



WORLDIA
MN-D2012 EN

PCD Standard Inserts

1 universal PCD grade for all non-ferrous materials 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 PCD 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

Chip Control 05

A reliable chip - control solution to help
reducing stringy chipping - MANANOVA

PCD Insert 06

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

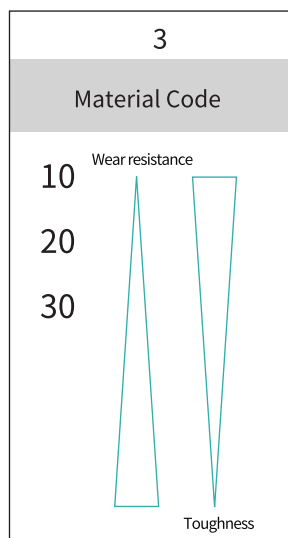
Key Definition - Material designation

Example

M	N	D	10
MANANOVA	1	2	3

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 CBN



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

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PCD Insert with chip-breaker

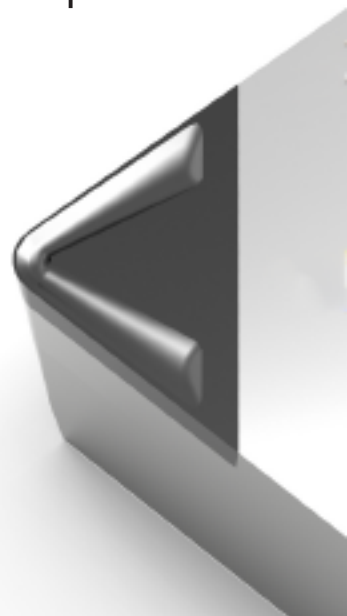
A reliable solution to control and avoid long chips



Material: A6061

Cutting conditions: $V_c=400\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.2\text{mm}$

Insert type: CCGW09T308



PCD Insert

CCGW

WORLDIA MANANOVA
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CC

80°Positive

7°Relief

Edge mark:

C - chipbreaker

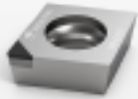
L - full length

F - full face

Application:

ISO N - Non-ferrous Metal

ISO O - Others

CCGW	Shape		Dimensions						Grade			
	ANSI Code	ISO Code	Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	CCGW 21.50.5	CCGW 060202	1N	6.35	2.38	0.2	2.8	2.5	MN 00005			
	CCGW 21.51	CCGW 060204	1N	6.35	2.38	0.4	2.8	2.5	MN 00007			
	CCGW 21.51.5	CCGW 060204	1N	6.35	2.38	0.5	2.8	2.5	MN 00660			
	CCGW21.52	CCGW 060208	1N	6.35	2.38	0.8	2.8	2.5	MN 00496			
	CCGW 32.50.5	CCGW 09T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00009			
	CCGW 32.51	CCGW 09T304	1N	9.525	3.97	0.4	4.4	2.5	MN 00010			
	CCGW 32.51 CBST44	CCGW 09T304 CBST44	1N	9.525	3.97	0.4	4.4	4.4	MN 00839			
	CCGW 32.52	CCGW 09T308	1N	9.525	3.97	0.8	4.4	2.5	MN 00011			
	CCGW 32.52 CBST44	CCGW 09T308 CBST44	1N	9.525	3.97	0.8	4.4	4.4	MN 00840			
	CCGW431	CCGW120404	1N	12.7	4.76	0.4	5.5	2.5	MN 00662			
	CCGW432	CCGW120408	1N	12.7	4.76	0.8	5.5	2.5	MN 00663			
	C - CCGW 21.50.5	C - CCGW 060202	1N	6.35	2.38	0.2	2.8	2.5	MN 00006			
	C - CCGW 32.51	C - CCGW 09T304	1N	9.525	3.97	0.4	4.4	2.5	MN 00075			
	F - CCGW 21.51	F - CCGW 060204	2N	6.35	2.38	0.4	2.8	6.4	MN 00008			

Items with order code MNXXXXX on stock

PCD Insert

CCGT

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CC

80°Positive

7°Relief

Edge mark:

C - chipbreaker

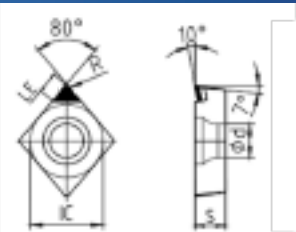
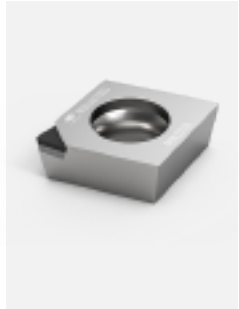
L - full length

F - full face

Application:

ISO N - Non-ferrous Metal

ISO O - Others

CCGT	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	CCGT 21.50.5	CCGT 060202	1N	6.35	2.38	0.2	2.8	2.5	MN 00012			
	CCGT 21.51	CCGT 060204	1N	6.35	2.38	0.4	2.8	2.5	MN 00013			
	CCGT 32.50.5	CCGT 09T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00014			
	CCGT 32.51	CCGT 09T304	1N	9.525	3.97	0.4	4.4	2.5	MN 00015			
	CCGT 32.52	CCGT 09T308	1N	9.525	3.97	0.8	4.4	2.5	MN 00016			

Items with order code MNXXXXX on stock

PCD Insert

DCGW-DCGT

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DC

55°Positive

7°Relief

Edge mark:

C - chipbreaker

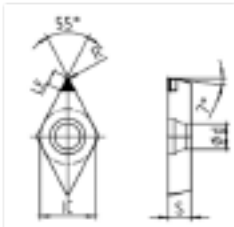
L - full length

F - full face

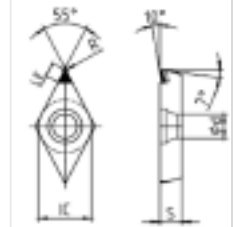
Application:

ISO N - Non-ferrous Metal

ISO O - Others

DCGW	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	DCGW 21.50.5	DCGW 070202	1N	6.35	2.38	0.2	2.8	2.5	MN 00017			
	DCGW 21.51	DCGW 070204	1N	6.35	2.38	0.4	2.8	2.5	MN 00018			
	DCGW 32.50.5	DCGW 11T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00019			
	DCGW 32.51	DCGW 11T304	1N	9.525	3.97	0.4	4.4	2.5	MN 00020			
	DCGW 32.52	DCGW 11T308	1N	9.525	3.97	0.8	4.4	2.5	MN 00021			

Items with order code MNXXXXX on stock

DCGT	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	DCGT 21.50.5	DCGT 070202	1N	6.35	2.38	0.2	2.8	2.5	MN 00022			
	DCGT 21.51	DCGT 070204	1N	6.35	2.38	0.4	2.8	2.5	MN 00023			
	DCGT 32.50.5	DCGT 11T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00024			
	DCGT 32.50.5	DCGT 11T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00543			
	DCGT 32.50.5	DCGT 11T302	1N	9.525	3.97	0.2	4.4	2.5	MN 00544			
	DCGT 32.51	DCGT 11T304	1N	9.525	3.97	0.4	4.4	2.5	MN 00025			
	DCGT 32.52	DCGT 11T308	1N	9.525	3.97	0.8	4.4	2.5	MN 00026			

Items with order code MNXXXXX on stock

PCD Insert

VCGW-VC GT

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VC

35°Positive

7°Relief

Edge mark:

C - chipbreaker

L - full length

F - full face

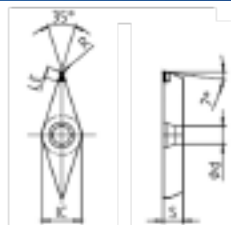
Application:

ISO N - Non-ferrous Metal

ISO O - Others

VCGW

Shape



ANSI Code

ISO Code

Dimensions

Grade

Tips

IC
mm

S
mm

R
mm

Φd
mm

LE
mm

MND
01

MND
10

MND
32

CVD

VCGW21.51

VCGW 110204

1N

6.35

2.38

0.4

2.8

2.5

MN
00512

VCGW 220.5

VCGW 110302

1N

6.35

3.18

0.2

2.8

2.5

MN
00027

VCGW 221

VCGW 110304

1N

6.35

3.18

0.4

2.8

2.5

MN
00028

VCGW 221

VCGW 110308

1N

6.35

3.18

0.8

2.8

2.5

MN
00666

VCGW 330.5

VCGW 160402

1N

9.525

4.76

0.2

4.4

2.5

MN
00029

VCGW 330.5 CBST44

VCGW 160402 CBST44

1N

9.525

4.76

0.2

4.4

4.4

MN
00836

VCGW 331

VCGW 160404

1N

9.525

4.76

0.4

4.4

2.5

MN
00030

VCGW 331 CBST44

VCGW 160404 CBST44

1N

9.525

4.76

0.4

4.4

4.4

MN
00837

VCGW 332

VCGW 160408

1N

9.525

4.76

0.8

4.4

2.5

MN
00031

VCGW 332

VCGW 160408

1N

9.525

4.76

0.8

4.4

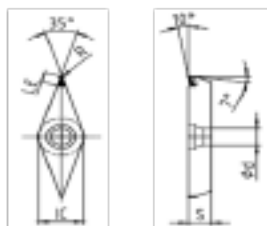
4.4

MN
00838

Items with order code MNXXXXX on stock

VC GT

Shape



ANSI Code

ISO Code

Dimensions

Grade

Tips

IC
mm

S
mm

R
mm

Φd
mm

LE
mm

MND
01

MND
10

MND
32

CVD

VC GT 220.5

VC GT 110302

1N

6.35

3.18

0.2

2.8

2.5

MN
00032

VC GT 221

VC GT 110304

1N

6.35

3.18

0.4

3.3

2.5

MN
00033

VC GT 330.5

VC GT 160402

1N

9.525

4.76

0.2

4.4

2.5

MN
00034

VC GT 331

VC GT 160404

1N

9.525

4.76

0.4

4.4

2.5

MN
00035

VC GT 332

VC GT 160408

1N

9.525

4.76

0.8

4.4

2.5

MN
00036

Items with order code MNXXXXX on stock

PCD Insert

VBGW-VBGT

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VB

35°Positive

5°Relief

Edge mark:

C - chipbreaker

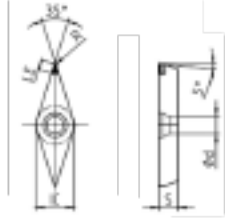
L - full length

F - full face

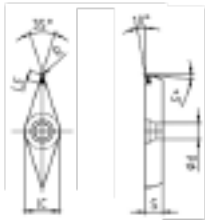
Application:

ISO N - Non-ferrous Metal

ISO O - Others

VBGW	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	VBGW 330.5	VBGW 160402	1N	9.525	4.76	0.2	4.4	2.5	MN 00037			
	VBGW 331	VBGW 160404	1N	9.525	4.76	0.4	4.4	2.5	MN 00038			
	VBGW 332	VBGW 160408	1N	9.525	4.76	0.8	4.4	2.5	MN 00039			

Items with order code MNXXXXX on stock

VBGT	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	VBGT221	VBGT 110304	1N	6.35	3.18	0.4	2.8	2.5	MN 00805			
	VBGT 330.5	VBGT 160402	1N	9.525	4.76	0.2	4.4	2.5	MN 00040			
	VBGT 331	VBGT 160404	1N	9.525	4.76	0.4	4.4	2.5	MN 00041			
	VBGT 332	VBGT 160408	1N	9.525	4.76	0.8	4.4	2.5	MN 00042			

Items with order code MNXXXXX on stock

PCD Insert

TCGW

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TC

60°Positive

7°Relief

Edge mark:

C - chipbreaker

L - full length

F - full face

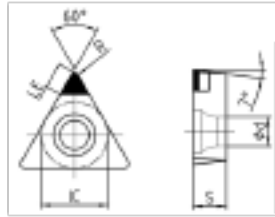
Application:

ISO N - Non-ferrous Metal

ISO O - Others

TCGW

Shape



Dimensions

Grade

ANSI Code

ISO Code

Tips

IC
mm

S
mm

R
mm

Φd
mm

LE
mm

MND
01

MND
10

MND
32

CVD

TCGW 1.81.50.5

TCGW 090202

1N

5.56

2.38

0.2

2.4

2.5

MN
00043

TCGW 1.81.51

TCGW 090204

1N

5.56

2.38

0.4

2.4

2.5

MN
00044

TCGW 220.5

TCGW 110302

1N

6.35

3.18

0.2

2.8

2.5

MN
00045

TCGW 221

TCGW 110304

1N

6.35

3.18

0.4

2.8

2.5

MN
00046

TCGW 222

TCGW 110308

1N

6.35

3.18

0.8

2.8

2.5

MN
00047

TCGW 32.51

TCGW 16T304

1N

9.525

3.97

0.4

4.4

2.5

MN
00077

TCGW 32.52

TCGW 16T308

1N

9.525

3.97

0.8

4.4

2.5

MN
00079

TCGW 32.51

TCGW 160404

1N

9.525

3.97

0.4

4.4

2.5

MN
00051

TCGW 32.52

TCGW 160408

1N

9.525

3.97

0.8

4.4

2.5

MN
00053

L-TCGW 32.50.5

L-TCGW 16T302

2N

9.525

3.97

0.2

4.4

16.2

MN
00076

L-TCGW 32.51

L-TCGW 16T304

2N

9.525

3.97

0.4

4.4

15.9

MN
00078

L-TCGW 32.52

L-TCGW 16T308

2N

9.525

3.97

0.8

4.4

15.3

MN
00080

F-TCGW 1.81.51

F-TCGW 090204

3N

5.56

2.38

0.4

2.4

9

MN
00057

Items with order code MNXXXXX on stock

PCD Insert

TCGT

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TC	60°Positive
	7°Relief

Edge mark:

C - chipbreaker

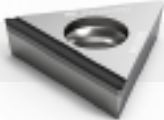
L - full length

F - full face

Application:

ISO N - Non-ferrous Metal

ISO O - Others

TCGT	Shape		Dimensions						Grade			
	ANSI Code	ISO Code	Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	TCGT 1.81.50.5	TCGT 090202	1N	5.56	2.38	0.2	2.4	2.5	MN 00055			
	TCGT 1.81.51	TCGT 090204	1N	5.56	2.38	0.4	2.4	2.5	MN 00056			
	TCGT 220.5	TCGT 110302	1N	6.35	3.18	0.2	2.8	2.5	MN 00058			
	TCGT 221	TCGT 110304	1N	6.35	3.18	0.4	2.8	2.5	MN 00059			
	TCGT 222	TCGT 110308	1N	6.35	3.18	0.8	2.8	2.5	MN 00060			
	L-TCGT 32.51	L-TCGT 16T304	2N	9.525	3.97	0.4	4.4	15.9	MN 00081			

Items with order code MNXXXXX on stock

PCD Insert

TPGW-TPGT

WORLDIA MANANOVA
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TP

60°Positive

11°Relief

Edge mark:

C - chipbreaker

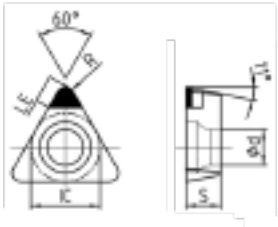
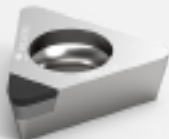
L - full length

F - full face

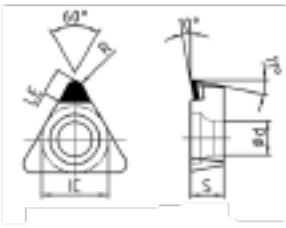
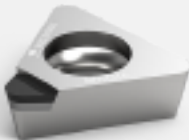
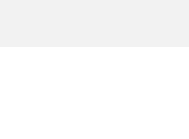
Application:

ISO N - Non-ferrous Metal

ISO O - Others

TPGW	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	TPGW 220.5	TPGW 110302	1N	6.35	3.18	0.2	3.3	2.5	MN 00064			
	TPGW 221	TPGW 110304	1N	6.35	3.18	0.4	3.3	2.5	MN 00065			
	TPGW 222	TPGW 110308	1N	6.35	3.18	0.8	3.3	2.5	MN 00066			
	TPGW 330.5	TPGW 160402	1N	9.525	4.76	0.2	4.4	2.5	MN 00067			
	TPGW 331	TPGW 160404	1N	9.525	4.76	0.4	4.4	2.5	MN 00068			
	F-TPGW 222	F-TPGW 110308	3N	9.525	3.18	0.8	3.3	15.3	MN 00048			

Items with order code MNXXXXX on stock

TPGT	Shape		Dimensions						Grade			
			Tips	IC mm	S mm	R mm	Φd mm	LE mm	MND 01	MND 10	MND 32	CVD
	ANSI Code	ISO Code										
	TPGT1.81.51	TPGT090204	1N	5.56	2.38	0.4	2.4	2.5	MN 00804			
	TPGT 22.50.5	TPGT 110302	1N	6.35	3.18	0.2	3.3	2.5	MN 00069			
	TPGT 22.51	TPGT 110304	1N	6.35	3.18	0.4	3.3	2.5	MN 00070			
	TPGT 22.52	TPGT 110308	1N	6.35	3.18	0.8	3.3	2.5	MN 00071			
	TPGT 330.5	TPGT 160402	1N	9.525	4.76	0.2	4.4	2.5	MN 00072			
	TPGT 331	TPGT 160404	1N	9.525	4.76	0.2	4.4	2.5	MN 00073			

Items with order code MNXXXXX on stock

The relationship between nose radius, feed rate and Ra.

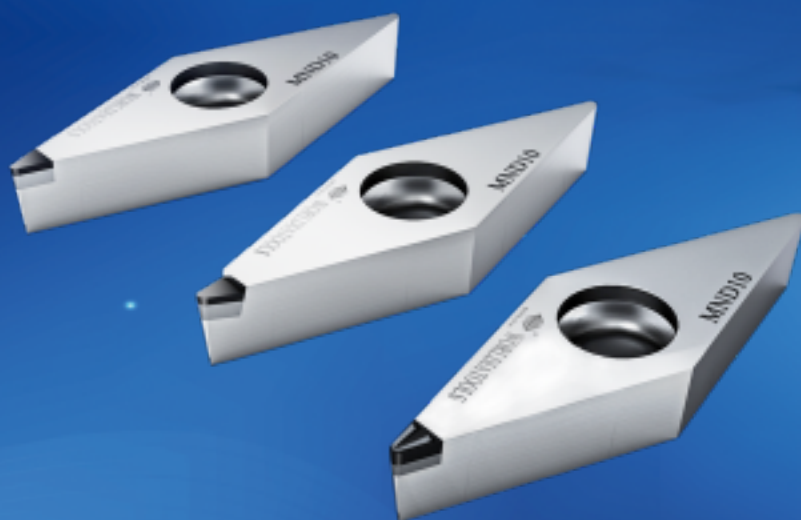
$$\therefore h = r\epsilon - (r\epsilon^2 - (0.5 \times f)^2)^{0.5} = \text{Scallop Height}$$

$$\therefore Ra = (0.25 \sim 0.33) h$$

$$\therefore f_{MAX} = (Ra \times r\epsilon / 50) \frac{1}{2}$$

Feed rate recommendation:

Nose radius (mm)	Ra μm					
	0.2	0.4	0.8	1.6	3.2	6.4
	Feed Rate f (mm/rev) $\leq$					
0.2	0.028	0.040	0.057	0.080	0.113	0.160
0.4	0.040	0.057	0.080	0.113	0.160	0.226
0.8	0.057	0.080	0.113	0.160	0.226	0.320
1.2	0.069	0.098	0.139	0.196	0.277	0.392
1.6	0.080	0.113	0.160	0.226	0.320	0.453
2.4	0.098	0.139	0.196	0.277	0.392	0.554



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Email: info@worldia-tools.eu

Office Address: Benzstraße, 38, 71083, Herrenberg Germany



www.worldia-tools.com