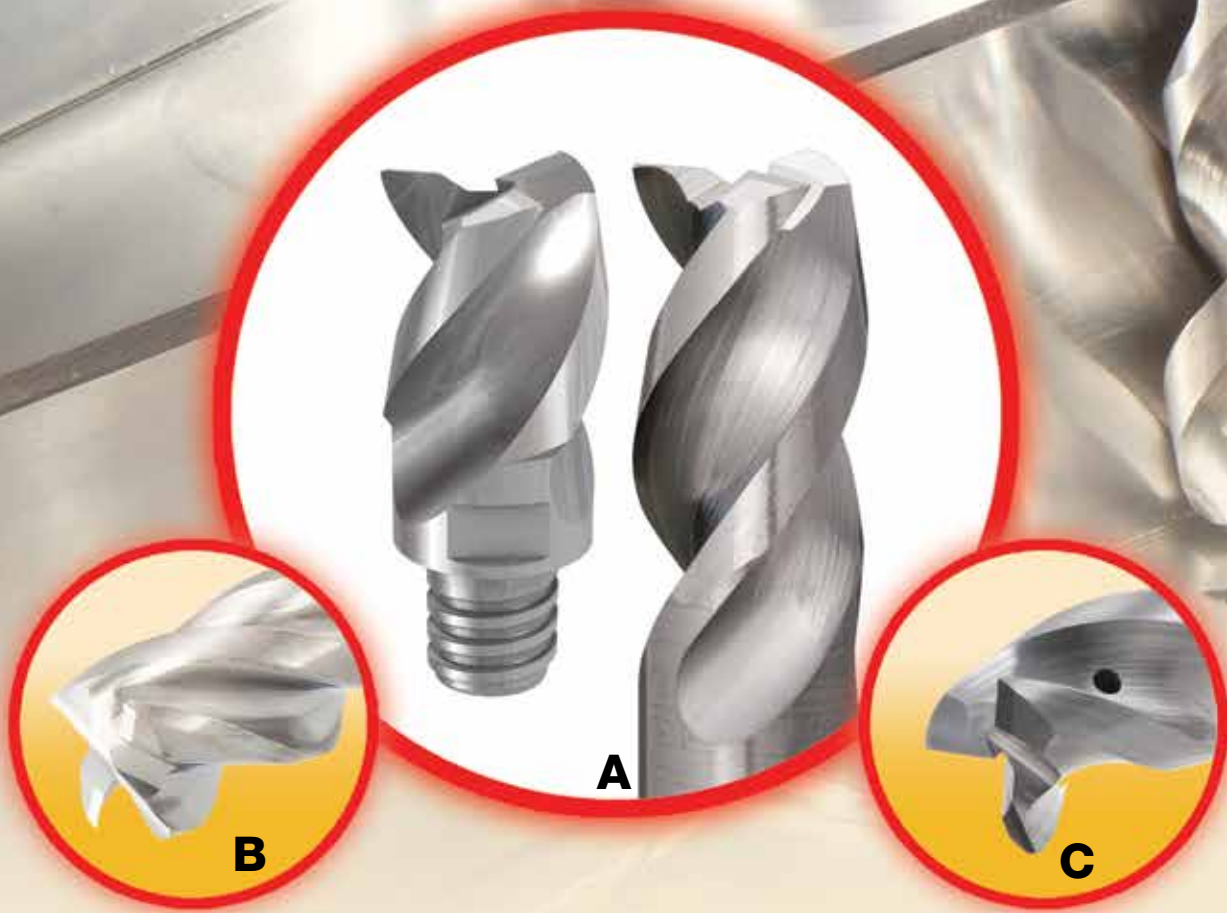


CHATTERFREE
SOLID MILL LINE

Engineered for
MAXIMUM
MILLING Performance



Engineered for
MAXIMUM
ALUMINUM Performance



CHATTERFREE • **SOLIDMILL** MULTI-MASTER LINE SOLID CARBIDE LINE

Solid Carbide and MULTI-MASTER Endmills for Machining Aluminum

A ISCAR's CHATTERFREE endmills for machining aluminum are an excellent solution for the aerospace industry. They improve material removal rate, eliminate vibration, maximize stock removal rate and reduce cycle time in most milling operations.

The different helix and variable pitch endmills are available with 3, 4, 5xD neck relief in a variety of corner radii. They have a unique ground and polished geometry that provides excellent bottom and side surface finish with no mismatch.

B **ECA-H4...CF** 4 flute endmills, designed for both roughing and finishing operations, feature excellent chatter dampening ability. They can be used with external cooling at very high cutting speeds, for full slot machining of aluminum up to 1XD.

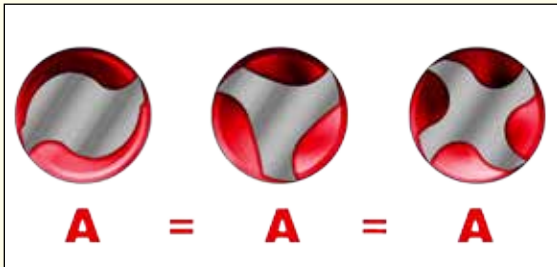
C **ECA-H3...CF** 3 flute, solid carbide endmills for machining aluminum with different helix and variable pitch coolant holes directed to each individual cutting edge. These endmills can be used for both roughing and finishing operations and feature excellent chatter dampening ability. The coolant holes improve chip evacuation and eliminate chip re-cutting, thus enabling machining full slots at very high cutting speeds and high material removal rates, providing extended tool life.

ISCAR is introducing the ECA-H4... CF - 4 flute, solid carbide endmills with different helix and variable pitch for machining aluminum.

The new endmills expand the already available endmill family: ECA-H3... FR - 3 flute endmills, providing an extra flute for higher production rates.

ECA-H4...CF endmills, designed for both roughing and finishing operations, feature excellent chatter dampening ability. They can be used with external cooling at very high cutting speeds.

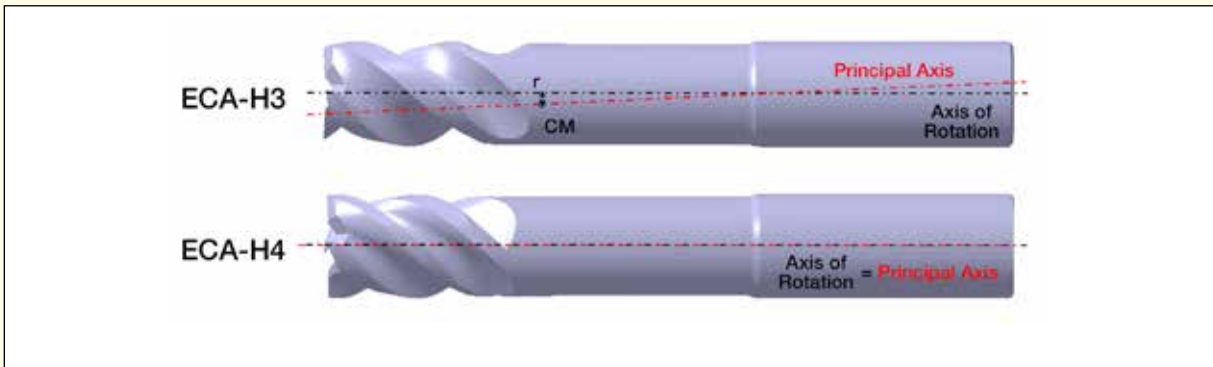
The new 4 cutting edged tools were designed with core diameter and flute chip gullet section size similar to the existing ECA-H3.. line.



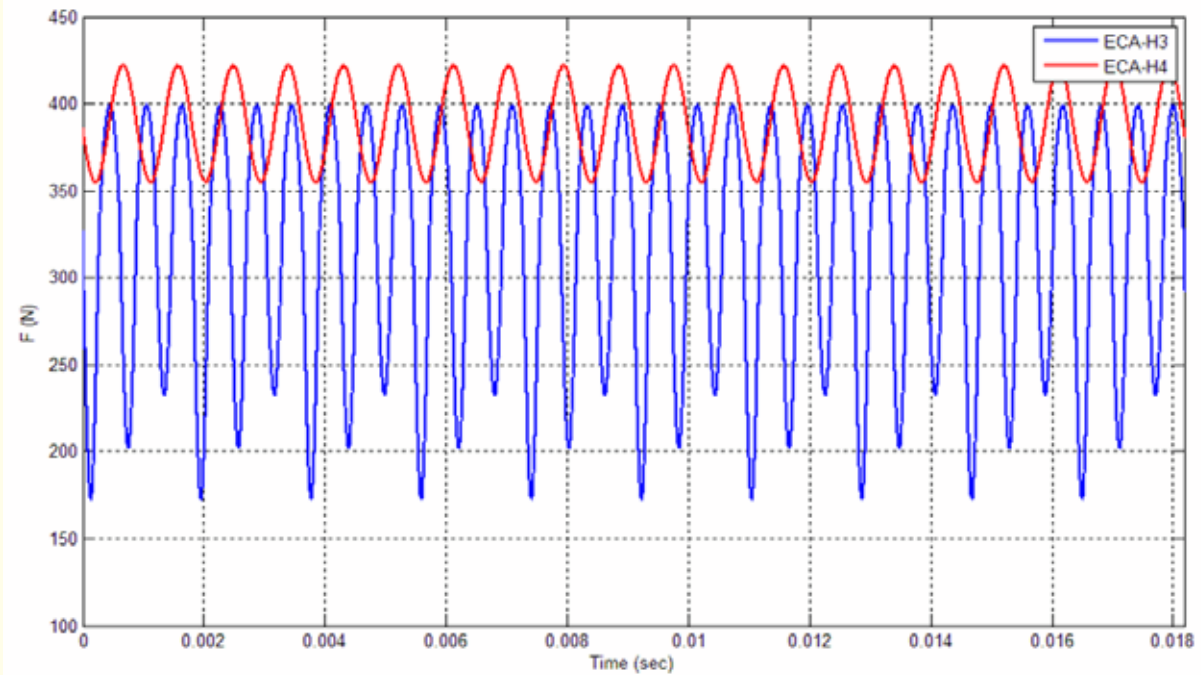
- The tools are statically and dynamically balanced by design
- Lower and fewer fluctuation bending forces (see diagram)
- Provides very stable machining process

Balance Grade by Design at 33,000 RPM

		r (µm)	CAD Model Balance Grade
D=12 mm	ECA-H3 12-18/60C12CF-R02	8	G16
	ECA-H4 12-18/60C12CFR02	0	0
D=16 mm	ECA-H3 16-24/80C16CF-R02	7	G16
	ECA-H4 16-24/80C16CFR02	0	0



Analytical Tool Bending Force Fluctuation



Material

Aluminum 7075

Machining Conditions

$a_p=3$ [mm] $f_z=0.1$ [mm/t]
 $n=33,000$ [RPM];

Tools

ECA-H3 12-18/60C12CF-R02

ECA-H4 12-18/60C12CF-R02

ISCAR's new CHATTERFREE endmills for machining aluminum are an excellent solution for low power machines with ISO40 or BT40 adaptations, improving material removal rate and eliminating vibration. They maximize stock removal rate and reduce cycle time in most milling operations.

Their unique ground and polished geometry provides excellent bottom and side surface finish with no mismatch.

Extended tool life can be expected when machining at high material removal rates. The new ECA-H4...CF CHATTERFREE solid carbide endmills are available in a diameter range of 6 to 25 mm, all with a 0.2 mm corner radius and milling depth to endmill diameter ratios of 3XD and 5XD (long and short necks).

Important

When machining at RPM higher than 12,000, tool and holder assembly should be balanced.

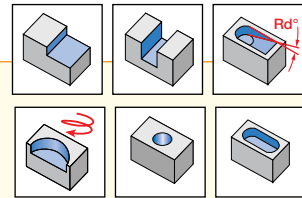
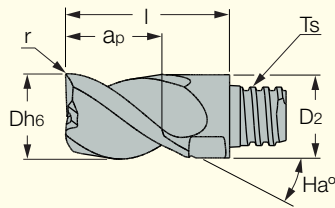
CHATTERFREE

MULTI-MASTER LINE

MM EA-CF

Interchangeable Solid Carbide Endmill Heads with Different Helix for Machining Aluminum

Engineered for **MAXIMUM** ALUMINUM Performance



ALUMINUM

Designation	Dimensions									IC08	Recommended Machining Data f _z (mm/t)
	D	Flute	a _p	r	Ts	D ₂	l	H _a °			
MM EA120H12R0.2CF-3T08	12.00	3	12.00	0.20	T08	11.70	23.00	40.0	●	0.04-0.11	
MM EA160H16R0.2CF-3T10	16.00	3	16.00	0.20	T10	15.30	28.00	40.0	●	0.05-0.13	
MM EA200H20R0.2CF-3T12	20.00	3	20.00	0.20	T12	18.30	34.00	40.0	●	0.05-0.13	
MM EA080H08R0CF-4T05 IC08	8	4	8	0	T05	7.7	17	40.0	●	0.03-0.09	
MM EA100H10R0CF-4T06 IC08	10	4	10	0	T06	11.7	24	40	●	0.03-0.1	
MM EA120H12R0CF-4T08 IC08	12	4	12	0	T08	15.3	32	40	●	0.04-0.11	
MM EA160H16R0CF-4T10 IC08	16	4	16	0	T10	18.3	39	40	●	0.05-0.12	

• Do not apply lubricant to the threaded connection.

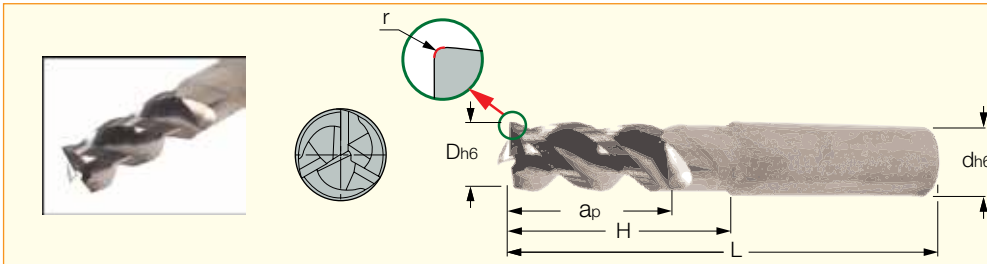
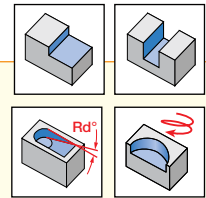


CHATTERFREE

SOLID MILL LINE

ECA-H3-CF

Solid Carbide Endmills with Different Helix and Variable Pitch, 3, 4 and 5xD Neck Relief for Machining Aluminum



ALUMINUM

Designation	Dimensions										IC08	Recommended Machining Data
	D	ap	H	L	d	r	Flute	Rd°	Shank ⁽¹⁾	fz (mm/t)		
ECA-H3 03-07/12C06CF-R01	3.00	7.00	12.00	57.00	6.00	0.10	3	5.0	C	●	0.03-0.05	
ECA-H3 04-10/16C06CF-R02	4.00	10.00	16.00	57.00	6.00	0.20	3	5.0	C	●	0.03-0.05	
ECA-H3 05-12/20C06CF-R02	5.00	12.00	20.00	57.00	6.00	0.20	3	5.0	C	●	0.03-0.06	
ECA-H3 06-09/18C06CF-R02	6.00	9.00	18.00	57.00	6.00	0.20	3	5.0	C	●	0.03-0.07	
ECA-H3 06-09/18C06CF-R04	6.00	9.00	18.00	57.00	6.00	0.40	3	5.0	C	●	0.03-0.07	
ECA-H3 06-09/18C06CF-R08	6.00	9.00	18.00	57.00	6.00	0.80	3	5.0	C	●	0.03-0.07	
ECA-H3 06-09/30C06CF-R02	6.00	9.00	30.00	65.00	6.00	0.20	3	5.0	C	●	0.03-0.07	
ECA-H3 06-09/30C06CF-R04	6.00	9.00	30.00	65.00	6.00	0.40	3	5.0	C	●	0.03-0.07	
ECA-H3 06-09/30C06CF-R08	6.00	9.00	30.00	65.00	6.00	0.80	3	5.0	C	●	0.03-0.07	
ECA-H3 06-14/24C06CF-R02	6.00	14.00	24.00	60.00	6.00	0.20	3	5.0	C	●	0.03-0.07	
ECA-H3 08-12/24C08CF-R02	8.00	12.00	24.00	63.00	8.00	0.20	3	5.0	C	●	0.03-0.09	
ECA-H3 08-12/24C08CF-R04	8.00	12.00	24.00	63.00	8.00	0.40	3	5.0	C	●	0.03-0.09	
ECA-H3 08-12/24C08CF-R08	8.00	12.00	24.00	63.00	8.00	0.80	3	5.0	C	●	0.03-0.09	
ECA-H3 08-12/40C08CF-R02	8.00	12.00	40.00	79.00	8.00	0.20	3	5.0	C	●	0.03-0.09	
ECA-H3 08-12/40C08CF-R04	8.00	12.00	40.00	79.00	8.00	0.40	3	5.0	C	●	0.03-0.09	
ECA-H3 08-12/40C08CF-R08	8.00	12.00	40.00	79.00	8.00	0.80	3	5.0	C	●	0.03-0.09	
ECA-H3 08-18/32C08CF-R02	8.00	18.00	32.00	68.00	8.00	0.20	3	5.0	C	●	0.03-0.09	
ECA-H3 10-15/30C10CF-R02	10.00	15.00	30.00	72.00	10.00	0.20	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/30C10CF-R04	10.00	15.00	30.00	72.00	10.00	0.40	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/30C10CF-R08	10.00	15.00	30.00	72.00	10.00	0.80	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/30C10CF-R16	10.00	15.00	30.00	72.00	10.00	1.60	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/50C10CF-R02	10.00	15.00	50.00	92.00	10.00	0.20	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/50C10CF-R04	10.00	15.00	50.00	92.00	10.00	0.40	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/50C10CF-R08	10.00	15.00	50.00	92.00	10.00	0.80	3	5.0	C	●	0.03-0.10	
ECA-H3 10-15/50C10CF-R16	10.00	15.00	50.00	92.00	10.00	1.60	3	5.0	C	●	0.03-0.10	
ECA-H3 10-22/40C10CF-R02	10.00	22.00	40.00	80.00	10.00	0.20	3	5.0	C	●	0.03-0.10	
ECA-H3 12-18/36C12CF-R02	12.00	18.00	36.00	83.00	12.00	0.20	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/36C12CF-R04	12.00	18.00	36.00	83.00	12.00	0.40	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/36C12CF-R08	12.00	18.00	36.00	83.00	12.00	0.80	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/36C12CF-R16	12.00	18.00	36.00	83.00	12.00	1.60	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/36C12CF-R20	12.00	18.00	36.00	83.00	12.00	2.00	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/36C12CF-R25	12.00	18.00	36.00	83.00	12.00	2.50	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R02	12.00	18.00	60.00	100.00	12.00	0.20	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R04	12.00	18.00	60.00	100.00	12.00	0.40	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R08	12.00	18.00	60.00	100.00	12.00	0.80	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R16	12.00	18.00	60.00	100.00	12.00	1.60	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R20	12.00	18.00	60.00	100.00	12.00	2.00	3	5.0	C	●	0.04-0.11	
ECA-H3 12-18/60C12CF-R25	12.00	18.00	60.00	100.00	12.00	2.50	3	5.0	C	●	0.04-0.11	
ECA-H3 12-26/48C12CF-R02	12.00	26.00	48.00	93.00	12.00	0.20	3	5.0	C	●	0.04-0.11	
ECA-H3 16-24/48C16CF-R02	16.00	24.00	48.00	92.00	16.00	0.20	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R04	16.00	24.00	48.00	92.00	16.00	0.40	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R08	16.00	24.00	48.00	92.00	16.00	0.80	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R16	16.00	24.00	48.00	92.00	16.00	1.60	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R20	16.00	24.00	48.00	92.00	16.00	2.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R25	16.00	24.00	48.00	92.00	16.00	2.50	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R32	16.00	24.00	48.00	92.00	16.00	3.20	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R40	16.00	24.00	48.00	92.00	16.00	4.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/48C16CF-R50	16.00	24.00	48.00	92.00	16.00	5.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R02	16.00	24.00	80.00	128.00	16.00	0.20	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R04	16.00	24.00	80.00	128.00	16.00	0.40	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R08	16.00	24.00	80.00	128.00	16.00	0.80	3	5.0	C	●	0.05-0.13	

⁽¹⁾ C-Cylindrical



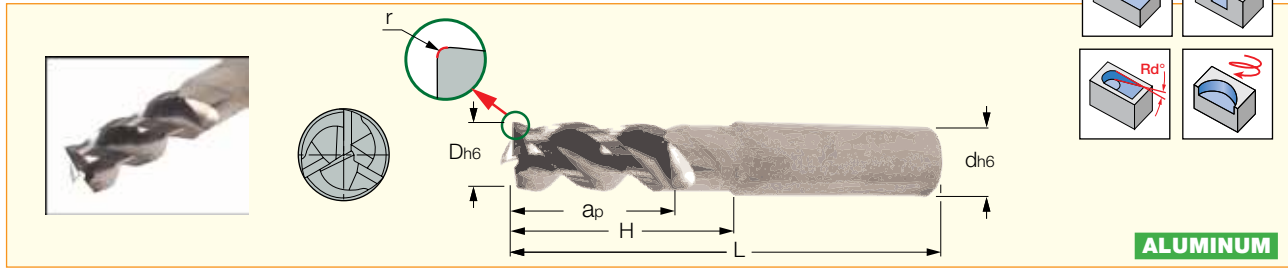
CHATTERFREE

SOLID MILL LINE

ECA-H3-CF (continued)

Solid Carbide Endmills with Different Helix and Variable Pitch, 3, 4 and 5xD Neck Relief for Machining Aluminum

Engineered for **MAXIMUM** ALUMINUM Performance



Designation	Dimensions										IC08	Recommended Machining Data fz (mm/t)
	D	ap	H	L	d	r	Flute	Rd°	Shank ⁽¹⁾			
ECA-H3 16-24/80C16CF-R16	16.00	24.00	80.00	128.00	16.00	1.60	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R20	16.00	24.00	80.00	128.00	16.00	2.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R25	16.00	24.00	80.00	128.00	16.00	2.50	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R32	16.00	24.00	80.00	128.00	16.00	3.20	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R40	16.00	24.00	80.00	128.00	16.00	4.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-24/80C16CF-R50	16.00	24.00	80.00	128.00	16.00	5.00	3	5.0	C	●	0.05-0.13	
ECA-H3 16-34/64C16CF-R02	16.00	34.00	64.00	115.00	16.00	0.20	3	5.0	C	●	0.05-0.13	
ECA-H3 20-30/100C20CF-R02	20.00	30.00	100.00	150.00	20.00	0.20	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R04	20.00	30.00	100.00	150.00	20.00	0.40	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R08	20.00	30.00	100.00	150.00	20.00	0.80	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R16	20.00	30.00	100.00	150.00	20.00	1.60	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R20	20.00	30.00	100.00	150.00	20.00	2.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R32	20.00	30.00	100.00	150.00	20.00	3.20	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R40	20.00	30.00	100.00	150.00	20.00	4.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/100C20CF-R50	20.00	30.00	100.00	150.00	20.00	5.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R02	20.00	30.00	60.00	110.00	20.00	0.20	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R04	20.00	30.00	60.00	110.00	20.00	0.40	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R08	20.00	30.00	60.00	110.00	20.00	0.80	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R16	20.00	30.00	60.00	110.00	20.00	1.60	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R20	20.00	30.00	60.00	110.00	20.00	2.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R32	20.00	30.00	60.00	110.00	20.00	3.20	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R40	20.00	30.00	60.00	110.00	20.00	4.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-30/60C20CF-R50	20.00	30.00	60.00	110.00	20.00	5.00	3	5.0	C	●	0.05-0.14	
ECA-H3 20-42/80C20CF-R02	20.00	42.00	80.00	130.00	20.00	0.20	3	5.0	C	●	0.05-0.14	
ECA-H3 25-38/125C25CF-R02	25.00	38.00	125.00	185.00	25.00	0.20	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R08	25.00	38.00	125.00	185.00	25.00	0.80	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R16	25.00	38.00	125.00	185.00	25.00	1.60	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R20	25.00	38.00	125.00	185.00	25.00	2.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R32	25.00	38.00	125.00	185.00	25.00	3.20	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R40	25.00	38.00	125.00	185.00	25.00	4.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/125C25CF-R50	25.00	38.00	125.00	185.00	25.00	5.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R02	25.00	38.00	75.00	130.00	25.00	0.20	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R04	25.00	38.00	75.00	130.00	25.00	0.40	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R08	25.00	38.00	75.00	130.00	25.00	0.80	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R16	25.00	38.00	75.00	130.00	25.00	1.60	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R20	25.00	38.00	75.00	130.00	25.00	2.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R32	25.00	38.00	75.00	130.00	25.00	3.20	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R40	25.00	38.00	75.00	130.00	25.00	4.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-38/75C25CF-R50	25.00	38.00	75.00	130.00	25.00	5.00	3	5.0	C	●	0.05-0.15	
ECA-H3 25-52/100C25CF-R02	25.00	52.00	100.00	158.00	25.00	0.20	3	5.0	C	●	0.05-0.15	

⁽¹⁾ C-Cylindrical

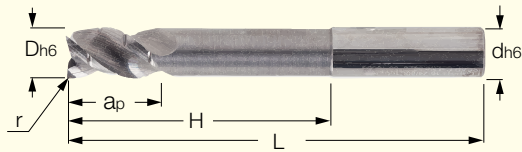
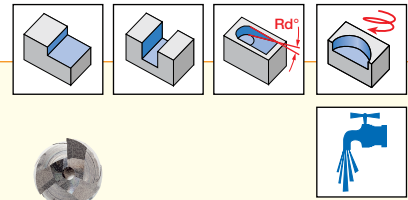


CHATTERFREE

SOLID MILL LINE

ECAP-H3-CF

Solid Carbide Endmills with Different Helix, Variable Pitch, Chip Splitters and Coolant Holes for Machining Aluminum



ALUMINUM

Designation	Dimensions									Recommended Machining Data	
	D	a_p	H	L	d	r	Flute	R_d°	IC08	f_z (mm/t)	
ECAP-H3 10-15/50C10CFR02C	10.00	15.00	50.00	92.00	10.00	0.20	3	5.0	●	0.03-0.10	
ECAP-H3 10-22/40C10CFR02C	10.00	22.00	40.00	80.00	10.00	0.20	3	5.0	●	0.03-0.10	
ECAP-H3 12-18/60C12CFR02C	12.00	18.00	60.00	100.00	12.00	0.20	3	5.0	●	0.04-0.11	
ECAP-H3 12-26/48C12CFR02C	12.00	26.00	48.00	93.00	12.00	0.20	3	5.0	●	0.04-0.11	
ECAP-H3 16-24/80C16CFR02C	16.00	24.00	80.00	128.00	16.00	0.20	3	5.0	●	0.05-0.13	
ECAP-H3 16-34/64C16CFR02C	16.00	34.00	64.00	115.00	16.00	0.20	3	5.0	●	0.05-0.13	
ECAP-H320-30/100C20CFR02C	20.00	30.00	100.00	150.00	20.00	0.20	3	5.0	●	0.05-0.14	
ECAP-H3 20-42/80C20CFR02C	20.00	42.00	80.00	130.00	20.00	0.20	3	5.0	●	0.05-0.14	
ECAP-H325-38/125C25CFR02C	25.00	38.00	125.00	185.00	25.00	0.20	3	5.0	●	0.05-0.14	
ECAP-H325-52/100C25CFR02C	25.00	52.00	100.00	158.00	25.00	0.20	3	5.0	●	0.05-0.14	

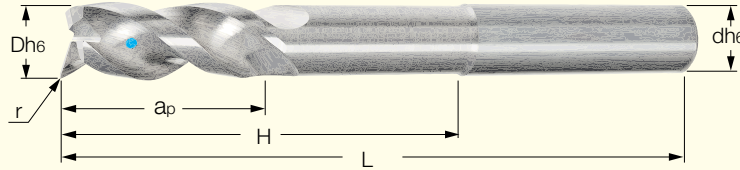
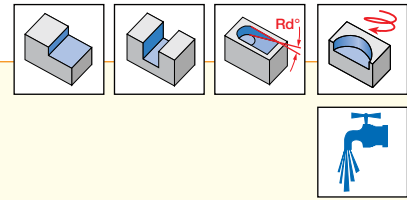


CHATTERFREE

SOLID MILL LINE
ECA-H3-CF-C

Solid Carbide Endmills with Different Helix, Variable Pitch, Coolant Holes, and Neck Relief for Machining Aluminum

Engineered for
MAXIMUM
ALUMINUM Performance



ALUMINUM

Designation	Dimensions										IC08	Recommended Machining Data
	D	a _p	H	L	d	r	Flute	R _d [°]	Shank ⁽¹⁾	f _z (mm/t)		
ECA-H3 06-12/18C06CF-R02C	6.00	12.00	18.00	57.00	6.00	0.20	3	5.0	C	●	0.03-0.07	
ECA-H3 06-12/30C06CF-R02C	6.00	12.00	30.00	65.00	6.00	0.20	3	5.0	C	●	0.03-0.07	
ECA-H3 08-16/24C08CF-R02C	8.00	16.00	24.00	63.00	8.00	0.20	3	5.0	C	●	0.03-0.09	
ECA-H3 08-16/40C08CF-R02C	8.00	16.00	40.00	79.00	8.00	0.20	3	5.0	C	●	0.03-0.09	
ECA-H3 10-20/30C10CF-R02C	10.00	20.00	30.00	72.00	10.00	0.20	3	5.0	C	●	0.03-0.10	
ECA-H3 10-20/50C10CF-R02C	10.00	20.00	50.00	100.00	10.00	0.20	3	5.0	C	●	0.03-0.10	
ECA-H3 12-24/36C12CF-R02C	12.00	24.00	36.00	83.00	12.00	0.20	3	5.0	C	●	0.04-0.11	
ECA-H3 12-24/60C12CF-R02C	12.00	24.00	60.00	100.00	12.00	0.20	3	5.0	C	●	0.04-0.11	
ECA-H3 16-32/48C16CF-R02C	16.00	32.00	48.00	92.00	16.00	0.20	3	5.0	C	●	0.05-0.13	
ECA-H3 16-32/80C16CF-R02C	16.00	32.00	80.00	128.00	16.00	0.20	3	5.0	C	●	0.05-0.13	
ECA-H3 25-50/75C25CF-R02C	25.00	50.00	75.00	130.00	25.00	0.20	3	5.0	C	●	0.05-0.15	

⁽¹⁾ C-Cylindrical

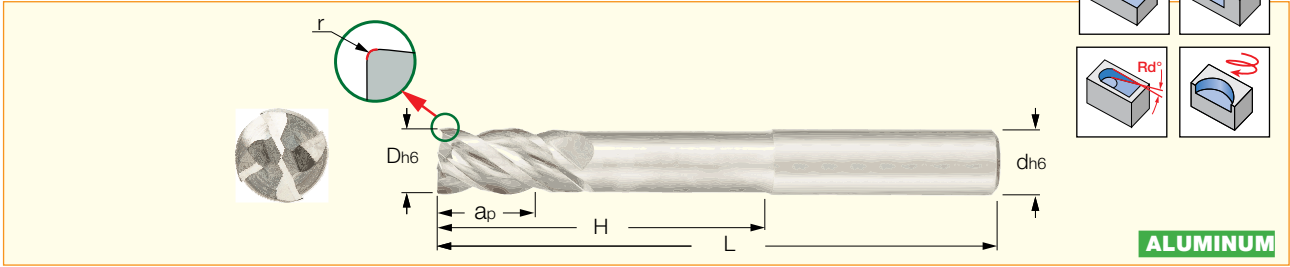


CHATTERFREE

SOLID MILL LINE

ECA-H4-CF

Solid Carbide Endmills with Different Helix, 3 and 5xD Neck Relief for Machining Aluminum



Designation	Dimensions								IC08	Recommended Machining Data
	D	a _p	H	L	d	r	Flute	R _d [°]		f _z (mm/t)
ECA-H4 06-09/30C06CFR02	6.00	9.00	30.00	65.00	6.00	0.20	4	5.0	●	0.03-0.07
ECA-H4 06-12/18C06CFR02	6.00	12.00	18.00	57.00	6.00	0.20	4	5.0	●	0.03-0.07
ECA-H4 08-12/40C08CFR02	8.00	12.00	40.00	79.00	8.00	0.20	4	5.0	●	0.03-0.09
ECA-H4 08-16/24C08CFR02	8.00	16.00	24.00	63.00	8.00	0.20	4	5.0	●	0.03-0.09
ECA-H4 10-15/50C10CFR02	10.00	15.00	50.00	92.00	10.00	0.20	4	5.0	●	0.04-0.10
ECA-H4 10-20/30C10CFR02	10.00	20.00	30.00	72.00	10.00	0.20	4	5.0	●	0.04-0.10
ECA-H4 12-18/60C12CFR02	12.00	18.00	60.00	100.00	12.00	0.20	4	5.0	●	0.04-0.11
ECA-H4 12-24/36C12CFR02	12.00	24.00	36.00	83.00	12.00	0.20	4	5.0	●	0.04-0.11
ECA-H4 16-24/80C16CFR02	16.00	24.00	80.00	128.00	16.00	0.20	4	5.0	●	0.05-0.13
ECA-H4 16-32/48C16CFR02	16.00	32.00	48.00	100.00	16.00	0.20	4	5.0	●	0.05-0.13
ECA-H4 20-30/100C20CFR02	20.00	30.00	100.00	150.00	20.00	0.20	4	5.0	●	0.05-0.14
ECA-H4 20-40/60C20CFR02	20.00	40.00	60.00	110.00	20.00	0.20	4	5.0	●	0.05-0.14
ECA-H4 25-38/125C25CFR02	25.00	38.00	125.00	185.00	25.00	0.20	4	5.0	●	0.08-0.14
ECA-H4 25-50/75C25CFR02	25.00	50.00	75.00	130.00	25.00	0.20	4	5.0	●	0.08-0.14



Material: Aluminum-cast, alloyed
Application: Roughing-full slot

	ISCAR	Competitor
Tool	ECA-H3 16-24/48C16CF-R02	Aluminum
Diameter (mm)	16	16
No. of Flutes	3	2
Carbide Grade	IC-08	K10-K20
Edge Preparation	Standard	Standard
Tool Stability	Fair	Fair
Overhang (mm)	130	130
Cutting Speed (m/min)	653	628
Spindle Speed (rpm)	12,991	12,494
Depth of Cut (mm)	18	18
Width of Cut (mm)	16	16
Machining Length (mm)	9,000	9,000
Feed per Tooth (mm/t)	0.14	0.13
Table Feed (mm/min)	5,456	3,248
Number of Passes	1	1
Parts per Cutter	10	10
Avg. Chip Thickness (mm)	0.14	0.13
Surface Quality	Good	Good
Chip Type	Comma/Helical	Comma/Helical
Wear	Flank Wear	Flank Wear
Reason for Stopping the Test	End of lot / Series	Wear
Metal Removal Rate (cm ³ /min)	1,571.39	935.53
Cutting Time/Part (sec)	99	166.2

Material: Aluminum-wrought alloy
Application: Roughing-Full slot

	ISCAR	Competitor
Tool	ECA-H3 06-09/18C06CF-R02	Alusurf
Diameter (mm)	6	6
Total No. of Teeth	3	2
Effective No. of Teeth	3	2
Edge Preparation	Sharp	Sharp
Tool Stability	Excellent	Excellent
Overhang (mm)	20	20
Cutting Speed (m/min)	207	170
Spindle Speed (rpm)	10987 (Maximum machine)	9023
Depth of Cut (mm)	9	9
Width of Cut (mm)	6	6
Machining Length (mm)	1,400	1,400
Feed per Tooth (mm/t)	0.05	0.04
Table Feed (mm/min)	1,648	722
Number of Passes	1	3
Parts per Cutting Edge	15	10
Avg. Chip Thickness (mm)	0.05	0.04
Surface Quality	Good	Good
Chip Type	Comma/Helical	Fragments
Metal Removal Rate (cm ³ /min)	89	39
Cutting Time/Part (sec)	51	349.3



Engineered for
MAXIMUM
STEEL & STAINLESS STEEL
Performance



CHATTERFREE • SOLIDMILL

MULTI-MASTER LINE SOLID CARBIDE LINE

EC-H Variable Helix and CHATTERFREE Endmills

ISCAR is introducing a new evolution of the CHATTERFREE solid carbide endmills with variable pitch and different flute helix angles for roughing and finishing operations.

The new endmills provide improved dampening performance, resulting in 20 to 25% prolonged tool life. They are capable of increased metal removal rate, when compared with the standard CHATTERFREE solid carbide endmills.

The new EC-H endmills feature a 4 flute, variable pitch (similar to the standard CHATTERFREE endmills) and in addition **different helix flute** angles: two 35° helix flutes and two 37° helix flutes. Two family types are available: cylindrical and relieved shank endmills. All endmills are made from IC900 - a most versatile, PVD coated grade.

Each family includes endmills in a diameter range of 6 to 25 mm. All have corner radii and each diameter is available in both Weldon and cylindrical shank options.

The new tools reduce the cutting forces and power consumption of the machine and improve tool life, providing better chip evacuation and good surface quality on stainless and alloyed steel.

These new endmills are an excellent solution for low power machines with ISO40 or BT40 adaptations, improving their material removal rate and eliminating vibration.

They can be used for full slot machining of up to 2XD.

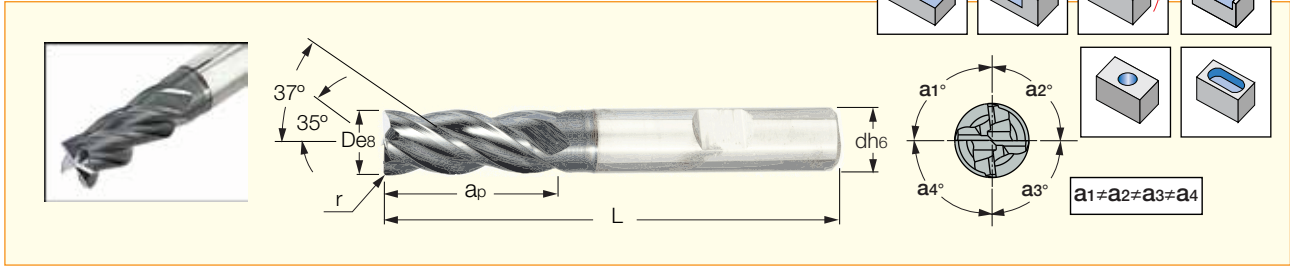
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PREMIUM LINE SOLID MILL LINE

EC-H4M-CFR

4 Flute Endmills with Different Helix and Variable Pitch, for Chatter Dampening with Assorted Radii

Engineered for **MAXIMUM STEEL & STAINLESS STEEL** Performance

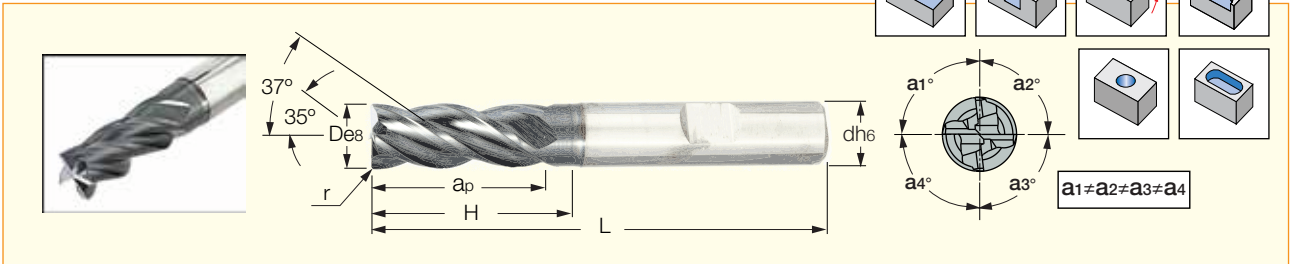


Designation	Dimensions									IC900	Recommended Machining Data f _z (mm/t)
	D	d	a _p	L	Flute	r	R _d °	Shank ⁽¹⁾			
EC-H4M 06-12C06CFR0.2-57	6.00	6.00	12.00	57.00	4	0.20	5.0	C	●	0.03-0.06	
EC-H4M 06-12W06CFR0.2-57	6.00	6.00	12.00	57.00	4	0.20	5.0	W	●	0.03-0.06	
EC-H4M 08-16C08CFR0.4-63	8.00	8.00	16.00	63.00	4	0.40	5.0	C	●	0.03-0.08	
EC-H4M 08-16W08CFR0.4-63	8.00	8.00	16.00	63.00	4	0.40	5.0	W	●	0.03-0.08	
EC-H4M 10-20C10CFR0.5-72	10.00	10.00	20.00	72.00	4	0.50	5.0	C	●	0.03-0.09	
EC-H4M 10-20W10CFR0.5-72	10.00	10.00	20.00	72.00	4	0.50	5.0	W	●	0.03-0.09	
EC-H4M 12-24C12CFR0.6-83	12.00	12.00	24.00	83.00	4	0.60	5.0	C	●	0.04-0.10	
EC-H4M 12-24W12CFR0.6-83	12.00	12.00	24.00	83.00	4	0.60	5.0	W	●	0.04-0.10	
EC-H4M 14-28C14CFR0.7-83	14.00	14.00	28.00	83.00	4	0.70	5.0	C	●	0.04-0.11	
EC-H4M 14-28W14CFR0.7-83	14.00	14.00	28.00	83.00	4	0.70	5.0	W	●	0.04-0.11	
EC-H4M 16-32C16CFR0.8-92	16.00	16.00	32.00	92.00	4	0.80	5.0	C	●	0.05-0.11	
EC-H4M 16-32W16CFR0.8-92	16.00	16.00	32.00	92.00	4	0.80	5.0	W	●	0.05-0.11	
EC-H4M 20-40C20CFR1.0-104	20.00	20.00	40.00	104.00	4	1.00	5.0	C	●	0.05-0.11	
EC-H4M 20-40W20CFR1.0-104	20.00	20.00	40.00	104.00	4	1.00	5.0	W	●	0.05-0.11	
EC-H4M 25-50C25CFR1.2-121	25.00	25.00	50.00	121.00	4	1.20	5.0	C	●	0.06-0.11	
EC-H4M 25-50W25CFR1.2-121	25.00	25.00	50.00	121.00	4	1.20	5.0	W	●	0.06-0.11	

⁽¹⁾ C-Cylindrical, W-Weldon

EC-H4L-CFR (relieved neck)

4 Flute Endmills with 3xD Relieved Necks, with Assorted Radii, Different Helix and Variable Pitch for Chatter Dampening



Designation	Dimensions									IC900	Recommended Machining Data f _z (mm/t)
	D	d	a _p	H	L	Flute	r	R _d °	Shank ⁽¹⁾		
EC-H4L 06-12/20C6CFR.2-57	6.00	6.00	12.00	20.00	57.00	4	0.20	5.0	C	●	0.03-0.06
EC-H4L 06-12/20W6CFR.2-57	6.00	6.00	12.00	20.00	57.00	4	0.20	5.0	W	●	0.03-0.06
EC-H4L 08-16/26C8CFR.4-63	8.00	8.00	16.00	26.00	63.00	4	0.40	5.0	C	●	0.03-0.08
EC-H4L 08-16/26W8CFR.4-63	8.00	8.00	16.00	26.00	63.00	4	0.40	5.0	W	●	0.03-0.08
EC-H4L 10-20/32C10CFR.5	10.00	10.00	20.00	32.00	72.00	4	0.50	5.0	C	●	0.03-0.09
EC-H4L 10-20/32W10CFR.5	10.00	10.00	20.00	32.00	72.00	4	0.50	5.0	W	●	0.03-0.09
EC-H4L 12-24/38C12CFR.6	12.00	12.00	24.00	38.00	83.00	4	0.60	5.0	C	●	0.04-0.10
EC-H4L 12-24/38W12CFR.6	12.00	12.00	24.00	38.00	83.00	4	0.60	5.0	W	●	0.04-0.10
EC-H4L 16-32/50C16CFR.8	16.00	16.00	32.00	50.00	100.00	4	0.80	5.0	C	●	0.05-0.11
EC-H4L 16-32/50W16CFR.8	16.00	16.00	32.00	50.00	100.00	4	0.80	5.0	W	●	0.05-0.11
EC-H4L 20-40/60C20CFR1.0	20.00	20.00	40.00	60.00	110.00	4	1.00	5.0	C	●	0.05-0.11
EC-H4L 20-40/60W20CFR1.0	20.00	20.00	40.00	60.00	110.00	4	1.00	5.0	W	●	0.05-0.11

⁽¹⁾ C-Cylindrical, W-Weldon



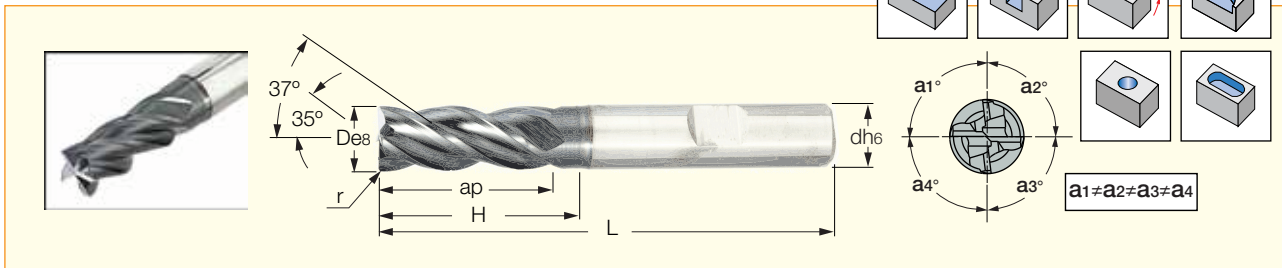
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PREMIUM LINE

SOLID MILL LINE

EC-H4XL-CFR (relieved neck)

4 Flute Endmills with 4xD Relieved Necks, with Assorted Radii,
Different Helix and Variable Pitch for Chatter Dampening



Designation	Dimensions									IC900	Recommended Machining Data f _z (mm/t)
	D	d	a _p	H	L	Flute	r	R _d °	Shank ⁽¹⁾		
EC-H4XL 06-12/25C06CFR.2	6.00	6.00	12.00	25.00	61.00	4	0.20	5.0	C	●	0.03-0.06
EC-H4XL 06-12/25W06CFR.2	6.00	6.00	12.00	25.00	61.00	4	0.20	5.0	W	●	0.03-0.06
EC-H4XL 08-16/32C08CFR.4	8.00	8.00	16.00	32.00	68.00	4	0.40	5.0	C	●	0.03-0.08
EC-H4XL 08-16/32W08CFR.4	8.00	8.00	16.00	32.00	68.00	4	0.40	5.0	W	●	0.03-0.08
EC-H4XL 10-20/40C10CFR.5	10.00	10.00	20.00	40.00	80.00	4	0.50	5.0	C	●	0.03-0.09
EC-H4XL 10-20/40W10CFR.5	10.00	10.00	20.00	40.00	80.00	4	0.50	5.0	W	●	0.03-0.09
EC-H4XL 12-24/50C12CFR.6	12.00	12.00	24.00	50.00	95.00	4	0.60	5.0	C	●	0.04-0.10
EC-H4XL 12-24/50W12CFR.6	12.00	12.00	24.00	50.00	95.00	4	0.60	5.0	W	●	0.04-0.10
EC-H4XL 16-32/64C16CFR.8	16.00	16.00	32.00	64.00	115.00	4	0.80	5.0	C	●	0.05-0.11
EC-H4XL 16-32/64W16CFR.8	16.00	16.00	32.00	64.00	115.00	4	0.80	5.0	W	●	0.05-0.11
EC-H4XL 20-40/75C20CFR1.0	20.00	20.00	40.00	75.00	125.00	4	1.00	5.0	C	●	0.05-0.11
EC-H4XL 20-40/75W20CFR1.0	20.00	20.00	40.00	75.00	125.00	4	1.00	5.0	W	●	0.05-0.11

⁽¹⁾ C-Cylindrical, W-Weldon

Material: Austenitic stainless steel
Application: Shoulder milling
Material No.: 1.4571 (X6CrNiMoTi17-12-2)
Cutting Conditions: Roughing

	ISCAR	Competitor
Tool	EC-H4L 10-20/32W10CFR.5	Solid carbide endmill with variable helix
Diameter (mm)	10	10
No. of Flutes	4	4
Grade	IC900	
Overhang (mm)	90	90
Cutting Speed (m/min)	70	80
Spindle Speed (rpm)	2,228	2,546
Depth of Cut (mm)	9	4.5
Width of Cut (mm)	5	5
Machining Length (mm)	1,312	1,312
Feed per Tooth (mm/t)	0.05	0.04
Table Feed (mm/min)	446	407
Number of Passes	1	2
Parts per Cutter	45	30
Avg. Chip Thickness (mm)	0.04	0.03
Surface Quality	Good	Good
Chip Type	Comma/Helical	Comma/Helical
Wear	Flank wear	Flank wear
Metal Removal Rate (cm ³ /min)	20.05	9.17

Metal removal rate has been improved by 118% and endmill life 50% longer.



Material Type: C45 180HB
Application: Full Slot

	ISCAR	Competitor
Tool	EC-H4M 12-24C12CFR0.6-83	Variable helix 12X12X22X72
Diameter (mm)	12	12
No. of Flutes	4	4
Carbide Grade	IC900	
Tool Stability	Good	Good
Cutting Speed (m/min)	107	125
Spindle Speed (rpm)	2,838	3,316
Depth of Cut (mm)	8	8
Width of Cut (mm)	12	12
Machining Length (mm)	45	45
Feed per Tooth (mm/t)	0.05	0.02
Table Feed (mm/min)	568	265
Parts per Cutter	72	24
Reason for Stopping the Test	Wear	Wear
Metal Removal Rate (cm ³ /min)	54.49	25.46

Material: Duplex
Application: Full slot

	ISCAR	Competitor
Tool	EC-H4M 20-40W20CFR1.0-104	Tool with insert
Diameter (mm)	20	20
No. of Flutes	4	3
Carbide Grade	900	F40M
Tool Stability	Good	Good
Cutting Speed (m/min)	55	130
Spindle Speed (rpm)	875	2,069
Depth of Cut (mm)	20	5
Width of Cut (mm)	20	20
Machining Length (mm)	4,000	4,000
Feed per Tooth (mm/t)	0.05	0.0644
Table Feed (mm/min)	175	400
Number of Passes	1	4
Parts per Cutter	2	0.25
Metal Removal Rate (cm ³ /min)	70.03	39.97



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MULTI-MASTER LINE SOLID CARBIDE LINE

EC-H5M-CFR

Various 5 Helix and CHATTERFREE Endmills

ISCAR is expanding the **CHATTERFREE** solid carbide endmills with variable pitch and 5 different flute helix angles for roughing and finishing operations.

The new endmills provide improved dampening performance, resulting in 20 to 25% prolonged tool life. They are capable of increased metal removal rate, when compared with the standard **CHATTERFREE** solid carbide endmills.

The new **EC-H5M-CFR** endmills feature a **5 flute**, variable pitch (similar to the standard **CHATTERFREE** endmills), a variety of corner radii and in addition **different helix flute angles**: 36°, 37° and 38° helix flutes. Available are cylindrical and Weldon shank endmills.

All endmills are made from IC900, a most versatile PVD coated grade.

The new family includes endmills in a diameter range of 4 to 20 mm and all have corner radii.

The new tools reduce cutting forces and power consumption of the machine and improve tool life, providing better chip evacuation and good surface quality on stainless and alloyed steel.

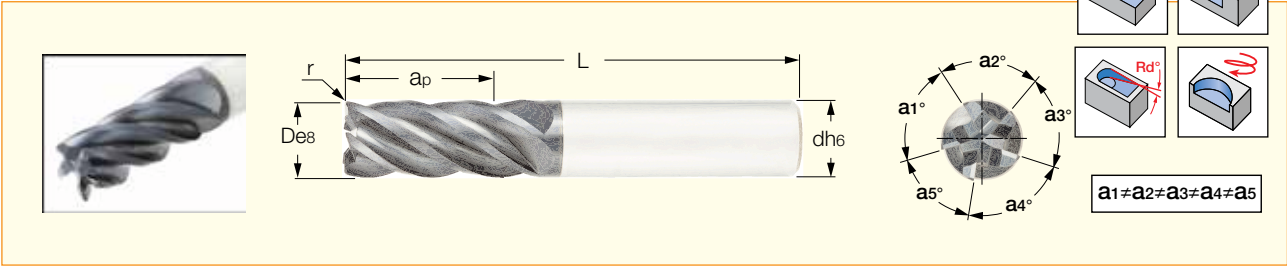
These new endmills are an excellent solution for low power machines with ISO40 or BT40 adaptations, improving their material removal rate and eliminating vibration. They can be used for full slot machining of up to 1.5XD.

CHATTERFREE

SOLID MILL LINE
EC-H5M-CFR

5 Flute Endmills with Different Helix (36 - 38°) and Variable Pitch for Chatter Dampening with Assorted Radii

Engineered for
MAXIMUM
STEEL & STAINLESS STEEL
Performance

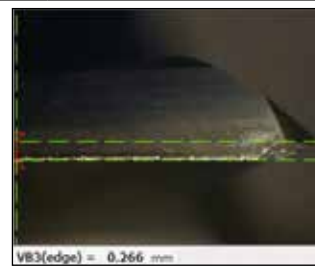
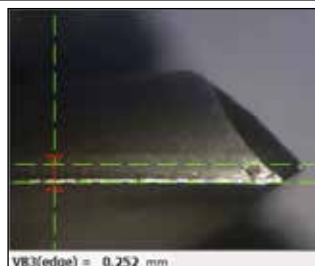


Designation	Dimensions								IC900	Recommended Machining Data fz (mm/t)
	D	d	ap	L	Flute	r	Rd°	Shank ⁽¹⁾		
EC-H5M 04-09C06CFR0.2-57	4.00	6.00	9.00	57.00	5	0.20	5.0	C	●	0.02-0.04
EC-H5M 05-11C06CFR0.2-57	5.00	6.00	11.00	57.00	5	0.20	5.0	C	●	0.02-0.04
EC-H5M 06-13C06CFR0.2-57	6.00	6.00	13.00	57.00	5	0.20	5.0	C	●	0.03-0.07
EC-H5M 06-13W06CFR0.2-57	6.00	6.00	13.00	57.00	5	0.20	5.0	W	●	0.03-0.07
EC-H5M 08-19C08CFR0.4-63	8.00	8.00	19.00	63.00	5	0.40	5.0	C	●	0.03-0.09
EC-H5M 08-19W08CFR0.4-63	8.00	8.00	19.00	63.00	5	0.40	5.0	W	●	0.03-0.09
EC-H5M 10-22C10CFR0.5-72	10.00	10.00	22.00	72.00	5	0.50	5.0	C	●	0.03-0.10
EC-H5M 10-22W10CFR0.5-72	10.00	10.00	22.00	72.00	5	0.50	5.0	W	●	0.03-0.10
EC-H5M 12-26C12CFR0.6-83	12.00	12.00	26.00	83.00	5	0.60	5.0	C	●	0.04-0.11
EC-H5M 12-26W12CFR0.6-83	12.00	12.00	26.00	83.00	5	0.60	5.0	W	●	0.04-0.11
EC-H5M 16-32C16CFR0.8-92	16.00	16.00	32.00	92.00	5	0.80	5.0	C	●	0.05-0.13
EC-H5M 16-32W16CFR0.8-92	16.00	16.00	32.00	92.00	5	0.80	5.0	W	●	0.05-0.13
EC-H5M 20-38C20CFR1-104	20.00	20.00	38.00	104.00	5	1.00	5.0	C	●	0.05-0.17
EC-H5M 20-38W20CFR1-104	20.00	20.00	38.00	104.00	5	1.00	5.0	W	●	0.05-0.17

⁽¹⁾ C-Cylindrical, W-Weldon

Material: AISI 316L 130-160HB
Application: Shoulder Milling

	ISCAR	New Different Helix and CHATTERFREE
Tool	EC-E5L 12-30C12CF83 IC900	EC-H5M 12-26C12CFR0.6-83
Diameter (mm)	12	12
Vc (m/min)	100	100
S= Spindle Speed (rpm)	2654	2654
Z= No. Teeth	5	5
fz (mm/t)	0.05	0.05
Vf= Table Feed (mm/min)	663.5	663.5
ap (mm)	20	20
ae (mm)	4	4
Coolant	Emulsion	Emulsion
Tool Life (min)	75	97
Wear (mm)	0.252	0.266



Material: Inconel 718
Application: Shoulder

	ISCAR	Competitor
Tool	ECI-H5R 500-1.25W025CF900	5 Flutes
Diameter (inch)	12.7	12.7
No. of Flutes	5	5
Carbide Grade	IC900	ALTIN
Tool Stability	Good	Good
Overhang (mm)	25.4	25.4
Cutting Speed (Vc)	27	27
Spindle Speed (rpm)	678	678
Depth of Cut (mm)	6.35	6.35
Width of Cut (mm)	12.7	12.7
Machining Length (mm)	3	3
Feed per Tooth (mm/t)	0.05	0.025
Table Feed (mm/min)	170	85
Number of Passes	120	120
Parts per Cutter	2	1
Chip Type	Comma/Helical	Spiral
Reason for Stopping the Test	Wear	Wear
Metal Removal Rate (cm ³ /min)	13.7	6.8

Material: Inconel 625
Application: Shoulder

	ISCAR	Competitor
Tool	ECI-H5R 500-1.25C025CF900	1/2 5FL .030R
Diameter (inch)	12.7	12.7
No. of Flutes	5	5
Carbide Grade	IC900	M905
Tool Stability	Good	Good
Overhang (mm)	50	50
Cutting Speed (m/min)	27	27
Spindle Speed (rpm)	687	687
Depth of Cut (mm)	6.35	6.35
Width of Cut (mm)	5	5
Machining Length (mm)	152	152
Feed per Tooth (mm/t)	0.05	0.025
Table Feed (mm/min)	172	86
Parts per Cutter	3	1
Metal Removal Rate (cm ³ /min)	5.5	2.7



Material: Super alloys Z40 CNW 25 52
Application: Shoulder milling

	ISCAR - TEST1	Competitor
Tool	EC-H5M 12-26C12CFR0.6-83	5 flutes variable helix
Diameter (mm)	12	12
No. of Flutes	5	5
Carbide Grade	IC900	
Overhang (mm)	30	30
Cutting Speed (m/min)	38	38
Spindle Speed (rpm)	1,008	1,008
Depth of Cut (mm)	22.6	11.3
Width of Cut (mm)	3	3
Machining Length (mm)	500	500
Feed per Tooth (mm/t)	0.03	0.03
Table Feed (mm/min)	151	151
Number of Passes	1	2
Parts per Cutter	37	25
Surface Quality	Good	Good
Reason for Stopping the Test	End of Lot / Series	Wear
Metal Removal Rate (cm ³ /min)	10.25	5.13

Material: Aero S/S PH 15-5 42 HRC
Application: Shoulder

	ISCAR	Competitor
Tool	EC-H5M 16-32C16CFR0.8-92	V5 R0.5
Diameter (mm)	16	16
No. of Flutes	5	5
Carbide Grade	IC900	
Tool Stability	Good	Good
Overhang (mm)	110	110
Cutting Speed (m/min)	110	100
Spindle Speed (rpm)	2,188	1,989
Depth of Cut (mm)	32	32
Width of Cut (mm)	0.9	0.9
Machining Length (mm)	23,856	23,856
Feed per Tooth (mm/t)	0.13	0.12
Table Feed (mm/min)	1,422	1,194
Number of Passes	1	1
Parts per Cutter	4	3
Reason for Stopping the Test	Wear	Wear
Metal Removal Rate (cm ³ /min)	40.97	34.38



Engineered for
MAXIMUM
STEEL & STAINLESS STEEL
Performance



CHATTERFREE • MULTI-MASTER

MULTI-MASTER LINE

SOLIDMILL

SOLID CARBIDE LINE

CHATTERFREE Solid Carbide and MULTI-MASTER Endmill

ISCAR is introducing solid carbide head endmills with variable pitch for roughing and finishing operations. They feature excellent chatter dampening ability, due to their **variable pitch**.

These new endmills are an excellent solution for low power machines with ISO40 or BT40 adaptations, improving their material removal rate and eliminating vibration.

They can be used for full slot machining of up to 2XD with solid carbide endmills. However, depth is more limited when using with MULTI-MASTER heads on alloy and stainless steel, titanium and exotic materials.

ISCAR's new CHATTERFREE endmills maximize stock removal rate and reduce cycle time in most milling operations. Their unique ground geometry provides excellent surface finish and long tool life while machining at high material removal rates.

The new CHATTERFREE solid carbide 4 and 5 flute, 38° helix EC...CF endmills are available in a diameter range of 3 to 25 mm.

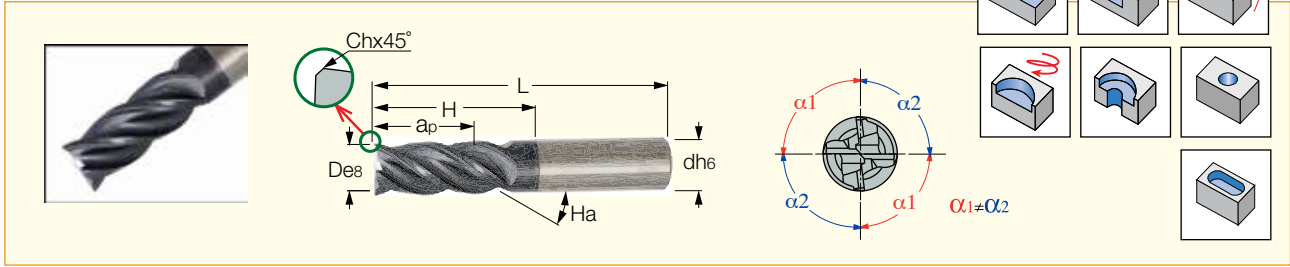
CHATTERFREE

SOLID MILL LINE

EC-E4L-CF

4 Flute 38° Helix Endmills with 3xD Relieved Necks and Variable Pitch for Chatter Dampening

Engineered for **MAXIMUM STEEL & STAINLESS STEEL** Performance



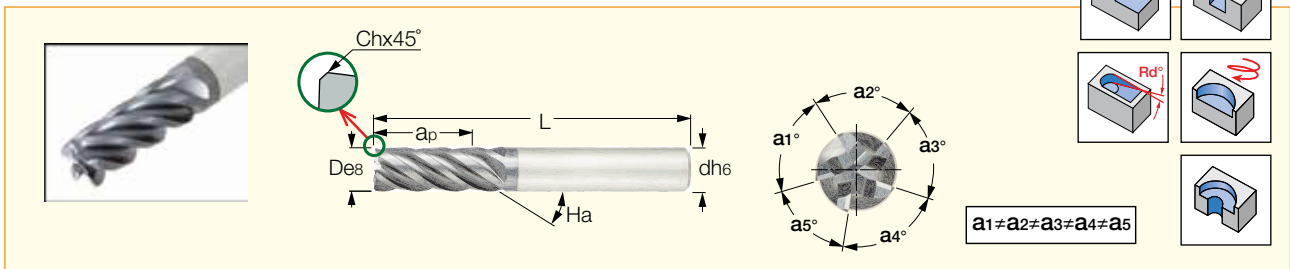
Designation	Dimensions										Tough ↔ Hard		Recommended Machining Data f _z (mm/t)
	D	d	a _p	H	L	Flute	H _a °	R _d °	Shank ⁽¹⁾	Ch	IC300	IC900	
EC-E4L 03-8/11C06CF57	3.00	6.00	8.00	11.00	57.00	4	38.0	5.0	C	0.10	●	●	0.02-0.05
EC-E4L 04-10/14C06CF57	4.00	6.00	10.00	14.00	57.00	4	38.0	5.0	C	0.15	●	●	0.02-0.05
EC-E4L 05-12/17C06CF57	5.00	6.00	12.00	17.00	57.00	4	38.0	5.0	C	0.18	●	●	0.02-0.06
EC-E4L 06-14/20C06CF57	6.00	6.00	14.00	20.00	57.00	4	38.0	5.0	C	0.25	●	●	0.03-0.07
EC-E4L 06-14/20W06CF57	6.00	6.00	14.00	20.00	57.00	4	38.0	5.0	W	0.25	●	●	0.03-0.07
EC-E4L 08-18/26C08CFS63	8.00	8.00	18.00	26.00	63.00	4	38.0	5.0	C	0	●	●	0.03-0.08
EC-E4L 08-18/26C08CF63	8.00	8.00	18.00	26.00	63.00	4	38.0	5.0	C	0.30	●	●	0.03-0.09
EC-E4L 08-18/26W08CF63	8.00	8.00	18.00	26.00	63.00	4	38.0	5.0	W	0.30	●	●	0.03-0.09
EC-E4L 10-22/32C10CFS72	10.00	10.00	22.00	32.00	72.00	4	38.0	5.0	C	0	●	●	0.03-0.09
EC-E4L 10-22/32C10CF72	10.00	10.00	22.00	32.00	72.00	4	38.0	5.0	C	0.40	●	●	0.03-0.10
EC-E4L 10-22/32W10CF72	10.00	10.00	22.00	32.00	72.00	4	38.0	5.0	W	0.40	●	●	0.03-0.10
EC-E4L 10-22/32W10CF72 30	10.00	10.00	22.00	32.00	72.00	4	38.0	5.0	W	0.40	●	●	0.03-0.10
EC-E4L 12-26/38C12CFS83	12.00	12.00	26.00	38.00	83.00	4	38.0	5.0	C	0	●	●	0.04-0.10
EC-E4L 12-26/38C12CF83	12.00	12.00	26.00	38.00	83.00	4	38.0	5.0	C	0.50	●	●	0.04-0.11
EC-E4L 12-26/38W12CF83	12.00	12.00	26.00	38.00	83.00	4	38.0	5.0	W	0.50	●	●	0.04-0.11
EC-E4L 16-34/50C16CF100	16.00	16.00	34.00	50.00	100.00	4	38.0	5.0	C	0.60	●	●	0.05-0.13
EC-E4L 16-34/50W16CF100	16.00	16.00	34.00	50.00	100.00	4	38.0	5.0	W	0.60	●	●	0.05-0.13
EC-E4L 20-42/60C20CF110	20.00	20.00	42.00	60.00	110.00	4	38.0	5.0	C	0.60	●	●	0.05-0.17
EC-E4L 20-42/60W20CF110	20.00	20.00	42.00	60.00	110.00	4	38.0	5.0	W	0.60	●	●	0.05-0.17
EC-E4L 25-50/65C25CF121	25.00	25.00	50.00	65.00	121.00	4	38.0	5.0	C	0.60	●	●	0.05-0.17
EC-E4L 25-50/65W25CF121	25.00	25.00	50.00	65.00	121.00	4	38.0	5.0	W	0.60	●	●	0.05-0.17

● IC300 should be mainly used for machining exotic materials

⁽¹⁾ C-Cylindrical, W-Weldon

EC-E5L-CF

5 Flute 38° Helix Endmills, Variable Pitch Medium Length



Designation	Dimensions										IC900	Recommended Machining Data f _z (mm/t)
	D	d	a _p	L	Flute	H _a °	R _d °	Shank ⁽¹⁾	Ch			
EC-E5L 06-15C06CF57	6.00	6.00	15.00	57.00	5	38.0	5.0	C	0.20	●	0.03-0.07	
EC-E5L 06-15W06CF57	6.00	6.00	15.00	57.00	5	38.0	5.0	W	0.20	●	0.03-0.07	
EC-E5L 08-20C08CF63	8.00	8.00	20.00	63.00	5	38.0	5.0	C	0.25	●	0.03-0.09	
EC-E5L 08-20W08CF63	8.00	8.00	20.00	63.00	5	38.0	5.0	W	0.25	●	0.03-0.09	
EC-E5L 10-25C10CF72	10.00	10.00	25.00	72.00	5	38.0	5.0	C	0.30	●	0.03-0.10	
EC-E5L 10-25W10CF72	10.00	10.00	25.00	72.00	5	38.0	5.0	W	0.30	●	0.03-0.10	
EC-E5L 12-30C12CF83	12.00	12.00	30.00	83.00	5	38.0	5.0	C	0.40	●	0.04-0.11	
EC-E5L 12-30W12CF83	12.00	12.00	30.00	83.00	5	38.0	5.0	W	0.40	●	0.04-0.11	
EC-E5L 16-40C16CF100	16.00	16.00	40.00	100.00	5	38.0	5.0	C	0.50	●	0.05-0.13	
EC-E5L 16-40W16CF100	16.00	16.00	40.00	100.00	5	38.0	5.0	W	0.50	●	0.05-0.13	
EC-E5L 20-50C20CF125	20.00	20.00	50.00	125.00	5	38.0	5.0	C	0.50	●	0.05-0.17	
EC-E5L 20-50W20CF125	20.00	20.00	50.00	125.00	5	38.0	5.0	W	0.50	●	0.05-0.17	

⁽¹⁾ C-Cylindrical, W-Weldon



Material: Aisi A2 30 HRC
Application: Slotting

	ISCAR - ACTUAL	Competitor	Competitor
Tool	ECI-E4L500-1.0/1.5C500CF	4 Flutes	3 Flutes
Diameter (mm)	12.7	12.7	12.7
No. of Flutes	4	4	3
Carbide Grade	IC900		
Edge Preparation	Standard	Standard	Standard
Tool Stability	Excellent	Excellent	Excellent
Overhang (mm)	1	1	1
Cutting Speed (m/min)	123	123	123
Spindle Speed (rpm)	3,099	3,099	3,099
Depth of Cut (mm)	7.6	7.6	7.6
Width of Cut (mm)	12.7	12.7	12.7
Machining Length (mm)	305	305	305
Feed per Tooth (mm/t)	0.035	0.035	0.035
Table Feed (mm/min)	434	434	325
Number of Passes	1	1	1
Parts per Cutter	70	35	35
Surface Quality	Excellent	Good	Good
Metal Removal Rate (cm ³ /min)	42	42	31.5

We doubled competitor tool life when they tried to test against us with the same parameters.

Material: 1.4435 (SAE 316L)
Application: Slotting

	ISCAR	Competitor	ISCAR
Tool	ECR-B4MF 08-18W08-63	8 mm dia. solid endmill	EC-E4L 08-18/26W08CF63
Diameter (mm)	8	8	8
Total No. of Teeth	4	3	4
Grade	IC900	IC900	IC900
Overhang (mm)	18	12	26
Cutting Speed (m/min)	58	60	65
Depth of Cut (mm)	6.5	6.5	12
Width of Cut (mm)	8	8	8
Feed Per Tooth (mm/t)	0.04	.035	0.035
Table Feed (mm/min)	277	251	362
Parts per Cutter	1	2	43



Recommended Cutting Conditions for CHATTERFREE Solid Carbide Endmills

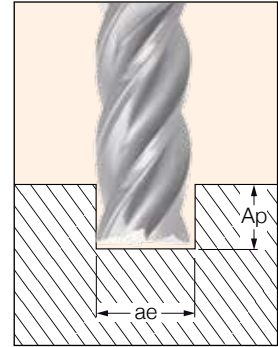
Cutting Speed (IC900/IC908)

Mtl. No.	V min m/min	V max m/min
1	260	280
2	200	230
3	160	220
4	160	220
5	140	180
6	160	220
7	120	180
8	130	180
9	140	180
10	130	180
11	70	120
12	80	160
13	60	150
14	60	120
15	80	260
16	130	240
17	150	280
18	90	280
19	150	280
20	140	240
21	810	840
22	730	830
23	800	840
24	730	830
25	320	340
26	400	430
27	400	430
28	270	300
29		
30		
31	20	40
32	20	30
33	20	30
34	20	30
35	30	70
36	30	70
37	30	70
38	30	50
39	30	40
40	60	80
41	30	50

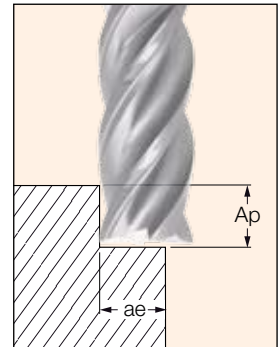
Recommended Feed

AP=0.5-1xD

D mm	ae=D ap=0.5-1XD	
	Fz(min)	Fz(max)
6	0.025	0.06
8	0.03	0.08
10	0.03	0.09
12	0.035	0.1
16	0.05	0.12
20	0.05	0.15

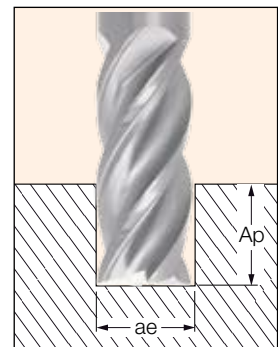


D mm	ae=DX0.75/0.45 ap=0.5-1 XD	
	Fz(min)	Fz(max)
6	0.025	0.07
8	0.03	0.09
10	0.03	0.1
12	0.035	0.11
16	0.05	0.13
20	0.05	0.17

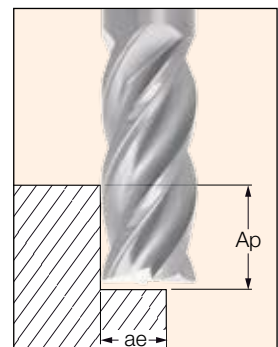


AP=1-2xD

D mm	ae=D ap=1-2XD	
	Fz(min)	Fz(max)
6	0.025	0.05
8	0.03	0.05
10	0.03	0.05
12	0.035	0.06
16	0.04	0.07
20	0.05	0.08



D mm	ae=DX0.75/0.45 ap=1-2 XD	
	Fz(min)	Fz(max)
6	0.025	0.06
8	0.03	0.08
10	0.03	0.09
12	0.035	0.1
16	0.05	0.11
20	0.05	0.11



Part name: Lever
Material: DIN 30MnCrV9
Application: Shoulder milling

	ISCAR	COMPETITOR
Tool	EC-E4L 20-42/60W20CF 125	R300 D=32
Diameter (mm)	20	32
No. of Flutes	4	3
Insert Type		R300-1240M-PH
Grade	IC900	GC4230
Overhang (mm)	300	200
Coolant Type	Air	Air
Cutting Speed (m/min)	180	120
Depth of Cut (mm)	18	2
Width of Cut (mm)	15	15
Machining length (mm)	251	251
Feed per Tooth (mm/t)	0.1	0.34
Table Feed (mm/min)	1146	1200
Number of Passes	12	87
Surface Quality	Excellent	Good
Pieces Per Cutting Edge	5	2
No. of Edges/Insert	1	4
Pieces Per Cutting Edge	5	2
Cutting Time/Component (min)	158	1,092
Cost Reduction per Component	88%	



Part Name: Shaft
Standard Code: Material No. 1.0727
Hardness: 229 HB
Coolant: External

	ISCAR	Competitor
Tool	EC-E4L 10-22/32C10CF 72	Holex 201084010
Diameter (mm)	10	10
Number of Teeth	4	3
Grade	IC900	TIAIN
Overhang (mm)	34	25
Cutting Speed (m/min)	120	120
Depth of Cut (mm)	1.4	1.4
Width of Cut (mm)	8	8
Machining length (mm)	50	50
Feed per Tooth (mm/t)	0.06	0.04
Table Feed (mm/min)	917	493
Number of Passes	1	1
Surface Quality	Good	Good
Cutting Time/Component (sec)	3.3	6.1



Engineered for
MAXIMUM
TITANIUM Performance



CHATTERFREE • **SOLIDMILL** MULTI-MASTER LINE SOLID CARBIDE LINE

Ti-TURBO SOLID MILL LINE

ECK-H4M-CFR New CHATTERFREE Solid Carbide Endmills for Machining Titanium with High Removal Rates

New evolution of the **CHATTERFREE** solid carbide endmills for machining titanium with high removal rates.

ISCAR is introducing a new 4 flute different helix and variable pitch ECK-H4M...CFR endmill family

Features

- Unique geometry
- Best chatter free tools for high removal rates when machining titanium (up to 2xD full slotting)

- 4 flute endmills with different helix and variable pitch
- Large variety of corner radii

The new tools are available in the diameter range of 10 to 20 mm and are made from PVD coated grade IC900, which provides long tool life when machining titanium.

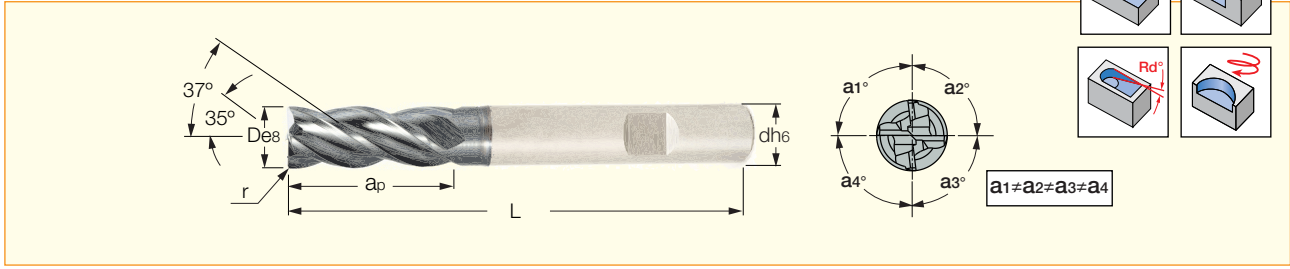
SOLIDMILL • CHATTERFREE • TI-TURBO

PREMIUM LINE SOLID MILL LINE SOLID MILL LINE

ECK-H4M-CFR

4 Flute Endmills with Different Helix, Chamfered Cutting Edges and Variable Pitch, for Chatter Dampening on Titanium

Engineered for
MAXIMUM
Titanium Performance



Designation	Dimensions								IC900	Recommended Machining Data
	D	d	ap	L	Flute	r	Rd°	Shank ⁽¹⁾		fz (mm/t)
ECK-H4M 04-08C06CFR0.2-57	4.00	6.00	8.00	57.00	4	0.20	5.0	C	●	0.02-0.05
ECK-H4M 05-10C06CFR0.2-57	5.00	6.00	10.00	57.00	4	0.20	5.0	C	●	0.02-0.05
ECK-H4M 06-12C06CFR0.2-57	6.00	6.00	12.00	57.00	4	0.20	5.0	C	●	0.03-0.06
ECK-H4M 06-12W06CFR0.2-57	6.00	6.00	12.00	57.00	4	0.20	5.0	W	●	0.03-0.06
ECK-H4M 08-16C08CFR0.4-63	8.00	8.00	16.00	63.00	4	0.40	5.0	C	●	0.03-0.06
ECK-H4M 08-16W08CFR0.4-63	8.00	8.00	16.00	63.00	4	0.40	5.0	W	●	0.03-0.06
ECK-H4M 10-20C10CFR0.5-72	10.00	10.00	20.00	72.00	4	0.50	5.0	C	●	0.03-0.07
ECK-H4M 10-20W10CFR0.5-72	10.00	10.00	20.00	72.00	4	0.50	5.0	W	●	0.03-0.07
ECK-H4M 12-24C12CFR0.6-83	12.00	12.00	24.00	83.00	4	0.60	5.0	C	●	0.04-0.08
ECK-H4M 12-24W12CFR0.6-83	12.00	12.00	24.00	83.00	4	0.60	5.0	W	●	0.04-0.08
ECK-H4M 16-32C16CFR0.8-92	16.00	16.00	32.00	92.00	4	0.80	5.0	C	●	0.05-0.08
ECK-H4M 16-32W16CFR0.8-92	16.00	16.00	32.00	92.00	4	0.80	5.0	W	●	0.05-0.08
ECK-H4M 20-40C20CFR1.-104	20.00	20.00	40.00	104.00	4	1.00	5.0	C	●	0.05-0.08
ECK-H4M 20-40W20CFR1.-104	20.00	20.00	40.00	104.00	4	1.00	5.0	W	●	0.05-0.08

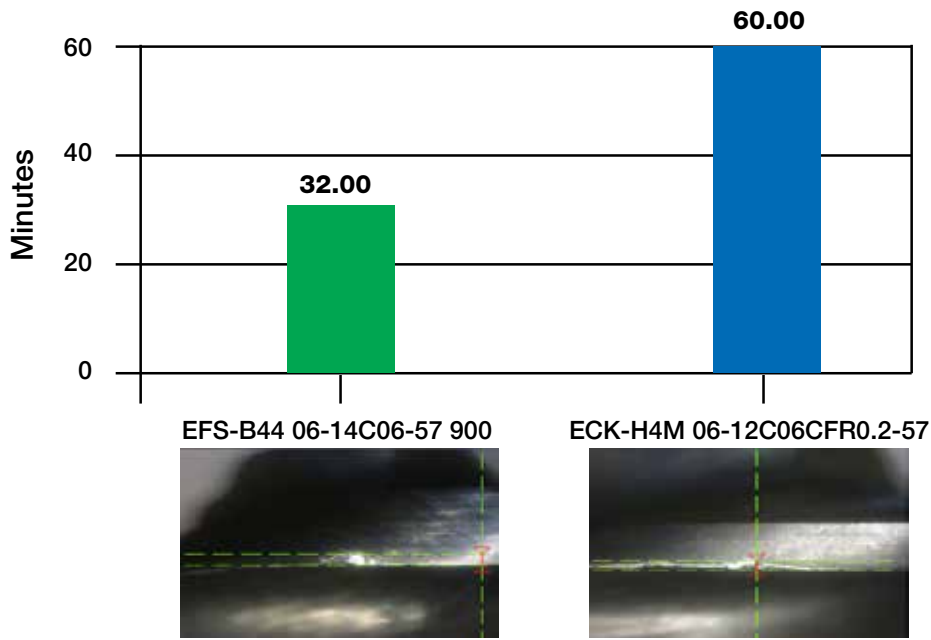
⁽¹⁾ C-Cylindrical, W-Weldon

Material: Titanium TiAl6V4
Application: Full slot

	ISCAR	Competitor
Tool	ECK-H4M 16-32W16CFR0.8-92	Rougher
Diameter (mm)	16	16
No. of Flutes	4	4
Carbide Grade	IC900	
Tool Stability	Good	Good
Cutting Speed (m/min)	50	50
Spindle Speed (rpm)	1000	1000
Depth of Cut (mm)	31	16
Width of Cut (mm)	16	16
Feed per Tooth (mm/t)	0.04	0.025
Table Feed (mm/min)	160	100
Number of Passes	1	2
Parts per Cutter	26	10
Metal Removal Rate (cm ³ /min)	80	26

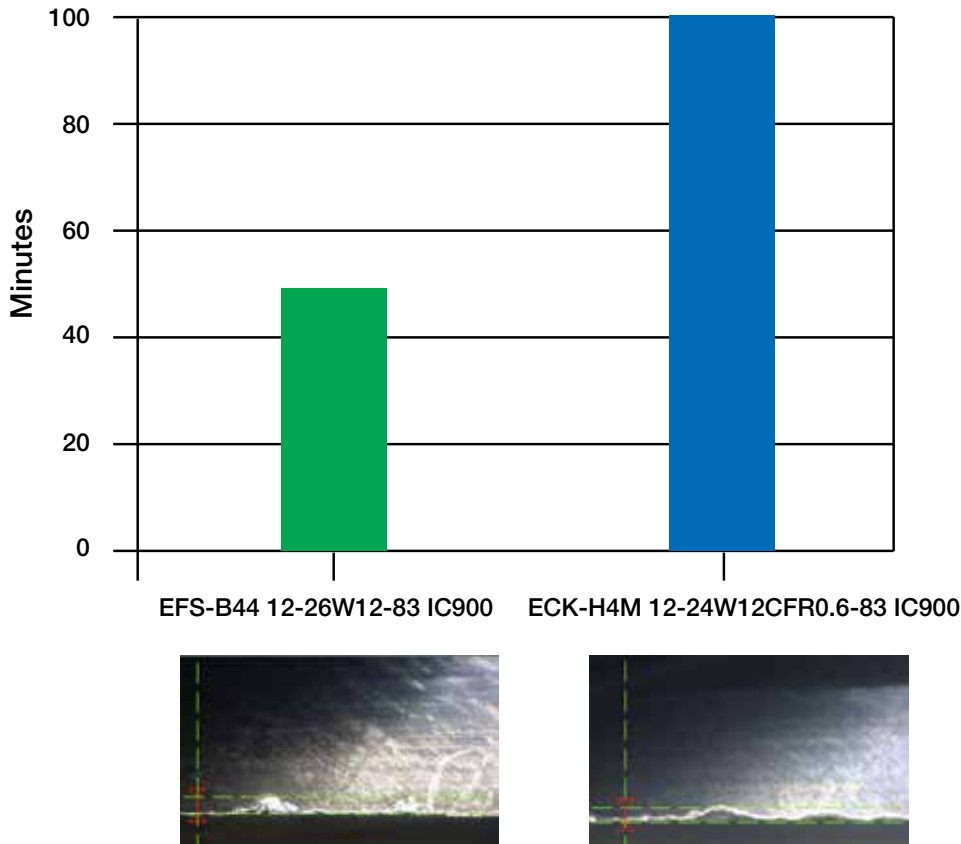


Tool Life Test Results for 6 mm Endmill



Operation: Side Milling
Material Ti6Al4V
Vc=90 m/min
n = 4775 RPM
Fz=0.06 mm/t
Ft =1146 (mm/min)
Ap=12 mm
Ae=1 mm
Emulsion coolant

Tool Life Test Results for 12 mm Endmill



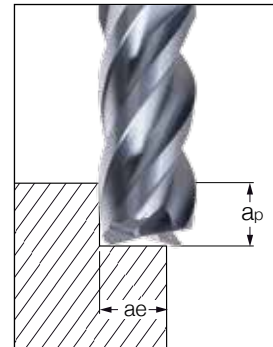
Operation: Side Milling
Material Ti6Al4V
Vc=80 m/min
n =2123 RPM
Fz=0.08 mm/t
Ft = 680 mm/min
Ap=22 mm
Ae=2 mm
Emulsion coolant

Recommended Machining Conditions for Machining Titanium with ECK-H4R Endmills

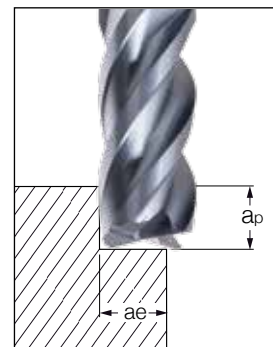
D mm	Slotting		$a_e=1XD$ $a_p=2XD$
	Vc (m/min)	Fz (min)	Fz (max)
4	40-60	0.025	0.04
5	40-60	0.025	0.04
6	40-60	0.025	0.04
8	40-60	0.04	0.06
10	50-70	0.04	0.06
12	50-70	0.05	0.08
16	60-80	0.05	0.08
20	60-80	0.05	0.09



D mm	Side Milling		$a_e=0.2XD$ $a_p=2XD$
	Vc (m/min)	Fz (min)	Fz (max)
4	50-70	0.025	0.04
5	50-70	0.03	0.04
6	60-90	0.04	0.06
8	60-90	0.05	0.06
10	70-100	0.05	0.07
12	70-100	0.06	0.08
16	70-100	0.07	0.09
20	70-100	0.07	0.09



D mm	Side Milling		$a_e=0.4-0.75XD$ $a_p=2XD$
	Vc (m/min)	Fz (min)	Fz (max)
4	50-70	0.025	0.04
5	50-70	0.03	0.04
6	60-90	0.04	0.06
8	60-90	0.04	0.06
10	70-100	0.04	0.07
12	70-100	0.05	0.08
16	70-100	0.05	0.08
20	70-100	0.05	0.09



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TITANIUM Performance



FINISHRED

FINISHRED - Solid Carbide Endmill Cuts Production Time in Half

ISCAR is introducing the FINISHRED EFS.. B44, a revolutionary solid carbide endmill family.

The FINISHRED endmill is a combination of both roughing and finishing endmills in a single tool. Roughing endmills remove material from workpieces more rapidly and efficiently than conventional endmills. However, roughing endmills leave grooves on the machined surface. Consequently, after using a roughing endmill, a finishing endmill has to be used in order to obtain a smooth surface finish.

This means time-consuming tool change, setup time and necessity of maintaining two endmills in the machine's magazine and keeping two types of tools in stock.

The EFS.. B44 endmill features 4 flutes with a 45° helix, two serrated flutes and two continuous flutes

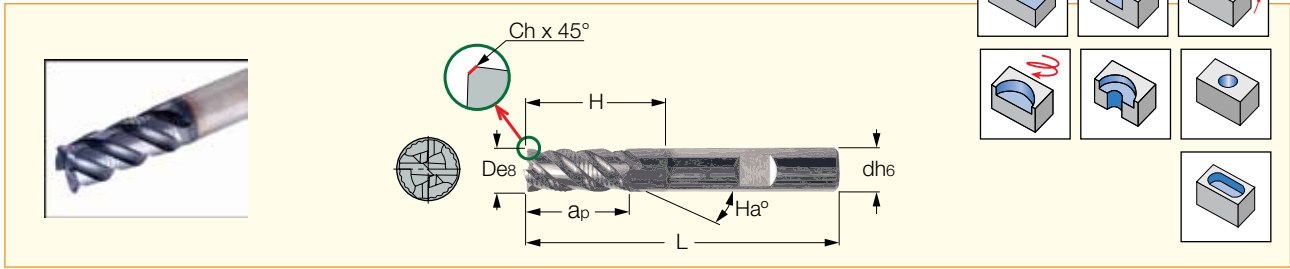
Tool Features

- Fully effective and enables running at rough machining parameters, resulting in finish surface quality.
- Unique tool design reduces vibration at high load applications.
- Produces short and long chips simultaneously. This chip mixture is evacuated more easily than each individual chip type, which is an excellent solution in slotting and cavity milling applications.

EFS-B44

Combination of Roughing and Finishing Solid Carbide Endmill in a Single Tool

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Designation	Dimensions										Tough ↔ Hard		Recommended Machining Data f _z (mm/t)
	D	d	a _p	H	L	Flute	H _a °	R _d °	Shank ⁽¹⁾	Ch	IC300	IC900	
EFS-B44 06-14/20C06-57	6.00	6.00	14.00	20.00	57.00	4	45.0	5.0	C	0.25		●	0.03-0.06
EFS-B44 06-14/20W06-57	6.00	6.00	14.00	20.00	57.00	4	45.0	5.0	W	0.25		●	0.03-0.06
EFS-B44 06-14C06-57	6.00	6.00	14.00	-	57.00	4	45.0	5.0	C	0.25	●	●	0.03-0.06
EFS-B44 06-14W06-57	6.00	6.00	14.00	-	57.00	4	45.0	5.0	W	0.25		●	0.03-0.06
EFS-B44 08-18/26C08-63	8.00	8.00	18.00	26.00	63.00	4	45.0	5.0	C	0.30		●	0.03-0.08
EFS-B44 08-18/26W08-63	8.00	8.00	18.00	26.00	63.00	4	45.0	5.0	W	0.30		●	0.03-0.08
EFS-B44 08-18C08-63	8.00	8.00	18.00	-	63.00	4	45.0	5.0	C	0.30	●	●	0.03-0.08
EFS-B44 08-18W08-63	8.00	8.00	18.00	-	63.00	4	45.0	5.0	W	0.30	●	●	0.03-0.08
EFS-B44 10-22/32C10-72	10.00	10.00	22.00	32.00	72.00	4	45.0	5.0	C	0.30		●	0.03-0.09
EFS-B44 10-22/32W10-72	10.00	10.00	22.00	32.00	72.00	4	45.0	5.0	W	0.30		●	0.03-0.09
EFS-B44 10-22C10-72	10.00	10.00	22.00	-	72.00	4	45.0	5.0	C	0.30	●	●	0.03-0.09
EFS-B44 10-22W10-72	10.00	10.00	22.00	-	72.00	4	45.0	5.0	W	0.30		●	0.03-0.09
EFS-B44 12-26/38C12-83	12.00	12.00	26.00	38.00	83.00	4	45.0	5.0	C	0.40		●	0.04-0.10
EFS-B44 12-26/38W12-83	12.00	12.00	26.00	38.00	83.00	4	45.0	5.0	W	0.40		●	0.04-0.10
EFS-B44 12-26C12-83	12.00	12.00	26.00	-	83.00	4	45.0	5.0	C	0.40		●	0.04-0.10
EFS-B44 12-26W12-83	12.00	12.00	26.00	-	83.00	4	45.0	5.0	W	0.40	●	●	0.04-0.10
EFS-B44 14-30C14-83	14.00	14.00	30.00	-	83.00	4	45.0	5.0	C	0.40	●	●	0.04-0.11
EFS-B44 14-30W14-83	14.00	14.00	30.00	-	83.00	4	45.0	5.0	W	0.40	●	●	0.04-0.11
EFS-B44 16-34/50C16-100	16.00	16.00	34.00	50.00	100.00	4	45.0	5.0	C	0.60		●	0.05-0.11
EFS-B44 16-34/50W16-100	16.00	16.00	34.00	50.00	100.00	4	45.0	5.0	W	0.60		●	0.05-0.11
EFS-B44 16-34C16-92	16.00	16.00	34.00	-	92.00	4	45.0	5.0	C	0.60	●	●	0.05-0.11
EFS-B44 16-34W16-92	16.00	16.00	34.00	-	92.00	4	45.0	5.0	W	0.60	●	●	0.05-0.11
EFS-B44 20-42/62C20-125	20.00	20.00	42.00	62.00	125.00	4	45.0	5.0	C	0.60		●	0.05-0.11
EFS-B44 20-42/62W20-125	20.00	20.00	42.00	62.00	125.00	4	45.0	5.0	W	0.60		●	0.05-0.11
EFS-B44 20-42C20-104	20.00	20.00	42.00	-	104.00	4	45.0	5.0	C	0.60	●	●	0.05-0.11
EFS-B44 20-42W20-104	20.00	20.00	42.00	-	104.00	4	45.0	5.0	W	0.60	●	●	0.05-0.11
EFS-B44 25-52C25-121	25.00	25.00	52.00	-	121.00	4	45.0	5.0	C	0.60	●	●	0.06-0.11
EFS-B44 25-52W25-121	25.00	25.00	52.00	-	121.00	4	45.0	5.0	W	0.60		●	0.06-0.11

• IC300 should be mainly used for machining exotic materials

⁽¹⁾ C-Cylindrical, W-Weldon



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Performance



CHATTERFREE • SOLIDMILL

MULTI-MASTER LINE SOLID CARBIDE LINE

EC-H-CF New CHATTERFREE Solid Carbide Endmills for High Speed/Trochoidal and Finishing Operations

ISCAR is introducing a new evolution of the CHATTERFREE solid carbide endmills for high speed/trochoidal milling and finishing operations with specially designed multi-flute endmills with different flute helix angles and variable pitch.

The unique geometry of the different flute helix and the variable pitch **EC-H...CF** line provides the best chatter free tool for **high speed/trochoidal milling**, featuring high productivity on most material types such as alloyed and stainless steel, and high temperature alloys.

Trochoidal milling is a programming technique for applying a small radial width of cut, high cutting speed and feed per tooth. It provides long tool life and high productivity on most materials, but especially on high temperature alloys where

chipbreaking and heat disposal is usually very problematic.

The new EC-H... CF endmills are divided into two families:

- EC-H7...CF featuring 7 flutes in 6-20 mm diameters
 - EC-H.. CF featuring 6-20 flutes in 6-20 mm diameters
- The EC-H7...CF 7 flute tools feature more open gullets than the 6-20 flute tools. Therefore EC-H7...CF tools can machine at radial width of cut (ae) of up to 0.1xD, while the EC-H.. CF tools can machine at ae of up to 0.06xD.

Both endmill families are made from the hard PVD coated grade IC902. This grade provides long tool life, and combined with the unique geometry, features excellent surface finish on most workpiece materials.

CHATTERFREE • SOLIDMILL

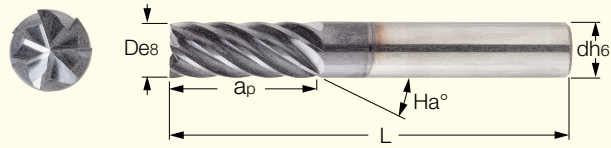
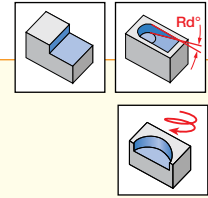
SOLID MILL LINE

PREMIUM LINE

EC-H7-CF

7 Flute Endmills with Different Helix and Variable Pitch, for CHATTERFREE High Speed Finish Milling

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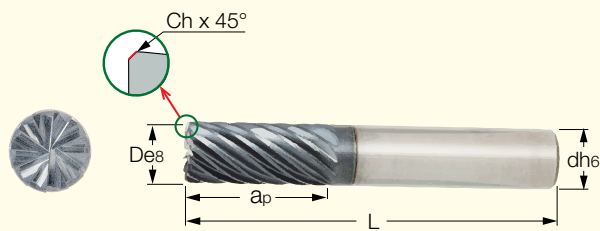
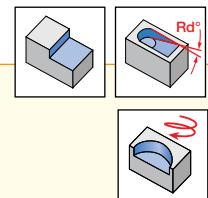


Designation	Dimensions							IC902	Recommended Machining Data
	D	d	ap	L	Flute	Ha°	Rd°		fz (mm/t)
EC-H7 06-12C06CF-M57	6.00	6.00	12.00	57.00	7	37.0	3.0	●	0.03-0.07
EC-H7 08-16C08CF-M63	8.00	8.00	16.00	63.00	7	37.0	3.0	●	0.03-0.09
EC-H7 10-20C10CF-M72	10.00	10.00	20.00	72.00	7	37.0	3.0	●	0.03-0.10
EC-H7 12-24C12CF-M83	12.00	12.00	24.00	83.00	7	37.0	3.0	●	0.04-0.11
EC-H7 16-32C16CF-M92	16.00	16.00	32.00	92.00	7	37.0	3.0	●	0.05-0.13
EC-H7 20-40C20CF-M104	20.00	20.00	40.00	104.00	7	37.0	3.0	●	0.05-0.13

• Can machine at radial width of cut (ae) of up to 0.10xD

EC-H-CF

6-20 Flute Endmills with Different Helix and Variable Pitch, for CHATTERFREE High Speed Finish Milling

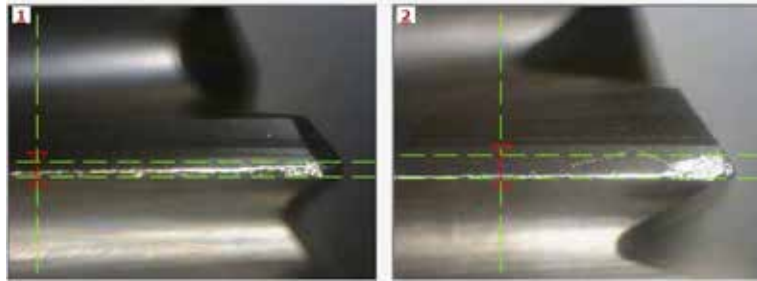


Designation	Dimensions								IC902	Recommended Machining Data
	D	d	ap	L	Flute	Ch	Ha°	Rd°		fz (mm/t)
EC-H6 06-12C06CF-H57	6.00	6.00	12.00	57.00	6	0.2x45°	45.0	3.0	●	0.03-0.07
EC-H8 08-16C08CF-H63	8.00	8.00	16.00	63.00	8	0.2x45°	45.0	3.0	●	0.03-0.09
EC-H10 10-20C10CF-H72	10.00	10.00	20.00	72.00	10	0.3x45°	35.0	3.0	●	0.03-0.10
EC-H12 12-24C12CF-H83	12.00	12.00	24.00	83.00	12	0.3x45°	35.0	3.0	●	0.04-0.11
EC-H16 16-32C16CF-H92	16.00	16.00	32.00	92.00	16	0.3x45°	35.0	3.0	●	0.05-0.13
EC-H20 20-40C20CFH104	20.00	20.00	40.00	104.00	20	0.4x45°	30.0	3.0	●	0.05-0.13

• Can machine at radial width of cut (ae) of up to 0.06xD



	ISCAR	Competitor
Tool	EC-H12 12-24C12CF-H83	Finishing Tool
Tool Diameter (mm)	12	12
No. of Flutes	12	12
Carbide Grade	IC902	
Material Type	D2 (1.2379) 62 HRc	D2 (1.2379) 62 HRc
Cutting Speed (m/min)	60	60
Spindle Speed (rpm)	1592	1592
Depth of Cut (mm)	20	20
Width of Cut (mm)	0.2	0.2
Feed per Tooth (mm/t)	0.04	0.04
Table Feed (mm/min)	764	764
Coolant	Air	Air
Tool Life (min)	150	116
Wear (mm)	0.168	0.266
Reason for Stopping the Test	Can continue	Chipping - end of tool life



Material: GGG50
Application: Troyuchodal Machining

	ISCAR	Garant - Actual
Tool	EC160H10-16C16CFR.4K92*SPC	VHM
Diameter (mm)	16	16
No. of Flutes	16	8
Carbide Grade	IC902	
Overhang (mm)	100	100
Cutting Speed (m/min)	200	260
Spindle Speed (rpm)	3,979	5,173
Depth of Cut (mm)	18	18
Width of Cut (mm)	0.3	0.3
Machining Length (mm)	6,000	6,000
Feed per Tooth (mm/t)	0.04	0.045
Table Feed (mm/min)	2,546	1,862
Number of Passes	1	1
Parts per Cutter	90	60
Surface Quality	Good	Good
Chip Type	Comma/Helical	Comma/Helical
Wear	Flank Wear	Flank Wear
Metal Removal Rate (cm ³ /min)	13.75	10.06

After testing the new multi-flute cutter, cycle time was reduced by 37% and tool life increased by 50%.



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Performance



CHATTERFREE • FEEDMILL

MULTI-MASTER LINE

‘All-in-One’ Solid Carbide Endmill: FEEDMILL, Chip Splitter and CHATTERFREE

ISCAR is introducing a new family of solid carbide endmills, that features a winning combination of three most innovative endmills: **FEEDMILL**, chip splitter and **CHATTERFREE**.

The new **EFM** solid carbide endmills provide the highest advantage in cavity milling, which is especially useful in the die and mold industry.

The **FEEDMILL** bottom utilizes a large radius cutting edge configuration that allows for greatly increased feed rates of up to 0.5 mm/tooth, at 0.3 to 1.0 mm depth of cut. This provides a significant reduction in cycle time, which thus increases productivity. The unique cutting edge geometry axially directs the resultant cutting forces towards the spindle. This results in high stability and enables machining at high feeds, even with long overhang. This feature should be used for the penetration stage of pocket machining.

After penetration into the cavity, the chip splitting flutes should be used to widen the initial cavity. The serrated cutting edge features flat peaks which leave a better surface finish, in comparison to other rougher endmills. The chip splitting flutes also feature better force distribution combined with the **CHATTERFREE**

variable pitch, which is the winning solution for maximum stock removal rates.

The new endmills are very effective, even on low power machines (ISO40/BT40).

The **EFM** solid endmills are available with 4 and 5 flutes, comprised of IC903 - an ultra-fine grain substrate protected by the advanced AL-TEC coating technology. The combination of these parameters offers outstanding wear resistance and toughness.

Advantages

- Optimal solution for roughing operations; highly useful for the die & mold industry
- Covers a wide range of applications, including slotting, pocketing, helical interpolation and contouring
- Useful for machining materials such as hardened steel up to 65 HRC, P20, H13, cast iron, stainless steel, titanium and high temperature alloys
- Reduces cycle time and increases productivity

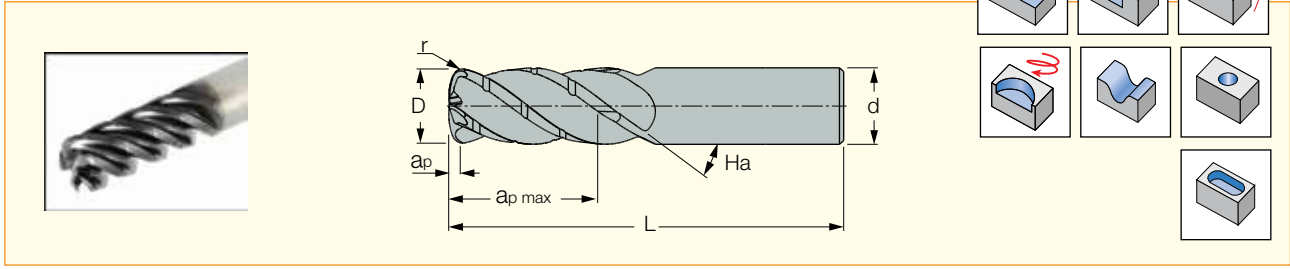
FEEDMILL • CHATTERFREE

SOLID MILL LINE

EFP-E4,5CF

Solid Carbide Roughing Endmills with Chip Splitting Cutting Edges, Variable Pitch and Large Radius Frontal Edge

Engineered for **MAXIMUM** Performance



Designation	Dimensions										IC903	Recommended Machining Data
	D	d	L	r ⁽²⁾	Flute	H _a [°]	a _p ⁽³⁾	a _{p max}	R _d [°]	f _z (mm/t)		
EFP-E4CF 06-12C06R1.0M57	6.00	6.00	57.00	1.00	4	38.0	0.30	12.00	5.0	●	0.02-0.30	
EFP-E4CF 08-16C08R1.4M63	8.00	8.00	63.00	1.40	4	38.0	0.40	16.00	5.0	●	0.03-0.40	
EFP-E4CF 10-20C10R1.7M72	10.00	10.00	72.00	1.70	4	38.0	0.50	20.00	5.0	●	0.03-0.50	
EFP-E5CF 10-24C10R1.7M72 ⁽¹⁾	10.00	10.00	72.00	1.70	5	38.0	0.50	24.00	5.0	●	0.03-0.50	
EFP-E4CF 12-25C12R2.0M83	12.00	12.00	83.00	2.00	4	38.0	0.60	24.00	5.0	●	0.04-0.50	
EFP-E4CF 16-32C16R2.7M92	16.00	16.00	92.00	2.70	4	38.0	0.80	32.00	5.0	●	0.05-0.60	
EFP-E5CF 16-40C16R2.7M92 ⁽¹⁾	16.00	16.00	92.00	2.70	5	38.0	0.80	40.00	5.0	●	0.05-0.60	
EFP-E4CF 20-40C20R3.4M104	20.00	20.00	104.00	3.40	4	38.0	1.00	40.00	5.0	●	0.05-0.70	
EFP-E5CF 20-48C20R3.4M104 ⁽¹⁾	20.00	20.00	104.00	3.40	5	38.0	1.00	48.00	5.0	●	0.05-0.70	

⁽¹⁾ Cannot be used for plunging application ⁽²⁾ Used for programming ⁽³⁾ Maximum D.O.C. for high feed milling (FEEDMILL)



Engineered for
MAXIMUM
PROFILING Performance



CHATTERFREE

MULTI-MASTER LINE

Ball Nose Endmills with Variable Pitch for Machining Hard Materials

ISCAR is introducing the **EB-E4L....CF.. IC902** - new ball nose **CHATTERFREE** variable pitch solid carbide endmills for roughing and finishing operations on hard materials up to 65 HRC.

The new endmills are available in a diameter range of 3 to 16 mm. They feature a unique geometry made from grade IC902 for long tool life when machining hard, up to 65 HRC materials.

Features

- 4 flutes with 38° helix angle
- Variable pitch for chatter free machining
- Up to 2XD depth of cut and 3XD relieved neck
- Special geometry for machining hard materials
- Low cutting forces
- Available in IC902 for long tool life

The new **EB-E4L....CF.. IC902** endmills will provide advantageous performance, especially in the die and mold industry.

CHATTERFREE

SOLID MILL LINE

EB-E4L-CF

4 Flute, 38° Helix Ball Nose Endmills with 3xD Relieved Necks and Variable Pitch for Chatter Dampening on Hard Materials

Engineered for
MAXIMUM
PROFILING Performance



Designation	Dimensions						IC902
	D	d	ap	H	L	Rd°	
EB-E4L 03-06/09C06CFH57	3.00	6.00	6.00	9.00	57.00	5.0	●
EB-E4L 04-08/12C06CFH57	4.00	6.00	8.00	12.00	57.00	5.0	●
EB-E4L 05-10/15C06CFH57	5.00	6.00	10.00	15.00	57.00	5.0	●
EB-E4L 06-12/18C06CFH57	6.00	6.00	12.00	18.00	57.00	5.0	●
EB-E4L 08-16/24C08CFH63	8.00	8.00	16.00	24.00	63.00	5.0	●
EB-E4L 10-20/30C10CFH72	10.00	10.00	20.00	30.00	72.00	5.0	●
EB-E4L 12-24/36C12CFH83	12.00	12.00	24.00	36.00	83.00	5.0	●
EB-E4L 16-32/48C16CFH92	16.00	16.00	32.00	48.00	92.00	5.0	●

	ISCAR	Competitor
Tool	EB-E4L 10-20/30C10CFH72	Ball Nose
Diameter (mm)	10	10
No. of flutes	4	4
Carbide grade	IC902	TIAN
Material type	H13(1.2344) 52-55 HRc	H13(1.2344) 52-55 HRc
Cutting speed (m/min)	226	226
Spindle speed (rpm)	7200	7200
Depth of cut (mm)	15	15
Width of cut (mm)	0.25	0.25
Feed per tooth (mm/t)	0.125	0.125
Table feed (mm/min)	3600	3600
Coolant	Emulsion	Emulsion
Tool life (min)	92	75



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