .007	3/4 .009	1 .011
Tool Steels T1, T2, T15, A2, A7, H13, P20, S7, D2	30-44 RC	150	1/8 .0015	1/4 .0025	5/16 .003	3/8 .004	1/2 .0045	5/8 .005	3/4 .006	1 .008
Hardened Steels Hardened Carbon Steels and Tool steels	42-54 RC	75	1/8 .001	1/4 .002	5/16 .0025	3/8 .003	1/2 .004	5/8 .005	3/4 .006	1 .007
Stainless Steel 430F, 301, 303, 410, 416, 420F, 430, 430F	Up to 30 RC	125	1/8 .0025	1/4 .004	5/16 .005	3/8 .006	1/2 .007	5/8 .008	3/4 .010	1 .012
Stainless Steel 301, 302, 303, 304, 305, 420, 15-5PH, 17-4PH, 17-7PH	Up to 30 RC	100	1/8 .002	1/4 .003	5/16 .004	3/8 .005	1/2 .006	5/8 .007	3/4 .009	1 .010
Stainless Steel 302B, 304B, 309, 310, 316, 316B, 316L, 317, 317L, 321, Nitronic	Over 30 RC	85	1/8 .002	1/4 .003	5/16 .004	3/8 .005	1/2 .006	5/8 .007	3/4 .009	1 .010
High Temp alloys Inconel, Monel, Hastelloy	Up to 42 RC	50	1/8 .001	1/4 .002	5/16 .003	3/8 .004	1/2 .0045	5/8 .005	3/4 .0065	1 .008
Titanium	Up to 42 RC	65	1/8 .002	1/4 .003	5/16 .0035	3/8 .0045	1/2 .005	5/8 .006	3/4 .0075	1 .009
Gray Cast iron ASTM A48, Class 20,25,30,35, SAE J431C, Grades G1800,G3000,G3500, GG10,15,20,25,30,35,40	———	325	1/8 .0025	1/4 .004	5/16 .005	3/8 .0055	1/2 .0065	5/8 .008	3/4 .010	1 .0125
Ductile Cast Iron 60-40-18, 65-45-12, D40148, D4512, 32510, 35108, M3210, M4504, M5503, 2502, 300, 350, 400, 450	———	250	1/8 .002	1/4 .0035	5/16 .004	3/8 .005	1/2 .006	5/8 .007	3/4 .009	1 .011
Aluminum 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	Up to 3% Si	750	1/8 .005	1/4 .008	5/16 .009	3/8 .011	1/2 .012	5/8 .016	3/4 .020	1 .025
Cast Aluminum High Silicon A380, Castings	Over 3% Si	500	1/8 .004	1/4 .006	5/16 .008	3/8 .010	1/2 .011	5/8 .013	3/4 .016	1 .020
Magnesium	———	600	1/8 .003	1/4 .005	5/16 .006	3/8 .007	1/2 .008	5/8 .009	3/4 .011	1 .014
Non Ferrous Copper, Brass, Bronze	Up to 30 RC	450	1/8 .003	1/4 .005	5/16 .006	3/8 .007	1/2 .008	5/8 .010	3/4 .012	1 .016

Recommended Speeds & Feeds for Drill Mills

		Milling									Chamfering										
		Feed rate, IPT (Inch per Tooth)									Feed rate, IPT (Inch per Tooth)										
Material	Hardness R/C	Starting SFM	Drill Mill Diameter									Starting SFM	Drill Mill Diameter								
Low Carbon Steel 1006, 1008, 1018, 1020, 1022, 1025, 1117, 1140, 1215, 1330	Up to 30	450	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.0018	.0023	.0026	.003	.004	.005		.0006	.0013	.0015	.0018	.0025	.0031	.004	.0052		
Medium Carbon and High Carbon, Steels 1030, 1040, 1050, 1060, 1085, 1095, 1541, 1551, 9255, 3135, 3415, 4130, 4140, 4150, 4320, 4520, 5015, 5120, 5140, 8620	30-40 RC	300									350										
			1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.0018	.0023	.0026	.003	.004	.005		.0005	.0011	.0014	.0017	.0023	.0028	.0034	.0045		
Tool Steels T1, T2, T15, A2, A7, H13, P20, S7, D2	30-44 RC	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0005	.0012	.0015	.0018	.0023	.0027	.0035	.004		.0006	.0013	.0015	.002	.0025	.003	.004	.005		
Stainless Steel 430F, 301, 303, 410, 416, 420F, 430, 430F	Up to 30 RC	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.0018	.0023	.0026	.003	.004	.005		.0006	.0011	.0016	.0021	.0028	.0033	.0041	.0055		
Stainless Steel 301, 302, 303, 304, 305, 420, 15-5PH, 17-4PH, 17-7PH	Up to 30 RC	225	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0005	.0012	.0015	.0018	.0023	.0027	.0035	.004		.0002	.0007	.001	.0012	.0016	.002	.0024	.003		
Stainless Steel 302B, 304B, 309, 310, 316, 316B, 316L, 317, 317L, 321, Nitronic	Over 30 RC	200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0005	.001	.0012	.0016	.0018	.0025	.0028	.0038		.0006	.0012	.0016	.0019	.0025	.003	.0037	.0048		
Gray Cast Iron ASTM A48, Class 20,25,30,35, SAE J431C, Grades G1800,G3000,G3500, GG10,15,20,25,30,35,40	————	400	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	900	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.0018	.0023	.0026	.003	.004	.005		.0012	.0025	.003	.0035	.005	.006	.007	.009		
Ductile Cast Iron 60-40-18, 65-45-12, D40148, D4512, 32510, 35108, M3210, M4504, M5503, 2502, 300, 350, 400, 450	————	300	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	600	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.0018	.0023	.0026	.003	.004	.005		.001	.002	.0025	.003	.004	.005	.0065	.0075		
Aluminum 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	Up to 3% Si	1000	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1000	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.001	.0023	.003	.0035	.0045	.006	.007	.009		.0012	.0025	.003	.0035	.005	.006	.007	.009		
Cast Aluminum High Silicon A380, Castings	Over 3% Si	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0008	.0018	.0023	.0028	.0036	.0046	.0055	.0075		.0014	.0028	.0035	.0042	.0055	.007	.0085	.011		
Magnesium	————	700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0006	.0015	.002	.0023	.003	.004	.0045	.006		.0012	.0025	.003	.0035	.0045	.006	.007	.0095		
Non Ferrous Copper, Brass, Bronze	Up to 30 RC	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		
			.0005	.001	.0015	.002	.0025	.003	.0035	.005		.001	.002	.0025	.003	.004	.005	.006	.007		

** Use OD of tool for all speed and feed calculations.

** If milling axial DOC exceeds .5 x dia, reduce IPT or radial DOC by 50%.

** Drilling - use milling IPT. Please note feed is listed as inches per tooth, not inches per rev.

** Calculate all drilling with 2 flutes. Even the 4 flute style since only 2 flutes are effective when drilling.

** Please note speeds and feeds are approximate values and can vary greatly depending on cutting situations.

Recommended Speeds & Feeds for Carbide Chamfer Mills

			Parameters for Edge break up to 20% of tool dia.								Parameters for chamfer larger than 20% of tool dia.									
			Starting SFM	Chamfer Mill Diameter								Starting SFM	Chamfer Mill Diameter							
				Feed rate, IPT (Inch per Tooth)									Feed rate, IPT (Inch per Tooth)							
Material	Hardness	R/C																		
Low Carbon Steel 1006, 1008, 1018, 1020, 1022, 1025, 1117, 1140, 1215, 1330	Up to 30		650	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	600-500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.001	.0017	.002	.0025	.0035	.0042	.005	.007		.0006	.0013	.0015	.0018	.0025	.0031	.004	.0052
Medium Carbon and High Carbon, Steels 1030, 1040, 1050, 1060, 1085, 1095, 1541, 1551, 9255, 3135, 3415, 4130, 4140, 4150, 4320, 4520, 5015, 5120, 5140, 8620	30-40 RC		450									400-300								
				1/8	1/4	5/16	3/8	1/2	5/8	3/4	1		1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0007	.0015	.0018	.0023	.0031	.0037	.0045	.006		.0005	.0011	.0014	.0017	.0023	.0028	.0034	.0045
Tool Steels T1, T2, T15, A2, A7, H13, P20, S7, D2	30-44 RC		350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	300-200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0008	.0015	.002	.0025	.0032	.004	.005	.0065		.0006	.0013	.0015	.002	.0025	.003	.004	.005
Hardened Steels Hardened Carbon Steels and Tool steels	42-54 RC		200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	150-100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0005	.0011	.0016	.0021	.0027	.0034	.0042	.005		.0003	.0008	.0012	.0017	.0022	.003	.0038	.0045
	54-62 RC		150	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	150-100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0004	.0008	.0011	.0016	.002	.0025	.003	.0035									
Stainless Steel 430F, 301, 303, 410, 416, 420F, 430, 430F	Up to 30 RC		500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	450-350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0008	.0015	.002	.0025	.0032	.004	.005	.0065		.0006	.0011	.0016	.0021	.0028	.0033	.0041	.0055
Stainless Steel 301, 302, 303, 304, 305, 420, 15-5PH, 17-4PH, 17-7PH	Up to 30 RC		250	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	200-150	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
				.0005	.001	.0012	.0015	.002	.0025	.003	.0035		.0002	.0007	.001	.0012	.0016	.002	.0024	.003
Stainless Steel 302B, 304B, 309, 310, 316, 316B, 316L, 317, 317L, 321, Nitronic	Over 30 RC	350	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	300-200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0008	.0015	.002	.0025	.003	.0036	.0043	.006		.0006	.0012	.0016	.0019	.0025	.003	.0037	.0048	
High Temp alloys Inconel, Monel, Hastelloy	Up to 42 RC	75	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	50	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0004	.0009	.001	.0014	.0018	.0023	.0027	.0036		.0002	.0005	.0007	.0009	.0011	.0014	.0017	.0023	
Titanium	Up to 42 RC	150	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	125-100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0005	.0009	.0012	.0015	.002	.0025	.003	.0038		.0003	.0006	.0008	.0009	.0012	.0015	.0018	.0025	
Gray Cast iron ASTM A48, Class 20,25,30,35, SAE J431C, Grades G1800,G3000,G3500, GG10,15,20,25,30,35,40	—	1200	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1100-900	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.002	.004	.005	.006	.0075	.0095	.012	.015		.0012	.0025	.003	.0035	.005	.006	.007	.009	
Ductile Cast Iron 60-40-18, 65-45-12, D40148, D4512, 32510, 35108, M3210, M4504, M5503, 2502, 300, 350, 400, 450	—	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700-500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0015	.0035	.0042	.0052	.0062	.0072	.0095	.011		.001	.002	.0025	.003	.004	.005	.0065	.0075	
Aluminum 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	Up to 3% Si	1100	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1000	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.002	.004	.005	.006	.0075	.0095	.012	.015		.0012	.0025	.003	.0035	.005	.006	.007	.009	
Cast Aluminum High Silicon A380, Castings	Over 3% Si	750	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	700	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0018	.0035	.0043	.0052	.007	.0085	.010	.0135		.0014	.0028	.0035	.0042	.0055	.007	.0085	.011	
Magnesium	—	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	1500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.002	.004	.005	.0055	.0075	.0095	.011	.015		.0012	.0025	.003	.0035	.0045	.006	.007	.0095	
Non Ferrous Copper, Brass, Bronze	Up to 30 RC	600	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	500	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1	
			.0015	.003	.004	.0045	.006	.0075	.009	.012		.001	.002	.0025	.003	.004	.005	.006	.007	

TROUBLESHOOTING AND MILLING STRATEGIES

Surface finish quality

If surface finish quality is sub-par or does not meet specifications

- Review/improve workpiece holding and tool holding
- Reduce feed rate (IPM)
- Increase cutting speed (RPM)
- Review tool selection / switch to tool better suited for finish requirements

Vibration

Excessive tool wear, poor surface finish, loud audible tool noise, and poor dimensional accuracy

- Review/improve workpiece holding and tool holding
- Increase feed rate (IPM)
- Decrease cutting speed (RPM)
- Review milling strategy.
ie: Climb vs conventional milling, or WOC / DOC
- Review tool selection.
ie: Number of teeth, helix angle, etc.

Chip congestion / Tool breakage

Insufficient chip evacuation, chipping on cutting edges, or edge build-up resulting in poor tool life or breakage

- Review delivery method of coolant / air
- Increase / adjust coolant flow
- Reduce feed rate (IPM)
- Review tool selection.
ie: Number of teeth, helix angle, etc.

Feed rate adjustments for extended DOC

When extended DOC is used, adjustment of the feed rate may be necessary to avoid deflection, chatter, and poor surface finish

- if DOC = 1xD, use feed rate per recommended values
- if DOC = 2xD, reduce feed rate 50%
- if DOC = 3xD, reduce feed rate 75%
- Cutting speed (SFM) can remain unchanged up to DOC of 3xD

Feed rate adjustments for Ramping & Plunging

Feed rates should be adjusted for ramping and plunging applications

- On a 90 degree vertical plunge with center cutting endmill reduce feed rate 70%
- Ramping with ramp angles 1-15 degrees , use normal recommended feed rates
- Ramping with angles from 15-30 degrees, reduce feed rate by 30%
- Helical plunging reduce feed rate by 15% with .100-.200 DOC per revolution

Entry in Hard Material

Feed rates should be adjusted into material over 44 RC

- Arcing into the cut is always recommended if possible
- When arc entry is not possible, see recommendation for feed reduction below:
 - When WOC is 1xD, reduce feed 50% until tool is engaged
 - When WOC is .5xD, reduce feed 30% until tool is engaged
 - When WOC is .25xD, reduce feed 20% until tool is engaged

CONVERSIONS

Inch

SFM	Surface Feet per Minute	$SFM = RPM \times D / 3.82$
RPM	Revolutions Per Minute	$RPM = 3.82 \times SFM / DIA$
IPT	Inches Per Tooth	$IPT = IPM / (Z \times RPM)$
IPM	Inches Per Minute	$IPM = IPT \times Z \times RPM$
CIM	Cubic Inches per Minute	$CIM = Feed \times WOC \times DOC$

D = Tool Diameter Z = Number of flutes
WOC = Width Of Cut DOC = Depth Of Cut

Metric

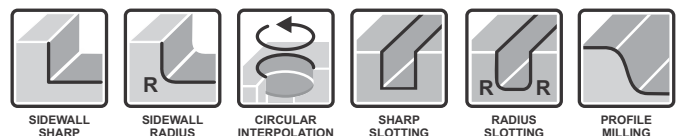
Vc	Surface Meters per minute	$Vc = 3.1416 \times D \times n / 1000$
n	Revolutions per minute	$n = Vc \times 1000 / 3.1416 \times D$
fz	Feed per tooth	$fz = vf / n \times z$
Vf	Millimeters per minute	$vf = (n) \times (z) \times (fz)$

D = Tool Diameter (mm) Z = Number of flutes

Conversion Formulas

Inch to mm	Inch number x 25.4
mm to Inch	mm number x .03937

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