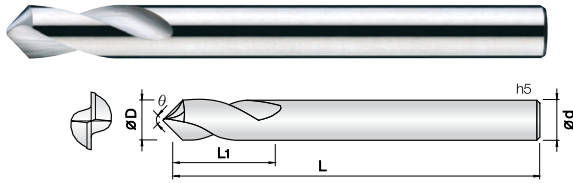


초경 2날 NC 스폿팅 드릴



- HRC50이하의 고경도강, 프리하트강, 공구강, 주철 등 파삭재 가공
- 실리콘계 코팅(Si) 처리하여 내마모성이 우수합니다.
- 헬릭스 타입 2날을 적용하여 센터링 작업에 적합합니다.
- 코팅과 비코팅으로 구분하여 수지, 아크릴 등의 가공도 가능합니다.
- 미립자 초경합금을 채택하여 다양한 비철합금 및 목업의 파삭재 영역에 적용 가능합니다.
- Drills for various work materials, hardened steel, prehardened steel, tool steel and cast iron.
- Good wear resistance by Si-based PVD coating.
- Optimum for centering with helix 2flutes.
- Resin, plastic machining applicable with coated or non coated endmill.
- Applied fine WC grade optimized for various non-ferrous and non-metallic work materials.

2

WC
미립자

TISIN
Coating

|D|
+0 -0.01

|D|
-0.01 -0.025

|D|
-0.015 -0.03

30°
Helix Angle

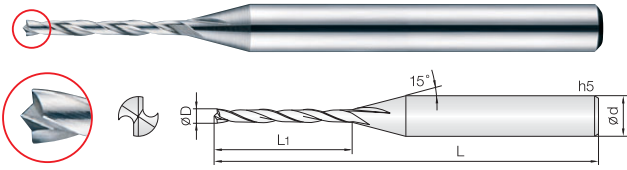
CUTTING
DATA

D Size	D Tolerance
ø0.3 ~ 4	+0 ~ -0.01mm
ø6 ~ 12	-0.01 ~ -0.025mm
ø16	-0.015 ~ -0.03mm

단위 : mm

Order Number		날경	각도	날장	전장	샙크	비고	
비코팅 Un coated	코팅 Coated	Diameter	Angle	Length of cut	Overall Length	Shank Dia	비코팅 Un coated	코팅 Coated
		D	θ	L1	L	d		
2SPO 003 090 040	2SPOC 003 090 040	0.3	90°	0.9	40	3		
2SPO 005 090 040	2SPOC 005 090 040	0.5	90°	1.5	40	3		
2SPO 008 090 040	2SPOC 008 090 040	0.8	90°	2.4	40	3		
2SPO 010 090 050	2SPOC 010 090 050	1	90°	3	50	3		
	2SPOC 010 090 080	1	90°	3	80	3		
2SPO 010 120 050	2SPOC 010 120 050	1	120°	3	50	3		
2SPO 015 090 050	2SPOC 015 090 050	1.5	90°	4.5	50	3		
2SPO 020 090 050	2SPOC 020 090 050	2	90°	6	50	3		
	2SPOC 020 090 080	2	90°	6	80	3		
2SPO 020 120 050	2SPOC 020 120 050	2	120°	6	50	3		
2SPO 030 090 050	2SPOC 030 090 050	3	90°	10	50	3		
2SPO 030 120 050	2SPOC 030 120 050	3	120°	10	50	3		
2SPO 030 090 100	2SPOC 030 090 100	3	90°	10	100	3		
2SPO 030 120 100	2SPOC 030 120 100	3	120°	10	100	3		
2SPO 040 090 050	2SPOC 040 090 050	4	90°	12	50	4		
2SPO 040 120 050	2SPOC 040 120 050	4	120°	12	50	4		
2SPO 040 090 100	2SPOC 040 090 100	4	90°	12	100	4		
2SPO 040 120 100	2SPOC 040 120 100	4	120°	12	100	4		
2SPO 060 090 070	2SPOC 060 090 070	6	90°	15	70	6		
2SPO 060 120 070	2SPOC 060 120 070	6	120°	15	70	6		
2SPO 060 090 110	2SPOC 060 090 110	6	90°	15	110	6		
	2SPOC 060 090 150	6	90°	15	150	6		
2SPO 060 120 110	2SPOC 060 120 110	6	120°	15	110	6		
2SPO 080 090 080	2SPOC 080 090 080	8	90°	25	80	8		
	2SPOC 080 090 150	8	90°	25	150	8		
2SPO 080 120 080	2SPOC 080 120 080	8	120°	25	80	8		
2SPO 100 090 090	2SPOC 100 090 090	10	90°	25	90	10		
2SPO 100 120 090	2SPOC 100 120 090	10	120°	25	90	10		
2SPO 100 090 150	2SPOC 100 090 150	10	90°	25	150	10		
2SPO 100 120 150	2SPOC 100 120 150	10	120°	25	150	10		
2SPO 120 090 090	2SPOC 120 090 090	12	90°	30	90	12		
2SPO 120 120 090	2SPOC 120 120 090	12	120°	30	90	12		
2SPO 120 090 150	2SPOC 120 090 150	12	90°	30	150	12		
2SPO 120 120 150	2SPOC 120 120 150	12	120°	30	150	12		
2SPO 160 090 110	2SPOC 160 090 110	16	90°	35	110	16		
2SPO 160 120 110	2SPOC 160 120 110	16	120°	35	110	16		

FLAT DRILL



- 알루미늄, 구리, 비철합금, A.B.S수지, 레진 가공 드릴
- 버를 최소화하기 위한 특별한 드릴 헤드 형상을 설계하였습니다.
- 드릴링 작업시 피삭재 센터의 드릴링 워킹 현상을 방지하여 정확한 드릴링 위치와 홀 크기를 제공합니다.
- Drill for aluminium, copper, non-ferrous alloys, A.B.S and resin.
- Special drill head geometry designed to minimize burrs.
- The drill location and hole size are provided to prevent drill walking in the center of the workpiece during drilling.

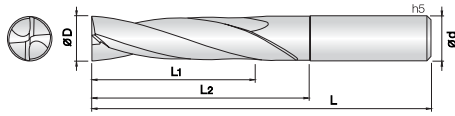


379P

D Size	D Tolerance
ø0.15 ~ 0.2	+0 ~ -0.005mm
ø0.21 ~ 3	+0 ~ -0.01mm
ø3.5 ~ 6	+0 ~ -0.015mm

단위 : mm

Order Number	날경 Diameter D	날장 Length of cut L1	전장 Overall Length L	샙크 Shank Dia d	비고	Order Number	날경 Diameter D	날장 Length of cut L1	전장 Overall Length L	샙크 Shank Dia d	비고
2DED 0015 009 S03	0.15	0.9	40	3		2DED 008 040 S03	0.8	4	40	3	
2DED 0015 018 S03	0.15	1.8	40	3		2DED 008 080 S03	0.8	8	40	3	
2DED 0016 009 S03	0.16	0.9	40	3		2DED 0085 040 S03	0.85	4	40	3	
2DED 0016 018 S03	0.16	1.8	40	3		2DED 0085 080 S03	0.85	8	40	3	
2DED 0017 009 S03	0.17	0.9	40	3		2DED 009 040 S03	0.9	4	40	3	
2DED 0017 018 S03	0.17	1.8	40	3		2DED 009 080 S03	0.9	8	40	3	
2DED 0018 0105 S03	0.18	1.05	40	3		2DED 0095 040 S03	0.95	4	40	3	
2DED 0018 021 S03	0.18	2.1	40	3		2DED 0095 080 S03	0.95	8	40	3	
2DED 0019 0105 S03	0.19	1.05	40	3		2DED 010 050 S03	1	5	40	3	
2DED 0019 021 S03	0.19	2.1	40	3		2DED 010 100 S03	1	10	40	3	
2DED 002 012 S03	0.2	1.2	40	3		2DED 011 050 S03	1.1	5	40	3	
2DED 002 024 S03	0.2	2.4	40	3		2DED 011 100 S03	1.1	10	40	3	
2DED 0021 012 S03	0.21	1.2	40	3		2DED 012 050 S03	1.2	5	40	3	
2DED 0021 024 S03	0.21	2.4	40	3		2DED 012 100 S03	1.2	10	40	3	
2DED 0022 013 S03	0.22	1.3	40	3		2DED 013 050 S03	1.3	5	40	3	
2DED 0022 026 S03	0.22	2.6	40	3		2DED 013 100 S03	1.3	10	40	3	
2DED 0023 013 S03	0.23	1.3	40	3		2DED 014 050 S03	1.4	5	40	3	
2DED 0023 026 S03	0.23	2.6	40	3		2DED 014 100 S03	1.4	10	40	3	
2DED 0024 013 S03	0.24	1.3	40	3		2DED 015 075 S03	1.5	7.5	45	3	
2DED 0024 026 S03	0.24	2.6	40	3		2DED 015 150 S03	1.5	15	45	3	
2DED 0025 015 S03	0.25	1.5	40	3		2DED 016 075 S03	1.6	7.5	45	3	
2DED 0025 030 S03	0.25	3	40	3		2DED 016 150 S03	1.6	15	45	3	
2DED 0026 015 S03	0.26	1.5	40	3		2DED 017 075 S03	1.7	7.5	45	3	
2DED 0026 030 S03	0.26	3	40	3		2DED 017 150 S03	1.7	15	45	3	
2DED 0027 015 S03	0.27	1.5	40	3		2DED 018 075 S03	1.8	7.5	45	3	
2DED 0027 030 S03	0.27	3	40	3		2DED 018 150 S03	1.8	15	45	3	
2DED 0028 0165 S03	0.28	1.65	40	3		2DED 019 075 S03	1.9	7.5	45	3	
2DED 0028 033 S03	0.28	3.3	40	3		2DED 019 150 S03	1.9	15	45	3	
2DED 0029 0165 S03	0.29	1.65	40	3		2DED 020 110 S03	2	11	50	3	
2DED 0029 033 S03	0.29	3.3	40	3		2DED 020 220 S03	2	22	50	3	
2DED 003 025 S03	0.3	2.5	40	3		2DED 021 110 S03	2.1	11	50	3	
2DED 003 050 S03	0.3	5	40	3		2DED 021 220 S03	2.1	22	50	3	
2DED 0035 025 S03	0.35	2.5	40	3		2DED 022 110 S03	2.2	11	50	3	
2DED 0035 050 S03	0.35	5	40	3		2DED 022 220 S03	2.2	22	50	3	
2DED 004 030 S03	0.4	3	40	3		2DED 023 110 S03	2.3	11	50	3	
2DED 004 060 S03	0.4	6	40	3		2DED 023 220 S03	2.3	22	50	3	
2DED 0045 030 S03	0.45	3	40	3		2DED 024 110 S03	2.4	11	50	3	
2DED 0045 060 S03	0.45	6	40	3		2DED 024 220 S03	2.4	22	50	3	
2DED 005 030 S03	0.5	3	40	3		2DED 025 110 S03	2.5	11	50	3	
2DED 005 060 S03	0.5	6	40	3		2DED 025 220 S03	2.5	22	50	3	
2DED 0055 030 S03	0.55	3	40	3		2DED 026 110 S03	2.6	11	50	3	
2DED 0055 060 S03	0.55	6	40	3		2DED 026 220 S03	2.6	22	50	3	
2DED 006 035 S03	0.6	3.5	40	3		2DED 027 125 S03	2.7	12.5	50	3	
2DED 006 070 S03	0.6	7	40	3		2DED 027 250 S03	2.7	25	50	3	
2DED 0065 035 S03	0.65	3.5	40	3		2DED 028 125 S03	2.8	12.5	50	3	
2DED 0065 070 S03	0.65	7	40	3		2DED 028 250 S03	2.8	25	50	3	
2DED 007 040 S03	0.7	4	40	3		2DED 029 125 S03	2.9	12.5	50	3	
2DED 007 080 S03	0.7	8	40	3		2DED 029 250 S03	2.9	25	50	3	
2DED 0075 040 S03	0.75	4	40	3		2DED 030 125 S03	3	12.5	50	3	
2DED 0075 080 S03	0.75	8	40	3		2DED 030 250 S03	3	25	50	3	



- HRC50이하, 프라하든강, 합금강, 주철, 알루미늄 가공용 플랫 드릴
- 밑날 플랫타입으로 다양한 경사면과 곡면 드릴가공에 탁월한 성능을 발휘합니다.
- 20도 헬릭스를 채택하여 칩배출 성능이 매우 우수합니다.
- 관통 드릴 작업시 버 발생을 최소화 합니다.
- TISIN-R 코팅으로 내열성과 내마모성이 우수, 긴 공구수명을 실현 하였습니다.

Flat drill for material below HRc 50, pre-hardened steel, alloy steel, cast iron and aluminum.

- With flat type of end face, excellent performance drilling is available to a variety of inclined and curved surfaces.
- Chip emission is great and stable drilling is available with 20 degree helix design.
- Minimize burrs during penetration drilling.
- Increased tool life by applying TISIN-R coating with great heat and wear resistance.



380P

단위: mm

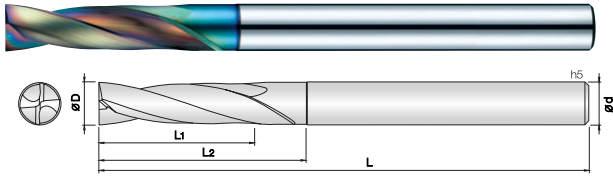
Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고	Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2FDR 002 009 S03	0.2	0.8	0.9	50	3		2FDR 044 189 S06	4.4	17.6	18.9	60	6	
2FDR 0025 011 S03	0.25	1	1.1	50	3		2FDR 045 194 S06	4.5	18	19.4	60	6	
2FDR 003 013 S03	0.3	1.2	1.3	50	3		2FDR 046 198 S06	4.6	18.4	19.8	60	6	
2FDR 0035 015 S03	0.35	1.4	1.5	50	3		2FDR 047 202 S06	4.7	18.8	20.2	60	6	
2FDR 004 017 S03	0.4	1.6	1.7	50	3		2FDR 048 206 S06	4.8	19.2	20.6	60	6	
2FDR 0045 019 S03	0.45	1.8	1.9	50	3		2FDR 049 211 S06	4.9	19.6	21.1	60	6	
2FDR 005 022 S03	0.5	2	2.2	50	3		2FDR 050 215 S06	5	20	21.5	60	6	
2FDR 0055 024 S03	0.55	2.2	2.4	50	3		2FDR 051 219 S06	5.1	20.4	21.9	60	6	
2FDR 006 026 S03	0.6	2.4	2.6	50	3		2FDR 052 224 S06	5.2	20.8	22.4	60	6	
2FDR 0065 028 S03	0.65	2.6	2.8	50	3		2FDR 053 228 S06	5.3	21.2	22.8	60	6	
2FDR 007 030 S03	0.7	2.8	3	50	3		2FDR 054 232 S06	5.4	21.6	23.2	60	6	
2FDR 0075 032 S03	0.75	3	3.2	50	3		2FDR 055 237 S06	5.5	22	23.7	60	6	
2FDR 008 034 S03	0.8	3.2	3.4	50	3		2FDR 056 241 S06	5.6	22.4	24.1	60	6	
2FDR 0085 037 S03	0.85	3.4	3.7	50	3		2FDR 057 245 S06	5.7	22.8	24.5	60	6	
2FDR 009 039 S03	0.9	3.6	3.9	50	3		2FDR 058 249 S06	5.8	23.2	24.9	60	6	
2FDR 0095 041 S03	0.95	3.8	4.1	50	3		2FDR 059 254 S06	5.9	23.6	25.4	60	6	
2FDR 010 043 S03	1	4	4.3	50	3		2FDR 060 258 S06	6	24	25.8	60	6	
2FDR 011 047 S03	1.1	4.4	4.7	50	3		2FDR 061 262 S08	6.1	24.4	26.2	70	8	
2FDR 012 052 S03	1.2	4.8	5.2	50	3		2FDR 062 267 S08	6.2	24.8	26.7	70	8	
2FDR 013 056 S03	1.3	5.2	5.6	50	3		2FDR 063 271 S08	6.3	25.2	27.1	70	8	
2FDR 014 060 S03	1.4	5.6	6	50	3		2FDR 064 275 S08	6.4	25.6	27.5	70	8	
2FDR 015 065 S03	1.5	6	6.5	50	3		2FDR 065 280 S08	6.5	26	28	70	8	
2FDR 016 069 S03	1.6	6.4	6.9	50	3		2FDR 066 284 S08	6.6	26.4	28.4	70	8	
2FDR 017 073 S03	1.7	6.8	7.3	50	3		2FDR 067 288 S08	6.7	26.8	28.8	70	8	
2FDR 018 077 S03	1.8	7.2	7.7	50	3		2FDR 068 292 S08	6.8	27.2	29.2	70	8	
2FDR 019 082 S03	1.9	7.6	8.2	50	3		2FDR 069 297 S08	6.9	27.6	29.7	70	8	
2FDR 020 086 S04	2	8	8.6	50	4		2FDR 070 301 S08	7	28	30.1	70	8	
2FDR 021 090 S04	2.1	8.4	9	50	4		2FDR 071 305 S08	7.1	28.4	30.5	70	8	
2FDR 022 095 S04	2.2	8.8	9.5	50	4		2FDR 072 310 S08	7.2	28.8	31	70	8	
2FDR 023 099 S04	2.3	9.2	9.9	50	4		2FDR 073 314 S08	7.3	29.2	31.4	70	8	
2FDR 024 103 S04	2.4	9.6	10.3	50	4		2FDR 074 318 S08	7.4	29.6	31.8	70	8	
2FDR 025 108 S04	2.5	10	10.8	50	4		2FDR 075 323 S08	7.5	30	32.3	70	8	
2FDR 026 112 S04	2.6	10.4	11.2	50	4		2FDR 076 327 S08	7.6	30.4	32.7	70	8	
2FDR 027 116 S04	2.7	10.8	11.6	50	4		2FDR 077 331 S08	7.7	30.8	33.1	70	8	
2FDR 028 120 S04	2.8	11.2	12	50	4		2FDR 078 335 S08	7.8	31.2	33.5	70	8	
2FDR 029 125 S04	2.9	11.6	12.5	50	4		2FDR 079 340 S08	7.9	31.6	34	70	8	
2FDR 030 129 S06	3	12	12.9	50	6		2FDR 080 344 S08	8	32	34.4	70	8	
2FDR 031 133 S06	3.1	12.4	13.3	50	6		2FDR 081 348 S10	8.1	32.4	34.8	80	10	
2FDR 032 138 S06	3.2	12.8	13.8	50	6		2FDR 082 353 S10	8.2	32.8	35.3	80	10	
2FDR 033 142 S06	3.3	13.2	14.2	50	6		2FDR 083 357 S10	8.3	33.2	35.7	80	10	
2FDR 034 146 S06	3.4	13.6	14.6	50	6		2FDR 084 361 S10	8.4	33.6	36.1	80	10	
2FDR 035 151 S06	3.5	14	15.1	50	6		2FDR 085 366 S10	8.5	34	36.6	80	10	
2FDR 036 155 S06	3.6	14.4	15.5	50	6		2FDR 086 370 S10	8.6	34.4	37	80	10	
2FDR 037 159 S06	3.7	14.8	15.9	50	6		2FDR 087 374 S10	8.7	34.8	37.4	80	10	
2FDR 038 163 S06	3.8	15.2	16.3	50	6		2FDR 088 378 S10	8.8	35.2	37.8	80	10	
2FDR 039 168 S06	3.9	15.6	16.8	50	6		2FDR 089 383 S10	8.9	35.6	38.3	80	10	
2FDR 040 172 S06	4	16	17.2	50	6		2FDR 090 387 S10	9	36	38.7	80	10	
2FDR 041 176 S06	4.1	16.4	17.6	60	6		2FDR 091 391 S10	9.1	36.4	39.1	80	10	
2FDR 042 181 S06	4.2	16.8	18.1	60	6		2FDR 092 396 S10	9.2	36.8	39.6	80	10	
2FDR 043 185 S06	4.3	17.2	18.5	60	6		2FDR 093 400 S10	9.3	37.2	40	80	10	



단위 : mm

Order Number	날경 Diameter D	홈길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고	Order Number	날경 Diameter D	홈길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2FDR 094 404 S10	9.4	37.6	40.4	80	10		2FDR 144 619 S16	14.4	57.6	61.9	105	16	
2FDR 095 409 S10	9.5	38	40.9	80	10		2FDR 145 624 S16	14.5	58	62.4	105	16	
2FDR 096 413 S10	9.6	38.4	41.3	80	10		2FDR 146 628 S16	14.6	58.4	62.8	105	16	
2FDR 097 417 S10	9.7	38.8	41.7	80	10		2FDR 147 632 S16	14.7	58.8	63.2	105	16	
2FDR 098 421 S10	9.8	39.2	42.1	80	10		2FDR 148 636 S16	14.8	59.2	63.6	105	16	
2FDR 099 426 S10	9.9	39.6	42.6	80	10		2FDR 149 641 S16	14.9	59.6	64.1	105	16	
2FDR 100 430 S10	10	40	43	80	10		2FDR 150 645 S16	15	60	64.5	105	16	
2FDR 101 434 S12	10.1	40.4	43.4	90	12		2FDR 151 649 S16	15.1	60.4	64.9	115	16	
2FDR 102 439 S12	10.2	40.8	43.9	90	12		2FDR 152 654 S16	15.2	60.8	65.4	115	16	
2FDR 103 443 S12	10.3	41.2	44.3	90	12		2FDR 153 658 S16	15.3	61.2	65.8	115	16	
2FDR 104 447 S12	10.4	41.6	44.7	90	12		2FDR 154 662 S16	15.4	61.6	66.2	115	16	
2FDR 105 452 S12	10.5	42	45.2	90	12		2FDR 155 667 S16	15.5	62	66.7	115	16	
2FDR 106 456 S12	10.6	42.4	45.6	90	12		2FDR 156 671 S16	15.6	62.4	67.1	115	16	
2FDR 107 460 S12	10.7	42.8	46	90	12		2FDR 157 675 S16	15.7	62.8	67.5	115	16	
2FDR 108 464 S12	10.8	43.2	46.4	90	12		2FDR 158 679 S16	15.8	63.2	67.9	115	16	
2FDR 109 469 S12	10.9	43.6	46.9	90	12		2FDR 159 684 S16	15.9	63.6	68.4	115	16	
2FDR 110 473 S12	11	44	47.3	90	12		2FDR 160 688 S16	16	64	68.8	115	16	
2FDR 111 477 S12	11.1	44.4	47.7	90	12		2FDR 165 710 S18	16.5	66	71	125	18	
2FDR 112 482 S12	11.2	44.8	48.2	90	12		2FDR 170 731 S18	17	68	73.1	125	18	
2FDR 113 486 S12	11.3	45.2	48.6	90	12		2FDR 175 753 S18	17.5	70	75.3	125	18	
2FDR 114 490 S12	11.4	45.6	49	90	12		2FDR 180 774 S18	18	72	77.4	125	18	
2FDR 115 495 S12	11.5	46	49.5	90	12		2FDR 185 796 S20	18.5	74	79.6	135	20	
2FDR 116 499 S12	11.6	46.4	49.9	90	12		2FDR 190 817 S20	19	76	81.7	135	20	
2FDR 117 503 S12	11.7	46.8	50.3	90	12		2FDR 195 839 S20	19.5	78	83.9	145	20	
2FDR 118 507 S12	11.8	47.2	50.7	90	12		2FDR 200 860 S20	20	80	86	145	20	
2FDR 119 512 S12	11.9	47.6	51.2	90	12								
2FDR 120 516 S12	12	48	51.6	90	12								
2FDR 121 520 S14	12.1	48.4	52	100	14								
2FDR 122 525 S14	12.2	48.8	52.5	100	14								
2FDR 123 529 S14	12.3	49.2	52.9	100	14								
2FDR 124 533 S14	12.4	49.6	53.3	100	14								
2FDR 125 538 S14	12.5	50	53.8	100	14								
2FDR 126 542 S14	12.6	50.4	54.2	100	14								
2FDR 127 546 S14	12.7	50.8	54.6	100	14								
2FDR 128 550 S14	12.8	51.2	55	100	14								
2FDR 129 555 S14	12.9	51.6	55.5	100	14								
2FDR 130 559 S14	13	52	55.9	100	14								
2FDR 131 563 S14	13.1	52.4	56.3	100	14								
2FDR 132 568 S14	13.2	52.8	56.8	100	14								
2FDR 133 572 S14	13.3	53.2	57.2	100	14								
2FDR 134 576 S14	13.4	53.6	57.6	100	14								
2FDR 135 581 S14	13.5	54	58.1	100	14								
2FDR 136 585 S14	13.6	54.4	58.5	100	14								
2FDR 137 589 S14	13.7	54.8	58.9	100	14								
2FDR 138 593 S14	13.8	55.2	59.3	100	14								
2FDR 139 598 S14	13.9	55.6	59.8	100	14								
2FDR 140 602 S14	14	56	60.2	100	14								
2FDR 141 606 S16	14.1	56.4	60.6	105	16								
2FDR 142 611 S16	14.2	56.8	61.1	105	16								
2FDR 143 615 S16	14.3	57.2	61.5	105	16								

FLAT DRILL



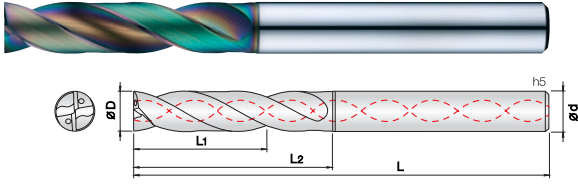
380P

- HRC50이하, 프리하드강, 합금강, 주철, 알루미늄 가공용 플랫 드릴
- 밀날 플랫타입으로 다양한 경사면과 곡면 드릴가공에 탁월한 성능을 발휘합니다.
- 20도 헬릭스를 채택하여 칩배출 성능이 매우 우수합니다.
- 관통 드릴 작업시 버 발생을 최소화 합니다.
- TISIN-R 코팅으로 내열성과 내마모성이 우수, 긴 공구수명을 실현 하였습니다.
- Flat drill for material below HRc 50, pre-hardened steel, alloy steel, cast iron and aluminum.
- With flat type of end face, excellent performance drilling is available to a variety of inclined and curved surfaces.
- Chip emission is great and stable drilling is available with 20 degree helix design.
- Minimize burrs during penetration drilling.
- Increased tool life by applying TISIN-R coating with great heat and wear resistance.

단위: mm

Order Number	Diameter D	Flute Length L1	Effective Length L2	Overall Length L	Shank Dia d	비고
2FDRL 030 300 S06	3	12	30	100	6	
2FDRL 031 310 S06	3.1	12.4	31	100	6	
2FDRL 032 320 S06	3.2	12.8	32	100	6	
2FDRL 033 330 S06	3.3	13.2	33	100	6	
2FDRL 034 340 S06	3.4	13.6	34	100	6	
2FDRL 035 350 S06	3.5	14	35	100	6	
2FDRL 036 360 S06	3.6	14.4	36	100	6	
2FDRL 037 370 S06	3.7	14.8	37	100	6	
2FDRL 038 380 S06	3.8	15.2	38	100	6	
2FDRL 039 390 S06	3.9	15.6	39	100	6	
2FDRL 040 400 S06	4	16	40	100	6	
2FDRL 041 410 S06	4.1	16.4	41	100	6	
2FDRL 042 420 S06	4.2	16.8	42	100	6	
2FDRL 043 430 S06	4.3	17.2	43	100	6	
2FDRL 044 440 S06	4.4	17.6	44	100	6	
2FDRL 045 450 S06	4.5	18	45	100	6	
2FDRL 046 460 S06	4.6	18.4	46	100	6	
2FDRL 047 470 S06	4.7	18.8	47	100	6	
2FDRL 048 480 S06	4.8	19.2	48	100	6	
2FDRL 049 490 S06	4.9	19.6	49	100	6	
2FDRL 050 500 S06	5	20	50	100	6	
2FDRL 051 510 S06	5.1	20.4	51	110	6	
2FDRL 052 520 S06	5.2	20.8	52	110	6	
2FDRL 053 530 S06	5.3	21.2	53	110	6	
2FDRL 054 540 S06	5.4	21.6	54	110	6	
2FDRL 055 550 S06	5.5	22	55	110	6	
2FDRL 056 560 S06	5.6	22.4	56	110	6	
2FDRL 057 570 S06	5.7	22.8	57	110	6	
2FDRL 058 580 S06	5.8	23.2	58	110	6	
2FDRL 059 590 S06	5.9	23.6	59	110	6	
2FDRL 060 480 S06	6	24	48	110	6	
2FDRL 061 488 S08	6.1	24.4	48.8	120	8	
2FDRL 062 496 S08	6.2	24.8	49.6	120	8	
2FDRL 063 504 S08	6.3	25.2	50.4	120	8	
2FDRL 064 512 S08	6.4	25.6	51.2	120	8	
2FDRL 065 520 S08	6.5	26	52	120	8	
2FDRL 066 528 S08	6.6	26.4	52.8	120	8	
2FDRL 067 536 S08	6.7	26.8	53.6	120	8	
2FDRL 068 544 S08	6.8	27.2	54.4	120	8	
2FDRL 069 552 S08	6.9	27.6	55.2	120	8	
2FDRL 070 560 S08	7	28	56	120	8	
2FDRL 071 568 S08	7.1	28.4	56.8	120	8	
2FDRL 072 576 S08	7.2	28.8	57.6	120	8	
2FDRL 073 584 S08	7.3	29.2	58.4	120	8	
2FDRL 074 592 S08	7.4	29.6	59.2	120	8	
2FDRL 075 600 S08	7.5	30	60	120	8	
2FDRL 076 608 S08	7.6	30.4	60.8	120	8	
2FDRL 077 616 S08	7.7	30.8	61.6	120	8	
2FDRL 078 624 S08	7.8	31.2	62.4	120	8	
2FDRL 079 632 S08	7.9	31.6	63.2	120	8	
2FDRL 080 640 S08	8	32	64	120	8	
2FDRL 081 648 S10	8.1	32.4	64.8	130	10	
2FDRL 082 656 S10	8.2	32.8	65.6	130	10	
2FDRL 083 664 S10	8.3	33.2	66.4	130	10	

Order Number	Diameter D	Flute Length L1	Effective Length L2	Overall Length L	Shank Dia d	비고
2FDRL 084 672 S10	8.4	33.6	67.2	130	10	
2FDRL 085 680 S10	8.5	34	68	130	10	
2FDRL 086 688 S10	8.6	34.4	68.8	130	10	
2FDRL 087 696 S10	8.7	34.8	69.6	130	10	
2FDRL 088 704 S10	8.8	35.2	70.4	130	10	
2FDRL 089 712 S10	8.9	35.6	71.2	130	10	
2FDRL 090 720 S10	9	36	72	130	10	
2FDRL 091 728 S10	9.1	36.4	72.8	130	10	
2FDRL 092 736 S10	9.2	36.8	73.6	130	10	
2FDRL 093 744 S10	9.3	37.2	74.4	130	10	
2FDRL 094 752 S10	9.4	37.6	75.2	130	10	
2FDRL 095 760 S10	9.5	38	76	130	10	
2FDRL 096 768 S10	9.6	38.4	76.8	130	10	
2FDRL 097 776 S10	9.7	38.8	77.6	130	10	
2FDRL 098 784 S10	9.8	39.2	78.4	130	10	
2FDRL 099 792 S10	9.9	39.6	79.2	130	10	
2FDRL 100 800 S10	10	40	80	130	10	
2FDRL 101 808 S12	10.1	40.4	80.8	150	12	
2FDRL 102 816 S12	10.2	40.8	81.6	150	12	
2FDRL 103 824 S12	10.3	41.2	82.4	150	12	
2FDRL 104 832 S12	10.4	41.6	83.2	150	12	
2FDRL 105 840 S12	10.5	42	84	150	12	
2FDRL 106 848 S12	10.6	42.4	84.8	150	12	
2FDRL 107 856 S12	10.7	42.8	85.6	150	12	
2FDRL 108 864 S12	10.8	43.2	86.4	150	12	
2FDRL 109 872 S12	10.9	43.6	87.2	150	12	
2FDRL 110 880 S12	11	44	88	150	12	
2FDRL 111 888 S12	11.1	44.4	88.8	150	12	
2FDRL 112 896 S12	11.2	44.8	89.6	150	12	
2FDRL 113 904 S12	11.3	45.2	90.4	150	12	
2FDRL 114 912 S12	11.4	45.6	91.2	150	12	
2FDRL 115 920 S12	11.5	46	92	150	12	
2FDRL 116 928 S12	11.6	46.4	92.8	150	12	
2FDRL 117 936 S12	11.7	46.8	93.6	150	12	
2FDRL 118 944 S12	11.8	47.2	94.4	150	12	
2FDRL 119 952 S12	11.9	47.6	95.2	150	12	
2FDRL 120 960 S12	12	48	96	150	12	
2FDRL 125 1000 S14	12.5	50	100	180	14	
2FDRL 130 1040 S14	13	52	104	180	14	
2FDRL 135 1080 S14	13.5	54	108	180	14	
2FDRL 140 1120 S14	14	56	112	180	14	
2FDRL 145 1160 S16	14.5	58	116	200	16	
2FDRL 150 1200 S16	15	60	120	200	16	
2FDRL 155 1240 S16	15.5	62	124	200	16	
2FDRL 160 1280 S16	16	64	128	200	16	
2FDRL 165 1320 S18	16.5	66	132	220	18	
2FDRL 170 1360 S18	17	68	136	220	18	
2FDRL 175 1400 S18	17.5	70	140	220	18	
2FDRL 180 1440 S18	18	72	144	220	18	
2FDRL 185 1480 S20	18.5	74	148	250	20	
2FDRL 190 1520 S20	19	76	152	250	20	
2FDRL 195 1560 S20	19.5	78	156	250	20	
2FDRL 200 1600 S20	20	80	160	250	20	



- HRC50이하, 프리하든강, 합금강, 주철, 알루미늄 가공용 플랫 드릴
- 더블 마진 옆날과 절삭유 홀을 적용하여, 다양한 경사면과 곡면 드릴가공에 빠른 가공 속도를 실현합니다.
- 24~30도 헬릭스를 채택하여 칩배출 성능이 매우 우수합니다.
- 관통 드릴 작업시 버 발생을 최소화 합니다.
- TISIN-R 코팅으로 내열성과 내마모성이 우수, 긴 공구수명을 실현 하였습니다.

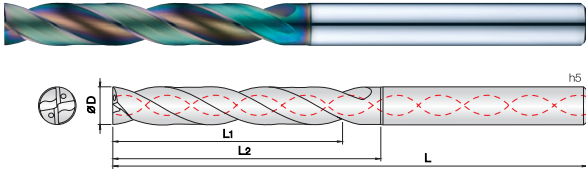
- Flat drill for material below HRc 50, pre-hardened steel, alloy steel, cast iron and aluminum.
- With double margin of side flute and coolant hole, high speed drilling is available to a variety of inclined and curved surfaces.
- Chip emission is great and stable drilling is available with between 24 to 30 degree helix design.
- Minimize burrs during penetration drilling.
- Increased tool life by applying TISIN-R coating with great heat and wear resistance.



381P

단위 : mm

Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고	Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2FDRW 030 165 S04	3	13.5	16.5	60	4		2FDRW 080 390 S08	8	36	39	80	8	
2FDRW 031 170 S04	3.1	14	17	60	4		2FDRW 081 395 S10	8.1	36.5	39.5	90	10	
2FDRW 032 174 S04	3.2	14.4	17.4	60	4		2FDRW 082 399 S10	8.2	36.9	39.9	90	10	
2FDRW 033 179 S04	3.3	14.9	17.9	60	4		2FDRW 083 404 S10	8.3	37.4	40.4	90	10	
2FDRW 034 183 S04	3.4	15.3	18.3	60	4		2FDRW 084 408 S10	8.4	37.8	40.8	90	10	
2FDRW 035 188 S04	3.5	15.8	18.8	60	4		2FDRW 085 413 S10	8.5	38.3	41.3	90	10	
2FDRW 036 192 S04	3.6	16.2	19.2	60	4		2FDRW 086 417 S10	8.6	38.7	41.7	90	10	
2FDRW 037 197 S04	3.7	16.7	19.7	60	4		2FDRW 087 422 S10	8.7	39.2	42.2	90	10	
2FDRW 038 201 S04	3.8	17.1	20.1	60	4		2FDRW 088 426 S10	8.8	39.6	42.6	90	10	
2FDRW 039 206 S04	3.9	17.6	20.6	60	4		2FDRW 089 431 S10	8.9	40.1	43.1	90	10	
2FDRW 040 210 S06	4	18	21	60	6		2FDRW 090 435 S10	9	40.5	43.5	90	10	
2FDRW 041 215 S06	4.1	18.5	21.5	70	6		2FDRW 091 440 S10	9.1	41	44	90	10	
2FDRW 042 219 S06	4.2	18.9	21.9	70	6		2FDRW 092 444 S10	9.2	41.4	44.4	90	10	
2FDRW 043 224 S06	4.3	19.4	22.4	70	6		2FDRW 093 449 S10	9.3	41.9	44.9	90	10	
2FDRW 044 228 S06	4.4	19.8	22.8	70	6		2FDRW 094 453 S10	9.4	42.3	45.3	90	10	
2FDRW 045 233 S06	4.5	20.3	23.3	70	6		2FDRW 095 458 S10	9.5	42.8	45.8	90	10	
2FDRW 046 237 S06	4.6	20.7	23.7	70	6		2FDRW 096 462 S10	9.6	43.2	46.2	90	10	
2FDRW 047 242 S06	4.7	21.2	24.2	70	6		2FDRW 097 467 S10	9.7	43.7	46.7	90	10	
2FDRW 048 246 S06	4.8	21.6	24.6	70	6		2FDRW 098 471 S10	9.8	44.1	47.1	90	10	
2FDRW 049 251 S06	4.9	22.1	25.1	70	6		2FDRW 099 476 S10	9.9	44.6	47.6	90	10	
2FDRW 050 255 S06	5	22.5	25.5	70	6		2FDRW 100 480 S10	10	45	48	90	10	
2FDRW 051 260 S06	5.1	23	26	70	6		2FDRW 101 485 S12	10.1	45.5	48.5	100	12	
2FDRW 052 264 S06	5.2	23.4	26.4	70	6		2FDRW 102 489 S12	10.2	45.9	48.9	100	12	
2FDRW 053 269 S06	5.3	23.9	26.9	70	6		2FDRW 103 494 S12	10.3	46.4	49.4	100	12	
2FDRW 054 273 S06	5.4	24.3	27.3	70	6		2FDRW 104 498 S12	10.4	46.8	49.8	100	12	
2FDRW 055 278 S06	5.5	24.8	27.8	70	6		2FDRW 105 503 S12	10.5	47.3	50.3	100	12	
2FDRW 056 282 S06	5.6	25.2	28.2	70	6		2FDRW 106 507 S12	10.6	47.7	50.7	100	12	
2FDRW 057 287 S06	5.7	25.7	28.7	70	6		2FDRW 107 512 S12	10.7	48.2	51.2	100	12	
2FDRW 058 291 S06	5.8	26.1	29.1	70	6		2FDRW 108 516 S12	10.8	48.6	51.6	100	12	
2FDRW 059 296 S06	5.9	26.6	29.6	70	6		2FDRW 109 521 S12	10.9	49.1	52.1	100	12	
2FDRW 060 300 S06	6	27	30	70	6		2FDRW 110 525 S12	11	49.5	52.5	100	12	
2FDRW 061 305 S08	6.1	27.5	30.5	80	8		2FDRW 111 530 S12	11.1	50	53	110	12	
2FDRW 062 309 S08	6.2	27.9	30.9	80	8		2FDRW 112 534 S12	11.2	50.4	53.4	110	12	
2FDRW 063 314 S08	6.3	28.4	31.4	80	8		2FDRW 113 539 S12	11.3	50.9	53.9	110	12	
2FDRW 064 318 S08	6.4	28.8	31.8	80	8		2FDRW 114 543 S12	11.4	51.3	54.3	110	12	
2FDRW 065 323 S08	6.5	29.3	32.3	80	8		2FDRW 115 548 S12	11.5	51.8	54.8	110	12	
2FDRW 066 327 S08	6.6	29.7	32.7	80	8		2FDRW 116 552 S12	11.6	52.2	55.2	110	12	
2FDRW 067 332 S08	6.7	30.2	33.2	80	8		2FDRW 117 557 S12	11.7	52.7	55.7	110	12	
2FDRW 068 336 S08	6.8	30.6	33.6	80	8		2FDRW 118 561 S12	11.8	53.1	56.1	110	12	
2FDRW 069 341 S08	6.9	31.1	34.1	80	8		2FDRW 119 566 S12	11.9	53.6	56.6	110	12	
2FDRW 070 345 S08	7	31.5	34.5	80	8		2FDRW 120 570 S12	12	54	57	110	12	
2FDRW 071 350 S08	7.1	32	35	80	8		2FDRW 125 593 S14	12.5	56.3	59.3	120	14	
2FDRW 072 354 S08	7.2	32.4	35.4	80	8		2FDRW 130 615 S14	13	58.5	61.5	120	14	
2FDRW 073 359 S08	7.3	32.9	35.9	80	8		2FDRW 135 638 S14	13.5	60.8	63.8	120	14	
2FDRW 074 363 S08	7.4	33.3	36.3	80	8		2FDRW 140 660 S14	14	63	66	120	14	
2FDRW 075 368 S08	7.5	33.8	36.8	80	8		2FDRW 145 683 S16	14.5	65.3	68.3	130	16	
2FDRW 076 372 S08	7.6	34.2	37.2	80	8		2FDRW 150 705 S16	15	67.5	70.5	130	16	
2FDRW 077 377 S08	7.7	34.7	37.7	80	8		2FDRW 155 728 S16	15.5	69.8	72.8	130	16	
2FDRW 078 381 S08	7.8	35.1	38.1	80	8		2FDRW 160 750 S16	16	72	75	130	16	
2FDRW 079 386 S08	7.9	35.6	38.6	80	8								



- HRC50이하, 프리하드강, 합금강, 주철, 알루미늄 가공용 플랫 드릴
- 더블 마진 옆날과 절삭유 홀을 적용하여, 다양한 경사면과 곡면 드릴가공에 빠른 가공 속도를 실현합니다.
- 24~30도 헬릭스를 채택하여 칩배출 성능이 매우 우수합니다.
- 관통 드릴 작업시 버 발생을 최소화 합니다.
- TISIN-R 코팅으로 내열성과 내마모성이 우수, 긴 공구수명을 실현 하였습니다.

- Flat drill for material below HRc 50, pre-hardened steel, alloy steel, cast iron and aluminum.
- With double margin of side flute and coolant hole, high speed drilling is available to a variety of inclined and curved surfaces.
- Chip emission is great and stable drilling is available with between 24 to 30 degree helix design.
- Minimize burrs during penetration drilling.
- Increased tool life by applying TISIN-R coating with great heat and wear resistance.



381P

단위: mm

Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2FDRLW 030 231 S04	3	20.1	23.1	70	4	
2FDRLW 031 238 S04	3.1	20.8	23.8	70	4	
2FDRLW 032 244 S04	3.2	21.4	24.4	70	4	
2FDRLW 033 251 S04	3.3	22.1	25.1	70	4	
2FDRLW 034 258 S04	3.4	22.8	25.8	70	4	
2FDRLW 035 265 S04	3.5	23.5	26.5	70	4	
2FDRLW 036 271 S04	3.6	24.1	27.1	70	4	
2FDRLW 037 278 S04	3.7	24.8	27.8	70	4	
2FDRLW 038 285 S04	3.8	25.5	28.5	70	4	
2FDRLW 039 291 S04	3.9	26.1	29.1	70	4	
2FDRLW 040 298 S06	4	26.8	29.8	70	6	
2FDRLW 041 305 S06	4.1	27.5	30.5	85	6	
2FDRLW 042 311 S06	4.2	28.1	31.1	85	6	
2FDRLW 043 318 S06	4.3	28.8	31.8	85	6	
2FDRLW 044 325 S06	4.4	29.5	32.5	85	6	
2FDRLW 045 332 S06	4.5	30.2	33.2	85	6	
2FDRLW 046 338 S06	4.6	30.8	33.8	85	6	
2FDRLW 047 345 S06	4.7	31.5	34.5	85	6	
2FDRLW 048 352 S06	4.8	32.2	35.2	85	6	
2FDRLW 049 358 S06	4.9	32.8	35.8	85	6	
2FDRLW 050 365 S06	5	33.5	36.5	85	6	
2FDRLW 051 372 S06	5.1	34.2	37.2	85	6	
2FDRLW 052 378 S06	5.2	34.8	37.8	85	6	
2FDRLW 053 385 S06	5.3	35.5	38.5	85	6	
2FDRLW 054 392 S06	5.4	36.2	39.2	85	6	
2FDRLW 055 399 S06	5.5	36.9	39.9	85	6	
2FDRLW 056 405 S06	5.6	37.5	40.5	85	6	
2FDRLW 057 412 S06	5.7	38.2	41.2	85	6	
2FDRLW 058 419 S06	5.8	38.9	41.9	85	6	
2FDRLW 059 425 S06	5.9	39.5	42.5	85	6	
2FDRLW 060 432 S06	6	40.2	43.2	85	6	
2FDRLW 061 439 S08	6.1	40.9	43.9	100	8	
2FDRLW 062 445 S08	6.2	41.5	44.5	100	8	
2FDRLW 063 452 S08	6.3	42.2	45.2	100	8	
2FDRLW 064 459 S08	6.4	42.9	45.9	100	8	
2FDRLW 065 466 S08	6.5	43.6	46.6	100	8	
2FDRLW 066 472 S08	6.6	44.2	47.2	100	8	
2FDRLW 067 479 S08	6.7	44.9	47.9	100	8	
2FDRLW 068 486 S08	6.8	45.6	48.6	100	8	
2FDRLW 069 492 S08	6.9	46.2	49.2	100	8	
2FDRLW 070 499 S08	7	46.9	49.9	100	8	
2FDRLW 071 506 S08	7.1	47.6	50.6	100	8	
2FDRLW 072 512 S08	7.2	48.2	51.2	100	8	
2FDRLW 073 519 S08	7.3	48.9	51.9	100	8	
2FDRLW 074 526 S08	7.4	49.6	52.6	100	8	
2FDRLW 075 533 S08	7.5	50.3	53.3	100	8	
2FDRLW 076 539 S08	7.6	50.9	53.9	100	8	
2FDRLW 077 546 S08	7.7	51.6	54.6	100	8	
2FDRLW 078 553 S08	7.8	52.3	55.3	100	8	
2FDRLW 079 559 S08	7.9	52.9	55.9	100	8	

Order Number	날경 Diameter D	홀길이 Flute Length L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2FDRLW 080 566 S08	8	53.6	56.6	100	8	
2FDRLW 081 573 S10	8.1	54.3	57.3	110	10	
2FDRLW 082 579 S10	8.2	54.9	57.9	110	10	
2FDRLW 083 586 S10	8.3	55.6	58.6	110	10	
2FDRLW 084 593 S10	8.4	56.3	59.3	110	10	
2FDRLW 085 600 S10	8.5	57	60	110	10	
2FDRLW 086 606 S10	8.6	57.6	60.6	110	10	
2FDRLW 087 613 S10	8.7	58.3	61.3	110	10	
2FDRLW 088 620 S10	8.8	59	62	110	10	
2FDRLW 089 626 S10	8.9	59.6	62.6	110	10	
2FDRLW 090 633 S10	9	60.3	63.3	110	10	
2FDRLW 091 640 S10	9.1	61	64	110	10	
2FDRLW 092 646 S10	9.2	61.6	64.6	110	10	
2FDRLW 093 653 S10	9.3	62.3	65.3	110	10	
2FDRLW 094 660 S10	9.4	63	66	110	10	
2FDRLW 095 667 S10	9.5	63.7	66.7	110	10	
2FDRLW 096 673 S10	9.6	64.3	67.3	110	10	
2FDRLW 097 680 S10	9.7	65	68	110	10	
2FDRLW 098 687 S10	9.8	65.7	68.7	110	10	
2FDRLW 099 693 S10	9.9	66.3	69.3	110	10	
2FDRLW 100 700 S10	10	67	70	110	10	
2FDRLW 101 707 S12	10.1	67.7	70.7	125	12	
2FDRLW 102 713 S12	10.2	68.3	71.3	125	12	
2FDRLW 103 720 S12	10.3	69	72	125	12	
2FDRLW 104 727 S12	10.4	69.7	72.7	125	12	
2FDRLW 105 734 S12	10.5	70.4	73.4	125	12	
2FDRLW 106 740 S12	10.6	71	74	125	12	
2FDRLW 107 747 S12	10.7	71.7	74.7	125	12	
2FDRLW 108 754 S12	10.8	72.4	75.4	125	12	
2FDRLW 109 760 S12	10.9	73	76	125	12	
2FDRLW 110 767 S12	11	73.7	76.7	125	12	
2FDRLW 111 774 S12	11.1	74.4	77.4	135	12	
2FDRLW 112 780 S12	11.2	75	78	135	12	
2FDRLW 113 787 S12	11.3	75.7	78.7	135	12	
2FDRLW 114 794 S12	11.4	76.4	79.4	135	12	
2FDRLW 115 801 S12	11.5	77.1	80.1	135	12	
2FDRLW 116 807 S12	11.6	77.7	80.7	135	12	
2FDRLW 117 814 S12	11.7	78.4	81.4	135	12	
2FDRLW 118 821 S12	11.8	79.1	82.1	135	12	
2FDRLW 119 827 S12	11.9	79.7	82.7	135	12	
2FDRLW 120 834 S12	12	80.4	83.4	135	12	
2FDRLW 125 868 S14	12.5	83.8	86.8	140	14	
2FDRLW 130 901 S14	13	87.1	90.1	140	14	
2FDRLW 135 935 S14	13.5	90.5	93.5	140	14	
2FDRLW 140 968 S14	14	93.8	96.8	140	14	
2FDRLW 145 1002 S16	14.5	97.2	100.2	160	16	
2FDRLW 150 1035 S16	15	100.5	103.5	160	16	
2FDRLW 155 1069 S16	15.5	103.9	106.9	160	16	
2FDRLW 160 1102 S16	16	107.2	110.2	160	16	