

## ISO 측정항목

98P

단위 Unit: mm

| Order Number | 나사 가능 규격<br>Thread | 피치 규격<br>Pitch | 날수<br>Flutes<br>Z | 날경<br>Diameter<br>D | 나사부 길이<br>Thread Length<br>L1 | 유효장<br>Effective Length<br>L2 | 전장<br>Overall Length<br>L | 샹크<br>Shank Dia<br>d |
|--------------|--------------------|----------------|-------------------|---------------------|-------------------------------|-------------------------------|---------------------------|----------------------|
|--------------|--------------------|----------------|-------------------|---------------------|-------------------------------|-------------------------------|---------------------------|----------------------|

## 외부 급유형 (Without coolant)

[illegible]

## 단위 Unit: mm

내부 급유형 (With coolant)

## 단위 Unit: mm

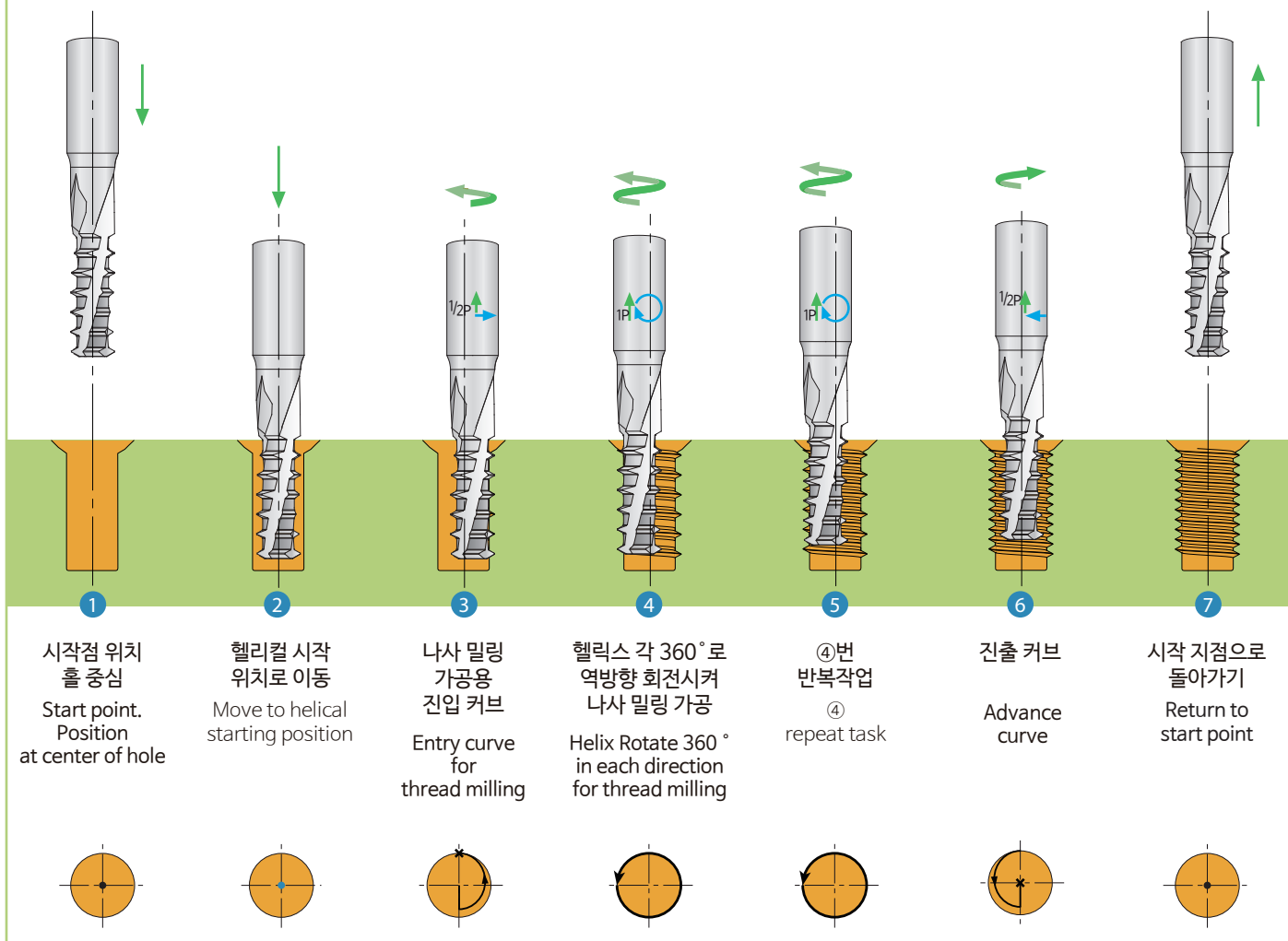
**내부 급유형 (With coolant)**

www.jjtools.co.kr | 67

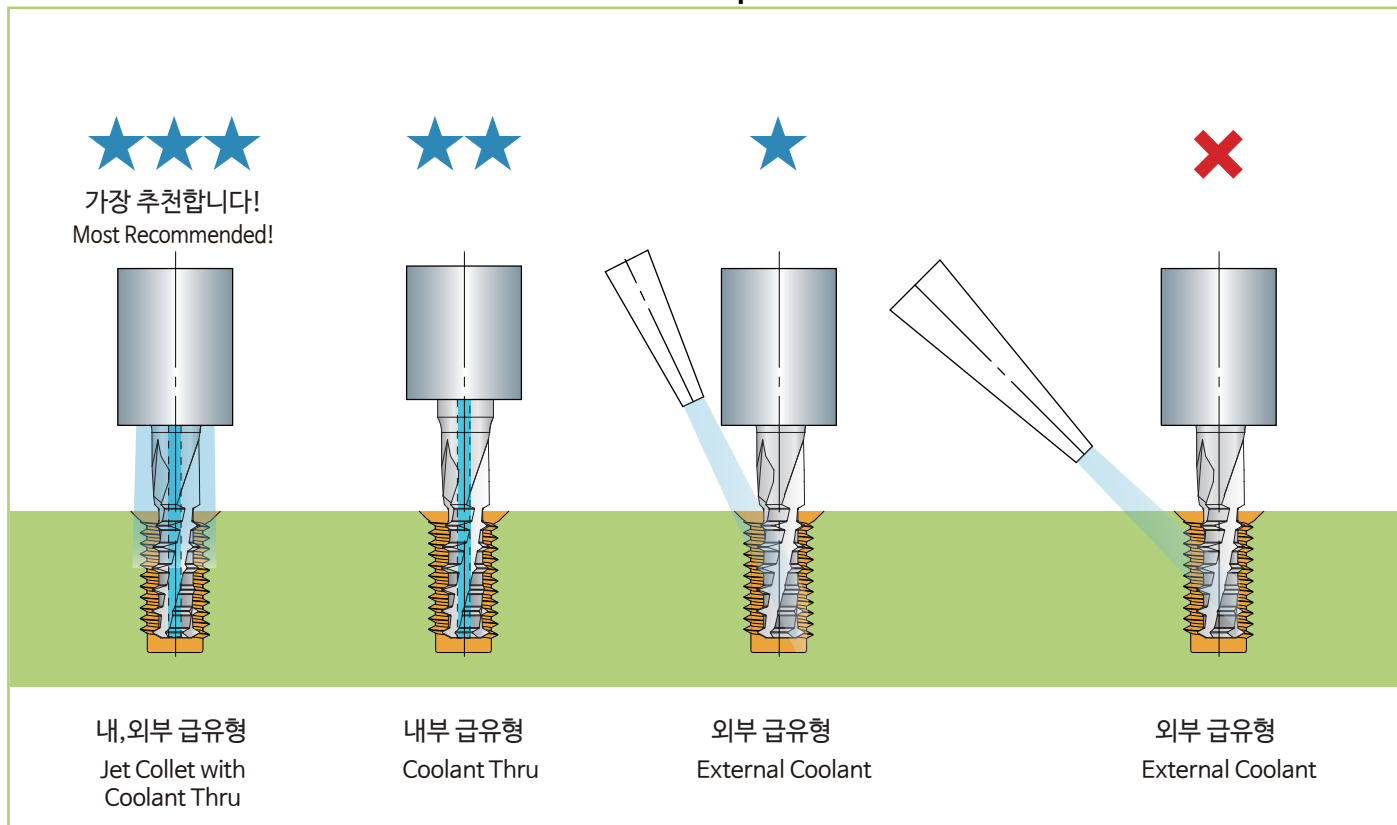
## 단위 Unit: mm

내부 급유형 (With coolant)

## 동작주기 Operating Cycle



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



### 4STM

| 피삭재<br>Work Material | 알루미늄 합금<br>Aluminum alloys<br>AL7075 |             | 스테인레스강<br>Stainless steels<br>SUS304 / SUS316 |             | 합금강 / 프리하든강<br>Alloy Steels / Pre-hardened Steels<br>NAK80 / KP4M |             | 열처리 / 고경도강<br>Heat-treated steels / Hardened Steels<br>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<br>Work Material | 알루미늄 합금<br>Aluminum alloys<br>AL7075 |             | 스테인레스강<br>Stainless steels<br>SUS304 / SUS316 |             | 합금강 / 프리하든강<br>Alloy Steels / Pre-hardened Steels<br>NAK80 / KP4M |             | 열처리 / 고경도강<br>Heat-treated steels / Hardened Steels<br>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<br>Work Material | 알루미늄 합금<br>Aluminum alloys<br>AL7075 |             | 스테인레스강<br>Stainless steels<br>SUS304 / SUS316 |             | 합금강 / 프리하든강<br>Alloy Steels / Pre-hardened Steels<br>NAK80 / KP4M |             | 열처리 / 고경도강<br>Heat-treated steels / Hardened Steels<br>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  |

## 유니파이 계열 나사직경(와이어 프레임)\_ UNC

| SIZE   | T.P.I | B inch<br>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<br>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 |
|        |       |                   |         |
|        |       |                   |         |

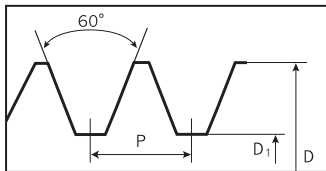
## 밀리미터(mm) 계열 나사직경(와이어 프레임)

| 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 |

## 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 드라이쉴 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<br>Diameter | 피치<br>Pitch | min (mm)       | max (mm) | 드릴 직경<br>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<br>Diameter | 피치<br>Pitch | min (mm)       | max (mm) | 드릴 직경<br>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 <sub>i</sub> |          |                          |
|----------------|-------------|----------------|----------|--------------------------|
| 직경<br>Diameter | 피치<br>Pitch | min (mm)       | max (mm) | 드릴 직경<br>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                     |

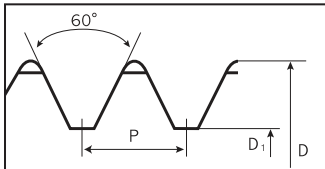
| D              |             | D <sub>1</sub> |          |                          |
|----------------|-------------|----------------|----------|--------------------------|
| 직경<br>Diameter | 피치<br>Pitch | min (mm)       | max (mm) | 드릴 직경<br>Drill Dia. (mm) |
| 48             | 1.5         | 46.376         | 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                       |

[illegible]

## 나사산 예비 가공 홀 직경 - 탭가공 / 스레드 밀링

UNF ASME B1.1에 따른  
미세 나사산

| D              | D <sub>i</sub> |          |                          |
|----------------|----------------|----------|--------------------------|
| 직경<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>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 <sub>i</sub> |          |                          |
|----------------|----------------|----------|--------------------------|
| 직경<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>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 <sub>i</sub> |          |                          |
|----------------|----------------|----------|--------------------------|
| 직경<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>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                    |

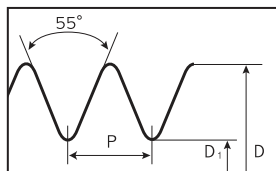
MJ DIN ISO 5855에 따른  
표준 나사산

| D              | D <sub>i</sub> |          |          |                          |
|----------------|----------------|----------|----------|--------------------------|
| 직경<br>Diameter | 피치<br>Pitch    | min (mm) | max (mm) | 드릴 직경<br>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 <sub>i</sub> |          |                          |
|----------------|----------------|----------|--------------------------|
| 직경<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>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

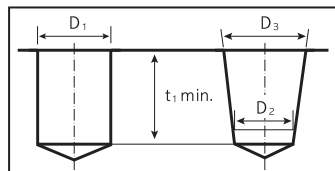
| D              | D <sub>1</sub> |          |                          |
|----------------|----------------|----------|--------------------------|
| 직경<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>Drill Dia. (mm) |
| PF(G) 1/16-28  | 6.561          | 6.843    | 6.80                     |
| PF(G) 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<br>Diameter | min (mm)       | max (mm) | 드릴 직경<br>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<br>Diameter  | min (mm)       | max (mm) | 드릴 직경<br>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<br>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                 |                |                |                |                |
|-------------------|----------------|----------------|----------------|----------------|
| 직경<br>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           |

**당신의스페셜은우리의표준품입니다.**

**WWW.JJTOOLS.CO.KR**

