

# A-PRO 03



R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

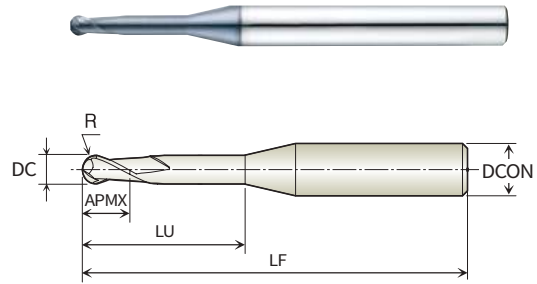
MULTI

Technical data

# 2ARB

## 2날 리브가공용 볼 엔드밀 2 Flutes Rib Ball End Mills

A

page  
No.278

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 샙크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-----------|-------------|----------|
| 2ARB-004-010-445     | 0.4      | 2          | R0.2     | 0.4        | 1         | 4           | 45       |
| 2ARB-004-020-445     | 0.4      | 2          | R0.2     | 0.4        | 2         | 4           | 45       |
| 2ARB-005-020-445     | 0.5      | 2          | R0.25    | 0.5        | 2         | 4           | 45       |
| 2ARB-005-040-445     | 0.5      | 2          | R0.25    | 0.5        | 4         | 4           | 45       |
| 2ARB-006-020-445     | 0.6      | 2          | R0.3     | 0.6        | 2         | 4           | 45       |
| 2ARB-006-030-445     | 0.6      | 2          | R0.3     | 0.6        | 3         | 4           | 45       |
| 2ARB-006-040-445     | 0.6      | 2          | R0.3     | 0.6        | 4         | 4           | 45       |
| 2ARB-006-050-445     | 0.6      | 2          | R0.3     | 0.6        | 5         | 4           | 45       |
| 2ARB-006-060-445     | 0.6      | 2          | R0.3     | 0.6        | 6         | 4           | 45       |
| 2ARB-008-020-445     | 0.8      | 2          | R0.4     | 0.8        | 2         | 4           | 45       |
| 2ARB-008-030-445     | 0.8      | 2          | R0.4     | 0.8        | 3         | 4           | 45       |
| 2ARB-008-040-445     | 0.8      | 2          | R0.4     | 0.8        | 4         | 4           | 45       |
| 2ARB-008-050-445     | 0.8      | 2          | R0.4     | 0.8        | 5         | 4           | 45       |
| 2ARB-008-060-445     | 0.8      | 2          | R0.4     | 0.8        | 6         | 4           | 45       |
| 2ARB-008-080-445     | 0.8      | 2          | R0.4     | 0.8        | 8         | 4           | 45       |
| 2ARB-010-030-445     | 1        | 2          | R0.5     | 1          | 3         | 4           | 45       |
| 2ARB-010-040-445     | 1        | 2          | R0.5     | 1          | 4         | 4           | 45       |
| 2ARB-010-050-445     | 1        | 2          | R0.5     | 1          | 5         | 4           | 45       |
| 2ARB-010-060-445     | 1        | 2          | R0.5     | 1          | 6         | 4           | 45       |
| 2ARB-010-080-445     | 1        | 2          | R0.5     | 1          | 8         | 4           | 45       |
| 2ARB-010-100-445     | 1        | 2          | R0.5     | 1          | 10        | 4           | 45       |
| 2ARB-010-120-445     | 1        | 2          | R0.5     | 1          | 12        | 4           | 45       |
| 2ARB-012-080-445     | 1.2      | 2          | R0.6     | 1.2        | 8         | 4           | 45       |
| 2ARB-012-100-445     | 1.2      | 2          | R0.6     | 1.2        | 10        | 4           | 45       |
| 2ARB-012-120-445     | 1.2      | 2          | R0.6     | 1.2        | 12        | 4           | 45       |

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-----------|-------------|----------|
| 2ARB-015-060-445     | 1.5      | 2          | R0.75    | 1.5        | 6         | 4           | 45       |
| 2ARB-015-080-445     | 1.5      | 2          | R0.75    | 1.5        | 8         | 4           | 45       |
| 2ARB-015-100-445     | 1.5      | 2          | R0.75    | 1.5        | 10        | 4           | 45       |
| 2ARB-015-120-445     | 1.5      | 2          | R0.75    | 1.5        | 12        | 4           | 45       |
| 2ARB-015-160-450     | 1.5      | 2          | R0.75    | 1.5        | 16        | 4           | 50       |
| 2ARB-016-080-445     | 1.6      | 2          | R0.8     | 1.6        | 8         | 4           | 45       |
| 2ARB-016-120-445     | 1.6      | 2          | R0.8     | 1.6        | 12        | 4           | 45       |
| 2ARB-020-080-445     | 2        | 2          | R1.0     | 2          | 8         | 4           | 45       |
| 2ARB-020-100-445     | 2        | 2          | R1.0     | 2          | 10        | 4           | 45       |
| 2ARB-020-120-445     | 2        | 2          | R1.0     | 2          | 12        | 4           | 45       |
| 2ARB-020-160-450     | 2        | 2          | R1.0     | 2          | 16        | 4           | 50       |
| 2ARB-020-200-450     | 2        | 2          | R1.0     | 2          | 20        | 4           | 50       |
| 2ARB-025-080-650     | 2.5      | 2          | R1.25    | 2.5        | 8         | 6           | 50       |
| 2ARB-030-120-650     | 3        | 2          | R1.5     | 3          | 12        | 6           | 50       |
| 2ARB-030-160-660     | 3        | 2          | R1.5     | 3          | 16        | 6           | 60       |
| 2ARB-030-200-660     | 3        | 2          | R1.5     | 3          | 20        | 6           | 60       |
| 2ARB-030-250-665     | 3        | 2          | R1.5     | 3          | 25        | 6           | 65       |
| 2ARB-040-120-650     | 4        | 2          | R2.0     | 4          | 12        | 6           | 50       |
| 2ARB-040-160-660     | 4        | 2          | R2.0     | 4          | 16        | 6           | 60       |
| 2ARB-040-200-660     | 4        | 2          | R2.0     | 4          | 20        | 6           | 60       |
| 2ARB-040-250-665     | 4        | 2          | R2.0     | 4          | 25        | 6           | 65       |
| 2ARB-040-300-670     | 4        | 2          | R2.0     | 4          | 30        | 6           | 70       |

|                |  |
|----------------|--|
| R-PRO          |  |
| H-PRO          |  |
| A-PRO          |  |
| X-PRO          |  |
| SUS MILL       |  |
| S-PRO          |  |
| D-PRO          |  |
| A-PLUS         |  |
| AL-PRO         |  |
| AL MILL        |  |
| ABS            |  |
| MICRO GRAIN    |  |
| MULTI          |  |
| Technical data |  |

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

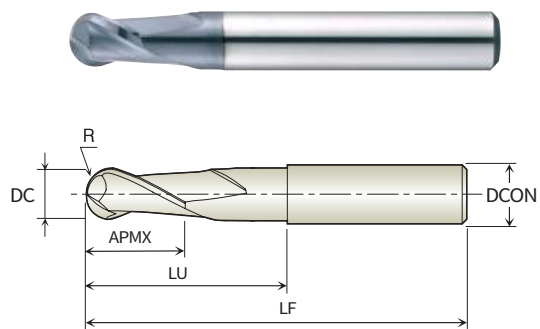
MULTI

Technical data

# 2ASB

## 2날 슷 볼 엔드밀 2 Flutes Short Ball End Mills

A

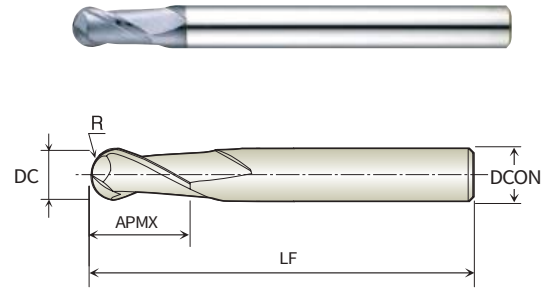
page  
No.279

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEP | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 샙크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|----------|------------|-----------|-------------|----------|
| 2ASB-004-010-650     | 0.4      | 2         | R0.2     | 0.4        | 1         | 6           | 50       |
| 2ASB-005-015-650     | 0.5      | 2         | R0.25    | 0.5        | 1.5       | 6           | 50       |
| 2ASB-006-015-650     | 0.6      | 2         | R0.3     | 0.6        | 1.5       | 6           | 50       |
| 2ASB-008-020-650     | 0.8      | 2         | R0.4     | 0.8        | 2         | 6           | 50       |
| 2ASB-010-025-650     | 1        | 2         | R0.5     | 1          | 2.5       | 6           | 50       |
| 2ASB-015-040-650     | 1.5      | 2         | R0.75    | 1.5        | 4         | 6           | 50       |
| 2ASB-020-060-650     | 2        | 2         | R1.0     | 2          | 6         | 6           | 50       |
| 2ASB-025-060-650     | 2.5      | 2         | R1.25    | 2.5        | 6         | 6           | 50       |
| 2ASB-030-080-650     | 3        | 2         | R1.5     | 3          | 8         | 6           | 50       |
| 2ASB-040-100-650     | 4        | 2         | R2.0     | 4          | 10        | 6           | 50       |
| 2ASB-050-120-650     | 5        | 2         | R2.5     | 5          | 12        | 6           | 50       |
| 2ASB-060-150-660     | 6        | 2         | R3.0     | 7          | 15        | 6           | 60       |
| 2ASB-080-200-860     | 8        | 2         | R4.0     | 10         | 20        | 8           | 60       |
| 2ASB-100-250-A70     | 10       | 2         | R5.0     | 12         | 25        | 10          | 70       |
| 2ASB-120-300-C80     | 12       | 2         | R6.0     | 14         | 30        | 12          | 80       |

# 2APB

## 2날 볼 엔드밀 2 Flutes Ball End Mills



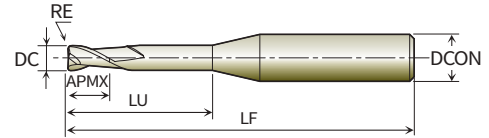
(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZFP | 반경<br>RE | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|----------|------------|-------------|----------|
| 2APB-004-008-445     | 0.4      | 2         | R0.2     | 0.8        | 4           | 45       |
| 2APB-005-010-445     | 0.5      | 2         | R0.25    | 1          | 4           | 45       |
| 2APB-006-012-445     | 0.6      | 2         | R0.3     | 1.2        | 4           | 45       |
| 2APB-008-015-445     | 0.8      | 2         | R0.4     | 1.5        | 4           | 45       |
| 2APB-010-020-650     | 1        | 2         | R0.5     | 2          | 6           | 50       |
| 2APB-015-040-650     | 1.5      | 2         | R0.75    | 4          | 6           | 50       |
| 2APB-020-050-660     | 2        | 2         | R1.0     | 5          | 6           | 60       |
| 2APB-025-060-660     | 2.5      | 2         | R1.25    | 6          | 6           | 60       |
| 2APB-030-080-360     | 3        | 2         | R1.5     | 8          | 3           | 60       |
| 2APB-030-080-660     | 3        | 2         | R1.5     | 8          | 6           | 60       |
| 2APB-035-080-660     | 3.5      | 2         | R1.75    | 8          | 6           | 60       |
| 2APB-040-080-470     | 4        | 2         | R2.0     | 8          | 4           | 70       |
| 2APB-040-080-670     | 4        | 2         | R2.0     | 8          | 6           | 70       |
| 2APB-045-100-670     | 4.5      | 2         | R2.25    | 10         | 6           | 70       |
| 2APB-050-100-680     | 5        | 2         | R2.5     | 10         | 6           | 80       |
| 2APB-055-120-680     | 5.5      | 2         | R2.75    | 12         | 6           | 80       |
| 2APB-060-120-690     | 6        | 2         | R3.0     | 12         | 6           | 90       |
| 2APB-065-140-890     | 6.5      | 2         | R3.25    | 14         | 8           | 90       |
| 2APB-070-140-890     | 7        | 2         | R3.5     | 14         | 8           | 90       |
| 2APB-080-140-8A0     | 8        | 2         | R4.0     | 14         | 8           | 100      |
| 2APB-090-180-AA0     | 9        | 2         | R4.5     | 18         | 10          | 100      |
| 2APB-100-180-AA0     | 10       | 2         | R5.0     | 18         | 10          | 100      |
| 2APB-100-250-AF0     | 10       | 2         | R5.0     | 25         | 10          | 150      |
| 2APB-120-220-CB0     | 12       | 2         | R6.0     | 22         | 12          | 110      |
| 2APB-120-300-CF0     | 12       | 2         | R6.0     | 30         | 12          | 150      |



# 2ARR

## 2날 리브 코너 래디우스 엔드밀 2 Flutes Rib Corner Radius End Mills



(Unit: mm)

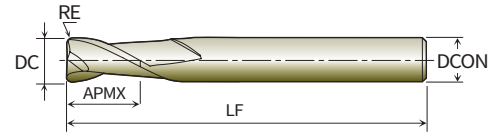
| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEFP | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-----------|-------------|----------|
| 2ARR-010-R02-030-650 | 1        | 2          | R0.2     | 1.5        | 3         | 6           | 50       |
| 2ARR-010-R02-060-650 | 1        | 2          | R0.2     | 1.5        | 6         | 6           | 50       |
| 2ARR-010-R02-080-650 | 1        | 2          | R0.2     | 1.5        | 8         | 6           | 50       |
| 2ARR-015-R02-045-650 | 1.5      | 2          | R0.2     | 2.3        | 4.5       | 6           | 50       |
| 2ARR-015-R02-100-650 | 1.5      | 2          | R0.2     | 2.3        | 10        | 6           | 50       |
| 2ARR-015-R02-120-650 | 1.5      | 2          | R0.2     | 2.3        | 12        | 6           | 50       |
| 2ARR-015-R05-045-650 | 1.5      | 2          | R0.5     | 2.3        | 4.5       | 6           | 50       |
| 2ARR-020-R02-060-650 | 2        | 2          | R0.2     | 3          | 6         | 6           | 50       |
| 2ARR-020-R02-120-650 | 2        | 2          | R0.2     | 3          | 12        | 6           | 50       |
| 2ARR-020-R02-160-660 | 2        | 2          | R0.2     | 3          | 16        | 6           | 60       |
| 2ARR-020-R05-060-650 | 2        | 2          | R0.5     | 3          | 6         | 6           | 50       |
| 2ARR-025-R02-080-650 | 2.5      | 2          | R0.2     | 4          | 8         | 6           | 50       |
| 2ARR-025-R05-080-650 | 2.5      | 2          | R0.5     | 4          | 8         | 6           | 50       |
| 2ARR-030-R03-120-650 | 3        | 2          | R0.3     | 4.5        | 12        | 6           | 50       |
| 2ARR-030-R03-160-660 | 3        | 2          | R0.3     | 4.5        | 16        | 6           | 60       |
| 2ARR-030-R05-120-650 | 3        | 2          | R0.5     | 4.5        | 12        | 6           | 50       |
| 2ARR-030-R05-160-660 | 3        | 2          | R0.5     | 4.5        | 16        | 6           | 60       |
| 2ARR-030-R10-120-650 | 3        | 2          | R1.0     | 4.5        | 12        | 6           | 50       |
| 2ARR-040-R03-150-660 | 4        | 2          | R0.3     | 6          | 15        | 6           | 60       |
| 2ARR-040-R05-150-660 | 4        | 2          | R0.5     | 6          | 15        | 6           | 60       |
| 2ARR-040-R05-200-660 | 4        | 2          | R0.5     | 6          | 20        | 6           | 60       |
| 2ARR-040-R10-150-660 | 4        | 2          | R1.0     | 6          | 15        | 6           | 60       |
| 2ARR-050-R03-180-660 | 5        | 2          | R0.3     | 7.5        | 18        | 6           | 60       |
| 2ARR-050-R05-180-660 | 5        | 2          | R0.5     | 7.5        | 18        | 6           | 60       |
| 2ARR-060-R03-180-660 | 6        | 2          | R0.3     | 9          | 18        | 6           | 60       |

|                |       |             |     |         |        |        |       |       |          |       |       |       |       |
|----------------|-------|-------------|-----|---------|--------|--------|-------|-------|----------|-------|-------|-------|-------|
| Technical data | MULTI | MICRO GRAIN | ABS | AL MILL | AL-PRO | A-PLUS | D-PRO | S-PRO | SUS MILL | X-PRO | A-PRO | H-PRO | R-PRO |
|----------------|-------|-------------|-----|---------|--------|--------|-------|-------|----------|-------|-------|-------|-------|

|                |       |             |     |         |        |        |       |       |          |       |       |       |       |
|----------------|-------|-------------|-----|---------|--------|--------|-------|-------|----------|-------|-------|-------|-------|
| Technical data | MULTI | MICRO GRAIN | ABS | AL MILL | AL-PRO | A-PLUS | D-PRO | S-PRO | SUS MILL | X-PRO | A-PRO | H-PRO | R-PRO |
|----------------|-------|-------------|-----|---------|--------|--------|-------|-------|----------|-------|-------|-------|-------|

# 2ACR

## 2날 코너 래디우스 엔드밀 2 Flutes Corner Radius End Mills



(Unit: mm)

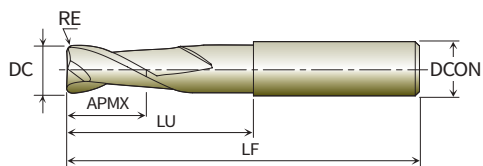
| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZFP | 반경<br>RE | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|----------|------------|-------------|----------|
| 2ACR-060-R05-130-690 | 6        | 2         | R0.5     | 13         | 6           | 90       |
| 2ACR-060-R10-130-690 | 6        | 2         | R1.0     | 13         | 6           | 90       |
| 2ACR-080-R05-190-8A0 | 8        | 2         | R0.5     | 19         | 8           | 100      |
| 2ACR-080-R10-190-8A0 | 8        | 2         | R1.0     | 19         | 8           | 100      |
| 2ACR-100-R05-220-AA0 | 10       | 2         | R0.5     | 22         | 10          | 100      |
| 2ACR-100-R10-220-AA0 | 10       | 2         | R1.0     | 22         | 10          | 100      |
| 2ACR-120-R05-260-CB0 | 12       | 2         | R0.5     | 26         | 12          | 110      |
| 2ACR-120-R10-260-CB0 | 12       | 2         | R1.0     | 26         | 12          | 110      |

# 2ALR

## 2날 롱샹크 코너 래디우스 엔드밀

2 Flutes Long Shank Corner Radius End Mills

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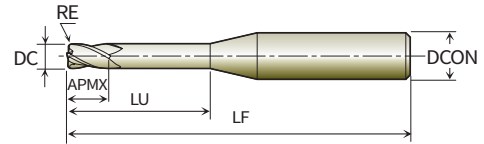
page  
No.283

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEP | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 샹크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|----------|------------|-----------|-------------|----------|
| 2ALR-060-R05-180-680 | 6        | 2         | R0.5     | 9          | 18        | 6           | 80       |
| 2ALR-060-R10-180-680 | 6        | 2         | R1.0     | 9          | 18        | 6           | 80       |
| 2ALR-080-R05-240-890 | 8        | 2         | R0.5     | 12         | 24        | 8           | 90       |
| 2ALR-080-R10-240-890 | 8        | 2         | R1.0     | 12         | 24        | 8           | 90       |
| 2ALR-100-R05-300-AA0 | 10       | 2         | R0.5     | 15         | 30        | 10          | 100      |
| 2ALR-100-R10-300-AA0 | 10       | 2         | R1.0     | 15         | 30        | 10          | 100      |
| 2ALR-120-R05-300-CB0 | 12       | 2         | R0.5     | 18         | 30        | 12          | 110      |
| 2ALR-120-R10-300-CB0 | 12       | 2         | R1.0     | 18         | 30        | 12          | 110      |

# 4ARR

## 4날 리브 코너 라디우스 엔드밀 4 Flutes Rib Corner Radius End Mills



(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEFP | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 샙크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-----------|-------------|----------|
| 4ARR-020-R03-060-650 | 2        | 4          | R0.3     | 3          | 6         | 6           | 50       |
| 4ARR-030-R03-120-650 | 3        | 4          | R0.3     | 4.5        | 12        | 6           | 50       |
| 4ARR-030-R03-160-660 | 3        | 4          | R0.3     | 4.5        | 16        | 6           | 60       |
| 4ARR-030-R05-120-650 | 3        | 4          | R0.5     | 4.5        | 12        | 6           | 50       |
| 4ARR-030-R05-160-660 | 3        | 4          | R0.5     | 4.5        | 16        | 6           | 60       |
| 4ARR-040-R03-150-660 | 4        | 4          | R0.3     | 6          | 15        | 6           | 60       |
| 4ARR-040-R03-200-660 | 4        | 4          | R0.3     | 6          | 20        | 6           | 60       |
| 4ARR-040-R05-150-660 | 4        | 4          | R0.5     | 6          | 15        | 6           | 60       |
| 4ARR-040-R05-200-660 | 4        | 4          | R0.5     | 6          | 20        | 6           | 60       |
| 4ARR-040-R10-150-660 | 4        | 4          | R1.0     | 6          | 15        | 6           | 60       |
| 4ARR-060-R05-180-660 | 6        | 4          | R0.5     | 9          | 18        | 6           | 60       |
| 4ARR-060-R10-180-660 | 6        | 4          | R1.0     | 9          | 18        | 6           | 60       |
| 4ARR-060-R15-180-660 | 6        | 4          | R1.5     | 9          | 18        | 6           | 60       |
| 4ARR-080-R05-240-865 | 8        | 4          | R0.5     | 12         | 24        | 8           | 65       |
| 4ARR-080-R10-240-865 | 8        | 4          | R1.0     | 12         | 24        | 8           | 65       |
| 4ARR-080-R15-240-865 | 8        | 4          | R1.5     | 12         | 24        | 8           | 65       |
| 4ARR-080-R20-240-865 | 8        | 4          | R2.0     | 12         | 24        | 8           | 65       |
| 4ARR-100-R05-300-A70 | 10       | 4          | R0.5     | 15         | 30        | 10          | 70       |
| 4ARR-100-R10-300-A70 | 10       | 4          | R1.0     | 15         | 30        | 10          | 70       |
| 4ARR-100-R15-300-A70 | 10       | 4          | R1.5     | 15         | 30        | 10          | 70       |
| 4ARR-100-R20-300-A70 | 10       | 4          | R2.0     | 15         | 30        | 10          | 70       |
| 4ARR-120-R05-300-C80 | 12       | 4          | R0.5     | 18         | 30        | 12          | 80       |
| 4ARR-120-R10-300-C80 | 12       | 4          | R1.0     | 18         | 30        | 12          | 80       |
| 4ARR-120-R15-300-C80 | 12       | 4          | R1.5     | 18         | 30        | 12          | 80       |
| 4ARR-120-R20-300-C80 | 12       | 4          | R2.0     | 18         | 30        | 12          | 80       |

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

MULTI

Technical data

# 4ACR

## 4날 코너 래디우스 엔드밀

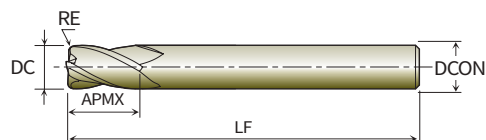
4 Flutes Corner Radius End Mills

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4

CR

35°

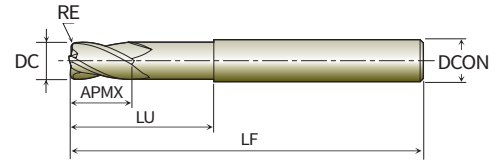
page  
No.285

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 반경<br>RE | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-------------|----------|
| 4ACR-060-R05-130-690 | 6        | 4          | R0.5     | 13         | 6           | 90       |
| 4ACR-060-R10-130-690 | 6        | 4          | R1.0     | 13         | 6           | 90       |
| 4ACR-080-R05-190-8A0 | 8        | 4          | R0.5     | 19         | 8           | 100      |
| 4ACR-080-R10-190-8A0 | 8        | 4          | R1.0     | 19         | 8           | 100      |
| 4ACR-100-R05-220-AA0 | 10       | 4          | R0.5     | 22         | 10          | 100      |
| 4ACR-100-R10-220-AA0 | 10       | 4          | R1.0     | 22         | 10          | 100      |
| 4ACR-120-R05-260-CB0 | 12       | 4          | R0.5     | 26         | 12          | 110      |
| 4ACR-120-R10-260-CB0 | 12       | 4          | R1.0     | 26         | 12          | 110      |

# 4ALR

## 4날 롱샹크 코너 래디우스 엔드밀 4 Flutes Long Shank Corner Radius End Mills



(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 반경<br>RE | 날장<br>APMX | 유효장<br>LU | 샹크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|----------|------------|-----------|-------------|----------|
| 4ALR-060-R05-180-680 | 6        | 4          | R0.5     | 9          | 18        | 6           | 80       |
| 4ALR-060-R10-180-680 | 6        | 4          | R1.0     | 9          | 18        | 6           | 80       |
| 4ALR-080-R05-240-8A0 | 8        | 4          | R0.5     | 12         | 24        | 8           | 100      |
| 4ALR-080-R10-240-8A0 | 8        | 4          | R1.0     | 12         | 24        | 8           | 100      |
| 4ALR-100-R05-300-AA0 | 10       | 4          | R0.5     | 15         | 30        | 10          | 100      |
| 4ALR-100-R10-300-AA0 | 10       | 4          | R1.0     | 15         | 30        | 10          | 100      |
| 4ALR-120-R05-300-CB0 | 12       | 4          | R0.5     | 18         | 30        | 12          | 110      |
| 4ALR-120-R10-300-CB0 | 12       | 4          | R1.0     | 18         | 30        | 12          | 110      |

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

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GRAIN

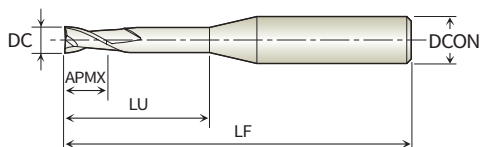
MULTI

Technical data

# 2ARE

## 2날 리브가공용 플랫 엔드밀 2 Flutes Rib Flat End Mills

A

page  
No.287

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEP | 날장<br>APMX | 유효장<br>LU | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|------------|-----------|-------------|----------|
| 2ARE-004-010-445     | 0.4      | 2         | 0.6        | 1         | 4           | 45       |
| 2ARE-004-020-445     | 0.4      | 2         | 0.6        | 2         | 4           | 45       |
| 2ARE-005-020-445     | 0.5      | 2         | 0.7        | 2         | 4           | 45       |
| 2ARE-005-030-445     | 0.5      | 2         | 0.7        | 3         | 4           | 45       |
| 2ARE-005-040-445     | 0.5      | 2         | 0.7        | 4         | 4           | 45       |
| 2ARE-006-020-445     | 0.6      | 2         | 0.9        | 2         | 4           | 45       |
| 2ARE-006-030-445     | 0.6      | 2         | 0.9        | 3         | 4           | 45       |
| 2ARE-006-040-445     | 0.6      | 2         | 0.9        | 4         | 4           | 45       |
| 2ARE-006-050-445     | 0.6      | 2         | 0.9        | 5         | 4           | 45       |
| 2ARE-006-060-445     | 0.6      | 2         | 0.9        | 6         | 4           | 45       |
| 2ARE-007-030-445     | 0.7      | 2         | 1          | 3         | 4           | 45       |
| 2ARE-007-040-445     | 0.7      | 2         | 1          | 4         | 4           | 45       |
| 2ARE-007-060-445     | 0.7      | 2         | 1          | 6         | 4           | 45       |
| 2ARE-008-020-445     | 0.8      | 2         | 1.2        | 2         | 4           | 45       |
| 2ARE-008-030-445     | 0.8      | 2         | 1.2        | 3         | 4           | 45       |
| 2ARE-008-040-445     | 0.8      | 2         | 1.2        | 4         | 4           | 45       |
| 2ARE-008-050-445     | 0.8      | 2         | 1.2        | 5         | 4           | 45       |
| 2ARE-008-060-445     | 0.8      | 2         | 1.2        | 6         | 4           | 45       |
| 2ARE-008-080-445     | 0.8      | 2         | 1.2        | 8         | 4           | 45       |
| 2ARE-010-030-445     | 1        | 2         | 1.5        | 3         | 4           | 45       |
| 2ARE-010-040-445     | 1        | 2         | 1.5        | 4         | 4           | 45       |
| 2ARE-010-050-445     | 1        | 2         | 1.5        | 5         | 4           | 45       |
| 2ARE-010-060-445     | 1        | 2         | 1.5        | 6         | 4           | 45       |
| 2ARE-010-080-445     | 1        | 2         | 1.5        | 8         | 4           | 45       |
| 2ARE-010-100-445     | 1        | 2         | 1.5        | 10        | 4           | 45       |

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 날장<br>APMX | 유효장<br>LU | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|------------|-----------|-------------|----------|
| 2ARE-010-120-445     | 1        | 2          | 1.5        | 12        | 4           | 45       |
| 2ARE-012-080-445     | 1.2      | 2          | 1.8        | 8         | 4           | 45       |
| 2ARE-012-100-445     | 1.2      | 2          | 1.8        | 10        | 4           | 45       |
| 2ARE-012-120-445     | 1.2      | 2          | 1.8        | 12        | 4           | 45       |
| 2ARE-015-060-445     | 1.5      | 2          | 2.3        | 6         | 4           | 45       |
| 2ARE-015-080-445     | 1.5      | 2          | 2.3        | 8         | 4           | 45       |
| 2ARE-015-100-445     | 1.5      | 2          | 2.3        | 10        | 4           | 45       |
| 2ARE-015-120-445     | 1.5      | 2          | 2.3        | 12        | 4           | 45       |
| 2ARE-015-160-450     | 1.5      | 2          | 2.3        | 16        | 4           | 50       |
| 2ARE-020-080-445     | 2        | 2          | 3          | 8         | 4           | 45       |
| 2ARE-020-100-445     | 2        | 2          | 3          | 10        | 4           | 45       |
| 2ARE-020-120-445     | 2        | 2          | 3          | 12        | 4           | 45       |
| 2ARE-020-160-450     | 2        | 2          | 3          | 16        | 4           | 50       |
| 2ARE-020-200-450     | 2        | 2          | 3          | 20        | 4           | 50       |
| 2ARE-025-080-650     | 2.5      | 2          | 3.8        | 8         | 6           | 50       |
| 2ARE-025-120-650     | 2.5      | 2          | 3.8        | 12        | 6           | 50       |
| 2ARE-030-120-650     | 3        | 2          | 4.5        | 12        | 6           | 50       |
| 2ARE-030-160-660     | 3        | 2          | 4.5        | 16        | 6           | 60       |
| 2ARE-030-200-660     | 3        | 2          | 4.5        | 20        | 6           | 60       |
| 2ARE-040-120-650     | 4        | 2          | 6          | 12        | 6           | 50       |
| 2ARE-040-160-660     | 4        | 2          | 6          | 16        | 6           | 60       |
| 2ARE-040-200-660     | 4        | 2          | 6          | 20        | 6           | 60       |
| 2ARE-040-250-665     | 4        | 2          | 6          | 25        | 6           | 65       |

R-PRO

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A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

MULTI

Technical data

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

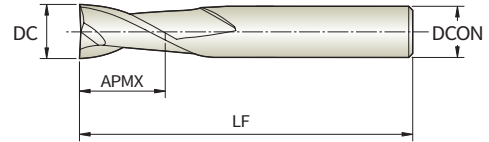
MULTI

Technical data

# 2APE

## 2날 플랫 엔드밀 2 Flutes Flat End Mills

A

page  
No.288

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEFP | 날장<br>APMX | 샙크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|------------|-------------|----------|
| 2APE-004-008-445     | 0.4      | 2          | 0.8        | 4           | 45       |
| 2APE-005-010-445     | 0.5      | 2          | 1          | 4           | 45       |
| 2APE-006-012-445     | 0.6      | 2          | 1.2        | 4           | 45       |
| 2APE-007-014-445     | 0.7      | 2          | 1.4        | 4           | 45       |
| 2APE-008-016-445     | 0.8      | 2          | 1.6        | 4           | 45       |
| 2APE-010-025-645     | 1        | 2          | 2.5        | 6           | 45       |
| 2APE-012-040-645     | 1.2      | 2          | 4          | 6           | 45       |
| 2APE-015-040-645     | 1.5      | 2          | 4          | 6           | 45       |
| 2APE-020-060-645     | 2        | 2          | 6          | 6           | 45       |
| 2APE-025-080-650     | 2.5      | 2          | 8          | 6           | 50       |
| 2APE-030-100-350     | 3        | 2          | 10         | 3           | 50       |
| 2APE-030-100-650     | 3        | 2          | 10         | 6           | 50       |
| 2APE-035-100-650     | 3.5      | 2          | 10         | 6           | 50       |
| 2APE-040-120-455     | 4        | 2          | 12         | 4           | 55       |
| 2APE-040-120-650     | 4        | 2          | 12         | 6           | 50       |
| 2APE-045-120-650     | 4.5      | 2          | 12         | 6           | 50       |
| 2APE-050-150-650     | 5        | 2          | 15         | 6           | 50       |
| 2APE-055-150-650     | 5.5      | 2          | 15         | 6           | 50       |
| 2APE-060-150-650     | 6        | 2          | 15         | 6           | 50       |
| 2APE-065-150-865     | 6.5      | 2          | 15         | 8           | 65       |
| 2APE-070-200-865     | 7        | 2          | 20         | 8           | 65       |
| 2APE-075-200-865     | 7.5      | 2          | 20         | 8           | 65       |
| 2APE-080-200-865     | 8        | 2          | 20         | 8           | 65       |
| 2APE-085-200-A65     | 8.5      | 2          | 20         | 10          | 65       |
| 2APE-090-250-A70     | 9        | 2          | 25         | 10          | 70       |

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEPF | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|------------|-------------|----------|
| 2APE-095-250-A70     | 9.5      | 2          | 25         | 10          | 70       |
| 2APE-100-250-A70     | 10       | 2          | 25         | 10          | 70       |
| 2APE-105-280-C80     | 10.5     | 2          | 25         | 12          | 70       |
| 2APE-110-300-C80     | 11       | 2          | 25         | 12          | 70       |
| 2APE-115-250-C70     | 11.5     | 2          | 25         | 12          | 70       |
| 2APE-120-300-C80     | 12       | 2          | 30         | 12          | 80       |
| 2APE-130-350-E90     | 13       | 2          | 35         | 14          | 90       |
| 2APE-140-350-E90     | 14       | 2          | 35         | 14          | 90       |
| 2APE-160-400-GA0     | 16       | 2          | 40         | 16          | 100      |
| 2APE-180-450-IA0     | 18       | 2          | 45         | 18          | 100      |
| 2APE-200-450-KA0     | 20       | 2          | 45         | 20          | 100      |

|                |  |
|----------------|--|
| R-PRO          |  |
| H-PRO          |  |
| A-PRO          |  |
| X-PRO          |  |
| SUS MILL       |  |
| S-PRO          |  |
| D-PRO          |  |
| A-PLUS         |  |
| AL-PRO         |  |
| AL MILL        |  |
| ABS            |  |
| MICRO GRAIN    |  |
| MULTI          |  |
| Technical data |  |

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

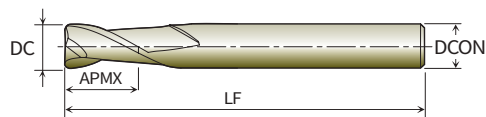
MULTI

Technical data

# 2AEL

## 2날 롱 플랫 엔드밀

2 Flutes Long Length Flat End Mills



A

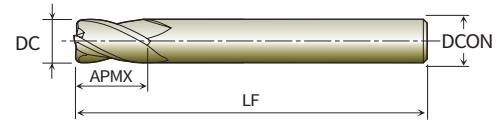
page  
No.289

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEFP | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|------------|-------------|----------|
| 2AEL-010-040-645     | 1        | 2          | 4          | 6           | 45       |
| 2AEL-020-080-645     | 2        | 2          | 8          | 6           | 45       |
| 2AEL-030-120-650     | 3        | 2          | 12         | 6           | 50       |
| 2AEL-030-150-660     | 3        | 2          | 15         | 6           | 60       |
| 2AEL-040-160-660     | 4        | 2          | 16         | 6           | 60       |
| 2AEL-040-200-670     | 4        | 2          | 20         | 6           | 70       |
| 2AEL-050-250-680     | 5        | 2          | 25         | 6           | 80       |
| 2AEL-060-200-670     | 6        | 2          | 20         | 6           | 70       |
| 2AEL-060-250-680     | 6        | 2          | 25         | 6           | 80       |
| 2AEL-080-280-890     | 8        | 2          | 28         | 8           | 90       |
| 2AEL-080-350-890     | 8        | 2          | 35         | 8           | 90       |
| 2AEL-100-350-AA0     | 10       | 2          | 35         | 10          | 100      |
| 2AEL-100-450-AB0     | 10       | 2          | 45         | 10          | 110      |
| 2AEL-120-400-CB0     | 12       | 2          | 40         | 12          | 110      |

# 4APE

## 4날 플랫 엔드밀 4 Flutes Flat End Mills



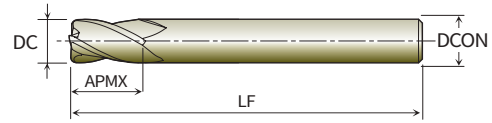
(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZFP | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|-----------|------------|-------------|----------|
| 4APE-020-060-645     | 2        | 4         | 6          | 6           | 45       |
| 4APE-025-080-645     | 2.5      | 4         | 8          | 6           | 45       |
| 4APE-030-100-650     | 3        | 4         | 10         | 6           | 50       |
| 4APE-035-100-650     | 3.5      | 4         | 10         | 6           | 50       |
| 4APE-040-120-650     | 4        | 4         | 12         | 6           | 50       |
| 4APE-045-120-650     | 4.5      | 4         | 12         | 6           | 50       |
| 4APE-050-150-650     | 5        | 4         | 15         | 6           | 50       |
| 4APE-055-150-650     | 5.5      | 4         | 15         | 6           | 50       |
| 4APE-060-150-650     | 6        | 4         | 15         | 6           | 50       |
| 4APE-065-180-865     | 6.5      | 4         | 18         | 8           | 65       |
| 4APE-070-200-865     | 7        | 4         | 20         | 8           | 65       |
| 4APE-075-200-865     | 7.5      | 4         | 20         | 8           | 65       |
| 4APE-080-200-865     | 8        | 4         | 20         | 8           | 65       |
| 4APE-085-230-A65     | 8.5      | 4         | 23         | 10          | 65       |
| 4APE-090-250-A70     | 9        | 4         | 25         | 10          | 70       |
| 4APE-095-250-A70     | 9.5      | 4         | 25         | 10          | 70       |
| 4APE-100-250-A70     | 10       | 4         | 25         | 10          | 70       |
| 4APE-105-280-C70     | 10.5     | 4         | 28         | 12          | 70       |
| 4APE-110-280-C70     | 11       | 4         | 28         | 12          | 70       |
| 4APE-115-300-C70     | 11.5     | 4         | 30         | 12          | 70       |
| 4APE-120-300-C80     | 12       | 4         | 30         | 12          | 80       |
| 4APE-130-350-E90     | 13       | 4         | 35         | 14          | 90       |
| 4APE-140-350-E90     | 14       | 4         | 35         | 14          | 90       |
| 4APE-160-400-GA0     | 16       | 4         | 40         | 16          | 100      |
| 4APE-180-450-IA0     | 18       | 4         | 45         | 18          | 100      |
| 4APE-200-450-KA0     | 20       | 4         | 45         | 20          | 100      |

# 4AEL

## 4날 롱 플랫 엔드밀

4 Flutes Long Length Flat End Mills



A

page  
No.291

(Unit: mm)

| 제품코드<br>Product Code | 직경<br>DC | 날수<br>ZEFP | 날장<br>APMX | 생크경<br>DCON | 전장<br>LF |
|----------------------|----------|------------|------------|-------------|----------|
| 4AEL-020-080-645     | 2        | 4          | 8          | 6           | 45       |
| 4AEL-030-150-660     | 3        | 4          | 15         | 6           | 60       |
| 4AEL-040-200-670     | 4        | 4          | 20         | 6           | 70       |
| 4AEL-050-250-680     | 5        | 4          | 25         | 6           | 80       |
| 4AEL-060-200-670     | 6        | 4          | 20         | 6           | 70       |
| 4AEL-060-250-680     | 6        | 4          | 25         | 6           | 80       |
| 4AEL-080-300-890     | 8        | 4          | 30         | 8           | 90       |
| 4AEL-080-350-890     | 8        | 4          | 35         | 8           | 90       |
| 4AEL-100-350-AA0     | 10       | 4          | 35         | 10          | 100      |
| 4AEL-100-450-AB0     | 10       | 4          | 45         | 10          | 110      |
| 4AEL-120-400-CB0     | 12       | 4          | 40         | 12          | 110      |
| 4AEL-120-500-CB0     | 12       | 4          | 50         | 12          | 110      |
| 4AEL-120-600-CC0     | 12       | 4          | 60         | 12          | 120      |

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

MULTI

Technical data

A-PRO

2ARB

High Speed Milling Condition

| 피삭재                 | 프리하드강                                                                               |               |               | 고경도강(열처리강)                      |               |               | 통합금                 |               |               |
|---------------------|-------------------------------------------------------------------------------------|---------------|---------------|---------------------------------|---------------|---------------|---------------------|---------------|---------------|
| Workpiece           | Preharden Steel(NAK)                                                                |               |               | Hardened Steels(SKD 61, STAVAX) |               |               | Copper Alloy        |               |               |
| HRC                 | 30 ~ 45                                                                             |               |               | 45 ~ 55                         |               |               |                     |               |               |
| Radius of Ball Nose | Depth of Cut Ad(mm)                                                                 | RPM           | Feed (mm/min) | Depth of Cut Ad(mm)             | RPM           | Feed (mm/min) | Depth of Cut Ad(mm) | RPM           | Feed (mm/min) |
| R0.25               | 0.006~0.010                                                                         | 20,000~40,000 | 300~600       | 0.003~0.010                     | 20,000~40,000 | 200~400       | 0.010~0.020         | 20,000~40,000 | 300~600       |
| R0.3                | 0.010~0.030                                                                         | 20,000~40,000 | 600~1,000     | 0.003~0.030                     | 20,000~40,000 | 400~800       | 0.020~0.040         | 20,000~40,000 | 600~1,000     |
| R0.4                | 0.005~0.050                                                                         | 17,000~40,000 | 400~1,200     | 0.006~0.030                     | 20,000~40,000 | 250~1,000     | 0.010~0.030         | 17,000~40,000 | 400~1,200     |
| R0.5                | 0.010~0.050                                                                         | 15,000~38,000 | 400~1,400     | 0.010~0.030                     | 15,000~38,000 | 300~1,200     | 0.050~0.100         | 15,000~40,000 | 800~3,000     |
| R0.6                | 0.030~0.050                                                                         | 15,000~30,000 | 500~1,000     | 0.020~0.030                     | 15,000~30,000 | 400~800       | 0.050~0.100         | 15,000~30,000 | 1,000~1,400   |
| R0.75               | 0.030~0.050                                                                         | 12,000~30,000 | 400~1,900     | 0.030~0.050                     | 12,000~30,000 | 300~1,400     | 0.050~0.100         | 12,000~30,000 | 1,000~3,000   |
| R1.0                | 0.050~0.100                                                                         | 8,000~20,000  | 600~2,200     | 0.050~0.100                     | 8,000~20,000  | 500~1,700     | 0.050~0.300         | 12,000~20,000 | 1,000~3,000   |
| R1.5                | 0.050~0.100                                                                         | 12,000~20,000 | 1,000~2,600   | 0.050~0.100                     | 12,000~20,000 | 1,000~2,100   | 0.100~0.300         | 12,000~20,000 | 1,600~3,500   |
| R2.0                | 0.050~0.100                                                                         | 12,000~20,000 | 1,200~2,700   | 0.050~0.100                     | 12,000~20,000 | 1,000~2,200   | 0.100~0.300         | 12,000~20,000 | 1,800~4,000   |
| Depth of Cut        |  |               |               |                                 |               |               |                     |               |               |

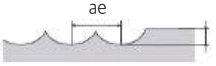
### ⚠ 경고 WARNING

1. 정밀하고 강성이 있는 홀더와 장비를 사용해주시시오.
2. 절입량의 ap는 축방향 절입량을 표시합니다.
3. 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
4. 회전수와 테이블 이송은 같은 비율로 조정해주시시오.
5. 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따라 조건을 조정해서 가공하시기 바랍니다.

1. Use a rigid precise machine and holder.
2. ap(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

# A-PRO 2ASB

## High Speed Milling Condition

| 피삭재                 | 탄소강                                                                                                          |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|---------------------|--------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece           | Carbon Steels(S45C)                                                                                          |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC                 | ~ 30                                                                                                         |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Radius of Ball Nose | RPM                                                                                                          | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| R0.5                | 34,000                                                                                                       | 2,000         | 32,000               | 1,600         | 30,000                          | 1,500         |
| R0.75               | 32,000                                                                                                       | 2,500         | 30,000               | 2,050         | 28,000                          | 1,900         |
| R1.0                | 30,000                                                                                                       | 2,700         | 28,000               | 2,250         | 25,000                          | 2,000         |
| R1.5                | 27,000                                                                                                       | 3,200         | 25,000               | 2,500         | 22,000                          | 2,200         |
| R2.0                | 24,000                                                                                                       | 3,300         | 20,000               | 2,700         | 18,300                          | 2,450         |
| R3.0                | 16,000                                                                                                       | 3,500         | 13,500               | 2,650         | 12,200                          | 2,450         |
| R4.0                | 12,000                                                                                                       | 3,100         | 10,000               | 2,500         | 9,200                           | 2,450         |
| R5.0                | 9,500                                                                                                        | 2,850         | 8,000                | 2,300         | 7,350                           | 2,150         |
| R6.0                | 8,000                                                                                                        | 2,800         | 6,700                | 2,250         | 6,100                           | 2,100         |
| Depth of Cut        |  $ap=0.02D$<br>$ae=0.05D$ |               |                      |               |                                 |               |

### △ 경고 WARNING

- 정밀하고 강성이 있는 홀더와 장비를 사용해주시오.
- 절입량의  $ap$ 는 측방향 절입량을 표시합니다.
- 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
- 회전수와 테이블 이송은 같은 비율로 조정해주시오.
- 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따라 조건을 조정해서 가공하시기 바랍니다.

- Use a rigid precise machine and holder.
- $ap(mm)$  : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

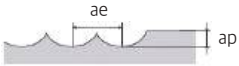
MULTI

Technical data

A-PRO

2APB

High Speed Milling Condition

| 피삭재                 | 탄소강                                                                                                              |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|---------------------|------------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece           | Carbon Steels(S45C)                                                                                              |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC                 | ~ 30                                                                                                             |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Radius of Ball Nose | RPM                                                                                                              | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| R0.5                | 34,000                                                                                                           | 2,000         | 32,000               | 1,600         | 30,000                          | 1,500         |
| R0.75               | 32,000                                                                                                           | 2,500         | 30,000               | 2,050         | 28,000                          | 1,900         |
| R1.0                | 30,000                                                                                                           | 2,700         | 28,000               | 2,250         | 25,000                          | 2,000         |
| R1.5                | 27,000                                                                                                           | 3,200         | 25,000               | 2,500         | 22,000                          | 2,200         |
| R2.0                | 24,000                                                                                                           | 3,300         | 20,000               | 2,700         | 18,300                          | 2,450         |
| R3.0                | 16,000                                                                                                           | 3,500         | 13,500               | 2,650         | 12,200                          | 2,450         |
| R4.0                | 12,000                                                                                                           | 3,100         | 10,000               | 2,500         | 9,200                           | 2,450         |
| R5.0                | 9,500                                                                                                            | 2,850         | 8,000                | 2,300         | 7,350                           | 2,150         |
| R6.0                | 8,000                                                                                                            | 2,800         | 6,700                | 2,250         | 6,100                           | 2,100         |
| Depth of Cut        |  <p>ap=0.02D<br/>ae=0.05D</p> |               |                      |               |                                 |               |

### ⚠ 경고 WARNING

1. 정밀하고 강성이 있는 홀더와 장비를 사용해주시요.
2. 절입량의 ap는 축방향 절입량을 표시합니다.
3. 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
4. 회전수와 테이블 이송은 같은 비율로 조정해주시요.
5. 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따로 조건을 조정해서 가공하시기 바랍니다.

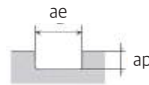
1. Use a rigid precise machine and holder.
2. ap(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

# A-PRO 2ARR

High Speed Milling Condition

| 피삭재              | 프리하든강                |               |               | 고경도강(열처리강)                      |               |               | 동합금                 |               |               |
|------------------|----------------------|---------------|---------------|---------------------------------|---------------|---------------|---------------------|---------------|---------------|
| Workpiece        | Preharden Steel(NAK) |               |               | Hardened Steels(SKD 61, STAVAX) |               |               | Copper Alloys       |               |               |
| HRC              | 30 ~ 45              |               |               | 45 ~ 55                         |               |               |                     |               |               |
| Outside Diameter | Depth of Cut Ad(mm)  | RPM           | Feed (mm/min) | Depth of Cut Ad(mm)             | RPM           | Feed (mm/min) | Depth of Cut Ad(mm) | RPM           | Feed (mm/min) |
| 1.0              | 0.020~0.030          | 14,000~25,000 | 340~1,260     | 0.020~0.030                     | 14,000~25,000 | 170~1,050     | 0.030~0.050         | 17,000~30,000 | 1,200~3,000   |
| 1.5              | 0.020~0.030          | 14,000~25,000 | 680~1,680     | 0.020~0.030                     | 14,000~25,000 | 510~1,470     | 0.050~0.100         | 17,000~30,000 | 1,500~3,000   |
| 2.0              | 0.020~0.030          | 9,000~20,000  | 480~1,360     | 0.020~0.030                     | 9,000~20,000  | 360~1,190     | 0.050~0.100         | 17,000~30,000 | 1,500~3,000   |
| 3.0              | 0.040~0.060          | 12,000~18,000 | 1,800~2,100   | 0.040~0.060                     | 9,000~20,000  | 1,500~1,800   | 0.050~0.100         | 17,000~25,000 | 3,000~3,500   |
| 4.0              | 0.040~0.060          | 5,000~18,000  | 1,950~2,250   | 0.040~0.060                     | 4,000~18,000  | 1,650~1,950   | 0.080~0.120         | 15,000~25,000 | 3,200~3,500   |
| 6.0              | 0.040~0.060          | 5,000~13,000  | 2,400~2,800   | 0.040~0.060                     | 4,000~13,000  | 2,200~2,400   | 0.080~0.120         | 15,000~25,000 | 3,800~4,200   |
| 8.0              | 0.040~0.060          | 4,000~9,000   | 2,200~2,400   | 0.040~0.060                     | 4,000~9000    | 1,800~2,100   | 0.080~0.120         | 7,000~15,000  | 3,800~4,200   |
| 10.0             | 0.080~0.120          | 3,000~6,000   | 1,500~1,900   | 0.080~0.120                     | 3,000~6,000   | 1,500~1,900   | 0.080~0.120         | 5,000~13,000  | 4,200~4,800   |
| 12.0             | 0.080~0.120          | 2,000~5,000   | 1,400~1,800   | 0.080~0.120                     | 3,000~5,000   | 1,400~1,800   | 0.080~0.120         | 3,000~9,000   | 4,200~4,800   |

Depth of Cut



## △ 경고 WARNING

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- ap(mm) : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

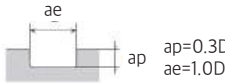
MULTI

Technical data

A-PRO

2ACR

Milling Condition

| 피삭재              | 탄소강                                                                                 |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|------------------|-------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                 |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                                |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                                 | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 6                | 3,800                                                                               | 250           | 2,700                | 130           | 1,600                           | 55            |
| 8                | 2,900                                                                               | 240           | 2,100                | 120           | 1,200                           | 50            |
| 10               | 2,300                                                                               | 230           | 1,700                | 100           | 1,000                           | 50            |
| 12               | 2,000                                                                               | 230           | 1,400                | 100           | 800                             | 45            |
| Depth of Cut     |  |               |                      |               |                                 |               |

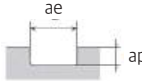
### ⚠ 경고 WARNING

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3. 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
4. 회전수와 테이블 이송은 같은 비율로 조정해주시시오.
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# A-PRO 2ALR

## Milling Condition

| 피삭재              | 탄소강                                                                                                        |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|------------------|------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                        |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                                                       |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                                                        | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 6                | 3,800                                                                                                      | 250           | 2,700                | 130           | 1,600                           | 55            |
| 8                | 2,900                                                                                                      | 240           | 2,100                | 120           | 1,200                           | 50            |
| 10               | 2,300                                                                                                      | 230           | 1,700                | 100           | 1,000                           | 50            |
| 12               | 2,000                                                                                                      | 230           | 1,400                | 100           | 800                             | 45            |
| Depth of Cut     |  $ap=0.3D$<br>$ae=1.0D$ |               |                      |               |                                 |               |

### △ 경고 WARNING

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R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

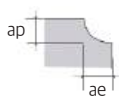
MULTI

Technical data

A-PRO

4ARR

High Speed Milling Condition

| 피삭재              | 탄소강                                                                                                                                                             |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                                                                             |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                                                                                                            |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                                                                                                             | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 3                | 21,000                                                                                                                                                          | 3,200         | 19,100               | 2,900         | 17,000                          | 2,300         |
| 4                | 16,000                                                                                                                                                          | 3,200         | 14,300               | 2,850         | 12,800                          | 2,350         |
| 6                | 10,500                                                                                                                                                          | 4,250         | 9,500                | 3,800         | 8,500                           | 3,050         |
| 8                | 8,000                                                                                                                                                           | 3,500         | 7,200                | 3,200         | 6,400                           | 2,500         |
| 10               | 6,400                                                                                                                                                           | 3,050         | 5,750                | 2,750         | 5,100                           | 2,250         |
| 12               | 5,300                                                                                                                                                           | 2,750         | 4,800                | 2,500         | 4,250                           | 2,050         |
| Depth of Cut     |  <p> <math>ap=0.01D\sim0.02D</math><br/> <math>ae=0.20D\sim0.40D</math> </p> |               |                      |               |                                 |               |

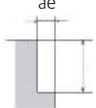
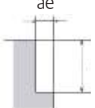
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5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

# A-PRO 4ACR

## Milling Condition

| 피삭재              | 탄소강                                                                                                        |               | 프리하든강                |               | 고경도강(열처리강)                                                                                                    |               |
|------------------|------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------------------------------------------------------------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                        |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX)                                                                               |               |
| HRC              | ~ 30                                                                                                       |               | 30 ~ 45              |               | 45 ~ 55                                                                                                       |               |
| Outside Diameter | RPM                                                                                                        | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                                                                                                           | Feed (mm/min) |
| 6                | 3,800                                                                                                      | 440           | 2,800                | 140           | 1,600                                                                                                         | 70            |
| 8                | 2,900                                                                                                      | 420           | 2,100                | 140           | 1,200                                                                                                         | 65            |
| 10               | 2,400                                                                                                      | 400           | 1,700                | 120           | 1,000                                                                                                         | 65            |
| 12               | 2,000                                                                                                      | 400           | 1,400                | 120           | 800                                                                                                           | 60            |
| Depth of Cut     |  $ap=0.1D$<br>$ae=1.0D$ |               |                      |               |  $ap=0.02D$<br>$ae=1.0D$ |               |

### △ 경고 WARNING

- 정밀하고 강성이 있는 홀더와 장비를 사용해주시요.
- 절입량의 ap는 축방향 절입량을 표시합니다.
- 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
- 회전수와 테이블 이송은 같은 비율로 조정해주시요.
- 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따로 조건을 조정해서 가공하시기 바랍니다.

- Use a rigid precise machine and holder.
- ap(mm) : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
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R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

MULTI

Technical data

A-PRO

4ALR

Milling Condition

| 피삭재              | 탄소강                                                                         |               | 프리하든강                |               | 고경도강(열처리강)                      |               |
|------------------|-----------------------------------------------------------------------------|---------------|----------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                         |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                        |               | 30 ~ 45              |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                         | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 6                | 10,500                                                                      | 3,850         | 9,000                | 3,450         | 8,000                           | 2,700         |
| 8                | 7,500                                                                       | 3,200         | 6,750                | 2,850         | 6,000                           | 2,250         |
| 10               | 6,050                                                                       | 2,800         | 5,400                | 2,500         | 4,750                           | 2,000         |
| 12               | 5,050                                                                       | 2,500         | 4,500                | 2,250         | 4,000                           | 1,830         |
| Depth of Cut     | <p> <math>ap=0.01D\sim0.02D</math><br/> <math>ae=0.20D\sim0.40D</math> </p> |               |                      |               |                                 |               |

### ⚠ 경고 WARNING

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- 절입량의  $ap$ 는 축방향 절입량을 표시합니다.
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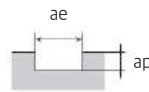
- Use a rigid precise machine and holder.
- $ap(mm)$  : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

# A-PRO 2ARE

High Speed Milling Condition

| 피삭재              | 탄소강                                   |               |               | 프리하드강                           |               |               | 동합금                 |               |               |
|------------------|---------------------------------------|---------------|---------------|---------------------------------|---------------|---------------|---------------------|---------------|---------------|
| Workpiece        | Carbon Steels(S45C, SCM 440, SCr 415) |               |               | Preharden Steel(NAK 80, HPM 50) |               |               | Copper Alloys       |               |               |
| HRC              | ~ 30                                  |               |               | 30 ~ 45                         |               |               |                     |               |               |
| Outside Diameter | Depth of Cut Ad(mm)                   | RPM           | Feed (mm/min) | Depth of Cut Ad(mm)             | RPM           | Feed (mm/min) | Depth of Cut Ad(mm) | RPM           | Feed (mm/min) |
| 0.5              | 0.004~0.015                           | 20,000~40,000 | 200~500       | 0.002~0.015                     | 20,000~32,000 | 100~400       | 0.005~0.015         | 20,000~30,000 | 100~800       |
| 0.6              | 0.004~0.020                           | 17,000~33,000 | 230~620       | 0.003~0.015                     | 15,000~30,000 | 150~420       | 0.005~0.030         | 15,000~30,000 | 200~980       |
| 0.7              | 0.010~0.020                           | 18,000~32,000 | 250~450       | 0.006~0.010                     | 15,000~22,000 | 150~300       | 0.010~0.030         | 15,000~30,000 | 300~820       |
| 0.8              | 0.005~0.030                           | 16,000~32,000 | 250~650       | 0.004~0.018                     | 12,000~25,000 | 150~350       | 0.007~0.030         | 15,000~30,000 | 300~1,170     |
| 1.0              | 0.007~0.040                           | 13,000~27,000 | 250~600       | 0.004~0.035                     | 10,000~17,000 | 160~400       | 0.009~0.050         | 15,000~22,000 | 430~1,200     |
| 1.2              | 0.015~0.050                           | 11,000~20,000 | 250~500       | 0.010~0.030                     | 8,000~14,000  | 200~350       | 0.020~0.050         | 15,000~22,000 | 500~980       |
| 1.5              | 0.010~0.050                           | 9,000~16,000  | 270~550       | 0.008~0.040                     | 6,000~14,000  | 190~400       | 0.025~0.070         | 15,000~22,000 | 500~1,100     |
| 2.0              | 0.017~0.050                           | 6,000~15,000  | 250~550       | 0.010~0.035                     | 5,000~12,000  | 200~400       | 0.025~0.070         | 10,000~17,000 | 500~1,100     |
| 3.0              | 0.030~0.070                           | 5,000~10,000  | 250~600       | 0.020~0.050                     | 4,000~10,000  | 200~400       | 0.050~0.110         | 7,000~11,000  | 500~1150      |
| 4.0              | 0.040~0.100                           | 5,000~7,000   | 250~650       | 0.030~0.070                     | 2,800~10,000  | 200~410       | 0.060~0.150         | 5,000~8,500   | 530~1,200     |

Depth of Cut



## △ 경고 WARNING

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- Use a rigid precise machine and holder.
- ap(mm) : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
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R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

MULTI

Technical data

A-PRO

2APE

Milling Condition

| 피삭재              | 탄소강                                                                     |               | 프리하든강                |               | 고경도강(열처리강)                                                              |               |
|------------------|-------------------------------------------------------------------------|---------------|----------------------|---------------|-------------------------------------------------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                     |               | Preharden Steel(NAK) |               | Hardened Steels(SKD 61, STAVAX)                                         |               |
| HRC              | ~ 30                                                                    |               | 30 ~ 45              |               | 45 ~ 55                                                                 |               |
| Outside Diameter | RPM                                                                     | Feed (mm/min) | RPM                  | Feed (mm/min) | RPM                                                                     | Feed (mm/min) |
| 1.0              | 29,000                                                                  | 520           | 19,000               | 260           | 12,000                                                                  | 120           |
| 1.5              | 20,000                                                                  | 530           | 13,000               | 270           | 8,500                                                                   | 120           |
| 2.0              | 16,000                                                                  | 530           | 10,000               | 270           | 6,500                                                                   | 120           |
| 3.0              | 11,000                                                                  | 580           | 6,500                | 290           | 4,500                                                                   | 140           |
| 4.0              | 8,800                                                                   | 560           | 5,500                | 270           | 3,500                                                                   | 130           |
| 6.0              | 6,500                                                                   | 540           | 3,700                | 250           | 2,500                                                                   | 130           |
| 8.0              | 4,800                                                                   | 540           | 2,800                | 250           | 2,000                                                                   | 130           |
| 10.0             | 3,800                                                                   | 540           | 2,300                | 250           | 1,500                                                                   | 130           |
| 12.0             | 3,200                                                                   | 540           | 1,900                | 250           | 1,300                                                                   | 130           |
| Depth of Cut     | $ap=0.15D \ (D \leq \varnothing 3)$<br>$ap=0.20D \ (D > \varnothing 3)$ |               |                      |               | $ap=0.10D \ (D \leq \varnothing 6)$<br>$ap=0.15D \ (D > \varnothing 6)$ |               |

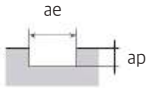
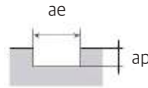
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# A-PRO 2AEL

## Milling Condition

| 피삭재              | 탄소강                                                                                                                                                     |               | 프리하든강                      |                                                                                                                                                           | 고경도강(열처리강)                      |               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                                                                     |               | Preharden Steel(NAK)       |                                                                                                                                                           | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ HRC 30                                                                                                                                                |               | HRC 30 ~ 45                |                                                                                                                                                           | HRC 45 ~ 55                     |               |
| Outside Diameter | Speed (min <sup>-1</sup> )                                                                                                                              | Feed (mm/min) | Speed (min <sup>-1</sup> ) | Feed (mm/min)                                                                                                                                             | Speed (min <sup>-1</sup> )      | Feed (mm/min) |
| 1.0              | 29,000                                                                                                                                                  | 520           | 19,000                     | 260                                                                                                                                                       | 12,000                          | 120           |
| 1.5              | 20,000                                                                                                                                                  | 530           | 13,000                     | 270                                                                                                                                                       | 8,500                           | 120           |
| 2.0              | 16,000                                                                                                                                                  | 530           | 10,000                     | 270                                                                                                                                                       | 6,500                           | 120           |
| 3.0              | 11,000                                                                                                                                                  | 580           | 6,500                      | 290                                                                                                                                                       | 4,500                           | 140           |
| 4.0              | 8,800                                                                                                                                                   | 560           | 5,500                      | 270                                                                                                                                                       | 3,500                           | 130           |
| 6.0              | 6,500                                                                                                                                                   | 540           | 3,700                      | 250                                                                                                                                                       | 2,500                           | 130           |
| 8.0              | 4,800                                                                                                                                                   | 540           | 2,800                      | 250                                                                                                                                                       | 2,000                           | 130           |
| 10.0             | 3,800                                                                                                                                                   | 540           | 2,300                      | 250                                                                                                                                                       | 1,500                           | 130           |
| 12.0             | 3,200                                                                                                                                                   | 540           | 1,900                      | 250                                                                                                                                                       | 1,300                           | 130           |
| Depth of Cut     |  $ap=0.15D (D \leq \varnothing 3)$<br>$ap=0.20D (D > \varnothing 3)$ |               |                            |  $ap=0.10D (D \leq \varnothing 6)$<br>$ap=0.15D (D > \varnothing 6)$ |                                 |               |

### △ 경고 WARNING

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R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO GRAIN

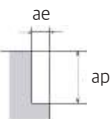
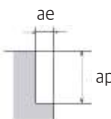
MULTI

Technical data

A-PRO

4APE

Milling Condition

| 피삭재              | 탄소강                                                                                                                                                                          |               | 프리하든강                                                                                                                                                                        |               | 고경도강(열처리강)                      |               |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                                                                                          |               | Preharden Steel(NAK)                                                                                                                                                         |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                                                                                                                         |               | 30 ~ 45                                                                                                                                                                      |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                                                                                                                          | Feed (mm/min) | RPM                                                                                                                                                                          | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 2.0              | 19,000                                                                                                                                                                       | 750           | 15,000                                                                                                                                                                       | 650           | 12,000                          | 350           |
| 3.0              | 15,000                                                                                                                                                                       | 1,000         | 12,500                                                                                                                                                                       | 800           | 10,000                          | 500           |
| 4.0              | 11,000                                                                                                                                                                       | 1,100         | 9,500                                                                                                                                                                        | 850           | 7,900                           | 600           |
| 6.0              | 7,500                                                                                                                                                                        | 1,100         | 6,500                                                                                                                                                                        | 850           | 5,200                           | 600           |
| 8.0              | 5,500                                                                                                                                                                        | 1,000         | 4,800                                                                                                                                                                        | 750           | 4,000                           | 500           |
| 10.0             | 4,500                                                                                                                                                                        | 1,000         | 3,800                                                                                                                                                                        | 750           | 3,200                           | 500           |
| 12.0             | 3,700                                                                                                                                                                        | 1,000         | 3,200                                                                                                                                                                        | 750           | 2,500                           | 500           |
| Depth of Cut     |  $ap=1.0D, Rd=0.02D (D \leq \varnothing 6)$<br>$ap=1.0D, Rd=0.05D (D \leq \varnothing 6)$ |               |  $ap=1.0D, Rd=0.02D (D \leq \varnothing 6)$<br>$ap=1.0D, Rd=0.05D (D \leq \varnothing 6)$ |               |                                 |               |

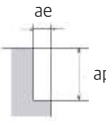
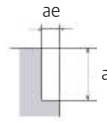
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# A-PRO 4AEL

## Milling Condition

| 피삭재              | 탄소강                                                                                                                                                                       |               | 프리하든강                                                                                                                                                                     |               | 고경도강(열처리강)                      |               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                                                                                       |               | Preharden Steel(NAK)                                                                                                                                                      |               | Hardened Steels(SKD 61, STAVAX) |               |
| HRC              | ~ 30                                                                                                                                                                      |               | 30 ~ 45                                                                                                                                                                   |               | 45 ~ 55                         |               |
| Outside Diameter | RPM                                                                                                                                                                       | Feed (mm/min) | RPM                                                                                                                                                                       | Feed (mm/min) | RPM                             | Feed (mm/min) |
| 2.0              | 19,000                                                                                                                                                                    | 750           | 15,000                                                                                                                                                                    | 650           | 12,000                          | 350           |
| 3.0              | 15,000                                                                                                                                                                    | 1,000         | 12,500                                                                                                                                                                    | 800           | 10,000                          | 500           |
| 4.0              | 11,000                                                                                                                                                                    | 1,100         | 9,500                                                                                                                                                                     | 850           | 7,900                           | 600           |
| 6.0              | 7,500                                                                                                                                                                     | 1,100         | 6,500                                                                                                                                                                     | 850           | 5,200                           | 600           |
| 8.0              | 5,500                                                                                                                                                                     | 1,000         | 4,800                                                                                                                                                                     | 750           | 4,000                           | 500           |
| 10.0             | 4,500                                                                                                                                                                     | 1,000         | 3,800                                                                                                                                                                     | 750           | 3,200                           | 500           |
| 12.0             | 3,700                                                                                                                                                                     | 1,000         | 3,200                                                                                                                                                                     | 750           | 2,500                           | 500           |
| Depth of Cut     |  $ap=1.0D, Rd=0.02D (D \leq \varnothing 6)$<br>$ap=1.0D, Rd=0.05D (D > \varnothing 6)$ |               |  $ap=1.0D, Rd=0.02D (D \leq \varnothing 6)$<br>$ap=1.0D, Rd=0.05D (D > \varnothing 6)$ |               |                                 |               |

### △ 경고 WARNING

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- 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따로 조건을 조정해서 가공하시기 바랍니다.

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- $ap(mm)$  : Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

R-PRO

H-PRO

A-PRO

X-PRO

SUS MILL

S-PRO

D-PRO

A-PLUS

AL-PRO

AL MILL

ABS

MICRO  
GRAIN

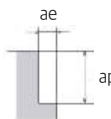
MULTI

Technical data

A-PRO

4APL

Milling Condition

| 피삭재              | 탄소강                                                                                                                                                                                                             |               | 프리하든강                |               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|
| Workpiece        | Carbon Steels(S45C)                                                                                                                                                                                             |               | Preharden Steel(NAK) |               |
| HRC              | ~ 30                                                                                                                                                                                                            |               | 30 ~ 45              |               |
| Outside Diameter | RPM                                                                                                                                                                                                             | Feed (mm/min) | RPM                  | Feed (mm/min) |
| 4.0              | 4,000                                                                                                                                                                                                           | 190           | 2,800                | 130           |
| 6.0              | 2,600                                                                                                                                                                                                           | 190           | 1,800                | 130           |
| 8.0              | 1,900                                                                                                                                                                                                           | 190           | 1,300                | 130           |
| 10.0             | 1,500                                                                                                                                                                                                           | 190           | 1,100                | 130           |
| 12.0             | 1,300                                                                                                                                                                                                           | 190           | 900                  | 110           |
| Depth of Cut     |  <p> <math>ap=2.5D, Rd=0.05D (D \leq \varnothing 10)</math><br/> <math>ap=2.5D, Rd=0.5mm (D \leq \varnothing 10)</math> </p> |               |                      |               |

## ⚠ 경고 WARNING

1. 정밀하고 강성이 있는 홀더와 장비를 사용해주시요.
2. 절입량의 ap는 축방향 절입량을 표시합니다.
3. 강재 가공 시 Air Blow나 Oil Mist 사용을 추천합니다.
4. 회전수와 테이블 이송은 같은 비율로 조정해주시요.
5. 상기 조건표는 참고 자료이니 실제 가공 시 가공 형상, 기계 용량, 작업환경에 따라 조건을 조정해서 가공하시기 바랍니다.

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