





4 Flutes Helix Long Thread Mill For Generaly

4날 범용 헬릭스 긴 길이 쓰레드밀



American UN

단위 Unit: mm

Order Number	파치규격 Thread			Pitch (TPI)	날수 Flutes Z	산수 Teeth Zt	날경 Diameter D	나사부 길이 Thread Length L1	전장 Overall Length L	샙크 Shank Dia d
	UNC	UNF	UNEF							

외부급유형 (Without coolant)

4LTM 0255 060 S04	No.4, No.5	No.6		40	4	9	2.55	6	45	4
4LTM 0255 079 S04	No.4, No.5	No.6		40	4	12	2.55	7.9	45	4
4LTM 021 075 S04	No.6, No.8	No.10	No.12	32	4	9	2.1	7.5	45	4
4LTM 021 099 S04	No.6, No.8	No.10	No.12	32	4	12	2.1	9.9	45	4
4LTM 033 088 S04		No.8		36	4	12	3.3	8.8	45	4
4LTM 033 109 S04		No.8		36	4	15	3.3	10.9	45	4
4LTM 0358 099 S04	No.10, No.12	5/16 ~		24	4	9	3.58	9.9	45	4
4LTM 0358 131 S04	No.10, No.12	5/16 ~		24	4	12	3.58	13.1	45	4
4LTM 038 099 S04		No.10	No.12, 5/16 ~	32	4	12	3.8	9.9	45	4
4LTM 038 130 S04		No.10	No.12, 5/16 ~	32	4	16	3.8	13	45	4
4LTM 0415 110 S06	No.12	5/16 ~, 3/8 ~		24	4	10	4.15	11	60	6
4LTM 0415 152 S06	No.12	5/16 ~, 3/8 ~		24	4	14	4.15	15.2	60	6
4LTM 043 112 S06		No.12, 1/4 ~	7/16 ~	28	4	12	4.3	11.2	60	6
4LTM 043 149 S06		No.12, 1/4 ~	7/16 ~	28	4	16	4.3	14.9	60	6
4LTM 044 114 S06			No.12, 1/4 ~, 5/16 ~	32	4	14	4.4	11.4	60	6
4LTM 044 154 S06			No.12, 1/4 ~, 5/16 ~	32	4	19	4.4	15.4	60	6
4LTM 0488 132 S06	1/4 ~	7/16 ~, 1/2 ~		20	4	10	4.88	13.2	60	6
4LTM 0488 170 S06	1/4 ~	7/16 ~, 1/2 ~		20	4	13	4.88	17	60	6
4LTM 0515 131 S06		1/4 ~	7/16 ~, 1/2 ~	28	4	14	5.15	13.1	60	6
4LTM 0515 167 S06		1/4 ~	7/16 ~, 1/2 ~	28	4	18	5.15	16.7	60	6
4LTM 0615 160 S08	5/16 ~	9/16 ~, 5/8 ~		18	4	11	6.15	16	65	8
4LTM 0615 217 S08	5/16 ~	9/16 ~, 5/8 ~		18	4	15	6.15	21.7	75	8
4LTM 0668 163 S08		5/16 ~, 3/8 ~	9/16 ~	24	4	15	6.68	16.3	65	8
4LTM 0668 205 S08		5/16 ~, 3/8 ~	9/16 ~	24	4	19	6.68	20.5	75	8
4LTM 0765 196 S08	3/8 ~	3/4 ~		16	4	12	7.65	19.6	65	8
4LTM 0765 244 S08	3/8 ~	3/4 ~		16	4	15	7.65	24.4	75	8
4LTM 082 195 S10		3/8 ~	9/16 ~, 5/8 ~	24	4	18	8.2	19.5	75	10
4LTM 082 247 S10		3/8 ~	9/16 ~, 5/8 ~	24	4	23	8.2	24.7	80	10
4LTM 090 224 S10	7/16 ~	7/8 ~		14	4	12	9	22.4	75	10
4LTM 090 297 S10	7/16 ~	7/8 ~		14	4	16	9	29.7	80	10
4LTM 096 221 S10		7/16 ~, 1/2 ~	3/4 ~	20	4	17	9.6	22.1	75	10
4LTM 096 284 S10		7/16 ~, 1/2 ~	3/4 ~	20	4	22	9.6	28.4	80	10
4LTM 099 221 S10			7/16 ~, 1/2 ~	28	4	24	9.9	22.1	75	10
4LTM 099 285 S10			7/16 ~, 1/2 ~	28	4	31	9.9	28.5	80	10
4LTM 1035 261 S12	1/2 ~			13	4	13	10.35	26.1	80	12
4LTM 1035 339 S12	1/2 ~			13	4	17	10.35	33.9	90	12
4LTM 111 259 S12		1/2 ~	3/4 ~, 13/16 ~	20	4	20	11.1	25.9	80	12
4LTM 111 322 S12		1/2 ~	3/4 ~, 13/16 ~	20	4	25	11.1	32.2	90	12
4LTM 118 283 S12	9/16 ~	1 ~, 1-1/8 ~		12	4	13	11.8	28.3	80	12
4LTM 118 367 S12	9/16 ~	1 ~, 1-1/8 ~		12	4	17	11.8	36.7	90	12
4LTM 125 287 S14		9/16 ~, 5/8 ~	11/16 ~	18	4	20	12.5	28.7	95	14
4LTM 125 372 S14		9/16 ~, 5/8 ~	11/16 ~	18	4	26	12.5	37.2	100	14
4LTM 129 290 S14			9/16 ~, 5/8 ~, 11/16 ~	24	4	27	12.9	29	95	14
4LTM 129 364 S14			9/16 ~, 5/8 ~, 11/16 ~	24	4	34	12.9	36.4	100	14
4LTM 131 331 S14	5/8 ~			11	4	14	13.1	33.1	95	14
4LTM 131 424 S14	5/8 ~			11	4	18	13.1	42.4	105	14
4LTM 141 316 S16		5/8 ~	11/16 ~, 1-1/8 ~	18	4	22	14.1	31.6	95	16
4LTM 141 414 S16		5/8 ~	11/16 ~, 1-1/8 ~	18	4	29	14.1	41.4	105	16
4LTM 159 390 S16	3/4 ~			10	4	15	15.9	39	100	16
4LTM 159 491 S16	3/4 ~			10	4	19	15.9	49.1	110	16
4LTM 160 387 S16		3/4 ~		16	4	24	16	38.7	105	16
4LTM 160 482 S16		3/4 ~		16	4	30	16	48.2	115	16
4LTM 160 386 S16			3/4 ~, 13/16 ~, 7/8 ~	20	4	30	16	38.6	105	16
4LTM 160 487 S16			3/4 ~, 13/16 ~, 7/8 ~	20	4	38	16	48.7	115	16
4LTM 160 461 S16	7/8 ~			9	4	16	16	46.1	110	16
4LTM 160 442 S16		7/8 ~		14	4	24	16	44.2	110	16
4LTM 160 519 S16	1 ~			8	4	16	16	51.9	120	16
4LTM 160 515 S16		1 ~, 1-1/8 ~, 1-1/2 ~		12	4	24	16	51.5	120	16

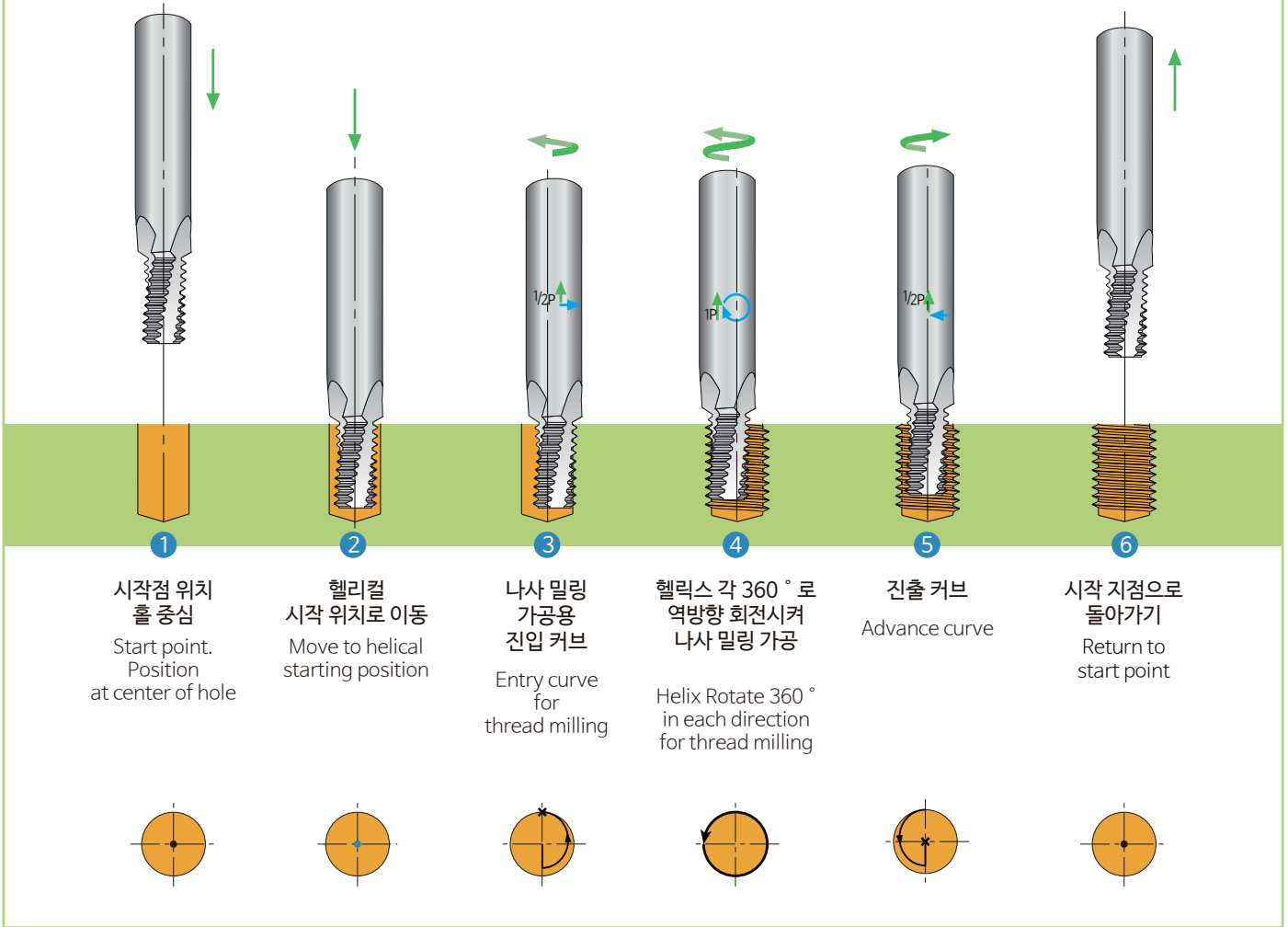


American UN

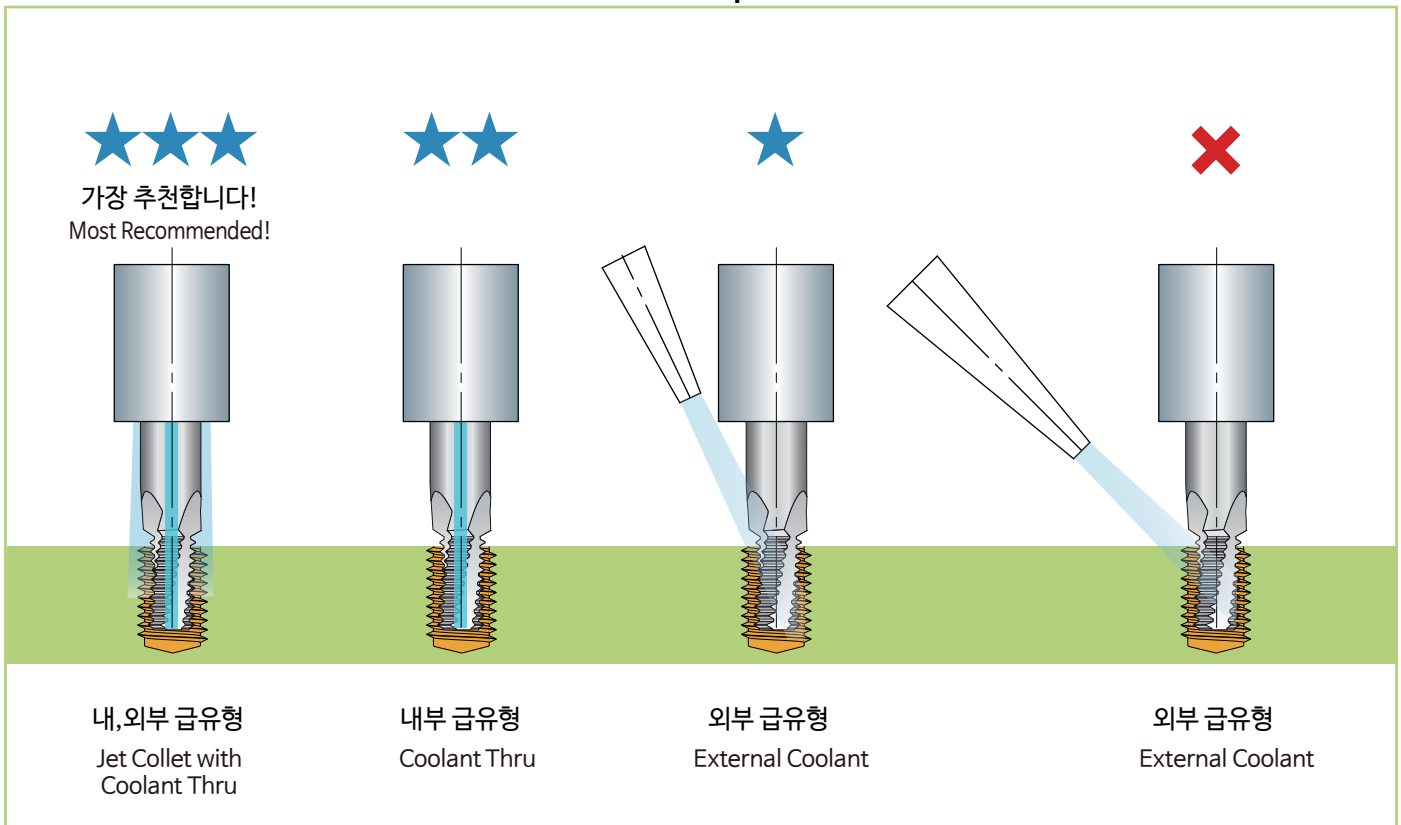
단위 Unit: mm

Order Number	피치규격 Thread			Pitch (TPI)	날수 Flutes Z	산수 Teeth Zt	날경 Diameter D	나사부 길이 Thread Length L1	전장 Overall Length L	샹크 Shank Dia d
	UNC	UNF	UNEF							
<b>내부 급유형 (With coolant)</b>										
4LTM 0358 099 S04C	No.10, No.12	5/16 ~		24	4	9	3.58	9.9	45	4
4LTM 0358 131 S04C	No.10, No.12	5/16 ~		24	4	12	3.58	13.1	45	4
4LTM 038 099 S04C		No.10	No.12, 5/16 ~	32	4	12	3.8	9.9	45	4
4LTM 038 130 S04C		No.10	No.12, 5/16 ~	32	4	16	3.8	13	45	4
4LTM 0415 110 S06C	No.12	5/16 ~, 3/8 ~		24	4	10	4.15	11	60	6
4LTM 0415 152 S06C	No.12	5/16 ~, 3/8 ~		24	4	14	4.15	15.2	60	6
4LTM 043 112 S06C		No.12, 1/4 ~	7/16 ~	28	4	12	4.3	11.2	60	6
4LTM 043 149 S06C		No.12, 1/4 ~	7/16 ~	28	4	16	4.3	14.9	60	6
4LTM 044 114 S06C			No.12, 1/4 ~, 5/16 ~	32	4	14	4.4	11.4	60	6
4LTM 044 154 S06C			No.12, 1/4 ~, 5/16 ~	32	4	19	4.4	15.4	60	6
4LTM 0488 132 S06C	1/4 ~	7/16 ~, 1/2 ~		20	4	10	4.88	13.2	60	6
4LTM 0488 170 S06C	1/4 ~	7/16 ~, 1/2 ~		20	4	13	4.88	17	60	6
4LTM 0515 131 S06C		1/4 ~	7/16 ~, 1/2 ~	28	4	14	5.15	13.1	60	6
4LTM 0515 167 S06C		1/4 ~	7/16 ~, 1/2 ~	28	4	18	5.15	16.7	60	6
4LTM 0615 160 S08C	5/16 ~	9/16 ~, 5/8 ~		18	4	11	6.15	16	65	8
4LTM 0615 217 S08C	5/16 ~	9/16 ~, 5/8 ~		18	4	15	6.15	21.7	75	8
4LTM 0668 163 S08C		5/16 ~, 3/8 ~	9/16 ~	24	4	15	6.68	16.3	65	8
4LTM 0668 205 S08C		5/16 ~, 3/8 ~	9/16 ~	24	4	19	6.68	20.5	75	8
4LTM 0765 196 S08C	3/8 ~	3/4 ~		16	4	12	7.65	19.6	65	8
4LTM 0765 244 S08C	3/8 ~	3/4 ~		16	4	15	7.65	24.4	75	8
4LTM 082 195 S10C		3/8 ~	9/16 ~, 5/8 ~	24	4	18	8.2	19.5	75	10
4LTM 082 247 S10C		3/8 ~	9/16 ~, 5/8 ~	24	4	23	8.2	24.7	80	10
4LTM 090 224 S10C	7/16 ~	7/8 ~		14	4	12	9	22.4	75	10
4LTM 090 297 S10C	7/16 ~	7/8 ~		14	4	16	9	29.7	80	10
4LTM 096 221 S10C		7/16 ~, 1/2 ~	3/4 ~	20	4	17	9.6	22.1	75	10
4LTM 096 284 S10C		7/16 ~, 1/2 ~	3/4 ~	20	4	22	9.6	28.4	80	10
4LTM 099 221 S10C			7/16 ~, 1/2 ~	28	4	24	9.9	22.1	75	10
4LTM 099 285 S10C			7/16 ~, 1/2 ~	28	4	31	9.9	28.5	80	10
4LTM 1035 261 S12C	1/2 ~			13	4	13	10.35	26.1	80	12
4LTM 1035 339 S12C	1/2 ~			13	4	17	10.35	33.9	90	12
4LTM 111 259 S12C		1/2 ~	3/4 ~, 13/16 ~	20	4	20	11.1	25.9	80	12
4LTM 111 322 S12C		1/2 ~	3/4 ~, 13/16 ~	20	4	25	11.1	32.2	90	12
4LTM 118 283 S12C	9/16 ~	1 ~, 1-1/8 ~		12	4	13	11.8	28.3	80	12
4LTM 118 367 S12C	9/16 ~	1 ~, 1-1/8 ~		12	4	17	11.8	36.7	90	12
4LTM 125 287 S14C		9/16 ~, 5/8 ~	11/16 ~	18	4	20	12.5	28.7	95	14
4LTM 125 372 S14C		9/16 ~, 5/8 ~	11/16 ~	18	4	26	12.5	37.2	100	14
4LTM 129 290 S14C			9/16 ~, 5/8 ~, 11/16 ~	24	4	27	12.9	29	95	14
4LTM 129 364 S14C			9/16 ~, 5/8 ~, 11/16 ~	24	4	34	12.9	36.4	100	14
4LTM 131 331 S14C	5/8 ~			11	4	14	13.1	33.1	95	14
4LTM 131 424 S14C	5/8 ~			11	4	18	13.1	42.4	105	14
4LTM 141 316 S16C		5/8 ~	11/16 ~, 1-1/8 ~	18	4	22	14.1	31.6	95	16
4LTM 141 414 S16C		5/8 ~	11/16 ~, 1-1/8 ~	18	4	29	14.1	41.4	105	16
4LTM 159 390 S16C	3/4 ~			10	4	15	15.9	39	100	16
4LTM 159 491 S16C	3/4 ~			10	4	19	15.9	49.1	110	16
4LTM 160 387 S16C		3/4 ~		16	4	24	16	38.7	105	16
4LTM 160 482 S16C		3/4 ~		16	4	30	16	48.2	115	16
4LTM 160 386 S16C			3/4 ~, 13/16 ~, 7/8 ~	20	4	30	16	38.6	105	16
4LTM 160 487 S16C			3/4 ~, 13/16 ~, 7/8 ~	20	4	38	16	48.7	115	16
4LTM 160 461 S16C	7/8 ~			9	4	16	16	46.1	110	16
4LTM 160 442 S16C		7/8 ~		14	4	24	16	44.2	110	16
4LTM 160 519 S16C	1 ~			8	4	16	16	51.9	120	16
4LTM 160 515 S16C		1 ~, 1-1/8 ~, 1-1/2 ~		12	4	24	16	51.5	120	16

## 동작주기 Operating Cycle



## 최적의 칩 배출을 위한 냉각수 사용 Coolant Use for Chip Evacuation



# 나사직경 규격안내

헬리코일 타입 사용을 위한 나사의 직경 Thread diameter to use heli coil type.

## 유니파이 계열 나사직경(와이어 프레임)\_ UNC

SIZE	T.P.I	B inch MAJ DIA	mm 환산시
NO. 2	56	0.1092	2.7737
NO. 3	48	0.1261	3.2029
NO. 4	40	0.1445	3.6703
NO. 5	40	0.1575	4.0005
NO. 6	32	0.1786	4.5364
NO. 8	32	0.2046	5.1968
NO. 10	24	0.2441	6.2001
NO. 12	24	0.2701	6.8605
1/4	20	0.315	8.001
5/16	18	0.3847	9.7714
3/8	16	0.4562	11.5875
7/16	14	0.5303	13.4696
1/2	13	0.5999	15.2375
9/16	12	0.6708	17.0383
5/8	11	0.7431	18.8747
3/4	10	0.8799	22.3495
7/8	9	1.0193	25.8902
1	8	1.1624	29.525
1 1/8	7	1.3106	33.2892
1 1/4	7	1.4356	36.4642
1 3/8	6	1.5914	40.4216
1 1/2	6	1.7164	43.5966

## 유니파이 계열 나사직경(와이어 프레임)\_ UNF

SIZE	T.P.I	B inch MAJ DIA	mm 환산시
NO. 3	56	0.1092	2.7737
NO. 4	48	0.1261	3.2029
NO. 5	44	0.1445	3.6703
NO. 6	40	0.1575	4.0005
NO. 8	36	0.1786	4.5364
NO. 10	32	0.2046	5.1968
1/4	28	0.2441	6.2001
5/16	24	0.2701	6.8605
3/8	24	0.315	8.001
7/16	20	0.3847	9.7714
1/2	20	0.4562	11.5875
9/16	18	0.5303	13.4696
5/8	18	0.5999	15.2375
3/4	16	0.6708	17.0383
7/8	14	0.7431	18.8747
1	12	0.8799	22.3495
1 1/8	12	1.0193	25.8902
1 1/4	12	1.1624	29.525
1 3/8	12	1.3106	33.2892
1 1/2	12	1.4356	36.4642

## 밀리미터(mm) 계열 나사직경(와이어 프레임)

SIZE	C MM
M2 x 0.4	2.520
M2.2 x 0.45	2.785
M2.5 x 0.45	3.085
M3 x 0.5	3.650
M3.5 x 0.6	4.279
M4 x 0.7	4.909
M5 x 0.8	6.039
M6 x 1.0	7.299
M7 x 1.0	8.299
M8 x 1.0	9.299
M8 x 1.25	9.624
M9 x 1.25	10.624
M10 x 1.25	11.624
M10 x 1.5	11.949
M11 x 1.5	12.949
M12 x 1.25	13.624
M12 x 1.5	14.131
M12 x 1.75	14.273
M14 x 1.5	15.949
M14 x 2.0	16.598
M16 x 1.5	17.949
M16 x 2.0	18.598
M18 x 1.5	19.949
M18 x 2.0	20.598
M18 x 2.5	21.248
M20 x 1.5	21.949
M20 x 2.0	22.598
M20 x 2.5	23.248
M22 x 1.5	23.949
M22 x 2.0	24.598
M22 x 2.5	25.248
M24 x 2.0	26.598
M24 x 3.0	27.897
M27 x 3.0	30.897
M30 x 3.5	34.547
M33 x 3.5	37.547
M36 x 4.0	41.196

## 4HTM

피삭재 Work Material	알루미늄 Aluminum		스테인레스강 Stainless Steel		합금강/ 공구강 Alloy Steel/ Tool Steel		고경도강 Hardened Steels	
경도 Hardness					~ 35 HRC		35 ~ 48 HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
∅2 ~ ∅3	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02	50 ~ 70	0.01 ~ 0.02	45 ~ 55	0.005 ~ 0.008
∅3 ~ ∅4		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.005 ~ 0.008
∅4 ~ ∅5		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.01 ~ 0.02
∅6 ~ ∅7		0.04 ~ 0.05		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02
∅7 ~ ∅8		0.04 ~ 0.05		0.02 ~ 0.03		0.02 ~ 0.03		0.02 ~ 0.03
∅8 ~ ∅9		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03
∅10 ~ ∅12		0.06 ~ 0.07		0.05 ~ 0.06		0.02 ~ 0.03		0.02 ~ 0.03
∅12 ~ ∅14		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04

## 4LTM

피삭재 Work Material	알루미늄 Aluminum		스테인레스강 Stainless Steel		합금강/ 공구강 Alloy Steel/ Tool Steel		고경도강 Hardened Steels	
경도 Hardness					~ 35 HRC		35 ~ 48 HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
∅2 ~ ∅3	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02	50 ~ 70	0.01 ~ 0.02	45 ~ 55	0.005 ~ 0.008
∅3 ~ ∅4		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.005 ~ 0.008
∅4 ~ ∅5		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.01 ~ 0.02
∅6 ~ ∅8		0.04 ~ 0.05		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02
∅8 ~ ∅10		0.04 ~ 0.05		0.02 ~ 0.03		0.02 ~ 0.03		0.02 ~ 0.03
∅10 ~ ∅12		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03
∅12 ~ ∅14		0.06 ~ 0.07		0.05 ~ 0.06		0.02 ~ 0.03		0.02 ~ 0.03
∅14 ~ ∅16		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04

## 4NKTM

피삭재 Work Material	알루미늄 Aluminum		스테인레스강 Stainless Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
경도 Hardness					30 ~ 40 HRC		40 ~ 62 HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02	60 ~ 70	0.01 ~ 0.02	50 ~ 60	0.008 ~ 0.01
M4		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.008 ~ 0.01
M5		0.03 ~ 0.04		0.01 ~ 0.02		0.01 ~ 0.02		0.01 ~ 0.02
M6		0.04 ~ 0.05		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02
M8		0.04 ~ 0.05		0.02 ~ 0.03		0.02 ~ 0.03		0.02 ~ 0.03
M10		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03
M12		0.06 ~ 0.07		0.05 ~ 0.06		0.02 ~ 0.03		0.02 ~ 0.03
M16		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04
M20		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04

## 4BSP(T)

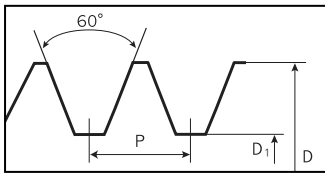
피삭재 Work Material	알루미늄 Aluminum		스테인레스강 Stainless Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
경도 Hardness					30 ~ 45 HRC		45 ~ 58 HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
∅6 ~ ∅8	100 ~ 130	0.05 ~ 0.06	70 ~ 85	0.03 ~ 0.04	60 ~ 70	0.02 ~ 0.03	50 ~ 60	0.02 ~ 0.03
∅8 ~ ∅10		0.06 ~ 0.07		0.05 ~ 0.06		0.02 ~ 0.03		0.02 ~ 0.03
∅10 ~ ∅12		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04
∅12 ~ ∅16		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04

- 파지력이 좋은 열박음 척 사용을 추천 합니다.
- 떨림방지를 위한 부등분할 설계로, 공구 진입 시 f1 (mm/tooth) 기준으로 나사가공 이송대비 50% 수준으로 낮춰 주십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 절삭시 내,외부 급유형 콜러트 사용을 추천합니다.
- Using shrink-fit chuck with great holding power is recommended.
- When the tool approaches the work material, reduce the feed by 50%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Internal and external coolants are recommended for milling.

# 나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링

## 나사의 종류 및 기호

나사의 종류		기호	나사산 각도	규격	
미터 나사	보통 나사	M	60°	JIS B 0205	
	가는 나사			JIS B 0207	
항공 우주용 미터 나사	보통 나사	MJ	60°	ISO 5855	
	가는 나사			JIS B 0206	
유니파이 나사	보통 나사	UNC	60°	ANSI B1.1	JIS B 0208
	가는 나사	UNF			
	아주 가는 나사	UNEF			
	특수 나사	UNS			
항공 우주용 인치 나사	보통 나사	UNJC	60°	MIL-S-8879	
	가는 나사	UNJF			
	아주 가는 나사	UNJEF			
	특수 나사	UNJ			
관용 테이퍼 나사	미국식 관용 테이퍼 나사	NPT	60°	ANSI/ASEM B1.20.1	
	미국식 드라이셸 관용 테이퍼 나사	NPTF		ANSI B1.20.3	
	영국식 관용 테이퍼 나사	PT(Rc)	55°	JIS B 0203	
관용 평행 나사	기계 결합용 관용 평행 나사	PF(G)	55°	JIS B 0202	
	내밀 용 관용 평행 나사	PS(Rp)		JIS B 0203	
영국 워트워스 나사	보통나사	BSW	55°	BS 84	



## M, UNC, UNF, UNEF 도면

**M** 미터법 ISO 미세 나사산  
DIN 13 및 DIN ISO 965-1

D		D <sub>1</sub>		
직경 Diameter	피치 Pitch	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
1	0.25	0.729	0.785	0.75
1.1	0.25	0.829	0.885	0.85
1.2	0.25	0.929	0.985	0.95
1.4	0.3	1.075	1.142	1.1
1.6	0.35	1.221	1.321	1.25
1.7	0.35	1.321	1.421	1.35
1.8	0.35	1.421	1.521	1.45
2	0.25	1.729	1.785	1.75
2	0.4	1.567	1.679	1.6
2.2	0.25	1.929	1.985	1.95
2.2	0.45	1.713	1.838	1.75
2.3	0.25	2.029	2.085	2.05
2.3	0.4	1.813	1.938	1.85
2.5	0.35	2.121	2.221	2.15
2.5	0.45	2.013	2.138	2.05
2.6	0.45	2.113	2.238	2.15
3	0.25	2.729	2.785	2.75
3	0.35	2.621	2.721	2.65
3	0.5	2.459	2.599	2.5
3.5	0.35	3.121	3.221	3.15
3.5	0.6	2.85	3.01	2.9
4	0.35	3.621	3.721	3.65
4	0.5	3.459	3.599	3.5
4	0.7	3.242	3.422	3.3
4.5	0.5	3.959	4.099	4
4.5	0.75	3.688	3.878	3.7
5	0.35	4.621	4.721	4.65
5	0.5	4.459	4.599	4.5
5	0.75	4.188	4.378	4.2
5	0.8	4.134	4.334	4.2

D		D <sub>1</sub>		
직경 Diameter	피치 Pitch	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
6	0.5	5.459	5.599	5.5
6	0.75	5.188	5.378	5.25
6	1	4.917	5.153	5
7	0.5	6.459	6.599	6.5
7	0.75	6.188	6.378	6.25
7	1	5.917	6.153	6
8	0.5	7.459	7.599	7.5
8	0.75	7.188	7.378	7.25
8	1	6.917	7.153	7
8	1.25	6.647	6.912	6.8
9	0.75	8.188	8.378	8.25
9	1	7.917	8.153	8
9	1.25	7.647	7.912	7.8
10	0.5	9.459	9.599	9.5
10	0.75	9.188	9.378	9.25
10	1	8.917	9.153	9
10	1.25	8.647	8.912	8.75
10	1.5	8.376	8.676	8.5
11	1	9.917	10.153	10
11	1.5	9.376	9.676	9.5
12	0.5	11.459	11.599	11.5
12	1	10.917	11.153	11
12	1.25	10.647	10.912	10.75
12	1.5	10.376	10.676	10.5
12	1.75	10.106	10.441	10.2
13	1	11.917	12.153	12
14	0.75	13.188	13.378	13.2
14	1	12.917	13.153	13
14	1.25	12.647	12.912	12.75
14	1.5	12.376	12.676	12.5



## 나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링

**M** 미터법 ISO 미세 나사산  
DIN 13 및 DIN ISO 965-1

D		D <sub>1</sub>		
직경 Diameter	피치 Pitch	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
14	2	11.835	12.21	12
15	1	13.917	14.153	14
15	1.5	13.376	13.676	13.5
16	0.75	15.188	15.378	15.2
16	1	14.917	15.153	15
16	1.25	14.647	14.912	14.8
16	1.5	14.376	14.676	14.5
16	2	13.835	14.21	14
17	1	15.917	16.153	16
18	1	16.917	17.153	17
18	1.5	16.376	16.676	16.5
18	2	15.835	16.21	16
18	2.5	15.294	15.744	15.5
20	1	18.917	19.153	19
20	1.5	18.376	18.676	18.5
20	2	17.835	18.21	18
20	2.5	17.294	17.744	17.5
22	1	20.917	21.153	21
22	1.5	20.376	20.676	20.5
22	2	19.835	20.21	20
22	2.5	19.294	19.744	19.5
24	1.5	22.376	22.676	22.5
24	2	21.835	22.21	22
24	3	20.752	21.252	21
25	1	22.917	23.153	23
25	1.5	23.376	23.676	23.5
26	1.5	24.376	24.676	24.5
27	1	25.917	26.153	26
27	1.5	25.376	25.676	25.5
27	2	24.835	25.21	25
27	3	23.752	24.252	24
28	1.5	26.376	26.676	26.5
28	2	25.835	26.21	26
30	1	28.917	29.153	29
30	1.5	28.376	28.676	28.5
30	2	27.835	28.21	28
30	3.5	26.211	26.771	26.5
32	1.5	30.376	30.676	30.5
32	2	29.835	30.21	30
33	1.5	31.376	31.676	31.5
33	2	30.835	31.21	31
33	3.5	29.211	29.771	29.5
34	1.5	32.376	32.676	32.5
35	1.5	33.376	33.676	33.5
36	1.5	34.376	34.676	34.5
36	2	33.835	34.21	34
36	3	32.752	33.252	33
36	4	31.67	32.27	32
38	1.5	36.376	36.676	36.5
39	1.5	37.376	37.676	37.5
39	2	36.835	37.21	37
39	3	35.752	36.252	36
39	4	34.67	35.27	35
40	1.5	38.376	38.676	38.5
40	2	37.835	38.21	38
40	3	36.752	37.252	37
42	1.5	40.376	40.676	40.5
42	2	39.835	40.21	40
42	3	38.752	37.252	39
42	4.5	37.129	37.799	37.5
45	1.5	43.376	40.676	43.5
45	2	42.835	40.21	43
45	3	41.752	42.252	42
45	4.5	40.129	40.799	40.5

D		D <sub>1</sub>		
직경 Diameter	피치 Pitch	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
48	1.5	46.376	46.676	46.5
48	2	45.835	46.21	46
48	3	44.752	45.252	45
48	5	42.587	43.297	43
50	1.5	48.376	48.676	48.5
50	2	47.835	48.21	48
50	3	46.752	47.252	47
52	1.5	50.376	50.676	50.5
52	2	49.835	50.21	50
52	3	46.587	47.087	49
52	5	46.587	47.297	47
56	1.5	54.376	54.676	54.5
56	2	53.835	54.21	54
56	3	52.752	53.252	53
56	5.5	50.046	50.796	50.5
58	1.5	56.376	56.676	56.5
60	1.5	58.376	58.676	58.5
60	2	57.835	58.21	58
60	3	56.752	57.252	57
60	5.5	54.046	54.796	54.5
64	6	57.505	58.305	58
68	6	62.505	62.305	62

**UNC** ASME B1.1에 따른  
보통 나사산

D	D <sub>1</sub>		
직경 Diameter	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
1-64 UNC	1.425	1.582	1.55
2-56 UNC	1.694	1.872	1.85
3-48 UNC	1.941	2.146	2.10
4-40 UNC	2.156	2.385	2.35
5-40 UNC	2.487	2.697	2.65
6-32 UNC	2.642	2.896	2.85
8-32 UNC	3.302	3.531	3.50
10-24 UNC	3.683	3.962	3.90
12-24 UNC	4.343	4.597	4.50
1/4-20 UNC	4.976	5.268	5.10
5/16-18 UNC	6.411	6.734	6.60
3/8-16 UNC	7.805	8.164	8.00
7/16-14 UNC	9.149	9.550	9.40
1/2-13 UNC	10.584	11.013	10.80
9/16-12 UNC	11.996	12.456	12.20
5/8-11 UNC	13.376	13.868	13.50
3/4-10 UNC	16.299	16.833	16.50
7/8-9 UNC	19.169	19.748	19.50
1-8 UNC	21.963	22.598	22.25
1 1/8-7 UNC	24.648	25.348	25.00
1 1/4-7 UNC	27.823	28.524	28.00
1 1/2-6 UNC	33.518	34.295	34.00
1 3/4-5 UNC	38.951	39.814	39.50
2-4.5 UNC	44.689	45.598	45.00



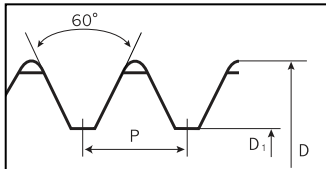
## 나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링

### UNF ASME B1.1에 따른 미세 나사산

D 직경 Diameter	D <sub>1</sub>		
	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
0-80 UNF	1.181	1.306	1.25
1-72 UNF	1.473	1.613	1.55
2-64 UNF	1.755	1.913	1.85
3-56 UNF	2.024	2.197	2.15
4-48 UNF	2.271	2.459	2.40
5-44 UNF	2.550	2.741	2.70
6-40 UNF	2.819	3.023	2.95
8-36 UNF	3.404	3.607	3.50
10-32 UNF	3.962	4.166	4.10
12-28 UNF	4.496	4.724	4.60
1/4-28 UNF	5.367	5.580	5.50
5/16-24 UNF	6.792	7.038	6.90
3/8-24 UNF	8.379	8.626	8.50
7/16-20 UNF	9.738	10.030	9.90
1/2-20 UNF	11.326	11.618	11.50
9/16-18 UNF	12.761	13.084	12.90
5/8-18 UNF	14.348	14.671	14.50
3/4-16 UNF	17.330	17.689	17.50
7/8-14 UNF	20.262	20.663	20.40
1-12 UNF	23.109	23.569	23.25
1 1/8-12 UNF	26.284	26.744	26.50
1 1/4-12 UNF	29.459	29.919	29.50
1 3/8-12 UNF	32.634	33.094	33.00
1 1/2-12 UNF	35.809	36.269	36.10

### UNEF

D 직경 Diameter	D <sub>1</sub>		
	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
No.12-32 UNEF	4.826	4.623	4.70
1/4-32 UNEF	5.689	5.487	5.60
5/16-32	7.264	7.087	7.10
3/8-32	8.864	8.662	8.70
7/16-28	10.337	10.135	10.20
1/2-28	11.938	11.710	11.80
9/16-24	13.385	13.132	13.20
5/8-24	14.986	14.732	14.80
3/4-20	17.957	17.679	17.80
7/8-20	21.132	20.854	21.00
1-20	24.307	24.029	24.10
1 1/8-18	27.381	27.051	27.20
1 1/4-18	30.556	30.226	30.30
1 3/8-18	33.731	33.401	33.50
1 1/2-18	36.906	36.576	36.70
1 5/8-18	40.081	39.751	39.80



MJ, UNJC, UNJF 도면

### MJ DIN ISO 5855에 따른 표준 나사산

D 직경 Diameter	피치 Pitch	D <sub>1</sub>		
		min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
MJ3	0.5	2.513	2.653	2.6
MJ4	0.7	3.318	3.498	3.4
MJ5	0.8	4.221	4.421	4.3
MJ6	1	5.026	5.215	5.1
MJ8	1.25	6.782	6.994	6.9
MJ10	1.5	8.539	8.779	8.7
MJ12	1.75	10.295	10.563	10.5
MJ16	2	14.051	14.351	14.3

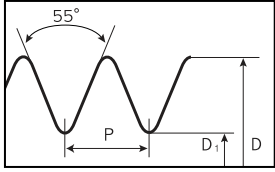
### UNJC ASME B1.15 및 ISO 3161에 따른 보통 나사산

D 직경 Diameter	D <sub>1</sub>		
	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
1-64 UNJC	1.467	1.570	1.50
2-56 UNJC	1.742	1.860	1.80
3-48 UNJC	1.999	2.137	2.05
4-40 UNJC	2.226	2.391	2.30
5-40 UNJC	2.556	2.721	2.65
6-32 UNJC	2.732	2.938	2.80
8-32 UNJC	3.393	3.599	3.50
10-24 UNJC	3.795	4.064	3.90
12-24 UNJC	4.455	4.704	4.60
1/4-20 UNJC	5.113	5.387	5.20
5/16-18 UNJC	6.563	6.833	6.70
3/8-16 UNJC	7.978	8.255	8.10
7/16-14 UNJC	9.344	9.637	9.50
1/2-13 UNJC	10.796	11.093	10.90
9/16-12 UNJC	12.226	12.480	12.30
5/8-11 UNJC	13.625	13.902	13.70
3/4-10 UNJC	16.575	16.880	16.75

### UNJF ASME B1.15 및 ISO 3161에 따른 미세 나사산

D 직경 Diameter	D <sub>1</sub>		
	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
0-80 UNJF	1.215	1.297	1.25
1-72 UNJF	1.510	1.602	1.55
2-64 UNJF	1.797	1.900	1.85
3-56 UNJF	2.073	2.191	2.10
4-48 UNJF	2.329	2.467	2.40
5-44 UNJF	2.613	2.763	2.70
6-40 UNJF	2.886	3.051	2.95
8-36 UNJF	3.479	3.662	3.60
10-32 UNJF	4.053	4.253	4.15
12-28 UNJF	4.602	4.815	4.70
1/4-28 UNJF	5.466	5.662	5.60
5/16-24 UNJF	6.907	7.110	7.00
3/8-24 UNJF	8.494	8.680	8.60
7/16-20 UNJF	9.875	10.083	10.00
1/2-20 UNJF	11.463	11.660	11.50
9/16-18 UNJF	12.913	13.123	13.00
5/8-18 UNJF	14.500	14.702	14.50

# 나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링



PF(G), PS(Rp), BSW

**PF(G)** DIN EN ISO 228에 따른 관용 나사산

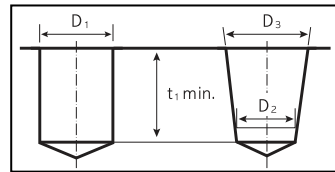
D	D <sub>1</sub>		
직경 Diameter	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
PF(G) 1/16-28	6.561	6.843	6.80
PF(G) 1/8-28	8.566	8.848	8.80
PF(G) 1/4-19	11.445	11.890	11.80
PF(G) 3/8-19	14.950	15.395	15.25
PF(G) 1/2-14	18.632	19.173	19.00
PF(G) 5/8-14	20.588	21.129	21.00
PF(G) 3/4-14	24.118	24.659	24.50
PF(G) 7/8-14	27.878	28.419	28.25
PF(G) 1-11	30.292	30.932	30.75
PF(G) 1 1/8-11	34.940	35.580	35.50
PF(G) 1 1/4-11	38.953	39.593	39.50
PF(G) 1 3/8-11	41.366	42.006	41.90
PF(G) 1 1/2-11	44.846	45.486	45.25
PF(G) 1 3/4-11	50.789	51.429	51.00
PF(G) 2-11	56.657	57.297	57.00
PF(G) 2 1/4-11	62.753	63.393	63.00
PF(G) 2 1/2-11	72.227	72.867	72.60
PF(G) 3-11	84.927	85.567	85.00

**BSW** BS 84에 따른 Whitworth 나사산

D	D <sub>1</sub>		
직경 Diameter	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
1/16-60	1.045	1.231	1.2
3/32-48	1.703	1.911	1.9
1/8-40	2.362	2.59	2.5
5/32-32	2.952	3.213	3.1
3/16-24	3.407	3.745	3.6
7/32-24	4.201	4.539	4.5
1/4-20	4.724	5.155	5
5/16-18	6.131	6.591	6.5
3/8-16	7.493	7.988	7.9
7/16-14	8.79	9.33	9.2
1/2-12	9.989	10.59	10.5
9/16-12	11.577	12.178	12
5/8-11	12.919	13.558	13.4
3/4-10	15.798	16.484	16.4
7/8-9	18.612	19.354	19.25
1-8	21.335	22.148	22
1 1/8-7	23.929	24.833	24.75
1 1/4-7	27.104	28.008	27.5
1 3/8-6	29.505	30.529	30
1 1/2-6	32.68	33.704	33.5
1 5/8-5	34.771	35.965	35.5
1 3/4-5	37.946	39.14	39
1 7/8-4.5	40.398	41.705	41.5
2-4 1/2	43.573	44.88	44.5
2 1/4-4	49.02	50.468	50
2 1/2-4	55.37	56.818	56

**PS(Rp)** DIN EN10226-1에 따른 Whitworth 관용 나사산

D	D <sub>1</sub>		
직경 Diameter	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
PS(Rp) 1/16-28	6.490	6.632	6.55
PS(Rp) 1/8-28	8.495	8.637	8.60
PS(Rp) 1/4-19	11.341	11.549	11.50
PS(Rp) 3/8-19	14.846	15.054	15.00
PS(Rp) 1/2-14	18.490	18.774	18.50
PS(Rp) 5/8-14	20.446	20.73	20.50
PS(Rp) 3/4-14	23.976	24.26	24.00
PS(Rp) 1-11	30.112	30.472	30.25
PS(Rp) 1 1/4-11	38.773	39.133	39.00
PS(Rp) 1 1/2-11	44.629	45.063	45.00
PS(Rp) 2-11	56.440	56.874	56.50
PS(Rp) 2 1/2-11	72.010	72.444	72.20
PS(Rp) 3-11	84.710	85.144	85.00



NPT, NPTF 도면

**NPT** ASME B1.20.1에 따른 관용 표준 나사산, 테이퍼 1:16

D	D <sub>1</sub>			
직경 Diameter	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	T <sub>1</sub>
1/16-27 NPT	6.150	5.950	6.39	10.7
1/8-27 NPT	8.400	8.310	8.74	10.8
1/4-18 NPT	11.100	10.730	11.36	15.6
3/8-18 NPT	14.300	14.150	14.80	16.0
1/2-14 NPT	17.900	17.470	18.32	20.8
3/4-14 NPT	23.300	22.790	23.67	21.3
1-11 1/2 NPT	29.000	28.640	29.69	25.6
1 1/4-11 1/2 NPT	37.700	3.370	38.45	26.1
1 1/2-11 1/2 NPT	43.700	43.440	44.52	26.1
2-11 1/2 NPT	55.600	55.450	56.56	26.5
2 1/2-8 NPT	66.300	66.140	67.62	36.3
3-8 NPT	82.300	81.900	83.52	38.5

**NPTF** ASME B1.20.3에 따른 미국 관용 표준 나사산, 테이퍼 1:16

D	D <sub>1</sub>			
직경 Diameter	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	T <sub>1</sub>
1/16-27 NPTF	6.1	5.97	6.41	10.3
1/8-27 NPTF	8.4	8.33	8.77	10.3
1/4-18 NPTF	11.0	10.77	11.40	15.0
3/8-18 NPTF	14.5	14.19	14.84	15.3
1/2-14 NPTF	17.5	17.48	18.33	19.9
3/4-14 NPTF	23.0	22.84	23.72	20.4
1-11 1/2 NPTF	29.0	28.62	29.76	24.5
1 1/4-11 1/2 NPTF	37.5	37.44	38.52	25.0
1 1/2-11 1/2 NPTF	43.5	43.50	44.59	25.0
2-11 1/2 NPTF	56.0	55.51	56.62	25.4
2 1/2-8 NPTF	66.0	66.03	67.71	38.0
3-8 NPTF	82.0	81.80	83.62	40.0