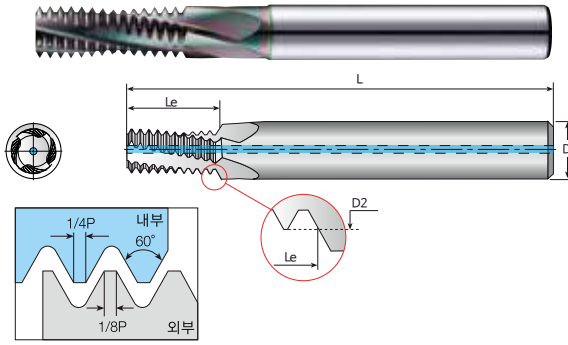




• 규격 정의 : R262 (DN 13)
• 공차 등급 : 6H



ISO 측정항목

521P

단위 Unit: mm

Order Number	피치 규격		날수 Flutes Z	날경 Diameter D	나사부 길이 Thread Length L1	전장 Overall Length L	샹크 Shank Dia d
	Thread	Pitch					
외부 급유형 (Without coolant)							
4LTMA 022 060 S06 M3	M3	0.5	4	2.2	6	60	6
4LTMA 022 075 S06 M3	M3	0.5	4	2.2	7.5	60	6
4LTMA 029 084 S06 M4	M4	0.7	4	2.9	8.4	60	6
4LTMA 029 105 S06 M4	M4	0.7	4	2.9	10.5	60	6
4LTMA 038 104 S06 M5	M5	0.8	4	3.8	10.4	60	6
4LTMA 038 128 S06 M5	M5	0.8	4	3.8	12.8	60	6
4LTMA 045 120 S06 M6	M6	1	4	4.5	12	60	6
4LTMA 045 150 S06 M6	M6	1	4	4.5	15	60	6
4LTMA 060 1625 S06 M8	M8	1.25	4	6	16.25	65	6
4LTMA 060 200 S06 M8	M8	1.25	4	6	20	65	6
4LTMA 075 210 S08 M10	M10	1.5	4	7.5	21	75	8
4LTMA 075 255 S08 M10	M10	1.5	4	7.5	25.5	80	8
4LTMA 095 245 S10 M12	M12	1.75	4	9.5	24.5	85	10
4LTMA 095 315 S10 M12	M12	1.75	4	9.5	31.5	85	10
4LTMA 100 280 S10 M14	M14	2	4	10	28	90	10
4LTMA 100 360 S10 M14	M14	2	4	10	36	95	10
4LTMA 120 320 S12 M16	M16	2	4	12	32	100	12
4LTMA 120 400 S12 M16	M16	2	4	12	40	105	12
4LTMA 140 375 S14 M18	M18	2.5	4	14	37.5	100	14
4LTMA 140 450 S14 M18	M18	2.5	4	14	45	110	14
4LTMA 160 400 S16 M20	M20	2.5	4	16	40	110	16
4LTMA 160 500 S16 M20	M20	2.5	4	16	50	120	16

내부 급유형 (With coolant)

4LTMA 045 120 S06 M6C	M6	1	4	4.5	12	60	6
4LTMA 045 150 S06 M6C	M6	1	4	4.5	15	60	6
4LTMA 060 1625 S06 M8C	M8	1.25	4	6	16.25	65	6
4LTMA 060 200 S06 M8C	M8	1.25	4	6	20	65	6
4LTMA 075 210 S08 M10C	M10	1.5	4	7.5	21	75	8
4LTMA 075 255 S08 M10C	M10	1.5	4	7.5	25.5	80	8
4LTMA 095 245 S10 M12C	M12	1.75	4	9.5	24.5	85	10
4LTMA 095 315 S10 M12C	M12	1.75	4	9.5	31.5	85	10
4LTMA 100 280 S10 M14C	M14	2	4	10	28	90	10
4LTMA 100 360 S10 M14C	M14	2	4	10	36	95	10
4LTMA 120 320 S12 M16C	M16	2	4	12	32	100	12
4LTMA 120 400 S12 M16C	M16	2	4	12	40	105	12
4LTMA 140 375 S14 M18C	M18	2.5	4	14	37.5	100	14
4LTMA 140 450 S14 M18C	M18	2.5	4	14	45	110	14
4LTMA 160 400 S16 M20C	M20	2.5	4	16	40	110	16
4LTMA 160 500 S16 M20C	M20	2.5	4	16	50	120	16

American UN

단위 Unit: mm

Order Number	피치규격 Thread				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	Pitch (TPI)						

외부 급유형(Without coolant)

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

American UN

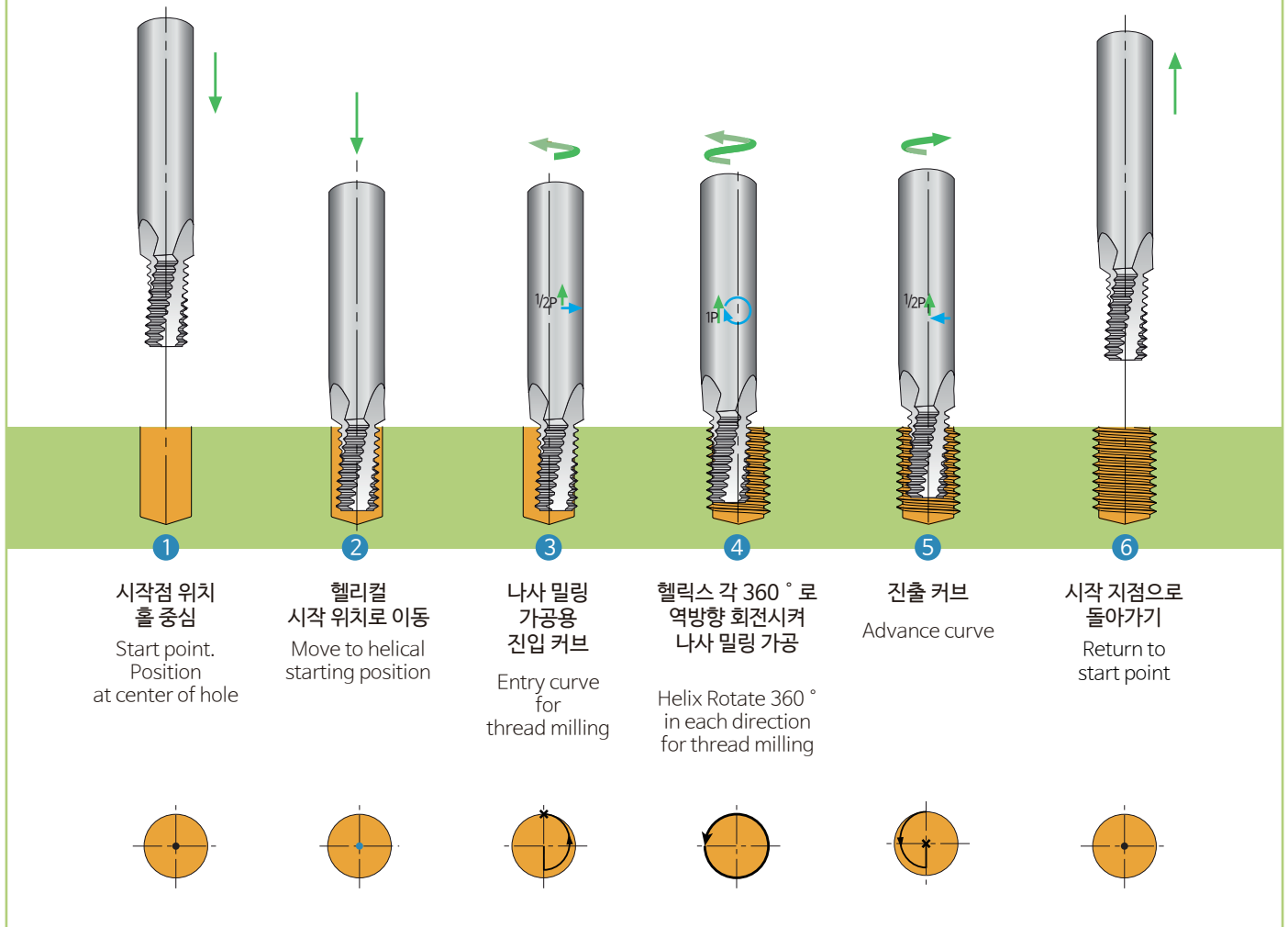
단위 Unit: mm

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

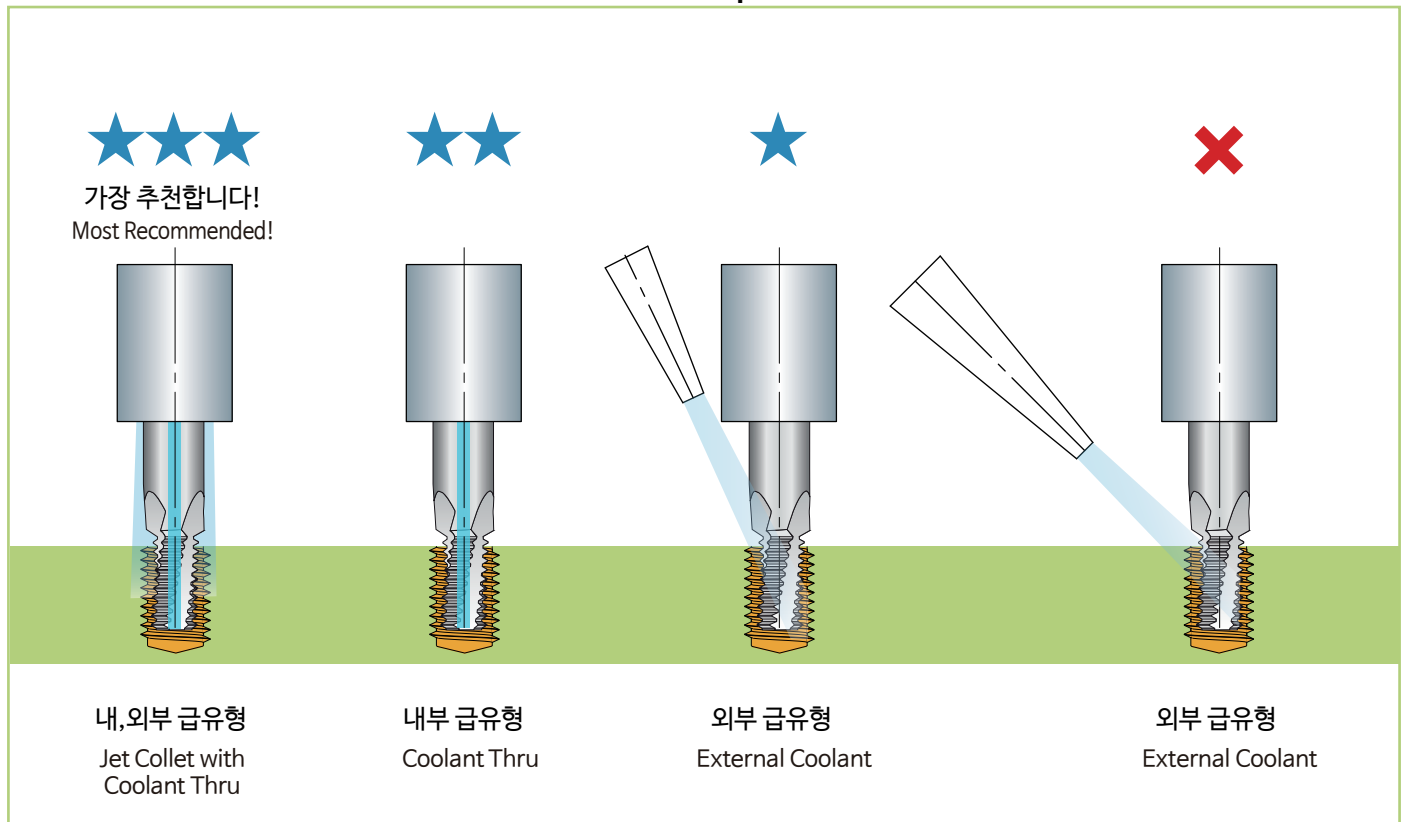
내부 급유형 (With coolant)

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



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

4STM

피삭재 Work Material	알루미늄 합금 Aluminum alloys AL7075		스테인레스강 Stainless steels SUS304 / SUS316		합금강 / 프리하든강 Alloy Steels / Pre-hardened Steels NAK80 / KP4M		열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61	
경도 Hardness					40 ~ 45HRC		55 ~ 62HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M1 ~ m3	120 ~ 250	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02	50 ~ 60	0.01 ~ 0.02	40 ~ 50	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 ~ M20		0.06 ~ 0.07		0.05 ~ 0.06		0.03 ~ 0.04		0.03 ~ 0.04

4HTM/4LTM

피삭재 Work Material	알루미늄 합금 Aluminum alloys AL7075		스테인레스강 Stainless steels SUS304 / SUS316		합금강 / 프리하든강 Alloy Steels / Pre-hardened Steels NAK80 / KP4M		열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61	
경도 Hardness					~ 30HRC		40 ~ 45HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	120 ~ 150	0.02 ~ 0.03	70 ~ 85	0.01 ~ 0.02	50 ~ 65	0.01 ~ 0.02	40 ~ 50	0.008 ~ 0.01
M4		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02		0.008 ~ 0.01
M5		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02		0.01 ~ 0.02
M6		0.03 ~ 0.04		0.02 ~ 0.03		0.01 ~ 0.02		0.01 ~ 0.02
M8		0.03 ~ 0.04		0.02 ~ 0.03		0.01 ~ 0.02		0.02 ~ 0.03
M10		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03
M12		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03
M16 ~ M20		0.05 ~ 0.06		0.03 ~ 0.04		0.02 ~ 0.03		0.02 ~ 0.03

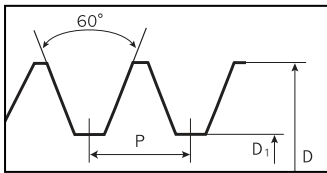
4NKTM

피삭재 Work Material	알루미늄 합금 Aluminum alloys AL7075		스테인레스강 Stainless steels SUS304 / SUS316		합금강 / 프리하든강 Alloy Steels / Pre-hardened Steels NAK80 / KP4M		열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61	
경도 Hardness					40 ~ 45HRC		55 ~ 62HRC	
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	120 ~ 150	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02	50 ~ 65	0.01 ~ 0.02	40 ~ 55	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

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	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 드라이셀 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 워트웬스 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 ₁		
직 경 Diameter	피 치 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 ₁		
직 경 Diameter	피 치 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

D		D _i		
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

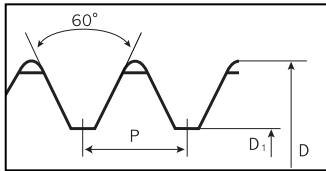
UNC ASME B1.1에 따른
보통 나사산

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나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링

UNF ASME B1.1에 따른 미세 나사산

D	D ₁		
직경 Diameter	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



MJ, UNJC, UNJF 도면

UNJC ASME B1.15 및 ISO 3161에 따른 보통 나사산

D	D ₁		
직경 Diameter	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

UNEF

D	D ₁		
직경 Diameter	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

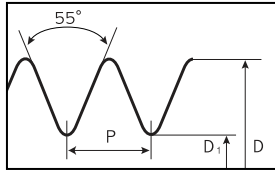
MJ DIN ISO 5855에 따른 표준 나사산

D	D ₁			
직경 Diameter	피치 Pitch	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

UNJF ASME B1.15 및 ISO 3161에 따른 미세 나사산

D	D ₁		
직경 Diameter	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

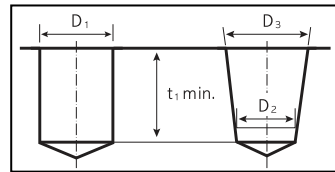
D	D ₁		
직경 Diameter	min (mm)	max (mm)	드릴 직경 Drill Dia. (mm)
PF(G) 1/16-28	6.561	6.843	6.80
PF(G) 1/8-28	8.566	8.848	8.80
PF(G) 1/4-19	11.445	11.890	11.80
PF(G) 3/8-19	14.950	15.395	15.25
PF(G) 1/2-14	18.632	19.173	19.00
PF(G) 5/8-14	20.588	21.129	21.00
PF(G) 3/4-14	24.118	24.659	24.50
PF(G) 7/8-14	27.878	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 ₁		
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 ₁		
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				
직경 Diameter	D ₁	D ₂	D ₃	T ₁
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				
직경 Diameter	D ₁	D ₂	D ₃	T ₁
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