Example of machining - re-turning of railway wheels

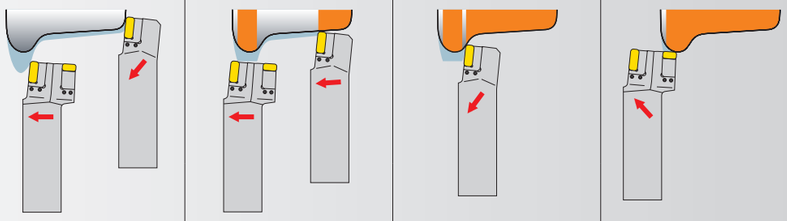
1. RE-TURNING OF HARD WORN WHEEL

2 holders in machine

Holder description (2 cart.): DKTR 5555 X C2
Cartridge (right): KTP-LANR 30
Insert: LNMX 301940SN-RM; 9315
Cartridge (left): KTP-LFNL 19
Insert: LNMX 191940SN-RM; 9315
Holder description (1 cart.): DKTR 5555 X C1
Cartridge (right): KTP-LANR 30
Insert: LNMX 301940SN-RM; 9315

Cutting conditions:
cutting speed: v_c = 50 – 70 m/min
feed per revolution: f = 0,55 – 0,8 mm/rev.
axial cutting depth: a_p = 3 – 10 mm

Step 1 Step 2 Step 3 Step 4



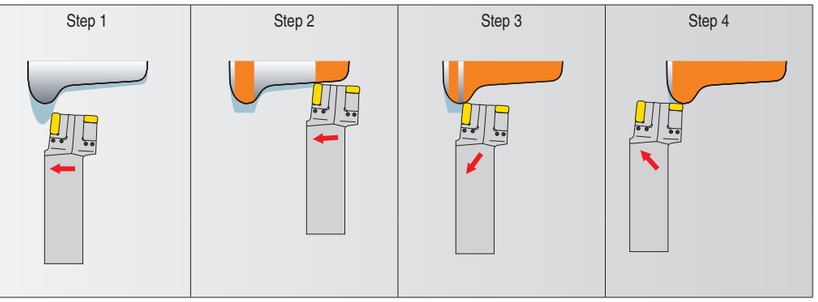
2. RE-TURNING OF HARD WORN WHEEL

1 holder in machine

Holder description (2 cart.): DKTR 5055 X A2
Cartridge (right): KTP-LANR 30
Insert: LNMX 301940SN-RM; 9315
Cartridge (left): KTP-LFNL 19
Insert: LNMX 191940SN-RM; 9315

Cutting conditions:
cutting speed: v_c = 80 – 90 m/min
feed per revolution: f = 0,4 – 1,0 mm/rev.
axial cutting depth: a_p = 3 – 5 mm

Step 1 Step 2 Step 3 Step 4



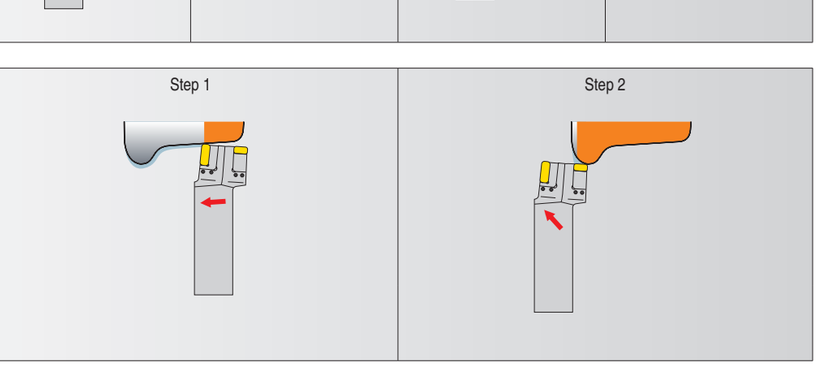
3. RE-TURNING OF LESS WORN WHEEL

1 holder in machine

Holder description (2 cart.): DKTR 5050 X D2
Cartridge (right): KTP-LANR 30
Insert: LNMX 301940SN-RF; 9315
Cartridge (left): KTP-LFNL 19
Insert: LNMX 191940SN-RF; 9315

Cutting conditions:
cutting speed: v_c = 80 – 90 m/min
feed per revolution: f = 0,4 – 1,0 mm/rev.
axial cutting depth: a_p = 3 – 5 mm

Step 1 Step 2



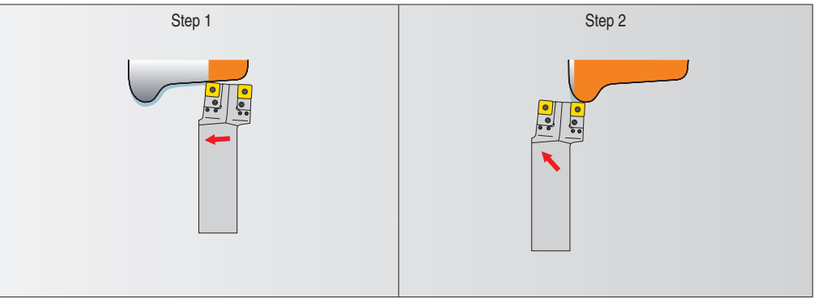
4. RE-TURNING OF WHEEL - 1ST PROFILE

1 holder in machine

Holder description (2 cart.): DKTR 5050 X D2
Cartridge (right): KTP-SANR 19
Insert: SNMX 191140SN-RF; 9315
Cartridge (left): KTP-SFNL 19
Insert: SNMX 191140SN-RF; 9315

Cutting conditions:
cutting speed: v_c = 60 – 70 m/min
feed per revolution: f = 0,4 – 1,0 mm/rev.
axial cutting depth: a_p = 2 – 4 mm

Step 1 Step 2



Specialists in Cutting Tools
ALCA TOOLS LTD
Tel. 01227 366051 Fax. 01227 740033
Email sales@alcatools.co.uk www.alcatools.co.uk

ALCA TOOLS LIMITED
ESTABLISHED 1974
Tel. +44 (0)1227 366051 Fax. +44 (0)1227 740033
Email sales@alcatools.co.uk Web www.alcatools.co.uk

COMPLETE LINE OF TOOLS
NEW INSERTS LNMX / SNMX
NEW RANGE OF CHIPBREAKERS

TOOLS FOR RE-TURNING OF RAILWAY WHEEL

NEW ASSORTMENT OF INSERTS AND TOOLS FOR RE-TURNING OF RAILWAY WHEEL

MAIN BENEFITS:

- complete line of tools for re-turning of railway wheel
- wide assortment of holders for Hegenscheidt and Rafamet lathe
- exchangeable cartridges with support protective cemented carbide shim
- new geometries of inserts LNMX 19, LNMX 30 and SNMX 19
- new assortment of inserts LNMX 19 with chipbreakers RF and RM
- new assortment of inserts LNMX 30 with chipbreakers RF, RM and RR
- new type of double sided inserts SNMX 19 with chipbreaker RF
- new range of grades - 9310, 9315 and 9325

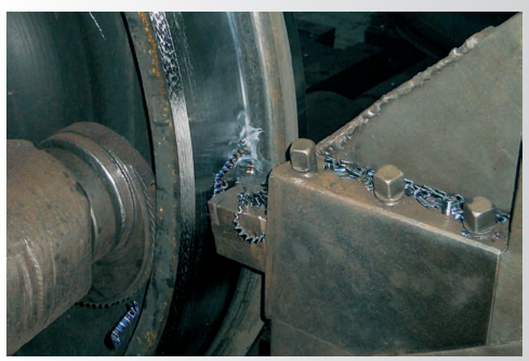
Technical information

Re-turning of railway wheel

Means wheel re-profiling on railway wheel. During renovations of railway wheels we talked about two basic conditions of wheels – soft wheels and hard wheels:

- soft wheels are typical own worn without badly damaged and defects
- hard wheels are very strenghten with surface defects and dirts (sand, stones) and with defects like skid flats, surface cracks etc.

Depending on status of wheel is necessary to adjust of cutting conditions i.e. cutting speed v_c, depth of cut a_p, feed f, choice of chipbreaker and grade of insert.



New complete line of tools

for re-turning of railway wheel included holders for lathe Hegenscheidt (Made in Germany) and lathe Rafamet (Made in Poland), exchangeable cartridges with inserts types LNM(U)X 19, LNM(U)X 30 and SNMX 19 with new range of chipbreakers RF, RM and RR.

Chipbreaker - *RF*

- for depth of cut a_p from 2 mm to 8 mm, feeds per revolution f from 0,4 mm/rev. to 1,1 mm/rev.
- choice of cutting speed depends on a_p, f and status of wheel
- suitable for middle cutting speeds v_c
- for inserts LNMX 19 and LNMX 30 it is suitable on soft wheels
- for new type double side inserts SNMX 19 it is given for machining of soft wheel, which profile is turned for the first time; by properly chosen of cutting condtitions is possible to use inserts SNMX 19 for re-profiling on trams wheels, wheels from passenger cars and manipulation cars

Chipbreaker - *RM*

- for depth of cut a_p from 2 mm to 10 mm, feeds per revolution f from 0,45 mm/rev. to 1,8 mm/rev.
- choice of cutting speed depends on a_p, f and status of wheel
- optimum for lower to middle cutting speeds v_c
- for inserts LNMX 19 and LNMX 30 it is suitable on soft wheel also hard wheel

Chipbreaker - *RR*

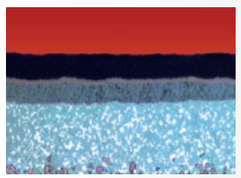
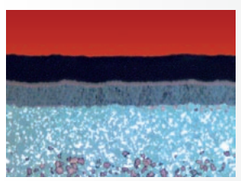
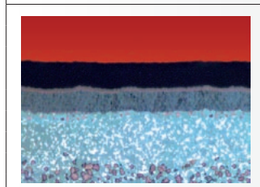
- for depth of cut a_p from 2 mm to 12 mm, feeds per revolution f from 0,75 mm/rev. to 1,8 mm/rev.
- choice of cutting speed depends on a_p, f and status of wheel
- optimum for middle until higher cutting speeds v_c
- for inserts LNMX 30 it is suitable on soft wheel also hard wheel
- optimum for upper feeds f and depths of cuts a_p

Assortment of inserts

INITIAL CUTTING CONDITIONS

Basic shape of insert	ISO	Initial cutting conditions P					
		f [mm/rev]		a_p [mm]		v_c [m/min]	
		min.	max.	min.	max.	min.	max.
	LNMX 191940SN-RF; 9310	0,40	1,10	2,0	5,0	85	105
	LNMX 191940SN-RF; 9315	0,45	1,40	2,0	5,0	60	90
	LNMX 191940SN-RF; 9325	0,45	1,40	2,0	5,0	50	80
	LNMX 301940SN-RF; 9310	0,40	1,10	2,0	8,0	80	105
	LNMX 301940SN-RF; 9315	0,40	1,10	2,0	8,0	60	90
	LNMX 301940SN-RF; 9325	0,40	1,10	2,0	8,0	50	85
	LNMX 191940SN-RM; 9310	0,45	1,40	2,0	5,0	80	100
	LNMX 191940SN-RM; 9315	0,45	1,40	2,0	5,0	60	90
	LNMX 191940SN-RM; 9325	0,45	1,40	2,0	5,0	50	80
	LNMX 301940SN-RM; 9310	0,55	1,80	2,0	10,0	75	100
	LNMX 301940SN-RM; 9315	0,55	1,80	2,0	10,0	55	85
	LNMX 301940SN-RM; 9325	0,55	1,80	2,0	10,0	40	75
	LNMX 301940SN-RR; 9310	0,75	1,80	2,0	12,0	70	95
	LNMX 301940SN-RR; 9315	0,75	1,80	2,0	12,0	55	80
	LNMX 301940SN-RR; 9325	0,75	1,80	2,0	12,0	40	65
	LNUX 191940SN-DF; 9230	0,70	1,50	2,0	6,0	80	125
	LNUX 301940SN-DM; 9230	0,80	1,50	3,0	10,0	125	175
	SNMX 191140SN-RF; 9310	0,40	1,10	2,0	7,0	80	95
	SNMX 191140SN-RF; 9315	0,40	1,10	2,0	7,0	60	85
	SNMX 191140SN-RF; 9325	0,40	1,10	2,0	7,0	50	75

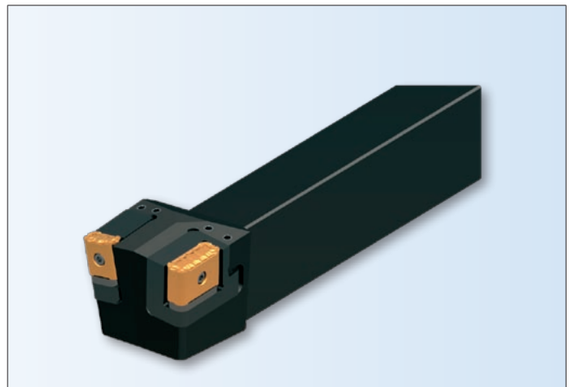
New grades assortment of inserts

Microstructure	Applications area	Workpiece material group	Recommended application
9310	10 20 30 40	P M K	Description
	■		- The most wear resistant grade of new generation 9300 - Functional gradient substrate with low content of cobalt binder phase - Thick MT-CVD coating with unique Al_2O_3 top layer warrants extra-ordinary thermal, mechanical and chemical stability and protection of substrate. - Special final treatment after coating - Machining of material group P - Finishing, continuous cut, conditionally interrupted cut - High stability of cutting edge - High cutting speed
9315	10 20 30 40	P M K	Description
	■		- New material of generation 9300 characterized by high wear resistance with good considerable toughness - Functional gradient substrate with relatively low content of cobalt binder phase - Thick MT-CVD coating with unique Al_2O_3 top layer warrants extra-ordinary thermal, mechanical and chemical stability and protection of substrate. - Special final treatment after coating - Machining of material group P - Finishing, continuous and modesty interrupted cut - High stability of cutting edge - High and moderate cutting speed
9325	10 20 30 40	P M K	Description
	■		- The most versatile grade of new generation 93xx - Functional gradient substrate with moderate content of cobalt binder phase - Thick MT-CVD coating with unique Al_2O_3 top layer warrants extra-ordinary thermal, mechanical and chemical stability and protection of substrate. - Special final treatment after coating - Machining of material group P - Versatile application - Unfavourable cutting conditions, continuous and/or interrupted cut. - Medium and higher cutting speed

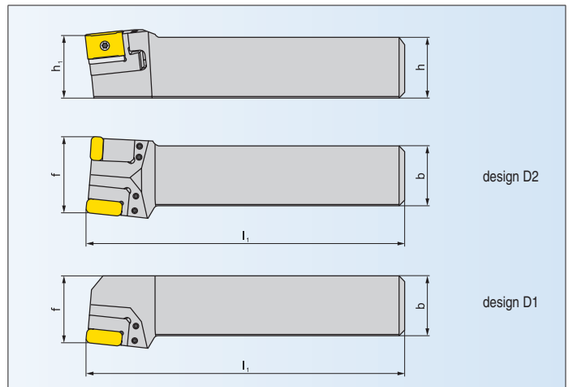
■ - Main application ▨ - Other applications □ - Conditional applications

DKTL/R

Holders for RAFAMET UBB 112 lathes



right hand version shown (DKTR 5050 X D2)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

ISO	Assortment	Dimensions										kg	Spare parts	Cartridge
		h	b	l_1	h_1	f				λ_s°	γ_o°			
DKTL 5050 X D1	*	50	50	262	50	55				-6	-6	4,2	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
DKTR 5050 X D1	*	50	50	262	50	55				-6	-6	4,2	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
DKTL 5050 X D2	*	50	50	262	50	63				-6	-6	4,2	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
														KTP-LFNR 19
														KTP-SFNR 19
DKTR 5050 X D2	*	50	50	262	50	63				-6	-6	4,2	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
														KTP-LFNL 19
														KTP-SFNL 19

SPARE PARTS

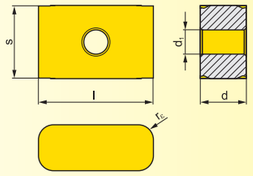
Group of spare parts	Screw	Key				
DKT	USS 0617	HXK 3				

* - For request only.

All dimensions in [mm]

Indexable inserts for re-turning of railway wheels

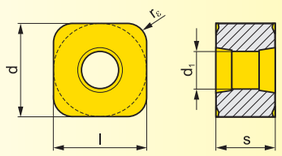
LNMX/LNUX



Size	l	d	d_1	s
1919	19,05	10,00	6,35	19,05
3019	30,00	12,00	6,35	19,05

Chipbreaker	ISO	ANSI	Grades										Radius	Feed per revolution		Cutting depth	
			9310	9315	9325	9230							r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	LNMX 191940SN-RF	LNMX --10SN-RF	●	●	●								4,0	0,40	1,10	2,0	5,0
	LNMX 301940SN-RF	LNMX --10SN-RF	●	●	●								4,0	0,40	1,10	2,0	8,0
	LNMX 191940SN-RM	LNMX --10SN-RM	●	●	●								4,0	0,45	1,40	2,0	5,0
	LNMX 301940SN-RM	LNMX --10SN-RM	●	●	●								4,0	0,55	1,80	2,0	10,0
	LNMX 301940SN-RR	LNMX --10SN-RR	●	●	●								4,0	0,75	1,80	2,0	12,0
	LNUX 191940SN-DF	LNUX --10SN-DF			●								4,0	0,70	1,50	2,0	6,0
	LNUX 301940SN-DM	LNUX --10SN-DM			●								4,0	0,80	1,50	3,0	10,0

SNMX



Size	l	d	d_1	s
1911	19,05	19,05	7,75	11,00

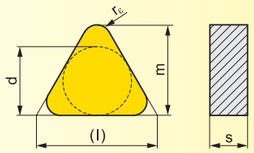
Chipbreaker	ISO	ANSI	Grades										Radius	Feed per revolution		Cutting depth	
			9310	9315	9325								r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SNMX 191140SN-RF	SNMX 6-10SN-RF	●	●	●								4,0	0,40	1,10	2,0	7,0

● Stock assortment ○ Non-stock assortment

All dimensions in [mm]

SPECIAL indexable inserts for re-turning of railway wheels

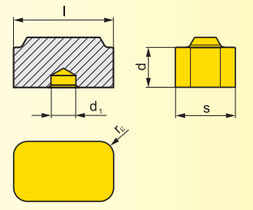
TNMN



Size	l	d	m	s
32	32,20	18,60	23,60	10,00
33	33,00	19,05	24,60	10,00
39	39,32	22,70	28,05	9,60

Chipbreaker	ISO	ANSI	Grades	Radius	Feed per revolution		Cutting depth	
				r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TNMN 32-018101		*	4,0	1,00	1,50	2,0	6,0
	TNMN 33-013001		*	4,0	1,00	1,50	2,0	7,0
	TNMN 39-2010000		*	6,0	1,00	1,50	2,0	10,0

LNMT



Size	l	d	d_1	s
3112	31,75	12,70	7,93	19,05

Chipbreaker	ISO	ANSI	Grades	Radius	Feed per revolution		Cutting depth	
				r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	LNMT 311240	LNMT -810	*	4,76	0,50	1,50	2,0	15,0

* - For request only.

All dimensions in [mm]

Code designation of cartridges and holders

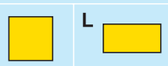
CARTRIDGES	1	2	3	4	5	6	7
	KT	P	- L	A	N	L	19

HOLDERS	8	6	9	10	11	12
	DKT	R	50	55	X	A2

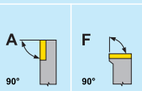
1 Cartridge

2 Clamping designation: P

3 Insert shape: S, L

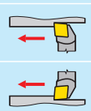


4 Tool style Cutting edge angle: A 90°, F 90°



5 Clearance angle: N $\alpha_n=0°$

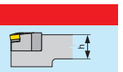
6 Designation of cut: R, L



7 Insert size

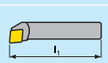
8 Cartridge holder

9 Shank height [mm]: 50, 55



10 Shank width [mm]: 50, 55

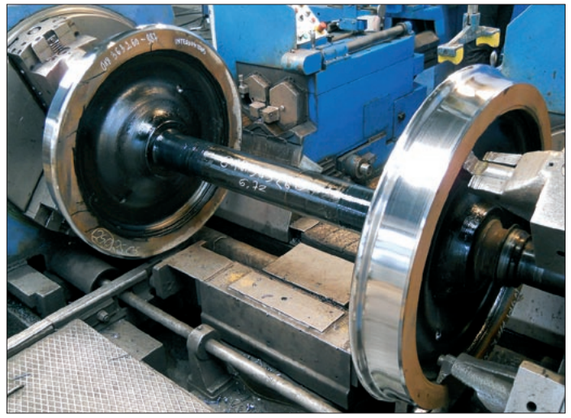
11 Tool lenght: X

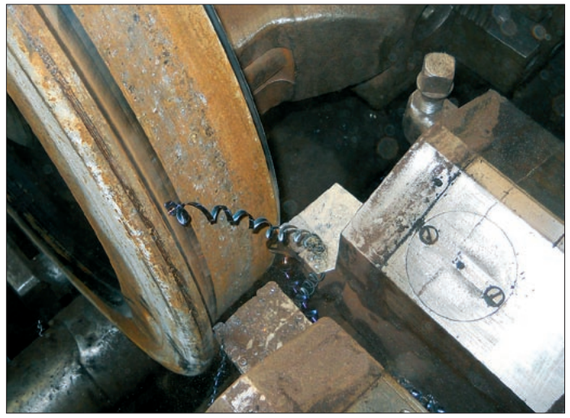


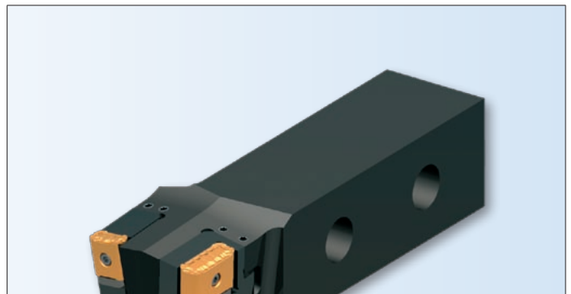
12 Type of machine

A1	Hegenscheidt	(1 cartridge in holder)	**C1**	Rafamet UBB 112/2	(1 cartridge in holder)
A2	Hegenscheidt	(2 cartridges in holder)	**C2**	Rafamet UBB 112/2	(2 cartridges in holder)
B1	Rafamet UDA 125N	(1 cartridge in holder)	**D1**	Rafamet UBB 112	(1 cartridge in holder)
B2	Rafamet UDA 125N	(2 cartridges in holder)	**D2**	Rafamet UBB 112	(2 cartridges in holder)

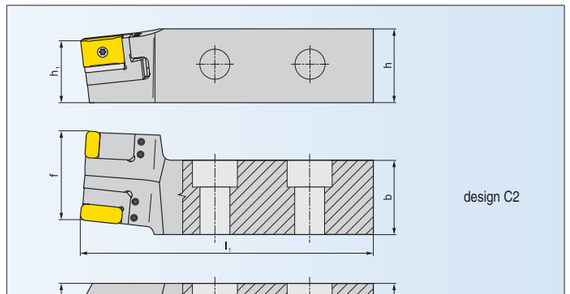
DKTL/R — Holders for RAFAMET UBB 112/2 lathes







right hand version shown (DKTR 5555 X C2)



ISO	Assortment	Dimensions										kg	Spare parts	Cartridge
		h	b	l_1	h_1	f				λ_s°	γ_o°			
DKTL 5555 X C1	*	55	55	215	44	44				-6	-6	4,1	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
DKTR 5555 X C1	*	55	55	215	44	44				-6	-6	4,1	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
DKTL 5555 X C2	*	55	55	215	44	65				-6	-6	4,1	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
														KTP-LFNR 19
														KTP-SFNR 19
DKTR 5555 X C2	*	55	55	215	44	65				-6	-6	4,1	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
														KTP-LFNL 19
														KTP-SFNL 19

SPARE PARTS

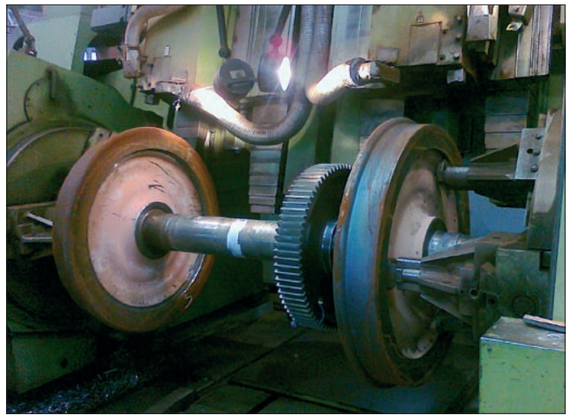
Group of spare parts	Screw	Key				
DKT	USS 0617	HXK 3				

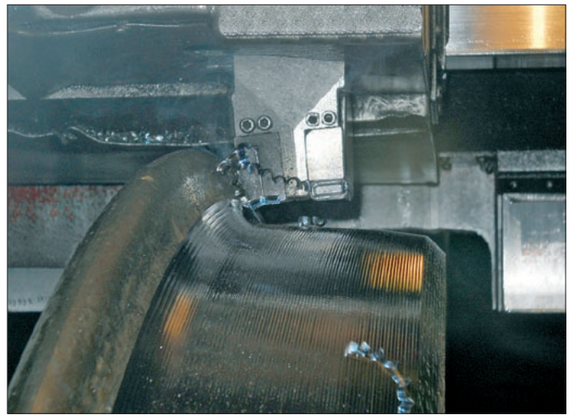
* - For request only.

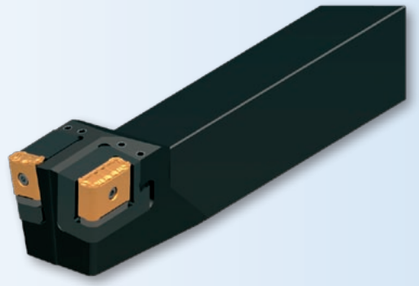
All dimensions in [mm]

DKTL/R

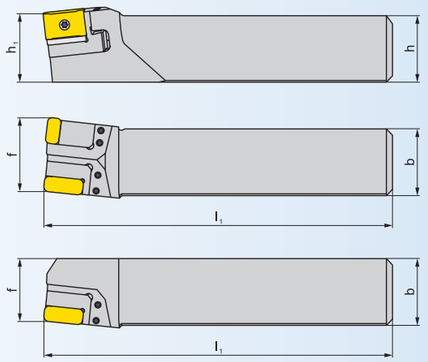
Holders for RAFAMET UDA 125N lathes







right hand version shown (DKTR 5050 X B2)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

ISO	Assortment	Dimensions										kg	Spare parts	Cartridge
		h	b	l_1	h_1	f				λ_s°	γ_o°			
DKTL 5050 X B1	*	50	50	261	50	47				-6	-6	4,0	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
DKTR 5050 X B1	*	50	50	261	50	47				-6	-6	4,0	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
DKTL 5050 X B2	*	50	50	261	50	55				-6	-6	4,0	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
														KTP-LFNR 19
														KTP-SFNR 19
DKTR 5050 X B2	*	50	50	261	50	55				-6	-6	4,0	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
														KTP-LFNL 19
														KTP-SFNL 19

SPARE PARTS

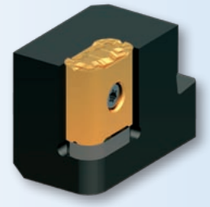
Group of spare parts	Screw	Key				
DKT	USS 0617	HXK 3				

* - For request only.

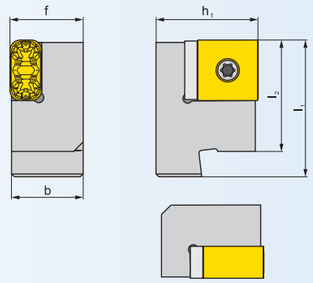
All dimensions in [mm]

KTP-LANL/R

Cartridges



right hand version shown (KTP-LANR 19)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

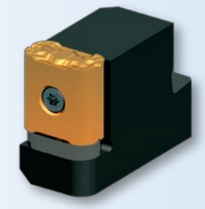
ISO	Assortment	Dimensions										kg	Spare parts	Inserts
		h_1	b	f	l_1	l_2				λ_s°	γ_o°			
KTP-LANL 19	●	32	22,6	23	43	35				0	0	0,18	LN19	LNMX 191940 / LNUX 191940
KTP-LANR 19	●											0,18	LN19	
KTP-LANL 30	●											0,16	LN30	LNMX 301940 / LNUX 301940
KTP-LANR 30	●											0,16	LN30	

SPARE PARTS

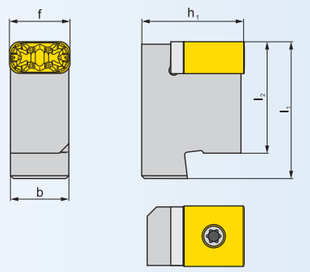
Group of spare parts	Shim	Screw of shim	Clamping pin	Screwdriver	Key
LN19	LNX 19T350	US 4007-T07P	UP 1515-T15P	FLAG T07P	FLAG T15P
LN30	LNX 30T350				

KTP-LFNL/R

Cartridges



right hand version shown (KTP-LFNR 19)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

ISO	Assortment	Dimensions										kg	Spare parts	Inserts
		h_1	b	f	l_1	l_2				λ_s°	γ_o°			
KTP-LFNL 19	●	32	18,25	19	43	35				0	0	0,14	LN19	LNMX 191940 / LNUX 191940
KTP-LFNR 19	●												LN19	

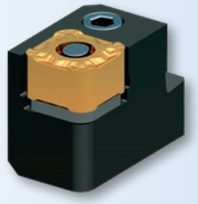
SPARE PARTS

Group of spare parts	Shim	Screw of shim	Clamping pin	Screwdriver	Key
LN19	LNX 19T350	US 4007-T07P	UP 1515-T15P	FLAG T07P	FLAG T15P

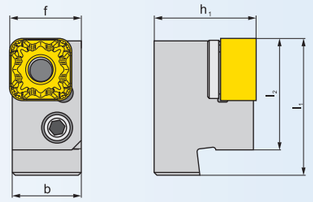
● Stock assortment ○ Non-stock assortment

All dimensions in [mm]

KTP-SANL/R — Cartridges



right hand version shown (KTP-SANR 19)



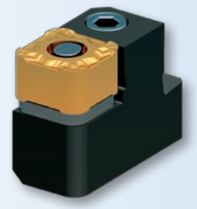
γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

ISO	Assortment	Dimensions										kg	Spare parts	Inserts
		h_1	b	f	l_1	l_2				λ_s°	γ_o°			
KTP-SANL 19	●	32	18,25	23	43	35				0	0	0,16	SN19	SNMX 191140
KTP-SANR 19	●													

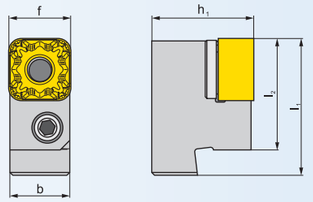
SPARE PARTS

Group of spare parts	Shim	Clamping lever	Clamping screw	Tubular rivet	Mounting taper plug	Key
SN19	SNX 19X340	PU 16	US 95	NT 06	MT 06	HXK 4

KTP-SFNL/R — Cartridges



right hand version shown (KTP-SFNR 19)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

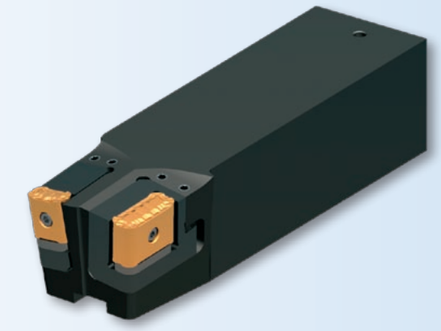
ISO	Assortment	Dimensions										kg	Spare parts	Inserts
		h_1	b	f	l_1	l_2				λ_s°	γ_o°			
KTP-SFNL 19	●	32	18,25	19	43	35				0	0	0,13	SN19	SNMX 191140
KTP-SFNR 19	●													

SPARE PARTS

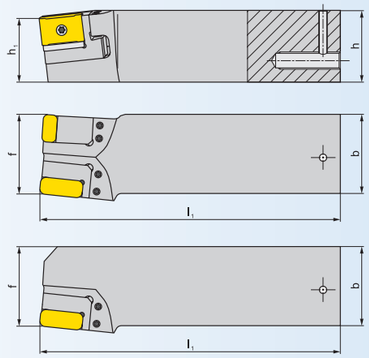
Group of spare parts	Shim	Clamping lever	Clamping screw	Tubular rivet	Mounting taper plug	Key
SN19	SNX 19X340	PU 16	US 95	NT 06	MT 06	HXK 4

● Stock assortment ○ Non-stock assortment All dimensions in [mm]

DKTL/R — Holders for HEGENSCHEIDT lathes



right hand version shown (DKTR 5055 X A2)



γ_o° - tool orthogonal rake λ_s° - tool cutting edge inclination

ISO	Assortment	Dimensions										kg	Spare parts	Cartridge
		h	b	l_1	h_1	f				λ_s°	γ_o°			
DKTL 5055 X A1	○	50	55	210	44	55				-6	-6	3,7	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
DKTR 5055 X A1	○	50	55	210	44	55				-6	-6	3,7	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
DKTL 5055 X A2	●	50	55	210	44	55				-6	-6	3,7	DKT	KTP-LANL 19
														KTP-LANL 30
														KTP-SANL 19
														KTP-LFNR 19
														KTP-SFNR 19
DKTR 5055 X A2	●	50	55	210	44	55				-6	-6	3,7	DKT	KTP-LANR 19
														KTP-LANR 30
														KTP-SANR 19
														KTP-LFNL 19
														KTP-SFNL 19

SPARE PARTS

Group of spare parts	Screw	Key				
DKT	USS 0617	HXK 3				

● Stock assortment ○ Non-stock assortment All dimensions in [mm]