

hard material matters



Wheel set machining



CERATIZIT – secrets of success

Secrets of success

- CERATIZIT is your partner for exceptional hard material solutions. Hard materials and tools from CERATIZIT – our solutions to complex problems are an integral part of our customers' success. Our products guarantee: economy – long life – speed! And it is precisely this combination which gives our business partners a direct competitive advantage.
- Premier performance is only possible through a total appreciation of the requirements of our business partners. A performance achieved through flexible thinking and continuous dialogue with our customers. A pioneering spirit and a deep understanding of powder metallurgy characterize the history of CERATIZIT. One of the attributes of our company philosophy is the search for perfection: target oriented – sustainably – passionately!
- Intensive research and development activities, taking into account the precise requirements and working processes of the customer, are today's investment for the solutions of tomorrow – and beyond.

Corporate values

- 1 The views and focus of our business partners matter
- 2 Innovative and flexible thinking matters
- 3 Communication matters
- 4 Employee development matters
- 5 Professionalism matters
- 6 Our environment matters



Tailored cutting tool solutions

- Cutting materials, coatings, inserts, tooling systems and machining solutions – all this is included in the cutting tool division at CERATIZIT.
- Worldwide well-known companies process advanced materials applying cutting tool products from CERATIZIT: from the automotive industry to the aerospace industry, mechanical engineering, tool construction to the oil industry.
- The basis of these long-term business relations is the faith of the customers in the extensive know-how of the carbide specialists.

Wheel set machining



Wheel set machining

Wheel set machining for railway vehicles



Wheels of railway vehicles (including underground and tramway vehicles) during production and their entire service life are machined using cutting tools. After forging the new wheels cast skin and uneven surfaces are removed through turning.

Many kilometres with heavy loads on very different routes mean that the wheels of railway vehicles are subject to a great deal of wear and tear. As for every technical facility, the service life of trains decisively depends upon maintenance. An important point on the checklist is the regular servicing of the wagon and locomotive wheel sets as well as the insurance of the quality of these components. Train wheels are heavily used and exposed to a correspondingly high degree of wear. Train wheels for mountainous and serpentine routes in particular suffer extreme stress. Particular attention is paid to the wheel surface quality on high-speed IC trains as these high comfort trains should guarantee the smoothest possible performance over long distances. CERATIZIT provides cutting tool solutions for the production and reprocessing of wheels. The first inserted tools for the machining of wheel sets were launched on the market by CERATIZIT as far back as the mid 1960's.

Reprocessing of wheels

When reprocessing the wheels there are two variants:

1. Underground machining: the machine is sited in an assembly pit. The train or wagon is positioned above the machine, the wheels are machined without being removed in a complicated procedure.



2. Machining above ground: the axle is removed: This method allows faster machining which ensures that twice as many axles are completed in the same time as with the underground method.

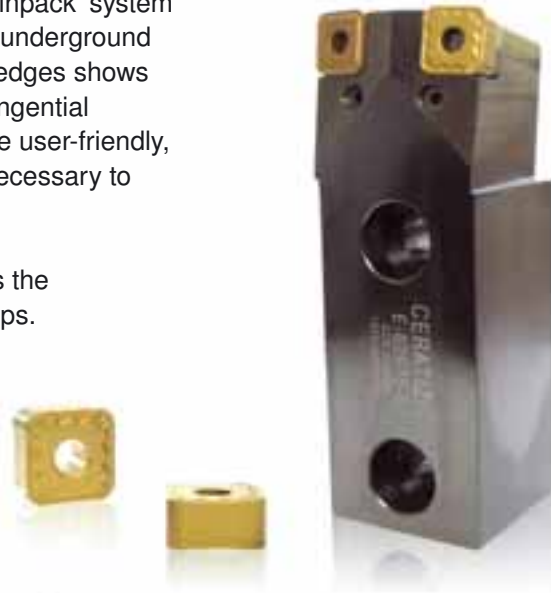


Benefit

The 'twinpack' system

A recently developed CERATIZIT product named 'twinpack' system sets new trends especially when machining with the underground method. A square insert with eight effective cutting edges shows improved efficiency compared to the conventional tangential concept. The tool holder system is considerably more user-friendly, the tool is protected by carbide shims, and it is not necessary to replace the cartridge.

When working with an underground machine there is the risk of injury for the operators caused by too long chips. Swarf control is extremely important, so CERATIZIT has developed the special geometries –R70 and –R71 which give optimum chip guidance when reprocessing railway wheels.



- The 'twinpack' system was developed by CERATIZIT at the end of the 1990's. The tools are individually adapted to the machine so that a quick change is possible. It is not necessary to change the coordinates in the NC program. The inserts are designed in such a way that the difference on the wheel profile is only visible because of the better surface.
- Einsatzbereich: besonders dort wo Räder nachbearbeitet werden als wirtschaftliche Alternative zu den alten Kassettensystemen mit LNUX Wendepplatten, oder CNMX und RCMX Plattenlösungen.

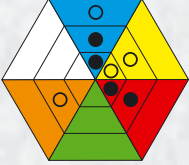
Benefit

- The inserts are provided with eight cutting edges which can all be applied on the same tool in the same position.
- The machine operator may clamp the insert in the machine (easier handling) using a lever lock system.
- A carbide shim protects the tool holder against premature wear (expensive cartridges are no longer necessary).
- The inserts are mounted in a way that cutting depths are now possible which in the past were only attained with LNUX 301940 inserts.
- This mounting position also provides improved swarf control.
- The inserts are available in several grades and geometries.

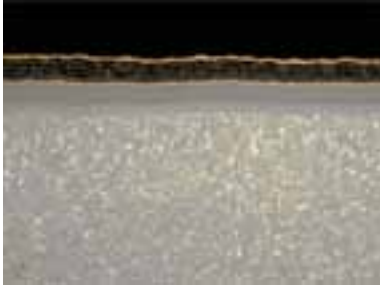


Grade overview

CTC1110
 HC-P10
 HC-M10
 HC-K15



for high-performance turning



Composition:
 Co 6.0%; composite carbides 6.4%; WC rest; grade with peripheral zone

Grain size:
 1 - 2 μm

Hardness:
 HV 1550

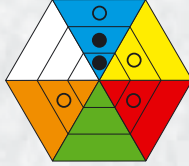
Coating specification:
 CVD
 Ti (C,N) + Ti (C,N) + Ti (N,B) + Al_2O_3 + top layer 18 μm

Properties, application:
 • Excellent heat resistance

Toughness: 0 2 4 6 8 10

Wear resistance: 0 2 4 6 8 10

CTC1115
 HC-P15
 HC-M15
 HC-K15



Composition:
 Co 5.8%; composite carbides 6.4%; WC rest

Grain size:
 1 - 2 μm

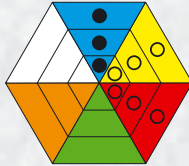
Hardness:
 HV 1480

Coating specification:
 CVD
 Ti (C,N) + Ti (C,N) + Ti (N,B) + Al_2O_3 + top layer 18 μm

Toughness: 0 2 4 6 8 10

Wear resistance: 0 2 4 6 8 10

CTC1125
 HC-P25
 HC-M25
 HC-K20



Composition:
 Co 7.0%; composite carbides 8.0%; WC rest

Grain size:
 1 - 2 μm

Hardness:
 HV 1450

Coating specification:
 CVD
 Ti (C,N) + Ti (C,N) + Ti (N,B) + Al_2O_3 + top layer 18 μm

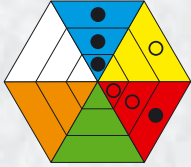
Toughness: 0 2 4 6 8 10

Verschleißfestigkeit: 0 2 4 6 8 10

Grade overview

CTC1130

HC-P30
HC-M20
HC-K20



Composition:

Co 7.0%; composite carbides 8.0%; WC rest

Grain size:

medium, 1 - 2 μm

Hardness:

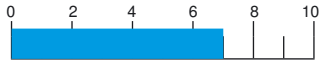
HV 1450

Coating specification:

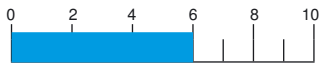
CVD

Ti (C,N) + Ti (C,N) + TiN + Al_2O_3 ; 12 μm

Toughness

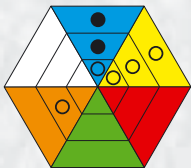


Wear resistance



CTC1135

HC-P35
HC-M25



Composition:

Co 9.5%; composite carbides 6.5%; WC rest

Grain size:

1 - 2 μm

Hardness:

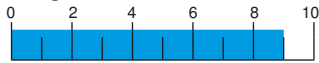
HV 1400

Coating specification:

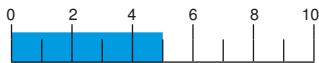
CVD

Ti (C,N) + Ti (C,N) + TiN + Ti (N,B) + Ti (C,N) + TiN; 12 μm

Toughness

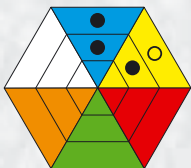


Wear resistance



S40T

HW-P40
HW-M40



Composition:

Co 11.0%; composite carbides 12.0%; WC rest

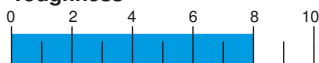
Grain size:

1-2 μm

Hardness:

HV 1420

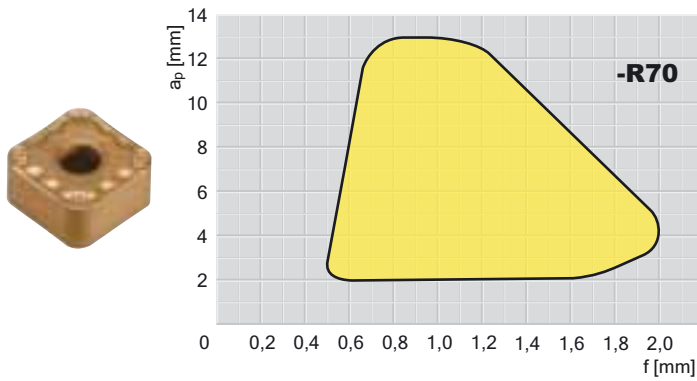
Toughness



Wear resistance



Chip grooves



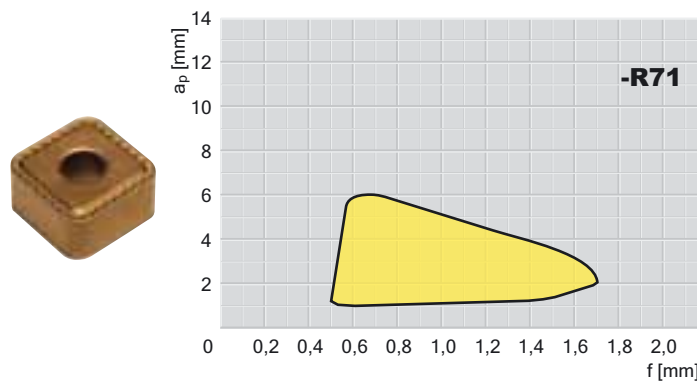
Application range:

SNMG 211040SN-R70

a_p : 2,0 - 13,0 mm

f : 0,5 - 2,0 mm

- > Excellent swarf control in a wide field of applications



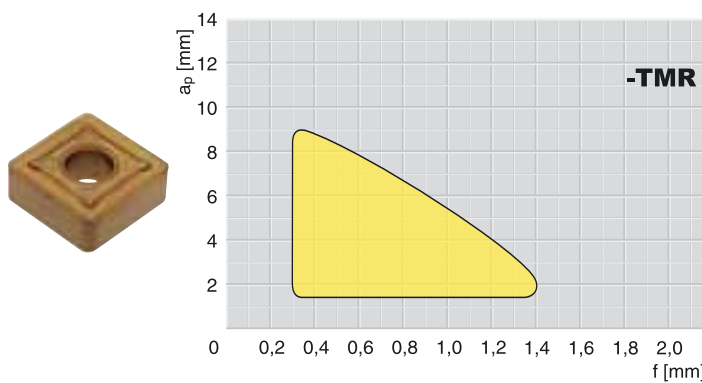
Application range:

SNMG 211040SN-R71

a_p : 1,0 - 6,0 mm

f : 0,5 - 1,7 mm

- > Soft cutting geometry
- > Good swarf control with small depth of cut



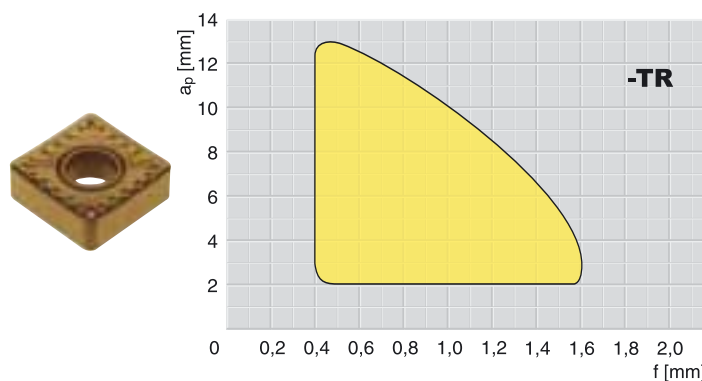
Application range:

SNMG 190616EN-TMR

a_p : 1,5 - 9,0 mm

f : 0,3 - 1,4 mm

- > Chip groove for double-faced insert
- > For new wheels and wheel rings



Application range:

SNMM 190616EN-TR

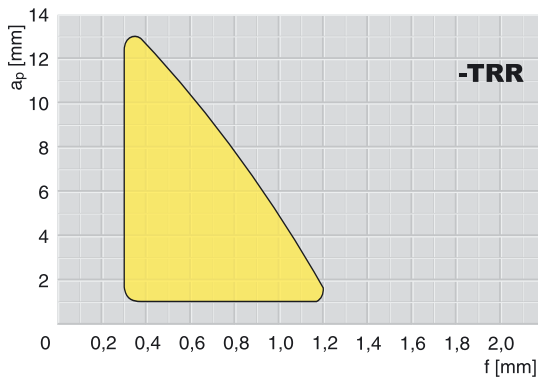
SNMM 250724EN-TR

a_p : 2,0 - 13,0 mm

f : 0,4 - 1,6 mm

- > Excellent for roughing
- > For turning new wheels

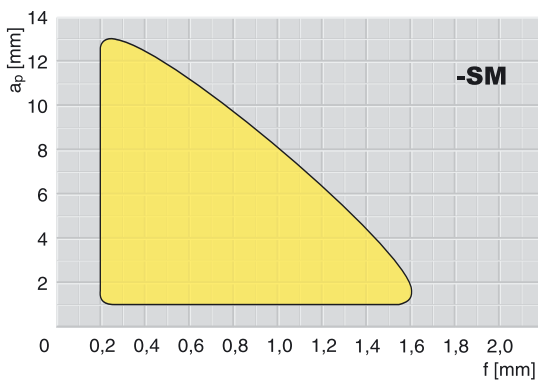
Chip grooves



Application range:

SNMM 190616SN-TRR
SNMM 250724SN-TRR
 a_p : 1,0 - 13,0 mm
 f : 0,3 - 1,2 mm

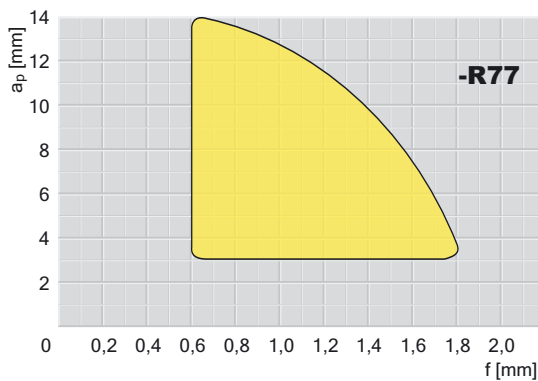
> For turning new wheels



Application range:

RCMT 2507MOSN-SM
RCMT 3209MOSN-SM
 a_p : 1,0 - 13,0 mm
 f : 0,2 - 1,6 mm

> For turning new wheels



Application range:

LNUX 191940SN-R77
 a_p : 3,0 - 14,0 mm
 f : 0,6 - 1,8 mm

> Insert to roughing and old machines

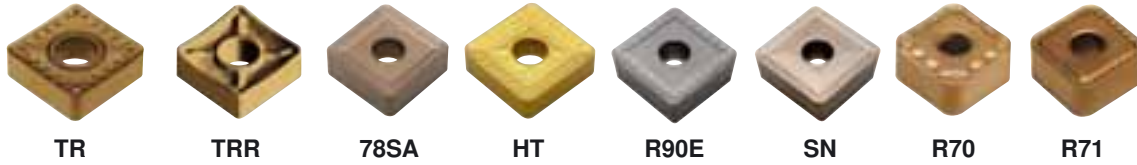
Grade overview

Grade designation	Standard designation	Cutting material	Application range									Material group													
												A	R	F	N	S	H								
			01	05	10	15	20	25	30	35	40	45	50	Steel	Stainless steel	Cast iron	Non ferrous metals	Heat resistant material	Hard materials						
CTC1110	HC-P10	C																							
	HC-M10	C																							
	HC-K15	C																							
CTC1115	HC-P15	C																							
	HC-M15	C																							
	HC-K15	C																							
CTC1125	HC-P25	C																							
	HC-M25	C																							
	HC-K20	C																							
CTC1130	HC-P30	C																							
	HC-M20	C																							
	HC-K20	C																							
CTC1135	HC-P35	C																							
	HC-M25	C																							
S40T	HW-P40	W																							
	HW-M40	W																							

- Main application
- Extended application

Inserts

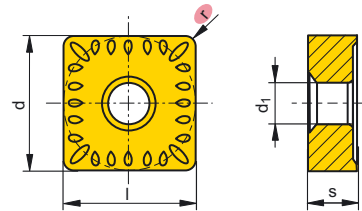
SNMM, SCMT, SNMG



r mm	Type, description					l mm	d mm	s mm	d ₁ mm
		CTC1115	CTC1125	CTC1130	CTC1135				
8,0	SNMM 120408EN-TR		●		●	12,00	12,00	4,76	5,16
1,2	SNMM 120412EN-TR		●	●	●	12,00	12,00	4,76	5,16
1,2	SNMM 150612EN-TR		●			15,87	15,87	6,35	6,35
1,6	SNMM 190616EN-TR		●	●	●	19,05	19,05	6,35	7,94
1,6	SNMM 190616EN-TRR		●		●	19,05	19,05	6,35	7,94
2,4	SNMM 250724EN-TR	●	●		●	25,40	25,40	7,94	9,12
2,4	SNMM 250724EN-TRR				●	25,40	25,40	7,94	9,12
2,4	SNMM 250924SN-78-SA	⚠				25,00	25,00	9,52	9,12
2,4	SNMM 250924SN-HT	⚠				25,00	25,00	9,52	9,12
3,2	SCMT 380932SN-R90E	⚠				38,00	38,00	9,52	8,70
3,2	SCMT 380932SN	⚠				38,00	38,00	9,52	8,70
4,0	SNMG 211040SN-R70	●	●			21,00	21,00	10,75	9,12
4,0	SNMG 211040SN-R71	●				21,00	21,00	10,75	9,12



Steel	●	●	●	●
Stainless	●	○	○	●



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 20 pieces SNMM 120408EN-TR CTC1125

⚠ upon request

Inserts LNUX



R70



R77

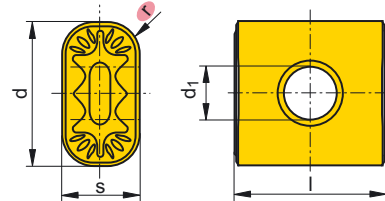


R73

r mm	Type, description	CTC1110	CTC1125	l mm	d mm	s mm	d ₁ mm
4	LNUX 191940SN-R70	●	●	19	19	10	6,35
4	LNUX 191940SN-R77		●	19	19	10	6,35
4	LNUX 301940SN-R70	●	●	30	19	10	6,35
4	LNUX 301940SN-R73			30	19	10	6,35



Steel ● ●
Stainless ● ●



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 20 pieces LNUX 191940SN-R70 CTC1110

⚠ upon request

Inserts RCMT



SM

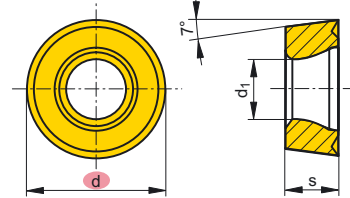


AR

d mm	Type, description	CTC1115	CTC1125	CTC1130	CTC1135	S40T	s mm	d ₁ mm
16	RCMT 1606MOSN-SM	●	●	●		●	6,35	5,30
20	RCMT 2006MOSN-SM		●		●		6,35	6,50
25	RCMT 2507MOSN-AR	▲					7,94	7,20
25	RCMT 2507MOSN-SM	●	●		●		7,94	7,20
32	RCMT 3209MOSN-AR	▲					9,52	9,50
32	RCMT 3209MOSN-SM	●	●				9,52	9,50



Steel	●	●	●	●	●
Stainless				●	



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 20 pieces RCMT 1606MOSN-SM CTC1115

▲ upon request

Inserts

CNMG, CNMM, CNMX



TMR



TR



TRR



R80



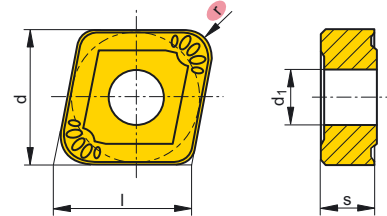
SN



HT

r mm	Type, description	CTC1110	CTC1115	CTC1125	CTC1130	CTC1135	l mm	d mm	s mm	d ₁ mm
1,2	CNMG 190612EN-TMR		●	●	●	●	19,30	19,05	6,35	7,94
1,6	CNMG 190616EN-TMR			●	●		19,30	19,05	6,35	7,94
1,2	CNMM 190612EN-TR		●				19,30	19,05	6,35	7,94
1,2	CNMM 190612SN-TRR					●	19,30	19,05	6,35	7,94
1,6	CNMM 190616EN-TR			●			19,30	19,05	6,35	7,94
1,6	CNMM 190616SN-R80				●		19,30	19,05	6,35	7,94
1,6	CNMM 190616SN-TRR			●		●	19,30	19,05	6,35	7,94
2,4	CNMM 190624SN-R80			●	●		19,30	19,05	6,35	7,94
4,0	CNMX 190740SN	●	●				19,30	19,05	7,94	7,94
2,4	CNMM 250724SN-HT						25,40	25,40	7,94	7,94
2,4	CNMM 250924SN-HT						25,40	25,40	9,52	7,94

Steel	●	●	●	●	●
Stainless					●



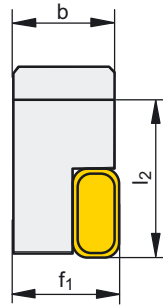
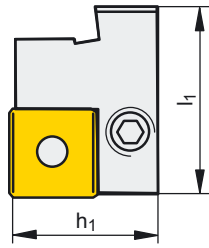
- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 20 pieces CNMG 190612EN-TMR CTC1135

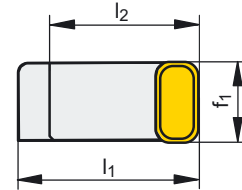
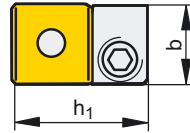
⚠ upon request

Tool holders

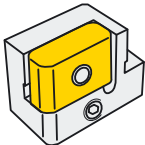
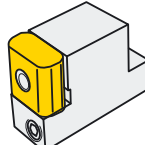
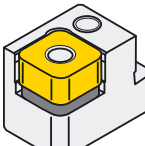
RK 3223...



RK 3219-19...







Drawing shows right-hand version

Cartridge	Type, description	l ₁ mm	l ₂ mm	h ₁ mm	f ₁ mm	b mm	Insert	Availability
	RK 3223-19R	42,5	35	32	23,0	22,5	LNUX 1919	●
	RK 3223-19L						LNUX 1919	●
	RK 3223-30R						LNUX 3019	●
	RK 3223-30L						LNUX 3019	●
	RK 3219-19R	42,5	35	32	19,1	18,6	LNUX 1919	●
	RK 3219-19L						LNUX 1919	●
	RK 3226-21R	42,5	35	32	26	25,3	SNMG 2110	○
	RK 3226-21L						SNMG 2110	○

- ex stock or short term delivery
- upon request

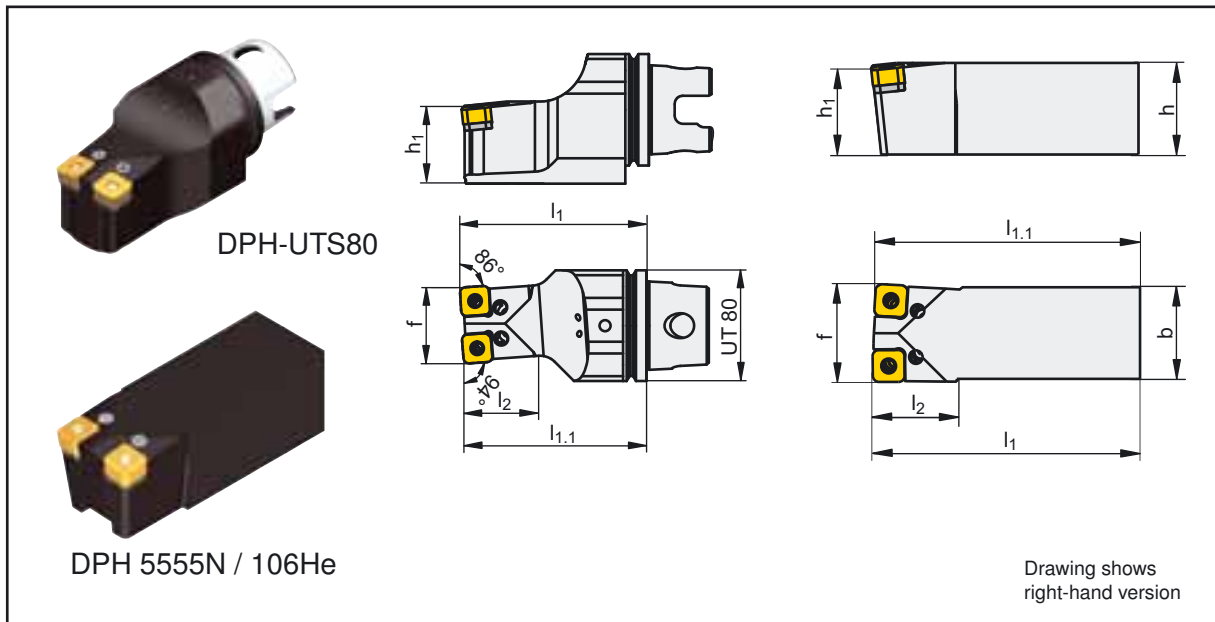
Ordering example: 1 piece RK 3223-19R

Supply details: cartridge body, lever, screws and key, but without indexable insert

Spare parts	 lever screw	 key	 lever	 shim
RK 3223-19R/L	S 000425/S/SK 3 MM	7882202/SW 3	H 028443/H	-
RK 3223-30R/L				
RK 3219-19R/L				
RK3226-21R/L	S 033422	7480412/SW 4	H 033442	3673051

Ordering example: 10 pieces H 028443/H







Tool holders, spare parts



Type, description	l_1 mm	$l_{1.1}$ mm	l_2 mm	h mm	h_1 mm	f mm	b mm	Insert
Tool shank DPH UTS80	135	132	54	53	-	55	-	SNMG 21...
Tool shank DPH 5555/R106He	180	177	57	55	45	60	55	SNMG 21...

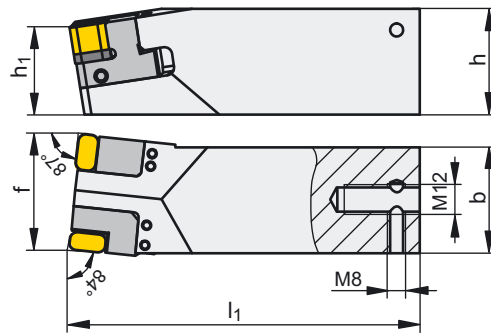
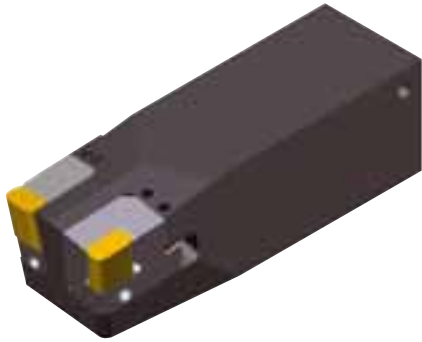
Ordering example: 2 pieces DPH 5555R/106He

⚠ DPH 5555-R/106He is specifically for Hegenscheidt machines type 106. For all other machines, tool holders are exclusively produced upon request and only if assembly dimensions are provided.

Spare parts						
	lever screw	lever	shim	shim pin	mounting pin	key
DPH ...	S 033422	H 033442/H	3673051	R 033462/R	M 022472/MO	7480412 (SW4) 7896919 (SW8)

Ordering example: 1 piece H 028443/H

Tool holders, spare parts



Drawing shows right-hand version



Type, description	l_1 mm	b mm	h mm	h_1 mm	f mm	Cartridge
RKH 5555-R/L	182	55	55	45	60	RK 32...

Ordering example: 2 pieces RKH 5555-R

Supply details: cartridge body, lever, screws and key, but without indexable insert

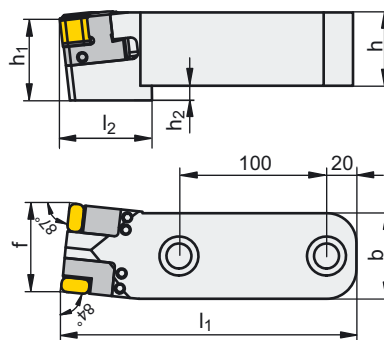
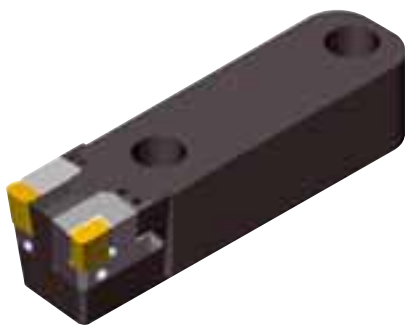


Tool holders are exclusively produced upon request and only if assembly dimensions are provided.

Spare parts	 threaded pin	 key
RKH 5555-R/L	M6x16	7882202 (SW3)

Ordering example: 1 piece 7882202 (SW3)

Tool holders, spare parts



Drawing shows right-hand version



Type, description	l_1 mm	l_2 mm	b mm	h mm	h_1 mm	h_2 mm	f mm	Cartridge
RKH 6060-R/L	275	75	60	60	55	12	64	RK 32...
RKH 5850-R/L	200	50	58	50	45	10	55	RK 32...

Ordering example: 2 pieces RKH 6060-R

Supply details: tool holder, screws and key, cartridge

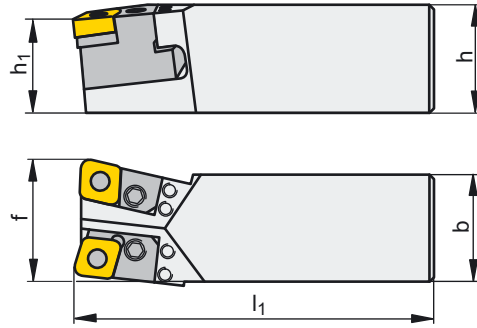


Tool holders are exclusively produced upon request and only if assembly dimensions are provided.

Spare parts	 threaded pin	 key
RKH 6060-R/L	M6x16	7882202 (SW3)
RKH 5850-R/L	M6x16	7882202 (SW3)

Ordering example: 10 pieces 7882202 (SW3)



Tool holders, spare parts



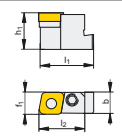
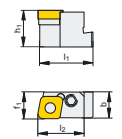
Drawing shows right-hand version

Type, description	l ₁ mm	b mm	h mm	h ₁ mm	f mm	Cartridge
E-10093R	150	50	50	45	57,6	E-10094R; E-10095L
E-10096L						E-10097L; E-10098R

Tool holders are exclusively produced upon request and only if assembly dimensions are provided. Ordering example: 2 pieces E-10093R







Spare parts	 threaded pin	 key
E-10093R	M6x16	7882202 (SW3)
E-10096L		

Ordering example: 10 pieces 7882202 (SW3)

Cartridge	Type, description	l ₁ mm	b mm	h mm	h ₁ mm	f ₁ mm	Insert	Availability
	E-10098R	46,8	40	18,4	32	19,05	CNMX 190740SN	o
	E-10095L							o
	E-10094R	42,5	35	32	19,1	18,6	CNMX 190740SN	o
	E-10097L							o

o upon request

Ordering example: 5 pieces E-10094R

Spare part	 lever screw	 key	 lever	 shim	 shim pin	 mounting pin
E-10098R	S 033422	7480412 (SW4)	H 033442/H	E 10516/E	R 033462/R	M 022472/M
E-10097L						
E-10095L						
E-10094R						

Ordering example: 10 pieces R 033462/R

Reprocessing – application – empirical values

When applying the 'twinpack' system an increase in tool life ranging between 20 and 30 % compared to the conventional cartridge system can be expected. In swarf control in particular there is a huge improvement. Machine operators specially appreciate the easier handling. Not only is the price compared to LNUX 301940 lower, but cost savings are also guaranteed due to the fact that the cartridges are no longer required. Thanks to the mounting position the cutting edge length of 21mm is sufficient and the same depths of cut as with LNUX 301940 inserts are possible.



Application example: the German railway.

In this case both tool types were mounted on a machine to provide a comparison. On the left hand tool holder the 'twinpack' system was applied, on the right hand side the cartridge system with LNUX inserts.

Machine: Hegenscheidt 106 underground

Machining procedure: Regional train R6 wheels

Tooling system

	'Twinpack'	Cartridges, tool
Tool holder	DPH 5555R/106He	RK 3223-30R
Insert	SNMG 211040SN-R70	LNUX 301940SN-R70
Grade	CTC1115	CTC1115

Cutting data

V_c m/min	80	80
f mm	1,4	1,4
a_p mm	4–8	4–8

Result

Swarf control	very good	Good (easier, long chip when draw turning)
Tool life	8 wheels	6 wheels
Insert change	Edge deformation (cutting pressure too high)	Edge deformation (cutting pressure too high)

Tool life was increased by 30%. No problems emerge during the process and danger for the operators is reduced thanks to the excellent swarf control and chip formation.

Railway points machining

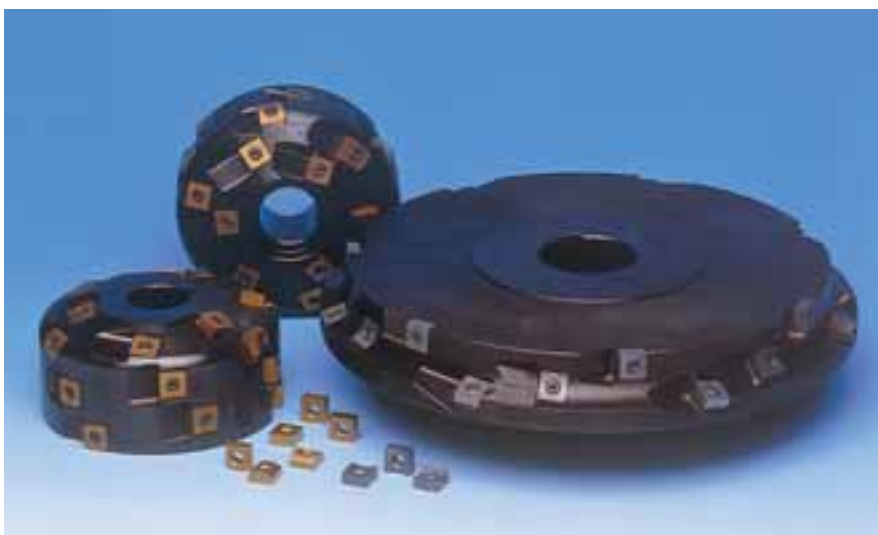


The milling tools which have recently been specially developed for the production of railway points combine the tried and tested tangential insert concept with new solutions and the well-known performance capacity of CERATIZIT carbide cutting materials.

In addition special tooling solutions are available for the planing of the rails.

Advantages of CERATIZIT points milling tools

- The particularly stable construction provides high machining security and leads to regular and thus calculable tool life, this is also applicable with manganese steels.
- The high-performance CERATIZIT cutting materials enable longer tool life and higher cutting speed which eventually leads to reduced manufacturing costs
- The standardised tangential inserts can be applied in many ways and are available short term.



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