

YU-X1EH24 AMERICAS

BEST VALUE IN THE WORLD OF CUTTING TOOLS



**FINE-FINISHING SOLID CARBIDE END MILLS
FOR HIGH HARDENED STEEL**

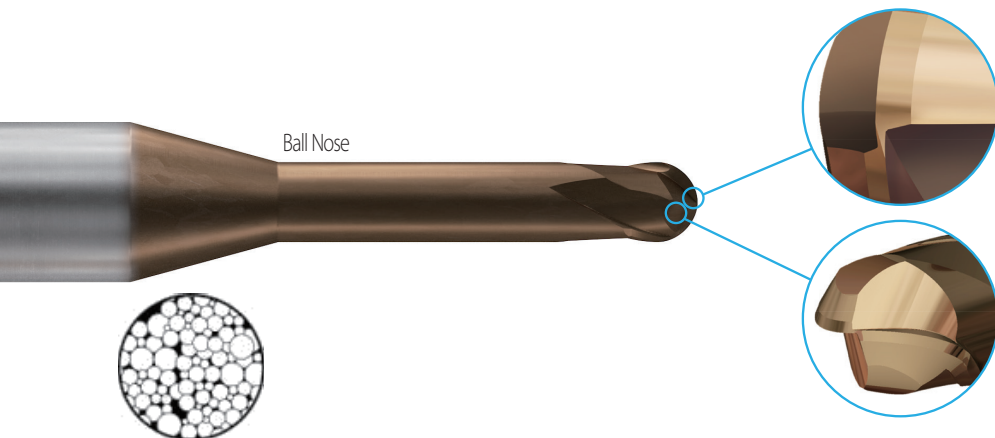
- /// Highest Accuracy for all Semi/Fine-Finishing application challenges
- /// Extensive Portfolio perfectly serving the Die&Mold Industry needs
- /// Latest Substrate and Coating Technology for predictive and extraordinary Tool Life



PREMIUM X¹-EH

Exceptionally High Accuracy Micro Tooling
C-coated Nano Grain Solid Carbide End Mills

- >800 different variants allow Length-to-Diameter and Stick-out optimization of Fine-Finishing applications without compromises
- Total High Accuracy setup including not only ball accuracy but shank, neck and conical transition accuracy



Ball Nose Gash Transition NEW
▶ Optimized transition from end mill center to flute for improved chip flow.

Reinforced Back Relief NEW
▶ Strengthened cutting edge design for greater stability while not interfering with chip flow.

Raw Material

- ▶ Newly developed fine-grain nanostructure substrate for improved thermal shock stability and higher hardness.

Special High Technology Coating

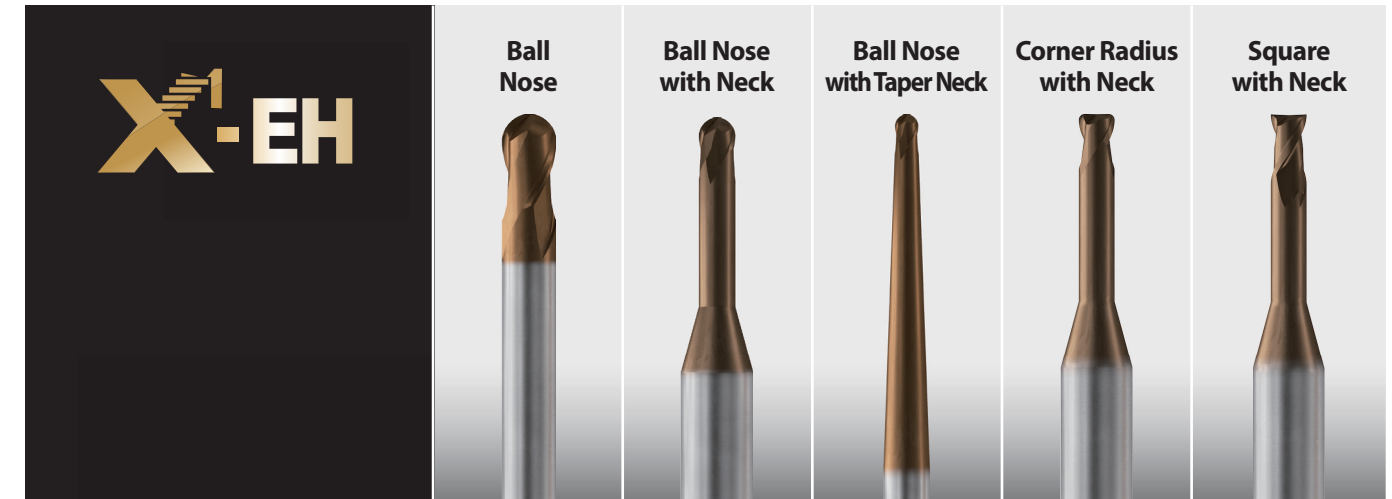
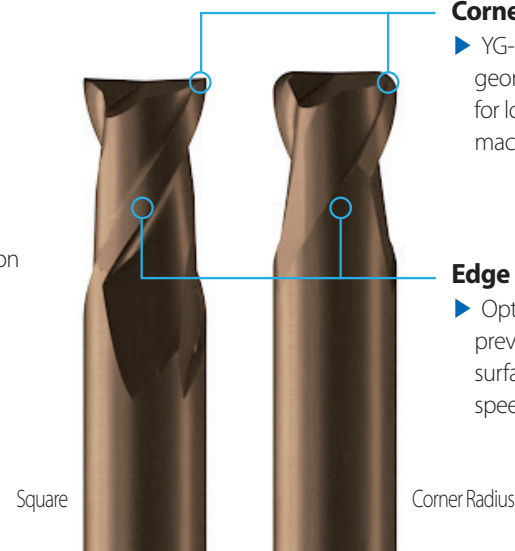
- ▶ Excellent wear and heat resistance with improved thermal shock stability. The nanolayer structure prevents the propagation of microcracks and coating elasticity promotes increased tool life.

Corner Geometries

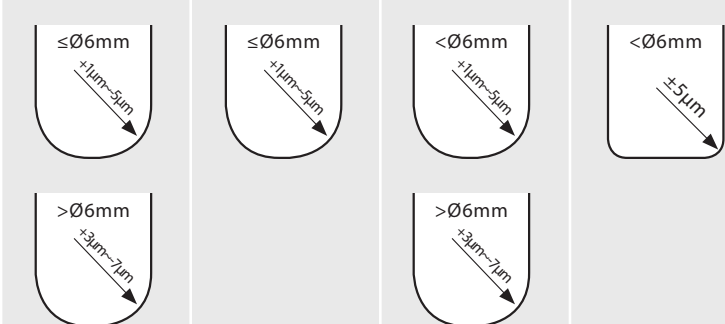
- ▶ YG-1's High performance corner geometries, including corner radius, for longer tool life in high-hardness machining.

Edge Preparation

- ▶ Optimal edge preparation applied to prevent chipping and achieve excellent surface finishes with longer tool life in high speed machining.



Cutting Portion Accuracy



Shank Accuracy

Size	Shank Dia. Tolerance
up to Ø6	h4
over Ø6	h5

Coating	Coating Color	Coating Type	Hardness (Hv)	Max. Usage Temperature (°C)	Friction Coefficient (dry)	Coating Thickness (µm)	General Information
C- Coating	Reddish Brown	Si-based	3,900	1,000	0.40	0.5 ~ 3.0	- Improved Hardness and Toughness - High Thermal Stability and Oxidation Resistance - Nanolayer Structure prevents Propagation of Microcracks - Extra-hard Surface with Good Anti-Friction Properties and a Low Tendency to Stick to the Machined Workpiece Material

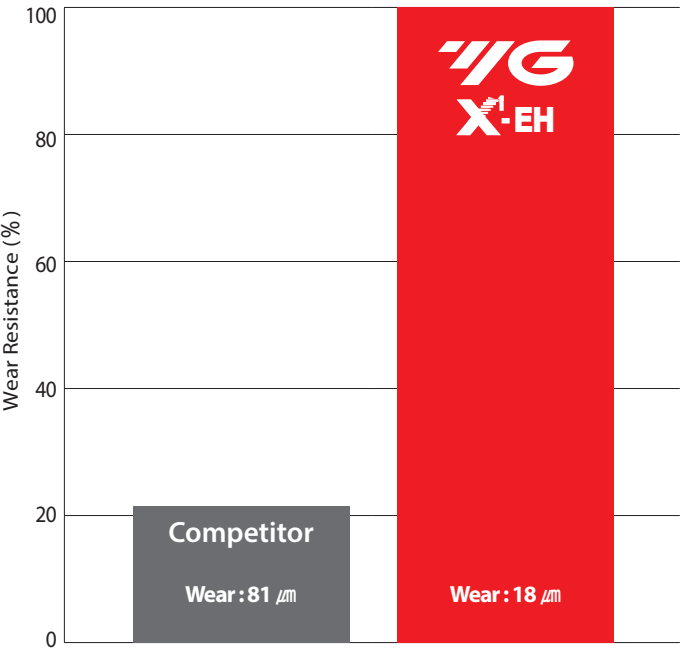
GUIDE TO ICONS

The tool is made of Nanograin carbide	No. of Flutes	Helix Angle	Tolerance of Ball Radius	Tolerance of Corner Radius	Type of Shank	Type of Coating	Cutting Conditions

CASE STUDY

TEST I Profiling application

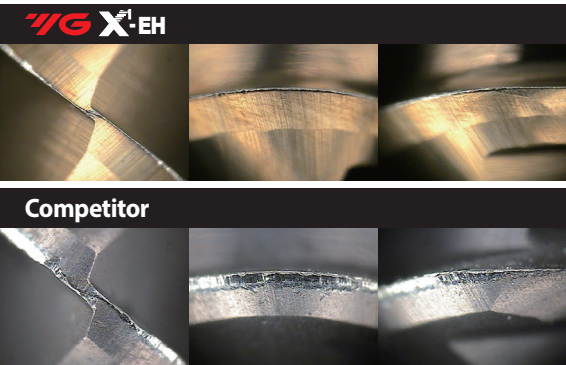
Ø3(R1.5) 2 Flute Ball Nose



Cutting Condition (Profiling)

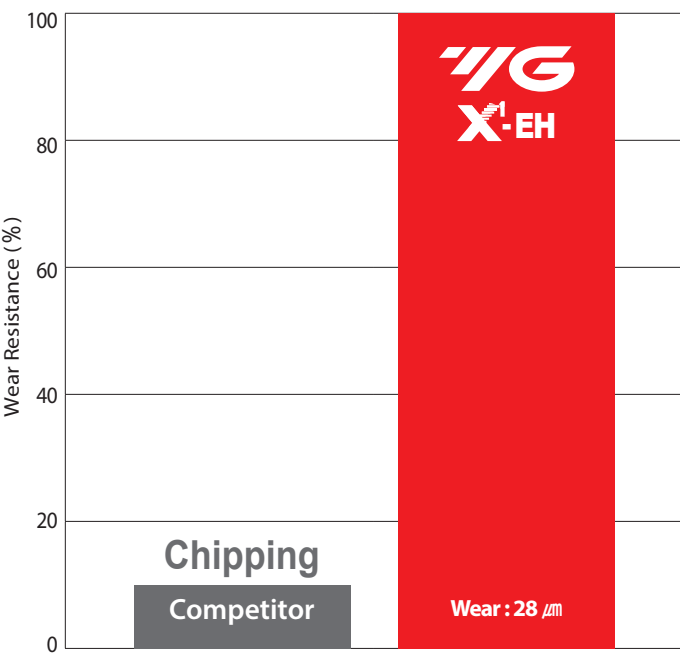
Tool	Ø3(R1.5) × Ø6 × 2.5(6) × 60
Work Material	DIN : 1.2379 JIS : SKD11(HRc63) AISI : D2
RPM	21,000 rev./min.
IPM	110 in/min.
Cutting Depth	.0024" (0.02xD) (Axial Depth) .0060" (0.05xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 813.6ft



TEST II Side Cutting application

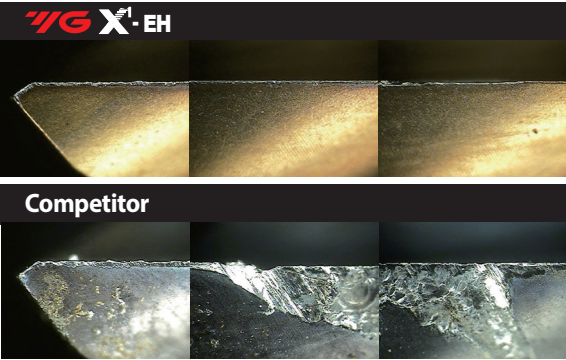
Ø6 2 Flute Square



Cutting Condition (Side Cutting)

Tool	Ø6 × Ø6 × 15 × 50
Work Material	DIN : 1.2379 JIS : SKD11(HRc63) AISI : D2
RPM	4,200 rev./min.
IPM	10 in/min.
Cutting Depth	.2362" (1.0xD) (Axial Depth) .0070" (0.03xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

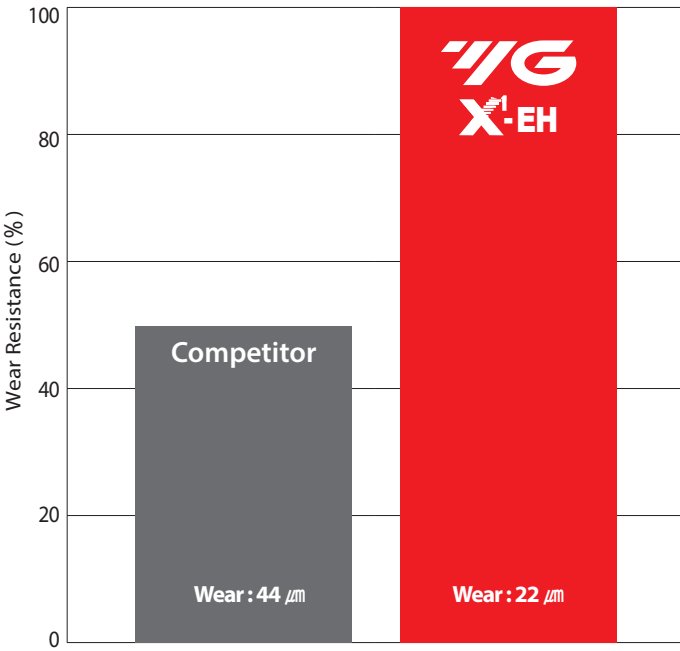
Total Milling Length : 6.6ft



CASE STUDY

TEST III Profiling application

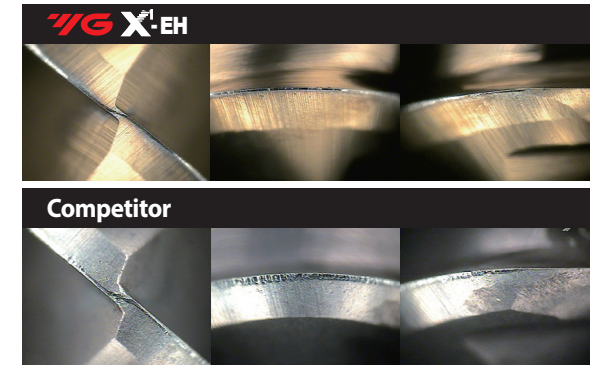
Ø3(R1.5) 2 Flute Ball Nose



Cutting Condition (Profiling)

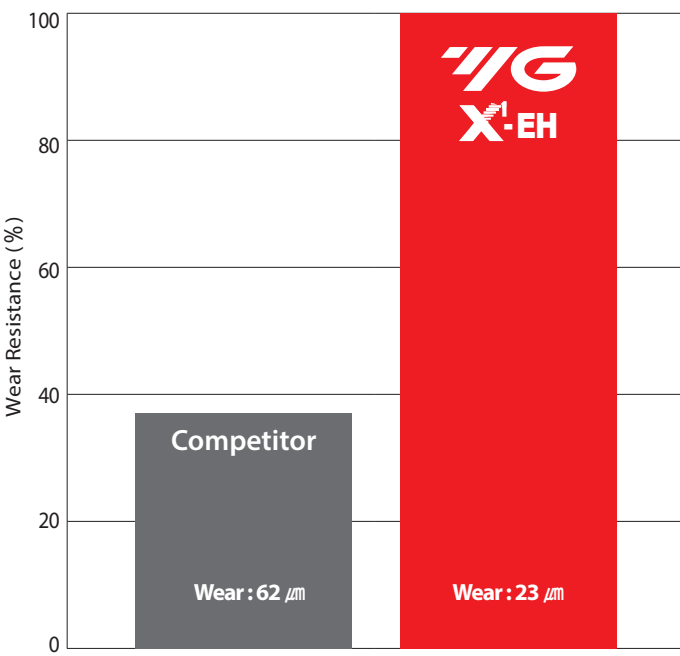
Tool	Ø3(R1.5) × Ø6 × 2.5(6) × 60
Work Material	DIN : X30Cr13 JIS : STAVAX(HRc52) AISI : 420
RPM	26,500 rev./min.
IPM	157 in/min.
Cutting Depth	.0024" (0.02xD) (Axial Depth) .0060" (0.05xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 2,034ft



TEST IV Face Milling application

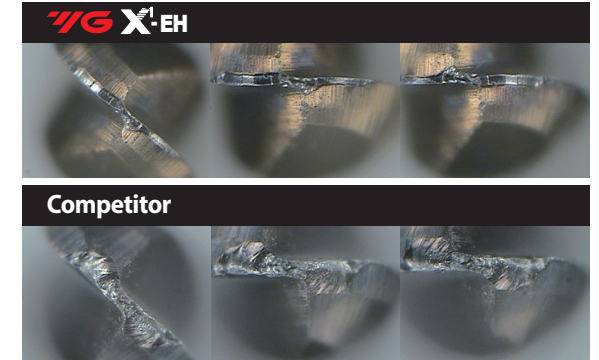
Ø0.6(R0.3) 2 Flute Ball Nose



Cutting Condition (Face Milling)

Tool	Ø0.6(R0.3) × Ø4 × 0.45(1) × 45
Work Material	DIN : X30Cr13 JIS : STAVAX(HRc52) AISI : 420
RPM	40,000 rev./min.
IPM	55 in/min.
Cutting Depth	.0020" (0.08xD) (Axial Depth) .0039" (0.16xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 262.5ft



SERIES
FLUTE
HELIX ANGLE
CUTTING EDGE SHAPE
SIZE MIN
SIZE MAX
PAGE

C-COATED SOLID CARBIDE

X¹-EH
END MILLS



Please visit
globalyg1.com/mat
for material search

Recommended cutting conditions : P.43-64

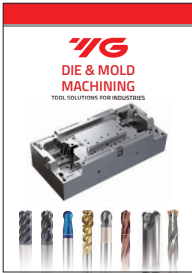
◎ : Excellent ○ : Good

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRc			
P	1	Non-alloy steel	About 0.15% C	Annealed	125				
	2		About 0.45% C	Annealed	190	13			
	3		About 0.45% C	Quenched & tempered	250	25			
	4		About 0.75% C	Annealed	270	28			
	5		About 0.75% C	Quenched & tempered	300	32	○	○	○
	6	Low alloy steel		Annealed	180	10			
	7			Quenched & tempered	275	29			
	8			Quenched & tempered	300	32	○	○	○
	9			Quenched & tempered	350	38	○	○	○
	10	High alloyed steel, and tool steel		Annealed	200	15			
	11.1			Quenched & Tempered	325	35	○	○	○
	11.2			Quenched & Tempered	409	44	○	○	○
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15			
	13		Martensitic	Quenched & Tempered	240	23			
	14.1			Austenitic	180	10			
	14.2			PH Stainless Steel	180	10			
K	15	Grey cast iron	Pearlitic / ferritic		180	10			
	16		Pearlitic (Martensitic)		260	26			
	17	Nodular cast iron	Ferritic		160	3			
	18		Pearlitic		250	25			
	19	Malleable cast iron	Ferritic		130				
	20		Pearlitic		230	21			
N	21	Aluminum-wrought alloy	Not Curable		60				
	22		Curable		100				
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75				
	24		≤ 12% Si, Curable		90				
	25		> 12% Si, Not Curable		130				
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110				
	27		CuZn, CuSnZn (Brass)		90				
	28		CuSn, lead-free copper and electrolytic copper		100				
	29.1	Non Metallic Materials	Duroplastic						
	29.2		GRAPHITE						
	29.3		CFRP, GFRP						
	30		Rubber, Wood, etc.						
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15			
	32			Cured	280	30			
	33		Ni or Co Based	Annealed	250	25			
	34			Cured	350	38			
	35	Titanium Alloys		Cast	320	34			
	36		Pure Titanium		400 Rm				
H	37		Alpha + Beta Alloys	Hardened	1050 Rm				
	38.1	Hardened steel		Hardened	421-469	45-49	◎	◎	◎
	38.2			Hardened	481-560	50-55	◎	◎	◎
	39.1			Hardened	577-654	56-60	◎	◎	◎
	39.2			Hardened	670-739	61-65	◎	◎	◎
	39.3			Hardened		66-70	◎	◎	◎
	40	Chilled Cast Iron		Cast	400	42	○	○	○
	41	Hardened Cast Iron		Hardened	550	55	◎	◎	◎

HPI89	HPI88
2	2
35°	35°
CORNER RADIUS	SQUARE
D0.2	D0.1
D3.0	D6.0
29	36
RIB PROCESSING	RIB PROCESSING
C-Coating	C-Coating

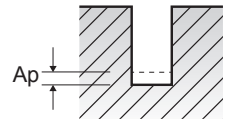
		
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◎	◎	39.1
◎	◎	39.2
◎	◎	39.3
○	○	40
◎	◎	41

Scan QR Code to See Catalogue
DIE & MOLD



RECOMMENDED CUTTING CONDITIONS

HPI88 SERIES 2 FLUTE SQUARE for RIB PROCESSING



SFM(Vc) = ft./min.
IPT(fz) = in./tooth

RPM = rev./min.
IPM(Feed) = in./min.

ISO	VDI 3323	Parameter L.B.S	Diameter (Ø)																			
			1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2	2	
			10	12	14	16	18	20	25	30	35	6	8	6	8	10	12	14	16	18	4	6
P	5	SFM	580	580	580	515	515	515	385	385	195	660	660	740	740	665	665	665	665	665	710	710
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0005	.0005
		RPM	37420	37420	37420	33270	33270	33270	24950	24950	12470	39960	39960	39960	39960	35960	35960	35960	35960	34430	34430	
		IPM	29	29	29	24	24	24	16	16	7	38	38	38	38	28	28	28	28	35	35	
		Ap	.0024	.0024	.0021	.0021	.0021	.0018	.0015	.0015	.0012	.0028	.0028	.0032	.0032	.0028	.0028	.0028	.0025	.0025	.0039	.0039

MEMO



HIGH QUALITY PRODUCTS and ON TIME DELIVERY for WORLD-WIDE CUSTOMERS

Since 1982, YG-1 has been committed to quality, innovation and the unique customer experience. Our performance and experience have granted YG-1 the global impression of one of the leading manufacturers of high quality cutting tool solutions. This global footprint expands over 75 countries, with international logistic centers, pledging to our customers to give the best service available today - and tomorrow.

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