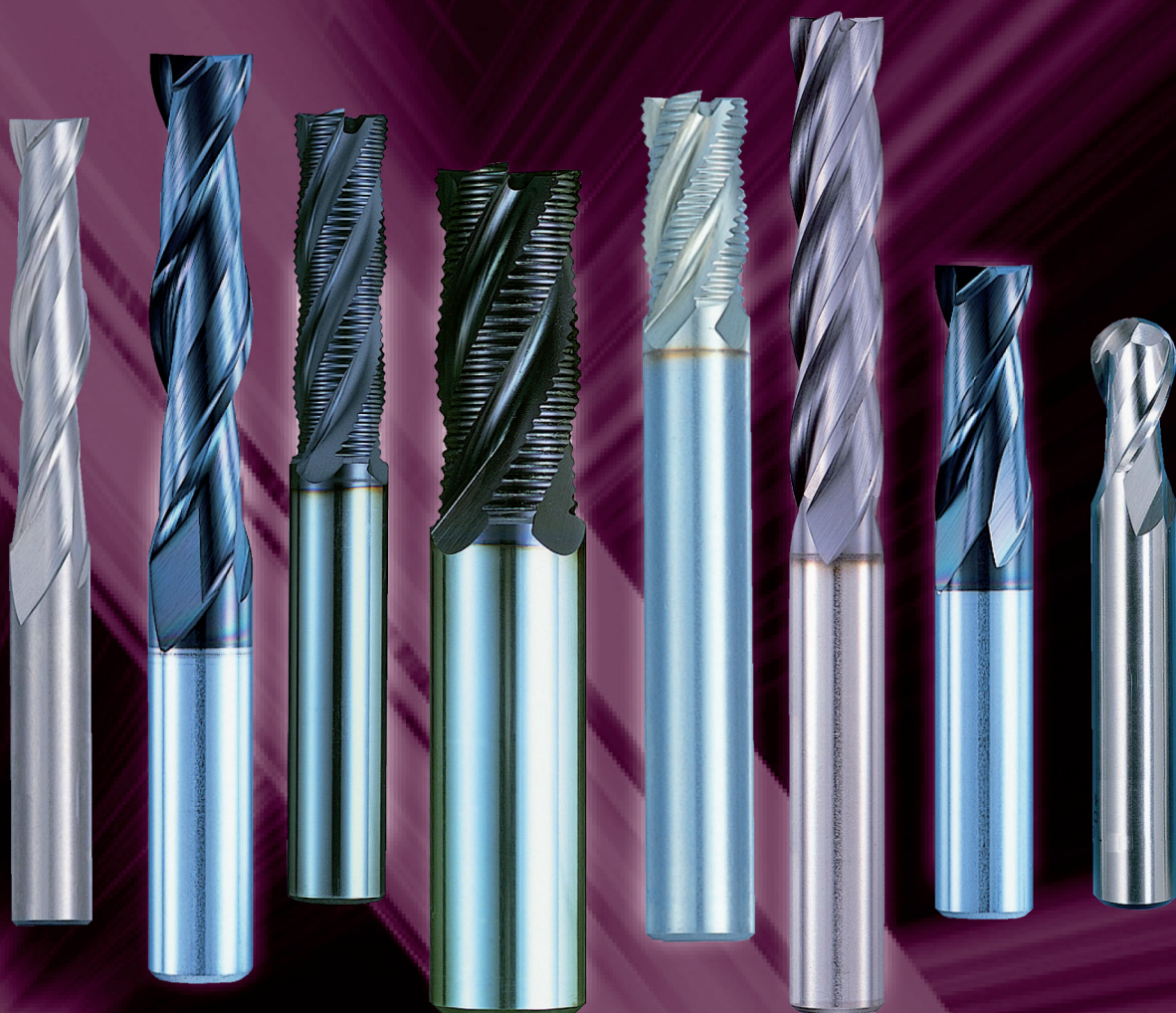


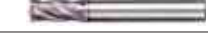
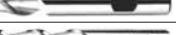
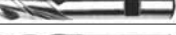
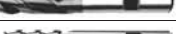
# NACHI

## FRESAS

### HSS



# TABLA DE SELECCIÓN

| FRESA                                   | REF.   | MATERIAL | RECUB.  | DIÁMETRO   | NORMA | PÁGINA  |                      |                                                                                       |
|-----------------------------------------|--------|----------|---------|------------|-------|---------|----------------------|---------------------------------------------------------------------------------------|
|                                         |        |          |         |            |       | MEDIDAS | CONDICIONES DE CORTE |                                                                                       |
| SERIE CORTA Z=2 JIS                     | 6490   | FMX      | AG      | 1,0 - 30,0 | JIS   | 5       | 29                   |    |
| SERIE MEDIA Z=2 JIS                     | 6492   |          |         | 1,0 - 20,0 | JIS   | 6       | 29                   |    |
| SERIE LARGA Z=2 JIS                     | 6494   |          |         | 3,0 - 20,0 | JIS   | 6       | 29                   |    |
| SERIE CORTA Z=4 JIS                     | 6496   |          |         | 2,0 - 30,0 | JIS   | 7       | 30                   |    |
| SERIE LARGA Z=4 JIS                     | 6498   |          |         | 3,0 - 25,0 | JIS   | 7       | 30                   |    |
| SEMI DESBASTE S/CORTA                   | 6402   |          |         | 3,0 - 32,0 | JIS   | 8       | 31                   |    |
| SEMI DESBASTE S/LARGA                   | 6404   |          |         | 4,0 - 30,0 | JIS   | 8       | 31                   |    |
| GRAN DESBASTE PASO FINO S/CORTA         | 6484   |          |         | 6,0 - 40,0 | JIS   | 9       | 32                   |    |
| GRAN DESBASTE PASO FINO S/CORTA M/LARGO | 6406   |          |         | 6,0 - 32,0 | JIS   | 9       | 32                   |    |
| GRAN DESBASTE PASO FINO S/MEDIA         | 6486   |          |         | 6,0 - 25,0 | JIS   | 10      | 32                   |    |
| GRAN DESBASTE PASO FINO S/LARGA         | 6488   |          |         | 6,0 - 40,0 | JIS   | 10      | 33                   |    |
| GRAN DESBASTE PASO FINO S/CORTA TÓRICA  | 6422   |          |         | 6,0 - 25,0 | JIS   | 11      | 32                   |    |
| GRAN DESBASTE SERIE CORTA               | 6322WT | HSS-Co8  | TIALN   | 6,0 - 30,0 | DIN   | 12      | 33                   |    |
| GRAN DESBASTE SERIE LARGA               | 6324WT |          |         | 6,0 - 25,0 | DIN   | 12      | 33                   |    |
| GRAN DESBASTE PASO FINO S/CORTA M/LARGO | 7300P  | HSS-PM   | PLATINA | 6,0 - 32,0 | JIS   | 13      | 34                   |    |
| GRAN DESBASTE PASO FINO S/MEDIA         | 7310P  |          |         | 6,0 - 30,0 | JIS   | 14      | 34                   |   |
| GRAN DESBASTE PASO FINO S/LARGA         | 7304P  |          |         | 6,0 - 30,0 | JIS   | 14      | 34                   |  |
| DLC Z=2                                 | 6450   | HSS-Co8  | DLC     | 1,0 - 20,0 | JIS   | 15      | 35                   |  |
| SERIE CORTA ALUMINIO Z=2                | 6276W  |          |         | 2,0 - 25,0 | DIN   | 16      | 35                   |  |
| SERIE LARGA ALUMINIO Z=2                | 6278W  |          |         | 2,0 - 20,0 | DIN   | 16      | 35                   |  |
| SERIE CORTA Z=2                         | 6258W  |          |         | 2,0 - 36,0 | DIN   | 17      | 36                   |  |
| SERIE CORTA Z=2                         | 6258WT |          | TIALN   | 6,0 - 25,0 | DIN   | 17      | 36                   |  |
| SERIE MEDIA Z=2                         | 6230   |          |         | 1,0 - 30,0 | JIS   | 18      | 36                   |  |
| SERIE LARGA Z=2                         | 6232   |          |         | 3,0 - 30,0 | JIS   | 18      | 36                   |  |
| SERIE CORTA PUNTA ESFÉRICA Z=2          | 6350W  |          |         | 2,0 - 32,0 | DIN   | 19      | 37                   |  |
| SERIE CORTA PUNTA ESFÉRICA Z=2          | 6350WT |          | TIALN   | 2,0 - 25,0 | DIN   | 19      | 37                   |  |
| SERIE LARGA PUNTA ESFÉRICA Z=2          | 6352W  |          |         | 2,0 - 30,0 | DIN   | 20      | 37                   |  |
| SERIE LARGA PUNTA ESFÉRICA Z=2          | 6352WT |          |         | 2,0 - 20,0 | DIN   | 20      | 37                   |  |
| SERIE CORTA Z=3                         | 6280W  |          |         | 2,0 - 25,0 | DIN   | 21      | 38                   |  |
| SERIE CORTE Z=3                         | 6280WT |          |         | 2,0 - 25,0 | DIN   | 21      | 38                   |  |
| SERIE MEDIA Z=3                         | 6288W  |          |         | 2,0 - 30,0 | DIN   | 22      | 38                   |  |
| SERIE MEDIA Z=3                         | 6288WT |          |         | 2,0 - 25,0 | DIN   | 22      | 38                   |  |
| GRAN RENDIMIENTO 50°                    | 6242W  |          |         | 6,0 - 30,0 | DIN   | 23      | 38                   |  |
| SERIE LARGA Z=3                         | 6298W  |          |         | 3,0 - 25,0 | DIN   | 23      | 38                   |  |
| SERIE CORTA VARIOS LABIOS               | 6260W  |          |         | 2,0 - 40,0 | DIN   | 24      | 39                   |  |
| SERIE LARGA VARIOS LABIOS               | 6262W  |          |         | 2,0 - 32,0 | DIN   | 24      | 39                   |  |
| SEMI-DESBASTE S/CORTA                   | 6366   |          |         | 6,0 - 40,0 | JIS   | 25      | 40                   |  |
| SEMI-DESBASTE S/LARGA                   | 6368   |          |         | 6,0 - 32,0 | JIS   | 25      | 40                   |  |
| GRAN DESBASTE S/CORTA                   | 6322W  |          |         | 6,0 - 40,0 | DIN   | 26      | 41                   |  |
| GRAN DESBASTE S/LARGA                   | 6324W  |          |         | 6,0 - 40,0 | DIN   | 26      | 41                   |  |
| GRAN DESBASTE PASO FINO S/CORTA         | 6308W  |          |         | 6,0 - 30,0 | DIN   | 27      | 42                   |  |
| GRAN DESBASTE PASO FINO S/LARGA         | 6328W  |          |         | 6,0 - 30,0 | DIN   | 27      | 42                   |  |

● EXCELENTE      ○ BUENA

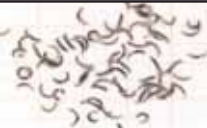
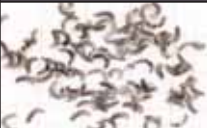
[illegible]

## FRESAS HSS FMX CON RECUBRIMIENTO AG

### Características

- Nuevo acero rápido FMX combinado con el excelente recubrimiento AG NACHI.
- Fresado de alto rendimiento aplicable en una alta gama de materiales.
- Fresas Z=2, Z=3, Z=4 y fresas de gran desbaste con nuevas geometrias que mejoran el control y la evacuación de la viruta.

#### COMPARACIÓN DE VIRUTAS

|                                | Fresas desbaste AG-Mill                                                            | Competidor                                                                         |
|--------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Inicio de trabajo              |   |   |
| Después de 5 metros de fresado |  |  |



#### MATERIALES A MECANIZAR

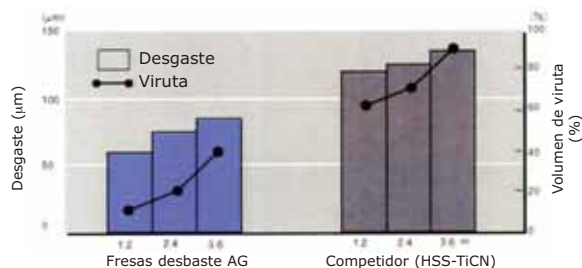
- Aceros al Carbono, Aceros Aleados, Aceros de Molde, Aceros Pre-templados, Aceros Inoxidables, Aleaciones de Níquel, Fundición, Aleaciones de Aluminio.

### Rendimientos

Excelente resistencia al astillamiento y al desgaste

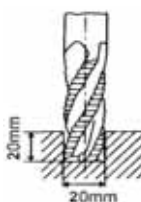


Contorneado con fresa AG Z=4 (Velocidad de corte 80m/min)



#### CONDICIONES DE FRESADO

Ø Fresa 20 (AGRS)  
Velocidad de corte: 40m/min.  
Avance: 0,1mm/diente  
Material: S50C (180HB)  
Refrigerante: Emulsión



#### CONDICIONES DE FRESADO

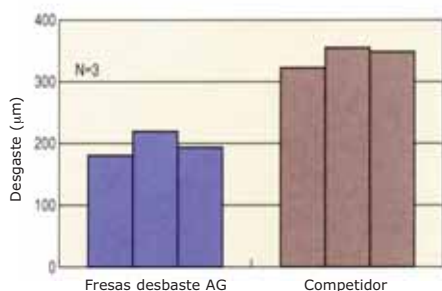
Ø Fresa 6  
Velocidad de corte: 80m/min.  
Avance: 400mm/min  
Material: S50C  
Refrigerante: Aire Comprimido



# FRESAS HSS FMX CON RECUBRIMIENTO AG

## Rendimientos

### CONTORNADO CON FRESA DESBASTE AG



#### CONDICIONES DE FRESADO

Ø Fresa 20 (AGRERS)  
**Velocidad de corte:** 22m/min.  
**Avance:** 0,093mm/diente  
**Material:** SKD11 (210HB)  
**Refrigerante:** Aire Comprimido



### RANURADO CON FRESA DESBASTE AG



#### CONDICIONES DE FRESADO

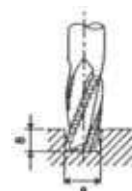
Ø Fresa 20 (AGRERS)  
**Velocidad de corte:** 40m/min.  
**Avance:** 0,1mm/diente  
**Material:** S50C (180HB)  
**Refrigerante:** Emulsión

### RANURADO CON FRESA HEAVY AG

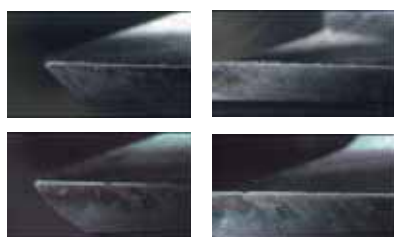


#### CONDICIONES DE FRESADO

Ø Fresa 8 (AGHV)  
**Velocidad de corte:** 60m/min.  
**Avance:** 0,038mm/diente  
**Material:** S50C (190HB)  
**Refrigerante:** Emulsión

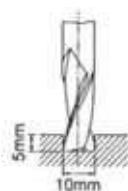


### RANURADO FRESA AG Z=2

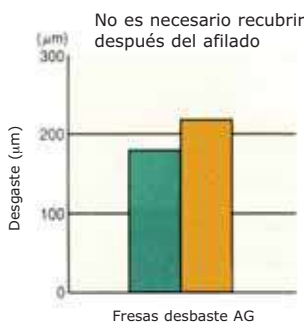


#### CONDICIONES DE FRESADO

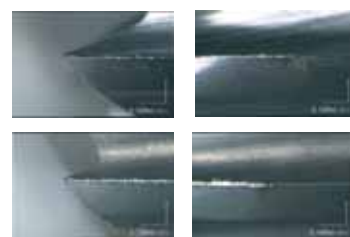
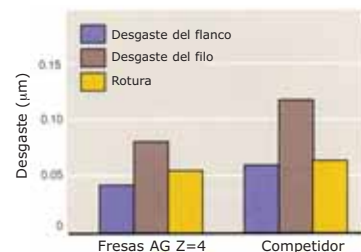
Ø Fresa 10  
**Velocidad de corte:** 50m/min.  
**Avance:** 210mm/min (0,066mm/diente)  
**Material:** S50C (180HB)  
**Refrigerante:** Aire Comprimido



### RENDIMIENTO CON FRESA DESBASTE AG DESPUÉS DE AFILADO

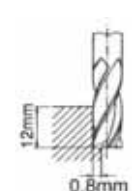


### CONTORNEADO FRESA AG Z=4



#### CONDICIONES DE FRESADO

Ø Fresa 8  
**Velocidad de corte:** 40m/min.  
**Avance:** 250mm/min (0,04mm/diente)  
**Material:** NAK55 (40HRC)  
**Refrigerante:** Aire Comprimido



## REF. 6490 FRESAS HSS-FMX NORMA JIS SERIE CORTA Z=2 RECUBRIMIENTO AG

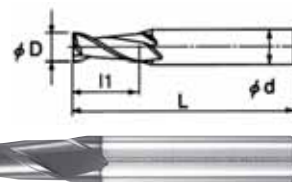
JIS

FMX

AG



- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D   | d | l1  | L  | P.V.P. |
|-----|---|-----|----|--------|
| 1,0 | 6 | 2   | 50 | ●      |
| 1,1 | 6 | 2,5 | 50 | ●      |
| 1,2 | 6 | 2,5 | 50 | ●      |
| 1,3 | 6 | 3   | 50 | ●      |
| 1,4 | 6 | 3   | 50 | ●      |
| 1,5 | 6 | 3   | 50 | ●      |
| 1,6 | 6 | 3,5 | 50 | ●      |
| 1,7 | 6 | 3,5 | 50 | ●      |
| 1,8 | 6 | 4   | 50 | ●      |
| 1,9 | 6 | 4   | 50 | ●      |
| 2,0 | 6 | 4   | 50 | ●      |
| 2,1 | 6 | 4,5 | 50 | ●      |
| 2,2 | 6 | 4,5 | 50 | ●      |
| 2,3 | 6 | 5   | 50 | ●      |
| 2,4 | 6 | 5   | 50 | ●      |
| 2,5 | 6 | 5   | 50 | ●      |
| 2,6 | 6 | 5,5 | 50 | ●      |
| 2,7 | 6 | 5,5 | 50 | ●      |
| 2,8 | 6 | 6   | 50 | ●      |
| 2,9 | 6 | 6   | 50 | ●      |
| 3,0 | 6 | 6   | 50 | ●      |
| 3,1 | 6 | 6,5 | 50 | ●      |
| 3,2 | 6 | 6,5 | 50 | ●      |
| 3,3 | 6 | 7   | 50 | ●      |
| 3,4 | 6 | 7   | 50 | ●      |
| 3,5 | 8 | 8   | 60 | ●      |
| 3,6 | 8 | 8   | 60 | ●      |
| 3,7 | 8 | 8   | 60 | ●      |
| 3,8 | 8 | 8   | 60 | ●      |
| 3,9 | 8 | 8   | 60 | ●      |
| 4,0 | 8 | 8   | 60 | ●      |
| 4,1 | 8 | 9   | 60 | ●      |
| 4,2 | 8 | 9   | 60 | ●      |
| 4,3 | 8 | 10  | 60 | ●      |
| 4,4 | 8 | 10  | 60 | ●      |
| 4,5 | 8 | 10  | 60 | ●      |
| 4,6 | 8 | 10  | 60 | ●      |
| 4,7 | 8 | 10  | 60 | ●      |
| 4,8 | 8 | 10  | 60 | ●      |
| 4,9 | 8 | 10  | 60 | ●      |
| 5,0 | 8 | 10  | 60 | ●      |
| 5,1 | 8 | 12  | 60 | ●      |
| 5,2 | 8 | 12  | 60 | ●      |
| 5,3 | 8 | 12  | 60 | ●      |
| 5,4 | 8 | 12  | 60 | ●      |
| 5,5 | 8 | 12  | 60 | ●      |
| 5,6 | 8 | 12  | 60 | ●      |
| 5,7 | 8 | 12  | 60 | ●      |
| 5,8 | 8 | 12  | 60 | ●      |
| 5,9 | 8 | 12  | 60 | ●      |

| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 6,0  | 8  | 12 | 60  | ●      |
| 6,5  | 10 | 14 | 65  | ●      |
| 7,0  | 10 | 14 | 65  | ●      |
| 7,5  | 10 | 14 | 65  | ●      |
| 8,0  | 10 | 14 | 65  | ●      |
| 8,5  | 10 | 18 | 70  | ●      |
| 9,0  | 10 | 18 | 70  | ●      |
| 9,5  | 10 | 18 | 70  | ●      |
| 10,0 | 10 | 18 | 70  | ●      |
| 11,0 | 12 | 22 | 80  | ●      |
| 12,0 | 12 | 22 | 80  | ●      |
| 13,0 | 16 | 26 | 90  | ●      |
| 14,0 | 16 | 26 | 90  | ●      |
| 15,0 | 16 | 30 | 95  | ●      |
| 16,0 | 16 | 30 | 95  | ●      |
| 17,0 | 20 | 35 | 105 | ●      |
| 18,0 | 20 | 35 | 105 | ●      |
| 19,0 | 20 | 40 | 110 | ●      |
| 20,0 | 20 | 40 | 110 | ●      |
| 22,0 | 20 | 45 | 110 | ●      |
| 24,0 | 25 | 50 | 120 | ●      |
| 25,0 | 25 | 50 | 120 | ●      |
| 26,0 | 25 | 50 | 120 | ●      |
| 28,0 | 25 | 55 | 125 | ●      |
| 30,0 | 25 | 55 | 125 | ●      |

### Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

- Material stock Japón. Cortos plazos de entrega.

NACHI

Condiciones de corte página 29

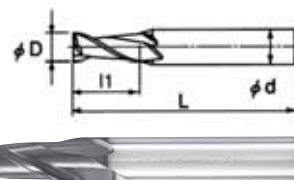
## REF. 6492 FRESAS HSS-FMX NORMA JIS SERIE MEDIA Z=2 RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1  | L  | P.V.P. |
|------|----|-----|----|--------|
| 1,0  | 6  | 3   | 50 | •      |
| 1,5  | 6  | 4,5 | 50 | •      |
| 2,0  | 6  | 7   | 50 | •      |
| 2,5  | 6  | 7   | 50 | •      |
| 3,0  | 6  | 9   | 50 | •      |
| 3,5  | 8  | 12  | 60 | •      |
| 4,0  | 8  | 12  | 60 | •      |
| 4,5  | 8  | 15  | 60 | •      |
| 5,0  | 8  | 15  | 60 | •      |
| 5,5  | 8  | 15  | 60 | •      |
| 6,0  | 8  | 15  | 60 | •      |
| 6,5  | 10 | 20  | 65 | •      |
| 7,0  | 10 | 20  | 65 | •      |
| 7,5  | 10 | 20  | 65 | •      |
| 8,0  | 10 | 20  | 65 | •      |
| 8,5  | 10 | 25  | 75 | •      |
| 9,0  | 10 | 25  | 75 | •      |
| 9,5  | 10 | 25  | 75 | •      |
| 10,0 | 10 | 25  | 75 | •      |
| 11,0 | 12 | 30  | 80 | •      |

| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 12,0 | 12 | 30 | 80  | •      |
| 13,0 | 16 | 35 | 90  | •      |
| 14,0 | 16 | 35 | 90  | •      |
| 15,0 | 16 | 40 | 95  | •      |
| 16,0 | 16 | 40 | 95  | •      |
| 17,0 | 20 | 40 | 105 | •      |
| 18,0 | 20 | 40 | 105 | •      |
| 19,0 | 20 | 45 | 110 | •      |
| 20,0 | 20 | 45 | 110 | •      |

## Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

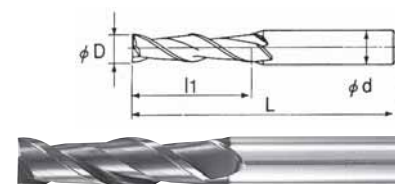
## REF. 6494 FRESAS HSS-FMX NORMA JIS SERIE LARGA Z=2 RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 3,0  | 6  | 15 | 60  | •      |
| 4,0  | 8  | 20 | 60  | •      |
| 5,0  | 8  | 25 | 65  | •      |
| 6,0  | 8  | 25 | 65  | •      |
| 7,0  | 10 | 35 | 80  | •      |
| 8,0  | 10 | 35 | 80  | •      |
| 9,0  | 10 | 45 | 95  | •      |
| 10,0 | 10 | 45 | 95  | •      |
| 11,0 | 12 | 55 | 105 | •      |
| 12,0 | 12 | 55 | 105 | •      |
| 13,0 | 16 | 55 | 110 | •      |
| 14,0 | 16 | 55 | 110 | •      |
| 15,0 | 16 | 65 | 120 | •      |
| 16,0 | 16 | 65 | 120 | •      |
| 17,0 | 20 | 65 | 130 | •      |
| 18,0 | 20 | 65 | 130 | •      |
| 19,0 | 20 | 75 | 140 | •      |
| 20,0 | 20 | 75 | 140 | •      |

## Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

## REF. 6496 FRESAS HSS-FMX NORMA JIS SERIE CORTA Z=4 RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L  | P.V.P. |
|------|----|----|----|--------|
| 2,0  | 6  | 7  | 50 | •      |
| 2,5  | 6  | 7  | 50 | •      |
| 3,0  | 6  | 9  | 50 | •      |
| 3,5  | 8  | 12 | 60 | •      |
| 4,0  | 8  | 12 | 60 | •      |
| 4,5  | 8  | 15 | 60 | •      |
| 5,0  | 8  | 15 | 60 | •      |
| 5,5  | 8  | 15 | 60 | •      |
| 6,0  | 8  | 15 | 60 | •      |
| 6,5  | 10 | 20 | 65 | •      |
| 7,0  | 10 | 20 | 65 | •      |
| 7,5  | 10 | 20 | 65 | •      |
| 8,0  | 10 | 20 | 65 | •      |
| 8,5  | 10 | 25 | 75 | •      |
| 9,0  | 10 | 25 | 75 | •      |
| 9,5  | 10 | 25 | 75 | •      |
| 10,0 | 10 | 25 | 75 | •      |
| 11,0 | 12 | 30 | 80 | •      |
| 12,0 | 12 | 30 | 80 | •      |
| 13,0 | 16 | 35 | 90 | •      |
| 14,0 | 16 | 35 | 90 | •      |
| 15,0 | 16 | 40 | 95 | •      |

| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 16,0 | 16 | 40 | 95  | •      |
| 17,0 | 20 | 40 | 105 | •      |
| 18,0 | 20 | 40 | 110 | •      |
| 19,0 | 20 | 45 | 110 | •      |
| 20,0 | 20 | 45 | 110 | •      |
| 22,0 | 20 | 45 | 110 | •      |
| 24,0 | 25 | 50 | 120 | •      |
| 25,0 | 25 | 50 | 120 | •      |
| 26,0 | 25 | 50 | 120 | •      |
| 28,0 | 25 | 55 | 125 | •      |
| 30,0 | 25 | 55 | 125 | •      |

### Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

## REF. 6498 FRESAS HSS-FMX NORMA JIS SERIE LARGA Z=4 RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 3,0  | 6  | 15 | 60  | •      |
| 4,0  | 8  | 20 | 60  | •      |
| 5,0  | 8  | 25 | 65  | •      |
| 6,0  | 8  | 25 | 65  | •      |
| 7,0  | 10 | 35 | 80  | •      |
| 8,0  | 10 | 35 | 80  | •      |
| 9,0  | 10 | 45 | 95  | •      |
| 10,0 | 10 | 45 | 95  | •      |
| 11,0 | 12 | 55 | 105 | •      |
| 12,0 | 12 | 55 | 105 | •      |
| 14,0 | 16 | 55 | 110 | •      |
| 16,0 | 16 | 65 | 120 | •      |
| 18,0 | 20 | 65 | 123 | •      |
| 20,0 | 20 | 75 | 140 | •      |
| 22,0 | 20 | 75 | 140 | •      |
| 25,0 | 25 | 90 | 160 | •      |

### Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

NACHI

Condiciones de corte página 30

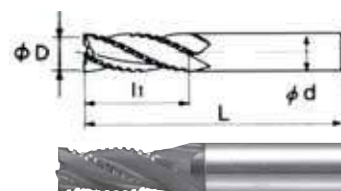
**REF. 6402 FRESAS HSS-FMX NORMA JIS SEMI-DESBASTE HEAVY SERIE CORTA  
RECUBRIMIENTO AG**

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 3,0  | 6  | 9  | 50  | 4 | ●      |
| 4,0  | 8  | 12 | 60  | 4 | ●      |
| 5,0  | 8  | 15 | 60  | 4 | ●      |
| 6,0  | 8  | 15 | 60  | 4 | ●      |
| 7,0  | 10 | 20 | 65  | 4 | ●      |
| 8,0  | 10 | 20 | 65  | 4 | ●      |
| 9,0  | 12 | 25 | 75  | 4 | ●      |
| 10,0 | 12 | 25 | 75  | 4 | ●      |
| 11,0 | 12 | 30 | 80  | 4 | ●      |
| 12,0 | 12 | 30 | 80  | 4 | ●      |
| 13,0 | 16 | 35 | 90  | 4 | ●      |
| 14,0 | 16 | 35 | 90  | 4 | ●      |
| 15,0 | 16 | 40 | 95  | 4 | ●      |
| 16,0 | 16 | 40 | 95  | 4 | ●      |
| 17,0 | 20 | 40 | 105 | 4 | ●      |
| 18,0 | 20 | 40 | 105 | 4 | ●      |
| 19,0 | 20 | 45 | 110 | 4 | ●      |
| 20,0 | 20 | 45 | 110 | 4 | ●      |
| 22,0 | 20 | 45 | 110 | 4 | ●      |
| 24,0 | 25 | 50 | 120 | 4 | ●      |

| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 25,0 | 25 | 50 | 120 | 4 | ●      |
| 28,0 | 25 | 55 | 125 | 6 | ●      |
| 30,0 | 25 | 55 | 125 | 6 | ●      |
| 32,0 | 32 | 60 | 145 | 6 | ●      |

**Tolerancias**

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 3     | +0,025 ~ 0      |
| 3                  | 6     | +0,030 ~ 0      |
| 6                  | 10    | +0,036 ~ 0      |
| 10                 | 18    | +0,043 ~ 0      |
| 18                 | 30    | +0,052 ~ 0      |
| 30                 |       | +0,062 ~ 0      |
| Diámetro Mango (d) |       | h7              |

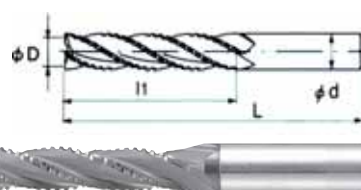
**REF. 6404 FRESAS HSS-FMX NORMA JIS SEMI-DESBASTE HEAVY SERIE LARGA  
RECUBRIMIENTO AG**

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 4,0  | 8  | 20 | 60  | 4 | ●      |
| 6,0  | 8  | 25 | 65  | 4 | ●      |
| 8,0  | 10 | 35 | 80  | 4 | ●      |
| 10,0 | 12 | 45 | 95  | 4 | ●      |
| 12,0 | 12 | 55 | 105 | 4 | ●      |
| 14,0 | 16 | 55 | 110 | 4 | ●      |
| 16,0 | 16 | 65 | 120 | 4 | ●      |
| 18,0 | 20 | 65 | 130 | 4 | ●      |
| 20,0 | 20 | 75 | 140 | 4 | ●      |
| 22,0 | 20 | 75 | 140 | 4 | ●      |
| 25,0 | 25 | 90 | 160 | 4 | ●      |
| 28,0 | 25 | 90 | 160 | 6 | ●      |
| 30,0 | 25 | 90 | 160 | 6 | ●      |

**Tolerancias**

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 3     | +0,025 ~ 0      |
| 3                  | 6     | +0,030 ~ 0      |
| 6                  | 10    | +0,036 ~ 0      |
| 10                 | 18    | +0,043 ~ 0      |
| 18                 | 30    | +0,052 ~ 0      |
| Diámetro Mango (d) |       | h7              |

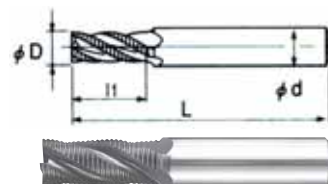
## REF. 6484 FRESAS HSS-FMX NORMA JIS GRAN DESBASTE PASO FINO SERIE CORTA RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 15 | 60  | 4 | •      |
| 7,0  | 10 | 20 | 65  | 4 | •      |
| 8,0  | 10 | 20 | 65  | 4 | •      |
| 9,0  | 10 | 25 | 75  | 4 | •      |
| 10,0 | 10 | 25 | 75  | 4 | •      |
| 11,0 | 12 | 30 | 80  | 4 | •      |
| 12,0 | 12 | 30 | 80  | 4 | •      |
| 14,0 | 16 | 35 | 90  | 4 | •      |
| 15,0 | 16 | 35 | 90  | 4 | •      |
| 16,0 | 16 | 40 | 95  | 4 | •      |
| 18,0 | 20 | 40 | 105 | 4 | •      |
| 20,0 | 20 | 45 | 110 | 4 | •      |
| 22,0 | 20 | 45 | 110 | 4 | •      |
| 24,0 | 25 | 50 | 120 | 5 | •      |
| 25,0 | 25 | 50 | 120 | 5 | •      |
| 28,0 | 25 | 55 | 125 | 5 | •      |
| 30,0 | 32 | 55 | 140 | 5 | •      |
| 32,0 | 32 | 60 | 145 | 6 | •      |
| 35,0 | 32 | 60 | 145 | 6 | •      |
| 40,0 | 32 | 65 | 150 | 6 | •      |

### Tolerancias

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

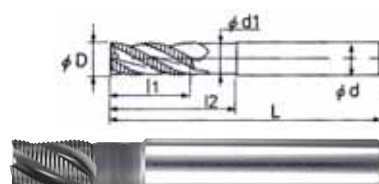
## REF. 6406 FRESAS HSS-FMX NORMA JIS GRAN DESBASTE PASO FINO SERIE CORTA MANGO LARGO RECUBRIMIENTO AG

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | l2 | d1   | L   | Z | P.V.P. |
|------|----|----|----|------|-----|---|--------|
| 6,0  | 6  | 11 | -- | --   | 80  | 4 | •      |
| 7,0  | 8  | 17 | -- | --   | 90  | 4 | •      |
| 8,0  | 8  | 17 | -- | --   | 90  | 4 | •      |
| 9,0  | 10 | 22 | -- | --   | 100 | 4 | •      |
| 10,0 | 10 | 22 | -- | --   | 100 | 4 | •      |
| 11,0 | 12 | 26 | -- | --   | 110 | 4 | •      |
| 12,0 | 12 | 26 | -- | --   | 110 | 4 | •      |
| 14,0 | 12 | 26 | -- | --   | 110 | 4 | •      |
| 15,0 | 16 | 26 | 45 | 13,3 | 125 | 4 | •      |
| 16,0 | 16 | 32 | 48 | 14,3 | 125 | 4 | •      |
| 18,0 | 16 | 32 | -- | --   | 125 | 4 | •      |
| 20,0 | 20 | 38 | 60 | 18   | 140 | 4 | •      |
| 22,0 | 20 | 38 | -- | --   | 140 | 4 | •      |
| 24,0 | 20 | 45 | -- | --   | 160 | 5 | •      |
| 25,0 | 25 | 45 | 75 | 23   | 160 | 5 | •      |
| 28,0 | 25 | 45 | -- | --   | 160 | 5 | •      |
| 30,0 | 25 | 45 | -- | --   | 160 | 5 | •      |
| 32,0 | 32 | 53 | 95 | 29,5 | 180 | 6 | •      |

### Tolerancias

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

NACHI

Condiciones de corte página 32

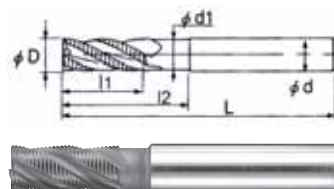
**REF. 6486 FRESAS HSS-FMX NORMA JIS GRAN DESBASTE PASO FINO SERIE MEDIA RECUBRIMIENTO AG**

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1 | l2 | d1   | L   | Z | P.V.P. |
|------|----|----|----|------|-----|---|--------|
| 6,0  | 6  | 16 | -- | --   | 80  | 4 | •      |
| 8,0  | 8  | 25 | -- | --   | 90  | 4 | •      |
| 10,0 | 10 | 32 | -- | --   | 100 | 4 | •      |
| 12,0 | 12 | 40 | -- | --   | 110 | 4 | •      |
| 14,0 | 12 | 40 | -- | --   | 110 | 4 | •      |
| 15,0 | 16 | 40 | 53 | 13,3 | 125 | 4 | •      |
| 16,0 | 16 | 48 | 56 | 14,3 | 125 | 4 | •      |
| 18,0 | 16 | 48 | -- | --   | 125 | 4 | •      |
| 20,0 | 20 | 56 | 70 | 18   | 140 | 4 | •      |
| 22,0 | 20 | 56 | -- | --   | 140 | 4 | •      |
| 25,0 | 25 | 67 | 88 | 23   | 160 | 5 | •      |

**Tolerancias**

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

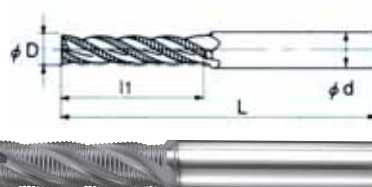
**REF. 6488 FRESAS HSS-FMX NORMA JIS GRAN DESBASTE PASO FINO SERIE LARGA RECUBRIMIENTO AG**

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RECUBRIMIENTO AG



| D    | d  | l1  | L   | Z | P.V.P. |
|------|----|-----|-----|---|--------|
| 6,0  | 6  | 26  | 80  | 4 | •      |
| 8,0  | 8  | 35  | 90  | 4 | •      |
| 10,0 | 10 | 45  | 100 | 4 | •      |
| 12,0 | 12 | 53  | 110 | 4 | •      |
| 14,0 | 12 | 53  | 110 | 4 | •      |
| 15,0 | 16 | 53  | 125 | 4 | •      |
| 16,0 | 16 | 63  | 125 | 4 | •      |
| 18,0 | 16 | 63  | 125 | 4 | •      |
| 20,0 | 20 | 75  | 140 | 4 | •      |
| 22,0 | 20 | 75  | 140 | 4 | •      |
| 24,0 | 20 | 90  | 160 | 5 | •      |
| 25,0 | 25 | 90  | 160 | 5 | •      |
| 28,0 | 25 | 90  | 160 | 5 | •      |
| 30,0 | 25 | 90  | 160 | 5 | •      |
| 32,0 | 32 | 106 | 180 | 6 | •      |
| 40,0 | 32 | 125 | 200 | 6 | •      |

**Tolerancias**

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

**REF. 6422 FRESAS HSS-FMX NORMA JIS GRAN DESBASTE PASO FINO RADIO TÓRICO  
SERIE CORTA RECUBRIMIENTO AG**



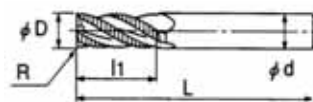
- El recubrimiento AG garantiza una larga vida de la herramienta proporcionando una gran resistencia al desgaste y a las altas temperaturas.
- Fresado estable de alto rendimiento gracias al nuevo HSS FMX con resistencia al astillamiento, que mejora las prestaciones del HSS sinterizado.
- Reducción de rotura de la herramienta gracias a su diseño con radio tórico.

JIS

FMX

AG

- HÉLICE DERECHA 30°
- ACERO ESPECIAL NACHI FMX
- RADIOS TÓRICOS
- RECUBRIMIENTO AG



| D    | d  | R   | l1 | L   | Z | P.V.P. |
|------|----|-----|----|-----|---|--------|
| 6,0  | 6  | 0,5 | 15 | 60  | 4 | •      |
| 6,0  | 6  | 1,0 | 15 | 60  | 4 | •      |
| 8,0  | 10 | 0,5 | 20 | 65  | 4 | •      |
| 8,0  | 10 | 1,0 | 20 | 65  | 4 | •      |
| 10,0 | 10 | 1,0 | 25 | 75  | 4 | •      |
| 10,0 | 10 | 1,5 | 25 | 75  | 4 | •      |
| 10,0 | 10 | 2,0 | 25 | 75  | 4 | •      |
| 12,0 | 12 | 1,0 | 30 | 80  | 4 | •      |
| 12,0 | 12 | 1,5 | 30 | 80  | 4 | •      |
| 12,0 | 12 | 2,0 | 30 | 80  | 4 | •      |
| 16,0 | 16 | 2,0 | 40 | 95  | 4 | •      |
| 16,0 | 16 | 2,5 | 40 | 95  | 4 | •      |
| 16,0 | 16 | 3,0 | 40 | 95  | 4 | •      |
| 16,0 | 16 | 4,0 | 40 | 95  | 4 | •      |
| 20,0 | 20 | 2,5 | 45 | 110 | 4 | •      |
| 20,0 | 20 | 3,0 | 45 | 110 | 4 | •      |
| 20,0 | 20 | 4,0 | 45 | 110 | 4 | •      |
| 25,0 | 25 | 2,5 | 50 | 120 | 5 | •      |
| 25,0 | 25 | 3,0 | 50 | 120 | 5 | •      |
| 25,0 | 25 | 4,0 | 50 | 120 | 5 | •      |

**Tolerancias**

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

**NACHI**

Condiciones de corte página 32

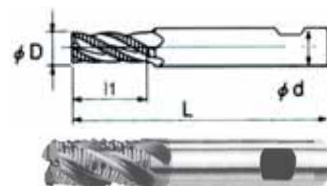
## REF. 6322WT FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE SERIE CORTA RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 20
- RECUBRIMIENTO TIALN



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 13 | 57  | 3 | •      |
| 7,0  | 10 | 16 | 66  | 3 | •      |
| 8,0  | 10 | 19 | 69  | 3 | •      |
| 9,0  | 10 | 19 | 69  | 3 | •      |
| 10,0 | 10 | 22 | 72  | 4 | •      |
| 11,0 | 12 | 22 | 83  | 4 | •      |
| 12,0 | 12 | 26 | 83  | 4 | •      |
| 13,0 | 12 | 26 | 83  | 4 | •      |
| 14,0 | 12 | 26 | 83  | 4 | •      |
| 15,0 | 12 | 26 | 83  | 4 | •      |
| 16,0 | 16 | 32 | 92  | 4 | •      |
| 18,0 | 16 | 32 | 92  | 4 | •      |
| 20,0 | 20 | 38 | 104 | 4 | •      |
| 22,0 | 20 | 38 | 104 | 5 | •      |
| 24,0 | 25 | 45 | 121 | 5 | •      |
| 25,0 | 25 | 45 | 121 | 5 | •      |
| 26,0 | 25 | 45 | 121 | 6 | •      |
| 28,0 | 25 | 45 | 121 | 6 | •      |
| 30,0 | 25 | 45 | 121 | 6 | •      |

## Tolerancias

|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

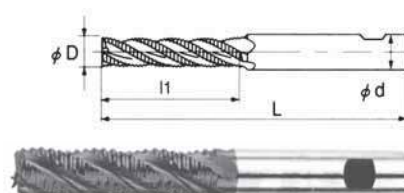
## REF. 6324WT FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE SERIE LARGA RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 20
- RECUBRIMIENTO TIALN



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 24 | 68  | 3 | •      |
| 8,0  | 10 | 38 | 88  | 3 | •      |
| 10,0 | 10 | 45 | 95  | 4 | •      |
| 12,0 | 12 | 53 | 110 | 4 | •      |
| 14,0 | 12 | 53 | 110 | 4 | •      |
| 16,0 | 16 | 63 | 123 | 4 | •      |
| 18,0 | 16 | 63 | 123 | 4 | •      |
| 20,0 | 20 | 75 | 141 | 4 | •      |
| 22,0 | 20 | 75 | 141 | 5 | •      |
| 25,0 | 25 | 90 | 166 | 5 | •      |

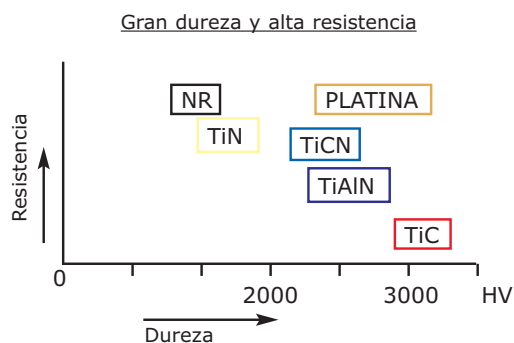
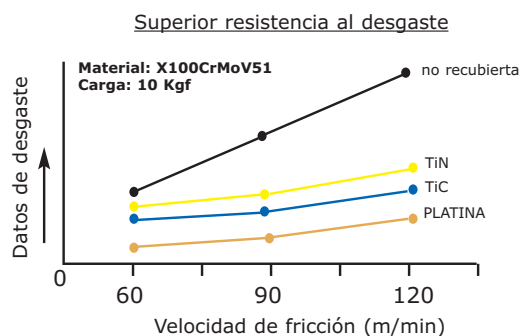
## Tolerancias

|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

## FRESAS HSS SINTERIZADO Co11%V8 (FAX 90) RECUBRIMIENTO PLATINA

### Características

- Alta resistencia al desgaste y la oxidación.
- Dureza superficial = Hv 3000.
- Gran aumento de la duración de la fresa debido al recubrimiento PLATINA.
- PLATINA-NACHI es un nuevo tipo de recubrimiento multicapa especial patentado diferente al resto de recubrimientos TiAlN del mercado.
- Idóneas para el mecanizado de **aceros inoxidables**.



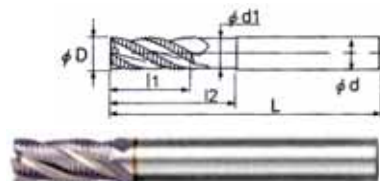
## REF. 7300P FRESAS HSS-SINTERIZADO Co11%V8 (FAX 90) NORMA JIS GRAN DESBASTE PASO FINO SERIE CORTA MANGO LARGO RECUBRIMIENTO PLATINA

JIS

PM

PLATINA

- HÉLICE DERECHA 30°
- ACERO SINTERIZADO FAX 90
- RECUBRIMIENTO PLATINA



| D    | d  | l1 | l2 | d1   | L   | Z | P.V.P. |
|------|----|----|----|------|-----|---|--------|
| 6,0  | 6  | 11 | -- | --   | 80  | 3 | •      |
| 7,0  | 8  | 17 | -- | --   | 90  | 3 | •      |
| 8,0  | 8  | 17 | -- | --   | 90  | 3 | •      |
| 9,0  | 10 | 22 | -- | --   | 100 | 3 | •      |
| 10,0 | 10 | 22 | -- | --   | 100 | 3 | •      |
| 12,0 | 12 | 26 | -- | --   | 110 | 4 | •      |
| 14,0 | 12 | 26 | -- | --   | 110 | 4 | •      |
| 15,0 | 16 | 26 | 45 | 13,3 | 125 | 4 | •      |
| 16,0 | 16 | 32 | 48 | 14,3 | 125 | 4 | •      |
| 18,0 | 16 | 32 | -- | --   | 125 | 4 | •      |
| 20,0 | 20 | 38 | 60 | 18   | 140 | 4 | •      |
| 22,0 | 20 | 38 | -- | --   | 140 | 4 | •      |
| 24,0 | 20 | 45 | -- | --   | 160 | 5 | •      |
| 25,0 | 25 | 45 | 75 | 23   | 160 | 5 | •      |
| 28,0 | 25 | 45 | -- | --   | 160 | 5 | •      |
| 30,0 | 25 | 45 | -- | --   | 160 | 5 | •      |
| 32,0 | 32 | 53 | 88 | 29,5 | 180 | 6 | •      |

### Tolerancias

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

NACHI

Condiciones de corte página 34

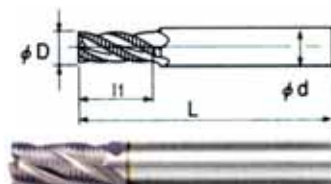
**REF. 7310P FRESAS HSS-SINTERIZADO Co11%V8 (FAX 90) NORMA JIS GRAN DESBASTE PASO FINO SERIE MEDIA RECUBRIMIENTO PLATINA**

JIS

PM

PLATINA

- HÉLICE DERECHA 30°
- ACERO SINTERIZADO FAX 90
- RECUBRIMIENTO PLATINA



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 15 | 60  | 3 | •      |
| 7,0  | 10 | 20 | 65  | 3 | •      |
| 8,0  | 10 | 20 | 65  | 3 | •      |
| 9,0  | 10 | 25 | 75  | 3 | •      |
| 10,0 | 10 | 25 | 75  | 3 | •      |
| 11,0 | 12 | 30 | 80  | 4 | •      |
| 12,0 | 12 | 30 | 80  | 4 | •      |
| 13,0 | 16 | 35 | 90  | 4 | •      |
| 14,0 | 16 | 35 | 90  | 4 | •      |
| 15,0 | 16 | 35 | 90  | 4 | •      |
| 16,0 | 16 | 40 | 95  | 4 | •      |
| 17,0 | 20 | 40 | 105 | 4 | •      |
| 18,0 | 20 | 40 | 105 | 4 | •      |
| 19,0 | 20 | 45 | 110 | 4 | •      |
| 20,0 | 20 | 45 | 110 | 4 | •      |
| 24,0 | 25 | 50 | 120 | 5 | •      |

| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 22,0 | 20 | 45 | 110 | 4 | •      |
| 25,0 | 25 | 50 | 120 | 5 | •      |
| 28,0 | 25 | 55 | 125 | 5 | •      |
| 30,0 | 32 | 55 | 140 | 5 | •      |

**Tolerancias**

|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

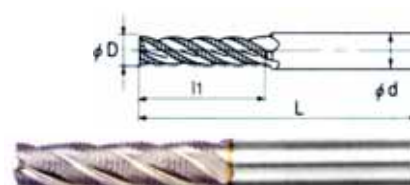
**REF. 7304P FRESAS HSS-SINTERIZADO Co11%V8 (FAX 90) NORMA JIS GRAN DESBASTE PASO FINO SERIE LARGA RECUBRIMIENTO PLATINA**

JIS

PM

PLATINA

- HÉLICE DERECHA 30°
- ACERO SINTERIZADO FAX 90
- RECUBRIMIENTO PLATINA



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 26 | 80  | 3 | •      |
| 8,0  | 8  | 35 | 90  | 3 | •      |
| 10,0 | 10 | 45 | 100 | 3 | •      |
| 12,0 | 12 | 53 | 110 | 4 | •      |
| 14,0 | 12 | 53 | 110 | 4 | •      |
| 15,0 | 16 | 53 | 125 | 4 | •      |
| 16,0 | 16 | 63 | 125 | 4 | •      |
| 18,0 | 16 | 63 | 125 | 4 | •      |
| 20,0 | 20 | 75 | 140 | 4 | •      |
| 22,0 | 20 | 75 | 140 | 4 | •      |
| 25,0 | 25 | 90 | 160 | 5 | •      |
| 30,0 | 25 | 90 | 160 | 5 | •      |

**Tolerancias**

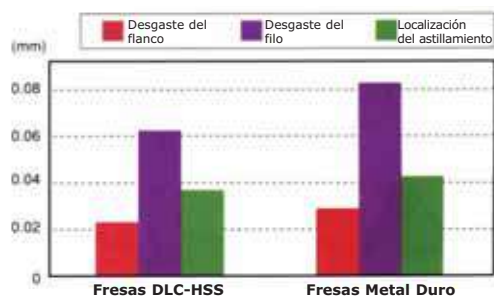
|                    |        |
|--------------------|--------|
| Diámetro Fresa (D) | ±0,1mm |
| Diámetro Mango (d) | h7     |

## FRESAS HSS Co8 CON RECUBRIMIENTO DLC (DIAMOND LIKE CARBON)

### Características

- Fresado de alta eficiencia en Aluminios gracias al recubrimiento DLC
- Tecnología de corte especial desarrollada para fresado de Aleaciones de Aluminio

### Rendimientos



#### CONDICIONES DE FRESADO

**Material:** A5052  
**Ø fresa:** 10 mm  
**Velocidad de corte:** 78,5 m/min (2500 rpm)  
**Avance:** 730 mm/min. (0.15 mm/diente)  
**Prof.axial:** aa=10mm.  
**Prof.radial:** ar=2,5mm.  
**Refrigerante:** Emulsión

## REF. 6450 FRESAS HSS Co8 NORMA JIS Z=2 CON RECUBRIMIENTO DLC PARA ALUMINIO

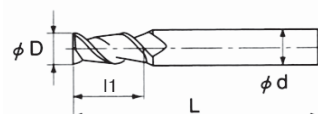
JIS

(HSS-E Co8)

DLC



- HÉLICE DERECHA 42°
- CORTE AL CENTRO
- RECUBRIMIENTO DLC



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 1,0  | 6  | 2  | 50  | •      |
| 1,5  | 6  | 3  | 50  | •      |
| 2,0  | 6  | 4  | 50  | •      |
| 2,5  | 6  | 5  | 50  | •      |
| 3,0  | 6  | 6  | 50  | •      |
| 3,5  | 8  | 8  | 60  | •      |
| 4,0  | 8  | 8  | 60  | •      |
| 4,5  | 8  | 10 | 60  | •      |
| 5,0  | 8  | 10 | 60  | •      |
| 5,5  | 8  | 12 | 60  | •      |
| 6,0  | 8  | 12 | 60  | •      |
| 6,5  | 10 | 14 | 65  | •      |
| 7,0  | 10 | 14 | 65  | •      |
| 7,5  | 10 | 14 | 65  | •      |
| 8,0  | 10 | 14 | 65  | •      |
| 8,5  | 10 | 18 | 70  | •      |
| 9,0  | 10 | 18 | 70  | •      |
| 9,5  | 10 | 18 | 70  | •      |
| 10,0 | 10 | 18 | 70  | •      |
| 11,0 | 12 | 22 | 80  | •      |
| 12,0 | 12 | 22 | 80  | •      |
| 13,0 | 16 | 26 | 90  | •      |
| 14,0 | 16 | 26 | 90  | •      |
| 15,0 | 16 | 30 | 95  | •      |
| 16,0 | 16 | 30 | 95  | •      |
| 17,0 | 20 | 35 | 105 | •      |
| 18,0 | 20 | 35 | 105 | •      |
| 19,0 | 20 | 40 | 110 | •      |
| 20,0 | 20 | 40 | 110 | •      |

#### Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 |       | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

NACHI

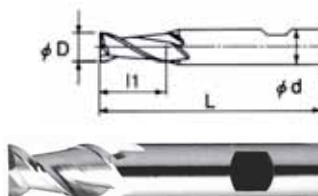
Condiciones de corte página 35

## REF. 6276W FRESAS HSS-E Co8 DIN 844 SERIE CORTA PARA ALUMINIO Z=2

DIN

HSS-E Co8

- HÉLICE DERECHA 42°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 7  | 51  | •      |
| 3,0  | 6  | 8  | 52  | •      |
| 4,0  | 6  | 11 | 55  | •      |
| 5,0  | 6  | 13 | 57  | •      |
| 6,0  | 6  | 13 | 57  | •      |
| 8,0  | 10 | 19 | 69  | •      |
| 10,0 | 10 | 22 | 72  | •      |
| 12,0 | 12 | 26 | 83  | •      |
| 14,0 | 12 | 26 | 83  | •      |
| 16,0 | 16 | 32 | 92  | •      |
| 18,0 | 16 | 32 | 92  | •      |
| 20,0 | 20 | 38 | 104 | •      |
| 22,0 | 20 | 38 | 104 | •      |
| 25,0 | 25 | 45 | 121 | •      |

## Tolerancias

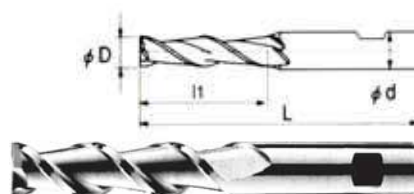
|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

## REF. 6278W FRESAS HSS-E Co8 DIN 844 SERIE LARGA PARA ALUMINIO Z=2

DIN

HSS-E Co8

- HÉLICE DERECHA 42°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 10 | 54  | •      |
| 3,0  | 6  | 12 | 56  | •      |
| 4,0  | 6  | 19 | 63  | •      |
| 5,0  | 6  | 24 | 68  | •      |
| 6,0  | 6  | 24 | 68  | •      |
| 8,0  | 10 | 38 | 88  | •      |
| 10,0 | 10 | 45 | 95  | •      |
| 12,0 | 12 | 53 | 110 | •      |
| 14,0 | 12 | 53 | 110 | •      |
| 16,0 | 16 | 63 | 123 | •      |
| 18,0 | 16 | 63 | 123 | •      |
| 20,0 | 20 | 75 | 141 | •      |

## Tolerancias

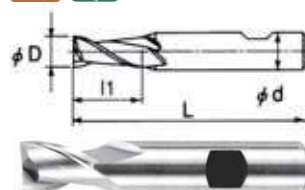
|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

## REF. 6258W FRESAS HSS-E Co8 DIN 327 SERIE CORTA Z=2

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L  | P.V.P. |
|------|----|----|----|--------|
| 2,0  | 6  | 4  | 48 | •      |
| 2,5  | 6  | 5  | 49 | •      |
| 3,0  | 6  | 5  | 49 | •      |
| 3,5  | 6  | 6  | 50 | •      |
| 4,0  | 6  | 7  | 51 | •      |
| 4,5  | 6  | 7  | 51 | •      |
| 5,0  | 6  | 8  | 52 | •      |
| 5,5  | 6  | 8  | 52 | •      |
| 6,0  | 6  | 8  | 52 | •      |
| 6,5  | 10 | 10 | 60 | •      |
| 7,0  | 10 | 10 | 60 | •      |
| 7,5  | 10 | 10 | 60 | •      |
| 8,0  | 10 | 11 | 61 | •      |
| 8,5  | 10 | 11 | 61 | •      |
| 9,0  | 10 | 11 | 61 | •      |
| 9,5  | 10 | 11 | 61 | •      |
| 10,0 | 10 | 13 | 63 | •      |
| 10,5 | 12 | 13 | 70 | •      |
| 11,0 | 12 | 13 | 70 | •      |
| 12,0 | 12 | 16 | 73 | •      |
| 13,0 | 12 | 16 | 73 | •      |
| 14,0 | 12 | 16 | 73 | •      |
| 15,0 | 12 | 16 | 73 | •      |
| 16,0 | 16 | 19 | 79 | •      |

\* Hasta fin de existencias

| D      | d  | l1 | L   | P.V.P. |
|--------|----|----|-----|--------|
| 17,0   | 16 | 19 | 79  | •      |
| 18,0   | 16 | 19 | 79  | •      |
| 19,0   | 16 | 19 | 79  | •      |
| 20,0   | 20 | 22 | 88  | •      |
| 21,0   | 20 | 22 | 88  | •      |
| 22,0   | 20 | 22 | 88  | •      |
| 24,0   | 25 | 26 | 102 | •      |
| 25,0   | 25 | 26 | 102 | •      |
| 26,0   | 25 | 26 | 102 | •      |
| 27,0   | 25 | 26 | 102 | •      |
| 28,0   | 25 | 26 | 102 | •      |
| 30,0   | 25 | 26 | 102 | •      |
| 32,0   | 32 | 32 | 112 | •      |
| * 34,0 | 32 | 32 | 112 | •      |
| * 36,0 | 32 | 32 | 112 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

## REF. 6258WT FRESAS HSS-E Co8 DIN 327 SERIE CORTA Z=2 RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- RECUBRIMIENTO TIALN



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 6,0  | 6  | 8  | 52  | •      |
| 7,0  | 10 | 10 | 60  | •      |
| 8,0  | 10 | 11 | 61  | •      |
| 9,0  | 10 | 11 | 61  | •      |
| 10,0 | 10 | 13 | 63  | •      |
| 12,0 | 12 | 16 | 73  | •      |
| 14,0 | 12 | 16 | 73  | •      |
| 16,0 | 16 | 19 | 79  | •      |
| 18,0 | 16 | 19 | 79  | •      |
| 20,0 | 20 | 22 | 88  | •      |
| 22,0 | 20 | 22 | 88  | •      |
| 25,0 | 25 | 26 | 102 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

NACHI

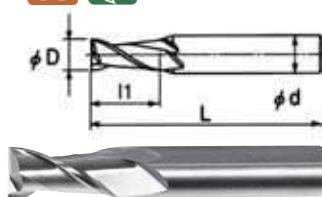
Condiciones de corte página 36

## REF. 6230 FRESAS HSS-E Co8 NORMA JIS SERIE MEDIA Z=2

JIS

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D     | d  | l1 | L  | P.V.P. |
|-------|----|----|----|--------|
| 1,0   | 6  | 2  | 50 | •      |
| 1,5   | 6  | 3  | 50 | •      |
| 2,0   | 6  | 7  | 50 | •      |
| 2,5   | 6  | 7  | 50 | •      |
| 3,0   | 6  | 9  | 50 | •      |
| 3,5   | 8  | 12 | 60 | •      |
| * 4,0 | 6  | 12 | 45 | •      |
| 4,0   | 8  | 12 | 60 | •      |
| 4,5   | 8  | 15 | 60 | •      |
| * 5,0 | 6  | 15 | 50 | •      |
| 5,0   | 8  | 15 | 60 | •      |
| 5,5   | 8  | 15 | 60 | •      |
| * 6,0 | 6  | 15 | 50 | •      |
| 6,0   | 8  | 15 | 60 | •      |
| 6,5   | 10 | 20 | 65 | •      |
| 7,0   | 10 | 20 | 65 | •      |
| 7,5   | 10 | 20 | 65 | •      |
| * 8,0 | 8  | 20 | 60 | •      |
| 8,0   | 10 | 20 | 65 | •      |
| 8,5   | 10 | 25 | 75 | •      |
| 9,0   | 10 | 25 | 75 | •      |
| 9,5   | 10 | 25 | 75 | •      |
| 10,0  | 10 | 25 | 75 | •      |
| 11,0  | 12 | 30 | 80 | •      |

\* Ref. 6204

| D      | d  | l1 | L   | P.V.P. |
|--------|----|----|-----|--------|
| 12,0   | 12 | 30 | 80  | •      |
| 13,0   | 16 | 35 | 90  | •      |
| * 14,0 | 12 | 35 | 85  | •      |
| 14,0   | 16 | 35 | 90  | •      |
| 15,0   | 16 | 40 | 95  | •      |
| 16,0   | 16 | 40 | 95  | •      |
| 17,0   | 20 | 40 | 105 | •      |
| * 18,0 | 16 | 45 | 90  | •      |
| 18,0   | 20 | 40 | 105 | •      |
| 19,0   | 20 | 45 | 110 | •      |
| 20,0   | 20 | 45 | 110 | •      |
| 22,0   | 20 | 45 | 110 | •      |
| 24,0   | 25 | 50 | 120 | •      |
| 25,0   | 25 | 50 | 120 | •      |
| 26,0   | 25 | 50 | 120 | •      |
| 28,0   | 25 | 55 | 125 | •      |
| 30,0   | 25 | 55 | 125 | •      |

## Tolerancias

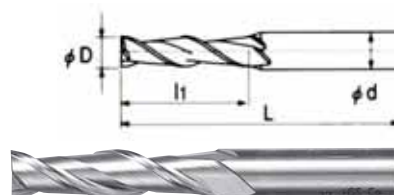
| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 | 30    | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

## REF. 6232 FRESAS HSS-E Co8 NORMA JIS SERIE LARGA Z=2

JIS

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 3,0  | 6  | 15 | 60  | •      |
| 4,0  | 8  | 20 | 60  | •      |
| 5,0  | 8  | 25 | 65  | •      |
| 6,0  | 8  | 25 | 65  | •      |
| 7,0  | 10 | 35 | 80  | •      |
| 8,0  | 10 | 35 | 80  | •      |
| 9,0  | 10 | 45 | 95  | •      |
| 10,0 | 10 | 45 | 95  | •      |
| 11,0 | 12 | 55 | 105 | •      |
| 12,0 | 12 | 55 | 105 | •      |
| 13,0 | 16 | 55 | 110 | •      |
| 14,0 | 16 | 55 | 110 | •      |
| 15,0 | 16 | 65 | 120 | •      |
| 16,0 | 16 | 65 | 120 | •      |
| 18,0 | 20 | 65 | 130 | •      |
| 20,0 | 20 | 75 | 140 | •      |
| 22,0 | 20 | 75 | 140 | •      |
| 24,0 | 25 | 90 | 160 | •      |

| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 25,0 | 25 | 90 | 160 | •      |
| 26,0 | 25 | 90 | 160 | •      |
| 28,0 | 25 | 90 | 160 | •      |
| 30,0 | 25 | 90 | 160 | •      |

## Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 10    | 0 ~ -0,020      |
| 10                 | 30    | 0 ~ -0,025      |
| Diámetro Mango (d) |       | h7              |

NACHI

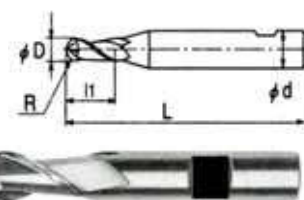
Condiciones de corte página 36

## REF. 6350W FRESAS HSS-E Co8 DIN 327 PUNTA ESFÉRICA SERIE CORTA Z=2

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | R    | d  | l1 | L  | P.V.P. |
|------|------|----|----|----|--------|
| 2,0  | 1,0  | 6  | 4  | 48 | •      |
| 3,0  | 1,5  | 6  | 5  | 49 | •      |
| 4,0  | 2,0  | 6  | 7  | 51 | •      |
| 5,0  | 2,5  | 6  | 8  | 52 | •      |
| 6,0  | 3,0  | 6  | 8  | 52 | •      |
| 7,0  | 3,5  | 10 | 10 | 60 | •      |
| 8,0  | 4,0  | 10 | 11 | 61 | •      |
| 9,0  | 4,5  | 10 | 11 | 61 | •      |
| 10,0 | 5,0  | 10 | 11 | 63 | •      |
| 11,0 | 5,5  | 12 | 13 | 70 | •      |
| 12,0 | 6,0  | 12 | 16 | 73 | •      |
| 13,0 | 6,5  | 12 | 16 | 73 | •      |
| 14,0 | 7,0  | 12 | 16 | 73 | •      |
| 15,0 | 7,5  | 12 | 16 | 73 | •      |
| 16,0 | 8,0  | 16 | 19 | 79 | •      |
| 17,0 | 8,5  | 16 | 19 | 79 | •      |
| 18,0 | 9,0  | 16 | 19 | 79 | •      |
| 20,0 | 10,0 | 20 | 22 | 88 | •      |

| D    | R    | d  | l1 | L   | P.V.P. |
|------|------|----|----|-----|--------|
| 22,0 | 11,0 | 20 | 22 | 88  | •      |
| 24,0 | 12,0 | 25 | 26 | 102 | •      |
| 25,0 | 12,5 | 25 | 26 | 102 | •      |
| 26,0 | 13,0 | 25 | 26 | 102 | •      |
| 28,0 | 14,0 | 25 | 26 | 102 | •      |
| 30,0 | 15,0 | 25 | 26 | 102 | •      |
| 32,0 | 16,0 | 32 | 32 | 112 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

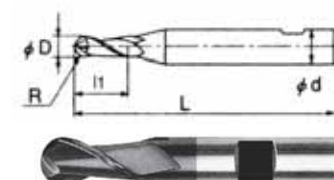
## REF. 6350WT FRESAS HSS-E Co8 DIN 327 PUNTA ESFÉRICA SERIE CORTA Z=2 RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- RECUBRIMIENTO TIALN



| D    | R    | d  | l1 | L   | P.V.P. |
|------|------|----|----|-----|--------|
| 2,0  | 1,0  | 6  | 4  | 48  | •      |
| 3,0  | 1,5  | 6  | 5  | 49  | •      |
| 4,0  | 2,0  | 6  | 7  | 51  | •      |
| 5,0  | 2,5  | 6  | 8  | 52  | •      |
| 6,0  | 3,0  | 6  | 8  | 52  | •      |
| 7,0  | 3,5  | 10 | 10 | 60  | •      |
| 8,0  | 4,0  | 10 | 11 | 61  | •      |
| 9,0  | 4,5  | 10 | 11 | 61  | •      |
| 10,0 | 5,0  | 10 | 13 | 63  | •      |
| 12,0 | 6,0  | 12 | 16 | 73  | •      |
| 14,0 | 7,0  | 12 | 16 | 73  | •      |
| 16,0 | 8,0  | 16 | 19 | 79  | •      |
| 18,0 | 9,0  | 16 | 19 | 79  | •      |
| 20,0 | 10,0 | 20 | 22 | 88  | •      |
| 22,0 | 11,0 | 20 | 22 | 88  | •      |
| 25,0 | 12,5 | 25 | 26 | 102 | •      |

### Tolerancias

|                    |         |
|--------------------|---------|
| Diámetro Fresa (D) | 0 -0,03 |
| Radio Fresa (R)    | ±0,02   |
| Diámetro Mango (d) | h6      |

NACHI

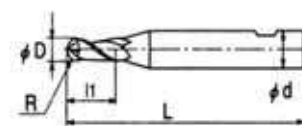
Condiciones de corte página 37

## REF. 6352W FRESAS HSS-E Co8 DIN 1887 PUNTA ESFÉRICA SERIE LARGA Z=2

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | R    | d  | l1 | L   | P.V.P. |
|------|------|----|----|-----|--------|
| 2,0  | 1,0  | 6  | 7  | 54  | •      |
| 3,0  | 1,5  | 6  | 8  | 56  | •      |
| 4,0  | 2,0  | 6  | 11 | 63  | •      |
| 5,0  | 2,5  | 6  | 13 | 68  | •      |
| 6,0  | 3,0  | 6  | 13 | 68  | •      |
| 7,0  | 3,5  | 10 | 16 | 80  | •      |
| 8,0  | 4,0  | 10 | 19 | 88  | •      |
| 9,0  | 4,5  | 10 | 19 | 88  | •      |
| 10,0 | 5,0  | 10 | 22 | 95  | •      |
| 11,0 | 5,5  | 12 | 22 | 102 | •      |
| 12,0 | 6,0  | 12 | 26 | 110 | •      |
| 13,0 | 6,5  | 12 | 26 | 110 | •      |
| 14,0 | 7,0  | 12 | 26 | 110 | •      |
| 15,0 | 7,5  | 12 | 26 | 110 | •      |
| 16,0 | 8,0  | 16 | 32 | 123 | •      |
| 18,0 | 9,0  | 16 | 32 | 123 | •      |
| 20,0 | 10,0 | 20 | 38 | 141 | •      |
| 22,0 | 11,0 | 20 | 38 | 141 | •      |

| D    | R    | d  | l1 | L   | P.V.P. |
|------|------|----|----|-----|--------|
| 24,0 | 12,0 | 25 | 45 | 166 | •      |
| 25,0 | 12,5 | 25 | 45 | 166 | •      |
| 26,0 | 13,0 | 25 | 45 | 166 | •      |
| 28,0 | 14,0 | 25 | 45 | 166 | •      |
| 30,0 | 15,0 | 25 | 45 | 166 | •      |

## Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

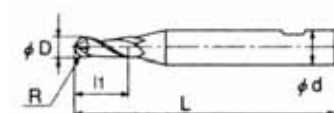
## REF. 6352WT FRESAS HSS-E Co8 DIN 1889 PUNTA ESFÉRICA SERIE LARGA Z=2 RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- RECUBRIMIENTO TIALN



| D    | R    | d  | l1 | L   | P.V.P. |
|------|------|----|----|-----|--------|
| 2,0  | 1,0  | 6  | 7  | 54  | •      |
| 3,0  | 1,5  | 6  | 8  | 56  | •      |
| 4,0  | 2,0  | 6  | 11 | 63  | •      |
| 5,0  | 2,5  | 6  | 13 | 68  | •      |
| 6,0  | 3,0  | 6  | 13 | 68  | •      |
| 7,0  | 3,5  | 10 | 16 | 80  | •      |
| 8,0  | 4,0  | 10 | 19 | 88  | •      |
| 9,0  | 4,5  | 10 | 19 | 88  | •      |
| 10,0 | 5,0  | 10 | 22 | 95  | •      |
| 12,0 | 6,0  | 12 | 26 | 110 | •      |
| 14,0 | 7,0  | 12 | 26 | 110 | •      |
| 16,0 | 8,0  | 16 | 32 | 123 | •      |
| 18,0 | 9,0  | 16 | 32 | 123 | •      |
| 20,0 | 10,0 | 20 | 38 | 141 | •      |

## Tolerancias

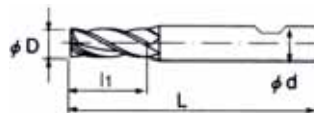
|                    |         |
|--------------------|---------|
| Diámetro Fresa (D) | 0 -0,03 |
| Radio Fresa (R)    | ±0,02   |
| Diámetro Mango (d) | h6      |

## REF. 6280W FRESAS HSS-E Co8 DIN 327 SERIE CORTA Z=3

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 4  | 48  | •      |
| 3,0  | 6  | 5  | 49  | •      |
| 4,0  | 6  | 7  | 51  | •      |
| 5,0  | 6  | 8  | 52  | •      |
| 6,0  | 6  | 8  | 52  | •      |
| 7,0  | 10 | 10 | 60  | •      |
| 8,0  | 10 | 11 | 61  | •      |
| 10,0 | 10 | 13 | 63  | •      |
| 12,0 | 12 | 16 | 73  | •      |
| 14,0 | 12 | 16 | 73  | •      |
| 16,0 | 16 | 19 | 79  | •      |
| 18,0 | 16 | 19 | 79  | •      |
| 20,0 | 20 | 22 | 88  | •      |
| 22,0 | 20 | 22 | 88  | •      |
| 25,0 | 25 | 26 | 102 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

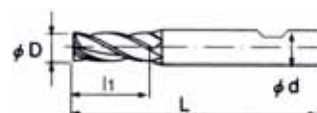
## REF. 6280WT FRESAS HSS-E Co8 DIN 327 SERIE CORTA Z=3 RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- RECUBRIMIENTO TIALN



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 4  | 48  | •      |
| 3,0  | 6  | 5  | 49  | •      |
| 4,0  | 6  | 7  | 51  | •      |
| 5,0  | 6  | 8  | 52  | •      |
| 6,0  | 6  | 8  | 52  | •      |
| 7,0  | 10 | 10 | 60  | •      |
| 8,0  | 10 | 11 | 61  | •      |
| 10,0 | 10 | 13 | 63  | •      |
| 12,0 | 12 | 16 | 73  | •      |
| 14,0 | 12 | 16 | 73  | •      |
| 16,0 | 16 | 19 | 79  | •      |
| 18,0 | 16 | 19 | 79  | •      |
| 20,0 | 20 | 22 | 88  | •      |
| 22,0 | 20 | 22 | 88  | •      |
| 25,0 | 25 | 26 | 102 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

NACHI

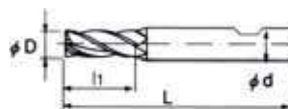
Condiciones de corte página 38

## REF. 6288W FRESAS HSS-E Co8 DIN 844 SERIE MEDIA Z=3

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 7  | 51  | •      |
| 3,0  | 6  | 8  | 52  | •      |
| 4,0  | 6  | 11 | 55  | •      |
| 5,0  | 6  | 13 | 57  | •      |
| 6,0  | 6  | 13 | 57  | •      |
| 7,0  | 10 | 16 | 66  | •      |
| 8,0  | 10 | 19 | 69  | •      |
| 9,0  | 10 | 19 | 69  | •      |
| 10,0 | 10 | 22 | 72  | •      |
| 11,0 | 12 | 22 | 72  | •      |
| 12,0 | 12 | 26 | 83  | •      |
| 13,0 | 12 | 26 | 83  | •      |
| 14,0 | 12 | 26 | 83  | •      |
| 15,0 | 12 | 26 | 83  | •      |
| 16,0 | 16 | 32 | 92  | •      |
| 18,0 | 16 | 32 | 92  | •      |
| 20,0 | 20 | 38 | 104 | •      |
| 22,0 | 20 | 38 | 104 | •      |
| 25,0 | 25 | 45 | 121 | •      |
| 30,0 | 25 | 45 | 121 | •      |

## Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

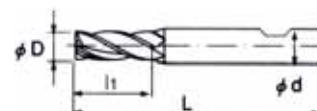
## REF. 6288WT FRESAS HSS-E Co8 DIN 844 SERIE MEDIA Z=3 RECUBRIMIENTO TIALN

DIN

HSS-E Co8

TIALN

- HÉLICE DERECHA 30°
- CORTE AL CENTRO
- RECUBRIMIENTO TIALN



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 2,0  | 6  | 7  | 51  | •      |
| 3,0  | 6  | 8  | 52  | •      |
| 4,0  | 6  | 11 | 55  | •      |
| 5,0  | 6  | 13 | 57  | •      |
| 6,0  | 6  | 13 | 57  | •      |
| 7,0  | 10 | 16 | 66  | •      |
| 8,0  | 10 | 19 | 69  | •      |
| 9,0  | 10 | 19 | 69  | •      |
| 10,0 | 10 | 22 | 72  | •      |
| 12,0 | 12 | 26 | 83  | •      |
| 14,0 | 12 | 26 | 83  | •      |
| 16,0 | 16 | 32 | 92  | •      |
| 18,0 | 16 | 32 | 92  | •      |
| 20,0 | 20 | 38 | 104 | •      |
| 22,0 | 20 | 38 | 104 | •      |
| 25,0 | 25 | 45 | 121 | •      |

## Tolerancias

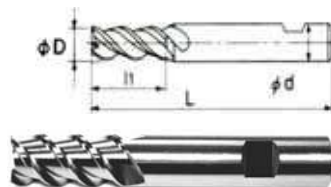
|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

## REF. 6242W FRESAS HSS-E Co8 DIN 844 GRAN RENDIMIENTO

DIN

HSS-E Co8

- HÉLICE DERECHA 50°
- CORTE AL CENTRO



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 13 | 57  | 3 | •      |
| 8,0  | 10 | 19 | 69  | 3 | •      |
| 10,0 | 10 | 22 | 72  | 3 | •      |
| 12,0 | 12 | 26 | 83  | 3 | •      |
| 14,0 | 12 | 26 | 83  | 3 | •      |
| 15,0 | 12 | 26 | 83  | 3 | •      |
| 16,0 | 16 | 32 | 92  | 3 | •      |
| 18,0 | 16 | 32 | 92  | 3 | •      |
| 20,0 | 20 | 38 | 104 | 3 | •      |
| 25,0 | 25 | 45 | 121 | 4 | •      |
| 30,0 | 25 | 45 | 121 | 4 | •      |

### Tolerancias

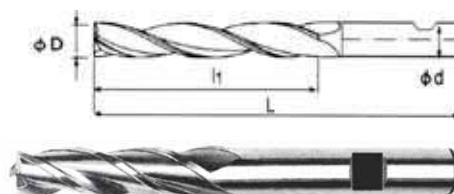
| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 6     | +0,048 -0       |
| 6                  | 10    | +0,058 -0       |
| 10                 | 18    | +0,070 -0       |
| 18                 | 30    | +0,084 -0       |
| Diámetro Mango (d) |       | h6              |

## REF. 6298W FRESAS HSS-E Co8 DIN 844 SERIE LARGA Z=3

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L   | P.V.P. |
|------|----|----|-----|--------|
| 3,0  | 6  | 12 | 56  | •      |
| 4,0  | 6  | 19 | 63  | •      |
| 5,0  | 6  | 24 | 68  | •      |
| 6,0  | 6  | 24 | 68  | •      |
| 8,0  | 10 | 38 | 88  | •      |
| 10,0 | 10 | 45 | 95  | •      |
| 12,0 | 12 | 53 | 110 | •      |
| 14,0 | 12 | 53 | 110 | •      |
| 16,0 | 16 | 63 | 123 | •      |
| 18,0 | 16 | 63 | 123 | •      |
| 20,0 | 20 | 75 | 141 | •      |
| 25,0 | 25 | 90 | 166 | •      |

### Tolerancias

|                    |    |
|--------------------|----|
| Diámetro Fresa (D) | e8 |
| Diámetro Mango (d) | h6 |

NACHI

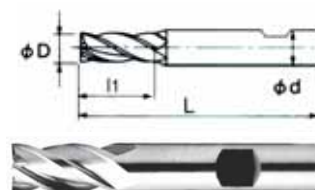
Condiciones de corte página 38

## REF. 6260W FRESAS HSS-E Co8 DIN 844 SERIE CORTA Z=VARIOS LABIOS

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D     | d  | l1 | L  | Z | P.V.P. |
|-------|----|----|----|---|--------|
| 2,0   | 6  | 7  | 51 | 4 | •      |
| 2,5   | 6  | 8  | 52 | 4 | •      |
| 3,0   | 6  | 8  | 52 | 4 | •      |
| 3,5   | 6  | 10 | 54 | 4 | •      |
| 4,0   | 6  | 11 | 55 | 4 | •      |
| * 4,5 | 6  | 11 | 55 | 4 | •      |
| 5,0   | 6  | 13 | 57 | 4 | •      |
| * 5,5 | 6  | 13 | 57 | 4 | •      |
| 6,0   | 6  | 13 | 57 | 4 | •      |
| * 6,5 | 10 | 16 | 66 | 4 | •      |
| 7,0   | 10 | 16 | 66 | 4 | •      |
| * 7,5 | 10 | 16 | 66 | 4 | •      |
| 8,0   | 10 | 19 | 69 | 4 | •      |
| * 8,5 | 10 | 19 | 69 | 4 | •      |
| 9,0   | 10 | 19 | 69 | 4 | •      |
| * 9,5 | 10 | 19 | 69 | 4 | •      |
| 10,0  | 10 | 22 | 72 | 4 | •      |
| 11,0  | 12 | 22 | 79 | 4 | •      |
| 12,0  | 12 | 26 | 83 | 4 | •      |
| 13,0  | 12 | 26 | 83 | 4 | •      |
| 14,0  | 12 | 26 | 83 | 4 | •      |
| 15,0  | 12 | 26 | 83 | 4 | •      |

\* Hasta fin de existencias

| D      | d  | l1 | L   | Z | P.V.P. |
|--------|----|----|-----|---|--------|
| 16,0   | 16 | 32 | 92  | 4 | •      |
| 17,0   | 16 | 32 | 92  | 4 | •      |
| 18,0   | 16 | 32 | 92  | 4 | •      |
| 19,0   | 16 | 32 | 92  | 4 | •      |
| 20,0   | 20 | 38 | 104 | 4 | •      |
| * 21,0 | 20 | 38 | 104 | 4 | •      |
| 22,0   | 20 | 38 | 104 | 4 | •      |
| * 23,0 | 20 | 38 | 121 | 4 | •      |
| 24,0   | 25 | 45 | 121 | 6 | •      |
| 25,0   | 25 | 45 | 121 | 6 | •      |
| 26,0   | 25 | 45 | 121 | 6 | •      |
| 28,0   | 25 | 45 | 121 | 6 | •      |
| 30,0   | 25 | 45 | 121 | 6 | •      |
| 32,0   | 32 | 53 | 133 | 6 | •      |
| 36,0   | 32 | 53 | 133 | 6 | •      |
| 40,0   | 40 | 63 | 155 | 6 | •      |

## Tolerancias

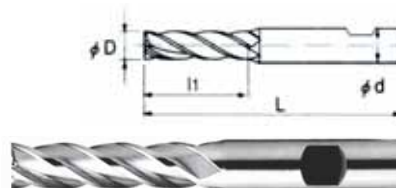
|                    |           |
|--------------------|-----------|
| Diámetro Fresa (D) | +0,040 -0 |
| Diámetro Mango (d) | h6        |

## REF. 6262W FRESAS HSS-E Co8 DIN 844 SERIE LARGA Z=VARIOS LABIOS

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 2,0  | 6  | 10 | 54  | 4 | •      |
| 2,5  | 6  | 12 | 56  | 4 | •      |
| 3,0  | 6  | 12 | 56  | 4 | •      |
| 3,5  | 6  | 15 | 59  | 4 | •      |
| 4,0  | 6  | 19 | 63  | 4 | •      |
| 4,5  | 6  | 19 | 63  | 4 | •      |
| 5,0  | 6  | 24 | 68  | 4 | •      |
| 5,5  | 6  | 24 | 68  | 4 | •      |
| 6,0  | 6  | 24 | 68  | 4 | •      |
| 7,0  | 10 | 30 | 80  | 4 | •      |
| 8,0  | 10 | 38 | 88  | 4 | •      |
| 9,0  | 10 | 38 | 88  | 4 | •      |
| 10,0 | 10 | 45 | 95  | 4 | •      |
| 11,0 | 12 | 45 | 102 | 4 | •      |
| 12,0 | 12 | 53 | 110 | 4 | •      |
| 13,0 | 12 | 53 | 110 | 4 | •      |
| 14,0 | 12 | 53 | 110 | 4 | •      |
| 15,0 | 12 | 53 | 110 | 4 | •      |

| D    | d  | l1  | L   | Z | P.V.P. |
|------|----|-----|-----|---|--------|
| 16,0 | 16 | 63  | 123 | 4 | •      |
| 17,0 | 16 | 63  | 123 | 4 | •      |
| 18,0 | 16 | 63  | 123 | 4 | •      |
| 20,0 | 20 | 75  | 141 | 4 | •      |
| 22,0 | 20 | 75  | 141 | 6 | •      |
| 24,0 | 25 | 90  | 166 | 6 | •      |
| 25,0 | 25 | 90  | 166 | 6 | •      |
| 28,0 | 25 | 90  | 166 | 6 | •      |
| 30,0 | 25 | 90  | 166 | 6 | •      |
| 32,0 | 32 | 106 | 186 | 6 | •      |

## Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
|                    | 6     | +0,040 -0       |
| 6                  | 30    | +0,050 -0       |
| Diámetro Mango (d) |       | h6              |

NACHI

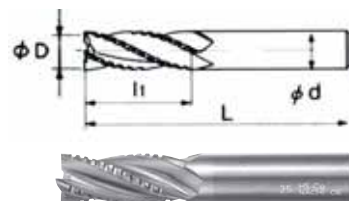
Condiciones de corte página 39

## REF. 6366 FRESAS HSS-E Co8 NORMA JIS SEMI-DESBASTE HEAVY SERIE CORTA

JIS

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 30



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 8  | 15 | 60  | 4 | •      |
| 7,0  | 10 | 20 | 65  | 4 | •      |
| 8,0  | 10 | 20 | 65  | 4 | •      |
| 9,0  | 12 | 25 | 75  | 4 | •      |
| 10,0 | 12 | 25 | 75  | 4 | •      |
| 11,0 | 12 | 30 | 80  | 4 | •      |
| 12,0 | 12 | 30 | 80  | 4 | •      |
| 13,0 | 16 | 35 | 90  | 4 | •      |
| 14,0 | 16 | 35 | 90  | 4 | •      |
| 15,0 | 16 | 40 | 95  | 4 | •      |
| 16,0 | 16 | 40 | 95  | 4 | •      |
| 17,0 | 20 | 40 | 105 | 4 | •      |
| 18,0 | 20 | 40 | 105 | 4 | •      |
| 19,0 | 20 | 45 | 110 | 4 | •      |
| 20,0 | 20 | 45 | 110 | 4 | •      |
| 22,0 | 20 | 45 | 110 | 4 | •      |
| 24,0 | 25 | 50 | 120 | 4 | •      |
| 25,0 | 25 | 50 | 120 | 4 | •      |
| 28,0 | 25 | 55 | 125 | 4 | •      |
| 30,0 | 25 | 55 | 125 | 4 | •      |

| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 32,0 | 32 | 60 | 145 | 6 | •      |
| 35,0 | 32 | 60 | 145 | 6 | •      |
| 38,0 | 32 | 65 | 150 | 6 | •      |
| 40,0 | 32 | 65 | 150 | 6 | •      |

### Tolerancias

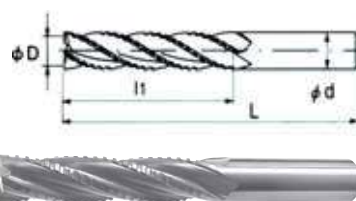
| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
| 6                  | 10    | +0,036 ~0       |
| 10                 | 18    | +0,043 ~0       |
| 18                 | 30    | +0,052 ~0       |
| 30                 |       | +0,062 ~0       |
| Diámetro Mango (d) |       | h7              |

## REF. 6368 FRESAS HSS-E Co8 NORMA JIS SEMI-DESBASTE HEAVY SERIE LARGA

JIS

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 30



| D    | d  | l1  | L   | Z | P.V.P. |
|------|----|-----|-----|---|--------|
| 6,0  | 8  | 25  | 65  | 4 | •      |
| 8,0  | 10 | 35  | 80  | 4 | •      |
| 10,0 | 12 | 45  | 95  | 4 | •      |
| 12,0 | 12 | 55  | 105 | 4 | •      |
| 14,0 | 16 | 55  | 110 | 4 | •      |
| 16,0 | 16 | 65  | 120 | 4 | •      |
| 18,0 | 20 | 65  | 130 | 4 | •      |
| 20,0 | 20 | 75  | 140 | 4 | •      |
| 22,0 | 20 | 75  | 140 | 4 | •      |
| 25,0 | 25 | 90  | 160 | 4 | •      |
| 28,0 | 25 | 90  | 160 | 4 | •      |
| 30,0 | 25 | 90  | 160 | 4 | •      |
| 32,0 | 32 | 105 | 190 | 6 | •      |

### Tolerancias

| Diámetro Fresa (D) |       | Tolerancia (mm) |
|--------------------|-------|-----------------|
| Desde              | Hasta |                 |
| 6                  | 10    | +0,036 ~0       |
| 10                 | 18    | +0,043 ~0       |
| 18                 | 30    | +0,052 ~0       |
| 30                 |       | +0,062 ~0       |
| Diámetro Mango (d) |       | h7              |

NACHI

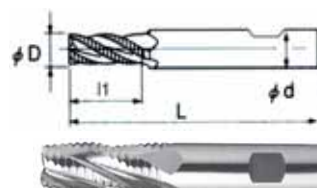
Condiciones de corte página 40

## REF. 6322W FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE SERIE CORTA

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 20



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 13 | 57  | 3 | •      |
| 7,0  | 10 | 16 | 66  | 3 | •      |
| 8,0  | 10 | 19 | 69  | 3 | •      |
| 9,0  | 10 | 19 | 69  | 3 | •      |
| 10,0 | 10 | 22 | 72  | 4 | •      |
| 11,0 | 12 | 22 | 79  | 4 | •      |
| 12,0 | 12 | 26 | 83  | 4 | •      |
| 13,0 | 12 | 26 | 83  | 4 | •      |
| 14,0 | 12 | 26 | 83  | 4 | •      |
| 15,0 | 12 | 26 | 83  | 4 | •      |
| 16,0 | 16 | 32 | 92  | 4 | •      |
| 17,0 | 16 | 32 | 92  | 4 | •      |
| 18,0 | 16 | 32 | 92  | 4 | •      |
| 19,0 | 16 | 32 | 92  | 4 | •      |
| 20,0 | 20 | 38 | 104 | 4 | •      |
| 22,0 | 20 | 38 | 104 | 5 | •      |
| 24,0 | 25 | 45 | 121 | 5 | •      |
| 25,0 | 25 | 45 | 121 | 5 | •      |

| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 26,0 | 25 | 45 | 121 | 6 | •      |
| 28,0 | 25 | 45 | 121 | 6 | •      |
| 30,0 | 25 | 45 | 121 | 6 | •      |
| 32,0 | 32 | 53 | 133 | 6 | •      |
| 35,0 | 32 | 53 | 133 | 6 | •      |
| 40,0 | 40 | 63 | 155 | 6 | •      |

## Tolerancias

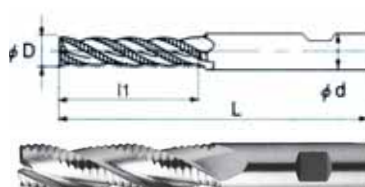
|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

## REF. 6324W FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE SERIE LARGA

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 20



| D    | d  | l1  | L   | Z | P.V.P. |
|------|----|-----|-----|---|--------|
| 6,0  | 6  | 24  | 68  | 3 | •      |
| 8,0  | 10 | 38  | 88  | 3 | •      |
| 10,0 | 10 | 45  | 95  | 4 | •      |
| 11,0 | 12 | 45  | 102 | 4 | •      |
| 12,0 | 12 | 53  | 110 | 4 | •      |
| 14,0 | 12 | 53  | 110 | 4 | •      |
| 15,0 | 12 | 53  | 110 | 4 | •      |
| 16,0 | 16 | 63  | 123 | 4 | •      |
| 18,0 | 16 | 63  | 123 | 4 | •      |
| 20,0 | 20 | 75  | 141 | 4 | •      |
| 22,0 | 20 | 75  | 141 | 5 | •      |
| 24,0 | 25 | 90  | 166 | 5 | •      |
| 25,0 | 25 | 90  | 166 | 5 | •      |
| 28,0 | 25 | 90  | 166 | 6 | •      |
| 30,0 | 25 | 90  | 166 | 6 | •      |
| 32,0 | 32 | 106 | 186 | 6 | •      |
| 35,0 | 32 | 106 | 186 | 6 | •      |
| 40,0 | 40 | 125 | 217 | 6 | •      |

## Tolerancias

|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

## REF. 6308W FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE PASO FINO SERIE CORTA

DIN

HSS-E Co8

- HÉLICE DERECHA 60°
- CORTE AL CENTRO HASTA Ø 20



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 13 | 57  | 3 | •      |
| 7,0  | 10 | 16 | 66  | 3 | •      |
| 8,0  | 10 | 19 | 69  | 3 | •      |
| 9,0  | 10 | 19 | 69  | 3 | •      |
| 10,0 | 10 | 22 | 72  | 4 | •      |
| 11,0 | 12 | 22 | 79  | 4 | •      |
| 12,0 | 12 | 26 | 83  | 4 | •      |
| 13,0 | 12 | 26 | 83  | 4 | •      |
| 14,0 | 12 | 26 | 83  | 4 | •      |
| 15,0 | 12 | 26 | 83  | 4 | •      |
| 16,0 | 16 | 32 | 92  | 4 | •      |
| 18,0 | 16 | 32 | 92  | 4 | •      |
| 20,0 | 20 | 38 | 104 | 4 | •      |
| 25,0 | 25 | 45 | 121 | 5 | •      |
| 28,0 | 25 | 45 | 121 | 6 | •      |
| 30,0 | 25 | 45 | 121 | 6 | •      |

### Tolerancias

|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

## REF. 6328W FRESAS HSS-E Co8 DIN 844 GRAN DESBASTE PASO FINO SERIE LARGA

DIN

HSS-E Co8

- HÉLICE DERECHA 30°
- CORTE AL CENTRO HASTA Ø 20



| D    | d  | l1 | L   | Z | P.V.P. |
|------|----|----|-----|---|--------|
| 6,0  | 6  | 24 | 68  | 3 | •      |
| 7,0  | 10 | 30 | 80  | 3 | •      |
| 8,0  | 10 | 38 | 88  | 3 | •      |
| 9,0  | 10 | 38 | 88  | 3 | •      |
| 10,0 | 10 | 45 | 95  | 4 | •      |
| 11,0 | 12 | 45 | 102 | 4 | •      |
| 12,0 | 12 | 53 | 110 | 4 | •      |
| 14,0 | 12 | 53 | 110 | 4 | •      |
| 15,0 | 12 | 53 | 110 | 4 | •      |
| 16,0 | 16 | 63 | 123 | 4 | •      |
| 18,0 | 16 | 63 | 123 | 4 | •      |
| 20,0 | 20 | 75 | 141 | 4 | •      |
| 22,0 | 20 | 75 | 141 | 5 | •      |
| 25,0 | 25 | 90 | 166 | 5 | •      |
| 30,0 | 25 | 90 | 166 | 6 | •      |

### Tolerancias

|                    |      |
|--------------------|------|
| Diámetro Fresa (D) | js12 |
| Diámetro Mango (d) | h6   |

NACHI

Condiciones de corte página 42

## **CONDICIONES DE CORTE FRESAS HSS**

---

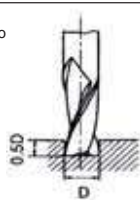
**NACHI**



## FRESAS HSS FMX Z=2 RECUBRIMIENTO AG REF. 6490 - 6492

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 2,0                        | 7900                                        | 180                | 6400                                   | 140                | 4000                                  | 70                 | 3200                                          | 45                 | 7200             | 420                | 14000                                                                   | 720                |
| 3,0                        | 5300                                        | 200                | 4200                                   | 140                | 2700                                  | 70                 | 2100                                          | 50                 | 4800             | 440                | 9000                                                                    | 760                |
| 5,0                        | 3200                                        | 200                | 2500                                   | 140                | 1600                                  | 70                 | 1300                                          | 50                 | 2900             | 430                | 5400                                                                    | 740                |
| 6,0                        | 2600                                        | 200                | 2100                                   | 140                | 1300                                  | 70                 | 1100                                          | 50                 | 2400             | 440                | 4500                                                                    | 760                |
| 8,0                        | 2000                                        | 200                | 1600                                   | 140                | 1000                                  | 70                 | 800                                           | 50                 | 1800             | 440                | 3400                                                                    | 760                |
| 10,0                       | 1590                                        | 200                | 1270                                   | 140                | 800                                   | 70                 | 640                                           | 50                 | 1400             | 450                | 2700                                                                    | 770                |
| 12,0                       | 1330                                        | 200                | 1060                                   | 140                | 660                                   | 70                 | 530                                           | 50                 | 1200             | 440                | 2300                                                                    | 760                |
| 15,0                       | 1060                                        | 200                | 850                                    | 140                | 530                                   | 70                 | 420                                           | 50                 | 960              | 440                | 1800                                                                    | 760                |
| 20,0                       | 800                                         | 190                | 640                                    | 130                | 400                                   | 65                 | 320                                           | 45                 | 720              | 410                | 1400                                                                    | 720                |
| 25,0                       | 640                                         | 150                | 510                                    | 100                | 320                                   | 50                 | 250                                           | 35                 | 570              | 320                | 1100                                                                    | 550                |
| 30,0                       | 530                                         | 120                | 420                                    | 80                 | 270                                   | 40                 | 210                                           | 30                 | 480              | 250                | 900                                                                     | 440                |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX Z=2 SERIE LARGA RECUBRIMIENTO AG REF. 6494

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 3,0                        | 4200                                        | 80                 | 3200                                   | 55                 | 2700                                  | 35                 | 2100                                          | 25                 | 4800             | 220                | 9000                                                                    | 380                |
| 5,0                        | 2500                                        | 80                 | 1900                                   | 55                 | 1600                                  | 35                 | 1300                                          | 25                 | 2900             | 220                | 5400                                                                    | 380                |
| 6,0                        | 2100                                        | 80                 | 1600                                   | 55                 | 1300                                  | 35                 | 1100                                          | 25                 | 2400             | 220                | 4500                                                                    | 380                |
| 8,0                        | 1600                                        | 80                 | 1200                                   | 55                 | 1000                                  | 35                 | 800                                           | 25                 | 1800             | 220                | 3400                                                                    | 380                |
| 10,0                       | 1300                                        | 80                 | 960                                    | 55                 | 800                                   | 35                 | 640                                           | 25                 | 1400             | 220                | 2700                                                                    | 380                |
| 12,0                       | 1100                                        | 80                 | 800                                    | 55                 | 660                                   | 35                 | 530                                           | 25                 | 1200             | 220                | 2300                                                                    | 380                |
| 15,0                       | 850                                         | 80                 | 640                                    | 55                 | 530                                   | 35                 | 420                                           | 25                 | 960              | 220                | 1800                                                                    | 380                |
| 20,0                       | 640                                         | 75                 | 480                                    | 50                 | 400                                   | 30                 | 320                                           | 25                 | 720              | 210                | 1400                                                                    | 360                |

Contorneado

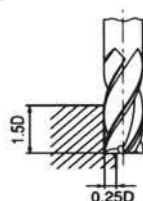


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX Z=4 RECUBRIMIENTO AG REF. 6496

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 3,0                        | 5300                                        | 250                | 4200                                   | 180                | 2700                                  | 90                 | 2100                                          | 60                 | 4800             | 550                | 9000                                                                    | 950                |
| 5,0                        | 3200                                        | 250                | 2500                                   | 180                | 1600                                  | 90                 | 1300                                          | 60                 | 2900             | 550                | 5400                                                                    | 920                |
| 6,0                        | 2600                                        | 250                | 2100                                   | 180                | 1300                                  | 90                 | 1100                                          | 60                 | 1400             | 550                | 4500                                                                    | 950                |
| 8,0                        | 2000                                        | 250                | 1600                                   | 180                | 1000                                  | 90                 | 800                                           | 60                 | 1800             | 550                | 3400                                                                    | 950                |
| 10,0                       | 1590                                        | 250                | 1270                                   | 180                | 800                                   | 90                 | 640                                           | 60                 | 1400             | 560                | 2700                                                                    | 970                |
| 12,0                       | 1330                                        | 250                | 1060                                   | 180                | 660                                   | 90                 | 530                                           | 60                 | 1200             | 550                | 2300                                                                    | 950                |
| 15,0                       | 1060                                        | 250                | 850                                    | 180                | 530                                   | 90                 | 420                                           | 60                 | 960              | 550                | 1800                                                                    | 950                |
| 20,0                       | 800                                         | 240                | 640                                    | 170                | 400                                   | 85                 | 320                                           | 55                 | 720              | 520                | 1400                                                                    | 890                |
| 25,0                       | 640                                         | 190                | 510                                    | 130                | 320                                   | 65                 | 250                                           | 45                 | 570              | 400                | 1100                                                                    | 690                |
| 30,0                       | 530                                         | 150                | 420                                    | 100                | 270                                   | 50                 | 210                                           | 35                 | 480              | 320                | 900                                                                     | 550                |

Contorneado

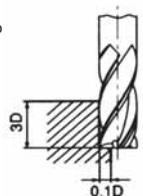


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX Z=4 SERIE LARGA RECUBRIMIENTO AG REF. 6498

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 3,0                        | 4200                                        | 110                | 3200                                   | 75                 | 2700                                  | 45                 | 2100                                          | 33                 | 4800             | 290                | 9000                                                                    | 510                |
| 5,0                        | 2500                                        | 110                | 1900                                   | 75                 | 1600                                  | 45                 | 1300                                          | 33                 | 2900             | 290                | 5400                                                                    | 490                |
| 6,0                        | 2100                                        | 110                | 1600                                   | 75                 | 1300                                  | 45                 | 1100                                          | 33                 | 2400             | 290                | 4500                                                                    | 500                |
| 8,0                        | 1600                                        | 110                | 1200                                   | 75                 | 1000                                  | 45                 | 800                                           | 33                 | 1800             | 290                | 3400                                                                    | 500                |
| 10,0                       | 1300                                        | 110                | 960                                    | 75                 | 800                                   | 45                 | 640                                           | 33                 | 1400             | 300                | 2700                                                                    | 510                |
| 12,0                       | 1100                                        | 110                | 800                                    | 75                 | 660                                   | 45                 | 530                                           | 33                 | 1200             | 290                | 2300                                                                    | 510                |
| 15,0                       | 850                                         | 110                | 640                                    | 75                 | 530                                   | 45                 | 420                                           | 33                 | 960              | 290                | 1800                                                                    | 510                |
| 20,0                       | 640                                         | 100                | 480                                    | 70                 | 400                                   | 45                 | 320                                           | 30                 | 720              | 280                | 1400                                                                    | 480                |
| 25,0                       | 510                                         | 80                 | 380                                    | 55                 | 320                                   | 35                 | 250                                           | 25                 | 570              | 210                | 1100                                                                    | 370                |
| 30,0                       | 420                                         | 65                 | 320                                    | 40                 | 270                                   | 25                 | 210                                           | 20                 | 480              | 170                | 900                                                                     | 290                |

Contorneado

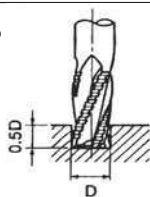


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

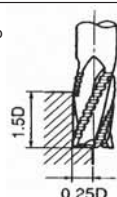
## FRESAS HSS FMX SEMI DESBASTE HEAVY SERIE CORTA RECUBRIMIENTO AG REF. 6402

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 3,0                        | 5000                                        | 290                | 3800                                   | 190                | 3200                                  | 130                | 2500                                          | 90                 | 5800             | 770                | 10800                                                                   | 1320               |
| 5,0                        | 3000                                        | 290                | 2300                                   | 190                | 1900                                  | 130                | 1600                                          | 90                 | 3500             | 770                | 6500                                                                    | 1320               |
| 6,0                        | 2500                                        | 290                | 1900                                   | 190                | 1600                                  | 130                | 1300                                          | 90                 | 2900             | 790                | 5400                                                                    | 1320               |
| 8,0                        | 1900                                        | 290                | 1400                                   | 190                | 1200                                  | 130                | 1000                                          | 90                 | 2200             | 790                | 4100                                                                    | 1320               |
| 10,0                       | 1500                                        | 300                | 1200                                   | 200                | 1000                                  | 130                | 800                                           | 90                 | 1700             | 800                | 3200                                                                    | 1320               |
| 12,0                       | 1250                                        | 290                | 1000                                   | 200                | 800                                   | 130                | 600                                           | 90                 | 1400             | 790                | 2800                                                                    | 1320               |
| 15,0                       | 1000                                        | 290                | 800                                    | 200                | 600                                   | 130                | 500                                           | 90                 | 1200             | 790                | 2200                                                                    | 1320               |
| 20,0                       | 750                                         | 260                | 600                                    | 180                | 500                                   | 120                | 400                                           | 80                 | 900              | 740                | 1700                                                                    | 1320               |
| 25,0                       | 600                                         | 220                | 500                                    | 150                | 400                                   | 90                 | 300                                           | 60                 | 700              | 580                | 1300                                                                    | 980                |
| 30,0                       | 500                                         | 200                | 400                                    | 120                | 300                                   | 80                 | 250                                           | 50                 | 600              | 510                | 1100                                                                    | 860                |

Ranurado



Contorneado

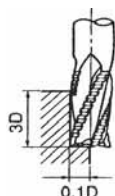


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX SEMI DESBASTE HEAVY SERIE LARGA RECUBRIMIENTO AG REF. 6404

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | FC, FCD          |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Fundición<br>~200 HB                          |                    |                  |                    |                                                                         |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 3,0                        | 5000                                        | 180                | 3800                                   | 120                | 3200                                  | 80                 | 2500                                          | 50                 | 5800             | 470                | 10800                                                                   | 840                |
| 5,0                        | 3000                                        | 180                | 2300                                   | 120                | 1900                                  | 80                 | 1600                                          | 50                 | 3500             | 470                | 6500                                                                    | 840                |
| 6,0                        | 2500                                        | 180                | 1900                                   | 120                | 1600                                  | 80                 | 1300                                          | 50                 | 2900             | 480                | 5400                                                                    | 840                |
| 8,0                        | 1900                                        | 180                | 1400                                   | 120                | 1200                                  | 80                 | 1000                                          | 50                 | 2200             | 480                | 4100                                                                    | 840                |
| 10,0                       | 1500                                        | 180                | 1200                                   | 120                | 1000                                  | 80                 | 800                                           | 50                 | 1700             | 490                | 3200                                                                    | 840                |
| 12,0                       | 1250                                        | 180                | 1000                                   | 120                | 800                                   | 80                 | 600                                           | 50                 | 1400             | 480                | 2800                                                                    | 840                |
| 15,0                       | 1000                                        | 180                | 800                                    | 120                | 600                                   | 80                 | 500                                           | 50                 | 1200             | 480                | 2200                                                                    | 800                |
| 20,0                       | 750                                         | 160                | 600                                    | 110                | 500                                   | 70                 | 400                                           | 50                 | 900              | 460                | 1700                                                                    | 700                |
| 25,0                       | 600                                         | 140                | 500                                    | 100                | 400                                   | 60                 | 300                                           | 40                 | 700              | 350                | 1300                                                                    | 600                |
| 30,0                       | 500                                         | 120                | 400                                    | 90                 | 300                                   | 60                 | 250                                           | 40                 | 600              | 300                | 1100                                                                    | 560                |

Contorneado



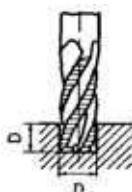
- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX GRAN DESBASTE PASO FINO SERIE CORTA RECUBRIMIENTO AG

REF. 6484 - 6406 - 6422

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2100                                        | 260                | 1600                                   | 180                | 1300                                  | 100                | 1100                                          | 75                 | 2400                 | 320                | 4500                                                                    | 1200               |
| 8,0                        | 1600                                        | 280                | 1200                                   | 190                | 1000                                  | 120                | 800                                           | 80                 | 1800                 | 340                | 3400                                                                    | 1300               |
| 10,0                       | 1300                                        | 280                | 960                                    | 190                | 800                                   | 120                | 640                                           | 80                 | 1400                 | 340                | 2700                                                                    | 1300               |
| 12,0                       | 1100                                        | 280                | 800                                    | 190                | 660                                   | 120                | 530                                           | 84                 | 1200                 | 340                | 2300                                                                    | 1300               |
| 15,0                       | 850                                         | 280                | 640                                    | 190                | 530                                   | 120                | 420                                           | 84                 | 960                  | 340                | 1800                                                                    | 1300               |
| 20,0                       | 640                                         | 260                | 480                                    | 180                | 400                                   | 110                | 320                                           | 78                 | 720                  | 340                | 1400                                                                    | 1300               |
| 25,0                       | 510                                         | 290                | 380                                    | 200                | 320                                   | 130                | 250                                           | 87                 | 570                  | 390                | 1100                                                                    | 1400               |
| 30,0                       | 420                                         | 260                | 320                                    | 180                | 270                                   | 110                | 210                                           | 78                 | 480                  | 360                | 900                                                                     | 1300               |
| 40,0                       | 320                                         | 170                | 240                                    | 110                | 200                                   | 74                 | 160                                           | 51                 | 360                  | 230                | 680                                                                     | 840                |

Ranurado



Contorneado

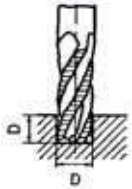


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX GRAN DESBASTE PASO FINO SERIE MEDIA RECUBRIMIENTO AG REF. 6486

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2100                                        | 180                | 1600                                   | 120                | 1300                                  | 75                 | 1100                                          | 50                 | 2400                 | 220                | 4500                                                                    | 800                |
| 8,0                        | 1600                                        | 200                | 1200                                   | 130                | 1000                                  | 80                 | 800                                           | 55                 | 1800                 | 240                | 3400                                                                    | 900                |
| 10,0                       | 1300                                        | 200                | 960                                    | 130                | 800                                   | 80                 | 640                                           | 59                 | 1400                 | 240                | 2700                                                                    | 900                |
| 12,0                       | 1100                                        | 200                | 800                                    | 130                | 660                                   | 86                 | 530                                           | 59                 | 1200                 | 240                | 2300                                                                    | 920                |
| 15,0                       | 850                                         | 200                | 640                                    | 130                | 530                                   | 86                 | 420                                           | 59                 | 960                  | 240                | 1800                                                                    | 920                |
| 20,0                       | 640                                         | 180                | 480                                    | 120                | 400                                   | 81                 | 320                                           | 55                 | 720                  | 240                | 1400                                                                    | 890                |
| 25,0                       | 510                                         | 190                | 380                                    | 130                | 320                                   | 76                 | 250                                           | 58                 | 570                  | 260                | 1100                                                                    | 950                |
| 30,0                       | 420                                         | 170                | 320                                    | 120                | 270                                   | 49                 | 210                                           | 52                 | 480                  | 240                | 900                                                                     | 860                |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS FMX GRAN DESBASTE PASO FINO SERIE LARGA RECUBRIMIENTO AG REF. 6488

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2100                                        | 130                | 1600                                   | 90                 | 1300                                  | 60                 | 1100                                          | 40                 | 2400                 | 170                | 4500                                                                    | 650                |
| 8,0                        | 1600                                        | 150                | 1200                                   | 100                | 1000                                  | 65                 | 800                                           | 45                 | 1800                 | 180                | 3400                                                                    | 700                |
| 10,0                       | 1300                                        | 150                | 960                                    | 100                | 800                                   | 65                 | 640                                           | 45                 | 1400                 | 180                | 2700                                                                    | 700                |
| 12,0                       | 1100                                        | 150                | 800                                    | 100                | 660                                   | 65                 | 530                                           | 45                 | 1200                 | 180                | 2300                                                                    | 700                |
| 15,0                       | 850                                         | 150                | 640                                    | 100                | 530                                   | 66                 | 420                                           | 45                 | 960                  | 180                | 1800                                                                    | 700                |
| 20,0                       | 640                                         | 140                | 480                                    | 95                 | 400                                   | 61                 | 320                                           | 42                 | 720                  | 180                | 1400                                                                    | 670                |
| 25,0                       | 510                                         | 150                | 380                                    | 98                 | 320                                   | 64                 | 250                                           | 44                 | 570                  | 200                | 1100                                                                    | 710                |
| 30,0                       | 420                                         | 130                | 320                                    | 88                 | 270                                   | 57                 | 210                                           | 39                 | 480                  | 180                | 900                                                                     | 650                |
| 40,0                       | 320                                         | 85                 | 240                                    | 57                 | 200                                   | 37                 | 160                                           | 25                 | 360                  | 120                | 680                                                                     | 420                |

Contorneado

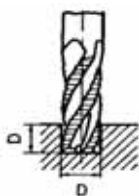


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS Co8 GRAN DESBASTE RECUBRIMIENTO TIALN REF. 6322WT - 6324WT

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2000                                        | 130                | 1600                                   | 95                 | 1200                                  | 55                 | 538                                           | 30                 | 2400                 | 190                | 4000                                                                    | 600                |
| 8,0                        | 1500                                        | 130                | 1200                                   | 95                 | 900                                   | 55                 | 400                                           | 30                 | 1800                 | 190                | 3000                                                                    | 600                |
| 10,0                       | 1200                                        | 130                | 960                                    | 95                 | 725                                   | 55                 | 340                                           | 30                 | 1400                 | 190                | 2400                                                                    | 600                |
| 12,0                       | 1000                                        | 130                | 800                                    | 95                 | 600                                   | 55                 | 280                                           | 30                 | 1200                 | 190                | 2000                                                                    | 600                |
| 15,0                       | 750                                         | 130                | 640                                    | 98                 | 450                                   | 55                 | 220                                           | 30                 | 960                  | 190                | 1500                                                                    | 600                |
| 20,0                       | 600                                         | 120                | 480                                    | 90                 | 380                                   | 50                 | 150                                           | 30                 | 720                  | 190                | 1200                                                                    | 600                |
| 25,0                       | 475                                         | 115                | 380                                    | 85                 | 290                                   | 46                 | 130                                           | 30                 | 570                  | 180                | 1000                                                                    | 550                |
| 30,0                       | 400                                         | 100                | 320                                    | 75                 | 240                                   | 42                 | 100                                           | 25                 | 480                  | 170                | 800                                                                     | 550                |

Ranurado



Contorneado



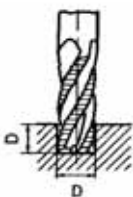
- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

\* Fresas HSS-E CO8% serie larga ref. 6324WT con recubrimiento TIALN reducir los avances de esta tabla un 50% manteniendo la velocidad.

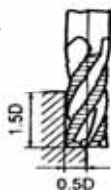
## FRESAS HSS-SINTERIZADO Co11%V8 (FAX 90) GRAN DESBASTE PASO FINO RECUBRIMIENTO PLATINA REF. 7300P - 7310P

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2100                                        | 230                | 1600                                   | 150                | 1300                                  | 100                | 1100                                          | 70                 | 2400                 | 290                | 4500                                                                    | 1100               |
| 8,0                        | 1600                                        | 230                | 1200                                   | 150                | 1000                                  | 100                | 800                                           | 68                 | 1800                 | 280                | 3400                                                                    | 1100               |
| 10,0                       | 1300                                        | 230                | 960                                    | 160                | 800                                   | 100                | 640                                           | 70                 | 1400                 | 290                | 2700                                                                    | 1100               |
| 12,0                       | 1100                                        | 280                | 800                                    | 190                | 660                                   | 120                | 530                                           | 84                 | 1200                 | 340                | 2300                                                                    | 1300               |
| 15,0                       | 850                                         | 280                | 640                                    | 190                | 530                                   | 120                | 420                                           | 84                 | 960                  | 340                | 1800                                                                    | 1300               |
| 20,0                       | 640                                         | 260                | 480                                    | 180                | 400                                   | 110                | 320                                           | 78                 | 720                  | 340                | 1400                                                                    | 1300               |
| 25,0                       | 510                                         | 290                | 380                                    | 200                | 320                                   | 130                | 250                                           | 87                 | 570                  | 390                | 1100                                                                    | 1400               |
| 30,0                       | 420                                         | 260                | 320                                    | 180                | 270                                   | 110                | 210                                           | 78                 | 480                  | 360                | 900                                                                     | 1300               |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS-SINTERIZADO Co11%V8 (FAX 90) GRAN DESBASTE PASO FINO SERIE LARGA RECUBRIMIENTO PLATINA REF. 7304P

| MATERIAL<br>A<br>MECANIZAR | SS, SC                                      |                    | SCM, NAK, HPM                          |                    | SKD, SUS                              |                    |                                               |                    | FC, FCD              |                    |                                                                         |                    |
|----------------------------|---------------------------------------------|--------------------|----------------------------------------|--------------------|---------------------------------------|--------------------|-----------------------------------------------|--------------------|----------------------|--------------------|-------------------------------------------------------------------------|--------------------|
|                            | Aceros de Construcción<br>Aceros al Carbono |                    | Aceros Aleados<br>Aceros Pre-templados |                    | Aceros de Molde<br>Aceros Inoxidables |                    | Aleaciones de Níquel<br>Aleaciones de Titanio |                    | Fundición<br>~200 HB |                    | Aleaciones de Aluminio<br>Aleaciones de Cobre<br>Aleaciones no férricas |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM                            | Avance<br>(mm/min) | Velocidad<br>RPM                       | Avance<br>(mm/min) | Velocidad<br>RPM                      | Avance<br>(mm/min) | Velocidad<br>RPM                              | Avance<br>(mm/min) | Velocidad<br>RPM     | Avance<br>(mm/min) | Velocidad<br>RPM                                                        | Avance<br>(mm/min) |
| 6,0                        | 2100                                        | 120                | 1600                                   | 82                 | 1300                                  | 53                 | 1100                                          | 37                 | 2400                 | 150                | 4500                                                                    | 570                |
| 8,0                        | 1600                                        | 120                | 1200                                   | 81                 | 1000                                  | 53                 | 800                                           | 36                 | 1800                 | 150                | 3400                                                                    | 560                |
| 10,0                       | 1300                                        | 120                | 960                                    | 84                 | 800                                   | 54                 | 640                                           | 37                 | 1400                 | 150                | 2700                                                                    | 580                |
| 12,0                       | 1100                                        | 150                | 800                                    | 100                | 660                                   | 65                 | 530                                           | 45                 | 1200                 | 180                | 2300                                                                    | 700                |
| 15,0                       | 850                                         | 150                | 640                                    | 100                | 530                                   | 66                 | 420                                           | 45                 | 960                  | 180                | 1800                                                                    | 700                |
| 20,0                       | 640                                         | 140                | 480                                    | 95                 | 400                                   | 61                 | 320                                           | 42                 | 720                  | 180                | 1400                                                                    | 670                |
| 25,0                       | 510                                         | 150                | 380                                    | 98                 | 320                                   | 64                 | 250                                           | 44                 | 570                  | 200                | 1100                                                                    | 710                |
| 30,0                       | 420                                         | 130                | 320                                    | 88                 | 270                                   | 57                 | 210                                           | 39                 | 480                  | 180                | 900                                                                     | 650                |

Contorneado

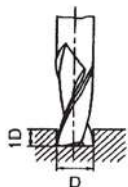


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Recomendamos el uso de refrigerante cuando se mecanicen Aceros Inoxidables.
- 3) Se recomienda el uso de aceite de corte cuando se mecanicen Aleaciones de Níquel y Aleaciones de Titanio

## FRESAS HSS Co8 Z=2 RECUBRIMIENTO DLC REF. 6450

| MATERIAL<br>A<br>MECANIZAR | 1070             |                    | 4032, 6061                          |                    | 5052                         |                    | 7075                            |                    |
|----------------------------|------------------|--------------------|-------------------------------------|--------------------|------------------------------|--------------------|---------------------------------|--------------------|
|                            | Aluminio         |                    | Aleaciones de Aluminio<br>Si, Mg-Si |                    | Aleaciones de Aluminio<br>Mg |                    | Aleaciones de Aluminio<br>Zn-Mg |                    |
| Diámetro<br>(mm)           | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM                    | Avance<br>(mm/min) | Velocidad<br>RPM             | Avance<br>(mm/min) | Velocidad<br>RPM                | Avance<br>(mm/min) |
| 3,0                        | 32000            | 800                | 5300                                | 200                | 13000                        | 400                | 27000                           | 400                |
| 5,0                        | 19200            | 1000               | 3200                                | 250                | 8000                         | 500                | 16000                           | 500                |
| 6,0                        | 16000            | 1000               | 2650                                | 250                | 6500                         | 500                | 13500                           | 500                |
| 8,0                        | 12000            | 1000               | 2000                                | 300                | 5000                         | 600                | 10000                           | 600                |
| 10,0                       | 9600             | 1200               | 1600                                | 300                | 4000                         | 600                | 8000                            | 600                |
| 12,0                       | 8000             | 1200               | 1300                                | 350                | 3300                         | 700                | 6600                            | 700                |
| 16,0                       | 6000             | 1200               | 1000                                | 350                | 2500                         | 700                | 5000                            | 700                |
| 20,0                       | 4800             | 1200               | 800                                 | 350                | 2000                         | 700                | 4000                            | 700                |

Ranurado



Contorneado



- 1) La fresa 6450 debe ser usada con refrigeración
- 2) Se recomienda la fresa de Metal Duro DLC-MILL ref. 9330 en el fresado de Aleaciones de Aluminio (AC - ADC12)
- 3) En caso de ranurado, reducir la rotación al 60% (-40%) y el avance al 40% (-60%) de los valores de esta tabla.

## FRESAS HSS-E Co8 Z=2 PARA ALUMINIO REF. 6276W - 6278W

Ref. 6276W

| MATERIAL<br>A<br>MECANIZAR | Aleaciones de Aluminio |                    |
|----------------------------|------------------------|--------------------|
| Diámetro<br>(mm)           | Velocidad<br>RPM       | Avance<br>(mm/min) |
| 4,0                        | 4800                   | 550                |
| 6,0                        | 3200                   | 557                |
| 8,0                        | 2400                   | 550                |
| 10,0                       | 1920                   | 568                |
| 12,0                       | 1600                   | 562                |
| 16,0                       | 1200                   | 578                |
| 20,0                       | 960                    | 540                |
| 25,0                       | 770                    | 655                |
| 30,0                       | 640                    | 594                |

Ref. 6278W

| MATERIAL<br>A<br>MECANIZAR | Aleaciones de Aluminio |                    |
|----------------------------|------------------------|--------------------|
| Diámetro<br>(mm)           | Velocidad<br>RPM       | Avance<br>(mm/min) |
| 4,0                        | 4800                   | 275                |
| 6,0                        | 3200                   | 279                |
| 8,0                        | 2400                   | 275                |
| 10,0                       | 1920                   | 284                |
| 12,0                       | 1600                   | 281                |
| 16,0                       | 1200                   | 279                |
| 20,0                       | 960                    | 270                |

Contorneado

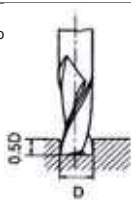


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 Z=2 REF. 6258W - 6230 - 6204 - 6258WT

| MATERIAL A MECANIZAR | Aceros no Aleados <700N/mm² |                 | Aceros Aleados <1000N/mm² Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm² |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|----------------------|-----------------------------|-----------------|---------------------------------------------------------|-----------------|---------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm)        | Velocidad RPM               | Avance (mm/min) | Velocidad RPM                                           | Avance (mm/min) | Velocidad RPM             | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 2,0                  | 4800                        | 72              | 4000                                                    | 55              | 2880                      | 31              | 1920                            | 20              | 1280                    | 11              | 6400           | 104             | 9600                   | 318             | 8000          | 220             |
| 4,0                  | 2400                        | 75              | 2000                                                    | 56              | 1440                      | 32              | 960                             | 21              | 640                     | 12              | 3200           | 102             | 4800                   | 330             | 4000          | 226             |
| 6,0                  | 1600                        | 76              | 1330                                                    | 57              | 960                       | 32              | 640                             | 21              | 430                     | 12              | 2130           | 112             | 3200                   | 334             | 2670          | 232             |
| 8,0                  | 1200                        | 75              | 1000                                                    | 56              | 720                       | 32              | 480                             | 21              | 320                     | 12              | 1600           | 110             | 2400                   | 330             | 2000          | 229             |
| 10,0                 | 960                         | 77              | 800                                                     | 58              | 580                       | 32              | 380                             | 22              | 260                     | 12              | 1280           | 114             | 1920                   | 341             | 1600          | 237             |
| 12,0                 | 800                         | 77              | 670                                                     | 58              | 480                       | 32              | 320                             | 21              | 210                     | 12              | 1070           | 112             | 1600                   | 337             | 1330          | 234             |
| 16,0                 | 600                         | 79              | 500                                                     | 59              | 360                       | 33              | 240                             | 22              | 160                     | 13              | 800            | 116             | 1200                   | 347             | 1000          | 241             |
| 20,0                 | 480                         | 72              | 400                                                     | 54              | 290                       | 30              | 190                             | 20              | 130                     | 11              | 640            | 111             | 960                    | 324             | 800           | 226             |
| 25,0                 | 380                         | 68              | 320                                                     | 51              | 230                       | 29              | 150                             | 19              | 100                     | 11              | 510            | 109             | 770                    | 314             | 640           | 220             |
| 30,0                 | 320                         | 61              | 270                                                     | 46              | 190                       | 26              | 130                             | 17              | 90                      | 10              | 430            | 100             | 640                    | 285             | 530           | 200             |
| 35,0                 | 270                         | 45              | 230                                                     | 34              | 160                       | 19              | 110                             | 13              | 70                      | 7               | 370            | 73              | 550                    | 209             | 460           | 146             |
| 40,0                 | 240                         | 35              | 200                                                     | 27              | 140                       | 15              | 100                             | 10              | 60                      | 6               | 320            | 57              | 480                    | 164             | 400           | 115             |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

\* Fresas HSS-E Co8% ref. 6258WT con recubrimiento TiAlN aumentar un 25% de las condiciones de esta tabla.

## FRESAS HSS-E Co8 Z=2 SERIE LARGA REF. 6232

| MATERIAL A MECANIZAR | Aceros no Aleados <700N/mm² |                 | Aceros Aleados <1000N/mm² Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm² |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|----------------------|-----------------------------|-----------------|---------------------------------------------------------|-----------------|---------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm)        | Velocidad RPM               | Avance (mm/min) | Velocidad RPM                                           | Avance (mm/min) | Velocidad RPM             | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 2,0                  | 4800                        | 36              | 4000                                                    | 28              | 2880                      | 15              | 1920                            | 10              | 1280                    | 5               | 6400           | 52              | 9600                   | 159             | 8000          | 110             |
| 4,0                  | 2400                        | 38              | 2000                                                    | 28              | 1440                      | 16              | 960                             | 11              | 640                     | 6               | 3200           | 51              | 4800                   | 165             | 4000          | 113             |
| 6,0                  | 1600                        | 38              | 1330                                                    | 28              | 960                       | 16              | 640                             | 11              | 430                     | 6               | 2130           | 56              | 3200                   | 167             | 2670          | 116             |
| 8,0                  | 1200                        | 38              | 1000                                                    | 28              | 720                       | 16              | 480                             | 11              | 320                     | 6               | 1600           | 55              | 2400                   | 165             | 2000          | 115             |
| 10,0                 | 960                         | 39              | 800                                                     | 29              | 580                       | 16              | 380                             | 11              | 260                     | 6               | 1280           | 57              | 1920                   | 171             | 1600          | 119             |
| 12,0                 | 800                         | 39              | 670                                                     | 29              | 480                       | 16              | 320                             | 11              | 210                     | 6               | 1070           | 56              | 1600                   | 169             | 1330          | 117             |
| 16,0                 | 600                         | 40              | 500                                                     | 30              | 360                       | 17              | 240                             | 11              | 160                     | 7               | 800            | 58              | 1200                   | 174             | 1000          | 121             |
| 20,0                 | 480                         | 36              | 400                                                     | 27              | 290                       | 15              | 190                             | 10              | 130                     | 5               | 640            | 56              | 960                    | 162             | 800           | 113             |
| 25,0                 | 380                         | 34              | 320                                                     | 26              | 230                       | 15              | 150                             | 9               | 100                     | 5               | 510            | 55              | 770                    | 157             | 640           | 110             |
| 30,0                 | 320                         | 31              | 270                                                     | 23              | 190                       | 13              | 130                             | 8               | 90                      | 5               | 430            | 50              | 640                    | 143             | 530           | 100             |

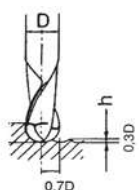
Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir al 70% (-30%) los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 PUNTA ESFÉRICA SERIE CORTA REF. 6350W - 6350WT

| MATERIAL A MECANIZAR |       | Aceros al Carbono<br>Aceros de Construcción<br><500N/mm <sup>2</sup> |                 | Aceros Aleados<br>500~800N/mm <sup>2</sup><br>(~20HRC) |                 | Acero Aleados<br>800~1000N/mm <sup>2</sup><br>(20~30HRC) |                 | Acero Aleados<br>1000~1300N/mm <sup>2</sup><br>(30~40HRC) |                 | Aleaciones de Aluminio |                 |
|----------------------|-------|----------------------------------------------------------------------|-----------------|--------------------------------------------------------|-----------------|----------------------------------------------------------|-----------------|-----------------------------------------------------------|-----------------|------------------------|-----------------|
| Diámetro (mm)        | Radio | Velocidad RPM                                                        | Avance (mm/min) | Velocidad RPM                                          | Avance (mm/min) | Velocidad RPM                                            | Avance (mm/min) | Velocidad RPM                                             | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) |
| 3,0                  | 1,5   | 4450                                                                 | 93              | 3350                                                   | 73              | 1970                                                     | 33              | 1380                                                      | 25              | 10800                  | 240             |
| 4,0                  | 2,0   | 3100                                                                 | 110             | 2350                                                   | 82              | 1350                                                     | 38              | 1000                                                      | 30              | 7900                   | 250             |
| 6,0                  | 3,0   | 2150                                                                 | 130             | 1725                                                   | 85              | 1050                                                     | 45              | 720                                                       | 30              | 5500                   | 270             |
| 8,0                  | 4,0   | 1550                                                                 | 155             | 1180                                                   | 100             | 720                                                      | 50              | 540                                                       | 35              | 3950                   | 360             |
| 10,0                 | 5,0   | 1270                                                                 | 175             | 1000                                                   | 115             | 550                                                      | 63              | 430                                                       | 40              | 3190                   | 370             |
| 12,0                 | 6,0   | 990                                                                  | 170             | 750                                                    | 103             | 460                                                      | 54              | 300                                                       | 40              | 2400                   | 350             |
| 16,0                 | 8,0   | 800                                                                  | 145             | 620                                                    | 95              | 360                                                      | 54              | 260                                                       | 40              | 2050                   | 320             |
| 20,0                 | 10,0  | 620                                                                  | 135             | 480                                                    | 80              | 290                                                      | 45              | 200                                                       | 40              | 1550                   | 290             |
| 25,0                 | 12,5  | 520                                                                  | 125             | 390                                                    | 75              | 200                                                      | 35              | 150                                                       | 35              | 1250                   | 260             |

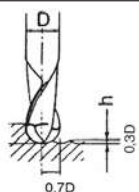


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

\* Fresas HSS-E Co8% ref. 6350WT con recubrimiento TIALN aumentar un 25% las condiciones de esta tabla.

## FRESAS HSS-E Co8 PUNTA ESFÉRICA SERIE LARGA REF. 6352W - 6352WT

| MATERIAL A MECANIZAR |       | Aceros al Carbono<br>Aceros de Construcción<br><500N/mm <sup>2</sup> |                 | Aceros Aleados<br>500~800N/mm <sup>2</sup><br>(~20HRC) |                 | Acero Aleados<br>800~1000N/mm <sup>2</sup><br>(20~30HRC) |                 | Acero Aleados<br>1000~1300N/mm <sup>2</sup><br>(30~40HRC) |                 | Aleaciones de Aluminio |                 |
|----------------------|-------|----------------------------------------------------------------------|-----------------|--------------------------------------------------------|-----------------|----------------------------------------------------------|-----------------|-----------------------------------------------------------|-----------------|------------------------|-----------------|
| Diámetro (mm)        | Radio | Velocidad RPM                                                        | Avance (mm/min) | Velocidad RPM                                          | Avance (mm/min) | Velocidad RPM                                            | Avance (mm/min) | Velocidad RPM                                             | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) |
| 3,0                  | 1,5   | 4450                                                                 | 48              | 3350                                                   | 35              | 1970                                                     | 15              | 1380                                                      | 10              | 10800                  | 115             |
| 4,0                  | 2,0   | 3100                                                                 | 58              | 2350                                                   | 40              | 1350                                                     | 18              | 1000                                                      | 13              | 7900                   | 130             |
| 6,0                  | 3,0   | 2150                                                                 | 68              | 1725                                                   | 45              | 1050                                                     | 23              | 720                                                       | 13              | 5500                   | 140             |
| 8,0                  | 4,0   | 1550                                                                 | 80              | 1180                                                   | 53              | 720                                                      | 25              | 540                                                       | 15              | 3950                   | 175             |
| 10,0                 | 5,0   | 1270                                                                 | 90              | 1000                                                   | 60              | 550                                                      | 30              | 430                                                       | 18              | 3190                   | 180             |
| 12,0                 | 6,0   | 990                                                                  | 85              | 750                                                    | 53              | 460                                                      | 28              | 300                                                       | 18              | 2400                   | 170             |
| 16,0                 | 8,0   | 800                                                                  | 75              | 620                                                    | 50              | 360                                                      | 28              | 260                                                       | 18              | 2050                   | 150             |
| 20,0                 | 10,0  | 620                                                                  | 70              | 480                                                    | 43              | 290                                                      | 25              | 200                                                       | 18              | 1550                   | 140             |
| 25,0                 | 12,5  | 520                                                                  | 65              | 390                                                    | 35              | 200                                                      | 20              | 150                                                       | 15              | 1250                   | 125             |



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

\* Fresas HSS-E Co8% ref. 6352WT con recubrimiento TIALN aumentar un 25% las condiciones de esta tabla.

# FRESAS HSS-E Co8 Z=3 REF. 6280W - 6280WT - 6288W - 6288WT - 6298W

| MATERIAL<br>A<br>MECANIZAR | Aceros no Aleados<br><700N/mm <sup>2</sup> |                    | Aceros Aleados<br><1000N/mm <sup>2</sup><br>Aceros Inoxidables<br>Ferríticos |                    | Aceros Aleados<br><1300N/mm <sup>2</sup> |                    | Aceros Inoxidables<br>Austeníticos |                    | Aceros<br>Alta Resistencia |                    | Fundición Gris   |                    | Aleaciones<br>de Aluminio |                    | Cobre            |                    |
|----------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------|------------------------------------|--------------------|----------------------------|--------------------|------------------|--------------------|---------------------------|--------------------|------------------|--------------------|
| Diámetro<br>(mm)           | Velocidad<br>RPM                           | Avance<br>(mm/min) | Velocidad<br>RPM                                                             | Avance<br>(mm/min) | Velocidad<br>RPM                         | Avance<br>(mm/min) | Velocidad<br>RPM                   | Avance<br>(mm/min) | Velocidad<br>RPM           | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM          | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) |
| 4,0                        | 2400                                       | 94                 | 2000                                                                         | 70                 | 1440                                     | 39                 | 960                                | 26                 | 640                        | 15                 | 3200             | 128                | 4800                      | 413                | 4000             | 282                |
| 6,0                        | 1600                                       | 95                 | 1330                                                                         | 71                 | 960                                      | 40                 | 640                                | 27                 | 430                        | 15                 | 2130             | 140                | 3200                      | 418                | 2670             | 290                |
| 8,0                        | 1200                                       | 94                 | 1000                                                                         | 70                 | 720                                      | 39                 | 480                                | 26                 | 320                        | 15                 | 1600             | 138                | 2400                      | 413                | 2000             | 286                |
| 10,0                       | 960                                        | 97                 | 800                                                                          | 73                 | 580                                      | 41                 | 380                                | 27                 | 260                        | 15                 | 1280             | 142                | 1920                      | 426                | 1600             | 296                |
| 12,0                       | 800                                        | 96                 | 670                                                                          | 72                 | 480                                      | 40                 | 320                                | 27                 | 210                        | 15                 | 1070             | 140                | 1600                      | 421                | 1330             | 292                |
| 16,0                       | 600                                        | 98                 | 500                                                                          | 74                 | 360                                      | 41                 | 240                                | 28                 | 160                        | 16                 | 800              | 144                | 1200                      | 433                | 1000             | 301                |
| 20,0                       | 480                                        | 90                 | 400                                                                          | 67                 | 290                                      | 38                 | 190                                | 25                 | 130                        | 14                 | 640              | 139                | 960                       | 405                | 800              | 283                |
| 25,0                       | 380                                        | 86                 | 320                                                                          | 64                 | 230                                      | 36                 | 150                                | 24                 | 100                        | 14                 | 510              | 136                | 770                       | 393                | 640              | 275                |
| 30,0                       | 320                                        | 77                 | 270                                                                          | 58                 | 190                                      | 32                 | 130                                | 21                 | 90                         | 12                 | 430              | 125                | 640                       | 357                | 530              | 250                |

Ranurado

Contorneado

- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

\* Fresas HSS-E Co8% ref. 6280WT - 6288WT con recubrimiento TIALN aumentar un 25% las condiciones de esta tabla.

\* Fresas HSS-E Co8% serie larga ref. 6298W reducir los avances de esta tabla un 50% manteniendo la velocidad.

# FRESAS HSS-E Co8 GRAN RENDIMIENTO Z=3/Z=4 HÉLICE 50° REF. 6242W

| MATERIAL<br>A<br>MECANIZAR | Aceros Aleados<br>500~800N/mm <sup>2</sup><br>(~20HRC) |                    | Aceros Aleados<br>800~1000N/mm <sup>2</sup><br>(20~30HRC) |                    | Acero Aleados<br>1000~1300N/mm <sup>2</sup><br>(30~40HRC) |                    |
|----------------------------|--------------------------------------------------------|--------------------|-----------------------------------------------------------|--------------------|-----------------------------------------------------------|--------------------|
|                            | Velocidad<br>RPM                                       | Avance<br>(mm/min) | Velocidad<br>RPM                                          | Avance<br>(mm/min) | Velocidad<br>RPM                                          | Avance<br>(mm/min) |
| 6,0                        | 1800                                                   | 83                 | 1300                                                      | 53                 | 900                                                       | 36                 |
| 8,0                        | 1200                                                   | 93                 | 1000                                                      | 63                 | 600                                                       | 42                 |
| 10,0                       | 1000                                                   | 93                 | 900                                                       | 66                 | 500                                                       | 42                 |
| 12,0                       | 900                                                    | 112                | 700                                                       | 68                 | 450                                                       | 48                 |
| 14,0                       | 800                                                    | 93                 | 600                                                       | 68                 | 400                                                       | 48                 |
| 16,0                       | 600                                                    | 93                 | 500                                                       | 68                 | 300                                                       | 42                 |
| 18,0                       | 550                                                    | 93                 | 450                                                       | 66                 | 280                                                       | 42                 |
| 20,0                       | 500                                                    | 93                 | 450                                                       | 66                 | 250                                                       | 42                 |
| 22,0                       | 500                                                    | 93                 | 400                                                       | 66                 | 250                                                       | 42                 |
| 25,0                       | 450                                                    | 86                 | 350                                                       | 56                 | 200                                                       | 33                 |
| 28,0                       | 400                                                    | 74                 | 300                                                       | 50                 | 180                                                       | 26                 |
| 30,0                       | 350                                                    | 66                 | 280                                                       | 44                 | 180                                                       | 26                 |

Contorneado

- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 Z=4/Z=6 SERIE CORTA REF. 6260W

| MATERIAL A MECANIZAR | Aceros no Aleados <700N/mm² |                 | Aceros Aleados <1000N/mm² Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm² |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|----------------------|-----------------------------|-----------------|---------------------------------------------------------|-----------------|---------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm)        | Velocidad RPM               | Avance (mm/min) | Velocidad RPM                                           | Avance (mm/min) | Velocidad RPM             | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 2,0                  | 4800                        | 144             | 4000                                                    | 110             | 2880                      | 61              | 1920                            | 41              | 1280                    | 22              | 6400           | 208             | 9600                   | 636             | 8000          | 440             |
| 4,0                  | 2400                        | 150             | 2000                                                    | 113             | 1440                      | 63              | 960                             | 42              | 640                     | 24              | 3200           | 204             | 4800                   | 660             | 4000          | 452             |
| 6,0                  | 1600                        | 152             | 1330                                                    | 113             | 960                       | 64              | 640                             | 42              | 430                     | 25              | 2130           | 224             | 3200                   | 668             | 2670          | 464             |
| 8,0                  | 1200                        | 150             | 1000                                                    | 113             | 720                       | 63              | 480                             | 42              | 320                     | 24              | 1600           | 220             | 2400                   | 660             | 2000          | 458             |
| 10,0                 | 960                         | 155             | 800                                                     | 116             | 580                       | 65              | 380                             | 43              | 260                     | 25              | 1280           | 227             | 1920                   | 682             | 1600          | 473             |
| 12,0                 | 800                         | 153             | 670                                                     | 115             | 480                       | 64              | 320                             | 43              | 210                     | 25              | 1070           | 224             | 1600                   | 674             | 1330          | 468             |
| 16,0                 | 600                         | 158             | 500                                                     | 118             | 360                       | 66              | 240                             | 44              | 160                     | 25              | 800            | 231             | 1200                   | 693             | 1000          | 481             |
| 20,0                 | 480                         | 143             | 400                                                     | 108             | 290                       | 60              | 190                             | 40              | 130                     | 23              | 640            | 222             | 960                    | 648             | 800           | 452             |
| 25,0                 | 380                         | 137             | 320                                                     | 102             | 230                       | 57              | 150                             | 38              | 100                     | 22              | 510            | 218             | 770                    | 629             | 640           | 440             |
| 30,0                 | 320                         | 164             | 270                                                     | 123             | 190                       | 68              | 130                             | 46              | 90                      | 26              | 430            | 266             | 640                    | 761             | 530           | 533             |
| 35,0                 | 270                         | 120             | 230                                                     | 90              | 160                       | 50              | 110                             | 33              | 70                      | 19              | 370            | 195             | 550                    | 557             | 460           | 391             |
| 40,0                 | 240                         | 94              | 200                                                     | 71              | 140                       | 39              | 100                             | 26              | 60                      | 15              | 320            | 153             | 480                    | 438             | 400           | 307             |

Contorneado

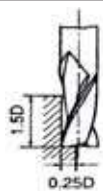


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 Z=4/Z=6 SERIE LARGA REF. 6262W

|               | Aceros no Aleados <700N/mm² |                 | Aceros Aleados <1000N/mm² Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm² |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|---------------|-----------------------------|-----------------|---------------------------------------------------------|-----------------|---------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm) | Velocidad RPM               | Avance (mm/min) | Velocidad RPM                                           | Avance (mm/min) | Velocidad RPM             | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 2,0           | 4800                        | 72              | 4000                                                    | 55              | 2880                      | 31              | 1920                            | 21              | 1280                    | 11              | 6400           | 104             | 9600                   | 318             | 8000          | 220             |
| 4,0           | 2400                        | 75              | 2000                                                    | 57              | 1440                      | 32              | 960                             | 21              | 640                     | 12              | 3200           | 102             | 4800                   | 330             | 4000          | 226             |
| 6,0           | 1600                        | 76              | 1330                                                    | 57              | 960                       | 32              | 640                             | 21              | 430                     | 13              | 2130           | 112             | 3200                   | 334             | 2670          | 232             |
| 8,0           | 1200                        | 75              | 1000                                                    | 57              | 720                       | 32              | 480                             | 21              | 320                     | 12              | 1600           | 110             | 2400                   | 330             | 2000          | 229             |
| 10,0          | 960                         | 78              | 800                                                     | 58              | 580                       | 33              | 380                             | 22              | 260                     | 13              | 1280           | 114             | 1920                   | 341             | 1600          | 237             |
| 12,0          | 800                         | 77              | 670                                                     | 58              | 480                       | 32              | 320                             | 22              | 210                     | 13              | 1070           | 112             | 1600                   | 337             | 1330          | 234             |
| 16,0          | 600                         | 79              | 500                                                     | 59              | 360                       | 33              | 240                             | 22              | 160                     | 13              | 800            | 116             | 1200                   | 347             | 1000          | 241             |
| 20,0          | 480                         | 72              | 400                                                     | 54              | 290                       | 30              | 190                             | 20              | 130                     | 12              | 640            | 111             | 960                    | 324             | 800           | 226             |
| 25,0          | 380                         | 69              | 320                                                     | 51              | 230                       | 29              | 150                             | 19              | 100                     | 11              | 510            | 109             | 770                    | 315             | 640           | 220             |
| 30,0          | 320                         | 82              | 270                                                     | 62              | 190                       | 34              | 130                             | 23              | 90                      | 13              | 430            | 133             | 640                    | 381             | 530           | 267             |

Contorneado



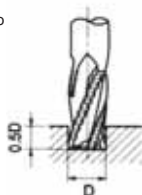
- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.



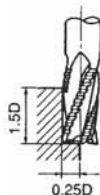
## FRESAS HSS-E Co8 SEMI-DESBASTE HEAVY SERIE CORTA REF. 6366

| MATERIAL<br>A<br>MECANIZAR | Aceros no Aleados<br><700N/mm <sup>2</sup> |                    | Aceros Aleados<br><1000N/mm <sup>2</sup><br>Aceros Inoxidables<br>Ferríticos |                    | Aceros Aleados<br><1300N/mm <sup>2</sup> |                    | Aceros Inoxidables<br>Austeníticos |                    | Aceros<br>Alta Resistencia |                    | Fundición Gris   |                    | Aleaciones<br>de Aluminio |                    | Cobre            |                    |
|----------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------|------------------------------------|--------------------|----------------------------|--------------------|------------------|--------------------|---------------------------|--------------------|------------------|--------------------|
|                            | Velocidad<br>RPM                           | Avance<br>(mm/min) | Velocidad<br>RPM                                                             | Avance<br>(mm/min) | Velocidad<br>RPM                         | Avance<br>(mm/min) | Velocidad<br>RPM                   | Avance<br>(mm/min) | Velocidad<br>RPM           | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM          | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) |
| 6,0                        | 1600                                       | 182                | 1330                                                                         | 136                | 960                                      | 76                 | 640                                | 51                 | 430                        | 29                 | 2130             | 269                | 3200                      | 802                | 2670             | 557                |
| 8,0                        | 1200                                       | 180                | 1000                                                                         | 135                | 720                                      | 76                 | 480                                | 50                 | 320                        | 29                 | 1600             | 264                | 2400                      | 792                | 2000             | 550                |
| 10,0                       | 960                                        | 186                | 800                                                                          | 139                | 580                                      | 78                 | 380                                | 52                 | 260                        | 30                 | 1280             | 273                | 1920                      | 818                | 1600             | 568                |
| 12,0                       | 800                                        | 184                | 670                                                                          | 138                | 480                                      | 77                 | 320                                | 51                 | 210                        | 29                 | 1070             | 269                | 1600                      | 809                | 1330             | 561                |
| 16,0                       | 600                                        | 189                | 500                                                                          | 142                | 360                                      | 79                 | 240                                | 53                 | 160                        | 30                 | 800              | 277                | 1200                      | 832                | 1000             | 578                |
| 20,0                       | 480                                        | 172                | 400                                                                          | 129                | 290                                      | 72                 | 190                                | 48                 | 130                        | 27                 | 640              | 266                | 960                       | 778                | 800              | 543                |
| 25,0                       | 380                                        | 164                | 320                                                                          | 123                | 230                                      | 69                 | 150                                | 46                 | 100                        | 26                 | 510              | 262                | 770                       | 755                | 640              | 528                |
| 30,0                       | 320                                        | 147                | 270                                                                          | 110                | 190                                      | 62                 | 130                                | 41                 | 90                         | 23                 | 430              | 239                | 640                       | 684                | 530              | 480                |
| 35,0                       | 270                                        | 144                | 230                                                                          | 108                | 160                                      | 60                 | 110                                | 40                 | 70                         | 23                 | 370              | 234                | 550                       | 668                | 460              | 469                |
| 40,0                       | 240                                        | 113                | 200                                                                          | 85                 | 140                                      | 47                 | 100                                | 31                 | 60                         | 18                 | 320              | 184                | 480                       | 526                | 400              | 369                |

Ranurado



Contorneado

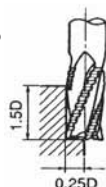


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 SEMI-DESBASTE HEAVY SERIE LARGA REF. 6368

| MATERIAL<br>A<br>MECANIZAR | Aceros no Aleados<br><700N/mm <sup>2</sup> |                    | Aceros Aleados<br><1000N/mm <sup>2</sup><br>Aceros Inoxidables<br>Ferríticos |                    | Aceros Aleados<br><1300N/mm <sup>2</sup> |                    | Aceros Inoxidables<br>Austeníticos |                    | Aceros<br>Alta Resistencia |                    | Fundición Gris   |                    | Aleaciones<br>de Aluminio |                    | Cobre            |                    |
|----------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------|------------------------------------|--------------------|----------------------------|--------------------|------------------|--------------------|---------------------------|--------------------|------------------|--------------------|
|                            | Velocidad<br>RPM                           | Avance<br>(mm/min) | Velocidad<br>RPM                                                             | Avance<br>(mm/min) | Velocidad<br>RPM                         | Avance<br>(mm/min) | Velocidad<br>RPM                   | Avance<br>(mm/min) | Velocidad<br>RPM           | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM          | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) |
| 6,0                        | 1600                                       | 91                 | 1330                                                                         | 68                 | 960                                      | 38                 | 640                                | 26                 | 430                        | 15                 | 2130             | 135                | 3200                      | 401                | 2670             | 279                |
| 8,0                        | 1200                                       | 90                 | 1000                                                                         | 68                 | 720                                      | 38                 | 480                                | 26                 | 320                        | 15                 | 1600             | 132                | 2400                      | 396                | 2000             | 275                |
| 10,0                       | 960                                        | 93                 | 800                                                                          | 70                 | 580                                      | 39                 | 380                                | 26                 | 260                        | 15                 | 1280             | 137                | 1920                      | 409                | 1600             | 284                |
| 12,0                       | 800                                        | 92                 | 670                                                                          | 69                 | 480                                      | 39                 | 320                                | 26                 | 210                        | 15                 | 1070             | 135                | 1600                      | 405                | 1330             | 281                |
| 16,0                       | 600                                        | 95                 | 500                                                                          | 71                 | 360                                      | 40                 | 240                                | 27                 | 160                        | 15                 | 800              | 139                | 1200                      | 416                | 1000             | 289                |
| 20,0                       | 480                                        | 86                 | 400                                                                          | 65                 | 290                                      | 36                 | 190                                | 24                 | 130                        | 14                 | 640              | 133                | 960                       | 389                | 800              | 272                |
| 25,0                       | 380                                        | 82                 | 320                                                                          | 62                 | 230                                      | 35                 | 150                                | 23                 | 100                        | 13                 | 510              | 131                | 770                       | 378                | 640              | 264                |
| 30,0                       | 320                                        | 74                 | 270                                                                          | 55                 | 190                                      | 31                 | 130                                | 21                 | 90                         | 12                 | 430              | 120                | 640                       | 342                | 530              | 240                |

Contorneado

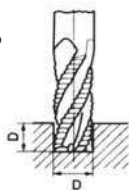


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 GRAN DESBASTE SERIE CORTA REF. 6322W

| MATERIAL A MECANIZAR | Aceros no Aleados <700N/mm <sup>2</sup> |                 | Aceros Aleados <1000N/mm <sup>2</sup> Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm <sup>2</sup> |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|----------------------|-----------------------------------------|-----------------|---------------------------------------------------------------------|-----------------|---------------------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm)        | Velocidad RPM                           | Avance (mm/min) | Velocidad RPM                                                       | Avance (mm/min) | Velocidad RPM                         | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 6,0                  | 1600                                    | 99              | 1330                                                                | 74              | 960                                   | 41              | 640                             | 28              | 430                     | 16              | 2130           | 146             | 3200                   | 434             | 2670          | 302             |
| 8,0                  | 1200                                    | 98              | 1000                                                                | 73              | 720                                   | 41              | 480                             | 27              | 320                     | 16              | 1600           | 143             | 2400                   | 429             | 2000          | 298             |
| 10,0                 | 960                                     | 101             | 800                                                                 | 75              | 580                                   | 42              | 380                             | 28              | 260                     | 16              | 1280           | 148             | 1920                   | 443             | 1600          | 308             |
| 12,0                 | 800                                     | 99              | 670                                                                 | 75              | 480                                   | 42              | 320                             | 28              | 210                     | 16              | 1070           | 146             | 1600                   | 438             | 1330          | 304             |
| 16,0                 | 600                                     | 102             | 500                                                                 | 77              | 360                                   | 43              | 240                             | 29              | 160                     | 16              | 800            | 150             | 1200                   | 450             | 1000          | 313             |
| 20,0                 | 480                                     | 93              | 400                                                                 | 70              | 290                                   | 39              | 190                             | 26              | 130                     | 15              | 640            | 144             | 960                    | 421             | 800           | 294             |
| 25,0                 | 380                                     | 89              | 320                                                                 | 67              | 230                                   | 37              | 150                             | 25              | 100                     | 14              | 510            | 142             | 770                    | 409             | 640           | 286             |
| 30,0                 | 320                                     | 80              | 270                                                                 | 60              | 190                                   | 33              | 130                             | 22              | 90                      | 13              | 430            | 130             | 640                    | 371             | 530           | 260             |
| 35,0                 | 270                                     | 69              | 230                                                                 | 52              | 160                                   | 29              | 110                             | 19              | 70                      | 11              | 370            | 112             | 550                    | 320             | 460           | 225             |
| 40,0                 | 240                                     | 54              | 200                                                                 | 41              | 140                                   | 23              | 100                             | 15              | 60                      | 9               | 320            | 88              | 480                    | 252             | 400           | 177             |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 GRAN DESBASTE SERIE LARGA REF. 6324W

| MATERIAL A MECANIZAR | Aceros no Aleados <700N/mm <sup>2</sup> |                 | Aceros Aleados <1000N/mm <sup>2</sup> Aceros Inoxidables Ferríticos |                 | Aceros Aleados <1300N/mm <sup>2</sup> |                 | Aceros Inoxidables Austeníticos |                 | Aceros Alta Resistencia |                 | Fundición Gris |                 | Aleaciones de Aluminio |                 | Cobre         |                 |
|----------------------|-----------------------------------------|-----------------|---------------------------------------------------------------------|-----------------|---------------------------------------|-----------------|---------------------------------|-----------------|-------------------------|-----------------|----------------|-----------------|------------------------|-----------------|---------------|-----------------|
| Diámetro (mm)        | Velocidad RPM                           | Avance (mm/min) | Velocidad RPM                                                       | Avance (mm/min) | Velocidad RPM                         | Avance (mm/min) | Velocidad RPM                   | Avance (mm/min) | Velocidad RPM           | Avance (mm/min) | Velocidad RPM  | Avance (mm/min) | Velocidad RPM          | Avance (mm/min) | Velocidad RPM | Avance (mm/min) |
| 6,0                  | 1600                                    | 60              | 1330                                                                | 45              | 960                                   | 25              | 640                             | 17              | 430                     | 10              | 2130           | 88              | 3200                   | 260             | 2670          | 181             |
| 8,0                  | 1200                                    | 59              | 1000                                                                | 44              | 720                                   | 25              | 480                             | 16              | 320                     | 10              | 1600           | 86              | 2400                   | 257             | 2000          | 179             |
| 10,0                 | 960                                     | 61              | 800                                                                 | 46              | 580                                   | 26              | 380                             | 17              | 260                     | 10              | 1280           | 89              | 1920                   | 266             | 1600          | 185             |
| 12,0                 | 800                                     | 60              | 670                                                                 | 46              | 480                                   | 26              | 320                             | 17              | 210                     | 10              | 1070           | 88              | 1600                   | 263             | 1330          | 183             |
| 16,0                 | 600                                     | 62              | 500                                                                 | 47              | 360                                   | 26              | 240                             | 18              | 160                     | 10              | 800            | 90              | 1200                   | 270             | 1000          | 188             |
| 20,0                 | 480                                     | 56              | 400                                                                 | 42              | 290                                   | 24              | 190                             | 16              | 130                     | 9               | 640            | 87              | 960                    | 253             | 800           | 177             |
| 25,0                 | 380                                     | 54              | 320                                                                 | 40              | 230                                   | 22              | 150                             | 15              | 100                     | 8               | 510            | 85              | 770                    | 245             | 640           | 172             |
| 30,0                 | 320                                     | 48              | 270                                                                 | 36              | 190                                   | 20              | 130                             | 14              | 90                      | 8               | 430            | 78              | 640                    | 223             | 530           | 156             |
| 35,0                 | 270                                     | 42              | 230                                                                 | 32              | 160                                   | 18              | 110                             | 12              | 70                      | 7               | 370            | 68              | 550                    | 192             | 460           | 135             |
| 40,0                 | 240                                     | 33              | 200                                                                 | 25              | 140                                   | 14              | 100                             | 9               | 60                      | 6               | 320            | 53              | 480                    | 151             | 400           | 106             |

Contorneado

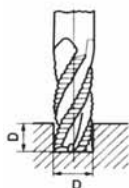


- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 GRAN DESBASTE PASO FINO SERIE CORTA REF. 6308W

| MATERIAL<br>A<br>MECANIZAR | Aceros no Aleados<br><700N/mm <sup>2</sup> |                    | Aceros Aleados<br><1000N/mm <sup>2</sup><br>Aceros Inoxidables<br>Ferríticos |                    | Aceros Aleados<br><1300N/mm <sup>2</sup> |                    | Aceros Inoxidables<br>Austeníticos |                    | Aceros<br>Alta Resistencia |                    | Fundición Gris   |                    | Aleaciones<br>de Aluminio |                    | Cobre            |                    |
|----------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------|------------------------------------|--------------------|----------------------------|--------------------|------------------|--------------------|---------------------------|--------------------|------------------|--------------------|
|                            | Velocidad<br>RPM                           | Avance<br>(mm/min) | Velocidad<br>RPM                                                             | Avance<br>(mm/min) | Velocidad<br>RPM                         | Avance<br>(mm/min) | Velocidad<br>RPM                   | Avance<br>(mm/min) | Velocidad<br>RPM           | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM          | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) |
| 6,0                        | 1600                                       | 117                | 1330                                                                         | 87                 | 960                                      | 49                 | 640                                | 33                 | 430                        | 19                 | 2130             | 172                | 3200                      | 512                | 2670             | 356                |
| 8,0                        | 1200                                       | 115                | 1000                                                                         | 86                 | 720                                      | 48                 | 480                                | 32                 | 320                        | 18                 | 1600             | 169                | 2400                      | 506                | 2000             | 351                |
| 10,0                       | 960                                        | 119                | 800                                                                          | 89                 | 580                                      | 50                 | 380                                | 33                 | 260                        | 19                 | 1280             | 174                | 1920                      | 523                | 1600             | 363                |
| 12,0                       | 800                                        | 148                | 670                                                                          | 111                | 480                                      | 62                 | 320                                | 41                 | 210                        | 24                 | 1070             | 217                | 1600                      | 652                | 1330             | 452                |
| 16,0                       | 600                                        | 152                | 500                                                                          | 114                | 360                                      | 64                 | 240                                | 43                 | 160                        | 24                 | 800              | 223                | 1200                      | 670                | 1000             | 465                |
| 20,0                       | 480                                        | 139                | 400                                                                          | 104                | 290                                      | 58                 | 190                                | 39                 | 130                        | 22                 | 640              | 214                | 960                       | 626                | 800              | 437                |
| 25,0                       | 380                                        | 146                | 320                                                                          | 109                | 230                                      | 61                 | 150                                | 41                 | 100                        | 23                 | 510              | 233                | 770                       | 671                | 640              | 470                |
| 30,0                       | 320                                        | 131                | 270                                                                          | 98                 | 190                                      | 55                 | 130                                | 37                 | 90                         | 21                 | 430              | 213                | 640                       | 608                | 530              | 427                |

Ranurado



Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## FRESAS HSS-E Co8 GRAN DESBASTE PASO FINO SERIE LARGA REF. 6328W

| MATERIAL<br>A<br>MECANIZAR | Aceros no Aleados<br><700N/mm <sup>2</sup> |                    | Aceros Aleados<br><1000N/mm <sup>2</sup><br>Aceros Inoxidables<br>Ferríticos |                    | Aceros Aleados<br><1300N/mm <sup>2</sup> |                    | Aceros Inoxidables<br>Austeníticos |                    | Aceros<br>Alta Resistencia |                    | Fundición Gris   |                    | Aleaciones<br>de Aluminio |                    | Cobre            |                    |
|----------------------------|--------------------------------------------|--------------------|------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------|------------------------------------|--------------------|----------------------------|--------------------|------------------|--------------------|---------------------------|--------------------|------------------|--------------------|
|                            | Velocidad<br>RPM                           | Avance<br>(mm/min) | Velocidad<br>RPM                                                             | Avance<br>(mm/min) | Velocidad<br>RPM                         | Avance<br>(mm/min) | Velocidad<br>RPM                   | Avance<br>(mm/min) | Velocidad<br>RPM           | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) | Velocidad<br>RPM          | Avance<br>(mm/min) | Velocidad<br>RPM | Avance<br>(mm/min) |
| 6,0                        | 1600                                       | 70                 | 1330                                                                         | 52                 | 960                                      | 29                 | 640                                | 20                 | 430                        | 11                 | 2130             | 103                | 3200                      | 307                | 2670             | 214                |
| 8,0                        | 1200                                       | 69                 | 1000                                                                         | 52                 | 720                                      | 29                 | 480                                | 19                 | 320                        | 11                 | 1600             | 101                | 2400                      | 304                | 2000             | 211                |
| 10,0                       | 960                                        | 71                 | 800                                                                          | 54                 | 580                                      | 30                 | 380                                | 19                 | 260                        | 11                 | 1280             | 104                | 1920                      | 314                | 1600             | 218                |
| 12,0                       | 800                                        | 89                 | 670                                                                          | 67                 | 480                                      | 37                 | 320                                | 24                 | 210                        | 14                 | 1070             | 130                | 1600                      | 391                | 1330             | 271                |
| 16,0                       | 600                                        | 91                 | 500                                                                          | 68                 | 360                                      | 39                 | 240                                | 26                 | 160                        | 14                 | 800              | 134                | 1200                      | 402                | 1000             | 279                |
| 20,0                       | 480                                        | 83                 | 400                                                                          | 62                 | 290                                      | 35                 | 190                                | 23                 | 130                        | 13                 | 640              | 128                | 960                       | 376                | 800              | 262                |
| 25,0                       | 380                                        | 88                 | 320                                                                          | 66                 | 230                                      | 37                 | 150                                | 25                 | 100                        | 14                 | 510              | 140                | 770                       | 403                | 640              | 282                |
| 30,0                       | 320                                        | 79                 | 270                                                                          | 59                 | 190                                      | 33                 | 130                                | 22                 | 90                         | 13                 | 430              | 128                | 640                       | 365                | 530              | 256                |

Contorneado



- 1) En caso de fresado en seco (recomendado aire comprimido), reducir la velocidad y el avance al 70% (-30%) de los valores de esta tabla.
- 2) Si se producen vibraciones o sonidos inusuales durante el fresado, corregir y ajustar los parámetros de corte.

## TABLAS Y FÓRMULAS DE UTILIZACIÓN PARA EL CÁLCULO DE LA VELOCIDAD Y AVANCE DE LAS FRESAS HSS-E Co8 Y FRESAS HSS SINTERIZADO

$$N = \frac{1000V}{\pi \cdot D}$$

$$V_f = \frac{V \cdot D \cdot F \cdot E}{a \cdot b}$$

$$S_z = \frac{V_f}{N \cdot Z}$$

N = Velocidad (rpm)

Z = Número de dientes

F = Coeficiente de avance (tabla 2)

E = Coeficiente de fresado (tabla 1)

V = Velocidad de corte (m/min)

$\pi = 3,14$

Vf = Avance (mm/min)

b = Longitud de corte

Sz = Avance por diente

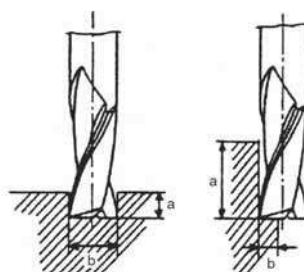
D = Diámetro de fresa

a = Profundidad de corte

### Ejemplo:

| Material a mecanizar | FRESA               |          |            | Condiciones de Trabajo |   | DATOS DE TRABAJO |                                            |                                                                |                                  |
|----------------------|---------------------|----------|------------|------------------------|---|------------------|--------------------------------------------|----------------------------------------------------------------|----------------------------------|
|                      | Tipo                | Diámetro | Nº dientes | a                      | b | V                | N                                          | Vf                                                             | Sz                               |
| Ck45<br>HB 220       | Frontal serie corta | 10       | 4          | 15                     | 5 | 30               | $\frac{100 \times 30}{\pi \cdot 10} = 955$ | $\frac{30 \times 10 \times 12,9 \times 1,5}{15 \times 5} = 77$ | $\frac{77}{955 \times 4} = 0,02$ |

| Tabla 1: Coeficiente de fresado E |                            | Coeficiente de fresado = E |      |      |     |      |
|-----------------------------------|----------------------------|----------------------------|------|------|-----|------|
| Calidad de la fresa               | Tipo Fresa                 | Número de dientes          |      |      |     |      |
|                                   |                            | 2                          | 3    | 4    | 5   | 6    |
| HSS-ECO8                          | Frontal serie corta        | 1,0                        | 1,25 | 1,5  | --  | 2,0  |
|                                   | Frontal serie larga        | 0,5                        | 0,65 | 0,75 | --  | 1,0  |
|                                   | Heavy serie corta          | --                         | --   | 1,8  | --  | 2,4  |
|                                   | Heavy serie larga          | --                         | --   | 1,1  | --  | 1,45 |
|                                   | Desbaste paso fino s.corta | --                         | 2,3  | 2,9  | 3,2 | 3,6  |
|                                   | Gran desbaste serie corta  | --                         | 1,45 | 1,95 | 2,3 | 2,6  |
| Acero Sinterizado                 | Gran desbaste serie larga  | --                         | --   | 1,4  | 1,6 | 1,85 |
|                                   |                            | --                         | 1,25 | --   | --  | --   |



| TABLA 2: Velocidades de corte y coeficiente de avance F  |                                   |                                                            |                           |     |      |      |      |     |      |      |      |      |      |      |      |      |
|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------|---------------------------|-----|------|------|------|-----|------|------|------|------|------|------|------|------|
| Material a mecanizar                                     | Carga de rotura (N/mm²)<br>DUREZA | Velocidad de corte<br>Fresas HSS-E Co8 y Acero Sinterizado | Coeficiente de avance = F |     |      |      |      |     |      |      |      |      |      |      |      |      |
|                                                          |                                   |                                                            | Diámetro Fresa = D (mm)   |     |      |      |      |     |      |      |      |      |      |      |      |      |
|                                                          |                                   |                                                            | 1                         | 2   | 3    | 5    | 6    | 8   | 10   | 12   | 15   | 18   | 20   | 25   | 30   | 40   |
| A.de facil mecanización<br>A.de construcción             | ~500                              | 30~35                                                      | 1,5                       | 2,6 | 4,2  | 6,8  | 8,4  | 11  | 14,2 | 16,8 | 21   | 25,2 | 26,3 | 25,2 | 24,2 | 22,1 |
| A.de nitruración<br>A.de temple                          | ~800                              | 25~30                                                      | 1,4                       | 2,4 | 3,8  | 6,2  | 7,6  | 10  | 12,9 | 15,3 | 19,1 | 22,9 | 23,9 | 22,9 | 22   | 20,1 |
| A.de herramienta                                         | ~1000                             | 18~25                                                      | 1,3                       | 2,2 | 3,4  | 5,6  | 6,8  | 9   | 11,6 | 13,8 | 17,2 | 20,6 | 21,5 | 20,6 | 19,8 | 18,1 |
| A. refractarios                                          | ~1300                             | 12~18                                                      | 1                         | 1,7 | 2,7  | 4,3  | 5,3  | 7   | 9    | 10,7 | 13,4 | 16   | 16,7 | 16   | 15,4 | 14,1 |
| A.de alta resistencia                                    | HRC 40~                           | ~10                                                        | 0,8                       | 1,4 | 2,8  | 3,7  | 4,6  | 6   | 7,7  | 9,2  | 11,5 | 13,7 | 14,3 | 13,7 | 13,2 | 12,1 |
| A.INOX Ferrítico<br>X6CrMo17-X8Cr17<br>X7CrAl13          | HB~183                            | 20~25                                                      | 1,4                       | 2,4 | 3,8  | 6,2  | 7,6  | 10  | 12,9 | 15,3 | 19,1 | 22,9 | 23,9 | 22,9 | 22   | 20,1 |
| A.INOX Martensítico<br>X7Cr13-X10Cr13<br>X15Cr13-X20Cr13 | HB~210                            | 15~20                                                      | 1,3                       | 2,2 | 3,4  | 5,6  | 6,8  | 9   | 11,6 | 13,8 | 17,2 | 20,6 | 21,5 | 20,6 | 19,8 | 18,1 |
| A.INOX Austenítico<br>X5CrNi18-9<br>X5CrNiMo18-18        | HB~187                            | 10~15                                                      | 1,1                       | 1,9 | 3    | 5    | 6,1  | 8   | 10,3 | 12,2 | 15,3 | 18,3 | 19,1 | 18,3 | 17,6 | 16,1 |
| Fundición Gris                                           | HB~200                            | 30~40                                                      | 3,4                       | 5,8 | 9,1  | 14,9 | 18,2 | 24  | 31   | 36,7 | 45,8 | 55   | 57,4 | 55   | 52,8 | 48,2 |
| Latón                                                    |                                   | 35~40                                                      | 2                         | 3,4 | 5,3  | 8,7  | 10,6 | 14  | 18,1 | 21,4 | 26,7 | 32,1 | 33,5 | 32,1 | 30,8 | 28,1 |
| Cobre                                                    |                                   | 40~60                                                      | 2,7                       | 4,6 | 7,2  | 11,8 | 14,4 | 19  | 24,5 | 29,1 | 36,3 | 43,5 | 45,4 | 43,5 | 41,8 | 38,2 |
| Alum.Laminación                                          |                                   | 50~70                                                      | 3,1                       | 5,3 | 8,4  | 13,6 | 16,7 | 22  | 28,4 | 33,7 | 42   | 50,4 | 52,6 | 50,4 | 48,4 | 44,2 |
| Aleaciones de Aluminio/Silicio (sílice < 11%)            |                                   | 60~80                                                      | 4,5                       | 7,7 | 12,2 | 19,8 | 24,3 | 32  | 41,3 | 49   | 61,1 | 73,3 | 76,5 | 73,3 | 70,4 | 64,3 |
| Acero especial aleado a base de Ni/Co                    |                                   | ~8                                                         | 0,2                       | 0,4 | 0,8  | 1,3  | 1,6  | 2,1 | 2,6  | 3,1  | 3,3  | 3,6  | 4    | 4,7  | 5,4  | 6,8  |

(1) En caso de fresado en seco, disminuir la velocidad (rpm) un 20+30%.

(2) En caso de  $a < 0,5 \times D$  o  $b < 0,1 \times D$  calcular Vf con  $a = 0,5 \times D$  o  $b = 0,1 \times D$

(3) Fresado de acabado=reducir sólo el avance entre un 20+50%

## GUIA PARA SOLUCIONAR LOS PRINCIPALES PROBLEMAS DE FRESADO

| PROBLEMA           | CONTROL A EFECTUAR                                                             |                                             | SOLUCIÓN |                    |             |                   |                   |                        |         |                           |                                       |                    |                                      |
|--------------------|--------------------------------------------------------------------------------|---------------------------------------------|----------|--------------------|-------------|-------------------|-------------------|------------------------|---------|---------------------------|---------------------------------------|--------------------|--------------------------------------|
|                    |                                                                                |                                             | Avance   | Velocidad de corte | Lubricación | Reducir la pasada | Número de dientes | Cambiar a fresa idónea | Afilado | Flexión de la herramienta | Máxima rigidez del porta-herramientas | Porta-herramientas | Reparar máquina o porta-herramientas |
| VIBRACIONES        | 1.Controlar el amarre de la pieza                                              |                                             |          |                    |             |                   |                   |                        |         |                           | ●                                     |                    |                                      |
|                    | 2.Verificar el cálculo de velocidad y avance                                   |                                             | ●        | ●                  |             | ●                 |                   |                        |         |                           |                                       |                    |                                      |
|                    | 3.Controlar la profundidad de corte y verificar si existen señales de flexión. |                                             |          |                    |             | ●                 |                   |                        |         | ●                         |                                       |                    |                                      |
|                    | 4.Controlar si la fresa tiende a deslizarse del porta-herramientas.            |                                             |          |                    |             |                   |                   |                        |         | ●                         |                                       | ●                  |                                      |
|                    | 5.Controlar el salto del porta-herramientas                                    |                                             |          |                    |             |                   |                   |                        |         |                           |                                       |                    | ●                                    |
| REBABAS            | 1.Controlar el afilado                                                         |                                             |          |                    |             |                   |                   |                        |         | ●                         |                                       |                    |                                      |
|                    | 2.Controlar la longitud y la profundidad del corte                             |                                             |          |                    |             | ●                 |                   |                        |         |                           | ●                                     |                    |                                      |
|                    | 3.Controlar el diámetro y la longitud de la fresa                              |                                             |          |                    |             |                   |                   |                        | ●       |                           |                                       | ●                  |                                      |
|                    | 4.Controlar que el amarre no produzca distorsiones en la pieza a mecanizar.    |                                             |          |                    |             |                   |                   |                        |         |                           | ●                                     |                    |                                      |
|                    | 5.Controlar el perfecto alineamiento de la máquina                             |                                             |          |                    |             |                   |                   |                        |         |                           | ●                                     |                    | ●                                    |
| SUPERFICIE RUGOSA  | 1.Controlar el cálculo del avance por diente                                   |                                             | ●        |                    |             | ●                 |                   |                        |         |                           |                                       |                    |                                      |
|                    | 2.Controlar el número de dientes de la fresa                                   |                                             | ●        |                    |             | ●                 | ●                 | ●                      |         |                           |                                       |                    |                                      |
|                    | 3.Controlar que la fresa no se deslice del porta-herramientas                  |                                             |          |                    |             |                   |                   |                        |         | ●                         |                                       | ●                  |                                      |
|                    | 4.Controlar el acabado de la fresa primero y después su afilado.               |                                             |          |                    |             | ●                 |                   |                        |         | ●                         |                                       |                    |                                      |
| FALTA DE PRECISIÓN | Varios dientes                                                                 | 1.Controlar diámetro fresa                  |          |                    |             |                   |                   |                        | ●       |                           |                                       |                    |                                      |
|                    |                                                                                | 2.Verificar avance por diente               | ●        |                    |             | ●                 |                   |                        |         |                           |                                       |                    |                                      |
|                    | Z=2                                                                            | 1.Controlar el ángulo de hélice de la fresa |          |                    |             |                   |                   |                        | ●       |                           |                                       |                    |                                      |
|                    |                                                                                | 2.Verificar el avance por diente            | ●        |                    |             | ●                 |                   |                        |         |                           |                                       |                    |                                      |
| PRODUCTIVIDAD      | 1.Verificar y calcular una velocidad y avances más altos                       |                                             | ●        | ●                  | ●           |                   | ●                 | ●                      |         |                           |                                       |                    |                                      |
|                    | 2.Controlar el perfecto amarre de la pieza a mecanizar                         |                                             |          |                    |             |                   |                   |                        |         |                           |                                       | ●                  |                                      |

# NACHI



**Distribuido por:**