

**INNOVATIONS**  
**2022 | 01 | METRIC**

# KCS10B™

Turning Grade for  
High-Temperature Alloys



New High-PIMS PVD coating provides excellent surface qualities and excellent dimensional accuracy.

High depth-of-cut notching resistance.

New High-PIMS PVD coating reduces friction, providing longer tool life.

# INNOVATIONS

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# CAS — Customer Application Support

## Get Fast and Reliable Answers to Your Toughest Problems

Our CAS Team is the metalworking industry's leading help desk resource for tooling application solutions and problem resolution.

## Easy Access to Proven Metalworking Expertise!

Kennametal Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of Kennametal tooling.



Region	Originating Country	Language	CAS Hotline	Email
<b>North America</b>	<b>USA</b>	English	800 835 3668	na.techsupport@kennametal.com
	<b>Mexico</b>	Spanish	1800 253 0758	na.techsupport@kennametal.com
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	<b>Poland</b>	Polish	0080 04411887	eu.techsupport@kennametal.com
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	<b>Malaysia</b>	English	1800 812 990	ap-kmt.techsupport@kennametal.com
	<b>New Zealand</b>	English	0800 450 941	ap-kmt.techsupport@kennametal.com
	<b>Singapore</b>	English	1800 6221031	ap-kmt.techsupport@kennametal.com
	<b>Taiwan</b>	English	0800 666 197	ap-kmt.techsupport@kennametal.com
<b>Thailand</b>	English	1800 4417820	ap-kmt.techsupport@kennametal.com	

Numbers shown only serve the originating country listed.



## Service & Sales Centers Around the World

Region	Country	Sales Hotline	Email
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	<b>Mexico</b>	+1 888 402 4963	k-mx.service@kennametal.com
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<b>Thailand</b>	+66 2 642 3455	k-sg.sales@kennametal.com	

\*Vietnam and Philippines individuals should contact the Singapore office.

Visit [kennametal.com](http://kennametal.com) to find local Authorized Kennametal Distributors.



# Spare Parts & Accessories Information

Lost a screw? Have to replace worn-out clamping wedges?  
Need to find and re-order those spare parts?

Are you in need of some accessories, like a torque wrench or coolant shower plate? These tools are at your fingertips!  
Go to [kenametal.com](http://kenametal.com) and find what you need in seconds. Enter the catalog number of the corresponding tool, and it will display.

**1 STEP 1** Enter the tool catalog number here

**Mill 16™**  
Shell Mills  
**Features and Benefits**

- Productivity booster for machining cast iron materials.
- Insert with 16 cutting edges.

**SPECIFICATIONS**  
**Mill 16 • Shell Mills • Wedge Clamping**

Show 10 entries

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	lbs	max RPM
<a href="#">6001979 &gt;</a>	MILL16E200Z35ON08W	2.000	2.495	.750	2.000	2.000	.215	5	1.45	11100

**2 STEP 2** Select the spare parts & accessories

PRODUCT USAGE /

Insert Selection   Inserts   Tool Body   Speeds & Feeds   Grades   **Spare Parts**

**Spare Parts**

D1	wedge	wedge screw	in. lbs.	wrench	mounting screw with coolant grooves	adjustable torque wrench	bit SW3 for adjustable torque wrench
2.000	CW16	12748601000	62	12148044800	KLSS0714C	DTQ50140	BTQSW3L90



Digitally access spare parts and accessories information to ensure you keep your operation running.

Visit [kenametal.com/novo](http://kenametal.com/novo) and download today.  
It's Free!



# Online Catalog

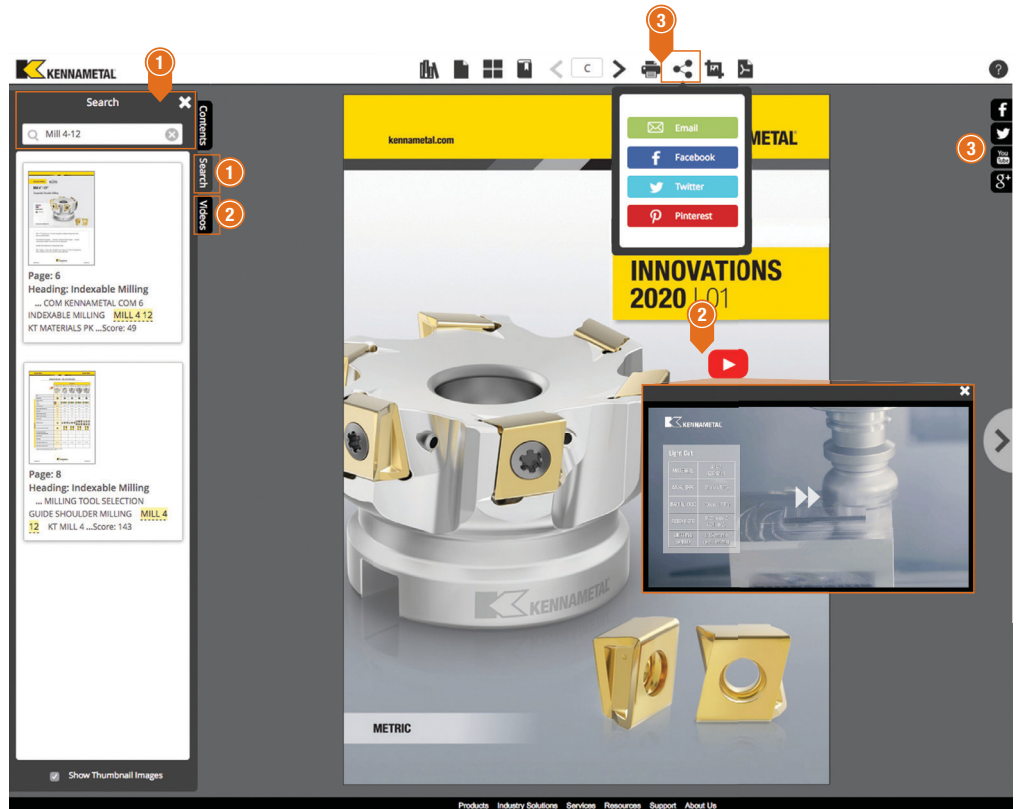
Can't find your paper copy of our catalog anymore?  
No worries. Go to [catalog.kennametal.com](http://catalog.kennametal.com) to see what's out there.

Search for what you need, watch a video, and share pages with others, all from one site! Go to [catalog.kennametal.com](http://catalog.kennametal.com), and if you want to check it out on your mobile device, just download the FREE app for iOS or Android™.

1 Search for what you need

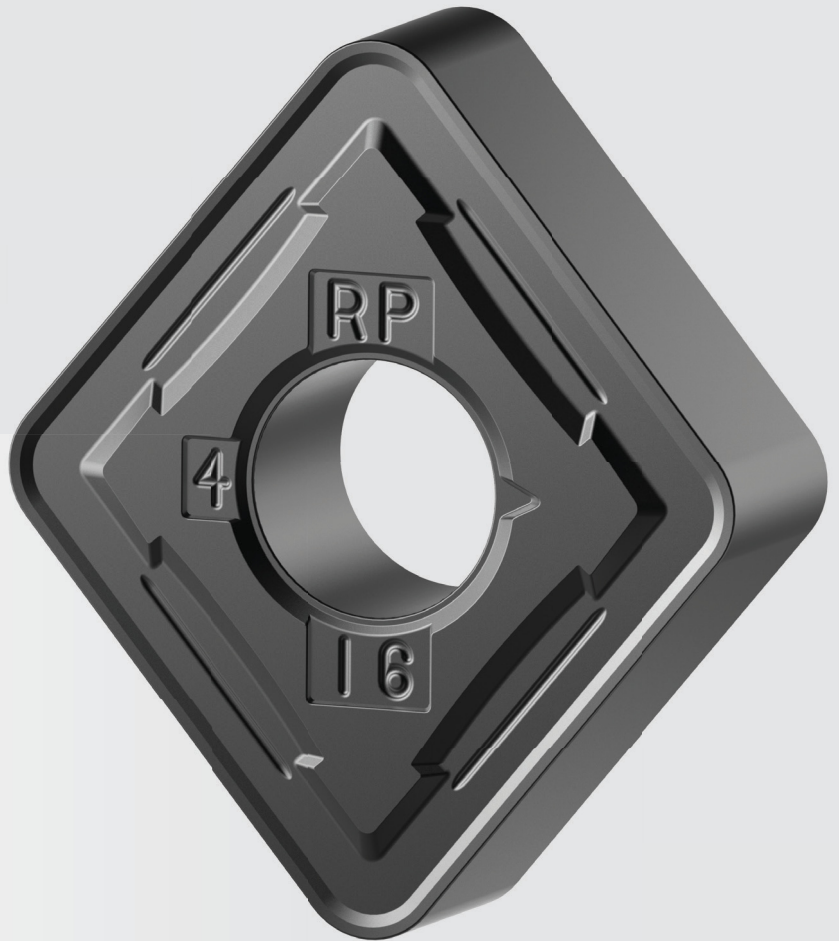
2 Watch videos

3 Share with others



Check out our new catalog app.  
Available in the Google Play™ Store or  
the App Store®



**KCS10B™**Turning Grade for  
High-Temperature Alloys**Materials****S****Applications**

Turning



Boring



Back Boring



Profiling



Facing



I.D. Facing



Chamfer Turning



Deep Grooving

[kenametal.com/KCS10B](http://kenametal.com/KCS10B)

The new KCS10B turning grade, featuring the new High-Power Impulse Magnetron Sputtering (High-PIMS).

The AlTiN PVD coating is ideal for iron-based alloys (S1), cobalt-based alloys (S2), and nickel-based alloys (S3).

The High-PIMS coating technology is characterized by:

- Smooth coating surface.
- Optimum layer adhesion, especially on sharp cutting edges.
- High depth-of-cut notching resistance.
- Long tool life and high process reliability.

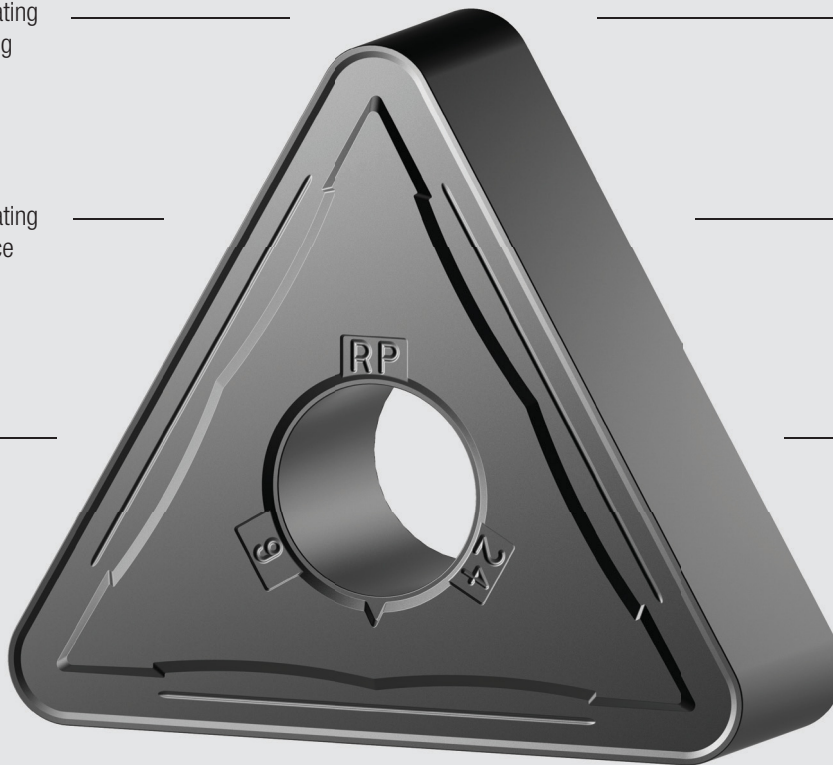
Applied on an extremely hard and wear-resistant, ultra fine-grain carbide substrate, the KCS10B grade is ideal for medium machining and finishing operations.



New High-PIMS PVD coating reduces friction, providing longer tool life.

New High-PIMS PVD coating provides excellent surface qualities and excellent dimensional accuracy.

Less built-up edge.

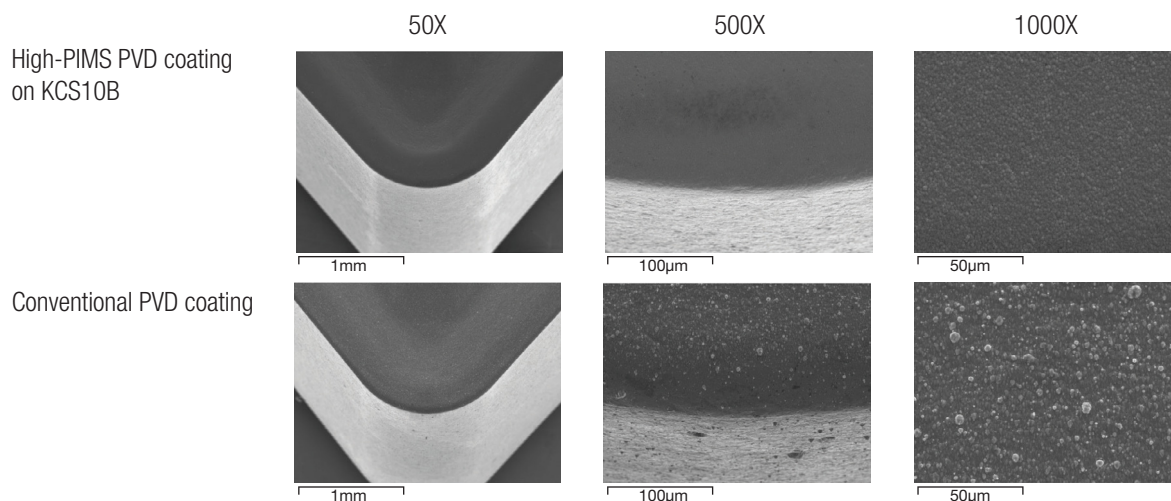


An extremely smooth coating surface reduces friction, providing longer tool life and increased process reliability.


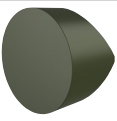


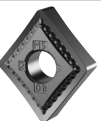













**NEW!**  
RP Geometry for roughing.

**NEW!**  
IC 19mm and 33mm inserts available now.

### The High-PIMS AlTiN PVD coating under the microscope.







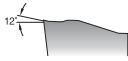


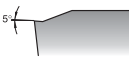








## HIGH-TEMPERATURE ALLOYS • TOOL SELECTION GUIDE

	Ceramic Inserts		Negative Inserts Geometry				
	NG	GV	RP	MP	MS	FP	FS
<b>Geometry</b>							
<b>Profile</b>							
<b>Edge Preparation</b>							
<i>T-Land</i>	✓						
<i>Honed</i>		✓	✓	✓		✓	
<i>Slightly Honed to Sharp</i>					✓		
<i>Sharp</i>							✓
<b>Application</b>							
<i>Roughing</i>	✓	✓	✓				
<i>Light Roughing</i>	✓	✓	✓	✓			
<i>Medium Machining</i>				✓	✓		
<i>Semi-Finishing</i>					✓	✓	✓
<i>Finishing</i>						✓	✓
<b>Cutting Condition</b>							
<i>Heavily Interrupted Cut</i>		•	•				
<i>Lightly Interrupted Cut</i>		•	•	•	•	○	○
<i>Varying Depth of Cut, Casting or Forging Skin</i>		•	•	•	•	•	•
<i>Smooth Cut, Pre-Turned Surface</i>		•	•		•	•	•

- Primary
- Secondary





HIGH-TEMPERATURE ALLOYS • TOOL SELECTION GUIDE

	Positive Inserts Geometry					
	MP	MP V-Bottom	MS	LF	FP	K-Lock FS
<b>Geometry</b>						
<b>Profile</b>						
<b>Edge Preparation</b>						
<i>T-Land</i>						
<i>Honed</i>	✓	✓				
<i>Slightly Honed to Sharp</i>			✓	✓	✓	
<i>Sharp</i>						✓
<b>Application</b>						
<i>Roughing</i>						
<i>Light Roughing</i>	✓	✓				
<i>Medium Machining</i>	✓	✓				
<i>Semi-Finishing</i>			✓	✓	✓	✓
<i>Finishing</i>			✓	✓	✓	✓
<b>Cutting Condition</b>						
<i>Heavily Interrupted Cut</i> 						
<i>Lightly Interrupted Cut</i> 	●	●	○	○	○	
<i>Varying Depth of Cut, Casting or Forging Skin</i> 	●	●	●	●	●	●
<i>Smooth Cut, Pre-Turned Surface</i> 	●	●	●	●	●	●





- Primary
- Secondary

**HIGH-TEMPERATURE ALLOYS • APPLICATION DATA • FEED**

**Insert with positive rake angle**

Conditions	Geometry				
	FS	FP	LF	MS	MP
Heavily Interrupted Cut 					
Lightly Interrupted Cut 		○	○	●	●
Varying Depth of Cut 	●	●	●	●	●
Smooth Cut 	●	●	●	●	●
<b>Min. - Max.</b>	<b>FS</b>	<b>FP</b>	<b>LF</b>	<b>MS</b>	<b>MP</b>
Depth of Cut - ap (mm)	0,1-5	0,1-2,5	0,1-2,5	0,5-5	0,4-5
Feed - fn (mm/rev)	0,04-0,4	0,05-0,3	0,06-0,4	0,15-0,8	0,1-0,6

**Insert with negative rake angle**

Conditions	Geometry				
	FS	FP	MS	MP	RP
Heavily Interrupted Cut 					○
Lightly Interrupted Cut 		○	○	●	●
Varying Depth of Cut 	●	●	●	●	●
Smooth Cut 	●	●	●	●	●
<b>Min. - Max.</b>	<b>FS</b>	<b>FP</b>	<b>MS</b>	<b>MP</b>	<b>RP</b>
Depth of Cut - ap (mm)	0,1-2,5	0,2-3,5	0,3-5,5	0,6-6	1-13
Feed - fn (mm/rev)	0,04-0,25	0,08-0,35	0,08-0,45	0,12-0,6	0,2-0,9

**HIGH-TEMPERATURE ALLOYS • APPLICATION DATA • SPEED**

Iron-Based, Heat-Resistant Alloys (135–320 HB) (<34 HRC)

Speed – m/min

Starting Conditions 

material group	grade	15	45	75	105	140	170	200	230	m/min
S1	KCS10B									80

Cobalt-Based, Heat-Resistant Alloys (150–425 HB) (<45 HRC)

Speed – m/min

Starting Conditions 

material group	grade	15	45	75	105	140	170	200	230	m/min
S2	KCS10B									50

Nickel-Based, Heat-Resistant Alloys (140–475 HB) (<48 HRC)

Speed – m/min

Starting Conditions 

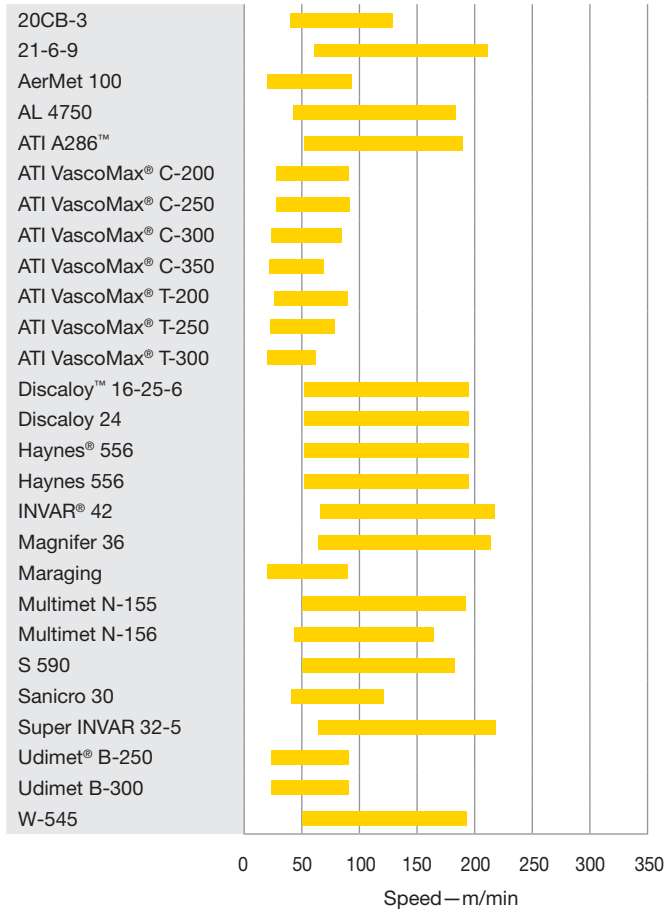
material group	grade	15	45	75	105	140	170	200	230	m/min
S3	KCS10B									70



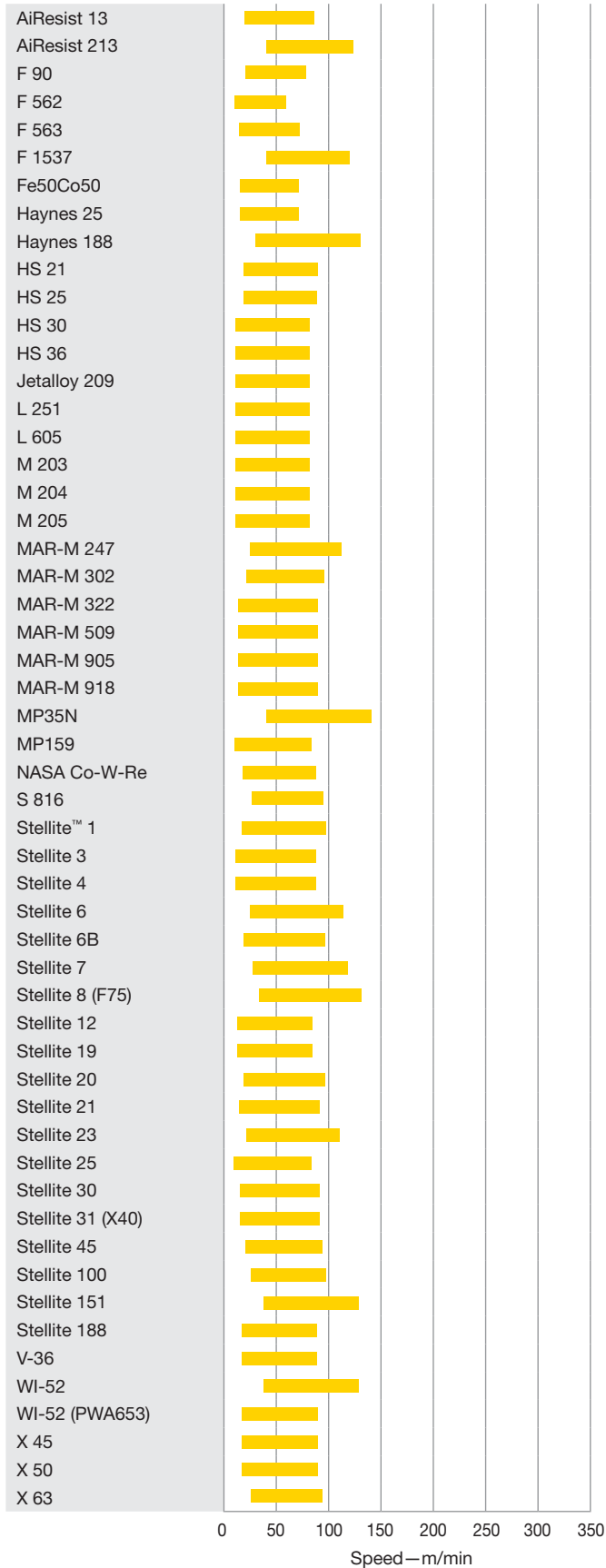
### HIGH-TEMPERATURE ALLOYS • APPLICATION DATA

**S1** Iron-Based, Heat-Resistant Alloys (135–320 HB) (≤34 HRC)

The most common HRSA alloys



**S2** Cobalt-Based, Heat-Resistant Alloys (150–425 HB) (≤45 HRC)

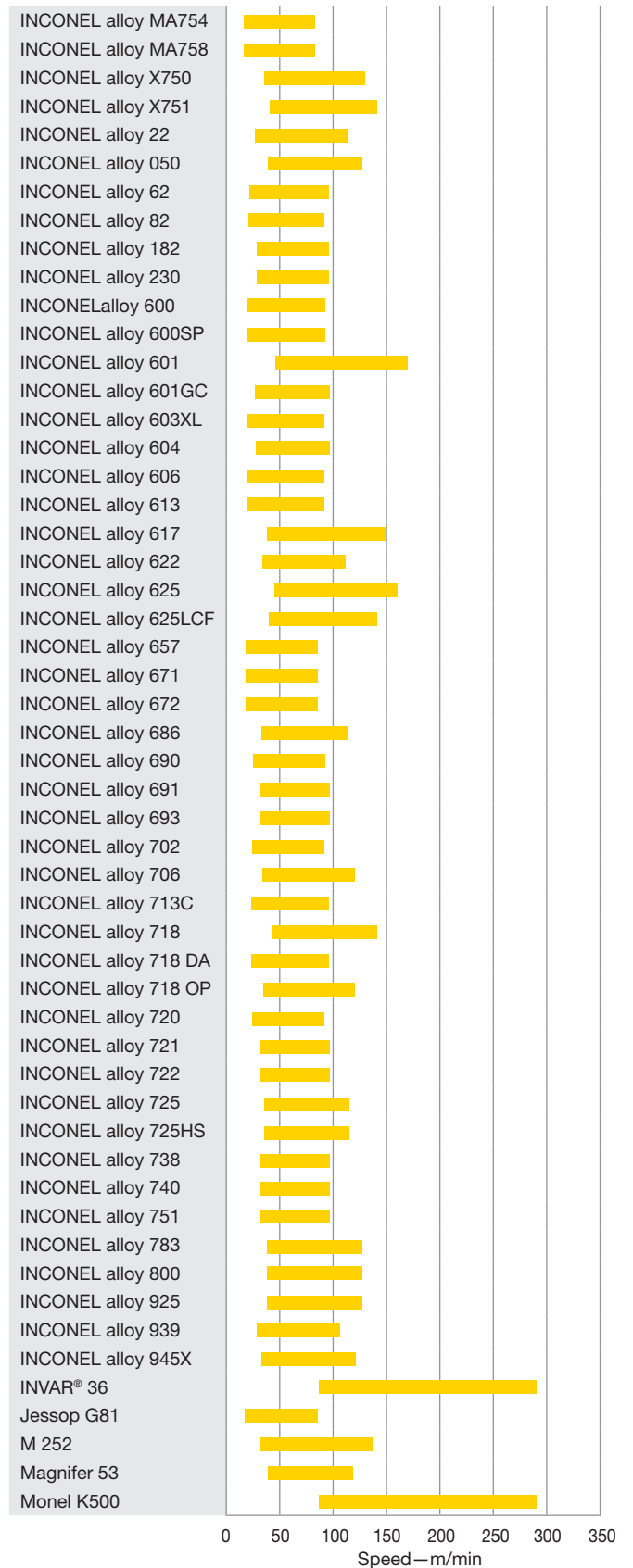
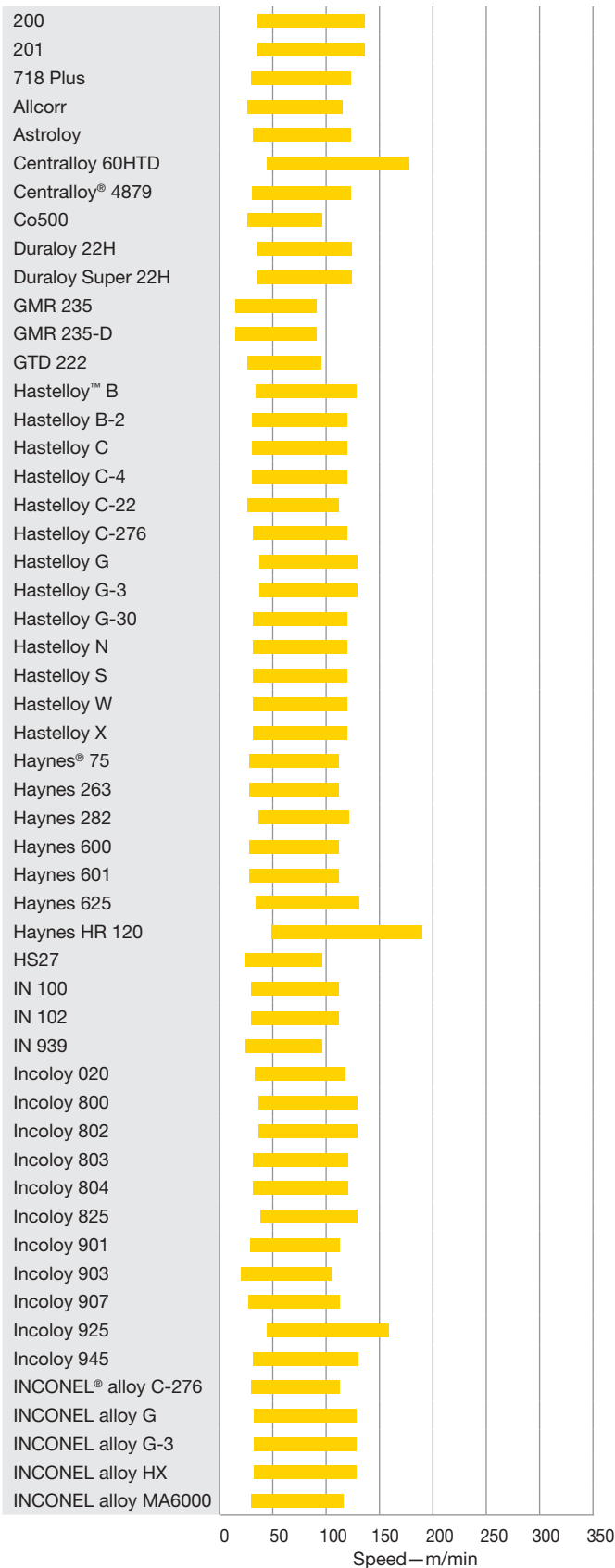


### HIGH-TEMPERATURE ALLOYS • APPLICATION DATA

(continued)

**S3** Nickel-Based, Heat-Resistant Alloys (140–475 HB) (≤48 HRC)

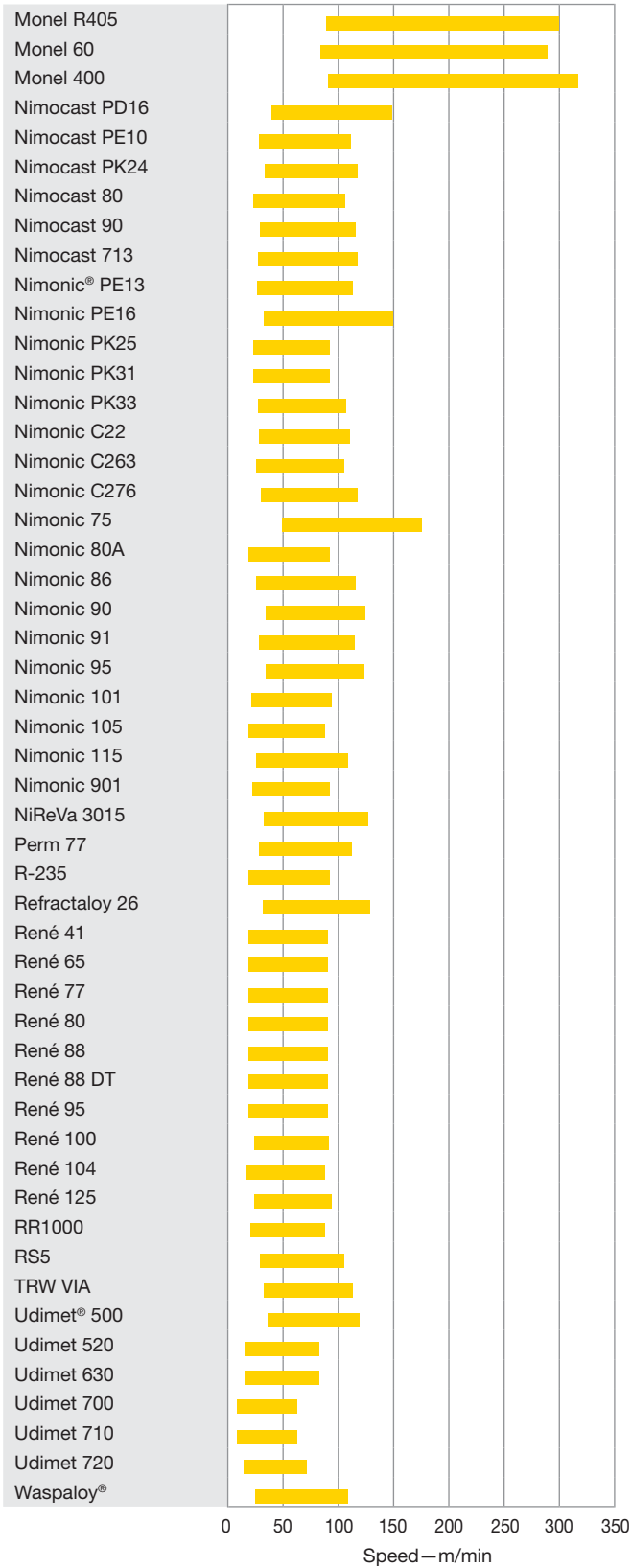
**S3** Nickel-Based, Heat-Resistant Alloys (140–475 HB) (≤48 HRC)



HIGH-TEMPERATURE ALLOYS • APPLICATION DATA

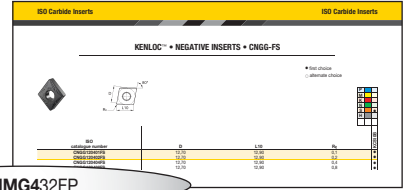
(continued)

**S3** Nickel-Based, Heat-Resistant Alloys (140–475 HB) (≤48 HRC)



## ISO INSERTS • CATALOG NUMBERING SYSTEM

Each character in our catalog number signifies a specific trait of that product.  
Use the following key columns and corresponding images to easily identify which attributes apply.



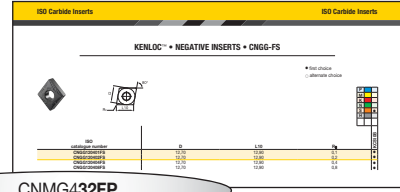
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C		N		M		G		4																																																																																																																																																																																																																															
Insert Shape		Insert Clearance Angle		Tolerance Class		Insert Features		Size																																																																																																																																																																																																																															
<b>H</b>	Hexagon 120°	<b>A</b>	3°	<p>Tolerances apply prior to edge prep and coating.</p> <p><b>D</b> = Theoretical diameter of the insert inscribed circle <b>S</b> = Thickness <b>B</b> = See figures below</p>	<b>N</b>	<p>Code for metric cutting edge length "L10"</p> <table border="1"> <thead> <tr> <th rowspan="2">"D"</th> <th colspan="7">Code for metric cutting edge length "L10"</th> </tr> <tr> <th>mm</th> <th>C</th> <th>D</th> <th>R</th> <th>S</th> <th>T</th> <th>V</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>3,97</td> <td>S4</td> <td>04</td> <td>03</td> <td>03</td> <td>06</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>4,76</td> <td>04</td> <td>05</td> <td>04</td> <td>04</td> <td>08</td> <td>08</td> <td>S3</td> <td>—</td> </tr> <tr> <td>5,56</td> <td>05</td> <td>06</td> <td>05</td> <td>05</td> <td>09</td> <td>09</td> <td>03</td> <td>—</td> </tr> <tr> <td>6,00</td> <td>—</td> <td>—</td> <td>06</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>6,35</td> <td>06</td> <td>07</td> <td>06</td> <td>06</td> <td>11</td> <td>11</td> <td>04</td> <td>—</td> </tr> <tr> <td>7,94</td> <td>08</td> <td>09</td> <td>07</td> <td>07</td> <td>13</td> <td>13</td> <td>05</td> <td>—</td> </tr> <tr> <td>8,00</td> <td>—</td> <td>—</td> <td>08</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>9,52</td> <td>09</td> <td>11</td> <td>09</td> <td>09</td> <td>16</td> <td>16</td> <td>06</td> <td>—</td> </tr> <tr> <td>10,00</td> <td>—</td> <td>—</td> <td>10</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>11,11</td> <td>11</td> <td>13</td> <td>11</td> <td>11</td> <td>19</td> <td>19</td> <td>07</td> <td>—</td> </tr> <tr> <td>12,00</td> <td>—</td> <td>—</td> <td>12</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>12,70</td> <td>12</td> <td>15</td> <td>12</td> <td>12</td> <td>22</td> <td>22</td> <td>08</td> <td>—</td> </tr> <tr> <td>14,29</td> <td>14</td> <td>17</td> <td>14</td> <td>14</td> <td>24</td> <td>24</td> <td>09</td> <td>—</td> </tr> <tr> <td>15,88</td> <td>16</td> <td>19</td> <td>15</td> <td>15</td> <td>27</td> <td>27</td> <td>10</td> <td>—</td> </tr> <tr> <td>16,00</td> <td>—</td> <td>—</td> <td>16</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>17,46</td> <td>17</td> <td>21</td> <td>17</td> <td>17</td> <td>30</td> <td>30</td> <td>11</td> <td>—</td> </tr> <tr> <td>19,05</td> <td>19</td> <td>23</td> <td>19</td> <td>19</td> <td>33</td> <td>33</td> <td>13</td> <td>—</td> </tr> <tr> <td>20,00</td> <td>—</td> <td>—</td> <td>20</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>22,22</td> <td>22</td> <td>27</td> <td>22</td> <td>22</td> <td>38</td> <td>38</td> <td>15</td> <td>—</td> </tr> <tr> <td>25,00</td> <td>—</td> <td>—</td> <td>25</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>25,40</td> <td>25</td> <td>31</td> <td>25</td> <td>25</td> <td>44</td> <td>44</td> <td>17</td> <td>—</td> </tr> <tr> <td>31,75</td> <td>32</td> <td>38</td> <td>31</td> <td>31</td> <td>54</td> <td>54</td> <td>21</td> <td>—</td> </tr> <tr> <td>32,00</td> <td>—</td> <td>—</td> <td>32</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	"D"	Code for metric cutting edge length "L10"							mm	C	D	R	S	T	V	W	3,97	S4	04	03	03	06	—	—	—	4,76	04	05	04	04	08	08	S3	—	5,56	05	06	05	05	09	09	03	—	6,00	—	—	06	—	—	—	—	—	6,35	06	07	06	06	11	11	04	—	7,94	08	09	07	07	13	13	05	—	8,00	—	—	08	—	—	—	—	—	9,52	09	11	09	09	16	16	06	—	10,00	—	—	10	—	—	—	—	—	11,11	11	13	11	11	19	19	07	—	12,00	—	—	12	—	—	—	—	—	12,70	12	15	12	12	22	22	08	—	14,29	14	17	14	14	24	24	09	—	15,88	16	19	15	15	27	27	10	—	16,00	—	—	16	—	—	—	—	—	17,46	17	21	17	17	30	30	11	—	19,05	19	23	19	19	33	33	13	—	20,00	—	—	20	—	—	—	—	—	22,22	22	27	22	22	38	38	15	—	25,00	—	—	25	—	—	—	—	—	25,40	25	31	25	25	44	44	17	—	31,75	32	38	31	31	54	54	21	—	32,00	—	—	32	—	—	—	—	—	<b>R</b>	Round—
"D"	Code for metric cutting edge length "L10"																																																																																																																																																																																																																																						
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<b>S</b>	Square 90°	<b>D</b>	15°	<b>G</b>	30°	<b>W</b>	Trigon 80° with enlarged corner angles																																																																																																																																																																																																																																
<b>T</b>	Triangular 60°	<b>E</b>	20°	<b>H</b>	Special Design	<b>X</b>																																																																																																																																																																																																																																	
<b>C</b>	Rhomboid 80°	<b>F</b>	25°	<b>C</b>																																																																																																																																																																																																																																			
<b>D</b>	55°	<b>G</b>	30°	<b>J</b>																																																																																																																																																																																																																																			
<b>E</b>	75°	<b>N</b>	0°	<b>S</b>																																																																																																																																																																																																																																			
<b>M</b>	86°	<b>P</b>	11°																																																																																																																																																																																																																																				
<b>V</b>	35°	<b>O</b>	Indicated for other clearance angles requiring descriptions.																																																																																																																																																																																																																																				
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<b>L</b>	Rectangular 90°																																																																																																																																																																																																																																						
<b>A</b>	Parallelogram 85°																																																																																																																																																																																																																																						
<b>B</b>	82°																																																																																																																																																																																																																																						
<b>N/K</b>	55°																																																																																																																																																																																																																																						



ISO INSERTS • CATALOG NUMBERING SYSTEM

(continued)



CNMG432FP

**3**

Thickness  
S

symbol	thickness
mm	mm
—	0,79
T0	1,00
01	1,59
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
9	9,52
11	11,11
12	12,70

**2**

Corner  
Radius "Rε"

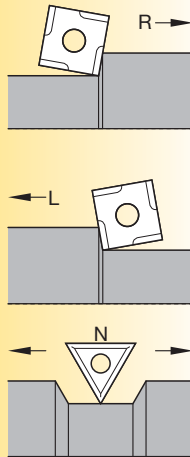
symbol	corner radius
mm	mm
X0	0,04
01	0,1
02	0,2
04	0,4
08	0,8
12	1,2
16	1,6
20	2,0
24	2,4
28	2,8
32	3,2
00	round insert
M0	
—	

Hand of Insert  
(optional)

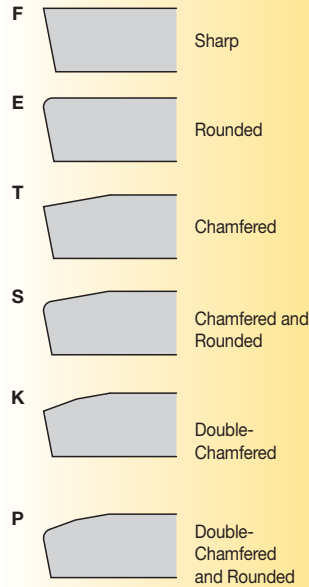
R = Right hand

L = Left hand

N = Neutral



Cutting Edge  
(optional)



**FP**

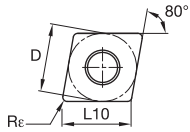
Chipbreaker  
(optional)

- F = Sharp
- FF = Fine Finishing
- FN = Finishing Negative
- MN = Medium Negative
- MR = Medium Roughing
- RN = Roughing Negative
- UN = Universal Medium
- FP = Finishing Positive
- MP = Medium Positive
- RP = Roughing Positive
- RM = Roughing Medium
- RH = Roughing Heavy
- FW = Finishing Wiper
- MW = Medium Wiper
- FS = Finishing Sharp
- MS = Medium Sharp
- RW = Roughing Wiper
- HP = High Positive
- UP = Universal Positive
- K = Light-Feed Chip Control
- UF = Ultra-Fine Finishing
- LF = Light Finishing
- MF = Medium Finishing
- E = Hone Only
- T = Negative Land
- S = Negative Land Plus Hone
- MP-K = Medium Positive
- MG-P = Medium Positive

"D"	± Tolerance on "D"				"D"	± Tolerance on "B"			
	Class M Tolerance		Class U Tolerance			Class M Tolerance		Class U Tolerance	
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C		Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
mm	mm	mm	mm	mm	mm	mm	mm	mm	
3,97	0,05	—	—	—	3,97	0,08	—	—	—
4,76	0,05	—	—	0,08	4,76	0,08	—	—	0,13
5,56	0,05	0,05	0,05	0,08	5,56	0,08	0,11	—	0,13
6,35	0,05	0,05	0,05	0,08	6,35	0,08	0,11	—	0,13
7,94	0,05	0,05	0,05	0,08	7,94	0,08	0,11	—	0,13
9,52	0,05	0,05	0,05	0,08	9,52	0,08	0,11	0,18	0,13
11,11	0,08	0,08	0,08	0,13	11,11	0,13	0,15	—	—
12,70	0,08	0,08	0,08	0,13	12,70	0,13	0,15	0,25	0,20
14,29	0,08	0,08	0,08	0,13	14,29	0,13	0,15	—	—
15,88	0,10	0,10	0,10	0,18	15,88	0,15	0,18	—	0,27
17,46	0,10	0,10	0,10	0,18	17,46	0,15	0,18	—	0,27
19,05	0,10	0,10	0,10	0,18	19,05	0,15	0,18	—	0,27
22,22	0,13	—	—	0,25	22,22	0,15	—	—	0,38
25,40	0,13	—	—	0,25	25,40	0,18	—	—	0,38
31,75	0,15	—	—	0,25	31,75	0,20	—	—	0,38

**KENLOC™ • NEGATIVE INSERTS • CNGG-FS**

- first choice
- alternate choice

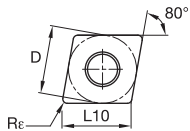


P	■
M	■
K	■
N	■
S	■
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CNGG120401FS	12,70	12,90	0,1	●
CNGG120402FS	12,70	12,90	0,2	●
CNGG120404FS	12,70	12,90	0,4	●
CNGG120408FS	12,70	12,90	0,8	●

**KENLOC • NEGATIVE INSERTS • CNMG-FP**

- first choice
- alternate choice

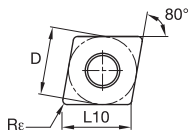
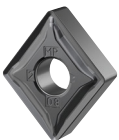


P	■
M	■
K	■
N	■
S	■
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CNMG120404FP	12,70	12,90	0,4	●
CNMG120408FP	12,70	12,90	0,8	●
CNMG120412FP	12,70	12,90	1,2	●





**KENLOC • NEGATIVE INSERTS • CNMG-MP**

- first choice
- alternate choice

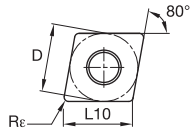
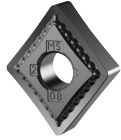


P	■
M	■
K	■
N	■
S	■
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CNMG120404MP	12,70	12,90	0,4	●
CNMG120408MP	12,70	12,90	0,8	●
CNMG120412MP	12,70	12,90	1,2	●
CNMG120416MP	12,70	12,90	1,6	●
CNMG160612MP	15,88	16,12	1,2	●
CNMG160616MP	15,88	16,12	1,6	●

			
44	45	14-15	48

**KENLOC™ • NEGATIVE INSERTS • CNMG-MS**

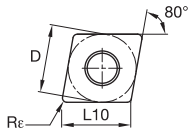


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
CNMG120404MS	12,70	12,90	0,4	●
CNMG120408MS	12,70	12,90	0,8	●
CNMG120412MS	12,70	12,90	1,2	●

**KENLOC • NEGATIVE INSERTS • CNMG-RP**

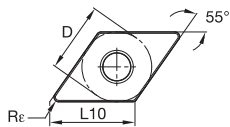


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
CNMG120408RP	12,70	12,90	0,8	●
CNMG120412RP	12,70	12,90	1,2	●
CNMG120416RP	12,70	12,90	1,6	●
CNMG160608RP	15,88	16,12	0,8	●
CNMG160612RP	15,88	16,12	1,2	●
CNMG160616RP	15,88	16,12	1,6	●
CNMG190612RP	19,05	19,34	1,2	●
CNMG190616RP	19,05	19,34	1,6	●

**KENLOC • NEGATIVE INSERTS • DNGG-FS**



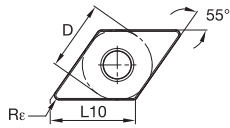
- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
DNGG150401FS	12,70	15,50	0,1	●
DNGG150601FS	12,70	15,50	0,1	●
DNGG150402FS	12,70	15,50	0,2	●
DNGG150602FS	12,70	15,50	0,2	●
DNGG150404FS	12,70	15,50	0,4	●
DNGG150604FS	12,70	15,50	0,4	●
DNGG150408FS	12,70	15,50	0,8	●
DNGG150608FS	12,70	15,50	0,8	●



**KENLOC™ • NEGATIVE INSERTS • DNMG-FP**

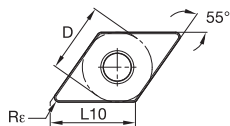


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DNMG110404FP	9,53	11,63	0,4	●
DNMG110408FP	9,53	11,63	0,8	●
DNMG150404FP	12,70	15,50	0,4	●
DNMG150604FP	12,70	15,50	0,4	●
DNMG150408FP	12,70	15,50	0,8	●
DNMG150608FP	12,70	15,50	0,8	●
DNMG150412FP	12,70	15,50	1,2	●
DNMG150612FP	12,70	15,50	1,2	●

**KENLOC • NEGATIVE INSERTS • DNMG-MP**

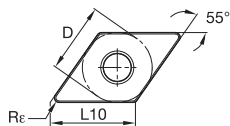
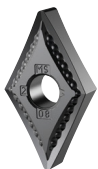


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DNMG150404MP	12,70	15,50	0,4	●
DNMG150604MP	12,70	15,50	0,4	●
DNMG150408MP	12,70	15,50	0,8	●
DNMG150608MP	12,70	15,50	0,8	●
DNMG150412MP	12,70	15,50	1,2	●
DNMG150612MP	12,70	15,50	1,2	●

**KENLOC • NEGATIVE INSERTS • DNMG-MS**



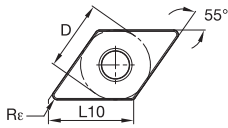
- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DNMG150404MS	12,70	15,50	0,4	●
DNMG150604MS	12,70	15,50	0,4	●
DNMG150408MS	12,70	15,50	0,8	●
DNMG150608MS	12,70	15,50	0,8	●
DNMG150412MS	12,70	15,50	1,2	●
DNMG150612MS	12,70	15,50	1,2	●



**KENLOC™ • NEGATIVE INSERTS • DNMG-RP**

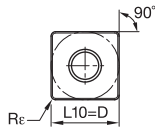
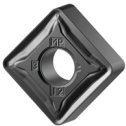


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■
	■	■

ISO catalogue number	D	L10	Rr	
DNMG150408RP	12,70	15,50	0,8	●
DNMG150608RP	12,70	15,50	0,8	●
DNMG150412RP	12,70	15,50	1,2	●
DNMG150612RP	12,70	15,50	1,2	●

**KENLOC • NEGATIVE INSERTS • SNMG-MP**

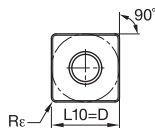


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■
	■	■

ISO catalogue number	D	L10	Rr	
SNMG120408MP	12,70	12,70	0,8	●
SNMG120412MP	12,70	12,70	1,2	●
SNMG150608MP	15,88	15,88	0,8	●
SNMG150612MP	15,88	15,88	1,2	●

**KENLOC • NEGATIVE INSERTS • SNMG-RP**



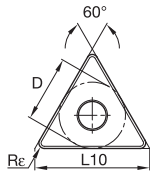
- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■
	■	■

ISO catalogue number	D	L10	Rr	
SNMG120408RP	12,70	12,70	0,8	●
SNMG120412RP	12,70	12,70	1,2	●
SNMG190612RP	19,05	19,05	1,2	●
SNMG190616RP	19,05	19,05	1,6	●

44	45	14-15	48

**KENLOC™ • NEGATIVE INSERTS • TNMG-RP**



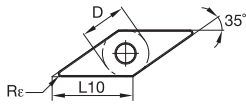
- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	■ ●
H	■

KCS10B

ISO catalogue number	D	L10	Re	
TNMG270616RP	15,88	27,50	1,6	●
TNMG330924RP	19,05	33,00	2,4	●

**KENLOC • NEGATIVE INSERTS • VNGG-FS**



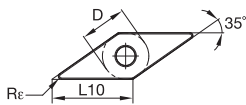
- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	■ ●
H	■

KCS10B

ISO catalogue number	D	L10	Re	
VNGG160401FS	9,53	16,61	0,1	●
VNGG160402FS	9,53	16,61	0,2	●
VNGG160404FS	9,53	16,61	0,4	●
VNGG160408FS	9,53	16,61	0,8	●

**KENLOC • NEGATIVE INSERTS • VNMG-FP**

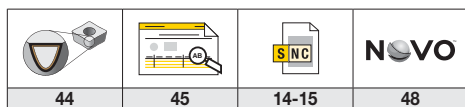


- first choice
- alternate choice

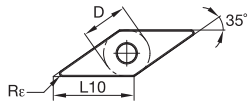
P	■
M	■
K	■
N	■
S	■ ●
H	■

KCS10B

ISO catalogue number	D	L10	Re	
VNMG160404FP	9,53	16,61	0,4	●
VNMG160408FP	9,53	16,61	0,8	●



**KENLOC™ • NEGATIVE INSERTS • VNMG-MP**

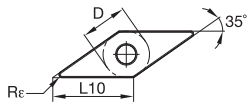


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	Rε	KCS10B
VNMG160404MP	9,53	16,61	0,4	●
VNMG160408MP	9,53	16,61	0,8	●
VNMG160412MP	9,53	16,61	1,2	●

**KENLOC • NEGATIVE INSERTS • VNMG-MS**

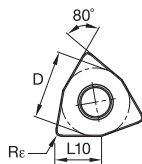


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	Rε	KCS10B
VNMG160402MS	9,53	16,61	0,2	●
VNMG160404MS	9,53	16,61	0,4	●
VNMG160408MS	9,53	16,61	0,8	●
VNMG220404MS	12,70	22,14	0,4	●
VNMG220408MS	12,70	22,14	0,8	●

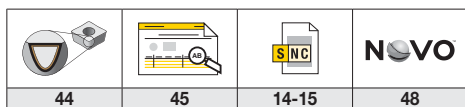
**KENLOC • NEGATIVE INSERTS • WNMG-RP**



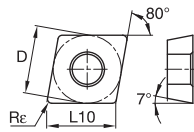
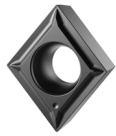
- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	Rε	KCS10B
WNMG080408RP	12,70	8,69	0,8	●
WNMG080412RP	12,70	8,69	1,2	●



SCREW-ON • POSITIVE INSERTS • CCGT-LF

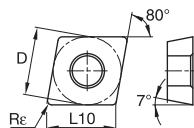


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CCGT060202LF	6,35	6,45	0,2	●
CCGT060204LF	6,35	6,45	0,4	●
CCGT060208LF	6,35	6,45	0,8	●
CCGT09T302LF	9,53	9,67	0,2	●
CCGT09T304LF	9,53	9,67	0,4	●
CCGT09T308LF	9,53	9,67	0,8	●

SCREW-ON • POSITIVE INSERTS • CCMT-MP

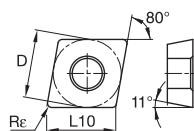


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CCMT060204MP	6,35	6,45	0,4	●
CCMT060208MP	6,35	6,45	0,8	●
CCMT09T304MP	9,53	9,67	0,4	●
CCMT09T308MP	9,53	9,67	0,8	●
CCMT120404MP	12,70	12,90	0,4	●
CCMT120408MP	12,70	12,90	0,8	●

SCREW-ON • POSITIVE INSERTS • CPGT-LF



- first choice
- alternate choice

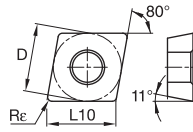
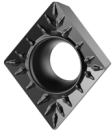
P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Rε	KCS10B
CPGT060202LF	6,35	6,45	0,2	●
CPGT060204LF	6,35	6,45	0,4	●
CPGT060208LF	6,35	6,45	0,8	●
CPGT09T302LF	9,53	9,67	0,2	●
CPGT09T304LF	9,53	9,67	0,4	●
CPGT09T308LF	9,53	9,67	0,8	●





SCREW-ON • POSITIVE INSERTS • CPMT-MP

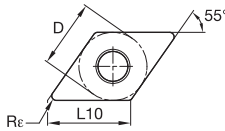


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	■ ●
H	■

ISO catalogue number	D	L10	Re	KCS10B
CPMT060204MP	6,35	6,45	0,4	●
CPMT060208MP	6,35	6,45	0,8	●
CPMT09T304MP	9,53	9,67	0,4	●
CPMT09T308MP	9,53	9,67	0,8	●

SCREW-ON • POSITIVE INSERTS • DCGT-LF

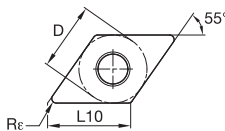


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	■ ●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DCGT070202LF	6,35	7,75	0,2	●
DCGT070204LF	6,35	7,75	0,4	●
DCGT070208LF	6,35	7,75	0,8	●
DCGT11T302LF	9,53	11,63	0,2	●
DCGT11T304LF	9,53	11,63	0,4	●
DCGT11T308LF	9,53	11,63	0,8	●





SCREW-ON • POSITIVE INSERTS • DCMT-MP



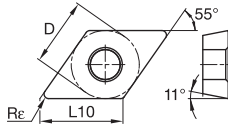
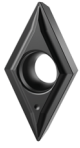
- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	■ ●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DCMT11T304MP	9,53	11,63	0,4	●
DCMT11T308MP	9,53	11,63	0,8	●
DCMT11T312MP	9,53	11,63	1,2	●

			
44	45	14-15	48

SCREW-ON • POSITIVE INSERTS • DPGT-LF

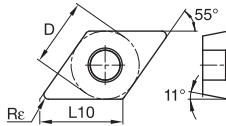


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DPGT070202LF	6,35	7,75	0,2	●
DPGT070204LF	6,35	7,75	0,4	●
DPGT070208LF	6,35	7,75	0,8	●
DPGT11T302LF	9,53	11,63	0,2	●
DPGT11T304LF	9,53	11,63	0,4	●
DPGT11T308LF	9,53	11,63	0,8	●

SCREW-ON • POSITIVE INSERTS • DPMT-MP

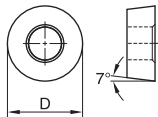


- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
DPMT11T304MP	9,53	11,63	0,4	●
DPMT11T308MP	9,53	11,63	0,8	●
DPMT11T312MP	9,53	11,63	1,2	●

SCREW-ON • POSITIVE INSERTS • RCGT-MS



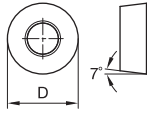
- first choice
- alternate choice

P	■
M	■
K	■
N	■
S	●
H	■

ISO catalogue number	D	L10	Re	KCS10B
RCGT0803M0MS	8,00	—	—	●
RCGT1204M0MS	12,00	—	—	●

44	45	14-15	48

**SCREW-ON • POSITIVE INSERTS • RCMT-MP**

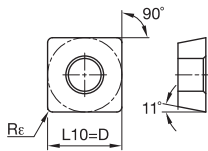
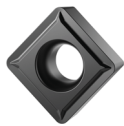


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
RCMT0803M0MP	8,00	—	—	●
RCMT10T3M0MP	10,00	—	—	●
RCMT1204M0MP	12,00	—	—	●
RCMT120400MP	12,70	—	—	●
RCMT1606M0MP	16,00	—	—	●

**SCREW-ON • POSITIVE INSERTS • SCGT-LF**

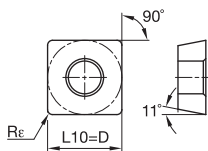
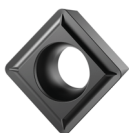


- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
SCGT09T304LF	9,53	9,53	0,4	●
SCGT09T308LF	9,53	9,53	0,8	●
SCGT120404LF	12,70	12,70	0,4	●
SCGT120408LF	12,70	12,70	0,8	●
SCGT120412LF	12,70	12,70	1,2	●

**SCREW-ON • POSITIVE INSERTS • SPGT-LF**



- first choice
- alternate choice

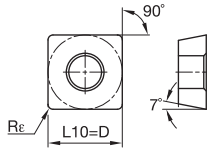
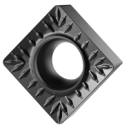
P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	R <sub>ε</sub>	KCS10B
SPGT09T304LF	9,53	9,53	0,4	●
SPGT09T308LF	9,53	9,53	0,8	●

44	45	14-15	48

**SCREW-ON • POSITIVE INSERTS • SCMT-MP**

- first choice
- alternate choice

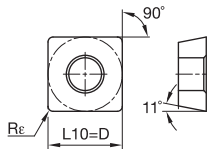


P	Blue	
M	Yellow	
K	Red	
N	Green	
S	Orange	●
H	Grey	

ISO catalogue number	D	L10	Re	
SCMT09T304MP	9,53	9,53	0,4	●
SCMT09T308MP	9,53	9,53	0,8	●
SCMT120404MP	12,70	12,70	0,4	●
SCMT120408MP	12,70	12,70	0,8	●

**SCREW-ON • POSITIVE INSERTS • SPMT-MP**

- first choice
- alternate choice

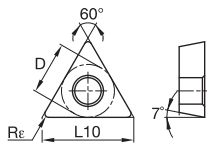


P	Blue	
M	Yellow	
K	Red	
N	Green	
S	Orange	●
H	Grey	

ISO catalogue number	D	L10	Re	
SPMT09T304MP	9,53	9,53	0,4	●
SPMT09T308MP	9,53	9,53	0,8	●
SPMT120404MP	12,70	12,70	0,4	●
SPMT120408MP	12,70	12,70	0,8	●

**SCREW-ON • POSITIVE INSERTS • TCGT-LF**

- first choice
- alternate choice



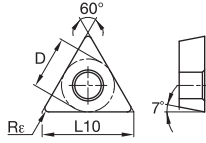
P	Blue	
M	Yellow	
K	Red	
N	Green	
S	Orange	●
H	Grey	

ISO catalogue number	D	L10	Re	
TCGT110204LF	6,35	11,00	0,4	●
TCGT110208LF	6,35	11,00	0,8	●
TCGT16T302LF	9,53	16,50	0,2	●
TCGT16T304LF	9,53	16,50	0,4	●
TCGT16T308LF	9,53	16,50	0,8	●

44	45	14-15	48

SCREW-ON • POSITIVE INSERTS • TCMT-MP

- first choice
- alternate choice



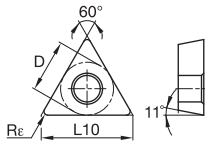
P	■
M	■
K	■
N	■
S	■
H	■

KCS10B

ISO catalogue number	D	L10	Re	
TCMT110204MP	6,35	11,00	0,4	●
TCMT110208MP	6,35	11,00	0,8	●
TCMT16T304MP	9,53	16,50	0,4	●
TCMT16T308MP	9,53	16,50	0,8	●

SCREW-ON • POSITIVE INSERTS • TPGT-LF

- first choice
- alternate choice



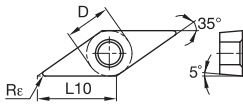
P	■
M	■
K	■
N	■
S	■
H	■

KCS10B

ISO catalogue number	D	L10	Re	
TPGT090202LF	5,56	9,62	0,2	●
TPGT090204LF	5,56	9,62	0,4	●
TPGT110202LF	6,35	11,00	0,2	●
TPGT110204LF	6,35	11,00	0,4	●
TPGT110208LF	6,35	11,00	0,8	●

SCREW-ON • POSITIVE INSERTS • VBGT-LF





- first choice
- alternate choice



P	■
M	■
K	■
N	■
S	■
H	■

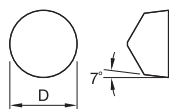
KCS10B

ISO catalogue number	D	L10	Re	
VBGT110302LF	6,35	11,07	0,2	●
VBGT110304LF	6,35	11,07	0,4	●
VBGT110308LF	6,35	11,07	0,8	●
VBGT160402LF	9,53	16,61	0,2	●
VBGT160404LF	9,53	16,61	0,4	●
VBGT160408LF	9,53	16,61	0,8	●

			
44	45	14-15	48

### KENDEX™ • POSITIVE INSERTS • RCGX-MP

- first choice
- alternate choice

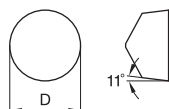


P	
M	
K	
N	
S	●
H	

ISO catalogue number	D	L10	Re	KCS10B
RCGX060400MP	6,35	—	—	●
RCGX090700MP	9,53	—	—	●
RCGX120700MP	12,70	—	—	●

### KENDEX • POSITIVE INSERTS • RPGX-MP

- first choice
- alternate choice



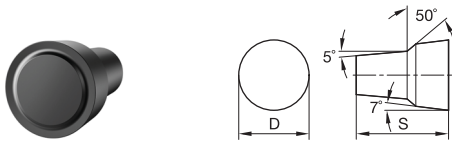
P	
M	
K	
N	
S	●
H	

ISO catalogue number	D	L10	Re	KCS10B
RPGX060400MP	6,35	—	—	●
RPGX090700MP	9,53	—	—	●
RPGX120700MP	12,70	—	—	●

44	45	14-15	48

### K-LOCK™ • POSITIVE INSERTS • RCGK-FS

- first choice
- alternate choice

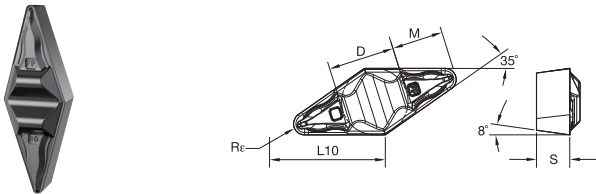


P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	S	KCS10B
RCGK040300FS	4,75	6,59	●
RCGK060400FS	6,35	9,30	●
RCGK090700FS	9,53	13,23	●
RCGK120800FS	12,70	16,92	●

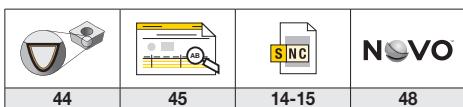
### TOP NOTCH™ PROFILING • POSITIVE INSERTS • VCGR-FP

- first choice
- alternate choice



P	■	■
M	■	■
K	■	■
N	■	■
S	■	●
H	■	■

ISO catalogue number	D	L10	S	M	Rε	KCS10B
VCGR160402FP	9,52	16,61	4,76	10,60	0,2	●
VCGR160404FP	9,52	16,61	4,76	10,15	0,4	●
VCGR160408FP	9,52	16,61	4,76	9,23	0,8	●
VCGR160412FP	9,52	16,61	4,76	8,31	1,2	●



### KCS10B™ • WEAR IDENTIFICATION

#### WEAR PROGRESSION

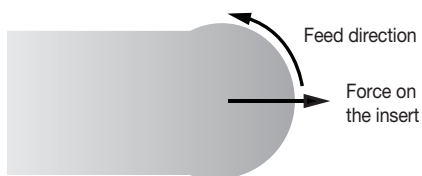


The new KCS10B coating provides easy wear identification. The shown wear pattern indicates end of tool life is near.

An extremely smooth coating surface, reducing friction, providing longer tool life, increasing process reliability.

The new KCS10B turning grade, featuring the new High-Power Impulse Magnetron Sputtering (High-PIMS) is ideal for iron-based alloys (S1), cobalt-based alloys (S2), and nickel-based alloys (S3).

### KCS10B • PROFILING WITH TOP NOTCH



Multiple feed direction profiling with highest accuracy and excellent surface finishes.

Rigid clamping mechanism holds insert precisely in place and eliminates insert movement.



———— Desired shape = Programmed shape.

———— Strong insert design.

———— Accurate indexing.

———— Superior clamping forces.

———— Second cutting edge protected from chip hammering.






## HIGH-TEMPERATURE ALLOYS • TROUBLESHOOTING

### Material Characteristics

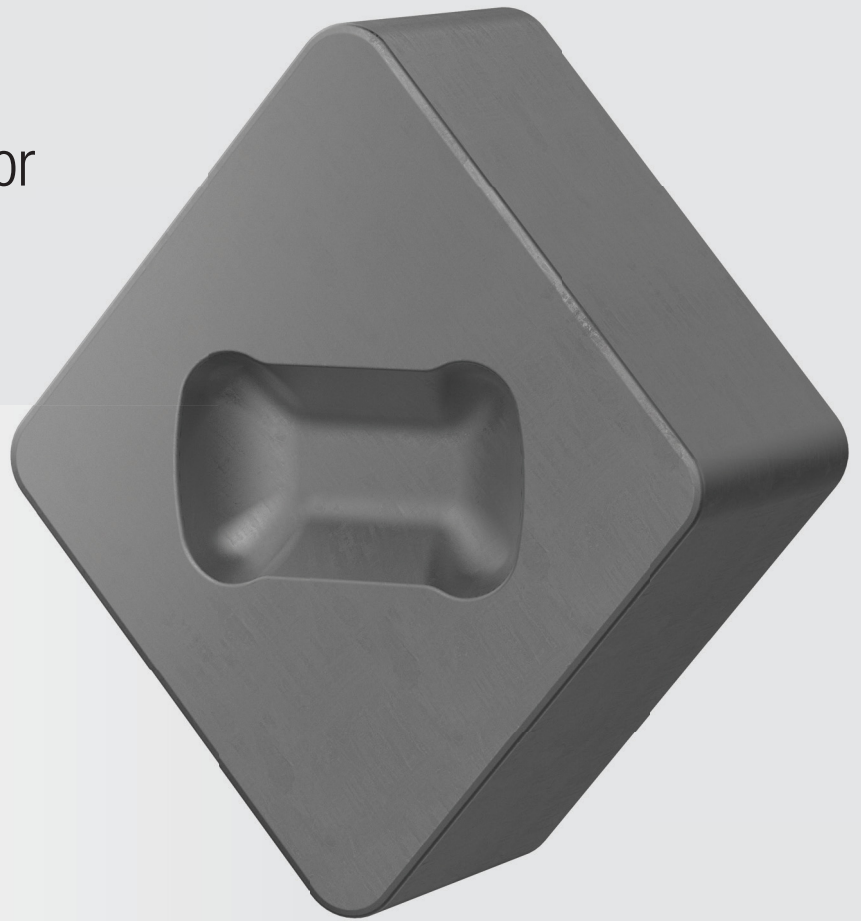
- High forces at the cutting edge.
- High heat concentration in cutting area.
- High cutting speed may cause insert failure by plastic deformation.
- Relatively poor tool life.
- Small depths of cut are difficult.
- Rapid work-hardening.
- Usually abrasive rather than hard.

### Troubleshooting

Problem	Solution	
<b>Depth-of-cut notch</b>	<ol style="list-style-type: none"> <li>1. Increase toolholder lead angle.</li> <li>2. Use tougher grades like KC5025™ and KY4300™ in -MS, -MP, and -RP geometries, or ceramic grade KYS30™/KYS25™.</li> <li>3. Use a 0,63mm/.025" or greater depth of cut.</li> <li>4. Depth of cut should be greater than the work-hardened layer resulting from the previous cut (&gt;0,12mm/.005").</li> <li>5. Program a ramp to vary depth of cut.</li> <li>6. Feed greater than 0,12mm/.005 IPR.</li> <li>7. Use strongest insert shape possible.</li> <li>8. When possible, use round inserts in carbide grade KCS10B™, or ceramic grade KYS30/KYS25.</li> <li>9. Decrease depth to 1/7 of insert diameter for round inserts (i.e.: 1,90mm/.075" max. depth for 12,7mm/1/2" IC RRG45).</li> </ol>	 <p>Depth-of-cut notch</p>
<b>Built-up edge</b>	<ol style="list-style-type: none"> <li>1. Increase speed.</li> <li>2. Use grades KYS30 or KY4300.</li> <li>3. Use positive rake, sharp PVD coated grade KCS10B.</li> <li>4. Use flood coolant.</li> </ol>	 <p>Built-up edge</p>
<b>Chipping</b>	<ol style="list-style-type: none"> <li>1. Use MG-MS geometry in place of MG-FS geometries.</li> <li>2. For interrupted cutting, maintain speed and decrease feed.</li> <li>3. Use a tougher grade like KC5025.</li> </ol>	 <p>Chipping</p>

# KYK10

Ceramic Turning Grade for  
Cast Iron



## Materials



## Applications



O.D. Turning



Chamfer Turning



Facing



Boring



Multi-Direction



I.D. Facing

[kennametal.com/KYK10](http://kennametal.com/KYK10)

KYK10 ceramic turning grade is a high-performance solution for cast iron materials. Ideal for continuous and lightly interrupted cuts.

Machining gray cast iron components such as brake disks or fly wheels, KYK10 offers great wear resistance, toughness, and improved fracture toughness.

The new SiAlON ceramic turning grade features a 30% increased speed capability.

Highest productivity through maximum cutting speeds.

Dimple clamping provides exceptional rigidity.

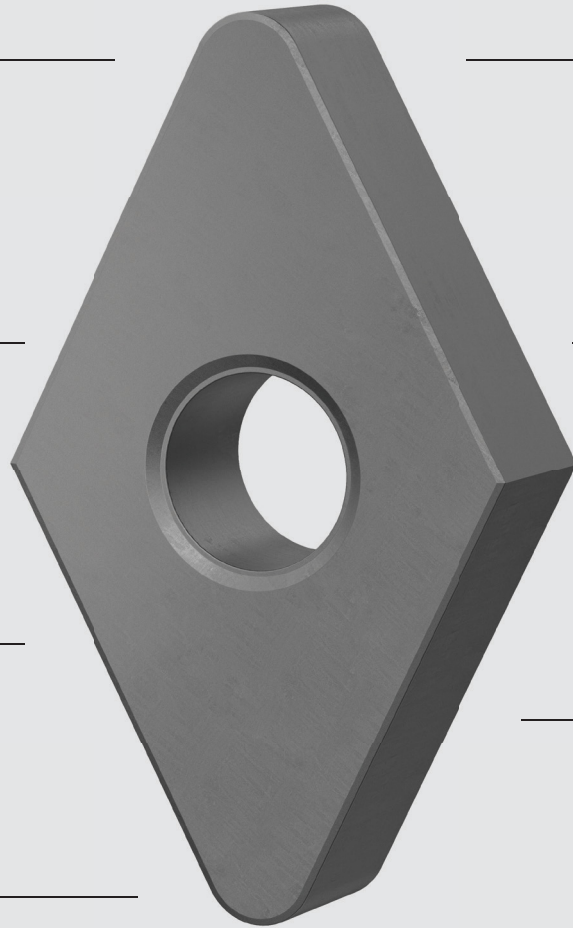
Excellent for roughing to finishing operations.

Precision ground inserts in G tolerance for finishing applications.

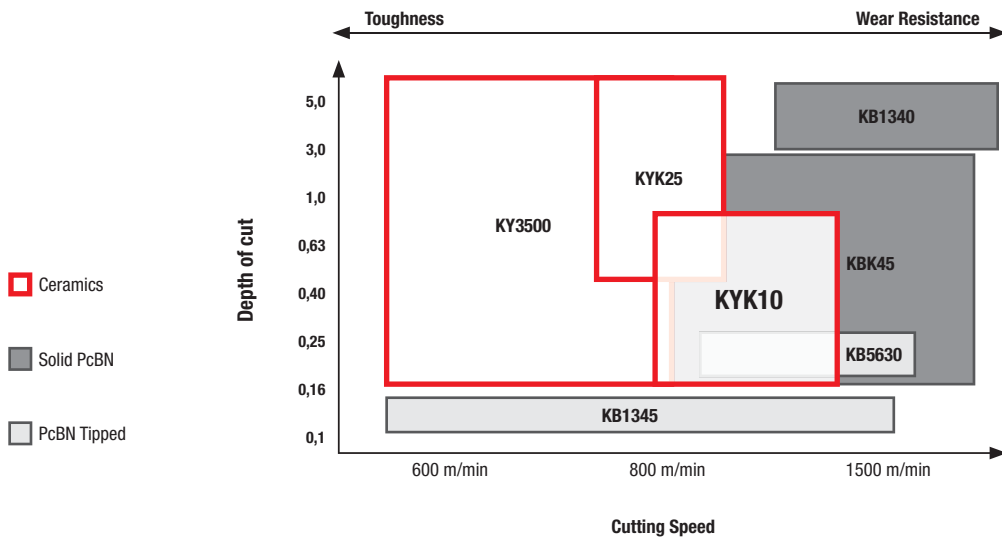
Pressed-to-size inserts in M tolerance for roughing and medium machining.

The KYK10 turning grade shows high chemical resistance. Also withstands high temperatures and higher speeds to provide longer tool life.

Suitable for wet or dry machining.

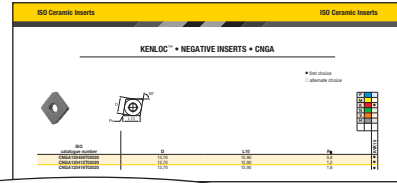


## Cast Iron Grades Overview



# ISO INSERTS • CATALOG NUMBERING SYSTEM

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

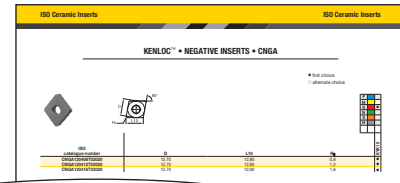


CNGN00408T02020

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Insert Shape		Insert Clearance Angle		Tolerance Class		Insert Features		Size																																																																																																																																																																																																																														
H	Hexagon 120°	A	3°	Tolerances apply prior to edge prep and coating.  	N		<table border="1"> <thead> <tr> <th rowspan="2">"D"</th> <th colspan="7">Code for metric cutting edge length "L10"</th> </tr> <tr> <th>mm</th> <th>C</th> <th>D</th> <th>R</th> <th>S</th> <th>T</th> <th>V</th> <th>W</th> </tr> </thead> <tbody> <tr><td>3,97</td><td>S4</td><td>04</td><td>03</td><td>03</td><td>06</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>4,76</td><td>04</td><td>05</td><td>04</td><td>04</td><td>08</td><td>08</td><td>S3</td><td>—</td></tr> <tr><td>5,56</td><td>05</td><td>06</td><td>05</td><td>05</td><td>09</td><td>09</td><td>03</td><td>—</td></tr> <tr><td>6,00</td><td>—</td><td>—</td><td>06</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>6,35</td><td>06</td><td>07</td><td>06</td><td>06</td><td>11</td><td>11</td><td>04</td><td>—</td></tr> <tr><td>7,94</td><td>08</td><td>09</td><td>07</td><td>07</td><td>13</td><td>13</td><td>05</td><td>—</td></tr> <tr><td>8,00</td><td>—</td><td>—</td><td>08</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>9,52</td><td>09</td><td>11</td><td>09</td><td>09</td><td>16</td><td>16</td><td>06</td><td>—</td></tr> <tr><td>10,00</td><td>—</td><td>—</td><td>10</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>11,11</td><td>11</td><td>13</td><td>11</td><td>11</td><td>19</td><td>19</td><td>07</td><td>—</td></tr> <tr><td>12,00</td><td>—</td><td>—</td><td>12</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>12,70</td><td>12</td><td>15</td><td>12</td><td>12</td><td>22</td><td>22</td><td>08</td><td>—</td></tr> <tr><td>14,29</td><td>14</td><td>17</td><td>14</td><td>14</td><td>24</td><td>24</td><td>09</td><td>—</td></tr> <tr><td>15,88</td><td>16</td><td>19</td><td>15</td><td>15</td><td>27</td><td>27</td><td>10</td><td>—</td></tr> <tr><td>16,00</td><td>—</td><td>—</td><td>16</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>17,46</td><td>17</td><td>21</td><td>17</td><td>17</td><td>30</td><td>30</td><td>11</td><td>—</td></tr> <tr><td>19,05</td><td>19</td><td>23</td><td>19</td><td>19</td><td>33</td><td>33</td><td>13</td><td>—</td></tr> <tr><td>20,00</td><td>—</td><td>—</td><td>20</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>22,22</td><td>22</td><td>27</td><td>22</td><td>22</td><td>38</td><td>38</td><td>15</td><td>—</td></tr> <tr><td>25,00</td><td>—</td><td>—</td><td>25</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>25,40</td><td>25</td><td>31</td><td>25</td><td>25</td><td>44</td><td>44</td><td>17</td><td>—</td></tr> <tr><td>31,75</td><td>32</td><td>38</td><td>31</td><td>31</td><td>54</td><td>54</td><td>21</td><td>—</td></tr> <tr><td>32,00</td><td>—</td><td>—</td><td>32</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	"D"	Code for metric cutting edge length "L10"							mm	C	D	R	S	T	V	W	3,97	S4	04	03	03	06	—	—	—	4,76	04	05	04	04	08	08	S3	—	5,56	05	06	05	05	09	09	03	—	6,00	—	—	06	—	—	—	—	—	6,35	06	07	06	06	11	11	04	—	7,94	08	09	07	07	13	13	05	—	8,00	—	—	08	—	—	—	—	—	9,52	09	11	09	09	16	16	06	—	10,00	—	—	10	—	—	—	—	—	11,11	11	13	11	11	19	19	07	—	12,00	—	—	12	—	—	—	—	—	12,70	12	15	12	12	22	22	08	—	14,29	14	17	14	14	24	24	09	—	15,88	16	19	15	15	27	27	10	—	16,00	—	—	16	—	—	—	—	—	17,46	17	21	17	17	30	30	11	—	19,05	19	23	19	19	33	33	13	—	20,00	—	—	20	—	—	—	—	—	22,22	22	27	22	22	38	38	15	—	25,00	—	—	25	—	—	—	—	—	25,40	25	31	25	25	44	44	17	—	31,75	32	38	31	31	54	54	21	—	32,00	—	—	32	—	—	—	—	—
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S	Square 90°	E	20°				<p>D = Theoretical diameter of the insert inscribed circle S = Thickness B = See figures below</p>	M																																																																																																																																																																																																																														
C D E M V	Rhomboid 80° 55° 75° 86° 35°	F	25°					<p>X V</p> <p>Special Design</p>	G																																																																																																																																																																																																																													
	W	Trigon 80° with enlarged corner angles	G						30°	<table border="1"> <thead> <tr> <th>tolerance class*</th> <th>tolerance on "D"</th> <th>tolerance on "B"</th> <th>tolerance on "S"</th> </tr> </thead> <tbody> <tr><td>C</td><td>±0,025</td><td>±0,013</td><td>±0,025</td></tr> <tr><td>H</td><td>±0,013</td><td>±0,013</td><td>±0,025</td></tr> <tr><td>E</td><td>±0,025</td><td>±0,025</td><td>±0,025</td></tr> <tr><td>G</td><td>±0,025</td><td>±0,025</td><td>±0,013</td></tr> <tr><td>M</td><td colspan="2">See tables on next page</td><td>±0,013</td></tr> <tr><td>U</td><td colspan="2">See tables on next page</td><td>±0,013</td></tr> </tbody> </table>	tolerance class*	tolerance on "D"	tolerance on "B"	tolerance on "S"	C	±0,025	±0,013	±0,025	H	±0,013	±0,013	±0,025	E	±0,025	±0,025	±0,025	G	±0,025	±0,025	±0,013	M	See tables on next page		±0,013	U	See tables on next page		±0,013																																																																																																																																																																																																
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	Parallelogram 85° 82° 55°	P	11°		<p>For other clearance angles requiring descriptions.</p>	H																																																																																																																																																																																																																																

### ISO INSERTS • CATALOG NUMBERING SYSTEM

(continued)



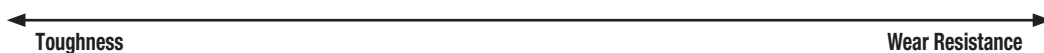
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04	08		T	020	20																																																																																													
Thickness "S"	Corner Radius "R <sub>e</sub> "	Hand of Insert (optional)	Cutting Edge (optional)	T-Land Width (optional)	T-Land Angle (optional)	Tip Style (optional)	Chipbreaker (optional)																																																																																											
<table border="1"> <thead> <tr> <th>symbol</th> <th>thick- ness</th> </tr> <tr> <th>mm</th> <th>mm</th> </tr> </thead> <tbody> <tr><td>—</td><td>0,79</td></tr> <tr><td>T0</td><td>1,00</td></tr> <tr><td>01</td><td>11,59</td></tr> <tr><td>T1</td><td>1,98</td></tr> <tr><td>02</td><td>2,38</td></tr> <tr><td>03</td><td>3,18</td></tr> <tr><td>T3</td><td>3,97</td></tr> <tr><td>04</td><td>4,76</td></tr> <tr><td>05</td><td>5,56</td></tr> <tr><td>06</td><td>6,35</td></tr> <tr><td>07</td><td>7,94</td></tr> <tr><td>09</td><td>9,52</td></tr> <tr><td>11</td><td>11,11</td></tr> <tr><td>12</td><td>12,70</td></tr> </tbody> </table>	symbol	thick- ness	mm	mm	—	0,79	T0	1,00	01	11,59	T1	1,98	02	2,38	03	3,18	T3	3,97	04	4,76	05	5,56	06	6,35	07	7,94	09	9,52	11	11,11	12	12,70	<table border="1"> <thead> <tr> <th>symbol</th> <th>corner radius</th> </tr> <tr> <th>mm</th> <th>mm</th> </tr> </thead> <tbody> <tr><td>X0</td><td>0,4</td></tr> <tr><td>01</td><td>0,1</td></tr> <tr><td>02</td><td>0,2</td></tr> <tr><td>04</td><td>0,4</td></tr> <tr><td>08</td><td>0,8</td></tr> <tr><td>12</td><td>1,2</td></tr> <tr><td>16</td><td>1,6</td></tr> <tr><td>20</td><td>2,0</td></tr> <tr><td>24</td><td>2,4</td></tr> <tr><td>28</td><td>2,8</td></tr> <tr><td>32</td><td>3,2</td></tr> <tr><td>00</td><td>round insert</td></tr> <tr><td>M0</td><td></td></tr> </tbody> </table>	symbol	corner radius	mm	mm	X0	0,4	01	0,1	02	0,2	04	0,4	08	0,8	12	1,2	16	1,6	20	2,0	24	2,4	28	2,8	32	3,2	00	round insert	M0		<p>R = Right hand</p> <p>L = Left hand</p> <p>N = Neutral</p>	<p>F*</p> <p>Sharp</p> <p>E</p> <p>Rounded</p> <p>T*</p> <p>Chamfered</p> <p>S*</p> <p>Chamfered and Rounded</p> <p>K</p> <p>Double-Chamfered</p> <p>P</p> <p>Double-Chamfered and Rounded</p> <p>*Also available in wiper style.</p>	<table border="1"> <thead> <tr> <th>symbol</th> <th>size</th> </tr> <tr> <th>ISO</th> <th>mm</th> </tr> </thead> <tbody> <tr><td>010</td><td>0,01</td></tr> <tr><td>020</td><td>0,2</td></tr> </tbody> </table>	symbol	size	ISO	mm	010	0,01	020	0,2	<table border="1"> <thead> <tr> <th>symbol</th> <th>size</th> </tr> </thead> <tbody> <tr><td>10</td><td>10°</td></tr> <tr><td>15</td><td>15°</td></tr> <tr><td>20</td><td>20°</td></tr> <tr><td>25</td><td>25°</td></tr> <tr><td>30</td><td>30°</td></tr> </tbody> </table>	symbol	size	10	10°	15	15°	20	20°	25	25°	30	30°	<p>FW = Finishing Wiper</p> <p>MW = Medium Wiper</p> <table border="1"> <thead> <tr> <th>symbol</th> <th>usage</th> </tr> </thead> <tbody> <tr><td>C</td><td>full tip</td></tr> <tr><td>M</td><td>mini tip</td></tr> <tr><td>MT</td><td>multi-tip</td></tr> <tr><td>ST</td><td>single tip</td></tr> </tbody> </table>	symbol	usage	C	full tip	M	mini tip	MT	multi-tip	ST	single tip
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"D"	± Tolerance on "D"				"D"	± Tolerance on "B"			
	Shapes S, T, C, R, & W	Class M Tolerance		Class U Tolerance		Shapes S, T, C, R, & W	Class M Tolerance		Class U Tolerance
		Shape D	Shape V				Shape D	Shape V	
mm	mm	mm	mm	mm	mm	mm	mm	mm	
3,97	0,05	—	—	—	3,97	0,08	—	—	—
4,76	0,05	—	—	0,08	4,76	0,08	—	—	0,13
5,56	0,05	0,05	0,05	0,08	5,56	0,08	0,11	—	0,13
6,35	0,05	0,05	0,05	0,08	6,35	0,08	0,11	—	0,13
7,94	0,05	0,05	0,05	0,08	7,94	0,08	0,11	—	0,13
9,52	0,05	0,05	0,05	0,08	9,52	0,08	0,11	0,18	0,13
11,11	0,08	0,08	0,08	0,13	11,11	0,13	0,15	—	—
12,70	0,08	0,08	0,08	0,13	12,70	0,13	0,15	0,25	0,20
14,29	0,08	0,08	0,08	0,13	14,29	0,13	0,15	—	—
15,88	0,10	0,10	0,10	0,18	15,88	0,15	0,18	—	0,27
17,46	0,10	0,10	0,10	0,18	17,46	0,15	0,18	—	0,27
19,05	0,10	0,10	0,10	0,18	19,05	0,15	0,18	—	0,27
22,22	0,13	—	—	0,25	22,22	0,15	—	—	0,38
25,40	0,13	—	—	0,25	25,40	0,18	—	—	0,38
31,75	0,15	—	—	0,25	31,75	0,20	—	—	0,38

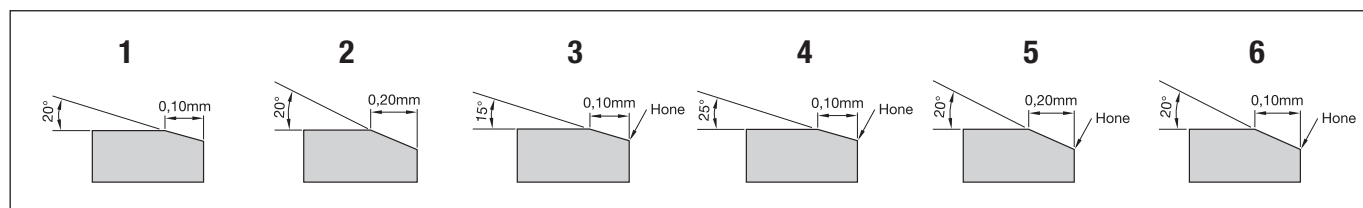


### CAST IRON • TOOL SELECTION GUIDE

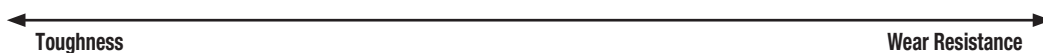


Geometry	Ceramic Inserts												
	KY3500					KYK25				KYK10			
	GX		GN	GA		GX	GN	GA		GX	GN	GA	
Profile <i>*See bottom of page</i>	2	1	2	2	1	2	2	2	1	2	2	2	1
Clamping Rigidity	■■■■	■■■■	■■■	■	■	■■■■	■■■	■	■	■■■■	■■■	■	■
Edge Preparation	T02020	T01020FW	T02020	T02020	T01020FW	T02020	T02020	T02020	T01020FW	T02020	T02020	T02020	T01020FW
T-Land	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Honed													
Wiper		✓			✓				✓				✓
Application													
Heavy-Roughing	●		●			●	●			○	○		
Roughing	●	○	●	●		●	●	●		●	●	●	
Medium Machining	●	●	●	●	●	●	●	●	●	●	●	●	●
Finishing		○	○	○	●	○	○	○	●	○	○	○	●
Fine-Finishing													
Cutting Condition													
Heavily Interrupted Cut	●		●			●	●			○	○		
Lightly Interrupted Cut	●	○	●	●	○	●	●	●	○	●	●	●	○
Varying Depth of Cut, Casting or Forging Skin	●	●	●	●	●	●	●	●	●	●	●	●	●
Smooth Cut, Pre-Turned Surface	○	●	○	○	●	○	○	○	●	●	●	●	●

- first choice
- alternate choice

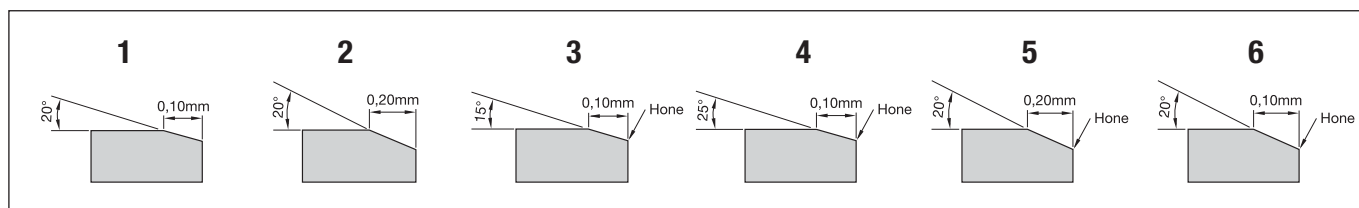


CAST IRON • TOOL SELECTION GUIDE

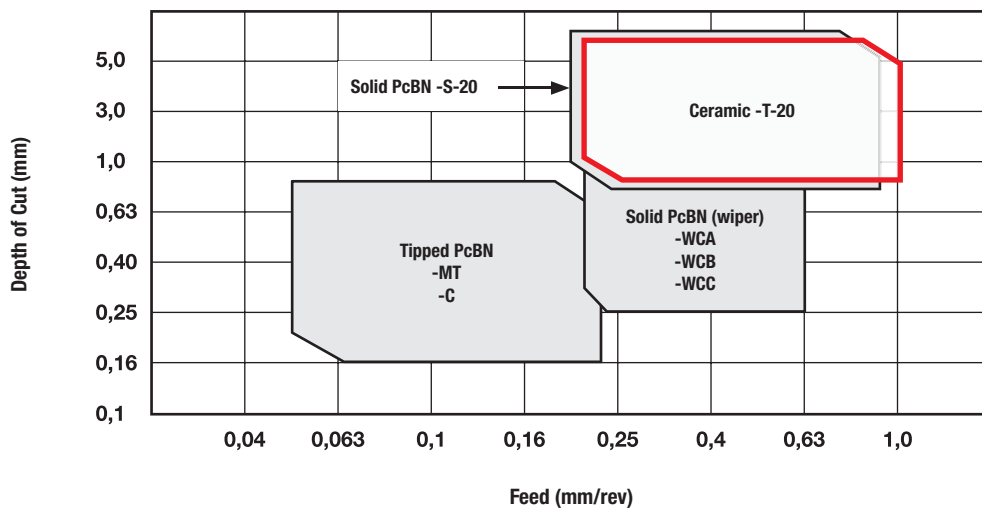


Geometry	Solid PcBN Inserts						Tipped PcBN Inserts		
	KBK45			KB1340			KB5630	KB1345	
	GX	GN		GX			GA	GA	
Profile <i>*See bottom of page</i>	5	5	3	5	3	3	4	3	6
Clamping Rigidity	■■■■	■■■	■■	■■■	■■■	■■■	■	■	■
Edge Preparation	S02020	S02020	S01015W..	S02020	S01015	S01015FW	S01025	S01025FW	S01020
T-Land	✓	✓	✓	✓	✓	✓	✓	✓	✓
Honed	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wiper			✓			✓		✓	
Application									
Heavy-Roughing	●	●		●					
Roughing	●	●	○	●	○		○		
Medium Machining	●	●	●	●	●	●	●	○	○
Finishing	○	○	●	○	○	●	●	●	●
Fine-Finishing			○			○	○	●	●
Cutting Condition									
Heavily Interrupted Cut	●	●	○	●	●	○	○		
Lightly Interrupted Cut	●	●	●	●	●	●	●	●	●
Varying Depth of Cut, Casting or Forging Skin	●	●	●	●	●	●	●	●	●
Smooth Cut, Pre-Turned Surface	●	●	●	●	●	●	●	●	●

- first choice
- alternate choice



**CAST IRON • APPLICATION DATA • FEED**



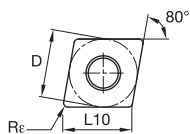
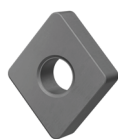
**CAST IRON • APPLICATION DATA • SPEED**

material group	grade	Speed – m/min													Starting Conditions
		60	180	305	430	550	675	800	920	1040	1160	1290	1400	1530	m/min
K1	KY3500														700
	KYK25														700
	KYK10														800
	KBK45														1000
	KB1340														1000
	KB5630														800
	KB1345														800



### KENLOC™ • NEGATIVE INSERTS • CNGA

- first choice
- alternate choice



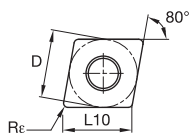
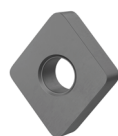
P	■
M	■
K	■ ●
N	■
S	■
H	■
	■

ISO catalogue number	D	L10	Re	
CNGA120408T02020	12,70	12,90	0,8	●
CNGA120412T02020	12,70	12,90	1,2	●
CNGA120416T02020	12,70	12,90	1,6	●

KYK10

### KENLOC • NEGATIVE INSERTS • CNGA-FW

- first choice
- alternate choice



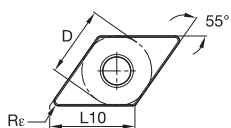
P	■
M	■
K	■ ●
N	■
S	■
H	■
	■

ISO catalogue number	D	L10	Re	
CNGA120412T01020FW	12,70	12,90	1,2	●

KYK10

### KENLOC • NEGATIVE INSERTS • DNGA

- first choice
- alternate choice



P	■
M	■
K	■ ●
N	■
S	■
H	■
	■

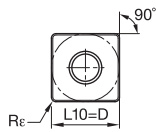
ISO catalogue number	D	L10	Re	
DNGA150416T02020	12,70	15,50	1,6	●

KYK10

44	45	34-35	48

### KENLOC™ • NEGATIVE INSERTS • SNGA

- first choice
- alternate choice

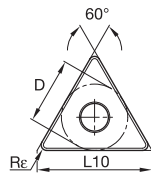


P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	
	■	

ISO catalogue number	D	L10	Rε	
SNGA120408T02020	12,70	12,70	0,8	● KYK10

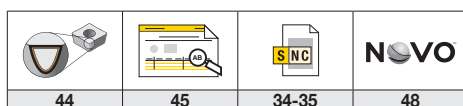
### KENLOC • NEGATIVE INSERTS • TNGA

- first choice
- alternate choice

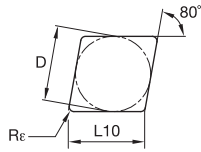
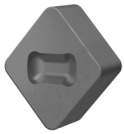


P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	
	■	

ISO catalogue number	D	L10	Rε	
TNGA160408T02020	9,53	16,50	0,8	● KYK10



**KENDEX™ • NEGATIVE INSERTS • CNGX**



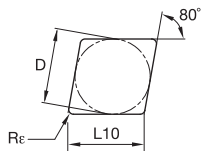
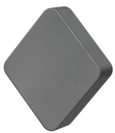
- first choice
- alternate choice

P	■
M	■
K	●
N	■
S	■
H	■

KYK10

ISO catalogue number	D	L10	Rε	
CNGX120712T02020	12,70	12,90	1,2	●
CNGX120716T02020	12,70	12,90	1,6	●

**KENDEX • NEGATIVE INSERTS • CNMN**



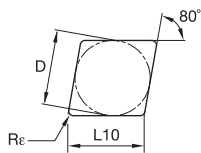
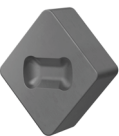
- first choice
- alternate choice

P	■
M	■
K	●
N	■
S	■
H	■

KYK10

ISO catalogue number	D	L10	Rε	
CNMN120412T02020	12,70	12,90	1,2	●
CNMN120416T02020	12,70	12,90	1,6	●

**KENDEX • NEGATIVE INSERTS • CNMX**

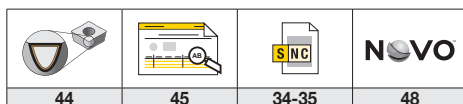


- first choice
- alternate choice

P	■
M	■
K	●
N	■
S	■
H	■

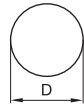
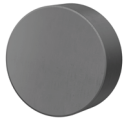
KYK10

ISO catalogue number	D	L10	Rε	
CNMX120712T02020	12,70	12,90	1,2	●
CNMX120716T02020	12,70	12,90	1,6	●



**KENDEX™ • NEGATIVE INSERTS • RNGN**

- first choice
- alternate choice

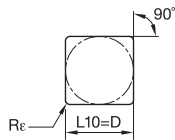
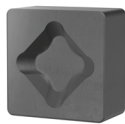


P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	

ISO catalogue number	D	L10	Re	
RNGN120400T02020	12,70	—	—	● KYK10

**KENDEX • NEGATIVE INSERTS • SNGX**

- first choice
- alternate choice

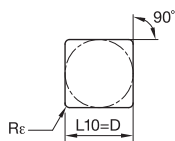


P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	

ISO catalogue number	D	L10	Re	
SNGX120712T02020	12,70	12,70	1,2	● KYK10
SNGX120716T02020	12,70	12,70	1,6	●
SNGX150724T02020	15,88	15,88	2,4	●

**KENDEX • NEGATIVE INSERTS • SNMN**

- first choice
- alternate choice



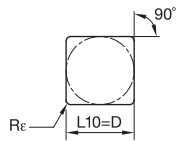
P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	

ISO catalogue number	D	L10	Re	
SNMN120412T02020	12,70	12,70	1,2	● KYK10
SNMN120416T02020	12,70	12,70	1,6	●

44	45	34-35	48

**KENDEX™ • NEGATIVE INSERTS • SNMX**

- first choice
- alternate choice



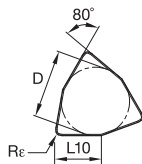
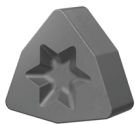
P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	
	■	

KYK10

ISO catalogue number	D	L10	Re	
SNMX120712T02020	12,70	12,70	1,2	●
SNMX120716T02020	12,70	12,70	1,6	●

**KENDEX • NEGATIVE INSERTS • WNGX**

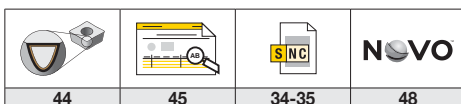
- first choice
- alternate choice



P	■	
M	■	
K	■	●
N	■	
S	■	
H	■	
	■	

KYK10

ISO catalogue number	D	L10	Re	
WNGX080712T02020	12,70	8,69	1,2	●



44

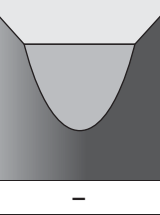
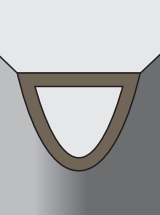
45

34-35

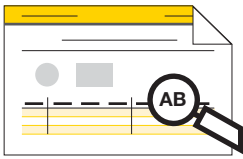
48

## TURNING

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45	
KYK10		Composition: An advanced SIALON ceramic grade. Application: Provides maximum wear resistance. Used for high-speed continuous turning of grey cast iron, including through scale. To be used for varying cast iron machinability.											
			<b>K</b>										
KCS10B		Composition: PVD-AlTiN coating with a very smooth coating surface and extremely hard, wear-resistant ultra fine-grain carbide substrate. Application: The KCS10B™ grade is ideal for medium machining and finishing operations of Nickel-Based, Cobalt-Based, and Iron-Based High-Temperature Alloys. The extremely hard, wear-resistant carbide substrate allows for longer tool life while the ultra fine-grain carbide substrate and smoother coating reduces friction.											
			<b>S</b>										

## KEY TO PRODUCT TABLE COLUMN HEADINGS



You may notice a slight change in the appearance of our product tables and specification charts. In this catalog, Kennametal introduces a set of short-name codes to improve the readability of tables and drawings. These codes replace full-text descriptions. The full list of codes and their definitions can be found below.

Short-Name Code	Full Text Description
D	Insert: Insert IC Size
L10	Insert Cutting Edge Length
M	Insert Gage Dimension
Re	Corner Radius
S	Insert Thickness

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron

<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys

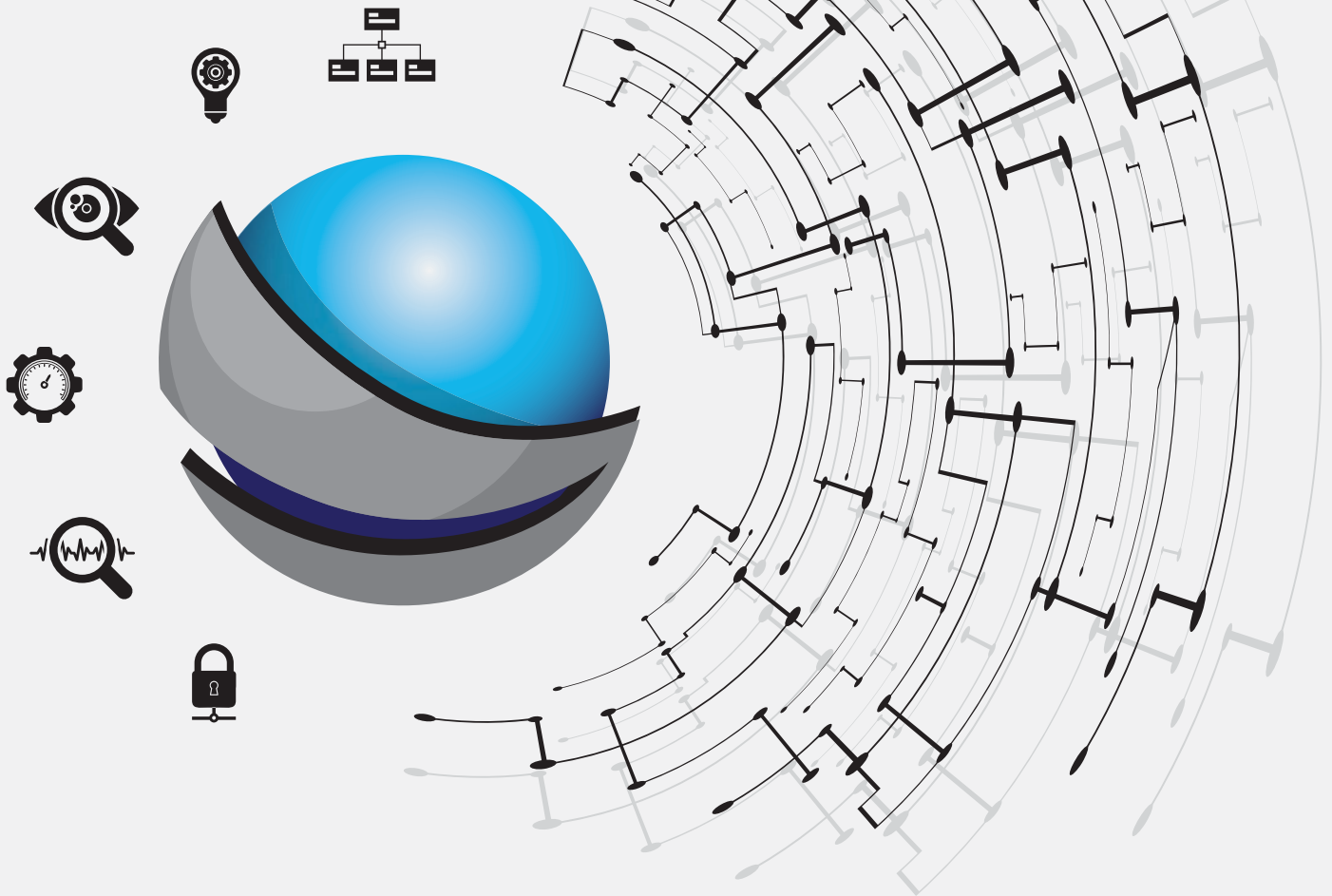
<b>H</b>	Hardened Materials
<b>C</b>	CFRP Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
<b>P0</b>	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	-	-
<b>P1</b>	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	-	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
<b>P2</b>	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
<b>P3</b>	Alloy Steels and Tool Steels	C >0,25%	600-850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
<b>P4</b>	Alloy Steels and Tool Steels	C >0,25%	850-1400	340-450	35-48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P5</b>	Ferritic, Martensitic, and PH Stainless Steels	-	600-900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P6</b>	High-Strength Ferritic, Martensitic, and PH Stainless Steels	-	900-1350	350-450	35-48	X102CrMo17, G-X120Cr29
<b>M1</b>	Austenitic Stainless Steel	-	<600	130-200	-	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
<b>M2</b>	High-Strength Austenitic Stainless and Cast Stainless Steels	-	600-800	150-230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
<b>M3</b>	Duplex Stainless Steel	-	<800	135-275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
<b>K1</b>	Grey Cast Iron	-	125-500	120-290	<32	GG15, GG25, GG30, GG40, GTW40
<b>K2</b>	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	-	<600	130-260	<28	GGG40, GTS35
<b>K3</b>	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	-	>600	180-350	<43	GGG60, GTW55, GTS65
<b>N1</b>	Wrought Aluminium	-	-	-	-	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, AlMgSiPb
<b>N2</b>	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	-	-	-	GAISiCu4, GDAISI10Mg
<b>N3</b>	High-Silicon Aluminium Alloys and Magnesium Alloys	Si >12,2%	-	-	-	G-ALSi12, G-ALSi17Cu4, G-ALSi21CuNiMg
<b>N4</b>	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70-100	-	-	-	-	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
<b>N5</b>	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	-	-	-	-	LEXAN®, Hostalen™, Polystyrol®, MAKROLON®
<b>N6</b>	Carbon, Graphite Composites, CFRP	-	-	-	-	CFK, GFK
<b>N7</b>	Metal Matrix Composites (MMC)	-	-	-	-	-
<b>S1</b>	Iron-Based, Heat-Resistant Alloys	-	500-1200	160-260	25-48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
<b>S2</b>	Cobalt-Based, Heat-Resistant Alloys	-	1000-1450	250-450	25-48	Haynes® 188, Stellite® 6,21,31
<b>S3</b>	Nickel-Based, Heat-Resistant Alloys	-	600-1700	160-450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
<b>S4</b>	Titanium and Titanium Alloys	-	900-1600	300-400	33-48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
<b>H1</b>	Hardened Materials	-	-	-	44-48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
<b>H2</b>	Hardened Materials	-	-	-	48-55	-
<b>H3</b>	Hardened Materials	-	-	-	56-60	-
<b>H4</b>	Hardened Materials	-	-	-	>60	-
<b>C1</b>	CFRP, CFRP/CFRP	-	-	-	-	-
<b>C2</b>	CFRP/Non-Ferrous	-	-	-	-	-
<b>C3</b>	CFRP/High Temp	-	-	-	-	-
<b>C4</b>	CFRP/Stainless Steel	-	-	-	-	-
<b>C5</b>	CFRP/Non-Ferrous/High-Temp	-	-	-	-	-





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# METALCUTTING SAFETY

## IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalogue!

### Projectile and Fragmentation Hazards:

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

### Breathing and Skin Contact Hazards:

Grinding carbide or other advanced cutting tool materials produces dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by Kennametal and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalogue and recommendations on machining practices may not apply to your particular operation. For more information, consult the Kennametal Metalcutting Safety booklet, available free from Kennametal at 724 539 5747 or fax 724 539 5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at 724 539 5066 or fax 724 539 5372.

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