

## Teknisyenler için yeni ürünler

**NEW** WTL – Spiral matkap, ekstra uzun, TiAlN



Yeni WTL – Kendini kanıtlamış TiAlN çok katmanlı kaplamalı spiral matkap üretkenliğinizi ve proses emniyetinizi artırır.

→ Sayfa **29+30**





# 1 HSS Matkaplar

1

Dolu malzeme delme ve delik işleme

## 2 Karbür Matkaplar

## 3 Takma Uçlu Matkaplar

## 4 Raybalar ve havşa matkapları

## 5 Delik işleme takımları

Diş açma

## 6 Kılavuzlar ve ovalama kılavuzları

## 7 Diş açma frezeleri

## 8 Diş açma

Tornalama

## 9 Tornalama Takımları

## 10 Multi Fonksiyonel Takımlar – EcoCut ve FreeTurn

## 11 Kesme ve Kanal Açma Takımları

## 12 UltraMini + MiniCut

Frezeleme

## 13 HSS-Frezeler

## 14 Karbür Frezeler

## 15 Takma uçlu freze takımlar

Bağlama Teknikleri Kataloğu

## 16 Tutucular ve Aksesuarlar

## 17 İş parçası bağlama

## 18 Malzeme örnekleri ve malzeme no listesi

## İçindekiler

|                   |       |
|-------------------|-------|
| Sembol açıklaması | 2     |
| Toolfinder        | 3     |
| İçerik özeti      | 4-7   |
| Ürün programı     | 8-44  |
| Teknik Bilgiler   |       |
| Kesme verileri    | 45-54 |
| İlerleme verileri | 55    |
| Kaplamar          | 56    |

## WNT \ Performance

En yüksek performans için üstün kaliteli ürün.

**WNT Performance** grubundaki üstün kaliteli ürünler özel kullanım için üretilmiştir ve üstün performans yakalamanızı sağlar. Eğer sizde üretiminizde üretim performansı isteğiniz ve çok iyi sonuçlar elde etmek istiyorsanız, **WNT Performance** grubundaki üstün kaliteli ürünler i tavsiye ederiz.

## Sembol açıklaması

### Şaft



### Versiyon



İçten soğutmalı



Kendiliğinden merkezlemeli

- = ana kullanım
- = Ek uygulamalar



## Toolfinder

|                     | Takım tipi | Malzeme/<br>Kaplama | Açıklama                                                                                                                              | DIN 1897 | DIN 338 | DIN 340 | Seri 1 | Seri 2 | Seri 3 |
|---------------------|------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------|---------|---------|--------|--------|--------|
|                     |            |                     |                                                                                                                                       | 3xD      | 5xD     | 10xD    | > 10xD |        |        |
| Çelik – genel       | VX         | HSS-E<br>TiN        | ▲ normal yüksek performanslı matkap<br>▲ Birim sap DIN 1835A<br>▲ kendinden merkezleme                                                | 8        | 16      |         |        |        |        |
|                     | UNI        | HSS-E-PM<br>TiN     | ▲ HSS-E-PM ve TiN kaplaması sayesinde aşınmaya karşı dayanıklılık<br>▲ Ünlversal yüksek performanslı karbür matkap                    | 9-14     | 17-22   |         |        |        |        |
|                     | UNI        | HSS-E<br>TiN        | ▲ VX tipi gibi<br>▲ DIN 1835 A'ya göre standart sapsız<br>▲ set olarak edinilebilir                                                   | 9-14     | 17-22   | 26-28   |        |        |        |
|                     | N          | HSS<br>vap.         | ▲ istikrarlı büküm matkap<br>▲ her tezgah için uygundur<br>▲ set olarak mevcut                                                        | 9-14     | 17-22   |         |        |        |        |
|                     | WT         | HSS-E<br>vap.       | ▲ yüksek alaşımlı çelikler ve özel alaşımlar için<br>(Hastelloy, Inconel, Nimonic)                                                    | 9-14     |         |         |        |        |        |
|                     | WT         | HSS-E<br>TiN        | ▲ aynı tip WT HSS-E vap.<br>▲ yüksek aşınma dayanıklılığı kaplama sayesinde                                                           | 9-14     |         |         |        |        |        |
|                     | WTL-L      | HSS<br>F-nit        | ▲ sol kesme<br>▲ pah nitrürleme ile aşınmaya karşı yüksek korunma hem kesme alanında ve kılavuz pahda                                 | 15       | 23      |         |        |        |        |
|                     | WNXi       | HSS-E               | ▲ iç soğutma yoluyla çok iyi talaş tahliyesi<br>▲ 1000 N/mm <sup>2</sup> kadar uzun talaş çıkaran malzemelerde                        |          | 25      |         |        |        |        |
|                     | WNXi       | HSS-E<br>TiN        | ▲ aynı Tip WNXi HSS-E<br>▲ yüksek aşınma dayanıklılığı kaplama sayesinde                                                              |          | 25      |         |        |        |        |
|                     | WTL        | HSS-E<br>F-nit      | ▲ özel kanal profilli büyük talaş alanı ile<br>▲ pah nitrürleme ile aşınmaya karşı yüksek korunma hem kesme alanında ve kılavuz pahda |          | 17-22   | 26-28   |        |        |        |
|                     | WTL        | HSS-E<br>TiN        | ▲ aynı WTL HSS-E, ama yüksek v <sub>c</sub> ve aşınmaya dayanıklı kaplama sayesinde<br>▲ Çelik ve döküm işlemek için uygundur         |          | 17-22   |         |        |        |        |
|                     | WTL        | HSS-E<br>TiCN       | ▲ aynı WTL TiN, ancak yüksek v <sub>c</sub> ve aşınma dayanıklılığı yüksek alaşımlı çeliklerde mümkün                                 |          | 23      |         |        |        |        |
|                     | WTL        | HSS-E<br>TiAlN      | ▲ geniş talaş bölümüne sahip özel oluk profilli<br>▲ TiAlN kaplama sayesinde aşınmaya daha fazla dayanıklılık                         |          |         |         | 29     | 30     | 30     |
|                     | WTL        | HSS<br>F-nit        | ▲ özel kanal profilli büyük talaş alanı ile<br>▲ pah nitrürleme ile aşınmaya karşı yüksek korunma hem kesme alanında ve kılavuz pahda |          |         | 26-28   | 29     | 30     | 30     |
|                     | WTL        | HSS<br>TiN          | ▲ aynı WTL HSS, ancak yüksek v <sub>c</sub> ve aşınma dayanıklılığı kaplama sayesinde                                                 |          |         | 26-28   |        |        |        |
|                     | WNX        | HSS-E               | ▲ uzun talaş veren malzemeler için geniş talaş kanalları                                                                              | 9-14     |         |         |        |        |        |
|                     | NC         | HSS                 | ▲ mil yuvası ile delmek uygundur<br>▲ iç soğutma yoluyla çok iyi talaş tahliyesi                                                      |          |         | 25      |        |        |        |
|                     | NC         | HSS<br>TiAlN        | ▲ aynı NC, ama yüksek v <sub>c</sub> ve aşınmaya dayanıklı kaplama sayesinde                                                          |          |         | 25      |        |        |        |
| Paslanmaz<br>çelik  | VA         | HSS-E               | ▲ Paslanmaz ve aside dayanıklı malzemeler için Uzman<br>▲ özel geometri                                                               | 9-14     | 17-22   |         |        |        |        |
| Demir dışı metaller | W          | HSS                 | ▲ demir dışı metaller için uzman                                                                                                      |          | 17-22   |         |        |        |        |
|                     | WTW        | HSS                 | ▲ 500 N / mm <sup>2</sup> kadar demir dışı metaller için<br>▲ derin delme için                                                        |          |         | 26-28   |        |        |        |

## HSS-Matkaplar genel bakış

| Takım tipi | malzeme   kaplama | Uç Açısı | Çap mm | DC | Çelik<br>P<br>Paslanmaz çelik<br>M<br>Dökme demir<br>K<br>Demir dışı metaller<br>N<br>Isıya dayanıklı alaşımlar<br>S<br>Sertleştirilmiş malzemeler<br>H<br>Metal dışı malzemeler<br>O | Kaplamalı<br>Kaplama | Kaplamasız<br>Kaplama | WNT \ Performance |
|------------|-------------------|----------|--------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|
|------------|-------------------|----------|--------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|

## 3xD içten soğutmasız

|  |       |                 |      |        |  |             |  |      |
|--|-------|-----------------|------|--------|--|-------------|--|------|
|  | VX    | HSS-E<br>TiN    | 118° | 2-20   |  |             |  | 8    |
|  | UNI   | HSS-E-PM<br>TiN | 130° | 1-14   |  |             |  | 9-14 |
|  | UNI   | HSS-E<br>TiN    | 118° | 1-14   |  |             |  | 9-14 |
|  | N     | HSS<br>vap.     | 118° | 0,4-20 |  |             |  | 9-14 |
|  | VA    | HSS-E           | 130° | 1-12   |  |             |  | 9-14 |
|  | WNX   | HSS-E           | 130° | 1-20   |  |             |  | 9-14 |
|  | WT    | HSS-E<br>vap.   | 130° | 0,4-25 |  |             |  | 9-14 |
|  | WT    | HSS-E<br>TiN    | 130° | 1-20   |  |             |  | 9-14 |
|  | WTL-L | HSS<br>F-nit    | 130° | 1-19   |  | sol helisli |  | 15   |

## 5xD içten soğutmasız

|  |       |                 |      |         |  |             |  |       |
|--|-------|-----------------|------|---------|--|-------------|--|-------|
|  | VX    | HSS-E<br>TiN    | 118° | 2-20    |  |             |  | 16    |
|  | UNI   | HSS-E-PM<br>TiN | 130° | 1-14    |  |             |  | 17-22 |
|  | UNI   | HSS-E<br>TiN    | 118° | 0,9-14  |  |             |  | 17-22 |
|  | N     | HSS<br>vap.     | 118° | 0,2-20  |  |             |  | 17-22 |
|  | VA    | HSS-E           | 130° | 1-12    |  |             |  | 17-22 |
|  | W     | HSS             | 130° | 0,20-20 |  |             |  | 17-22 |
|  | WTL   | HSS-E<br>F-nit  | 130° | 1-16    |  |             |  | 17-22 |
|  | WTL   | HSS-E<br>TiN    | 130° | 1-16    |  |             |  | 17-22 |
|  | WTL   | HSS-E<br>TiCN   | 130° | 3-12    |  |             |  | 23    |
|  | WTL-L | HSS<br>F-nit    | 130° | 1-16    |  | sol helisli |  | 23    |



## HSS-Matkaplar genel bakış

| Takım tipi                      | malzeme   kaplama      | Uç Açısı | Çap mm    | Çelik<br>P<br>Paslanmaz çelik<br>M<br>Dökme demir<br>K<br>Demir dışı metaller<br>N<br>Isıya dayanıklı alaşımlar<br>S<br>Sertleştirilmiş malzemeler<br>H<br>Metal dışı malzemeler<br>O | Kaplamalı<br>Kaplama | Kaplamasız<br>Kaplama | Performance |
|---------------------------------|------------------------|----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------|
| 5xD içten soğutmalı             |                        |          |           |                                                                                                                                                                                       |                      |                       |             |
|                                 | WNXi HSS-E             | 130°     | 5-20      |                                                                                                                                                                                       |                      |                       | 25          |
|                                 | WNXi HSS-E TiN         | 130°     | 5-20      |                                                                                                                                                                                       |                      |                       | 25          |
| iç soğutma olmadan 10xD a kadar |                        |          |           |                                                                                                                                                                                       |                      |                       |             |
|                                 | UNI HSS-E TiN          | 118°     | 1-14      |                                                                                                                                                                                       |                      |                       | 26-28       |
|                                 | WTL HSS-E F-nit        | 130°     | 1-12      |                                                                                                                                                                                       |                      |                       | 26-28       |
|                                 | WTL HSS F-nit          | 130°     | 1-14      |                                                                                                                                                                                       |                      |                       | 26-28       |
|                                 | WTL HSS TiN            | 130°     | 1-14      |                                                                                                                                                                                       |                      |                       | 26-28       |
|                                 | WTW HSS                | 130°     | 1-14      |                                                                                                                                                                                       |                      |                       | 26-28       |
| iç soğutmalı 10xD a kadar       |                        |          |           |                                                                                                                                                                                       |                      |                       |             |
|                                 | NC HSS                 | 130°     | 3-13      |                                                                                                                                                                                       |                      |                       | 25          |
|                                 | NC HSS TiAlN           | 130°     | 3-13      |                                                                                                                                                                                       |                      |                       | 25          |
| iç soğutma olmadan 10xD yüksek  |                        |          |           |                                                                                                                                                                                       |                      |                       |             |
|                                 | WTL HSS F-nit Seri 1   | 130°     | 2-13      |                                                                                                                                                                                       |                      |                       | 29          |
|                                 | WTL HSS F-nit Seri 2   | 130°     | 2-13      |                                                                                                                                                                                       |                      |                       | 30          |
|                                 | WTL HSS F-nit Seri 3   | 130°     | 2,5-13    |                                                                                                                                                                                       |                      |                       | 30          |
|                                 | WTL HSS-E TiAlN Seri 1 | 130°     | 3-10,2    |                                                                                                                                                                                       |                      |                       | 29          |
|                                 | WTL HSS-E TiAlN Seri 2 | 130°     | 3-12      |                                                                                                                                                                                       |                      |                       | 30          |
|                                 | WTL HSS-E TiAlN Seri 3 | 130°     | 4-10      |                                                                                                                                                                                       |                      |                       | 30          |
| Mini matkap                     |                        |          |           |                                                                                                                                                                                       |                      |                       |             |
|                                 | N HSS-E-PM             | 118°     | 0,15-1,45 |                                                                                                                                                                                       |                      |                       | 31          |

## HSS-Matkaplar genel bakış

|                            |                   |
|----------------------------|-------------------|
| Takım tipi                 | malzeme   kaplama |
| Uç Açısı                   |                   |
| Çap mm                     |                   |
| Çelik                      |                   |
| Paslanmaz çelik            |                   |
| Dökme demir                |                   |
| Demir dışı metaller        |                   |
| Isıya dayanıklı alaşımlar  |                   |
| Sertleştirilmiş malzemeler |                   |
| Metal dışı malzemeler      |                   |
| Kaplamalı                  |                   |
| Kaplamasız                 |                   |
| WNT \ Performance          |                   |

## Helisel matkap setleri



|            |              |             |      |                                                                                                                                                                                                                                                                 |                                                                                     |           |
|------------|--------------|-------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|
| <b>N</b>   | HSS<br>vap.  | <b>118°</b> | 1-10 | <br>A                                                                                      |  | <b>24</b> |
| <b>UNI</b> | HSS-E<br>TiN | <b>118°</b> | 1-10 | <br>A   |  | <b>24</b> |

## NC punta matkapları



NC-A HSS 90° 3-20

A ~B

35-37



NC-A HSS TIN 90° 3-20 A ~B 35+36



NC-A HSS 120° 3-20

A ~B

35+36



NC-A HSS TiN 120° 3-20     35+36

## Punta matkaplari



ZB HSS 118° 0,5-6,3  DIN 333 - Form A/B/R  37-39



ZB HSS TIN 118° 0,5-6,3  DIN 333 – Form A  38



ZB HSS-E 118° 0,5-6,3  DIN 333 – Form A  38

## Karot matkapları



N HSS vap. 120° 3,8-12 A 3-ağızlı 40

## Kademeli helisel matkaplar



SB HSS vap. 118° 2,5-10,2 A Havşa açısı 90° 41



SB HSS 118° 2,5-10,2  Havşa açısı 90°  41



SB HSS vap. 118° 3,2-10,5 A Havşa açısı 90° 41



SB HSS 118° 3,2-10,5  Havşa açısı 90°  41



SB HSS vap. 118° 3,4-11  Havşa açısı 180°  42



|    |     |      |        |                                                                                     |                  |                                                                                       |    |
|----|-----|------|--------|-------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|----|
| SB | HSS | 118° | 3,4-11 |  | Havşa açısı 180° |  | 42 |
|----|-----|------|--------|-------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|----|



SB HSS vap. 118° 3,3-21  Havşa açısı 60°  44

## HSS-Matkaplar genel bakış

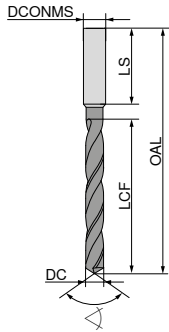
|                                                                                     | Takım tipi | malzeme   kaplama           | Uç Açısı | Çap mm | Çelik<br>P<br>Paslanmaz çelik<br>M<br>Dökme demir<br>K<br>Demir dışı metaller<br>N<br>Isıya dayanıklı alaşımlar<br>S<br>Sertleştirilmiş malzemeler<br>H<br>Metal dışı malzemeler<br>O | Kaplamalı<br>Kaplama                                                                  | Kaplamasız       | WNT \ Performance |
|-------------------------------------------------------------------------------------|------------|-----------------------------|----------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------|-------------------|
| <b>Helisel matkaplar mors konik saplı</b>                                           |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
| <b>3xD</b>                                                                          |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|    | WT         | HSS-E<br>vap.               | 130°     | 10-30  |                                                                                                     |    |                  | 31                |
| <b>5xD</b>                                                                          |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|    | N          | HSS<br>vap.                 | 118°     | 10-60  |                                                                                                     |    |                  | 32                |
|    | WTL        | HSS-E<br>F-nit/vap.         | 130°     | 10-27  |                                                                                                     |    |                  | 32                |
| <b>10xD</b>                                                                         |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|   | N          | HSS<br>vap.                 | 118°     | 10-50  |                                                                                                    |   |                  | 33                |
|  | WTL        | HSS-E<br>F-nit/vap.         | 130°     | 10-26  |                                                                                                   |  |                  | 33                |
| <b>10xD üzeri</b>                                                                   |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|  | WTL        | HSS<br>F-nit/vap.<br>Seri 1 | 130°     | 10-30  |                                                                                                   |  |                  | 34                |
|  | WTL        | HSS<br>F-nit/vap.<br>Seri 2 | 130°     | 10-30  |                                                                                                   |  |                  | 34                |
| <b>Karot matkapları</b>                                                             |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|  | N          | HSS<br>vap.                 | 120°     | 10-30  |                                                                                                   |                                                                                       | 3-ağızlı         | 40                |
| <b>Kademeli helisel matkaplar</b>                                                   |            |                             |          |        |                                                                                                                                                                                       |                                                                                       |                  |                   |
|  | SB         | HSS<br>vap.                 | 118°     | 5,5-22 |                                                                                                   |                                                                                       | Havşa açısı 180° | 43                |



## DIN 1897'ye benzer yüksek performanslı helisel matkap, ekstra kısa

- ▲ DIN 1835 A'ya göre standart saplı
- ▲ Özel delme ucu geometrisi
- ▲ Kendinden merkezlemeli
- ▲ 4 yüzeyli bileme geometrisi
- ▲ en yüksek performans

≤ 3xD

VX  
TiNA  
118°  
HSS-E

10 122 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | DCONMS <sub>h6</sub><br>mm | LS<br>mm |     |
|------------------------|-----------|-----------|----------------------------|----------|-----|
| 2,00                   | 44        | 12        | 3                          | 28       | 020 |
| 2,10                   | 44        | 12        | 3                          | 28       | 021 |
| 2,20                   | 45        | 13        | 3                          | 28       | 022 |
| 2,30                   | 45        | 13        | 3                          | 28       | 023 |
| 2,40                   | 46        | 14        | 3                          | 28       | 024 |
| 2,50                   | 46        | 14        | 3                          | 28       | 025 |
| 2,60                   | 46        | 14        | 3                          | 28       | 026 |
| 2,70                   | 48        | 16        | 3                          | 28       | 027 |
| 2,80                   | 48        | 16        | 3                          | 28       | 028 |
| 2,90                   | 48        | 16        | 3                          | 28       | 029 |
| 3,00                   | 48        | 16        | 3                          | 28       | 030 |
| 3,10                   | 50        | 18        | 4                          | 28       | 031 |
| 3,20                   | 50        | 18        | 4                          | 28       | 032 |
| 3,30                   | 50        | 18        | 4                          | 28       | 033 |
| 3,40                   | 52        | 20        | 4                          | 28       | 034 |
| 3,50                   | 52        | 20        | 4                          | 28       | 035 |
| 3,60                   | 52        | 20        | 4                          | 28       | 036 |
| 3,70                   | 52        | 20        | 4                          | 28       | 037 |
| 3,80                   | 54        | 22        | 4                          | 28       | 038 |
| 3,90                   | 54        | 22        | 4                          | 28       | 039 |
| 4,00                   | 54        | 22        | 4                          | 28       | 040 |
| 4,10                   | 66        | 22        | 6                          | 36       | 041 |
| 4,20                   | 66        | 22        | 6                          | 36       | 042 |
| 4,30                   | 68        | 24        | 6                          | 36       | 043 |
| 4,40                   | 68        | 24        | 6                          | 36       | 044 |
| 4,50                   | 68        | 24        | 6                          | 36       | 045 |
| 4,60                   | 68        | 24        | 6                          | 36       | 046 |
| 4,70                   | 68        | 24        | 6                          | 36       | 047 |
| 4,80                   | 70        | 26        | 6                          | 36       | 048 |
| 4,90                   | 70        | 26        | 6                          | 36       | 049 |
| 5,00                   | 70        | 26        | 6                          | 36       | 050 |
| 5,10                   | 70        | 26        | 6                          | 36       | 051 |
| 5,20                   | 70        | 26        | 6                          | 36       | 052 |
| 5,30                   | 70        | 26        | 6                          | 36       | 053 |
| 5,40                   | 72        | 28        | 6                          | 36       | 054 |
| 5,50                   | 72        | 28        | 6                          | 36       | 055 |
| 5,55                   | 72        | 28        | 6                          | 36       | 055 |
| 5,60                   | 72        | 28        | 6                          | 36       | 056 |
| 5,70                   | 72        | 28        | 6                          | 36       | 057 |
| 5,80                   | 72        | 28        | 6                          | 36       | 058 |
| 5,90                   | 72        | 28        | 6                          | 36       | 059 |
| 6,00                   | 72        | 28        | 6                          | 36       | 060 |
| 6,10                   | 75        | 31        | 8                          | 36       | 061 |
| 6,20                   | 75        | 31        | 8                          | 36       | 062 |
| 6,30                   | 75        | 31        | 8                          | 36       | 063 |
| 6,40                   | 75        | 31        | 8                          | 36       | 064 |
| 6,50                   | 75        | 31        | 8                          | 36       | 065 |
| 6,60                   | 75        | 31        | 8                          | 36       | 066 |
| 6,70                   | 75        | 31        | 8                          | 36       | 067 |
| 6,80                   | 78        | 34        | 8                          | 36       | 068 |
| 6,90                   | 78        | 34        | 8                          | 36       | 069 |
| 7,00                   | 78        | 34        | 8                          | 36       | 070 |
| 7,10                   | 78        | 34        | 8                          | 36       | 071 |

10 122 ...

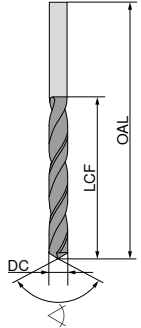
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | DCONMS <sub>h6</sub><br>mm | LS<br>mm |     |
|------------------------|-----------|-----------|----------------------------|----------|-----|
| 7,20                   | 78        | 34        | 8                          | 36       | 072 |
| 7,30                   | 78        | 34        | 8                          | 36       | 073 |
| 7,40                   | 78        | 34        | 8                          | 36       | 074 |
| 7,45                   | 78        | 34        | 8                          | 36       | 075 |
| 7,50                   | 78        | 34        | 8                          | 36       | 076 |
| 7,60                   | 81        | 37        | 8                          | 36       | 077 |
| 7,70                   | 81        | 37        | 8                          | 36       | 078 |
| 7,80                   | 81        | 37        | 8                          | 36       | 079 |
| 7,90                   | 81        | 37        | 8                          | 36       | 080 |
| 8,00                   | 81        | 37        | 8                          | 36       | 081 |
| 8,10                   | 87        | 37        | 10                         | 40       | 082 |
| 8,20                   | 87        | 37        | 10                         | 40       | 083 |
| 8,30                   | 87        | 37        | 10                         | 40       | 084 |
| 8,40                   | 87        | 37        | 10                         | 40       | 085 |
| 8,50                   | 87        | 37        | 10                         | 40       | 086 |
| 8,60                   | 91        | 40        | 10                         | 40       | 087 |
| 8,70                   | 91        | 40        | 10                         | 40       | 088 |
| 8,80                   | 91        | 40        | 10                         | 40       | 089 |
| 8,90                   | 91        | 40        | 10                         | 40       | 090 |
| 9,00                   | 91        | 40        | 10                         | 40       | 091 |
| 9,10                   | 91        | 40        | 10                         | 40       | 092 |
| 9,20                   | 91        | 40        | 10                         | 40       | 093 |
| 9,30                   | 91        | 40        | 10                         | 40       | 094 |
| 9,35                   | 91        | 40        | 10                         | 40       | 095 |
| 9,40                   | 91        | 40        | 10                         | 40       | 096 |
| 9,50                   | 91        | 40        | 10                         | 40       | 097 |
| 9,60                   | 93        | 43        | 10                         | 40       | 098 |
| 9,70                   | 93        | 43        | 10                         | 40       | 099 |
| 9,80                   | 93        | 43        | 10                         | 40       | 100 |
| 9,90                   | 93        | 43        | 10                         | 40       | 101 |
| 10,00                  | 93        | 43        | 10                         | 40       | 102 |
| 10,10                  | 100       | 43        | 12                         | 45       | 103 |
| 10,20                  | 100       | 43        | 12                         | 45       | 104 |
| 10,30                  | 100       | 43        | 12                         | 45       | 105 |
| 10,40                  | 100       | 43        | 12                         | 45       | 106 |
| 10,50                  | 100       | 43        | 12                         | 45       | 107 |
| 10,60                  | 100       | 43        | 12                         | 45       | 108 |
| 10,70                  | 104       | 47        | 12                         | 45       | 109 |
| 10,80                  | 104       | 47        | 12                         | 45       | 110 |
| 10,90                  | 104       | 47        | 12                         | 45       | 111 |
| 11,00                  | 104       | 47        | 12                         | 45       | 112 |
| 11,10                  | 104       | 47        | 12                         | 45       | 113 |
| 11,20                  | 104       | 47        | 12                         | 45       | 114 |
| 11,30                  | 104       | 47        | 12                         | 45       | 115 |
| 11,40                  | 104       | 47        | 12                         | 45       | 116 |
| 11,50                  | 104       | 47        | 12                         | 45       | 117 |
| 11,60                  | 104       | 47        | 12                         | 45       | 118 |
| 11,70                  | 104       | 47        | 12                         | 45       | 119 |
| 11,80                  | 104       | 47        | 12                         | 45       | 120 |
| 11,90                  | 108       | 51        | 12                         | 45       | 121 |
| 12,00                  | 108       | 51        | 12                         | 45       | 122 |
| 12,10                  | 111       | 51        | 16                         | 48       | 123 |
| 12,20                  | 111       | 51        | 16                         | 48       | 124 |
| 12,30                  | 111       | 51        | 16                         | 48       | 125 |
| 12,40                  | 111       | 51        | 16                         | 48       | 126 |
| 12,50                  | 111       | 51        | 16                         | 48       | 127 |
| 12,60                  | 111       | 51        | 16                         | 48       | 128 |
| 12,70                  | 111       | 51        | 16                         | 48       | 129 |
| 12,80                  | 111       | 51        | 16                         | 48       | 130 |
| 12,90                  | 111       | 51        | 16                         | 48       | 131 |
| 13,00                  | 111       | 51        | 16                         | 48       | 132 |
| 13,50                  | 114       | 54        | 16                         | 48       | 133 |
| 14,00                  | 114       | 54        | 16                         | 48       | 134 |
| 14,50                  | 116       | 56        | 16                         | 48       | 135 |
| 15,00                  | 116       | 56        | 16                         | 48       | 136 |
| 15,50                  | 118       | 58        | 16                         | 48       | 137 |
| 16,00                  | 118       | 58        | 16                         | 48       | 138 |
| 16,50                  | 126       | 60        | 20                         | 50       | 139 |
| 17,00                  | 126       | 60        | 20                         | 50       | 140 |
| 17,50                  | 128       | 62        | 20                         | 50       | 141 |
| 18,00                  | 128       | 62        | 20                         | 50       | 142 |
| 18,50                  | 130       | 64        | 20                         | 50       | 143 |
| 19,00                  | 130       | 64        | 20                         | 50       | 144 |
| 19,50                  | 132       | 66        | 20                         | 50       | 145 |
| 20,00                  | 132       | 66        | 20                         | 50       | 146 |

|   |   |
|---|---|
| P | ● |
| M | ● |
| K | ● |
| N | ○ |
| S | ○ |
| H |   |
| O | ○ |

→ v<sub>c</sub> Sayfa 46

## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



UNI

TiN


 $\angle 130^\circ$   
HSS-E-PM

10 113 ...

UNI

TiN


 $\angle 118^\circ$   
HSS-E

10 107 ...

N

vap.


 $\angle 118^\circ$   
HSS

10 105 ...

VA


 $\angle 130^\circ$   
HSS-E

10 130 ...

WNX


 $\angle 130^\circ$   
HSS-E

10 106 ...

WT

vap.


 $\angle 130^\circ$   
HSS-E

10 109 ...

WT

TiN


 $\angle 130^\circ$   
HSS-E

10 110 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 113 ...        | 10 107 ...        | 10 105 ...        | 10 130 ... | 10 106 ... | 10 109 ...          | 10 110 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|-------------------|------------|------------|---------------------|------------|
| 0,40                   |            | 19        | 2,5       |                   |                   | 004 <sup>1)</sup> |            |            | 00400 <sup>1)</sup> |            |
| 0,50                   |            | 20        | 3,0       |                   |                   | 005 <sup>1)</sup> |            |            | 00500 <sup>1)</sup> |            |
| 0,55                   |            | 21        | 3,5       |                   |                   |                   |            |            | 00550 <sup>1)</sup> |            |
| 0,60                   |            | 21        | 3,5       |                   |                   | 006 <sup>1)</sup> |            |            | 00600 <sup>1)</sup> |            |
| 0,65                   |            | 22        | 4,0       |                   |                   |                   |            |            | 00650 <sup>1)</sup> |            |
| 0,70                   |            | 23        | 4,5       |                   |                   | 007 <sup>1)</sup> |            |            | 00700 <sup>1)</sup> |            |
| 0,75                   |            | 23        | 4,5       |                   |                   |                   |            |            | 00750 <sup>1)</sup> |            |
| 0,80                   |            | 24        | 5,0       |                   |                   | 008 <sup>1)</sup> |            |            | 00800 <sup>1)</sup> |            |
| 0,85                   |            | 24        | 5,0       |                   |                   |                   |            |            | 00850 <sup>1)</sup> |            |
| 0,90                   |            | 25        | 5,5       |                   |                   | 009 <sup>1)</sup> |            |            | 00900 <sup>1)</sup> |            |
| 0,95                   |            | 25        | 5,5       |                   |                   |                   |            |            | 00950 <sup>1)</sup> |            |
| 1,00                   |            | 26        | 6,0       | 010 <sup>2)</sup> | 010 <sup>2)</sup> | 010 <sup>1)</sup> | 010        | 010        | 01000 <sup>1)</sup> | 010        |
| 1,05                   |            | 26        | 6,0       |                   |                   |                   |            |            | 01050 <sup>1)</sup> |            |
| 1,10                   |            | 28        | 7,0       | 011 <sup>2)</sup> | 011 <sup>2)</sup> | 011 <sup>1)</sup> | 011        | 011        | 01100 <sup>1)</sup> | 011        |
| 1,15                   |            | 28        | 7,0       |                   |                   |                   |            |            | 01150 <sup>1)</sup> |            |
| 1,20                   |            | 30        | 8,0       | 012 <sup>2)</sup> | 012 <sup>2)</sup> | 012 <sup>1)</sup> | 012        | 012        | 01200 <sup>1)</sup> | 012        |
| 1,25                   |            | 30        | 8,0       |                   |                   |                   |            |            | 01250 <sup>1)</sup> |            |
| 1,30                   |            | 30        | 8,0       | 013 <sup>2)</sup> | 013 <sup>2)</sup> | 013 <sup>1)</sup> | 013        | 013        | 01300 <sup>1)</sup> | 013        |
| 1,35                   |            | 32        | 9,0       |                   |                   |                   |            |            | 01350 <sup>1)</sup> |            |
| 1,40                   |            | 32        | 9,0       | 014 <sup>2)</sup> | 014 <sup>2)</sup> | 014 <sup>1)</sup> | 014        | 014        | 01400 <sup>1)</sup> | 014        |
| 1,45                   |            | 32        | 9,0       |                   |                   |                   |            |            | 01450 <sup>1)</sup> |            |
| 1,50                   |            | 32        | 9,0       | 015 <sup>2)</sup> | 015 <sup>2)</sup> | 015 <sup>1)</sup> | 015        | 015        | 01500 <sup>1)</sup> | 015        |
| 1,55                   |            | 34        | 10,0      |                   |                   |                   |            |            | 01550 <sup>1)</sup> |            |
| 1,60                   |            | 34        | 10,0      | 016 <sup>2)</sup> | 016 <sup>2)</sup> | 016 <sup>1)</sup> | 016        | 016        | 01600 <sup>1)</sup> | 016        |
| 1,65                   |            | 34        | 10,0      |                   |                   |                   |            |            | 01650 <sup>1)</sup> |            |
| 1,70                   |            | 34        | 10,0      | 017 <sup>2)</sup> | 017 <sup>2)</sup> | 017 <sup>1)</sup> | 017        | 017        | 01700 <sup>1)</sup> | 017        |
| 1,75                   |            | 36        | 11,0      |                   |                   |                   |            |            | 01750 <sup>1)</sup> |            |
| 1,80                   |            | 36        | 11,0      | 018 <sup>2)</sup> | 018 <sup>2)</sup> | 018 <sup>1)</sup> | 018        | 018        | 01800 <sup>1)</sup> | 018        |
| 1,83                   |            | 36        | 11,0      |                   |                   |                   |            |            | 01830 <sup>1)</sup> |            |
| 1,85                   |            | 36        | 11,0      |                   |                   |                   |            |            | 01850 <sup>1)</sup> |            |
| 1,90                   |            | 36        | 11,0      | 019 <sup>2)</sup> | 019 <sup>2)</sup> | 019 <sup>1)</sup> | 019        | 019        | 01900 <sup>1)</sup> | 019        |
| 1,95                   |            | 38        | 12,0      |                   |                   |                   |            |            | 01950 <sup>1)</sup> |            |
| 2,00                   |            | 38        | 12,0      | 020 <sup>2)</sup> | 020 <sup>2)</sup> | 020 <sup>1)</sup> | 020        | 020        | 02000 <sup>1)</sup> | 020        |
| 2,05                   |            | 38        | 12,0      |                   |                   |                   |            |            | 02050 <sup>1)</sup> |            |
| 2,10                   |            | 38        | 12,0      | 021 <sup>2)</sup> | 021 <sup>2)</sup> | 021 <sup>1)</sup> | 021        | 021        | 02100 <sup>1)</sup> | 021        |
| 2,15                   |            | 40        | 13,0      |                   |                   |                   |            |            | 02150 <sup>1)</sup> |            |
| 2,20                   |            | 40        | 13,0      | 022 <sup>2)</sup> | 022 <sup>2)</sup> | 022 <sup>1)</sup> | 022        | 022        | 02200 <sup>1)</sup> | 022        |
| 2,25                   |            | 40        | 13,0      |                   |                   |                   |            |            | 02250 <sup>1)</sup> |            |
| 2,30                   |            | 40        | 13,0      | 023 <sup>2)</sup> | 023 <sup>2)</sup> | 023 <sup>1)</sup> | 023        | 023        | 02300 <sup>1)</sup> | 023        |
| 2,35                   |            | 40        | 13,0      |                   |                   |                   |            |            | 02350 <sup>1)</sup> |            |
| 2,38                   | 3/32       | 43        | 14,0      | 238 <sup>2)</sup> | 238 <sup>2)</sup> |                   | 024        | 024        | 02400               | 024        |
| 2,40                   |            | 43        | 14,0      | 024 <sup>2)</sup> | 024 <sup>2)</sup> | 024               |            |            | 02450               |            |
| 2,45                   |            | 43        | 14,0      |                   |                   |                   |            |            | 02500               |            |
| 2,50                   |            | 43        | 14,0      | 025 <sup>2)</sup> | 025 <sup>2)</sup> | 025               | 025        | 025        | 02550               | 025        |
| 2,55                   |            | 43        | 14,0      |                   |                   |                   |            |            |                     |            |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | • | • | ○ | ○ | • | • | • |
| M |   | • |   | • |   | • | • |
| K | • | • | • |   | • | • | • |
| N | ○ | ○ | ○ | • | ○ | ○ | ○ |
| S | ○ | ○ |   | ○ | ○ | ○ | • |
| H | ○ |   |   |   | ○ | ○ | ○ |
| O | ○ | ○ | ○ |   | ○ |   |   |

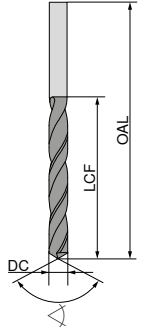
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 46+47

## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

10 113 ...

10 107 ...

10 105 ...

10 130 ...

10 106 ...

10 109 ...

10 110 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 113 ...        | 10 107 ...        | 10 105 ... | 10 130 ... | 10 106 ... | 10 109 ... | 10 110 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 2,60                   |            | 43        | 14,0      | 026 <sup>2)</sup> | 026 <sup>2)</sup> | 026        | 026        | 026        | 02600      | 026        |
| 2,65                   |            | 43        | 14,0      |                   |                   |            |            |            | 02650      |            |
| 2,70                   |            | 46        | 16,0      | 027 <sup>2)</sup> | 027 <sup>2)</sup> | 027        | 027        | 027        | 02700      | 027        |
| 2,75                   |            | 46        | 16,0      |                   |                   |            |            |            | 02750      |            |
| 2,78                   | 7/64       | 46        | 16,0      | 278 <sup>2)</sup> | 278 <sup>2)</sup> |            |            |            |            |            |
| 2,80                   |            | 46        | 16,0      | 028 <sup>2)</sup> | 028 <sup>2)</sup> | 028        | 028        | 028        | 02800      | 028        |
| 2,85                   |            | 46        | 16,0      |                   |                   |            |            |            | 02850      |            |
| 2,90                   |            | 46        | 16,0      | 029 <sup>2)</sup> | 029 <sup>2)</sup> | 029        | 029        | 029        | 02900      | 029        |
| 2,95                   |            | 46        | 16,0      |                   |                   |            |            |            | 02950      |            |
| 3,00                   |            | 46        | 16,0      | 030 <sup>2)</sup> | 030 <sup>2)</sup> | 030        | 030        | 030        | 03000      | 030        |
| 3,05                   |            | 49        | 18,0      |                   |                   |            |            |            | 03050      |            |
| 3,10                   |            | 49        | 18,0      | 031 <sup>2)</sup> | 031 <sup>2)</sup> | 031        | 031        | 031        | 03100      | 031        |
| 3,15                   |            | 49        | 18,0      |                   |                   |            |            |            | 03150      |            |
| 3,17                   | 1/8        | 49        | 18,0      | 317 <sup>2)</sup> | 317 <sup>2)</sup> |            |            |            |            |            |
| 3,20                   |            | 49        | 18,0      | 032 <sup>2)</sup> | 032 <sup>2)</sup> | 032        | 032        | 032        | 03200      | 032        |
| 3,25                   |            | 49        | 18,0      |                   |                   |            |            |            | 03250      |            |
| 3,30                   |            | 49        | 18,0      | 033 <sup>2)</sup> | 033 <sup>2)</sup> | 033        | 033        | 033        | 03300      | 033        |
| 3,35                   |            | 49        | 18,0      |                   |                   |            |            |            | 03350      |            |
| 3,40                   |            | 52        | 20,0      | 034 <sup>2)</sup> | 034 <sup>2)</sup> | 034        | 034        | 034        | 03400      | 034        |
| 3,45                   |            | 52        | 20,0      |                   |                   |            |            |            | 03450      |            |
| 3,50                   |            | 52        | 20,0      | 035 <sup>2)</sup> | 035 <sup>2)</sup> | 035        | 035        | 035        | 03500      | 035        |
| 3,55                   |            | 52        | 20,0      |                   |                   |            |            |            | 03550      |            |
| 3,57                   | 9/64       | 52        | 20,0      | 357 <sup>2)</sup> | 357 <sup>2)</sup> |            |            |            |            |            |
| 3,60                   |            | 52        | 20,0      | 036 <sup>2)</sup> | 036 <sup>2)</sup> | 036        | 036        | 036        | 03600      | 036        |
| 3,70                   |            | 52        | 20,0      | 037 <sup>2)</sup> | 037 <sup>2)</sup> | 037        | 037        | 037        | 03700      | 037        |
| 3,75                   |            | 52        | 20,0      |                   |                   |            |            |            | 03750      |            |
| 3,80                   |            | 55        | 22,0      | 038 <sup>2)</sup> | 038 <sup>2)</sup> | 038        | 038        | 038        | 03800      | 038        |
| 3,85                   |            | 55        | 22,0      |                   |                   |            |            |            | 03850      |            |
| 3,90                   |            | 55        | 22,0      | 039 <sup>2)</sup> | 039 <sup>2)</sup> | 039        |            | 039        | 03900      | 039        |
| 3,95                   |            | 55        | 22,0      |                   |                   |            |            |            | 03950      |            |
| 3,97                   | 5/32       | 55        | 22,0      | 397 <sup>2)</sup> | 397 <sup>2)</sup> |            |            |            |            |            |
| 4,00                   |            | 55        | 22,0      | 040 <sup>2)</sup> | 040 <sup>2)</sup> | 040        | 040        | 040        | 04000      | 040        |
| 4,05                   |            | 55        | 22,0      |                   |                   |            |            |            | 04050      |            |
| 4,10                   |            | 55        | 22,0      | 041 <sup>2)</sup> | 041 <sup>2)</sup> | 041        | 041        | 041        | 04100      | 041        |
| 4,15                   |            | 55        | 22,0      |                   |                   |            |            |            | 04150      |            |
| 4,20                   |            | 55        | 22,0      | 042 <sup>2)</sup> | 042 <sup>2)</sup> | 042        | 042        | 042        | 04200      | 042        |
| 4,25                   |            | 55        | 22,0      |                   |                   |            |            |            | 04250      |            |
| 4,30                   |            | 58        | 24,0      | 043 <sup>2)</sup> | 043 <sup>2)</sup> | 043        | 043        | 043        | 04300      | 043        |
| 4,35                   |            | 58        | 24,0      |                   |                   |            |            |            | 04350      |            |
| 4,37                   | 11/64      | 58        | 24,0      | 437 <sup>2)</sup> | 437 <sup>2)</sup> |            |            |            |            |            |
| 4,40                   |            | 58        | 24,0      | 044 <sup>2)</sup> | 044 <sup>2)</sup> | 044        |            | 044        | 04400      | 044        |
| 4,45                   |            | 58        | 24,0      |                   |                   |            |            |            | 04450      |            |
| 4,50                   |            | 58        | 24,0      | 045 <sup>2)</sup> | 045 <sup>2)</sup> | 045        | 045        | 045        | 04500      | 045        |
| 4,55                   |            | 58        | 24,0      |                   |                   |            |            |            | 04550      |            |
| 4,60                   |            | 58        | 24,0      | 046 <sup>2)</sup> | 046 <sup>2)</sup> | 046        | 046        | 046        | 04600      | 046        |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ | ● | ● | ● |
| M |   | ● |   | ● |   | ● | ● |
| K | ● | ● | ● |   | ● | ● | ● |
| N | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| S | ○ | ○ |   | ○ | ○ | ○ | ● |
| H | ○ |   |   |   | ○ | ○ | ○ |
| O | ○ | ○ | ○ |   | ○ |   |   |

1) Kaplamasız

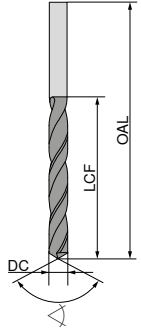
2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 46+47



## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

10 113 ...

10 107 ...

10 105 ...

10 130 ...

10 106 ...

10 109 ...

10 110 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 113 ...        | 10 107 ...        | 10 105 ... | 10 130 ... | 10 106 ... | 10 109 ... | 10 110 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 4,65                   |            | 58        | 24,0      |                   |                   |            |            |            | 04650      | 465        |
| 4,70                   |            | 58        | 24,0      | 047 <sup>2)</sup> | 047 <sup>2)</sup> | 047        | 047        | 047        | 04700      | 047        |
| 4,75                   |            | 58        | 24,0      |                   |                   |            |            |            | 04750      |            |
| 4,76                   | 3/16       | 62        | 26,0      | 476 <sup>2)</sup> | 476 <sup>2)</sup> |            |            |            |            |            |
| 4,80                   |            | 62        | 26,0      | 048 <sup>2)</sup> | 048 <sup>2)</sup> | 048        | 048        | 048        | 04800      | 048        |
| 4,85                   |            | 62        | 26,0      |                   |                   |            |            |            | 04850      |            |
| 4,90                   |            | 62        | 26,0      | 049 <sup>2)</sup> | 049 <sup>2)</sup> | 049        | 049        | 049        | 04900      | 049        |
| 4,95                   |            | 62        | 26,0      |                   |                   |            |            |            | 04950      |            |
| 5,00                   |            | 62        | 26,0      | 050 <sup>2)</sup> | 050 <sup>2)</sup> | 050        | 050        | 050        | 05000      | 050        |
| 5,05                   |            | 62        | 26,0      |                   |                   |            |            |            | 05050      |            |
| 5,10                   |            | 62        | 26,0      | 051 <sup>2)</sup> | 051 <sup>2)</sup> | 051        | 051        | 051        | 05100      | 051        |
| 5,15                   |            | 62        | 26,0      |                   |                   |            |            |            | 05150      |            |
| 5,16                   | 13/64      | 62        | 26,0      | 516 <sup>2)</sup> | 516 <sup>2)</sup> |            |            |            |            |            |
| 5,20                   |            | 62        | 26,0      | 052 <sup>2)</sup> | 052 <sup>2)</sup> | 052        | 052        | 052        | 05200      | 052        |
| 5,25                   |            | 62        | 26,0      |                   |                   |            |            |            | 05250      |            |
| 5,30                   |            | 62        | 26,0      | 053 <sup>2)</sup> | 053 <sup>2)</sup> | 053        | 053        | 053        | 05300      | 053        |
| 5,35                   |            | 66        | 28,0      |                   |                   |            |            |            | 05350      |            |
| 5,40                   |            | 66        | 28,0      | 054 <sup>2)</sup> | 054 <sup>2)</sup> | 054        |            | 054        | 05400      | 054        |
| 5,45                   |            | 66        | 28,0      |                   |                   |            |            |            | 05450      |            |
| 5,50                   |            | 66        | 28,0      | 055 <sup>2)</sup> | 055 <sup>2)</sup> | 055        | 055        | 055        | 05500      | 055        |
| 5,55                   |            | 66        | 28,0      |                   |                   |            |            |            | 05550      | 555        |
| 5,56                   | 7/32       | 66        | 28,0      | 556 <sup>2)</sup> | 556 <sup>2)</sup> |            |            |            |            |            |
| 5,60                   |            | 66        | 28,0      | 056 <sup>2)</sup> | 056 <sup>2)</sup> | 056        | 056        | 056        | 05600      | 056        |
| 5,70                   |            | 66        | 28,0      | 057 <sup>2)</sup> | 057 <sup>2)</sup> | 057        | 057        | 057        | 05700      | 057        |
| 5,75                   |            | 66        | 28,0      |                   |                   |            |            |            | 05750      |            |
| 5,80                   |            | 66        | 28,0      | 058 <sup>2)</sup> | 058 <sup>2)</sup> | 058        | 058        | 058        | 05800      | 058        |
| 5,85                   |            | 66        | 28,0      |                   |                   |            |            |            | 05850      |            |
| 5,90                   |            | 66        | 28,0      | 059 <sup>2)</sup> | 059 <sup>2)</sup> | 059        | 059        | 059        | 05900      | 059        |
| 5,95                   | 15/64      | 66        | 28,0      | 595 <sup>2)</sup> | 595 <sup>2)</sup> |            |            |            | 05950      |            |
| 6,00                   |            | 66        | 28,0      | 060 <sup>2)</sup> | 060 <sup>2)</sup> | 060        | 060        | 060        | 06000      | 060        |
| 6,05                   |            | 70        | 31,0      |                   |                   |            |            |            | 06050      |            |
| 6,10                   |            | 70        | 31,0      | 061 <sup>2)</sup> | 061 <sup>2)</sup> | 061        | 061        | 061        | 06100      | 061        |
| 6,15                   |            | 70        | 31,0      |                   |                   |            |            |            | 06150      |            |
| 6,20                   |            | 70        | 31,0      | 062 <sup>2)</sup> | 062 <sup>2)</sup> | 062        | 062        | 062        | 06200      | 062        |
| 6,25                   |            | 70        | 31,0      |                   |                   |            |            |            | 06250      |            |
| 6,30                   |            | 70        | 31,0      | 063 <sup>2)</sup> | 063 <sup>2)</sup> | 063        | 063        | 063        | 06300      | 063        |
| 6,35                   | 1/4        | 70        | 31,0      | 635 <sup>2)</sup> | 635 <sup>2)</sup> |            |            |            | 06350      |            |
| 6,40                   |            | 70        | 31,0      | 064 <sup>2)</sup> | 064 <sup>2)</sup> | 064        | 064        | 064        | 06400      | 064        |
| 6,45                   |            | 70        | 31,0      |                   |                   |            |            |            | 06450      |            |
| 6,50                   |            | 70        | 31,0      | 065 <sup>2)</sup> | 065 <sup>2)</sup> | 065        | 065        | 065        | 06500      | 065        |
| 6,55                   |            | 70        | 31,0      |                   |                   |            |            |            | 06550      |            |
| 6,60                   |            | 70        | 31,0      | 066 <sup>2)</sup> | 066 <sup>2)</sup> | 066        | 066        | 066        | 06600      | 066        |
| 6,65                   |            | 70        | 31,0      |                   |                   |            |            |            | 06650      |            |
| 6,70                   |            | 70        | 31,0      | 067 <sup>2)</sup> | 067 <sup>2)</sup> | 067        | 067        | 067        | 06700      | 067        |
| 6,75                   |            | 74        | 34,0      | 675 <sup>2)</sup> | 675 <sup>2)</sup> |            |            |            | 06750      |            |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ | ● | ● | ● |
| M |   | ● |   | ● |   | ● | ● |
| K | ● | ● | ● |   | ● | ● | ● |
| N | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| S | ○ | ○ |   | ○ | ○ | ○ | ● |
| H | ○ |   |   |   | ○ | ○ | ○ |
| O | ○ | ○ | ○ |   | ○ |   |   |

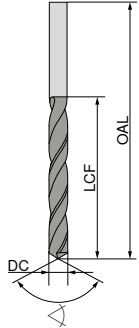
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 46+47

## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

10 113 ...

10 107 ...

10 105 ...

10 130 ...

10 106 ...

10 109 ...

10 110 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 113 ...        | 10 107 ...        | 10 105 ... | 10 130 ... | 10 106 ... | 10 109 ... | 10 110 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 6,80                   |            | 74        | 34,0      | 068 <sup>2)</sup> | 068 <sup>2)</sup> | 068        | 068        | 068        | 06800      | 068        |
| 6,85                   |            | 74        | 34,0      |                   |                   |            |            |            | 06850      |            |
| 6,90                   |            | 74        | 34,0      | 069 <sup>2)</sup> | 069 <sup>2)</sup> | 069        | 069        | 069        | 06900      | 069        |
| 7,00                   |            | 74        | 34,0      | 070 <sup>2)</sup> | 070 <sup>2)</sup> | 070        | 070        | 070        | 07000      | 070        |
| 7,05                   |            | 74        | 34,0      |                   |                   |            |            |            | 07050      |            |
| 7,10                   |            | 74        | 34,0      | 071 <sup>2)</sup> | 071 <sup>2)</sup> | 071        | 071        | 071        | 07100      | 071        |
| 7,14                   | 9/32       | 74        | 34,0      | 714 <sup>2)</sup> | 714 <sup>2)</sup> |            |            |            |            |            |
| 7,20                   |            | 74        | 34,0      | 072 <sup>2)</sup> | 072 <sup>2)</sup> | 072        | 072        | 072        | 07200      | 072        |
| 7,25                   |            | 74        | 34,0      |                   |                   |            |            |            | 07250      |            |
| 7,30                   |            | 74        | 34,0      | 073 <sup>2)</sup> | 073 <sup>2)</sup> | 073        |            | 073        | 07300      | 073        |
| 7,35                   |            | 74        | 34,0      |                   |                   |            |            |            | 07350      |            |
| 7,40                   |            | 74        | 34,0      | 074 <sup>2)</sup> | 074 <sup>2)</sup> | 074        |            | 074        | 07400      | 074        |
| 7,50                   |            | 74        | 34,0      | 075 <sup>2)</sup> | 075 <sup>2)</sup> | 075        | 075        | 075        | 07500      | 075        |
| 7,60                   |            | 79        | 37,0      | 076 <sup>2)</sup> | 076 <sup>2)</sup> | 076        |            | 076        | 07600      | 076        |
| 7,70                   |            | 79        | 37,0      | 077 <sup>2)</sup> | 077 <sup>2)</sup> | 077        | 077        | 077        | 07700      | 077        |
| 7,75                   |            | 79        | 37,0      |                   |                   |            |            |            | 07750      |            |
| 7,80                   |            | 79        | 37,0      | 078 <sup>2)</sup> | 078 <sup>2)</sup> | 078        |            | 078        | 07800      | 078        |
| 7,90                   |            | 79        | 37,0      | 079 <sup>2)</sup> | 079 <sup>2)</sup> | 079        | 079        | 079        | 07900      | 079        |
| 7,94                   | 5/16       | 79        | 37,0      | 794 <sup>2)</sup> | 794 <sup>2)</sup> |            |            |            |            |            |
| 8,00                   |            | 79        | 37,0      | 080 <sup>2)</sup> | 080 <sup>2)</sup> | 080        | 080        | 080        | 08000      | 080        |
| 8,05                   |            | 79        | 37,0      |                   |                   |            |            |            | 08050      |            |
| 8,10                   |            | 79        | 37,0      | 081 <sup>2)</sup> | 081 <sup>2)</sup> | 081        | 081        | 081        | 08100      | 081        |
| 8,15                   |            | 79        | 37,0      |                   |                   |            |            |            | 08150      |            |
| 8,20                   |            | 79        | 37,0      | 082 <sup>2)</sup> | 082 <sup>2)</sup> | 082        | 082        | 082        | 08200      | 082        |
| 8,25                   |            | 79        | 37,0      |                   |                   |            |            |            | 08250      |            |
| 8,30                   |            | 79        | 37,0      | 083 <sup>2)</sup> | 083 <sup>2)</sup> | 083        | 083        | 083        | 08300      | 083        |
| 8,40                   |            | 79        | 37,0      | 084 <sup>2)</sup> | 084 <sup>2)</sup> | 084        | 084        | 084        | 08400      | 084        |
| 8,50                   |            | 79        | 37,0      | 085 <sup>2)</sup> | 085 <sup>2)</sup> | 085        | 085        | 085        | 08500      | 085        |
| 8,55                   |            | 84        | 40,0      |                   |                   |            |            |            | 08550      |            |
| 8,60                   |            | 84        | 40,0      |                   | 086 <sup>2)</sup> | 086        | 086        | 086        | 08600      | 086        |
| 8,70                   |            | 84        | 40,0      |                   | 087 <sup>2)</sup> | 087        | 087        | 087        | 08700      | 087        |
| 8,73                   | 11/32      | 84        | 40,0      | 873 <sup>2)</sup> | 873 <sup>2)</sup> |            |            |            |            |            |
| 8,75                   |            | 84        | 40,0      |                   |                   |            |            |            | 08750      |            |
| 8,80                   |            | 84        | 40,0      | 088 <sup>2)</sup> | 088 <sup>2)</sup> | 088        |            | 088        | 08800      | 088        |
| 8,90                   |            | 84        | 40,0      |                   | 089 <sup>2)</sup> | 089        |            | 089        | 08900      | 089        |
| 8,95                   |            | 84        | 40,0      |                   |                   |            |            |            | 08950      |            |
| 9,00                   |            | 84        | 40,0      | 090 <sup>2)</sup> | 090 <sup>2)</sup> | 090        | 090        | 090        | 09000      | 090        |
| 9,05                   |            | 84        | 40,0      |                   |                   |            |            |            | 09050      |            |
| 9,10                   |            | 84        | 40,0      |                   | 091 <sup>2)</sup> | 091        |            | 091        | 09100      | 091        |
| 9,20                   |            | 84        | 40,0      |                   | 092 <sup>2)</sup> | 092        | 092        | 092        | 09200      | 092        |
| 9,25                   |            | 84        | 40,0      |                   |                   |            |            |            | 09250      |            |
| 9,30                   |            | 84        | 40,0      | 093 <sup>2)</sup> | 093 <sup>2)</sup> | 093        | 093        | 093        | 09300      | 093        |
| 9,40                   |            | 84        | 40,0      |                   | 094 <sup>2)</sup> | 094        |            | 094        | 09400      | 094        |
| 9,50                   |            | 84        | 40,0      | 095 <sup>2)</sup> | 095 <sup>2)</sup> | 095        | 095        | 095        | 09500      | 095        |
| 9,60                   |            | 89        | 43,0      |                   | 096 <sup>2)</sup> | 096        |            | 096        | 09600      | 096        |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ | ● | ● | ● |
| M |   | ● |   | ● |   | ● | ● |
| K | ● | ● | ● |   | ● | ● | ● |
| N | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| S | ○ | ○ |   | ○ | ○ | ○ | ● |
| H | ○ |   |   |   | ○ | ○ | ○ |
| O | ○ | ○ | ○ |   | ○ |   |   |

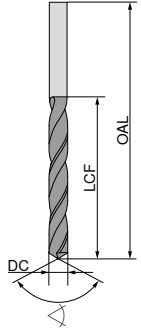
1) Kaplamsız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 46+47

## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

130°  
HSS-E

10 113 ...

10 107 ...

10 105 ...

10 130 ...

10 106 ...

10 109 ...

10 110 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 113 ...        | 10 107 ...        | 10 105 ... | 10 130 ... | 10 106 ... | 10 109 ... | 10 110 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 9,65                   |            | 89        | 43,0      |                   |                   |            |            |            | 09650      |            |
| 9,70                   |            | 89        | 43,0      |                   | 097 <sup>2)</sup> | 097        |            | 097        | 09700      | 097        |
| 9,75                   |            | 89        | 43,0      |                   |                   |            |            |            | 09750      |            |
| 9,80                   |            | 89        | 43,0      | 098 <sup>2)</sup> | 098 <sup>2)</sup> | 098        | 098        | 098        | 09800      | 098        |
| 9,90                   |            | 89        | 43,0      |                   | 099 <sup>2)</sup> | 099        |            | 099        | 09900      | 099        |
| 10,00                  |            | 89        | 43,0      | 100 <sup>2)</sup> | 100 <sup>2)</sup> | 100        | 100        | 100        | 10000      | 100        |
| 10,05                  |            | 89        | 43,0      |                   |                   |            |            |            | 10050      |            |
| 10,10                  |            | 89        | 43,0      |                   | 101 <sup>2)</sup> | 101        |            |            | 10100      |            |
| 10,20                  |            | 89        | 43,0      | 102 <sup>2)</sup> | 102 <sup>2)</sup> | 102        | 102        | 102        | 10200      | 102        |
| 10,25                  |            | 89        | 43,0      |                   |                   |            |            |            | 10250      |            |
| 10,30                  |            | 89        | 43,0      |                   | 103 <sup>2)</sup> | 103        |            |            | 10300      |            |
| 10,40                  |            | 89        | 43,0      |                   | 104 <sup>2)</sup> | 104        |            |            | 10400      |            |
| 10,50                  |            | 89        | 43,0      | 105 <sup>2)</sup> | 105 <sup>2)</sup> | 105        | 105        | 105        | 10500      | 105        |
| 10,60                  |            | 95        | 47,0      |                   |                   | 106        |            |            | 10600      |            |
| 10,70                  |            | 95        | 47,0      |                   |                   | 107        |            |            | 10700      |            |
| 10,75                  |            | 95        | 47,0      |                   |                   |            |            |            | 10750      |            |
| 10,80                  |            | 95        | 47,0      |                   |                   | 108        |            | 108        | 10800      | 108        |
| 10,90                  |            | 95        | 47,0      |                   |                   | 109        |            |            | 10900      |            |
| 11,00                  |            | 95        | 47,0      | 110 <sup>2)</sup> | 110 <sup>2)</sup> | 110        | 110        | 110        | 11000      | 110        |
| 11,10                  |            | 95        | 47,0      |                   |                   | 111        |            |            | 11100      |            |
| 11,11                  | 7/16       | 95        | 47,0      | 111 <sup>2)</sup> | 111 <sup>2)</sup> |            |            |            |            |            |
| 11,20                  |            | 95        | 47,0      |                   |                   | 112        |            |            | 11200      |            |
| 11,30                  |            | 95        | 47,0      |                   |                   | 113        |            |            | 11300      |            |
| 11,40                  |            | 95        | 47,0      |                   |                   | 114        |            |            | 11400      |            |
| 11,50                  |            | 95        | 47,0      | 115 <sup>2)</sup> | 115 <sup>2)</sup> | 115        | 115        | 115        | 11500      | 115        |
| 11,60                  |            | 95        | 47,0      |                   |                   | 116        |            |            |            |            |
| 11,70                  |            | 95        | 47,0      |                   |                   | 117        | 117        |            | 11700      |            |
| 11,75                  |            | 95        | 47,0      |                   |                   |            |            |            | 11750      |            |
| 11,80                  |            | 95        | 47,0      |                   |                   | 118        |            | 118        | 11800      | 118        |
| 11,90                  |            | 102       | 51,0      |                   |                   | 119        |            |            |            |            |
| 12,00                  |            | 102       | 51,0      | 120 <sup>2)</sup> | 120 <sup>2)</sup> | 120        | 120        | 120        | 12000      | 120        |
| 12,10                  |            | 102       | 51,0      |                   |                   | 121        |            |            | 12100      |            |
| 12,20                  |            | 102       | 51,0      |                   |                   | 122        |            |            | 12200      |            |
| 12,25                  |            | 102       | 51,0      |                   |                   |            |            |            | 12250      |            |
| 12,30                  |            | 102       | 51,0      | 123 <sup>2)</sup> | 123 <sup>2)</sup> | 123        |            | 123        | 12300      | 123        |
| 12,40                  |            | 102       | 51,0      |                   |                   | 124        |            |            | 12400      |            |
| 12,50                  |            | 102       | 51,0      | 125 <sup>2)</sup> | 125 <sup>2)</sup> | 125        |            | 125        | 12500      | 125        |
| 12,60                  |            | 102       | 51,0      |                   |                   | 126        |            |            | 12600      |            |
| 12,70                  |            | 102       | 51,0      | 127 <sup>2)</sup> | 127 <sup>2)</sup> | 127        |            |            | 12700      |            |
| 12,80                  |            | 102       | 51,0      |                   |                   | 128        |            | 128        | 12800      | 128        |
| 12,90                  |            | 102       | 51,0      |                   |                   | 129        |            |            | 12900      |            |
| 13,00                  |            | 102       | 51,0      | 130 <sup>2)</sup> | 130 <sup>2)</sup> | 130        |            | 130        | 13000      | 130        |
| 13,20                  |            | 102       | 51,0      |                   |                   | 132        |            |            | 13200      |            |
| 13,30                  |            | 107       | 54,0      |                   |                   | 133        |            |            |            |            |
| 13,50                  |            | 107       | 54,0      | 135 <sup>2)</sup> | 135 <sup>2)</sup> | 135        |            | 135        | 13500      | 135        |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ | ● | ● | ● |
| M |   | ● |   | ● |   | ● | ● |
| K | ● | ● | ● |   | ● | ● | ● |
| N | ○ | ○ | ○ | ● | ○ | ○ | ○ |
| S | ○ | ○ |   | ○ | ○ | ○ | ● |
| H | ○ |   |   |   | ○ | ○ | ○ |
| O | ○ | ○ | ○ |   | ○ |   |   |

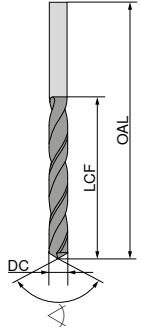
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 46+47

## Helisel matkaplar, DIN 1897, ekstra kısa

≤ 3xD



|                        |            |           |           | UNI               | UNI               | N           | VA            | WNX           | WT            | WT            |
|------------------------|------------|-----------|-----------|-------------------|-------------------|-------------|---------------|---------------|---------------|---------------|
|                        |            |           |           | TiN               | TiN               | vap.        |               |               | vap.          | TiN           |
|                        |            |           |           |                   |                   |             |               |               |               |               |
|                        |            |           |           | 130°<br>HSS-E-PM  | 118°<br>HSS-E     | 118°<br>HSS | 130°<br>HSS-E | 130°<br>HSS-E | 130°<br>HSS-E | 130°<br>HSS-E |
|                        |            |           |           | 10 113 ...        | 10 107 ...        | 10 105 ...  | 10 130 ...    | 10 106 ...    | 10 109 ...    | 10 110 ...    |
| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm |                   |                   |             |               |               |               |               |
| 13,80                  |            | 107       | 54,0      |                   |                   | 138         |               | 138           |               | 138           |
| 14,00                  |            | 107       | 54,0      | 140 <sup>2)</sup> | 140 <sup>2)</sup> | 140         |               | 140           | 14000         | 140           |
| 14,50                  |            | 111       | 56,0      |                   |                   | 145         |               | 145           | 14500         | 145           |
| 14,75                  |            | 111       | 56,0      |                   |                   | 147         |               |               |               |               |
| 14,80                  |            | 111       | 56,0      |                   |                   |             |               | 148           |               |               |
| 15,00                  |            | 111       | 56,0      |                   |                   | 150         |               | 150           | 15000         | 150           |
| 15,25                  |            | 115       | 58,0      |                   |                   | 152         |               | 155           | 15250         |               |
| 15,50                  |            | 115       | 58,0      |                   |                   | 155         |               |               | 15500         | 155           |
| 15,75                  |            | 115       | 58,0      |                   |                   |             |               |               |               | 157           |
| 16,00                  |            | 115       | 58,0      |                   |                   | 160         |               | 160           | 16000         | 160           |
| 16,50                  |            | 119       | 60,0      |                   |                   | 165         |               | 165           | 16500         | 165           |
| 17,00                  |            | 119       | 60,0      |                   |                   | 170         |               | 170           | 17000         | 170           |
| 17,50                  |            | 123       | 62,0      |                   |                   | 175         |               | 175           | 17500         | 175           |
| 17,75                  |            | 123       | 62,0      |                   |                   |             |               |               |               | 177           |
| 18,00                  |            | 123       | 62,0      |                   |                   | 180         |               | 180           | 18000         | 180           |
| 18,50                  |            | 127       | 64,0      |                   |                   | 185         |               |               | 18500         | 185           |
| 19,00                  |            | 127       | 64,0      |                   |                   | 190         |               | 190           | 19000         | 190           |
| 19,50                  |            | 131       | 66,0      |                   |                   | 195         |               |               | 19500         | 195           |
| 19,75                  |            | 131       | 66,0      |                   |                   |             |               |               |               | 197           |
| 20,00                  |            | 131       | 66,0      |                   |                   | 200         |               | 200           | 20000         | 200           |
| 20,50                  |            | 136       | 68,0      |                   |                   |             |               |               | 20500         |               |
| 21,00                  |            | 136       | 68,0      |                   |                   |             |               |               | 21000         |               |
| 21,50                  |            | 141       | 70,0      |                   |                   |             |               |               | 21500         |               |
| 22,00                  |            | 141       | 70,0      |                   |                   |             |               |               | 22000         |               |
| 22,20                  |            | 141       | 70,0      |                   |                   |             |               |               | 22200         |               |
| 23,00                  |            | 146       | 72,0      |                   |                   |             |               |               | 23000         |               |
| 24,00                  |            | 151       | 75,0      |                   |                   |             |               |               | 24000         |               |
| 25,00                  |            | 151       | 75,0      |                   |                   |             |               |               | 25000         |               |
| P                      |            |           |           | ●                 | ●                 | ○           | ○             | ●             | ●             | ●             |
| M                      |            |           |           |                   | ●                 |             | ●             |               | ●             | ●             |
| K                      |            |           |           | ●                 | ●                 | ●           |               | ●             | ●             | ●             |
| N                      |            |           |           | ○                 | ○                 | ○           | ●             | ○             | ○             | ○             |
| S                      |            |           |           | ○                 | ○                 |             | ○             | ○             | ○             | ●             |
| H                      |            |           |           | ○                 |                   |             |               | ○             | ○             | ○             |
| O                      |            |           |           | ○                 | ○                 | ○           |               | ○             |               |               |

1) Kaplamsız

2) Kendiliğinden merkezlemeli

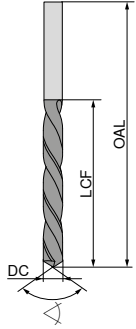
→ v<sub>c</sub> Sayfa 46+47



## Helisel matkaplar, DIN 1897, ekstra kısa

▲ sol helisli

≤ 3xD



WTL-L

F-nit

130°  
HSS

10 112 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |                   |
|------------------------|-----------|-----------|-------------------|
| 1,0                    | 26        | 6         | 010 <sup>1)</sup> |
| 1,1                    | 28        | 7         | 011 <sup>1)</sup> |
| 1,2                    | 30        | 8         | 012 <sup>1)</sup> |
| 1,3                    | 30        | 8         | 013 <sup>1)</sup> |
| 1,4                    | 32        | 9         | 014 <sup>1)</sup> |
| 1,5                    | 32        | 9         | 015 <sup>1)</sup> |
| 1,6                    | 34        | 10        | 016 <sup>1)</sup> |
| 1,7                    | 34        | 10        | 017 <sup>1)</sup> |
| 1,8                    | 36        | 11        | 018 <sup>1)</sup> |
| 1,9                    | 36        | 11        | 019 <sup>1)</sup> |
| 2,0                    | 38        | 12        | 020 <sup>1)</sup> |
| 2,1                    | 38        | 12        | 021 <sup>1)</sup> |
| 2,2                    | 40        | 13        | 022 <sup>1)</sup> |
| 2,3                    | 40        | 13        | 023 <sup>1)</sup> |
| 2,4                    | 43        | 14        | 024               |
| 2,5                    | 43        | 14        | 025               |
| 2,6                    | 43        | 14        | 026               |
| 2,7                    | 46        | 16        | 027               |
| 2,8                    | 46        | 16        | 028               |
| 2,9                    | 46        | 16        | 029               |
| 3,0                    | 46        | 16        | 030               |
| 3,1                    | 49        | 18        | 031               |
| 3,2                    | 49        | 18        | 032               |
| 3,3                    | 49        | 18        | 033               |
| 3,4                    | 52        | 20        | 034               |
| 3,5                    | 52        | 20        | 035               |
| 3,6                    | 52        | 20        | 036               |
| 3,7                    | 52        | 20        | 037               |
| 3,8                    | 55        | 22        | 038               |
| 3,9                    | 55        | 22        | 039               |
| 4,0                    | 55        | 22        | 040               |
| 4,1                    | 55        | 22        | 041               |
| 4,2                    | 55        | 22        | 042               |
| 4,3                    | 58        | 24        | 043               |
| 4,4                    | 58        | 24        | 044               |
| 4,5                    | 58        | 24        | 045               |
| 4,6                    | 58        | 24        | 046               |
| 4,7                    | 58        | 24        | 047               |
| 4,8                    | 62        | 26        | 048               |
| 4,9                    | 62        | 26        | 049               |
| 5,0                    | 62        | 26        | 050               |
| 5,1                    | 62        | 26        | 051               |
| 5,2                    | 62        | 26        | 052               |
| 5,3                    | 62        | 26        | 053               |
| 5,4                    | 66        | 28        | 054               |
| 5,5                    | 66        | 28        | 055               |
| 5,6                    | 66        | 28        | 056               |
| 5,7                    | 66        | 28        | 057               |
| 5,8                    | 66        | 28        | 058               |
| 5,9                    | 66        | 28        | 059               |

10 112 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |                   |
|------------------------|-----------|-----------|-------------------|
| 6,0                    | 66        | 28        | 060               |
| 6,1                    | 70        | 31        | 061               |
| 6,2                    | 70        | 31        | 062               |
| 6,3                    | 70        | 31        | 063               |
| 6,4                    | 70        | 31        | 064               |
| 6,5                    | 70        | 31        | 065               |
| 6,6                    | 70        | 31        | 066               |
| 6,7                    | 70        | 31        | 067               |
| 6,8                    | 74        | 34        | 068               |
| 6,9                    | 74        | 34        | 069               |
| 7,0                    | 74        | 34        | 070               |
| 7,2                    | 74        | 34        | 072               |
| 7,3                    | 74        | 34        | 073               |
| 7,4                    | 74        | 34        | 074               |
| 7,5                    | 74        | 34        | 075               |
| 7,7                    | 79        | 37        | 077               |
| 8,0                    | 79        | 37        | 080               |
| 8,1                    | 79        | 37        | 081               |
| 8,2                    | 79        | 37        | 082               |
| 8,3                    | 79        | 37        | 083               |
| 8,5                    | 79        | 37        | 085               |
| 8,6                    | 84        | 40        | 086               |
| 8,7                    | 84        | 40        | 087               |
| 8,8                    | 84        | 40        | 088               |
| 9,0                    | 84        | 40        | 090               |
| 9,5                    | 84        | 40        | 095               |
| 9,7                    | 89        | 43        | 097               |
| 10,0                   | 89        | 43        | 100               |
| 10,1                   | 89        | 43        | 101               |
| 10,2                   | 89        | 43        | 102               |
| 10,5                   | 89        | 43        | 105               |
| 11,0                   | 95        | 47        | 110               |
| 11,5                   | 95        | 47        | 115               |
| 11,8                   | 95        | 47        | 118               |
| 12,0                   | 102       | 51        | 120               |
| 12,5                   | 102       | 51        | 125               |
| 12,8                   | 102       | 51        | 128               |
| 13,0                   | 102       | 51        | 130               |
| 14,0                   | 107       | 54        | 140               |
| 14,5                   | 111       | 56        | 145               |
| 15,0                   | 111       | 56        | 150               |
| 16,0                   | 115       | 58        | 160 <sup>2)</sup> |
| 18,0                   | 123       | 62        | 180 <sup>2)</sup> |
| 19,0                   | 127       | 64        | 190 <sup>2)</sup> |

|   |   |
|---|---|
| P | ○ |
| M | ○ |
| K | ● |
| N | ● |
| S | ○ |
| H | ○ |
| O | ○ |

1) Kaplamsız

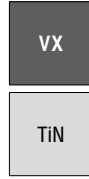
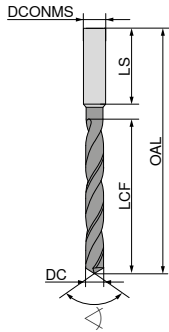
2) buhar menevişli

→ v<sub>c</sub> Sayfa 47

## Yüksek performanslı helisel matkap, DIN 338'e benzer, kısa

- ▲ DIN 1835 A'ya göre standart saplı
- ▲ Özel delme ucu geometrisi
- ▲ 4 yüzeyli bileme geometrisi
- ▲ en yüksek performans
- ▲ çok iyi kendinden merkezleme

≤ 5xD



10 124 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | DCONMS <sub>h6</sub><br>mm | LS<br>mm |      |
|------------------------|-----------|-----------|----------------------------|----------|------|
| 2,00                   | 56        | 24        | 3                          | 28       | 020  |
| 2,10                   | 56        | 24        | 3                          | 28       | 021  |
| 2,20                   | 59        | 27        | 3                          | 28       | 022  |
| 2,30                   | 59        | 27        | 3                          | 28       | 023  |
| 2,40                   | 62        | 30        | 3                          | 28       | 024  |
| 2,50                   | 62        | 30        | 3                          | 28       | 025  |
| 2,60                   | 62        | 30        | 3                          | 28       | 026  |
| 2,70                   | 65        | 33        | 3                          | 28       | 027  |
| 2,80                   | 65        | 33        | 3                          | 28       | 028  |
| 2,90                   | 65        | 33        | 3                          | 28       | 029  |
| 3,00                   | 65        | 33        | 3                          | 28       | 030  |
| 3,10                   | 68        | 36        | 4                          | 28       | 031  |
| 3,20                   | 68        | 36        | 4                          | 28       | 032  |
| 3,30                   | 68        | 36        | 4                          | 28       | 033  |
| 3,40                   | 71        | 39        | 4                          | 28       | 034  |
| 3,50                   | 71        | 39        | 4                          | 28       | 035  |
| 3,60                   | 71        | 39        | 4                          | 28       | 036  |
| 3,70                   | 71        | 39        | 4                          | 28       | 037  |
| 3,80                   | 75        | 43        | 4                          | 28       | 038  |
| 3,90                   | 75        | 43        | 4                          | 28       | 039  |
| 4,00                   | 75        | 43        | 4                          | 28       | 040  |
| 4,10                   | 87        | 43        | 6                          | 36       | 041  |
| 4,20                   | 87        | 43        | 6                          | 36       | 042  |
| 4,30                   | 91        | 47        | 6                          | 36       | 043  |
| 4,40                   | 91        | 47        | 6                          | 36       | 044  |
| 4,50                   | 91        | 47        | 6                          | 36       | 045  |
| 4,60                   | 91        | 47        | 6                          | 36       | 046  |
| 4,65                   | 91        | 47        | 6                          | 36       | 0465 |
| 4,70                   | 91        | 47        | 6                          | 36       | 047  |
| 4,80                   | 96        | 52        | 6                          | 36       | 048  |
| 4,90                   | 96        | 52        | 6                          | 36       | 049  |
| 5,00                   | 96        | 52        | 6                          | 36       | 050  |
| 5,10                   | 96        | 52        | 6                          | 36       | 051  |
| 5,20                   | 96        | 52        | 6                          | 36       | 052  |
| 5,30                   | 96        | 52        | 6                          | 36       | 053  |
| 5,40                   | 101       | 57        | 6                          | 36       | 054  |
| 5,50                   | 101       | 57        | 6                          | 36       | 055  |
| 5,55                   | 101       | 57        | 6                          | 36       | 0555 |
| 5,60                   | 101       | 57        | 6                          | 36       | 056  |
| 5,70                   | 101       | 57        | 6                          | 36       | 057  |
| 5,80                   | 101       | 57        | 6                          | 36       | 058  |
| 5,90                   | 101       | 57        | 6                          | 36       | 059  |
| 6,00                   | 101       | 57        | 6                          | 36       | 060  |
| 6,10                   | 107       | 63        | 8                          | 36       | 061  |
| 6,20                   | 107       | 63        | 8                          | 36       | 062  |
| 6,30                   | 107       | 63        | 8                          | 36       | 063  |
| 6,40                   | 107       | 63        | 8                          | 36       | 064  |
| 6,50                   | 107       | 63        | 8                          | 36       | 065  |
| 6,60                   | 107       | 63        | 8                          | 36       | 066  |
| 6,70                   | 107       | 63        | 8                          | 36       | 067  |
| 6,80                   | 113       | 69        | 8                          | 36       | 068  |
| 6,90                   | 113       | 69        | 8                          | 36       | 069  |
| 7,00                   | 113       | 69        | 8                          | 36       | 070  |
| 7,10                   | 113       | 69        | 8                          | 36       | 071  |
| 7,20                   | 113       | 69        | 8                          | 36       | 072  |
| 7,30                   | 113       | 69        | 8                          | 36       | 073  |

10 124 ...

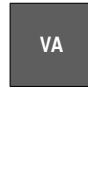
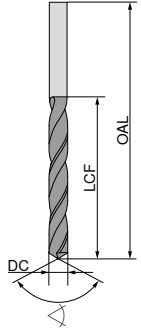
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | DCONMS <sub>h6</sub><br>mm | LS<br>mm |      |
|------------------------|-----------|-----------|----------------------------|----------|------|
| 7,40                   | 113       | 69        | 8                          | 36       | 074  |
| 7,50                   | 113       | 69        | 8                          | 36       | 075  |
| 7,55                   | 119       | 75        | 8                          | 36       | 0755 |
| 7,60                   | 119       | 75        | 8                          | 36       | 076  |
| 7,70                   | 119       | 75        | 8                          | 36       | 077  |
| 7,80                   | 119       | 75        | 8                          | 36       | 078  |
| 7,90                   | 119       | 75        | 8                          | 36       | 079  |
| 8,00                   | 119       | 75        | 8                          | 36       | 080  |
| 8,10                   | 125       | 75        | 10                         | 40       | 081  |
| 8,20                   | 125       | 75        | 10                         | 40       | 082  |
| 8,30                   | 125       | 75        | 10                         | 40       | 083  |
| 8,40                   | 125       | 75        | 10                         | 40       | 084  |
| 8,50                   | 125       | 75        | 10                         | 40       | 085  |
| 8,60                   | 131       | 81        | 10                         | 40       | 086  |
| 8,70                   | 131       | 81        | 10                         | 40       | 087  |
| 8,80                   | 131       | 81        | 10                         | 40       | 088  |
| 8,90                   | 131       | 81        | 10                         | 40       | 089  |
| 9,00                   | 131       | 81        | 10                         | 40       | 090  |
| 9,10                   | 131       | 81        | 10                         | 40       | 091  |
| 9,20                   | 131       | 81        | 10                         | 40       | 092  |
| 9,30                   | 131       | 81        | 10                         | 40       | 093  |
| 9,40                   | 131       | 81        | 10                         | 40       | 094  |
| 9,50                   | 131       | 81        | 10                         | 40       | 095  |
| 9,55                   | 137       | 87        | 10                         | 40       | 0955 |
| 9,60                   | 137       | 87        | 10                         | 40       | 096  |
| 9,70                   | 137       | 87        | 10                         | 40       | 097  |
| 9,80                   | 137       | 87        | 10                         | 40       | 098  |
| 9,90                   | 137       | 87        | 10                         | 40       | 099  |
| 10,00                  | 137       | 87        | 10                         | 40       | 100  |
| 10,10                  | 144       | 87        | 12                         | 45       | 101  |
| 10,20                  | 144       | 87        | 12                         | 45       | 102  |
| 10,30                  | 144       | 87        | 12                         | 45       | 103  |
| 10,40                  | 144       | 87        | 12                         | 45       | 104  |
| 10,50                  | 144       | 87        | 12                         | 45       | 105  |
| 10,60                  | 144       | 87        | 12                         | 45       | 106  |
| 10,70                  | 151       | 94        | 12                         | 45       | 107  |
| 10,80                  | 151       | 94        | 12                         | 45       | 108  |
| 10,90                  | 151       | 94        | 12                         | 45       | 109  |
| 11,00                  | 151       | 94        | 12                         | 45       | 110  |
| 11,10                  | 151       | 94        | 12                         | 45       | 111  |
| 11,20                  | 151       | 94        | 12                         | 45       | 112  |
| 11,30                  | 151       | 94        | 12                         | 45       | 113  |
| 11,40                  | 151       | 94        | 12                         | 45       | 114  |
| 11,50                  | 151       | 94        | 12                         | 45       | 115  |
| 11,60                  | 151       | 94        | 12                         | 45       | 116  |
| 11,70                  | 151       | 94        | 12                         | 45       | 117  |
| 11,80                  | 151       | 94        | 12                         | 45       | 118  |
| 11,90                  | 158       | 101       | 12                         | 45       | 119  |
| 12,00                  | 158       | 101       | 12                         | 45       | 120  |
| 12,10                  | 161       | 101       | 16                         | 48       | 121  |
| 12,20                  | 161       | 101       | 16                         | 48       | 122  |
| 12,30                  | 161       | 101       | 16                         | 48       | 123  |
| 12,40                  | 161       | 101       | 16                         | 48       | 124  |
| 12,50                  | 161       | 101       | 16                         | 48       | 125  |
| 12,60                  | 161       | 101       | 16                         | 48       | 126  |
| 12,70                  | 161       | 101       | 16                         | 48       | 127  |
| 12,80                  | 161       | 101       | 16                         | 48       | 128  |
| 12,90                  | 161       | 101       | 16                         | 48       | 129  |
| 13,00                  | 161       | 101       | 16                         | 48       | 130  |
| 13,50                  | 166       | 106       | 16                         | 48       | 135  |
| 14,00                  | 166       | 106       | 16                         | 48       | 140  |
| 14,50                  | 169       | 109       | 16                         | 48       | 145  |
| 15,00                  | 169       | 109       | 16                         | 48       | 150  |
| 15,50                  | 172       | 112       | 16                         | 48       | 155  |
| 16,00                  | 172       | 112       | 16                         | 48       | 160  |
| 16,50                  | 181       | 115       | 20                         | 50       | 165  |
| 17,00                  | 181       | 115       | 20                         | 50       | 170  |
| 17,50                  | 184       | 118       | 20                         | 50       | 175  |
| 18,00                  | 184       | 118       | 20                         | 50       | 180  |
| 18,50                  | 188       | 122       | 20                         | 50       | 185  |
| 19,00                  | 188       | 122       | 20                         | 50       | 190  |
| 19,50                  | 191       | 125       | 20                         | 50       | 195  |
| 20,00                  | 191       | 125       | 20                         | 50       | 200  |

|   |   |
|---|---|
| P | ● |
| M | ● |
| K | ● |
| N | ○ |
| S | ○ |
| H |   |
| O | ○ |

→ v<sub>c</sub> Sayfa 48

## Helisel matkaplar, DIN 338, kısa

≤ 5xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS

130°  
HSS-E

130°  
HSS-E

10 173 ...

10 171 ...

10 152 ...

10 175 ...

10 161 ...

10 168 ...

10 170 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm |  |  |  |  |  |  |  |  |
|------------------------|------------|-----------|-----------|--|--|--|--|--|--|--|--|
| 0,20                   |            | 19        | 2,5       |  |  |  |  |  |  |  |  |
| 0,25                   |            | 19        | 3,0       |  |  |  |  |  |  |  |  |
| 0,30                   |            | 19        | 3,0       |  |  |  |  |  |  |  |  |
| 0,35                   |            | 19        | 4,0       |  |  |  |  |  |  |  |  |
| 0,40                   |            | 20        | 5,0       |  |  |  |  |  |  |  |  |
| 0,45                   |            | 20        | 5,0       |  |  |  |  |  |  |  |  |
| 0,50                   |            | 22        | 6,0       |  |  |  |  |  |  |  |  |
| 0,55                   |            | 24        | 7,0       |  |  |  |  |  |  |  |  |
| 0,60                   |            | 24        | 7,0       |  |  |  |  |  |  |  |  |
| 0,65                   |            | 26        | 8,0       |  |  |  |  |  |  |  |  |
| 0,70                   |            | 28        | 9,0       |  |  |  |  |  |  |  |  |
| 0,75                   |            | 28        | 9,0       |  |  |  |  |  |  |  |  |
| 0,80                   |            | 30        | 10,0      |  |  |  |  |  |  |  |  |
| 0,85                   |            | 30        | 10,0      |  |  |  |  |  |  |  |  |
| 0,90                   |            | 32        | 11,0      |  |  |  |  |  |  |  |  |
| 0,95                   |            | 32        | 11,0      |  |  |  |  |  |  |  |  |
| 1,00                   |            | 34        | 12,0      |  |  |  |  |  |  |  |  |
| 1,05                   |            | 34        | 12,0      |  |  |  |  |  |  |  |  |
| 1,10                   |            | 36        | 14,0      |  |  |  |  |  |  |  |  |
| 1,15                   |            | 36        | 14,0      |  |  |  |  |  |  |  |  |
| 1,20                   |            | 38        | 16,0      |  |  |  |  |  |  |  |  |
| 1,25                   |            | 38        | 16,0      |  |  |  |  |  |  |  |  |
| 1,30                   |            | 38        | 16,0      |  |  |  |  |  |  |  |  |
| 1,35                   |            | 40        | 18,0      |  |  |  |  |  |  |  |  |
| 1,40                   |            | 40        | 18,0      |  |  |  |  |  |  |  |  |
| 1,45                   |            | 40        | 18,0      |  |  |  |  |  |  |  |  |
| 1,50                   |            | 40        | 18,0      |  |  |  |  |  |  |  |  |
| 1,55                   |            | 43        | 20,0      |  |  |  |  |  |  |  |  |
| 1,60                   |            | 43        | 20,0      |  |  |  |  |  |  |  |  |
| 1,65                   |            | 43        | 20,0      |  |  |  |  |  |  |  |  |
| 1,70                   |            | 43        | 20,0      |  |  |  |  |  |  |  |  |
| 1,75                   |            | 46        | 22,0      |  |  |  |  |  |  |  |  |
| 1,80                   |            | 46        | 22,0      |  |  |  |  |  |  |  |  |
| 1,85                   |            | 46        | 22,0      |  |  |  |  |  |  |  |  |
| 1,90                   |            | 46        | 22,0      |  |  |  |  |  |  |  |  |
| 1,95                   |            | 49        | 24,0      |  |  |  |  |  |  |  |  |
| 2,00                   |            | 49        | 24,0      |  |  |  |  |  |  |  |  |
| 2,05                   |            | 49        | 24,0      |  |  |  |  |  |  |  |  |
| 2,10                   |            | 49        | 24,0      |  |  |  |  |  |  |  |  |
| 2,15                   |            | 53        | 27,0      |  |  |  |  |  |  |  |  |
| 2,20                   |            | 53        | 27,0      |  |  |  |  |  |  |  |  |
| 2,25                   |            | 53        | 27,0      |  |  |  |  |  |  |  |  |
| 2,30                   |            | 53        | 27,0      |  |  |  |  |  |  |  |  |
| 2,35                   |            | 53        | 27,0      |  |  |  |  |  |  |  |  |
| 2,38                   | 3/32       | 57        | 30,0      |  |  |  |  |  |  |  |  |
| 2,40                   |            | 57        | 30,0      |  |  |  |  |  |  |  |  |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | • | • | ○ | ○ |   | • | • |
| M |   | • |   | • |   | ○ | ○ |
| K | • | • | • |   |   | • | • |
| N | ○ | ○ | ○ | • | • | • | ○ |
| S | ○ | ○ |   | ○ |   | ○ | ○ |
| H | ○ |   |   |   |   | ○ | ○ |
| O | ○ | ○ | ○ |   |   | ○ | ○ |

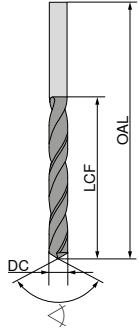
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49

## Helisel matkaplar, DIN 338, kısa

≤ 5xD

130°  
HSS-E-PM118°  
HSS-E118°  
HSS130°  
HSS-E130°  
HSS130°  
HSS-E130°  
HSS-E

10 173 ...

10 171 ...

10 152 ...

10 175 ...

10 161 ...

10 168 ...

10 170 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 173 ...        | 10 171 ...        | 10 152 ... | 10 175 ... | 10 161 ... | 10 168 ... | 10 170 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 2,45                   |            | 57        | 30,0      |                   |                   | 02450      |            | 02450      |            |            |
| 2,50                   |            | 57        | 30,0      | 025 <sup>2)</sup> | 025 <sup>2)</sup> | 02500      | 025        | 02500      | 025        | 025        |
| 2,55                   |            | 57        | 30,0      |                   | 255 <sup>2)</sup> | 02550      |            | 02550      |            |            |
| 2,60                   |            | 57        | 30,0      | 026 <sup>2)</sup> | 026 <sup>2)</sup> | 02600      | 026        | 02600      | 026        | 026        |
| 2,65                   |            | 57        | 30,0      |                   |                   | 02650      |            | 02650      |            |            |
| 2,70                   |            | 61        | 33,0      | 027 <sup>2)</sup> | 027 <sup>2)</sup> | 02700      | 027        | 02700      | 027        | 027        |
| 2,75                   |            | 61        | 33,0      |                   |                   | 02750      |            | 02750      |            |            |
| 2,78                   | 7/64       | 61        | 33,0      | 278 <sup>2)</sup> | 278 <sup>2)</sup> |            |            |            |            |            |
| 2,80                   |            | 61        | 33,0      | 028 <sup>2)</sup> | 028 <sup>2)</sup> | 02800      | 028        | 02800      | 028        | 028        |
| 2,85                   |            | 61        | 33,0      |                   |                   | 02850      |            | 02850      |            |            |
| 2,90                   |            | 61        | 33,0      | 029 <sup>2)</sup> | 029 <sup>2)</sup> | 02900      | 029        | 02900      | 029        | 029        |
| 2,95                   |            | 61        | 33,0      |                   |                   | 02950      |            | 02950      |            |            |
| 3,00                   |            | 61        | 33,0      | 030 <sup>2)</sup> | 030 <sup>2)</sup> | 03000      | 030        | 03000      | 030        | 030        |
| 3,05                   |            | 65        | 36,0      |                   |                   | 03050      |            | 03050      |            |            |
| 3,10                   |            | 65        | 36,0      | 031 <sup>2)</sup> | 031 <sup>2)</sup> | 03100      | 031        | 03100      | 031        | 031        |
| 3,15                   |            | 65        | 36,0      |                   |                   | 03150      |            | 03150      |            |            |
| 3,17                   | 1/8        | 65        | 36,0      | 317 <sup>2)</sup> | 317 <sup>2)</sup> |            |            |            |            |            |
| 3,20                   |            | 65        | 36,0      | 032 <sup>2)</sup> | 032 <sup>2)</sup> | 03200      | 032        | 03200      | 032        | 032        |
| 3,25                   |            | 65        | 36,0      |                   | 325 <sup>2)</sup> | 03250      |            | 03250      |            |            |
| 3,30                   |            | 65        | 36,0      | 033 <sup>2)</sup> | 033 <sup>2)</sup> | 03300      | 033        | 03300      | 033        | 033        |
| 3,35                   |            | 65        | 36,0      |                   |                   | 03350      |            | 03350      |            |            |
| 3,40                   |            | 70        | 39,0      | 034 <sup>2)</sup> | 034 <sup>2)</sup> | 03400      | 034        | 03400      | 034        | 034        |
| 3,45                   |            | 70        | 39,0      |                   |                   | 03450      |            | 03450      |            |            |
| 3,50                   |            | 70        | 39,0      | 035 <sup>2)</sup> | 035 <sup>2)</sup> | 03500      | 035        | 03500      | 035        | 035        |
| 3,55                   |            | 70        | 39,0      |                   |                   | 03550      |            | 03550      |            |            |
| 3,57                   | 9/64       | 70        | 39,0      | 357 <sup>2)</sup> | 357 <sup>2)</sup> |            |            |            |            |            |
| 3,60                   |            | 70        | 39,0      | 036 <sup>2)</sup> | 036 <sup>2)</sup> | 03600      | 036        | 03600      | 036        | 036        |
| 3,65                   |            | 70        | 39,0      |                   |                   | 03650      |            | 03650      |            |            |
| 3,70                   |            | 70        | 39,0      | 037 <sup>2)</sup> | 037 <sup>2)</sup> | 03700      | 037        | 03700      | 037        | 037        |
| 3,75                   |            | 70        | 39,0      |                   |                   | 03750      |            | 03750      |            |            |
| 3,80                   |            | 75        | 43,0      | 038 <sup>2)</sup> | 038 <sup>2)</sup> | 03800      | 038        | 03800      | 038        | 038        |
| 3,85                   |            | 75        | 43,0      |                   |                   | 03850      |            | 03850      |            |            |
| 3,90                   |            | 75        | 43,0      | 039 <sup>2)</sup> | 039 <sup>2)</sup> | 03900      | 039        | 03900      | 039        | 039        |
| 3,95                   |            | 75        | 43,0      |                   |                   | 03950      |            | 03950      |            |            |
| 3,97                   | 5/32       | 75        | 43,0      | 397 <sup>2)</sup> | 397 <sup>2)</sup> |            |            |            |            |            |
| 4,00                   |            | 75        | 43,0      | 040 <sup>2)</sup> | 040 <sup>2)</sup> | 04000      | 040        | 04000      | 040        | 040        |
| 4,05                   |            | 75        | 43,0      |                   |                   | 04050      |            | 04050      |            |            |
| 4,10                   |            | 75        | 43,0      | 041 <sup>2)</sup> | 041 <sup>2)</sup> | 04100      | 041        | 04100      | 041        | 041        |
| 4,15                   |            | 75        | 43,0      |                   |                   | 04150      |            | 04150      |            |            |
| 4,20                   |            | 75        | 43,0      | 042 <sup>2)</sup> | 042 <sup>2)</sup> | 04200      | 042        | 04200      | 042        | 042        |
| 4,25                   |            | 75        | 43,0      |                   | 425 <sup>2)</sup> | 04250      |            | 04250      |            |            |
| 4,30                   |            | 80        | 47,0      | 043 <sup>2)</sup> | 043 <sup>2)</sup> | 04300      | 043        | 04300      | 043        | 043        |
| 4,35                   |            | 80        | 47,0      |                   |                   | 04350      |            | 04350      |            |            |
| 4,37                   | 11/64      | 80        | 47,0      | 437 <sup>2)</sup> | 437 <sup>2)</sup> |            |            |            |            |            |
| 4,40                   |            | 80        | 47,0      | 044 <sup>2)</sup> | 044 <sup>2)</sup> | 04400      | 044        | 04400      | 044        | 044        |
| 4,45                   |            | 80        | 47,0      |                   |                   | 04450      |            |            |            |            |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ |   | ● | ● |
| M |   | ● |   | ● |   | ○ | ○ |
| K | ● | ● | ● |   |   | ● | ● |
| N | ○ | ○ | ○ | ● | ● | ● | ○ |
| S | ○ | ○ |   | ○ |   | ○ | ○ |
| H | ○ |   |   |   |   | ○ | ○ |
| O | ○ | ○ | ○ |   |   | ○ | ○ |

1) Kaplamasız

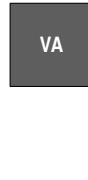
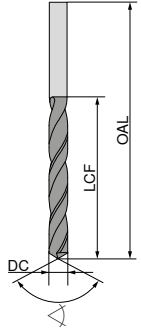
2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49



## Helisel matkaplar, DIN 338, kısa

≤ 5xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS

130°  
HSS-E

130°  
HSS-E

10 173 ...

10 171 ...

10 152 ...

10 175 ...

10 161 ...

10 168 ...

10 170 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 173 ...        | 10 171 ...        | 10 152 ... | 10 175 ... | 10 161 ... | 10 168 ... | 10 170 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 4,50                   |            | 80        | 47,0      | 045 <sup>2)</sup> | 045 <sup>2)</sup> | 04500      | 045        | 04500      | 045        | 045        |
| 4,55                   |            | 80        | 47,0      |                   |                   | 04550      |            | 04550      |            |            |
| 4,60                   |            | 80        | 47,0      | 046 <sup>2)</sup> | 046 <sup>2)</sup> | 04600      | 046        | 04600      | 046        | 046        |
| 4,65                   |            | 80        | 47,0      |                   |                   | 04650      |            | 04650      |            |            |
| 4,70                   |            | 80        | 47,0      | 047 <sup>2)</sup> | 047 <sup>2)</sup> | 04700      | 047        | 04700      | 047        | 047        |
| 4,75                   |            | 80        | 47,0      |                   |                   | 04750      |            | 04750      |            |            |
| 4,76                   | 3/16       | 86        | 52,0      | 476 <sup>2)</sup> | 476 <sup>2)</sup> |            |            |            |            |            |
| 4,80                   |            | 86        | 52,0      | 048 <sup>2)</sup> | 048 <sup>2)</sup> | 04800      | 048        | 04800      | 048        | 048        |
| 4,85                   |            | 86        | 52,0      |                   |                   | 04850      |            | 04850      |            |            |
| 4,90                   |            | 86        | 52,0      | 049 <sup>2)</sup> | 049 <sup>2)</sup> | 04900      | 049        | 04900      | 049        | 049        |
| 4,95                   |            | 86        | 52,0      |                   |                   | 04950      |            | 04950      |            |            |
| 5,00                   |            | 86        | 52,0      | 050 <sup>2)</sup> | 050 <sup>2)</sup> | 05000      | 050        | 05000      | 050        | 050        |
| 5,05                   |            | 86        | 52,0      |                   |                   | 05050      |            | 05050      |            |            |
| 5,10                   |            | 86        | 52,0      | 051 <sup>2)</sup> | 051 <sup>2)</sup> | 05100      | 051        | 05100      | 051        | 051        |
| 5,15                   |            | 86        | 52,0      |                   |                   | 05150      |            |            |            |            |
| 5,16                   | 13/64      | 86        | 52,0      | 516 <sup>2)</sup> | 516 <sup>2)</sup> |            |            |            |            |            |
| 5,20                   |            | 86        | 52,0      | 052 <sup>2)</sup> | 052 <sup>2)</sup> | 05200      | 052        | 05200      | 052        | 052        |
| 5,25                   |            | 86        | 52,0      |                   |                   | 05250      |            | 05250      |            |            |
| 5,30                   |            | 86        | 52,0      | 053 <sup>2)</sup> | 053 <sup>2)</sup> | 05300      | 053        | 05300      | 053        | 053        |
| 5,35                   |            | 93        | 57,0      |                   |                   | 05350      |            |            |            |            |
| 5,40                   |            | 93        | 57,0      | 054 <sup>2)</sup> | 054 <sup>2)</sup> | 05400      | 054        | 05400      | 054        | 054        |
| 5,45                   |            | 93        | 57,0      |                   |                   | 05450      |            | 05450      |            |            |
| 5,50                   |            | 93        | 57,0      | 055 <sup>2)</sup> | 055 <sup>2)</sup> | 05500      | 055        | 05500      | 055        | 055        |
| 5,55                   |            | 93        | 57,0      |                   |                   | 05550      |            | 05550      |            |            |
| 5,56                   | 7/32       | 93        | 57,0      | 556 <sup>2)</sup> | 556 <sup>2)</sup> |            |            |            |            |            |
| 5,60                   |            | 93        | 57,0      | 056 <sup>2)</sup> | 056 <sup>2)</sup> | 05600      | 056        | 05600      | 056        | 056        |
| 5,65                   |            | 93        | 57,0      |                   |                   | 05650      |            | 05650      |            |            |
| 5,70                   |            | 93        | 57,0      | 057 <sup>2)</sup> | 057 <sup>2)</sup> | 05700      | 057        | 05700      | 057        | 057        |
| 5,75                   |            | 93        | 57,0      |                   |                   | 05750      |            | 05750      |            |            |
| 5,80                   |            | 93        | 57,0      | 058 <sup>2)</sup> | 058 <sup>2)</sup> | 05800      | 058        | 05800      | 058        | 058        |
| 5,85                   |            | 93        | 57,0      |                   |                   | 05850      |            | 05850      |            |            |
| 5,90                   |            | 93        | 57,0      | 059 <sup>2)</sup> | 059 <sup>2)</sup> | 05900      | 059        | 05900      | 059        | 059        |
| 5,95                   | 15/64      | 93        | 57,0      | 595 <sup>2)</sup> | 595 <sup>2)</sup> | 05950      |            | 05950      |            |            |
| 6,00                   |            | 93        | 57,0      | 060 <sup>2)</sup> | 060 <sup>2)</sup> | 06000      | 060        | 06000      | 060        | 060        |
| 6,05                   |            | 101       | 63,0      |                   |                   | 06050      |            | 06050      |            |            |
| 6,10                   |            | 101       | 63,0      | 061 <sup>2)</sup> | 061 <sup>2)</sup> | 06100      | 061        | 06100      | 061        | 061        |
| 6,15                   |            | 101       | 63,0      |                   |                   | 06150      |            | 06150      |            |            |
| 6,20                   |            | 101       | 63,0      | 062 <sup>2)</sup> | 062 <sup>2)</sup> | 06200      | 062        | 06200      | 062        | 062        |
| 6,25                   |            | 101       | 63,0      |                   |                   | 06250      |            | 06250      |            |            |
| 6,30                   |            | 101       | 63,0      | 063 <sup>2)</sup> | 063 <sup>2)</sup> | 06300      | 063        | 06300      | 063        | 063        |
| 6,35                   | 1/4        | 101       | 63,0      | 635 <sup>2)</sup> | 635 <sup>2)</sup> | 06350      |            | 06350      |            |            |
| 6,40                   |            | 101       | 63,0      | 064 <sup>2)</sup> | 064 <sup>2)</sup> | 06400      | 064        | 06400      | 064        | 064        |
| 6,45                   |            | 101       | 63,0      |                   |                   | 06450      |            |            |            |            |
| 6,50                   |            | 101       | 63,0      | 065 <sup>2)</sup> | 065 <sup>2)</sup> | 06500      | 065        | 06500      | 065        | 065        |
| 6,55                   |            | 101       | 63,0      |                   |                   | 06550      |            | 06550      |            |            |
| 6,60                   |            | 101       | 63,0      | 066 <sup>2)</sup> | 066 <sup>2)</sup> | 06600      | 066        | 06600      | 066        | 066        |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ |   | ● | ● |
| M |   | ● |   | ● |   | ○ | ○ |
| K | ● | ● | ● |   |   | ● | ● |
| N | ○ | ○ | ○ | ● | ● | ● | ○ |
| S | ○ | ○ |   | ○ |   | ○ | ○ |
| H | ○ |   |   |   |   | ○ | ○ |
| O | ○ | ○ | ○ |   |   | ○ | ○ |

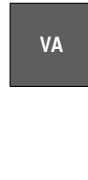
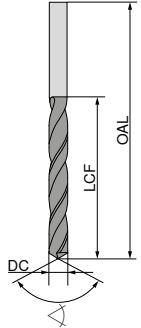
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49

## Helisel matkaplar, DIN 338, kısa

≤ 5xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS

130°  
HSS-E

130°  
HSS-E

10 173 ...

10 171 ...

10 152 ...

10 175 ...

10 161 ...

10 168 ...

10 170 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 173 ...         | 10 171 ...         | 10 152 ... | 10 175 ... | 10 161 ... | 10 168 ... | 10 170 ... |
|------------------------|------------|-----------|-----------|--------------------|--------------------|------------|------------|------------|------------|------------|
| 6,65                   |            | 101       | 63,0      |                    |                    | 06650      |            | 06650      |            |            |
| 6,70                   |            | 101       | 63,0      | 067 <sup>2)</sup>  | 067 <sup>2)</sup>  | 06700      | 067        | 06700      | 067        | 067        |
| 6,75                   |            | 109       | 69,0      | 0675 <sup>2)</sup> | 0675 <sup>2)</sup> | 06750      |            | 06750      |            |            |
| 6,80                   |            | 109       | 69,0      | 068 <sup>2)</sup>  | 068 <sup>2)</sup>  | 06800      | 068        | 06800      | 068        | 068        |
| 6,85                   |            | 109       | 69,0      |                    |                    | 06850      |            | 06850      |            |            |
| 6,90                   |            | 109       | 69,0      | 069 <sup>2)</sup>  | 069 <sup>2)</sup>  | 06900      | 069        | 06900      | 069        | 069        |
| 6,95                   |            | 109       | 69,0      |                    |                    | 06950      |            | 06950      |            |            |
| 7,00                   |            | 109       | 69,0      | 070 <sup>2)</sup>  | 070 <sup>2)</sup>  | 07000      | 070        | 07000      | 070        | 070        |
| 7,05                   |            | 109       | 69,0      |                    |                    | 07050      |            | 07050      |            |            |
| 7,10                   |            | 109       | 69,0      | 071 <sup>2)</sup>  | 071 <sup>2)</sup>  | 07100      | 071        | 07100      | 071        | 071        |
| 7,14                   | 9/32       | 109       | 69,0      | 714 <sup>2)</sup>  | 714 <sup>2)</sup>  |            |            |            |            |            |
| 7,15                   |            | 109       | 69,0      |                    |                    | 07150      |            |            |            |            |
| 7,20                   |            | 109       | 69,0      | 072 <sup>2)</sup>  | 072 <sup>2)</sup>  | 07200      | 072        | 07200      | 072        | 072        |
| 7,25                   |            | 109       | 69,0      |                    |                    | 07250      |            | 07250      |            |            |
| 7,30                   |            | 109       | 69,0      | 073 <sup>2)</sup>  | 073 <sup>2)</sup>  | 07300      | 073        | 07300      | 073        | 073        |
| 7,35                   |            | 109       | 69,0      |                    |                    | 07350      |            |            |            |            |
| 7,40                   |            | 109       | 69,0      | 074 <sup>2)</sup>  | 074 <sup>2)</sup>  | 07400      | 074        | 07400      | 074        | 074        |
| 7,45                   |            | 109       | 69,0      |                    |                    | 07450      |            |            |            |            |
| 7,50                   |            | 109       | 69,0      | 075 <sup>2)</sup>  | 075 <sup>2)</sup>  | 07500      | 075        | 07500      | 075        | 075        |
| 7,55                   |            | 117       | 75,0      |                    |                    | 07550      |            |            |            |            |
| 7,60                   |            | 117       | 75,0      | 076 <sup>2)</sup>  | 076 <sup>2)</sup>  | 07600      | 076        | 07600      | 076        | 076        |
| 7,65                   |            | 117       | 75,0      |                    |                    | 07650      |            |            |            |            |
| 7,70                   |            | 117       | 75,0      | 077 <sup>2)</sup>  | 077 <sup>2)</sup>  | 07700      | 077        | 07700      | 077        | 077        |
| 7,75                   |            | 117       | 75,0      |                    |                    | 07750      |            | 07750      |            |            |
| 7,80                   |            | 117       | 75,0      | 078 <sup>2)</sup>  | 078 <sup>2)</sup>  | 07800      | 078        | 07800      | 078        | 078        |
| 7,85                   |            | 117       | 75,0      |                    |                    | 07850      |            |            |            |            |
| 7,90                   |            | 117       | 75,0      | 079 <sup>2)</sup>  | 079 <sup>2)</sup>  | 07900      | 079        | 07900      | 079        | 079        |
| 7,94                   | 5/16       | 117       | 75,0      | 794 <sup>2)</sup>  | 794 <sup>2)</sup>  |            |            |            |            |            |
| 7,95                   |            | 117       | 75,0      |                    |                    | 07950      |            |            |            |            |
| 8,00                   |            | 117       | 75,0      | 080 <sup>2)</sup>  | 080 <sup>2)</sup>  | 08000      | 080        | 08000      | 080        | 080        |
| 8,05                   |            | 117       | 75,0      |                    |                    | 08050      |            | 08050      |            |            |
| 8,10                   |            | 117       | 75,0      | 081 <sup>2)</sup>  | 081 <sup>2)</sup>  | 08100      | 081        | 08100      | 081        | 081        |
| 8,15                   |            | 117       | 75,0      |                    |                    | 08150      |            | 08150      |            |            |
| 8,20                   |            | 117       | 75,0      | 082 <sup>2)</sup>  | 082 <sup>2)</sup>  | 08200      | 082        | 08200      | 082        | 082        |
| 8,25                   |            | 117       | 75,0      |                    |                    | 08250      |            | 08250      |            |            |
| 8,30                   |            | 117       | 75,0      | 083 <sup>2)</sup>  | 083 <sup>2)</sup>  | 08300      | 083        | 08300      | 083        | 083        |
| 8,35                   |            | 117       | 75,0      |                    |                    | 08350      |            |            |            |            |
| 8,40                   |            | 117       | 75,0      | 084 <sup>2)</sup>  | 084 <sup>2)</sup>  | 08400      | 084        | 08400      | 084        | 084        |
| 8,45                   |            | 117       | 75,0      |                    |                    | 08450      |            | 08450      |            |            |
| 8,50                   |            | 117       | 75,0      | 085 <sup>2)</sup>  | 085 <sup>2)</sup>  | 08500      | 085        | 08500      | 085        | 085        |
| 8,55                   |            | 125       | 81,0      |                    |                    | 08550      |            | 08550      |            |            |
| 8,60                   |            | 125       | 81,0      |                    | 086 <sup>2)</sup>  | 08600      | 086        | 08600      | 086        | 086        |
| 8,65                   |            | 125       | 81,0      |                    |                    | 08650      |            |            |            |            |
| 8,70                   |            | 125       | 81,0      |                    | 087 <sup>2)</sup>  | 08700      | 087        | 08700      | 087        | 087        |
| 8,73                   | 11/32      | 125       | 81,0      | 873 <sup>2)</sup>  | 873 <sup>2)</sup>  |            |            |            |            |            |
| 8,75                   |            | 125       | 81,0      |                    |                    | 08750      |            | 08750      |            |            |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ | ● | ● |
| M | ● | ● | ● | ● | ○ | ○ |
| K | ● | ● | ● | ● | ● | ● |
| N | ○ | ○ | ○ | ● | ● | ○ |
| S | ○ | ○ | ○ | ○ | ○ | ○ |
| H | ○ | ○ | ○ | ○ | ○ | ○ |
| O | ○ | ○ | ○ | ○ | ○ | ○ |

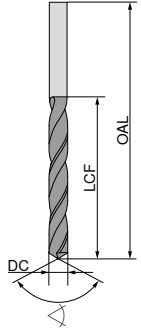
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49

## Helisel matkaplar, DIN 338, kısa

≤ 5xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS

130°  
HSS-E

130°  
HSS-E

10 173 ...

10 171 ...

10 152 ...

10 175 ...

10 161 ...

10 168 ...

10 170 ...

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 173 ...        | 10 171 ...        | 10 152 ... | 10 175 ... | 10 161 ... | 10 168 ... | 10 170 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 8,80                   |            | 125       | 81,0      | 088 <sup>2)</sup> | 088 <sup>2)</sup> | 08800      | 088        | 08800      | 088        | 088        |
| 8,90                   |            | 125       | 81,0      |                   | 089 <sup>2)</sup> | 08900      | 089        | 08900      | 089        | 089        |
| 8,95                   |            | 125       | 81,0      |                   |                   | 08950      |            |            |            |            |
| 9,00                   |            | 125       | 81,0      | 090 <sup>2)</sup> | 090 <sup>2)</sup> | 09000      | 090        | 09000      | 090        | 090        |
| 9,05                   |            | 125       | 81,0      |                   |                   | 09050      |            |            |            |            |
| 9,10                   |            | 125       | 81,0      |                   | 091 <sup>2)</sup> | 09100      | 091        | 09100      | 091        | 091        |
| 9,15                   |            | 125       | 81,0      |                   |                   | 09150      |            |            |            |            |
| 9,20                   |            | 125       | 81,0      |                   | 092 <sup>2)</sup> | 09200      | 092        | 09200      | 092        | 092        |
| 9,25                   |            | 125       | 81,0      |                   |                   | 09250      |            | 09250      |            |            |
| 9,30                   |            | 125       | 81,0      | 093 <sup>2)</sup> | 093 <sup>2)</sup> | 09300      | 093        | 09300      | 093        | 093        |
| 9,35                   |            | 125       | 81,0      |                   | 935 <sup>2)</sup> | 09350      |            |            |            |            |
| 9,40                   |            | 125       | 81,0      |                   | 094 <sup>2)</sup> | 09400      | 094        | 09400      | 094        | 094        |
| 9,45                   |            | 125       | 81,0      |                   |                   | 09450      |            |            |            |            |
| 9,50                   |            | 125       | 81,0      | 095 <sup>2)</sup> | 095 <sup>2)</sup> | 09500      | 095        | 09500      | 095        | 095        |
| 9,55                   |            | 133       | 87,0      |                   |                   | 09550      |            |            |            |            |
| 9,60                   |            | 133       | 87,0      |                   | 096 <sup>2)</sup> | 09600      | 096        | 09600      | 096        | 096        |
| 9,65                   |            | 133       | 87,0      |                   |                   | 09650      |            |            |            |            |
| 9,70                   |            | 133       | 87,0      |                   | 097 <sup>2)</sup> | 09700      | 097        | 09700      | 097        | 097        |
| 9,75                   |            | 133       | 87,0      |                   |                   | 09750      |            |            |            |            |
| 9,80                   |            | 133       | 87,0      | 098 <sup>2)</sup> | 098 <sup>2)</sup> | 09800      | 098        | 09800      | 098        | 098        |
| 9,85                   |            | 133       | 87,0      |                   |                   | 09850      |            |            |            |            |
| 9,90                   |            | 133       | 87,0      |                   | 099 <sup>2)</sup> | 09900      | 099        | 09900      | 099        | 099        |
| 9,95                   |            | 133       | 87,0      |                   |                   | 09950      |            |            |            |            |
| 10,00                  |            | 133       | 87,0      | 100 <sup>2)</sup> | 100 <sup>2)</sup> | 10000      | 100        | 10000      | 100        | 100        |
| 10,05                  |            | 133       | 87,0      |                   |                   | 10050      |            | 10050      |            |            |
| 10,10                  |            | 133       | 87,0      |                   | 101 <sup>2)</sup> | 10100      | 101        | 10100      | 101        | 101        |
| 10,15                  |            | 133       | 87,0      |                   |                   | 10150      |            |            |            |            |
| 10,20                  |            | 133       | 87,0      | 102 <sup>2)</sup> | 102 <sup>2)</sup> | 10200      | 102        | 10200      | 102        | 102        |
| 10,25                  |            | 133       | 87,0      |                   |                   | 10250      |            | 10250      |            |            |
| 10,30                  |            | 133       | 87,0      |                   | 103 <sup>2)</sup> | 10300      | 103        | 10300      | 103        | 103        |
| 10,35                  |            | 133       | 87,0      |                   |                   | 10350      |            |            |            |            |
| 10,40                  |            | 133       | 87,0      |                   | 104 <sup>2)</sup> | 10400      | 104        | 10400      | 104        | 104        |
| 10,45                  |            | 133       | 87,0      |                   |                   | 10450      |            |            |            |            |
| 10,50                  |            | 133       | 87,0      | 105 <sup>2)</sup> | 105 <sup>2)</sup> | 10500      | 105        | 10500      | 105        | 105        |
| 10,55                  |            | 133       | 87,0      |                   | 955 <sup>2)</sup> | 10550      |            |            |            |            |
| 10,60                  |            | 133       | 87,0      |                   |                   | 10600      | 106        | 10600      | 106        |            |
| 10,70                  |            | 142       | 94,0      |                   |                   | 10700      | 107        | 10700      | 107        | 107        |
| 10,75                  |            | 142       | 94,0      |                   |                   | 10750      |            | 10750      |            |            |
| 10,80                  |            | 142       | 94,0      |                   |                   | 10800      | 108        | 10800      | 108        | 108        |
| 10,90                  |            | 142       | 94,0      |                   |                   | 10900      | 109        | 10900      | 109        |            |
| 11,00                  |            | 142       | 94,0      | 110 <sup>2)</sup> | 110 <sup>2)</sup> | 11000      | 110        | 11000      | 110        | 110        |
| 11,10                  |            | 142       | 94,0      |                   |                   | 11100      | 111        | 11100      | 111        |            |
| 11,11                  | 7/16       | 142       | 94,0      | 111 <sup>2)</sup> | 111 <sup>2)</sup> |            |            |            |            |            |
| 11,20                  |            | 142       | 94,0      |                   | 112 <sup>2)</sup> | 11200      | 112        | 11200      | 112        | 112        |
| 11,30                  |            | 142       | 94,0      |                   | 113 <sup>2)</sup> |            | 113        |            | 113        |            |
| 11,40                  |            | 142       | 94,0      |                   | 114 <sup>2)</sup> | 11400      | 114        | 11400      | 114        |            |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ● | ● | ○ | ○ |   | ● | ● |
| M |   | ● |   | ● |   | ○ | ○ |
| K | ● | ● | ● |   |   | ● | ● |
| N | ○ | ○ | ○ | ● | ● | ● | ○ |
| S | ○ | ○ |   | ○ |   | ○ | ○ |
| H | ○ |   |   |   |   | ○ | ○ |
| O | ○ | ○ | ○ |   |   | ○ | ○ |

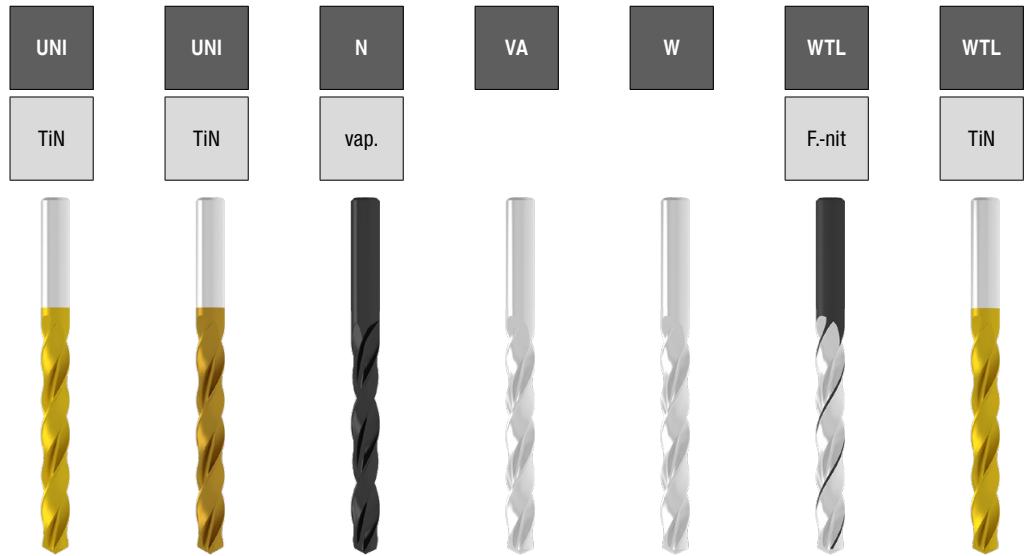
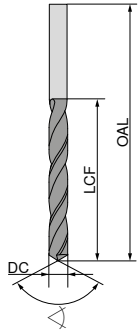
1) Kaplamasız

2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49

## Helisel matkaplar, DIN 338, kısa

≤ 5xD



130°  
HSS-E-PM

118°  
HSS-E

118°  
HSS

130°  
HSS-E

130°  
HSS

130°  
HSS-E

130°  
HSS-E

| DC <sub>h8</sub><br>mm | DC<br>inch | OAL<br>mm | LCF<br>mm | 10 173 ...        | 10 171 ...        | 10 152 ... | 10 175 ... | 10 161 ... | 10 168 ... | 10 170 ... |
|------------------------|------------|-----------|-----------|-------------------|-------------------|------------|------------|------------|------------|------------|
| 11,50                  |            | 142       | 94,0      | 115 <sup>2)</sup> | 115 <sup>2)</sup> | 11500      | 115        | 11500      | 115        | 115        |
| 11,60                  |            | 142       | 94,0      |                   | 116 <sup>2)</sup> | 11600      | 116        | 11600      | 116        |            |
| 11,70                  |            | 142       | 94,0      |                   |                   | 11700      | 117        | 11700      | 117        | 117        |
| 11,80                  |            | 142       | 94,0      |                   |                   | 11800      | 118        | 11800      | 118        | 118        |
| 11,90                  |            | 151       | 101,0     |                   |                   | 11900      | 119        | 11900      |            |            |
| 12,00                  |            | 151       | 101,0     | 120 <sup>2)</sup> | 120 <sup>2)</sup> | 12000      | 120        | 12000      | 120        | 120        |
| 12,15                  |            | 151       | 101,0     |                   | 121 <sup>2)</sup> |            |            |            |            |            |
| 12,20                  |            | 151       | 101,0     |                   |                   | 12200      |            | 12200      |            |            |
| 12,25                  |            | 151       | 101,0     |                   |                   | 12250      |            |            |            |            |
| 12,30                  |            | 151       | 101,0     | 123 <sup>2)</sup> | 123 <sup>2)</sup> |            |            |            |            |            |
| 12,50                  |            | 151       | 101,0     | 125 <sup>2)</sup> | 925 <sup>2)</sup> | 12500      |            | 12500      | 125        | 125        |
| 12,70                  |            | 151       | 101,0     | 127 <sup>2)</sup> | 127 <sup>2)</sup> | 12700      |            | 12700      |            |            |
| 12,80                  |            | 151       | 101,0     |                   |                   | 12800      |            | 12800      | 128        | 128        |
| 13,00                  |            | 151       | 101,0     | 130 <sup>2)</sup> | 130 <sup>2)</sup> | 13000      |            | 13000      | 130        | 130        |
| 13,10                  |            | 151       | 101,0     |                   | 131 <sup>2)</sup> |            |            |            |            |            |
| 13,20                  |            | 151       | 101,0     |                   |                   | 13200      |            | 13200      |            |            |
| 13,30                  |            | 160       | 108,0     |                   | 133 <sup>2)</sup> |            |            |            |            |            |
| 13,50                  |            | 160       | 108,0     | 135 <sup>2)</sup> | 135 <sup>2)</sup> | 13500      |            | 13500      | 135        | 135        |
| 13,80                  |            | 160       | 108,0     |                   |                   | 13800      |            | 13800      | 138        | 138        |
| 14,00                  |            | 160       | 108,0     | 140 <sup>2)</sup> | 140 <sup>2)</sup> | 14000      |            | 14000      | 140        | 140        |
| 14,50                  |            | 169       | 114,0     |                   |                   | 14500      |            | 14500      | 145        | 145        |
| 14,80                  |            | 169       | 114,0     |                   |                   |            |            |            | 148        | 148        |
| 15,00                  |            | 169       | 114,0     |                   |                   | 15000      |            | 15000      | 150        | 150        |
| 15,25                  |            | 178       | 120,0     |                   |                   | 15250      |            |            |            |            |
| 15,50                  |            | 178       | 120,0     |                   |                   | 15500      |            | 15500      | 155        | 155        |
| 15,80                  |            | 178       | 120,0     |                   |                   | 15800      |            |            |            |            |
| 16,00                  |            | 178       | 120,0     |                   |                   | 16000      |            | 16000      | 160        | 160        |
| 16,50                  |            | 184       | 125,0     |                   |                   | 16500      |            | 16500      |            |            |
| 17,00                  |            | 184       | 125,0     |                   |                   | 17000      |            | 17000      |            |            |
| 17,50                  |            | 191       | 130,0     |                   |                   | 17500      |            | 17500      |            |            |
| 18,00                  |            | 191       | 130,0     |                   |                   | 18000      |            | 18000      |            |            |
| 18,50                  |            | 198       | 135,0     |                   |                   | 18500      |            |            |            |            |
| 19,00                  |            | 198       | 135,0     |                   |                   | 19000      |            | 19000      |            |            |
| 19,50                  |            | 205       | 140,0     |                   |                   | 19500      |            |            |            |            |
| 20,00                  |            | 205       | 140,0     |                   |                   | 20000      |            | 20000      |            |            |
| P                      |            |           |           | ●                 | ●                 | ○          | ○          |            | ●          | ●          |
| M                      |            |           |           |                   | ●                 |            | ●          |            | ○          | ○          |
| K                      |            |           |           | ●                 | ●                 | ●          |            |            | ●          | ●          |
| N                      |            |           |           | ○                 | ○                 | ○          | ●          | ●          | ●          | ○          |
| S                      |            |           |           | ○                 | ○                 |            | ○          |            | ○          | ○          |
| H                      |            |           |           | ○                 |                   |            |            |            | ○          | ○          |
| O                      |            |           |           | ○                 | ○                 | ○          |            |            | ○          | ○          |

1) Kaplamasız

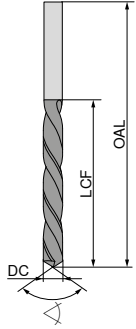
2) Kendiliğinden merkezlemeli

→ v<sub>c</sub> Sayfa 48+49

## Helisel matkaplar, DIN 338, kısa

▲ Ürün kodu 10 169 ... WTL-L - Sol helisli matkap

≤ 5xD



WTL

TiCN

130°  
HSS-E

WTL-L

F-nit

130°  
HSS

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |
|------------------------|-----------|-----------|
| 1,0                    | 34        | 12        |
| 1,3                    | 38        | 16        |
| 1,4                    | 40        | 18        |
| 1,5                    | 40        | 18        |
| 1,6                    | 43        | 20        |
| 1,7                    | 43        | 20        |
| 1,8                    | 46        | 22        |
| 1,9                    | 46        | 22        |
| 2,0                    | 49        | 24        |
| 2,1                    | 49        | 24        |
| 2,2                    | 53        | 27        |
| 2,3                    | 53        | 27        |
| 2,4                    | 57        | 30        |
| 2,5                    | 57        | 30        |
| 2,6                    | 57        | 30        |
| 2,7                    | 61        | 33        |
| 2,8                    | 61        | 33        |
| 2,9                    | 61        | 33        |
| 3,0                    | 61        | 33        |
| 3,1                    | 65        | 36        |
| 3,2                    | 65        | 36        |
| 3,3                    | 65        | 36        |
| 3,4                    | 70        | 39        |
| 3,5                    | 70        | 39        |
| 3,6                    | 70        | 39        |
| 3,7                    | 70        | 39        |
| 3,8                    | 75        | 43        |
| 3,9                    | 75        | 43        |
| 4,0                    | 75        | 43        |
| 4,1                    | 75        | 43        |
| 4,2                    | 75        | 43        |
| 4,3                    | 80        | 47        |
| 4,4                    | 80        | 47        |
| 4,5                    | 80        | 47        |
| 4,6                    | 80        | 47        |
| 4,7                    | 80        | 47        |
| 4,8                    | 86        | 52        |
| 4,9                    | 86        | 52        |
| 5,0                    | 86        | 52        |
| 5,1                    | 86        | 52        |
| 5,2                    | 86        | 52        |
| 5,3                    | 86        | 52        |
| 5,4                    | 93        | 57        |
| 5,5                    | 93        | 57        |
| 5,6                    | 93        | 57        |
| 5,7                    | 93        | 57        |
| 5,8                    | 93        | 57        |
| 5,9                    | 93        | 57        |
| 6,0                    | 93        | 57        |
| 6,1                    | 101       | 63        |

10 172 ...

10 169 ...

|                   |
|-------------------|
| 010 <sup>1)</sup> |
| 013 <sup>1)</sup> |
| 014 <sup>1)</sup> |
| 015 <sup>1)</sup> |
| 016 <sup>1)</sup> |
| 017 <sup>1)</sup> |
| 018 <sup>1)</sup> |
| 019 <sup>1)</sup> |
| 020 <sup>1)</sup> |
| 021 <sup>1)</sup> |
| 022 <sup>1)</sup> |
| 023 <sup>1)</sup> |
| 024               |
| 025               |
| 026               |
| 027               |
| 028               |
| 029               |
| 030               |
| 031               |
| 032               |
| 033               |
| 034               |
| 035               |
| 036               |
| 037               |
| 038               |
| 039               |
| 040               |
| 041               |
| 042               |
| 043               |
| 044               |
| 045               |
| 046               |
| 047               |
| 048               |
| 049               |
| 050               |
| 051               |
| 052               |
| 053               |
| 054               |
| 055               |
| 056               |
| 057               |
| 058               |
| 059               |
| 060               |
| 061               |

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |
|------------------------|-----------|-----------|
| 6,2                    | 101       | 63        |
| 6,3                    | 101       | 63        |
| 6,4                    | 101       | 63        |
| 6,5                    | 101       | 63        |
| 6,6                    | 101       | 63        |
| 6,7                    | 101       | 63        |
| 6,8                    | 109       | 69        |
| 6,9                    | 109       | 69        |
| 7,0                    | 109       | 69        |
| 7,1                    | 109       | 69        |
| 7,2                    | 109       | 69        |
| 7,3                    | 109       | 69        |
| 7,4                    | 109       | 69        |
| 7,5                    | 109       | 69        |
| 7,7                    | 117       | 75        |
| 7,8                    | 117       | 75        |
| 7,9                    | 117       | 75        |
| 8,0                    | 117       | 75        |
| 8,1                    | 117       | 75        |
| 8,2                    | 117       | 75        |
| 8,3                    | 117       | 75        |
| 8,4                    | 117       | 75        |
| 8,5                    | 117       | 75        |
| 8,6                    | 125       | 81        |
| 8,7                    | 125       | 81        |
| 8,8                    | 125       | 81        |
| 8,9                    | 125       | 81        |
| 9,0                    | 125       | 81        |
| 9,2                    | 125       | 81        |
| 9,3                    | 125       | 81        |
| 9,5                    | 125       | 81        |
| 9,8                    | 133       | 87        |
| 9,9                    | 133       | 87        |
| 10,0                   | 133       | 87        |
| 10,1                   | 133       | 87        |
| 10,2                   | 133       | 87        |
| 10,3                   | 133       | 87        |
| 10,4                   | 133       | 87        |
| 10,5                   | 133       | 87        |
| 11,0                   | 142       | 94        |
| 11,5                   | 142       | 94        |
| 12,0                   | 151       | 101       |
| 12,2                   | 151       | 101       |
| 12,5                   | 151       | 101       |
| 13,0                   | 151       | 101       |
| 14,0                   | 160       | 108       |
| 14,5                   | 169       | 114       |
| 15,0                   | 169       | 114       |
| 16,0                   | 178       | 120       |

10 172 ...

10 169 ...

|     |     |
|-----|-----|
| 062 | 062 |
| 063 | 063 |
| 064 | 064 |
| 065 | 065 |
| 066 | 066 |
| 067 | 067 |
| 068 | 068 |
| 069 | 069 |
| 070 | 070 |
| 071 | 071 |
| 072 | 072 |
| 073 | 073 |
| 074 | 074 |
| 075 | 075 |
| 077 | 077 |
| 078 | 078 |
| 079 | 079 |
| 080 | 080 |
| 081 | 081 |
| 082 | 082 |
| 083 | 083 |
| 084 | 084 |
| 085 | 085 |
| 086 | 086 |
| 087 | 087 |
| 088 | 088 |
| 089 | 089 |
| 090 | 090 |
| 092 | 092 |
| 093 | 093 |
| 095 | 095 |
| 098 | 098 |
| 099 | 099 |
| 100 | 100 |
| 101 | 101 |
| 102 | 102 |
| 103 | 103 |
| 104 | 104 |
| 105 | 105 |
| 110 | 110 |
| 115 | 115 |
| 120 | 120 |
| 122 | 122 |
| 125 | 125 |
| 130 | 130 |
| 140 | 140 |
| 145 | 145 |
| 150 | 150 |
| 160 | 160 |

|   |   |   |
|---|---|---|
| P | ● | ○ |
| M | ○ | ○ |
| K | ● | ● |
| N | ○ | ● |
| S | ○ | ○ |
| H | ○ | ○ |
| O | ○ | ○ |

1) Kaplamasız

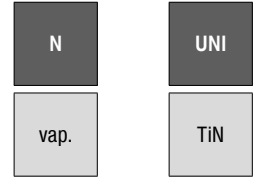
→ v<sub>c</sub> Sayfa 49



## Helisel matkap seti, DIN 338, kısa

- ▲ Metal kutuda
- ▲ 0,1 mm artarak

≤ 5xD

Matkap seti,  
Tip N  
HSSMatkap seti, Tip  
UNI TiN  
HSS-E

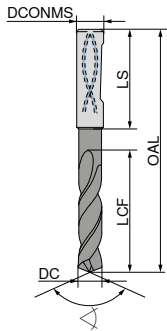
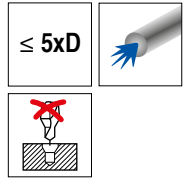
| DC <sub>h8</sub><br>mm | 10 158 ... | 10 158 ... |
|------------------------|------------|------------|
| 1,0 - 5,9              | 050        | 054        |
| 6,0 - 10,0             | 100        | 104        |
| P                      | ○          | ●          |
| M                      |            | ●          |
| K                      | ●          | ●          |
| N                      | ○          | ○          |
| S                      |            | ○          |
| H                      |            |            |
| O                      | ○          | ○          |

→ v<sub>c</sub> Sayfa 48

Set tip N vap. içeriği helisel matkap ürün kodu 10 152 ...  
Set tip UNI TiN içeriği helisel matkap ürün kodu 10 171 ...

## Helisel matkaplar, soğutma kanallı, DIN 338 benzer, kısa

- ▲ Matkap özü inceltmelidir.
- ▲ Özel delme ucu geometrisi
- ▲ Geniş talaş kanalları
- ▲ Yuvarlatılmış kanal kenarları
- ▲ 1000N/mm<sup>2</sup>'ye kadar olan malzemeler için <sup>2</sup>



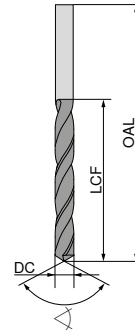
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | DCNMS <sub>h6</sub><br>mm | LS<br>mm | 10 180 ... | 10 181 ... |
|------------------------|-----------|-----------|---------------------------|----------|------------|------------|
| 5,0                    | 82        | 44        | 6                         | 38       | 050        | 050        |
| 5,5                    | 82        | 44        | 6                         | 38       | 055        | 055        |
| 6,0                    | 82        | 44        | 6                         | 38       | 060        | 060        |
| 6,5                    | 91        | 53        | 8                         | 38       | 065        | 065        |
| 6,8                    | 91        | 53        | 8                         | 38       | 068        | 068        |
| 7,0                    | 91        | 53        | 8                         | 38       | 070        | 070        |
| 7,5                    | 91        | 53        | 8                         | 38       | 075        | 075        |
| 7,8                    | 91        | 53        | 8                         | 38       | 078        | 078        |
| 8,0                    | 91        | 53        | 8                         | 38       | 080        | 080        |
| 8,5                    | 103       | 61        | 10                        | 42       | 085        | 085        |
| 9,0                    | 103       | 61        | 10                        | 42       | 090        | 090        |
| 9,5                    | 103       | 61        | 10                        | 42       | 095        | 095        |
| 10,0                   | 103       | 61        | 10                        | 42       | 100        | 100        |
| 10,2                   | 118       | 71        | 12                        | 47       | 102        | 102        |
| 10,5                   | 118       | 71        | 12                        | 47       | 105        | 105        |
| 11,0                   | 118       | 71        | 12                        | 47       | 110        | 110        |
| 11,5                   | 118       | 71        | 12                        | 47       | 115        | 115        |
| 12,0                   | 118       | 71        | 12                        | 47       | 120        | 120        |
| 12,5                   | 124       | 77        | 14                        | 47       | 125        | 125        |
| 13,0                   | 124       | 77        | 14                        | 47       | 130        | 130        |
| 13,5                   | 124       | 77        | 14                        | 47       | 135        | 135        |
| 14,0                   | 124       | 77        | 14                        | 47       | 140        | 140        |
| 14,5                   | 133       | 83        | 16                        | 50       | 145        | 145        |
| 15,0                   | 133       | 83        | 16                        | 50       | 150        | 150        |
| 15,5                   | 133       | 83        | 16                        | 50       | 155        | 155        |
| 16,0                   | 133       | 83        | 16                        | 50       | 160        | 160        |
| 16,5                   | 143       | 93        | 18                        | 50       | 165        | 165        |
| 17,0                   | 143       | 93        | 18                        | 50       | 170        | 170        |
| 17,5                   | 143       | 93        | 18                        | 50       | 175        | 175        |
| 18,0                   | 143       | 93        | 18                        | 50       | 180        | 180        |
| 18,5                   | 153       | 101       | 20                        | 52       | 185        | 185        |
| 19,0                   | 153       | 101       | 20                        | 52       | 190        | 190        |
| 19,5                   | 153       | 101       | 20                        | 52       | 195        | 195        |
| 20,0                   | 153       | 101       | 20                        | 52       | 200        | 200        |

|   |   |   |
|---|---|---|
| P | ● | ● |
| M |   |   |
| K | ● | ● |
| N | ○ | ○ |
| S |   |   |
| H |   |   |
| O | ○ | ○ |

→ v<sub>c</sub> Sayfa 49

## Helisel matkaplar, soğutma kanallı, fabrika standardı, uzun

≤ 10xD



NC

NC

TiAlN

130°  
HSS130°  
HSS

10 223 ...

10 224 ...

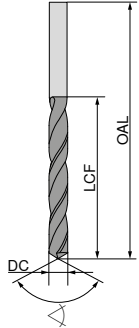
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |
|------------------------|-----------|-----------|
| 3,0                    | 100       | 66        |
| 3,3                    | 106       | 69        |
| 3,5                    | 112       | 73        |
| 3,8                    | 119       | 78        |
| 4,0                    | 119       | 78        |
| 4,2                    | 119       | 78        |
| 4,5                    | 126       | 82        |
| 4,8                    | 132       | 87        |
| 5,0                    | 132       | 87        |
| 5,5                    | 139       | 91        |
| 5,8                    | 139       | 91        |
| 6,0                    | 139       | 91        |
| 6,5                    | 148       | 97        |
| 6,8                    | 156       | 102       |
| 7,0                    | 156       | 102       |
| 7,5                    | 156       | 102       |
| 7,8                    | 165       | 109       |
| 8,0                    | 165       | 109       |
| 8,5                    | 165       | 109       |
| 8,8                    | 175       | 115       |
| 9,0                    | 175       | 115       |
| 9,5                    | 175       | 115       |
| 9,8                    | 184       | 121       |
| 10,0                   | 184       | 121       |
| 10,2                   | 184       | 121       |
| 10,5                   | 184       | 121       |
| 10,8                   | 195       | 128       |
| 11,0                   | 195       | 128       |
| 11,5                   | 195       | 128       |
| 11,8                   | 205       | 134       |
| 12,0                   | 205       | 134       |
| 12,8                   | 205       | 134       |
| 13,0                   | 205       | 134       |

|   |   |   |
|---|---|---|
| P | ○ | ○ |
| M |   | ○ |
| K | ● | ● |
| N | ○ | ○ |
| S |   |   |
| H |   |   |
| O | ○ | ○ |

→ v<sub>c</sub> Sayfa 50

## Helisel matkaplar, DIN 340, uzun

≤ 10xD



118°  
HSS-E

10 270 ...



130°  
HSS-E

10 225 ...



130°  
HSS

10 215 ...



130°  
HSS

10 210 ...



130°  
HSS

10 200 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | 10 270 ... | 10 225 ...        | 10 215 ...        | 10 210 ... | 10 200 ... |
|------------------------|-----------|-----------|------------|-------------------|-------------------|------------|------------|
| 1,0                    | 56        | 33        | 010        | 010 <sup>1)</sup> | 010 <sup>1)</sup> | 010        | 010        |
| 1,1                    | 60        | 37        | 011        | 011 <sup>1)</sup> | 011 <sup>1)</sup> | 011        | 011        |
| 1,2                    | 65        | 41        | 012        | 012 <sup>1)</sup> | 012 <sup>1)</sup> | 012        | 012        |
| 1,3                    | 65        | 41        | 013        | 013 <sup>1)</sup> | 013 <sup>1)</sup> | 013        | 013        |
| 1,4                    | 70        | 45        | 014        | 014 <sup>1)</sup> | 014 <sup>1)</sup> | 014        | 014        |
| 1,5                    | 70        | 45        | 015        | 015 <sup>1)</sup> | 015 <sup>1)</sup> | 015        | 015        |
| 1,6                    | 76        | 50        | 016        | 016 <sup>1)</sup> | 016 <sup>1)</sup> | 016        | 016        |
| 1,7                    | 76        | 50        | 017        | 017 <sup>1)</sup> | 017 <sup>1)</sup> | 017        | 017        |
| 1,8                    | 80        | 53        | 018        | 018 <sup>1)</sup> | 018 <sup>1)</sup> | 018        | 018        |
| 1,9                    | 80        | 53        | 019        | 019 <sup>1)</sup> | 019 <sup>1)</sup> | 019        | 019        |
| 2,0                    | 85        | 56        | 020        | 020 <sup>1)</sup> | 020 <sup>1)</sup> | 020        | 020        |
| 2,1                    | 85        | 56        | 021        | 021 <sup>1)</sup> | 021 <sup>1)</sup> | 021        | 021        |
| 2,2                    | 90        | 59        | 022        | 022 <sup>1)</sup> | 022 <sup>1)</sup> | 022        | 022        |
| 2,3                    | 90        | 59        | 023        | 023 <sup>1)</sup> | 023 <sup>1)</sup> | 023        | 023        |
| 2,4                    | 95        | 62        | 024        | 024               | 024               | 024        | 024        |
| 2,5                    | 95        | 62        | 025        | 025               | 025               | 025        | 025        |
| 2,6                    | 95        | 62        | 026        | 026               | 026               | 026        | 026        |
| 2,7                    | 100       | 66        | 027        | 027               | 027               | 027        | 027        |
| 2,8                    | 100       | 66        | 028        | 028               | 028               | 028        | 028        |
| 2,9                    | 100       | 66        | 029        | 029               | 029               | 029        | 029        |
| 3,0                    | 100       | 66        | 030        | 030               | 030               | 030        | 030        |
| 3,1                    | 106       | 69        | 031        | 031               | 031               | 031        | 031        |
| 3,2                    | 106       | 69        | 032        | 032               | 032               | 032        | 032        |
| 3,3                    | 106       | 69        | 033        | 033               | 033               | 033        | 033        |
| 3,4                    | 112       | 73        | 034        | 034               | 034               | 034        | 034        |
| 3,5                    | 112       | 73        | 035        | 035               | 035               | 035        | 035        |
| 3,6                    | 112       | 73        | 036        | 036               | 036               | 036        | 036        |
| 3,7                    | 112       | 73        | 037        | 037               | 037               | 037        | 037        |
| 3,8                    | 119       | 78        | 038        | 038               | 038               | 038        | 038        |
| 3,9                    | 119       | 78        | 039        | 039               | 039               | 039        | 039        |
| 4,0                    | 119       | 78        | 040        | 040               | 040               | 040        | 040        |
| 4,1                    | 119       | 78        | 041        | 041               | 041               | 041        | 041        |
| 4,2                    | 119       | 78        | 042        | 042               | 042               | 042        | 042        |
| 4,3                    | 126       | 82        | 043        | 043               | 043               | 043        | 043        |
| 4,4                    | 126       | 82        | 044        | 044               | 044               | 044        | 044        |
| 4,5                    | 126       | 82        | 045        | 045               | 045               | 045        | 045        |
| 4,6                    | 126       | 82        | 046        | 046               | 046               | 046        | 046        |
| 4,7                    | 126       | 82        | 047        | 047               | 047               | 047        | 047        |
| 4,8                    | 132       | 87        | 048        | 048               | 048               | 048        | 048        |
| 4,9                    | 132       | 87        | 049        | 049               | 049               | 049        | 049        |
| 5,0                    | 132       | 87        | 050        | 050               | 050               | 050        | 050        |
| 5,1                    | 132       | 87        | 051        | 051               | 051               | 051        | 051        |

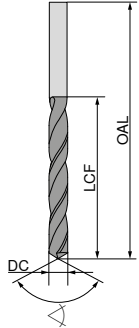
|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ○ | ○ |
| M | ● | ○ |   |   |
| K | ● | ● | ● | ● |
| N | ○ | ● | ● | ○ |
| S | ○ | ○ |   |   |
| H |   | ○ |   |   |
| Q | ○ | ○ | ○ | ○ |

1) Kaplamasız

→ v<sub>c</sub> Sayfa 50+51

## Helisel matkaplar, DIN 340, uzun

≤ 10xD



118°  
HSS-E

10 270 ...



130°  
HSS-E

10 225 ...



130°  
HSS

10 215 ...



130°  
HSS

10 210 ...



130°  
HSS

10 200 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |     |     |     |     |     |
|------------------------|-----------|-----------|-----|-----|-----|-----|-----|
| 5,2                    | 132       | 87        | 052 | 052 | 052 | 052 | 052 |
| 5,3                    | 132       | 87        | 053 | 053 | 053 | 053 | 053 |
| 5,4                    | 139       | 91        | 054 | 054 | 054 | 054 | 054 |
| 5,5                    | 139       | 91        | 055 | 055 | 055 | 055 | 055 |
| 5,6                    | 139       | 91        | 056 | 056 | 056 | 056 | 056 |
| 5,7                    | 139       | 91        | 057 | 057 | 057 | 057 | 057 |
| 5,8                    | 139       | 91        | 058 | 058 | 058 | 058 | 058 |
| 5,9                    | 139       | 91        | 059 | 059 | 059 | 059 | 059 |
| 6,0                    | 139       | 91        | 060 | 060 | 060 | 060 | 060 |
| 6,1                    | 148       | 97        | 061 | 061 | 061 | 061 | 061 |
| 6,2                    | 148       | 97        | 062 | 062 | 062 | 062 | 062 |
| 6,3                    | 148       | 97        | 063 | 063 | 063 | 063 | 063 |
| 6,4                    | 148       | 97        | 064 | 064 | 064 | 064 | 064 |
| 6,5                    | 148       | 97        | 065 | 065 | 065 | 065 | 065 |
| 6,6                    | 148       | 97        | 066 | 066 | 066 | 066 | 066 |
| 6,7                    | 148       | 97        | 067 | 067 | 067 | 067 | 067 |
| 6,8                    | 156       | 102       | 068 | 068 | 068 | 068 | 068 |
| 6,9                    | 156       | 102       | 069 | 069 | 069 | 069 | 069 |
| 7,0                    | 156       | 102       | 070 | 070 | 070 | 070 | 070 |
| 7,1                    | 156       | 102       | 071 | 071 | 071 | 071 | 071 |
| 7,2                    | 156       | 102       | 072 | 072 | 072 | 072 | 072 |
| 7,3                    | 156       | 102       | 073 | 073 | 073 | 073 | 073 |
| 7,4                    | 156       | 102       | 074 | 074 | 074 | 074 | 074 |
| 7,5                    | 156       | 102       | 075 | 075 | 075 | 075 | 075 |
| 7,6                    | 165       | 109       | 076 | 076 | 076 | 076 | 076 |
| 7,7                    | 165       | 109       | 077 | 077 | 077 | 077 | 077 |
| 7,8                    | 165       | 109       | 078 | 078 | 078 | 078 | 078 |
| 7,9                    | 165       | 109       | 079 | 079 | 079 | 079 | 079 |
| 8,0                    | 165       | 109       | 080 | 080 | 080 | 080 | 080 |
| 8,1                    | 165       | 109       | 081 | 081 | 081 | 081 | 081 |
| 8,2                    | 165       | 109       | 082 | 082 | 082 | 082 | 082 |
| 8,3                    | 165       | 109       | 083 | 083 | 083 | 083 | 083 |
| 8,4                    | 165       | 109       | 084 | 084 | 084 | 084 | 084 |
| 8,5                    | 165       | 109       | 085 | 085 | 085 | 085 | 085 |
| 8,6                    | 175       | 115       | 086 | 086 | 086 | 086 | 086 |
| 8,7                    | 175       | 115       | 087 | 087 | 087 | 087 | 087 |
| 8,8                    | 175       | 115       | 088 | 088 | 088 | 088 | 088 |
| 8,9                    | 175       | 115       | 089 | 089 | 089 | 089 | 089 |
| 9,0                    | 175       | 115       | 090 | 090 | 090 | 090 | 090 |
| 9,1                    | 175       | 115       | 091 | 091 | 091 | 091 | 091 |
| 9,2                    | 175       | 115       | 092 | 092 | 092 | 092 | 092 |
| 9,3                    | 175       | 115       | 093 | 093 | 093 | 093 | 093 |

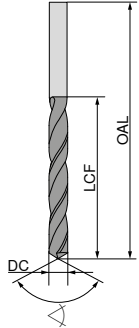
|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ○ | ○ |
| M | ● | ○ |   |   |
| K | ● | ● | ● | ● |
| N | ○ | ● | ● | ○ |
| S | ○ | ○ |   |   |
| H |   | ○ |   |   |
| Q | ○ | ○ | ○ | ○ |

1) Kaplamasız

→ v<sub>c</sub> Sayfa 50+51

## Helisel matkaplar, DIN 340, uzun

≤ 10xD



118°  
HSS-E

130°  
HSS-E

130°  
HSS

130°  
HSS

130°  
HSS

10 270 ...

10 225 ...

10 215 ...

10 210 ...

10 200 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |     |     |     |  |     |
|------------------------|-----------|-----------|-----|-----|-----|--|-----|
| 9,4                    | 175       | 115       | 094 | 094 |     |  | 094 |
| 9,5                    | 175       | 115       | 095 | 095 |     |  | 095 |
| 9,6                    | 184       | 121       | 096 |     | 095 |  | 096 |
| 9,7                    | 184       | 121       | 097 | 097 | 097 |  |     |
| 9,8                    | 184       | 121       | 098 | 098 | 098 |  | 098 |
| 9,9                    | 184       | 121       | 099 | 099 | 099 |  |     |
| 10,0                   | 184       | 121       | 100 | 100 | 100 |  | 100 |
| 10,1                   | 184       | 121       | 101 |     | 101 |  |     |
| 10,2                   | 184       | 121       | 102 | 102 | 102 |  | 102 |
| 10,3                   | 184       | 121       | 103 |     | 103 |  | 103 |
| 10,4                   | 184       | 121       | 104 |     | 104 |  | 104 |
| 10,5                   | 184       | 121       | 105 | 105 | 105 |  | 105 |
| 10,6                   | 184       | 121       |     |     | 106 |  |     |
| 10,8                   | 195       | 128       |     | 108 | 108 |  | 108 |
| 11,0                   | 195       | 128       | 110 | 110 | 110 |  | 110 |
| 11,5                   | 195       | 128       | 115 | 115 | 115 |  | 115 |
| 11,6                   | 195       | 128       |     |     |     |  | 116 |
| 11,8                   | 195       | 128       |     | 118 | 118 |  | 118 |
| 12,0                   | 205       | 134       | 120 | 120 | 120 |  | 120 |
| 12,2                   | 205       | 134       |     |     |     |  | 122 |
| 12,3                   | 205       | 134       |     |     |     |  | 123 |
| 12,5                   | 205       | 134       | 125 |     | 125 |  | 125 |
| 13,0                   | 205       | 134       | 130 |     | 130 |  | 130 |
| 13,5                   | 214       | 140       | 135 |     | 135 |  |     |
| 14,0                   | 214       | 140       | 140 |     | 140 |  | 140 |

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ○ | ○ |
| M | ● | ○ |   |   |
| K | ● | ● | ● | ● |
| N | ○ | ● | ● | ○ |
| S | ○ | ○ |   |   |
| H |   | ○ |   |   |
| O | ○ | ○ | ○ | ○ |

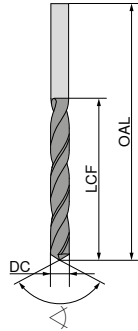
1) Kaplamasız

→ v<sub>c</sub> Sayfa 50+51



## Helisel matkaplar, DIN 1869, ekstra uzun, Seri-1

&gt; 10xD



130°  
HSS-E

130°  
HSS

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | 10 236 ... | 10 235 ...        |
|------------------------|-----------|-----------|------------|-------------------|
| 2,0                    | 125       | 85        |            | 020 <sup>1)</sup> |
| 2,1                    | 125       | 85        |            | 021 <sup>1)</sup> |
| 2,2                    | 135       | 90        |            | 022 <sup>1)</sup> |
| 2,3                    | 135       | 90        |            | 023 <sup>1)</sup> |
| 2,4                    | 140       | 95        |            | 024               |
| 2,5                    | 140       | 95        |            | 025               |
| 2,6                    | 140       | 95        |            | 026               |
| 2,7                    | 150       | 100       |            | 027               |
| 2,8                    | 150       | 100       |            | 028               |
| 2,9                    | 150       | 100       |            | 029               |
| 3,0                    | 150       | 100       | 03000      | 030               |
| 3,1                    | 155       | 105       |            | 031               |
| 3,2                    | 155       | 105       |            | 032               |
| 3,3                    | 155       | 105       | 03300      | 033               |
| 3,4                    | 165       | 115       |            | 034               |
| 3,5                    | 165       | 115       | 03500      | 035               |
| 3,6                    | 165       | 115       |            | 036               |
| 3,7                    | 165       | 115       |            | 037               |
| 3,8                    | 175       | 120       |            | 038               |
| 3,9                    | 175       | 120       |            | 039               |
| 4,0                    | 175       | 120       | 04000      | 040               |
| 4,1                    | 175       | 120       |            | 041               |
| 4,2                    | 175       | 120       | 04200      | 042               |
| 4,3                    | 185       | 125       |            | 043               |
| 4,4                    | 185       | 125       |            | 044               |
| 4,5                    | 185       | 125       | 04500      | 045               |
| 4,6                    | 185       | 125       |            | 046               |
| 4,7                    | 185       | 125       |            | 047               |
| 4,8                    | 195       | 135       |            | 048               |
| 4,9                    | 195       | 135       |            | 049               |
| 5,0                    | 195       | 135       | 05000      | 050               |
| 5,1                    | 195       | 135       |            | 051               |
| 5,2                    | 195       | 135       |            | 052               |
| 5,3                    | 195       | 135       |            | 053               |
| 5,4                    | 205       | 140       |            | 054               |
| 5,5                    | 205       | 140       | 05500      | 055               |
| 5,6                    | 205       | 140       |            | 056               |
| 5,7                    | 205       | 140       |            | 057               |
| 5,8                    | 205       | 140       |            | 058               |
| 5,9                    | 205       | 140       |            | 059               |
| 6,0                    | 205       | 140       | 06000      | 060               |
| 6,1                    | 215       | 150       |            | 061               |
| 6,2                    | 215       | 150       |            | 062               |
| 6,3                    | 215       | 150       |            | 063               |
| 6,4                    | 215       | 150       |            | 064               |
| 6,5                    | 215       | 150       | 06500      | 065               |
| 6,6                    | 215       | 150       |            | 066               |
| 6,7                    | 215       | 150       |            | 067               |

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | 10 236 ... | 10 235 ... |
|------------------------|-----------|-----------|------------|------------|
| 6,8                    | 225       | 155       | 06800      | 068        |
| 6,9                    | 225       | 155       |            | 069        |
| 7,0                    | 225       | 155       | 07000      | 070        |
| 7,1                    | 225       | 155       |            | 071        |
| 7,3                    | 225       | 155       |            | 073        |
| 7,4                    | 225       | 155       |            | 074        |
| 7,5                    | 225       | 155       | 07500      | 075        |
| 7,7                    | 240       | 165       |            | 077        |
| 7,8                    | 240       | 165       |            | 078        |
| 7,9                    | 240       | 165       |            | 079        |
| 8,0                    | 240       | 165       | 08000      | 080        |
| 8,1                    | 240       | 165       |            | 081        |
| 8,2                    | 240       | 165       |            | 082        |
| 8,3                    | 240       | 165       |            | 083        |
| 8,4                    | 240       | 165       |            | 084        |
| 8,5                    | 240       | 165       | 08500      | 085        |
| 8,6                    | 250       | 175       |            | 086        |
| 8,7                    | 250       | 175       |            | 087        |
| 8,8                    | 250       | 175       |            | 088        |
| 9,0                    | 250       | 175       | 09000      | 090        |
| 9,2                    | 250       | 175       |            | 092        |
| 9,4                    | 250       | 175       |            | 094        |
| 9,5                    | 250       | 175       | 09500      | 095        |
| 9,6                    | 265       | 185       |            | 096        |
| 9,7                    | 265       | 185       |            | 097        |
| 9,8                    | 265       | 185       |            | 098        |
| 9,9                    | 265       | 185       |            | 099        |
| 10,0                   | 265       | 185       | 10000      | 100        |
| 10,2                   | 265       | 185       | 10200      |            |
| 10,5                   | 265       | 185       |            | 105        |
| 11,0                   | 280       | 195       |            | 110        |
| 11,5                   | 280       | 195       |            | 115        |
| 12,0                   | 295       | 205       |            | 120        |
| 12,5                   | 295       | 205       |            | 125        |
| 13,0                   | 295       | 205       |            | 130        |

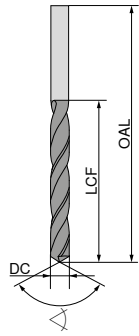
|   |   |   |
|---|---|---|
| P | • | • |
| M |   |   |
| K | • | • |
| N | • | • |
| S |   |   |
| H |   |   |
| O | ○ | ○ |

1) Kaplamasız

→ v<sub>c</sub> Sayfa 52

Helisel matkaplar, DIN 1869, ekstra uzun,  
Seri-2Helisel matkaplar, DIN 1869, ekstra uzun,  
Seri-3

&gt; 10xD

NEW  
WTL  
TiAlN130°  
HSS-EWTL  
F-nit130°  
HSS

10 246 ...

10 245 ...

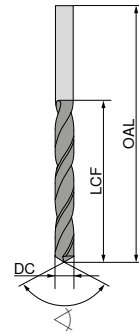
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |       |                   |
|------------------------|-----------|-----------|-------|-------------------|
| 2,0                    | 160       | 110       |       | 020 <sup>1)</sup> |
| 2,5                    | 180       | 120       |       | 025               |
| 3,0                    | 190       | 130       | 03000 | 030               |
| 3,5                    | 210       | 145       | 03500 | 035               |
| 4,0                    | 220       | 150       | 04000 | 040               |
| 4,5                    | 235       | 160       | 04500 | 045               |
| 5,0                    | 245       | 170       | 05000 | 050               |
| 5,5                    | 260       | 180       | 05500 | 055               |
| 6,0                    | 260       | 180       | 06000 | 060               |
| 6,5                    | 275       | 190       | 06500 | 065               |
| 7,0                    | 290       | 200       | 07000 | 070               |
| 7,5                    | 290       | 200       | 07500 | 075               |
| 8,0                    | 305       | 210       | 08000 | 080               |
| 8,5                    | 305       | 210       | 08500 | 085               |
| 9,0                    | 320       | 220       | 09000 | 090               |
| 9,5                    | 320       | 220       | 09500 | 095               |
| 10,0                   | 340       | 235       | 10000 | 100               |
| 10,2                   | 340       | 235       | 10200 |                   |
| 10,5                   | 340       | 235       |       | 105               |
| 11,0                   | 365       | 250       |       | 110               |
| 11,5                   | 365       | 250       |       | 115               |
| 12,0                   | 375       | 260       | 12000 | 120               |
| 12,5                   | 375       | 260       |       | 125               |
| 13,0                   | 375       | 260       |       | 130               |

|   |   |   |
|---|---|---|
| P | • | • |
| M |   |   |
| K | • | • |
| N | • | • |
| S |   |   |
| H |   |   |
| O | ○ | ○ |

1) Kaplamasız

→ v<sub>c</sub> Sayfa 52

&gt; 10xD

NEW  
WTL  
TiAlN130°  
HSS-EWTL  
F-nit130°  
HSS

10 256 ...

10 255 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |       |     |
|------------------------|-----------|-----------|-------|-----|
| 2,5                    | 225       | 150       |       | 025 |
| 3,0                    | 240       | 160       |       | 030 |
| 3,5                    | 265       | 180       |       | 035 |
| 4,0                    | 280       | 190       | 04000 | 040 |
| 4,5                    | 295       | 200       |       | 045 |
| 5,0                    | 315       | 210       | 05000 | 050 |
| 5,5                    | 330       | 225       |       | 055 |
| 6,0                    | 330       | 225       | 06000 | 060 |
| 6,5                    | 350       | 235       |       | 065 |
| 7,0                    | 370       | 250       |       | 070 |
| 7,5                    | 370       | 250       |       | 075 |
| 8,0                    | 390       | 265       | 08000 | 080 |
| 8,5                    | 390       | 265       |       | 085 |
| 9,0                    | 410       | 280       |       | 090 |
| 9,5                    | 410       | 280       |       | 095 |
| 10,0                   | 430       | 295       | 10000 | 100 |
| 10,5                   | 430       | 295       |       | 105 |
| 11,0                   | 455       | 310       |       | 110 |
| 11,5                   | 455       | 310       |       | 115 |
| 12,0                   | 480       | 330       |       | 120 |
| 12,5                   | 480       | 330       |       | 125 |
| 13,0                   | 480       | 330       |       | 130 |

|   |   |   |
|---|---|---|
| P | • | • |
| M |   |   |
| K | • | • |
| N | • | • |
| S |   |   |
| H |   |   |
| O | ○ | ○ |

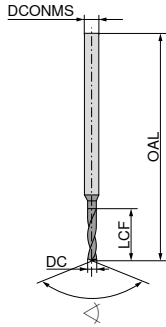
→ v<sub>c</sub> Sayfa 52

## Mini matkap, DIN 1899

- ▲ 4 yüzeyli bileme geometrisi
- ▲ Güçlendirilmiş sap

## Teslimat kapsamı:

- ▲ Ambalaj içeriği 5 adet
- ▲ birim fiyat



118°  
HSS-E-PM

10 103 ...

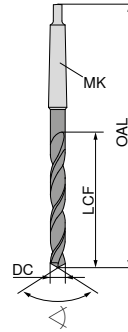
| DC <sub>-0,004</sub><br>mm | OAL<br>mm | LCF<br>mm | DCONMS <sub>h8</sub><br>mm |       |
|----------------------------|-----------|-----------|----------------------------|-------|
| 0,15                       | 25        | 0,8       | 1,0                        | 00150 |
| 0,20                       | 25        | 1,5       | 1,0                        | 00200 |
| 0,25                       | 25        | 1,9       | 1,0                        | 00250 |
| 0,30                       | 25        | 1,9       | 1,0                        | 00300 |
| 0,35                       | 25        | 2,4       | 1,0                        | 00350 |
| 0,40                       | 25        | 3,0       | 1,0                        | 00400 |
| 0,45                       | 25        | 3,0       | 1,0                        | 00450 |
| 0,50                       | 25        | 3,4       | 1,0                        | 00500 |
| 0,55                       | 25        | 3,9       | 1,0                        | 00550 |
| 0,60                       | 25        | 3,9       | 1,0                        | 00600 |
| 0,65                       | 25        | 4,2       | 1,0                        | 00650 |
| 0,70                       | 25        | 4,8       | 1,0                        | 00700 |
| 0,75                       | 25        | 4,8       | 1,0                        | 00750 |
| 0,80                       | 25        | 5,3       | 1,5                        | 00800 |
| 0,85                       | 25        | 5,3       | 1,5                        | 00850 |
| 0,90                       | 25        | 6,0       | 1,5                        | 00900 |
| 0,95                       | 25        | 6,0       | 1,5                        | 00950 |
| 1,00                       | 25        | 6,8       | 1,5                        | 01000 |
| 1,05                       | 25        | 6,8       | 1,5                        | 01050 |
| 1,10                       | 25        | 7,6       | 1,5                        | 01100 |
| 1,15                       | 25        | 7,6       | 1,5                        | 01150 |
| 1,20                       | 25        | 8,5       | 1,5                        | 01200 |
| 1,25                       | 25        | 8,5       | 1,5                        | 01250 |
| 1,30                       | 25        | 8,5       | 1,5                        | 01300 |
| 1,35                       | 25        | 9,5       | 1,5                        | 01350 |
| 1,40                       | 25        | 9,5       | 1,5                        | 01400 |
| 1,45                       | 25        | 9,5       | 1,5                        | 01450 |

|   |   |
|---|---|
| P | ● |
| M | ○ |
| K | ● |
| N | ● |
| S | ○ |
| H | ○ |
| O | ○ |

→ v<sub>c</sub> Sayfa 54

## Helisel matkaplar, fabrika standardı, kısa

≤ 3xD



130°  
HSS-E

10 285 ...

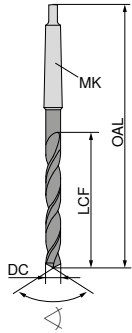
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |     |
|------------------------|-----------|-----------|----|-----|
| 10,0                   | 138       | 57        | 1  | 100 |
| 10,5                   | 138       | 57        | 1  | 105 |
| 11,0                   | 142       | 61        | 1  | 110 |
| 11,5                   | 142       | 61        | 1  | 115 |
| 12,0                   | 147       | 66        | 1  | 120 |
| 12,5                   | 147       | 66        | 1  | 125 |
| 13,0                   | 147       | 66        | 1  | 130 |
| 13,5                   | 168       | 70        | 2  | 135 |
| 14,0                   | 168       | 70        | 2  | 140 |
| 14,5                   | 172       | 74        | 2  | 145 |
| 15,0                   | 172       | 74        | 2  | 150 |
| 15,5                   | 176       | 78        | 2  | 155 |
| 16,0                   | 176       | 78        | 2  | 160 |
| 16,5                   | 179       | 81        | 2  | 165 |
| 17,0                   | 179       | 81        | 2  | 170 |
| 17,5                   | 183       | 85        | 2  | 175 |
| 18,0                   | 183       | 85        | 2  | 180 |
| 18,5                   | 186       | 88        | 2  | 185 |
| 19,0                   | 186       | 88        | 2  | 190 |
| 19,5                   | 212       | 91        | 3  | 195 |
| 20,0                   | 212       | 91        | 3  | 200 |
| 21,0                   | 216       | 95        | 3  | 210 |
| 22,0                   | 219       | 98        | 3  | 220 |
| 23,0                   | 222       | 101       | 3  | 230 |
| 24,0                   | 225       | 104       | 3  | 240 |
| 25,0                   | 225       | 104       | 3  | 250 |
| 26,0                   | 256       | 107       | 4  | 260 |
| 27,0                   | 259       | 110       | 4  | 270 |
| 28,0                   | 259       | 110       | 4  | 280 |
| 30,0                   | 263       | 114       | 4  | 300 |

|   |   |
|---|---|
| P | ● |
| M | ● |
| K | ● |
| N | ○ |
| S | ○ |
| H | ○ |
| O | ○ |

→ v<sub>c</sub> Sayfa 47

## Helisel matkaplar, DIN 345

≤ 5xD

N  
vap.MK  
118°  
HSS

WTL

MK  
130°  
HSS-E

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |
|------------------------|-----------|-----------|----|
| 10,00                  | 168       | 87        | 1  |
| 10,20                  | 168       | 87        | 1  |
| 10,50                  | 168       | 87        | 1  |
| 10,80                  | 175       | 94        | 1  |
| 11,00                  | 175       | 94        | 1  |
| 11,20                  | 175       | 94        | 1  |
| 11,50                  | 175       | 94        | 1  |
| 11,80                  | 175       | 94        | 1  |
| 12,00                  | 182       | 101       | 1  |
| 12,20                  | 182       | 101       | 1  |
| 12,50                  | 182       | 101       | 1  |
| 12,80                  | 182       | 101       | 1  |
| 13,00                  | 182       | 101       | 1  |
| 13,20                  | 182       | 101       | 1  |
| 13,50                  | 189       | 108       | 1  |
| 13,80                  | 189       | 108       | 1  |
| 14,00                  | 189       | 108       | 1  |
| 14,25                  | 212       | 114       | 2  |
| 14,50                  | 212       | 114       | 2  |
| 14,75                  | 212       | 114       | 2  |
| 15,00                  | 212       | 114       | 2  |
| 15,25                  | 218       | 120       | 2  |
| 15,50                  | 218       | 120       | 2  |
| 15,75                  | 218       | 120       | 2  |
| 16,00                  | 218       | 120       | 2  |
| 16,25                  | 223       | 125       | 2  |
| 16,50                  | 223       | 125       | 2  |
| 16,75                  | 223       | 125       | 2  |
| 17,00                  | 223       | 125       | 2  |
| 17,25                  | 228       | 130       | 2  |
| 17,50                  | 228       | 130       | 2  |
| 17,75                  | 228       | 130       | 2  |
| 18,00                  | 228       | 130       | 2  |
| 18,25                  | 233       | 135       | 2  |
| 18,50                  | 233       | 135       | 2  |
| 18,75                  | 233       | 135       | 2  |
| 19,00                  | 233       | 135       | 2  |
| 19,25                  | 238       | 140       | 2  |
| 19,50                  | 238       | 140       | 2  |
| 19,75                  | 238       | 140       | 2  |
| 20,00                  | 238       | 140       | 2  |
| 20,25                  | 243       | 145       | 2  |
| 20,50                  | 243       | 145       | 2  |
| 20,75                  | 243       | 145       | 2  |
| 21,00                  | 243       | 145       | 2  |
| 21,25                  | 248       | 150       | 2  |
| 21,50                  | 248       | 150       | 2  |
| 21,75                  | 248       | 150       | 2  |
| 22,00                  | 248       | 150       | 2  |
| 22,25                  | 248       | 150       | 2  |
| 22,50                  | 253       | 155       | 2  |

10 265 ...

10 280 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |
|------------------------|-----------|-----------|----|
| 22,75                  | 253       | 155       | 2  |
| 23,00                  | 253       | 155       | 2  |
| 23,50                  | 276       | 155       | 3  |
| 23,75                  | 281       | 160       | 3  |
| 24,00                  | 281       | 160       | 3  |
| 24,50                  | 281       | 160       | 3  |
| 24,75                  | 281       | 160       | 3  |
| 25,00                  | 281       | 160       | 3  |
| 25,50                  | 286       | 165       | 3  |
| 25,75                  | 286       | 165       | 3  |
| 26,00                  | 286       | 165       | 3  |
| 26,50                  | 286       | 165       | 3  |
| 26,75                  | 291       | 170       | 3  |
| 27,00                  | 291       | 170       | 3  |
| 27,50                  | 291       | 170       | 3  |
| 27,75                  | 291       | 170       | 3  |
| 28,00                  | 291       | 170       | 3  |
| 28,50                  | 296       | 175       | 3  |
| 28,75                  | 296       | 175       | 3  |
| 29,00                  | 296       | 175       | 3  |
| 29,50                  | 296       | 175       | 3  |
| 29,75                  | 296       | 175       | 3  |
| 30,00                  | 296       | 175       | 3  |
| 30,50                  | 301       | 180       | 3  |
| 31,00                  | 301       | 180       | 3  |
| 31,50                  | 301       | 180       | 3  |
| 32,00                  | 334       | 185       | 4  |
| 32,50                  | 334       | 185       | 4  |
| 33,00                  | 334       | 185       | 4  |
| 33,50                  | 334       | 185       | 4  |
| 34,00                  | 339       | 190       | 4  |
| 34,50                  | 339       | 190       | 4  |
| 35,00                  | 339       | 190       | 4  |
| 35,50                  | 339       | 190       | 4  |
| 36,00                  | 344       | 195       | 4  |
| 36,50                  | 344       | 195       | 4  |
| 37,00                  | 344       | 195       | 4  |
| 37,50                  | 344       | 195       | 4  |
| 38,00                  | 349       | 200       | 4  |
| 38,50                  | 349       | 200       | 4  |
| 39,00                  | 349       | 200       | 4  |
| 39,50                  | 349       | 200       | 4  |
| 40,00                  | 349       | 200       | 4  |
| 41,00                  | 354       | 205       | 4  |
| 42,00                  | 354       | 205       | 4  |
| 43,00                  | 359       | 210       | 4  |
| 44,00                  | 359       | 210       | 4  |
| 45,00                  | 359       | 210       | 4  |
| 46,00                  | 364       | 215       | 4  |
| 47,00                  | 364       | 215       | 4  |
| 48,00                  | 369       | 220       | 4  |
| 49,00                  | 369       | 220       | 4  |
| 50,00                  | 369       | 220       | 4  |
| 51,00                  | 412       | 225       | 5  |
| 52,00                  | 412       | 225       | 5  |
| 53,00                  | 412       | 225       | 5  |
| 54,00                  | 417       | 230       | 5  |
| 55,00                  | 417       | 230       | 5  |
| 56,00                  | 417       | 230       | 5  |
| 57,00                  | 422       | 235       | 5  |
| 58,00                  | 422       | 235       | 5  |
| 59,00                  | 422       | 235       | 5  |
| 60,00                  | 422       | 235       | 5  |

10 265 ...

10 280 ...

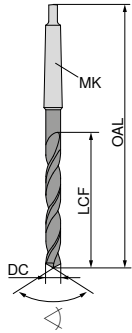
|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ○ |
| K | ● | ● |
| N | ○ | ● |
| S |   | ○ |
| H |   | ○ |
| O | ○ | ○ |

- 1) Nitrasyonlu  
2) buhar menevişli

→ v<sub>c</sub> Sayfa 49

## Helisel matkaplar, DIN 341, uzun

≤ 10xD



10 295 ...



10 297 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK | 10 295 ... | 10 297 ...        |
|------------------------|-----------|-----------|----|------------|-------------------|
| 10,00                  | 197       | 116       | 1  | 100        | 100 <sup>1)</sup> |
| 10,20                  | 197       | 116       | 1  | 102        | 102 <sup>1)</sup> |
| 10,50                  | 197       | 116       | 1  | 105        | 105 <sup>1)</sup> |
| 10,80                  | 206       | 125       | 1  | 108        |                   |
| 11,00                  | 206       | 125       | 1  | 110        | 110 <sup>1)</sup> |
| 11,20                  | 206       | 125       | 1  | 112        | 112 <sup>1)</sup> |
| 11,50                  | 206       | 125       | 1  | 115        | 115 <sup>1)</sup> |
| 11,80                  | 206       | 125       | 1  | 118        | 118 <sup>1)</sup> |
| 12,00                  | 215       | 134       | 1  | 120        | 120 <sup>1)</sup> |
| 12,20                  | 215       | 134       | 1  | 122        | 122 <sup>1)</sup> |
| 12,50                  | 215       | 134       | 1  | 125        | 125 <sup>1)</sup> |
| 12,80                  | 215       | 134       | 1  | 128        | 128 <sup>1)</sup> |
| 13,00                  | 215       | 134       | 1  | 130        | 130 <sup>1)</sup> |
| 13,20                  | 215       | 134       | 1  | 132        |                   |
| 13,50                  | 223       | 142       | 1  | 135        | 135 <sup>1)</sup> |
| 13,80                  | 223       | 142       | 1  | 138        | 138 <sup>1)</sup> |
| 14,00                  | 223       | 142       | 1  | 140        | 140 <sup>1)</sup> |
| 14,25                  | 245       | 147       | 2  | 142        |                   |
| 14,50                  | 245       | 147       | 2  | 145        | 145 <sup>1)</sup> |
| 14,75                  | 245       | 147       | 2  | 147        |                   |
| 15,00                  | 245       | 147       | 2  | 150        | 150 <sup>1)</sup> |
| 15,25                  | 251       | 153       | 2  | 152        |                   |
| 15,50                  | 251       | 153       | 2  | 155        | 155 <sup>1)</sup> |
| 15,75                  | 251       | 153       | 2  | 157        |                   |
| 16,00                  | 251       | 153       | 2  | 160        | 160 <sup>1)</sup> |
| 16,25                  | 257       | 159       | 2  | 162        |                   |
| 16,50                  | 257       | 159       | 2  | 165        | 165 <sup>2)</sup> |
| 16,75                  | 257       | 159       | 2  | 167        |                   |
| 17,00                  | 257       | 159       | 2  | 170        | 170 <sup>2)</sup> |
| 17,25                  | 263       | 165       | 2  | 172        |                   |
| 17,50                  | 263       | 165       | 2  | 175        | 175 <sup>2)</sup> |
| 17,75                  | 263       | 165       | 2  | 177        |                   |
| 18,00                  | 263       | 165       | 2  | 180        | 180 <sup>2)</sup> |
| 18,25                  | 269       | 171       | 2  | 182        |                   |
| 18,50                  | 269       | 171       | 2  | 185        | 185 <sup>2)</sup> |
| 18,75                  | 269       | 171       | 2  | 187        |                   |
| 19,00                  | 269       | 171       | 2  | 190        | 190 <sup>2)</sup> |
| 19,25                  | 275       | 177       | 2  | 192        |                   |
| 19,50                  | 275       | 177       | 2  | 195        | 195 <sup>2)</sup> |
| 19,75                  | 275       | 177       | 2  | 197        |                   |
| 20,00                  | 275       | 177       | 2  | 200        | 200 <sup>2)</sup> |
| 20,50                  | 282       | 184       | 2  | 205        | 205 <sup>2)</sup> |
| 21,00                  | 282       | 184       | 2  | 210        | 210 <sup>2)</sup> |
| 21,50                  | 289       | 191       | 2  | 215        |                   |
| 21,75                  | 289       | 191       | 2  | 217        |                   |
| 22,00                  | 289       | 191       | 2  | 220        | 220 <sup>2)</sup> |
| 22,50                  | 296       | 198       | 2  | 225        |                   |
| 23,00                  | 296       | 198       | 2  | 230        |                   |

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |
|------------------------|-----------|-----------|----|
| 23,50                  | 319       | 198       | 3  |
| 24,00                  | 327       | 206       | 3  |
| 24,50                  | 327       | 206       | 3  |
| 25,00                  | 327       | 206       | 3  |
| 25,50                  | 335       | 214       | 3  |
| 26,00                  | 335       | 214       | 3  |
| 26,50                  | 335       | 214       | 3  |
| 27,00                  | 343       | 222       | 3  |
| 27,50                  | 343       | 222       | 3  |
| 28,00                  | 343       | 222       | 3  |
| 29,00                  | 351       | 230       | 3  |
| 29,50                  | 351       | 230       | 3  |
| 30,00                  | 351       | 230       | 3  |
| 30,50                  | 360       | 239       | 3  |
| 31,00                  | 360       | 239       | 3  |
| 31,50                  | 360       | 239       | 3  |
| 32,00                  | 397       | 248       | 4  |
| 33,00                  | 397       | 248       | 4  |
| 33,50                  | 397       | 248       | 4  |
| 34,00                  | 406       | 257       | 4  |
| 35,00                  | 406       | 257       | 4  |
| 36,00                  | 416       | 267       | 4  |
| 37,00                  | 416       | 267       | 4  |
| 37,50                  | 416       | 267       | 4  |
| 38,00                  | 426       | 277       | 4  |
| 39,00                  | 426       | 277       | 4  |
| 40,00                  | 426       | 277       | 4  |
| 42,00                  | 436       | 287       | 4  |
| 43,00                  | 447       | 298       | 4  |
| 44,00                  | 447       | 298       | 4  |
| 45,00                  | 447       | 298       | 4  |
| 50,00                  | 470       | 321       | 4  |

10 295 ...

10 297 ...

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ○ |
| K | ● | ● |
| N | ○ | ● |
| S |   | ○ |
| H |   | ○ |
| O | ○ | ○ |

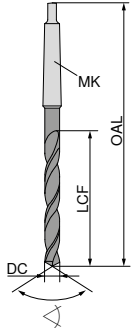
1) Nitrasyonlu

2) buhar menevişli

→ v<sub>c</sub> Sayfa 51

Helisel matkaplar, DIN 1870, ekstra uzun,  
Seri-1

&gt; 10xD



WTL

MK  
130°  
HSS

10 305 ...

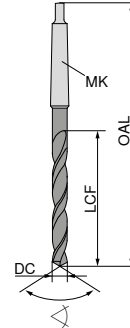
| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |                   |
|------------------------|-----------|-----------|----|-------------------|
| 10,0                   | 285       | 185       | 1  | 100 <sup>1)</sup> |
| 10,5                   | 285       | 185       | 1  | 105 <sup>1)</sup> |
| 11,0                   | 300       | 195       | 1  | 110 <sup>1)</sup> |
| 11,5                   | 300       | 195       | 1  | 115 <sup>1)</sup> |
| 12,0                   | 310       | 205       | 1  | 120 <sup>1)</sup> |
| 12,5                   | 310       | 205       | 1  | 125 <sup>1)</sup> |
| 13,0                   | 310       | 205       | 1  | 130 <sup>1)</sup> |
| 13,5                   | 325       | 220       | 1  | 135 <sup>1)</sup> |
| 14,0                   | 325       | 220       | 1  | 140 <sup>1)</sup> |
| 14,5                   | 340       | 220       | 2  | 145 <sup>1)</sup> |
| 15,0                   | 340       | 220       | 2  | 150 <sup>1)</sup> |
| 15,5                   | 355       | 230       | 2  | 155 <sup>1)</sup> |
| 16,0                   | 355       | 230       | 2  | 160 <sup>1)</sup> |
| 16,5                   | 355       | 230       | 2  | 165 <sup>2)</sup> |
| 17,0                   | 355       | 230       | 2  | 170 <sup>2)</sup> |
| 17,5                   | 370       | 245       | 2  | 175 <sup>2)</sup> |
| 18,0                   | 370       | 245       | 2  | 180 <sup>2)</sup> |
| 18,5                   | 370       | 245       | 2  | 185 <sup>2)</sup> |
| 19,0                   | 370       | 245       | 2  | 190 <sup>2)</sup> |
| 19,5                   | 385       | 260       | 2  | 195 <sup>2)</sup> |
| 20,0                   | 385       | 260       | 2  | 200 <sup>2)</sup> |
| 21,0                   | 385       | 260       | 2  | 210 <sup>2)</sup> |
| 22,0                   | 405       | 270       | 2  | 220 <sup>2)</sup> |
| 23,0                   | 405       | 270       | 2  | 230 <sup>2)</sup> |
| 24,0                   | 440       | 290       | 3  | 240 <sup>2)</sup> |
| 25,0                   | 440       | 290       | 3  | 250 <sup>2)</sup> |
| 26,0                   | 440       | 290       | 3  | 260 <sup>2)</sup> |
| 28,0                   | 460       | 305       | 3  | 280 <sup>2)</sup> |
| 30,0                   | 460       | 305       | 3  | 300 <sup>2)</sup> |

|   |   |
|---|---|
| P | ● |
| M | ● |
| K | ● |
| N | ● |
| S | ● |
| H | ● |
| O | ○ |

- 1) Nitrasyonlu  
2) buhar menevişli

→ v<sub>c</sub> Sayfa 53Helisel matkaplar, DIN 1870, ekstra uzun,  
Seri-2

&gt; 10xD



WTL

MK  
130°  
HSS

10 315 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | MK |                   |
|------------------------|-----------|-----------|----|-------------------|
| 10,0                   | 360       | 235       | 1  | 100 <sup>1)</sup> |
| 10,5                   | 360       | 235       | 1  | 105 <sup>1)</sup> |
| 11,0                   | 375       | 250       | 1  | 110 <sup>1)</sup> |
| 11,5                   | 375       | 250       | 1  | 115 <sup>1)</sup> |
| 12,0                   | 395       | 260       | 1  | 120 <sup>1)</sup> |
| 13,0                   | 395       | 260       | 1  | 130 <sup>1)</sup> |
| 13,5                   | 410       | 275       | 1  | 135 <sup>1)</sup> |
| 14,0                   | 410       | 275       | 1  | 140 <sup>1)</sup> |
| 14,5                   | 425       | 275       | 2  | 145 <sup>1)</sup> |
| 15,0                   | 425       | 275       | 2  | 150 <sup>1)</sup> |
| 15,5                   | 445       | 295       | 2  | 155 <sup>1)</sup> |
| 16,0                   | 445       | 295       | 2  | 160 <sup>1)</sup> |
| 16,5                   | 445       | 295       | 2  | 165 <sup>2)</sup> |
| 17,0                   | 445       | 295       | 2  | 170 <sup>2)</sup> |
| 17,5                   | 465       | 310       | 2  | 175 <sup>2)</sup> |
| 18,0                   | 465       | 310       | 2  | 180 <sup>2)</sup> |
| 18,5                   | 465       | 310       | 2  | 185 <sup>2)</sup> |
| 19,0                   | 465       | 310       | 2  | 190 <sup>2)</sup> |
| 19,5                   | 490       | 325       | 2  | 195 <sup>2)</sup> |
| 20,0                   | 490       | 325       | 2  | 200 <sup>2)</sup> |
| 21,0                   | 490       | 325       | 2  | 210 <sup>2)</sup> |
| 22,0                   | 515       | 345       | 2  | 220 <sup>2)</sup> |
| 23,0                   | 515       | 345       | 2  | 230 <sup>2)</sup> |
| 24,0                   | 555       | 365       | 3  | 240 <sup>2)</sup> |
| 25,0                   | 555       | 365       | 3  | 250 <sup>2)</sup> |
| 26,0                   | 555       | 365       | 3  | 260 <sup>2)</sup> |
| 28,0                   | 580       | 385       | 3  | 280 <sup>2)</sup> |
| 30,0                   | 580       | 385       | 3  | 300 <sup>2)</sup> |

|   |   |
|---|---|
| P | ● |
| M | ● |
| K | ● |
| N | ● |
| S | ● |
| H | ● |
| O | ○ |

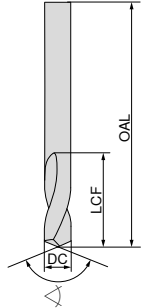
- 1) Nitrasyonlu  
2) buhar menevişli

→ v<sub>c</sub> Sayfa 53



## NC punta matkapları, fabrika standardı

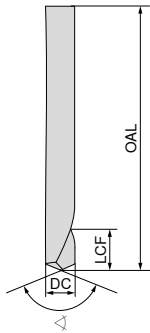
▲ helis kanallı



| DC <sub>h6</sub><br>mm | OAL<br>mm | LCF<br>mm |
|------------------------|-----------|-----------|
| 3                      | 46        | 12,0      |
| 4                      | 55        | 12,0      |
| 5                      | 62        | 14,0      |
| 6                      | 66        | 16,0      |
| 8                      | 79        | 21,0      |
| 10                     | 89        | 25,0      |
| 12                     | 102       | 30,0      |
| 16                     | 115       | 37,5      |
| 20                     | 131       | 45,0      |

| NC-A        | NC-A<br>TiN | NC-A       | NC-A<br>TiN |
|-------------|-------------|------------|-------------|
|             |             |            |             |
| 120°<br>HSS | 120°<br>HSS | 90°<br>HSS | 90°<br>HSS  |
| 10 510 ...  | 10 512 ...  | 10 520 ... | 10 522 ...  |
| 030         | 030         | 030        | 030         |
| 040         | 040         | 040        | 040         |
| 050         | 050         | 050        | 050         |
| 060         | 060         | 060        | 060         |
| 080         | 080         | 080        | 080         |
| 100         | 100         | 100        | 100         |
| 120         | 120         | 120        | 120         |
| 160         | 160         | 160        | 160         |
| 200         | 200         | 200        | 200         |

▲ NC-Punta Matkapları, Fabrika standardı, uzun



| DC <sub>h6</sub><br>mm | OAL<br>mm | LCF<br>mm |
|------------------------|-----------|-----------|
| 6                      | 66        | 7,0       |
| 8                      | 79        | 9,0       |
| 10                     | 89        | 11,5      |
| 12                     | 102       | 14,0      |
| 16                     | 115       | 18,0      |
| 20                     | 131       | 23,0      |

| ~B          | ~B          | ~B         | ~B         |
|-------------|-------------|------------|------------|
|             |             |            |            |
| 120°<br>HSS | 120°<br>HSS | 90°<br>HSS | 90°<br>HSS |
| 10 511 ...  | 10 513 ...  | 10 521 ... | 10 523 ... |
| 060         | 060         | 060        | 060        |
| 080         | 080         | 080        | 080        |
| 100         | 100         | 100        | 100        |
| 120         | 120         | 120        | 120        |
| 160         | 160         | 160        | 160        |
| 200         | 200         | 200        | 200        |

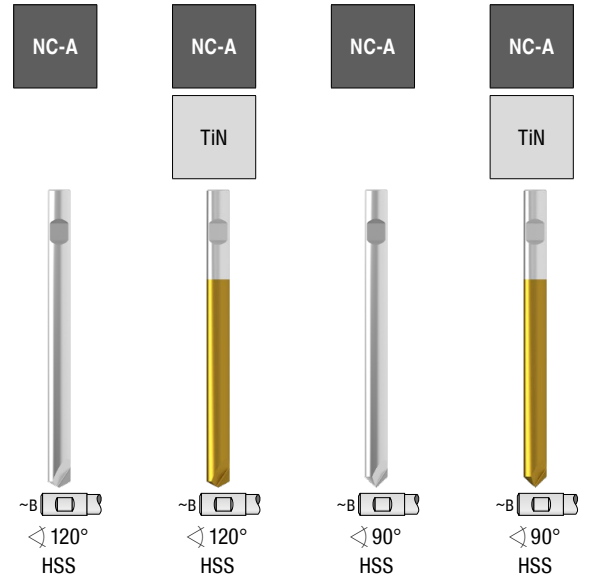
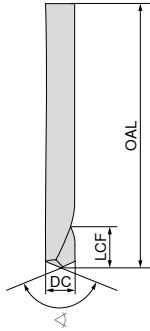
|   |       |       |       |       |
|---|-------|-------|-------|-------|
| P | 15-35 | 25-55 | 15-35 | 25-55 |
| M | 10    | 20    | 10    | 20    |
| K | 20-35 | 30-55 | 20-35 | 30-55 |
| N | 50-70 | 65-85 | 50-70 | 65-85 |
| S |       |       |       |       |
| H |       |       |       |       |
| O |       |       |       |       |



Yalnızca merkezleme matkabından sonra kullanılabilir

## NC-Punta Matkapları, Fabrika standardı, uzun

▲ DIN 1835 B göre düz sıkma yüzeyli sap



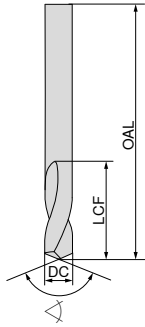
| DC <sub>h6</sub><br>mm | OAL<br>mm | LCF<br>mm | 10 530 ... | 10 532 ... | 10 526 ... | 10 528 ... |
|------------------------|-----------|-----------|------------|------------|------------|------------|
| 6                      | 93        | 7,0       | 060        | 060        | 060        | 060        |
| 8                      | 117       | 9,0       | 080        | 080        | 080        | 080        |
| 10                     | 133       | 11,5      | 100        | 100        | 100        | 100        |
| 12                     | 151       | 14,0      | 120        | 120        | 120        | 120        |
| 16                     | 178       | 18,0      | 160        | 160        | 160        | 160        |
| 20                     | 205       | 23,0      | 200        | 200        | 200        | 200        |
| P                      |           |           | 15-35      | 25-55      | 15-35      | 25-55      |
| M                      |           |           | 10         | 20         | 10         | 20         |
| K                      |           |           | 20-35      | 30-55      | 20-35      | 30-55      |
| N                      |           |           | 50-70      | 65-85      | 50-70      | 65-85      |
| S                      |           |           |            |            |            |            |
| H                      |           |           |            |            |            |            |
| O                      |           |           |            |            |            |            |



Yalnızca merkezleme matkabından sonra kullanılabilir

## NC punta matkapları, fabrika standardı, uzun

▲ helis kanallı



NC-A



90°  
HSS

10 525 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm |       |
|------------------------|-----------|-----------|-------|
| 6,35                   | 105       | 17        | 025   |
| 8,00                   | 118       | 21        | 030   |
| 9,52                   | 132       | 25        | 040   |
| 12,70                  | 159       | 30        | 050   |
| 15,87                  | 186       | 37        | 060   |
| 19,05                  | 213       | 45        | 075   |
| P                      |           |           | 15-35 |
| M                      |           |           | 10    |
| K                      |           |           | 20-35 |
| N                      |           |           | 50-70 |
| S                      |           |           |       |
| H                      |           |           |       |
| O                      |           |           |       |



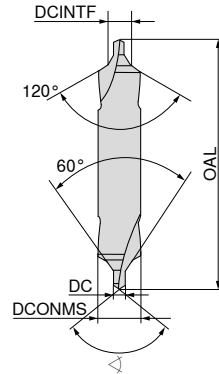
Yalnızca merkezleme matkabından sonra kullanılabilir

## Punta matkapları, DIN 333, Form B

▲ 120° koruyucu havşalı

ZB

ZB



Sağ  
118°  
HSS

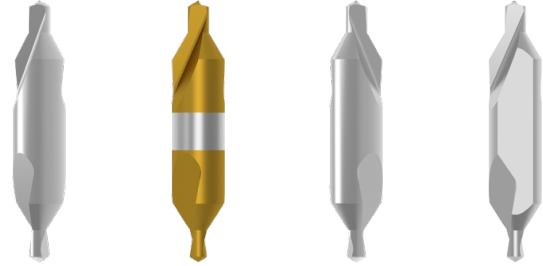
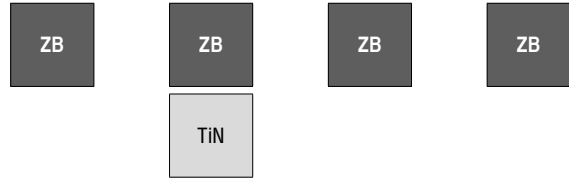
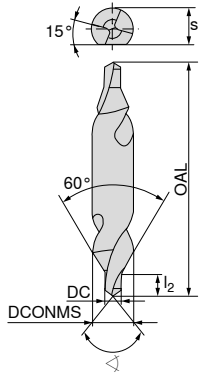
Sol  
118°  
HSS

10 480 ...

10 485 ...

| DC<br>mm | DCONMS <sub>h8</sub><br>mm | DCINTF <sub>k12</sub><br>mm | OAL<br>mm |       |       |
|----------|----------------------------|-----------------------------|-----------|-------|-------|
| 1,00     | 4,0                        | 2,12                        | 35,5      | 100   | 100   |
| 1,25     | 5,0                        | 2,65                        | 40,0      | 125   | 125   |
| 1,60     | 6,3                        | 3,35                        | 45,0      | 160   | 160   |
| 2,00     | 8,0                        | 4,25                        | 50,0      | 200   | 200   |
| 2,50     | 10,0                       | 5,30                        | 56,0      | 250   | 250   |
| 3,15     | 11,2                       | 6,70                        | 62,0      | 315   | 315   |
| 4,00     | 14,0                       | 8,50                        | 69,0      | 400   | 400   |
| 5,00     | 18,0                       | 10,60                       | 77,0      | 500   | 500   |
| P        |                            |                             |           | 15-35 | 15-35 |
| M        |                            |                             |           | 10    | 10    |
| K        |                            |                             |           | 20-35 | 20-35 |
| N        |                            |                             |           | 50-70 | 50-70 |
| S        |                            |                             |           |       |       |
| H        |                            |                             |           |       |       |
| O        |                            |                             |           |       |       |

## Punta matkapları, DIN 333, Form A



Sağ  
118°  
HSS

Sağ  
118°  
HSS

Sol  
118°  
HSS

Sağ  
118°  
HSS-E

| 10 415 ...        | 10 425 ...        | 10 435 ...        | 10 445 ...        |
|-------------------|-------------------|-------------------|-------------------|
| 050 <sup>2)</sup> | 050 <sup>2)</sup> | 050 <sup>2)</sup> |                   |
| 080 <sup>2)</sup> | 080 <sup>2)</sup> | 080 <sup>2)</sup> |                   |
| 100               | 100               | 100               |                   |
| 125               | 125               | 125               |                   |
| 160               | 160               | 160               | 160 <sup>1)</sup> |
| 200               | 200               | 200               | 200 <sup>1)</sup> |
| 250               | 250               | 250               | 250 <sup>1)</sup> |
| 315               | 315               | 315               | 315 <sup>1)</sup> |
| 400               | 400               | 400               | 400 <sup>1)</sup> |
| 500               | 500               | 500               | 500 <sup>1)</sup> |
| 630               | 630               | 630               | 630 <sup>1)</sup> |

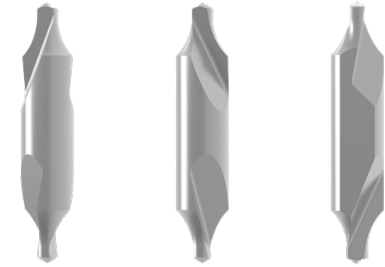
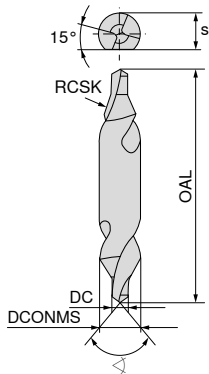
| DC<br>mm | s<br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | l <sub>2</sub><br>mm |
|----------|---------|----------------------------|-----------|----------------------|
| 0,50     |         | 3,15                       | 25,0      | 0,8                  |
| 0,80     |         | 3,15                       | 25,0      | 1,1                  |
| 1,00     |         | 3,15                       | 31,5      | 1,3                  |
| 1,25     |         | 3,15                       | 31,5      | 1,6                  |
| 1,60     | 3,25    | 4,00                       | 35,5      | 2,0                  |
| 1,60     |         | 4,00                       | 35,5      | 2,0                  |
| 2,00     | 4,20    | 5,00                       | 40,0      | 2,5                  |
| 2,00     |         | 5,00                       | 40,0      | 2,5                  |
| 2,50     | 5,35    | 6,30                       | 45,0      | 3,1                  |
| 2,50     |         | 6,30                       | 45,0      | 3,1                  |
| 3,15     | 6,95    | 8,00                       | 50,0      | 3,9                  |
| 3,15     |         | 8,00                       | 50,0      | 3,9                  |
| 4,00     | 8,40    | 10,00                      | 56,0      | 5,0                  |
| 4,00     |         | 10,00                      | 56,0      | 5,0                  |
| 5,00     | 10,95   | 12,50                      | 63,0      | 6,3                  |
| 5,00     |         | 12,50                      | 63,0      | 6,3                  |
| 6,30     | 14,00   | 16,00                      | 71,0      | 8,0                  |
| 6,30     |         | 16,00                      | 71,0      | 8,0                  |

|   |       |       |       |       |
|---|-------|-------|-------|-------|
| P | 15-35 | 25-55 | 15-35 | 15-35 |
| M | 10    | 20    | 10    | 10    |
| K | 20-35 | 30-55 | 20-35 | 20-35 |
| N | 50-70 | 65-85 | 50-70 | 50-70 |
| S |       |       |       |       |
| H |       |       |       |       |
| O |       |       |       |       |

1) Düz yüzeyli

2) Sadece tek taraflı olarak kullanılabilir.

## Punta matkapları, DIN 333, Form R



Sağ  
118°  
HSS

Sol  
118°  
HSS

Sağ  
118°  
HSS

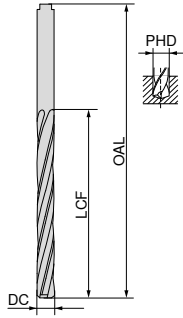
| 10 455 ...        | 10 475 ...        | 10 465 ...        |
|-------------------|-------------------|-------------------|
| 050 <sup>2)</sup> |                   |                   |
| 080 <sup>2)</sup> | 080 <sup>2)</sup> |                   |
| 100               | 100               |                   |
| 125               | 125               |                   |
| 160               | 160               | 160 <sup>1)</sup> |
| 200               | 200               | 200 <sup>1)</sup> |
| 250               | 250               | 250 <sup>1)</sup> |
| 315               | 315               | 315 <sup>1)</sup> |
| 400               | 400               | 400 <sup>1)</sup> |
| 500               | 500               | 500 <sup>1)</sup> |
| 630               |                   | 630 <sup>1)</sup> |
| P                 | 15-35             | 15-35             |
| M                 | 10                | 10                |
| K                 | 20-35             | 20-35             |
| N                 | 50-70             | 50-70             |
| S                 |                   |                   |
| H                 |                   |                   |
| O                 |                   |                   |

1) Düz yüzeyli

2) Sadece tek taraflı olarak kullanılabilir.

## Karot matkapları (konik havşa)

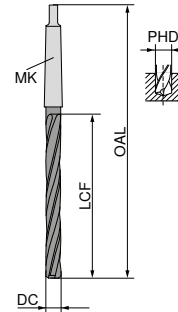
▲ Silindirik saplı, DIN 344

120°  
HSS

10 226 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | PHD<br>mm |       |
|------------------------|-----------|-----------|-----------|-------|
| 3,80                   | 96        | 64        | 2,8       | 038   |
| 4,00                   | 96        | 64        | 2,8       | 040   |
| 4,80                   | 108       | 74        | 3,5       | 048   |
| 5,00                   | 108       | 74        | 3,5       | 050   |
| 5,80                   | 116       | 80        | 4,2       | 058   |
| 6,00                   | 116       | 80        | 4,2       | 060   |
| 6,80                   | 133       | 93        | 4,9       | 068   |
| 7,00                   | 133       | 93        | 4,9       | 070   |
| 7,80                   | 142       | 100       | 5,6       | 078   |
| 8,00                   | 142       | 100       | 5,6       | 080   |
| 8,80                   | 151       | 107       | 6,3       | 088   |
| 9,00                   | 151       | 107       | 6,3       | 090   |
| 9,80                   | 162       | 116       | 7,0       | 098   |
| 10,00                  | 162       | 116       | 7,0       | 100   |
| 10,75                  | 173       | 125       | 7,7       | 107   |
| 11,00                  | 173       | 125       | 7,7       | 110   |
| 11,75                  | 184       | 134       | 8,4       | 117   |
| 12,00                  | 184       | 134       | 8,4       | 120   |
| P                      |           |           |           | 15-35 |
| M                      |           |           |           | 10    |
| K                      |           |           |           | 20-35 |
| N                      |           |           |           | 50-80 |
| S                      |           |           |           | 14-28 |
| H                      |           |           |           |       |
| O                      |           |           |           |       |

## Karot matkapları (konik havşa)



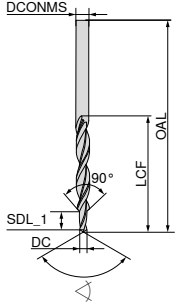
10 228 ...

| DC <sub>h8</sub><br>mm | OAL<br>mm | LCF<br>mm | PHD<br>mm | MK |       |
|------------------------|-----------|-----------|-----------|----|-------|
| 10,00                  | 168       | 87        | 7,0       | 1  | 100   |
| 10,75                  | 175       | 94        | 7,7       | 1  | 107   |
| 11,00                  | 175       | 94        | 7,7       | 1  | 110   |
| 11,75                  | 182       | 101       | 8,4       | 1  | 117   |
| 12,00                  | 182       | 101       | 8,4       | 1  | 120   |
| 12,75                  | 182       | 101       | 9,1       | 1  | 127   |
| 13,00                  | 182       | 101       | 9,1       | 1  | 130   |
| 13,75                  | 189       | 108       | 9,8       | 1  | 137   |
| 14,00                  | 189       | 108       | 9,8       | 1  | 140   |
| 14,75                  | 212       | 114       | 10,5      | 2  | 147   |
| 15,00                  | 212       | 114       | 10,5      | 2  | 150   |
| 15,75                  | 218       | 120       | 11,2      | 2  | 157   |
| 16,00                  | 218       | 120       | 11,2      | 2  | 160   |
| 16,75                  | 223       | 125       | 11,9      | 2  | 167   |
| 17,00                  | 223       | 125       | 11,9      | 2  | 170   |
| 17,75                  | 228       | 130       | 12,6      | 2  | 177   |
| 18,00                  | 228       | 130       | 12,6      | 2  | 180   |
| 18,70                  | 233       | 135       | 13,3      | 2  | 187   |
| 19,00                  | 233       | 135       | 13,3      | 2  | 190   |
| 19,70                  | 238       | 140       | 14,0      | 2  | 197   |
| 20,00                  | 238       | 140       | 14,0      | 2  | 200   |
| 20,70                  | 243       | 145       | 14,6      | 2  | 207   |
| 21,00                  | 243       | 145       | 14,6      | 2  | 210   |
| 21,70                  | 248       | 150       | 15,3      | 2  | 217   |
| 22,00                  | 248       | 150       | 15,3      | 2  | 220   |
| 22,70                  | 253       | 155       | 16,0      | 2  | 227   |
| 23,00                  | 253       | 155       | 16,0      | 2  | 230   |
| 23,70                  | 281       | 160       | 16,6      | 3  | 237   |
| 24,00                  | 281       | 160       | 16,6      | 3  | 240   |
| 24,70                  | 281       | 160       | 17,3      | 3  | 247   |
| 25,00                  | 281       | 160       | 17,3      | 3  | 250   |
| 25,70                  | 286       | 165       | 18,0      | 3  | 257   |
| 26,00                  | 286       | 165       | 18,0      | 3  | 260   |
| 26,70                  | 291       | 170       | 18,6      | 3  | 267   |
| 27,00                  | 291       | 170       | 18,6      | 3  | 270   |
| 27,70                  | 291       | 170       | 19,3      | 3  | 277   |
| 28,00                  | 291       | 170       | 19,3      | 3  | 280   |
| 28,70                  | 296       | 175       | 20,0      | 3  | 287   |
| 29,00                  | 296       | 175       | 20,0      | 3  | 290   |
| 29,70                  | 296       | 175       | 20,5      | 3  | 297   |
| 30,00                  | 296       | 175       | 20,5      | 3  | 300   |
| P                      |           |           |           |    | 15-35 |
| M                      |           |           |           |    | 10    |
| K                      |           |           |           |    | 20-35 |
| N                      |           |           |           |    | 50-80 |
| S                      |           |           |           |    | 14-28 |
| H                      |           |           |           |    |       |
| O                      |           |           |           |    |       |



## Çok fazlı kademeli matkaplar, DIN 8378

- ▲ Konik havşa açısı 90°
- ▲ DIN 336, Tablo 1'e göre 90° girintili diş havşa başları için ve DIN EN 20273'e göre boydan boya delikler için – orta
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir

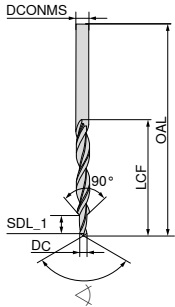


10 365 ...

| Diş ölçüsü | DC <sub>h6</sub><br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |
|------------|------------------------|----------------------------|-----------|-------------|-----------|
| M3         | 2,5                    | 3,4                        | 70        | 8,8         | 39        |
| M4         | 3,3                    | 4,5                        | 80        | 11,4        | 47        |
| M5         | 4,2                    | 5,5                        | 93        | 13,6        | 57        |
| M6         | 5,0                    | 6,6                        | 101       | 16,5        | 63        |
| M8         | 6,8                    | 9,0                        | 125       | 21,0        | 81        |
| M10        | 8,5                    | 11,0                       | 142       | 25,5        | 94        |
| M12        | 10,2                   | 13,5                       | 160       | 30,0        | 108       |

030  
040  
050  
060  
080  
100  
120

- ▲ DIN EN 20273 uyarınca delikler – hassas
- ▲ 90° açılı vida başlı geçiş delikleri için
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir



10 355 ...

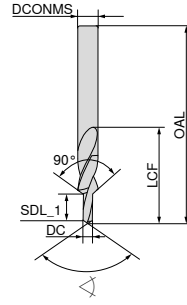
| Diş ölçüsü | DC <sub>h6</sub><br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |
|------------|------------------------|----------------------------|-----------|-------------|-----------|
| M3         | 3,2                    | 6,0                        | 93        | 9           | 57        |
| M4         | 4,3                    | 8,0                        | 117       | 11          | 75        |
| M5         | 5,3                    | 10,0                       | 133       | 13          | 87        |
| M6         | 6,4                    | 11,5                       | 142       | 15          | 94        |
| M8         | 8,4                    | 15,0                       | 169       | 19          | 114       |
| M10        | 10,5                   | 19,0                       | 198       | 23          | 135       |

030  
040  
050  
060  
080  
100

|   |       |
|---|-------|
| P | 15-35 |
| M | 10    |
| K | 20-35 |
| N | 50-80 |
| S |       |
| H |       |
| O |       |

## Kademeli matkaplar, DIN 1897 uyarınca toplam uzunluk

- ▲ Konik havşa açısı 90°
- ▲ DIN 336, Tablo 1'e göre 90° girintili diş havşa başları için ve DIN EN 20273'e göre boydan boya delikler için – orta
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir

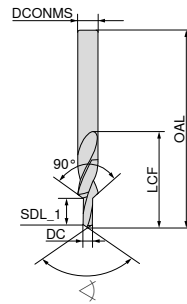


10 320 ...

| Diş ölçüsü | DC <sub>h6</sub><br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |
|------------|------------------------|----------------------------|-----------|-------------|-----------|
| M3         | 2,5                    | 3,4                        | 52        | 8,8         | 20        |
| M4         | 3,3                    | 4,5                        | 58        | 11,4        | 24        |
| M5         | 4,2                    | 5,5                        | 66        | 13,6        | 28        |
| M6         | 5,0                    | 6,6                        | 70        | 16,5        | 31        |
| M8         | 6,8                    | 9,0                        | 84        | 21,0        | 40        |
| M10        | 8,5                    | 11,0                       | 95        | 25,5        | 47        |
| M12        | 10,2                   | 13,5                       | 107       | 30,0        | 54        |

030  
040  
050  
060  
080  
100  
120

- ▲ DIN EN 20273 uyarınca delikler – hassas
- ▲ 90° açılı vida başlı
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir



10 330 ...

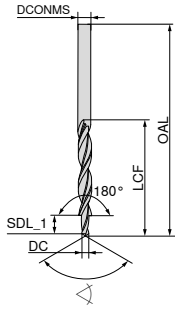
| Diş ölçüsü | DC <sub>h6</sub><br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |
|------------|------------------------|----------------------------|-----------|-------------|-----------|
| M3         | 3,2                    | 6,0                        | 66        | 9           | 28        |
| M4         | 4,3                    | 8,0                        | 79        | 11          | 37        |
| M5         | 5,3                    | 10,0                       | 89        | 13          | 43        |
| M6         | 6,4                    | 11,5                       | 95        | 15          | 47        |
| M8         | 8,4                    | 15,0                       | 111       | 19          | 56        |
| M10        | 10,5                   | 19,0                       | 127       | 23          | 64        |

030  
040  
050  
060  
080  
100

|   |       |
|---|-------|
| P | 15-35 |
| M | 10    |
| K | 20-35 |
| N | 50-80 |
| S |       |
| H |       |
| O |       |

## Çok fazlı kademeli matkaplar, DIN 8376

- ▲ Konik havşa açısı 180°
- ▲ DIN EN 20273 uyarınca geçiş delikleri için – orta
- ▲ DIN 974-1 – Sıra 1 uyarınca açılı vida başı havşaları açmak içi
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir



118°  
HSS

10 375 ...

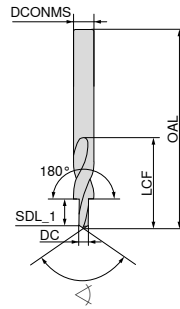
| Diş ölçüsü | DC <sub>h9</sub><br>mm | DCONMS <sub>h8</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |                   |
|------------|------------------------|----------------------------|-----------|-------------|-----------|-------------------|
| M3         | 3,4                    | 6                          | 93        | 9           | 57        | 030 <sup>1)</sup> |
| M4         | 4,5                    | 8                          | 117       | 11          | 75        | 040               |
| M5         | 5,5                    | 10                         | 133       | 13          | 87        | 050               |
| M6         | 6,6                    | 11                         | 142       | 15          | 94        | 060               |
| M8         | 9,0                    | 15                         | 169       | 19          | 114       | 080               |
| M10        | 11,0                   | 18                         | 191       | 23          | 130       | 100               |

|   |       |
|---|-------|
| P | 15-35 |
| M | 10    |
| K | 20-35 |
| N | 50-80 |
| S |       |
| H |       |
| O |       |

1) DCONMS DIN 974-1'e göre değildir

Kademeli matkaplar, fabrika standardı,  
DIN 1897 uyarınca toplam uzunluk

- ▲ Konik havşa açısı 180°
- ▲ DIN EN 20273 uyarınca geçiş delikleri için – orta
- ▲ DIN 974-1 – Sıra 1 uyarınca açılı vida başı havşaları açmak içi
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir



118°  
HSS

10 340 ...

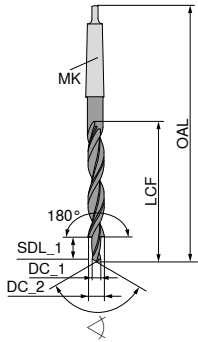
| Diş ölçüsü | DC <sub>h6</sub><br>mm | DCONMS <sub>h6</sub><br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm |                   |
|------------|------------------------|----------------------------|-----------|-------------|-----------|-------------------|
| M3         | 3,4                    | 6                          | 66        | 9           | 28        | 030 <sup>1)</sup> |
| M4         | 4,5                    | 8                          | 79        | 11          | 37        | 040               |
| M5         | 5,5                    | 10                         | 89        | 13          | 43        | 050               |
| M6         | 6,6                    | 11                         | 95        | 15          | 47        | 060               |
| M8         | 9,0                    | 15                         | 111       | 19          | 56        | 080               |
| M10        | 11,0                   | 18                         | 123       | 23          | 62        | 100               |

|   |       |
|---|-------|
| P | 15-35 |
| M | 10    |
| K | 20-35 |
| N | 50-80 |
| S |       |
| H |       |
| O |       |

1) DCONMS DIN 974-1'e göre değildir

## Çok fazlı kademeli matkaplar, DIN 8377

- ▲ Konik havşa açısı 180°
- ▲ DIN EN 20273 uyarınca geçiş delikleri için – orta
- ▲ DIN 974-1 – Sıra 1 uyarınca açılı vida başı havşaları açmak içi
- ▲ İlerleme, küçük Ø DC'ye göre seçilmelidir



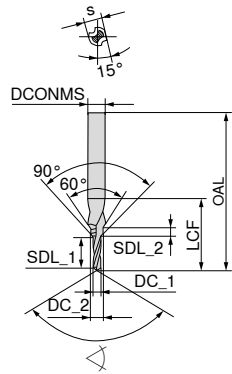
HSS

10 405 ...

| Diş ölçüsü | DC_1<br>mm | DC_2<br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm | MK |     |
|------------|------------|------------|-----------|-------------|-----------|----|-----|
| M5         | 5,5        | 10         | 168       | 13          | 87        | 1  | 050 |
| M6         | 6,6        | 11         | 175       | 15          | 94        | 1  | 060 |
| M8         | 9,0        | 15         | 212       | 19          | 114       | 2  | 080 |
| M10        | 11,0       | 18         | 228       | 23          | 130       | 2  | 100 |
| M12        | 13,5       | 20         | 238       | 27          | 140       | 2  | 120 |
| M14        | 15,5       | 24         | 281       | 31          | 160       | 3  | 140 |
| M16        | 17,5       | 26         | 286       | 35          | 165       | 3  | 160 |
| M18        | 20,0       | 30         | 296       | 39          | 175       | 3  | 180 |
| M20        | 22,0       | 33         | 334       | 43          | 185       | 4  | 200 |
| P15-35     |            |            |           |             |           |    |     |
| M10        |            |            |           |             |           |    |     |
| K20-35     |            |            |           |             |           |    |     |
| N50-80     |            |            |           |             |           |    |     |
| S          |            |            |           |             |           |    |     |
| H          |            |            |           |             |           |    |     |
| O          |            |            |           |             |           |    |     |

## Puntalama için kademeli matkaplar, fabrika standardı

- ▲ yüzeyli
- ▲ Konik havşa açısı 60°
- ▲ Puntalı dış delikleri açmak için özel matkaplar, konik havşa açısı 60°, DIN 332, Sayfa 2, Form D uyarınca.
- ▲ Delme ucu  $\geq \varnothing 3,3$  mm
- ▲ İlerleme, küçük  $\varnothing$  DC'ye göre seçilmelidir



SB

vap.

118°  
HSS

10 350 ...

| Diş ölçüsü | DC_1<br>mm <sub>H8</sub> | DCONMS<br>mm <sub>H7</sub> | DC_2<br>mm | s<br>mm | OAL<br>mm | SDL_1<br>mm | LCF<br>mm | SDL_2<br>mm |
|------------|--------------------------|----------------------------|------------|---------|-----------|-------------|-----------|-------------|
| M4         | 3,3                      | 8,0                        | 4,3        | 6,75    | 63        | 11,0        | 23        | 1,60        |
| M5         | 4,2                      | 10,0                       | 5,3        | 8,45    | 67        | 13,0        | 27        | 2,15        |
| M6         | 5,0                      | 12,5                       | 6,4        | 10,45   | 71        | 16,0        | 33        | 2,90        |
| M8         | 6,8                      | 14,0                       | 8,4        | 12,50   | 88        | 19,5        | 41        | 3,50        |
| M10        | 8,5                      | 16,0                       | 10,5       | 14,85   | 94        | 23,0        | 47        | 4,70        |
| M12        | 10,2                     | 20,0                       | 13,0       | 18,45   | 105       | 28,0        | 59        | 6,50        |
| M16        | 14,0                     | 25,0                       | 17,0       | 23,40   | 132       | 33,0        | 67        | 8,30        |
| M20        | 17,5                     | 31,5                       | 21,0       | 29,35   | 145       | 38,0        | 77        | 10,35       |
| M24        | 21,0                     | 40,0                       | 25,0       | 36,50   | 160       | 45,0        | 90        | 12,00       |

040

050

060

080

100

120

160

200

240

|   |       |
|---|-------|
| P | 15-35 |
| M | 10    |
| K | 20-35 |
| N | 50-80 |
| S |       |
| H |       |
| O |       |

## Kesme verileri tablolarına ilişkin malzeme örnekleri

|   | Malzeme alt grubu                                     | Dizin | Bileşim / yapı / ısıt işlem                 | Çekme mukavemeti<br>N/mm² / HB / HRC | Malzeme<br>numarası | Malzeme tanımı | Malzeme<br>numarası        | Malzeme tanımı |                    |
|---|-------------------------------------------------------|-------|---------------------------------------------|--------------------------------------|---------------------|----------------|----------------------------|----------------|--------------------|
| P | Alaşımsız çelik                                       | P.1.1 | < 0,15 % C                                  | tavlınmış                            | 420 N/mm² / 125 HB  | 1.0401         | C15                        | 1.1141         | Ck15               |
|   |                                                       | P.1.2 | < 0,45 % C                                  | tavlınmış                            | 640 N/mm² / 190 HB  | 1.1191         | C45E                       | 1.0718         | 9SMnPb28           |
|   |                                                       | P.1.3 |                                             | temperlenmiş                         | 840 N/mm² / 250 HB  | 1.1191         | C45E                       | 1.0535         | C55                |
|   |                                                       | P.1.4 |                                             | tavlınmış                            | 910 N/mm² / 270 HB  | 1.1223         | C60R                       | 1.0535         | C55                |
|   |                                                       | P.1.5 | < 0,75 % C                                  | temperlenmiş                         | 1010 N/mm² / 300 HB | 1.1223         | C60R                       | 1.0727         | 45S20              |
|   | Düşük alaşımlı çelik                                  | P.2.1 |                                             | tavlınmış                            | 610 N/mm² / 180 HB  | 1.7131         | 16MnCr5                    | 1.6587         | 17CrNiMo6          |
|   |                                                       | P.2.2 |                                             | temperlenmiş                         | 930 N/mm² / 275 HB  | 1.7131         | 16MnCr5                    | 1.6587         | 17CrNiMo6          |
|   |                                                       | P.2.3 |                                             | temperlenmiş                         | 1010 N/mm² / 300 HB | 1.7225         | 42CrMo4                    | 1.3505         | 100Cr6             |
|   |                                                       | P.2.4 |                                             | temperlenmiş                         | 1200 N/mm² / 375 HB | 1.7225         | 42CrMo4                    | 1.3505         | 100Cr6             |
|   | Yüksek alaşımlı çelik ve yüksek alaşımlı takım çeliği | P.3.1 |                                             | tavlınmış                            | 680 N/mm² / 200 HB  | 1.4021         | X20Cr13                    | 1.4034         | X46Cr13            |
|   |                                                       | P.3.2 |                                             | sertleştirilmiş ve temperlenmiş      | 1100 N/mm² / 300 HB | 1.2343         | X38CrMoV5-1                | 1.4034         | X46Cr13            |
|   |                                                       | P.3.3 |                                             | sertleştirilmiş ve temperlenmiş      | 1300 N/mm² / 400 HB | 1.2343         | X38CrMoV5-1                | 1.4034         | X46Cr13            |
|   | Paslanmaz çelik                                       | P.4.1 | ferritik / martensitik                      | tavlınmış                            | 680 N/mm² / 200 HB  | 1.4016         | X6Cr17                     | 1.2316         | X36CrMo16          |
|   |                                                       | P.4.2 | martensitik                                 | temperlenmiş                         | 1010 N/mm² / 300 HB | 1.4112         | X90CrMoV18                 | 1.2316         | X36CrMo16          |
| M | Paslanmaz çelik                                       | M.1.1 | östenitik / östenitik-ferritik              | su verilmiş                          | 610 N/mm² / 180 HB  | 1.4301         | X5CrNi18-10                | 1.4571         | X6CrNiMoTi17-12-2  |
|   |                                                       | M.2.1 | östenitik                                   | temperlenmiş                         | 300 HB              | 1.4841         | X15CrNiSi25-21             | 1.4539         | X1NiCrMoCu25-20-5  |
|   |                                                       | M.3.1 | östenitik / ferritik (dubleks)              |                                      | 780 N/mm² / 230 HB  | 1.4462         | X2CrNiMoN22-5-3            | 1.4501         | X2CrNiMoCuWN25-7-4 |
| K | Gri dökme demir                                       | K.1.1 | perlitik / ferritik                         |                                      | 350 N/mm² / 180 HB  | 0.6010         | GG-10                      | 0.6025         | GG-25              |
|   |                                                       | K.1.2 | perlitik (martensitik)                      |                                      | 500 N/mm² / 260 HB  | 0.6030         | GG-30                      | 0.6045         | GG-45              |
|   | Küresel grafitli dökme demir                          | K.2.1 | ferritik                                    |                                      | 540 N/mm² / 160 HB  | 0.7040         | GGG-40                     | 0.7060         | GGG-60             |
|   |                                                       | K.2.2 | perlitik                                    |                                      | 845 N/mm² / 250 HB  | 0.7070         | GGG-70                     | 0.7080         | GGG-80             |
|   | Temper döküm                                          | K.3.1 | ferritik                                    |                                      | 440 N/mm² / 130 HB  | 0.8035         | GTW-35-04                  | 0.8045         | GTW-45             |
|   |                                                       | K.3.2 | perlitik                                    |                                      | 780 N/mm² / 230 HB  | 0.8165         | GTS-65-02                  | 0.8170         | GTS-70-02          |
| N | Alüminyum yoğurma alaşımı                             | N.1.1 | sertleştirilemez                            |                                      | 60 HB               | 3.0255         | Al99,5                     | 3.3315         | AlMg1              |
|   |                                                       | N.1.2 | sertleştirilebilir                          | sertleştirilmiş                      | 340 N/mm² / 100 HB  | 3.1355         | AlCuMg2                    | 3.2315         | AlMgSi1            |
|   | Alüminyum döküm alaşımları                            | N.2.1 | ≤ 12 % Si, sertleştirilemez                 |                                      | 250 N/mm² / 75 HB   | 3.2581         | G-AlSi12                   | 3.2163         | G-AlSi9Cu3         |
|   |                                                       | N.2.2 | ≤ 12 % Si, sertleştirilebilir               | sertleştirilmiş                      | 300 N/mm² / 90 HB   | 3.2134         | G-AlSi5Cu1Mg               | 3.2373         | G-AlSi9Mg          |
|   |                                                       | N.2.3 | > 12 % Si, sertleştirilemez                 |                                      | 440 N/mm² / 130 HB  |                | G-AlSi17Cu4Mg              |                | G-AlSi18CuNiMg     |
|   | Bakır ve bakır alaşımları (Bronz, Piring)             | N.3.1 | Otomat alaşımları, PB > 1 %                 |                                      | 375 N/mm² / 110 HB  | 2.0380         | CuZn39Pb2 (Ms58)           | 2.0410         | CuZn44Pb2          |
|   |                                                       | N.3.2 | CuZn, CuSnZn                                |                                      | 300 N/mm² / 90 HB   | 2.0331         | CuZn15                     | 2.4070         | CuZn28Sn1As        |
|   |                                                       | N.3.3 | CuSn, kurşunsuz bakır ve elektrolitik bakır |                                      | 340 N/mm² / 100 HB  | 2.0060         | E-Cu57                     | 2.0590         | CuZn40Fe           |
|   | Magnezyum alaşımları                                  | N.4.1 | Magnezyum ve magnezyum alaşımları           |                                      | 70 HB               | 3.5612         | MgAl6Zn                    | 3.5312         | MgAl3Zn            |
| S | Isıya dayanıklı alaşımlar                             | S.1.1 | FE bazlı                                    | tavlınmış                            | 680 N/mm² / 200 HB  | 1.4864         | X12NiCrSi 36-16            | 1.4865         | G-X40NiCrSi38-18   |
|   |                                                       | S.1.2 |                                             | sertleştirilmiş                      | 950 N/mm² / 280 HB  | 1.4980         | X6NiCrTiMoVB25-15-2        | 1.4876         | X10NiCrAlTi32-20   |
|   |                                                       | S.2.1 | Ni veya Co bazlı                            | tavlınmış                            | 840 N/mm² / 250 HB  | 2.4631         | NiCr20TiAl (Nimonic80A)    | 3.4856         | NiCr22Mo9Nb        |
|   |                                                       | S.2.2 |                                             | sertleştirilmiş                      | 1180 N/mm² / 350 HB | 2.4668         | NiCr19Nb5Mo3 (Inconel 718) | 2.4955         | NiFe25Cr20NbTi     |
|   |                                                       | S.2.3 |                                             | dökülmüş                             | 1080 N/mm² / 320 HB | 2.4765         | CoCr20W15Ni                | 1.3401         | G-X120Mn12         |
|   | Titanyum alaşımları                                   | S.3.1 | Saf titanyum                                |                                      | 400 N/mm²           | 3.7025         | Ti99,8                     | 3.7034         | Ti99,7             |
|   |                                                       | S.3.2 | Alfa + Beta alaşımları                      | sertleştirilmiş                      | 1050 N/mm² / 320 HB | 3.7165         | TiAl6V4                    | Ti-6246        | Ti-6Al-2Sn-4Zr-6Mo |
|   |                                                       | S.3.3 | Beta alaşımları                             |                                      | 1400 N/mm² / 410 HB | Ti555.3        | Ti-5Al-5V-5Mo-3Cr          | R56410         | Ti-10V-2Fe-3Al     |
| H | Sertleştirilmiş çelik                                 | H.1.1 | sertleştirilmiş ve temperlenmiş             |                                      | 46-55 HRC           |                |                            |                |                    |
|   |                                                       | H.1.2 |                                             |                                      | 56-60 HRC           |                |                            |                |                    |
|   |                                                       | H.1.3 |                                             |                                      | 61-65 HRC           |                |                            |                |                    |
|   |                                                       | H.1.4 |                                             |                                      | 66-70 HRC           |                |                            |                |                    |
|   | Sert döküm                                            | H.2.1 | dökülmüş                                    | 400 HB                               |                     |                |                            |                |                    |
|   | Sertleştirilmiş dökme demir                           | H.3.1 | sertleştirilmiş ve temperlenmiş             | 55 HRC                               |                     |                |                            |                |                    |
| O | Metal dışı malzemeler                                 | O.1.1 | Plastikler, termoset plastik                |                                      | ≤ 150 N/mm²         |                |                            |                |                    |
|   |                                                       | O.1.2 | Plastikler, termoplastik                    |                                      | ≤ 100 N/mm²         |                |                            |                |                    |
|   |                                                       | O.2.1 | aramid elyaf takviyeli                      |                                      | ≤ 1000 N/mm²        |                |                            |                |                    |
|   |                                                       | O.2.2 | cam / karbon elyaf takviyeli                |                                      | ≤ 1000 N/mm²        |                |                            |                |                    |
|   |                                                       | O.3.1 | Grafit                                      |                                      |                     |                |                            |                |                    |

\* çekme mukavemeti

## Kesme verileri referans değerleri – Delme derinliği 3xD

| İçinde-<br>kiler | Tip VX-TiN<br>10 122 ... |   | Tip UNI-PM-TiN<br>10 113 ... |   | Tip UNI-TiN<br>10 107 ... |   | Tip N<br>10 105 ...  |   | Tip VA<br>10 130 ... |   | Tip WNX<br>10 106 ... |   |
|------------------|--------------------------|---|------------------------------|---|---------------------------|---|----------------------|---|----------------------|---|-----------------------|---|
|                  | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min         | F | v <sub>c</sub> m/min      | F | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min  | F |
| P.1.1            | 46                       | 6 | 44                           | 6 | 46                        | 6 | 28                   | 6 | 38                   | 5 | 38                    | 6 |
| P.1.2            | 39                       | 5 | 37                           | 5 | 39                        | 5 | 24                   | 5 | 32                   | 4 | 32                    | 5 |
| P.1.3            | 35                       | 5 | 33                           | 5 | 35                        | 5 | 21                   | 5 | 29                   | 4 | 29                    | 5 |
| P.1.4            | 32                       | 5 | 31                           | 5 | 32                        | 5 | 20                   | 5 | 27                   | 4 | 27                    | 5 |
| P.1.5            | 28                       | 5 | 26                           | 5 | 28                        | 5 | 17                   | 5 |                      |   | 23                    | 5 |
| P.2.1            | 35                       | 5 | 32                           | 6 | 35                        | 5 | 17                   | 4 | 25                   | 5 | 28                    | 6 |
| P.2.2            | 24                       | 4 | 23                           | 5 | 24                        | 4 | 12                   | 3 | 18                   | 4 | 20                    | 5 |
| P.2.3            | 21                       | 4 | 19                           | 5 | 21                        | 4 | 10                   | 3 |                      |   | 17                    | 5 |
| P.2.4            | 19                       | 3 | 18                           | 4 | 19                        | 3 | 9                    | 2 |                      |   | 15                    | 4 |
| P.3.1            | 17                       | 4 | 21                           | 4 | 17                        | 4 | 13                   | 4 |                      |   | 18                    | 4 |
| P.3.2            | 13                       | 3 | 16                           | 3 | 13                        | 3 |                      |   |                      |   | 14                    | 3 |
| P.3.3            | 12                       | 3 | 15                           | 3 | 12                        | 3 |                      |   |                      |   | 13                    | 3 |
| P.4.1            | 18                       | 4 | 14                           | 3 | 18                        | 4 |                      |   | 15                   | 3 | 13                    | 3 |
| P.4.2            | 17                       | 3 | 14                           | 2 | 17                        | 3 |                      |   | 14                   | 2 | 12                    | 2 |
| M.1.1            | 15                       | 4 |                              |   | 15                        | 4 |                      |   | 13                   | 3 |                       |   |
| M.2.1            | 12                       | 3 |                              |   | 12                        | 3 |                      |   | 11                   | 2 |                       |   |
| M.3.1            | 10                       | 3 |                              |   | 10                        | 3 |                      |   | 9                    | 2 |                       |   |
| K.1.1            | 41                       | 6 | 46                           | 6 | 41                        | 6 | 30                   | 6 |                      |   | 40                    | 6 |
| K.1.2            | 33                       | 6 | 37                           | 6 | 33                        | 6 | 24                   | 6 |                      |   | 32                    | 6 |
| K.2.1            | 35                       | 6 | 39                           | 6 | 35                        | 6 | 26                   | 6 |                      |   | 34                    | 6 |
| K.2.2            | 27                       | 5 | 30                           | 5 | 27                        | 5 | 20                   | 5 |                      |   | 26                    | 5 |
| K.3.1            | 35                       | 6 | 39                           | 6 | 35                        | 6 | 26                   | 6 |                      |   | 34                    | 6 |
| K.3.2            | 27                       | 5 | 30                           | 5 | 27                        | 5 | 20                   | 5 |                      |   | 26                    | 5 |
| N.1.1            |                          |   |                              |   |                           |   |                      |   | 80                   | 7 |                       |   |
| N.1.2            |                          |   |                              |   |                           |   |                      |   | 80                   | 7 |                       |   |
| N.2.1            | 75                       | 6 | 69                           | 6 | 75                        | 6 | 50                   | 6 | 65                   | 6 | 60                    | 6 |
| N.2.2            | 60                       | 5 | 55                           | 5 | 60                        | 5 | 40                   | 5 | 52                   | 5 | 48                    | 5 |
| N.2.3            | 52                       | 5 | 48                           | 5 | 52                        | 5 | 35                   | 5 | 46                   | 5 | 42                    | 5 |
| N.3.1            | 69                       | 5 | 64                           | 5 | 69                        | 5 | 60                   | 5 | 60                   | 5 | 56                    | 5 |
| N.3.2            | 41                       | 4 | 39                           | 4 | 41                        | 4 | 36                   | 4 | 36                   | 4 | 34                    | 4 |
| N.3.3            | 55                       | 4 | 52                           | 4 | 55                        | 4 | 48                   | 4 | 48                   | 4 | 45                    | 4 |
| N.4.1            | 70                       | 5 | 60                           | 5 | 70                        | 5 | 45                   | 5 | 6                    | 5 | 55                    | 5 |
| S.1.1            |                          |   | 7                            | 2 |                           |   |                      |   | 8                    | 1 | 6                     | 2 |
| S.1.2            |                          |   | 6                            | 1 |                           |   |                      |   | 6                    | 1 | 5                     | 1 |
| S.2.1            |                          |   | 6                            | 2 |                           |   |                      |   | 7                    | 1 | 5                     | 2 |
| S.2.2            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| S.2.3            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| S.3.1            | 9                        | 2 |                              |   | 9                         | 2 |                      |   | 10                   | 2 |                       |   |
| S.3.2            | 6                        | 1 |                              |   | 6                         | 1 |                      |   | 7                    | 1 |                       |   |
| S.3.3            |                          |   |                              |   |                           |   |                      |   | 6                    | 2 |                       |   |
| H.1.1            |                          |   | 6                            | 1 |                           |   |                      |   |                      |   | 5                     | 1 |
| H.1.2            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| H.1.3            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| H.1.4            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| H.2.1            |                          |   | 10                           | 3 |                           |   |                      |   |                      |   | 9                     | 3 |
| H.3.1            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |
| O.1.1            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   | 20                    | 4 |
| O.1.2            | 29                       | 4 |                              |   | 29                        | 4 | 20                   | 5 |                      |   |                       |   |
| O.2.1            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   | 20                    | 4 |
| O.2.2            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   | 20                    | 4 |
| O.3.1            |                          |   |                              |   |                           |   |                      |   |                      |   |                       |   |



Kesme verileri, takımın ve takım sıkıştırıcının stabilitesi, malzeme ve makine tipi gibi dış faktörlere son derece bağlıdır! Belirtilen değerler, her bir uygulamaya göre artırılması veya azaltılması gerekebilecek muhtemel kesme verileridir.

|  | İçinde-<br>kiler | Tip WT<br>10 109 ... |   | Tip WT-TiN<br>10 110 ... |   | Tip WTL-L<br>10 112 ... |   | Tip WT-MK<br>10 285 ... |   |
|--|------------------|----------------------|---|--------------------------|---|-------------------------|---|-------------------------|---|
|  |                  | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min    | F | v <sub>c</sub> m/min    | F |
|  | P.1.1            | 38                   | 6 | 44                       | 6 | 28                      | 6 | 38                      | 6 |
|  | P.1.2            | 32                   | 5 | 37                       | 5 | 24                      | 5 | 32                      | 5 |
|  | P.1.3            | 29                   | 5 | 33                       | 5 | 21                      | 5 | 29                      | 5 |
|  | P.1.4            | 27                   | 5 | 31                       | 5 | 20                      | 5 | 27                      | 5 |
|  | P.1.5            | 23                   | 5 | 26                       | 5 | 17                      | 5 | 23                      | 5 |
|  | P.2.1            | 25                   | 5 | 29                       | 5 | 17                      | 4 | 25                      | 5 |
|  | P.2.2            | 18                   | 4 | 20                       | 4 | 12                      | 3 | 18                      | 4 |
|  | P.2.3            | 15                   | 4 | 17                       | 4 | 10                      | 3 | 15                      | 4 |
|  | P.2.4            | 14                   | 3 | 16                       | 3 | 9                       | 2 | 14                      | 3 |
|  | P.3.1            | 16                   | 4 | 18                       | 4 | 13                      | 4 | 16                      | 4 |
|  | P.3.2            | 12                   | 3 | 14                       | 3 |                         |   | 12                      | 3 |
|  | P.3.3            | 12                   | 3 | 14                       | 3 |                         |   | 12                      | 3 |
|  | P.4.1            | 14                   | 3 | 17                       | 3 |                         |   | 14                      | 3 |
|  | P.4.2            | 14                   | 2 | 16                       | 2 |                         |   | 14                      | 2 |
|  | M.1.1            | 12                   | 3 | 14                       | 3 |                         |   | 12                      | 3 |
|  | M.2.1            | 10                   | 2 | 12                       | 2 |                         |   | 10                      | 2 |
|  | M.3.1            | 8                    | 2 | 10                       | 2 |                         |   | 8                       | 2 |
|  | K.1.1            | 35                   | 6 | 40                       | 6 | 30                      | 6 | 35                      | 6 |
|  | K.1.2            | 28                   | 6 | 32                       | 6 | 24                      | 6 | 28                      | 6 |
|  | K.2.1            | 30                   | 6 | 34                       | 6 | 26                      | 6 | 30                      | 6 |
|  | K.2.2            | 23                   | 5 | 26                       | 5 | 20                      | 5 | 23                      | 5 |
|  | K.3.1            | 30                   | 6 | 34                       | 6 | 26                      | 6 | 30                      | 6 |
|  | K.3.2            | 23                   | 5 | 26                       | 5 | 20                      | 5 | 23                      | 5 |
|  | N.1.1            |                      |   |                          |   | 60                      | 7 |                         |   |
|  | N.1.2            |                      |   |                          |   | 60                      | 7 |                         |   |
|  | N.2.1            |                      |   |                          |   | 50                      | 6 |                         |   |
|  | N.2.2            |                      |   |                          |   | 40                      | 5 |                         |   |
|  | N.2.3            |                      |   |                          |   | 35                      | 5 |                         |   |
|  | N.3.1            | 62                   | 5 | 71                       | 5 | 60                      | 5 | 62                      | 5 |
|  | N.3.2            | 37                   | 4 | 43                       | 4 | 36                      | 4 | 37                      | 4 |
|  | N.3.3            |                      |   |                          |   | 48                      | 4 |                         |   |
|  | N.4.1            |                      |   |                          |   | 45                      | 5 |                         |   |
|  | S.1.1            | 8                    | 1 | 9                        | 1 |                         |   | 8                       | 1 |
|  | S.1.2            | 6                    | 1 | 7                        | 1 |                         |   | 6                       | 1 |
|  | S.2.1            | 7                    | 1 | 8                        | 1 |                         |   | 7                       | 1 |
|  | S.2.2            |                      |   | 5                        | 1 |                         |   |                         |   |
|  | S.2.3            |                      |   | 6                        | 1 |                         |   |                         |   |
|  | S.3.1            | 10                   | 2 | 12                       | 2 |                         |   | 10                      | 2 |
|  | S.3.2            | 7                    | 1 | 7                        | 1 |                         |   | 7                       | 1 |
|  | S.3.3            | 6                    | 2 | 7                        | 2 |                         |   | 6                       | 2 |
|  | H.1.1            | 4                    | 1 | 5                        | 1 |                         |   | 4                       | 1 |
|  | H.1.2            |                      |   |                          |   |                         |   |                         |   |
|  | H.1.3            |                      |   |                          |   |                         |   |                         |   |
|  | H.1.4            |                      |   |                          |   |                         |   |                         |   |
|  | H.2.1            | 8                    | 3 | 9                        | 3 |                         |   | 8                       | 3 |
|  | H.3.1            |                      |   |                          |   |                         |   |                         |   |
|  | O.1.1            |                      |   |                          |   | 20                      | 4 |                         |   |
|  | O.1.2            |                      |   |                          |   |                         |   |                         |   |
|  | O.2.1            |                      |   |                          |   | 20                      | 4 |                         |   |
|  | O.2.2            |                      |   |                          |   | 20                      | 4 |                         |   |
|  | O.3.1            |                      |   |                          |   |                         |   |                         |   |

**1** Sert yüzeylere delik açarken sıkışmaya eğilimli iş parçalarında delme derinliği  $\geq 4xD$ 'de talaşlar alınmalı ve kesme hızı v<sub>c</sub>, tarif edildiği gibi düşürülmelidir: Delme derinliği  $> 4xD$ 'de %10, delme derinliği  $> 6xD$ 'de %15-20.  
Ayrıca emülsiyon ile soğutulması önerilmektedir.

**1** v<sub>c</sub> = Kesme hızı (m/min.)  
F = İlerleme hesaplama faktörü  
İlerleme referans → **Sayfa 55**



## Kesme verileri referans değerleri – Delme derinliği 5xD

| İçinde-<br>kiler | Tip VX-TiN<br>10 124 ... |   | Tip UNI-PM-TiN<br>10 173 ... |   | Tip UNI-TiN<br>10 171 ... |   | Tip N<br>10 152 ...  |   | Tip VA<br>10 175 ... |   | Tip W<br>10 161 ...  |   | Tip WTL<br>10 168 ... |   |
|------------------|--------------------------|---|------------------------------|---|---------------------------|---|----------------------|---|----------------------|---|----------------------|---|-----------------------|---|
|                  | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min         | F | v <sub>c</sub> m/min      | F | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min  | F |
| P.1.1            | 46                       | 6 | 44                           | 6 | 46                        | 6 | 28                   | 6 | 38                   | 5 |                      |   | 32                    | 6 |
| P.1.2            | 39                       | 5 | 37                           | 5 | 39                        | 5 | 24                   | 5 | 32                   | 4 |                      |   | 27                    | 5 |
| P.1.3            | 35                       | 5 | 33                           | 5 | 35                        | 5 | 21                   | 5 | 29                   | 4 |                      |   | 24                    | 5 |
| P.1.4            | 32                       | 5 | 31                           | 5 | 32                        | 5 | 20                   | 5 | 27                   | 4 |                      |   | 23                    | 5 |
| P.1.5            | 28                       | 5 | 26                           | 5 | 28                        | 5 | 17                   | 5 |                      |   |                      |   | 19                    | 5 |
| P.2.1            | 35                       | 5 | 32                           | 6 | 35                        | 5 | 17                   | 4 | 25                   | 5 |                      |   | 20                    | 5 |
| P.2.2            | 24                       | 4 | 23                           | 5 | 24                        | 4 | 12                   | 3 | 18                   | 4 |                      |   | 14                    | 4 |
| P.2.3            | 21                       | 4 | 19                           | 5 | 21                        | 4 | 10                   | 3 |                      |   |                      |   | 12                    | 4 |
| P.2.4            | 19                       | 3 | 18                           | 4 | 19                        | 3 | 9                    | 2 |                      |   |                      |   | 11                    | 3 |
| P.3.1            | 17                       | 4 | 21                           | 4 | 17                        | 4 | 13                   | 4 |                      |   |                      |   | 15                    | 4 |
| P.3.2            | 13                       | 3 | 16                           | 3 | 13                        | 3 |                      |   |                      |   |                      |   | 11                    | 3 |
| P.3.3            | 12                       | 3 | 15                           | 3 | 12                        | 3 |                      |   |                      |   |                      |   | 10                    | 3 |
| P.4.1            | 18                       | 4 | 14                           | 3 | 18                        | 4 |                      |   | 15                   | 3 |                      |   | 10                    | 3 |
| P.4.2            | 17                       | 3 | 14                           | 2 | 17                        | 3 |                      |   | 14                   | 2 |                      |   | 10                    | 2 |
| M.1.1            | 15                       | 4 |                              |   | 15                        | 4 |                      |   | 13                   | 3 |                      |   | 9                     | 3 |
| M.2.1            | 14                       | 4 |                              |   | 14                        | 4 |                      |   | 12                   | 3 |                      |   | 8                     | 2 |
| M.3.1            | 10                       | 3 |                              |   | 10                        | 3 |                      |   | 9                    | 2 |                      |   |                       |   |
| K.1.1            | 41                       | 6 | 46                           | 6 | 41                        | 6 | 30                   | 6 |                      |   |                      |   | 35                    | 6 |
| K.1.2            | 33                       | 6 | 37                           | 6 | 33                        | 6 | 24                   | 6 |                      |   |                      |   | 28                    | 6 |
| K.2.1            | 35                       | 6 | 39                           | 6 | 35                        | 6 | 26                   | 6 |                      |   |                      |   | 29                    | 6 |
| K.2.2            | 27                       | 5 | 30                           | 5 | 27                        | 5 | 20                   | 5 |                      |   |                      |   | 22                    | 5 |
| K.3.1            | 35                       | 6 | 39                           | 6 | 35                        | 6 | 26                   | 6 |                      |   |                      |   | 29                    | 6 |
| K.3.2            | 27                       | 5 | 30                           | 5 | 27                        | 5 | 20                   | 5 |                      |   |                      |   | 22                    | 5 |
| N.1.1            |                          |   |                              |   |                           |   |                      |   | 80                   | 7 | 70                   | 7 | 69                    | 7 |
| N.1.2            |                          |   |                              |   |                           |   |                      |   | 80                   | 7 | 70                   | 7 | 69                    | 7 |
| N.2.1            | 75                       | 6 | 69                           | 6 | 75                        | 6 | 50                   | 6 | 65                   | 6 | 60                   | 6 | 58                    | 6 |
| N.2.2            | 60                       | 5 | 55                           | 5 | 60                        | 5 | 40                   | 5 | 52                   | 5 |                      |   | 46                    | 5 |
| N.2.3            | 52                       | 5 | 48                           | 5 | 52                        | 5 | 35                   | 5 | 46                   | 5 |                      |   | 40                    | 5 |
| N.3.1            | 69                       | 5 | 64                           | 5 | 69                        | 5 | 60                   | 5 | 60                   | 5 |                      |   | 69                    | 5 |
| N.3.2            | 41                       | 4 | 39                           | 4 | 41                        | 4 | 36                   | 4 | 36                   | 4 |                      |   | 41                    | 4 |
| N.3.3            | 55                       | 4 | 52                           | 4 | 55                        | 4 | 48                   | 4 | 48                   | 4 | 56                   | 4 | 55                    | 4 |
| N.4.1            | 75                       | 6 | 65                           | 6 | 70                        | 6 | 45                   | 6 | 60                   | 6 | 60                   | 6 | 6                     | 6 |
| S.1.1            |                          |   | 7                            | 2 |                           |   |                      |   | 8                    | 1 |                      |   | 7                     | 2 |
| S.1.2            |                          |   | 6                            | 1 |                           |   |                      |   | 6                    | 1 |                      |   | 6                     | 1 |
| S.2.1            |                          |   | 6                            | 2 |                           |   |                      |   | 7                    | 1 |                      |   | 6                     | 2 |
| S.2.2            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   | 3                     | 1 |
| S.2.3            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   | 4                     | 1 |
| S.3.1            | 9                        | 2 |                              |   | 9                         | 2 |                      |   | 10                   | 2 |                      |   | 6                     | 2 |
| S.3.2            | 6                        | 1 |                              |   | 6                         | 1 |                      |   | 7                    | 1 |                      |   | 4                     | 1 |
| S.3.3            |                          |   |                              |   |                           |   |                      |   | 6                    | 1 |                      |   |                       |   |
| H.1.1            |                          |   | 6                            | 1 |                           |   |                      |   |                      |   |                      |   | 5                     | 1 |
| H.1.2            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   |                       |   |
| H.1.3            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   |                       |   |
| H.1.4            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   |                       |   |
| H.2.1            |                          |   | 10                           | 3 |                           |   |                      |   |                      |   |                      |   | 9                     | 3 |
| H.3.1            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   |                       |   |
| O.1.1            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   |                      |   | 23                    | 4 |
| O.1.2            | 29                       | 4 |                              |   | 29                        | 4 | 20                   | 5 |                      |   |                      |   | 23                    | 4 |
| O.2.1            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   |                      |   | 23                    | 4 |
| O.2.2            | 29                       | 4 | 23                           | 4 | 29                        | 4 | 20                   | 5 |                      |   |                      |   | 23                    | 4 |
| O.3.1            |                          |   |                              |   |                           |   |                      |   |                      |   |                      |   |                       |   |



Kesme verileri, takımların ve takım sıkıştırıcıların stabilitesi, malzeme ve makine tipi gibi dış faktörlere son derece bağlıdır! Belirtilen değerler, her bir uygulamaya göre artırılması veya azaltılması gerekebilecek muhtemel kesme verileridir.

|  | İçinde-<br>kiler | Tip WTL-TiN<br>10 170 ... |   | Tip WTL-TiCN<br>10 172 ... |   | Tip WTL-L<br>10 169 ... |   | Tip WNXi<br>10 180 ... |   | Tip WNXi-TiN<br>10 181 ... |   | Tip N-MK<br>10 265 ... |   | Tip WTL-MK<br>10 280 ... |   |
|--|------------------|---------------------------|---|----------------------------|---|-------------------------|---|------------------------|---|----------------------------|---|------------------------|---|--------------------------|---|
|  |                  | v <sub>c</sub> m/min      | F | v <sub>c</sub> m/min       | F | v <sub>c</sub> m/min    | F | v <sub>c</sub> m/min   | F | v <sub>c</sub> m/min       | F | v <sub>c</sub> m/min   | F | v <sub>c</sub> m/min     | F |
|  | P.1.1            | 37                        | 6 | 37                         | 6 | 28                      | 6 | 45                     | 7 | 52                         | 7 | 28                     | 6 | 32                       | 6 |
|  | P.1.2            | 31                        | 5 | 31                         | 5 | 24                      | 5 | 38                     | 6 | 44                         | 6 | 24                     | 5 | 27                       | 5 |
|  | P.1.3            | 28                        | 5 | 28                         | 5 | 21                      | 5 | 34                     | 6 | 39                         | 6 | 21                     | 5 | 24                       | 5 |
|  | P.1.4            | 26                        | 5 | 26                         | 5 | 20                      | 5 | 32                     | 6 | 36                         | 6 | 20                     | 5 | 23                       | 5 |
|  | P.1.5            | 22                        | 5 | 22                         | 5 | 17                      | 5 | 27                     | 6 | 31                         | 6 | 17                     | 5 | 19                       | 5 |
|  | P.2.1            | 22                        | 5 | 22                         | 5 | 17                      | 5 | 27                     | 5 | 31                         | 5 | 17                     | 4 | 20                       | 5 |
|  | P.2.2            | 16                        | 4 | 16                         | 4 | 12                      | 4 | 19                     | 4 | 22                         | 4 | 12                     | 3 | 14                       | 4 |
|  | P.2.3            | 13                        | 4 | 13                         | 4 | 10                      | 4 | 16                     | 4 | 19                         | 4 | 10                     | 3 | 12                       | 4 |
|  | P.2.4            | 12                        | 3 | 12                         | 3 | 9                       | 3 | 15                     | 3 | 17                         | 3 | 9                      | 2 | 11                       | 3 |
|  | P.3.1            | 17                        | 4 | 17                         | 4 | 13                      | 4 | 21                     | 5 | 24                         | 5 | 13                     | 4 | 15                       | 4 |
|  | P.3.2            | 13                        | 3 | 13                         | 3 | 10                      | 3 | 16                     | 4 | 18                         | 4 |                        |   | 11                       | 3 |
|  | P.3.3            | 12                        | 3 | 12                         | 3 |                         |   | 15                     | 4 | 17                         | 4 |                        |   | 10                       | 3 |
|  | P.4.1            | 12                        | 3 | 12                         | 3 |                         |   | 14                     | 4 | 17                         | 4 |                        |   | 10                       | 3 |
|  | P.4.2            | 11                        | 2 | 11                         | 2 |                         |   | 14                     | 3 | 16                         | 3 |                        |   | 10                       | 2 |
|  | M.1.1            | 11                        | 3 | 11                         | 3 |                         |   |                        |   |                            |   |                        |   | 9                        | 3 |
|  | M.2.1            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   | 8                        | 2 |
|  | M.3.1            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | K.1.1            | 40                        | 6 | 40                         | 6 | 30                      | 6 | 48                     | 7 | 56                         | 7 | 30                     | 6 | 35                       | 6 |
|  | K.1.2            | 32                        | 6 | 32                         | 6 | 24                      | 6 | 39                     | 7 | 44                         | 7 | 24                     | 6 | 28                       | 6 |
|  | K.2.1            | 34                        | 6 | 34                         | 6 | 26                      | 6 | 41                     | 7 | 47                         | 7 | 26                     | 6 | 29                       | 6 |
|  | K.2.2            | 26                        | 5 | 26                         | 5 | 20                      | 5 | 31                     | 6 | 36                         | 6 | 20                     | 5 | 22                       | 5 |
|  | K.3.1            | 34                        | 6 | 34                         | 6 | 26                      | 6 | 41                     | 7 | 47                         | 7 | 26                     | 6 | 29                       | 6 |
|  | K.3.2            | 26                        | 5 | 26                         | 5 | 20                      | 5 | 31                     | 6 | 36                         | 6 | 20                     | 5 | 22                       | 5 |
|  | N.1.1            |                           |   |                            |   | 60                      | 7 |                        |   |                            |   |                        |   | 69                       | 7 |
|  | N.1.2            |                           |   |                            |   | 60                      | 7 |                        |   |                            |   |                        |   | 69                       | 7 |
|  | N.2.1            | 66                        | 6 | 66                         | 6 | 50                      | 6 | 81                     | 7 | 93                         | 7 | 50                     | 6 | 58                       | 6 |
|  | N.2.2            | 53                        | 5 | 53                         | 5 | 40                      | 5 | 64                     | 6 | 74                         | 6 | 40                     | 5 | 46                       | 5 |
|  | N.2.3            | 46                        | 5 | 46                         | 5 | 35                      | 5 | 56                     | 6 | 65                         | 6 | 35                     | 5 | 40                       | 5 |
|  | N.3.1            | 79                        | 5 | 79                         | 5 | 60                      | 5 | 97                     | 6 | 111                        | 6 | 60                     | 5 | 69                       | 5 |
|  | N.3.2            | 48                        | 4 | 48                         | 4 | 36                      | 4 | 58                     | 5 | 67                         | 5 | 36                     | 4 | 41                       | 4 |
|  | N.3.3            | 63                        | 4 | 63                         | 4 | 48                      | 4 | 77                     | 5 | 89                         | 5 | 48                     | 4 | 55                       | 4 |
|  | N.4.1            | 60                        | 6 | 60                         | 6 | 45                      | 6 | 70                     | 7 | 80                         | 7 | 45                     | 6 | 50                       | 6 |
|  | S.1.1            | 8                         | 2 | 8                          | 2 |                         |   |                        |   |                            |   |                        |   | 7                        | 2 |
|  | S.1.2            | 6                         | 1 | 6                          | 1 |                         |   |                        |   |                            |   |                        |   | 6                        | 1 |
|  | S.2.1            | 7                         | 2 | 7                          | 2 |                         |   |                        |   |                            |   |                        |   | 6                        | 2 |
|  | S.2.2            | 4                         | 1 | 4                          | 1 |                         |   |                        |   |                            |   |                        |   | 3                        | 1 |
|  | S.2.3            | 5                         | 1 | 5                          | 1 |                         |   |                        |   |                            |   |                        |   | 4                        | 1 |
|  | S.3.1            | 7                         | 2 | 7                          | 2 |                         |   |                        |   |                            |   |                        |   | 6                        | 2 |
|  | S.3.2            | 4                         | 1 | 4                          | 1 |                         |   |                        |   |                            |   |                        |   | 4                        | 1 |
|  | S.3.3            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | H.1.1            | 5                         | 1 | 5                          | 1 |                         |   |                        |   |                            |   |                        |   | 5                        | 1 |
|  | H.1.2            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | H.1.3            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | H.1.4            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | H.2.1            | 11                        | 3 | 11                         | 3 |                         |   |                        |   |                            |   |                        |   | 9                        | 3 |
|  | H.3.1            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |
|  | O.1.1            | 26                        | 4 | 26                         | 4 | 20                      | 4 | 32                     | 5 | 37                         | 5 | 20                     | 5 | 23                       | 4 |
|  | O.1.2            | 26                        | 4 | 26                         | 4 | 20                      | 4 |                        |   |                            |   | 20                     | 5 | 23                       | 4 |
|  | O.2.1            | 26                        | 4 | 26                         | 4 | 20                      | 4 | 32                     | 5 | 37                         | 5 | 20                     | 5 | 23                       | 4 |
|  | O.2.2            | 26                        | 4 | 26                         | 4 | 20                      | 4 | 32                     | 5 | 37                         | 5 | 20                     | 5 | 23                       | 4 |
|  | O.3.1            |                           |   |                            |   |                         |   |                        |   |                            |   |                        |   |                          |   |

 Sert yüzeylere delik açarken sıkışmaya eğilimli iş parçalarında delme derinliği  $\geq 4xD'$ 'de talaşlar alınmalı ve kesme hızı v<sub>c</sub>, tarif edildiği gibi düşürülmelidir: Delme derinliği  $> 4xD'$ 'de %10, delme derinliği  $> 6xD'$ 'de %15-20.  
Ayrıca emülsiyon ile soğutulması önerilmektedir.

 v<sub>c</sub> = Kesme hızı (m/min.)  
F = İlerleme hesaplama faktörü  
İlerleme referans → **Sayfa 55**

## Kesme verileri referans değerleri – Delme derinliği 10xD

| İçinde-<br>kiler | Tip NC<br>10 223 ... |   | Tip NC-TIALN<br>10 224 ... |   | Tip UNI-TIN<br>10 270 ... |   | Tip WTL<br>10 225 ... |   | Tip WTL<br>10 215 ... |   |
|------------------|----------------------|---|----------------------------|---|---------------------------|---|-----------------------|---|-----------------------|---|
|                  | v <sub>c</sub> m/min | F | v <sub>c</sub> m/min       | F | v <sub>c</sub> m/min      | F | v <sub>c</sub> m/min  | F | v <sub>c</sub> m/min  | F |
| P.1.1            | 35                   | 7 | 41                         | 7 | 41                        | 6 | 29                    | 6 | 25                    | 6 |
| P.1.2            | 30                   | 6 | 34                         | 6 | 35                        | 5 | 25                    | 5 | 21                    | 5 |
| P.1.3            | 26                   | 6 | 30                         | 6 | 31                        | 5 | 22                    | 5 | 19                    | 5 |
| P.1.4            | 25                   | 6 | 28                         | 6 | 29                        | 5 | 20                    | 5 | 18                    | 5 |
| P.1.5            | 21                   | 6 | 24                         | 6 | 25                        | 5 | 17                    | 5 | 15                    | 5 |
| P.2.1            | 21                   | 5 | 25                         | 5 | 31                        | 5 | 18                    | 5 | 15                    | 5 |
| P.2.2            | 15                   | 4 | 17                         | 4 | 22                        | 4 | 12                    | 4 | 11                    | 4 |
| P.2.3            | 13                   | 4 | 15                         | 4 | 19                        | 4 | 11                    | 4 | 9                     | 4 |
| P.2.4            | 12                   | 3 | 14                         | 3 | 17                        | 3 | 10                    | 3 | 8                     | 3 |
| P.3.1            | 16                   | 5 | 19                         | 5 | 16                        | 4 | 13                    | 4 | 12                    | 4 |
| P.3.2            |                      |   |                            |   | 12                        | 3 | 10                    | 3 | 9                     | 3 |
| P.3.3            |                      |   |                            |   | 10                        | 2 | 8                     | 3 |                       |   |
| P.4.1            |                      |   | 13                         | 4 | 16                        | 4 | 9                     | 3 |                       |   |
| P.4.2            |                      |   | 12                         | 3 | 15                        | 3 | 9                     | 2 |                       |   |
| M.1.1            |                      |   | 12                         | 4 | 13                        | 4 | 8                     | 3 |                       |   |
| M.2.1            |                      |   | 8                          | 3 | 8                         | 3 | 2                     | 2 |                       |   |
| M.3.1            |                      |   |                            |   | 9                         | 3 |                       |   |                       |   |
| K.1.1            | 38                   | 7 | 43                         | 7 | 37                        | 6 | 31                    | 6 | 27                    | 6 |
| K.1.2            | 30                   | 7 | 35                         | 7 | 30                        | 6 | 25                    | 6 | 22                    | 6 |
| K.2.1            | 32                   | 7 | 37                         | 7 | 32                        | 6 | 26                    | 6 | 23                    | 6 |
| K.2.2            | 25                   | 6 | 28                         | 6 | 24                        | 5 | 20                    | 5 | 18                    | 5 |
| K.3.1            | 32                   | 7 | 37                         | 7 | 32                        | 6 | 26                    | 6 | 23                    | 6 |
| K.3.2            | 25                   | 6 | 28                         | 6 | 24                        | 5 | 20                    | 5 | 18                    | 5 |
| N.1.1            |                      |   |                            |   |                           |   | 62                    | 7 | 54                    | 7 |
| N.1.2            |                      |   |                            |   |                           |   | 62                    | 7 | 54                    | 7 |
| N.2.1            | 63                   | 7 | 72                         | 7 | 67                        | 6 | 52                    | 6 | 45                    | 6 |
| N.2.2            | 50                   | 6 | 58                         | 6 | 54                        | 5 | 41                    | 5 | 36                    | 5 |
| N.2.3            | 44                   | 6 | 51                         | 6 | 47                        | 5 | 36                    | 5 | 32                    | 5 |
| N.3.1            | 76                   | 6 | 87                         | 6 | 62                        | 5 | 62                    | 5 | 54                    | 5 |
| N.3.2            | 45                   | 5 | 52                         | 5 | 37                        | 4 | 37                    | 4 | 32                    | 4 |
| N.3.3            | 60                   | 5 | 70                         | 5 | 50                        | 4 | 50                    | 4 | 43                    | 4 |
| N.4.1            | 60                   | 5 | 50                         | 6 | 50                        | 6 | 50                    | 6 | 45                    | 5 |
| S.1.1            |                      |   |                            |   |                           |   | 6                     | 2 |                       |   |
| S.1.2            |                      |   |                            |   |                           |   | 5                     | 1 |                       |   |
| S.2.1            |                      |   |                            |   |                           |   | 5                     | 2 |                       |   |
| S.2.2            |                      |   |                            |   |                           |   | 3                     | 1 |                       |   |
| S.2.3            |                      |   |                            |   |                           |   | 4                     | 1 |                       |   |
| S.3.1            |                      |   |                            |   | 8                         | 2 | 5                     | 2 |                       |   |
| S.3.2            |                      |   |                            |   | 5                         | 1 | 3                     | 1 |                       |   |
| S.3.3            |                      |   |                            |   |                           |   |                       |   |                       |   |
| H.1.1            |                      |   |                            |   |                           |   | 4                     | 1 |                       |   |
| H.1.2            |                      |   |                            |   |                           |   |                       |   |                       |   |
| H.1.3            |                      |   |                            |   |                           |   |                       |   |                       |   |
| H.1.4            |                      |   |                            |   |                           |   |                       |   |                       |   |
| H.2.1            |                      |   |                            |   |                           |   | 8                     | 3 |                       |   |
| H.3.1            |                      |   |                            |   |                           |   |                       |   |                       |   |
| O.1.1            | 25                   | 6 | 29                         | 6 | 26                        | 4 | 21                    | 4 | 18                    | 4 |
| O.1.2            | 25                   | 6 | 29                         | 6 | 26                        | 4 | 21                    | 4 | 18                    | 4 |
| O.2.1            | 25                   | 6 | 29                         | 6 | 26                        | 4 | 21                    | 4 | 18                    | 4 |
| O.2.2            | 25                   | 6 | 29                         | 6 | 26                        | 4 | 21                    | 4 | 18                    | 4 |
| O.3.1            |                      |   |                            |   |                           |   |                       |   |                       |   |



Kesme verileri, takımların ve takım sıkıştırıcıların stabilitesi, malzeme ve makine tipi gibi dış faktörlere son derece bağlıdır! Belirtilen değerler, her bir uygulamaya göre artırılması veya azaltılması gerekebilecek muhtemel kesme verileridir.

|  | İçinde-<br>kiler | Tip WTL-TiN<br>10 210 ... |   | Tip WTW<br>10 200 ... |   | Tip N-MK<br>10 295 ... |   | Tip WTL-MK<br>10 297 ... |   |
|--|------------------|---------------------------|---|-----------------------|---|------------------------|---|--------------------------|---|
|  |                  | v <sub>c</sub> m/min      | F | v <sub>c</sub> m/min  | F | v <sub>c</sub> m/min   | F | v <sub>c</sub> m/min     | F |
|  | P.1.1            | 29                        | 6 |                       |   | 25                     | 6 | 29                       | 6 |
|  | P.1.2            | 25                        | 5 |                       |   | 21                     | 5 | 25                       | 5 |
|  | P.1.3            | 22                        | 5 |                       |   | 19                     | 5 | 22                       | 5 |
|  | P.1.4            | 20                        | 5 |                       |   | 18                     | 5 | 20                       | 5 |
|  | P.1.5            | 17                        | 5 |                       |   | 15                     | 5 | 17                       | 5 |
|  | P.2.1            | 18                        | 5 |                       |   | 15                     | 4 | 18                       | 5 |
|  | P.2.2            | 12                        | 4 |                       |   | 11                     | 3 | 12                       | 4 |
|  | P.2.3            | 11                        | 4 |                       |   | 9                      | 3 | 11                       | 4 |
|  | P.2.4            | 10                        | 3 |                       |   | 8                      | 2 | 10                       | 3 |
|  | P.3.1            | 13                        | 4 |                       |   | 12                     | 4 | 13                       | 4 |
|  | P.3.2            | 10                        | 3 |                       |   |                        |   | 10                       | 3 |
|  | P.3.3            | 8                         | 3 |                       |   |                        |   | 8                        | 3 |
|  | P.4.1            |                           |   |                       |   |                        |   | 9                        | 3 |
|  | P.4.2            |                           |   |                       |   |                        |   | 9                        | 2 |
|  | M.1.1            |                           |   |                       |   |                        |   | 8                        | 3 |
|  | M.2.1            |                           |   |                       |   |                        |   | 2                        | 2 |
|  | M.3.1            |                           |   |                       |   |                        |   |                          |   |
|  | K.1.1            | 31                        | 6 |                       |   | 27                     | 6 | 31                       | 6 |
|  | K.1.2            | 25                        | 6 |                       |   | 22                     | 6 | 25                       | 6 |
|  | K.2.1            | 26                        | 6 |                       |   | 23                     | 6 | 26                       | 6 |
|  | K.2.2            | 20                        | 5 |                       |   | 18                     | 5 | 20                       | 5 |
|  | K.3.1            | 26                        | 6 |                       |   | 23                     | 6 | 26                       | 6 |
|  | K.3.2            | 20                        | 5 |                       |   | 18                     | 5 | 20                       | 5 |
|  | N.1.1            |                           |   | 72                    | 7 |                        |   | 62                       | 7 |
|  | N.1.2            |                           |   | 72                    | 7 |                        |   | 62                       | 7 |
|  | N.2.1            | 52                        | 6 |                       |   | 45                     | 6 | 52                       | 6 |
|  | N.2.2            | 41                        | 5 |                       |   | 36                     | 5 | 41                       | 5 |
|  | N.2.3            | 36                        | 5 |                       |   | 32                     | 5 | 36                       | 5 |
|  | N.3.1            | 62                        | 5 |                       |   | 54                     | 5 | 62                       | 5 |
|  | N.3.2            | 37                        | 4 |                       |   | 32                     | 4 | 37                       | 4 |
|  | N.3.3            | 50                        | 4 |                       |   | 43                     | 4 | 50                       | 4 |
|  | N.4.1            | 50                        | 5 |                       |   | 60                     | 6 | 50                       | 6 |
|  | S.1.1            |                           |   |                       |   |                        |   | 6                        | 2 |
|  | S.1.2            |                           |   |                       |   |                        |   | 5                        | 1 |
|  | S.2.1            |                           |   |                       |   |                        |   | 5                        | 2 |
|  | S.2.2            |                           |   |                       |   |                        |   | 3                        | 1 |
|  | S.2.3            |                           |   |                       |   |                        |   | 4                        | 1 |
|  | S.3.1            |                           |   |                       |   |                        |   | 5                        | 2 |
|  | S.3.2            |                           |   |                       |   |                        |   | 3                        | 1 |
|  | S.3.3            |                           |   |                       |   |                        |   |                          |   |
|  | H.1.1            |                           |   |                       |   |                        |   | 4                        | 1 |
|  | H.1.2            |                           |   |                       |   |                        |   |                          |   |
|  | H.1.3            |                           |   |                       |   |                        |   |                          |   |
|  | H.1.4            |                           |   |                       |   |                        |   |                          |   |
|  | H.2.1            |                           |   |                       |   |                        |   | 8                        | 3 |
|  | H.3.1            |                           |   |                       |   |                        |   |                          |   |
|  | O.1.1            | 21                        | 4 |                       |   | 18                     | 5 | 21                       | 4 |
|  | O.1.2            | 21                        | 4 |                       |   | 18                     | 5 | 21                       | 4 |
|  | O.2.1            | 21                        | 4 |                       |   | 18                     | 5 | 21                       | 4 |
|  | O.2.2            | 21                        | 4 |                       |   | 18                     | 5 | 21                       | 4 |
|  | O.3.1            |                           |   |                       |   |                        |   |                          |   |

 Sert yüzeylere delik açarken sıkışmaya eğilimli iş parçalarında delme derinliği  $\geq 4xD'$ 'de talaşlar alınmalı ve kesme hızı v<sub>c</sub>, tarif edildiği gibi düşürülmelidir: Delme derinliği  $> 4xD'$ 'de %10, delme derinliği  $> 6xD'$ 'de %15-20. Ayrıca emülsiyon ile soğutulması önerilmektedir.

 v<sub>c</sub> = Kesme hızı (m/min.)  
F = İlerleme hesaplama faktörü  
İlerleme referans → **Sayfa 55**

## Kesme verileri referans değerleri – Delme derinliği &gt; 10xD

| İçinde-<br>kiler | Tip WTL-R1<br>10 235 ... |   | Tip WTL-R2<br>10 245 ... |   | Tip WTL-R3<br>10 255 ... |   | Tip WTL-TiAIN-R1<br>10 236 ... |   | Tip WTL-TiAIN-R2<br>10 246 ... |   | Tip WTL-TiAIN-R3<br>10 256 ... |   |
|------------------|--------------------------|---|--------------------------|---|--------------------------|---|--------------------------------|---|--------------------------------|---|--------------------------------|---|
|                  | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min     | F | v <sub>c</sub> m/min           | F | v <sub>c</sub> m/min           | F | v <sub>c</sub> m/min           | F |
| P.1.1            | 21                       | 5 | 21                       | 5 | 21                       | 5 | 24                             | 5 | 24                             | 5 | 24                             | 5 |
| P.1.2            | 18                       | 4 | 18                       | 4 | 18                       | 4 | 21                             | 4 | 21                             | 4 | 21                             | 4 |
| P.1.3            | 16                       | 4 | 16                       | 4 | 16                       | 4 | 18                             | 4 | 18                             | 4 | 18                             | 4 |
| P.1.4            | 15                       | 4 | 15                       | 4 | 15                       | 4 | 17                             | 4 | 17                             | 4 | 17                             | 4 |
| P.1.5            | 13                       | 4 | 13                       | 4 | 13                       | 4 | 14                             | 4 | 14                             | 4 | 14                             | 4 |
| P.2.1            | 13                       | 4 | 13                       | 4 | 13                       | 4 | 15                             | 4 | 15                             | 4 | 15                             | 4 |
| P.2.2            | 9                        | 3 | 9                        | 3 | 9                        | 3 | 10                             | 3 | 10                             | 3 | 10                             | 3 |
| P.2.3            | 8                        | 3 | 8                        | 3 | 8                        | 3 | 9                              | 3 | 9                              | 3 | 9                              | 3 |
| P.2.4            | 7                        | 2 | 7                        | 2 | 7                        | 2 | 8                              | 2 | 8                              | 2 | 8                              | 2 |
| P.3.1            | 10                       | 3 | 10                       | 3 | 10                       | 3 | 11                             | 3 | 11                             | 3 | 11                             | 3 |
| P.3.2            | 7                        | 2 | 7                        | 2 | 7                        | 2 | 8                              | 2 | 8                              | 2 | 8                              | 2 |
| P.3.3            | 6                        | 2 | 6                        | 2 | 6                        | 2 | 7                              | 2 | 7                              | 2 | 7                              | 2 |
| P.4.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| P.4.2            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| M.1.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| M.2.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| M.3.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| K.1.1            | 23                       | 5 | 23                       | 5 | 23                       | 5 | 26                             | 5 | 26                             | 5 | 26                             | 5 |
| K.1.2            | 18                       | 5 | 18                       | 5 | 18                       | 5 | 21                             | 5 | 21                             | 5 | 21                             | 5 |
| K.2.1            | 19                       | 5 | 19                       | 5 | 19                       | 5 | 22                             | 5 | 22                             | 5 | 22                             | 5 |
| K.2.2            | 15                       | 4 | 15                       | 4 | 15                       | 4 | 17                             | 4 | 17                             | 4 | 17                             | 4 |
| K.3.1            | 19                       | 5 | 19                       | 5 | 19                       | 5 | 22                             | 5 | 22                             | 5 | 22                             | 5 |
| K.3.2            | 15                       | 4 | 15                       | 4 | 15                       | 4 | 17                             | 4 | 17                             | 4 | 17                             | 4 |
| N.1.1            | 45                       | 6 | 45                       | 6 | 45                       | 6 | 52                             | 6 | 52                             | 6 | 52                             | 6 |
| N.1.2            | 45                       | 6 | 45                       | 6 | 45                       | 6 | 52                             | 6 | 52                             | 6 | 52                             | 6 |
| N.2.1            | 38                       | 5 | 38                       | 5 | 38                       | 5 | 43                             | 5 | 43                             | 5 | 43                             | 5 |
| N.2.2            | 30                       | 4 | 30                       | 4 | 30                       | 4 | 35                             | 4 | 35                             | 4 | 35                             | 4 |
| N.2.3            | 26                       | 4 | 26                       | 4 | 26                       | 4 | 30                             | 4 | 30                             | 4 | 30                             | 4 |
| N.3.1            | 45                       | 4 | 45                       | 4 | 45                       | 4 | 52                             | 4 | 52                             | 4 | 52                             | 4 |
| N.3.2            | 27                       | 3 | 27                       | 3 | 27                       | 3 | 31                             | 3 | 31                             | 3 | 31                             | 3 |
| N.3.3            | 36                       | 3 | 36                       | 3 | 36                       | 3 | 41                             | 3 | 41                             | 3 | 41                             | 3 |
| N.4.1            | 55                       | 5 | 55                       | 5 | 55                       | 5 | 60                             | 6 | 60                             | 6 | 60                             | 6 |
| S.1.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.1.2            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.2.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.2.2            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.2.3            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.3.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.3.2            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| S.3.3            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.1.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.1.2            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.1.3            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.1.4            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.2.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| H.3.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |
| O.1.1            | 15                       | 3 | 15                       | 3 | 15                       | 3 | 17                             | 3 | 17                             | 3 | 17                             | 3 |
| O.1.2            | 15                       | 3 | 15                       | 3 | 15                       | 3 | 17                             | 3 | 17                             | 3 | 17                             | 3 |
| O.2.1            | 15                       | 3 | 15                       | 3 | 15                       | 3 | 17                             | 3 | 17                             | 3 | 17                             | 3 |
| O.2.2            | 15                       | 3 | 15                       | 3 | 15                       | 3 | 17                             | 3 | 17                             | 3 | 17                             | 3 |
| O.3.1            |                          |   |                          |   |                          |   |                                |   |                                |   |                                |   |



Kesme verileri, takımın ve takım sıkıştırıcıların stabilitesi, malzeme ve makine tipi gibi dış faktörlere son derece bağlıdır! Belirtilen değerler, her bir uygulamaya göre artırılması veya azaltılması gerekebilecek muhtemel kesme verileridir.

|  | İçinde-<br>kiler | Tip WTL-MK-R1<br>10 305 ... |   | Tip WTL-MK-R2<br>10 315 ... |   |
|--|------------------|-----------------------------|---|-----------------------------|---|
|  |                  | $v_c$ m/min                 | F | $v_c$ m/min                 | F |
|  | P.1.1            | 21                          | 5 | 21                          | 5 |
|  | P.1.2            | 18                          | 4 | 18                          | 4 |
|  | P.1.3            | 16                          | 4 | 16                          | 4 |
|  | P.1.4            | 15                          | 4 | 15                          | 4 |
|  | P.1.5            | 13                          | 4 | 13                          | 4 |
|  | P.2.1            | 13                          | 4 | 13                          | 4 |
|  | P.2.2            | 9                           | 3 | 9                           | 3 |
|  | P.2.3            | 8                           | 3 | 8                           | 3 |
|  | P.2.4            | 7                           | 2 | 7                           | 2 |
|  | P.3.1            | 10                          | 3 | 10                          | 3 |
|  | P.3.2            | 7                           | 2 | 7                           | 2 |
|  | P.3.3            | 6                           | 2 | 6                           | 2 |
|  | P.4.1            |                             |   |                             |   |
|  | P.4.2            |                             |   |                             |   |
|  | M.1.1            |                             |   |                             |   |
|  | M.2.1            |                             |   |                             |   |
|  | M.3.1            |                             |   |                             |   |
|  | K.1.1            | 23                          | 5 | 23                          | 5 |
|  | K.1.2            | 18                          | 5 | 18                          | 5 |
|  | K.2.1            | 19                          | 5 | 19                          | 5 |
|  | K.2.2            | 15                          | 4 | 15                          | 4 |
|  | K.3.1            | 19                          | 5 | 19                          | 5 |
|  | K.3.2            | 15                          | 4 | 15                          | 4 |
|  | N.1.1            | 45                          | 6 | 45                          | 6 |
|  | N.1.2            | 45                          | 6 | 45                          | 6 |
|  | N.2.1            | 38                          | 5 | 38                          | 5 |
|  | N.2.2            | 30                          | 4 | 30                          | 4 |
|  | N.2.3            | 26                          | 4 | 26                          | 4 |
|  | N.3.1            | 45                          | 4 | 45                          | 4 |
|  | N.3.2            | 27                          | 3 | 27                          | 3 |
|  | N.3.3            | 36                          | 3 | 36                          | 3 |
|  | N.4.1            | 55                          | 5 | 55                          | 5 |
|  | S.1.1            |                             |   |                             |   |
|  | S.1.2            |                             |   |                             |   |
|  | S.2.1            |                             |   |                             |   |
|  | S.2.2            |                             |   |                             |   |
|  | S.2.3            |                             |   |                             |   |
|  | S.3.1            |                             |   |                             |   |
|  | S.3.2            |                             |   |                             |   |
|  | S.3.3            |                             |   |                             |   |
|  | H.1.1            |                             |   |                             |   |
|  | H.1.2            |                             |   |                             |   |
|  | H.1.3            |                             |   |                             |   |
|  | H.1.4            |                             |   |                             |   |
|  | H.2.1            |                             |   |                             |   |
|  | H.3.1            |                             |   |                             |   |
|  | O.1.1            | 15                          | 3 | 15                          | 3 |
|  | O.1.2            | 15                          | 3 | 15                          | 3 |
|  | O.2.1            | 15                          | 3 | 15                          | 3 |
|  | O.2.2            | 15                          | 3 | 15                          | 3 |
|  | O.3.1            |                             |   |                             |   |

**1** Sert yüzeylere delik açarken sıkışmaya eğilimli iş parçalarında delme derinliği  $\geq 4xD$ 'de talaşlar alınmalı ve kesme hızı  $v_c$ , tarif edildiği gibi düşürülmelidir: Delme derinliği  $> 4xD$ 'de %10, delme derinliği  $> 6xD$ 'de %15-20.  
Ayrıca emülsiyon ile soğutulması önerilmektedir.

**1**  $v_c$  = Kesme hızı (m/min.)  
F = İlerleme hesaplama faktörü  
İlerleme referans → **Sayfa 55**

## Kesme verileri referans değerleri – Küçük çap matkaplar 10 103 ...

| İçinde-<br>kiler | v <sub>c</sub> m/min | Nominal-Ø mm |             |             |             |             |             |             |
|------------------|----------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                  |                      | Ø 0,15       | Ø 0,20–0,25 | Ø 0,30–0,35 | Ø 0,40–0,55 | Ø 0,60–0,75 | Ø 0,80–0,95 | Ø 1,00–1,45 |
|                  |                      | f<br>mm/U    | f<br>mm/U   | f<br>mm/U   | f<br>mm/U   | f<br>mm/U   | f<br>mm/U   | f<br>mm/U   |
| P.1.1            | 33                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| P.1.2            | 28                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| P.1.3            | 25                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| P.1.4            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| P.1.5            | 20                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| P.2.1            | 20                   | 0,0050       | 0,0070      | 0,0090      | 0,0110      | 0,0150      | 0,0200      | 0,0350      |
| P.2.2            | 14                   | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| P.2.3            | 12                   | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| P.2.4            | 11                   | 0,0030       | 0,0040      | 0,0050      | 0,0070      | 0,0090      | 0,0130      | 0,0240      |
| P.3.1            | 15                   | 0,0050       | 0,0070      | 0,0090      | 0,0110      | 0,0150      | 0,0200      | 0,0350      |
| P.3.2            | 11                   | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| P.3.3            | 10                   | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| P.4.1            | 11                   | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| P.4.2            | 10                   | 0,0030       | 0,0040      | 0,0050      | 0,0070      | 0,0090      | 0,0130      | 0,0240      |
| M.1.1            | 9                    | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| M.2.1            | 8                    | 0,0040       | 0,0050      | 0,0070      | 0,0080      | 0,0120      | 0,0160      | 0,0290      |
| M.3.1            |                      |              |             |             |             |             |             |             |
| K.1.1            | 35                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| K.1.2            | 28                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| K.2.1            | 30                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| K.2.2            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| K.3.1            | 30                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| K.3.2            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| N.1.1            | 70                   | 0,0120       | 0,0140      | 0,0190      | 0,0240      | 0,0340      | 0,0380      | 0,0600      |
| N.1.2            | 70                   | 0,0120       | 0,0140      | 0,0190      | 0,0240      | 0,0340      | 0,0380      | 0,0600      |
| N.2.1            | 59                   | 0,0090       | 0,0110      | 0,0150      | 0,0190      | 0,0260      | 0,0310      | 0,0500      |
| N.2.2            | 47                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| N.2.3            | 41                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| N.3.1            | 70                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| N.3.2            | 42                   | 0,0050       | 0,0070      | 0,0090      | 0,0110      | 0,0150      | 0,0200      | 0,0350      |
| N.3.3            | 56                   | 0,0050       | 0,0070      | 0,0090      | 0,0110      | 0,0150      | 0,0200      | 0,0350      |
| N.4.1            | 42                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| S.1.1            | 7                    | 0,0030       | 0,0040      | 0,0050      | 0,0070      | 0,0090      | 0,0130      | 0,0240      |
| S.1.2            | 6                    | 0,0020       | 0,0030      | 0,0040      | 0,0050      | 0,0070      | 0,0100      | 0,0200      |
| S.2.1            | 6                    | 0,0030       | 0,0040      | 0,0050      | 0,0070      | 0,0090      | 0,0130      | 0,0240      |
| S.2.2            | 4                    | 0,0020       | 0,0030      | 0,0040      | 0,0050      | 0,0070      | 0,0100      | 0,0200      |
| S.2.3            | 4                    | 0,0020       | 0,0030      | 0,0040      | 0,0050      | 0,0070      | 0,0100      | 0,0200      |
| S.3.1            | 6                    | 0,0030       | 0,0040      | 0,0050      | 0,0070      | 0,0090      | 0,0130      | 0,0240      |
| S.3.2            | 4                    | 0,0020       | 0,0030      | 0,0040      | 0,0050      | 0,0070      | 0,0100      | 0,0200      |
| S.3.3            |                      |              |             |             |             |             |             |             |
| H.1.1            |                      |              |             |             |             |             |             |             |
| H.1.2            |                      |              |             |             |             |             |             |             |
| H.1.3            |                      |              |             |             |             |             |             |             |
| H.1.4            |                      |              |             |             |             |             |             |             |
| H.2.1            |                      |              |             |             |             |             |             |             |
| H.3.1            |                      |              |             |             |             |             |             |             |
| O.1.1            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| O.1.2            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| O.2.1            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| O.2.2            | 23                   | 0,0070       | 0,0090      | 0,0110      | 0,0140      | 0,0200      | 0,0240      | 0,0410      |
| O.3.1            |                      |              |             |             |             |             |             |             |



Kesme verileri, takımların ve takım sıkıştırıcıların stabilitesi, malzeme ve makine tipi gibi dış faktörlere son derece bağlıdır! Belirtilen değerler, her bir uygulamaya göre artırılması veya azaltılması gerekebilecek muhtemel kesme verileridir.



## HSS helisel matkaplar için ilerleme değerleri

| Faktör F | Delme çapı (mm) |       |      |      |      |       |      |      |      |      |      |      |      |      |      |      |
|----------|-----------------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|
|          | 0,5             | 1     | 2    | 3    | 4    | 5     | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 20   | 26   | 30   |
|          | İlerleme mm/dev |       |      |      |      |       |      |      |      |      |      |      |      |      |      |      |
| 1        | 0,004           | 0,006 | 0,02 | 0,03 | 0,04 | 0,04  | 0,05 | 0,06 | 0,08 | 0,08 | 0,09 | 0,1  | 0,12 | 0,15 | 0,18 | 0,19 |
| 2        | 0,006           | 0,008 | 0,02 | 0,03 | 0,05 | 0,05  | 0,05 | 0,08 | 0,1  | 0,1  | 0,1  | 0,12 | 0,12 | 0,2  | 0,2  | 0,2  |
| 3        | 0,007           | 0,012 | 0,03 | 0,05 | 0,06 | 0,069 | 0,08 | 0,1  | 0,12 | 0,13 | 0,13 | 0,16 | 0,16 | 0,25 | 0,25 | 0,25 |
| 4        | 0,008           | 0,014 | 0,04 | 0,06 | 0,08 | 0,09  | 0,1  | 0,14 | 0,16 | 0,16 | 0,16 | 0,2  | 0,2  | 0,3  | 0,3  | 0,3  |
| 5        | 0,01            | 0,016 | 0,06 | 0,08 | 0,1  | 0,12  | 0,13 | 0,16 | 0,2  | 0,2  | 0,22 | 0,25 | 0,25 | 0,4  | 0,4  | 0,4  |
| 6        | 0,012           | 0,018 | 0,06 | 0,1  | 0,12 | 0,14  | 0,16 | 0,2  | 0,25 | 0,25 | 0,25 | 0,3  | 0,3  | 0,5  | 0,5  | 0,5  |
| 7        | 0,014           | 0,02  | 0,08 | 0,13 | 0,16 | 0,18  | 0,2  | 0,25 | 0,35 | 0,35 | 0,35 | 0,4  | 0,4  | 0,6  | 0,6  | 0,6  |
| 8        | 0,016           | 0,023 | 0,1  | 0,16 | 0,2  | 0,2   | 0,25 | 0,35 | 0,4  | 0,4  | 0,4  | 0,4  | 0,5  | 0,6  | 0,7  | 0,8  |
| 9        | 0,019           | 0,025 | 0,13 | 0,17 | 0,2  | 0,23  | 0,32 | 0,4  | 0,4  | 0,5  | 0,5  | 0,5  | 0,6  | 0,8  | 0,9  | 0,9  |

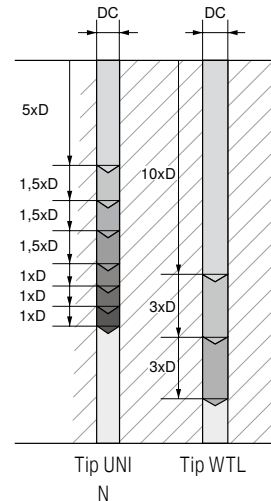
 Belirtilen tüm veriler sadece ortalama değerlerdir ve başlangıç şartlarını gösterir.

## HSS Helis Matkap devir

| v <sub>c</sub> m/dak | Delme çapı (mm) |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------------------|-----------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                      | 2,0             | 2,5   | 3,15 | 4,0  | 5,0  | 6,3  | 8,0  | 10,0 | 12,5 | 16,0 | 20,0 | 25,0 | 31,5 | 40,0 | 50,0 | 63,0 | 80,0 |
|                      | Devir U/min     |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 80                   | 12500           | 10000 | 8000 | 6300 | 5000 | 4000 | 3200 | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  |
| 63                   | 10000           | 8000  | 6300 | 5000 | 4000 | 3200 | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  |
| 50                   | 8000            | 6300  | 5000 | 4000 | 3200 | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  |
| 40                   | 6300            | 5000  | 4000 | 3200 | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  |
| 32                   | 5000            | 4000  | 3200 | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  |
| 25                   | 4000            | 3200  | 2500 | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  |
| 20                   | 3200            | 2500  | 2000 | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   |
| 16                   | 2500            | 2000  | 1600 | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   |
| 12                   | 2000            | 1600  | 1250 | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   |
| 10                   | 1600            | 1250  | 1000 | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   |
| 8                    | 1250            | 1000  | 800  | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   | 32   |
| 6                    | 1000            | 800   | 630  | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   | 32   | 25   |
| 5                    | 800             | 630   | 500  | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   | 32   | 25   | 20   |
| 4                    | 630             | 500   | 400  | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   | 32   | 25   | 20   | 16   |
| 3                    | 500             | 400   | 320  | 250  | 200  | 160  | 125  | 100  | 80   | 63   | 50   | 40   | 32   | 25   | 20   | 16   | 12   |

## Derin delme işleminde periyodik talaş tahliyesi (gagalama):

- ▲ Matkap yeterli ve uygun şekilde soğutulmalıdır.
- ▲ Düz kanallı (WTL tipi) bir matkap kullanılarak talaş atma kabiliyeti önemli oranda iyileştirilir.
- ▲ Aşırı derin delikler veya yatay delme sırasında içten soğutma özellikli matkaplar önerilir.



## Kaplamalar

|       |                                                                                                                                                                                                                                  |       |                                                                                                                                                 |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| TiN   | <ul style="list-style-type: none"><li>▲ TiN kaplama</li><li>▲ azami uygulama sıcaklığı: 450 °C</li></ul>                                                                                                                         | TiCN  | <ul style="list-style-type: none"><li>▲ TiCN çok katmanlı kaplama</li><li>▲ azami uygulama sıcaklığı: 450 °C</li></ul>                          |
| TiAlN | <ul style="list-style-type: none"><li>▲ TiAlN çok katmanlı kaplama</li><li>▲ azami uygulama sıcaklığı: 900 °C</li></ul>                                                                                                          | F-nit | <ul style="list-style-type: none"><li>▲ Özellikle çelik işlemeye uygun Titancarbonitrid tabanlı PVD kaplama</li><li>▲ 450 °C'ye kadar</li></ul> |
| vap.  | <ul style="list-style-type: none"><li>▲ Buhar menevişli</li><li>▲ Buharlı menevişleme (buhar deşarjı), takımın üzerinde soğuk kaynak oluşmasına engel olur ve yüzey sertliğini ve dolayısıyla aşınma direncini artırır</li></ul> |       |                                                                                                                                                 |

