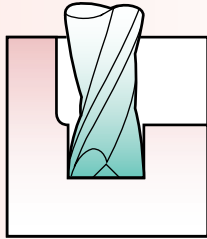
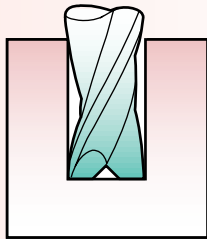


STANDARD LENGTH MINIATURE END-MILLS

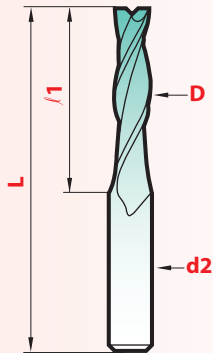
TOLERANCE 0 - .0004"



SLOTING
ENGRAVING



FLAT BOTTOM
BORING



USING
RECOMMENDATIONS
Page 43

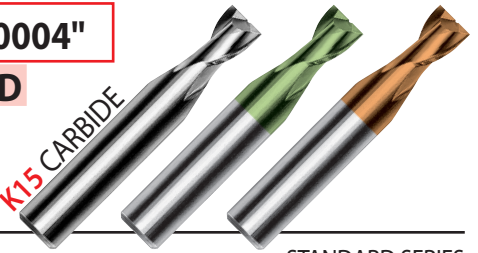
PRECISION MINIATURE END-MILLS

TOLERANCE 0 - .0004"

$\lambda \approx 2-3 \times D$



K15 CARBIDE



STANDARD SERIES

Diameter inch	mm	\1	L	d2	magaforce 8500	Graph'X 8500-G	Hard'X 8500-H
.0020	0,05	.004	1-1/2	.118 3 mm	85000005		
.0024	0,06	.005			85000006		
.0031	0,08	.006			85000008		
.0039	0,10	.008			85000010		
.0047	0,12	.009			85000012		
.0059	0,15	.012			85000015		
.0079	0,20	.020			85000020		
.0098	0,25	.020			85000025		
.0118	0,30	.039			85000030	85000030-G	8500030-H
.0138	0,35	.039			85000035	85000035-G	8500035-H
.0157	0,40	.039			85000040	85000040-G	8500040-H
.0177	0,45	.039			85000045	85000045-G	8500045-H
.0197	0,50	.059			85000050	85000050-G	8500050-H
.0216	0,55	.059			85000055	85000055-G	8500055-H
.0236	0,60	.059			85000060	85000060-G	8500060-H
.0256	0,65	.059			85000065	85000065-G	8500065-H
.0276	0,70	.079			85000070	85000070-G	8500070-H
.0295	0,75	.079			85000075	85000075-G	8500075-H
.0315	0,80	.079			85000080	85000080-G	8500080-H
.0335	0,85	.079			85000085	85000085-G	8500085-H
.0354	0,90	.098			85000090	85000090-G	8500090-H
.0374	0,95	.098			85000095	85000095-G	8500095-H
.0394	1,00	0,12			85000100	85000100-G	8500100-H
.0413	1,05	0,12			85000105	85000105-G	8500105-H
.0433	1,10	0,12			85000110	85000110-G	8500110-H
.0452	1,15	0,12			85000115	85000115-G	8500115-H
.0472	1,20	0,16			85000120	85000120-G	8500120-H
.0492	1,25	0,16			85000125	85000125-G	8500125-H
.0512	1,30	0,16			85000130	85000130-G	8500130-H
.0551	1,40	0,16			85000140	85000140-G	8500140-H
.0591	1,50	0,16			85000150	85000150-G	8500150-H
.0630	1,60	0,20			85000160	85000160-G	8500160-H
.0669	1,70	0,20			85000170	85000170-G	8500170-H
.0709	1,80	0,20			85000180	85000180-G	8500180-H
.0748	1,90	0,20			85000190	85000190-G	8500190-H
.0787	2,00	0,20			85000200	85000200-G	8500200-H
.0827	2,10	0,24			85000210	85000210-G	8500210-H
.0866	2,20	0,24			85000220	85000220-G	8500220-H

TOLERANCE 0 - .0004"



STANDARD SERIES

Diameter inch mm	λ1	L	d2	magaforce 8500	Graph'X 8500-G	Hard'X 8500-H
.0906 2,30	0.24	1-1/2	.118 3 mm	85000230	85000230-G	8500230-H
.0945 2,40	0.24			85000240	85000240-G	8500240-H
.0984 2,50	0.28			85000250	85000250-G	85000250-H
.1024 2,60	0.28			85000260	85000260-G	85000260-H
.1063 2,70	0.28			85000270	85000270-G	85000270-H
.1102 2,80	0.28			85000280	85000280-G	85000280-H
.1142 2,90	0.28			85000290	85000290-G	85000290-H
.1181 3,00	0.39			85000300	85000300-G	85000300-H
.1220 3,10	0.39	1-3/4	.157 4 mm	85000310	85000310-G	85000310-H
.1260 3,20	0.39			85000320	85000320-G	85000320-H
.1299 3,30	0.39			85000330	85000330-G	85000330-H
.1339 3,40	0.39			85000340	85000340-G	85000340-H
.1378 3,50	0.39			85000350	85000350-G	85000350-H
.1417 3,60	0.39			85000360	85000360-G	85000360-H
.1457 3,70	0.39			85000370	85000370-G	85000370-H
.1496 3,80	0.39			85000380	85000380-G	85000380-H
.1535 3,90	0.39			85000390	85000390-G	85000390-H

STANDARD SERIES

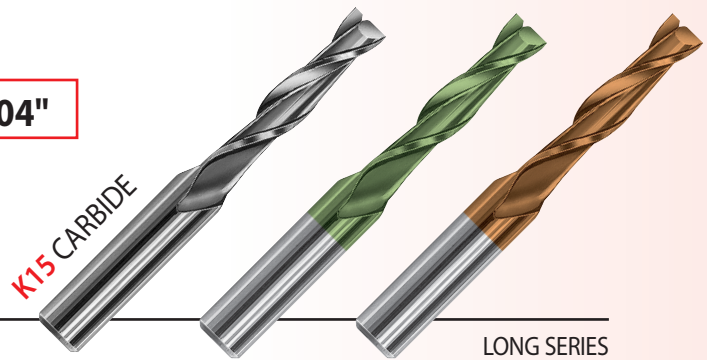
Diameter inch mm	λ1	L	d2	magaforce 8500	Graph'X 8500-G	Hard'X 8500-H
.1575 4,00	0.47	2-3/16	.197 5 mm	85000400	85000400-G	85000400-H
.1614 4,10	0.47			85000410	85000410-G	85000410-H
.1654 4,20	0.47			85000420	85000420-G	85000420-H
.1693 4,30	0.47			85000430	85000430-G	85000430-H
.1732 4,40	0.47			85000440	85000440-G	85000440-H
.1772 4,50	0.47			85000450	85000450-G	85000450-H
.1811 4,60	0.47			85000460	85000460-G	85000460-H
.1850 4,70	0.47			85000470	85000470-G	85000470-H
.1890 4,80	0.47	2-3/16	.236 6 mm	85000480	85000480-G	85000480-H
.1929 4,90	0.47			85000490	85000490-G	85000490-H
.1969 5,00	0.55			85000500	85000500-G	85000500-H
.2008 5,10	0.55			85000510	85000510-G	85000510-H
.2047 5,20	0.55			85000520	85000520-G	85000520-H
.2087 5,30	0.55			85000530	85000530-G	85000530-H
.2126 5,40	0.55			85000540	85000540-G	85000540-H
.2165 5,50	0.55			85000550	85000550-G	85000550-H
.2205 5,60	0.55			85000560	85000560-G	85000560-H
.2244 5,70	0.55			85000570	85000570-G	85000570-H
.2283 5,80	0.55			85000580	85000580-G	85000580-H
.2323 5,90	0.55			85000590	85000590-G	85000590-H

TOLERANCE 0 - .0004"

λ = 5 x D



L = 1-1/2 d2 = .118 / 3 mm

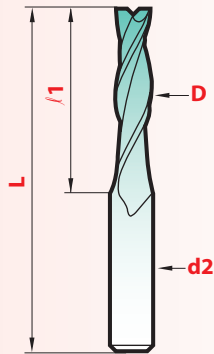
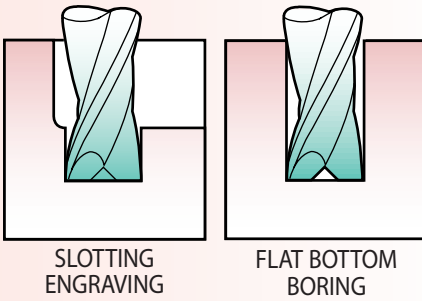


LONG SERIES

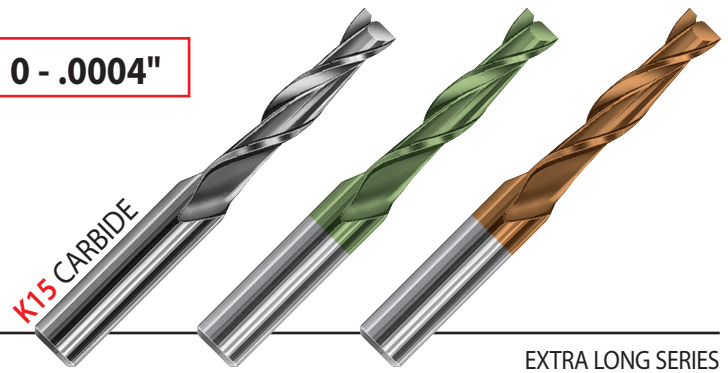
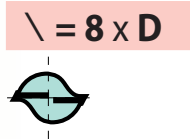
Diameter inch mm	λ1	magaforce 8509	Graph'X 8509-G	Hard'X 8509-H
.0157 0,4	.078	850904	850904-G	850904-H
.0197 0,5	.098	850905	850905-G	850905-H
.0236 0,6	.118	850906	850906-G	850906-H
.0276 0,7	.137	850907	850907-G	850907-H
.0315 0,8	.157	850908	850908-G	850908-H
.0354 0,9	.177	850909	850909-G	850909-H
.0394 1,0	.197	850910	850910-G	850910-H
.0472 1,2	.236	850912	850912-G	850912-H
.0591 1,5	.295	850915	850915-G	850915-H
.0787 2,0	.394	850920	850920-G	850920-H

*Call for pricing

EXTRA-LONG MINIATURE END-MILLS



TOLERANCE 0 - .0004"

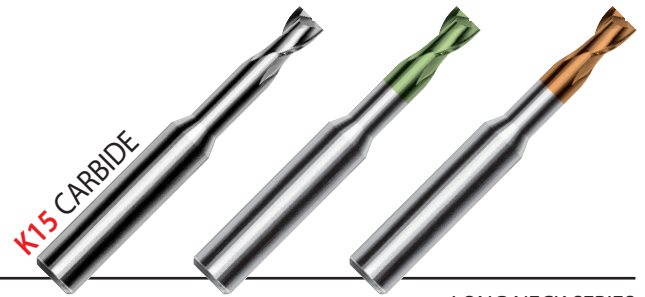
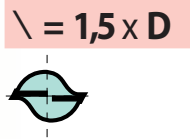
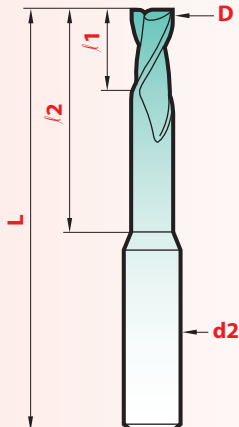
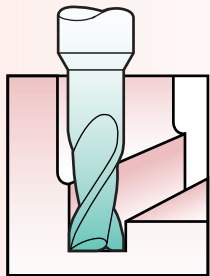


EXTRA LONG SERIES

Diameter		l_1	L	d2	magaforce 8510	Graph'X 8510-G	Hard'X 8510-H
inch	mm						
.0197	0,5	.157	1-1/2	.118 3 mm	851005	851005-G	851005-H
.0236	0,6	.197			851006	851006-G	851006-H
.0315	0,8	.236			851008	851008-G	851008-H
.0394	1,0	.315			851010	851010-G	851010-H
.0472	1,2	.354	1-3/4	.157 4 mm	851012	851012-G	851012-H
.0591	1,5	.472			851015	851015-G	851015-H
.0787	2,0	.630			851020	851020-G	851020-H
.0984	2,5	.788	2-3/8	.197 5 mm	851025	851025-G	851025-H
.1181	3,0	.945			851030	851030-G	851030-H

*Call for pricing

MINIATURE END-MILLS WITH BACK CLEARANCE



$d_2 = .118 / 3 \text{ mm}$

LONG NECK SERIES

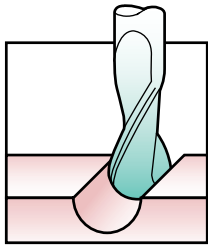
Diameter ϕ		l_1	L	magaforce 8507-D	Graph'X 8507-DG	Hard'X 8507-DH
inch	mm					
.0157 x .078	0,4 x 2	.024	1-1/2	8507D0402	8507DG0402	8507DH0402
.0197 x .078	0,5 x 2	.027	1-1/2	8507D0502	8507DG0502	8507DH0502
.0197 x .157	0,5 x 4	.027	1-1/2	8507D0504	8507DG0504	8507DH0504
.0197 x .236	0,5 x 6	.027	2-3/8	8507D0506	8507DG0506	8507DH0506
.0236 x .157	0,6 x 4	.029	1-1/2	8507D0604	8507DG0604	8507DH0604
.0276 x .157	0,7 x 4	.035	1-1/2	8507D0704	8507DG0704	8507DH0704
.0315 x .157	0,8 x 4	.041	1-1/2	8507D0804	8507DG0804	8507DH0804
.0315 x .236	0,8 x 6	.041	1-1/2	8507D0806	8507DG0806	8507DH0806
.0315 x .354	0,8 x 9	.041	2-3/8	8507D0809	8507DG0809	8507DH0809
.0354 x .236	0,9 x 6	.053	1-1/2	8507D0906	8507DG0906	8507DH0906
.0394 x .157	1,0 x 4	.059	1-1/2	8507D1004	8507DG1004	8507DH1004
.0394 x .236	1,0 x 6	.059	1-1/2	8507D1006	8507DG1006	8507DH1006
.0394 x .354	1,0 x 9	.059	1-1/2	8507D1009	8507DG1009	8507DH1009
.0394 x .472	1,0 x 12	.059	2-3/8	8507D1012	8507DG1012	8507DH1012
.0472 x .236	1,2 x 6	.071	1-1/2	8507D1206	8507DG1206	8507DH1206
.0472 x .354	1,2 x 9	.071	1-1/2	8507D1209	8507DG1209	8507DH1209
.0551 x .236	1,4 x 6	.083	1-1/2	8507D1406	8507DG1406	8507DH1406
.0551 x .354	1,4 x 9	.083	1-1/2	8507D1409	8507DG1409	8507DH1409
.0591 x .236	1,5 x 6	.089	1-1/2	8507D1506	8507DG1506	8507DH1506
.0591 x .354	1,5 x 9	.089	1-1/2	8507D1509	8507DG1509	8507DH1509
.0591 x .472	1,5 x 12	.089	2-3/8	8507D1512	8507DG1512	8507DH1512
.0709 x .354	1,8 x 9	.106	1-1/2	8507D1809	8507DG1809	8507DH1809
.0709 x .472	1,8 x 12	.106	1-1/2	8507D1812	8507DG1812	8507DH1812
.0787 x .354	2,0 x 9	.118	1-1/2	8507D2009	8507DG2009	8507DH2009
.0787 x .472	2,0 x 12	.118	1-1/2	8507D2012	8507DG2012	8507DH2012
.0787 x .590	2,0 x 15	.118	2-3/8	8507D2015	8507DG2015	8507DH2015
.0984 x .590	2,5 x 15	.148	2-3/8	8507D2515	8507DG2515	8507DH2515

ϕ 2: tolerance - .0008 - .0020

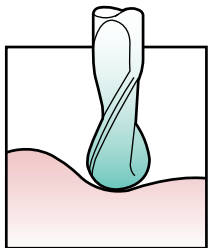
*Call for pricing

MINIATURE BALL-END END-MILLS

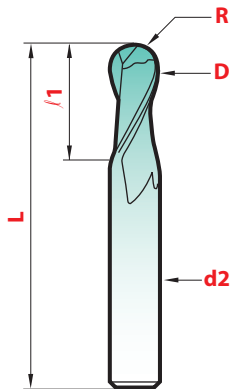
PRECISION $R \pm .0004$



SLOTING
ENGRAVING



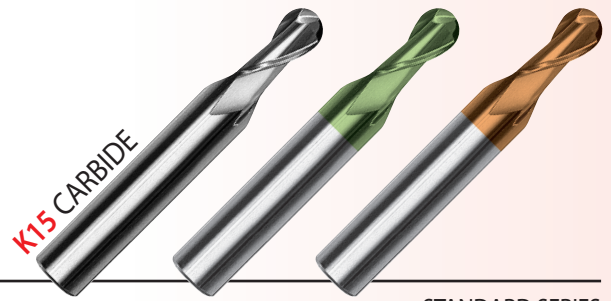
MOLD SHAPING



D	d2	L
.0039 to .0984	.118	1-1/2
.1181 to .1378	.157	1-3/4
.1575 to .1772	.197	2
.1968 to .2165	.236	2

Tolerances

$\backslash \approx 2-3 \times D$



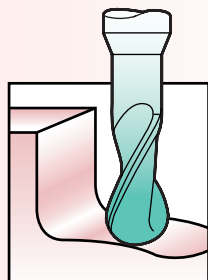
STANDARD SERIES

Diameter inch mm	$\backslash 1$	R	magaforce 8529	Graph'X 8529-G	Hard'X 8529-H
.0039 0,1	.008	.0020	85290010		
.0059 0,15	.012	.0030	85290015		
.0079 0,2	.020	.0040	85290020		
.0098 0,25	.020	.0049	85290025		
.0118 0,3	.040	.0059	85290030	85290030-G	85290030-H
.0138 0,35	.040	.0069	85290035		85290035-H
.0157 0,4	.040	.0079	85290040	85290040-G	85290040-H
.0197 0,5	.060	.0098	85290050	85290050-G	85290050-H
.0236 0,6	.060	.0118	85290060	85290060-G	85290060-H
.0276 0,7	.080	.0138	85290070	85290070-G	85290070-H
.0315 0,8	.080	.0158	85290080	85290080-G	85290080-H
.0354 0,9	.100	.0177	85290090	85290090-G	85290090-H
.0394 1,0	.120	.0197	85290100	85290100-G	85290100-H
.0433 1,1	.120	.0217	85290110	85290110-G	85290110-H
.0472 1,2	.160	.0236	85290120	85290120-G	85290120-H
.0551 1,4	.160	.0276	85290140	85290140-G	85290140-H
.0591 1,5	.160	.0295	85290150	85290150-G	85290150-H
.0630 1,6	.160	.0315	85290160	85290160-G	85290160-H
.0709 1,8	.200	.0354	85290180	85290180-G	85290180-H
.0787 2,0	.200	.0394	85290200	85290200-G	85290200-H
.0984 2,5	.275	.0492	85290250	85290250-G	85290250-H
.1181 3,0	.400	.0590	85290300	85290300-G	85290300-H
.1378 3,5	.400	.0689	85290350	85290350-G	85290350-H
.1575 4,0	.475	.0787	85290400	85290400-G	85290400-H
.1772 4,5	.475	.0886	85290450	85290450-G	85290450-H
.1968 5,0	.550	.0984	85290500	85290500-G	85290500-H
.2165 5,5	.550	.1083	85290550	85290550-G	85290550-H

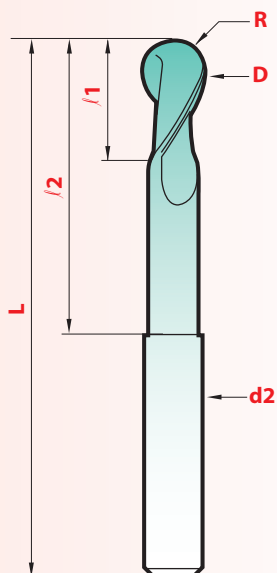
USING
RECOMMENDATIONS
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MINIATURE BALL-END END-MILLS WITH BACK CLEARANCE

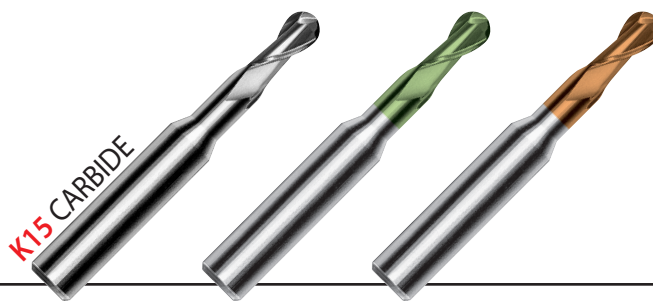
PRECISION $R \pm .0004$



MACHININGS
HARD TO REACH



$\backslash = -1,5 \times D$



$d2 = .118 / 3 \text{ mm (except *)}$

LONG NECK SERIES

Diameter inch	$\backslash 2$ mm	L	$\backslash 1$	R	carbide 8527-D	Graph'X 8527-DG	Hard'X 8527-DH
.0157 x .078	0,4 x 2	1-1/2	.024	.0079	8527D0402	8527DG0402	8527DH0402
.0197 x .078	0,5 x 2	1-1/2	.027	.0098	8527D0502	8527DG0502	8527DH0502
.0197 x .157	0,5 x 4	1-1/2	.027	.0098	8527D0504	8527DG0504	8527DH0504
.0197 x .236	0,5 x 6	2-3/8	.027	.0098	8527D0506	8527DG0506	8527DH0506
.0236 x .157	0,6 x 4	1-1/2	.029	.0118	8527D0604	8527DG0604	8527DH0604
.0315 x .157	0,8 x 4	1-1/2	.041	.0158	8527D0804	8527DG0804	8527DH0804
.0315 x .236	0,8 x 6	1-1/2	.041	.0158	8527D0806	8527DG0806	8527DH0806
.0315 x .354	0,8 x 9	2-3/8	.041	.0158	8527D0809	8527DG0809	8527DH0809
.0394 x .157	1,0 x 4	1-1/2	.059	.0197	8527D1004	8527DG1004	8527DH1004
.0394 x .197	1,0 x 5	1-1/2	.059	.0197	8527D1005	8527DG1005	8527DH1005
.0394 x .236	1,0 x 6	1-1/2	.059	.0197	8527D1006	8527DG1006	8527DH1006
.0394 x .354	1,0 x 9	1-1/2	.059	.0197	8527D1009	8527DG1009	8527DH1009
.0394 x .472	1,0 x 12	2-3/8	.059	.0197	8527D1012	8527DG1012	8527DH1012
.0472 x .236	1,2 x 6	1-1/2	.071	.0236	8527D1206	8527DG1206	8527DH1206
.0551 x .276	1,4 x 7	1-3/4*	.083	.0276	8527D1407	8527DG1407	8527DH1407
.0591 x .236	1,5 x 6	1-1/2	.089	.0295	8527D1506	8527DG1506	8527DH1506
.0591 x .295	1,5 x 7,5	1-3/4*	.089	.0295	8527D1575	8527DG1575	8527DH1575
.0591 x .354	1,5 x 9	1-1/2	.089	.0295	8527D1509	8527DG1509	8527DH1509
.0591 x .472	1,5 x 12	2-3/8	.089	.0295	8527D1512	8527DG1512	8527DH1512
.0630 x .315	1,6 x 8	1-3/4*	.094	.0315	8527D1608	8527DG1608	8527DH1608
.0709 x .354	1,8 x 9	1-3/4*	.106	.0354	8527D1809	8527DG1809	8527DH1809
.0787 x .354	2,0 x 9	1-1/2	.118	.0394	8527D2009	8527DG2009	8527DH2009
.0787 x .394	2,0 x 10	1-3/4*	.118	.0394	8527D2010	8527DG2010	8527DH2010
.0787 x .472	2,0 x 12	1-1/2	.118	.0394	8527D2012	8527DG2012	8527DH2012
.0787 x .590	2,0 x 15	2-3/8	.118	.0394	8527D2015	8527DG2015	8527DH2015
.0984 x .472	2,5 x 12	1-3/4*	.148	.0492	8527D2512	8527DG2512	8527DH2512
.0984 x .590	2,5 x 15	2-3/8	.148	.0492	8527D2515	8527DG2515	8527DH2515
.1181 x .590	3,0 x 15	1-3/4*	.177	.0590	8527D3015	8527DG3015	8527DH3015

* $d2 = .157 / 4 \text{ mm}$

$\backslash = -1,5 \times D$



K15 CARBIDE



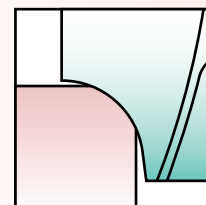
$L = 2-3/8$

$d2 = .118 / 3 \text{ mm}$

LONG SHANK SERIES

Diameter inch	mm	$\backslash 1$	R	carbide 8527-L
.0197	0,5	.027	.0098	8527L05
.0315	0,8	.041	.0158	8527L08
.0394	1,0	.059	.0197	8527L10
.0591	1,5	.089	.0295	8527L15
.0787	2,0	.118	.0394	8527L20
.0984	2,5	.148	.0492	8527L25

MINIATURE round corner MILLING CUTTERS

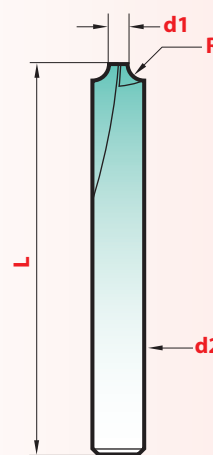
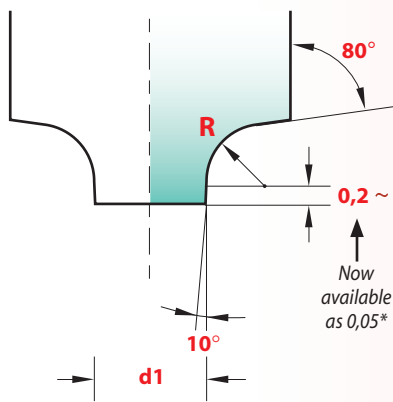


These cutters are designed for CNC machine. They allow machining even very thin materials. Many easy regrinds.

METRIC

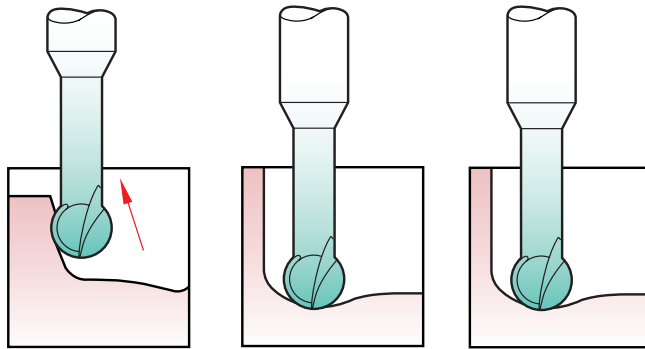
Radius					
inch	mm	d1	d2	L	Carbide 8555
.0040	0,10	0,8	3	50	8555010
.0060	0,15	0,8	3	50	8555015
.0080	0,20	0,8	3	50	8555020
.0100	0,25	1,0	3	50	8555025
.0120	0,30	1,0	3	50	8555030
.0160	0,40	1,0	3	50	8555040
.0195	0,50	1,5	4	50	8555050
.0235	0,60	1,5	4	50	8555060
.0275	0,70	1,5	4	50	8555070
.0295	0,75	1,5	4	50	8555075
.0315	0,80	1,5	4	50	8555080
.0355	0,90	1,5	4	50	8555090
.0395	1,00	1,5	4	50	8555100
.0490	1,25	2,0	6	50	8555125
.0590	1,50	2,0	6	50	8555150
.0690	1,75	2,0	6	50	8555175
.0790	2,00	2,5	8	50	8555200
.0885	2,25	2,5	8	50	8555225
.0985	2,50	2,5	8	50	8555250
.1180	3,00	3,0	10	55	8555300
.1575	4,00	3,0	12	63	8555400

*Call for pricing

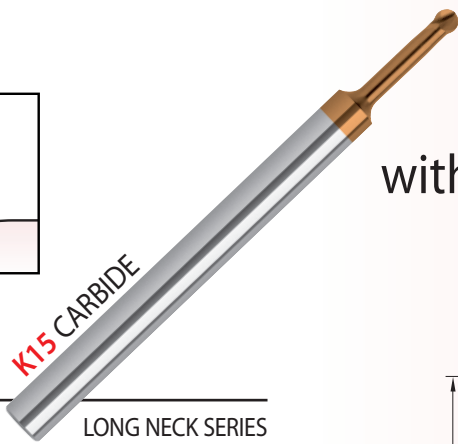


The radius is positioned in relation to the small Ø d1-: so it is possible to machine compound forms, small slots and holes from 0,8 mm.

We also offer a reduced neck series for machining inside smaller holes.



$\backslash 2 = 5 \times D$



220° ball-end MINIATURE END-MILLS with back clearance

METRIC

Diameter								
inch	mm	d1	d2	L	\1	\2	R	Hard'X 8522-H
.0315	0,8	0,70	3	60	0,55	4,0	0,4	8522H08
.0394	1,0	0,85	3	60	0,70	5,0	0,5	8522H10
.0472	1,2	1,00	3	60	0,80	6,0	0,6	8522H12
.0590	1,5	1,30	3	60	1,00	7,5	0,75	8522H15
.0787	2,0	1,70	3	60	1,35	10,0	1,0	8522H20
.1180	3,0	2,60	6	75	2,00	15,0	1,5	8522H30
.1575	4,0	3,45	6	75	2,70	20,0	2,0	8522H40
.1969	5,0	4,30	6	75	3,40	25,0	2,5	8522H50

*Call for pricing

LONG NECK SERIES

