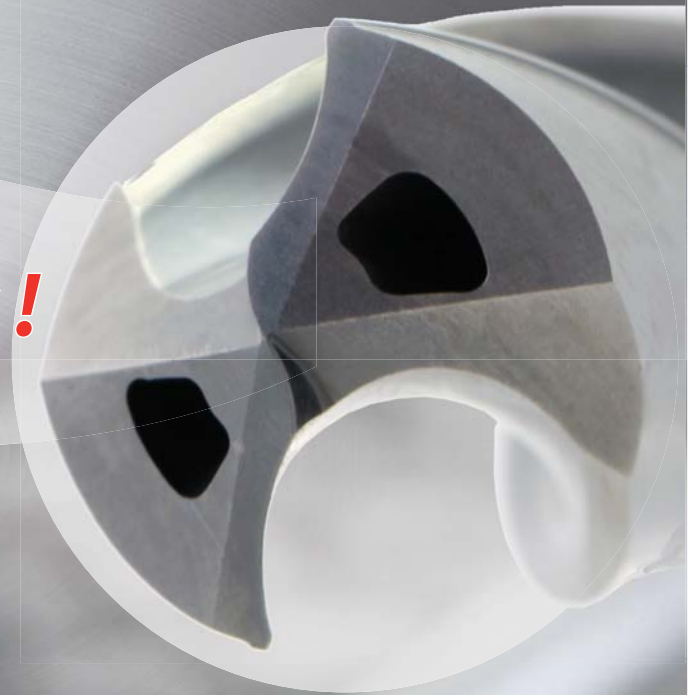




WDO-SUS-3D/WDO-SUS-5D

Carbide Internal Coolant Drill for Stainless Steel

*New Hole
Geometry!*



**HIGH
PERFORMANCE** for
STAINLESS STEEL

A Published
Technical Report
HEINZ  EDELSTAHL
inside

More than 20,000 holes drilled in the master class of machining

Lower cutting forces, lower cutting temperature or lower feed rates by using new chamfer design, such things sound nice on paper. That's why at Heinz Edelstahl in the German town of Salach one does not care much about figures achieved under laboratory conditions. They care about process reliability, even with a hard to machine materials such as stainless steel

So far they had no difficulties, but they didn't want to stop just there. A wise decision, without it an efficiency increase such as this would not have occurred in Salach. In this specific case it was about drilling sieve segments for a renowned manufacture of paper machines. In total that requires more than 10,000 through holes with a diameter of 12mm to be drilled in 20mm stainless steel 1.4462. This stainless steel X2CrNiMoN22-5-3 is hard to machine, and in machining processing this steel belong in the master class. This cryogenic stainless steel is highly weather resistant and is therefore mainly used in architecture, but also in the petrochemical industry. For drilling one of these sieve segments, so far three days and 2.5 drills were needed. The up to then exceptional cutting conditions were however achieve with a top shelf carbide drill. Now cutting parameters have been increased by 3.5 and tool life has been more than doubled. This was made possible by the WDO SUS carbide drill from OSG, engineered specifically for tough materials like stainless steel.



Heinz Edelstahl is processing up to 1,200 tons of stainless steel per year, 95% of that are machined (milling, turning, grinding and drilling).

Therefore by using this drill cutting forces and friction as with that cutting temperature are reduced and because of the new chamfer design less feed is needed. Features of the WDO SUS that have been proven at Heinz Edelstahl GmbH but which Peter Heinz, Head of Sales and Engineering, does not care about much: "We are now machining stainless steel for 25 years and have tested a lot. According to our experience, quality of a tool doesn't show under ideal conditions like climate controlled environment and state-of-the-art machinery. Our machines aren't the latest model, radial deviation isn't the best either. That's why I was surprised by OSG's drill. It's completely reliable, evacuates chips really well and tool life is also great."



Instead of figures achieved under ideal conditions as climate controlled environment and state-of-the-art machinery, practical use is what counts in Salach. The machines aren't the latest model, radial deviation isn't as good as with a new machine.



The WDO SUS carbide drill from OSG in use: Besides 1.4462 other stainless steels are processed and, according to Peter Heinz, these are no match in terms of problematic machining for the master class.

Less idle time is far more cost effective

Of course, OSG had set up testing for cycle time and tool life. So at first, cutting parameters were set to the maximum to shorten cycle time. As a result, cycle time was reduced from three days to one and a half. After that the next step was unsupervised production. The result is a tool life of two sieve segments with one drill, but even after that it doesn't need to be replaced. Therefore can be used further without problems. These results were able to build enough trust to start thinking about unsupervised manufacturing overnight. It's just that the optimizations OSG did with WDO SUS were meant to relief the Machine and to reduce power intake. But that's not what it is about in Salach. There is no mass production, no permanent load. Process reliability is far more important, higher speed and longer tool life are just an additional bonus. At least according to Peter Heinz: „Less stress on machines



Lower cutting forces and less friction to reduce cutting temperature, a new chamfer design to allow lower feed rates and optimal chip forming are promised by OSG with the WDO SUS.

and warehouse is nice, but for us not really the point. With our lot sizes, there is not much need for maximized cutting speed. It's far more cost efficient to produce as many sieve segments as possible, so noticeable less machine idle time because of tool replacement or even breakage occurs."

Cost efficiency itself is really a big concern. For small and mid-sized companies, so OSG promises with WDO SUS less need for a stockpile of tools because the carbide drill shows its strength even in carbide and tool steel. So even higher tool cost are not much of a concern since in the high-end league of drills necessary expenses don't differ that much. With cheap products on the other hand one has always stock multiple tools while always risking, if a certain material can even be drilled, breakage. So Heinz Edelstahl seems to be on the right track, besides the 1.4462 a variety of other stainless steels are processed in Salach. And, according to Peter Heinz, these are no match in terms of problematic machining for the master class, the 1.4462.

Spotlight Heinz Edelstahl GmbH

The company as it is today was founded 1990 and has established itself as a supplier for small batches and custom pieces of stainless steel parts. In Salach up to 1,200 tons of stainless steel are processed each year, 95% of that are machined (milling, turning, grinding and drilling). The company also offers plasma cutting with three cutters. Together with efficient cutting optimizations by using

state-of-the-art CAM software this results in very little waste. Customers today come from the medical and food industry, architecture and construction, as well pipe manufacturing and the petrochemical sector.

By the way

Using a high quality carbide drill has already led to a significant increase in

cutting speed and tool life at Heinz Edelstahl. With the WDO SUS from OSG, even these figures were more than tripled/resp. doubled.

Interesting Facts

The stainless steel 1.4462 is so hard to machine, that for offers for parts to be turned, twice the processing time has to be calculated.



The Company has established itself as a supplier for small batches and custom pieces of stainless steel parts.



Zeljko Kuzmann, head of production (left) and Peter Heinz (right): "This drill has proven trustworthy enough, that we are thinking about using it unsupervised overnight."

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WDO-SUS-3D/5D

////// INTRODUCTION

OSG's next generation of carbide drills is an almighty one. Focused on the reduction of thrust and aimed at machining Stainless Steel, WDO-SUS-3D/5D is the perfect drill to use for your machine.

The flute design produces optimal chip shape, thereby realizing smooth chip evacuation. The margin form is designed to realize low resistance and low cutting temperature.

1. Sharp Cutting Edge

Reduces work hardening, which leads to longer tool life during tapping and reaming

2. New Flute Geometry

Enables the creation of compact cutting chips

3. Special Margin Shape

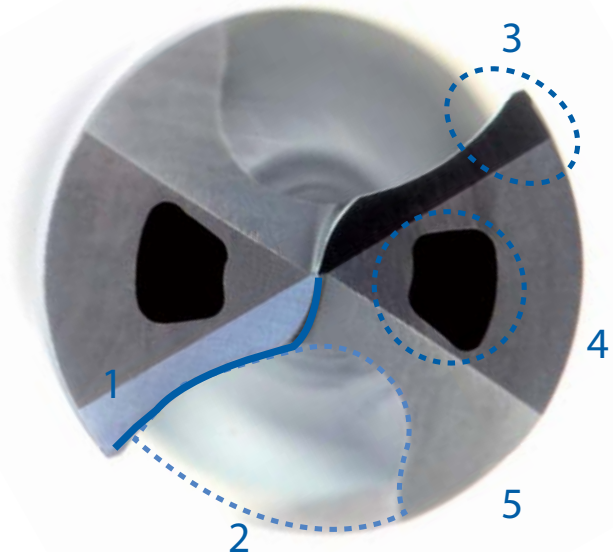
Reduces friction and heat generation

4. New Coolant Hole Shape

Improves coolant flow, chip evacuation and cutting heat generation.

5. WXL Coating

High adhesion strength, which minimizes the possibility of chipping



WDO-SUS-3D/ WDO-SUS-5D
(hole geometry over diameter 6mm)

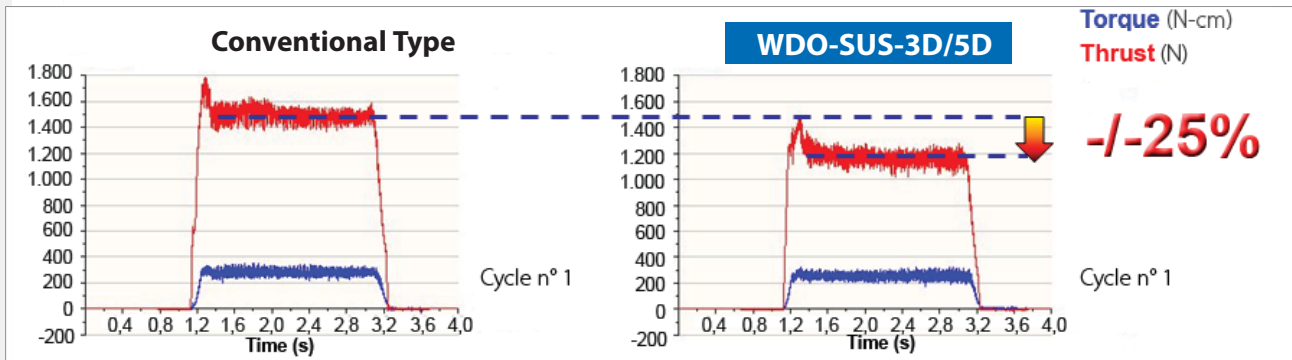
	Competitor A	Competitor B	WDO-SUS-5D
$\phi 6$	V=100m/min	V=100m/min	V=100m/min
f=0.12mm/rev			
f=0.18mm/rev			
f=0.24mm/rev			

Excellent Chips

WDO-SUS-3D/5D

CUTTING DATA

Performance WDO-SUS-3D/5D versus Conventional type on Work Material SUS304



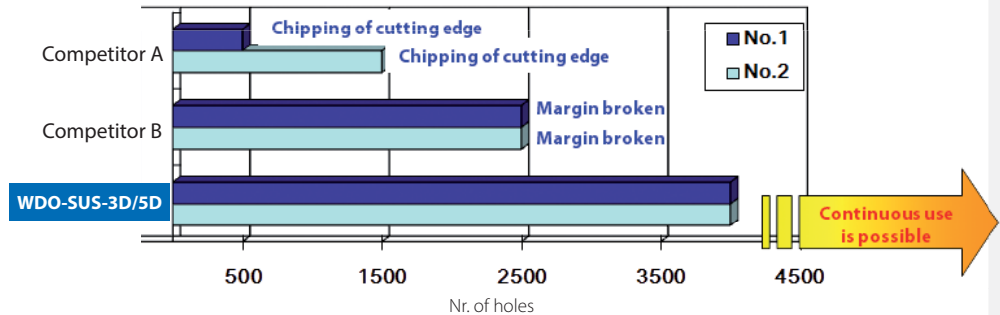
Cutting Dia	Ø6
Material	SUS304

Speed	80m/min
Feed Rate	0,18mm/rev (3% x D)

Depth of Hole	25mm (Through hole)
Coolant	Internal - Emulsion - 1,5Mpa

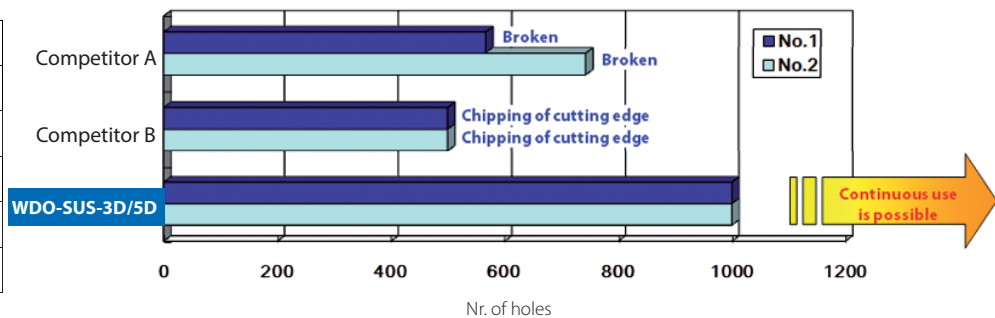
Performance WDO-SUS-3D/5D versus Conventional type on Work Material SUS304

Cutting Dia	Ø 6
Work Material	SUS304
Cutting Speed	80m/min
Feed Rate	0,18mm/rev (3% x D)
Depth of Hole	25mm (Through hole)
Coolant	Internal - Emulsion - 1,5Mpa



Performance WDO-SUS-3D/5D versus Conventional type on Work Material S50C

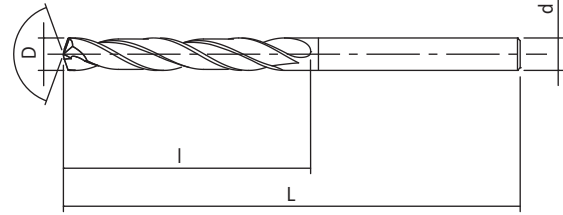
Cutting Dia	Ø 10
Work Material	S50C
Cutting Speed	100m/min
Feed Rate	0,30mm/rev (3% x D)
Depth of Hole	50mm (Through hole)
Coolant	Internal - Emulsion - 1,5Mpa



CONDITIONS

Vc	Carbon Steel S50C		Alloy Steel SCM440		Alloy Steel SCM440 - 30HRC		Stainless Steel SUS304 SUS316		Super Duplex SUS630 17-4PH, 15-5PH		Ti Alloy	
	S (min ⁻¹)	F (mm/rev)	S (min ⁻¹)	F (mm/rev)	S (min ⁻¹)	F (mm/rev)	S (min ⁻¹)	F (mm/rev)	S (min ⁻¹)	F (mm/rev)	S (min ⁻¹)	F (mm/rev)
3	10.600	0,06~0,12	10.600	0,06~0,12	7.400	0,06~0,12	8.500	0,06~0,12	4.800	0,06~0,09	3.700	0,05~0,09
4	8.000	0,08~0,16	8.000	0,08~0,16	5.600	0,08~0,16	6.400	0,08~0,16	3.600	0,08~0,12	2.800	0,06~0,12
5	6.400	0,10~0,20	6.400	0,10~0,20	4.500	0,10~0,20	5.100	0,10~0,20	2.900	0,10~0,15	2.200	0,08~0,15
6	5.300	0,12~0,24	5.300	0,12~0,24	3.700	0,12~0,24	4.200	0,12~0,24	2.400	0,12~0,18	1.900	0,09~0,18
7	4.500	0,14~0,26	4.500	0,14~0,26	3.200	0,14~0,26	3.600	0,14~0,26	2.000	0,14~0,21	1.600	0,11~0,21
8	4.000	0,16~0,28	4.000	0,16~0,28	2.800	0,16~0,28	3.200	0,16~0,28	1.800	0,16~0,24	1.400	0,12~0,24
9	3.500	0,18~0,30	3.500	0,18~0,30	2.500	0,18~0,30	2.800	0,18~0,30	1.600	0,18~0,27	1.200	0,14~0,27
10	3.200	0,20~0,30	3.200	0,20~0,30	2.200	0,20~0,30	2.500	0,20~0,30	1.400	0,20~0,30	1.100	0,15~0,30
11	2.900	0,20~0,30	2.900	0,20~0,30	2.000	0,20~0,30	2.300	0,20~0,30	1.300	0,20~0,30	1.000	0,15~0,30
12	2.700	0,21~0,30	2.700	0,21~0,30	1.900	0,21~0,30	2.100	0,21~0,30	1.200	0,21~0,30	900	0,16~0,30
13	2.400	0,21~0,33	2.400	0,21~0,33	1.700	0,21~0,33	2.000	0,21~0,33	1.100	0,21~0,33	900	0,18~0,33
14	2.300	0,22~0,35	2.300	0,22~0,35	1.600	0,22~0,35	1.800	0,22~0,35	1.000	0,22~0,35	800	0,19~0,35
16	2.000	0,25~0,36	2.000	0,25~0,36	1.400	0,25~0,36	1.600	0,25~0,36	900	0,25~0,36	700	0,22~0,36
18	1.800	0,28~0,38	1.800	0,28~0,38	1.200	0,28~0,38	1.400	0,28~0,38	800	0,28~0,38	600	0,24~0,38
20	1.600	0,30~0,40	1.600	0,30~0,40	1.100	0,30~0,40	1.300	0,30~0,40	700	0,30~0,40	600	0,27~0,40

PRODUCT INFORMATION



Carbide 3D Internal Coolant Drill High Performance on Stainless Steel **M**

Optimized flute design
Smooth chip evacuation

New coolant hole shape applies only to diameter sizes over 6mm

Unit:mm

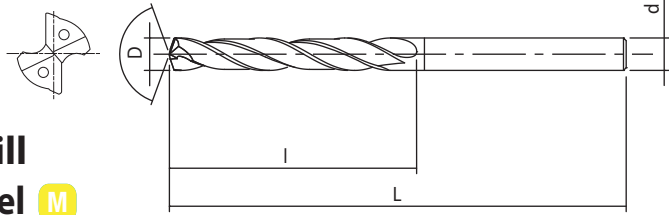
EDP	D	L	l	d	Price	EDP	D	L	l	d	Price
8665280	2,8	66	17	3		48169083	8,3	101	42	10	
8665290	2,9	66	18	3		48169084	8,4	101	42	10	
8665300	3	66	18	3		48169085	8,5	101	43	10	
8665310	3,1	74	19	4		48169086	8,6	101	43	10	
8665320	3,2	74	20	4		48169087	8,7	101	44	10	
8665330	3,3	74	20	4		48169088	8,8	101	44	10	
8665340	3,4	74	21	4		48169089	8,9	101	45	10	
8665350	3,5	74	21	4		48169090	9	101	45	10	
8665360	3,6	74	22	4		8665910	9,1	106	46	10	
8665370	3,7	74	23	4		8665920	9,2	106	46	10	
8665380	3,8	74	23	4		8665930	9,3	106	47	10	
8665390	3,9	74	24	4		8665940	9,4	106	47	10	
8665400	4	74	24	4		8665950	9,5	106	48	10	
48169041	4,1	80	25	6		8665960	9,6	106	48	10	
48169042	4,2	80	26	6		8665970	9,7	106	49	10	
48169043	4,3	80	26	6		8665980	9,8	106	49	10	
48169044	4,4	80	27	6		8665990	9,9	106	50	10	
48169045	4,5	80	27	6		8666000	10	106	50	10	
48169046	4,6	80	28	6		48169101	10,1	113	51	12	
48169047	4,7	80	29	6		48169102	10,2	113	51	12	
48169048	4,8	80	29	6		48169103	10,3	113	52	12	
48169049	4,9	80	30	6		48169104	10,4	113	52	12	
48169050	5	80	25	6		48169105	10,5	113	53	12	
8665510	5,1	82	26	6		48169106	10,6	113	53	12	
8665520	5,2	82	26	6		48169107	10,7	113	54	12	
8665530	5,3	82	27	6		48169108	10,8	113	54	12	
8665540	5,4	82	27	6		48169109	10,9	113	55	12	
8665550	5,5	82	28	6		48169110	11	113	55	12	
8665560	5,6	82	28	6		8666110	11,1	120	56	12	
8665570	5,7	82	29	6		8666120	11,2	120	56	12	
8665580	5,8	82	29	6		8666130	11,3	120	57	12	
8665590	5,9	82	30	6		8666140	11,4	120	57	12	
8665600	6	82	30	6		8666150	11,5	120	58	12	
48169061	6,1	88	31	8		8666160	11,6	120	58	12	
48169062	6,2	88	31	8		8666170	11,7	120	59	12	
48169063	6,3	88	32	8		8666180	11,8	120	59	12	
48169064	6,4	88	32	8		8666190	11,9	120	60	12	
48169065	6,5	88	33	8		8666200	12	120	60	12	
48169066	6,6	88	33	8		48169125	12,5	128	63	14	
48169067	6,7	88	34	8		48169130	13	128	65	14	
48169068	6,8	88	34	8		8666350	13,5	134	68	14	
48169069	6,9	88	35	8		8666400	14	134	70	14	
48169070	7	88	35	8		48169145	14,5	140	73	16	
8665710	7,1	94	36	8		48169150	15	140	75	16	
8665720	7,2	94	36	8		8666550	15,5	145	78	16	
8665730	7,3	94	37	8		8666600	16	145	80	16	
8665740	7,4	94	37	8		48169165	16,5	150	83	18	
8665750	7,5	94	38	8		48169170	17	150	85	18	
8665760	7,6	94	38	8		8666750	17,5	155	88	18	
8665770	7,7	94	39	8		8666800	18	155	90	18	
8665780	7,8	94	39	8		48169185	18,5	160	93	20	
8665790	7,9	94	40	8		48169190	19	160	95	20	
8665800	8	94	40	8		8666950	19,5	165	98	20	
48169081	8,1	101	41	10		8667000	20	165	100	20	
48169082	8,2	101	41	10							

On some drills, the coating may have some discoloration. This does not pose any performance problems.

Applications - Anwendungen - Applicazioni - Applications - Applikation - Aplicaciones - Применение								
C≤0.2%	0.25<C≤0.4%	C≥0.45%	SCM	-35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	SUS
⊙	⊙	⊙	⊙	⊙	○	○	⊙	⊙
SKD	GG	GGG	Cu	Al	AC	Ti	TiAl	Inc
○	⊙	⊙	○		○	○	⊙	



PRODUCT INFORMATION



Carbide 5D Internal Coolant Drill
High Performance on Stainless Steel M
Optimized flute design
Smooth chip evacuation

New coolant hole shape applies only to diameter sizes over 6mm

Unit:mm

Limited Supply EDP	New EDP	D	L	l	d	Price	Limited Supply EDP	New EDP	D	L	l	d	Price
-	8667278	2,78	78	26	3		5512057550	48170087	8,7	128	70	10	
-	8667280	2,8	78	26	3		5512057560	48170088	8,8	128	71	10	
-	8667290	2,9	78	27	3		5512057570	48170089	8,9	128	72	10	
5512056960	8667300	3	78	27	3		5512057580	48170090	9	128	72	10	
5512056970	8667310	3,1	86	28	4		5512057590	8667910	9,1	136	73	10	
5512056980	8667320	3,2	86	29	4		5512057600	8667920	9,2	136	74	10	
5512056990	8667330	3,3	86	30	4		-	8667926	9,26	136	75	10	
5512057000	8667340	3,4	86	31	4		5512057610	8667930	9,3	136	75	10	
5512057010	8667350	3,5	86	32	4		-	8667938	9,38	136	76	10	
5512057020	8667360	3,6	86	33	4		5512057620	8667940	9,4	136	76	10	
-	8667368	3,68	86	34	4		5512057630	8667950	9,5	136	76	10	
5512057030	8667370	3,7	86	34	4		-	8667954	9,54	136	77	10	
5512057040	8667380	3,8	86	35	4		5512057640	8667960	9,6	136	77	10	
5512057050	8667390	3,9	86	36	4		5512057650	8667970	9,7	136	78	10	
5512057060	8667400	4	86	36	4		5512057660	8667980	9,8	136	79	10	
5512057070	48170041	4,1	95	37	6		5512057670	8667990	9,9	136	80	10	
5512057080	48170042	4,2	95	38	6		5512057680	8668000	10	136	80	10	
5512057090	48170043	4,3	95	39	6		5512057690	48170101	10,1	146	81	12	
5512057100	48170044	4,4	95	40	6		5512057700	48170102	10,2	146	82	12	
5512057110	48170045	4,5	95	41	6		5512057710	48170103	10,3	146	83	12	
5512057120	48170046	4,6	95	42	6		5512057720	48170104	10,4	146	84	12	
-	48170464	4,64	95	42	6		5512057730	48170105	10,5	146	84	12	
5512057130	48170047	4,7	95	43	6		5512057740	48170106	10,6	146	85	12	
5512057140	48170048	4,8	95	44	6		5512057750	48170107	10,7	146	86	12	
5512057150	48170049	4,9	95	45	6		5512057760	48170108	10,8	146	87	12	
5512057160	48170050	5	95	45	6		5512057770	48170109	10,9	146	88	12	
5512057170	8667510	5,1	100	41	6		5512057780	48170110	11	146	88	12	
5512057180	8667520	5,2	100	42	6		5512057790	8668110	11,1	156	89	12	
5512057190	8667530	5,3	100	43	6		5512057800	8668120	11,2	156	90	12	
5512057200	8667540	5,4	100	44	6		-	8668124	11,24	156	90	12	
5512057210	8667550	5,5	100	44	6		5512057810	8668130	11,3	156	91	12	
-	8667554	5,54	100	45	6		-	8668138	11,38	156	92	12	
5512057220	8667560	5,6	100	45	6		5512057820	8668140	11,4	156	92	12	
5512057240	8667570	5,7	100	46	6		5512057830	8668150	11,5	156	92	12	
5512057250	8667580	5,8	100	47	6		5512057840	8668160	11,6	156	93	12	
5512057260	8667590	5,9	100	48	6		5512057850	8668170	11,7	156	94	12	
5512057270	8667600	6	100	48	6		5512057860	8668180	11,8	156	95	12	
5512057280	48170061	6,1	109	49	8		5512057870	8668190	11,9	156	96	12	
5512057290	48170062	6,2	109	50	8		5512057880	8668200	12	156	96	12	
5512057300	48170063	6,3	109	51	8		5512057890	48170125	12,5	167	100	14	
5512057310	48170064	6,4	109	52	8		5512057900	48170130	13	167	104	14	
5512057320	48170065	6,5	109	52	8		-	8668325	13,25	176	106	14	
5512057330	48170066	6,6	109	53	8		5512057910	8668350	13,5	176	108	14	
5512057340	48170067	6,7	109	54	8		5512057920	8668400	14	176	112	14	
5512057350	48170068	6,8	109	55	8		5512057930	48170145	14,5	185	116	16	
5512057360	48170069	6,9	109	56	8		5512057940	48170150	15	185	120	16	
5512057370	48170070	7	109	56	8		-	8668525	15,25	193	122	16	
5512057380	8667710	7,1	118	57	8		5512057950	8668550	15,5	193	124	16	
5512057390	8667720	7,2	118	58	8		5512057960	8668600	16	193	128	16	
5512057400	8667730	7,3	118	59	8		5512057970	-	16,5	201	132	18	
-	8667738	7,38	118	60	8		-	48170165	-	184	113	18	
5512057410	8667740	7,4	118	60	8		5512057980	-	17	201	136	18	
5512057420	8667750	7,5	118	60	8		-	48170170	-	184	114	18	
-	8667754	7,54	118	61	8		5512057990	-	17,5	209	140	18	
5512057430	8667760	7,6	118	61	8		-	8668750	-	184	115	18	
5512057440	8667770	7,7	118	62	8		5512058000	-	18	209	144	18	
5512057450	8667780	7,8	118	63	8		-	8668800	-	184	115	18	
5512057460	8667790	7,9	118	64	8		5512058010	-	18,5	217	148	20	
5512057470	8667800	8	118	64	8		-	48170185	-	184	116	20	
5512057480	48170081	8,1	128	65	10		5512058020	-	19	217	152	20	
5512057490	48170082	8,2	128	66	10		-	48170190	-	184	117	20	
5512057510	48170083	8,3	128	67	10		5512058030	-	19,5	225	156	20	
5512057520	48170084	8,4	128	68	10		-	8668950	-	184	117	20	
5512057530	48170085	8,5	128	68	10		5512058040	-	20	225	160	20	
5512057540	48170086	8,6	128	69	10		-	8669000	-	184	118	20	

On some drills, the coating may have some discoloration. This does not pose any performance problems.

Applications - Anwendungen - Applicazioni - Applications - Applikation - Applikation - Aplicaciones - Применение								
C≤0.2%	0.25<C≤0.4%	C≥0.45%	SCM	-35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	SUS
☉	☉	☉	☉	☉	○	○		☉
SKD	GG	GGG	Cu	Al	AC	Ti	TiAl	Inc
○	☉	☉	○		○	○	☉	



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