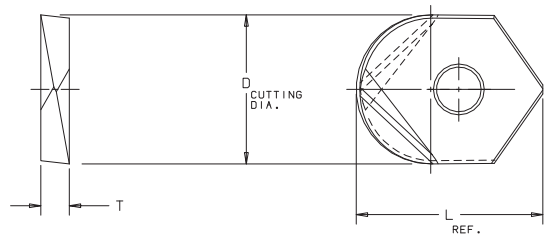


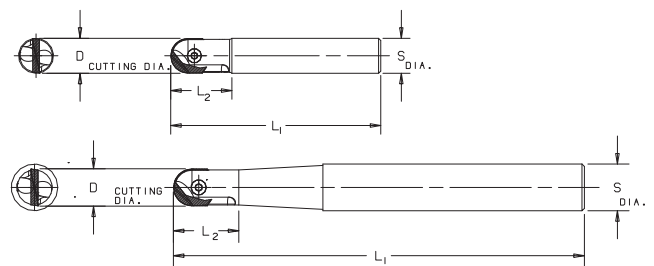
EXCELERATOR® BALL NOSE

Greenleaf's line of Excelerator® ball nose mills features patented geometries designed to maximize your productivity and improve tool life. Greenleaf's ball nose mills are the only ball nose end mills on the market designed to accept either carbide or ceramic inserts, making extreme applications profitable.

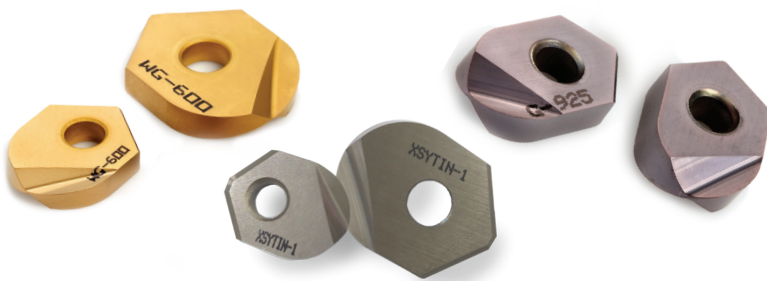


INSERT	'L'	'D'	'T'	INSERT SCREW	SCREW TORQUE SETTING
GBN-M010	12,7	10	3,18	SM30-083	1,96 Nm
GBN-M012	17,0	12	4,78	SM40-106	2,94 Nm
GBN-M016	20,3	16	4,78	SM50-139	5,88 Nm
GBN-M020	22,9	20	4,78	SM60-167	8,14 Nm
GBN-M025	31,2	25	4,78	SM70-210	9,32 Nm

Application of medium strength thread locker recommended



PART NUMBER SHORT SERIES	PART NUMBER EXTENDED SERIES	INSERT	D	L1	L2	S
SSBN-M010X	SSBN-M010EX	GBN-M010	10	100	17	16
				180	17	16
SSBN-M012X	SSBN-M012EX	GBN-M012	12	110	19	16
				200	19	16
SSBN-M016X	SSBN-M016EX	GBN-M016	16	130	25,4	20
				220	25,4	20
SSBN-M020X	SSBN-M020EX	GBN-M020	20	140	32	25
				250	32	25
SSBN-M025X	SSBN-M025EX	GBN-M025	25	150	36	32
				250	36	32



Inserts available in ceramic grades WG-600® and XSYTIN®-1 and carbide grade G-925.

U.S. Patent No. 8, 177, 459 B2

Starting Speeds and Feeds for Exceleator® Ball Nose

Work Material	Hardness (HRC)	Insert Grades	Cutting Speed (m/min)	Target Chip Thickness (mm)	Recommended Feed per Tooth (mm/t/rev) Depth of Cut to Radius Ratio (Ap/r)		
					0-13.4%	13.4-29.3%	29.3-50%
Steel	40 HRC	G-925	152	0.048	0.216	0.124	0.095
		XSYTIN®-1	320	0.080	0.365	0.206	0.159
		WG-600	457	0.056	0.253	0.144	0.111
	50 HRC	G-925	350	0.002	0.107	0.062	0.048
		XSYTIN®-1	720	0.004	0.290	0.165	0.127
		WG-600	1020	0.003	0.216	0.124	0.095
	60 HRC	G-925	91	0.016	0.071	0.041	0.032
		XSYTIN®-1	131	0.048	0.216	0.124	0.095
		WG-600	186	0.032	0.143	0.082	0.064
Tool Steel	65 HRC	G-925	84	0.016	0.071	0.041	0.032
		XSYTIN®-1	85	0.040	0.179	0.103	0.079
		WG-600	122	0.024	0.107	0.062	0.048
HRSA	20-25 HRC	G-925	168	0.064	0.290	0.165	0.127
		XSYTIN®-1	914	0.064	0.290	0.165	0.127
		WG-600	1204	0.040	0.179	0.103	0.079
	40-45 HRC	G-925	107	0.040	0.179	0.103	0.079
		XSYTIN®-1	792	0.040	0.179	0.103	0.079
		WG-600	1052	0.024	0.107	0.062	0.048
Graphitic Cast Iron	<40 HRC	G-925	259	0.086	0.395	0.223	0.171
		XSYTIN®-1	701	0.072	0.327	0.185	0.143
		WG-600	899	0.048	0.216	0.124	0.095
Stainless Steel	≤40 HRC	G-925	137	0.064	0.290	0.165	0.127
		XSYTIN®-1	732	0.064	0.290	0.165	0.127
		WG-600	1061	0.040	0.179	0.103	0.079
Titanium 6Al4V	35-40 HRC	G-925	76	0.024	0.107	0.062	0.048
Aluminum		G-925	290	0.095	0.441	0.247	0.190

* Recommended Feed per Tooth values are given here for full slotting. When 3D/Profile milling, please use the Greenleaf Ball Nose Calculator to determine the appropriate cutting parameters to achieve the target chip thickness shown. For questions regarding applications and additional materials, please contact your local sales and service engineer or the Greenleaf Technical Service department.

** Optimal chip thickness has to be balanced with resulting cutting forces (can the cutting tool material withstand the mechanical loads?), the dynamics of the machine, the rigidity of the setup, and ultimately the surface roughness requirements.

Effective Cutting Diameter

DOC		DEPTH OF CUT (DOC)												
		.013	0.25	0.38	0.64	0.89	1.40	1.91	2.41	2.54	2.92	3.18	3.81	5.08
INSERT DIAMETER	10	2.18	3.07	3.73	4.75	5.54	6.74	7.62	8.29	8.42	8.78	8.98	9.33	-
	12	2.53	3.56	4.33	5.54	6.48	7.95	9.07	9.96	10.16	10.69	11.00	11.64	12.44
	16	2.83	3.98	4.86	6.22	7.30	8.99	10.32	11.40	11.64	12.30	12.70	13.56	14.81
	20	3.10	4.37	5.33	6.84	8.04	9.93	11.43	12.67	12.95	13.73	14.20	15.24	16.85
	25	3.58	5.05	6.17	7.93	9.34	11.58	13.38	14.90	15.24	16.21	16.80	18.14	20.32

 Effective diameter at maximum recommended DOC for WG-600®

 Effective diameter at maximum recommended DOC for G-925 and XSYTIN®-1



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Exceleator Ball Nose (Metric)