NEW

MOLDINO
The Edge To Innovation

8-flute End Mill for Vertical Wall/Bottom Face Finishing

ER8WB-ATH (Radius type)
ES8WB-ATH (Square type)

MOLDINO Tool Engineering, Ltd.

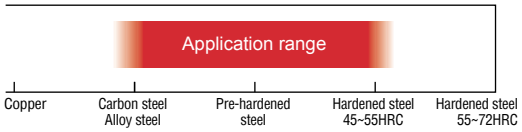
New Product News | No. H2204A-1 | 2022-01

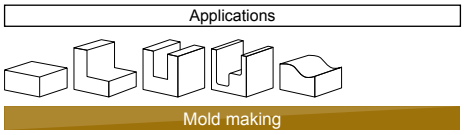
The Pinnacle of Finish Milling Vertical Walls and Bottom Faces. Vertical walls and bottom face finishing all with a single tool!

ER8WB-ATH/ES8WB-ATH features

01 Peripheral cutting edge design tailored for vertical wall milling. Allows milling as intended with minimal deflection, reducing re-machining and re-working steps.

02 Incorporates MOLDINO's own corner radius edges to achieve high-quality bottom face milling.



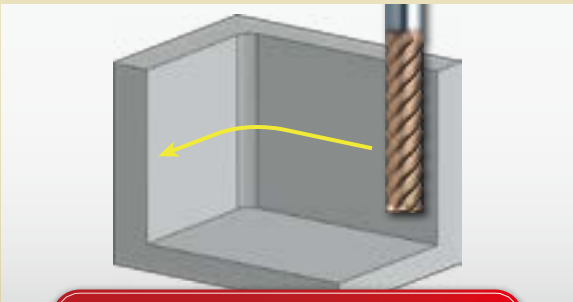


ER8WB-ATH : ϕ6～ϕ12 [19 Items]
(Corner radius R1)

ES8WB-ATH : ϕ6～ϕ12 [19 Items]
(Square)

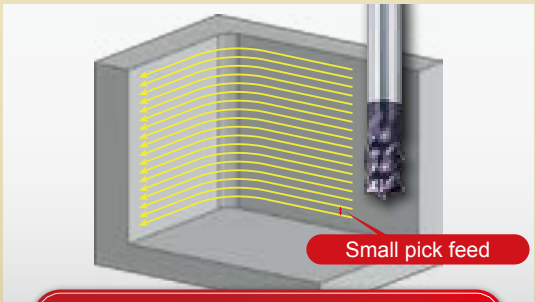
Task

1 Using long-fluted end mill for cutting vertical walls on mold parts reduces accuracy and generates time-consuming re-maching and reworking.



Task : Vertical wall machining accuracy

2 Reducing pick feed when contour milling achieves machining accuracy for vertical walls but increases machining time.

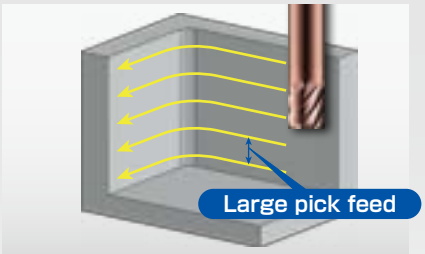


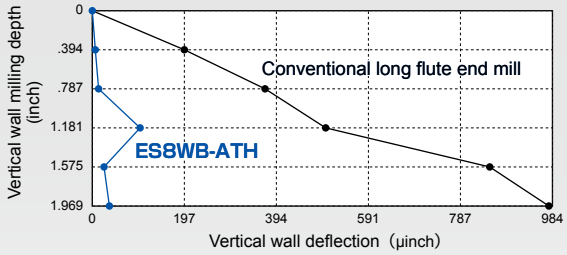
Task : Machining time

Proposal

Using the ER(S)8WB-ATH will reduce the need for re-machining, allowing for unattended machining processes.

The ER(S)8WB-ATH allows contour milling with larger pick feed.





Work material : STAVAX (52HRC)　Machine : Vertical MC　Coolant : Air blow　Projection : 1.181 inch(L/D=5)

【Conventional long-flute end mill】

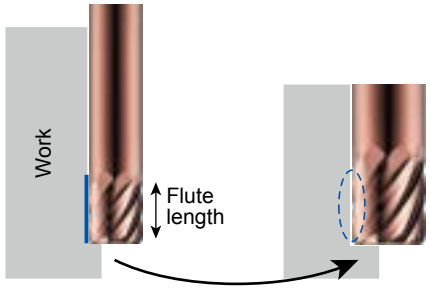
Tool specifications：DC .472 inch・Flute length 2.165 inch・6Flutes
n=530min^{-1}(v_c=66 SFM)　v_f=3.7 IPM(f_z =.001 IPT)
a_p=1.969 inch　a_e=.002 inch

【ES8WB-ATH】

Tool specifications：ES8WB1200LN-60-ATH (DC .472 inch・Flute length .472 inch・8Flutes)
n=1,326min^{-1}(v_c=164 SFM)　v_f=25.0 IPM(f_z=.002 IPT)
a_p=.236 inch　a_e=.002 inch

Features 01 Peripheral cutting edge design tailored for vertical wall milling

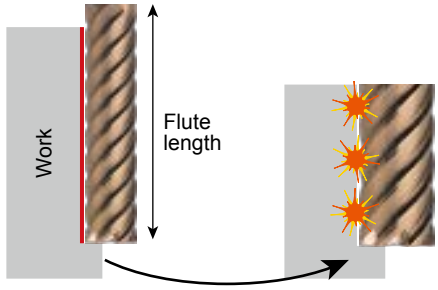
Vertical wall finishing using ER(S)8WB-ATH



Solution

- Short flute gives high rigidity
  => Minimizes deflection
- Tool design with few contact points
  => Minimizes vibration

Vertical wall finishing with conventional long-flute end mill



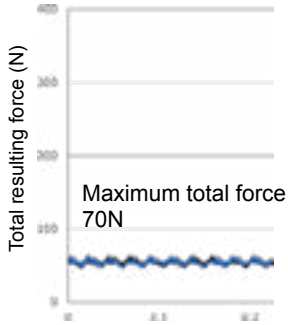
Task

- Extended projection length (flute length)
  => Deflection
- Multiple contact points
  => Increased vibration

Comparison of cutting force

Work material：H13(48HRC)　Machine：Vertical MC(BT40)　Coolant：Air blow　Projection：30mm(L/D=5)

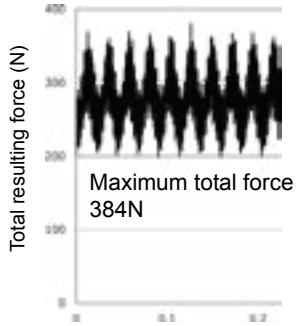
ER(S)8WB-ATH



Tool : ES8WB0600LN-30-AT
(DC .236 inch,
Flute length .236 inch,
Under neck length 1.181 inch)
Cutting conditions : n=2650min^{-1}
(v_c 164 SFM)
v_f=25.0 IPM
(f_z .001 IPT)
a_p .118 inch
a_e .004 inch

Reduced cutting force and vibration

Conventional long flute end mill

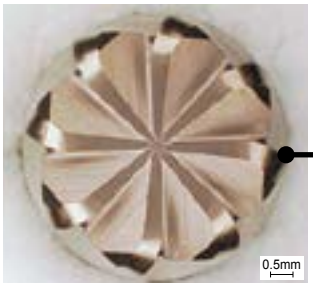


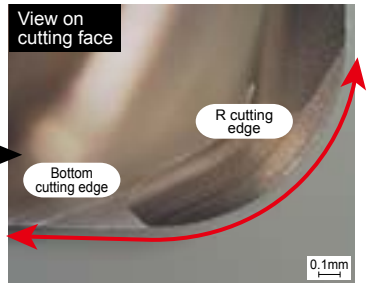
Tool : 6flutes long flute
(DC .236 inch,
Flute length .984 inch)
Cutting conditions : n=2650min^{-1}
(v_c 164 SFM)
v_f=18.8 IPM
(f_z .001 IPT)
a_p .984 inch
a_e .004 inch

Large cutting force, resulting in vibration

This is the Point The unique design reducing cutting force and vibration allows milling as intended with minimal deflection.

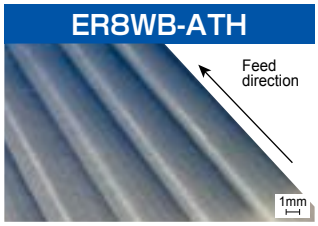
Features 02 MOLDINO's own corner radius cutting edge design * ER8WB-ATH only





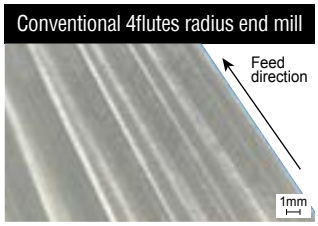
Smooth interface between bottom and radius cutting edges insures high-quality bottom face milling.

ER8WB-ATH



Shiny appearance with uniform cutter marks

Conventional 4flutes radius end mill

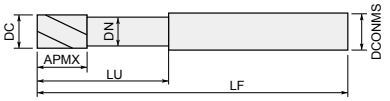


Milled surface appears cloudy. Uneven cutter marks

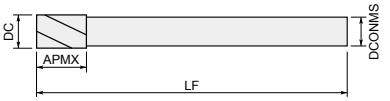
Work material：Carbon Steel　Machine：Vertical MC(BT40)
Coolant：Air blow　Projection：2.362 inch(L/D=5)
Tool : Conventional 4flutes radius end mill,
ER8WB1200LN-60-R1.0-ATH(DC .472 inch)
Cutting conditions：n=5310min^{-1}(v_c 656 SFM) f_z=.002 IPT
a_p .002 inch, a_e .236 inch

Line up

Square



A type



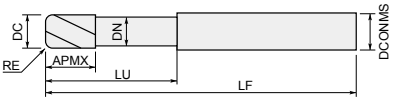
B type

ES8WB○○○○LN(LS)-○○-ATH

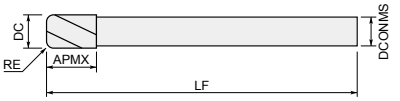
Carbide ATH Helix 38 $^{0}_{-0.015}$ (ϕ6) $^{0}_{-0.02}$ (ϕ7~ϕ12) h5 (ϕ6,8,10,12) h6 (ϕ7,9,11)

Item code	Stock	Size(mm)						Shape
		Tool dia.	Flute length	Under neck length	Neck dia.	Overall length	Shank dia.	
		DC	APMX	LU	DN	LF	DCONMS	
ES8WB0600LN-20-ATH	●	6 (.236inch)	6 (.236inch)	20	5.88	70	6	A
ES8WB0600LN-30-ATH	●			30	5.88	80	6	A
ES8WB0600LN-40-ATH	●			40	5.88	90	6	A
ES8WB0600LN-50-ATH	●			50	5.88	100	6	A
ES8WB0700LS-ATH	●	7 (.276inch)	7 (.276inch)	—	—	90	6	B
ES8WB0800LN-30-ATH	●	8 (.315inch)	8 (.315inch)	30	7.84	75	8	A
ES8WB0800LN-40-ATH	●			40	7.84	90	8	A
ES8WB0800LN-50-ATH	●			50	7.84	100	8	A
ES8WB0800LN-60-ATH	●			60	7.84	110	8	A
ES8WB0900LS-ATH	●	9 (.354inch)	9 (.354inch)	—	—	100	8	B
ES8WB1000LN-35-ATH	●	10 (.394inch)	10 (.394inch)	35	9.8	80	10	A
ES8WB1000LN-50-ATH	●			50	9.8	100	10	A
ES8WB1000LN-60-ATH	●			60	9.8	110	10	A
ES8WB1000LN-80-ATH	●			80	9.8	130	10	A
ES8WB1100LS-ATH	●	11 (.433inch)	11 (.433inch)	—	—	110	10	B
ES8WB1200LN-40-ATH	●	12 (.472inch)	12 (.472inch)	40	11.8	90	12	A
ES8WB1200LN-60-ATH	●			60	11.8	110	12	A
ES8WB1200LN-80-ATH	●			80	11.8	130	12	A
ES8WB1200LN-100-ATH	●			100	11.8	150	12	A

Radius



A type



B type

ER8WB○○○○LN(LS)-○○-R○○-ATH

Carbide ATH Helix 38 $^{0}_{-0.015}$ (ϕ6) $^{0}_{-0.02}$ (ϕ7~ϕ12) h5 (ϕ6,8,10,12) h6 (ϕ7,9,11)

Item code	Stock	Size(mm)							Shape
		Tool dia.	Corner radius	Flute length	Under neck length	Neck dia.	Overall length	Shank dia.	
		DC	RE	APMX	LU	DN	LF	DCONMS	
ER8WB0600LN-20-R1.0-ATH	●	6 (.236inch)	1	7 (.276inch)	20	5.88	70	6	A
ER8WB0600LN-30-R1.0-ATH	●		1		30	5.88	80	6	A
ER8WB0600LN-40-R1.0-ATH	●		1		40	5.88	90	6	A
ER8WB0600LN-50-R1.0-ATH	●		1		50	5.88	100	6	A
ER8WB0700LS-R1.0-ATH	●	7 (.276inch)	1	8 (.315inch)	—	—	90	6	B
ER8WB0800LN-30-R1.0-ATH	●	8 (.315inch)	1	9 (.354inch)	30	7.84	75	8	A
ER8WB0800LN-40-R1.0-ATH	●		1		40	7.84	90	8	A
ER8WB0800LN-50-R1.0-ATH	●		1		50	7.84	100	8	A
ER8WB0800LN-60-R1.0-ATH	●		1		60	7.84	110	8	A
ER8WB0900LS-R1.0-ATH	●	9 (.354inch)	1	10 (.394inch)	—	—	100	8	B
ER8WB1000LN-35-R1.0-ATH	●	10 (.394inch)	1	11 (.433inch)	35	9.8	80	10	A
ER8WB1000LN-50-R1.0-ATH	●		1		50	9.8	100	10	A
ER8WB1000LN-60-R1.0-ATH	●		1		60	9.8	110	10	A
ER8WB1000LN-80-R1.0-ATH	●		1		80	9.8	130	10	A
ER8WB1100LS-R1.0-ATH	●	11 (.433inch)	1	12 (.472inch)	—	—	110	10	B
ER8WB1200LN-40-R1.0-ATH	●	12 (.472inch)	1	13 (.512inch)	40	11.8	90	12	A
ER8WB1200LN-60-R1.0-ATH	●		1		60	11.8	110	12	A
ER8WB1200LN-80-R1.0-ATH	●		1		80	11.8	130	12	A
ER8WB1200LN-100-R1.0-ATH	●		1		100	11.8	150	12	A

● : Inventory maintained in US ★ : Inventory maintained in Japan

Recommended Cutting Conditions (Inch)

Vertical wall finishing

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Item code	a_p (inch)	a_e (inch)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)
ER(S)8WB0600LN-20-(R1.0)-ATH	.118	≦.004	7960	75.2	6370	60.2	4770	44.9	3180	29.9	2650	25.2
ER(S)8WB0600LN-30-(R1.0)-ATH	.118	≦.004	6630	62.6	5310	50.0	3980	37.8	2650	25.2	2120	20.1
ER(S)8WB0600LN-40-(R1.0)-ATH	.118	≦.004	4640	30.7	3710	24.4	2790	18.5	1860	12.2	1490	9.8
ER(S)8WB0600LN-50-(R1.0)-ATH	.118	≦.004	3320	15.7	2650	12.6	1990	9.4	1330	6.3	1060	5.1
ER(S)8WB0700LS-(R1.0)-ATH	.138	≦.004	5680	62.6	4550	50.0	3410	37.4	2270	25.2	1820	20.1
ER(S)8WB0800LN-30-(R1.0)-ATH	.157	≦.004	5970	75.2	4770	60.2	3580	45.3	2390	29.9	1990	25.2
ER(S)8WB0800LN-40-(R1.0)-ATH	.157	≦.004	4970	62.6	3980	50.0	2980	37.4	1990	25.2	1590	20.1
ER(S)8WB0800LN-50-(R1.0)-ATH	.157	≦.004	3480	35.0	2790	24.4	2090	21.3	1390	14.2	1110	11.0
ER(S)8WB0800LN-60-(R1.0)-ATH	.157	≦.004	2490	15.7	1990	12.6	1490	9.4	990	6.3	800	5.1
ER(S)8WB0900LS-(R1.0)-ATH	.177	≦.004	4420	62.6	3540	50.0	2650	37.4	1770	25.2	1410	20.1
ER(S)8WB1000LN-35-(R1.0)-ATH	.197	≦.004	4770	75.2	3820	60.2	2860	44.9	1910	29.9	1590	25.2
ER(S)8WB1000LN-50-(R1.0)-ATH	.197	≦.004	3980	62.6	3180	50.0	2390	37.8	1590	25.2	1270	20.1
ER(S)8WB1000LN-60-(R1.0)-ATH	.197	≦.004	2790	35.0	2230	24.4	1670	20.9	1110	14.2	890	11.0
ER(S)8WB1000LN-80-(R1.0)-ATH	.197	≦.004	1990	15.7	1590	12.6	1190	9.4	800	6.3	640	5.1
ER(S)8WB1100LS-(R1.0)-ATH	.217	≦.004	3620	59.4	2890	47.6	2170	35.8	1450	24.0	1160	18.9
ER(S)8WB1200LN-40-(R1.0)-ATH	.236	≦.004	3980	67.7	3180	53.9	2390	40.6	1590	27.2	1330	22.4
ER(S)8WB1200LN-60-(R1.0)-ATH	.236	≦.004	3320	56.3	2650	44.9	1990	33.9	1330	22.4	1060	18.1
ER(S)8WB1200LN-80-(R1.0)-ATH	.236	≦.004	2320	27.6	1860	22.0	1390	16.5	930	11.0	740	8.7
ER(S)8WB1200LN-100-(R1.0)-ATH	.236	≦.004	1660	14.2	1330	11.4	990	8.3	660	5.5	530	4.3

* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5D (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

Cutting condition correction factors for long-shank type (%)

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Projection	a_p (inch)	a_e (inch)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)	Revolution n (min^{-1})	Feed rate vf (IPM)
5D	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6D	100%	100%	70%	60%	70%	60%	70%	60%	70%	60%	70%	60%
7D	100%	100%	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

Recommended Cutting Conditions (Inch)

Bottom face finishing

※ A radius type (ER8WB-ATH) should be used for bottom face finishing.

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Item code	a_p (inch)	a_e (inch)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)
ER8WB0600LN-20-R1.0-ATH	.002~.004	.118~.236	9550	90.2	7960	75.2	6370	60.2	4770	44.9	3180	29.9
ER8WB0600LN-30-R1.0-ATH	.002~.004	.118~.236	7960	75.2	6630	62.6	5310	50.0	3980	37.8	2650	25.2
ER8WB0600LN-40-R1.0-ATH	.002~.004	.118~.236	5570	37.0	4640	30.7	3710	24.4	2790	18.5	1860	12.2
ER8WB0600LN-50-R1.0-ATH	.002~.004	.118~.236	3980	18.9	3320	15.7	2650	12.6	1990	9.4	1330	6.3
ER8WB0700LS-R1.0-ATH	.002~.004	.138~.276	6820	75.2	5680	62.6	4550	50.0	3410	37.4	2270	25.2
ER8WB0800LN-30-R1.0-ATH	.002~.004	.157~.315	7160	90.2	5970	75.2	4770	60.2	3580	45.3	2390	29.9
ER8WB0800LN-40-R1.0-ATH	.002~.004	.157~.315	5970	75.2	4970	62.6	3980	50.0	2980	37.4	1990	25.2
ER8WB0800LN-50-R1.0-ATH	.002~.004	.157~.315	4180	42.1	3480	35.0	2790	28.0	2090	21.3	1390	14.2
ER8WB0800LN-60-R1.0-ATH	.002~.004	.157~.315	2980	18.9	2490	15.7	1990	12.6	1490	9.4	990	6.3
ER8WB0900LS-R1.0-ATH	.002~.004	.177~.354	5310	75.2	4420	62.6	3540	50.0	2650	37.4	1770	25.2
ER8WB1000LN-35-R1.0-ATH	.002~.004	.197~.394	5730	90.2	4770	75.2	3820	60.2	2860	44.9	1910	29.9
ER8WB1000LN-50-R1.0-ATH	.002~.004	.197~.394	4770	75.2	3980	62.6	3180	50.0	2390	37.8	1590	25.2
ER8WB1000LN-60-R1.0-ATH	.002~.004	.197~.394	3340	42.1	2790	35.0	2230	28.0	1670	20.9	1110	14.2
ER8WB1000LN-80-R1.0-ATH	.002~.004	.197~.394	2390	18.9	1990	15.7	1590	12.6	1190	9.4	800	6.3
ER8WB1100LS-R1.0-ATH	.002~.004	.217~.433	4340	71.3	3620	59.4	2890	47.6	2170	35.8	1450	24.0
ER8WB1200LN-40-R1.0-ATH	.002~.004	.236~.472	4770	81.1	3980	67.7	3180	53.9	2390	40.6	1590	27.2
ER8WB1200LN-60-R1.0-ATH	.002~.004	.236~.472	3980	67.7	3320	56.3	2650	44.9	1990	33.9	1330	22.4
ER8WB1200LN-80-R1.0-ATH	.002~.004	.236~.472	2790	33.1	2320	27.6	1860	22.0	1390	16.5	930	11.0
ER8WB1200LN-100-R1.0-ATH	.002~.004	.236~.472	1990	16.9	1660	14.2	1330	11.4	990	8.3	660	5.5

* Cutting conditions for the long-shank type (⌀ 7/9/11) are for a tool projection of 5D (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

Cutting condition correction factors for long-shank type (%)

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Projection	a_p (inch)	a_e (inch)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)	Revolution n (min^{-1})	Feed rate v_f (IPM)
5D	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6D	100%	100%	70%	60%	70%	60%	70%	60%	70%	60%	70%	60%
7D	100%	100%	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ For slotting, adjust the feed rate to 50% as general criteria.
⑥ For ramping, adjust the ramp angle to 0.5° or less and the feed rate to 50% as general criteria.

Recommended Cutting Conditions (Metric)

Vertical wall finishing

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Item code	a_p (mm)	a_e (mm)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)
ER(S)8WB0600LN-20-(R1.0)-ATH	3	≦0.1	7960	1910	6370	1530	4770	1140	3180	760	2650	640
ER(S)8WB0600LN-30-(R1.0)-ATH	3	≦0.1	6630	1590	5310	1270	3980	960	2650	640	2120	510
ER(S)8WB0600LN-40-(R1.0)-ATH	3	≦0.1	4640	780	3710	620	2790	470	1860	310	1490	250
ER(S)8WB0600LN-50-(R1.0)-ATH	3	≦0.1	3320	400	2650	320	1990	240	1330	160	1060	130
ER(S)8WB0700LS-(R1.0)-ATH	3.5	≦0.1	5680	1590	4550	1270	3410	950	2270	640	1820	510
ER(S)8WB0800LN-30-(R1.0)-ATH	4	≦0.1	5970	1910	4770	1530	3580	1150	2390	760	1990	640
ER(S)8WB0800LN-40-(R1.0)-ATH	4	≦0.1	4970	1590	3980	1270	2980	950	1990	640	1590	510
ER(S)8WB0800LN-50-(R1.0)-ATH	4	≦0.1	3480	890	2790	620	2090	540	1390	360	1110	280
ER(S)8WB0800LN-60-(R1.0)-ATH	4	≦0.1	2490	400	1990	320	1490	240	990	160	800	130
ER(S)8WB0900LS-(R1.0)-ATH	4.5	≦0.1	4420	1590	3540	1270	2650	950	1770	640	1410	510
ER(S)8WB1000LN-35-(R1.0)-ATH	5	≦0.1	4770	1910	3820	1530	2860	1140	1910	760	1590	640
ER(S)8WB1000LN-50-(R1.0)-ATH	5	≦0.1	3980	1590	3180	1270	2390	960	1590	640	1270	510
ER(S)8WB1000LN-60-(R1.0)-ATH	5	≦0.1	2790	890	2230	620	1670	530	1110	360	890	280
ER(S)8WB1000LN-80-(R1.0)-ATH	5	≦0.1	1990	400	1590	320	1190	240	800	160	640	130
ER(S)8WB1100LS-(R1.0)-ATH	5.5	≦0.1	3620	1510	2890	1210	2170	910	1450	610	1160	480
ER(S)8WB1200LN-40-(R1.0)-ATH	6	≦0.1	3980	1720	3180	1370	2390	1030	1590	690	1330	570
ER(S)8WB1200LN-60-(R1.0)-ATH	6	≦0.1	3320	1430	2650	1140	1990	860	1330	570	1060	460
ER(S)8WB1200LN-80-(R1.0)-ATH	6	≦0.1	2320	700	1860	560	1390	420	930	280	740	220
ER(S)8WB1200LN-100-(R1.0)-ATH	6	≦0.1	1660	360	1330	290	990	210	660	140	530	110

* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5D (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

Cutting condition correction factors for long-shank type (%)

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Projection	a_p (mm)	a_e (mm)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)	Revolution n (min^{-1})	Feed rate v_f (mm/min)
5D	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6D	100%	100%	70%	60%	70%	60%	70%	60%	70%	60%	70%	60%
7D	100%	100%	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

Recommended Cutting Conditions (Metric)

Bottom face finishing

※ A radius type (ER8WB-ATH) should be used for bottom face finishing.

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Item code	a_p (mm)	a_e (mm)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)
ER8WB0600LN-20-R1.0-ATH	0.05~0.1	3~6	9550	2290	7960	1910	6370	1530	4770	1140	3180	760
ER8WB0600LN-30-R1.0-ATH	0.05~0.1	3~6	7960	1910	6630	1590	5310	1270	3980	960	2650	640
ER8WB0600LN-40-R1.0-ATH	0.05~0.1	3~6	5570	940	4640	780	3710	620	2790	470	1860	310
ER8WB0600LN-50-R1.0-ATH	0.05~0.1	3~6	3980	480	3320	400	2650	320	1990	240	1330	160
ER8WB0700LS-R1.0-ATH	0.05~0.1	3.5~7	6820	1910	5680	1590	4550	1270	3410	950	2270	640
ER8WB0800LN-30-R1.0-ATH	0.05~0.1	4~8	7160	2290	5970	1910	4770	1530	3580	1150	2390	760
ER8WB0800LN-40-R1.0-ATH	0.05~0.1	4~8	5970	1910	4970	1590	3980	1270	2980	950	1990	640
ER8WB0800LN-50-R1.0-ATH	0.05~0.1	4~8	4180	1070	3480	890	2790	710	2090	540	1390	360
ER8WB0800LN-60-R1.0-ATH	0.05~0.1	4~8	2980	480	2490	400	1990	320	1490	240	990	160
ER8WB0900LS-R1.0-ATH	0.05~0.1	4.5~9	5310	1910	4420	1590	3540	1270	2650	950	1770	640
ER8WB1000LN-35-R1.0-ATH	0.05~0.1	5~10	5730	2290	4770	1910	3820	1530	2860	1140	1910	760
ER8WB1000LN-50-R1.0-ATH	0.05~0.1	5~10	4770	1910	3980	1590	3180	1270	2390	960	1590	640
ER8WB1000LN-60-R1.0-ATH	0.05~0.1	5~10	3340	1070	2790	890	2230	710	1670	530	1110	360
ER8WB1000LN-80-R1.0-ATH	0.05~0.1	5~10	2390	480	1990	400	1590	320	1190	240	800	160
ER8WB1100LS-R1.0-ATH	0.05~0.1	5.5~11	4340	1810	3620	1510	2890	1210	2170	910	1450	610
ER8WB1200LN-40-R1.0-ATH	0.05~0.1	6~12	4770	2060	3980	1720	3180	1370	2390	1030	1590	690
ER8WB1200LN-60-R1.0-ATH	0.05~0.1	6~12	3980	1720	3320	1430	2650	1140	1990	860	1330	570
ER8WB1200LN-80-R1.0-ATH	0.05~0.1	6~12	2790	840	2320	700	1860	560	1390	420	930	280
ER8WB1200LN-100-R1.0-ATH	0.05~0.1	6~12	1990	430	1660	360	1330	290	990	210	660	140

* Cutting conditions for the long-shank type (⌀7/9/11) are for a tool projection of 5D (tool diameter × 5). Modify the conditions using the following correction factors if the projection amount changes:

Cutting condition correction factors for long-shank type (%)

Work material			Carbon steel Alloy steel (180~250HB)		Tool steel (25~35HRC)		Pre-hardened steel (35~45HRC)		Hardened steel (45~55HRC)		Hardened steel (55~62HRC)	
Projection	a_p (mm)	a_e (mm)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)	Revolution n (min^{-1})	Feed rate vf (mm/min)
5D	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6D	100%	100%	70%	60%	70%	60%	70%	60%	70%	60%	70%	60%
7D	100%	100%	70%	50%	70%	50%	70%	50%	70%	50%	70%	50%

【Note】
① Use the appropriate coolant for the work material and machining shape.
② Use a highly rigid and accurate machine as possible.
③ These Recommended Cutting Conditions indicate only the rule of a thumb for the cutting conditions. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.
⑤ For slotting, adjust the feed rate to 50% as general criteria.
⑥ For ramping, adjust the ramp angle to 0.5° or less and the feed rate to 50% as general criteria.

The ER8WB-ATH achieves high-quality bottom face milling.

This is the Point

Use with a small pick feed and high cutting speed milling allows for a high mirror finish

ER8WB-ATH

Work size：3.150×2.756 inch

Work material：STAVAX(52HRC)
Machine：Vertical MC(HSK-E32)
Coolant：Water base coolant
Projection：.787 inch(L/D≒3)
Tool：ER8WB0600LN-20-R1.0-ATH (DC .236 inch)
Cutting conditions：n=40,000min^{-1} (v_c=2,470 SFM)
vf=126.0 IPM (f_z=.0004 IPT)
a_p=.0006 inch a_e=.0008 inch Wet
Reciprocating machining of scanning line 2-hour machining time

Surface roughness in pick direction Ra：.591 µinch, Rz：2.717 µinch

Field data

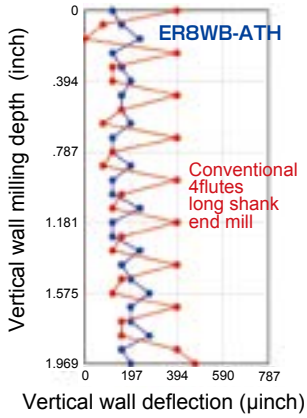
Diecast mold core vertical wall finishing

Work material : H13(45HRC)　Machine : Vertical MC (HSK-A63)　Coolant : Air blow　Projection : 2.559 inch(L/D≒5)
Tool : ER8WB1200LN-60-R1.0-ATH(φ12)　Conventional 4flutes long shank end mill

Cutting conditions :

ER8WB-ATH
n=1,326min^{-1}(v_c=164 SFM)　v_f=25.0 IPM(f_z=.002 IPT)
a_p=.236 inch　a_e=.004 inch

Conventional 4flutes long shank end mill
n=1,326min^{-1}(v_c=164 SFM)　v_f=12.5 IPM(f_z=.002 IPT)
a_p=.236 inch　a_e=.004 inch



ER8WB-ATH

Surface roughness in pick direction
Ra 5.12 µinch
Rz 38.03 µinch

Milled surface with minimal unevenness and shine

Conventional

Surface roughness in pick direction
Ra 18.90 µinch
Rz 139.09 µinch

Cloudy and uneven milled surface with conventional tools

ER8WB-ATH produces good machining accuracy and surface finish that increases efficiency compared to conventional tools.

Example for plastic molds and bushing hole finishing

Work material : STAVAX(52HRC)　Machine : Vertical MC (BT40)　Coolant : Oil base coolant　Projection : 1.969 inch(L/D=5)
Tool : ES8WB1000LN-50-ATH(φ10)　Conventional long flute end mill　Hole dia. : 1.654 inch　Depth : 1.457 inch

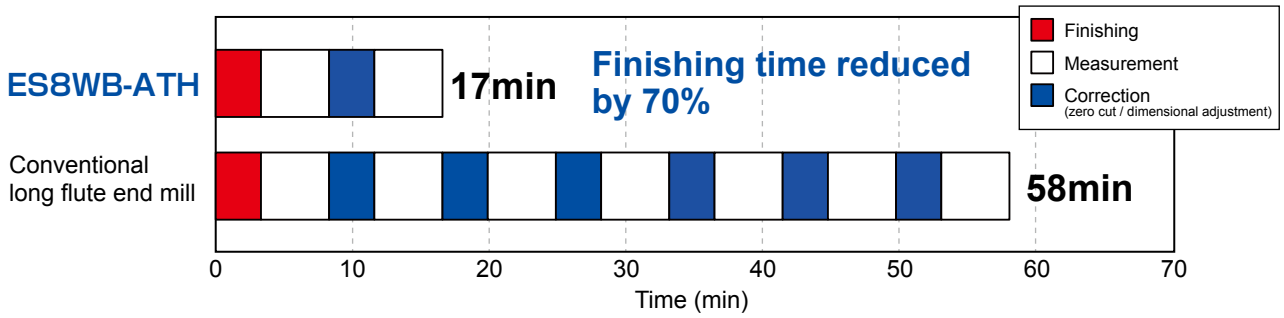
Cutting conditions :

ES8WB-ATH
n=1,592min^{-1}(v_c=164 SFM)　v_f=12.5 IPM(f_z=.001 IPT)
a_p=.197 inch　a_e=.002 inch

Conventional 6flutes long flute end mill
n=600min^{-1}(v_c=62 SFM)　v_f=3.2 IPM(f_z=.001 IPT)
a_p=.787 inch　a_e=.002 inch

* Machined using finishing machining with nominal diameter for both tools

【Comparison of finishing time】



ES8WB-ATH

- Long-flute end mill requires total of 6 zero cuts and corrections for deflection and dimensional adjustment.
- ES8WB-ATH achieves deflection of less than 118.11 µinch, even without zero cutting.
  Completed with just one final dimensional adjustment.

Surface roughness in pick direction Ra : 8.50 µinch, Rz : 36.38 µinch

Notes

⚠ Safety notes

1. Cautions regarding handling

(1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
(2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

(1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
(2) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

(1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
(2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
(3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
(4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. **Please caution of fire while using oil base coolant, fire prevention is necessary.**
(5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

(1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
(2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
(3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with thelocal laws and regulations regarding prevention of hazards due to specified chemical substances.

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