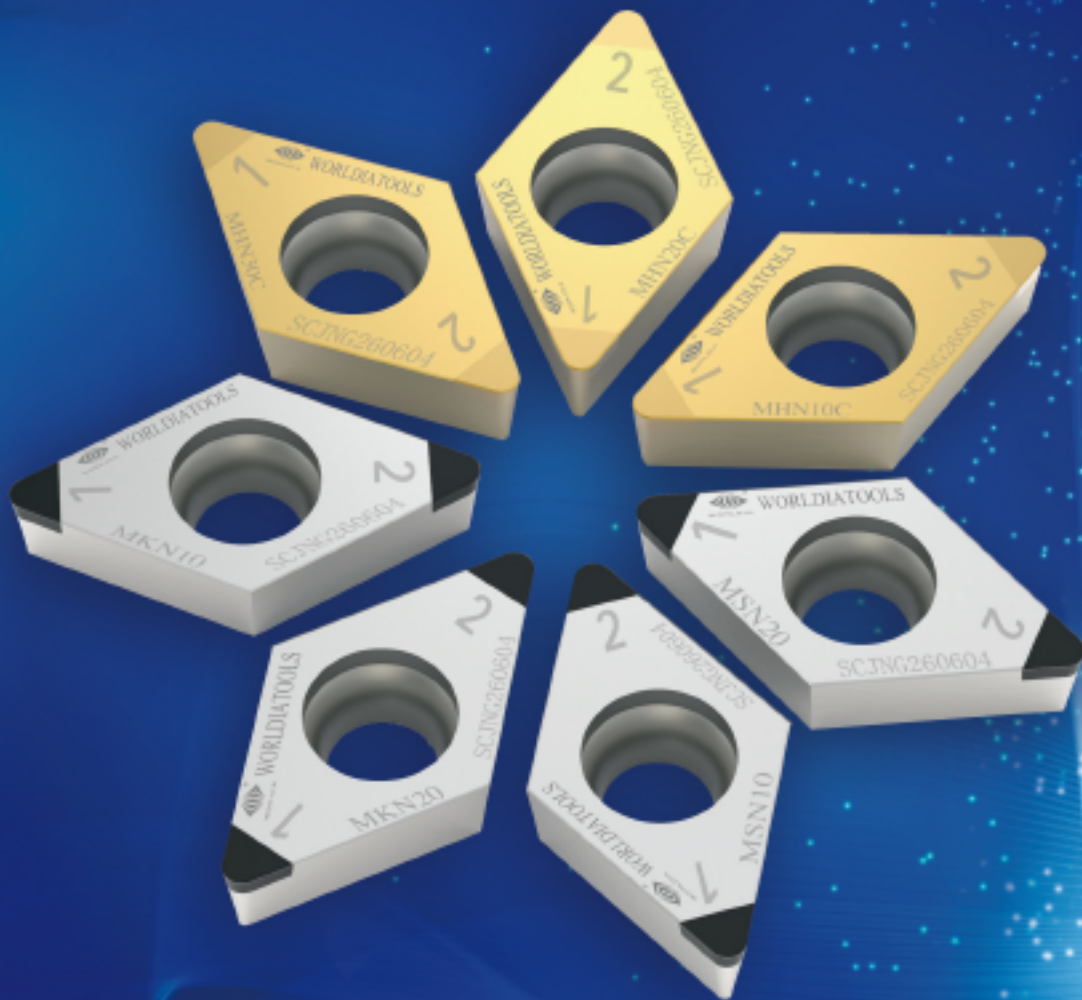




WORLDIA
MN-N2010 EN

PCBN Standard Inserts

7 premium PCBN grades for hardened steel,
cast and ductile iron, powder metal from stock



WORLDIA MANANOVA

Easy Choice Fast Delivery

MANANOVA

Easy Choice Fast Delivery

MANANOVA is the name for Worldia's stock-keeping standard product portfolio. It provides best-in-class high-quality products within a wide range of most-common applications at very attractive prices. Each them has an inventory code which simplifies the order process.

Please refer to Worldia's general PCBN Turning Inserts catalogue for more grades, geometries, tip sizes, cutting edge designs and coatings.



Contents

ISO Turning 03

Product range overview of indexable inserts
for ISO turning - Inserts description

PCBN Insert 06

Providing stable , universal , high efficient
cutting effects - MANANOVA EASY CHOICE

Definition Key - Material designation

Example

M	H	N	10	C
MANANOVA	1	2	3	4

1
Application Materials
P Steel
M Stainless Steel
K Cast Iron
S Power Metal
H Hardened Steel
N Non-ferrous Metal

2
Cutting Tool Material
D PCD
N PCBN

3
Material Code
10
20
30

4
Coating
C Coated
Without Uncoated

Material Introduction - Easy choice for PCBN Grade

ISO H: Hardened Steel

ISO K: Cast Iron

ISO S: Powder Metal

- Continuous cutting
- ◐ Light interrupted cutting
- ◑ Medium interrupted cutting
- ✱ Heavy interrupted cutting

	ISO H			ISO K		ISO S	
PCBN Grade	MHN10C	MHN20C	MHN30C	MKN10	MKN20	MSN10	MSN20
	Hardened Steel (●)	Hardened Steel (◐◑)	Hardened Steel (✱)	Cast Iron	Ductile Iron	Powder Metal	Powder Metal
vc	180(150~250) m/min	100(50~150) m/min	80(30~120) m/min	600(300~800) m/min	300(150~450) m/min	300(200~500) m/min	500(300~800) m/min
fn	0.1(0.03~0.2) mm/r	0.1(0.03~0.2) mm/r	0.1(0.03~0.2) mm/r	0.1(0.03~0.3) mm/r	0.1(0.03~0.3) mm/r	0.1(0.03~0.3) mm/r	0.1(0.03~0.3) mm/r
%	45~55	60~70	85~95	85~95	60~70	60~70	85~95
Grain size	1~2 μm	1~2 μm	2~3 μm	2~3 μm	1~2 μm	1~2 μm	2~3 μm
Bond	TiC	TiN	Co/W	Co/W	TiCN	TiCN	Co/W
First Choice	●	◐◑	✱	●◐◑	●◐◑	●◐◑	●◐◑

- Continuous
- ◐ Light interrupted
- ◑ Medium interrupted
- ✱ Heavy interrupted

Definition Key - Identification Code

ANSI	C	-	C	C	G	W	2	1.5	0.5	-	1	N
ISO	C	-	C	C	G	W	06	02	02	-	1	N
	1		2	3	4	5	6	7	8		9	10

1		2				3		4			5			
Insert Style		Insert Shape				Clearance Angle		Tolerances			Pattern Type			
Without	Standard	A	85°	M	86°	A	3°	F	25°	G	ISO mm	ANSI inch	A	
C	Chip breaker	B	82°	O	135°	B	5°	G	30°	m	±0.025	±0.001	N	
L	Full Length	C	80°	P	108°	C	7°	N	0°	IC	±0.025	±0.001	T	
F	Full Face	D	55°	R	90°	D	15°	P	11°	S	±0.130	±0.005	W	
S	Solid	E	75°	S	90°	E	20°			R	±0.03	±0.001	R	
W	Wiper	H	120°	T	60°									
H	Heavy cutting	K	55°	V	35°									
		L	90°	W	80°									

6							7			8			9	
Inscribed Circle Diameter							Insert Thickness			Nose Radius			Cutting Edges	
IC (mm)	C	D	T	V	W	Code							1	single
ISO						IC (Inch)	ISO mm	ANSI	inch	ISO mm	ANSI	inch	2	double
3.970						ANSI	01 = 1.59	1	1/16	00 = 0.0	0	.000	3	triple
4.760			08				02 = 2.38	1.5	3/32	01 = 2.1	0.2	.004	⋮	
5.560			09				T2 = 2.78			02 = 0.2	0.5	.008		
6.350	06	07	11	11		1/4	03 = 3.18	2	1/8	04 = 0.4	1	1/64		
7.940						5/16	T3 = 3.97	2.5	5/32	08 = 0.8	2	1/32		
9.525	09	11	16	16		3/8	04 = 4.76	3	3/16	12 = 1.2	3	3/64		
12.700	12	15			08	1/2	05 = 5.56	3.5	7/32	16 = 1.6	4	1/16		
15.875						5/8	06 = 6.35	4	1/4	20 = 2.0	5	5/64		
							07 = 7.94	5	5/16	24 = 2.4	6	3/32		
							09 = 9.525	6	3/8	28 = 2.8	7	7/64		

10	
Cutting Direction	
N	
R	
L	

PCBN Insert CCGW

WORLDIA MANANOVA
Easy Choice Fast Delivery






CC 80°Positive
7°Relief

Application materia:

- H - Hardened Steel
- K - Cast Iron
- K - Ductile Iron(NCI)
- S - Powder Metal

Symbol mark:

- Continuous
- ◐ Light interrupted
- ◑ Medium interrupted
- ★ Heavy interrupted

CCGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		
 MHN Series	CCGW21.50.5	CCGW 060202	2N	6.35	2.38	0.2	2.8	2.2	MN 00536	MN 00555	MN 00556	MN 00086	MN 00087	MN 00088	MN 00729	
	CCGW21.51	CCGW 060204	2N	6.35	2.38	0.4	2.8	2.2	MN 00529	MN 00557	MN 00558	MN 00092	MN 00093	MN 00094	MN 00730	
	CCGW21.52	CCGW 060208	2N	6.35	2.38	0.8	2.8	2.2	MN 00559	MN 00560	MN 00561	MN 00098	MN 00099	MN 00100	MN 00730	
 MKN Series	CCGW32.50.5	CCGW 09T302	2N	9.525	3.97	0.2	4.4	2.2	MN 00562	MN 00547	MN 00563	MN 00104	MN 00105	MN 00106	MN 00732	
	CCGW32.51	CCGW 09T304	2N	9.525	3.97	0.4	4.4	2.2	MN 00511	MN 00540	MN 00532	MN 00110	MN 00111	MN 00112	MN 00733	
	CCGW32.52	CCGW 09T308	2N	9.525	3.97	0.8	4.4	2.2	MN 00494	MN 00545	MN 00533	MN 00116	MN 00117	MN 00118	MN 00734	
	CCGW32.53	CCGW 09T312	2N	9.525	3.97	1.2	4.4	2.2	MN 00564	MN 00565	MN 00566	MN 00122	MN 00123	MN 00124	MN 00735	
 MSN Series	CCGW432	CCGW 120408	2N	12.7	4.76	0.8	5.5	2.2	MN 00812		MN 00725					

Items with order code MNXXXX on stock

PCBN Insert

CPGW-CNGA

WORLDIA MANANOVA
Easy Choice Fast Delivery

CP 80°Positive
11°Relief

Application materia:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
⚙ Heavy interrupted

CPGW	Shape		Dimensions						Applications							
	ANSI Code	ISO Code	Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
									Coated	Coated	Coated	●	◐	◑	●	◐
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		



CPGW21.51	CPGW060204	2N	6.35	2.38	0.4	2.8	2.2			MN 00821					
CPGW21.51	CPGW060204	2N	6.35	2.38	0.4	2.8	2.2							MN 00822	



Items with order code MNXXXXX on stock

CN 80°
Negative

Application materia:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
⚙ Heavy interrupted

CNGA	Shape		Dimensions						Applications							
	ANSI Code	ISO Code	Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
									Coated	Coated	Coated	●	◐	◑	●	◐
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		



CNGA430.5	CNGA 120402	2N	12.7	4.76	0.2	5.16	2.2	MN 00780	MN 00781						
CNGA431	CNGA 120404	2N	12.7	4.76	0.4	5.16	2.2	MN 00525	MN 00497	MN 00567	MN 00128	MN 00129	MN 00130	MN 00736	
CNGA432	CNGA 120408	2N	12.7	4.76	0.8	5.16	2.2	MN 00509	MN 00498	MN 00510	MN 00134	MN 00135	MN 00136	MN 00737	
CNGA432	CNGA 120408	4N	12.7	4.76	0.8	5.16	2.2	MN 00522	MN 00568	MN 00569	MN 00140	MN 00141	MN 00142		
CNGA433	CNGA 120412	2N	12.7	4.76	1.2	5.16	2.2	MN 00669	MN 00807	MN 00654	MN 00777				
CNGA434	CNGA 120416	2N	12.7	4.76	1.6	5.16	2.2		MN 00823	MN 00824					
CNGA434	CNGA 120416	4N	12.7	4.76	1.6	5.16	2.2		MN 00825	MN 00826					



Items with order code MNXXXXX on stock

PCBN Insert

DCGW

WORLDIA MANANOVA
Easy Choice Fast Delivery

DC	55°Positive
	7°Relief

Application material:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
⚙ Heavy interrupted

DCGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
			MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20							

MHN Series	DCGW21.50.5	DCGW070202	2N	6.35	2.38	0.2	2.8	2.2	MN 00787	MN 00788				MSN 00703	
	DCGW21.51	DCGW 070204	2N	6.35	2.38	0.4	2.8	2.2	MN 00554	MN 00548	MN 00570	MN 00146	MN 00147	MN 00148	MN 00738
	DCGW21.52	DCGW 070208	2N	6.35	2.38	0.8	2.8	2.2	MN 00571	MN 00572	MN 00573	MN 00152	MN 00153	MN 00154	MN 00739
MKN Series	DCGW32.50.5	DCGW 11T302	2N	9.525	3.97	0.2	4.4	2.2	MN 00550	MN 00574	MN 00575	MN 00118	MN 00159	MN 00160	MN 00740
	DCGW32.51	DCGW 11T304	2N	9.525	3.97	0.4	4.4	2.2	MN 00520	MN 00549	MN 00515	MN 00164	MN 00165	MN 00166	MN 00741
	DCGW32.52	DCGW 11T308	2N	9.525	3.97	0.8	4.4	2.2	MN 00576	MN 00521	MN 00577	MN 00170	MN 00171	MN 00172	MN 00742
MSN Series	DCGW32.53	DCGW11T312	2N	9.525	3.97	1.2	4.4	2.2	MN 00827	MN 00828					

Items with order code MNXXXXX on stock

PCBN Insert

DNGA

WORLDIA MANANOVA
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DN **55°**
Negative

Application material:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
⊛ Heavy interrupted



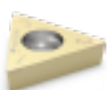


DNGA	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
			MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20							
	DNGA431	DNGA 150404	2N	12.7	4.76	0.4	5.16	2.2	MN 00578	MN 00541	MN 00579	MN 00176	MN 00177	MN 00178	MN 00743	
	DNGA432	DNGA 150408	2N	12.7	4.76	0.8	5.16	2.2	MN 00580	MN 00546	MN 00528	MN 00183	MN 00184	MN 00185	MN 00744	
	DNGA432	DNGA 150408	4N	12.7	4.76	0.8	5.16	2.2			MN 00829					
	DNGA433	DNGA 150412	2N	12.7	4.76	1.2	5.16	2.2	MN 00581	MN 00582	MN 00583	MN 00189	MN 00190	MN 00191	MN 00745	
	DNGA441	DNGA 150604	2N	12.7	6.35	0.4	5.16	2.2	MN 00584	MN 00585	MN 00586	MN 00195	MN 00196	MN 00197	MN 00746	
	DNGA441	DNGA 150604	4N	12.7	6.35	0.4	5.16	2.2		MN 00814						
	DNGA442	DNGA 150608	2N	12.7	6.35	0.8	5.16	2.2	MN 00524	MN 00514	MN 00513	MN 00201	MN 00202	MN 00203	MN 00747	
	DNGA442	DNGA 150608	4N	12.7	6.35	0.8	5.16	2.2				MN 00676	MN 00677			
	DNGA443	DNGA 150612	2N	12.7	6.35	1.2	5.16	2.2		MN 00830	MN 00668					
	DNGA443	DNGA 150612	4N	12.7	6.35	1.2	5.16	2.2	MN 00704							

Items with order code MNXXXX on stock

TC 60° Positive
7° Relief

Application material:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
◒ Heavy interrupted

TCGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20										
	TCGW1.81.50.5	TCGW 090202	3N	5.56	2.38	0.2	2.4	2.2	MN 00815						MN 00748	
	TCGW1.81.51	TCGW 090204	3N	5.56	2.38	0.4	2.4	2.2	MN 00587	MN 00588	MN 00589	MN 00207	MN 00208	MN 00209		
	TCGW1.81.52	TCGW 090208	3N	5.56	2.38	0.8	2.4	2.2	MN 00590	MN 00591	MN 00592	MN 00213	MN 00214	MN 00215	MN 00749	
	TCGW21.51	TCGW 110204	3N	6.35	2.38	0.4	2.8	2.2	MN 00552	MN 00593	MN 00594	MN 00219	MN 00220	MN 00221	MN 00750	
	TCGW21.52	TCGW 110208	3N	6.35	2.38	0.8	2.8	2.2	MN 00526	MN 00595	MN 00596	MN 00225	MN 00226	MN 00227	MN 00751	
	TCGW221	TCGW 110304	3N	6.35	3.18	0.4	2.8	2.2	MN 00597	MN 00598	MN 00599	MN 00231	MN 00232	MN 00233	MN 00752	
	TCGW222	TCGW 110308	3N	6.35	3.18	0.8	2.8	2.2	MN 00600	MN 00601	MN 00534	MN 00237	MN 00238	MN 00239	MN 00753	
	TCGW32.5 1	TCGW 16T304	3N	9.525	3.97	0.4	4.4	2.2	MN 00816							

Items with order code MNXXXXX on stock

PCBN Insert

TNGA

WORLDIA MANANOVA
Easy Choice Fast Delivery

TN

60°

Negative

Application material:

- H - Hardened Steel
- K - Cast Iron
- K - Ductile Iron (NCI)
- S - Powder Metal

Symbol mark:

- Continuous
- ◐ Light interrupted
- ◑ Medium interrupted
- ✱ Heavy interrupted

TNGA	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
			MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20							
	TNGA330	TNGA 160402	3N	9.525	4.76	0.2	3.81	2.2	MN 00842	MN 00843						
	TNGA331	TNGA 160404	3N	9.525	4.76	0.4	3.81	2.2	MN 00503	MN 00504			MN 00507	MN 00841		
	TNGA332	TNGA 160408	3N	9.525	4.76	0.8	3.81	2.2	MN 00602	MN 00495	MN 00519	MN 00243	MN 00244	MN 00245	MN 00754	
	TNGA333	TNGA 160412	3N	9.525	4.76	1.2	3.81	2.2	MN 00603	MN 00604	MN 00605	MN 00249	MN 00250	MN 00251	MN 00755	
	TNGA334	TNGA 160416	3N	9.525	4.76	1.6	3.81	2.2		MN 00831	MN 00832					





Items with order code MNXXXXX on stock

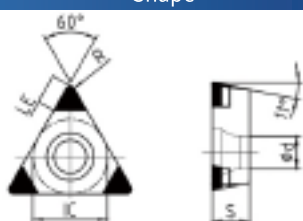



PCBN Insert TPGW

WORLDIA MANANOVA
Easy Choice Fast Delivery

TP	60°Positive
	11°Relief

Application material:
 H - Hardened Steel
 K - Cast Iron
 K - Ductile Iron(NCI)
 S - Powder Metal

Symbol mark:
 Continuous
 Light interrupted
 Medium interrupted
 Heavy interrupted

TPGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		
	TPGW1.51.50.5	TPGW 080202	3N	4.76	2.38	0.2	2.4	2.2	MN 00671							
	TPGW1.51.51	TPGW 080204	3N	4.76	2.38	0.4	2.4	2.2	MN 00539	MN 00606	MN 00530	MN 00255	MN 00256	MN 00257	MN 00756	
	TPGW1.51.52	TPGW 080208	3N	4.76	2.38	0.8	2.4	2.2	MN 00607	MN 00608	MN 00609	MN 00261	MN 00262	MN 00263	MN 00757	
	TPGW1.81.50.5	TPGW 090202	3N	5.56	2.38	0.2	2.8	2.2	MN 00610	MN 00611	MN 00612	MN 00267	MN 00268	MN 00269	MN 00758	
	TPGW1.81.51	TPGW 090204	3N	5.56	2.38	0.4	2.8	2.2	MN 00613	MN 00614	MN 00531	MN 00279	MN 00280		MN 00759	
	TPGW21.51	TPGW 110204	3N	6.35	2.38	0.4	2.8	2.2	MN 00615	MN 00616	MN 00535	MN 00273	MN 00274	MN 00275	MN 00760	
	TPGW21.52	TPGW 110208	3N	6.35	2.38	0.8	2.8	2.2	MN 00618	MN 00619	MN 00620	MN 00285	MN 00286	MN 00287	MN 00761	
	TPGW220.5	TPGW 110302	3N	6.35	3.18	0.2	3.3	2.2	MN 00621	MN 00622	MN 00623	MN 00291	MN 00292	MN 00293	MN 00762	
	TPGW221	TPGW 110304	3N	6.35	3.18	0.4	3.3	2.2	MN 00553	MN 00624	MN 00625	MN 00297	MN 00298	MN 00299	MN 00763	
	TPGW222	TPGW 110308	3N	6.35	3.18	0.8	3.3	2.2	MN 00833	MN 00834						

Items with order code MNXXXXX on stock

PCBN Insert VCGW

WORLDIA MANANOVA
Easy Choice Fast Delivery

VC 35°Positive
7°Relief

Application material:

H - Hardened Steel

K - Cast Iron

K - Ductile Iron(NCI)

S - Powder Metal

Symbol mark:

● Continuous

◐ Light interrupted

◑ Medium interrupted

✱ Heavy interrupted

VCGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		
	VCGW1.51.50.5	VCGW 080202	2N	4.76	2.38	0.2	2.3	2.2	MN 00790	MN 00789						
	VCGW1.51.51	VCGW 080204	2N	4.76	2.38	0.4	2.3	2.2	MN 00791	MN 00792						
	VCGW220.5	VCGW 110302	2N	6.35	3.18	0.2	2.8	2.2	MN 00670	MN 00835						
	VCGW221	VCGW 110304	2N	6.35	3.18	0.4	2.8	2.2	MN 00626	MN 00627	MN 00628	MN 00303	MN 00304	MN 00305	MN 00764	
	VCGW222	VCGW 110308	2N	6.35	3.18	0.8	2.8	2.2	MN 00629	MN 00630	MN 00631	MN 00309	MN 00310	MN 00311	MN 00765	
	VCGW330.5	VCGW 160402	2N	9.525	4.76	0.2	4.4	2.2	MN 00778	MN 00779						
	VCGW331	VCGW 160404	2N	9.525	4.76	0.4	4.4	2.2	MN 00635	MN 00636	MN 00637	MN 00321	MN 00322	MN 00323	MN 00766	
	VCGW332	VCGW 160408	2N	9.525	4.76	0.8	4.4	2.2	MN 00638	MN 00639	MN 00640	MN 00327	MN 00328	MN 00329	MN 00767	

Items with order code MNXXXXX on stock





PCBN Insert VBGW

WORLDIA MANANOVA
Easy Choice Fast Delivery

VB	35°Positive
	5°Relief

Application materia:
H - Hardened Steel
K - Cast Iron
K - Ductile Iron(NCI)
S - Powder Metal

Symbol mark:
● Continuous
◐ Light interrupted
◑ Medium interrupted
◒ Heavy interrupted

VBGW	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
			MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20							
	VBGW220.5	VBGW110302	2N	6.35	3.18	0.2	2.8	2.2	MN 00775	MN 00776						
	VBGW221	VBGW110304	2N	6.35	3.18	0.4	2.8	2.2	MN 00782	MN 00783						
MHN Series																
	VBGW330.5	VBGW160402	2N	9.525	4.76	0.2	4.4	2.2	MN 00695	MN 00687	MN 00680	MN 00681	MN 00693	MN 00694	MN 00797	
	VBGW331	VBGW160404	2N	9.525	4.76	0.4	4.4	2.2	MN 00690	MN 00686	MN 00679	MN 00678	MN 00692	MN 00691	MN 00798	
MKN Series	VBGW332	VBGW160408	2N	9.525	4.76	0.8	4.4	2.2	MN 00696	MN 00688	MN 00683	MN 00682	MN 00698	MN 00697	MN 00799	
	VBGW333	VBGW160412	2N	9.525	4.76	1.2	4.4	2.2	MN 00701	MN 00689	MN 00684	MN 00685	MN 00699	MN 00700		

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MSN Series

PCBN Insert

VNGA-MNGA

WORLDIA MANANOVA
Easy Choice Fast Delivery

VN

35°

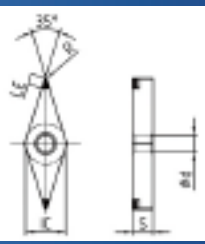
Negative

Application material:

- H - Hardened Steel
- K - Cast Iron
- K - Ductile Iron(NCI)
- S - Powder Metal

Symbol mark:

- Continuous
- ◐ Light interrupted
- ◑ Medium interrupted
- ★ Heavy interrupted

VNGA	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		



VNGA330.5	VNGA 160402	2N	9.525	4.76	0.2	3.81	2.2	MN 00632	MN 00633	MN 00634	MN 00315	MN 00316	MN 00317	MN 00768
VNGA331	VNGA 160404	2N	9.525	4.76	0.4	3.81	2.2	MN 00480	MN 00481	MN 00482	MN 00483	MN 00484	MN 00485	MN 00769
VNGA332	VNGA 160408	2N	9.525	4.76	0.8	3.81	2.2	MN 00486	MN 00487	MN 00488	MN 00489	MN 00490	MN 00491	MN 00770
VNGA333	VNGA 160412	2N	9.525	4.76	1.2	3.81	2.2	MN 00641	MN 00642	MN 00643	MN 00333	MN 00334	MN 00335	MN 00771

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WN

80°

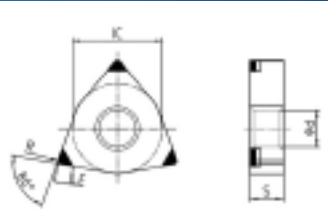
Negative

Application material:

- H - Hardened Steel
- K - Cast Iron
- K - Ductile Iron(NCI)
- S - Powder Metal

Symbol mark:

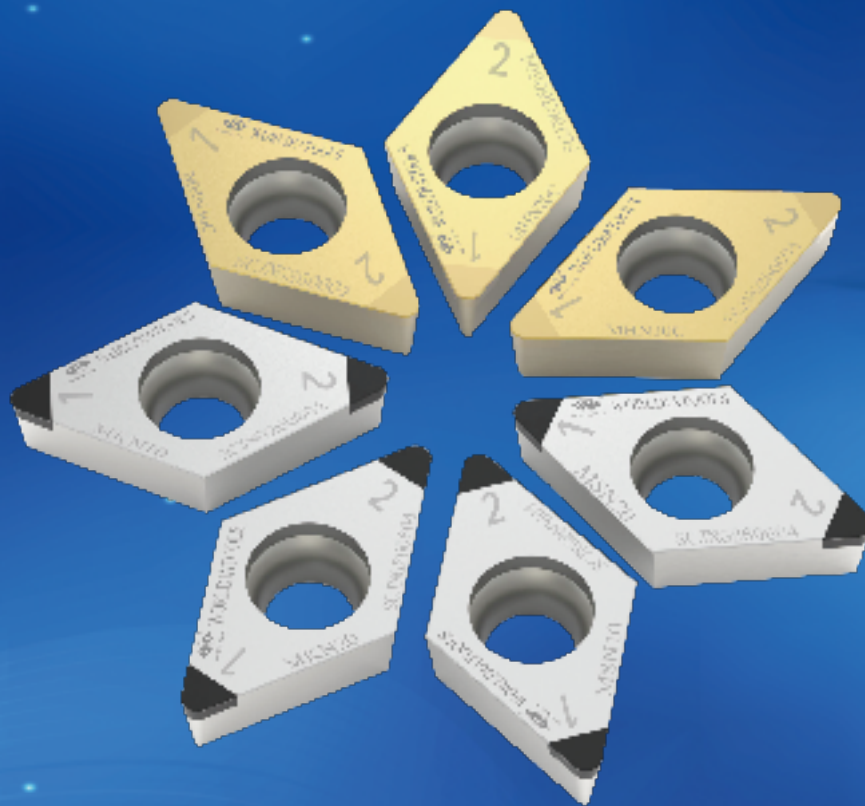
- Continuous
- ◐ Light interrupted
- ◑ Medium interrupted
- ★ Heavy interrupted

WNGA	Shape		Dimensions						Applications							
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	H	H	H	K	K	S	S	
	ANSI Code	ISO Code							Coated	Coated	Coated					
								MHN 10C	MHN 20C	MHN 30C	MKN 10	MKN 20	MSN 10	MSN 20		



WNGA431	WNGA 080404	3N	12.7	4.76	0.4	5.16	2.2	MN 00644	MN 00499	MN 00645	MN 00339	MN 00340	MN 00341	MN 00772
WNGA342	WNGA 080408	3N	12.7	4.76	0.8	5.16	2.2	MN 00500	MN 00501	MN 00646	MN 00345	MN 00346	MN 00347	MN 00773
WNGA433	WNGA 080412	3N	12.7	4.76	1.2	5.16	2.2	MN 00801	MN 00802		MN 00803			

Items with order code MNXXXXX on stock



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