

50 YEARS

**NACHI**

NACHI EUROPE GmbH

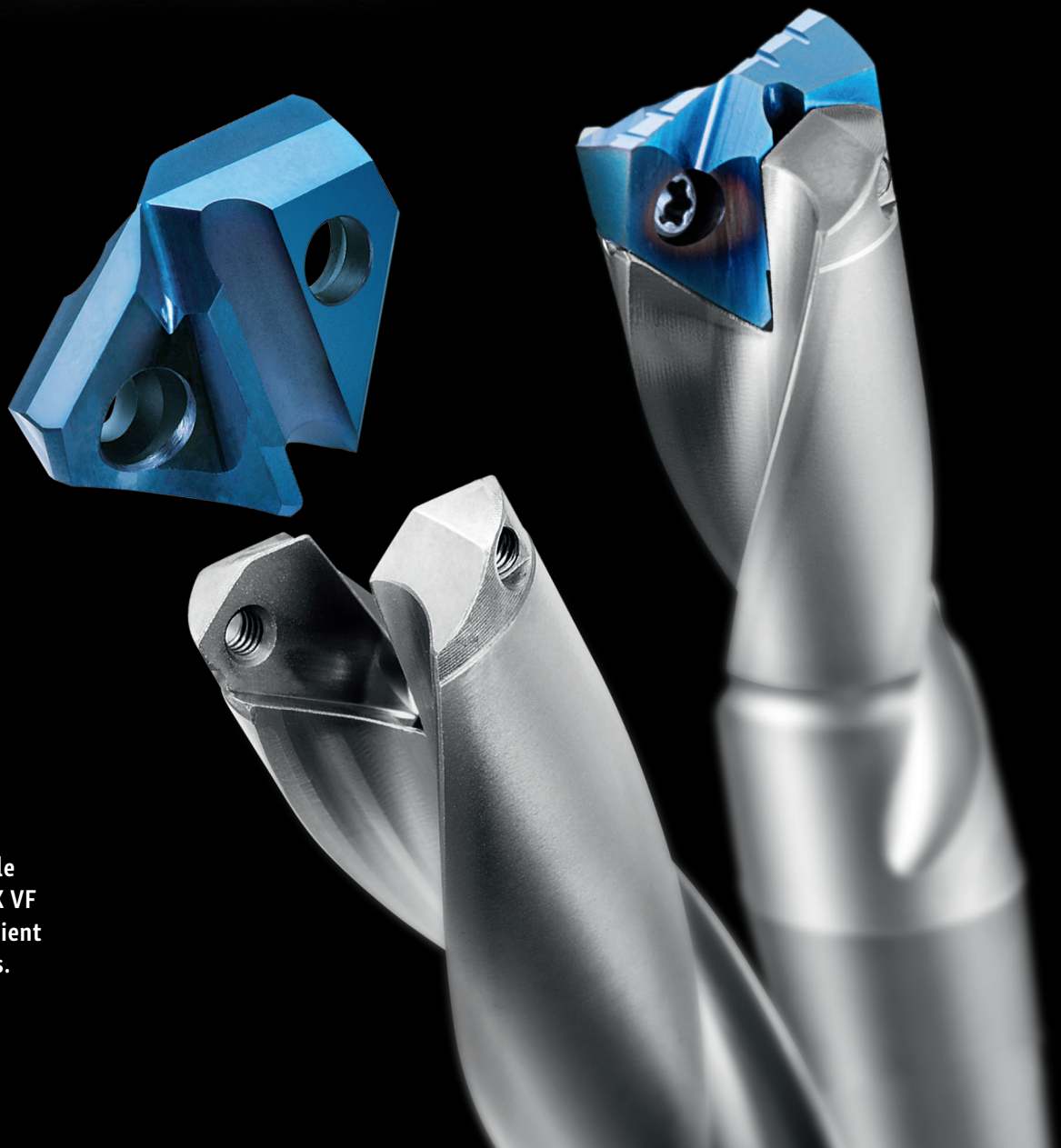
OUR SYNERGY  
YOUR PERFORMANCE

# PROFITABLE AND EFFICIENT AQUA DRILL EX VF

FOR LARGE DIAMETERS



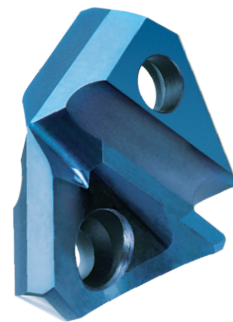
CELEBRATE THE POLE POSITION



**NEW**  
**INDEXABLE**  
**INSERTS**

Drills with Indexable  
Inserts Aquadrill EX VF  
Profitable and Efficient  
for Large Diameters.

# AQUA Drills EX VF



**The most suitable indexable insert drills for high efficiency and high precision drilling of large diameter**

▶ **Excellent cost performance**

Compare with carbide solid drill about middle and large diameter, to largely save tool cost

▶ **Long tool life**

By chip material of high chipping resistance and AQEX coat

▶ **High precision**

It is possible to be high precision drilling by excellent damping capacity material, high rigidity body and head exchangeable type drills for well-balanced

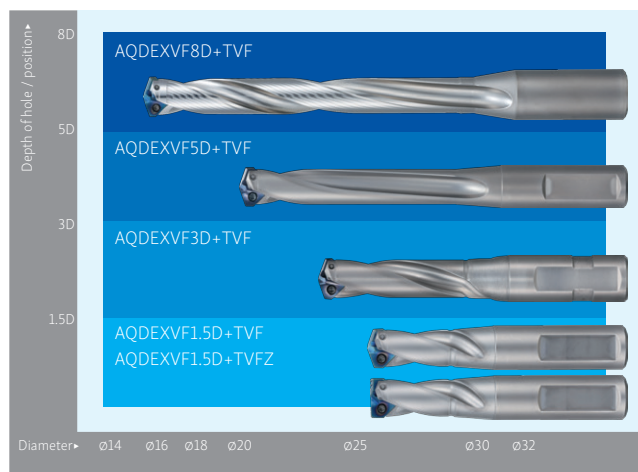
▶ **Installation is very easily**

V-shaped insert geometry allows high precision high rigidity clamping

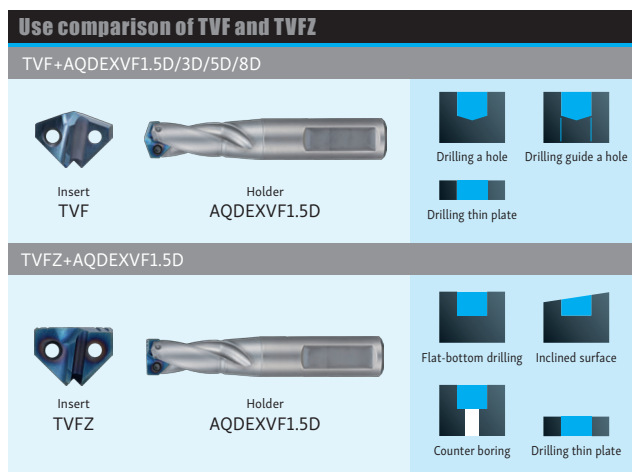
▶ **Abundant line-up**

AQDEXVF series is 4types of holders according to hole depth 1.5D/3D/5D/8D Insert of AQDEXVF adds flat type for counter bore and slope cutting  $\varnothing 14\sim\varnothing 32$

## The combination of the AQUA Drills EX VF holder and Insert



Applicable work materials: Low-carbon steels, carbon steels, alloy steels, pre-hardened steels, cast irons and stainless steels when using AQDEXVF8D, drilling guide holes in advance using AQDEXVF1.5D is recommended.



It is possible to drill the bottom of the hole or a through hole by using a combination of TVFZ and AQDEXVF3D/5D/8D.

APPLICABLE WORK MATERIALS											
Structural Steels	Carbon Steels	Pre-Hardened Steels Alloy Steels	Hardened Steels Mold Steels	Hardened Steels		Stainless Steels		Titanium Alloys Nickel Alloys	Cast Irons	Aluminum Alloys	Copper Alloys
				40-50HRC	50-65HRC	Austenitic 1.4301/1.440	Martensitic 1.4021/1.4028				
ST52	C45/C50	SCR/NAK	30-40HRC	40-50HRC	50-65HRC	Austenitic 1.4301/1.440	Martensitic 1.4021/1.4028		GG/GGG	AC/ADC	Cu
●	●	●	○		x	●	●		●		

● Excellent | ○ Good | x Not Applicable

## Web video

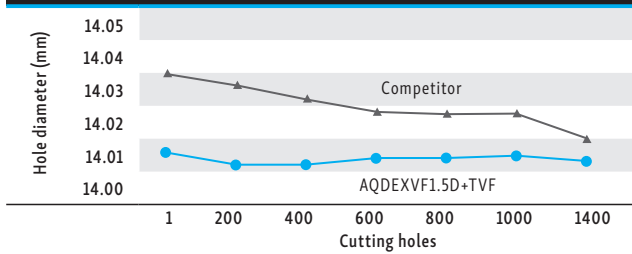


### THE MOST SUITABLE TVFZ FOR BURR-LESS PROCESSING

Drill (point angle 140°)	AQDEXVF1.5D +TVFZ	Cutting conditions
		Tool AQDEXVF1.5D19 TVFZ Ø19 Cutting Speed 50m/min Rotation 833 min <sup>-1</sup> Feed Speed 200mm/min Feed 0.24mm/rev Hole Depth 19mm - 5mm Step drilling Work Material C50 Cutting Fluid Water-Soluble Internal coolant
Burr 0.31mm in height	Burr 0.13mm in height	

## High precision and Stable drilling even if Indexable insert drill

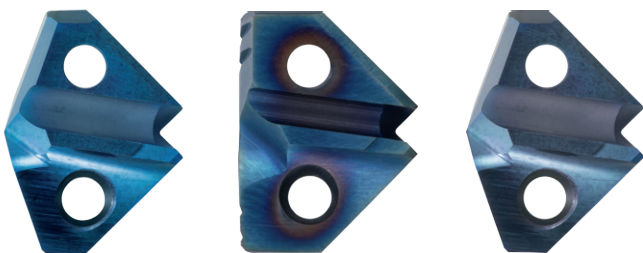
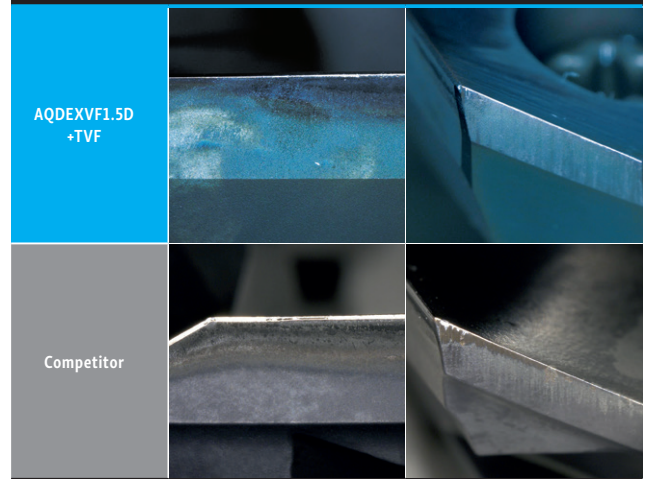
### COMPARISON OF DRILLING HOLE PRECISION



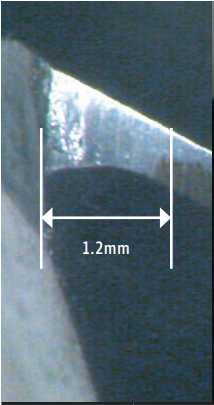
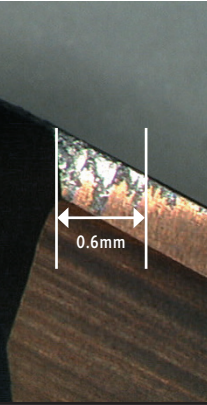
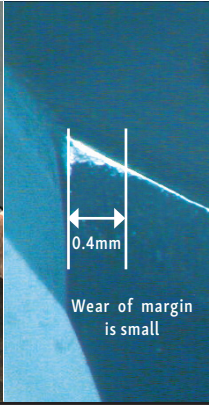
**Cutting conditions**

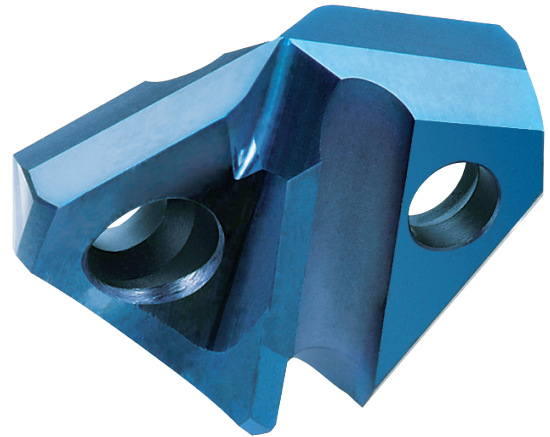
Tool AQDEXVF1.5D14 TVF Ø14  
 Cutting Speed 100m/min      Rotation 2260 min<sup>-1</sup>  
 Feed Speed 520mm/min      Feed 0.23 mm/rev  
 Hole Depth 21mm - Blind hole - Non-step drilling  
 Work Material C50 (180HB)  
 Cutting Fluid Water-Soluble - Internal Coolant

### COMPARISON OF WEAR AFTER DRILLING 1400 HOLES

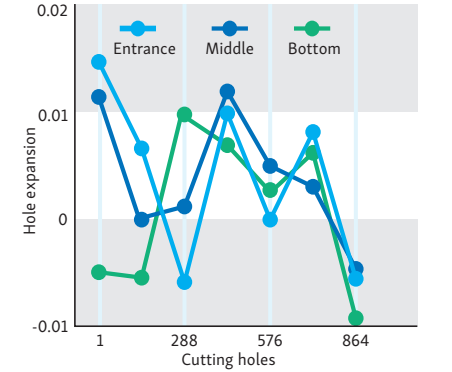
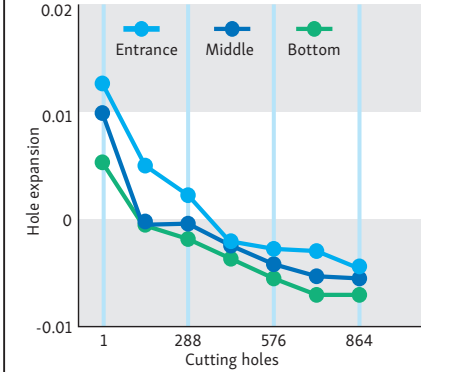
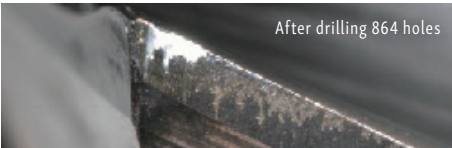



## High wear resistance and wear of margin is small

COMPARISON OF WEAR OF MARGIN AFTER DRILLING 200 HOLES		
Competitor A	Competitor B	AQDEXVF3D+TVF
		
<p><b>Cutting conditions</b></p> <p>Tool AQDEXVF3D17 TVF Ø17.5</p> <p>Cutting Speed 140m/min      Rotation 2543 min<sup>-1</sup></p> <p>Feed Speed 890mm/min      Feed 0.35 mm/rev</p> <p>Hole Depth 35mm - Blind hole</p> <p>Work Material GG25 (FC250)</p> <p>Cutting Fluid Water-Soluble - Internal Coolant</p>		



## Stable hole precision and excellent wear resistance

THE MOST SUITABLE TVFZ FOR BURR-LESS PROCESSING		
Competitor	AQDEXVF5D+TVF	Cutting conditions
		<p>Tool AQDEXVF5D14 TVF Ø14</p> <p>Cutting Speed 75m/min</p> <p>Rotation 1700min<sup>-1</sup></p> <p>Feed Speed 425mm/min</p> <p>Feed 0.25 mm/rev</p> <p>Hole Depth 65mm - Through hole Non-step drilling</p> <p>Work Material C50(180HB)</p> <p>Cutting Fluid Water-Soluble Internal coolant</p>
 <p>After drilling 864 holes</p>	 <p>After drilling 864 holes</p>	



# Non-step cutting is possible even if deep hole of 8D

**THE MOST SUITABLE TVFZ FOR BURR-LESS PROCESSING**

Competitor	AQDEXVF5D+TVF	Cutting conditions
		<p>Tool AQDEXVF8D19 TVF Ø19</p> <p>Cutting Speed 40m/min</p> <p>Rotation 670min<sup>-1</sup></p> <p>Feed Speed 170mm/min</p> <p>Feed 0.254mm/rev</p> <p>Hole Depth 152mm - Non-step drilling</p> <p>Work Material 1.4301(SUS304)</p> <p>Cutting Fluid Water-Soluble Internal coolant</p>
<p>Chips crushed due to interference inside flutes</p>		

## Excellent chipping resistance even if drilling for stainless steels

**CUTTING COMPARISON**

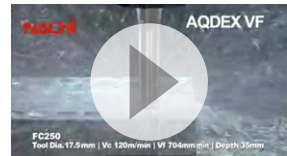
	Competitor	AQDEXVF-5D+TVF	Cutting conditions
Cutting holes	Breakage after 4 holes	It is possible to continue after 135 holes	<p>Tool AQDEXVF5D19 TVF Ø19</p> <p>Cutting Speed 40m/min</p> <p>Rotation 670 min<sup>-1</sup></p> <p>Feed Speed 200mm/min</p> <p>Feed 0.3mm/rev</p> <p>Hole Depth 95mm - Blind hole Non-step drilling</p> <p>Work Material 1.4301(SUS304)</p> <p>Cutting Fluid Water-Soluble Internal coolant</p>
Chip			
Result			

## Web video

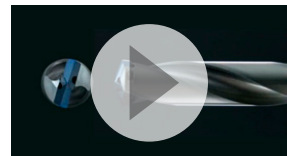


Please scan QR code by smart phones or mobile phones. You can watch videos of cutting scene

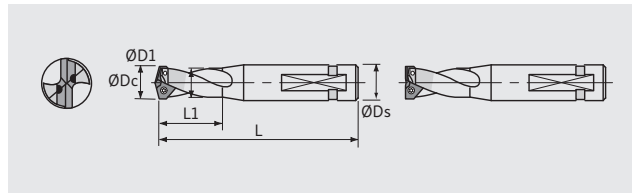
WEB VIDEO  
Drilling for S50C/  
FC250/SUS304



WEB VIDEO  
8D non-step  
drilling for S50C



## AQDEXVF1.5D



LIST: 9846

UNIT: mm

Dc		Holder						Applicable Insert	
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF	TVFZ
14.0	14.5	AQDEXVF1.5D14	29	91	13.1	16	●	TVF1400	TVFZ1400
								TVF1410	-
								TVF1420	-
								TVF1430	-
								TVF1440	-
14.6	15.5	AQDEXVF1.5D15	31	96	14.1	20	●	TVF1450	TVFZ1450
								TVF1460	-
								TVF1470	-
								TVF1480	-
								TVF1490	-
								TVF1500	TVFZ1500
								TVF1510	-
								TVF1520	-
								TVF1530	-
								TVF1540	-
15.6	16.5	AQDEXVF1.5D16	33	99	15.1	20	●	TVF1550	TVFZ1550
								TVF1560	-
								TVF1570	-
								TVF1580	-
								TVF1590	-
								TVF1600	TVFZ1600
								TVF1610	-
								TVF1620	-
								TVF1630	-
								TVF1640	-
16.6	17.5	AQDEXVF1.5D17	35	102	16.1	20	●	TVF1650	TVFZ1650
								TVF1660	-
								TVF1670	-
								TVF1680	-
								TVF1690	-
								TVF1700	TVFZ1700
								TVF1710	-
								TVF1720	-
								TVF1730	-
								TVF1740	-
17.6	18.5	AQDEXVF1.5D18	37	105	17.1	20	●	TVF1750	TVFZ1750
								TVF1760	-
								TVF1770	-
								TVF1780	-
								TVF1790	-
								TVF1800	TVFZ1800
								TVF1810	-
								TVF1820	-
								TVF1830	-
								TVF1840	-
18.6	19.5	AQDEXVF1.5D19	39	114	18.1	25	●	TVF1850	TVFZ1850
								TVF1860	-
								TVF1870	-
								TVF1880	-
								TVF1890	-

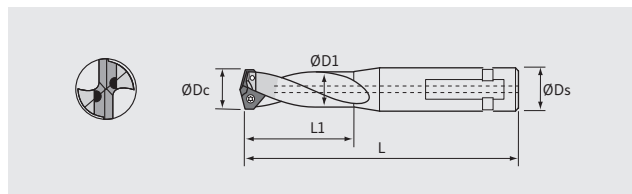
**LIST: 9846**

**UNIT: mm**

Dc		Holder						Applicable Insert	
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF	TVFZ
18.6	19.5	AQDEXVF1.5D19	39	114	18.1	25	●	TVF1900	TVFZ1900
								TVF1910	-
								TVF1920	-
								TVF1930	-
								TVF1940	-
								TVF1950	TVFZ1950
19.6	20.5	AQDEXVF1.5D20	41	117	19.1	25	●	TVF1960	-
								TVF1970	-
								TVF1980	-
								TVF1990	-
								TVF2000	TVFZ2000
								TVF2050	TVFZ2050
20.6	21.5	AQDEXVF1.5D21	43	120	20.1	25	●	TVF2100	TVFZ2100
								TVF2110	-
								TVF2120	-
								TVF2150	TVFZ2150
21.6	22.5	AQDEXVF1.5D22	45	123	21.1	25	●	TVF2200	TVFZ2200
								TVF2250	TVFZ2250
22.6	23.5	AQDEXVF1.5D23	47	126	22.1	25	●	TVF2260	-
								TVF2270	-
								TVF2300	TVFZ2300
								TVF2350	TVFZ2350
23.6	24.5	AQDEXVF1.5D24	49	133	23.1	32	●	TVF2400	TVFZ2400
								TVF2410	-
								TVF2420	-
								TVF2450	TVFZ2450
24.6	25.5	AQDEXVF1.5D25	51	136	24.1	32	●	TVF2470	-
								TVF2500	TVFZ2500
								TVF2550	TVFZ2550
25.6	26.5	AQDEXVF1.5D26	53	139	25.1	32	●	TVF2560	-
								TVF2570	-
								TVF2600	TVFZ2600
								TVF2650	TVFZ2650
26.6	27.5	AQDEXVF1.5D27	55	142	26.1	32	●	TVF2660	-
								TVF2670	-
								TVF2700	TVFZ2700
								TVF2750	TVFZ2750
27.6	28.5	AQDEXVF1.5D28	57	145	27.1	32	●	TVF2800	TVFZ2800
								TVF2850	TVFZ2850
28.6	29.5	AQDEXVF1.5D29	59	148	28.1	32	●	TVF2860	-
								TVF2870	-
								TVF2900	TVFZ2900
								TVF2950	TVFZ2950
29.6	30.5	AQDEXVF1.5D30	61	151	29.1	32	●	TVF3000	TVFZ3000
								TVF3050	TVFZ3050
30.6	31.5	AQDEXVF1.5D31	94*(92)	154	30.1	32	●	TVF3100	TVFZ3100
								TVF3150	TVFZ3150
31.6	32.0	AQDEXVF1.5D32	97*(95)	157	31.1	32	●	TVF3200	TVFZ3200

●: Standard stock item | In the \*( ), it is the flute length | \*Inserts are sold separately. The holder does not come with an insert.

## AQDEXVF3D



LIST: 9822

UNIT: mm

Dc		Holder						Applicable Insert
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
14.0	14.5	AQDEXVF3D14	51	113	13.1	16	●	TVF1400
								TVF1410
								TVF1420
								TVF1430
								TVF1440
								TVF1450
14.6	15.5	AQDEXVF3D15	54	113	14.1	20	●	TVF1460
								TVF1470
								TVF1480
								TVF1490
								TVF1500
								TVF1510
								TVF1520
								TVF1530
								TVF1540
								TVF1550
15.6	16.5	AQDEXVF3D16	58	124	15.1	20	●	TVF1560
								TVF1570
								TVF1580
								TVF1590
								TVF1600
								TVF1610
								TVF1620
								TVF1630
								TVF1640
								TVF1650
16.6	17.5	AQDEXVF3D17	61	128	16.1	20	●	TVF1660
								TVF1670
								TVF1680
								TVF1690
								TVF1700
								TVF1710
								TVF1720
								TVF1730
								TVF1740
								TVF1750
17.6	18.5	AQDEXVF3D18	65	133	17.1	20	●	TVF1760
								TVF1770
								TVF1780
								TVF1790
								TVF1800
								TVF1810
								TVF1820
								TVF1830
								TVF1840
								TVF1850
18.6	19.5	AQDEXVF3D19	68	143	18.1	25	●	TVF1860
								TVF1870
								TVF1880
								TVF1890



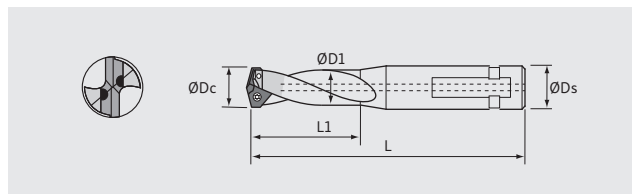
LIST: 9822

UNIT: mm

Dc		Holder						Applicable Insert
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
18.6	19.5	AQDEXVF3D19	68	143	18.1	25	●	TVF1900
								TVF1910
								TVF1920
								TVF1930
								TVF1940
19.6	20.5	AQDEXVF3D20	72	148	19.1	25	●	TVF1950
								TVF1960
								TVF1970
								TVF1980
								TVF1990
20.6	21.5	AQDEXVF3D21	75	152	20.1	25	●	TVF2000
								TVF2050
								TVF2100
								TVF2110
								TVF2120
21.6	22.5	AQDEXVF3D22	79	157	21.1	25	●	TVF2150
								TVF2200
								TVF2250
								TVF2260
								TVF2270
22.6	23.5	AQDEXVF3D23	82	161	22.1	25	●	TVF2300
								TVF2350
								TVF2400
								TVF2410
								TVF2420
23.6	24.5	AQDEXVF3D24	86	170	23.1	32	●	TVF2450
								TVF2470
								TVF2500
								TVF2550
								TVF2560
24.6	25.5	AQDEXVF3D25	89	174	24.1	32	●	TVF2570
								TVF2600
								TVF2650
								TVF2660
								TVF2670
25.6	26.5	AQDEXVF3D26	93	179	25.1	32	●	TVF2700
								TVF2750
								TVF2800
								TVF2850
								TVF2860
26.6	27.5	AQDEXVF3D27	96	183	26.1	32	●	TVF2870
								TVF2900
								TVF2950
								TVF3000
								TVF3050
27.6	28.5	AQDEXVF3D28	100	188	27.1	32	●	TVF3100
								TVF3150
								TVF3200
								TVF3260
								TVF3270
28.6	29.5	AQDEXVF3D29	103	192	28.1	32	●	TVF3300
								TVF3350
								TVF3400
								TVF3450
								TVF3500
29.6	30.5	AQDEXVF3D30	107	197	29.1	32	●	TVF3550
								TVF3600
								TVF3650
								TVF3700
								TVF3750
30.6	31.5	AQDEXVF3D31	141*(139)	201	30.1	32	●	TVF3800
								TVF3850
								TVF3900
								TVF3950
								TVF4000
31.6	32.0	AQDEXVF3D32	146*(144)	206	31.1	32	●	TVF4050

●: Standard stock item | In the \*( ), it is the flute length | \*Inserts are sold separately. The holder does not come with an insert.

# AQDEXVF5D



25°

h6

14.0 32.0  
0.1 2 6 20 45 100

LIST: 9828

UNIT: mm

Dc		Holder						Applicable Insert
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
14.0	14.5	AQDEXVF5D14	80	145	13.1	16	●	TVF1400
								TVF1410
								TVF1420
								TVF1430
								TVF1440
								TVF1450
14.6	15.5	AQDEXVF5D15	85	153	14.1	20	●	TVF1460
								TVF1470
								TVF1480
								TVF1490
								TVF1500
								TVF1510
								TVF1520
								TVF1530
								TVF1540
								TVF1550
15.6	16.5	AQDEXVF5D16	91	160	15.1	20	●	TVF1560
								TVF1570
								TVF1580
								TVF1590
								TVF1600
								TVF1610
								TVF1620
								TVF1630
								TVF1640
								TVF1650
16.6	17.5	AQDEXVF5D17	96	167	16.1	20	●	TVF1660
								TVF1670
								TVF1680
								TVF1690
								TVF1700
								TVF1710
								TVF1720
								TVF1730
								TVF1740
								TVF1750
17.6	18.5	AQDEXVF5D18	102	173	17.1	20	●	TVF1760
								TVF1770
								TVF1780
								TVF1790
								TVF1800
								TVF1810
								TVF1820
								TVF1830
								TVF1840
								TVF1850
18.6	19.5	AQDEXVF5D19	107	186	18.1	25	●	TVF1860
								TVF1870
								TVF1880
								TVF1890

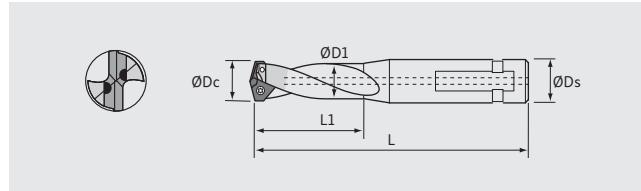
**LIST: 9828**

**UNIT: mm**

Dc		Holder					Applicable Insert	
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
18.6	19.5	AQDEXVF5D19	107	186	18.1	25	●	TVF1900
								TVF1910
								TVF1920
								TVF1930
								TVF1940
19.6	20.5	AQDEXVF5D20	113	193	19.1	25	●	TVF1950
								TVF1960
								TVF1970
								TVF1980
								TVF1990
20.6	21.5	AQDEXVF5D21	118	199	20.1	25	●	TVF2000
								TVF2050
								TVF2100
								TVF2110
21.6	22.5	AQDEXVF5D22	124	206	21.1	25	●	TVF2120
								TVF2150
								TVF2200
22.6	23.5	AQDEXVF5D23	129	213	22.1	25	●	TVF2250
								TVF2260
								TVF2270
23.6	24.5	AQDEXVF5D24	135	224	23.1	32	●	TVF2300
								TVF2350
								TVF2400
								TVF2410
24.6	25.5	AQDEXVF5D25	140	230	24.1	32	●	TVF2420
								TVF2450
								TVF2470
25.6	26.5	AQDEXVF5D26	146	237	25.1	32	●	TVF2500
								TVF2550
								TVF2560
								TVF2570
26.6	27.5	AQDEXVF5D27	151	244	26.1	32	●	TVF2600
								TVF2650
								TVF2660
27.6	28.5	AQDEXVF5D28	157	250	27.1	32	●	TVF2670
								TVF2700
								TVF2750
28.6	29.5	AQDEXVF5D29	162	257	28.1	32	●	TVF2800
								TVF2850
								TVF2860
								TVF2870
29.6	30.5	AQDEXVF5D30	168	264	29.1	32	●	TVF2900
								TVF2950
								TVF3000
30.6	31.5	AQDEXVF5D31	210*(208)	270	30.1	32	●	TVF3050
								TVF3100
31.6	32.0	AQDEXVF5D32	217*(215)	277	31.1	32	●	TVF3150
								TVF3200

●: Standard stock item | In the \*( ), it is the flute length | \*Inserts are sold separately. The holder does not come with an insert.

# AQDEXVF8D



25°

h6

14.0 32.0  
0.1 2 6 20 45 100

**LIST: 9844**

**UNIT: mm**

Dc		Holder						Applicable Insert
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
14.0	14.5	AQDEXVF8D14	119	181	13.1	16	●	TVF1400
								TVF1410
								TVF1420
								TVF1430
								TVF1440
								TVF1450
14.6	15.5	AQDEXVF8D15	128	193	14.1	20	●	TVF1460
								TVF1470
								TVF1480
								TVF1490
								TVF1500
								TVF1510
								TVF1520
								TVF1530
								TVF1540
								TVF1550
15.6	16.5	AQDEXVF8D16	136	202	15.1	20	●	TVF1560
								TVF1570
								TVF1580
								TVF1590
								TVF1600
								TVF1610
								TVF1620
								TVF1630
								TVF1640
								TVF1650
16.6	17.5	AQDEXVF8D17	145	212	16.1	20	●	TVF1660
								TVF1670
								TVF1680
								TVF1690
								TVF1700
								TVF1710
								TVF1720
								TVF1730
								TVF1740
								TVF1750
17.6	18.5	AQDEXVF8D18	153	221	17.1	20	●	TVF1760
								TVF1770
								TVF1780
								TVF1790
								TVF1800
								TVF1810
								TVF1820
								TVF1830
								TVF1840
								TVF1850
18.6	19.5	AQDEXVF8D19	162	237	18.1	25	●	TVF1860
								TVF1870
								TVF1880
								TVF1890

LIST: 9844

UNIT: mm

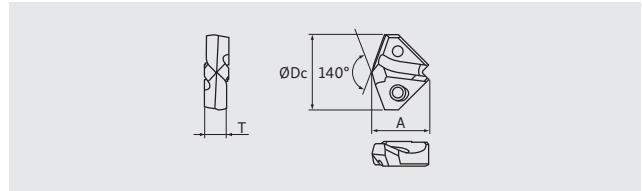
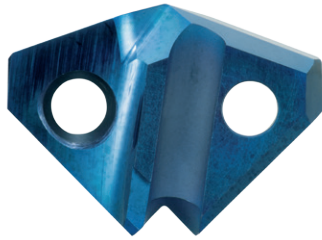
Dc		Holder					Applicable Insert	
Min.	Max.	Code	L1	L	Di	Ds	Stock	TVF
18.6	19.5	AQDEXVF8D19	162	237	18.1	25	●	TVF1900
								TVF1910
								TVF1920
								TVF1930
								TVF1940
19.6	20.5	AQDEXVF8D20	170	246	19.1	25	●	TVF1950
								TVF1960
								TVF1970
								TVF1980
								TVF1990
20.6	21.5	AQDEXVF8D21	179	256	20.1	25	●	TVF2000
								TVF2050
								TVF2100
								TVF2110
								TVF2120
21.6	22.5	AQDEXVF8D22	187	265	21.1	25	●	TVF2150
								TVF2200
								TVF2250
								TVF2260
								TVF2270
22.6	23.5	AQDEXVF8D23	196	275	22.1	25	●	TVF2300
								TVF2350
								TVF2400
								TVF2410
								TVF2420
23.6	24.5	AQDEXVF8D24	204	288	23.1	32	●	TVF2450
								TVF2470
								TVF2500
								TVF2550
								TVF2560
24.6	25.5	AQDEXVF8D25	213	298	24.1	32	●	TVF2570
								TVF2600
								TVF2650
								TVF2660
								TVF2670
25.6	26.5	AQDEXVF8D26	221	307	25.1	32	●	TVF2700
								TVF2750
								TVF2800
								TVF2850
								TVF2860
26.6	27.5	AQDEXVF8D27	230	317	26.1	32	●	TVF2870
								TVF2900
								TVF2950
								TVF3000
								TVF3050
27.6	28.5	AQDEXVF8D28	238	326	27.1	32	●	TVF3100
								TVF3150
								TVF3200
								TVF3260
								TVF3270
28.6	29.5	AQDEXVF8D29	247	336	28.1	32	●	TVF3280
								TVF3290
								TVF3300
								TVF3310
								TVF3320
29.6	30.5	AQDEXVF8D30	255	345	29.1	32	●	TVF3330
								TVF3340
								TVF3350
								TVF3360
								TVF3370
30.6	31.5	AQDEXVF8D31	295*(293)	355	30.1	32	●	TVF3380
								TVF3390
								TVF3400
								TVF3410
								TVF3420
31.6	32.0	AQDEXVF8D32	304*(302)	364	31.1	32	●	TVF3430
								TVF3440
								TVF3450
								TVF3460
								TVF3470

●: Standard stock item | In the \*( ), it is the flute length | \*Inserts are sold separately. The holder does not come with an insert.



## TVF

### AQUA Drills EX VF Insert



LIST: 9824

UNIT: mm

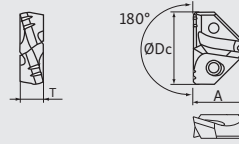
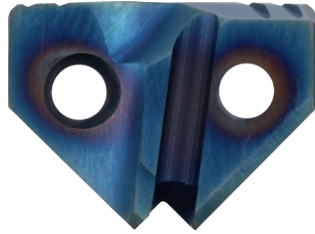
Insert					Applicable Holder
Code	Dc	A	T	Stock	AQDEXVF1.5D/3D/5D/8D
TVF1400	14.0	11.4	4,5	•	AQDEXVF1.5D14 AQDEXVF3D14 AQDEXVF5D14 AQDEXVF8D14
TVF1410	14.1				
TVF1420	14.2				
TVF1430	14.3				
TVF1440	14.4				
TVF1450	14.5				
TVF1460	14.6	11.5	4.8	•	AQDEXVF1.5D15 AQDEXVF3D15 AQDEXVF5D15 AQDEXVF8D15
TVF1470	14.7				
TVF1480	14.8				
TVF1490	14.9				
TVF1500	15.0				
TVF1510	15.1				
TVF1520	15.2				
TVF1530	15.3				
TVF1540	15.4				
TVF1550	15.5				
TVF1560	15.6				
TVF1570	15.7				
TVF1580	15.8				
TVF1590	15.9				
TVF1600	16.0				
TVF1610	16.1				
TVF1620	16.2				
TVF1630	16.3				
TVF1640	16.4				
TVF1650	16.5				
TVF1660	16.6				
TVF1670	16.7				
TVF1680	16.8				
TVF1690	16.9				
TVF1700	17.0	13.2	5.5	•	AQDEXVF1.5D17 AQDEXVF3D17 AQDEXVF5D17 AQDEXVF8D17
TVF1710	17.1				
TVF1720	17.2				
TVF1730	17.3				
TVF1740	17.4				
TVF1750	17.5				
TVF1760	18.6				
TVF1770	18.7				
TVF1780	18.8				
TVF1790	18.9	14.2	6.0	•	AQDEXVF1.5D19 AQDEXVF3D19 AQDEXVF5D19 AQDEXVF8D19
TVF1800	19.0				
TVF1810	19.1				
TVF1820	19.2				
TVF1830	19.3				
TVF1840	19.4				
TVF1850	19.5				
TVF1960	19.6				
TVF1970	19.7				
TVF1980	19.8				
TVF1990	19.9	15.1	6.5	•	AQDEXVF1.5D20 AQDEXVF3D20 AQDEXVF5D20 AQDEXVF8D20
TVF2000	20.0				
TVF2050	20.5				

Insert					Applicable Holder
Code	Dc	A	T	Stock	AQDEXVF1.5D/3D/5D/8D
TVF2100	21.0	15.7	6.7	•	AQDEXVF1.5D21 AQDEXVF3D21 AQDEXVF5D21 AQDEXVF8D21
TVF2110	21.1				
TVF2120	21.2				
TVF2150	21.5				
TVF2200	22.0				
TVF2250	22.5	16.6	7.5	•	AQDEXVF1.5D22 AQDEXVF3D22 AQDEXVF5D22 AQDEXVF8D22
TVF2260	22.6				
TVF2270	22.7	17.4	7.5	•	AQDEXVF1.5D23 AQDEXVF3D23 AQDEXVF5D23 AQDEXVF8D23
TVF2300	23.0				
TVF2350	23.5				
TVF2400	24.0				
TVF2410	24.1	18.2	8.0	•	AQDEXVF1.5D24 AQDEXVF3D24 AQDEXVF5D24 AQDEXVF8D24
TVF2420	24.2				
TVF2450	24.5				
TVF2470	24.7				
TVF2500	25.0				
TVF2550	25.5	19.1	8.0	•	AQDEXVF1.5D25 AQDEXVF3D25 AQDEXVF5D25 AQDEXVF8D25
TVF2560	25.6				
TVF2570	25.7				
TVF2600	26.0	19.7	8.5	•	AQDEXVF1.5D26 AQDEXVF3D26 AQDEXVF5D26 AQDEXVF8D26
TVF2650	26.5				
TVF2660	26.6				
TVF2670	26.7				
TVF2700	27.0	20.4	8.5	•	AQDEXVF1.5D27 AQDEXVF3D27 AQDEXVF5D27 AQDEXVF8D27
TVF2750	27.5				
TVF2800	28.0	21.2	9.0	•	AQDEXVF1.5D28 AQDEXVF3D28 AQDEXVF5D28 AQDEXVF8D28
TVF2850	28.5				
TVF2860	28.6				
TVF2870	28.7	22.1	9.0	•	AQDEXVF1.5D29 AQDEXVF3D29 AQDEXVF5D29 AQDEXVF8D29
TVF2900	29.0				
TVF2950	29.5				
TVF3000	30.0				
TVF3050	30.5	22.5	9.5	•	AQDEXVF1.5D30 AQDEXVF3D30 AQDEXVF5D30 AQDEXVF8D30
TVF3100	31.0				
TVF3150	31.5	23.4	10.0	•	AQDEXVF1.5D31 AQDEXVF3D31 AQDEXVF5D31 AQDEXVF8D31
TVF3200	32.0				
TVF3200	32.0	24.3	10.0	•	AQDEXVF1.5D32 AQDEXVF3D32 AQDEXVF5D32 AQDEXVF8D32

•: Standard stock item  
 •: Size of bridge  
 \*Inserts are sold separately. The holder does not come with an insert.

# TVFZ

## AQUA Drills EX VF Insert FLAT Type



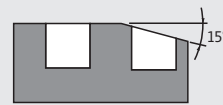
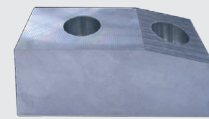
LIST: 9840

UNIT: mm

Code	Insert				Applicable Holder AQDEXVF1.5D/3D/5D/8D
	Dc	A	T	Stock	
TVFZ1400	14.0	10.5	4.5	●	AQDEXVF1.5D14
TVFZ1450	14.5				
TVFZ1500	15.0	11.1	4.8	●	AQDEXVF1.5D15
TVFZ1550	15.5				
TVFZ1600	16.0	12.0	5.0	●	AQDEXVF1.5D16
TVFZ1650	16.5				
TVFZ1700	17.0	12.4	5.5	●	AQDEXVF1.5D17
TVFZ1750	17.5				
TVFZ1800	18.0	13.0	5.8	●	AQDEXVF1.5D18
TVFZ1850	18.5				
TVFZ1900	19.0	13.6	6.0	●	AQDEXVF1.5D19
TVFZ1950	19.5				
TVFZ2000	20.0	14.4	6.5	●	AQDEXVF1.5D20
TVFZ2050	20.5				
TVFZ2100	21.0	15.0	6.7	●	AQDEXVF1.5D21
TVFZ2150	21.5				
TVFZ2200	22.0	15.7	7.5	●	AQDEXVF1.5D22
TVFZ2250	22.5				
TVFZ2300	23.0	16.5	7.5	●	AQDEXVF1.5D23
TVFZ2350	23.5				
TVFZ2400	24.0	17.3	8.0	●	AQDEXVF1.5D24
TVFZ2450	24.5				
TVFZ2500	25.0	18.1	8.0	●	AQDEXVF1.5D25
TVFZ2550	25.5				
TVFZ2600	26.0	18.6	8.5	●	AQDEXVF1.5D26
TVFZ2650	26.5				
TVFZ2700	27.0	19.3	8.5	●	AQDEXVF1.5D27
TVFZ2750	27.5				
TVFZ2800	28.0	20.1	9.0	●	AQDEXVF1.5D28
TVFZ2850	28.5				
TVFZ2900	29.0	20.9	9.0	●	AQDEXVF1.5D29
TVFZ2950	29.5				
TVFZ3000	30.0	21.3	9.5	●	AQDEXVF1.5D30
TVFZ3050	30.5				
TVFZ3100	31.0	22.1	10.0	●	AQDEXVF1.5D31
TVFZ3150	31.5				
TVFZ3200	32.0	23.0	10.0	●	AQDEXVF1.5D32

●: Standard stock item  
\*It is possible to drill the bottom of the hole or a through hole by using a combination of TVFZ and AQDEXVF3D/5D/8D.

IT IS POSSIBLE TO BE CUTTING ONCE AT SLOPE AND FLAT



The bottom face is flat and smooth, by cutting edge of point angle 180°



Cutting conditions

Tool AQDEXVF1.5D19 TVFZ1900

Cutting Speed 50m/min

Rotation 840 min<sup>-1</sup>

Feed Speed Flat 200mm/min Slope 160mm/min

Feed Flat (0.24mm/rev) Slope (0.19mm/rev)

Hole Depth 19mm Step drilling 5mm

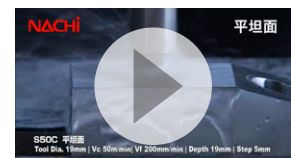
Work Material C50(180HB)

Cutting Fluid Water-Soluble - Internal Coolant

## Web video



Please scan QR code by smart phones or mobile phones. You can watch videos of cutting scene



## High wear resistance and wear of margin is small

AQDEXVF1.5D/3D/5D + TVF										
Work Material	Structural Steels Carbon Steels ST52, C45/C50		Alloy Steels 42CrMo2, NAK, HPM		Stainless Steels 1.4301/1.440		Cast Irons GG25/GG30		Ductile Cast Irons GGG40	
	-200HB		20-30HRC							
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)
14	2300	520	1800	330	900	200	2300	700	1600	400
16	2000	520	1600	330	800	200	2300	700	1400	350
18	1800	520	1400	330	700	200	2200	700	1400	350
20	1800	500	1400	320	700	190	2200	700	1300	350
22	1600	500	1300	320	650	190	2000	700	1300	350
24	1500	500	1200	320	600	190	1800	600	1200	350
26	1400	470	1100	300	550	180	1700	600	1200	350
28	1300	470	1000	300	500	180	1600	600	1100	330
30	1300	430	1000	280	500	170	1500	600	1100	330
32	1200	400	950	270	480	160	1400	560	1000	300

### Warnings on using the drilling condition tables

- 1) Cutting conditions listed here use TVF Insert. | 2) Adjust drilling condition according to the rigidity of machine or work clamp state.  
3) When for hole depth more than 3xD, reduce the rotation and feed by 30%. | 4) Use on internal coolant.

AQDEXVF8D + TVF										
Work Material	Structural Steels Carbon Steels ST52, C45/C50		Alloy Steels 42CrMo2, NAK, HPM		Stainless Steels 1.4301/1.440		Cast Irons GG25/GG30		Ductile Cast Irons GGG40	
	-200HB		20-30HRC							
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)
14	1820	410	1460	270	900	200	1820	550	1280	320
16	1580	410	1260	260	800	190	1580	480	1100	270
18	1400	410	1120	260	700	180	1400	460	980	240
20	1270	360	1020	230	640	160	1270	400	890	240
22	1160	360	930	230	580	150	1160	400	810	220
24	1060	360	850	230	530	140	1060	360	740	220
26	980	330	780	210	490	140	980	340	680	200
28	900	330	720	210	450	130	900	340	630	190
30	850	280	680	190	420	130	850	340	600	180
32	800	260	640	180	400	120	800	320	560	170

### Warnings on using the drilling condition tables


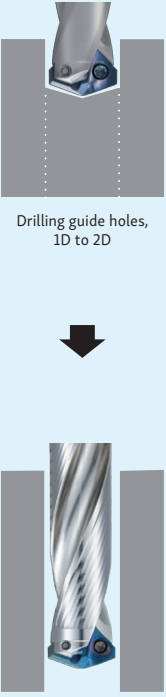

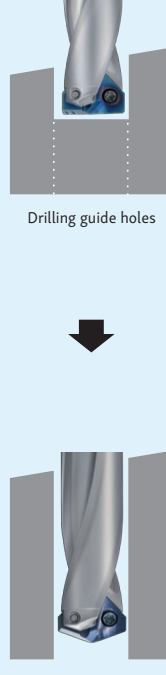
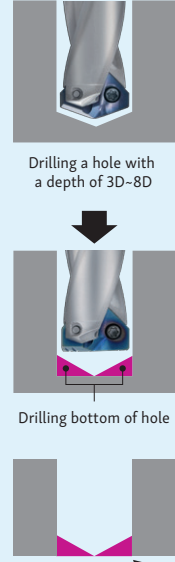
- 1) Cutting conditions listed here use TVF Insert. | 2) Adjust drilling condition according to the rigidity of machine or work clamp state.  
3) We recommend pre-drilling of guide holes. Depth is 1D to 2D. | 4) Use on internal coolant.



AQDEXVF1.5D + TVFZ										
Work Material	Structural Steels Carbon Steels ST52, C45/C50		Alloy Steels 42CrMo2, NAK, HPM		Stainless Steels 1.4301/1.440		Cast Irons GG25/GG30		Ductile Cast Irons GGG40	
	-200HB		20-30HRC							
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)
14	1140	150	1140	50	2270	100	1140	210	800	120
16	1000	150	1000	50	2000	100	1100	200	760	110
18	880	150	880	50	1750	100	1100	190	710	110
20	880	150	880	50	1750	90	1100	200	710	110
22	800	150	800	50	1590	90	1000	200	640	110
24	730	150	730	50	1460	90	930	180	640	110
26	670	130	670	40	1350	80	860	180	610	100
28	630	130	630	40	1250	80	800	170	530	100
30	630	120	630	40	1250	80	740	170	530	100
32	600	120	600	40	1190	80	700	170	500	100

### Warnings on using the drilling condition tables

- 1) Use the AQUA Drills EX VF 1.5D holder. | 2) Do step drilling. As a guideline, drill stainless steels to 0.05D, and other metals to 0.25D.  
3) It is possible to drill the bottom of the hole or a through hole by using a combination of a TVF insert and a 3D or deeper holder. | 4) Adjust drilling condition according to the rigidity of machine or work clamp state.  
5) Use on internal coolant. | 6) Better finished surface achieved by flat drilling bottom surface for set time (0.5 s). In the case of drilling for Stainless Steels, please flat drilling bottom surface for set time (0.2 s).

## GUIDE TO SELECTING HOLDERS AND INSERTS

Insert	TVF		TVFZ	TVFZ+TVF	
Holder	AQDEXVF1.5D AQDEXVF3D AQDEXVF5D	AQDEXVF1.5D ▼ AQDEXVF8D	AQDEXVF1.5D	AQDEXVF1.5D ▼ AQDEXVF3D AQDEXVF5D AQDEXVF8D	AQDEXVF3D AQDEXVF5D AQDEXVF8D
Application	Holes drilled up to 5D	Holes drilled over 5D	Holes drilled up to 1.5D, flat bottom, inclined surface	Holes drilled over 1.5D, inclined surface	Holes drilled over 1.5D, flat bottom, through hole
	 <p>Drilling a hole with a depth of 1.5D-5D</p>	 <p>Drilling guide holes, 1D to 2D</p> <p>Drilling flat bottoms</p> <p>Inclined surface</p> <p>Counter boring</p> <p>No burrs</p> <p>Drilling through</p>	 <p>Drilling flat bottoms</p> <p>Inclined surface</p> <p>Counter boring</p> <p>No burrs</p> <p>Drilling through</p>	 <p>Drilling guide holes</p> <p>Drilling a hole with a depth of 3D-8D</p> <p>Drilling bottom of hole</p> <p>No burrs</p> <p>Drilling through</p>	 <p>Drilling a hole with a depth of 3D-8D</p> <p>Drilling bottom of hole</p> <p>No burrs</p> <p>Drilling through</p>
<p>*It is possible to drill the bottom of the hole or a through hole by using a combination of TVFZ and AQDEXVF3D/5D/8D</p> <p>*When using AQDEXVF8D, pre-drilling of guide holes</p>					

Holder AQDEXVF AQUA Drills EX VF				Screw	Wrench	Anti-seizure lubricant	Recommended torque
AQDEXVF1.5D 1.5D	AQDEXVF3D 3D	AQDEXVF5D 5D	AQDEXVF8D 8D			NP-5	
AQDEXVF1.5D14 AQDEXVF1.5D15	AQDEXVF3D14 AQDEXVF3D15	AQDEXVF5D14 AQDEXVF5D15	AQDEXVF8D14 AQDEXVF8D15	SW-2045	T-07	NP-5	0.5N·m
AQDEXVF1.5D16 AQDEXVF1.5D17 AQDEXVF1.5D18	AQDEXVF3D16 AQDEXVF3D17 AQDEXVF3D18	AQDEXVF5D16 AQDEXVF5D17 AQDEXVF5D18	AQDEXVF8D16 AQDEXVF8D17 AQDEXVF8D18	SW-2556	T-08		0.9N·m
AQDEXVF1.5D19 AQDEXVF1.5D20 AQDEXVF1.5D21	AQDEXVF3D19 AQDEXVF3D20 AQDEXVF3D21	AQDEXVF5D19 AQDEXVF5D20 AQDEXVF5D21	AQDEXVF8D19 AQDEXVF8D20 AQDEXVF8D21	SW-2567	T-10		1.8N·m
AQDEXVF1.5D22 AQDEXVF1.5D23 AQDEXVF1.5D24	AQDEXVF3D22 AQDEXVF3D23 AQDEXVF3D24	AQDEXVF5D22 AQDEXVF5D23 AQDEXVF5D24	AQDEXVF8D22 AQDEXVF8D23 AQDEXVF8D24	SW-3007	T-15		2.1N·m
AQDEXVF1.5D25 AQDEXVF1.5D26 AQDEXVF1.5D27	AQDEXVF3D25 AQDEXVF3D26 AQDEXVF3D27	AQDEXVF5D25 AQDEXVF5D26 AQDEXVF5D27	AQDEXVF8D25 AQDEXVF8D26 AQDEXVF8D27	SW-3009			
AQDEXVF1.5D28 AQDEXVF1.5D29 AQDEXVF1.5D30	AQDEXVF3D28 AQDEXVF3D29 AQDEXVF3D30	AQDEXVF5D28 AQDEXVF5D29 AQDEXVF5D30	AQDEXVF8D28 AQDEXVF8D29 AQDEXVF8D30	SW-3510			
AQDEXVF1.5D31 AQDEXVF1.5D32	AQDEXVF3D31 AQDEXVF3D32	AQDEXVF5D31 AQDEXVF5D32	AQDEXVF8D31 AQDEXVF8D32	SW-3512			

## Replacing inserts

Inserts are sold separately.

The holder does not come with an insert.

### 1. Removing inserts

- ▶ Remove the clamp screw with a wrench.
- ▶ If there is any dirt or chips around the screw, remove them first.
- ▶ After removing the insert, use compressed air to remove any dirt or foreign materials from the insert mount and the screw area.

### 2. Mounting the replacement insert

- ▶ Make sure there is no foreign material on the replacement insert and then insert the V shaped part into the mount. As shown in the diagram, press on the point of the insert with your finger and lightly tighten the two screws.
- ▶ Be sure to apply the anti-seizure lubricant provided to the screws.
- ▶ After lightly tightening the screws, make sure there are no gaps between the insert and the holder, then tighten the screws to the recommended torque.

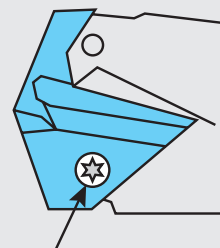
Check the list provided for information about anti-seizure lubricant, screws, wrench, and tightening torque.

### Warnings

- ▶ Be careful of injury from chips flying out of or twisting around the drill bit.
- ▶ Do not touch the cutting edges with your bare hands.
- ▶ Use covers and protective glasses to prevent the risk of injury.

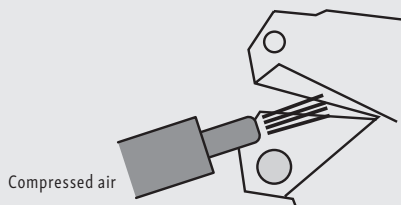
The designs, specifications and/or dimensions are subject to change without notice.

Screw area



Remove any chips and dirt.

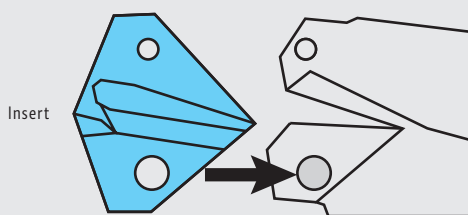
Insert mounting area



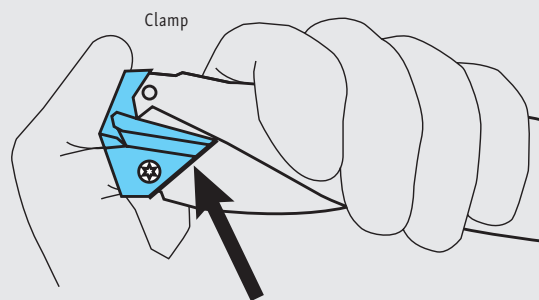
Compressed air

Use compressed air to remove foreign material from the insert mounting area.

Inserting inserts



Insert



Clamp

Make sure there are no gaps between the insert and the holder, then tighten the screws.

Do not touch the cutting edges with your bare hands.

### Note

Screws are consumable parts. Replace screws if they are warped or damaged. Otherwise, the inserts may not mount correctly.

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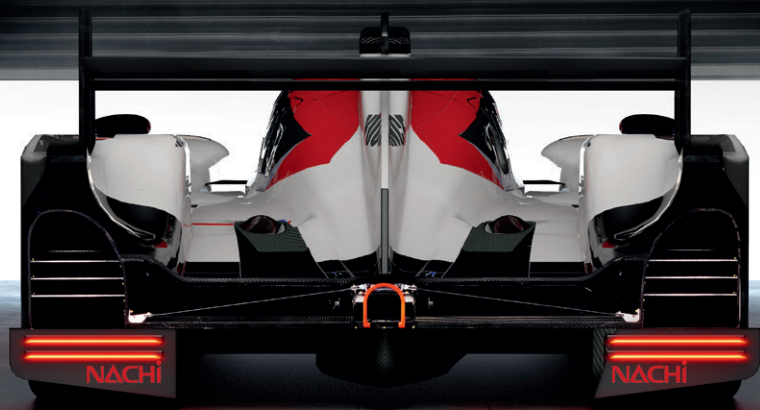
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