



# PARTING AND GROOVING



Grades	<b>B02-03</b>
Inserts for parting and grooving	<b>B04-07</b>
Applications index	<b>B08</b>
Toolholders	<b>B10-31</b>
Tool blocks	<b>B32</b>
Blades	<b>B09,33-36</b>
Top Notch tools	<b>B37-40</b>
Cutting data	<b>B41-43</b>

## CVD / PVD



### CVD coated carbide

The CVD coatings are generated by a chemical reaction at high temperatures (700-1050°C). All CVD coatings provide a high wear resistance due to its excellent adhesion to cemented carbide.

CVD coatings are the first choice in a large turning range where wear resistance is important.

### PVD coated carbide

PVD coatings offer wear resistance due to their hardness. The coating process involves the evaporation of metal, which reacts with nitrogen to form a hard nitride coating. The full process is made at relatively low temperatures (400-600°C).

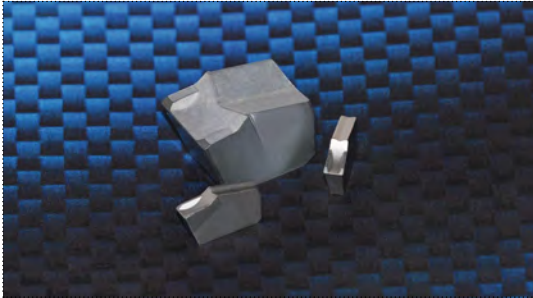
PVD coatings are recommended when sharp cutting edges are needed.

## Features of CVD and PVD coated carbide

	Grade	Colour	Coating composition	Definition
	<b>TN15</b>		TiN-TiC-TiN	CVD coating with TiN-TiC-TiN. The coating has a thickness of 3-5 microns for use on steel, alloyed steel and stainless steel, with or without coolant.
	<b>TN30</b>		TiCN+Al <sub>2</sub> O <sub>3</sub> +TiN	General purpose wear resistant CVD turning grade. The multi-layer coating includes aluminium oxide to add additional heat and wear resistance. It is used to machine steel at lower speeds than TN15. This turning grade is for demanding metal removal operations, including cutting through scale at low speeds through heavy interruption, and problem machining of stainless steel at low speed and poor rigidity.
	<b>TL20</b>		TiAlN	Carbide with TiAlN and lubricity layer PVD coating. It has a lower friction coefficient and a lower cutting energy during finishing. The sharper cutting edge reduces the built-up edge damage and gives the workpiece an excellent surface finish. Recommended for alloyed steel.
	<b>TL30</b>		TiAlN	The PVD universal high-performance grade for steel, austenitic steel, cast iron and heat-resistant alloys.
	<b>TL40</b>		TiAlN	Carbide with TiAlN and lubricity layer PVD coating. It has a lower friction coefficient and a lower cutting energy during finishing. The sharper cutting edge reduces the built-up edge damage and gives the workpiece an excellent surface finish. Recommended for alloyed steel.



## UNCOATED CARBIDE



### UNCOATED CARBIDE

- Excellent thermal crack resistance makes it possible to machine in wet cutting conditions.
- Cemented carbide can be applied for various workpieces.
- High toughness and low cutting force.
- Low affinity to workpiece.

## Features of uncoated carbide

Material		Grade	Colour	Composition	Definition
<b>P</b> Steel		<b>PM25</b>		WC+TiC+TaC+Co	General purpose uncoated grade in the P30 range. This tough, economical grade is suitable to work carbon steels, alloyed steels, tool steels and stainless steels. PM25 provides toughness and resistance to deformation in roughing and semi-finishing applications.
		<b>PM40</b>		WC+TiC+TaC+Co	Roughing grade in the P35 range. This tough grade is for structural, cast and tool steels. It is recommended when toughness is more important than wear resistance.
<b>K</b> Cast iron		<b>KM15</b>		WC+Co	Finishing grade in the K10 range. This carbide grade is for use on cast iron, aluminium and heat-resistant alloys. This grade works well on cobalt based alloys and synthetic materials and is suitable for finishing on heat-resistant alloys.

## Application

ISO	Composition	Features	Workpiece
<b>P</b>	WC+TiC+TaC+Co	Heat resistance, excellent plastic deformation resistance.	Carbon steel, alloyed steel, stainless steel.
<b>M</b>	WC+TiC+TaC+Co	General tools stable heat resistance with strength.	Carbon steel, alloyed steel, stainless steel, cast steel.
<b>K</b>	WC+Co	High strength and superior wear resistance.	Carbon iron, non-ferrous metal, plastic, etc.

## Properties

Grade	Hardness (HRA)	TRS (Kg/mm <sup>2</sup> )	Young's modulus (103Kg/mm <sup>2</sup> )	Thermal expansion coefficient (10 <sup>-6</sup> /°C)	Thermal conductivity (cal/cm-sec-°C)
<b>KM15</b>	90.9	250	63	-	105
<b>PM25</b>	91.9	200	56	5.2	45
<b>PM40</b>	91.3	230	53	5.2	-

## Inserts for parting and grooving

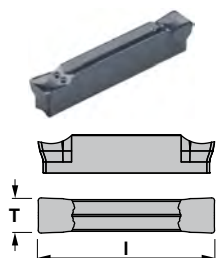
### USE CLASSIFICATION

- Continuous
- ◐ Slight interruption
- ⊕ Interruption

### AVAILABILITY

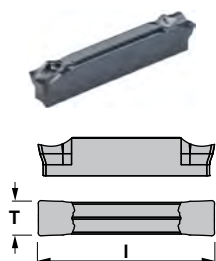
- Standard item
- Check availability

Grade	Continuous	Slight interruption	Interruption
TN15	●	◐	⊕
TN30	●	◐	⊕
TL20	●	◐	⊕
TL30	●	◐	⊕
TL40	●	◐	⊕
PM25	●	◐	⊕
PM40	●	◐	⊕
KM15	●	◐	⊕



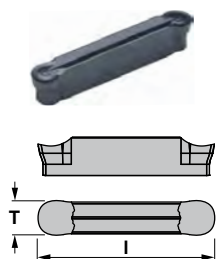
### WDMG

Reference	I	T	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL30	ZR10
WDMG02	0.866	0.078								●	
WDMG03	0.866	0.118								●	
WDMG04	0.984	0.157								●	
WDMG05	0.984	0.197								●	
WDMG06	0.984	0.236								●	



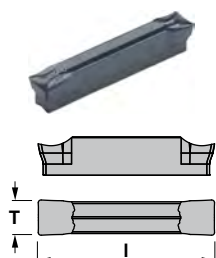
### WDMP

Reference	I	T	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL30	ZR10
WDMP02	0.866	0.078								●	
WDMP03	0.866	0.118								●	
WDMP04	0.984	0.157								●	
WDMP05	0.984	0.197								●	
WDMP06	0.984	0.236								●	



### WDMR

Reference	I	T	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL30	ZR10
WDMR02	0.866	0.078								●	
WDMR03	0.866	0.118								●	
WDMR04	0.984	0.157								●	
WDMR05	0.984	0.197								●	
WDMR06	0.984	0.236								●	



### WDMT

Reference	I	T	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL30	ZR10
WDMT02	0.866	0.078								●	
WDMT03	0.866	0.118								●	
WDMT04	0.984	0.157								●	
WDMT05	0.984	0.197								●	
WDMT06	0.984	0.236								●	



## Inserts for parting and grooving

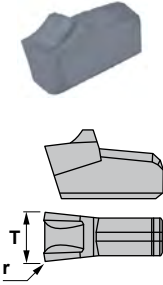
**USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ✚ Interruption

**AVAILABILITY**

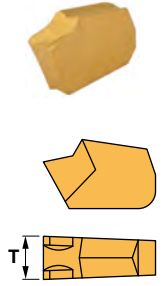
- Standard item
- Check availability

Grade	Continuous	Slight interruption	Interruption
TN15	[Progressive bar chart]		
TN30	[Progressive bar chart]		
TL20	[Progressive bar chart]		
TL30	[Progressive bar chart]		
TL40	[Progressive bar chart]		
PM25	[Progressive bar chart]		
PM40	[Progressive bar chart]		
KM15	[Progressive bar chart]		



### MRCN

Reference	T	r	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL40	ZR10
MRCN16	0.063	0.006								●	
MRCN22	0.087	0.008								●	
MRCN30	0.118	0.008								●	
MRCN40	0.157	0.008								●	
MRCN50	0.197	0.012								●	
MRCN60	0.236	0.016								●	



### PTNT

Reference	T	KM15	PM25	PM40	TN15	TN20	TN30	TN21	TL40	ZR10
PTNT02	0.083		●	●			●			
PTNT03	0.122	○	●	●			●	●		
PTNT04	0.161		●	●			●	●		
PTNT05	0.201	○	○				○			
PTNT06	0.240						○			
PTNT08	0.319						●			
PTNT09	0.358	○					●			

## Inserts for parting and grooving

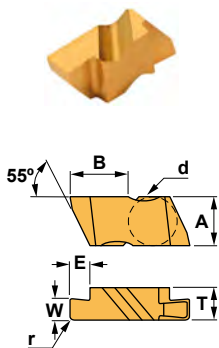
**i USE CLASSIFICATION**

- Continuous
- ◐ Slight interruption
- ✚ Interruption

**i AVAILABILITY**

- Standard item
- Check availability

Grade	Continuous	Slight interruption	Interruption
TN15	●	◐	✚
TN30	●	◐	✚
TL20	●	◐	✚
TL30	●	◐	✚
TL40	●	◐	✚
PM25	●	◐	✚
PM40	●	◐	✚
KM15	●	◐	✚



### NG

Reference	d	A	B	E	r	T	W	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL40	ZR10
NG2031R/L	0.187	0.219	0.270	0.050	0.002	0.150	0.031				○					
NG210R/L	0.187	0.219	0.270	0.050	0.002	0.150	0.039				○					
NG2041R/L	0.187	0.219	0.270	0.050	0.002	0.150	0.041				○					
NG2047R/L	0.187	0.219	0.270	0.050	0.002	0.150	0.047				○					
NG2058R/L	0.187	0.219	0.270	0.050	0.002	0.150	0.058				○					
NG2062R/L	0.187	0.219	0.270	0.110	0.002	0.150	0.062				○					
NG220R/L	0.187	0.219	0.270	0.110	0.002	0.150	0.080				○					
NG2094R/L	0.187	0.219	0.270	0.110	0.002	0.150	0.094				○					
NG230R/L	0.187	0.219	0.270	0.110	0.002	0.150	0.119				○					
NG2125R/L	0.187	0.219	0.270	0.110	0.002	0.150	0.125				○					
NG3031R/L	0.375	0.344	0.405	0.050	0.002	0.195	0.031				○					
NG310R/L	0.375	0.344	0.405	0.050	0.002	0.195	0.039				○					
NG3047R/L	0.375	0.344	0.405	0.075	0.002	0.195	0.047				○					
NG3062R/L	0.375	0.344	0.405	0.120	0.005	0.195	0.062				○					
NG3072R/L	0.375	0.344	0.405	0.120	0.005	0.195	0.072				○					
NG3078R/L	0.375	0.344	0.405	0.120	0.005	0.195	0.078				○					
NG320R/L	0.375	0.344	0.405	0.120	0.005	0.195	0.079				○					
NG3088R/L	0.375	0.344	0.405	0.120	0.005	0.195	0.088				○					
NG3094R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.094				○					
NG3105R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.105				○					
NG3110R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.110				○					
NG330R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.118				○					
NG3122R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.122				○					
NG3125R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.125				○					
NG3142R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.142				○					
NG3156R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.156				○					
NG340R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.158				○					
NG3178R/L	0.375	0.344	0.405	0.180	0.005	0.195	0.178				○					
NG3185R/L	0.375	0.344	0.405	0.180	0.020	0.195	0.185				○					
NG3189R/L	0.375	0.344	0.405	0.180	0.020	0.195	0.189				○					
NG4125R/L	0.375	0.453	0.636	0.250	0.005	0.255	0.125				○					
NG4189R/L	0.375	0.453	0.636	0.250	0.020	0.255	0.189				○					
NG450R/L	0.375	0.453	0.636	0.250	0.010	0.255	0.197				○					
NG4213R/L	0.375	0.453	0.636	0.250	0.005	0.255	0.213				○					
NG4219R/L	0.375	0.453	0.636	0.250	0.020	0.255	0.219				○					
NG4250R/L	0.375	0.453	0.636	0.250	0.020	0.255	0.250				○					
NG6281R/L	0.375	0.453	0.636	0.250	0.030	0.383	0.281				○					
NG6312R/L	0.375	0.453	0.636	0.250	0.030	0.383	0.319				○					
NG6375R/L	0.375	0.453	0.636	0.250	0.030	0.383	0.375				○					



## Inserts for parting and grooving

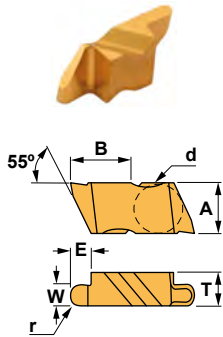
**i** USE CLASSIFICATION

- Continuous
- ◐ Slight interruption
- ✚ Interruption

**i** AVAILABILITY

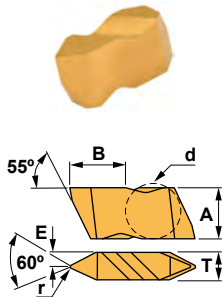
- Standard item
- Check availability

Grade	● Continuous	◐ Slight interruption	✚ Interruption
TN15	[Progressive bar chart]		
TN30	[Progressive bar chart]		
TL20	[Progressive bar chart]		
TL30	[Progressive bar chart]		
TL40	[Progressive bar chart]		
PM25	[Progressive bar chart]		
PM40	[Progressive bar chart]		
KM15	[Progressive bar chart]		



### NR

Reference	d	A	B	E	r	T	W	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL40	ZR10
NR2031R/L	0.187	0.219	0.268	0.110	0.031	0.150	0.062				○					
NR2047R/L	0.187	0.219	0.267	0.110	0.047	0.150	0.094				○					
NR2062R/L	0.187	0.219	0.266	0.110	0.062	0.150	0.125				○					
NR3031R/L	0.375	0.344	0.403	0.150	0.031	0.195	0.062				○					
NR3047R/L	0.375	0.344	0.402	0.150	0.047	0.195	0.094				○					
NR3062R/L	0.375	0.344	0.401	0.150	0.062	0.195	0.125				○					
NR3078R/L	0.375	0.344	0.400	0.150	0.078	0.195	0.156				○					
NR3094R/L	0.375	0.344	0.400	0.150	0.094	0.195	0.188				○					
NR4062R/L	0.375	0.453	0.632	0.250	0.062	0.255	0.125				○					
NR4094R/L	0.375	0.453	0.394	0.250	0.094	0.255	0.188				○					
NR4125R/L	0.375	0.453	0.630	0.250	0.125	0.255	0.250				○					



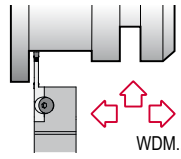
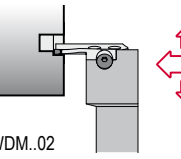
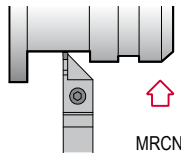
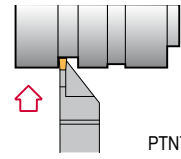
### NT

Reference	d	A	B	E	r	T	KM15	PM25	PM40	TN15	TN20	TN30	TK15	TL40	ZR10
NT2R/L	0.187	0.219	0.266	0.075	0.003	0.150				○					
NT3R/L	0.375	0.344	0.400	0.098	0.005	0.195				○					
NT4R/L	0.375	0.453	0.629	0.128	0.005	0.255				○					


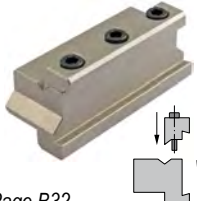




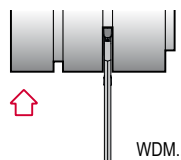
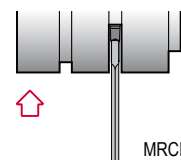
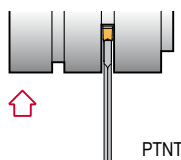
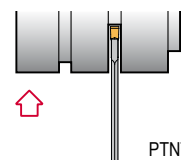
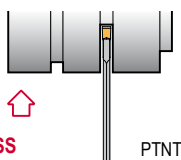
**Toolholders**

<p><b>CZGD</b></p>  <p>WDM..02 .. WDM..06</p> <p>Page B10</p>	<p><b>CZFD</b></p>  <p>WDM..02 .. WDM..06</p> <p>Page B11</p>	<p><b>CZCB</b></p>  <p>MRCN16 .. MRCN60</p> <p>Page B30</p>	<p><b>XLCF</b></p>  <p>PTNT02 PTNT03 PTNT04</p> <p>Page B31</p>	
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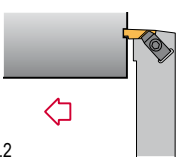
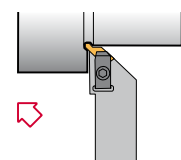
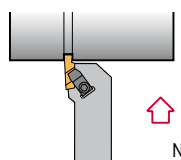
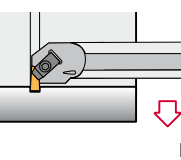
**Tool blocks**

<p><b>CPTS</b></p>  <p>Page B32</p>	<p><b>DPTS</b></p>  <p>Page B32</p>			
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**Blades**

<p><b>CZDPN</b></p>  <p>WDM..02 WDM..03 WDM..04</p> <p>Page B09</p>	<p><b>CRCFN</b></p>  <p>MRCN22 .. MRCN60</p> <p>Page B33</p>	<p><b>XLCFN</b></p>  <p>PTNT02 .. PTNT09</p> <p>Page B34</p>	<p><b>XLCTN</b></p>  <p>PTNT02 .. PTNT06</p> <p>Page B35</p>	<p><b>XLCTN-HSS</b></p>  <p>HSS PTNT02 .. PTNT05</p> <p>Page B36</p>
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**Top Notch tools**

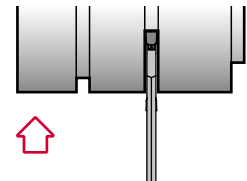
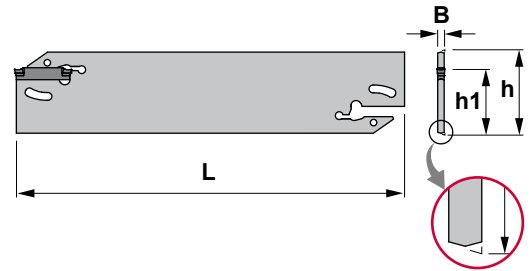
<p><b>NE 93°</b></p>  <p>N..2 N..3 N..4</p> <p>Page B37</p>	<p><b>NR 45°</b></p>  <p>N..3</p> <p>Page B38</p>	<p><b>NS 93°</b></p>  <p>N..2 N..3 N..4</p> <p>Page B39</p>	<p><b>NNTO 93°</b></p>  <p>N..2 N..3 N..4</p> <p>Page B40</p>	
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Characteristics:

Parting, grooving and face grooving blade that works well on steels, alloyed steels, stainless steels and refractories. Modular system for inserts with thickness from 0.078 to 0.157 inches.



# CZDPN

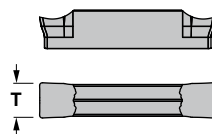
Reference	h	L	h1	B	Insert size	 lbs
CZDPN2601J02	1.023	4.330	0.842	0.086	WDM..02	0.130
CZDPN2602J03	1.023	4.330	0.842	0.118	WDM..03	0.155
CZDPN3201M02	1.260	5.906	0.984	0.086	WDM..02	0.200
CZDPN3202M03	1.260	5.906	0.984	0.118	WDM..03	0.220
CZDPN3203M04	1.260	5.906	0.984	0.157	WDM..04	0.275

Reference	
CZDPN2601J02	5735
CZDPN2602J03	5735
CZDPN3201M02	5735
CZDPN3202M03	5735
CZDPN3203M04	5735

## WDM..

 B04

Reference	T
WDM..02	0.078
WDM..03	0.118
WDM..04	0.157

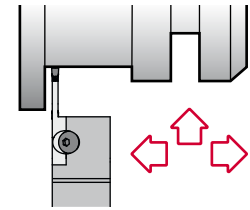
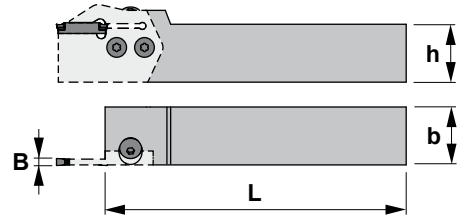


WDMG: Insert for grooving.  
 WDMP: Insert for parting.  
 WDMR: Insert for parting with radius.  
 WDMT: Insert for turning.





**Characteristics:**  
 Parting, grooving and side turning toolholder that works well on steels, alloyed steels, stainless steels and refractories.  
 Double-ended inserts with thickness from 0.078 to 0.236 inches.



## CZGD


Reference	h	b	L	B	lbs
CZGDL12-26	0.750	0.750	4.5	0.078-0.236	0.683
CZGDR12-26	0.750	0.750	4.5	0.078-0.236	0.683
CZGDL16-26	1.000	1.000	6.0	0.078-0.236	1.345
CZGDR16-26	1.000	1.000	6.0	0.078-0.236	1.345
CZGDL20-26	1.250	1.250	6.0	0.078-0.236	2.866
CZGDR20-26	1.250	1.250	6.0	0.078-0.236	2.866

Reference					Nm
CZGDL12-26	1025	1450	5003	5520	3.0
CZGDR12-26	1025	1450	5003	5520	3.0
CZGDL16-26	1025	1450	5003	5520	3.0
CZGDR16-26	1025	1450	5003	5520	3.0
CZGDL20-26	1025	1450	5003	5520	3.0
CZGDR20-26	1025	1450	5003	5520	3.0

## Modular blades

WDM..02  
WDM..03  
WDM..04  
WDM..05  
WDM..06




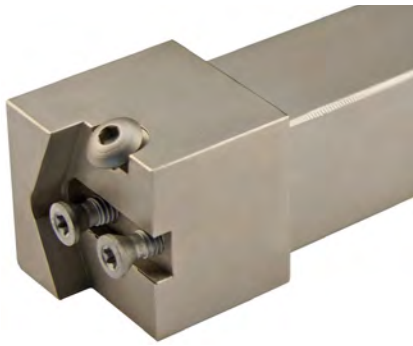


**CZGD**

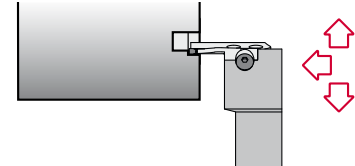
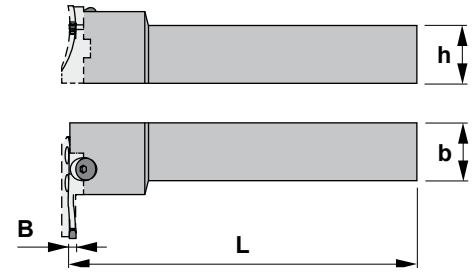
Right-handed holders use right-handed modular blades.

WDM..03  
WDM..04  
WDM..05  
WDM..06










**Characteristics:**  
Parting, grooving and face grooving toolholder that works well on steels, alloyed steels, stainless steels and refractories. Modular system for inserts with thickness from 0.078 to 0.236 inches.



## CZFD

Reference	h	b	L	B	
CZFDL12-26	0.750	0.750	4.5	0.078-0.236	0.990
CZFDR12-26	0.750	0.750	4.5	0.078-0.236	0.990
CZFDL16-26	1.000	1.000	6.0	0.078-0.236	1.720
CZFDR16-26	1.000	1.000	6.0	0.078-0.236	1.720
CZFDL20-26	1.250	1.250	6.0	0.078-0.236	3.090
CZFDR20-26	1.250	1.250	6.0	0.078-0.236	3.090

Reference					Nm
CZFDL12-26	1025	1450	5003	5520	3.0
CZFDR12-26	1025	1450	5003	5520	3.0
CZFDL16-26	1025	1450	5003	5520	3.0
CZFDR16-26	1025	1450	5003	5520	3.0
CZFDL20-26	1025	1450	5003	5520	3.0
CZFDR20-26	1025	1450	5003	5520	3.0

## Modular blades

WDM..02  
WDM..03  
WDM..04  
WDM..05  
WDM..06



**CZFD**

**Right-handed holders use left-handed modular blades.**

WDM..03  
WDM..04  
WDM..05  
WDM..06

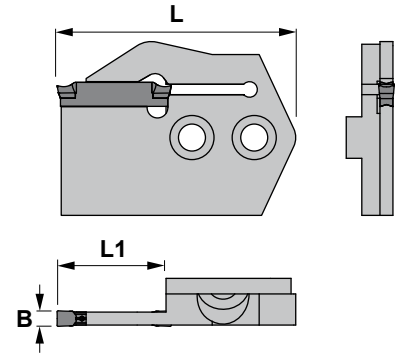




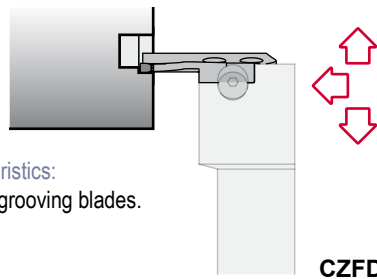
Right Hand



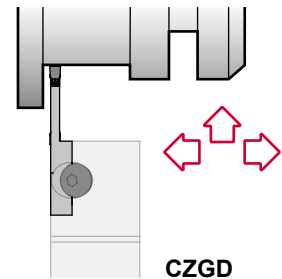
Left Hand



Characteristics:  
Modular grooving blades.



CZFD



CZGD

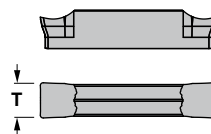
## CZFD

Reference	L1	L	B	Insert size
CZFDL0012-02	0.472	1.496	0.078	WDM..02
CZFDR0012-02	0.472	1.496	0.078	WDM..02
CZFDL0020-02	0.787	1.811	0.078	WDM..02
CZFDR0020-02	0.787	1.811	0.078	WDM..02
CZFDL0012-03	0.472	1.496	0.118	WDM..03
CZFDR0012-03	0.472	1.496	0.118	WDM..03
CZFDL0020-03	0.787	1.811	0.118	WDM..03
CZFDR0020-03	0.787	1.811	0.118	WDM..03
CZFDL0012-04	0.472	1.496	0.157	WDM..04
CZFDR0012-04	0.472	1.496	0.157	WDM..04
CZFDL0020-04	0.787	1.811	0.157	WDM..04
CZFDR0020-04	0.787	1.811	0.157	WDM..04
CZFDL0012-05	0.472	1.496	0.197	WDM..05
CZFDR0012-05	0.472	1.496	0.197	WDM..05
CZFDL0022-05	0.866	1.890	0.197	WDM..05
CZFDR0022-05	0.866	1.890	0.197	WDM..05
CZFDL0012-06	0.472	1.496	0.236	WDM..06
CZFDR0012-06	0.472	1.496	0.236	WDM..06
CZFDL0022-06	0.866	1.890	0.236	WDM..06
CZFDR0022-06	0.866	1.890	0.236	WDM..06

## WDM..

B04

Reference	T
WDM..02	0.078
WDM..03	0.118
WDM..04	0.157
WDM..05	0.197
WDM..06	0.236



WDMG: Insert for grooving.  
 WDMP: Insert for parting.  
 WDMR: Insert for parting with radius.  
 WDMT: Insert for turning.

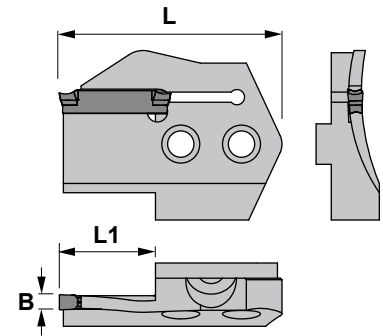




Right Hand



Left Hand



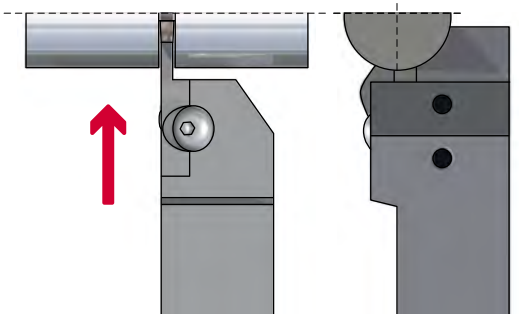
## CZFD

Reference	L1	L	B	Ø Range	Insert size
CZFDL4055-03	0.472	1.496	0.118	1.574-2.165	WDM..03
CZFDR4055-03	0.472	1.496	0.118	1.574-2.165	WDM..03
CZFDL5570-03	0.590	1.614	0.118	2.165-2.755	WDM..03
CZFDR5570-03	0.590	1.614	0.118	2.165-2.755	WDM..03
CZFDL7098-03	0.710	1.732	0.118	2.755-3.858	WDM..03
CZFDR7098-03	0.710	1.732	0.118	2.755-3.858	WDM..03
CZFDL90140-03	0.710	1.732	0.118	3.543-5.511	WDM..03
CZFDR90140-03	0.710	1.732	0.118	3.543-5.511	WDM..03
CZFDL130300-03	0.710	1.732	0.118	5.118-11.811	WDM..03
CZFDR130300-03	0.710	1.732	0.118	5.118-11.811	WDM..03
CZFDL300999-03	0.710	1.732	0.118	11.811-39.330	WDM..03
CZFDR300999-03	0.710	1.732	0.118	11.811-39.330	WDM..03
CZFDL4055-04	0.710	1.732	0.157	1.574-2.165	WDM..04
CZFDR4055-04	0.710	1.732	0.157	1.574-2.165	WDM..04
CZFDL5570-04	0.710	1.732	0.157	2.165-2.755	WDM..04
CZFDR5570-04	0.710	1.732	0.157	2.165-2.755	WDM..04
CZFDL7098-04	0.710	1.732	0.157	2.755-3.858	WDM..04
CZFDR7098-04	0.710	1.732	0.157	2.755-3.858	WDM..04
CZFDL90140-04	0.710	1.732	0.157	3.543-5.511	WDM..04
CZFDR90140-04	0.710	1.732	0.157	3.543-5.511	WDM..04
CZFDL130300-04	0.710	1.732	0.157	5.118-11.811	WDM..04
CZFDR130300-04	0.710	1.732	0.157	5.118-11.811	WDM..04
CZFDL300999-04	0.710	1.732	0.157	11.811-39.330	WDM..04
CZFDR300999-04	0.710	1.732	0.157	11.811-39.330	WDM..04
CZFDL5070-05	0.787	1.811	0.197	1.968-2.755	WDM..05
CZFDR5070-05	0.787	1.811	0.197	1.968-2.755	WDM..05
CZFDL7098-05	0.787	1.811	0.197	2.755-3.858	WDM..05
CZFDR7098-05	0.787	1.811	0.197	2.755-3.858	WDM..05
CZFDL90140-05	0.787	1.811	0.197	3.543-5.511	WDM..05
CZFDR90140-05	0.787	1.811	0.197	3.543-5.511	WDM..05
CZFDL130300-05	0.787	1.811	0.197	5.118-11.811	WDM..05
CZFDR130300-05	0.787	1.811	0.197	5.118-11.811	WDM..05
CZFDL300999-05	0.787	1.811	0.197	11.811-39.330	WDM..05
CZFDR300999-05	0.787	1.811	0.197	11.811-39.330	WDM..05
CZFDL5070-06	0.787	1.811	0.236	1.968-2.755	WDM..06
CZFDR5070-06	0.787	1.811	0.236	1.968-2.755	WDM..06
CZFDL7098-06	0.787	1.811	0.236	2.755-3.858	WDM..06
CZFDR7098-06	0.787	1.811	0.236	2.755-3.858	WDM..06
CZFDL90140-06	0.787	1.811	0.236	3.543-5.511	WDM..06
CZFDR90140-06	0.787	1.811	0.236	3.543-5.511	WDM..06
CZFDL130300-06	0.787	1.811	0.236	5.118-11.811	WDM..06
CZFDR130300-06	0.787	1.811	0.236	5.118-11.811	WDM..06
CZFDL300999-06	0.787	1.811	0.236	11.811-39.330	WDM..06
CZFDR300999-06	0.787	1.811	0.236	11.811-39.330	WDM..06

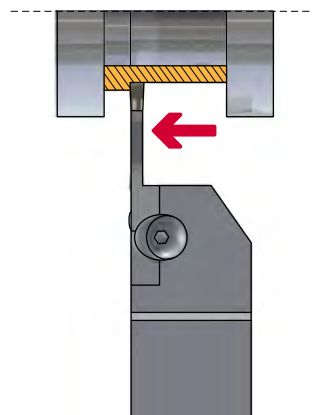
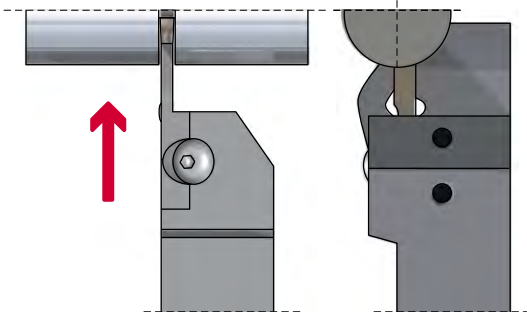
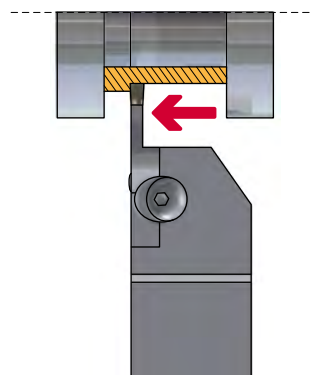
## Tool selection

### Notes to select the tool body

Modular blade



Modular blade



**i** Select the shortest possible blade suitable for the application.

**i** Select the shortest possible blade suitable for the application.

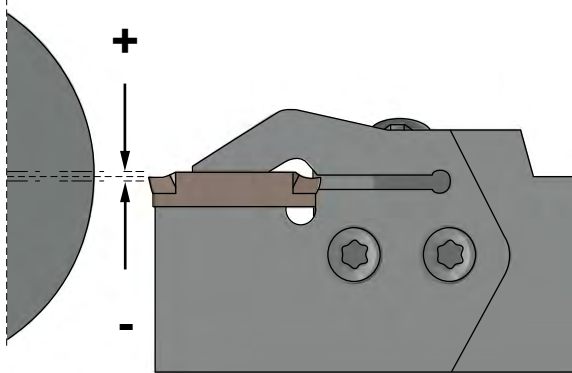




**Tool selection**

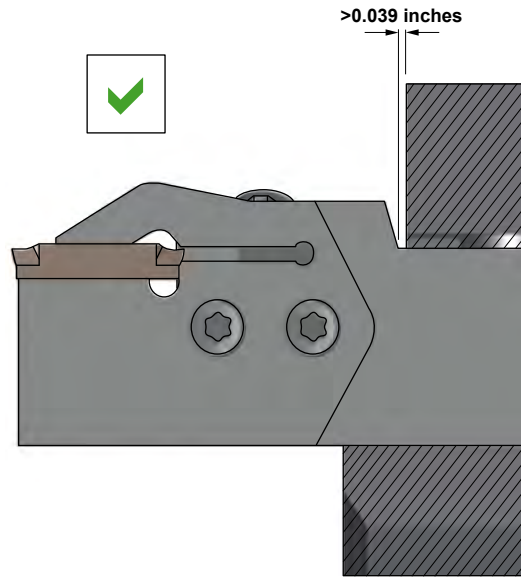
**Notes for the tool setting**

*Setting of the cutting edge height*

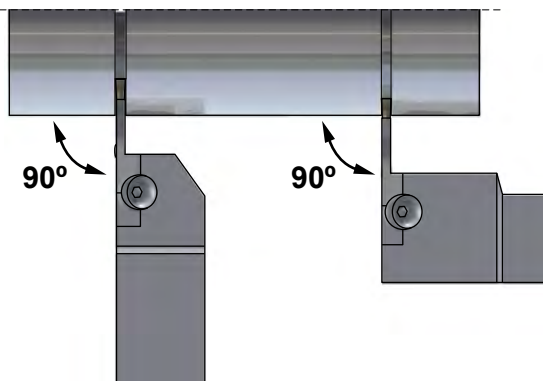


**i** <Grooving/Cross-feed machining> Set the cutting edge height to  $\pm 0.039$  inches parallel to the central axis.  
 <Parting> Set the cutting edge height to  $0 \pm 0.007$  inches parallel to the central axis.

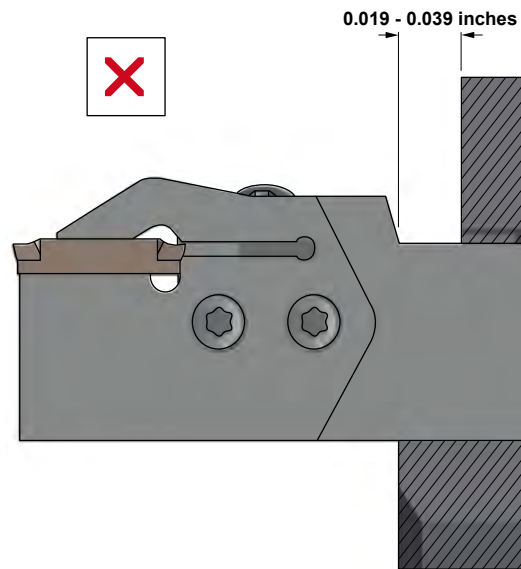
*Overhang*



*Tool setting angle*



**i** Set the insert perpendicular to the central axis.

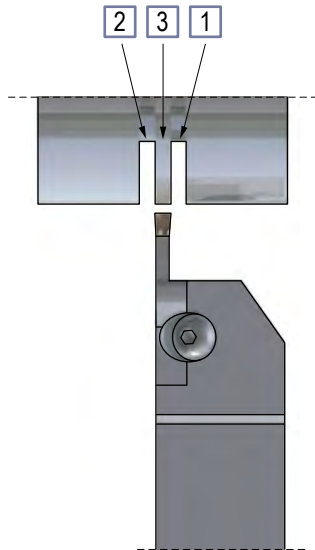


**i** When you set the tool, ensure that the overhang is as short as possible.

## Machining recommendations

### Notes for multi-functional machining

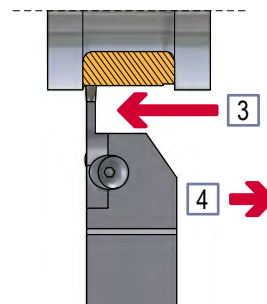
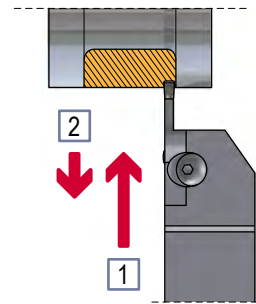
#### Machining of narrow grooves



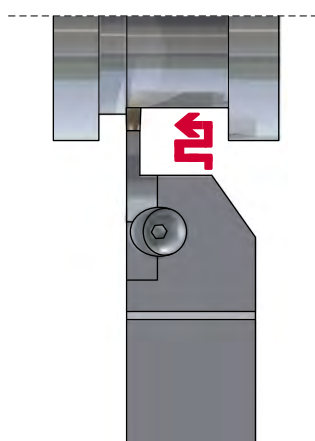
- i** We recommend to do the plunging in several passes. Following the above mentioned steps makes it difficult for the chips to elongate. This also improves the accuracy of the workpiece wall surface.

#### Machining of wide grooves

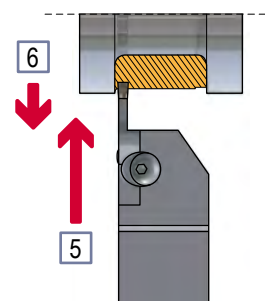
##### ROUGHING



#### Machining wide grooves



- i** It is recommended to use cross-feed machining.



- i** 1 - Carry out grooving.  
 2 - Retract the tool approx. 0.003 inch.  
 3 - Carry out cross-feed machining.  
 4 - Retract the tool approx. 0.003 inch.  
 5 - Carry out grooving.  
 6 - Retract the tool approx. 0.003 inch.  
 \* Repeat the steps 1 - 6.

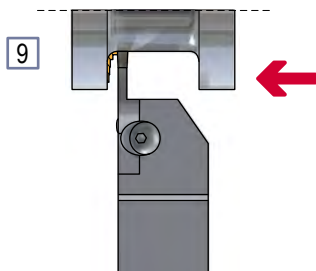
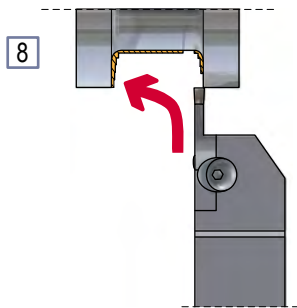
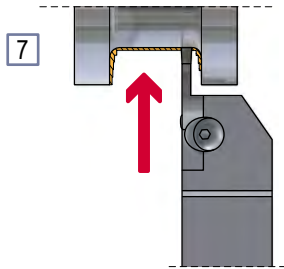


**Machining recommendations**

**Notes for multi-functional machining**

*Machining wide grooves*

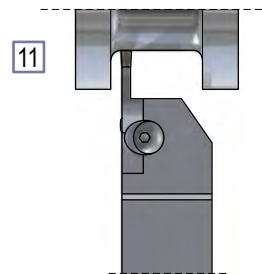
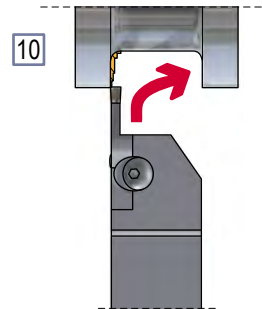
*FINISHING*



- i** 7 - Carry out grooving to the end point of the corner radius.
- 8 - The machining of the wall surface, corner radius and bottom face must be carried out in one process.
- 9 - Stop at the bottom of the corner radius.

*Machining wide grooves*

*FINISHING*

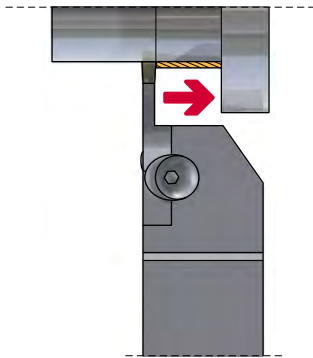


- i** 10 - Machine the counter wall to the corner radius in one process.
- 11 - Finish the machining.

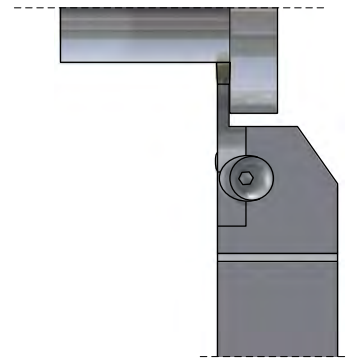
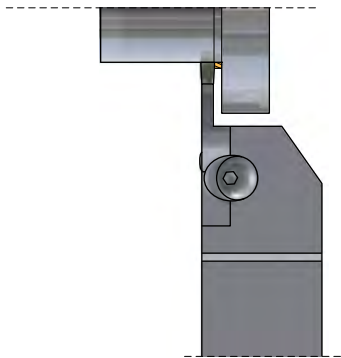
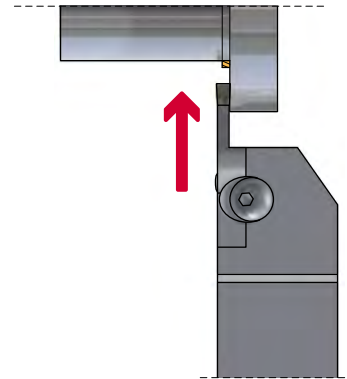
## Machining recommendations

### Notes for multi-functional machining

Wall machining



Wall machining



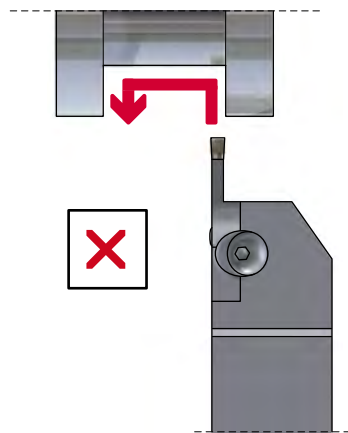
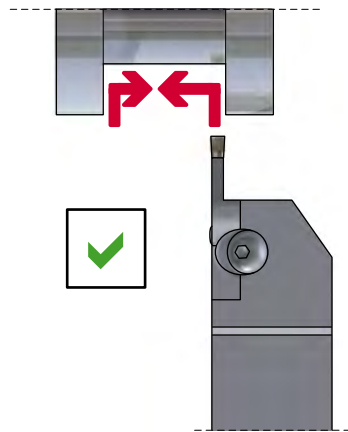
- i** When machining a wall, chip jamming can occur. In that case, stop the cross-feed machining just before the wall (a point less than the insert width) and then remove the remaining material by plunging.



**Machining recommendations**

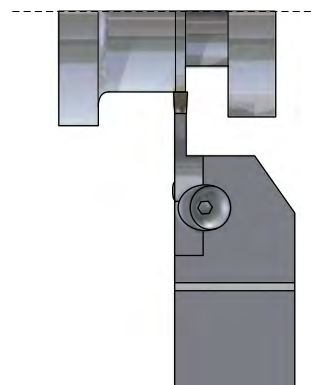
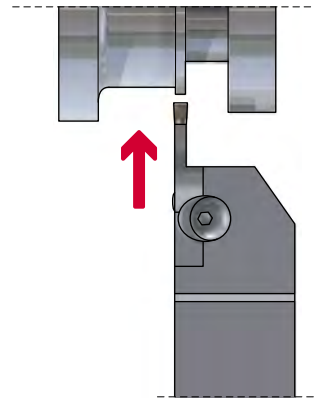
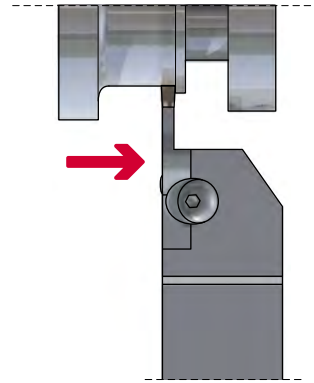
**Notes for multi-functional machining**

*Precautions when finishing walls*



**i** To produce high accuracy walls using face grooving inserts, do not carry out back turning. We recommend plunging.

*Machining of a ring*

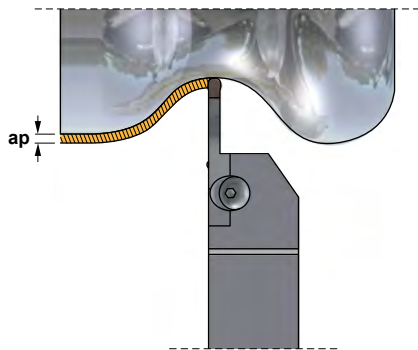


**i** When a ring remains in a cross-feed end process, finish the cross-feed machining 0.039-0.059 inches short of the end point, and then remove the ring by plunging.

## Machining recommendations

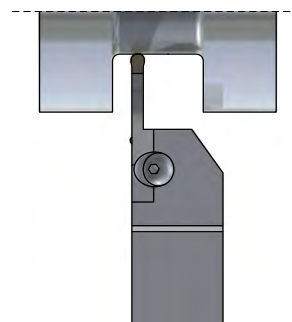
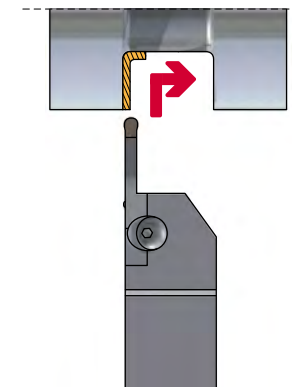
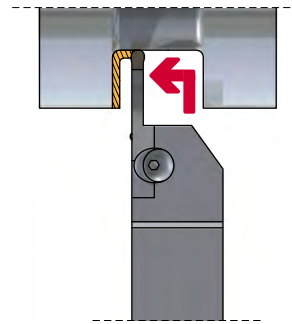
### Notes for multi-functional machining

#### Notes for the first pass

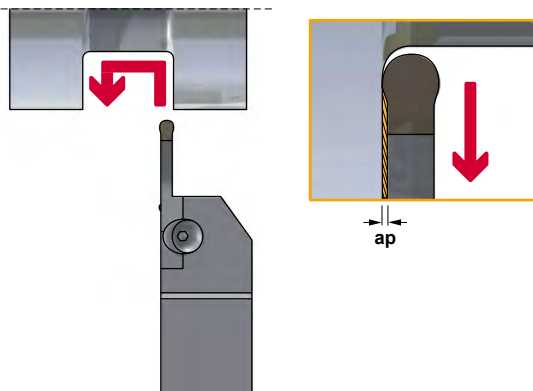


- i** With the face grooving ball nose insert it is possible to do tridimensional copying. Set the depth of cut ( $ap$ ) to 40% less than the insert width.

#### ROUGHING



#### FINISHING



WDMR	$ap$ (inch)
WDMR03	0.003
WDMR04	0.005
WDMR05	0.007
WDMR06	0.009

- i** Carry out finishing in one process. For the depth of cut ( $ap$ ) when back turning, refer to the table above.

- i** Use plunging and cross-feed machining. When machining the corner, vibration is likely to occur. To avoid this, reduce the feed by 50%.



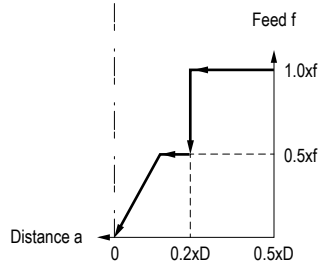
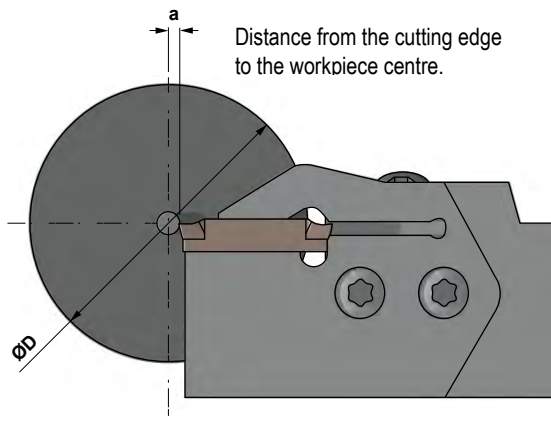


**Machining recommendations**

**Notes for parting**

**FEED**

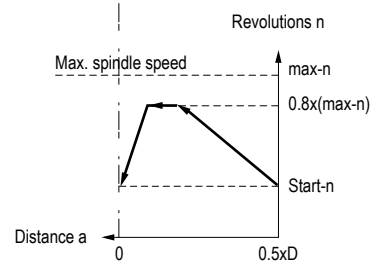
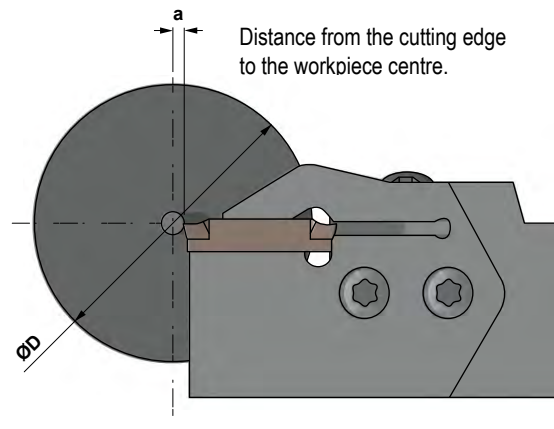
<Feed>



- i** - When the cutting edge approaches the centre, reduce the feed by 50%.
- If necessary, stop the feed prior to reaching the centre of the workpiece to prevent it falling under its own weight.

**REVOLUTIONS**

<Spindle speed>

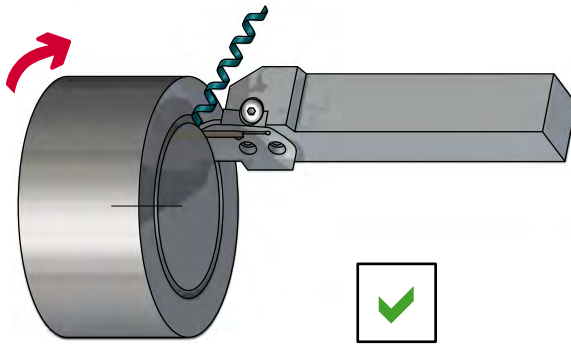


- i** If you use a constant cutting speed during a parting cycle, it is recommended to limit the spindle speed to 80% of maximum to ensure stability.
- To prevent the workpiece from being expelled, reduce the spindle speed before finishing the grooving operation.

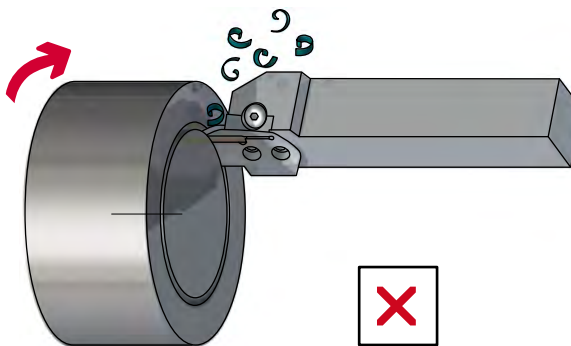
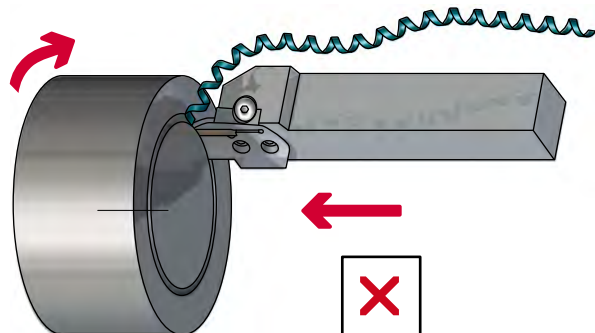
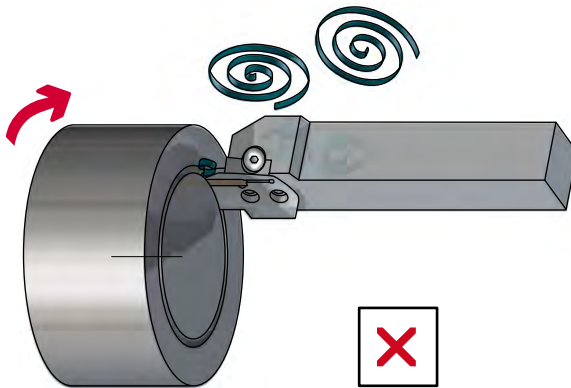
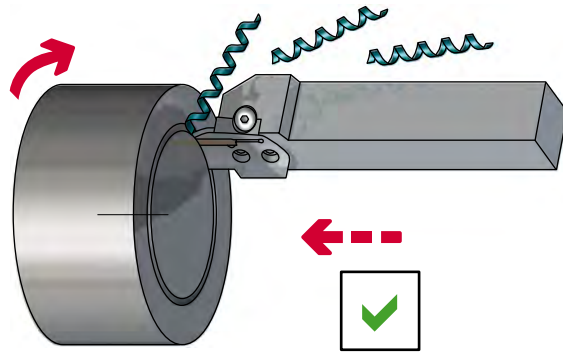
## Machining recommendations

### Notes for face grooving

Notes for the first pass



Notes for the first pass



**i** If the chips become too long, use peck feed to break them into a suitable length.

**i** During the first face grooving pass it is difficult to disperse the broken chips, and that can lead to problems, such as insert wearing. Maintain longer chips that disperse easily by reducing the feed per rotation.



**Machining recommendations**

**Notes for face grooving**

*Notes for face grooving by plunging in several passes*

1

2

3

**i** When machining a face groove in several passes, machine from the outer diameter towards the centre, leaving space for discharging chips, and so preventing insert damage caused by chip jamming. It is recommended to set the plunging width of cut at 60-80% of the insert width. This enhances the effect of the chipbreaker by enlarging the width of the groove to improve chip dispersal.

*Notes for face grooving by combination of plunging and traverse machining*

1

2

$ap \times 2$

3

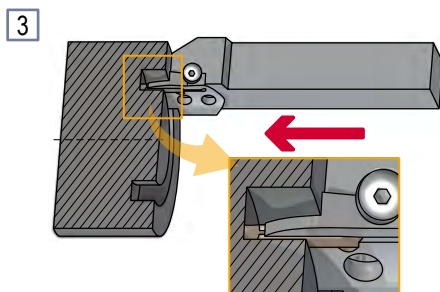
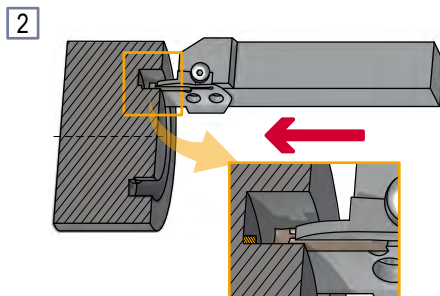
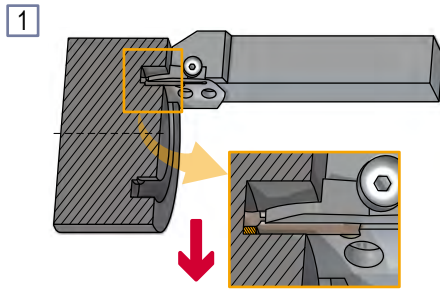
$ap \times 3$

**i** When face grooving by using plunge feed and traverse machining, always machine from the outer diameter towards the centre to disperse the chips outwards in order to avoid chip jamming problems. Set the depth of cut within 40% of the insert width.

## Machining recommendations

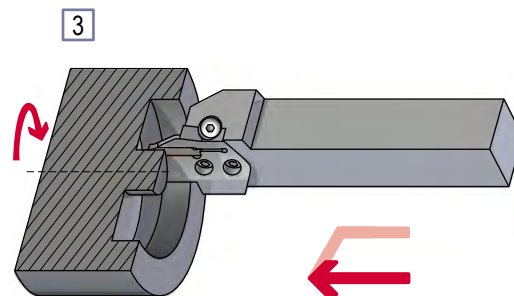
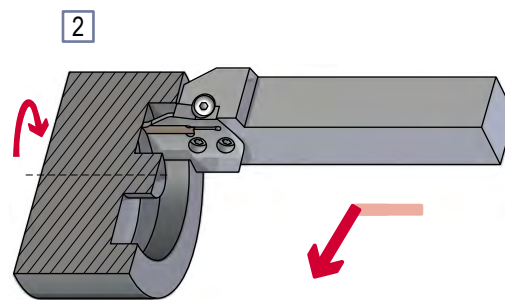
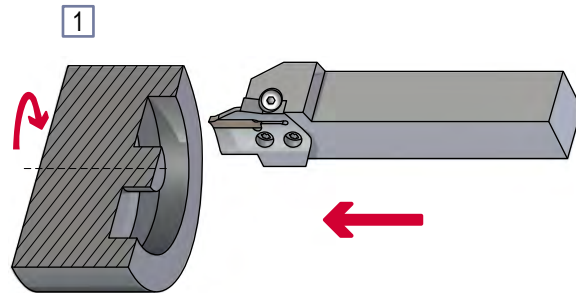
### Notes for face grooving

#### Notes for face grooving by combination of plunging and traverse machining



- i** When infeed machining at the bottom of a deep groove, chips may interfere on the cutting edge near the centre wall. In such cases, stop infeed machining just before the centre wall (at a point less than the insert width) and then remove the remaining material by plunging.

#### Finishing



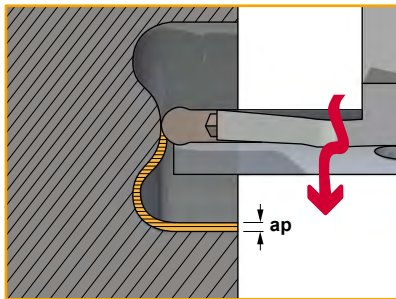
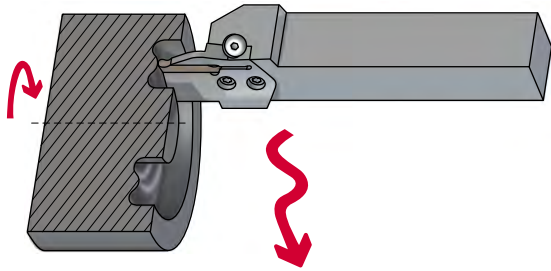
- i** When you finish cutting, machine continuously from the outer wall to the bottom of the groove, then finally plunge cut the centre wall.



**Machining recommendations**

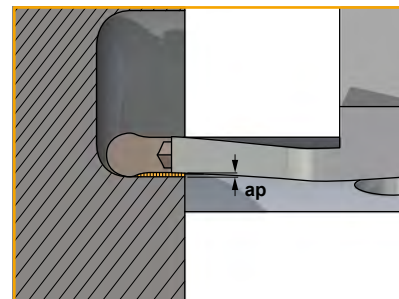
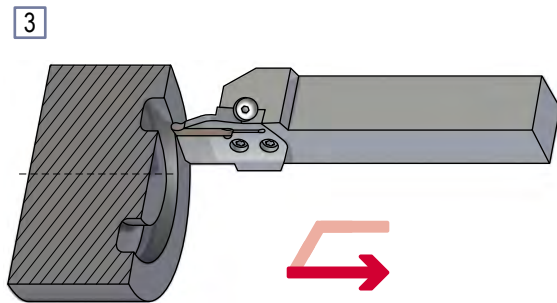
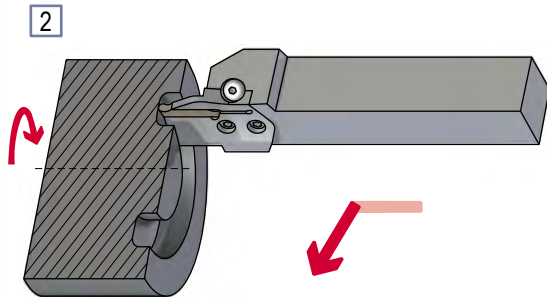
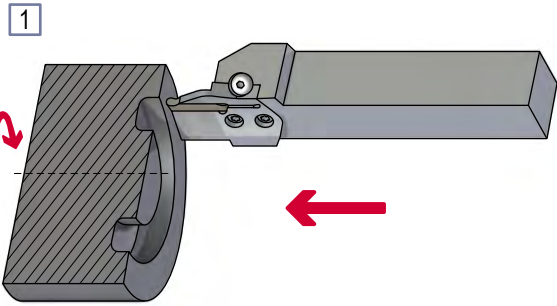
**Notes for face grooving**

*Notes for the copying with a ball nose insert*



**i** With the ball nose insert it is possible to do tridimensional copying. Set the depth of cut (ap) to 30% less than the insert width.

*Finishing with a ball nose insert*



<b>WDMR</b>	<b>ap (inch)</b>
WDMR03	0.003
WDMR04	0.005
WDMR05	0.007
WDMR06	0.009

**i** Carry out finishing in one process. For the depth of cut (ap) when back turning, refer to the table above.

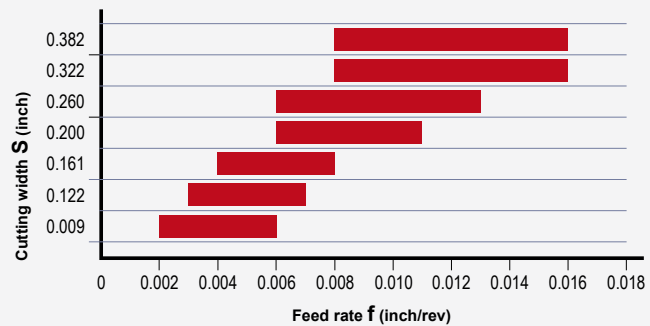
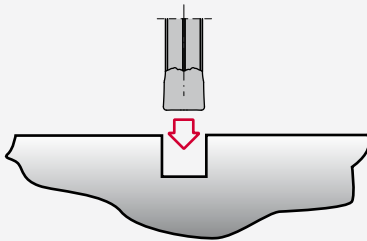
## Nominal cutting speed and feed values for parting and grooving

**WDMG**



**WDMG** Medium cutting geometry

- Insert with narrow negative chamfer.
- Suitable for all steel materials with high strength.
- Suitable for all applications.
- For steel and grey cast iron.





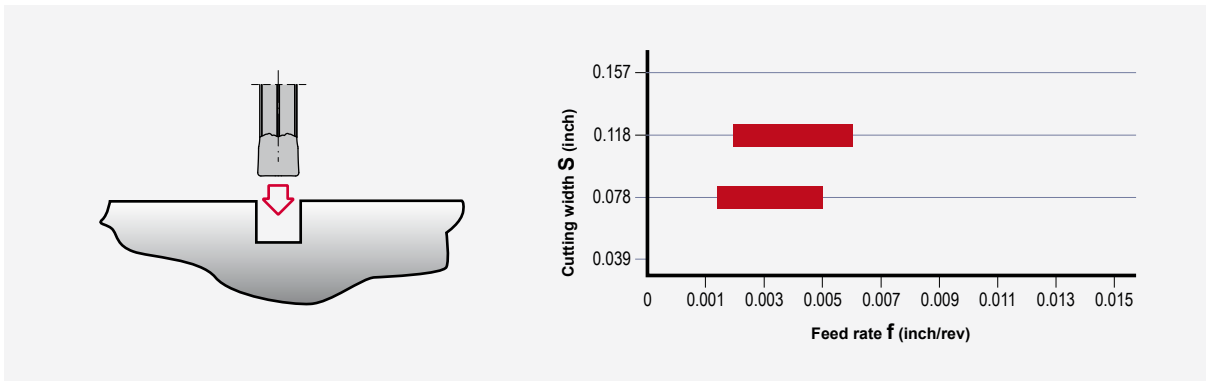


**Nominal cutting speed and feed values for parting and grooving**



**WDMP** Soft cutting geometry

- Especially for stainless steel.
- Problem solver for steel machining.



Material	M	HB	Condition	Cutting speed	
				TL30	
				Vc (ft/min)	
Stainless steel		200	Annealed ferritic	164 656	
		180	Quenched austenitic	164 590	
		230-260	Quenched duplex	164 328	
		330	Hardened martensitic	164 262	

**Nominal cutting speed and feed values for parting and grooving**

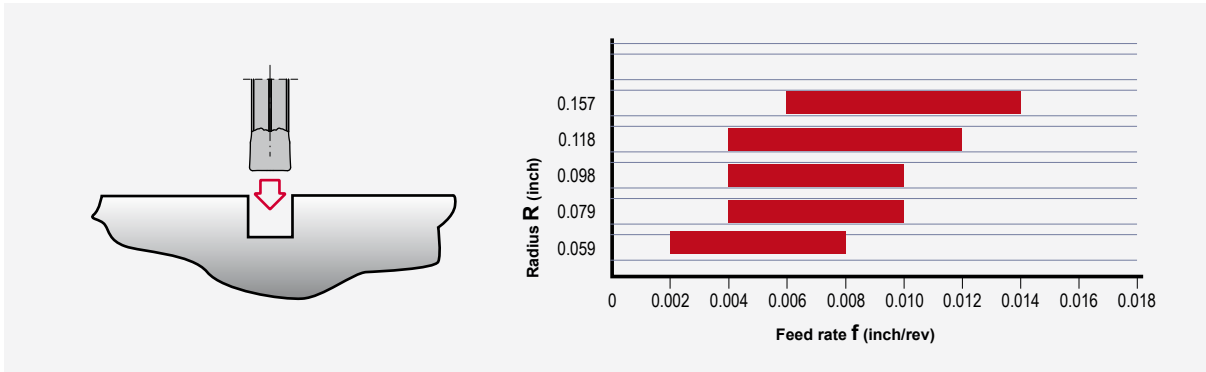
**WDMR**



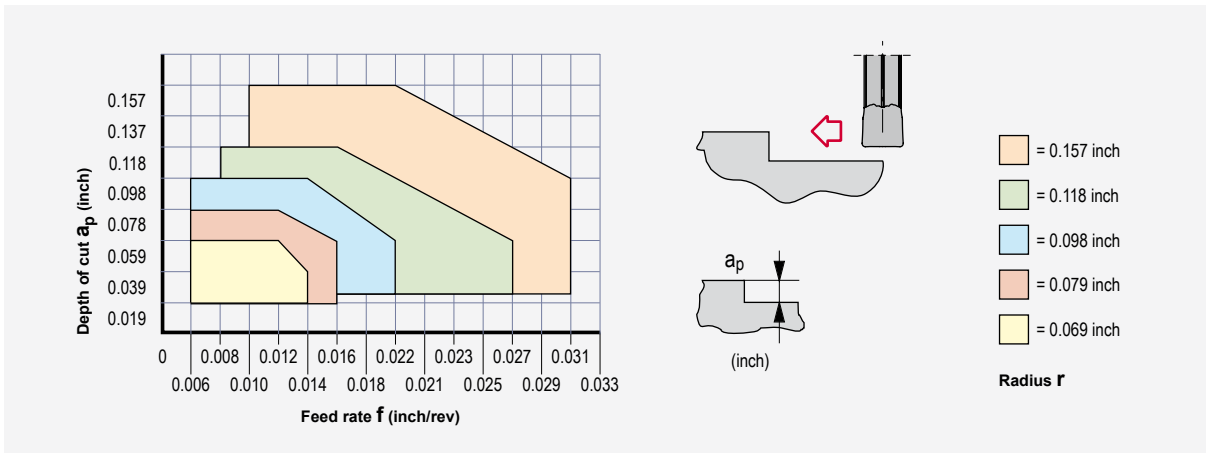
**WDMR** Radius grooves

- Insert for radius grooves.
- For copy turning.
- Suitable for all steel and cast iron materials.

**Feed rate for parting and grooving**



**Feed rate for longitudinal turning**





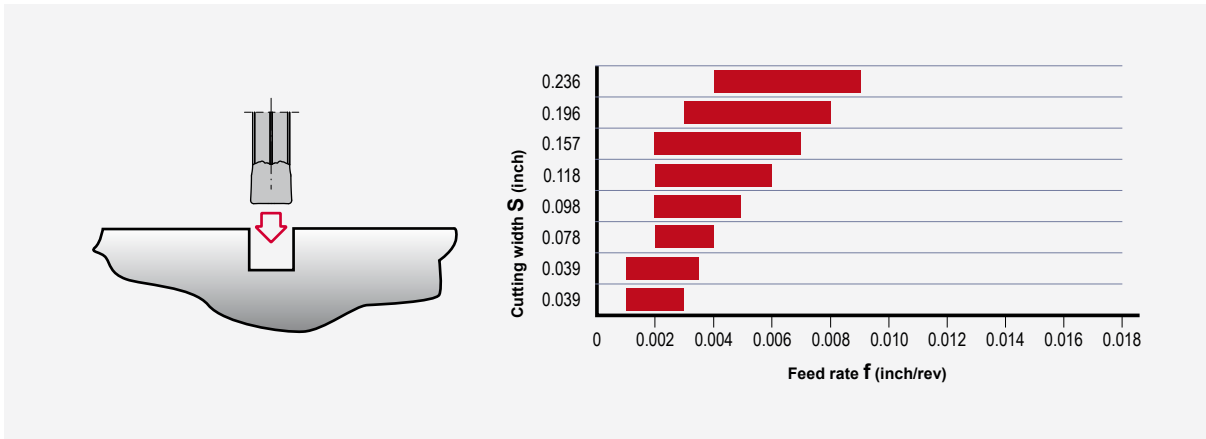
## Nominal cutting speed and feed values for parting and grooving



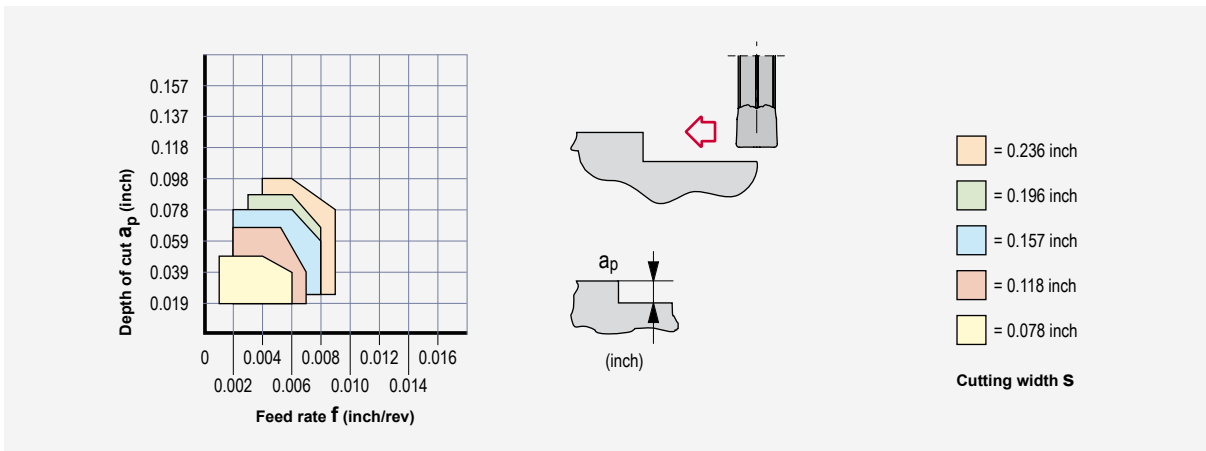
### WDMT Grooving and Turning

- For grooving and turning.
- Suitable for all steel and stainless steel materials.
- Very good chip control.

### Feed rate for parting and grooving



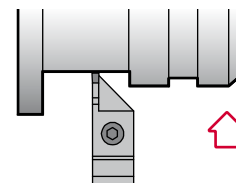
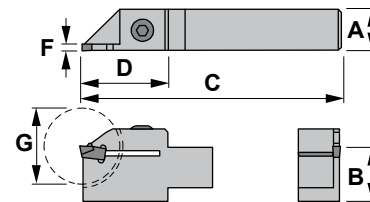
### Feed rate for longitudinal turning





**Characteristics:**

Parting, grooving and side turning toolholder that works well on steels, alloyed steels, stainless steels and refractories.

Single-ended inserts with thickness from 0.08 to 0.35 inches.

**CZCB**

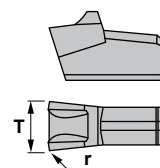
Reference	A	B	C	D	F	G	Insert size	
CZCBR/L06-16	0.375	0.375	3.543	0.984	0.063	0.866	MRCN16	0.176
CZCBR/L06-22	0.375	0.375	3.543	0.984	0.087	0.866	MRCN22	0.176
CZCBR/L08-16	0.500	0.500	3.543	0.984	0.063	0.866	MRCN16	0.220
CZCBR/L08-22	0.500	0.500	3.543	0.984	0.087	0.866	MRCN22	0.220
CZCBR/L10-22	0.500	0.625	3.740	1.142	0.087	1.260	MRCN22	0.330
CZCBR/L10-30	0.500	0.625	3.740	1.142	0.118	1.260	MRCN30	0.330
CZCBR/L12-30	0.625	0.750	5.905	1.378	0.118	1.654	MRCN30	0.770
CZCBR/L12-40	0.625	0.750	5.905	1.378	0.157	1.654	MRCN40	0.770
CZCBR/L12-50	0.625	0.750	5.905	1.378	0.197	1.654	MRCN50	0.770
CZCBR/L12-60	0.625	0.750	5.905	1.378	0.236	1.654	MRCN60	0.770
CZCBR/L16-30	0.750	1.000	6.497	1.968	0.118	3.150	MRCN30	1.210
CZCBR/L16-40	0.750	1.000	6.497	1.968	0.157	3.150	MRCN40	1.210
CZCBR/L16-50	0.750	1.000	6.497	1.968	0.197	3.150	MRCN50	1.210
CZCBR/L16-60	0.750	1.000	6.497	1.968	0.236	3.150	MRCN60	1.210

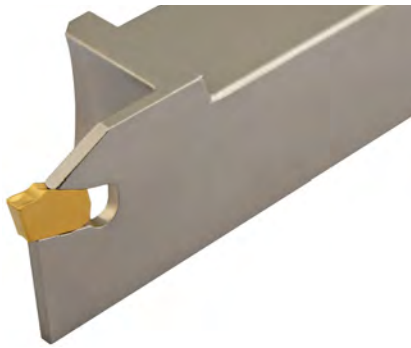
Reference		
CZCBR/L06-16	1905	5004
CZCBR/L06-22	1905	5004
CZCBR/L08-16	1905	5004
CZCBR/L08-22	1905	5004
CZCBR/L10-22	1916	5005
CZCBR/L10-30	1916	5005
CZCBR/L12-30	1906	5005
CZCBR/L12-40	1906	5005
CZCBR/L12-50	1906	5005
CZCBR/L12-60	1906	5005
CZCBR/L16-30	1906	5005
CZCBR/L16-40	1906	5005
CZCBR/L16-50	1906	5005
CZCBR/L16-60	1906	5005

**MRCN**

Single-ended insert for parting and grooving.  B05

Reference	T	r
MRCN16	0.063	0.006
MRCN22	0.087	0.008
MRCN30	0.118	0.008
MRCN40	0.157	0.008
MRCN50	0.197	0.012
MRCN60	0.236	0.016

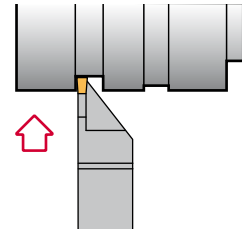
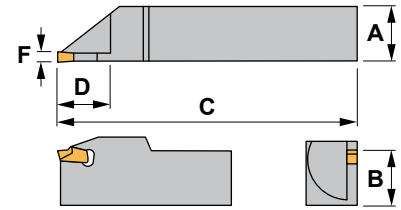
**MRCN**




**Characteristics:**


Parting and grooving toolholder that works well on steels, alloyed steels, stainless steels and refractories.

Single-ended inserts with thickness from 0.08 to 0.35 inches.



# XLCF

Reference	A	B	C	D	F	Insert size	
XLCFR/L06-2B	0.375	0.375	4.331	0.709	0.078	PTNT02	0.176
XLCFR/L08-2B	0.500	0.500	4.331	0.709	0.078	PTNT02	0.220
XLCFR/L52-3B	0.500	0.625	4.331	0.787	0.118	PTNT03	0.330
XLCFR/L52-4B	0.500	0.625	4.331	0.787	0.157	PTNT04	0.330
XLCFR/L62-3C	0.500	0.750	4.921	0.787	0.118	PTNT03	0.440
XLCFR/L62-4C	0.500	0.750	4.921	0.787	0.157	PTNT04	0.440
XLCFR/L12-3C	0.750	0.750	4.921	0.787	0.118	PTNT03	0.770
XLCFR/L12-4C	0.750	0.750	4.921	0.787	0.157	PTNT04	0.770
XLCFR/L16-3D	1.000	1.000	5.906	0.787	0.118	PTNT03	1.430
XLCFR/L16-4D	1.000	1.000	5.906	0.787	0.157	PTNT04	1.430

Reference	
XLCFR/L06-2B	5732
XLCFR/L08-2B	5732
XLCFR/L52-3B	5732
XLCFR/L52-4B	5732
XLCFR/L62-3C	5732
XLCFR/L62-4C	5732
XLCFR/L12-3C	5732
XLCFR/L12-4C	5732
XLCFR/L16-3D	5732
XLCFR/L16-4D	5732

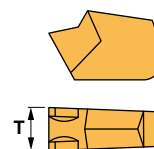
## PTNT

Single-ended insert for parting and grooving.  B05

**Reference**

**T**

PTNT02	0.083
PTNT03	0.122
PTNT04	0.161



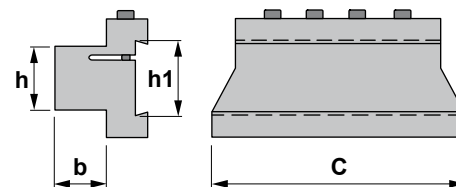
**PTNT**






**Characteristics:**

Tool blocks manufactured with two slot-guides that allow to maintain the blade always guided.

For manual and C.N.C. lathes.



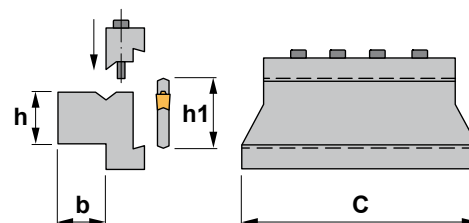
## CPTS

Reference	h1	C	h	b			
CPTS-1019	0.750	2.990	0.625	0.625	1075	5004	0.660
CPTS-1026	1.020	3.430	0.625	0.625	1076	5005	0.990
CPTS-1226	1.020	3.430	0.750	0.750	1076	5005	1.100
CPTS-1232	1.250	3.940	0.750	0.750	1076	5005	1.540
CPTS-1632	1.250	4.330	1.000	1.000	1076	5005	2.090
CPTS-2032	1.250	4.750	1.250	1.250	1076	5005	3.080
CPTS-2432	1.250	4.750	1.500	1.640	1076	5005	3.080





**Characteristics:**

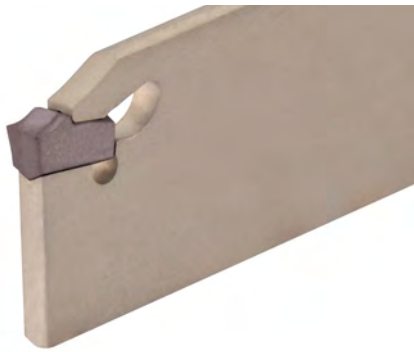
Tool blocks manufactured with two slot-guides that allow to maintain the blade always guided. Fixing system in two parts for machines with difficult access.

For manual and C.N.C. lathes.

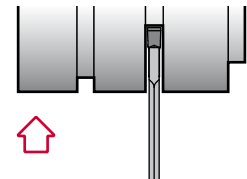
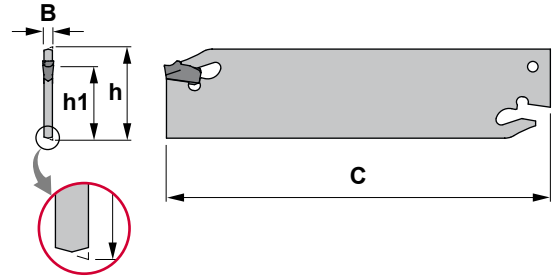


## DPTS


Reference	h1	C	h	b				
DPTS-1019	0.750	2.990	0.625	0.625	1075	2916	5004	0.550
DPTS-1026	1.020	3.430	0.625	0.625	1076	2920	5005	1.210
DPTS-1226	1.020	3.430	0.750	0.750	1076	2920	5005	1.540
DPTS-1232	1.250	3.940	0.750	0.750	1076	2930	5005	1.650
DPTS-1632	1.250	4.330	1.000	1.000	1076	2935	5005	2.200
DPTS-2032	1.250	4.750	1.250	1.250	1076	2942	5005	3.190
DPTS-2432	1.250	4.750	1.500	1.640	1076	2950	5005	3.190




**Characteristics:**  
 Parting and grooving blade that works well on steels, alloyed steels, stainless steels and refractories.  
 Single-ended inserts with thickness from 0.08 to 0.23 inches.



## CRCFN

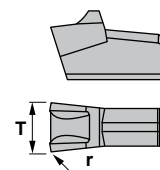
Reference	h	C	h1	B	Insert size	 lbs
CRCFN2601J02	1.020	4.330	0.840	0.086	MRCN22	0.132
CRCFN2602J03	1.020	4.330	0.840	0.118	MRCN30	0.154
CRCFN2603J04	1.020	4.330	0.840	0.157	MRCN40	0.198
CRCFN2604J05	1.020	4.330	0.840	0.196	MRCN50	0.220
CRCFN2605J06	1.020	4.330	0.840	0.236	MRCN60	0.220
CRCFN3202M03	1.250	5.900	0.980	0.118	MRCN30	0.220
CRCFN3203M04	1.250	5.900	0.980	0.157	MRCN40	0.275
CRCFN3204M05	1.250	5.900	0.980	0.196	MRCN50	0.374
CRCFN3205M06	1.250	5.900	0.980	0.236	MRCN60	0.410

Reference	
CRCFN2601J02	5735
CRCFN2602J03	5735
CRCFN2603J04	5735
CRCFN2604J05	5735
CRCFN2605J06	5735
CRCFN3202M03	5735
CRCFN3203M04	5735
CRCFN3204M05	5735
CRCFN3205M06	5735

## MRCN

Single-ended insert for parting and grooving.  B05

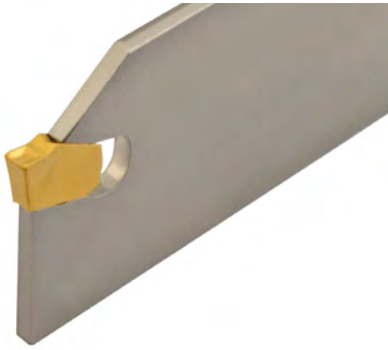
Reference	T	r
MRCN22	0.087	0.008
MRCN30	0.118	0.008
MRCN40	0.157	0.008
MRCN50	0.197	0.012
MRCN60	0.236	0.016



## MRCN

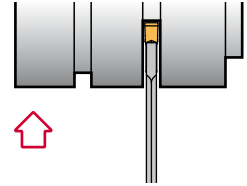
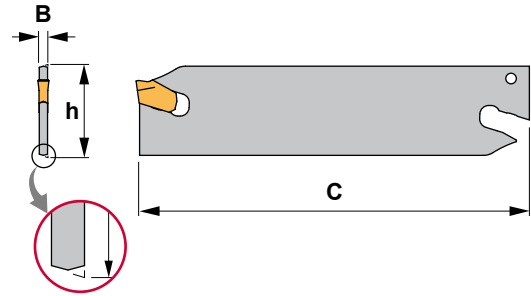






**Characteristics:**

Parting and grooving blade that works well on steels, alloyed steels, stainless steels and refractories.

Single-ended inserts with thickness from 0.08 to 0.35 inches.

**XLCFN**

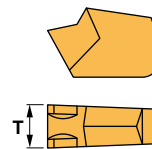
Reference	h	C	B		Insert size	
XLCFN1901X02	0.750	3.386	0.083	5732	PTNT02	0.088
XLCFN2601J02	1.020	4.331	0.083	5732	PTNT02	0.110
XLCFN2602J03	1.020	4.331	0.122	5732	PTNT03	0.110
XLCFN2603J04	1.020	4.331	0.161	5732	PTNT04	0.187
XLCFN2604J05	1.020	4.331	0.201	5732	PTNT05	0.209
XLCFN2605J06	1.020	4.331	0.240	5732	PTNT06	0.264
XLCFN3201M02	1.250	5.906	0.083	5732	PTNT02	0.165
XLCFN3202M03	1.250	5.906	0.122	5732	PTNT03	0.220
XLCFN3203M04	1.250	5.906	0.161	5732	PTNT04	0.286
XLCFN3204M05	1.250	5.906	0.201	5732	PTNT05	0.352
XLCFN3205M06	1.250	5.906	0.240	5732	PTNT06	0.418
XLCFN3207M08	1.250	5.906	0.319	5732	PTNT08	0.506
XLCFN3208M09	1.250	5.906	0.358	5732	PTNT09	0.594
XLCFN5207X08	2.087	7.480	0.319	5732	PTNT08	1.100
XLCFN5208X09	2.087	7.480	0.358	5732	PTNT09	1.320
XLCFN5307X08	2.087	10.236	0.319	5732	PTNT08	1.540
XLCFN5308X09	2.087	10.236	0.358	5732	PTNT09	1.760

**PTNT**

Single-ended insert for parting and grooving.

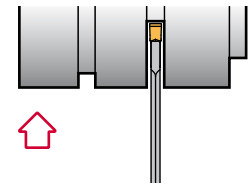
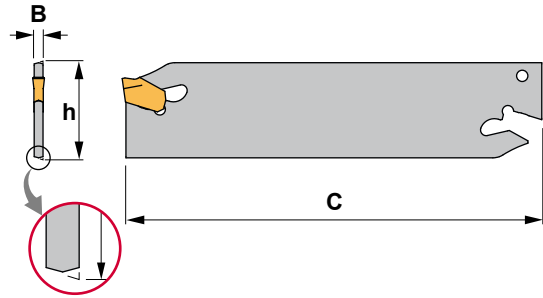
 B05

Reference	T
PTNT02	0.083
PTNT03	0.122
PTNT04	0.161
PTNT05	0.201
PTNT06	0.240
PTNT08	0.319
PTNT09	0.358

**PTNT**



**Characteristics:**  
 Parting and grooving positive stop blade that works well on steels, alloyed steels, stainless steels and refractories.  
 For inserts with thickness from 0.078 to 0.236 inches.



## XLCTN

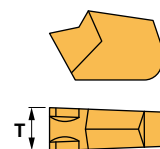
Reference	h	C	B	Insert size	lbs
XLCTN1901X02	0.750	3.386	0.083	PTNT02	0.088
XLCTN2601J02	1.020	4.331	0.083	PTNT02	0.110
XLCTN2602J03	1.020	4.331	0.122	PTNT03	0.110
XLCTN2603J04	1.020	4.331	0.161	PTNT04	0.187
XLCTN2604J05	1.020	4.331	0.201	PTNT05	0.209
XLCTN2605J06	1.020	4.331	0.240	PTNT06	0.264
XLCTN3201M02	1.250	5.906	0.083	PTNT02	0.165
XLCTN3202M03	1.250	5.906	0.122	PTNT03	0.220
XLCTN3203M04	1.250	5.906	0.161	PTNT04	0.286
XLCTN3204M05	1.250	5.906	0.201	PTNT05	0.352
XLCTN3205M06	1.250	5.906	0.240	PTNT06	0.418

Reference	
XLCTN1901X02	5732
XLCTN2601J02	5732
XLCTN2602J03	5732
XLCTN2603J04	5732
XLCTN2604J05	5732
XLCTN2605J06	5732
XLCTN3201M02	5732
XLCTN3202M03	5732
XLCTN3203M04	5732
XLCTN3204M05	5732
XLCTN3205M06	5732

## PTNT

Single-ended insert for parting and grooving. B05

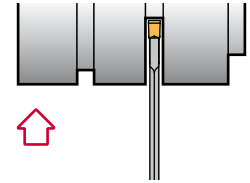
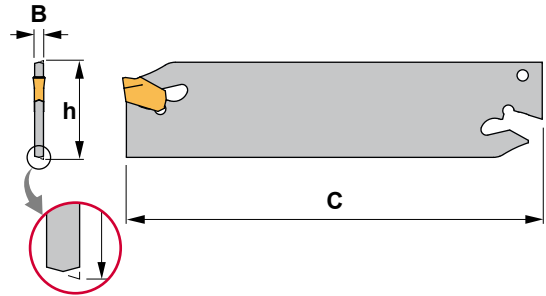
Reference	T
PTNT02	0.083
PTNT03	0.122
PTNT04	0.161
PTNT05	0.201
PTNT06	0.240



**Characteristics:**

Parting and grooving positive stop blade that works well on steels, alloyed steels, stainless steels and refractories.

For inserts with thickness from 0.078 to 0.197 inches.

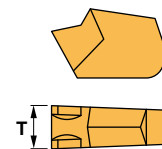
**HSS****XLCTN-HSS**

Reference	h	C	B	Insert size	lbs
XLCTN2601J02-HSS	1.020	4.331	0.083	PTNT02	0.110
XLCTN2602J03-HSS	1.020	4.331	0.122	PTNT03	0.110
XLCTN2603J04-HSS	1.020	4.331	0.161	PTNT04	0.187
XLCTN3201M02-HSS	1.250	5.906	0.083	PTNT02	0.165
XLCTN3202M03-HSS	1.250	5.906	0.122	PTNT03	0.220
XLCTN3203M04-HSS	1.250	5.906	0.161	PTNT04	0.286
XLCTN3204M05-HSS	1.250	5.906	0.201	PTNT05	0.352

Reference	
XLCTN2601J02-HSS	5732
XLCTN2602J03-HSS	5732
XLCTN2603J04-HSS	5732
XLCTN3201M02-HSS	5732
XLCTN3202M03-HSS	5732
XLCTN3203M04-HSS	5732
XLCTN3204M05-HSS	5732

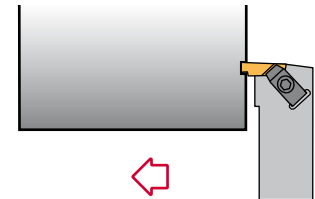
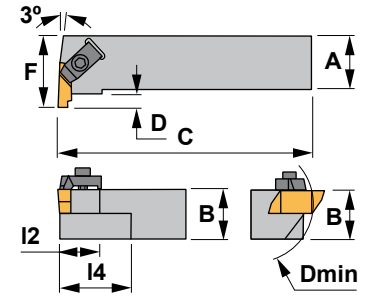
**PTNT**Single-ended insert for parting and grooving.  B05

Reference	T
PTNT02	0.083
PTNT03	0.122
PTNT04	0.161
PTNT05	0.201

**PTNT**



Characteristics:  
Multipurpose grooving and threading  
top clamp external toolholder.



## NE 93°

Reference	Dmin	A	B	I2	C	I4	D	F	Insert size	lbs
NER/L062	1.968	0.375	0.375	0.500	2.5	1.000	0.138	0.750	N..2	0.154
NER/L082J	1.968	0.500	0.500	0.500	3.5	1.000	0.138	0.750	N..2	0.220
NER/L102B	1.968	0.625	0.625	-	4.5	1.000	0.138	0.750	N..2	0.440
NER/L122B	2.362	0.750	0.750	0.500	4.5	1.000	0.138	1.000	N..2	0.880
NER/L123B	2.362	0.750	0.750	0.750	4.5	2.000	0.210	1.125	N..3	0.880
NER/L163D	2.755	1.000	1.000	0.750	6.0	2.000	0.210	1.250	N..3	1.540
NER/L203D	3.346	1.250	1.250	0.750	6.0	2.000	0.210	1.500	N..3	2.750
NER/L164D	3.149	1.000	1.000	0.750	6.0	2.000	0.294	1.375	N..4	1.540
NER/L204D	3.346	1.250	1.250	0.750	6.0	2.000	0.294	1.625	N..4	2.750

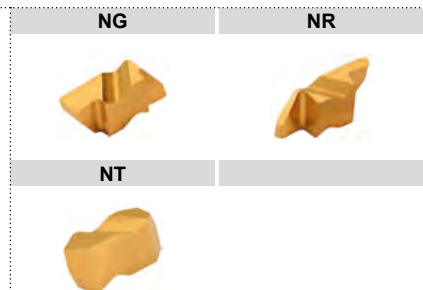
Reference					
NER/L062		5124	TF-75	TF-74	1291
NER/L082J		5124	TF-75	TF-74	1291
NER/L102B		5124	TF-75	TF-74	1291
NER/L122B		5124	TF-75	TF-74	1291
NER/L123B		5004	TF-73	TF-72	1297
NER/L163D		5004	TF-73	TF-72	1297
NER/L203D		5004	TF-73	TF-72	1297
NER/L164D		5004	TF-73	TF-72	1297
NER/L204D		5004	TF-73	TF-72	1297

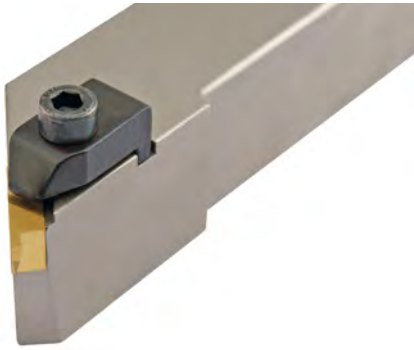
### N..

B06-07

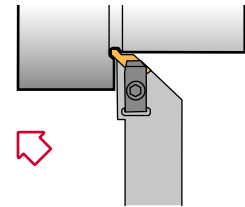
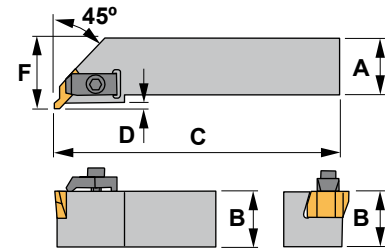
Reference	T
N..2	0.150
N..3	0.195
N..4	0.255

NG: Insert for grooving  
NR: Insert for grooving with radius  
NT: Insert for threading










Characteristics:  
 Specific application external grooving toolholder.  
 Right tools require left inserts and vice versa. Maximum grooving depth depending on insert.



## NR 45°

Reference	A	B	C	D	F	Insert size	
NRR/L123B	0.750	0.750	4.5	1.250	1.000	N..3	0.880
NRR/L163D	1.000	1.000	6.0	1.250	1.250	N..3	1.540
NRR/L203D	1.250	1.250	6.0	1.375	1.375	N..3	2.200
NRR/L243D	1.500	1.500	6.0	1.375	1.375	N..3	5.830

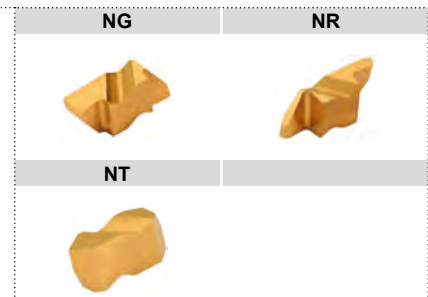
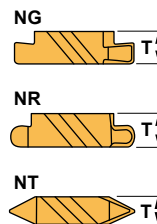
Reference				
NRR/L123B	5004	TF-73	TF-72	1297
NRR/L163D	5004	TF-73	TF-72	1297
NRR/L203D	5004	TF-73	TF-72	1297
NRR/L243D	5004	TF-73	TF-72	1297

### N..

 B06-07

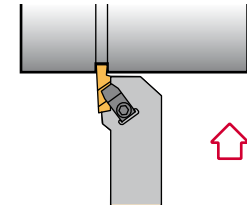
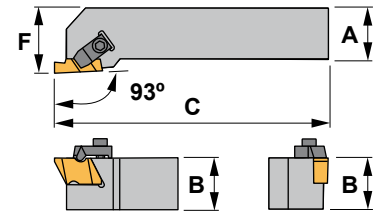
Reference	T
N..3	0.195

NG: Insert for grooving  
 NR: Insert for grooving with radius  
 NT: Insert for threading





**Characteristics:**  
 Multipurpose grooving and threading top clamp external toolholder.  
 Maximum grooving depth depending on insert.



# NS 93°

Reference	A	B	C	D	F	Insert size	
NSR/L062	0.375	0.375	2.5	0.138	0.562	N..2	0.154
NSR/L082J	0.500	0.500	3.5	0.138	0.750	N..2	0.220
NSR/L102B	0.625	0.625	4.5	0.138	0.875	N..2	0.440
NSR/L122B	0.750	0.750	4.5	0.138	1.000	N..2	0.880
NSR/L162D	1.000	1.000	6.0	0.138	1.250	N..2	1.540
NSR/L123B	0.750	0.750	4.5	0.210	1.000	N..3	0.880
NSR/L163C	1.000	1.000	5.0	0.210	1.250	N..3	1.540
NSR/L163D	1.000	1.000	6.0	0.210	1.250	N..3	1.540
NSR/L203D	1.250	1.250	6.0	0.210	1.500	N..3	2.750
NSR/L164C	1.000	1.000	5.0	0.294	1.250	N..4	1.540
NSR/L164D	1.000	1.000	6.0	0.294	1.250	N..4	1.540
NSR/L204D	1.250	1.250	6.0	0.294	1.500	N..4	2.750
NSR/L244D	1.500	1.500	6.0	0.294	1.750	N..4	3.800

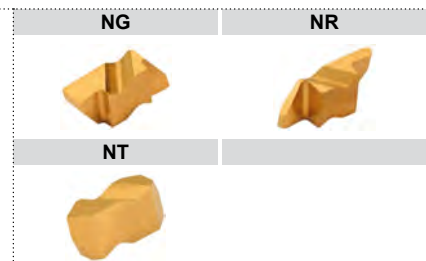
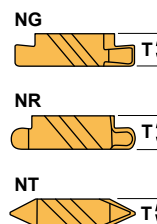
Reference						
NSR/L062	5124	TF-75	TF-74	-	-	1291
NSR/L082J	5124	TF-75	TF-74	-	-	1291
NSR/L102B	5124	TF-75	TF-74	-	-	1291
NSR/L122B	5124	TF-75	TF-74	-	-	1291
NSR/L162D	5124	TF-75	TF-74	-	-	1291
NSR/L123B	5004	TF-73	TF-72	-	-	1297
NSR/L163C	5004	TF-73	TF-72	-	-	1297
NSR/L163D	5004	TF-73	TF-72	-	-	1297
NSR/L203D	5004	TF-73	TF-72	-	-	1297
NSR/L164C	5004	TF-73	TF-72	3521	1625	1297
NSR/L164D	5004	TF-73	TF-72	3521	1625	1297
NSR/L204D	5004	TF-73	TF-72	3521	1625	1297
NSR/L244D	5004	TF-73	TF-72	3521	1625	1297

## N..

B06-07

Reference	T
N..2	0.150
N..3	0.195
N..4	0.255

NG: Insert for grooving / NR: Insert for grooving with radius / NT: Insert for threading

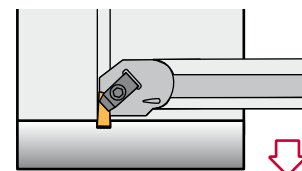
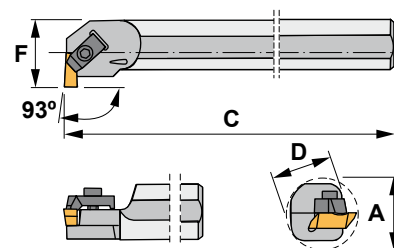




## Characteristics:





Multipurpose grooving and threading top clamp boring bar. Right tools require left inserts and vice versa.

Maximum grooving depth depending on insert.



## NNTO 93°

Reference	A	C	D	F	Insert size	lbs
A10S-NNTOR/L2	1.000	10.0	0.625	0.500	N..2	0.440
A12S-NNTOR/L2	1.125	10.0	0.750	0.562	N..2	0.880
A16T-NNTOR/L2	1.375	12.0	1.000	0.688	N..2	1.540
A16T-NNTOR/L3	1.375	12.0	1.000	0.688	N..3	1.540
A20U-NNTOR/L3	1.750	14.0	1.250	0.875	N..3	3.080
A24U-NNTOR/L3	2.000	14.0	1.500	1.000	N..3	5.830
A28U-NNTOR/L3	2.250	14.0	1.750	1.125	N..3	5.830
A28U-NNTOR/L4	2.500	14.0	1.750	1.250	N..4	5.830
A32V-NNTOR/L4	2.750	16.0	2.000	1.375	N..4	11.880

Reference				
A10S-NNTOR/L2	5124	TF-147	TF-146	1291
A12S-NNTOR/L2	5124	TF-75	TF-74	1291
A16T-NNTOR/L2	5124	TF-75	TF-74	1291
A16T-NNTOR/L3	5004	TF-75	TF-74	1297
A20U-NNTOR/L3	5004	TF-73	TF-72	1297
A24U-NNTOR/L3	5004	TF-73	TF-72	1297
A28U-NNTOR/L3	5004	TF-73	TF-72	1297
A28U-NNTOR/L4	5004	TF-73	TF-72	1297
A32V-NNTOR/L4	5004	TF-73	TF-72	1297

### N..

 B06-07

Reference	T
N..2	0.150
N..3	0.195
N..4	0.255

NG: Insert for grooving  
 NR: Insert for grooving with radius  
 NT: Insert for threading



NG

NR



NT





## Nominal cutting speed for parting

Material	P	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>				
				TN30	PM25	KM15	TL30					
				Cutting speed m/min.								
Unalloyed steel	P	125	C=0.15%	656-492	525-394		394-821	390.0				
		150	C=0.35%	623-459	492-361		263-591	304.5				
		200	C=0.60%	558-394	426-295		197-492	330.5				
Low alloyed steel	P	180	Annealed	590-426	459-328		263-591	304.5				
		275	Hardened	525-361	394-262		197-492	377.0				
		300	Hardened	492-328	361-230		197-394	400.0				
		350	Hardened	459-295	295-197			413.5				
High alloyed steel	P	200	Annealed	361-295	230-197		263-525	377.0				
		325	Hardened	230-164	148-98		164-394	565.5				
Stainless steel	P	200	Martensitic / ferritic	558-394	426-295		164-657	377.0				
Steel	P	180	Unalloyed	426-295	328-197			290.0				
		200	Low alloyed	377-246	295-164			304.5				
		225	High alloyed	328-197	262-131			391.5				
Material	M	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>				
				TN30	PM25	KM15	TL30					
				Cutting speed m/min.								
Stainless steel annealed	M	180		558-394	426-295	328-197		355.0				
Heat-resistant alloys	M	200	Annealed									
		280	Aged						Iron base	164-98	164-657	435.0
		250	Annealed						Ni or	131-66	164-591	422.0
		350	Aged						Co base	98-66	164-328	481.5
		320	Cast							66-33	164-263	522.0
Titanium alloys	M	400	Ti									
		950	Cast $\alpha$ , almost $\alpha$ and $\alpha+\beta$						222.0			
		1050	Aged cast $\alpha+\beta$						243.0			
								245.0				
Material	K	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>				
				TN30	PM25	KM15	TL30					
				Cutting speed m/min.								
Hardened steel	K	220	Hardened steel									
		250	Manganese steel 12%						652.5			
Malleable cast iron	K	130	Ferritic	459-361		100-80	361-755	138.0				
		230	Pearlitic						328-230	70-50	263-525	159.5
Cast iron	K	180	Low tensile strength	361-279		80-60	328-657	159.5				
		260	High tensile strength						328-230	70-50	295-525	203.5
Nodular SG iron	K	160	Ferritic	328-230		70-50	328-591	152				
		250	Pearlitic						279-197	60-40	263-525	254
Aluminium alloys	K	60	Non heat treatable	4920	4920	3280		72.5				
		100	Heat treatable						1640	1640	2132	116.0
Aluminium alloys (cast)	K	75	Non heat treatable	4920	4920	3280		109.0				
		90	Heat treatable						2460	2460	2132	130.5
Bronze-brass alloys	K	110	Lead alloys, Pb>1%	984	984	984		101.5				
		90	Brass, red brass						656	656	656	101.5
		100	Bronze and lead-free copper						492	492	492	254.0



## Nominal cutting speed for grooving

Material	P	HB	Condition	External				Internal				Specific cutting force lbs/in <sup>2</sup>
				TL30	TN30	PM25	KM15	TL30	TN30	PM25	KM15	
				Cutting speed m/min.								
Unalloyed steel	125	C=0.15%	394-821	656-492	525-394		394-821	459-344	361-279		390.0	
	150	C=0.35%	263-591	623-460	150-361		263-591	443-328	344-262		304.5	
	200	C=0.60%	197-492	558-394	426-295		197-492	394-279	295-197		330.5	
Low alloyed steel	180	Annealed	263-591	590-426	459-328		263-591	410-295	328-230		304.5	
	275	Hardened	197-492	525-361	394-262		197-492	361-262	279-180		377.0	
	300	Hardened	197-394	492-328	361-230		197-394	344-230	262-164		400.0	
	350	Hardened		459-295	295-197			328-197	197-147		413.5	
High alloyed steel	200	Annealed	263-525	361-295	230-197		263-525	262-197	164-147		377.0	
	325	Hardened	164-394	230-164	148-98		164-394	262-115	105-66		565.5	
Stainless steel	200	Martensitic / ferritic	164-657	558-394	426-295		164-657	394-279	295-197		377.0	
Steel	180	Unalloyed		426-295	328-197			295-197	230-148		290.0	
	200	Low alloyed		377-246	295-164			262-164	197-115		304.5	
	225	High alloyed		328-197	262-131			230-148	180-98		391.5	

Material	M	HB	Condition	External				Internal				Specific cutting force lbs/in <sup>2</sup>
				TL30	TN30	PM25	KM15	TL30	TN30	PM25	KM15	
				Cutting speed m/min.								
Stainless steel annealed	180			558-394	426-295	328-197		394-279	295-197	230-148	355.0	
Heat-resistant alloys	200	Annealed	Iron base	164-657			164-98	164-657			164-98	435.0
	280	Aged		164-591			131-66	164-591			131-66	422.0
	250	Annealed	Ni or Co base	164-328			98-66	164-328			98-66	481.5
	350	Aged		164-263			66-33	164-263			66-33	522.0
	320	Cast					66-33				66-33	536.5
Titanium alloys	400	Ti				574					222.0	
	950	Cast $\alpha$ , almost $\alpha$ and $\alpha+\beta$				236					243.0	
	1050	Aged cast $\alpha+\beta$				213					245.0	

Material	K	HB	Condition	External				Internal				Specific cutting force lbs/in <sup>2</sup>
				TL30	TN30	PM25	KM15	TL30	TN30	PM25	KM15	
				Cutting speed m/min.								
Hardened steel	220	Hardened steel									652.5	
	250	Manganese steel 12%										
Malleable cast iron	130	Ferritic	361-755	459-361		328-262	361-755	328-262		328-262	138.0	
	230	Pearlitic	263-525	328-230		230-164	263-525	230-164		230-164	159.5	
Cast iron	180	Low tensile strength	328-657	361-279		262-197	328-657	262-197		262-197	159.5	
	260	High tensile strength	295-525	328-230		230-164	295-525	230-164		230-164	203.5	
Nodular SG iron	160	Ferritic	328-591	328-230		230-164	328-591	230-164		230-164	152	
	250	Pearlitic	263-525	279-197		197-131	263-525	197-148		197-131	254	
Aluminium alloys	60	Non heat treatable		4920	4920	3280		3444	3444	2296	72.5	
	100	Heat treatable		1640	1640	1378		1148	1148	984	116.0	
Aluminium alloys (cast)	75	Non heat treatable		4920	4920	3280		3444	3444	2296	109.0	
	90	Heat treatable		2460	2460	2132		1722	1722	1509	130.5	
Bronze-brass alloys	110	Lead alloys, Pb>1%		984	984	984		689	689	689	101.5	
	90	Brass, red brass		656	656	656		459	459	459	101.5	
	100	Bronze and lead-free copper		492	492	492		344	344	344	254.0	

## Nominal cutting speed for profiling

Material	P	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>
				TN30	PM25	KM15	TL30	
				Cutting speed m/min.				
Unalloyed steel	125	C=0.15%	656	525		394-821	390.0	
	150	C=0.35%	623	492		263-591	304.5	
	200	C=0.60%	558	426		197-492	330.5	
Low alloyed steel	180	Annealed	590	459		263-591	304.5	
	275	Hardened	525	394		197-492	377.0	
	300	Hardened	492	361		197-394	400.0	
	350	Hardened	459	295			413.5	
High alloyed steel	200	Annealed	426	328		263-525	377.0	
	325	Hardened	328	197		164-394	565.5	
Stainless steel	200	Martensitic / ferritic	558	426		164-657	377.0	
Steel	180	Unalloyed	426	328			290.0	
	200	Low alloyed	377	295			304.5	
	225	High alloyed	328	230			391.5	

Material	M	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>
				TN30	PM25	KM15	TL30	
				Cutting speed m/min.				
Stainless steel annealed	180		558	394	328		355.0	
Heat-resistant alloys	200	Annealed	Iron base Ni or Co base			197	164-657	435.0
	280	Aged				164	164-591	422.0
	250	Annealed				98	164-328	481.5
	350	Aged				66	164-263	522.0
	320	Cast				66		536.5
Titanium alloys	400	Ti			574		222.0	
	950	Cast $\alpha$ , almost $\alpha$ and $\alpha+\beta$			236		243.0	
	1050	Aged cast $\alpha+\beta$			213		245.0	

Material	K	HB	Condition	Basic grades				Specific cutting force lbs/in <sup>2</sup>
				TN30	PM25	KM15	TL30	
				Cutting speed m/min.				
Hardened steel	220	Hardened steel					652.5	
	250	Manganese steel 12%						
Malleable cast iron	130	Ferritic		459	328	361-755	138.0	
	230	Pearlitic		361	230	263-525	159.5	
Cast iron	180	Low tensile strength		361	328	328-657	159.5	
	260	High tensile strength		328	230	295-525	203.5	
Nodular SG iron	160	Ferritic		328	328	328-591	152.0	
	250	Pearlitic		279	230	263-525	254.0	
Aluminium alloys	60	Non heat treatable			3280		72.5	
	100	Heat treatable			1378		116.0	
Aluminium alloys (cast)	75	Non heat treatable			1476		109.0	
	90	Heat treatable			984		130.5	
Bronze-brass alloys	110	Lead alloys, Pb>1%	984	984	984		101.5	
	90	Brass, red brass	656	656	656		101.5	
	100	Bronze and lead-free copper	492	492	492		254.0	



