

NACHI

NACHI EUROPE GmbH

**OUR SYNERGY
YOUR PERFORMANCE**

AquaREVO DRILLS

HIGHLY EFFICIENT AND MULTI-PURPOSE



CELEBRATE THE POLE POSITION

NEW

**TOP
QUALITY
LEADER**

Doubled tool life
due to improved
substrate, coating
and cutting geometry



REVOlutionize your processing time

NEW

- ▶ NACHI Carbide Drills have been continuously improved: From the first generation AQUA to the second AQUA EX and now AquaREVO.
- ▶ AquaREVO drills profit from over 90 years of experience from a technology leader.
- ▶ Substrate, design and coating have been completely renewed.
- ▶ The newly developed features dramatically improve all drilling functions.

Doubled tool life

AquaREVO's durability and stability outperform that of other drills by far.

High efficiency

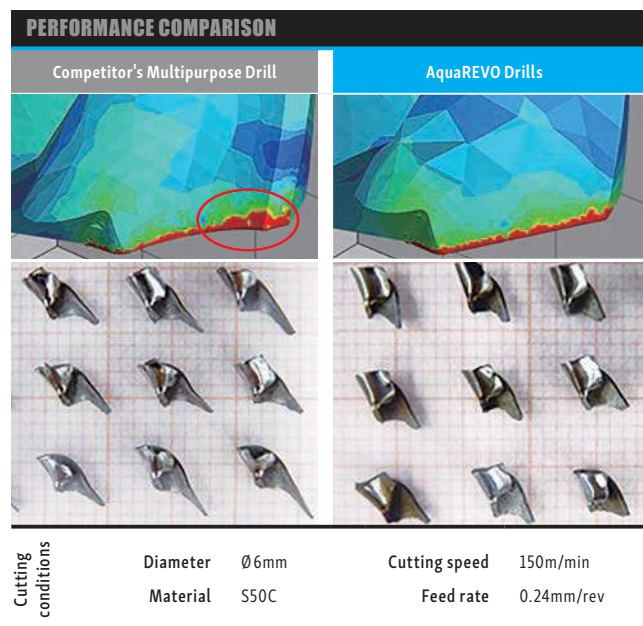
High performance even at increased speed and feed, significantly shorting the processing time.

Multi-purpose

Even with high-hardness- and difficult-to-cut-materials, high-quality processing is possible without lowering efficiency.

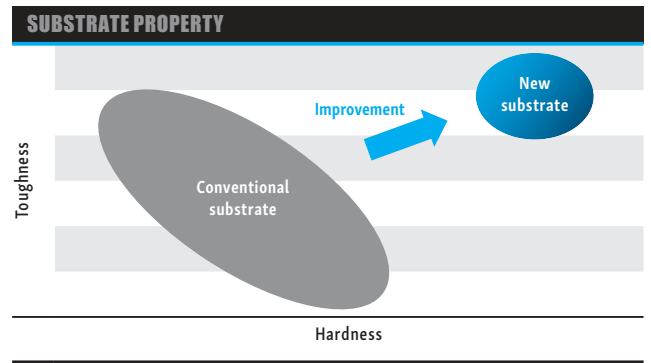
Design of Geometry

- ▶ A straight cutting edge has been adopted as well as a disperse inflexion point where cutting stress concentrates to evenly distribute wear.
- ▶ By implementing the straight cutting edge and thinning shape, chips are ejected finely even during high-speed cutting and high feed processing.



Improved Substrate

- ▶ A newly developed carbide substrate with enhanced hardness and toughness constitutes to a considerable improvement in wear- and chipping-resistance.



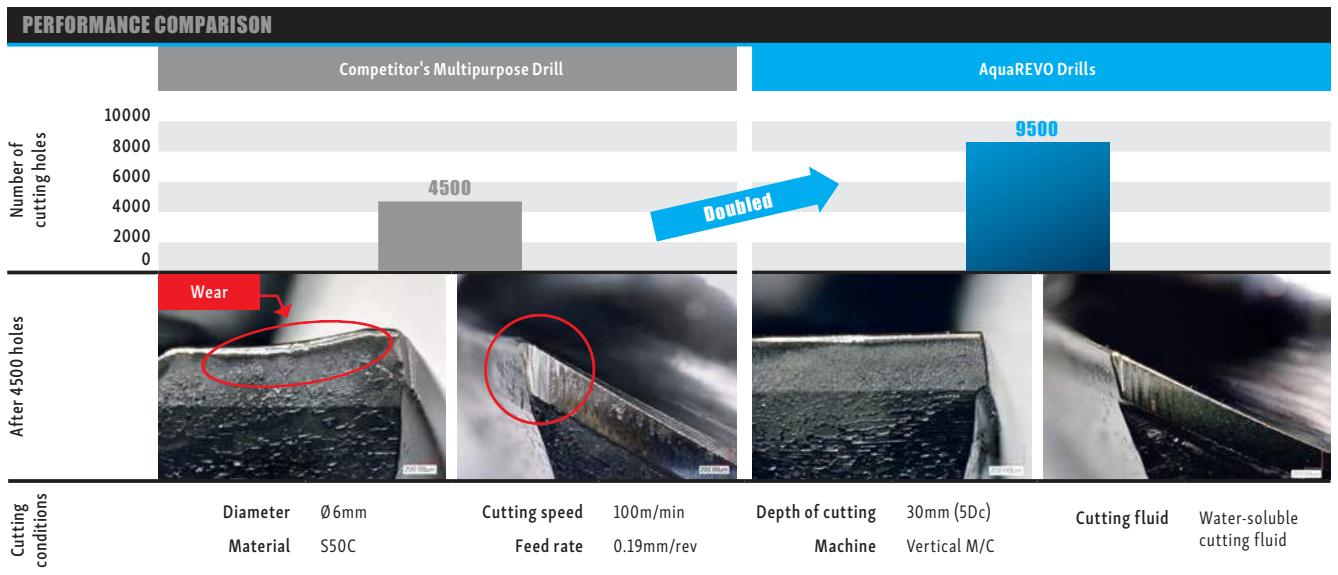
Newly developed Coating

- ▶ Newly developed REVO-D coating – suitable for drilling.
- ▶ AlCr-based and AlTi-based films are stacked at the nano level ensuring high oxidation resistance and wear resistance.
- ▶ Low friction and smooth chip evacuation by super smooth surface treatment.



An overwhelming number of cutting holes!

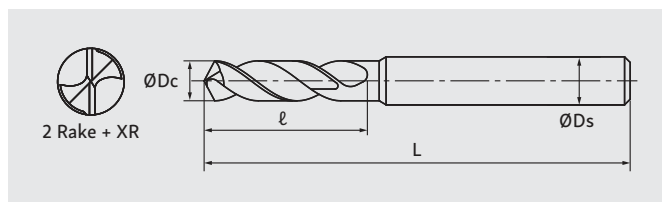
Doubled tool life due to an improved substrate, coating and cutting geometry.



Tool	APPLICABLE WORK MATERIALS													
	Structural Steels	Carbon Steels	Alloy Steels Heat-treated Steels	Mold Steels Hardened Steels	Hardened Steels			Stainless Steels		Titanium Alloys	Nickel Alloys	Cast Irons	Aluminium Alloys	Copper Alloys
	SS400	S45C	SCM/NAK	30-40HRC	40-50HRC	50-57HRC	58-65HRC	SUS304/SUS316	SUS420			FC/FCD	AC/ADC	Cu
AquaREVO Drills Stub (3D)	●	●	●	●	●	○		○	○	○	●	●		
AquaREVO Drills Regular (5D)	●	●	●	●	●	○		○	○	○	●	●		

● Excellent | ○ Good

AQRVDS AquaREVO Drills Stub (3D)



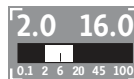
TOOL MATERIAL



POINT ANGLE



HELIX ANGLE



List: 9860

Article number	Dc	ℓ	L	Ds	Stock
9198600200	2.0	9	45	3	●
9198600205	2.05	10	45	3	●
9198600210	2.1	11	45	3	●
9198600215	2.15	11	45	3	●
9198600220	2.2	11	45	3	●
9198600225	2.25	11	45	3	●
9198600230	2.3	11	45	3	●
9198600235	2.35	11	45	3	●
9198600240	2.4	11	45	3	●
9198600245	2.45	11	45	3	●
9198600250	2.5	11	45	3	●
9198600255	2.55	14	45	3	●
9198600260	2.6	14	45	3	●
9198600265	2.65	14	45	3	●
9198600270	2.7	14	45	3	●
9198600275	2.75	14	45	3	●
9198600280	2.8	14	45	3	●
9198600285	2.85	14	45	3	●
9198600290	2.9	14	45	3	●
9198600295	2.95	14	45	3	●
9198600300	3.0	14	45	3	●
9198600305	3.05	20	55	4	●
9198600310	3.1	20	55	4	●
9198600315	3.15	20	55	4	●
9198600320	3.2	20	55	4	●
9198600325	3.25	20	55	4	●
9198600330	3.3	20	55	4	●
9198600335	3.35	20	55	4	●
9198600340	3.4	20	55	4	●
9198600345	3.45	20	55	4	●
9198600350	3.5	20	55	4	●
9198600355	3.55	22	55	4	●
9198600360	3.6	22	55	4	●

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198600365	3.65	22	55	4	●
9198600370	3.7	22	55	4	●
9198600375	3.75	22	55	4	●
9198600380	3.8	22	55	4	●
9198600385	3.85	22	55	4	●
9198600390	3.9	22	55	4	●
9198600395	3.95	22	55	4	●
9198600400	4.0	22	55	4	●
9198600405	4.05	24	62	5	●
9198600410	4.1	24	62	5	●
9198600410-D	4.1	24	62	6	○
9198600415	4.15	24	62	5	●
9198600420	4.2	24	62	5	●
9198600420-D	4.2	24	62	6	○
9198600425	4.25	24	62	5	●
9198600430	4.3	24	62	5	●
9198600430-D	4.3	24	62	6	○
9198600435	4.35	24	62	5	●
9198600440	4.4	24	62	5	●
9198600440-D	4.4	24	62	6	○
9198600445	4.45	24	62	5	●
9198600450	4.5	24	62	5	●
9198600450-D	4.5	24	62	6	○
9198600455	4.55	26	62	5	●
9198600460	4.6	26	62	5	●
9198600460-D	4.6	26	62	6	○
9198600465	4.65	26	62	5	●
9198600470	4.7	26	62	5	●
9198600470-D	4.7	26	62	6	○
9198600475	4.75	26	62	5	●
9198600480	4.8	26	62	5	●
9198600480-D	4.8	26	62	6	○
9198600485	4.85	26	62	5	●

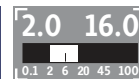
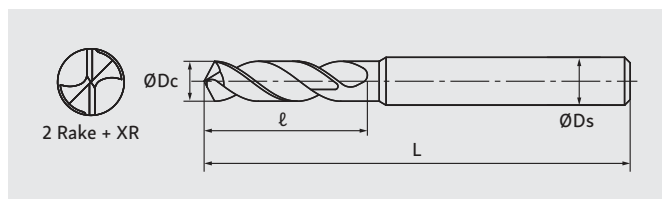
List: 9860

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198600490	4.9	26	62	5	●
9198600490-D	4.9	26	62	6	○
9198600495	4.95	26	62	5	●
9198600500	5.0	26	62	5	●
9198600500-D	5.0	26	62	6	○
9198600505	5.05	26	66	6	●
9198600510	5.1	26	66	6	●
9198600515	5.15	26	66	6	●
9198600520	5.2	26	66	6	●
9198600525	5.25	26	66	6	●
9198600530	5.3	26	66	6	●
9198600535	5.35	26	66	6	●
9198600540	5.4	26	66	6	●
9198600545	5.45	26	66	6	●
9198600550	5.5	26	66	6	●
9198600555	5.55	28	66	6	●
9198600560	5.6	28	66	6	●
9198600565	5.65	28	66	6	●
9198600570	5.7	28	66	6	●
9198600575	5.75	28	66	6	●
9198600580	5.8	28	66	6	●
9198600585	5.85	28	66	6	●
9198600590	5.9	28	66	6	●
9198600595	5.95	28	66	6	●
9198600600	6.0	28	66	6	●
9198600610	6.1	32	74	7	●
9198600610-D	6.1	32	74	8	○
9198600620	6.2	32	74	7	●
9198600620-D	6.2	32	74	8	○
9198600630	6.3	32	74	7	●
9198600630-D	6.3	32	74	8	○
9198600640	6.4	32	74	7	●
9198600640-D	6.4	32	74	8	○
9198600650	6.5	32	74	7	●
9198600650-D	6.5	32	74	8	○
9198600660	6.6	35	74	7	●
9198600660-D	6.6	35	74	8	○
9198600670	6.7	35	74	7	●
9198600670-D	6.7	35	74	8	○
9198600680	6.8	35	74	7	●

Article number	Dc	ℓ	L	Ds	Stock
9198600680-D	6.8	35	74	8	○
9198600690	6.9	35	74	7	●
9198600690-D	6.9	35	74	8	○
9198600700	7.0	35	74	7	●
9198600700-D	7.0	35	74	8	○
9198600710	7.1	35	79	8	●
9198600720	7.2	35	79	8	●
9198600730	7.3	35	79	8	●
9198600740	7.4	35	79	8	●
9198600750	7.5	35	79	8	●
9198600760	7.6	38	79	8	●
9198600770	7.7	38	79	8	●
9198600780	7.8	38	79	8	●
9198600790	7.9	38	79	8	●
9198600800	8.0	38	79	8	●
9198600810	8.1	38	83	9	●
9198600810-D	8.1	38	83	10	○
9198600820	8.2	38	83	9	●
9198600820-D	8.2	38	83	10	○
9198600830	8.3	38	83	9	●
9198600830-D	8.3	38	83	10	○
9198600840	8.4	38	83	9	●
9198600840-D	8.4	38	83	10	○
9198600850	8.5	38	83	9	●
9198600850-D	8.5	38	83	10	○
9198600860	8.6	40	83	9	●
9198600860-D	8.6	40	83	10	○
9198600870	8.7	40	83	9	●
9198600870-D	8.7	40	83	10	○
9198600880	8.8	40	83	9	●
9198600880-D	8.8	40	83	10	○
9198600890	8.9	40	83	9	●
9198600890-D	8.9	40	83	10	○
9198600900	9.0	40	83	9	●
9198600900-D	9.0	40	83	10	○
9198600910	9.1	40	89	10	●
9198600920	9.2	40	89	10	●
9198600930	9.3	40	89	10	●
9198600940	9.4	40	89	10	●
9198600950	9.5	40	89	10	●

AQRVDS AquaREVO Drills Stub (3D)



TOOL MATERIAL

POINT ANGLE HELIX ANGLE

List: 9860

Article number	Dc	ℓ	L	Ds	Stock
9198600960	9.6	43	89	10	●
9198600970	9.7	43	89	10	●
9198600980	9.8	43	89	10	●
9198600990	9.9	43	89	10	●
9198601000	10.0	43	89	10	●
9198601010	10.1	43	95	11	●
9198601010-D	10.1	43	95	12	○
9198601020	10.2	43	95	11	●
9198601020-D	10.2	43	95	12	○
9198601030	10.3	43	95	11	●
9198601030-D	10.3	43	95	12	○
9198601040	10.4	43	95	11	●
9198601040-D	10.4	43	95	12	○
9198601050	10.5	43	95	11	●
9198601050-D	10.5	43	95	12	○
9198601060	10.6	47	95	11	●
9198601060-D	10.6	47	95	12	○
9198601070	10.7	47	95	11	●
9198601070-D	10.7	47	95	12	○
9198601080	10.8	47	95	11	●
9198601080-D	10.8	47	95	12	○
9198601090	10.9	47	95	11	●
9198601090-D	10.9	47	95	12	○
9198601100	11.0	47	95	11	●
9198601100-D	11.0	47	95	12	○
9198601110	11.1	47	102	12	●
9198601120	11.2	47	102	12	●
9198601130	11.3	47	102	12	●
9198601140	11.4	47	102	12	●
9198601150	11.5	47	102	12	●
9198601160	11.6	50	102	12	●
9198601170	11.7	50	102	12	●
9198601180	11.8	50	102	12	●

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198601190	11.9	50	102	12	●
9198601200	12.0	50	102	12	●
9198601210	12.1	50	102	13	●
9198601210-D	12.1	50	102	14	○
9198601220	12.2	50	102	13	●
9198601220-D	12.2	50	102	14	○
9198601230	12.3	50	102	13	●
9198601230-D	12.3	50	102	14	○
9198601240	12.4	50	102	13	●
9198601240-D	12.4	50	102	14	○
9198601250	12.5	50	102	13	●
9198601250-D	12.5	50	102	14	○
9198601260	12.6	52	102	13	●
9198601260-D	12.6	52	102	14	○
9198601270	12.7	52	102	13	●
9198601270-D	12.7	52	102	14	○
9198601280	12.8	52	102	13	●
9198601280-D	12.8	52	102	14	○
9198601290	12.9	52	102	13	●
9198601290-D	12.9	52	102	14	○
9198601300	13.0	52	102	13	●
9198601300-D	13.0	52	102	14	○
9198601310	13.1	53	107	14	●
9198601320	13.2	53	107	14	●
9198601330	13.3	53	107	14	●
9198601340	13.4	53	107	14	●
9198601350	13.5	53	107	14	●
9198601360	13.6	55	107	14	●
9198601370	13.7	55	107	14	●
9198601380	13.8	55	107	14	●
9198601390	13.9	55	107	14	●
9198601400	14.0	55	107	14	●
9198601410	14.1	55	110	15	●

List: 9860

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198601410-D	14.1	55	110	16	○
9198601420	14.2	55	110	15	●
9198601420-D	14.2	55	110	16	○
9198601430	14.3	55	110	15	●
9198601430-D	14.3	55	110	16	○
9198601440	14.4	55	110	15	●
9198601440-D	14.4	55	110	16	○
9198601450	14.5	55	110	15	●
9198601450-D	14.5	55	110	16	○
9198601460	14.6	56	110	15	●
9198601460-D	14.6	56	110	16	○
9198601470	14.7	56	110	15	●
9198601470-D	14.7	56	110	16	○
9198601480	14.8	56	110	15	●
9198601480-D	14.8	56	110	16	○

Article number	Dc	ℓ	L	Ds	Stock
9198601490	14.9	56	110	15	●
9198601490-D	14.9	56	110	16	○
9198601500	15.0	56	110	15	●
9198601500-D	15.0	56	110	16	○
9198601510	15.1	56	114	16	●
9198601520	15.2	56	114	16	●
9198601530	15.3	56	114	16	●
9198601540	15.4	56	114	16	●
9198601550	15.5	56	114	16	●
9198601560	15.6	58	114	16	●
9198601570	15.7	58	114	16	●
9198601580	15.8	58	114	16	●
9198601590	15.9	58	114	16	●
9198601600	16.0	58	114	16	●

●: German Stock | ○: Available from March 2019

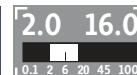
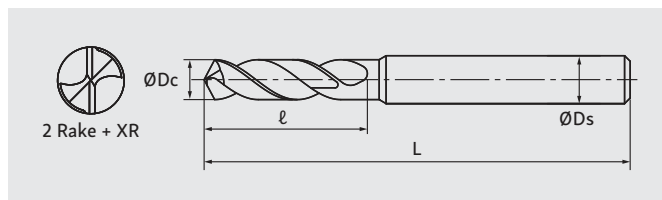
STANDARD CUTTING CONDITIONS

Work Material	Structural Steel, Carbon Steel, Cast Iron SS400 S50C FC250		Alloy Steel Heat-treated Steel SCM440 NAK		Mold Steel Hardened Steel SKD61 NAK HPM		Hardened Steel		Ductile Cast Iron FCD400		Stainless Steel SUS304 SUS316	
	~200HB		20~30HRC		30~40HRC		40~50HRC					
Drill Dia. mm	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min
2.0	16000	1000	12700	800	7200	350	4800	190	12000	750	3200	140
3.0	10600	1100	8500	890	4800	390	3200	210	8000	830	2120	150
5.0	6400	1100	5100	890	2900	390	1900	210	4800	830	1280	150
8.0	4000	1100	3200	890	1800	390	1200	210	3000	830	800	150
10.0	3200	1050	2500	840	1400	380	1000	200	2400	800	640	150
12.0	2650	1000	2100	800	1200	350	800	190	2000	750	530	140
16.0	2000	890	1600	700	900	320	600	170	1500	660	400	120

Attention on using the cutting condition tables

- Adjust cutting condition according to the rigidity of machine or work clamp state.
- Wet conditions are for drilling with water-soluble cutting fluid.
- In non-water-soluble cutting fluid, reduce the rotation and feed rate by 20%.
- Drilling the step feed in Stainless Steel when hole depth more than 2×Dc deep, step feed interval is about 0.5×Dc.
- Use air blow for cooling and the chip exclusion in dry process.
- By sparks during cutting, or heat by breakage, or hot chip, there is danger of fire.
- Retraction of the step feed is to be returned to the top of the hole.
- Step feed is recommended to 0.5-1.0×Dc. In the case of small diameter, step feed is recommended to 0.2-0.5×Dc.
- Please use the fixture to control the amplitude of the drill bit below 0.02mm, for small diameter, high-speed cutting control amplitude of the drill bit 0.01mm or less.

AQRVDR AquaREVO Drills Regular (5D)



TOOL MATERIAL

POINT ANGLE HELIX ANGLE

List: 9862

Article number	Dc	ℓ	L	Ds	Stock
9198620200	2.0	15	49	3	●
9198620205	2.05	18	49	3	●
9198620210	2.1	18	49	3	●
9198620215	2.15	18	49	3	●
9198620220	2.2	18	49	3	●
9198620225	2.25	18	49	3	●
9198620230	2.3	18	49	3	●
9198620235	2.35	18	49	3	●
9198620240	2.4	18	49	3	●
9198620245	2.45	18	49	3	●
9198620250	2.5	18	49	3	●
9198620255	2.55	20	49	3	●
9198620260	2.6	20	49	3	●
9198620265	2.65	20	49	3	●
9198620270	2.7	20	49	3	●
9198620275	2.75	20	49	3	●
9198620280	2.8	20	49	3	●
9198620285	2.85	20	49	3	●
9198620290	2.9	20	49	3	●
9198620295	2.95	20	49	3	●
9198620300	3.0	20	49	3	●
9198620305	3.05	25	60	4	●
9198620310	3.1	25	60	4	●
9198620315	3.15	25	60	4	●
9198620320	3.2	25	60	4	●
9198620325	3.25	25	60	4	●
9198620330	3.3	25	60	4	●
9198620335	3.35	25	60	4	●
9198620340	3.4	25	60	4	●
9198620345	3.45	25	60	4	●
9198620350	3.5	25	60	4	●
9198620355	3.55	28	60	4	●
9198620360	3.6	28	60	4	●

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198620365	3.65	28	60	4	●
9198620370	3.7	28	60	4	●
9198620375	3.75	28	60	4	●
9198620380	3.8	28	60	4	●
9198620385	3.85	28	60	4	●
9198620390	3.9	28	60	4	●
9198620395	3.95	28	60	4	●
9198620400	4.0	28	60	4	●
9198620405	4.05	32	77	5	●
9198620410	4.1	32	77	5	●
9198620410-D	4.1	32	77	6	○
9198620415	4.15	32	77	5	●
9198620420	4.2	32	77	5	●
9198620420-D	4.2	32	77	6	○
9198620425	4.25	32	77	5	●
9198620430	4.3	32	77	5	●
9198620430-D	4.3	32	77	6	○
9198620435	4.35	32	77	5	●
9198620440	4.4	32	77	5	●
9198620440-D	4.4	32	77	6	○
9198620445	4.45	32	77	5	●
9198620450	4.5	32	77	5	●
9198620450-D	4.5	32	77	6	○
9198620455	4.55	39	77	5	●
9198620460	4.6	39	77	5	●
9198620460-D	4.6	39	77	6	○
9198620465	4.65	39	77	5	●
9198620470	4.7	39	77	5	●
9198620470-D	4.7	39	77	6	○
9198620475	4.75	39	77	5	●
9198620480	4.8	39	77	5	●
9198620480-D	4.8	39	77	6	○
9198620485	4.85	39	77	5	●

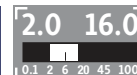
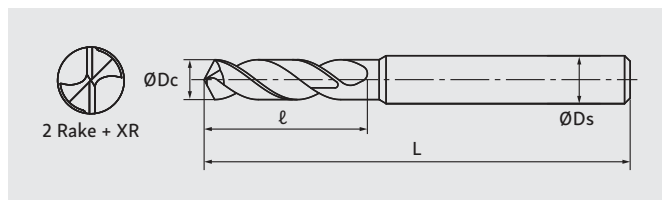
List: 9862

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198620490	4.9	39	77	5	●
9198620490-D	4.9	39	77	6	○
9198620495	4.95	39	77	5	●
9198620500	5.0	40	77	5	●
9198620500-D	5.0	40	77	6	○
9198620505	5.05	40	82	6	●
9198620510	5.1	40	82	6	●
9198620515	5.15	40	82	6	●
9198620520	5.2	40	82	6	●
9198620525	5.25	40	82	6	●
9198620530	5.3	40	82	6	●
9198620535	5.35	40	82	6	●
9198620540	5.4	40	82	6	●
9198620545	5.45	40	82	6	●
9198620550	5.5	40	82	6	●
9198620555	5.55	42	82	6	●
9198620560	5.6	42	82	6	●
9198620565	5.65	42	82	6	●
9198620570	5.7	42	82	6	●
9198620575	5.75	42	82	6	●
9198620580	5.8	42	82	6	●
9198620585	5.85	42	82	6	●
9198620590	5.9	42	82	6	●
9198620595	5.95	42	82	6	●
9198620600	6.0	42	82	6	●
9198620610	6.1	43	84	7	●
9198620610-D	6.1	43	84	8	○
9198620620	6.2	43	84	7	●
9198620620-D	6.2	43	84	8	○
9198620630	6.3	43	84	7	●
9198620630-D	6.3	43	84	8	○
9198620640	6.4	43	84	7	●
9198620640-D	6.4	43	84	8	○
9198620650	6.5	43	84	7	●
9198620650-D	6.5	43	84	8	○
9198620660	6.6	44	84	7	●
9198620660-D	6.6	44	84	8	○
9198620670	6.7	44	84	7	●
9198620670-D	6.7	44	84	8	○
9198620680	6.8	44	84	7	●

Article number	Dc	ℓ	L	Ds	Stock
9198620680-D	6.8	44	84	8	○
9198620690	6.9	44	84	7	●
9198620690-D	6.9	44	84	8	○
9198620700	7.0	44	84	7	●
9198620700-D	7.0	44	84	8	○
9198620710	7.1	46	91	8	●
9198620720	7.2	46	91	8	●
9198620730	7.3	46	91	8	●
9198620740	7.4	46	91	8	●
9198620750	7.5	46	91	8	●
9198620760	7.6	47	91	8	●
9198620770	7.7	47	91	8	●
9198620780	7.8	47	91	8	●
9198620790	7.9	47	91	8	●
9198620800	8.0	47	91	8	●
9198620810	8.1	55	99	9	●
9198620810-D	8.1	55	99	10	○
9198620820	8.2	55	99	9	●
9198620820-D	8.2	55	99	10	○
9198620830	8.3	55	99	9	●
9198620830-D	8.3	55	99	10	○
9198620840	8.4	55	99	9	●
9198620840-D	8.4	55	99	10	○
9198620850	8.5	55	99	9	●
9198620850-D	8.5	55	99	10	○
9198620860	8.6	57	99	9	●
9198620860-D	8.6	57	99	10	○
9198620870	8.7	57	99	9	●
9198620870-D	8.7	57	99	10	○
9198620880	8.8	57	99	9	●
9198620880-D	8.8	57	99	10	○
9198620890	8.9	57	99	9	●
9198620890-D	8.9	57	99	10	○
9198620900	9.0	57	99	9	●
9198620900-D	9.0	57	99	10	○
9198620910	9.1	60	107	10	●
9198620920	9.2	60	107	10	●
9198620930	9.3	60	107	10	●
9198620940	9.4	60	107	10	●
9198620950	9.5	60	107	10	●

AQRVDR AquaREVO Drills Regular (5D)



TOOL MATERIAL

POINT ANGLE HELIX ANGLE

List: 9862

Article number	Dc	ℓ	L	Ds	Stock
9198620960	9.6	62	107	10	●
9198620970	9.7	62	107	10	●
9198620980	9.8	62	107	10	●
9198620990	9.9	62	107	10	●
9198621000	10.0	62	107	10	●
9198621010	10.1	68	116	11	●
9198621010-D	10.1	68	116	12	○
9198621020	10.2	68	116	11	●
9198621020-D	10.2	68	116	12	○
9198621030	10.3	68	116	11	●
9198621030-D	10.3	68	116	12	○
9198621040	10.4	68	116	11	●
9198621040-D	10.4	68	116	12	○
9198621050	10.5	68	116	11	●
9198621050-D	10.5	68	116	12	○
9198621060	10.6	70	116	11	●
9198621060-D	10.6	70	116	12	○
9198621070	10.7	70	116	11	●
9198621070-D	10.7	70	116	12	○
9198621080	10.8	70	116	11	●
9198621080-D	10.8	70	116	12	○
9198621090	10.9	70	116	11	●
9198621090-D	10.9	70	116	12	○
9198621100	11.0	70	116	11	●
9198621100-D	11.0	70	116	12	○
9198621110	11.1	73	123	12	●
9198621120	11.2	73	123	12	●
9198621130	11.3	73	123	12	●
9198621140	11.4	73	123	12	●
9198621150	11.5	73	123	12	●
9198621160	11.6	76	123	12	●
9198621170	11.7	76	123	12	●
9198621180	11.8	76	123	12	●

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198621190	11.9	76	123	12	●
9198621200	12.0	76	123	12	●
9198621210	12.1	79	138	13	●
9198621210-D	12.1	79	138	14	○
9198621220	12.2	79	138	13	●
9198621220-D	12.2	79	138	14	○
9198621230	12.3	79	138	13	●
9198621230-D	12.3	79	138	14	○
9198621240	12.4	79	138	13	●
9198621240-D	12.4	79	138	14	○
9198621250	12.5	79	138	13	●
9198621250-D	12.5	79	138	14	○
9198621260	12.6	81	138	13	●
9198621260-D	12.6	81	138	14	○
9198621270	12.7	81	138	13	●
9198621270-D	12.7	81	138	14	○
9198621280	12.8	81	138	13	●
9198621280-D	12.8	81	138	14	○
9198621290	12.9	81	138	13	●
9198621290-D	12.9	81	138	14	○
9198621300	13.0	81	138	13	●
9198621300-D	13.0	81	138	14	○
9198621310	13.1	87	148	14	●
9198621320	13.2	87	148	14	●
9198621330	13.3	87	148	14	●
9198621340	13.4	87	148	14	●
9198621350	13.5	87	148	14	●
9198621360	13.6	90	148	14	●
9198621370	13.7	90	148	14	●
9198621380	13.8	90	148	14	●
9198621390	13.9	90	148	14	●
9198621400	14.0	90	148	14	●
9198621410	14.1	92	154	15	●

List: 9862

Article number	Dc	ℓ	L	Ds	Stock
9198621410-D	14.1	92	154	16	○
9198621420	14.2	92	154	15	●
9198621420-D	14.2	92	154	16	○
9198621430	14.3	92	154	15	●
9198621430-D	14.3	92	154	16	○
9198621440	14.4	92	154	15	●
9198621440-D	14.4	92	154	16	○
9198621450	14.5	92	154	15	●
9198621450-D	14.5	92	154	16	○
9198621460	14.6	94	154	15	●
9198621460-D	14.6	94	154	16	○
9198621470	14.7	94	154	15	●
9198621470-D	14.7	94	154	16	○
9198621480	14.8	94	154	15	●
9198621480-D	14.8	94	154	16	○

unit: mm

Article number	Dc	ℓ	L	Ds	Stock
9198621490	14.9	94	154	15	●
9198621490-D	14.9	94	154	16	○
9198621500	15.0	94	154	15	●
9198621500-D	15.0	94	154	16	○
9198621510	15.1	97	162	16	●
9198621520	15.2	97	162	16	●
9198621530	15.3	97	162	16	●
9198621540	15.4	97	162	16	●
9198621550	15.5	97	162	16	●
9198621560	15.6	99	162	16	●
9198621570	15.7	99	162	16	●
9198621580	15.8	99	162	16	●
9198621590	15.9	99	162	16	●
9198621600	16.0	99	162	16	●

●: German Stock | ○: Available from March 2019

STANDARD CUTTING CONDITIONS												
Work Material	Structural Steel, Carbon Steel, Cast Iron SS400 S50C FC250		Alloy Steel Heat-treated Steel SCM440 NAK		Mold Steel Hardened Steel SKD61 NAK HPM		Hardened Steel		Ductile Cast Iron FCD400		Stainless Steel SUS304 SUS316	
	~200HB		20~30HRC		30~40HRC		40~50HRC					
Drill Dia. mm	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min	Rotation min ⁻¹	Feed mm/min
2.0	16000	900	12700	720	7200	320	4800	170	12000	680	3200	130
3.0	10600	1000	8500	810	4800	360	3200	190	8000	760	2120	140
5.0	6400	1000	5100	810	2900	360	1900	190	4800	760	1280	140
8.0	4000	1000	3200	810	1800	350	1200	190	3000	760	800	140
10.0	3200	960	2500	760	1400	340	1000	180	2400	720	640	130
12.0	2650	900	2100	720	1200	310	800	170	2000	680	530	130
16.0	2000	810	1600	650	900	290	600	150	1500	600	400	110

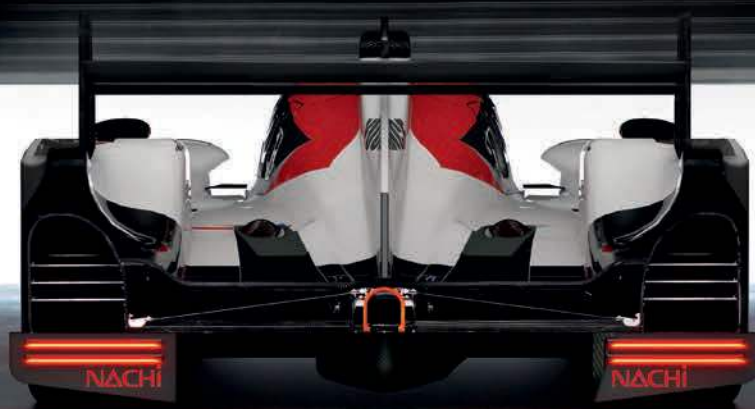
Attention on using the cutting condition tables

- Adjust cutting condition according to the rigidity of machine or work clamp state.
- Wet conditions are for drilling with water-soluble cutting fluid.
- In non-water-soluble cutting fluid, reduce the rotation and feed rate by 20%.
- Drilling the step feed in Stainless Steel when hole depth more than 2×Dc deep, step feed interval is about 0.5×Dc.
- Use air blow for cooling and the chip exclusion in dry process.
- By sparks during cutting, or heat by breakage or hot chip, there is danger of fire.
- Retraction of the step feed is to be returned to the top of the hole.
- Step feed is recommended to 0.5-1.0×Dc. In the case of small diameter, step feed is recommended to 0.2-0.5×Dc.
- Please use the fixture to control the amplitude of the drill bit below 0.02mm, for small diameter, high-speed cutting control amplitude of the drill bit 0.01mm or less.

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