UNION TOOL

Tungsten Carbide End Mills
UNIMAX Series

NEW

UTSCOAT 4 Flutes　Highly Efficient Square End Mills for Stainless Steels

CESUS

Total 21 Models

For Stainless Steels

UNION TOOL CO.

UTSCOAT 4 Flutes Highly Efficient Square End Mills for Stainless Steels

Size φ6～φ12

CESUS

Super MG | UTS COAT | 40°~42° | Flatland | Shank Dia 0/-0.005 | Variable Pitch | Variable Helix

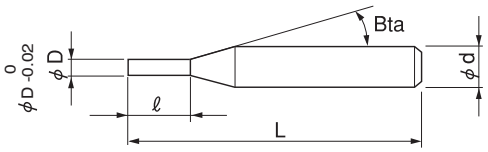
NEW

Material Applications (☆ Highly Recommended ◎ Recommended ○ Suggested)

Work Material														
CARBON STEELS S45C S55C	ALLOY STEELS SK / SCM SUS	PREHARDENED STEELS NAK HPM	HARDENED STEELS ~55HRC	HARDENED STEELS ~60HRC	HARDENED STEELS ~70HRC	CAST IRON	ALUMINUM ALLOYS	GRAPHITE	COPPER	PLASTICS	GLASS FILLED PLASTICS	TITANIUM ALLOYS	HEAT RESISTANT ALLOYS	CEMENTED CARBIDE	HARD BRITTLE (NON-METALLIC) MATERIALS
◎	☆	○				○			○			○	○		

Features

4 Flute Highly Efficient Square End Mills for stainless steels.
Variable pitch & variable helix designed for milling stainless steels offers higher efficiency milling.
New coating 'UTSCOAT' with excellent adhesion offers high resistance to breakage.

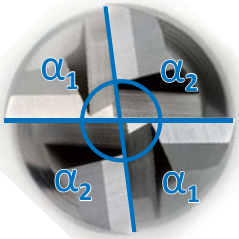


The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Design features

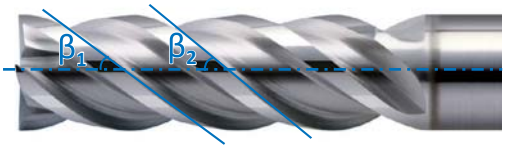
Variable pitch & variable helix designed for milling stainless steels.

Variable pitch



$\alpha_1 \neq \alpha_2$

Variable helix



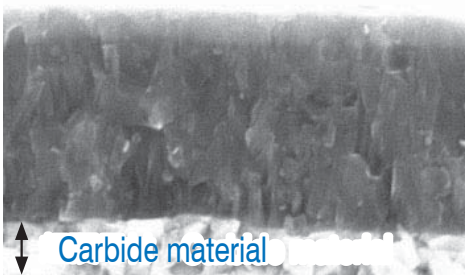
$\beta_1 \neq \beta_2$

Minimizes chattering

Stable milling under highly efficient conditions

Features of UTSCOAT

Improve the resistance to adhesion by adding a highly lubricant layer onto the high hardness and high toughness UTCOAT.



Ultra lubricant layer
Ultra hard layer
High toughness and adhesion layer

Reduce adhesion

High resistance to breakage with high lubricity

UTSCOAT 4 Flutes Highly Efficient Square End Mills for Stainless Steels

Total 21 models

Unit（mm）

Model Number	Outside Diameter ØD	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter Ød	Price ¥
CESUS 4060-0900	6	9	-	60	6	8,500
CESUS 4060-1300		13		60	6	8,500
CESUS 4060-1800		18		60	6	9,350
CESUS 4070-1050	7	10.5	16°	70	8	10,500
CESUS 4070-1600		16		70	8	10,500
CESUS 4070-2100		21		70	8	11,550
CESUS 4080-1200	8	12	-	70	8	10,500
CESUS 4080-1900		19		70	8	10,500
CESUS 4080-2400		24		70	8	11,550
CESUS 4090-1350	9	13.5	16°	80	10	12,500
CESUS 4090-1900		19		80	10	12,500
CESUS 4090-2700		27		80	10	13,750
CESUS 4100-1500	10	15	-	80	10	12,500
CESUS 4100-2200		22		80	10	12,500
CESUS 4100-3000		30		80	10	13,750
CESUS 4110-1650	11	16.5	16°	100	12	17,800
CESUS 4110-2200		22		100	12	17,800
CESUS 4110-3300		33		100	12	19,580
CESUS 4120-1800	12	18	-	100	12	17,800
CESUS 4120-2600		26		100	12	17,800
CESUS 4120-3600		36		100	12	19,580

CESUS Milling Conditions

Side Milling

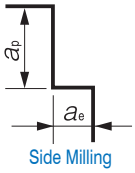
WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)				ALLOY STEELS SK / SCM Annealed Materials (225~325HB)				STAINLESS STEELS SUS304 Use water soluble or oil coolant.			
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4060-0900	6	9	6,000	1,600	9.0	1.2	6,000	1,100	9.0	1.2	6,000	1,100	9.0	1.2
4060-1300		13	6,000	1,600	13.0	1.2	6,000	1,100	13.0	1.2	6,000	1,100	13.0	1.2
4060-1800		18	6,000	1,170	18.0	1.2	4,800	800	18.0	1.2	4,800	800	18.0	1.2
4070-1050	7	10.5	5,000	1,450	10.5	1.4	5,000	1,025	10.5	1.4	5,000	1,025	10.5	1.4
4070-1600		16	5,000	1,450	16.0	1.4	5,000	1,025	16.0	1.4	5,000	1,025	16.0	1.4
4070-2100		21	5,000	1,060	21.0	1.4	4,000	750	21.0	1.4	4,000	750	21.0	1.4
4080-1200	8	12	4,300	1,300	12.0	1.6	4,300	950	12.0	1.6	4,300	950	12.0	1.6
4080-1900		19	4,300	1,300	19.0	1.6	4,300	950	19.0	1.6	4,300	950	19.0	1.6
4080-2400		24	4,300	950	24.0	1.6	3,440	695	24.0	1.6	3,440	695	24.0	1.6
4090-1350	9	13.5	3,700	1,150	13.5	1.8	3,700	875	13.5	1.8	3,700	875	13.5	1.8
4090-1900		19	3,700	1,150	19.0	1.8	3,700	875	19.0	1.8	3,700	875	19.0	1.8
4090-2700		27	3,700	840	27.0	1.8	2,960	640	27.0	1.8	2,960	640	27.0	1.8
4100-1500	10	15	3,200	1,000	15.0	2.0	3,200	800	15.0	2.0	3,200	800	15.0	2.0
4100-2200		22	3,200	1,000	22.0	2.0	3,200	800	22.0	2.0	3,200	800	22.0	2.0
4100-3000		30	3,200	730	30.0	2.0	2,650	580	30.0	2.0	2,650	580	30.0	2.0
4110-1650	11	16.5	2,900	900	16.5	2.2	2,900	725	16.5	2.2	2,900	725	16.5	2.2
4110-2200		22	2,900	900	22.0	2.2	2,900	725	22.0	2.2	2,900	725	22.0	2.2
4110-3300		33	2,900	650	33.0	2.2	2,400	530	33.0	2.2	2,400	530	33.0	2.2
4120-1800	12	18	2,650	800	18.0	2.4	2,650	650	18.0	2.4	2,650	650	18.0	2.4
4120-2600		26	2,650	800	26.0	2.4	2,650	650	26.0	2.4	2,650	650	26.0	2.4
4120-3600		36	2,650	580	36.0	2.4	2,200	475	36.0	2.4	2,200	475	36.0	2.4
Milling Amount (mm)			a_p: All Flute a_e: 0.2D				a_p: All Flute a_e: 0.2D				a_p: All Flute a_e: 0.2D			

Slotting

WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)			ALLOY STEELS SK / SCM Annealed Materials (225~325HB)			STAINLESS STEELS SUS304 Use water soluble or oil coolant.		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)
4060-0900	6	9	6,000	700	6.0	6,000	700	6.0	6,000	700	6.0
4060-1300		13	6,000	700	6.0	6,000	700	6.0	6,000	700	6.0
4060-1800		18	6,000	560	6.0	4,200	350	6.0	4,200	350	6.0
4070-1050	7	10.5	5,000	625	7.0	5,000	625	7.0	5,000	625	7.0
4070-1600		16	5,000	625	7.0	5,000	625	7.0	5,000	625	7.0
4070-2100		21	5,000	500	7.0	3,500	300	7.0	3,500	300	7.0
4080-1200	8	12	4,300	550	8.0	4,300	550	8.0	4,300	550	8.0
4080-1900		19	4,300	550	8.0	4,300	550	8.0	4,300	550	8.0
4080-2400		24	4,300	440	8.0	3,000	275	8.0	3,000	275	8.0
4090-1350	9	13.5	3,500	475	9.0	3,500	475	9.0	3,500	475	9.0
4090-1900		19	3,500	475	9.0	3,500	475	9.0	3,500	475	9.0
4090-2700		27	3,500	380	9.0	2,450	240	9.0	2,450	240	9.0
4100-1500	10	15	2,900	400	10.0	2,900	400	10.0	2,900	400	10.0
4100-2200		22	2,900	400	10.0	2,900	400	10.0	2,900	400	10.0
4100-3000		30	2,900	320	10.0	2,000	200	10.0	2,000	200	10.0
4110-1650	11	16.5	2,650	340	11.0	2,650	340	11.0	2,650	340	11.0
4110-2200		22	2,650	340	11.0	2,650	340	11.0	2,650	340	11.0
4110-3300		33	2,650	270	11.0	1,820	170	11.0	1,820	170	11.0
4120-1800	12	18	2,420	300	12.0	2,420	300	12.0	2,420	300	12.0
4120-2600		26	2,420	300	12.0	2,420	300	12.0	2,420	300	12.0
4120-3600		36	2,420	240	12.0	1,650	150	12.0	1,650	150	12.0
MillingAmount (mm)			a_p: 1D			a_p: 1D			a_p: 1D		

Note:

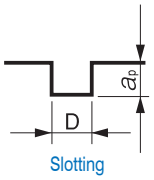
- Decrease both spindle speed and feed rate proportionally in case of chattering.
- These milling parameters are calculated based on the shortest overhang length. Longer overhangs may require an adjustment to the milling parameters.
- Reduce the milling amount and feed rate in accordance with required milling precision.
- Every coolant offers stable milling.
- Recommend water soluble or oil coolant for Stainless Steels and Copper.



Side Milling

a_p : Axial Depth (mm)

a_e : Radial Depth (mm)



Slotting

a_p : Axial Depth (mm)

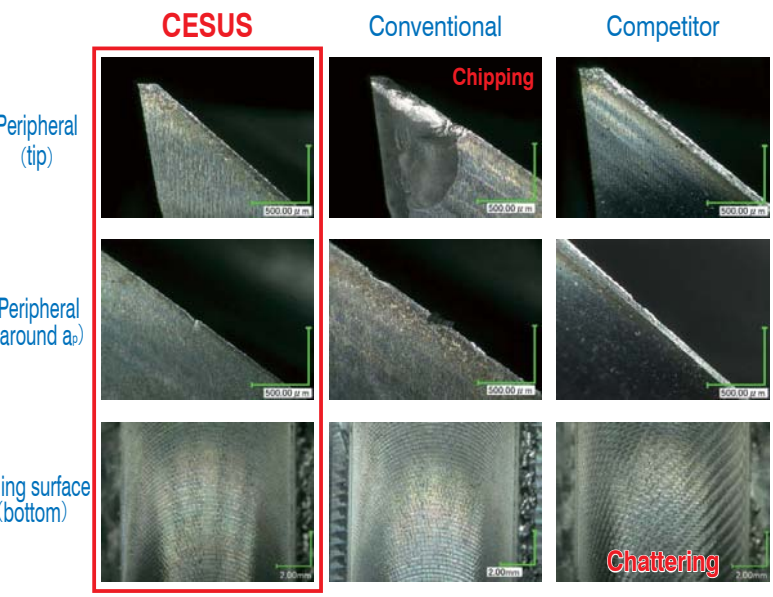
D : Outside Diameter (mm)

Milling Example for Slot Milling
CESUS Ø10 x 22 **Length of Cut**

SUS304

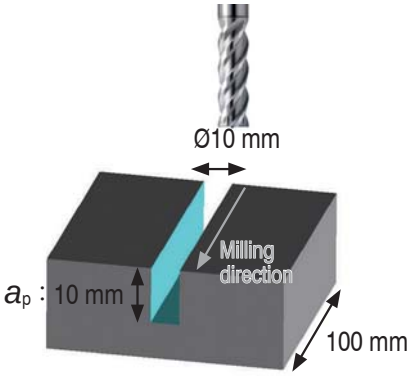
Tool	CESUS 4100-2200
Spindle Speed	3,200 min^{-1}
Feed Rate	900 mm/min *
Axial Depth a_p	10 mm
Coolant	Water soluble
Milling Distance	100 mm

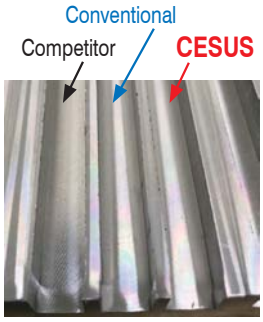
*Milled by higher efficiency conditions than catalogue conditions to evaluate the tool performance.



CESUS offers stable milling with less chattering under highly efficient conditions.

Milling image



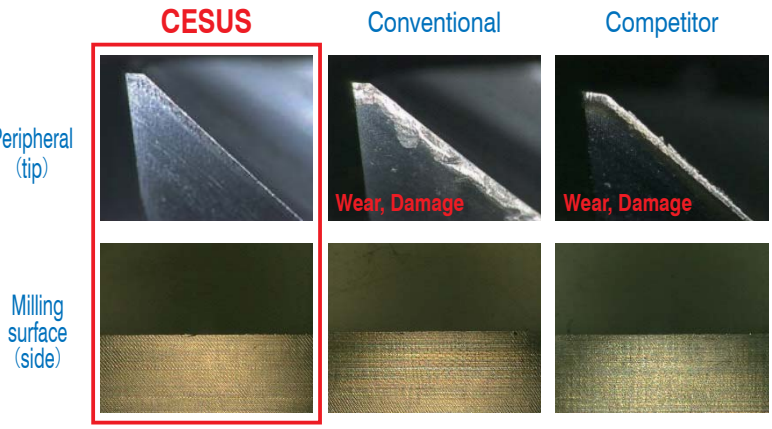


Slot milling surface

Milling Example for Side Milling
CESUS Ø10 x 22 **Length of Cut**

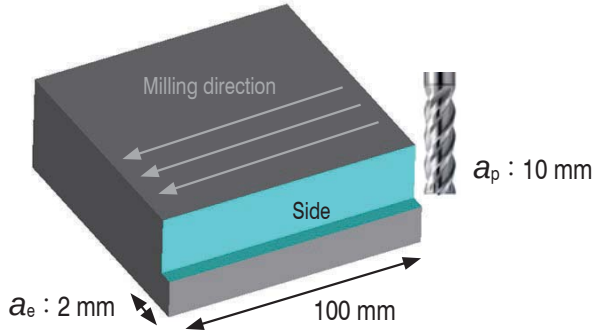
SUS304

Tool	CESUS 4100-2200
Spindle Speed	2,560 min^{-1}
Feed Rate	580 mm/min
Axial Depth a_p	10 mm
Radial Depth a_e	2 mm
Coolant	Water soluble
Milling Distance	64.8 m
Milling Time	120 min



CESUS offers longer tool life with less wear after 120 min milling!
Great surface finish without chattering!

Milling image



Advisory for Safe Use of UNIMAX Tungsten Carbide End Mills

Correct application and operation is strongly advised to avoid clogging, abrasion, etc, that could cause serious accidents or injuries.
Ignition or sparks generated during milling could lead to fire or extreme damage to the work piece.
End Mills are made with very sharp cutting edges and must be handled with extra care.

- Never touch the cutting edge with your bare hands, as this could cause serious injury. Special caution is required when opening the package.
- Dropping the tool could cause breakage or flying debris, leading to serious injury.
- During milling, unexpected impact or shock on the tool could cause breakage or flying debris. Ensure to use protective items such as safety glasses and a face guard.
- For best results, fine parameter adjustment may be required, depending on the materials; milling shape and strategy; machine rigidity and spindle capability.
- Use a machine that has high rigidity and generates a low level of vibration.
- Do not use flammable cutting oils.

Advisory for regrinding UNIMAX Tungsten Carbide End Mills

- Never regrind the tool without wearing safety glasses and a face guard.

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AM9:00～PM4:30

http://www.uniontool.co.jp

Price & Specifications are subject to change without notice.

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