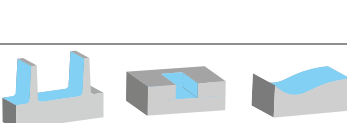


GRAPHEX



Designed specifically
for machining
Graphite



P			M		K		N					S		H	MACHINING GUIDE	2-FLUTE END MILLS				
1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39			Code	Item	Description	Page No.
										○	●						109333		Miniature Extended Neck Corner Radius ø0.2mm - 6.0mm	P.286-287
										○	●						113333		Miniature Tapered Neck Corner Radius ø1.0mm - 2.0mm	P.288
										○	●						101333 102333		Miniature Extended Neck Ball Nose ø0.2mm - 6.0mm	P.290-291
										○	●						107333		Extended Neck Long Length ø0.5mm - 12.0mm	P.289
										○	●						103333		Extended Neck Short Length Ball Nose ø2.0mm - 12.0mm	P.292
										○	●						104333 105333		Extended Neck Long Length Ball Nose ø2.0mm - 12.0mm	P.293
										○	●						108333		Tapered Neck Ball Nose ø1.0mm - 2.0mm	P.294
																3-FLUTE END MILLS				
							○			○	●						111333		Short Length Corner Radius ø2.0mm - 12.0mm	P.295
							○			○	●						112333		Long Length Corner Radius ø2.0mm - 12.0mm	P.296
							○			○	●						106333		Extended Neck Short Length Ball Nose ø2.0mm - 12.0mm	P.297
																4-FLUTE END MILLS				
										○	●						110333		Extended Neck Corner Radius ø6.0mm - 12.0mm	P.298
																			Cutting Data	P.299

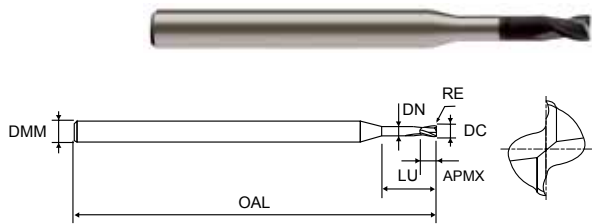
MINIATURE CORNER RADIUS
EXTENDED NECK



Series No. 109333

► cutting conditions : p.301

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1093330020	0.2	-	3	0.3	-	40	-
1093330030	0.3	-	3	0.5	-	40	-
1093330040	0.4	-	3	0.6	-	40	-
1093330050	0.5	0.05	3	0.7	2.5	40	0.45
1093339001	0.5	0.05	3	0.7	4.0	40	0.45
1093330060	0.6	0.05	3	0.9	3.0	40	0.55
1093339002	0.6	0.05	3	0.9	5.0	40	0.55
1093330080	0.8	0.05	3	1.2	4.0	40	0.75
1093339003	0.8	0.05	3	1.2	7.0	40	0.75
1093330100	1.0	0.10	3	1.5	5.0	40	0.95
1093339004	1.0	0.10	3	1.5	8.5	40	0.95
1093339005	1.0	0.10	3	1.5	12.0	40	0.95
1093330120	1.2	0.10	3	1.8	6.0	50	1.15
1093339006	1.2	0.10	3	1.8	10.0	50	1.15
1093330150	1.5	0.15	3	2.2	7.5	50	1.40
1093339007	1.5	0.15	3	2.2	12.0	50	1.40
1093339008	1.5	0.15	3	2.2	18.0	50	1.40
1093330200	2.0	0.15	3	2.2	10.0	60	1.90
1093339009	2.0	0.15	3	2.2	16.0	60	1.90
1093339010	2.0	0.15	3	2.2	25.0	60	1.90

Mill Dia. Tolerance TCD C (mm)	Shank Dia. Tolerance TCD M M
0.00 / -0.02	h6

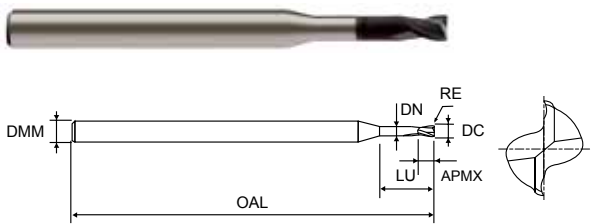
MINIATURE CORNER RADIUS
EXTENDED NECK



Series No. 109333

► cutting conditions : p.301

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1093330300	3.0	0.20	4	3.0	10.0	65	2.90
1093339011	3.0	0.20	4	3.0	15.0	65	2.90
1093339012	3.0	0.20	4	3.0	20.0	65	2.90
1093339013	3.0	0.20	4	3.0	25.0	75	2.90
1093339014	3.0	0.20	4	3.0	30.0	75	2.90
1093330400	4.0	0.20	6	4.0	20.0	65	3.90
1093339015	4.0	0.20	6	4.0	30.0	75	3.90
1093339016	4.0	0.20	6	4.0	40.0	90	3.90
1093330500	5.0	0.30	6	5.0	20.0	75	4.90
1093339017	5.0	0.30	6	5.0	30.0	75	4.90
1093339018	5.0	0.30	6	5.0	40.0	90	4.90
1093339019	5.0	0.30	6	5.0	50.0	90	4.90
1093330600	6.0	0.30	6	6.0	30.0	75	5.90
1093339020	6.0	0.30	6	6.0	40.0	90	5.90
1093339021	6.0	0.30	6	6.0	50.0	90	5.90
1093339022	6.0	0.0	6	6.0	60.0	100	5.90

Mill Dia. Tolerance TCD C (mm)	Shank Dia. Tolerance TCD M M
0.00 / -0.02	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

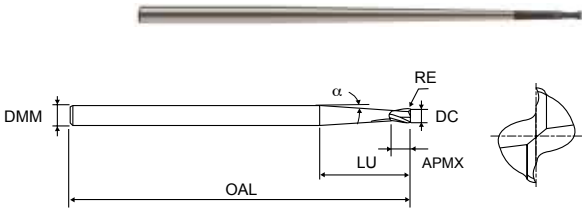
MINIATURE CORNER RADIUS
TAPERED NECK



Series No. 113333

► cutting conditions : p.301

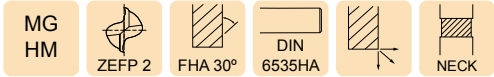
Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK TAPER α
1133330100	1.0	0.10	3	2.0	30	60	2°
1133339001	1.0	0.10	3	2.0	70	100	1°
1133330150	1.5	0.15	3	3.0	30	60	1°30'
1133339002	1.5	0.15	3	3.0	50	100	1°
1133330200	2.0	0.15	3	4.0	30	60	1°
1133339003	2.0	0.15	4	4.0	70	100	1°

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.02	h6

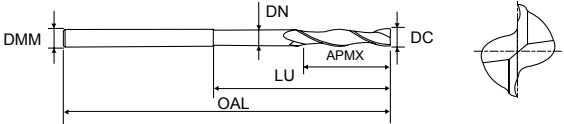
LONG LENGTH



Series No.107333

► cutting conditions : p.301

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



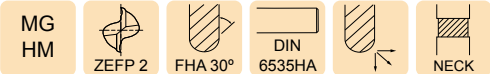
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1073330050	0.5	3	1.0	2	40	0.45
1073330060	0.6	3	2.0	3	40	0.55
1073330070	0.7	3	2.0	4	40	0.65
1073330080	0.8	3	2.0	5	40	0.75
1073330090	0.9	3	2.0	6	40	0.85
1073330100	1.0	4	3.0	8	75	0.95
1073330150	1.5	4	4.0	10	75	1.45
1073330200	2.0	4	6.0	16	100	1.90
1073330250	2.5	4	8.0	20	100	2.40
1073330300	3.0	6	8.0	30	100	2.80
1073330350	3.5	6	10.0	35	100	3.20
1073330400	4.0	6	20.0	40	100	3.70
1073330500	5.0	6	25.0	50	125	4.60
1073330600	6.0	6	30.0	60	140	5.60
1073330700	7.0	6	35.0	-	140	-
1073330800	8.0	8	40.0	80	150	7.40
1073330900	9.0	8	45.0	-	150	-
1073331000	10.0	10	50.0	80	150	9.40
1073331100	11.0	10	50.0	-	150	-
1073331200	12.0	12	55.0	80	150	11.40

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

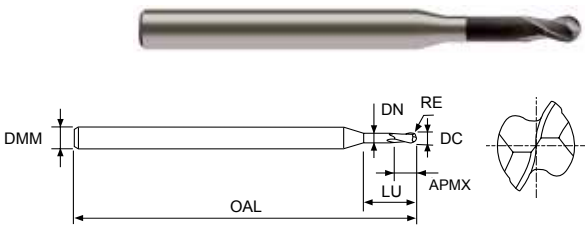
MINIATURE BALL NOSE
EXTENDED NECK



Series No. 101333, 102333

► cutting conditions : p.300

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.

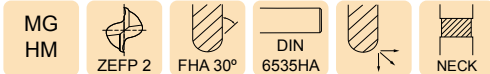


EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1013330020	0.2	0.10	3	0.2	-	40	-
1013330030	0.3	0.15	3	0.3	-	40	-
1013330040	0.4	0.20	3	0.4	-	40	-
1023330040	0.4	0.20	4	0.6	4.0	45	0.35
1023339001	0.4	0.20	4	0.6	6.0	45	0.35
1013330050	0.5	0.25	3	0.5	2.5	40	0.45
1013330060	0.6	0.30	3	0.6	3.0	40	0.55
1023330060	0.6	0.30	4	1.0	4.0	45	0.55
1013339001	0.6	0.30	3	0.6	5.0	40	0.55
1023339002	0.6	0.30	4	1.0	6.0	45	0.55
1023339003	0.6	0.30	4	1.0	8.0	45	0.55
1013330080	0.8	0.40	3	0.8	4.0	40	0.75
1013339002	0.8	0.40	3	0.8	7.0	40	0.75
1013330100	1.0	0.50	3	1.0	5.0	40	0.95
1023330100	1.0	0.50	4	1.5	6.0	45	0.95
1023339004	1.0	0.50	4	1.5	8.0	45	0.95
1013339003	1.0	0.50	3	1.0	8.5	40	0.95
1013339004	1.0	0.50	3	1.0	12.0	40	0.95
1023339005	1.0	0.50	4	1.5	12.0	45	0.95
1013330120	1.2	0.60	3	1.2	6.0	50	1.15
1013339005	1.2	0.60	3	1.2	10.0	50	1.15
1013330150	1.5	0.75	3	1.5	7.5	50	1.40
1013339006	1.5	0.75	3	1.5	12.0	50	1.40
1023330150	1.5	0.75	4	1.75	12.0	45	1.40
1013339007	1.5	0.75	3	1.5	18.0	50	1.40

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.02	-0.010	+0.010	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

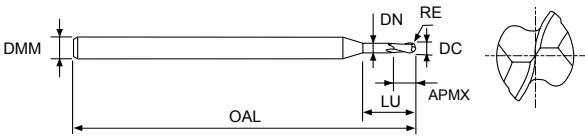
MINIATURE BALL NOSE
EXTENDED NECK



Series No. 101333, 102333

► cutting conditions : p.300

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.

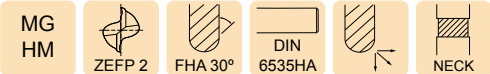


EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1023330200	2.0	1.0	4	3.0	8.0	60	1.90
1013330200	2.0	1.0	3	2.2	10.0	60	1.90
1023339006	2.0	1.0	4	3.0	12.0	60	1.90
1013339008	2.0	1.0	3	2.2	16.0	60	1.90
1023339007	2.0	1.0	4	3.0	16.0	60	1.90
1013339009	2.0	1.0	3	2.2	25.0	60	1.90
1013330300	3.0	1.5	4	3.0	10.0	65	2.90
1013339010	3.0	1.5	4	3.0	15.0	65	2.90
1013339011	3.0	1.5	4	3.0	20.0	65	2.90
1013339012	3.0	1.5	4	3.0	25.0	75	2.90
1013339013	3.0	1.5	4	3.0	30.0	75	2.90
1023330400	4.0	2.0	4	6.0	16.0	60	3.90
1013330400	4.0	2.0	6	4.0	20.0	65	3.90
1013339014	4.0	2.0	6	4.0	30.0	75	3.90
1013339015	4.0	2.0	6	4.0	40.0	90	3.90
1013330500	5.0	2.5	6	5.0	20.0	65	4.90
1013339016	5.0	2.5	6	5.0	30.0	75	4.90
1013339017	5.0	2.5	6	5.0	40.0	90	4.90
1013339018	5.0	2.5	6	5.0	50.0	90	4.90
1013330600	6.0	3.0	6	6.0	30.0	75	5.90
1013339019	6.0	3.0	6	6.0	40.0	90	5.90
1013339020	6.0	3.0	6	6.0	50.0	90	5.90
1013339021	6.0	3.0	6	6.0	60.0	100	5.90

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.02	-0.010	+0.010	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

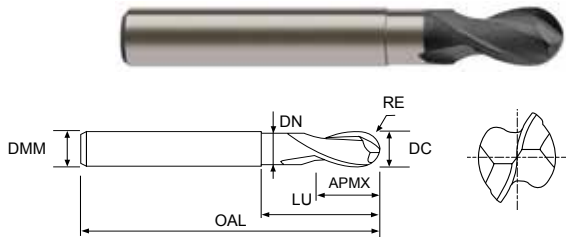
SHORT LENGTH BALL NOSE
EXTENDED NECK



Series No. 103333

► cutting conditions : p.300

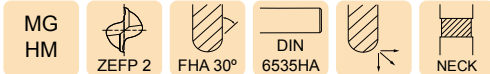
Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1033330200	2.0	1.0	6	3.0	5.0	60	1.9
1033330250	2.5	1.25	6	4.0	6.0	60	2.4
1033330300	3.0	1.5	6	4.5	6.5	60	2.8
1033330350	3.5	1.75	6	5.0	7.0	65	3.2
1033330400	4.0	2.0	6	6.0	8.0	65	3.7
1033330500	5.0	2.5	6	7.5	10.0	65	4.6
1033330600	6.0	3.0	6	9.0	12.0	75	5.6
1033330800	8.0	4.0	8	12.0	25.0	75	7.4
1033331000	10.0	5.0	10	15.0	30.0	80	9.4
1033331200	12.0	6.0	12	18.0	36.0	90	11.4

Mill Dia. Tolerance TDCD(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.010	+0.010	h6

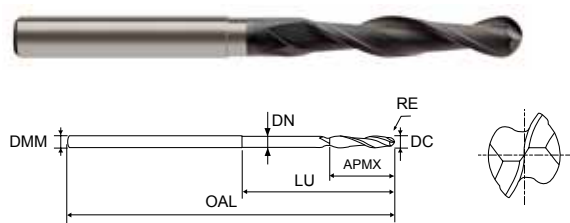
LONG LENGTH BALL NOSE
EXTENDED NECK



Series No.104333, 105333

► cutting conditions : p.300

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



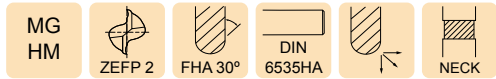
EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1043330200	2.0	1.0	4	10.0	20.0	80	1.95
1053330200	2.0	1.0	4	10.0	20.0	100	1.95
1043330300	3.0	1.5	4	15.0	25.0	80	2.90
1053330300	3.0	1.5	4	15.0	25.0	100	2.90
1043330400	4.0	2.0	4	20.0	30.0	80	3.90
1053330400	4.0	2.0	4	20.0	30.0	100	3.90
1043330500	5.0	2.5	6	30.0	50.0	100	4.90
1053330500	5.0	2.5	6	30.0	50.0	120	4.90
1043330600	6.0	3.0	6	30.0	50.0	100	5.50
1053330600	6.0	3.0	6	30.0	50.0	150	5.50
1043330700	7.0	3.5	6	30.0	-	100	-
1053330700	7.0	3.5	6	30.0	-	150	-
1043330800	8.0	4.0	8	40.0	60.0	110	7.50
1053330800	8.0	4.0	8	40.0	60.0	150	7.50
1043330900	9.0	4.5	8	40.0	-	110	-
1053330900	9.0	4.5	8	40.0	-	150	-
1043331000	10.0	5.0	10	50.0	70.0	120	9.50
1053331000	10.0	5.0	10	50.0	70.0	180	9.50
1043331200	12.0	6.0	12	55.0	75.0	130	11.50
1053331200	12.0	6.0	12	55.0	75.0	200	11.50

Mill Dia. Tolerance TDCD(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.010	+0.010	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

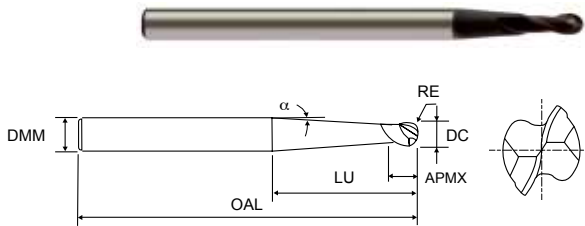
BALL NOSE TAPERED NECK



Series No. 108333

► cutting conditions : p.300

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK TAPER α
1083330100	1.0	0.5	3	2.0	-	40	8°30'
1083339001	1.0	0.5	3	2.0	30.0	60	2°
1083339002	1.0	0.5	3	2.0	70.0	100	1°
1083330150	1.5	0.75	3	3.0	-	40	6°15'
1083339003	1.5	0.75	3	3.0	30.0	60	1°30'
1083339004	1.5	0.75	3	3.0	58.0	100	0°45'
1083330200	2.0	1.0	3	4.0	-	40	4°15'
1083339005	2.0	1.0	3	4.0	30.0	60	1°
1083339006	2.0	1.0	4	4.0	70.0	100	1°

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.02	-0.010	+0.010	h6

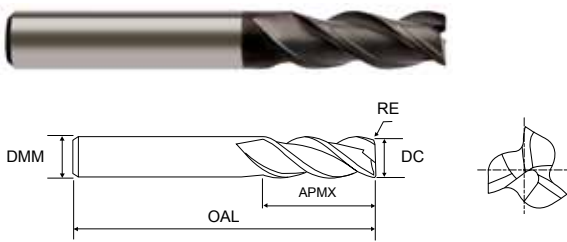
SHORT LENGTH CORNER RADIUS



Series No.111333

► cutting conditions : p.302

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1113330200	2.0	0.15	3	6.0	40
1113330300	3.0	0.15	3	12.0	40
1113330400	4.0	0.20	4	14.0	50
1113330500	5.0	0.30	5	16.0	50
1113330600	6.0	0.30	6	20.0	65
1113330800	8.0	0.50	8	20.0	65
1113331000	10.0	0.50	10	25.0	75
1113331200	12.0	0.50	12	25.0	75

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good							○			○	●			

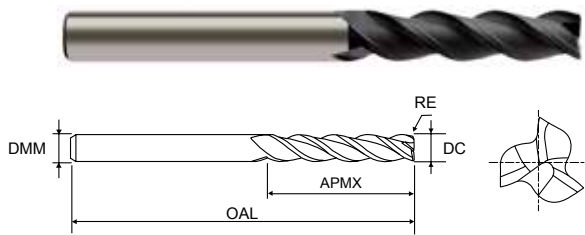
LONG LENGTH CORNER RADIUS



Series No. 112333

► cutting conditions : p.302

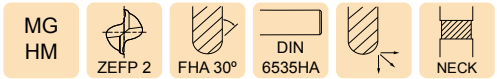
Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1123330200	2.0	0.15	3	9.0	60
1123330300	3.0	0.15	3	30.0	60
1123330400	4.0	0.20	4	30.0	60
1123330500	5.0	0.30	5	35.0	70
1123330600	6.0	0.30	6	40.0	100
1123330800	8.0	0.50	8	40.0	100
1123331000	10.0	0.50	10	40.0	100
1123331200	12.0	0.50	12	45.0	100

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

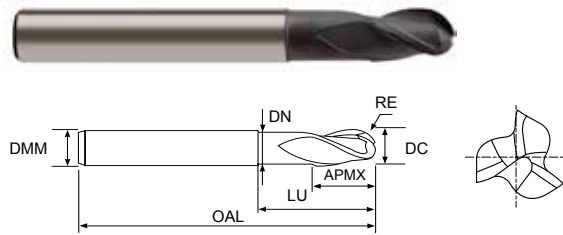
SHORT LENGTH BALL NOSE
EXTENDED NECK



Series No.106333

► cutting conditions : p.302

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1063330200	2.0	1.0	6	3.0	5.0	60	1.9
1063330250	2.5	1.25	6	4.0	6.0	60	2.4
1063330300	3.0	1.5	6	4.5	6.5	60	2.8
1063330350	3.5	1.75	6	5.0	7.0	65	3.2
1063330400	4.0	2.0	6	6.0	8.0	65	3.7
1063330500	5.0	2.5	6	7.5	10.0	65	4.6
1063330600	6.0	3.0	6	9.0	12.0	75	5.6
1063330800	8.0	4.0	8	12.0	25.0	75	7.4
1063331000	10.0	5.0	10	15.0	30.0	80	9.4
1063331200	12.0	6.0	12	18.0	36.0	90	11.4

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.010	+0.010	h6

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good							○			○	●			

ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good							○			○	●			

CORNER RADIUS EXTENDED NECK



MG
HM

ZEFP 4

RE

FHA 30°

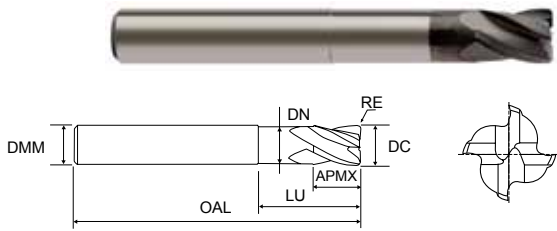
DIN
6535HA

NECK

Series No. 110333

► cutting conditions : p.302

Unique ultra fine diamond coating for high quality surface finish.
High hardness coating for increased wear resistance.
High performance on graphite and non-metals.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NECK DIAMETER DN
1103330600	6.0	0.5	6	10.0	40.0	80	5.9
1103330800	8.0	0.5	8	10.0	40.0	80	7.8
1103339004	8.0	1.0	8	10.0	60.0	100	7.8
1103331000	10.0	0.5	10	25.0	-	75	-
1103339005	10.0	0.5	10	12.0	40.0	80	9.8
1103339006	10.0	1.0	10	12.0	40.0	80	9.8
1103339007	10.0	0.5	10	12.0	80.0	125	9.8
1103331200	12.0	0.5	12	25.0	-	80	-
1103339008	12.0	0.5	12	15.0	40.0	80	11.8
1103339009	12.0	1.0	12	15.0	40.0	80	11.8
1103339100	12.0	1.0	12	15.0	80.0	125	11.8

Mill Dia.
Tolerance
TCDC(mm)

Shank Dia.
Tolerance
TCDMM

0.00 / -0.03h6

GRAPHEX
CUTTING DATA

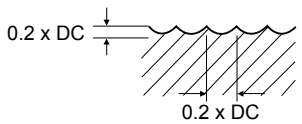
ISO	P			M		K		N					S		H
VDI	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39
EMG	11-12	13-14	15	21-22	23	31-32	33-34	71-74	61-64	81-82	83	84	51-53	41-43	16
● Excellent	○ Good										○	●			

CUTTING DATA



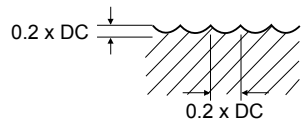
101333, 102333, 108333 (2 Flute Miniature Ball Nose)

VDI MATERIAL GROUP	Type of cut		Size (mm)										
			0.4	0.6	0.8	1.0	1.2	1.5	2.0	3.0	4.0	5.0	6.0
N	30	SLOTTING	v_c (m/min)	50	75	100	125	150	190	250	255	250	265
			n	40000	40000	40000	40000	40000	40000	27000	20000	16000	14000
			f_z	0.008	0.01	0.012	0.015	0.018	0.02	0.025	0.041	0.091	0.104
			f (mm/min)	600	800	960	1200	1440	1600	2000	2200	2900	2900



103333, 104333, 105333 (2 Flute Ball Nose)

VDI MATERIAL GROUP		Type of cut		Size (mm)									
				2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	12.0
N	30	SLOTTING	v_c (m/min)	100	125	150	175	200	245	285	325	360	395
			n	16000	16000	16000	16000	16000	15500	15000	13000	11500	10500
			f_z	0.025	0.035	0.045	0.055	0.066	0.082	0.098	0.115	0.133	0.150
			f (mm/min)	800	1120	1450	1750	2100	2550	2950	3000	3050	3150



v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed rate (mm/tooth)
 f - feed rate (mm/rev)
 z - No. of teeth
 a_p - axial depth of cut
 a_e - radial depth of cut

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \varnothing}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \varnothing}{1000}$

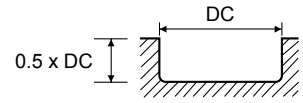
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

CUTTING DATA



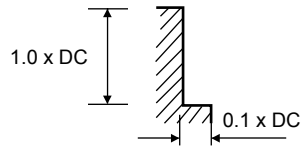
109333, 113333 (2 Flute Miniature Corner Radius)

VDI MATERIAL GROUP	Type of cut		Size (mm)										
			0.4	0.6	0.8	1.0	1.2	1.5	2.0	3.0	4.0	5.0	6.0
N	30	SLOTTING	v_c (m/min)	50	75	100	125	150	190	250	255	250	265
			n	40000	40000	40000	40000	40000	40000	27000	20000	16000	14000
			f_z	0.008	0.008	0.01	0.012	0.015	0.018	0.02	0.035	0.058	0.072
			f (mm/min)	640	640	800	960	1200	1440	1600	1900	2300	2300



107333 (2 Flute Long Length)

VDI MATERIAL GROUP	Type of cut		Size (mm)											
			0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0	10.0
N	30	SIDE CUTTING	v_c (m/min)	50	75	100	125	190	155	190	225	220	205	200
			n	40000	40000	40000	40000	40000	25000	20000	18000	14000	11000	8000
			f_z	0.003	0.004	0.007	0.009	0.010	0.016	0.020	0.026	0.043	0.064	0.081
			f (mm/min)	200	350	550	700	800	800	950	1200	1400	1300	1200



► The feed rate for long series and long necked tools should be reduced by up to 50%

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed rate (mm/tooth)
 f - feed rate (mm/rev)
 z - No. of teeth
 a_p - axial depth of cut
 a_e - radial depth of cut

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \varnothing}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \varnothing}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

106333 (3 Flute Ball Nose)

VDI MATERIAL GROUP		Type of cut		Size (mm)									
				2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	12.0
N	30	SLOTTING	v_c (m/min)	100	125	150	175	200	245	285	325	360	395
			n	16000	16000	16000	16000	16000	15500	15000	13000	11500	10500
			f_z	0.025	0.035	0.045	0.055	0.065	0.082	0.099	0.115	0.133	0.151
			f (mm/min)	1200	1700	2150	2650	3100	3800	4450	4500	4600	4750

The diagram illustrates a 3-flute ball nose tool. A vertical dimension line on the left indicates the chip thickness as $0.2 \times DC$. A horizontal dimension line at the bottom indicates the flute width as $0.2 \times DC$. The tool's profile is shown with three flutes, and the workpiece is represented by diagonal hatching.

111333, 112333 (3 Flute Corner Radius)

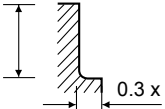
VDI MATERIAL GROUP		Type of cut		Size (mm)							
				2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
N	30	SIDE CUTTING	v_c (m/min)	250	375	505	630	755	805	815	790
			n	40000	40000	40000	40000	40000	32000	26000	21000
			f_z	0.025	0.035	0.05	0.06	0.07	0.088	0.110	0.130
			f (mm/min)	3000	4200	6000	7200	8400	8400	8600	8200

Diagram illustrating the corner radius and flute width specifications for the tool. The corner radius is indicated as $0.3 \times DC$ (where DC is the diameter) and the flute width is also indicated as $0.3 \times DC$.

► The feed rate for long series and long necked tools should be reduced by up to 50%

110333 (4 Flute Corner Radius)

VDI MATERIAL GROUP		Type of cut		Size (mm)			
				6.0	8.0	10.0	12.0
N	30	SLOTTING	v_c (m/min)	755	805	815	790
			n	40000	32000	26000	21000
			f_z	0.035	0.044	0.055	0.065
			f (mm/min)	5600	5600	5700	5450



0.3 x DC

0.3 x DC

► The feed rate for long series and long necked tools should be reduced by up to 50%