



Ball Nose / Back Draft

Single-Sided Insert Platform IM-119

Cutter Bodies IM-121

RDBN Insert Series IM-127

HBN Insert Series IM-128

BNR Insert Series IM-129

BDR Insert Series IM-131

FBR Insert Series IM-132

HFBD Insert Series IM-133

Double-Sided Insert Platform IM-141

Cutter Bodies IM-143

SBN Insert Series IM-147

SBD Insert Series IM-148



Ball Nose / Back Draft

Single-Sided Insert Platform

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for technical reference &
application information

SINGLE-SIDED BALL NOSE / BACK DRAFT INSERT PLATFORM

Cutter Bodies	IM-121	BDR Insert Series	IM-131
RDBN Insert Series	IM-127	FBR Insert Series	IM-132
HBN Insert Series	IM-128	HFBD Insert Series	IM-133
BNR Insert Series	IM-129		

Large variety of inserts and cutter bodies that achieve high-level surface finishes on a wide range of materials.

- Tool performance that reduces or eliminates costly bench work.
- Periphery-ground inserts to achieve closer tolerances and less runout.
- Cutter bodies ensure close-tolerance finishing capabilities.

CUTTER BODIES



END MILLS

Steel / Carbide Core / Solid Carbide

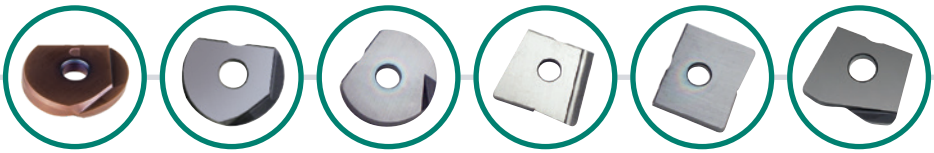
Standard / Oversized / Undersized



MODULAR HEADS

Steel

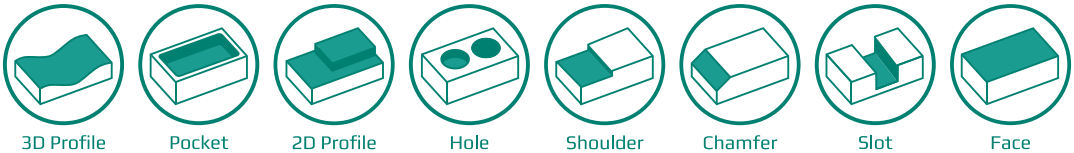
INSERTS



RDBN HBN BNR BDR FBR HFBD



Steel Stainless Iron Super Alloys Hardened Non-Ferrous

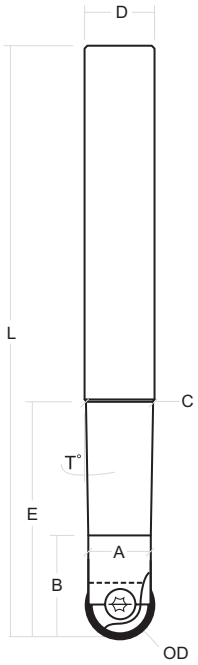


3D Profile Pocket 2D Profile Hole Shoulder Chamfer Slot Face

Standard Shank Cutter Bodies

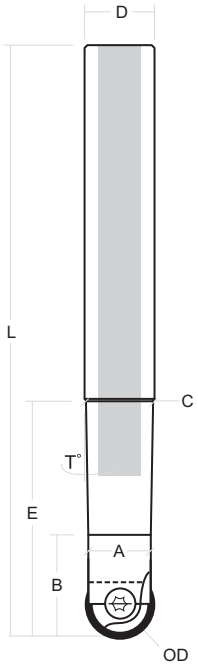
Steel Ball Nose End Mills – Standard Shank

EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40095	0.375”	10mm	BNEM-0375-3950-SS	0.335”	0.625”	0.365”	0.375”	1.500”	0.516°	3.950”
40100	0.500”	12mm	BNEM-0500-3500-SS	0.413”	0.750”	0.490”	0.500”	1.250”	4.400°	3.500”
40110	0.500”	12mm	BNEM-0500-5250-SS	0.413”	0.750”	0.490”	0.500”	2.000”	1.775°	5.250”
40120	0.500”	12mm	BNEM-0500-6000-SS	0.413”	0.750”	0.490”	0.500”	2.500”	1.000°	6.000”
40270	0.500”	12mm	SE-BNEM-0500-7000-SS	0.413”	0.750”	0.490”	0.500”	1.210”	4.400°	7.000”
41250	0.500”	12mm	BNEM-0500-7000-12MM-SS	0.413"	0.750"	Straight	12mm	0.750”	N/A	7.000"
40130	0.625”	16mm	BNEM-0625-5500-SS	0.547”	0.750”	0.615”	0.625”	1.380”	3.090°	5.500”
40140	0.625”	16mm	BNEM-0625-6250-SS	0.547”	0.750”	0.615”	0.625”	2.500”	1.088°	6.250”
40280	0.625”	16mm	SE-BNEM-0625-7000-SS	0.547”	0.750”	0.615”	0.625”	1.340”	3.100°	7.000”
40150	0.750”	20mm	BNEM-0750-4500-SS	0.670”	1.000”	0.740”	0.750”	1.750”	2.690°	4.500”
40160	0.750”	20mm	BNEM-0750-7000-SS	0.670”	1.000”	0.740”	0.750”	3.000”	1.030°	7.000”
40170	0.750”	20mm	BNEM-0750-8250-SS	0.670”	1.000”	0.740”	0.750”	4.500”	0.573°	8.250”
40290	0.750”	20mm	SE-BNEM-0750-9000-SS	0.670”	1.000”	0.740”	0.750”	1.710”	2.700°	9.000”
41260	0.750”	20mm	BNEM-0750-10000-18MM-SS	0.670"	1.000"	Straight	18mm	1.000”	N/A	10.000"
40180	1.000”	25mm	BNEM-1000-6250-SS	0.860”	1.500”	0.990”	1.000”	2.000”	7.400°	6.250”
40190	1.000”	25mm	BNEM-1000-7500-SS	0.860”	1.500”	0.990”	1.000”	3.750”	1.660°	7.500”
40200	1.000”	25mm	BNEM-1000-9000-SS	0.860”	1.500”	0.990”	1.000”	5.000”	1.088°	9.000”
41270	1.000"	25mm	BNEM-1000-10000-25MM-SS	0.860"	1.500"	Straight	25mm	1.500”	N/A	10.000"
40300	1.000”	25mm	SE-BNEM-1000-10000-SS	0.860”	1.500”	0.990”	1.000”	1.940”	7.400°	10.000”
40210	1.250”	30mm / 32mm	BNEM-1250-7000-SS	1.070”	1.750”	1.240”	1.250”	2.500”	6.447°	7.000”
40220	1.250”	30mm / 32mm	BNEM-1250-9000-SS	1.070”	1.750”	1.240”	1.250”	4.500”	1.775°	9.000”



Carbide Core Ball Nose End Mills – Standard Shank

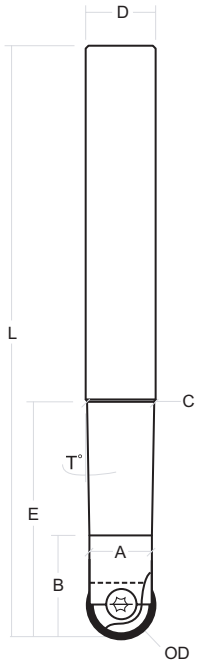
EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40570	0.750”	20mm	CC-BNEM-0750-7000-SS	0.670”	1.000”	0.740”	0.750”	3.000”	1.031°	7.000”
40580	0.750”	20mm	CC-BNEM-0750-8250-SS	0.670”	1.000”	0.740”	0.750”	4.500”	0.573°	8.250”
40590	1.000”	25mm	CC-BNEM-1000-6250-SS	0.860”	1.500”	0.990”	1.000”	2.000”	7.400°	6.250”
40600	1.000”	25mm	CC-BNEM-1000-7500-SS	0.860”	1.500”	0.990”	1.000”	3.750”	1.661°	7.500”
40610	1.000”	25mm	CC-BNEM-1000-9000-SS	0.860”	1.500”	0.990”	1.000”	5.000”	1.088°	9.000”
40620	1.250”	30mm / 32mm	CC-BNEM-1250-7000-SS	1.070”	1.750”	1.240”	1.250”	2.500”	6.447°	7.000”



Oversized Shank Cutter Bodies

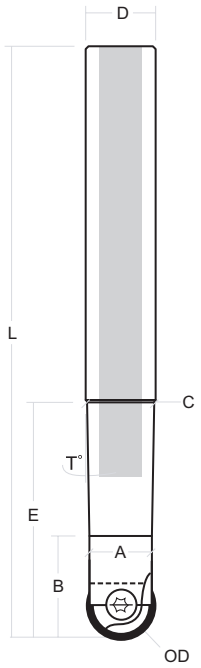
Steel Ball Nose End Mills – Oversized Shank

EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40000	0.313”	8mm	BNEM-0313-5500-OS	0.280”	0.625”	0.415”	0.500”	1.910”	3.000°	5.500”
40010	0.375”	10mm	BNEM-0375-3500-OS	0.335”	0.625”	0.365”	0.500”	1.340”	1.200°	3.500”
40020	0.375”	10mm	BNEM-0375-6000-OS	0.335”	0.625”	0.365”	0.500”	1.880”	0.688°	6.000”
40230	0.375”	10mm	SE-BNEM-0375-6000-OS	Tapered	N/A	N/A	0.500”	1.380”	3.000°	5.880”
40030	0.500”	12mm	BNEM-0500-6000-OS	0.414”	0.750”	0.490”	0.625”	2.500”	1.260°	6.000”
40240	0.500”	12mm	SE-BNEM-0500-6000-OS	Tapered	N/A	N/A	0.625”	2.310”	3.000°	6.000”
40040	0.625”	16mm	BNEM-0625-7000-OS	0.547”	0.750”	0.615”	0.750”	3.130”	0.802°	7.000”
40050	0.750”	20mm	BNEM-0750-7500-OS	0.670”	1.000”	0.740”	1.000”	3.500”	0.802°	7.500”
40250	0.750”	20mm	SE-BNEM-0750-9500-OS	Tapered	N/A	N/A	1.000”	3.000”	3.000°	9.500”
40070	1.000”	25mm	BNEM-1000-8250-OS	0.860”	1.500”	0.990”	1.250”	4.500”	1.260°	8.250”
40260	1.000”	25mm	SE-BNEM-1000-9500-OS	Tapered	N/A	N/A	1.250”	3.880”	3.000°	9.500”
40080	1.000”	25mm	BNEM-1000-10000-OS	0.860”	1.500”	0.990”	1.250”	4.500”	0.022°	10.000”



Carbide Core Ball Nose End Mills – Oversized Shank

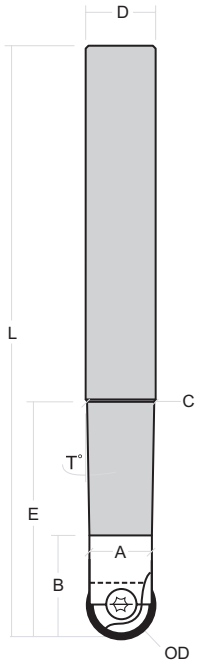
EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40510	0.750”	20mm	CC-BNEM-0750-9500-OS	0.670”	1.000”	0.740”	1.000”	4.500”	0.573°	9.500”
40520	1.000”	25mm	CC-BNEM-1000-8250-OS	0.860”	1.500”	0.990”	1.250”	4.500”	1.260°	8.250”
40560	1.250”	30mm / 32mm	CC-BNEM-1250-11000-OS	1.070”	1.750”	1.240”	1.500”	7.500”	0.859°	11.000”



Solid Carbide Cutter Bodies

Solid Carbide Ball Nose End Mills – Standard Shank

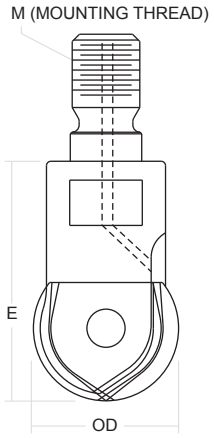
EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40640	0.375”	10mm	SC-BNEM-0375-3950-SS	0.335”	0.625”	0.365”	0.375”	1.500”	0.516°	3.950”
40645	0.375”	10mm	SC-BNEM-0375-3950-OS	0.335”	0.750”	0.360”	0.500”	1.375”	0.120°	3.950”
40650	0.375”	10mm	SC-BNEM-0375-7000-SS	0.335”	0.625”	0.365”	0.375”	3.000”	0.172°	7.000”
40660	0.500”	12mm	SC-BNEM-0500-3950-SS	0.413”	0.750”	0.490”	0.500”	1.500”	2.920°	3.950”
40670	0.500”	12mm	SC-BNEM-0500-7000-SS	0.413”	0.750”	0.490”	0.500”	4.000”	0.688°	7.000”
40680	0.500”	12mm	SC-BNEM-0500-7000-12MM-SS	0.413”	0.500”	0.490”	12mm	1.450”	1.500°	7.000”
40690	0.625”	16mm	SC-BNEM-0625-7000-SS	0.547”	0.750”	0.615”	0.625”	1.500”	3.400°	7.000”
40695	0.625”	16mm	SC-BNEM-0625-7000-15MM-SS	0.547”	1.300”	Straight	15mm	1.300”	N/A	7.000”
40700	0.750”	20mm	SC-BNEM-0750-7500-SS	0.670”	1.000”	0.740”	0.750”	2.250”	1.600°	7.500”
40710	0.750”	20mm	SC-BNEM-0750-10000-SS	0.670”	1.000”	0.740”	0.750”	6.000”	0.400°	10.000”
40720	0.750”	20mm	SC-BNEM-0750-10000-18MM-SS	0.670”	1.000”	0.698”	18mm	2.250”	1.600°	10.000”
40730	1.000”	25mm	SC-BNEM-1000-7500-SS	0.860”	1.500”	0.990”	1.000”	3.000”	2.500°	7.500”
40740	1.000”	25mm	SC-BNEM-1000-10000-SS	0.860”	1.500”	0.990”	1.000”	7.000”	0.670°	10.000”
40750	1.000”	25mm	SC-BNEM-1000-10000-25MM-SS	0.860”	1.500”	0.990”	25mm	3.000”	2.500°	10.000”



Modular Heads

Ball Nose Modular Heads

EDP	OD – Insert Size		Description	M Thread	E Effective Length	Flutes	Wrench
	Inch	Metric					
40835-6	0.500”	12mm	GWR12-MOD-C (M6)	M6	1.05”	2	3/8”
40835	0.500”	12mm	GWR12-MOD-C (M8)	M8	1.05”	2	3/8”
40840C	0.625”	16mm	GWR16-MOD-C	M8	1.11”	2	7/16”
40855	0.750”	20mm	GWR20-MOD-C	M10	1.28”	2	9/16”
40865	1.000”	25mm	GWR25-MOD-C	M12	1.65”	2	11/16”
40875	1.250”	30mm / 32mm	GWR32-MOD-C	M16	1.78”	2	15/16”

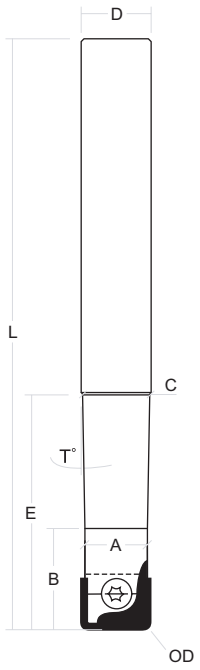


Back Draft & Flat Bottom Cutter Bodies

For use with BDR and FBR inserts only.

Back Draft & Flat Bottom Cutter Bodies

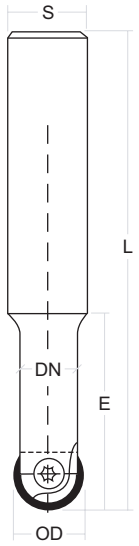
EDP	OD – Insert Size	Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
40760	0.375”	BDEM-0375-5250-OS	0.335”	0.625”	0.365”	0.500”	1.125”	1.700°	5.250”
40770	0.500”	BDEM-0500-6000-SS	0.413”	0.750”	0.490”	0.500”	1.500”	2.900°	6.000”
40810	0.500”	SC-BDEM-0500-3950-SS	0.413”	0.750”	0.490”	0.500”	1.500”	2.920°	3.950”
40820	0.500”	SC-BDEM-0500-7000-SS	0.413”	0.750”	0.490”	0.500”	4.000”	0.688°	7.000”
40780	0.625”	BDEM-0625-7000-SS	0.547”	0.750”	0.615”	0.625”	1.875”	1.700°	7.000”
40790	0.750”	BDEM-0750-9000-SS	0.670”	1.000”	0.740”	0.750”	2.250”	1.600°	9.000”
40800	1.000”	BDEM-1000-10000-SS	0.860”	1.500”	0.990”	1.000”	3.000”	2.500°	10.000”



Metric Series Cutter Bodies

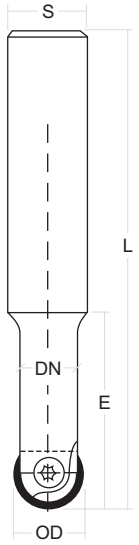
Metric Shank Cutter Bodies

EDP	OD – Insert Size		Description	E Effective Length	L Overall Length	S Shank Ø	DN Neck Ø
	Metric	Inch					
50000	8mm	0.313”	GWR08-100-10-RZK	25mm	100mm	10mm	7mm
50010	10mm	0.375”	GWR10-130-10-RZ	25mm	130mm	10mm	9mm
50020	12mm	0.500”	GWR12-150-12-RZ	47mm	150mm	12mm	10.5mm
50030	16mm	0.625”	GWR16-180-16-RZ	52mm	180mm	16mm	14.5mm
50040	20mm	0.750”	GWR20-230-20-RZ	65mm	230mm	20mm	18mm



Metric Shank / Imperial Cutter Bodies

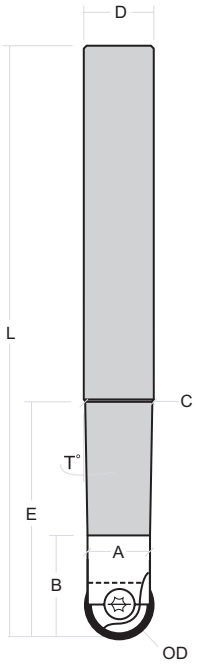
EDP	OD – Insert Size		Description	E Effective Length	L Overall Length	S Shank Ø	DN Neck Ø
	Metric	Inch					
41250	12mm	0.500"	BNEM-0500-7000-12MM-SS	0.750"	7.00”	12mm	0.413"
41260	20mm	0.750"	BNEM-0750-10000-18MM-SS	1.000"	10.00”	18mm	0.670"
41270	25mm	1.000"	BNEM-1000-10000-25MM-SS	1.500"	10.00”	25mm	0.860"



Metric Series Cutter Bodies

Metric Shank / Solid Carbide Imperial Cutter Bodies

EDP	OD – Insert Size		Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
	Inch	Metric								
40680	0.500”	12mm	SC-BNEM-0500-7000-12MM-SS	0.413”	0.500”	0.490”	12mm	1.450”	1.500°	7.000”
40695	0.625”	16mm	SC-BNEM-0625-7000-15MM-SS	0.547”	1.300”	Straight	15mm	1.300”	N/A	7.000”
40720	0.750”	20mm	SC-BNEM-0750-10000-18MM-SS	0.670”	1.000”	0.698”	18mm	2.250”	1.600°	10.000”
40750	1.000”	25mm	SC-BNEM-1000-10000-25MM-SS	0.860”	1.500”	0.990”	25mm	3.000”	2.500°	10.000”



Metric Undersized Shank Cutter Bodies

EDP	OD – Insert Size		Description	E Effective Length	L Overall Length	S Shank Ø	DN Neck Ø
	Metric	Inch					
41200	12mm	0.500"	US-GWR12-150-11MM-RZ	32mm	150mm	11mm	10.5mm
41210	16mm	0.625"	US-GWR16-180-15MM-RZ	36mm	180mm	15mm	14.5mm
41220	20mm	0.750"	US-GWR20-230-18MM-RZ	45mm	230mm	18mm	18mm
41230	25mm	1.000"	US-GWR25-250-24MM-RZ	51mm	250mm	24mm	22.5mm



Rough-Duty Ball Nose Inserts

- Tougher carbide substrate for added shock resistance
- Stronger ground cutting edges for extra strength and durability
- Helical geometry for reduced cutting forces



RDBN Inserts

Insert	Size / Dia.	Thickness	Grade	Coating		
				Uncoated	TS	HM
RDBN	0.500”	0.098”	T1	57000	57003	57001
	0.625”	0.118”		57020	57023	57021
	0.750”	0.118”		57040	57043	57041
	1.000”	0.157”		57060	57063	57061

See page IM-156 for insert grade and coating selection.

Helical Cutting Edge Ball Nose Inserts

- Single-sided HBN series helical cutting edge inserts provide optimized performance in ball nose finishing applications
- High-shear cutting edge reduces tool pressure and stress
- Smoother cutting action improves tool life and reduces chatter



HBN Inserts

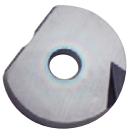
Insert	Size / Dia.	Thickness	Grade	Coating			
				Uncoated	FP-GLH	FP-HM	FPD
Inches							
HBN	0.375”	0.0981”	F1	42300	42340	42365	49105
	0.500”	0.0981”		42400	42440	42465	49110
	0.625”	0.1178”		42500	42540	42565	
	0.750”	0.1178”		42600	42640	42665	49120
	1.000”	0.1572”		42700	42740	42765	49130
	1.250”	0.1965”		42800	42840	42865	
Metric							
HBN	10mm	2.5mm	F1	54000	54060	54065	
	12mm	2.5mm		54100	54160	54165	
	16mm	3.0mm		54200	54260	54265	
	20mm	3.0mm		54300	54360	54365	
	25mm	4.0mm		54400	54460	54465	
	30mm	5.0mm		54500	54560	54565	
	32mm	5.0mm		54600	54660		

See page IM-156 for insert grade and coating selection.

Standard Ball Nose Inserts

- Precision-ground inserts maintain a positional tolerance of .0005”
- A variety of edge geometry options for a multitude of applications.
- Excellent for light roughing, semi-finishing, and finishing of most materials.





BNR-N



BNR-CB



BNR-N-PCD

BNR Inserts

Insert	Edge	Size / Dia.	Thickness	Grade	Coating						
					Uncoated	FP-GLH	FP-TS	FP-HM	FP-DL	FPD	PCD
Inches											
BNR	N	0.375”	0.0981”	F1	43000	43040	43067	43065	43030	49000	43070
		0.500”	0.0981”		43100	43140	43167	43165	43135	49010	43170
		0.625”	0.1178”		43200	43240	43267	43265		43230	
		0.750”	0.1178”		43300	43340	43395	43365	43372	49020	43370
		1.000”	0.1572”		43400	43440	43467	43465	43475	49030	43470
		1.250”	0.1965”		43500	43540	43567	43565			
	CB	0.312”	0.0784”		43700	43740		43765		49300	
		0.375”	0.0981”		43800	43840	43867	43865			
		0.500”	0.0981”		43900	43940	43967	43965		49310	
		0.625”	0.1178”		44000	44040	44067	44065			
		0.750”	0.1178”		44100	44140	44167	44165			
		1.000”	0.1572”		44200	44240	44267	44265		MP00795	
		1.250”	0.1965”		44300	44340	44367	44365			

See page IM-156 for insert grade and coating selection.

Standard Ball Nose Inserts

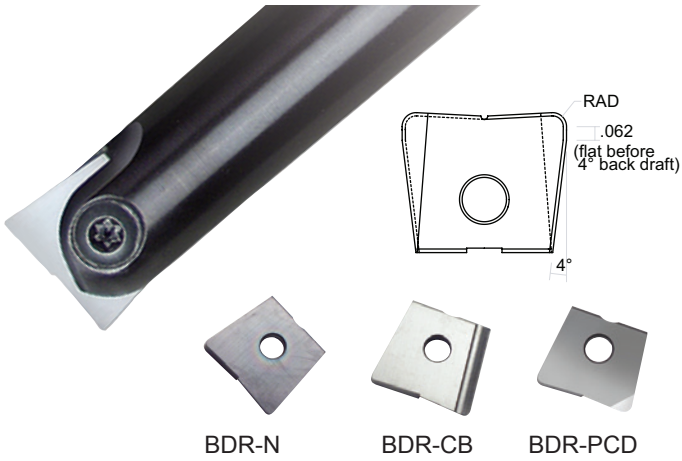
BNR Inserts (continued)

Insert	Edge	Size / Dia.	Thickness	Grade	Coating				
					Uncoated	FP-GLH	FP-TS	FP-HM	FP-DL
Metric									
BNR	N	12mm	2.5mm	F1	51200	51240	51267		
		16mm	3.0mm		51300	51340	51367		
		20mm	3.0mm		51400	51440	51467	51465	
		25mm	4.0mm		51500	51540	51567	51565	
		30mm	5.0mm		51600	51640	51667	51665	
		32mm	5.0mm						
	CB	8mm	2.0mm		52000	52040		52065	
		10mm	2.5mm		52100	52140	52167	52165	
		12mm	2.5mm		52200	52240	52267	52265	
		20mm	3.0mm		52400	52490			
		25mm	4.0mm		52500	52540	52567	52565	
		32mm	5.0mm		52600	52660	52667	52665	

See page IM-156 for insert grade and coating selection.

Back Draft Inserts

- Reduced tool pressure for long-reach wall, core, and cavity finishing
- Wiper flat produces fine finishes on straight-wall work
- Multiple corner radii available
- Strong “N” geometry for steels, irons, and graphite electrodes
- Sharper “CB” geometry for stainless and high-temp. alloys, and for minimizing fracture on graphite



BDR-N BDR-CB BDR-PCD

BDR Inserts

Insert	Edge	Size / Dia.	Corner Radius	Thickness	Hole Dia.	Grade	Coating						
							Uncoated	FP-GLH	FP-TS	FP-HM	FP-DL	FPD	PCD
BDR	N	0.375”	1/32	0.0981”	0.1578”	F1	46600	46640	46667	46665	46630	49050	49200*
		0.375”	1/16	0.0981”	0.1578”		46700	46740	46767	46765	46730	49055	
		0.500”	1/32	0.0981”	0.1972”		46800	46840	46867	46865	46805	49060	49210*
		0.500”	1/16	0.0981”	0.1972”		46900	46940	46967	46965	46930	49070	49220*
		0.625”	1/32	0.1178”	0.1972”		47000	47040	47067	47065			
		0.625”	1/16	0.1178”	0.1972”		47100	47140	47167	47165			
		0.750”	1/32	0.1178”	0.1972”		47200	47240		47265	47230	47250	49230*
		0.750”	1/16	0.1178”	0.1972”		47300	47340	47367	47365	47330	49080	49240*
		1.000”	1/32	0.1572”	0.2365”		47400	47440	47467	47465	47430	49090	49250*
		1.000”	1/16	0.1572”	0.2365”		47500	47540	47567	47565	47530	49100	49255*
		1.000”	1/8	0.1572”	0.2365”		47600	47640	47667	47665			
	CB	0.500”	1/32	0.0981”	0.1972”		47800	47840	47867	47885			
		0.500”	1/16	0.0981”	0.1972”		47900	47940	47967	47985			
		0.500”	1/8	0.0981”	0.1972”		48000	48040	48067	48085			
		0.625”	1/32	0.1178”	0.1972”		48100	48140	48167	48185			
		0.625”	1/16	0.1178”	0.1972”		48200	48240	48267	48285			
		0.750”	1/32	0.1178”	0.1972”		48300	48340	48367	48365			
		0.750”	1/16	0.1178”	0.1972”		48400	48440	48467	48465			
		0.750”	1/8	0.1178”	0.1972”		48500	48540	48567	48565			
		1.000”	1/32	0.1572”	0.2365”		48600	48640	48667	48665			
		1.000”	1/16	0.1572”	0.2365”		48700	48740	48767	48765			
		1.000”	1/8	0.1572”	0.2365”		48800	48840	48867	48865			

* DOC of PCD-tipped BDR inserts is 0.125”.

See page IM-156 for insert grade and coating selection.

Flat Bottom Inserts

- For fine finishing of tapered walls or floor work
- Multiple corner radii available
- Excellent for any bull nose cutter applications



FBR-N

FBR-CB

FBR Inserts

Insert	Edge	Size / Dia.	Corner Radius	Thickness	Hole Dia.	Grade	Coating				
							Uncoated	FP-GLH	FP-TS	FP-HM	FP-DL
FBR	N	0.375”	1/32	0.0981”	0.1578”	F1	44500	44540	44567	44565	
		0.500”	1/32	0.0981”	0.1972”		44600	44640	44667	44665	
		0.500”	1/16	0.0981”	0.1972”		44700	44740	44767	44765	
		0.625”	1/32	0.1178”	0.1972”		44820	44840	44867	44865	
		0.750”	1/32	0.1178”	0.1972”		45000	45040	45067	45065	
		0.750”	1/16	0.1178”	0.1972”		45100	45140	45167	45165	
		1.000”	1/16	0.1572”	0.2365”		45300	45340	45367	45365	
	CB	0.500”	1/32	0.0981”	0.1972”		45600	45640	45667	45665	
		0.625”	1/32	0.1178”	0.1972”		45800	45840	45867	45865	
		0.750”	1/32	0.1178”	0.1972”		46000	46040	46067	46065	
		0.750”	1/16	0.1178”	0.1972”		46100	46140	46167	46165	
		1.000”	1/32	0.1572”	0.2365”		46200	46240			
		1.000”	1/16	0.1572”	0.2365”		46300	46340	46367	46365	

See page IM-156 for insert grade and coating selection.

HFBD High-Feed Inserts

- $^{3}/_{8}$" to 1" diameter
- Use for cavity / core roughing, pocketing, detail area roughing, and helical interpolation
- Utilizes BNEM cutter body (will not fit BDEM)



HFBD Inserts

Insert	Size / Dia.	Uses Holder	Corner Radius (Actual)	Program Radius	FPT	Max. DOC	Grade	Coating			
								Uncoated	FP-GLH	FP-TS	FP-HM
HFBD	0.375"	BNEM0375 / GWR10	.020"	.0295"	.010-.020	.013"	F1	42000	42010	42027	42025
	0.500"	BNEM0500 / GWR12	.034"	.0558"	.012-.025	.020"		42030	42050	42067	42065
	0.625"	BNEM0625 / GWR16	.048"	.0766"	.012-.030	.025"		42080	42090	42087	42085
	0.750"	BNEM0750 / GWR20	.062"	.0852"	.012-.040	.028"		42110	42120	42137	42135
	1.000"	BNEM1000 / GWR25	.076"	.1104"	.012-.040	.033"		42140	42160	42177	42165

See page IM-156 for insert grade and coating selection.

Single-Sided Accessories



** T10-T wrenches are available for older-style insert screws.*

Insert Screw	Screw EDP	Insert Size		Dia.	Major Dia.	Pitch	Wrench	Wrench EDP	Torque	
		Inch	Metric						Nm	in-lbs.
1 GWS-08	41000	.312	8	3mm	3mm	.5mm	8 T8-F	83000	Manual	
2 GWS-10	41010	.375	10	4mm	4mm	.5mm	9 T15-T	83010	Manual	
3 GWS-12	41020	.500	12	5mm	5mm	.5mm	10 T20-T	83020	6.0	53
4 GWS-16	41030	.625	16	5mm	5mm	.5mm	10 T20-T	83020	6.2	55
5 GWS-20	41040	.750	20	5mm	5mm	.5mm	10 T20-T	83020	6.2	55
6 GWS-25	41050	1.000	25	6mm	6mm	.75mm	11 T30-T	41100	6.5	58
7 GWS-32	41060	1.250	30/32	8mm	8mm	.75mm	11 T30-T	41100	6.5	58

All listed tools use Anti-Seize Grease ASG-120 (41110).

Ball Nose / Back Draft Recommended Parameters

Style	Edge	Coating	Speed / Feed		Low-Carbon Steel	Alloy Steel	Tool Steels	Medium Hardened Steel (36-48 Rc)	Hardened Steel (> 48 Rc)
RDBN		HM	Speed		700-1000	500-900	450-800	**300-600**	**250-600**
			Feed	≤ .50" Dia.	.005-.010	.005-.010	.004-.008	**.003-.008**	**.003-.007**
				> .50" Dia.	.005-.012	.005-.012	.005-.010	**.005-.010**	**.004-.010**
		TS	Speed		**700-1000**	**500-900**	**450-800**	**300-600**	250-600
			Feed	≤ .50" Dia.	**.005-.010**	**.005-.010**	**.004-.008**	**.003-.008**	.003-.007
				> .50" Dia.	**.005-.012**	**.005-.012**	**.005-.010**	**.005-.010**	.004-.010
HBN		Uncoated	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-GLH	Speed		**700-1000**	**500-900**	**400-800**	**300-700**	**250-500**
			Feed	≤ .50" Dia.	**.010-.020**	**.010-.020**	**.010-.020**	**.008-.015**	**.006-.015**
				> .50" Dia.	**.015-.025**	**.015-.025**	**.012-.025**	**.010-.020**	**.008-.015**
		FP-HM	Speed		450-800	400-700	**300-550**	**300-500**	**250-400**
			Feed	≤ .50" Dia.	.020-.060	.020-.060	**.020-.050**	**.015-.050**	**.005-.030**
				> .50" Dia.	.015-.030	.015-.030	**.015-.030**	**.015-.030**	**.005-.020**

› **Bold text** indicates best choice for material shown.
› The parameters provided are suggested starting operating parameters.
› See page IM-156 for insert grade and coating selection.

Continued on next page

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Austenitic Stainless	Ferritic / Martensitic Stainless	Tough PH Stainless	Gray Cast Iron	Ductile / Malleable	Ni Co-Based Alloys	9 Series Inconel	Titanium	Copper Alloys	Aluminum / Non-Ferrous	Carbon Graphite
300-600	**450-800**	**250-550**	**600-1000**	**500-900**	**55-90**	**35-75**	**120-180**	400-900		
.003-.008	**.004-.010**	**.003-.008**	**.005-.012**	**.004-.008**	**.003-.006**	**.002-.005**	**.003-.007**	.005-.012		
.003-.010	**.004-.012**	**.003-.010**	**.005-.012**	**.005-.010**	**.003-.007**	**.002-.006**	**.003-.008**	.005-.012		
300-600	450-800	**250-550**	600-1000	500-900	**55-90**	**35-75**	**120-180**	400-900		
.003-.008	.004-.010	**.003-.008**	.005-.012	.004-.008	**.003-.006**	**.002-.005**	**.003-.007**	.005-.012		
.003-.010	.004-.012	**.003-.010**	.005-.012	.005-.010	**.003-.007**	**.002-.006**	**.003-.008**	.005-.012		
									1200+	700--1200
									.007-.012	.010-.020
									.007-.015	.010-.020
300-600	**500-900**	**300-550**	**700-1200**	**600-1000**	55-90	35-75	120-180	**400-900**	1000+ (cast)	**700-1200**
.003-.007	**.004-.008**	**.003-.007**	**.004-.010**	**.003-.007**	.002-.005	.002-.004	.003-.007	**.005-.010**	.007-.012	**.010-.020**
.003-.008	**.004-.010**	**.003-.008**	**.005-.012**	**.004-.008**	.003-.006	.002-.005	.003-.007	**.005-.012**	.007-.015	**.010-.020**
300-600	500-900	**300-550**	**700-1200**	**600-1000**	**55-90**	**35-75**	**120-180**			700-1200
.003-.007	.004-.008	**.003-.007**	**.004-.010**	**.003-.007**	**.002-.005**	**.002-.004**	**.003-.007**			.010-.020
.003-.008	.004-.010	**.003-.008**	**.005-.012**	**.004-.008**	**.003-.006**	**.002-.005**	**.003-.007**			.010-.020

Ball Nose / Back Draft Recommended Parameters

Style	Edge	Coating	Speed / Feed		Low-Carbon Steel	Alloy Steel	Tool Steels	Medium Hardened Steel (36-48 Rc)	Hardened Steel (> 48 Rc)
BNR	N	FP-GLH / FP-TS	Speed		**800-1200**	**700-1000**	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	**.005-.010**	**.005-.010**	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	**.005-.012**	**.005-.012**	**.005-.010**	**.004-.010**	**.004-.010**
		FP-HM	Speed		800-1200	700-1000	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	.005-.010	.005-.010	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	.005-.012	.005-.012	**.005-.010**	**.004-.010**	**.004-.010**
		FPD	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-DL	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		PCD	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
	CB	Uncoated	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FPD	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-GLH / FP-TS	Speed		**800-1200**	**600-1000**	500-900	300-700	
			Feed	≤ .50" Dia.	**.003-.008**	**.003-.008**	.003-.007	.003-.007	
				> .50" Dia.	**.005-.010**	**.005-.010**	.004-.008	.003-.008	
		FP-HM	Speed		800-1200	600-1000	500-900	300-700	
				≤ .50" Dia.	.003-.008	.003-.008	.003-.007	.003-.007	
				> .50" Dia.	.005-.010	.005-.010	.004-.008	.003-.008	

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› See page IM-156 for insert grade and coating selection.

Continued on next page

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Austenitic Stainless	Ferritic / Martensitic Stainless	Tough PH Stainless	Gray Cast Iron	Ductile / Malleable	Ni Co-Based Alloys	9 Series Inconel	Titanium	Copper Alloys	Aluminum / Non-Ferrous	Carbon Graphite
			700-1200	**600-1000**						700-1200
			.005-.012	**.004-.008**						.010-.020
			.005-.015	**.005-.012**						.010-.020
			700-1200	**600-1000**						
			.005-.012	**.004-.008**						
			.005-.015	**.005-.012**						
										1200+
										.010-.020
										.010-.020
										1200+
										.010-.020
										.010-.020
									1500+ (cast)	**1200+**
									.005-.010	**.010-.020**
									.005-.010	**.010-.020**
									1200+	700--1200
									.010-.020	.010-.020
									.010-.020	.010-.020
										1200+
										.010-.020
										.010-.020
300-600	**500-900**	**300-550**	700-1200	600-1000	55-90	35-75	120-180	**400-900**	1000+ (cast)	700-1200
.003-.007	**.004-.008**	**.003-.007**	.004-.010	.003-.007	.002-.005	.002-.004	.003-.007	**.005-.010**	.007-.012	.010-.020
.003-.008	**.004-.010**	**.003-.008**	.005-.012	.004-.008	.003-.006	.002-.005	.003-.007	**.005-.012**	.007-.015	.010-.020
300-600	500-900	**300-550**	700-1200	600-1000	**55-90**	**35-75**	**120-180**			700-1200
.003-.007	.004-.008	**.003-.007**	.004-.010	.003-.007	**.002-.005**	**.002-.004**	**.003-.007**			.010-.020
.003-.008	.004-.010	**.003-.008**	.005-.012	.004-.008	**.003-.006**	**.002-.005**	**.003-.007**			.010-.020

Ball Nose / Back Draft Recommended Parameters

Style	Edge	Coating	Speed / Feed		Low-Carbon Steel	Alloy Steel	Tool Steels	Medium Hardened Steel (36-48 Rc)	Hardened Steel (> 48 Rc)
BDR / FBR	N	FP-GLH / FP-TS	Speed		**800-1200**	**700-1000**	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	**.005-.010**	**.005-.010**	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	**.005-.012**	**.005-.012**	**.005-.010**	**.004-.010**	**.003-.010**
		FP-HM	Speed		800-1200	700-1000	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	.005-.010	.005-.010	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	.005-.012	.005-.012	**.005-.010**	**.004-.010**	**.003-.010**
BDR	N	FPD	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-DL	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		PCD	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
BDR / FBR	CB	Uncoated	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-GLH	Speed		**800-1200**	**600-1000**	500-900		
			Feed	≤ .50" Dia.	**.005-.008**	**.005-.008**	.004-.007		
				> .50" Dia.	**.005-.010**	**.005-.010**	.005-.008		
		FP-HM	Speed		800-1200	600-1000	500-900		
			Feed	≤ .50" Dia.	.005-.008	.005-.008	.004-.007		
					.005-.010	.005-.010	.005-.008		
HFBD*		Uncoated	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		FP-GLH / FP-TS	Speed		**700-1000**	**500-900**	**400-800**	**300-700**	**250-500**
			Feed	≤ .50" Dia.	**.010-.020**	**.010-.020**	**.010-.020**	**.008-.015**	**.006-.015**
				> .50" Dia.	**.015-.025**	**.015-.025**	**.012-.025**	**.010-.020**	**.008-.015**
		FP-HM	Speed		700-1000	500-900	**400-800**	**300-700**	**250-500**
			Feed	≤ .50" Dia.	.010-.020	.010-.020	**.010-.020**	**.008-.015**	**.006-.015**
				> .50" Dia.	.015-.025	.015-.025	**.012-.025**	**.010-.020**	**.008-.015**

* DAPRA recommends a maximum 1° ramp angle on HFBD inserts.

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› See page IM-156 for insert grade and coating selection.

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Austenitic Stainless	Ferritic / Martensitic Stainless	Tough PH Stainless	Gray Cast Iron	Ductile / Malleable	Ni Co-Based Alloys	9 Series Inconel	Titanium	Copper Alloys	Aluminum / Non-Ferrous	Carbon Graphite
			700-1200	**600-1000**						
			.005-.010	**.004-.008**						
			.005-.012	**.004-.010**						
			700-1200	**600-1000**						
			.005-.010	**.004-.008**						
			.005-.012	**.004-.010**						
										1000+
										.010-.020
										.010-.020
										1000+
										.010-.020
										.010-.020
										1000+
										.010-.020
										.010-.020
									1200+	
									.007-.012	
									.007-.015	
300-600	**500-900**	**300-550**	700-1200	600-1000	55-90	35-75	120-180	**400-900**	1000+ (cast)	700-1200
.004-.007	**.005-.010**	**.003-.007**	.005-.010	.004-.008	.002-.006	.002-.004	.003-.007	**.004-.008**	.007-.012	.010-.020
.004-.008	**.005-.010**	**.003-.008**	.005-.012	.004-.010	.002-.006	.002-.005	.003-.007	**.004-.010**	.007-.015	.010-.020
300-600	500-900	**300-550**	700-1200	600-1000	**55-90**	**35-75**	**120-180**			
.004-.007	.005-.010	**.003-.007**	.005-.010	.004-.008	**.002-.006**	**.002-.004**	**.003-.007**			
.004-.008	.005-.010	**.003-.008**	.005-.012	.004-.010	**.002-.006**	**.002-.005**	**.003-.007**			
									1200+	
									.015-.030	
									.015-.030	
250-550	**400-700**	250-550	**600-1000**	**500-900**	55-90	35-75	120-180	**400-900**		700-1200
.010-.015	**.010-.020**	.006-.015	**.010-.020**	**.008-.015**	.005-.010	.005-.008	.007-.012	**.010-.015**		.015-.030
.012-.020	**.015-.025**	.008-.020	**.015-.025**	**.012-.020**	.005-.012	.005-.010	.008-.012	**.015-.020**		.015-.030
250-550	400-700	**250-550**	**600-1000**	**500-900**	**55-90**	**35-75**	**120-180**	400-900		
.010-.015	.010-.020	**.006-.015**	**.010-.020**	**.008-.015**	**.005-.010**	**.005-.008**	**.007-.012**	.010-.015		
.012-.020	.015-.025	**.008-.020**	**.015-.025**	**.012-.020**	**.005-.012**	**.005-.010**	**.008-.012**	.015-.020		



Ball Nose / Back Draft

Double-Sided Insert Platform

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DOUBLE-SIDED BALL NOSE / BACK DRAFT INSERT PLATFORM

Cutter Bodies	IM-143
SBN Series Inserts	IM-147
SBD Series Inserts	IM-148

The EDGE^2 SBN design allows for two usable cutting edges that delivers cost savings without sacrificing surface finish.

- A thicker cross section of carbide provides for better heat and stress absorption.
- Periphery-ground inserts to achieve closer tolerances and less runout.
- Cutter bodies ensure close-tolerance finishing capabilities.

CUTTER BODIES

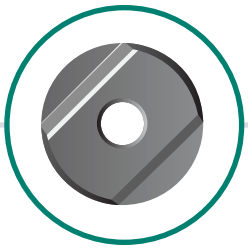


END MILLS
Steel / Solid Carbide / Carbide Core



MODULAR HEADS
Steel

INSERTS

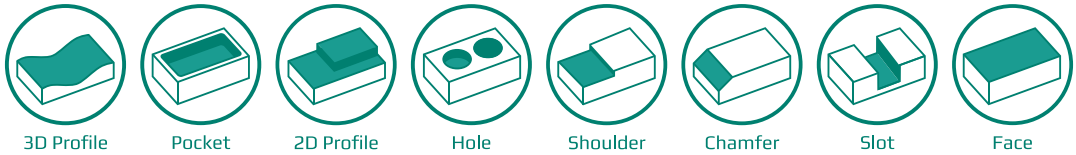


SBN



SBD

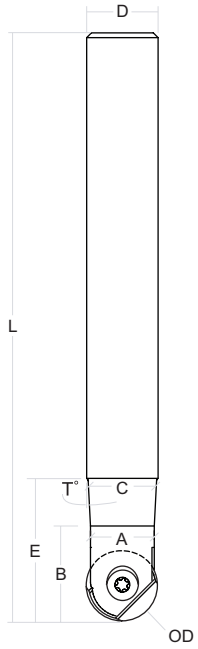




Standard Shank Cutter Bodies

SBN End Mills – Standard Shank

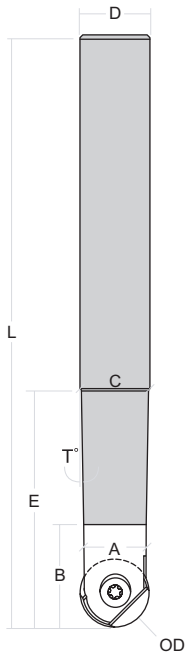
EDP	OD – Insert Size	Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
Inch Shank									
41415	0.500”	SBNEM-0500-7000-SS	0.450”	0.750”	0.470”	0.500”	1.250”	1.7°	7.000”
41440	0.750”	SBNEM-0750-7500-SS	0.670”	1.000”	0.720”	0.750”	1.880”	1.5°	7.500”
41455	1.000”	SBNEM-1000-8000-SS	0.890”	1.500”	0.970”	1.000”	2.500”	2.2°	8.000”
Metric Shank									
41420	0.500”	SBNEM-0500-7000-SS-12MM	0.450”	1.250”	Straight	12mm	1.250”	N/A	7.000”
41445	0.750”	SBNEM-0750-10000-SS-18MM	0.670”	1.880”	Straight	18mm	1.880”	N/A	10.000”
41460	1.000”	SBNEM-1000-10000-SS-25MM	0.890”	1.500”	0.970”	25mm	2.500”	1.7°	10.000”



Solid Carbide Cutter Bodies

SBN End Mills – Solid Carbide Shank

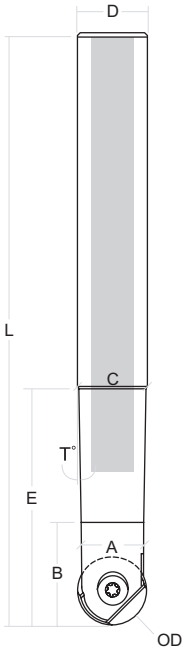
EDP	OD – Insert Size	Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
Inch Shank									
41510	0.500”	SC-SBNEM-0500-7000-SS	0.450”	0.750”	0.470”	0.500”	2.000”	0.70°	7.000”
41525	0.750”	SC-SBNEM-0750-7500-SS	0.670”	1.000”	0.720”	0.750”	2.500”	1.00°	7.500”
41530	0.750”	SC-SBNEM-0750-10000-SS	0.670”	1.000”	0.720”	0.750”	3.750”	0.50°	10.000”
41535	1.000”	SC-SBNEM-1000-8000-SS	0.890”	1.500”	0.970”	1.000”	3.000”	2.25°	8.000”
41540	1.000”	SC-SBNEM-1000-11000-SS	0.890”	1.500”	0.970”	1.000”	4.500”	0.75°	11.000”
Metric Shank									
41515	0.500”	SC-SBNEM-0500-7000-SS-12MM	0.450”	1.250”	Straight	12mm	1.250”	N/A	7.000”
41529	0.750”	SC-SBNEM-0750-9000-SS-18MM	0.670”	1.500”	Straight	18mm	1.500”	N/A	9.000”
41545	1.000”	SC-SBNEM-1000-10000-SS-25MM	0.890”	1.500”	0.970”	25mm	2.000”	3.70°	10.000”



Carbide Core Cutter Bodies

SBN End Mills – Carbide Core Shank

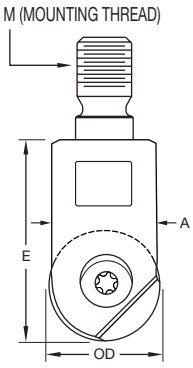
EDP	OD – Insert Size	Description	A Ø	B Straight Length	C Taper End Ø	D Shank Ø	E Effective Length	T Taper Angle	L Overall Length
Inch Shank									
41470	0.750”	CC-SBNEM-0750-9000-SS	0.670”	1.000”	0.720”	0.750”	2.250”	1.10°	9.000”
41475	1.000”	CC-SBNEM-1000-8000-SS	0.890”	1.500”	0.970”	1.000”	3.000”	1.50°	8.000”



Modular Heads

SBN Modular Heads

EDP	OD – Insert Size	Description	M Thread	A Ø	E Effective Length	Flutes	Wrench
41590-M6	.500”	SBNEM-0500-MOD-M6	M6	0.440”	1.06”	2	3/8”
41590	.500”	SBNEM-0500-MOD	M8	0.440”	1.06”	2	3/8”
41600	.750”	SBNEM-0750-MOD	M10	0.670”	1.25”	2	9/16”
41605	1.000”	SBNEM-1000-MOD	M12	0.890”	1.63”	2	9/16”



Double-Sided Accessories

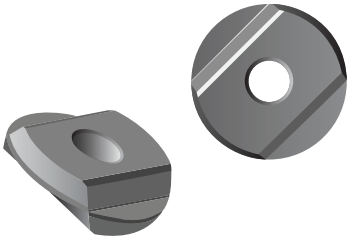
Insert Screw	Screw EDP	Thread	Wrench	Wrench EDP	Torque	
					Nm	in-lbs.
1 SBNS-0500-T20	41710	M5x.5	4 T20-T	83020	6.0	45
2 SBNS-0750-T20	41720	M5x.5	4 T20-T	83020	6.2	55
3 SBNS-1000-T20	41730	M6x.75	4 T20-T	83020	6.5	58

All listed tools use Anti-Seize Grease ASG-120 (41110).



SBN Spherical Ball Nose Inserts

- Thick carbide insert construction for better heat and stress absorption
- Superior surface finishes due to an enhanced grinding process
- Close-tolerance insert pocket produced by EDM, removing less body material for improved insert support





SBN Inserts

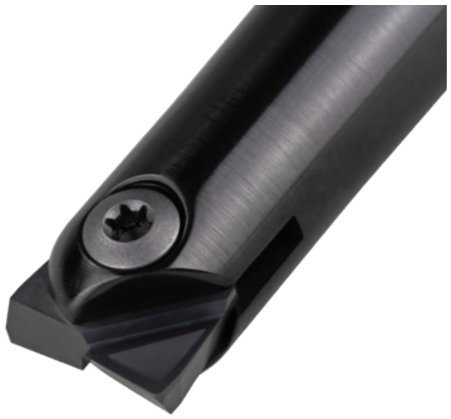
Insert	Size / Dia.	Thickness	Radius	Hole Diameter	Grade	Coating			
						Uncoated	GLH	TS	HM
SBN	.500”	0.138”	0.250”	0.2070”	UC	55500	55560	55587	55585
	.750”	0.218”	0.375”	0.2070”		55700	55760	55787	55765
	1.000”	0.250”	0.500”	0.2464”		55800	55860	55887	55865

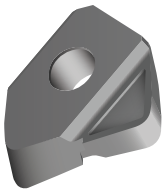
See page IM-156 for insert grade and coating selection.

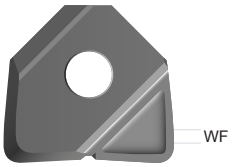
SBD Back Draft-Style Inserts

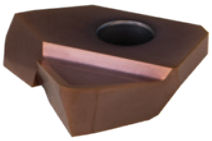
- Insert thickness provides optimum rigidity and heat control, resulting in superior tool life
- EDM pocket provides accuracy and accepts cutting forces with minimal deflection, allowing no insert movement

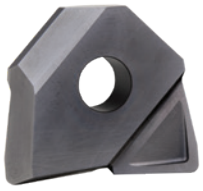
(Back draft angle: 7° per side)











SBD Inserts

Insert	Size / Dia.	Thickness	Radius	Hole Diameter	WF Wiper Flat	Grade	Coating		
							Uncoated	TS	HM
SBD	.500”	0.138”	0.031”	0.2070”	0.050”	UC	54700	54795	54785
	.500”	0.138”	0.062”	0.2070”	0.050”		54800	54895	54885
	.750”	0.218”	0.031”	0.2070”	0.075”		55000	55095	55085
	.750”	0.218”	0.062”	0.2070”	0.075”		55100	55195	55185
	1.000”	0.250”	0.031”	0.2464”	0.100”		55200	55295	55285
	1.000”	0.250”	0.062”	0.2464”	0.100”		55300	55395	55385

See page IM-156 for insert grade and coating selection.

Ball Nose / Back Draft Recommended Parameters

Style	Edge	Coating	Speed / Feed		Low-Carbon Steel	Alloy Steel	Tool Steels	Medium Hardened Steel (36-48 Rc)	Hardened Steel (> 48 Rc)
SBN		GLH / TS	Speed		**800-1200**	**700-1000**	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	**.005-.010**	**.005-.010**	**.004-.008**	**.003-.007**	**.003-.007**
				> .50" Dia.	**.005-.012**	**.005-.012**	**.005-.010**	**.004-.008**	**.003-.008**
		HM	Speed		800-1200	700-1000	**450-800**	**300-700**	**250-700**
			Feed	≤ .50" Dia.	.005-.010	.005-.010	**.004-.008**	**.003-.007**	**.003-.007**
				> .50" Dia.	.005-.012	.005-.012	**.005-.010**	**.004-.008**	**.003-.008**
SBD		Uncoated	Speed						
			Feed	≤ .50" Dia.					
				> .50" Dia.					
		HM	Speed		800-1200	600-1000	**500-900**	**300-600**	**250-600**
			Feed	≤ .50" Dia.	.005-.010	.005-.010	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	.005-.012	.005-.012	**.005-.010**	**.004-.010**	**.004-.010**
		TS	Speed		**800-1200**	**600-1000**	**500-900**	**300-600**	**250-600**
			Feed	≤ .50" Dia.	**.005-.010**	**.005-.010**	**.004-.008**	**.003-.008**	**.003-.008**
				> .50" Dia.	**.005-.012**	**.005-.012**	**.005-.010**	**.004-.010**	**.004-.010**

› **Bold text** indicates best choice for material shown.
› The parameters provided are suggested starting operating parameters.
› See page IM-156 for insert grade and coating selection.

Visit **generalcuttingtools.com** for technical reference & application information

Austenitic Stainless	Ferritic / Martensitic Stainless	Tough PH Stainless	Gray Cast Iron	Ductile / Malleable	Ni Co-Based Alloys	9 Series Inconel	Titanium	Copper Alloys	Aluminum / Non-Ferrous	Carbon Graphite
	500-900	**300-550**	**700-1200**	**600-1000**						700-1200
	.004-.008	**.003-.007**	**.005-.012**	**.004-.008**						.010-.020
	.004-.010	**.003-.008**	**.005-.015**	**.005-.012**						.010-.020
	500-900	**300-550**	**700-1200**	**600-1000**						700-1200
	.004-.008	**.003-.007**	**.005-.012**	**.004-.008**						.010-.020
	.004-.010	**.003-.008**	**.005-.015**	**.005-.012**						.010-.020
									1200+	
									.007-.012	
									.007-.015	
300-600	**500-900**	**300-550**	**700-1200**	**600-1000**	**55-90**	**35-75**	**120-180**	400-900	1000+ (cast)	700-1200
.004-.007	**.005-.010**	**.003-.007**	**.005-.010**	**.004-.008**	**.002-.006**	**.002-.004**	**.003-.007**	.004-.008	.007-.012	.010-.020
.004-.008	**.005-.010**	**.003-.008**	**.005-.012**	**.004-.010**	**.002-.006**	**.002-.005**	**.003-.007**	.004-.010	.007-.015	.010-.020
300-600	500-900	**300-550**	**700-1200**	**600-1000**	**55-90**	**35-75**	**120-180**	**400-900**	1000+ (cast)	700-1200
.004-.007	.005-.010	**.003-.007**	**.005-.010**	**.004-.008**	**.002-.006**	**.002-.004**	**.003-.007**	**.004-.008**	.007-.012	.010-.020
.004-.008	.005-.010	**.003-.008**	**.005-.012**	**.004-.010**	**.002-.006**	**.002-.005**	**.003-.007**	**.004-.010**	.007-.015	.010-.020

Carbide Core Modular Extensions

Ideal for Standard Inch End Mill Holders

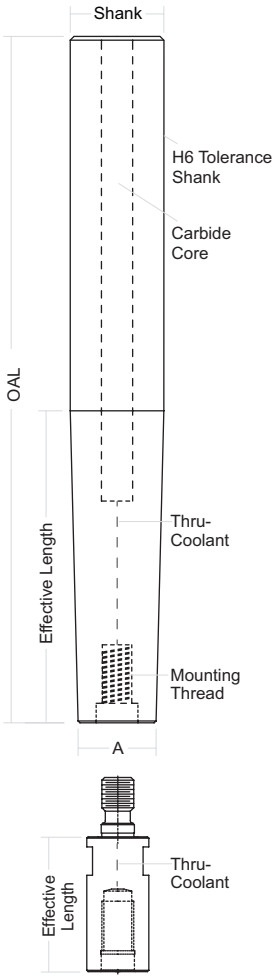
- All styles of modular extensions are universal – use them with any of our screw-on modular heads, as well as many competitors' modular heads
- Cylindrical inch shanks, providing adaptation for end mill holders (add your own flat), milling chucks and heat-shrink holders
- 3 sizes to accommodate modular head sizes from 3/4" to 1-1/2"
- Carbide core for enhanced vibration dampening capability; reduced deflection and improved rigidity
- Optional add-on extensions for additional 2" reach – screw on to base extensions (for 3/4" to 1-1/2" modular heads)
- Thru-coolant for delivery of air or coolant right at the cutting edge



Carbide Core Modular Extensions

EDP	For Head Dia.	Description	Shank Dia.	Effective Length	OAL	Thread	CC	A
22475	.750" / 20mm	CC-ME-0750-2500-5500-C	.750"	2.5"	5.5"	M10	3/8" x 4.0"	.660"
22485	.750" / 20mm	CC-ME-0750-3500-C-SS	.750"	3.7"	5.8"	M10	3/8" x 4.0"	.660"
22480	.750" / 20mm	CC-ME-0750-3500-C	1.000"	3.7"	6.0"	M10	7/16" x 4.0"	.660"
22495	1.000" / 25mm	CC-ME-1000-2500-5500-C	1.000"	2.5"	5.5"	M12	7/16" x 4.0"	.935"
22500	1.000" / 25mm	CC-ME-1000-4500-C	1.000"	4.7"	7.0"	M12	7/16" x 5.0"	.935"
22505	1.250" / 1.500"	CC-ME-1250-3250-C	1.250"	3.5"	5.8"	M16	1/2" x 4.0"	1.175"
22510	1.250" / 1.500"	CC-ME-1250-5500-C	1.250"	5.7"	8.0"	M16	1/2" x 6.0"	1.175"

Extensions feature a cylindrical shank, with no Weldon flats. Hold with high-performance milling chucks or heat / mechanical shrink holders, or mill Weldon flats and use a short-length solid end mill holder.



2" Add-On Extensions

EDP	For Head Dia.	Description	Effective Length	Thread
22520	.750" / 20mm	ME-0750-2C Extension Adapter	2.0"	M10
22530	1.000" / 25mm	ME-1000-2C Extension Adapter	2.0"	M12
22540	1.250" / 1.500"	ME-1250-2C Extension Adapter	2.0"	M16

Solid Carbide Modular Extensions

- Optimum rigidity reduces deflection and chatter
- No braze joints
- Best option for finishing with modular heads
- Thru-coolant for delivery of air or coolant right at the cutting edge



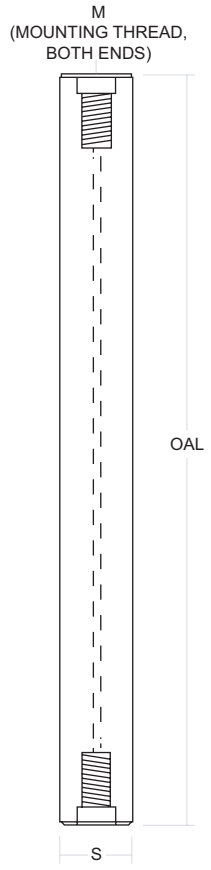
Solid Carbide Modular Extensions

EDP	For Head Dia.	Description	Shank Dia.	Effective Length	OAL	Thread	A
22550-6	.500”	SC-ME-0500-6500-C-M6	.500”	1.500”	6.5”	M6	.460”
22560	.750”	SC-ME-0750-7700-C	.750”	2.250”	7.7”	M10	.709”
22570	1.000”	SC-ME-1000-8300-C	1.00”	5.000”	8.3”	M12	.890” / .950”

Heavy Metal Modular Extensions

- Made of high-density tungsten, providing extra resistance to vibration and deflection
- Machined on both ends; can be cut in half and used with two different modular heads
- Metric shank diameter provides clearance for each inch size modular head
- Thru-coolant equipped





Heavy Metal Modular Extensions

EDP	For Head Dia.	Description	Shank Dia.	OAL	M
22440	.750” / 20mm	ME-0750-18MM-900-C	18mm	9”	M10
22460	1.000” / 25mm	ME-1000-25MM-1100-C	25mm	11”	M12
22470	1.250” / 1.500”	ME-125/150-25MM-1200-C	25mm	12”	M16

Torque Wrench Systems

- Accurate, repeatable application of torque to insert screws – no over-tightening, stripping or binding
- More secure grip and leverage when compared to typical flag-style wrenches, with choice of two handle styles
- Color-coded adapters and bits for quick identification of the correct size for your application
- Each adapter has a preset torque value – simply tighten until you hear a click



T-Handle Torque Driver
TW-TH with TW-AD-20 and TW-BT-20

Complete Set Part Numbers

T10	T15	T20
Straight Handle: TW-SS-10	Straight Handle: TW-SS-15	Straight Handle: TW-SS-20
T-Handle: TW-TS-10	T-Handle: TW-TS-15	T-Handle: TW-TS-20

Individual Pieces

Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH	Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH	Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH
Adapter: TW-AD-10	Adapter: TW-AD-15	Adapter: TW-AD-20
TORX® Bits: TW-BT-10	TORX® Bits: TW-BT-15	TORX® Bits: TW-BT-20



T10 Torque Adapter
TW-AD-10



T15 Torque Adapter
TW-AD-15



T20 Torque Adapter
TW-AD-20



Straight-Handle Torque Driver
TW-SH-L



T-Handle Torque Driver
TW-TH



T10 TORX® Bits (set of 6)
TW-BT-10



T15 TORX® Bits (set of 6)
TW-BT-15



T20 TORX® Bits (set of 6)
TW-BT-20



Straight-Handle Torque Driver
TW-SH-L with TW-AD-10 and TW-BT-10

TORX® is a registered trademark of Camcar/Textron.

Notes

Ball Nose Insert Grade & Coating Selection

Grade	Materials		Machining Conditions			Coating			Coolant
			Roughing	Medium	Light				
			Severe	Moderate	Rigid	1st Choice	2nd Choice	3rd Choice	
F1 / UC	**Steel**	P10-P25	☐	■	■	GLH	HM	TS	◆
	Hardened Steel (> 45 Rc)	H10-H20	☐	▬	■	HM	GLH	TS	★ ○
	Iron	K10-K25	▬	■	■	HM	GLH	TS	◆
	Stainless Steel	M10-M20	☐	▬	■	HM	GLH	TS	●
	High-Temp. Alloys	S10-S20	☐	▬	■	HM	TS	GLH	●
	Non-Ferrous (Alu, Graph)	N10-N40	■	■	■	PCD	FPD	FPDL	●
	Non-Ferrous (Wood, Plastic)	N10-N40	■	■	■	Uncoated			●
	Copper Alloys	N10-N30	■	■	■	GLH	FPO		●
T1	**Steel**	P10-P35	■	■	■	HM	TS		◆
	Hardened Steel (> 45 Rc)	H10-H25	▬	■	■	HM	TS		★ ○
	Iron	K10-K35	■	■	■	HM	TS		◆
	Stainless Steel	M10-M30	■	■	■	HM	TS		●
	High-Temp. Alloys	S10-S25	■	■	■	TS	HM		●
	Non-Ferrous (Alu, Graph, Wood, Plastic)	N10-N40	▬	▬	▬	T1			●
	Copper Alloys	N10-N40	■	▬	▬	TS	HM		●

■ Highly Recommended
▬ Recommended
☐ Not Recommended

● Coolant Beneficial
◆ Coolant Optional
○ Coolant Detrimental
★ Air Preferred

› **Bold text** indicates preferred material.