



Makina Takım Endüstrisi A.Ş.



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# KOMPLE SERT METAL TAKIM PROGRAMI



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## KOMPLE KARBÜR TAKIMLARIN SAĞLADIĞI AVANTAJLAR

- Uzun takım ömrü
- Yüksek kesme performansı
- Ölçü hassasiyeti (Kesici ve h6 sap toleransı)
- İyi yüzey kalitesi ( $R_a=0,1\mu m$ )
- Yüksek çalışma sıcaklıklarına dayanıklılık



## PARMAK FREZE

Kesme hızları (Çekme mukavemeti 1100N / mm<sup>2</sup> çelik için)

HSS	10-15	m/dk
HSS-E	15-30	m/dk
TiN kaplı	20-40	m/dk
KSM	50-80	m/dk
Kaplamalı KSM	75-110	m/dk

İlerleme hızları (Çekme mukavemeti 1100N / mm<sup>2</sup> çelik için Z=4)

HSS	0,01-0,03	m/diş
HSS-E	0,02-0,05	m/diş
TiN kaplı	0,025-0,06	m/diş
KSM	0,04-0,05	m/diş
Kaplamalı KSM	0,06-0,08	m/diş



## MATKAP UCU (ø 8 mm)

(Alaşımli çelik 1100N / mm<sup>2</sup> çekme mukavemeti için)

Kesme hızı

HSS-E	8-12	m/dk
KSM	40-80	m/dk

İlerleme

HSS-E	0,06	m/dev
KSM	0,06	m/dev

Devir

HSS-E	400	dev./dv
KSM	2000	dev./dv

# KOMPLE SERT METAL TAKIM PROGRAMI

MTE,

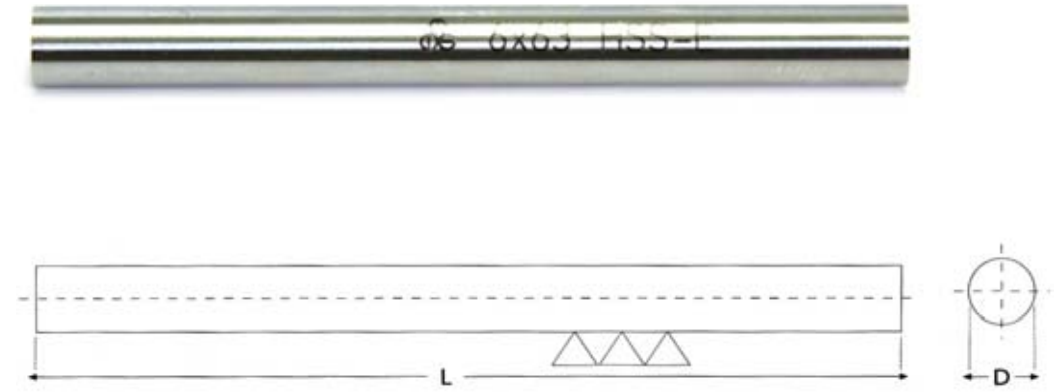
1957 yılından bu yana Türkiye Kesici Takım Sektöründe tecrübe, bilgi birikimi ve dünya standartlarındaki kalitesini bayilerinin desteği ile geleceğe taşımaktan gurur duyar.



**Makina Takım Endüstrisi A.Ş.**



**Avantajları**  
CNC Teknolojisi  
Daha hassas ve hızlı üretim  
Benzersiz yüzey kalitesi  
Özel takım taşlama imkanları



Sipariş Numarası	D h6	Kalite K10 EMT100	L
B248 53 145 40	3,0	•	325
B248 53 146 40	4,0	•	325
B248 53 147 40	5,0	•	325
B248 53 148 40	6,0	•	325
B248 53 149 40	8,0	•	325
B248 53 150 40	10,0	•	325
B248 53 151 40	12,0	•	325
B248 53 152 40	14,0	•	325
B248 53 153 40	16,0	•	325
B248 53 198 40	18,0	•	325
B248 53 154 40	20,0	•	325
B248 53 155 40	25,0	•	325



## KOMPLE KARBÜR KONİK KALIPÇI FREZE 3°

Sipariş Numarası			Ød <sub>1</sub> mm	Ød <sub>2</sub> mm	H mm	l2 mm	z	∞/2
KAPLAMASIZ	TIC	TICN						
B005562 03000	B005562 03010	B005562 03030	3,0	8,0	85	40	3	3°
B005562 04000	B005562 04010	B005562 04030	4,0	8,0	75	30	3	3°
B005562 05000	B005562 05010	B005562 05030	5,0	12,0	115	60	3	3°
B005562 06000	B005562 06010	B005562 06030	6,0	12,0	110	55	3	3°
B005562 08000	B005562 08010	B005562 08030	8,0	14,0	100	50	4	3°



## KOMPLE KARBÜR KONİK KALIPÇI FREZE 4°

Sipariş Numarası			Ød <sub>1</sub> mm	Ød <sub>2</sub> mm	H mm	l2 mm	z	∞/2
KAPLAMASIZ	TIC	TICN						
B005563 03000	B005563 03010	B005563 03030	3,0	8,0	75	32	3	4°
B005563 04000	B005563 04010	B005563 04030	4,0	12,0	100	45	3	4°
B005563 05000	B005563 05010	B005563 05030	5,0	12,0	100	45	3	4°
B005563 06000	B005563 06010	B005563 06030	6,0	16,0	110	50	3	4°
B005563 08000	B005563 08010	B005563 08030	8,0	16,0	110	50	3	4°



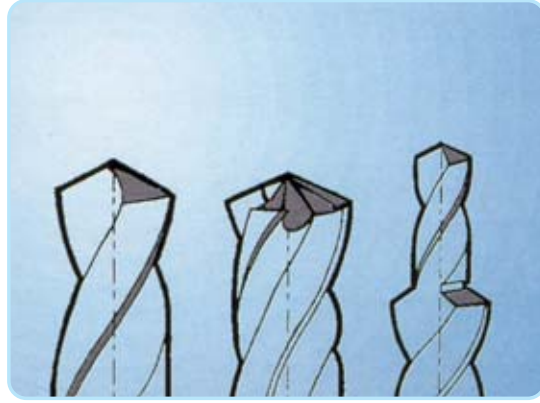
## KOMPLE KARBÜR KONİK KALIPÇI FREZE 5°

Sipariş Numarası			Ød <sub>1</sub> mm	Ød <sub>2</sub> mm	H mm	l2 mm	z	∞/2
KAPLAMASIZ	TIC	TICN						
B005564 03000	B005564 03010	B005564 03030	3,0	10,0	90	40	3	5°
B005564 04000	B005564 04010	B005564 04030	4,0	12,0	100	45	3	5°
B005564 05000	B005564 05010	B005564 05030	5,0	16,0	115	62	3	5°
B005564 06000	B005564 06010	B005564 06030	6,0	16,0	110	55	3	5°
B005564 08000	B005564 08010	B005564 08030	8,0	18,0	110	50	4	5°

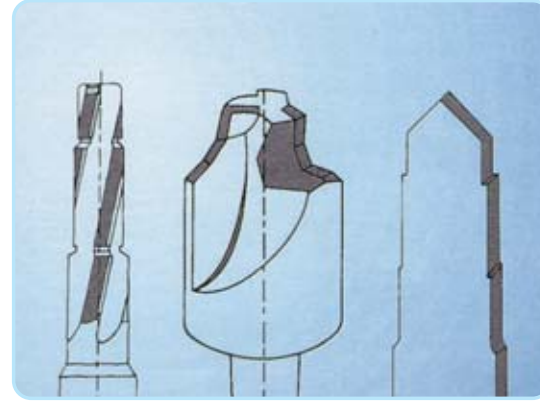




## MATKAP KANAL TAŞLAMA KADEMELİ TAKIMLAR



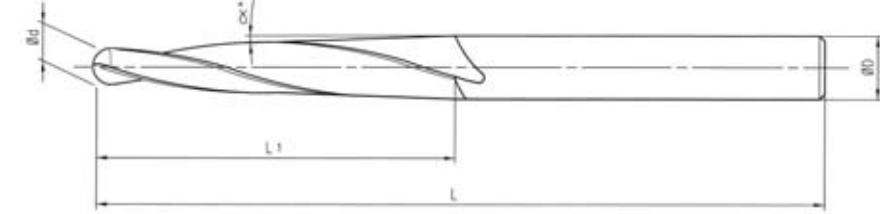
- Değişik uç bileme şekilleri
- Maksimum 3 değişik kademe ve alın geometrisi



- 5 ayrı çeşide kadar konkav ve konveks kademe formları
- Değişik profil taşlama imkanları



## KALIPÇI FREZELER



## KOMPLE KARBÜR KONİK KALIPÇI FREZE 2°

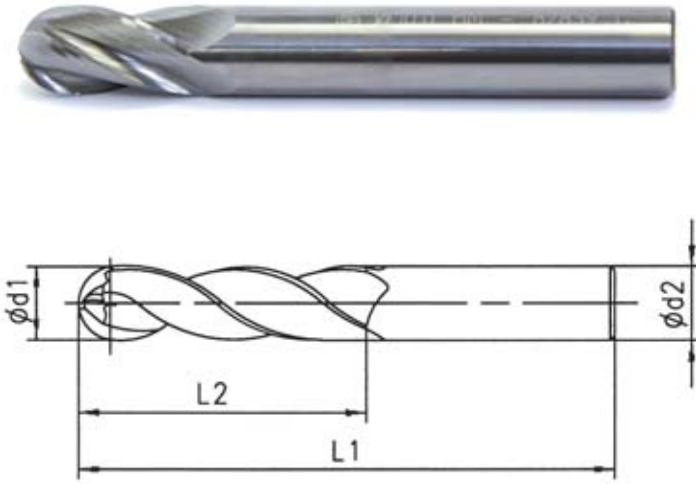


Sipariş Numarası			Ød <sub>1</sub>	Ød <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	z	∞/2
KAPLAMASIZ	TIC	TICN	mm	mm	mm	mm		
B005560 03000	B005560 03010	B005560 03030	3,0	5,0	60	20	3	2°
B005560 04000	B005560 04010	B005560 04030	4,0	6,0	65	20	3	2°
B005560 05000	B005560 05010	B005560 05030	5,0	8,0	75	30	3	2°
B005560 06000	B005560 06010	B005560 06030	6,0	10,0	110	57	3	2°
B005560 08000	B005560 08010	B005560 08030	8,0	12,0	110	57	4	2°



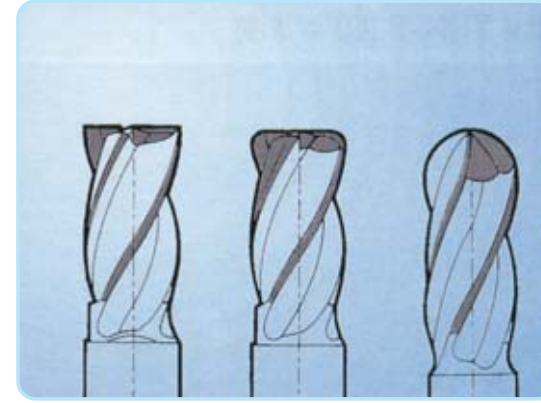
## KOMPLE KARBÜR KONİK KALIPÇI FREZE 2.5°

Sipariş Numarası			Ød <sub>1</sub>	Ød <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	z	∞/2
KAPLAMASIZ	TIC	TICN	mm	mm	mm	mm		
B005561 03000	B005561 03010	B005561 03030	3,0	5,0	60	20	3	2,5°
B005561 04000	B005561 04010	B005561 04030	4,0	6,0	65	20	3	2,5°
B005561 05000	B005561 05010	B005561 05030	5,0	8,0	75	30	3	2,5°
B005561 06000	B005561 06010	B005561 06030	6,0	10,0	80	30	3	2,5°
B005561 08000	B005561 08010	B005561 08030	8,0	12,0	90	30	4	2,5°

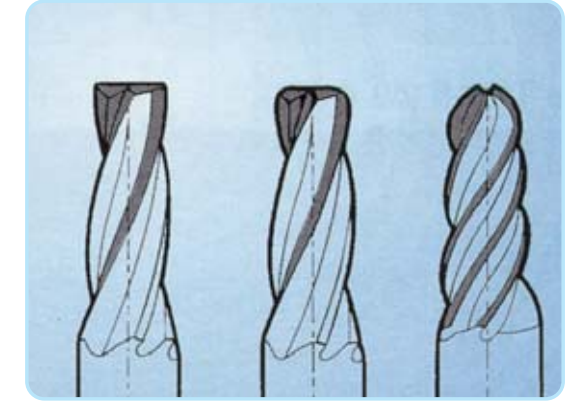


Sipariş Numarası			Ød <sub>1</sub> h10 mm	Ød <sub>2</sub> h6 mm	l1 mm	l2 mm	z
KAPLAMASIZ	TIC	TICN					
B005542 06000	B005542 06010	B005542 06030	6,00	6,00	80	15	4
B005542 08000	B005542 08010	B005542 08030	8,00	8,00	90	20	4
B005542 10000	B005542 10010	B005542 10030	10,00	10,00	100	25	4
B005542 12000	B005542 12010	B005542 12030	12,00	12,00	110	30	4
B005542 14000	B005542 14010	B005542 14030	14,00	14,00	110	30	4
B005542 16000	B005542 16010	B005542 16030	16,00	16,00	120	40	4
B005542 20000	B005542 20010	B005542 20030	20,00	20,00	130	45	4

Sipariş Numarası			Ød <sub>1</sub> h10 mm	Ød <sub>2</sub> h6 mm	l1 mm	l2 mm	z
KAPLAMASIZ	TIC	TICN					
B005543 06000	B005543 06010	B005543 06030	6,00	6,00	80	15	2
B005543 08000	B005543 08010	B005543 08030	8,00	8,00	90	20	2
B005543 10000	B005543 10010	B005543 10030	10,00	10,00	100	25	2
B005543 12000	B005543 12010	B005543 12030	12,00	12,00	110	30	2
B005543 14000	B005543 14010	B005543 14030	14,00	14,00	110	30	2
B005543 16000	B005543 16010	B005543 16030	16,00	16,00	120	40	2
B005543 20000	B005543 20010	B005543 20030	20,00	20,00	130	45	2



- Düz, sağ ve sol helis kanallı takımlar
- Keskin köşe, radyüs köşe ve tam radyüs alın bileme şekilleri



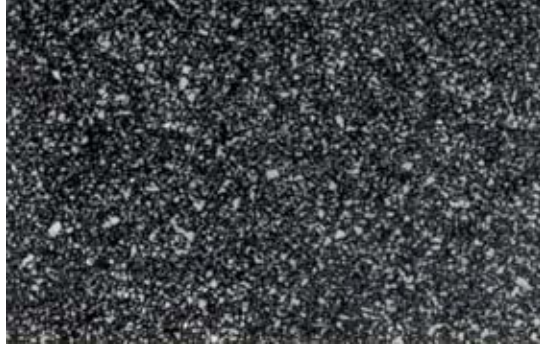
- Sağ helis, sağ kesici
- Sol helis, sol kesici
- Düz kanal, sağ kesici takımlar
- Sabit hatve ve/veya sabit helis açısı
- Keskin köşe, radyüs köşe ve tam radyüs alın bileme şekilleri





Matkap ucu ve parmak freze imalatı için EMT 100 ve EMT-210 mikro taneli kaliteler kullanılmaktadır. Bu kaliteler imalatta delme ve frezeleme operasyonlarında kullanımı yaygındır. Mikro taneli sert metaller özellikle uygun kaplama kombinasyonu ile sert ve aşındırıcı malzemelerin işlenmesinde artan bir önem kazanmaktadır.

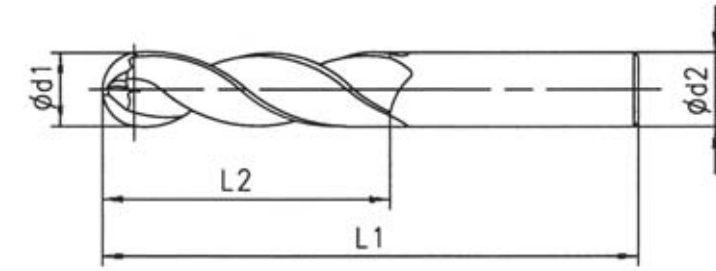
## Kalite EMT 100 (ISO=K10)



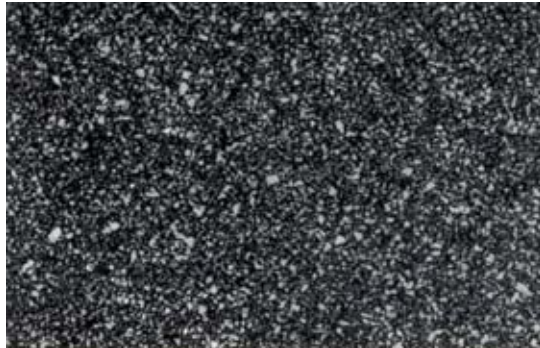
Uygulama Alanı: "Hassas operasyonlar"

- Alaşimsız ve alaşımli pik döküm
- Düşük ve orta dayanımlı çelikler
- Demirdışı metaller
- Plastikler
- Yapışkan özellikli malzemeler

Teknik Bilgi	
WC	91.8 %
Co	6.5 %
İlave Karbürler	1.7 %
Yoğunluk (ISO 3369)	14.80 g/cm <sup>3</sup>
Sertlik (ISO 3778)	1780 HV30
Çekme Dayanımı	3000 N/mm <sup>2</sup>



## Kalite EMT 210 (ISO=K20-30)



Uygulama Alanı: "Kaba ve Hassas operasyonlar"

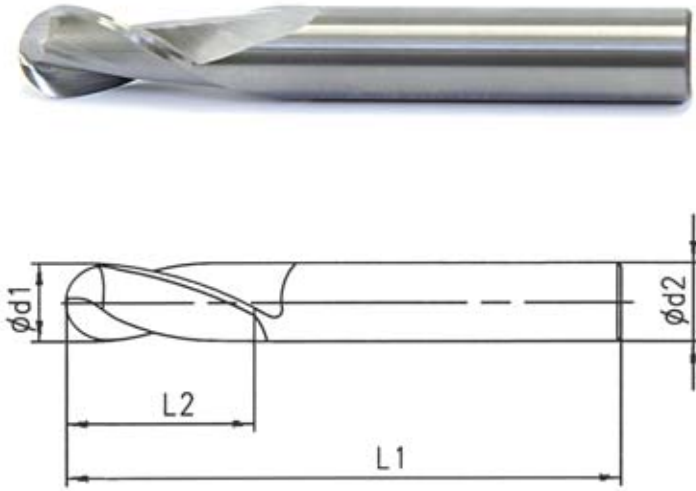
- Alaşimsız imalat çeliği
- Paslanmaz çelikler
- Takım çelikleri
- Titanyum alaşımları
- Nikel esaslı alaşımlar
- Kuvvetlendirilmiş plastikler

Teknik Bilgi	
WC	89.5 %
Co	10.0 %
İlave Karbürler	0.5 %
Yoğunluk (ISO 3369)	14.50 g/cm <sup>3</sup>
Sertlik (ISO 3778)	1570 HV30
Çekme Dayanımı	3800 N/mm <sup>2</sup>

## DIN 6527

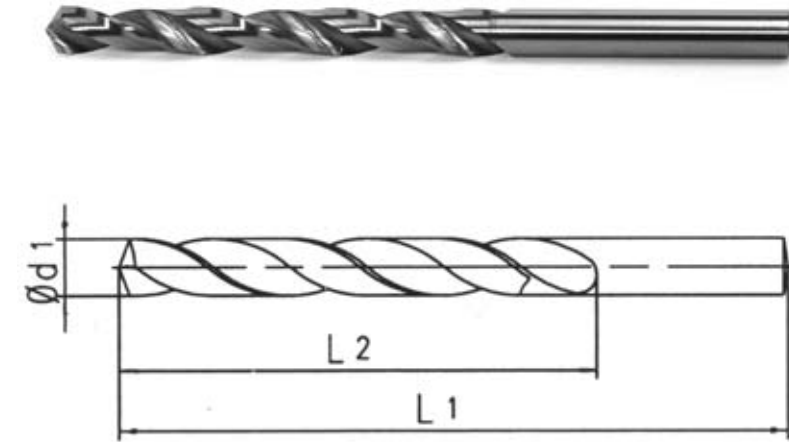
Sipariş Numarası			Ød <sub>1</sub>	Ød <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	z
KAPLAMASIZ	TIC	TICN	mm	mm	mm	mm	
B005541 06000	B005541 06010	B005541 06030	6,0	6,0	57	13	4
B005541 08000	B005541 08010	B005541 08030	8,0	8,0	63	19	4
B005541 10000	B005541 10010	B005541 10030	10,0	10,0	72	22	4
B005541 12000	B005541 12010	B005541 12030	12,0	12,0	83	26	4
B005541 14000	B005541 14010	B005541 14030	14,0	14,0	83	26	4
B005541 16000	B005541 16010	B005541 16030	16,0	16,0	92	32	4
B005541 20000	B005541 20010	B005541 20030	20,0	20,0	104	38	4





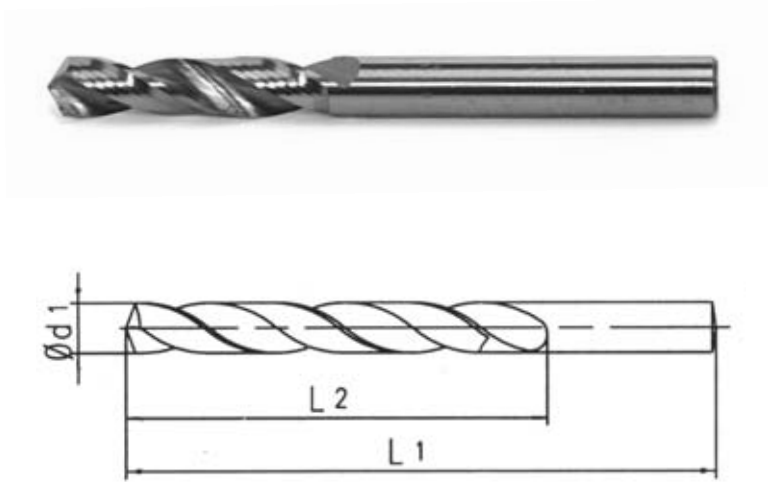
### DIN 6527

Sipariş Numarası			$\phi d_1$ mm	$\phi d_2$ mm	H mm	L2 mm	z
KAPLAMASIZ	TIC	TICN					
B005540 06000	B005540 06010	B005540 06030	6,0	6,0	57	10	2
B005540 08000	B005540 08010	B005540 08030	8,0	8,0	63	16	2
B005540 10000	B005540 10010	B005540 10030	10,0	10,0	72	19	2
B005540 12000	B005540 12010	B005540 12030	12,0	12,0	83	22	2
B005540 14000	B005540 14010	B005540 14030	14,0	14,0	83	22	2
B005540 16000	B005540 16010	B005540 16030	16,0	16,0	92	26	2
B005540 18000	B005540 18010	B005540 18030	18,0	18,0	92	26	2
B005540 20000	B005540 20010	B005540 20030	20,0	20,0	104	32	2

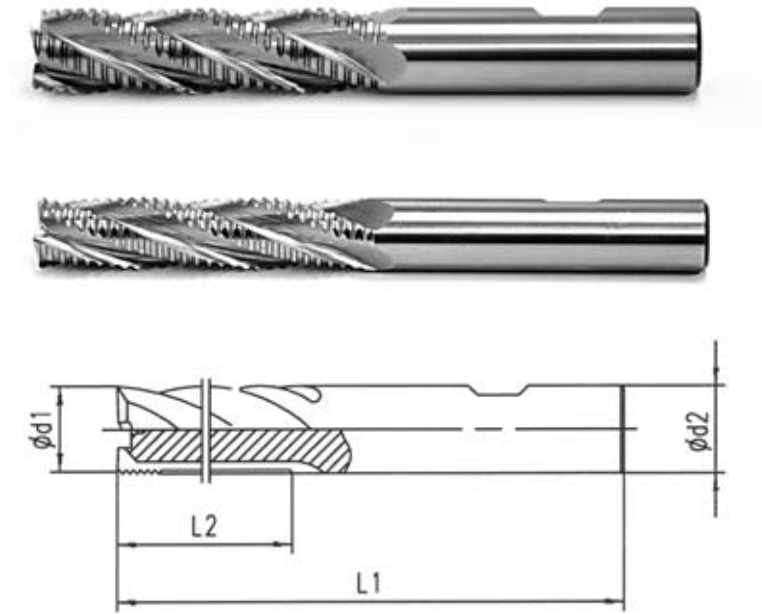


### DIN 338

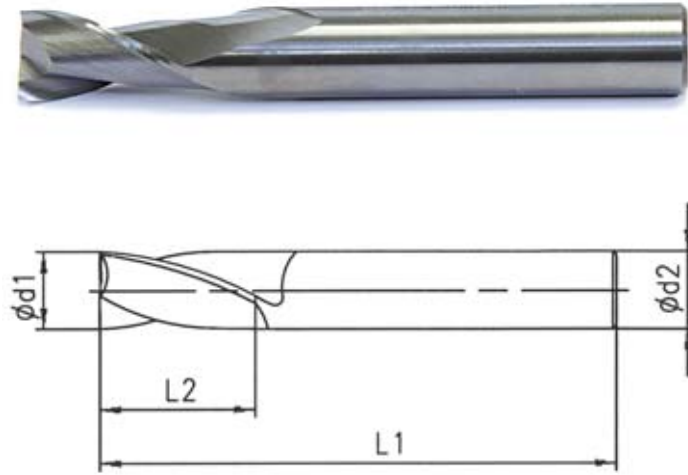
Sipariş Numarası			$\phi d_1$ mm	$\phi d_2$ mm	H mm	L2 mm	z
KAPLAMASIZ	TIC	TIALN					
B005510 02000	B005510 02010	B005510 02020	2,0	2,0	49	24	2
B005510 02500	B005510 02510	B005510 02520	2,5	2,5	57	30	2
B005510 03000	B005510 03010	B005510 03020	3,0	3,0	61	33	2
B005510 03500	B005510 03510	B005510 03520	3,5	3,5	70	39	2
B005510 04000	B005510 04010	B005510 04020	4,0	4,0	75	43	2
B005510 04500	B005510 04510	B005510 04520	4,5	4,5	80	47	2
B005510 05000	B005510 05010	B005510 05020	5,0	5,0	86	52	2
B005510 05500	B005510 05510	B005510 05520	5,5	5,5	93	57	2
B005510 06000	B005510 06010	B005510 06020	6,0	6,0	93	57	2
B005510 06500	B005510 06510	B005510 06520	6,5	6,5	101	63	2
B005510 07000	B005510 07010	B005510 07020	7,0	7,0	109	69	2
B005510 07500	B005510 07510	B005510 07520	7,5	7,5	109	69	2
B005510 08000	B005510 08010	B005510 08020	8,0	8,0	117	75	2
B005510 08500	B005510 08510	B005510 08520	8,5	8,5	117	75	2
B005510 09000	B005510 09010	B005510 09020	9,0	9,0	125	81	2
B005510 09500	B005510 09510	B005510 09520	9,5	9,5	125	81	2
B005510 10000	B005510 10010	B005510 10020	10,0	10,0	133	87	2


**DIN 6539**

Sipariş Numarası			$\phi d_1$	$\phi d_2$	l1	l2	z
KAPLAMASIZ	TiC	TiAlN	mm	mm	mm	mm	
B005511 02000	B005511 02010	B005511 02020	2,00	2,0	38	12	2
B005511 02500	B005511 02510	B005511 02520	2,50	2,5	43	14	2
B005511 03000	B005511 03010	B005511 03020	3,00	3,0	46	16	2
B005511 03500	B005511 03510	B005511 03520	3,50	3,5	52	20	2
B005511 04000	B005511 04010	B005511 04020	4,00	4,0	55	22	2
B005511 04500	B005511 04510	B005511 04520	4,50	4,5	58	24	2
B005511 05000	B005511 05010	B005511 05020	5,00	5,0	62	26	2
B005511 05500	B005511 05510	B005511 05520	5,50	5,5	66	28	2
B005511 06000	B005511 06010	B005511 06020	6,00	6,0	66	28	2
B005511 06500	B005511 06510	B005511 06520	6,50	6,5	70	31	2
B005511 08000	B005511 08010	B005511 08020	8,00	8,0	79	37	2
B005511 08500	B005511 08510	B005511 08520	8,50	8,5	79	37	2
B005511 09000	B005511 09010	B005511 09020	9,00	9,0	84	40	2
B005511 09500	B005511 09510	B005511 09520	9,50	9,5	84	40	2
B005511 10000	B005511 10010	B005511 10020	10,00	10,0	89	43	2

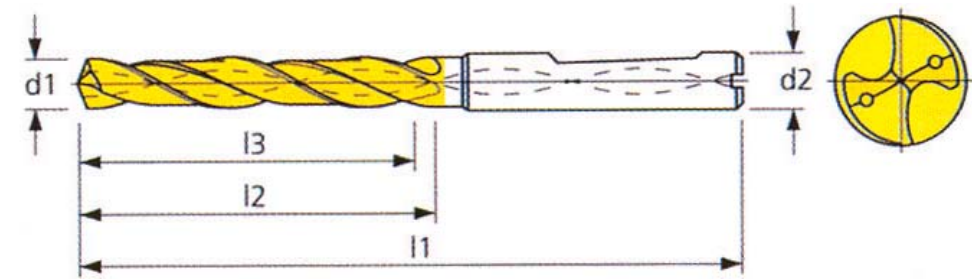

**DIN 6527**

Sipariş Numarası			$\phi d_1$	$\phi d_2$	l1	l2	z
KAPLAMASIZ	TiC	TiCN	mm	mm	mm	mm	
<b>K A B A</b>							
B005533 06000	B005533 06010	B005533 06030	6,0	6,0	57	10	3
B005533 08000	B005533 08010	B005533 08030	8,0	8,0	69	19	3
B005533 10000	B005533 10010	B005533 10030	10,0	10,0	72	22	3
B005533 12000	B005533 12010	B005533 12030	12,0	12,0	83	26	3
B005533 16000	B005533 12010	B005533 12030	16,0	16,0	92	32	4
B005533 20000	B005533 20010	B005533 20030	20,0	20,0	104	38	4
<b>i N C E</b>							
B005534 06000	B005534 06010	B005534 06030	6,0	6,0	57	10	3
B005534 08000	B005534 08010	B005534 08030	8,0	8,0	69	19	3
B005534 10000	B005534 10010	B005534 10030	10,0	10,0	72	22	3
B005534 12000	B005534 12010	B005534 12030	12,0	12,0	83	26	3
B005534 16000	B005534 12010	B005534 12030	16,0	16,0	92	32	4
B005534 20000	B005534 20010	B005534 20030	20,0	20,0	104	38	4



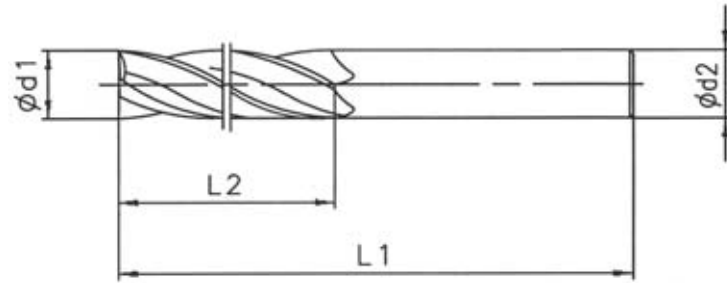
**DIN 6528**

Sipariş Numarası			$\phi d_1$ mm	$\phi d_2$ mm	H mm	L2 mm	z
KAPLAMASIZ	TIC	TICN					
B005532 04000	B005532 04010	B005532 04030	4,0	4,0	50	8	2
B005532 05000	B005532 05010	B005532 05030	5,0	5,0	50	10	2
B005532 06000	B005532 06010	B005532 06030	6,0	6,0	57	10	2
B005532 07000	B005532 07010	B005532 07030	7,0	7,0	60	13	2
B005532 08000	B005532 08010	B005532 08030	8,0	8,0	63	16	2
B005532 09000	B005532 09010	B005532 09030	9,0	9,0	67	16	2
B005532 10000	B005532 10010	B005532 10030	10,0	10,0	72	19	2
B005532 12000	B005532 12010	B005532 12030	12,0	12,0	83	22	2
B005532 14000	B005532 14010	B005532 14030	14,0	14,0	83	22	2
B005532 16000	B005532 16010	B005532 16030	16,0	16,0	92	26	2
B005532 20000	B005532 20010	B005532 20030	20,0	20,0	104	32	2



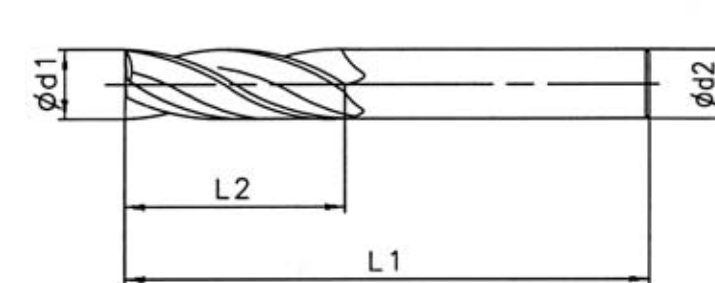
**DIN 6537**

Sipariş Numarası			$\phi d_1$ m7 mm	$\phi d_2$ h6 mm	H mm	L2 Helis Boyu mm	L3 Kesici Boy mm	z
KAPLAMASIZ	TIC	TIALN						
B005512 04000	B005512 04010	B005512 04020	4,0	6,0	74	36	29	2
B005512 04500	B005512 04510	B005512 04520	4,5	6,0	74	36	29	2
B005512 05000	B005512 05010	B005512 05020	5,0	6,0	82	44	35	2
B005512 05500	B005512 05510	B005512 05520	5,5	6,0	82	44	35	2
B005512 06000	B005512 06010	B005512 06020	6,0	6,0	82	44	35	2
B005512 06500	B005512 06510	B005512 06520	6,5	8,0	91	53	43	2
B005512 07000	B005512 07010	B005512 07020	7,0	8,0	91	53	43	2
B005512 07500	B005512 07510	B005512 07520	7,5	8,0	91	53	43	2
B005512 08000	B005512 08010	B005512 08020	8,0	8,0	91	53	43	2
B005512 08500	B005512 08510	B005512 08520	8,5	10,0	103	61	49	2
B005512 09000	B005512 09010	B005512 09020	9,0	10,0	103	61	49	2
B005512 09500	B005512 09510	B005512 09520	9,5	10,0	103	61	49	2
B005512 10000	B005512 10010	B005512 10020	10,0	10,0	103	61	49	2
B005512 10500	B005512 10510	B005512 10520	10,5	12,0	118	71	56	2
B005512 11000	B005512 11010	B005512 11020	11,0	12,0	118	71	56	2
B005512 11500	B005512 11510	B005512 11520	11,5	12,0	118	71	56	2
B005512 12000	B005512 12010	B005512 12020	12,0	12,0	118	71	60	2



**DIN 6528**

Sipariş Numarası			$\phi d_1$	$\phi d_2$	l1	l2	z
KAPLAMASIZ	TiC	TiCN	mm	mm	mm	mm	
B005530 04000	B005530 04010	B005530 04030	4,0	4,0	50	11	4
B005530 05000	B005530 05010	B005530 05030	5,0	5,0	50	13	4
B005530 06000	B005530 06010	B005530 06030	6,0	6,0	57	13	4
B005530 07000	B005530 07010	B005530 07030	7,0	7,0	60	16	4
B005530 08000	B005530 08010	B005530 08030	8,0	8,0	63	19	4
B005530 09000	B005530 09010	B005530 09030	9,0	9,0	67	19	4
B005530 10000	B005530 10010	B005530 10030	10,0	10,0	72	22	4
B005530 12000	B005530 12010	B005530 12030	12,0	12,0	83	26	4
B005530 14000	B005530 14010	B005530 14030	14,0	14,0	83	26	4
B005530 16000	B005530 16010	B005530 16030	16,0	16,0	92	32	4
B005530 20000	B005530 20010	B005530 20030	20,0	20,0	104	38	4



**DIN 6528**

Sipariş Numarası			$\phi d_1$	$\phi d_2$	l1	l2	z
KAPLAMASIZ	TiC	TiCN	mm	mm	mm	mm	
B005531 04000	B005531 04010	B005531 04030	4,0	4,0	50	8	3
B005531 05000	B005531 05010	B005531 05030	5,0	5,0	50	10	3
B005531 06000	B005531 06010	B005531 06030	6,0	6,0	57	10	3
B005531 07000	B005531 07010	B005531 07030	7,0	7,0	60	13	3
B005531 08000	B005531 08010	B005531 08030	8,0	8,0	63	16	3
B005531 09000	B005531 09010	B005531 09030	9,0	9,0	67	16	3
B005531 10000	B005531 10010	B005531 10030	10,0	10,0	72	19	3
B005531 12000	B005531 12010	B005531 12030	12,0	12,0	83	22	3
B005531 14000	B005531 14010	B005531 14030	14,0	14,0	83	22	3
B005531 16000	B005531 16010	B005531 16030	16,0	16,0	92	26	3
B005531 20000	B005531 20010	B005531 20030	20,0	20,0	104	32	3