SMART TOOLSUK
ADVANCED MANUFACTURING TECHNOLOGIES

01245 260414 - 250910 sales@smarttoolsuk.com www.smarttoolsuk.com

LOW Price HIGH Performance

TAPER-SERIES

JCRO coating

JCRO coating

LOW Price HIGH Performance

HRc ~52

TAPER *series*

HRc52

Endmills for various work materials(~HRc52), **pre-hardened steel, carbon steel, mold steel, cast iron, aluminium,**

- *Good wear resistance by high quality Si-based PVD coating.*
- *Suitable shape is designed for tooling in wide areas.*
- *Maximize the manufacturing cost saving with low price of products.*
- *Minimize fracturing by high TRS fine(0.5 ㎛)WC grade.*

3TBIC 2CTB 2CTE 4CTE 4RTE

In 2015 Smart Tools UK Ltd and JJ Tools undertook a strategic alliance, resulting in Smart Tools securing sole distribution rights for the UK.

Joint collaboration with customers is key to our success, by gaining a clear understanding of your needs; we ensure you are kept informed of the latest developments in tooling technology that are critical to staying ahead of the curve.

Call one of the team today on 01245 260414 to discuss how Smart Tools can improve your tooling solutions while reducing costs and ensure a robust supply chain.

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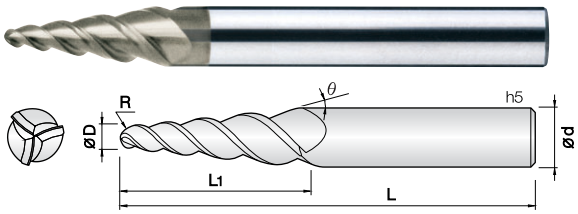
3TBIC

3 Flutes Taper Ball End Mills for Impellers



- **Pre-hardened steel, Cast iron, Non-metallic materials** JCRO coating
- provides wear resistance improvement as well as avoid edge stress in various applications.
- Suitable for special components with 3 axes and 5 axes sector such as impellers, blisks, tire profiles, turbine blades.
- Available for simultaneous machining of roughing and finishing with only one tool.

0.5R ~ 1R 2R ~ 3R

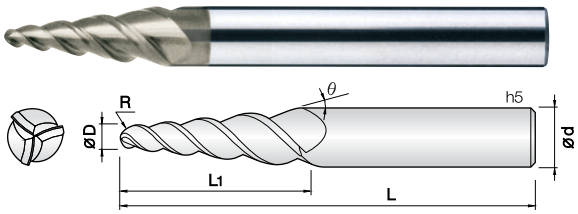
Size	D Tolerance
ø4 ~ 6	+0.01~ −0.01mm

: mm

Order Number	Diameter R x D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d	
3TBIC 010 010 120	R0.5 X 1	1°	12	50	6	
3TBIC 010 010 200	R0.5 X 1	1°	20	60	6	
3TBIC 010 020 150	R0.5 X 1	2°	15	55	6	
3TBIC 010 020 200	R0.5 X 1	2°	20	60	6	
3TBIC 010 030 150	R0.5 X 1	3°	15	55	6	
3TBIC 010 030 200	R0.5 X 1	3°	20	60	6	
3TBIC 010 040 200	R0.5 X 1	4°	20	60	6	
3TBIC 010 050 200	R0.5 X 1	5°	20	60	6	
3TBIC 010 060 200	R0.5 X 1	6°	20	60	6	
3TBIC 010 070 200	R0.5 X 1	7°	20	60	6	
3TBIC 010 080 180	R0.5 X 1	8°	18	60	6	
3TBIC 020 010 120	R1 X 2	1°	12	50	6	
3TBIC 020 010 200	R1 X 2	1°	20	60	6	
3TBIC 020 020 150	R1 X 2	2°	15	55	6	
3TBIC 020 020 200	R1 X 2	2°	20	60	6	
3TBIC 020 030 150	R1 X 2	3°	15	55	6	
3TBIC 020 030 200	R1 X 2	3°	20	60	6	
3TBIC 020 030 300	R1 X 2	3°	30	70	6	
3TBIC 020 040 200	R1 X 2	4°	20	60	6	
3TBIC 020 050 200	R1 X 2	5°	20	60	6	
3TBIC 020 050 300	R1 X 2	5°	30	75	8	
3TBIC 020 060 190	R1 X 2	6°	19	60	6	
3TBIC 020 060 290	R1 X 2	6°	29	75	8	
3TBIC 020 070 160	R1 X 2	7°	16	60	6	
3TBIC 020 070 250	R1 X 2	7°	25	70	8	
3TBIC 020 080 150	R1 X 2	8°	15	60	6	
3TBIC 020 080 220	R1 X 2	8°	22	70	8	
3TBIC 030 010 200	R1.5 X 3	1°	20	60	6	
3TBIC 030 010 320	R1.5 X 3	1°	32	75	6	
3TBIC 030 020 200	R1.5 X 3	2°	20	60	6	
3TBIC 030 030 200	R1.5 X 3	3°	20	60	6	
3TBIC 030 030 300	R1.5 X 3	3°	30	70	6	
3TBIC 030 030 390	R1.5 X 3	3°	39	80	8	
3TBIC 030 040 200	R1.5 X 3	4°	20	65	6	
3TBIC 030 050 180	R1.5 X 3	5°	18	60	6	
3TBIC 030 050 300	R1.5 X 3	5°	30	75	8	
3TBIC 030 060 150	R1.5 X 3	6°	15	60	6	
3TBIC 030 060 250	R1.5 X 3	6°	25	70	8	
3TBIC 030 070 190	R1.5 X 3	7°	19	70	8	
3TBIC 030 070 300	R1.5 X 3	7°	30	80	10	
3TBIC 030 080 190	R1.5 X 3	8°	19	70	8	
3TBIC 030 080 260	R1.5 X 3	8°	26	75	10	
3TBIC 040 010 200	R2 X 4	1°	20	60	6	
3TBIC 040 010 320	R2 X 4	1°	32	75	6	
3TBIC 040 020 200	R2 X 4	2°	20	60	6	
3TBIC 040 020 300	R2 X 4	2°	30	70	6	
3TBIC 040 030 210	R2 X 4	3°	21	70	6	
3TBIC 040 030 320	R2 X 4	3°	32	80	8	

3TBIC

3 Flutes Taper Ball End Mills for Impellers



- **Pre-hardened steel, Cast iron, Non-metallic materials**
- JCRO coating provides wear resistance improvement as well as avoid edge stress in various applications.
- Suitable for special components with 3 axes and 5 axes sector such as impellers, blisks, tire profiles, turbine blades.
- Available for simultaneous machining of roughing and finishing with only one tool.

0.5R ~ 1R 2R ~ 3R

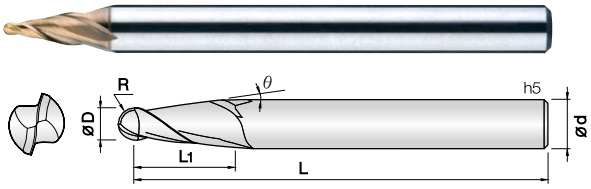
Size	D Tolerance
ø4 ~ 6	+0.01~ −0.01mm

: mm

Order Number	Diameter R x D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d	
3TBIC 040 030 400	R2 X 4	3°	40	90	8	
3TBIC 040 040 200	R2 X 4	4°	20	70	8	
3TBIC 040 040 300	R2 X 4	4°	30	75	8	
3TBIC 040 050 200	R2 X 4	5°	20	70	8	
3TBIC 040 050 320	R2 X 4	5°	32	80	10	
3TBIC 040 060 200	R2 X 4	6°	20	70	8	
3TBIC 040 060 300	R2 X 4	6°	30	80	10	
3TBIC 040 070 180	R2 X 4	7°	18	70	8	
3TBIC 040 070 260	R2 X 4	7°	26	80	10	
3TBIC 040 080 230	R2 X 4	8°	23	75	10	
3TBIC 060 010 320	R3 X 6	1°	32	75	8	
3TBIC 060 020 300	R3 X 6	2°	30	75	8	
3TBIC 060 030 220	R3 X 6	3°	22	75	8	
3TBIC 060 030 320	R3 X 6	3°	32	80	10	
3TBIC 060 030 400	R3 X 6	3°	40	90	10	
3TBIC 060 040 250	R3 X 6	4°	25	75	10	
3TBIC 060 040 310	R3 X 6	4°	31	80	10	
3TBIC 060 050 210	R3 X 6	5°	21	75	10	
3TBIC 060 050 320	R3 X 6	5°	32	80	12	
3TBIC 060 060 210	R3 X 6	6°	21	75	10	
3TBIC 060 060 310	R3 X 6	6°	31	80	12	
3TBIC 060 070 190	R3 X 6	7°	19	75	10	
3TBIC 060 070 270	R3 X 6	7°	27	80	12	

2CTB

2 Flutes Taper Ball End Mills



- **Endmills for pre-hardened and hardened steel (HRc50~)**
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Very nice work surface finish.
- Minimize fracturing by high TRS fine(0.5㎛) WC grade.

2 | WC 미립자 | TISIN Coating | LRJ ±0.005 (0.2 ~ 1.5R) | LRJ ±0.01 (1.5 ~ 3R) | 30° Helix Angle

D Size	D Tolerance
ø0.4 ~ 3	−0.01 ~ −0.025mm
Ø3 ~ 6	−0.015 ~ −0.03mm

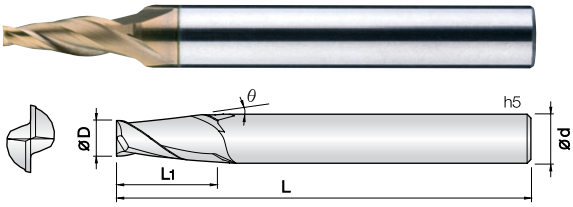
: mm

Order Number	Diameter R ×D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
2CTB 004 020 030	0.2R X 0.4	2°	3	40	4
2CTB 004 030 030	0.2R X 0.4	3°	3	40	4
2CTB 004 040 030	0.2R X 0.4	4°	3	40	4
2CTB 004 050 030	0.2R X 0.4	5°	3	40	4
2CTB 004 070 030	0.2R X 0.4	7°	3	40	4
2CTB 004 100 030	0.2R X 0.4	10°	3	40	4
2CTB 005 020 030	0.25R X 0.5	2°	3	40	4
2CTB 005 030 030	0.25R X 0.5	3°	3	40	4
2CTB 005 040 035	0.25R X 0.5	4°	3.5	40	4
2CTB 005 050 035	0.25R X 0.5	5°	3.5	40	4
2CTB 005 070 035	0.25R X 0.5	7°	3.5	40	4
2CTB 005 100 035	0.25R X 0.5	10°	3.5	40	4
2CTB 006 020 030	0.3R X 0.6	2°	3	40	4
2CTB 006 030 030	0.3R X 0.6	3°	3	40	4
2CTB 006 040 035	0.3R X 0.6	4°	3.5	40	4
2CTB 006 050 035	0.3R X 0.6	5°	3.5	40	4
2CTB 006 070 035	0.3R X 0.6	7°	3.5	40	4
2CTB 006 100 035	0.3R X 0.6	10°	3.5	40	4
2CTB 008 020 030	0.4R X 0.8	2°	3	40	4
2CTB 008 030 030	0.4R X 0.8	3°	3	40	4
2CTB 008 040 040	0.4R X 0.8	4°	4	40	4
2CTB 008 050 040	0.4R X 0.8	5°	4	40	4
2CTB 008 070 040	0.4R X 0.8	7°	4	40	4
2CTB 008 100 040	0.4R X 0.8	10°	4	40	4
2CTB 010 003 030	0.5R X 1	0°30	3	40	4
2CTB 010 010 030	0.5R X 1	1°	3	40	4
2CTB 010 013 040	0.5R X 1	1°30	4	40	4
2CTB 010 020 040	0.5R X 1	2°	4	40	4
2CTB 010 030 040	0.5R X 1	3°	4	40	4
2CTB 010 040 060	0.5R X 1	4°	6	45	4
2CTB 010 050 060	0.5R X 1	5°	6	45	4
2CTB 010 070 060	0.5R X 1	7°	6	45	4
2CTB 010 100 060	0.5R X 1	10°	6	45	4
2CTB 015 003 060	0.75R X 1.5	0°30	6	45	4
2CTB 015 010 060	0.75R X 1.5	1°	6	45	4
2CTB 015 013 060	0.75R X 1.5	1°30	6	45	4
2CTB 015 020 060	0.75R X 1.5	2°	6	45	4
2CTB 015 030 060	0.75R X 1.5	3°	6	45	4
2CTB 015 040 060	0.75R X 1.5	4°	6	45	4
2CTB 015 050 060	0.75R X 1.5	5°	6	45	4
2CTB 015 070 060	0.75R X 1.5	7°	6	45	4
2CTB 020 003 080	1R X 2	0°30	8	45	4
2CTB 020 010 080	1R X 2	1°	8	45	4
2CTB 020 013 080	1R X 2	1°30	8	45	4
2CTB 020 020 080	1R X 2	2°	8	45	4
2CTB 020 030 080	1R X 2	3°	8	45	4
2CTB 020 040 080	1R X 2	4°	8	45	4
2CTB 020 050 080	1R X 2	5°	8	45	4

Order Number	Diameter R ×D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
2CTB 020 070 080	1R X 2	7°	8	45	4
2CTB 030 003 120	1.5RX3	0°30	12	60	6
2CTB 030 010 120	1.5RX3	1°	12	60	6
2CTB 030 013 120	1.5RX3	1°30	12	60	6
2CTB 030 020 120	1.5RX3	2°	12	60	6
2CTB 030 030 120	1.5RX3	3°	12	60	6
2CTB 030 040 120	1.5RX3	4°	12	60	6
2CTB 030 050 120	1.5RX3	5°	12	60	6
2CTB 030 070 120	1.5RX3	7°	12	60	6
2CTB 040 003 160	2RX4	0°30	16	70	8
2CTB 040 010 160	2RX4	1°	16	70	8
2CTB 040 013 160	2RX4	1°30	16	70	8
2CTB 040 020 160	2RX4	2°	16	70	8
2CTB 040 030 160	2RX4	3°	16	70	8
2CTB 040 040 160	2RX4	4°	16	70	8
2CTB 040 050 160	2RX4	5°	16	70	8
2CTB 040 070 160	2RX4	7°	16	70	8
2CTB 050 003 200	2.5RX5	0°30	20	75	8
2CTB 050 010 200	2.5RX5	1°	20	75	8
2CTB 050 013 200	2.5RX5	1°30	20	75	8
2CTB 050 020 200	2.5RX5	2°	20	75	8
2CTB 050 030 200	2.5RX5	3°	20	75	8
2CTB 050 040 200	2.5RX5	4°	20	75	8
2CTB 050 050 200	2.5RX5	5°	20	80	10
2CTB 050 070 200	2.5RX5	7°	20	80	10
2CTB 060 003 240	3RX6	0°30	24	80	10
2CTB 060 010 240	3RX6	1°	24	80	10
2CTB 060 013 240	3RX6	1°30	24	80	10
2CTB 060 020 240	3RX6	2°	24	80	10
2CTB 060 030 240	3RX6	3°	24	80	10
2CTB 060 040 240	3RX6	4°	24	80	10
2CTB 060 050 240	3RX6	5°	24	90	12
2CTB 060 070 240	3RX6	7°	24	90	12

2CTE

2 Flutes Taper End Mills



- **Endmills for pre-hardened and hardened steel (HRc50~)**
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Very nice work surface finish.
- Minimize fracturing by high TRS fine(0.5㎛) WC grade.

D Size	D Tolerance
Ø0.3 ~ 4	+0 ~ −0.01mm
Ø6 ~ 8	−0.01 ~ −0.025mm

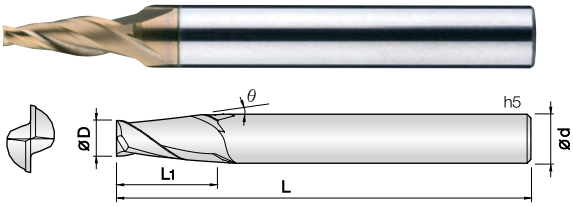
: mm

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
2CTE 003 003 012	0.3	0°30	1.2	40	4
2CTE 003 010 012	0.3	1°	1.2	40	4
2CTE 003 013 012	0.3	1°30	1.2	40	4
2CTE 003 020 012	0.3	2°	1.2	40	4
2CTE 003 030 012	0.3	3°	1.2	40	4
2CTE 003 050 012	0.3	5°	1.2	40	4
2CTE 003 070 015	0.3	7°	1.5	40	4
2CTE 003 100 015	0.3	10°	1.5	40	4
2CTE 004 003 016	0.4	0°30	1.6	40	4
2CTE 004 010 016	0.4	1°	1.6	40	4
2CTE 004 013 016	0.4	1°30	1.6	40	4
2CTE 004 020 016	0.4	2°	1.6	40	4
2CTE 004 030 016	0.4	3°	1.6	40	4
2CTE 004 050 016	0.4	5°	1.6	40	4
2CTE 004 070 020	0.4	7°	2	40	4
2CTE 004 100 020	0.4	10°	2	40	4
2CTE 005 003 020	0.5	0°30	2	40	4
2CTE 005 010 020	0.5	1°	2	40	4
2CTE 005 013 020	0.5	1°30	2	40	4
2CTE 005 020 020	0.5	2°	2	40	4
2CTE 005 030 020	0.5	3°	2	40	4
2CTE 005 050 020	0.5	5°	2	40	4
2CTE 005 070 025	0.5	7°	2.5	40	4
2CTE 005 100 025	0.5	10°	2.5	40	4
2CTE 006 003 020	0.6	0°30	2	40	4
2CTE 006 010 020	0.6	1°	2	40	4
2CTE 006 013 020	0.6	1°30	2	40	4
2CTE 006 020 020	0.6	2°	2	40	4
2CTE 006 030 020	0.6	3°	2	40	4
2CTE 006 050 020	0.6	5°	2	40	4
2CTE 006 070 025	0.6	7°	2.5	40	4
2CTE 006 100 025	0.6	10°	2.5	40	4
2CTE 007 010 025	0.7	1°	2.5	40	4
2CTE 007 013 025	0.7	1°30	2.5	40	4
2CTE 007 020 025	0.7	2°	2.5	40	4
2CTE 007 030 025	0.7	3°	2.5	40	4
2CTE 007 050 025	0.7	5°	2.5	40	4
2CTE 007 070 030	0.7	7°	3	40	4
2CTE 007 100 030	0.7	10°	3	40	4
2CTE 008 003 030	0.8	0°30	3	40	4
2CTE 008 010 030	0.8	1°	3	40	4
2CTE 008 013 030	0.8	1°30	3	40	4
2CTE 008 020 030	0.8	2°	3	40	4
2CTE 008 030 030	0.8	3°	3	40	4
2CTE 008 050 030	0.8	5°	3	40	4
2CTE 008 070 030	0.8	7°	3	40	4
2CTE 008 100 030	0.8	10°	3	40	4
2CTE 010 003 040	1	0°30	4	45	4

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
2CTE 010 010 040	1	1°	4	45	4
2CTE 010 013 040	1	1°30	4	45	4
2CTE 010 020 040	1	2°	4	45	4
2CTE 010 030 040	1	3°	4	45	4
2CTE 010 050 040	1	5°	4	45	4
2CTE 010 070 040	1	7°	4	45	4
2CTE 010 100 040	1	10°	4	45	4
2CTE 015 003 050	1.5	0°30	5	45	4
2CTE 015 010 050	1.5	1°	5	45	4
2CTE 015 013 060	1.5	1°30	6	45	4
2CTE 015 020 070	1.5	2°	7	45	4
2CTE 015 030 080	1.5	3°	8	45	4
2CTE 015 050 100	1.5	5°	10	50	4
2CTE 015 070 100	1.5	7°	10	50	4
2CTE 015 100 100	1.5	10°	10	50	6
2CTE 020 003 060	2	0°30	6	45	4
2CTE 020 010 060	2	1°	6	45	4
2CTE 020 013 060	2	1°30	6	45	4
2CTE 020 020 080	2	2°	8	45	4
2CTE 020 030 100	2	3°	10	50	4
2CTE 020 050 100	2	5°	10	50	4
2CTE 020 070 100	2	7°	10	50	6
2CTE 020 100 110	2	10°	11	50	6
2CTE 025 003 080	2.5	0°30	8	45	6
2CTE 025 010 100	2.5	1°	10	50	6
2CTE 025 013 100	2.5	1°30	10	50	6
2CTE 025 020 120	2.5	2°	12	50	6
2CTE 025 030 120	2.5	3°	12	50	6
2CTE 025 050 120	2.5	5°	12	50	6
2CTE 025 070 120	2.5	7°	12	50	6
2CTE 025 100 100	2.5	10°	10	50	6
2CTE 030 003 120	3	0°30	12	50	6
2CTE 030 010 120	3	1°	12	50	6
2CTE 030 013 120	3	1°30	12	50	6
2CTE 030 020 120	3	2°	12	50	6
2CTE 030 030 120	3	3°	12	50	6
2CTE 030 050 120	3	5°	12	50	6
2CTE 030 070 120	3	7°	12	50	6
2CTE 030 100 080	3	10°	8	50	6
2CTE 040 003 150	4	0°30	15	60	6
2CTE 040 010 150	4	1°	15	60	6
2CTE 040 013 150	4	1°30	15	60	6
2CTE 040 020 150	4	2°	15	60	6
2CTE 040 030 180	4	3°	18	60	6
2CTE 040 050 230	4	5°	23	65	8
2CTE 060 003 200	6	0°30	20	65	8
2CTE 060 010 200	6	1°	20	65	8
2CTE 060 013 200	6	1°30	20	65	8

2CTE

2 Flutes Taper End Mills



- **Endmills for pre-hardened and hardened steel (HRc50~)**
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Very nice work surface finish.
- Minimize fracturing by high TRS fine(0.5㎛) WC grade.

Ø0.3 ~ Ø4 Ø6 ~ Ø8 Shield Edge

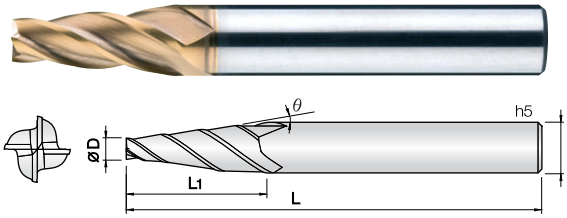
D Size	D Tolerance
Ø0.3 ~ 4	+0 ~ −0.01mm
Ø6 ~ 8	−0.01 ~ −0.025mm

: mm

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
2CTE 060 020 200	6	2°	20	65	8
2CTE 060 030 190	6	3°	19	65	8
2CTE 060 050 230	6	5°	23	75	10
2CTE 060 070 240	6	7°	24	75	12
2CTE 060 100 170	6	10°	17	75	12
2CTE 070 003 250	7	0°30	25	70	8
2CTE 070 010 250	7	1°	25	70	8
2CTE 070 013 250	7	1°30	25	70	10
2CTE 070 030 280	7	3°	28	80	10
2CTE 070 050 280	7	5°	28	80	12
2CTE 080 003 320	8	0°30	32	90	10
2CTE 080 010 350	8	1°	35	90	10
2CTE 080 013 350	8	1°30	35	90	10
2CTE 080 020 280	8	2°	28	75	10
2CTE 080 030 350	8	3°	35	90	12
2CTE 080 050 450	8	5°	45	100	16
2CTE 080 070 320	8	7°	32	90	16
2CTE 080 100 340	8	10°	34	100	20

4CTE

4 Flutes Taper End Mills



- **Endmills for pre-hardened and hardened steel** (HRc50~)
- Good wear resistance by Si-based PVD coating.
- High precise edge tolerance.
- Very nice work surface finish.
- Minimize fracturing by high TRS fine(0.5 ㎛) WC grade.

4 | WC 미립자 | TISIN Coating | D +0 −0.01 Ø0.3 ~ Ø5 | D −0.01 −0.025 Ø6 ~ Ø10 | 30° Helix Angle | Shield Edge

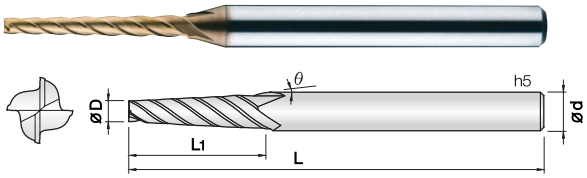
D Size	D Tolerance
Ø0.3 ~ 5	+0 ~ −0.01mm
Ø6 ~ 8	−0.01 ~ −0.025mm

mm

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
4CTE 030 003 110	3	0°30	11	50	6
4CTE 030 010 110	3	1°	11	50	6
4CTE 030 013 110	3	1°30	11	50	6
4CTE 030 020 150	3	2°	15	60	6
4CTE 030 023 150	3	2°30	15	60	6
4CTE 030 030 150	3	3°	15	60	6
4CTE 030 050 150	3	5°	15	60	6
4CTE 030 070 120	3	7°	12	60	6
4CTE 040 003 150	4	0°30	15	60	6
4CTE 040 010 150	4	1°	15	60	6
4CTE 040 013 150	4	1°30	15	60	6
4CTE 040 020 180	4	2°	18	60	6
4CTE 040 023 180	4	2°30	18	60	6
4CTE 040 030 180	4	3°	18	60	6
4CTE 040 050 230	4	5°	23	65	8
4CTE 040 070 250	4	7°	25	75	10
4CTE 050 003 180	5	0°30	18	60	6
4CTE 050 010 180	5	1°	18	60	6
4CTE 050 013 180	5	1°30	18	60	6
4CTE 050 020 150	5	2°	15	60	6
4CTE 050 023 200	5	2°30	20	65	8
4CTE 050 030 210	5	3°	21	65	8
4CTE 050 050 280	5	5°	28	80	10
4CTE 050 070 280	5	7°	28	80	12
4CTE 060 003 200	6	0°30	20	65	8
4CTE 060 010 200	6	1°	20	65	8
4CTE 060 013 200	6	1°30	20	65	8
4CTE 060 020 200	6	2°	20	65	8
4CTE 060 023 200	6	2°30	20	65	8
4CTE 060 030 260	6	3°	26	75	10
4CTE 060 050 230	6	5°	23	75	10
4CTE 060 070 240	6	7°	24	80	12
4CTE 080 003 250	8	0°30	25	75	10
4CTE 080 010 250	8	1°	25	75	10
4CTE 080 013 250	8	1°30	25	75	10
4CTE 080 020 250	8	2°	25	75	10
4CTE 080 023 230	8	2°30	23	75	10
4CTE 080 030 300	8	3°	30	80	12
4CTE 080 050 230	8	5°	23	85	12
4CTE 100 003 300	10	0°30	30	80	12
4CTE 100 010 300	10	1°	30	80	12
4CTE 100 013 300	10	1°30	30	80	12
4CTE 100 020 280	10	2°	28	80	12
4CTE 100 030 400	10	3°	40	100	16
4CTE 100 050 340	10	5°	34	100	16

4RTE

4 Flutes Rib Taper End Mills



- **Endmills for pre-hardened and hardened steel (HRc50~)**
- Good wear resistance by Si-based PVD coating.
- Optimum for deep grooving by 2bottom edge with 4flutes.
- High precise edge tolerance.
- Very nice work surface finish.
- Minimize fracturing by high TRS fine(0.5㎛) WC grade.

ø0.5~ø2.5 Shield Edge

D Size	D Tolerance
ø0.5 ~ 2.5	+0~ −0.01mm

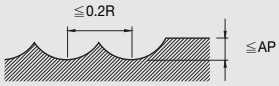
: mm

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
4RTE 005 030 040	0.5	0°30	4	45	4
4RTE 005 030 060	0.5	0°30	6	45	4
4RTE 005 045 040	0.5	0°45	4	45	4
4RTE 005 045 060	0.5	0°45	6	45	4
4RTE 005 100 040	0.5	1°	4	45	4
4RTE 005 100 060	0.5	1°	6	45	4
4RTE 006 030 040	0.6	0°30	4	45	4
4RTE 006 030 060	0.6	0°30	6	45	4
4RTE 006 045 040	0.6	0°45	4	45	4
4RTE 006 045 060	0.6	0°45	6	45	4
4RTE 006 100 040	0.6	1°	4	45	4
4RTE 006 100 060	0.6	1°	6	45	4
4RTE 007 030 060	0.7	0°30	6	45	4
4RTE 007 030 080	0.7	0°30	8	45	4
4RTE 007 045 060	0.7	0°45	6	45	4
4RTE 007 045 080	0.7	0°45	8	45	4
4RTE 007 100 060	0.7	1°	6	45	4
4RTE 007 100 080	0.7	1°	8	45	4
4RTE 008 030 060	0.8	0°30	6	45	4
4RTE 008 030 080	0.8	0°30	8	45	4
4RTE 008 030 100	0.8	0°30	10	45	4
4RTE 008 045 060	0.8	0°45	6	45	4
4RTE 008 045 080	0.8	0°45	8	45	4
4RTE 008 045 100	0.8	0°45	10	45	4
4RTE 008 100 060	0.8	1°	6	45	4
4RTE 008 100 080	0.8	1°	8	45	4
4RTE 008 100 100	0.8	1°	10	45	4
4RTE 009 030 060	0.9	0°30	6	45	4
4RTE 009 030 080	0.9	0°30	8	45	4
4RTE 009 030 100	0.9	0°30	10	45	4
4RTE 009 045 060	0.9	0°45	6	45	4
4RTE 009 045 080	0.9	0°45	8	45	4
4RTE 009 045 100	0.9	0°45	10	45	4
4RTE 009 100 060	0.9	1°	6	45	4
4RTE 009 100 080	0.9	1°	8	45	4
4RTE 009 100 100	0.9	1°	10	45	4
4RTE 010 030 080	1	0°30	8	45	4
4RTE 010 030 100	1	0°30	10	45	4
4RTE 010 030 120	1	0°30	12	45	4
4RTE 010 045 080	1	0°45	8	45	4
4RTE 010 045 100	1	0°45	10	45	4
4RTE 010 045 120	1	0°45	12	45	4
4RTE 010 100 080	1	1°	8	45	4
4RTE 010 100 100	1	1°	10	45	4
4RTE 010 100 120	1	1°	12	45	4
4RTE 012 030 080	1.2	0°30	8	45	4
4RTE 012 030 100	1.2	0°30	10	45	4
4RTE 012 030 120	1.2	0°30	12	45	4

Order Number	Diameter D	Angle θ	Length of cut L1	Overall Length L	Shank Dia d
4RTE 012 030 160	1.2	0°30	16	50	4
4RTE 012 045 080	1.2	0°45	8	45	4
4RTE 012 045 100	1.2	0°45	10	45	4
4RTE 012 045 120	1.2	0°45	12	45	4
4RTE 012 045 160	1.2	0°45	16	50	4
4RTE 012 100 080	1.2	1°	8	45	4
4RTE 012 100 100	1.2	1°	10	45	4
4RTE 012 100 120	1.2	1°	12	45	4
4RTE 012 100 160	1.2	1°	16	50	4
4RTE 015 030 060	1.5	0°30	6	45	4
4RTE 015 030 100	1.5	0°30	10	45	4
4RTE 015 030 160	1.5	0°30	16	50	4
4RTE 015 030 200	1.5	0°30	20	60	4
4RTE 015 100 060	1.5	1°	6	45	4
4RTE 015 100 100	1.5	1°	10	45	4
4RTE 015 100 160	1.5	1°	16	50	4
4RTE 015 100 200	1.5	1°	20	60	4
4RTE 015 100 250	1.5	1°	25	60	4
4RTE 015 130 060	1.5	1°30	6	45	4
4RTE 015 130 100	1.5	1°30	10	45	4
4RTE 015 130 160	1.5	1°30	16	50	4
4RTE 015 130 200	1.5	1°30	20	60	4
4RTE 015 130 250	1.5	1°30	25	60	4
4RTE 020 030 100	2	0°30	10	45	4
4RTE 020 030 160	2	0°30	16	50	4
4RTE 020 030 200	2	0°30	20	60	4
4RTE 020 030 250	2	0°30	25	60	4
4RTE 020 100 100	2	1°	10	45	4
4RTE 020 100 160	2	1°	16	50	4
4RTE 020 100 200	2	1°	20	60	4
4RTE 020 100 250	2	1°	25	60	4
4RTE 020 130 100	2	1°30	10	45	4
4RTE 020 130 160	2	1°30	16	50	4
4RTE 020 130 200	2	1°30	20	60	4
4RTE 020 130 250	2	1°30	25	60	4
4RTE 025 030 100	2.5	0°30	10	45	4
4RTE 025 030 160	2.5	0°30	16	50	4
4RTE 025 030 200	2.5	0°30	20	60	4
4RTE 025 030 250	2.5	0°30	25	60	4
4RTE 025 100 100	2.5	1°	10	45	4
4RTE 025 100 160	2.5	1°	16	50	4
4RTE 025 100 200	2.5	1°	20	60	4
4RTE 025 100 250	2.5	1°	25	60	4
4RTE 025 130 100	2.5	1°30	10	45	4
4RTE 025 130 160	2.5	1°30	16	50	4
4RTE 025 130 200	2.5	1°30	20	60	4
4RTE 025 130 250	2.5	1°30	25	60	4

2CTB

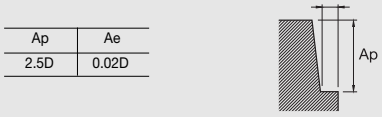
• RPM : rev./min • Feed : mm/min

Material	Alloy Steels/ Tool Steels/ / Prehardened Steels S50C / FC250 / SCM / NAK					Hardened Steels SKD61				
Hardness	~ 45HRc					45 ~ 55HRc				
Radius	$\alpha \leqq 15^\circ$		$\alpha > 15^\circ$		Ap Axial Depth	$\alpha \leqq 15^\circ$		$\alpha > 15^\circ$		Ap Axial Depth
	RPM	FEED	RPM	FEED		RPM	FEED	RPM	FEED	
R0.5	40,000	5,600	40,000	3,200	0.06	40,000	5,600	40,000	3,000	0.05
R0.75	40,000	6,500	40,000	4,000	0.09	40,000	6,500	32,000	3,200	0.08
R1	40,000	6,500	39,000	4,700	0.11	40,000	6,500	31,000	3,500	0.11
R1.25	40,000	7,000	30,000	4,500	0.12	36,000	6,500	26,000	3,500	0.12
R1.5	40,000	7,500	27,000	4,300	0.13	32,000	6,000	22,000	3,400	0.13
R2	32,000	7,500	20,000	3,600	0.15	25,000	6,000	16,000	2,700	0.15
R2.5	25,000	6,000	16,000	2,900	0.2	20,000	5,400	13,000	2,300	0.2
R3	21,000	5,800	13,000	2,600	0.25	17,000	4,700	10,000	2,000	0.25
R4	16,000	4,500	10,000	2,000	0.3	13,000	3,600	8,000	1,500	0.3
R5	13,000	3,600	8,000	1,700	0.5	10,000	2,900	6,400	1,200	0.5
R6	9,000	2,500	6,000	1,300	0.5	7,200	2,000	4,800	1,000	0.5
Depth of Cut										

- α is the inclination angle of the machined surface.
- If the depth of cut is shallow, the revolution and feed rate can be increased.
- If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

2CTE

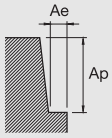
• RPM : rev./min • Feed : mm/min

Material	Mild Steels / Carbon Steels SS400 / S55C		Alloy Steels / Tool Steels SCM / SKT / SKS / SKD		Hardened Steels/ Prehardened Steels SKT / SKD / NAK55 / HPM1		Hardened Steels/ Stainless Steels SUS304 / SKD		Hardened Steels	
Hardness	~750HN/mm^2		~ 30HRc		30 ~ 38HRc		38 ~ 45HRc		45 ~ 55HRc	
Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1mm	15,500	155	15,500	130	13,000	90	12,000	90	10,500	40
1.5mm	10,500	155	10,500	130	8,900	90	8,250	90	7,000	40
2mm	7,950	155	7,950	130	6,650	90	6,200	90	5,250	40
2.5mm	6,200	145	6,200	125	5,300	90	4,950	90	4,200	40
3mm	5,150	145	5,150	125	4,450	90	4,100	90	3,500	40
4mm	3,850	145	3,850	125	3,300	90	3,100	85	2,600	40
5mm	3,100	145	3,100	125	2,650	90	2,450	85	2,100	40
6mm	2,600	145	2,600	125	2,200	90	2,050	85	1,750	40
8mm	1,950	145	1,950	125	1,650	90	1,550	85	1,300	40
10mm	1,550	145	1,550	120	1,300	90	1,200	85	1,050	40
Depth of Cut										

- Use a rigid and precise machine and holder.
- When chattering occurs, reduce the speed and feed simultaneously.
- Use a suitable cutting fluid with high smoke retardant properties.

4CTE

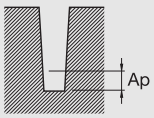
• RPM : rev./min • Feed : mm/min

Material	Mild Steels / Carbon Steels SS400 / S55C		Alloy Steels / Tool Steels SCM / SKT / SKS / SKD		Hardened Steels/ Prehardened Steels SKT / SKD / NAK55 / HPM1		Hardened Steels/ Stainless Steels SUS304 / SKD		Hardened Steels	
Hardness	~750HN/mm^2		~ 30HRc		30 ~ 38HRc		38 ~ 45HRc		45 ~ 55HRc	
Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3mm	5,300	225	4,450	225	4,450	180	4,100	130	3,500	130
4mm	3,950	245	3,300	245	3,300	195	3,100	150	2,600	150
5mm	3,150	275	2,650	275	2,650	225	2,450	160	2,100	160
6mm	2,200	275	2,200	275	2,200	225	2,050	175	1,750	175
8mm	1,950	270	1,650	270	1,650	225	1,550	190	1,300	190
10mm	1,550	270	1,300	270	1,300	225	1,200	180	1,050	180
Depth of Cut	Ap: 2.5D, Ae: 0.02D 									

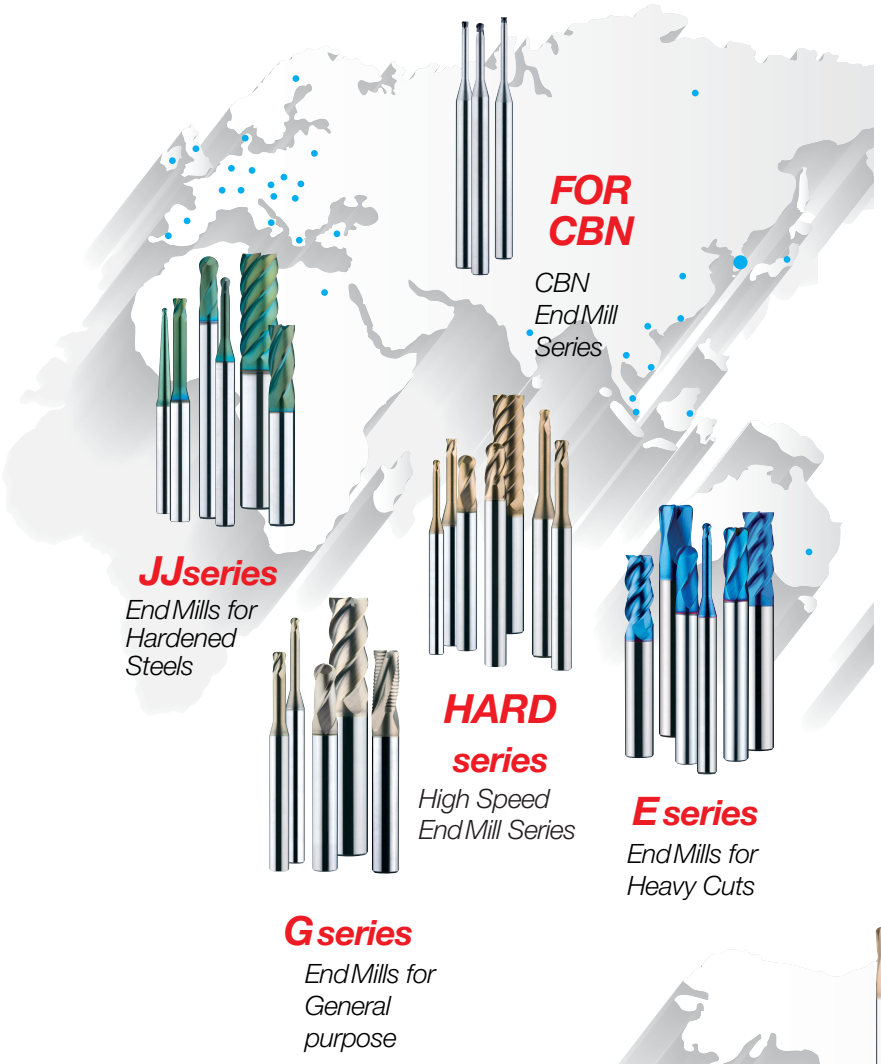
- Use a rigid and precise machine and holder.
- When chattering occurs, reduce the speed and feed simultaneously.
- Use a suitable cutting fluid with high smoke retardant properties.

4RTE

• RPM : rev./min • Feed : mm/min

Material	Mild Steels / Carbon Steels SS400 / S55C			Alloy Steels / Tool Steels SCM / SKT / SKS / SKD			Prehardened Steels / Hardened Steels SKT / SKD / NAK55 / HPM1			Hardened Steels / Stainless Steels SUS304 / SKD			Hardened Steels		
Hardness	~750HN/mm^2			~ 30HRc			30HRc ~ 38HRc			38HRc ~ 45HRc			45HRc ~ 55HRc		
Outside Diameter	RPM	FEED	Ap	RPM	FEED	Ap	RPM	FEED	Ap	RPM	FEED	Ap	RPM	FEED	Ap
0.5mm	31,500	630	0.01~0.025	31,500	565	0.01~0.025	31,500	475	0.01~0.025	31,500	440	0.01~0.025	19,000	250	0.005~0.01
0.6mm	31,500	755	0.012~0.03	31,500	680	0.012~0.03	29,500	530	0.012~0.03	26,500	445	0.012~0.03	15,500	260	0.006~0.012
0.7mm	29,000	940	0.014~0.035	27,000	680	0.014~0.035	25,000	530	0.014~0.035	22,500	445	0.014~0.035	13,500	260	0.007~0.014
0.8mm	25,000	935	0.016~0.004	23,500	680	0.016~0.04	22,000	630	0.016~0.04	19,500	445	0.016~0.04	11,500	260	0.008~0.016
0.9mm	22,500	935	0.018~0.045	21,000	680	0.018~0.045	19,500	530	0.018~0.045	17,500	445	0.018~0.045	10,500	260	0.009~0.018
1mm	20,000	930	0.02~0.05	19,000	680	0.02~0.05	17,500	530	0.02~0.05	15,500	445	0.02~0.05	9,500	260	0.01~0.02
1.2mm	16,500	930	0.024~0.06	15,500	680	0.024~0.06	14,500	530	0.024~0.06	13,000	445	0.024~0.06	7,950	260	0.012~0.024
1.5mm	13,500	930	0.03~0.075	12,500	680	0.03~0.075	11,500	530	0.03~0.075	10,500	445	0.03~0.075	6,350	260	0.015~0.03
2mm	10,000	930	0.04~0.1	9,500	680	0.04~0.1	8,900	530	0.04~0.1	7,950	445	0.04~0.1	4,750	260	0.02~0.04
2.5mm	8,100	930	0.05~0.125	7,600	680	0.05~0.125	7,100	530	0.05~0.125	7,950	445	0.04~0.1	4,750	260	0.02~0.04
Depth of Cut															

- To achieve flute depth, sequential one neck length at a time is most effective.
- When corner processing, reduce the feed rate by approximatelyu half.
- Use cutting fluid.



FOR CBN

CBN End Mill Series

JJseries

End Mills for Hardened Steels

HARD series

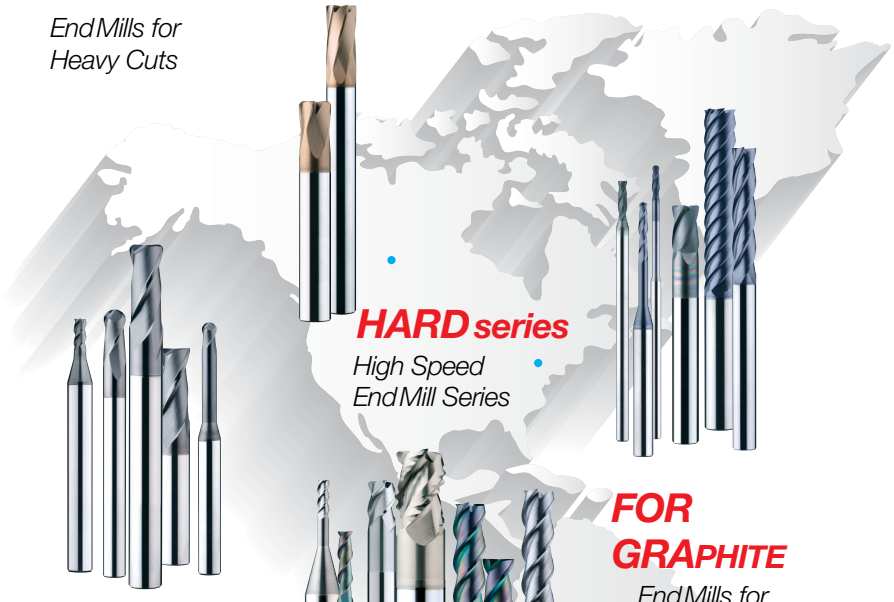
High Speed End Mill Series

E series

End Mills for Heavy Cuts

G series

End Mills for General purpose



HARD series

High Speed End Mill Series

G-TAC

G-TAC Coated End Mill Series

FOR GRAPHITE

End Mills for •Graphite

FOR ALUMINUM

End Mills for Aluminum

FOR SUS

End Mills for SUS

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