

PRO-BALL™

MILLING PRODUCTS

Cutter Styles:
Modular ChipSurfer
Modular Top-On
Weldon Straight
Weldon w/Flange
Weldon Taper

Insert Series
Ball Insert
NKET, NCET, NNET, NDET
Side Station Insert
DGM

Insert Grades:
IN2005
IN2030
IN05S

Application:
Die & Mold, Aerospace &
General Purpose



Tried and True Contouring Performance!

The Pro-Ball line has been expanded to include new cutter body offerings for increased application range! This roughing and semi-roughing ball nose line is well engineered, packed with great features and benefits! The Pro-Ball has a well-established performance history as an efficient contour milling indexable ball nose. The inserts have positive rake face geometry and are extremely free cutting. Larger cutter diameter inserts benefit from a chip splitter edge preparation that significantly helps to reduce cutting forces in aggressive rough milling applications. Proven contour milling performance, increased productivity, expanded milling options...Pro-Ball! Test one today!

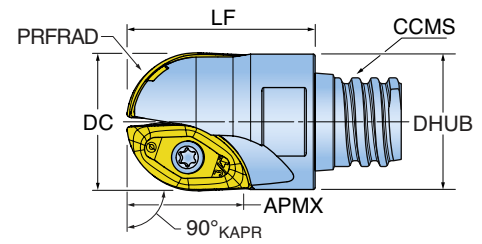
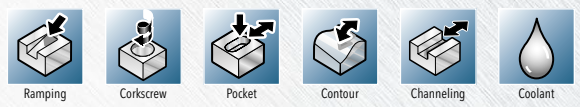
Features & Benefits:

- Aggressive roughing ball nose with exceptional free shearing insert design
- Diameter range from Ø.500 to Ø2.000
- Serrated chip splitters reduce cutting forces in larger diameter sizes
- Stable contour roughing performance
- Single-sided insert with 2 cutting edges provides economy
- Modular, weldon, weldon flange and weldon taper style cutters
- Coolant through cutter bodies



PROBALL™ SERIES 1BW

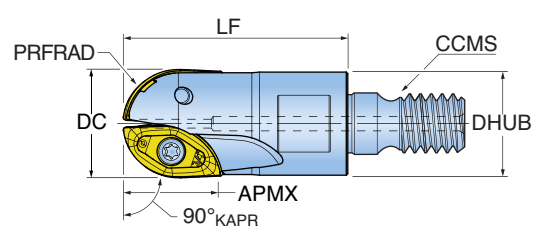
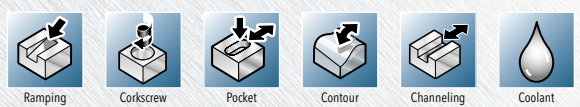
BALL NOSE END MILL - MODULAR CHIPSURFER STYLE



Part Number	DC Cutting Dia.	APMX Max. Depth of Cut	LF Functional Length	ZEFF Effective Teeth	PRFRAD Profile Radius	DHUB Hub Diameter	CCMS Connection Style	CSP Coolant
1BW7T-05007T8R01	0.500	0.250	0.75	2	0.250	0.485	Chip SurferT08	Yes
1BW7V-07010TSR01	0.750	0.375	1.00	2	0.375	0.725	Chip SurferT12	Yes
NEW 1BW7W-10012TUR01	1.000	0.500	1.25	2	0.500	0.945	Chip SurferT15	Yes

PROBALL™ SERIES 1BW

BALL NOSE END MILL - MODULAR TOP-ON STYLE

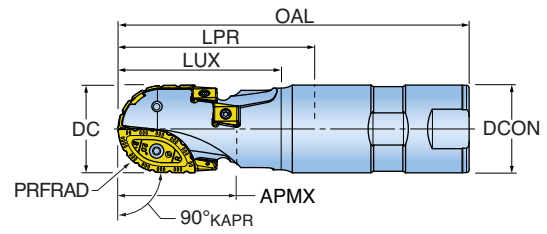
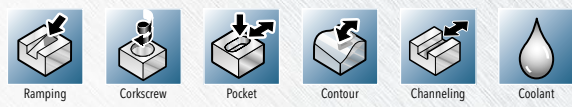


Part Number	DC Cutting Dia.	APMX Max. Depth of Cut	LF Functional Length	ZEFF Effective Teeth	PRFRAD Profile Radius	DHUB Hub Diameter	CCMS Connection Style	CSP Coolant
1BW7T-05010X5R01	0.500	0.250	1.00	2	0.250	0.502	TopOn M08	No
1BW7V-07015X6R01	0.750	0.375	1.50	2	0.375	0.699	TopOn M10	Yes
1BW7W-10015X7R01	1.000	0.500	1.50	2	0.500	0.817	TopOn M12	Yes
NEW 1BW7X-12023X8R01	1.250	0.625	2.37	2	0.625	1.132	TopOn M16	Yes
NEW 1BW3Z-15027X8R01	1.500	0.750	2.75	2	0.750	1.132	TopOn M16	Yes
NEW 1BW3Y-20026X9R01	2.000	1.000	2.60	2	1.000	1.417	TopOn M20	Yes



PROBALL™ SERIES 1BW7/2BW3

BALL NOSE END MILL - WELDON

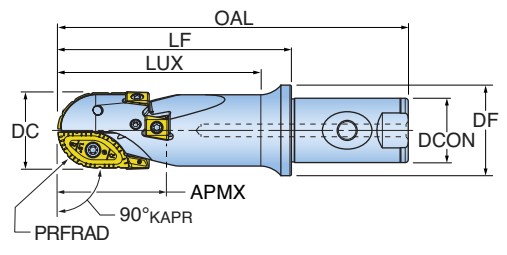


Part Number	DC Cutting Dia.	APMX Max. Depth of Cut	LUX Maximum Usable Length	LPR Projection Length	OAL Overall Length	ZEFF Effective Teeth	PRFRAD Profile Radius	DCON Connection Style	CSP Coolant
1BW7T-0501778R01	0.500	0.250	1.50	1.720	3.50	2	0.250	Weldon .500"	Yes
1BW7V-0701584R01	0.750	0.375	1.34	1.500	3.50	2	0.375	Weldon .750"	Yes
1BW7V-0704084R01	0.750	0.375	2.09	2.250	6.00	2	0.375	Weldon .750"	Yes
1BW7W-1001580R01	1.000	0.500	1.31	1.500	3.75	2	0.500	Weldon 1.000"	Yes
1BW7W-10037E1R01	1.000	0.500	3.56	3.750	6.75	2	0.500	Weldon 1.000"	Yes
NEW 1BW7X-12035E2R01	1.250	0.625	3.35	3.500	6.50	2	0.625	Weldon 1.250"	Yes
NEW 1BW7X-12050E2R01	1.250	0.625	4.85	5.000	8.00	2	0.625	Weldon 1.250"	Yes
NEW 2BW3Z-15033E3R01	1.500	2.100	3.16	3.340	6.75	2	0.750	Weldon 1.500"	Yes
NEW 2BW3Z-15050E3R01	1.500	2.100	4.91	5.090	8.50	2	0.750	Weldon 1.500"	Yes
2BW3Y-20040E4R01	2.000	2.700	3.72	4.000	8.00	2	1.000	Weldon 2.000"	Yes
2BW3Y-20070E4R01	2.000	2.700	6.72	7.000	11.00	2	1.000	Weldon 2.000"	Yes



PROBALL™ SERIES 1BW7/2BW3

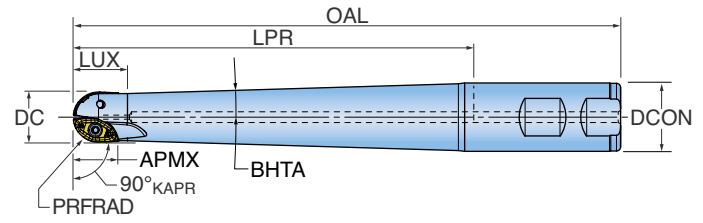
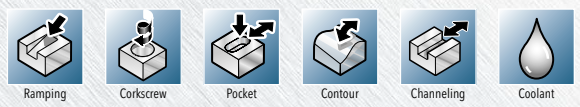
BALL NOSE END MILL - FLANGE STYLE



Part Number	DC Cutting Dia.	APMX Max. Depth of Cut	LUX Max. Usable Length	LF Functional Length	OAL Overall Length	DF Flange Dia.	ZEFF Effective Teeth	PRFRAD Profile Radius	DCON Connection Style	CSP Coolant
1BW7X-1202781R01	1.250	0.625	2.25	2.75	5.00	1.75	2	0.625	Weldon 1.250"	Yes
1BW7X-1205781R01	1.250	0.625	5.25	5.75	8.00	2.00	2	0.625	Weldon 1.250"	Yes
2BW3Z-1504581R01	1.500	2.100	3.91	4.50	6.75	1.75	2	0.750	Weldon 1.250"	Yes
2BW3Z-1506086R01	1.500	2.100	5.30	6.00	8.31	2.00	2	0.750	Weldon 1.500"	Yes

PROBALL™ SERIES 1BW8

BALL NOSE END MILL - TAPER STYLE

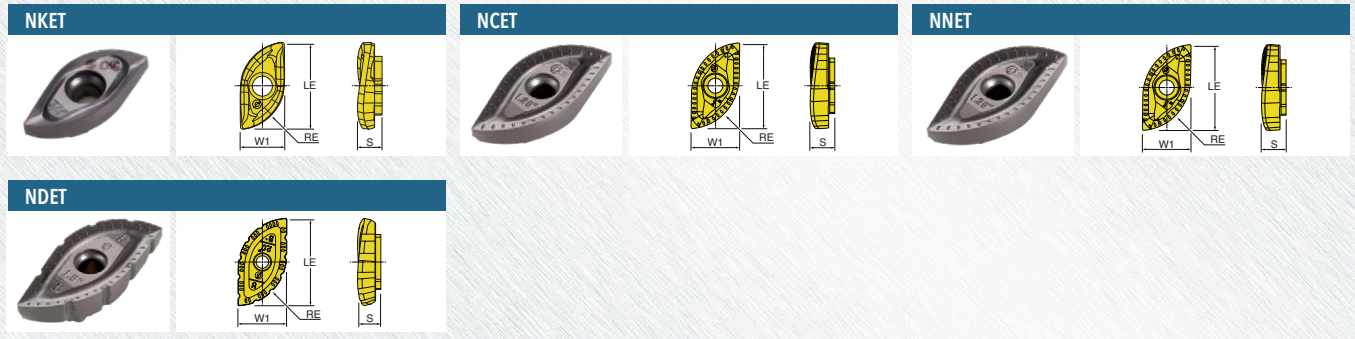


Part Number	DC Cutting Dia.	APMX Max. Depth of Cut	LUX Maximum Usable Length	LPR Projection Length	OAL Overall Length	BHTA Body Half Taper Angle	ZEFF Effective Teeth	PRFRAD Profile Radius	DCON Connection Style	CSP Coolant
1BW8T-0504584R01	0.500	0.250	0.52	4.500	6.50	2°	2	0.250	Weldon .750"	Yes
1BW8V-0705780R01	0.750	0.375	0.79	5.750	8.00	1.7°	2	0.375	Weldon 1.000"	Yes
1BW8W-1008581R01	1.000	0.500	1.10	6.250	8.50	1.6°	2	0.500	Weldon 1.250"	Yes

NEW



PROBALL™ BALL NOSE INSERTS



Part Number	Application	RE Corner Radius	LE Edge Length	W1 Width	S Thickness	NOI Number of Indexes	IH Insert Hand	Grade	IN2005	IN2030	IN055
NKET120200R	Multi-Purpose	0.250	0.462	0.236	0.126	2	Right		•	•	
NKET180300R	Multi-Purpose	0.375	0.654	0.359	0.189	2	Right		•		
NCET250400R	Multi-Purpose	0.500	0.858	0.471	0.243	2	Right		•	•	•
NNET310500R	Multi-Purpose	0.625	1.102	0.594	0.275	2	Right		•		
NDET380700R	Multi-Purpose - Chip Breaker	0.750	1.384	0.706	0.369	2	Right		•		
NDET500800R	Multi-Purpose - Chip Breaker	1.000	1.758	0.986	0.463	2	Right		•		



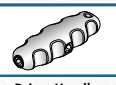



PROBALL™ 2BW3Y, 2BW3Z - SIDE STATION INSERTS



Cutter Series	Part Number	Application	RE Corner Radius	INSL Edge Length	W1 Width	S1 Thickness	Number of Inserts	NOI Number of Indexes	IH Insert Hand	Grade	IN4005	IN2505	IN2005
2BW3Z	DGM314R001	Multi-Purpose	0.031	0.450	0.395	0.280	4	4	Right		•	•	•
2BW3Y	DGM324R001	Multi-Purpose	0.031	0.571	0.451	0.313	4	4	Right		•	•	•



PROBALL™ HARDWARE

Cutter Style	Part Number						
		Insert Screw (Ball)	Insert Screw (Side)	Driver Handle	Driver Bit	Driver	Wrench (optional)
Chip surfer	1BW7T-05007T8R01	SM25-052-80				DS-0038	
Chip surfer	1BW7V-07010TSR01	SM30-080-10				DS-0022	
Chip surfer	1BW7W-10012TUR01	SM35-110-00		DS-A00T	BLD T15/S7		
Top-On	1BW7T-05010X5R01	SM25-052-80				DS-0038	610mm
Top-On	1BW7V-07015X6R01	SM30-080-10				DS-0022	615mm
Top-On	1BW7W-10015X7R01	SM35-110-00		DS-A00T	BLD T15/S7		617mm
Top-On	1BW7X-12023X8R01	SM40-120-20		DS-A00T	BLD T15/S7		622mm
Top-On	1BW3Z-15027X8R01	SM50-160-10		DS-A00T	BLD T20/S7		622mm
Top-On	1BW3Y-20026X9R01	SM60-180-00		DS-A00T	BLD T25/S7		630mm
Weldon Straight	1BW7T-0501778R01	SM25-052-80				DS-0038	
Weldon Straight	1BW7V-0701584R01	SM30-080-10				DS-0022	
Weldon Straight	1BW7V-0704084R01	SM30-080-10				DS-0022	
Weldon Straight	1BW7W-1001580R01	SM35-110-00		DS-A00T	BLD T15/S7		
Weldon Straight	1BW7W-10037E1R01	SM35-110-00		DS-A00T	BLD T15/S7		
Weldon Straight	1BW7X-12035E2R01	SM40-120-20		DS-A00T	BLD T15/S7		
Weldon Straight	1BW7X-12050E2R01	SM40-120-20		DS-A00T	BLD T15/S7		
Weldon Straight	2BW3Z-15033E3R01	SM50-160-10	SM35-110-00	DS-A00T	BLD T20/S7 BLD T15/S7		
Weldon Straight	2BW3Z-15050E3R01	SM50-160-10	SM35-110-00	DS-A00T	BLD T20/S7 BLD T15/S7		
Weldon Straight	2BW3Y-20040E4R01	SM60-180-00	SM40-140-00	DS-A00T	BLD T25/S7 BLD T15/S7		
Weldon Straight	2BW3Y-20070E4R01	SM60-180-00	SM40-140-00	DS-A00T	BLD T25/S7 BLD T15/S7		
Weldon Flange	1BW7X-1202781R01	SM40-120-20		DS-A00T	BLD T15/S7		
Weldon Flange	1BW7X-1205781R01	SM40-120-20		DS-A00T	BLD T15/S7		
Weldon Flange	2BW3Z-1504581R01	SM50-160-10	SM35-110-00	DS-A00T	BLD T20/S7 BLD T15/S7		
Weldon Flange	2BW3Z-1506086R01	SM50-160-10	SM35-110-00	DS-A00T	BLD T20/S7 BLD T15/S7		
Weldon Taper	1BW8T-0504584R01	SM25-052-80				DS-0038	
Weldon Taper	1BW8V-0705780R01	SM30-080-10				DS-0022	
Weldon Taper	1BW8W-1008581R01	SM35-110-00		DS-A00T	BLD T15/S7		



PROBALL™ BALL NOSE INSERTS

ISO	Materials			V _c Cutting Speed SFM	f _z Feed/Tooth (inch)	Harder <-----> Tougher			Coolant
	Mat'l Group #VDI 3323	Type	Examples			IN2005	IN2030	IN055	
P	1 thru 5	Non-alloy Steel	1018, A36, 1045, A572, 1070	600-1200	.005 - .035	1	-	-	NO
	6 thru 9	Low-alloy Steel	4140, 4340, P20, 8620, 300M	350-750	.005 - .035	1	-	-	
	10, 11	High-alloy Steel	H13, A2, D2, M2, T1	300-650	.005 - .035	1	-	-	
M	12 thru 13	Stainless Steel (Ferritic & Martensitic)	410, 416, 440	350 - 600	.003 - .030	2	1	-	YES
	14	Stainless Steel (Austenitic)	303, 304, 316, 15-5, 17-4	300 - 500	.003 - .030	2	1	-	
K	15 thru 16	Gray Cast Iron	CLS. 20, 30, 45	500-1000	.005 - .035	1	-	-	NO
	17 thru 20	Nodular Cast Iron	60-40-18, 100-70-03	400-800	.005 - .035	1	-	-	
N	21 thru 30	Aluminum	7075, 6061	500 -1250	.005 - .030	2	-	1	YES
S	31 thru 35	High-Temp Alloys	Inconel, Hastelloy, Nimonic, Monel	60-110	.003 - .020	2	1	-	YES
	36 thru 37	Titanium Alloys	6AL-4V, 5Al-5Mo-5V-3Cr	70-140	.003 - .020	2	1	-	
H	38 thru 39	Hardened Steel >48	A2, 01, D2	160 -350	.005 - .020	1	-	-	NO

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