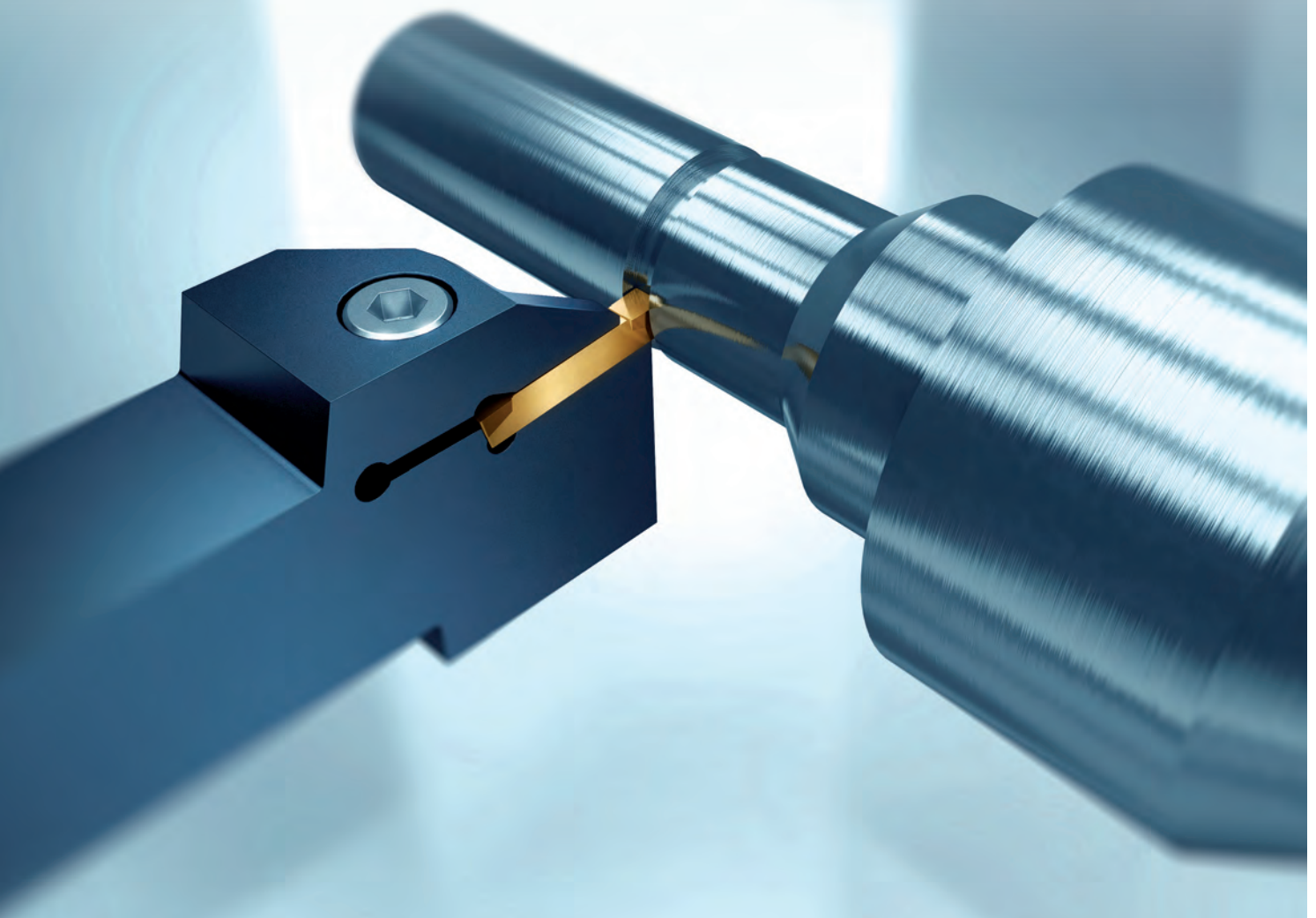


# *Hard material machining*

*Inserts, coating and tool holders for parting off, grooving and turning*

*Inserts with efficient chip breakers and special coating for:*

- ▶ *machining hardened materials*
- ▶ *hard materials*
- ▶ *exotic and tempered materials*



# Hard material machining

## Inserts, coating and tool holders parting off, grooving and turning

### Definition:

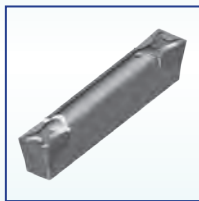
Machining materials with a Rockwell hardness of 54 and more. Inserts and holders are stressed heavily on such operations. Therefore starting-up speeds, feeds and depths should be low graded.



To be able to machine hard materials inserts are coated with Hardlox 2 coating. (Description p. 214) or have a CBN tipping (**new**). For the right solution you can choose from an extensive product portfolio depending to your requirements or production volume.

### HARDLOX 2® or CBN?

#### HARDLOX 2®



p. 181 - 187

- Polished edges and surfaces
- Low price alternative compared with CBN tipped inserts
- Constant performance when cutting from hard fringe area into soft area
- Big variety of different geometries and GripLock systems
- To be used on unhardened steels as well
- Multi edge inserts available
- Tailor made on request

#### CBN (Kubisch kristallines Bornitrid)



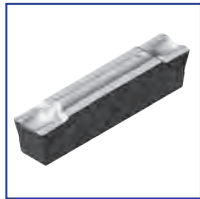
p. 189

- For machining hard materials, sintered materials and cast materials
- Extremely wear resisting
- To be used with holders of GripLock P92 system
- CBN tips on one edge

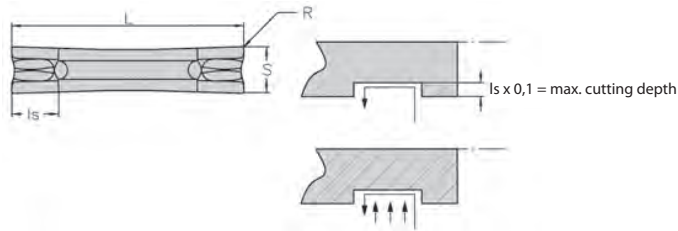
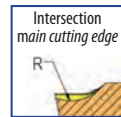
### Remark:

Other inserts with HARDLOX 2® coating on request

**Cutting and turning inserts**



**BTNG**  
System P92



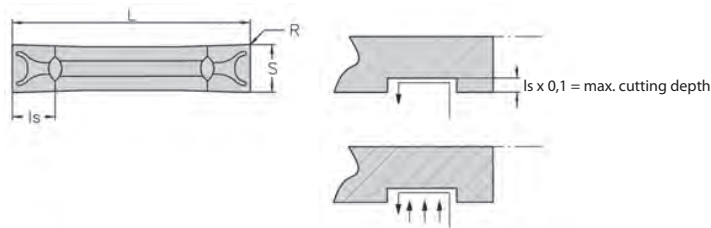
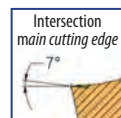
Enlarged view

WG262 Ref.	GF110 Hardlox 2	⌀	L	ls	R	S ±0,025
	ID-Nr.					
BTNG 202	38751	N	20,00	2,00	0,2	2,00
BTNG 302	38752	N	20,00	3,50	0,2	3,00
BTNG 304	38753	N	20,00	3,50	0,4	3,00
BTNG 402	new! 54891	N	20,00	3,50	0,2	4,00
BTNG 404	new! 54892	N	20,00	3,50	0,4	4,00
BTNG 408	new! 54893	N	20,00	3,50	0,8	4,00
BTNG 504	38754	N	25,00	4,20	0,4	5,00
BTNG 508	54894	N	25,00	4,20	0,8	5,00
BTNG 604	new! 54895	N	30,00	4,90	0,4	6,00
BTNG 808	new! 38755	N	30,00	6,40	0,8	8,00

Fitting tool holders see below



**MTNS**  
System P92



Enlarged view

WG302 Bezeichnung	KM Hardlox 2	GF110 Hardlox 2	⌀	L	ls	R	S
	ID-Nr.	ID-Nr.					
MTNS 202	38745	54940	N	20,10	2,0	0,2	2,05 +0,10
MTNS 302	48392	38746	N	20	3,5	0,2	3,00 +0,15
MTNS 304	54934	38747	N	20	3,5	0,4	3,00 +0,15
MTNS 402	54935	38748	N	20	3,5	0,2	4,00 +0,20
MTNS 404	new! 54936	54941	N	20,00	3,5	0,4	4,0 +0,20
MTNS 408	new! 54937	54942	N	20,00	3,5	0,8	4,0 +0,15
MTNS 504	new! 54938	54943	N	25,00	4,2	0,4	5,0 +0,25
MTNS 508	new! 40999	54944	N	25,00	4,2	0,8	5,05 +0,25
MTNS 604	54939	38749	N	30	4,9	0,4	6,05 +0,25
MTNS 808	38750	54945	N	30	6,4	0,8	8,05 +0,25

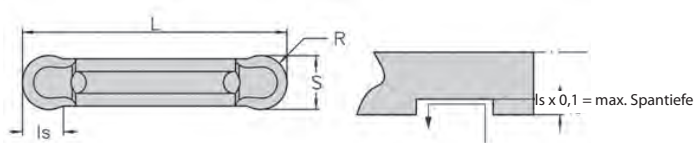
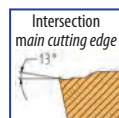
Fitting tool holders



Cutting and turning inserts



**RTNG**  
System P92



Enlarged view

WG262 Ref.	GF110 Hardlox 2 ID-Nr.	(C)	L	ls	R	$s \pm 0,025$
RTNG 210	38756	N	20,00	1,71	1,0	2,00
RTNG 315	38757	N	20,00	2,60	1,5	3,00
RTNG 420	<b>new!</b> 39805	N	20,00	3,40	2,0	4,00
RTNG 525	<b>new!</b> 40366	N	25,00	4,10	2,5	5,00
RTNG 630	<b>new!</b> 39031	N	30,00	4,90	3,0	6,00
RTNG 840	<b>new!</b> 44679	N	30,00	6,50	4,0	8,00
RTNG 1050	<b>new!</b> 54990	N	30,00	8,10	5,0	10,00

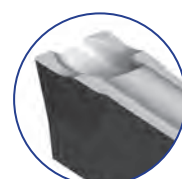
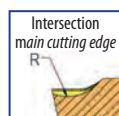
Fitting tool holder



Inserts for grooving and parting off



**BTNN**  
System P92



Enlarged view

WG302 Bezeichnung	KM Hardlox 2 ID-Nr.	(C)	$L \pm 0,10$	R	$s \pm 0,10$
BTNN1,5	38760	N	15,50	0,2	1,58
BTNN 2	38761	N	20,00	0,2	2,08
BTNN 2,5	38762	N	20,00	0,2	2,58
BTNN 3	38763	N	20,00	0,2	3,08
BTNN 4	38764	N	20,00	0,2	4,08

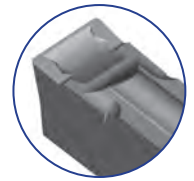
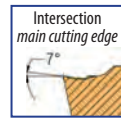
Fitting tool holder



**Inserts for grooving and parting off**



**CTD ALU**  
System P92



Enlarged view

WG302 Ref.	KM Hardlox 2	GF110 Hardlox 2	(C)	L	R	$s \pm 0,10$	
	ID-Nr.	ID-Nr.					
CTD 1.5 ALU	new!	-	54900	N	15,5 ±0,15	0,15	1,58
CTD 2 ALU	new!	-	54902	N	20 ±0,15	0,2	2,08
CTD 2.5 ALU	new!	-	54904	N	20 ±0,15	0,2	2,58
CTD 3 ALU	38758	-	-	N	20 ±0,15	0,2	3,08
CTD 4 ALU	38759	-	-	N	20 ±0,15	0,2	4,08
CTD 5 ALU	54896	-	-	N	25 ±0,20	0,2	5,13

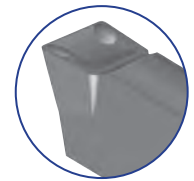
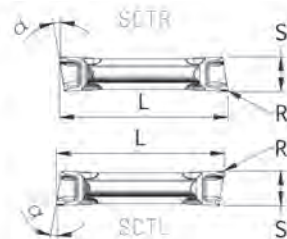
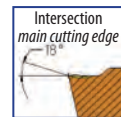
**Remark**

Inserts with ground top-face.

**Fitting tool holder**



**SCTD**  
System P92



Enlarged view

WG302 Ref.	GF110 Hardlox 2	(C)	L	R	$s \pm 0,10$	$\alpha^\circ$
	ID-Nr.					
SCTD 1,5	54911	N	15,5 ±0,15	0,2	1,58	0
SCTD 2	54991	N	20 ±0,15	0,2	2,08	0
SCTD 2,5	54992	N	20 ±0,15	0,2	2,58	0
SCTD 3,0	54993	N	20 ±0,15	0,2	3,08	0
SCTD 4,0	54994	N	20 ±0,15	0,2	4,08	0
SCTD 5,0	54995	N	25 ±0,20	0,2	5,13	0

**SUPERNOVA Parting off geometry...**

Slightly honed cutting edge with reinforced flanks and large chip through.

**Fitting tool holders**

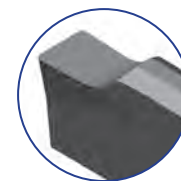
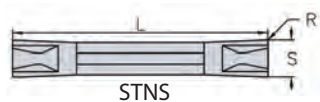
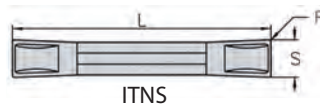
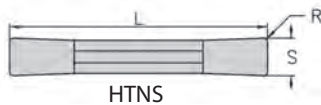
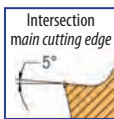




Inserts for grooving



**HTNS / ITNS / STNS**  
System P92 S



Enlarged view

WG302 Ref.	KM Hardlox2	(C)	L	R	$s_{\pm 0,10}$
	ID-Nr.				
HTNS 2	38767	N	14,00	0,2	2,00
ITNS 2	<b>new!</b> 54909	N	14,00	0,2	2,00
STNS 2	<b>new!</b> 54910	N	14,00	0,2	2,00

Remark

Inserts for internal and external machining

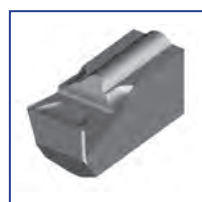
Fitting tool holder



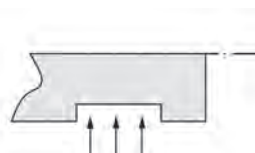
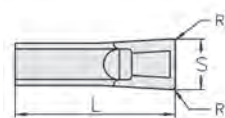
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**KCTD**  
System P92



WG302 Ref.	KM Hardlox 2	(C)	P	L	R	$s_{+0,15}$
	ID-Nr.					
KCTD 3	38768	N	3/4,5	9,5	0,2	3,0
KCTD 3 MAX	38769	N	5,5/7	12	0,2	3,0

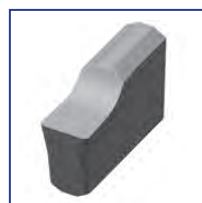
Remark

Inserts for small diameters.

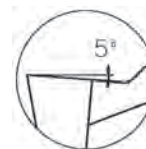
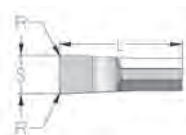
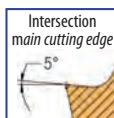
Fitting tool holder



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**KHTNS**  
System P92 S



WG302 Ref.	KM Hardlox2	(C)	$L_{\pm 0,1}$	R	$s_{\pm 0,10}$
	ID-Nr.				
KHTNS 2	38770	N	6,35	0,2	2,0

Remark

Inserts for small diameters.

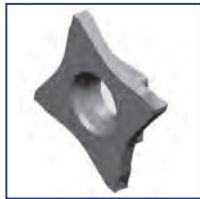
Fitting tool holder



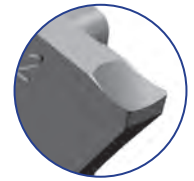
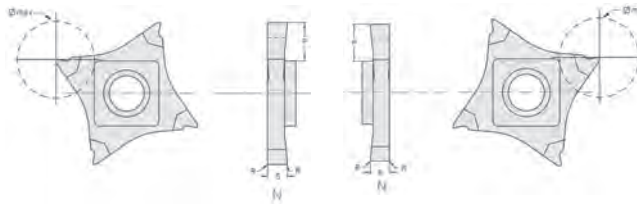
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**MULTICUT 4 Inserts for grooving and parting off**



**OFQ16 R/L...N00**  
System M92 Q



Enlarged view

WG404 Ref.	FM Hardlox2	( )	P	R	$\zeta \pm 0,05$	$\alpha$	$\varnothing_{max}$
	ID-Nr.						
OFQ16L 100 000 N 00	38782	N	3,5	0,00	1,00	0	7,0
OFQ16L 120 000 N 00	38771	N	6,5	0,00	1,20	0	13,0
OFQ16L 150 010 N 00	38772	N	6,5	0,10	1,50	0	13,0
OFQ16L 200 010 N 00	38773	N	6,5	0,10	2,00	0	13,0
OFQ16L 200 020 N 00	43689	N	6,5	0,20	2,00	0	13,0
OFQ16L 250 010 N 00	<b>new!</b> 55005	N	6,5	0,10	2,50	0	13,0
OFQ16L 250 020 N 00	<b>new!</b> 55006	N	6,5	0,20	2,50	0	13,0
OFQ16L 300 010 N 00	<b>new!</b> 55008	N	6,5	0,10	3,00	0	13,0
OFQ16L 300 020 N 00	<b>new!</b> 55010	N	6,5	0,20	3,00	0	13,0
OFQ16R 100 000 N 00	38778	N	3,5	0,00	1,00	0	7,0
OFQ16R 120 000 N 00	38774	N	6,5	0,00	1,20	0	13,0
OFQ16R 150 010 N 00	38775	N	6,5	0,10	1,50	0	13,0
OFQ16R 200 010 N 00	38776	N	6,5	0,10	2,00	0	13,0
OFQ16R 200 020 N 00	43690	N	6,5	0,20	2,00	0	13,0
OFQ16R 250 010 N 00	<b>new!</b> 55012	N	6,5	0,10	2,50	0	13,0
OFQ16R 250 020 N 00	<b>new!</b> 55013	N	6,5	0,20	2,50	0	13,0
OFQ16R 300 010 N 00	<b>new!</b> 55014	N	6,5	0,10	3,00	0	13,0
OFQ16R 300 020 N 00	<b>new!</b> 55015	N	6,5	0,20	3,00	0	13,0

Fitting tool holder



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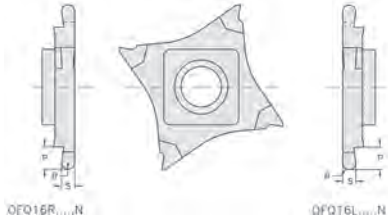
p. 43 - 44

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**MULTICUT 4 - Full radius insert for grooving and copying**



**OFQ16L..R..N**  
System M92-Q



**OFQ16R..R..N**  
System M92-Q



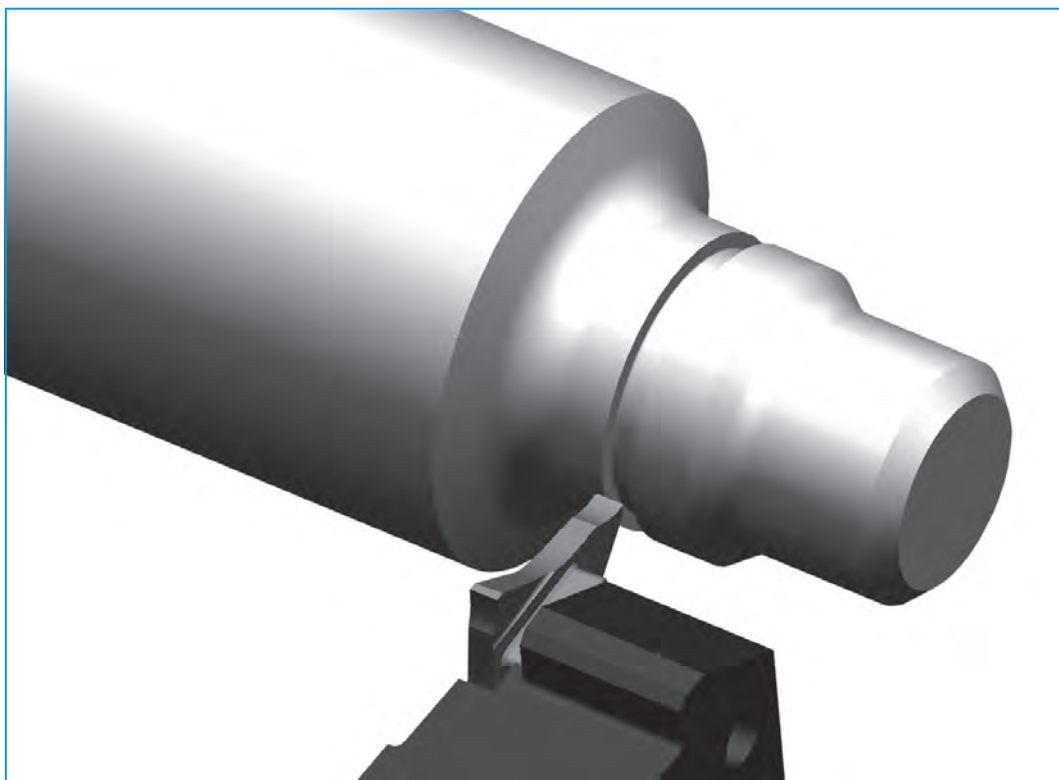
WG404 Ref.	FM Hardlox 2 ID-Nr.	⌀	P	R	s <sup>+</sup> +0,05
OFQ16L 100 R050 N	55031	L	1,0	0,50	1,00
OFQ16L 150 R075 N	43481	L	1,5	0,75	1,50
OFQ16L 200 R100 N	55032	L	2,0	1,00	2,00
OFQ16L 250 R125 N	55033	L	2,5	1,25	2,50
OFQ16L 300 R150 N	55034	L	3,0	1,50	3,00
OFQ16R 100 R050 N	55035	R	1,0	0,50	1,00
OFQ16R 150 R075 N	55039	R	1,5	0,75	1,50
OFQ16R 200 R100 N	55036	R	2,0	1,00	2,00
OFQ16R 250 R125 N	55037	R	2,5	1,25	2,50
OFQ16R 300 R150 N	55038	R	3,0	1,50	3,00

**Comment:**

Segmented and ground micrograin insert.  
Horizontal cutting edge and positive top rake.

**Fitting tool holder**

[Technical section page 205 onwards](#)



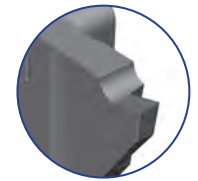
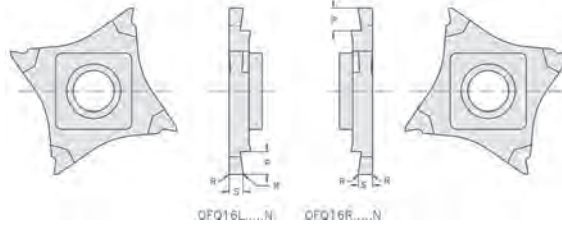
**Hard material machining**  
PRECISION GROOVE  
with MULTICUT 4  
precision insert



**MULTICUT 4 Precision grooving inserts according to DIN 471**



**OFQ16 R/L...N**  
System M92 Q



Enlarged view

WG404 Ref.	FM Hardlox 2	( )	P	R	Breite	$\zeta$ -0,05
ID-Nr.						
OFQ16L 050 000 N	38781	L	1,0	0,00	0,50	0,57
OFQ16L 060 000 N	<b>new!</b> 55004	L	1,0	0,00	0,60	0,67
OFQ16L 070 000 N	<b>new!</b> 55007	L	1,5	0,00	0,70	0,77
OFQ16L 080 000 N	<b>new!</b> 55009	L	1,5	0,00	0,80	0,87
OFQ16L 090 000 N	<b>new!</b> 55011	L	1,5	0,00	0,90	0,97
OFQ16L 100 000 N	38782	L	1,5	0,00	1,00	1,07
OFQ16L 110 010 N	<b>new!</b> 55016	L	1,5	0,10	1,10	1,24
OFQ16L 130 010 N	<b>new!</b> 55017	L	1,5	0,10	1,30	1,44
OFQ16L 160 010 N	38783	L	2,0	0,10	1,60	1,74
OFQ16L 185 010 N	<b>new!</b> 55019	L	2,0	0,10	1,85	1,99
OFQ16L 215 010 N	38784	L	2,5	0,10	2,15	2,29
OFQ16L 265 010 N	<b>new!</b> 55020	L	2,5	0,10	2,65	2,79
OFQ16L 315 010 N	<b>new!</b> 55021	L	2,5	0,10	3,15	3,29
OFQ16R 050 000 N	38777	R	1,0	0,00	0,50	0,57
OFQ16R 060 000 N	<b>new!</b> 55022	R	1,0	0,00	0,60	0,67
OFQ16R 070 000 N	<b>new!</b> 55023	R	1,5	0,00	0,70	0,77
OFQ16R 080 000 N	<b>new!</b> 55024	R	1,5	0,00	0,80	0,87
OFQ16R 090 000 N	<b>new!</b> 55025	R	1,5	0,00	0,90	0,97
OFQ16R 100 000 N	38778	R	1,5	0,00	1,00	1,07
OFQ16R 110 010 N	<b>new!</b> 55026	R	1,5	0,10	1,10	1,24
OFQ16R 130 010 N	<b>new!</b> 55027	R	1,5	0,10	1,30	1,44
OFQ16R 160 010 N	38779	R	2,0	0,10	1,60	1,74
OFQ16R 185 010 N	<b>new!</b> 55028	R	2,0	0,10	1,85	1,99
OFQ16R 215 010 N	38780	R	2,5	0,10	2,15	2,29
OFQ16R 265 010 N	<b>new!</b> 47854	R	2,5	0,10	2,65	2,79
OFQ16R 315 010 N	<b>new!</b> 55029	R	2,5	0,10	3,15	3,29

Fitting tool holder



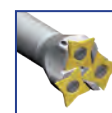
p. 35



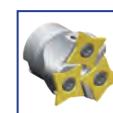
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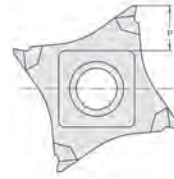


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**MULTICUT 4 - Precision threading inserts external for ISO- and Whitworth full profile**



**OFQ16R...ER**  
System M92-Q



WG404 Ref.	FM Hardlox 2	(C)		A	P	S	$\alpha^\circ$
	ID-Nr.						
OFQ16R 200 050 ER ISO	54985	R	0,50	0,5	6,5	2,0	60
OFQ16R 200 070 ER ISO	54961	R	0,70	0,5	6,5	2,0	60
OFQ16R 200 075 ER ISO	54962	R	0,75	0,5	6,5	2,0	60
OFQ16R 200 080 ER ISO	54987	R	0,80	0,7	6,5	2,0	60
OFQ16R 200 100 ER ISO	54988	R	1,00	0,7	6,5	2,0	60
OFQ16R 200 125 ER ISO	45201	R	1,25	0,7	6,5	2,0	60
OFQ16R 200 28W ER	54966	R	28 G/inch	1,0	6,5	2,0	55
OFQ16R 200 19W ER	54997	R	19 G/inch	1,0	6,5	2,0	55
OFQ16R 350 14W ER	54998	R	14 G/inch	1,3	6,5	3,5	55
OFQ16R 350 11W ER	54999	R	11 G/inch	1,5	6,5	3,5	55
OFQ16R 350 150 ER ISO	50333	R	1,50	0,8	6,5	3,5	60
OFQ16R 350 175 ER ISO	55000	R	1,75	0,9	6,5	3,5	60
OFQ16R 350 200 ER ISO	55001	R	2,00	1,0	6,5	3,5	60
OFQ16R 350 250 ER ISO	55002	R	2,50	1,3	6,5	3,5	60
OFQ16R 350 300 ER ISO	55003	R	3,00	1,8	6,5	3,5	60

Fitting tool holder



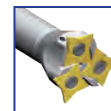
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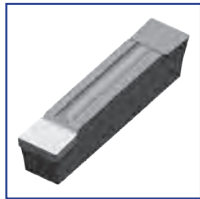


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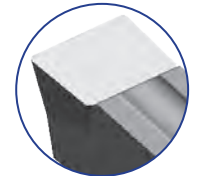
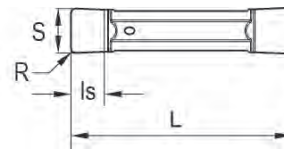
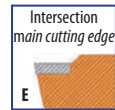


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**CBN tipped cutting inserts for grooving and turning**

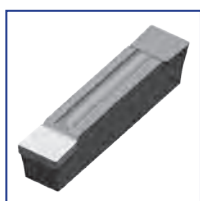


**OTX EST**

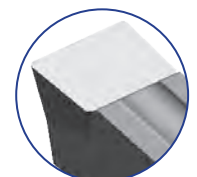
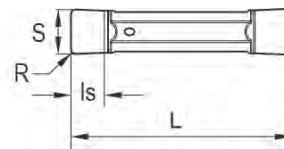
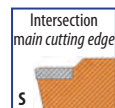


Enlarged view

WG700 Ref.	CBN1630GL uncoated	(C)	L	Ls	R	S ±0,025
	ID-Nr.					
OTX 304 EST	49061	N	20,00	3,00	0,4	3,00
OTX 404 EST	49062	N	20,00	3,30	0,4	4,00
OTX 508 EST	49063	N	25,00	3,50	0,8	5,00
OTX 608 EST	49064	N	30,00	4,00	0,8	6,00



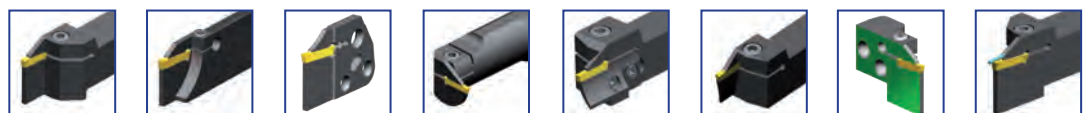
**OTX S02025ST**



Enlarged view

WG700 Ref.	CBN1630GL uncoated	CBN5625GL	(C)	L	Ls	R	S ±0,025
	ID-Nr.	ID-Nr.					
OTX 304 S02025ST	49065	49069	N	20,00	3,00	0,4	3,00
OTX 404 S02025ST	49066	49070	N	20,00	3,30	0,4	4,00
OTX 508 S02025ST	49067	49071	N	25,00	3,50	0,8	5,00
OTX 608 S02025ST	49068	49072	N	30,00	4,00	0,8	6,00

Fitting tool holder



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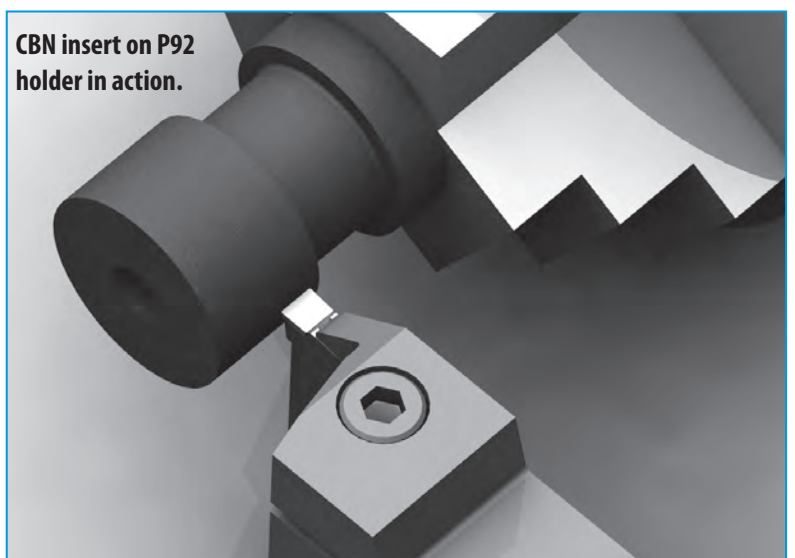
**CBN1630GL** (90% CBN contents)

Uncoated, tough CBN grade. To be used on hardened components, sinter materials and cast irons. (Continuous and interrupted cutting)

**CBN5625GL** (65% CBN contents)

PVD coated CBN grade to be used on hardened components, sinter materials (Continuous and interrupted cutting)

CBN insert on P92 holder in action.



- E** = Flat geometry slightly honed
- ST** = Insert with one CBN tip
- S** = Edge negative chamfer and honing