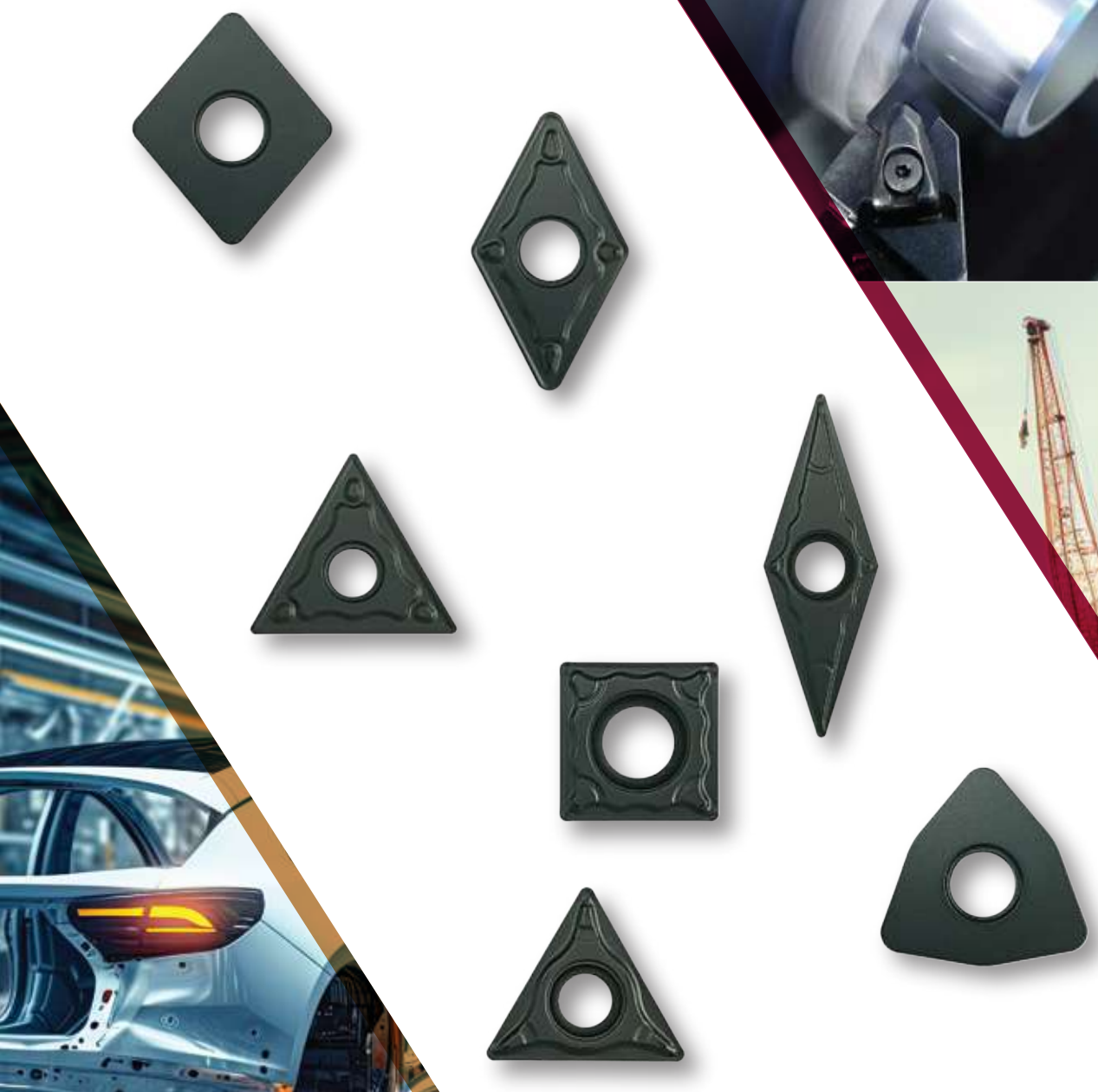
HPMT
High Precision Machining Tools







CAST IRON TURNING INSERTS

www.hpmt-industries.com

K

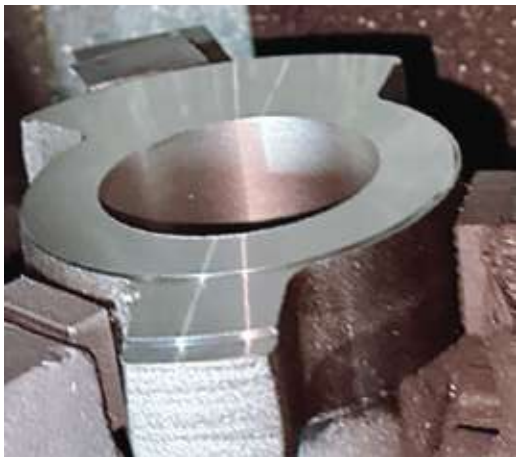
CASE STUDY 1

CUTTING CONDITION			
Operation	:	Facing, Roughing	
Industry	:	General Machining	
Workpiece Material:	:	FC250 (Cast Iron, K)	
Workpiece Hardness	:	20 – 30 HRC	
Workpiece Treatment	:	Machined	
TOOL TEST CONDITION			
Tool Producer	:	Competitor T	HPMT
Insert	:	CNMA120412	CNMA120412
Chipbreaker	:	Flat	Flat
Grade	:	T515	HCK2000
Cooling	:	Dry	Dry
Cutting Speed (m/min)	:	231 – 490	231 – 490
Feed (mm/rev)	:	0.3	0.3
Depth of Cut ap (mm)	:	1	1
Machined Diameter (mm)	:	49 – 104	49 – 104
Machining Length (mm)	:	-/-	-/-
Tool Life (pcs/edge)	:	**60 – 70**	**90 – 100**



CASE STUDY 2

CUTTING CONDITION			
Operation	:	Facing, Roughing	
Industry	:	General Machining	
Workpiece Material:	:	HT250 (Cast Iron, K)	
Workpiece Hardness	:	190 – 220 HB	
Workpiece Treatment	:	Machined	
TOOL TEST CONDITION			
Tool Producer	:	Competitor G	HPMT
Insert	:	SNMA120412	SNMA120412
Chipbreaker	:	Flat	Flat
Grade	:	GK1125	HCK2000
Cooling	:	Dry	Dry
Cutting Speed (m/min)	:	340 – 788	340 – 788
Feed (mm/rev)	:	0.16	0.16
Depth of Cut ap (mm)	:	2	2
Machined Diameter (mm)	:	57 – 132	57 – 132
Machining Length (mm)	:	37.5	37.5
Tool Life (pcs/edge)	:	**28**	**35**



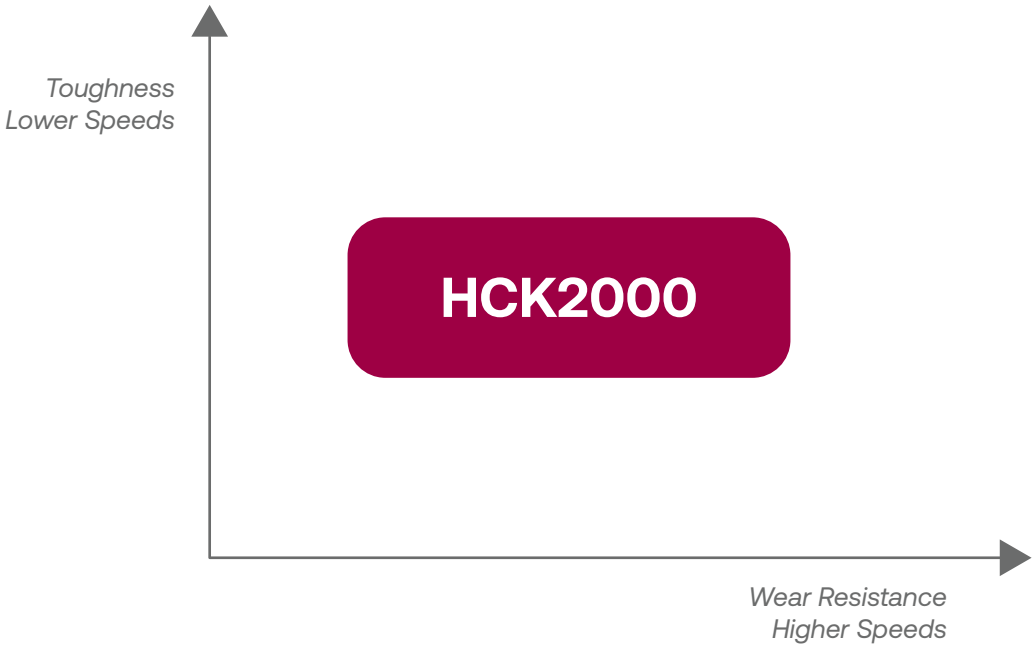


CASE STUDY 3

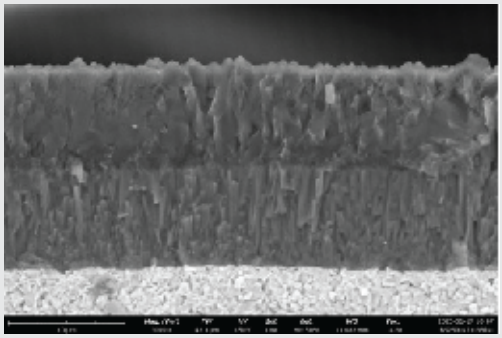
CUTTING CONDITION			
Operation	:	Outer Diameter Turning	
Industry	:	General Machining	
Workpiece Material:	:	QT500 (Ductile Cast Iron, K)	
Workpiece Hardness	:	20 – 30 HRC	
Workpiece Treatment	:	Machined	
TOOL TEST CONDITION			
Tool Producer	:	Competitor Z	HPMT
Insert	:	TNMG160408	TNMG160408
Chipbreaker	:	-	KM5
Grade	:	None	HCK2000
Cooling	:	Dry	Dry
Cutting Speed (m/min)	:	128	128
Feed (mm/rev)	:	0.35	0.35
Depth of Cut ap (mm)	:	0.4	0.4
Machined Diameter (mm)	:	17.7 – 16.9	17.7 – 16.9
Machining Length (mm)	:	123	123
Tool Life (pcs/edge)	:	**356**	**458**



Grades Description



A robust carbide substrate with superior resistance to deformation, wear, and chipping, designed for efficient high speed-speed semi-finishing and roughing of general cast iron materials.



UNMATCHED STRENGTH & DURABILITY

Engineered with a special carbide substrate, our insert offers exceptional resistance to plastic deformation, ensuring maximum tool life and unwavering performance even under extreme cutting conditions.

ADVANCED WEAR & CHIPPING RESISTANCE

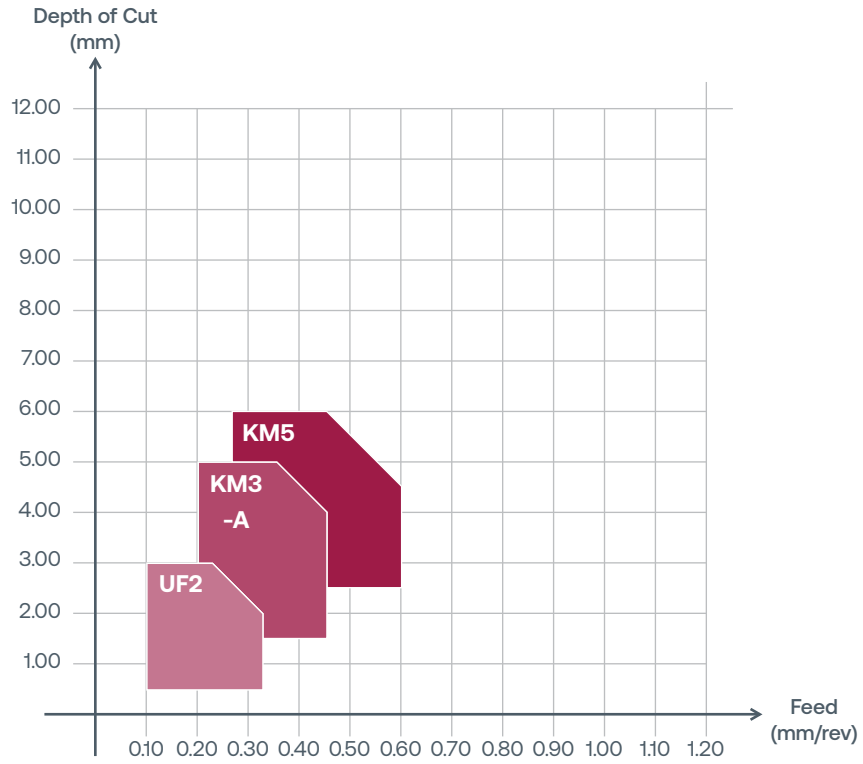
The fine-grained MT-TiCN and Al_2O_3 coating creates an ultra-tough barrier against wear and chipping, delivering unparalleled cutting stability and flawless precision for extended operations.

OPTIMIZED FOR EFFICIENCY & VERSATILITY

Designed for high speed-speed semi-finishing and roughing, this insert excels in processing general cast iron materials, offering seamless adaptability across a wide range of applications.

Cast Iron Turning Chipbreakers

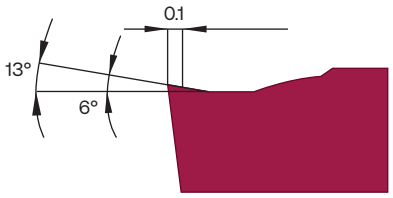
K Cast Iron



Chipbreakers

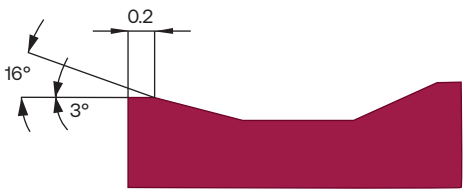
UF2





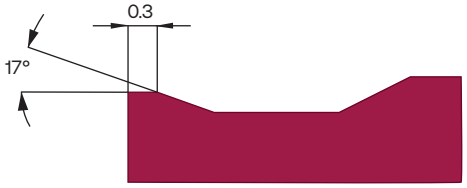
KM3





KM5





Geometries

CCMT



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
CCMT060204-UF2 HCK2000	0.4	●		●		
CCMT09T304-UF2 HCK2000	0.4	●		●		
CCMT120408-UF2 HCK2000	0.8	●		●		

CNMA



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
CNMA120404 HCK2000	0.4	●	●			
CNMA120408 HCK2000	0.8	●	●			
CNMA120412 HCK2000	1.2	●	●			

DNMA



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
DNMA150404 HCK2000	0.4	●	●			
DNMA150408 HCK2000	0.8	●	●			
DNMA150612 HCK2000	1.2	●	●			

DNMG



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
DNMG150404-KM3 HCK2000	0.4	●			●	
DNMG150408-KM3 HCK2000	0.8	●			●	
DNMG150608-KM3 HCK2000	0.8	●			●	
DNMG150612-KM3 HCK2000	1.2	●			●	
DNMG150408-KM5 HCK2000	0.8	●				●
DNMG150412-KM5 HCK2000	1.2	●				●

SCMT



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
SCMT09T304-UF2 HCK2000	0.4	●		●		

SNMA



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
SNMA120412 HCK2000	0.4	●	●			

Geometries

SNMG



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
SNMG120408-KM3 HCK2000	0.8	●			●	
SNMG120412-KM3 HCK2000	1.2	●			●	
SNMG120408-KM5 HCK2000	0.8	●				●
SNMG120412-KM5 HCK2000	1.2	●				●

TCMT



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
TCMT090204-UF2 HCK2000	0.4	●		●		
TCMT090208-UF2 HCK2000	0.8	●		●		
TCMT110204-UF2 HCK2000	0.4	●		●		
TCMT110208-UF2 HCK2000	0.8	●		●		

TNMG



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
TNMG160404-KM3 HCK2000	0.4	●			●	
TNMG160408-KM3 HCK2000	0.8	●			●	
TNMG160408-KM5 HCK2000	0.8	●				●
TNMG160412-KM5 HCK2000	1.2	●				●
TNMG220408-KM5 HCK2000	0.8	●				●
TNMG220412-KM5 HCK2000	1.2	●				●
TNMG220416-KM5 HCK2000	1.6	●				●

VBMT



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
VBMT110304-UF2 HCK2000	0.4	●		●		
VBMT110308-UF2 HCK2000	0.8	●		●		
VBMT160404-UF2 HCK2000	0.4	●		●		
VBMT160408-UF2 HCK2000	0.8	●		●		

VCMT



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
VCMT110304-UF2 HCK2000	0.4	●		●		
VCMT110308-UF2 HCK2000	0.8	●		●		

Geometries

VNMG



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
VNMG160404-KM5 HCK2000	0.4	●				●
VNMG160408-KM5 HCK2000	0.8	●				●
VNMG160412-KM5 HCK2000	1.2	●				●
VNMG160404-KM3 HCK2000	0.4	●			●	
VNMG160408-KM3 HCK2000	0.8	●			●	

WNMA



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
WNMA080408 HCK2000	0.8	●	●			
WNMA080412 HCK2000	1.2	●	●			
WNMA080416 HCK2000	1.6	●	●			

WNMG



HPMT DESIGNATION	Corner (mm)	HCK 2000	Flat	UF2	KM3	KM5
WNMG080408-KM5 HCK2000	0.8	●				●
WNMG080412-KM5 HCK2000	1.2	●				●
WNMG080416-KM5 HCK2000	1.6	●				●
WNMG080404-KM3 HCK2000	0.4	●			●	
WNMG080408-KM3 HCK2000	0.8	●			●	
WNMG080412-KM3 HCK2000	1.2	●			●	

Recommended Cutting Speeds

HPMT

			Cutting Speed (Vc)			
			HCK 2000			
			m/min		SFM	
			min	max	min	max
K	Grey, Malleable, CGI Cast Irons	125 HB	270	450	890	1480
		190 HB	240	400	790	1310
		250 HB	210	350	690	1150
	Nodular, ADI Cast Irons	180 HB	190	320	620	1050
		230 HB	170	290	560	950
		280HB	160	270	520	890
		350 HB	140	230	460	750
H	Tool Steels, White Cast Irons	45 HRC	50	90	160	300

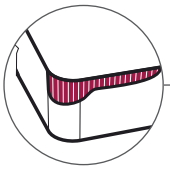
			UF2				KM3				KM5			
			Feed mm/rev		inch/rev		Feed mm/rev		inch/rev		Feed mm/rev		inch/rev	
			min	max	min	max	min	max	min	max	min	max	min	max
K	Grey, Malleable, CGI Cast Irons	125 HB	0.13	0.33	0.005	0.013	0.20	0.41	0.008	0.016	0.43	0.62	0.017	0.025
		190 HB	0.13	0.31	0.005	0.012	0.19	0.39	0.007	0.015	0.41	0.59	0.016	0.023
		250 HB	0.12	0.29	0.005	0.012	0.18	0.37	0.007	0.014	0.39	0.55	0.015	0.022
	Nodular, ADI Cast Irons	180 HB	0.11	0.28	0.005	0.011	0.17	0.35	0.007	0.014	0.37	0.53	0.015	0.021
		230 HB	0.11	0.27	0.004	0.011	0.17	0.34	0.007	0.013	0.36	0.51	0.014	0.020
		280HB	0.11	0.26	0.004	0.010	0.16	0.33	0.006	0.013	0.35	0.49	0.014	0.019
		350 HB	0.10	0.25	0.004	0.010	0.15	0.31	0.006	0.012	0.33	0.46	0.013	0.018
H	Tool Steels, White Cast Irons	45 HRC	0.08	0.19	0.003	0.008	0.13	0.24	0.005	0.010	0.27	0.36	0.011	0.014

Technical Formulas

Parameter	Metric Formula	Metric Unit	American Formula	American Unit
Cutting Speed	$V_c = \frac{D_m \times \pi \times n}{1000}$	m/min	$V_c = \frac{D_m \times n}{382}$	SFM
Rotation	$n = \frac{V_c \times 1000}{D_m \times \pi}$	RPM	$n = \frac{V_c \times 12}{D_m \times \pi}$	RPM
Cutting Time	$T_c = \frac{l_m}{f_n \times n}$	min	$T_c = \frac{l_m}{f_n \times n}$	min
Surface Roughness	$R_{max} = \frac{f_n^2}{r_\varepsilon} \times 125$	µm	$R_{max} = \frac{f_n^2}{r_\varepsilon} \times 4921.26$	µin
Metarial Removal Rate	MRR = Ap x fn x Vc	cm^3/min	MRR = Ap x fn x Vc x 12	in^3/min

Symbol	Designation	Metric Unit	American Unit
D_m	Machining Diameter	mm	in
f_n	Feed per Revolution	mm/rev	IPR
l_m	Machining Length	mm	in
r	Nose Radius	mm	in

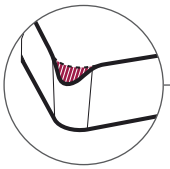
Troubleshooting



Flank Wear

Occurs from abrasion by hard particles, reducing the tool's flank surface.

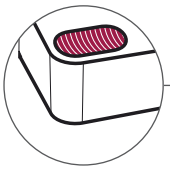
Solutions :
Lower cutting speed or use a harder grade.



Plastic Deformation

Tool material yields under excessive thermal and mechanical stress.

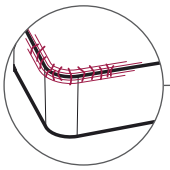
Solutions :
Opt for a harder grade, reduce cutting speed, or lower feed rate.



Crater Wear

Affects the tool's rake face, caused by high-speed abrasion and diffusion between the tool and workpiece.

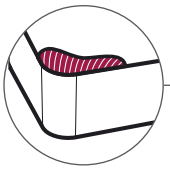
Solutions :
Decrease cutting speed, improve coolant flow, or switch to a harder grade.



Thermal Cracks

Caused by rapid temperature changes during interrupted cuts, worsened by improper coolant us

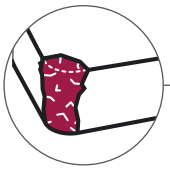
Solutions :
Use a tougher grade, direct coolant properly, reduce speed, or turn off coolant.



Built-up Edge (BUE)

Material from the workpiece sticks to the cutting tool due to pressure welding, common with sticky materials at low speeds.

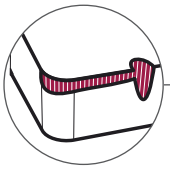
Solutions :
Adjust cutting speed to the optimal range, alter feed rate, or select a sharper chipbreaker.



Edge Chipping / Breakage

Results from excessive mechanical stress, possible from high feed rates, deep cuts, or improper tool setup.

Solutions :
Ensure parameters are correct, check toolholder and shim, use the appropriate tool. If breakage persists, retry with a new edge and diagnose before failure.



Notch Wear

Localized damage along the depth-of-cut line from adhesive and abrasive wear, typical in machining stainless steels and superalloys.

Solutions :
Vary depth of cut, use conical passes, or choose a harder grade or sharper chipbreaker.

Frequently Asked Questions

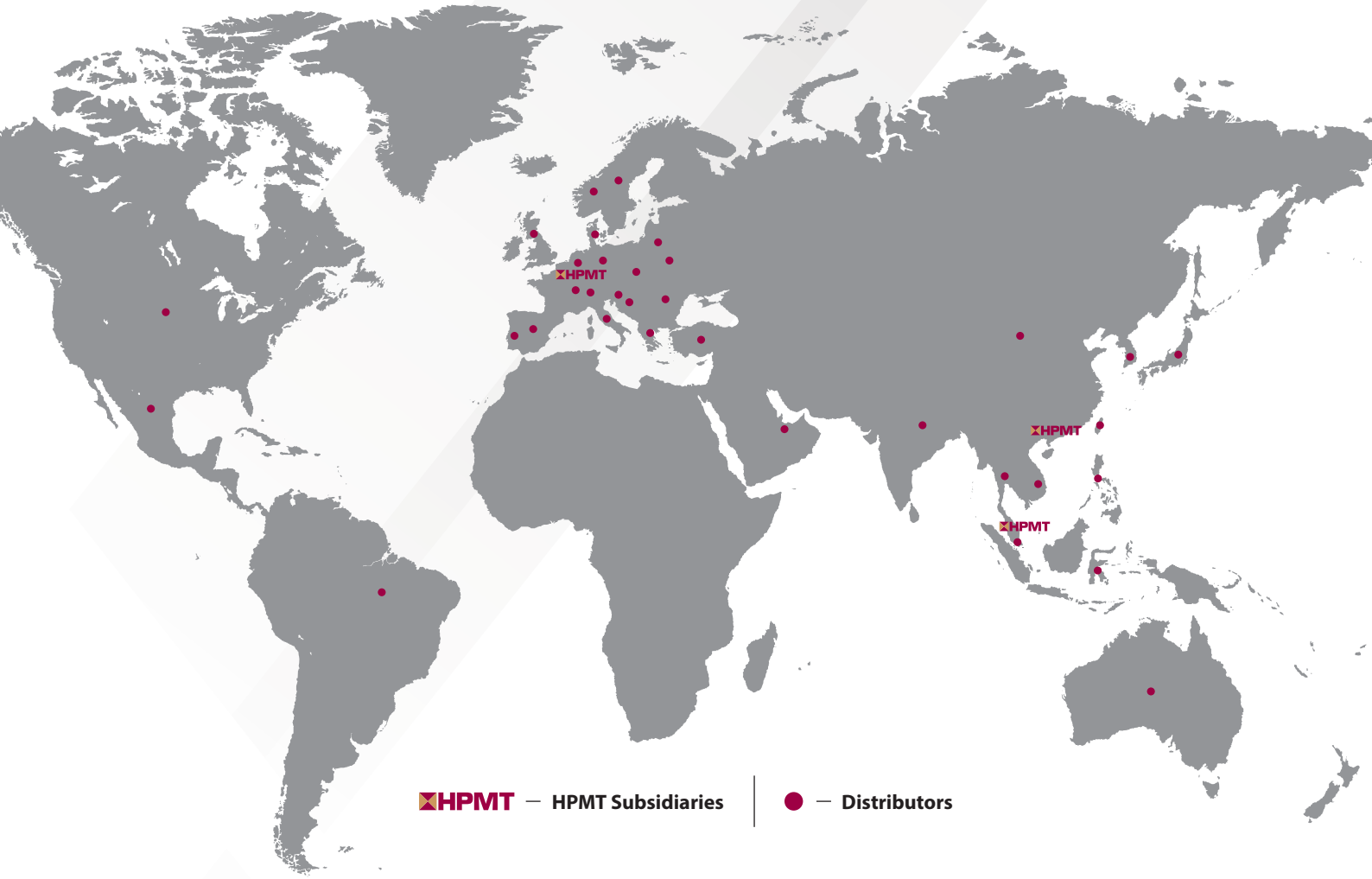
WHY IS HPMT EXPANDING INTO THE CARBIDE INSERTS BUSINESS?
We are expanding to offer you a complete range of tooling solutions. As tools get larger, using indexable carbide inserts becomes more efficient and sustainable. A wider range of products allows us to offer more tailored and innovative solutions to meet your specific needs. It also enables us to achieve economies of scope in production, R&D, sales, and marketing, which can improve our efficiency and lead to better pricing and service for you.

WHAT ADVANTAGES DO I GAIN FROM SOURCING TOOLS FROM A SINGLE SUPPLIER LIKE HPMT?
By consolidating your tooling needs with us, you streamline the procurement process and cut down on administrative tasks, which enhances supplier communication. Increased efficiency and potential cost savings arise from bulk purchasing and streamlined logistics. Consolidating services under one roof reduces complexity and improves the management of your supply chain.

WILL THE QUALITY OF HPMT'S CARBIDE INSERTS MATCH YOUR SOLID CARBIDE TOOLS?
Absolutely. We are committed to delivering the same high-quality standards across all our products. Our carbide inserts undergo rigorous testing to ensure they meet the performance and reliability you expect from HPMT.

HOW WILL HPMT SUPPORT ME DURING THIS TRANSITION TO INCLUDE CARBIDE INSERTS?
We are here to provide full support, including technical assistance, product training, and after-sales service, to ensure you seamlessly integrate our carbide inserts into your operations.

DOES THIS MOVE MEAN HPMT IS SHIFTING FOCUS AWAY FROM SOLID CARBIDE TOOLS?
Not at all. We remain dedicated to our solid carbide tools while enhancing our offerings to include carbide inserts. Our goal is to provide a comprehensive tooling solution that covers all your machining needs.



HPMT

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