



**U-DRILL**

TAKMA UÇLU MATKAPLAR  
U-DRILL SYSTEM

AKKO  
TOOLS & TOOLING



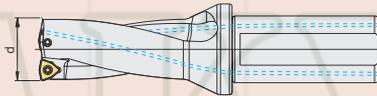
AKKO **A** **TUM** **16** x **D3**

**S** **P** **M** **T** **06** **02** **04**

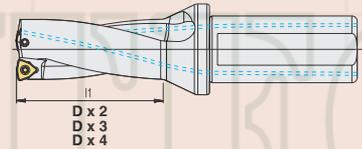
**2** Kesiş Stili / Cutter Style

TUM : Takma Uçlu Matkap / U-Drill

**3** Takım Çapı / Tool Diameter



**4** Delme Derinliği / Drilling Depth



**5** Uç Şekli / Insert Form



W



S

**6** Serbest Uç Açısı / Clearance angle of Insert

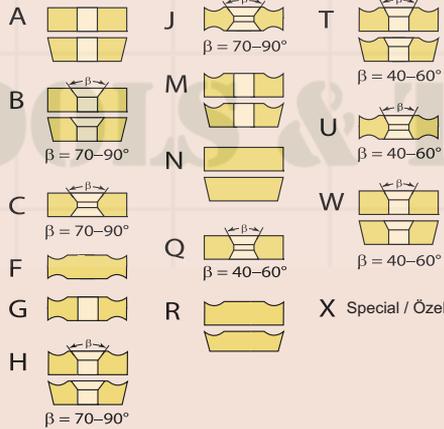


C

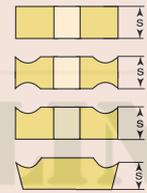


P

**8** Uç Tipi / Type of Insert



**10** Kalınlık / Thickness



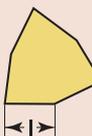
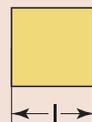
01	s = 1.59
T1	s = 1.98
02	s = 2.38
T2	s = 2.78
03	s = 3.18
T3	s = 3.97
04	s = 4.76
05	s = 5.56
06	s = 6.35
07	s = 7.94
09	s = 9.52

**7** Toleranslar / Tolerance Classes

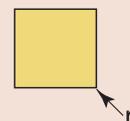
	d	m	t
A	± 0.025	± 0.005	± 0.025
C	± 0.025	± 0.013	± 0.025
E	± 0.025	± 0.025	± 0.025
F	± 0.013	± 0.005	± 0.025
G	± 0.025	± 0.025	± 0.130
H	± 0.013	± 0.013	± 0.025
J	± 0.05-0.15	± 0.005	± 0.025
K	± 0.05-0.15	± 0.013	± 0.025
L	± 0.05-0.15	± 0.025	± 0.025
M	± 0.05-0.15	± 0.08-0.20	± 0.130
N	± 0.05-0.15	± 0.08-0.20	± 0.025
U	± 0.08-0.25	± 0.13-0.38	± 0.130

d : Daire Ölçüsü / Inscribed Circle  
m : Şekle Göre / Refer to Figure  
t : Kalınlık / Thickness

**9** Kesme Kenar Uzunluğu / Cutting Edge Length



**11** Köşe Konfigürasyonu / Corner Radius

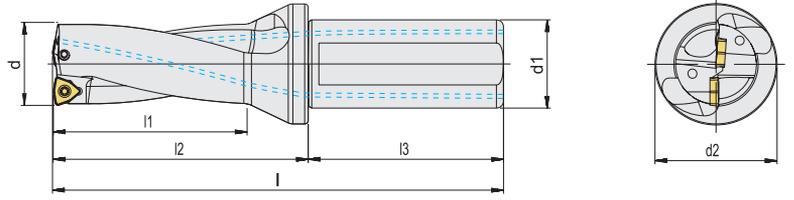


01	r = 0.1
02	r = 0.2
04	r = 0.4
08	r = 0.8
12	r = 1.2
16	r = 1.6
24	r = 2.4

# TAKMA UÇLU MATKAPLAR U-DRILL SYSTEM



Delme Derinliği = 2xÇap  
Drilling Depth = 2xDiameter



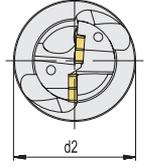
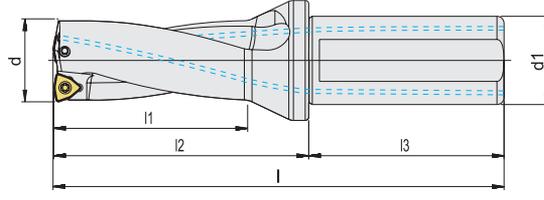
Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
ATUM 16XD2 WCM. 030208	●	16	25	34	108	32	52	56	WCM. 030208	3008-M2.5x6	80-T08
ATUM 16.5XD2 WCM. 030208	●	16.5	25	34	110	34	54	56			
ATUM 17XD2 WCM. 030208	●	17	25	34	110	34	54	56			
ATUM 17.5XD2 WCM. 030208	●	17.5	25	34	113	36	57	56			
ATUM 18XD2 WCM. 030208	●	18	25	34	113	36	57	56			
ATUM 18.5XD2 WCM. 030208	●	18.5	25	34	115	38	59	56			
ATUM 19XD2 WCM. 030208	●	19	25	34	115	38	59	56			
ATUM 19.5XD2 WCM. 030208	●	19.5	25	34	119	40	63	56			
ATUM 20XD2 WCM. 040208	●	20	25	34	119	40	63	56			
ATUM 20.5XD2 WCM. 040208	●	20.5	25	34	121	42	65	56			
ATUM 21XD2 WCM. 040208	●	21	25	34	121	42	65	56	WCM. 040208		
ATUM 21.5XD2 WCM. 040208	●	21.5	25	34	123	44	67	56			
ATUM 22XD2 WCM. 040208	●	22	25	34	123	44	67	56			
ATUM 22.5XD2 WCM. 040208	●	22.5	25	34	127	46	71	56			
ATUM 23XD2 WCM. 040208	●	23	25	34	127	46	71	56			
ATUM 23.5XD2 WCM. 040208	●	23.5	25	34	130	48	74	56			
ATUM 24XD2 WCM. 050308	●	24	25	34	130	48	74	56			
ATUM 24.5XD2 WCM. 050308	●	24.5	25	34	133	48	77	56			
ATUM 25XD2 WCM. 050308	●	25	25	34	133	50	77	56			
ATUM 25.5XD2 WCM. 050308	●	25.5	25	34	135	52	79	56			
ATUM 26XD2 WCM. 050308	●	26	25	34	135	52	79	56	WCM. 050308	1008-M3x9	
ATUM 26.5XD2 WCM. 050308	●	26.5	25	34	137	54	81	56			
ATUM 27XD2 WCM. 050308	●	27	25	34	137	54	81	56			
ATUM 27.5XD2 WCM. 050308	●	27.5	25	34	140	56	84	56			
ATUM 28XD2 WCM. 050308	●	28	25	34	140	56	84	56			
ATUM 28.5XD2 WCM. 050308	●	28.5	25	34	142	58	86	56			
ATUM 29XD2 WCM. 050308	●	29	25	34	142	58	86	56			
ATUM 29.5XD2 WCM. 050308	●	29.5	25	34	151	60	91	56			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 16xD2 WCM. 030208  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 2xÇap  
Drilling Depth = 2xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
ATUM 30XD2 WCM. 06T308	●	30	32	44	151	60	91	60	WCM. 06T308	1510-M3.5x9	80-T10
ATUM 31XD2 WCM. 06T308	●	31	32	44	154	62	94	60			
ATUM 32XD2 WCM. 06T308	●	32	32	44	156	64	96	60			
ATUM 33XD2 WCM. 06T308	●	33	32	44	159	66	99	60			
ATUM 34XD2 WCM. 06T308	●	34	32	44	161	68	101	60			
ATUM 35XD2 WCM. 06T308	●	35	32	44	164	70	104	60			
ATUM 36XD2 WCM. 06T308	●	36	32	44	167	72	107	60			
ATUM 37XD2 WCM. 06T308	●	37	32	44	170	74	110	60			
ATUM 38XD2 WCM. 06T308	●	38	32	44	173	76	113	60			
ATUM 39XD2 WCM. 06T308	●	39	32	44	175	78	115	60			
ATUM 40XD2 WCM. 06T308	●	40	32	44	178	80	118	60	WCM. 080412	1515-M4x11	80-T15
ATUM 41XD2 WCM. 06T308	●	41	32	44	181	82	121	60			
ATUM 42XD2 WCM. 06T308	●	42	32	44	183	84	123	60			
ATUM 43XD2 WCM. 06T308	●	43	32	44	186	86	126	60			
ATUM 44XD2 WCM. 06T308	●	44	32	44	188	88	128	60			
ATUM 45XD2 WCM. 080412	●	45	40	54	202	90	132	70			
ATUM 46XD2 WCM. 080412	●	46	40	54	205	92	135	70			
ATUM 47XD2 WCM. 080412	●	47	40	54	207	94	137	70			
ATUM 48XD2 WCM. 080412	●	48	40	54	210	96	140	70			
ATUM 49XD2 WCM. 080412	●	49	40	54	212	98	142	70			
ATUM 50XD2 WCM. 080412	●	50	40	54	215	100	145	70			
ATUM 51XD2 WCM. 080412	●	51	40	60	217	102	147	70			
ATUM 52XD2 WCM. 080412	●	52	40	60	220	104	150	70			
ATUM 53XD2 WCM. 080412	●	53	40	60	222	106	152	70			
ATUM 54XD2 WCM. 080412	●	54	40	60	225	108	155	70			
ATUM 55XD2 WCM. 080412	●	55	40	60	227	110	157	70			
ATUM 56XD2 WCM. 080412	●	56	40	60	230	112	160	70			
ATUM 57XD2 WCM. 080412	●	57	40	60	232	114	162	70			
ATUM 58XD2 WCM. 080412	●	58	40	60	235	116	165	70			
ATUM 59XD2 WCM. 080412	●	59	40	60	237	118	167	70			
ATUM 60XD2 WCM. 080412	●	60	40	60	240	120	170	70			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

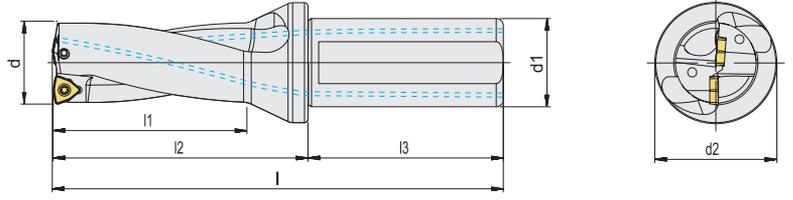
Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 30xD2 WCM. 06T308  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143

# TAKMA UÇLU MATKAPLAR

## U-DRILL SYSTEM



Delme Derinliği = 3xÇap  
Drilling Depth = 3xDiameter



Takım Kodu  
Ordering Code

Stok  
Stock

Takım Ölçüleri (mm)  
Dimension (mm)

Kesici Uç  
Insert

Yedek Parçaları  
Spare Parts

Sıkma Vidası  
Clamp Screw

Tork Anahtar  
Torx Key

d d<sub>1</sub> d<sub>2</sub> l l<sub>1</sub> l<sub>2</sub> l<sub>3</sub>

WCM. 030208

3008-M2.5x6

80-T08

WCM. 040208

WCM. 050308

1008-M3x9

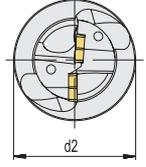
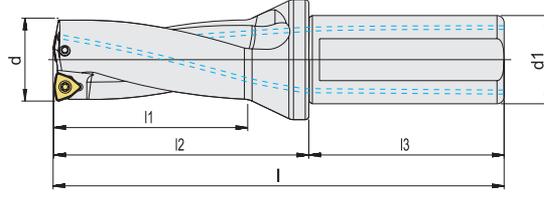
Takım Kodu Ordering Code	Stok Stock	d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>
ATUM 16XD3 WCM. 030208	●	16	25	34	124	48	68	56
ATUM 16.5XD3 WCM. 030208	●	16.5	25	34	127	51	71	56
ATUM 17XD3 WCM. 030208	●	17	25	34	127	51	71	56
ATUM 17.5XD3 WCM. 030208	●	17.5	25	34	131	54	75	56
ATUM 18XD3 WCM. 030208	●	18	25	34	131	54	75	56
ATUM 18.5XD3 WCM. 030208	●	18.5	25	34	134	57	78	56
ATUM 19XD3 WCM. 030208	●	19	25	34	134	57	78	56
ATUM 19.5XD3 WCM. 030208	●	19.5	25	34	139	60	83	56
ATUM 20XD3 WCM. 040208	●	20	25	34	139	60	83	56
ATUM 20.5XD3 WCM. 040208	●	20.5	25	34	142	63	86	56
ATUM 21XD3 WCM. 040208	●	21	25	34	142	63	86	56
ATUM 21.5XD3 WCM. 040208	●	21.5	25	34	145	66	89	56
ATUM 22XD3 WCM. 040208	●	22	25	34	145	66	89	56
ATUM 22.5XD3 WCM. 040208	●	22.5	25	34	150	69	94	56
ATUM 23XD3 WCM. 040208	●	23	25	34	150	69	94	56
ATUM 23.5XD3 WCM. 040208	●	23.5	25	34	154	72	98	56
ATUM 24XD3 WCM. 050308	●	24	25	34	154	72	98	56
ATUM 24.5XD3 WCM. 050308	●	24.5	25	34	158	75	102	56
ATUM 25XD3 WCM. 050308	●	25	25	34	158	75	102	56
ATUM 25.5XD3 WCM. 050308	●	25.5	25	34	161	78	105	56
ATUM 26XD3 WCM. 050308	●	26	25	34	161	78	105	56
ATUM 26.5XD3 WCM. 050308	●	26.5	25	34	164	81	108	56
ATUM 27XD3 WCM. 050308	●	27	25	34	164	81	108	56
ATUM 27.5XD3 WCM. 050308	●	27.5	25	34	168	84	112	56
ATUM 28XD3 WCM. 050308	●	28	25	34	168	84	112	56
ATUM 28.5XD3 WCM. 050308	●	28.5	25	34	171	87	115	56
ATUM 29XD3 WCM. 050308	●	29	25	34	171	87	115	56
ATUM 29.5XD3 WCM. 050308	●	29.5	25	34	177	90	121	56

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 16xD3 WCM. 030208  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 3xÇap  
Drilling Depth = 3xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
ATUM 30XD3 WCM. 06T308	●	30	32	44	181	90	121	60	 <b>WCM. 06T308</b>	 1510-M3.5x9	 80-T10
ATUM 31XD3 WCM. 06T308	●	31	32	44	185	93	125	60			
ATUM 32XD3 WCM. 06T308	●	32	32	44	188	96	128	60			
ATUM 33XD3 WCM. 06T308	●	33	32	44	192	99	132	60			
ATUM 34XD3 WCM. 06T308	●	34	32	44	195	102	135	60			
ATUM 35XD3 WCM. 06T308	●	35	32	44	199	105	139	60			
ATUM 36XD3 WCM. 06T308	●	36	32	44	203	108	143	60			
ATUM 37XD3 WCM. 06T308	●	37	32	44	207	111	147	60			
ATUM 38XD3 WCM. 06T308	●	38	32	44	211	114	151	60			
ATUM 39XD3 WCM. 06T308	●	39	32	44	214	117	154	60			
ATUM 40XD3 WCM. 06T308	●	40	32	44	218	120	158	60			
ATUM 41XD3 WCM. 06T308	●	41	32	44	222	123	162	60			
ATUM 42XD3 WCM. 06T308	●	42	32	44	225	126	165	60			
ATUM 43XD3 WCM. 06T308	●	43	32	44	229	129	169	60			
ATUM 44XD3 WCM. 06T308	●	44	32	44	232	132	172	60			
ATUM 45XD3 WCM. 080412	●	45	40	54	247	135	177	70	<b>WCM. 080412</b>	1515-M4x11	80-T15
ATUM 46XD3 WCM. 080412	●	46	40	54	251	138	181	70			
ATUM 47XD3 WCM. 080412	●	47	40	54	254	141	184	70			
ATUM 48XD3 WCM. 080412	●	48	40	54	258	144	188	70			
ATUM 49XD3 WCM. 080412	●	49	40	54	261	147	191	70			
ATUM 50XD3 WCM. 080412	●	50	40	54	265	150	195	70			
ATUM 51XD3 WCM. 080412	●	51	40	60	268	153	198	70			
ATUM 52XD3 WCM. 080412	●	52	40	60	271	156	201	70			
ATUM 53XD3 WCM. 080412	●	53	40	60	274	159	204	70			
ATUM 54XD3 WCM. 080412	●	54	40	60	277	162	207	70			
ATUM 55XD3 WCM. 080412	●	55	40	60	280	165	210	70			
ATUM 56XD3 WCM. 080412	●	56	40	60	283	168	213	70			
ATUM 57XD3 WCM. 080412	●	57	40	60	286	171	216	70			
ATUM 58XD3 WCM. 080412	●	58	40	60	289	174	219	70			
ATUM 59XD3 WCM. 080412	●	59	40	60	292	177	222	70			
ATUM 60XD3 WCM. 080412	●	60	40	60	295	180	225	70			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

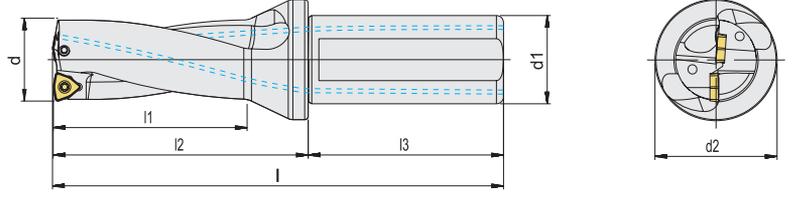
Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 30xD3 WCM. 06T308  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143

# TAKMA UÇLU MATKAPLAR

## U-DRILL SYSTEM



Delme Derinliği = 4xÇap  
Drilling Depth = 4xDiameter



Takım Kodu  
Ordering Code

Stok  
Stock

Takım Ölçüleri (mm)  
Dimension (mm)

Kesici Uç  
Insert

Yedek Parçaları  
Spare Parts

Sıkma Vidası  
Clamp Screw

Tork Anahtar  
Torx Key

d d<sub>1</sub> d<sub>2</sub> l l<sub>1</sub> l<sub>2</sub> l<sub>3</sub>

WCM. 030208

WCM. 040208

WCM. 050308

WCM. 06T308

WCM. 080412

3008-M2.5x6

1008-M3x9

1510-M3.5x9

1515-M4x11

80-T08

80-T10

80-T15

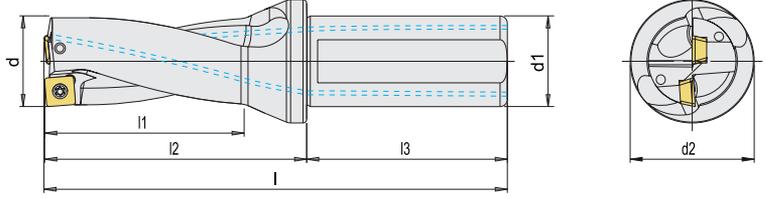
ATUM 16XD4	WCM. 030208	●	16	25	34	140	64	84	56
ATUM 16.5XD4	WCM. 030208	○	16.5	25	34	144	68	88	56
ATUM 17XD4	WCM. 030208	●	17	25	34	144	68	88	56
ATUM 17.5XD4	WCM. 030208	○	17.5	25	34	149	72	93	56
ATUM 18XD4	WCM. 030208	●	18	25	34	149	72	93	56
ATUM 18.5XD4	WCM. 030208	○	18.5	25	34	153	76	97	56
ATUM 19XD4	WCM. 030208	●	19	25	34	153	76	97	56
ATUM 19.5XD4	WCM. 030208	○	19.5	25	34	159	80	103	56
ATUM 20XD4	WCM. 040208	●	20	25	34	159	80	103	56
ATUM 20.5XD4	WCM. 040208	○	20.5	25	34	163	84	107	56
ATUM 21XD4	WCM. 040208	●	21	25	34	163	84	107	56
ATUM 21.5XD4	WCM. 040208	○	21.5	25	34	167	88	111	56
ATUM 22XD4	WCM. 040208	●	22	25	34	167	88	111	56
ATUM 22.5XD4	WCM. 040208	○	22.5	25	34	173	92	117	56
ATUM 23XD4	WCM. 040208	●	23	25	34	173	92	117	56
ATUM 23.5XD4	WCM. 040208	○	23.5	25	34	178	96	122	56
ATUM 24XD4	WCM. 050308	●	24	25	34	178	96	122	56
ATUM 24.5XD4	WCM. 050308	○	24.5	25	34	183	100	127	56
ATUM 25XD4	WCM. 050308	●	25	25	34	183	100	127	56
ATUM 25.5XD4	WCM. 050308	○	25.5	25	34	187	104	131	56
ATUM 26XD4	WCM. 050308	●	26	25	34	187	104	131	56
ATUM 26.5XD4	WCM. 050308	○	26.5	25	34	191	108	135	56
ATUM 27XD4	WCM. 050308	●	27	25	34	191	108	135	56
ATUM 27.5XD4	WCM. 050308	○	27.5	25	34	196	112	140	56
ATUM 28XD4	WCM. 050308	●	28	25	34	196	112	140	56
ATUM 28.5XD4	WCM. 050308	○	28.5	25	34	200	116	144	56
ATUM 29XD4	WCM. 050308	●	29	25	34	200	116	144	56
ATUM 29.5XD4	WCM. 050308	○	29.5	25	34	207	120	151	56
ATUM 30XD4	WCM. 06T308	●	30	32	44	211	120	151	60
ATUM 31XD4	WCM. 06T308	●	31	32	44	216	124	156	60
ATUM 32XD4	WCM. 06T308	●	32	32	44	220	128	160	60
ATUM 33XD4	WCM. 06T308	●	33	32	44	225	132	165	60
ATUM 34XD4	WCM. 06T308	●	34	32	44	229	136	169	60
ATUM 35XD4	WCM. 06T308	●	35	32	44	234	140	174	60
ATUM 36XD4	WCM. 06T308	●	36	32	44	239	144	179	60
ATUM 37XD4	WCM. 06T308	●	37	32	44	244	148	184	60
ATUM 38XD4	WCM. 06T308	●	38	32	44	249	152	189	60
ATUM 39XD4	WCM. 06T308	●	39	32	44	253	156	193	60
ATUM 40XD4	WCM. 06T308	●	40	32	44	258	160	198	60
ATUM 41XD4	WCM. 06T308	●	41	32	44	263	164	203	60
ATUM 42XD4	WCM. 06T308	●	42	32	44	267	168	207	60
ATUM 43XD4	WCM. 06T308	●	43	32	44	272	172	212	60
ATUM 44XD4	WCM. 06T308	●	44	32	44	276	176	216	60
ATUM 45XD4	WCM. 080412	●	45	40	54	292	180	222	70
ATUM 46XD4	WCM. 080412	●	46	40	54	297	184	227	70
ATUM 47XD4	WCM. 080412	●	47	40	54	301	188	231	70
ATUM 48XD4	WCM. 080412	●	48	40	54	306	192	236	70
ATUM 49XD4	WCM. 080412	●	49	40	54	310	196	240	70
ATUM 50XD4	WCM. 080412	●	50	40	54	315	200	245	70

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 16XD4 WCM. 030208  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 2xÇap  
Drilling Depth = 2xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
ATUM 13XD2 SPMT 050203	○	13	20	25	94	26	44	50	SPMT 050203	3006-M2x4	80-T06
ATUM 13.5xD2 SPMT 050203	○	13.5	20	25	96	28	46	50			
ATUM 14XD2 SPMT 050203	○	14	20	25	96	28	46	50			
ATUM 14.5XD2 SPMT 050203	○	14.5	20	25	99	30	49	50			
ATUM 15XD2 SPMT 050203	○	15	20	25	99	30	49	50			
ATUM 15.5XD2 SPMT 050203	○	15.5	20	25	102	32	52	50			
ATUM 16XD2 SPMT 060204	○	16	25	34	108	32	52	56	SPMT 060204	3007-M2.2x5	80-T07
ATUM 16.5XD2 SPMT 060204	○	16.5	25	34	110	34	54	56			
ATUM 17XD2 SPMT 060204	○	17	25	34	110	34	54	56			
ATUM 17.5XD2 SPMT 060204	○	17.5	25	34	113	36	57	56			
ATUM 18XD2 SPMT 060204	○	18	25	34	113	36	57	56			
ATUM 18.5XD2 SPMT 060204	○	18.5	25	34	115	38	59	56			
ATUM 19XD2 SPMT 060204	○	19	25	34	115	38	59	56			
ATUM 19.5XD2 SPMT 060204	○	19.5	25	34	119	40	63	56			
ATUM 20XD2 SPMT 060204	○	20	25	34	119	40	63	56			
ATUM 20.5XD2 SPMT 060204	○	20.5	25	34	121	42	65	56			
ATUM 21XD2 SPMT 060204	○	21	25	34	121	42	65	56	SPMT 070204	3008-M2.5x6	80-T08
ATUM 21.5XD2 SPMT 060204	○	21.5	25	34	123	44	67	56			
ATUM 22XD2 SPMT 070204	○	22	25	34	123	44	67	56			
ATUM 22.5XD2 SPMT 070204	○	22.5	25	34	127	46	71	56			
ATUM 23XD2 SPMT 070204	○	23	25	34	127	46	71	56			
ATUM 23.5XD2 SPMT 070204	○	23.5	25	34	130	48	74	56			
ATUM 24XD2 SPMT 070204	○	24	25	34	130	48	74	56			
ATUM 24.5XD2 SPMT 070204	○	24.5	25	34	133	50	77	56			
ATUM 25XD2 SPMT 070204	○	25	25	34	133	50	77	56			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 13xD2 SPMT 050203  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143

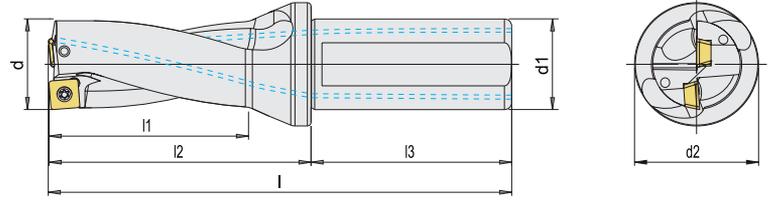


# TAKMA UÇLU MATKAPLAR

## U-DRILL SYSTEM



Delme Derinliği = 3xÇap  
4xÇap  
Drilling Depth = 3xDiameter  
4xDiameter



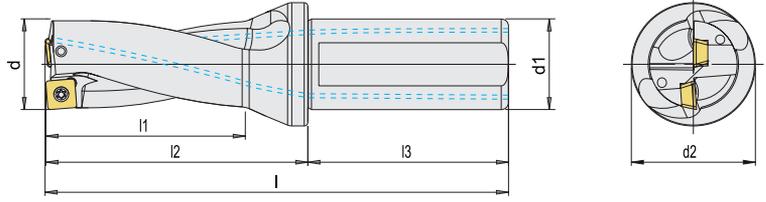
Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)								Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Sıkma Vidası Clamp Screw		Tork Anahtar Torx Key	
ATUM 13XD3 SPMT 050203	●	13	20	25	107	39	57	50	SPMT 050203	3006-M2x4	80-T06	
ATUM 13.5xD3 SPMT 050203	●	13.5	20	25	110	42	60	50				
ATUM 14XD3 SPMT 050203	●	14	20	25	110	42	60	50				
ATUM 14.5XD3 SPMT 050203	●	14.5	20	25	113	45	63	50				
ATUM 15XD3 SPMT 050203	●	15	20	25	113	45	63	50				
ATUM 15.5XD3 SPMT 050203	●	15.5	20	25	118	48	68	50				
ATUM 16XD3 SPMT 060204	●	16	25	34	124	48	68	56				
ATUM 16.5XD3 SPMT 060204	○	16.5	25	34	127	51	71	56				
ATUM 17XD3 SPMT 060204	●	17	25	34	127	51	71	56				
ATUM 17.5XD3 SPMT 060204	●	17.5	25	34	131	54	75	56				
ATUM 18XD3 SPMT 060204	●	18	25	34	131	54	75	56				
ATUM 18.5XD3 SPMT 060204	○	18.5	25	34	134	57	78	56				
ATUM 19XD3 SPMT 060204	●	19	25	34	134	57	78	56	SPMT 060204	3007-M2.2x5	80-T07	
ATUM 19.5XD3 SPMT 060204	●	19.5	25	34	139	60	83	56				
ATUM 20XD3 SPMT 060204	●	20	25	34	139	60	83	56				
ATUM 20.5XD3 SPMT 060204	○	20.5	25	34	144	63	86	56				
ATUM 21XD3 SPMT 060204	●	21	25	34	144	63	86	56				
ATUM 21.5XD3 SPMT 060204	●	21.5	25	34	145	66	89	56				
ATUM 22XD3 SPMT 070204	●	22	25	34	145	66	89	56				
ATUM 22.5XD3 SPMT 070204	○	22.5	25	34	150	69	94	56				
ATUM 23XD3 SPMT 070204	●	23	25	34	150	69	94	56				
ATUM 23.5XD3 SPMT 070204	●	23.5	25	34	154	72	98	56				
ATUM 24XD3 SPMT 070204	●	24	25	34	154	72	98	56				
ATUM 24.5XD3 SPMT 070204	●	24.5	25	34	158	75	102	56				
ATUM 25XD3 SPMT 070204	●	25	25	34	158	75	102	56				
ATUM 13XD4 SPMT 050203	●	13	20	25	120	52	70	50	SPMT 050203	3006-M2x4	80-T06	
ATUM 14XD4 SPMT 050203	●	14	20	25	124	56	74	50				
ATUM 15XD4 SPMT 050203	●	15	20	25	128	60	78	50				
ATUM 16XD4 SPMT 060204	●	16	25	34	140	64	84	56	SPMT 060204	3007-M2.2x5	80-T07	
ATUM 17XD4 SPMT 060204	●	17	25	34	144	68	88	56				
ATUM 18XD4 SPMT 060204	●	18	25	34	149	72	93	56				
ATUM 19XD4 SPMT 060204	●	19	25	34	153	76	97	56				
ATUM 20XD4 SPMT 060204	●	20	25	34	159	80	103	56				
ATUM 21XD4 SPMT 060204	●	21	25	34	163	84	107	56				
ATUM 22XD4 SPMT 070204	●	22	25	34	167	88	111	56				
ATUM 23XD4 SPMT 070204	●	23	25	34	173	92	117	56				
ATUM 24XD4 SPMT 070204	●	24	25	34	178	96	122	56				
ATUM 25XD4 SPMT 070204	●	25	25	34	183	100	127	56				SPMT 070204
ATUM 23XD4 SPMT 070204	●	23	25	34	173	92	117	56				

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 13xD3 SPMT 050203  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 2xÇap  
Drilling Depth = 2xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
									SPMG-SPKX-SPGT		
ATUM 12.5XD2 SP.. 050204	○	12.5	20	25	94	26	44	50	SP.. 050204	3006-M2x4	80-T06
ATUM 13XD2 SP.. 050204	○	13	20	25	94	26	44	50			
ATUM 13.5XD2 SP.. 050204	○	13.5	20	25	96	28	46	50			
ATUM 14XD2 SP.. 050204	●	14	20	25	96	28	46	50			
ATUM 14.5XD2 SP.. 050204	○	14.5	20	25	99	30	49	50			
ATUM 15XD2 SP.. 050204	○	15	20	25	99	30	49	50			
ATUM 15.5XD2 SP.. 060204	○	15.5	20	25	102	32	52	50	SP.. 060204	3007-M2.2x5	80-T07
ATUM 16XD2 SP.. 060204	○	16	25	34	108	32	52	56			
ATUM 16.5XD2 SP.. 060204	●	16.5	25	34	110	34	54	56			
ATUM 17XD2 SP.. 060204	○	17	25	34	110	34	54	56			
ATUM 17.5XD2 SP.. 060204	○	17.5	25	34	113	36	57	56			
ATUM 18XD2 SP.. 060204	○	18	25	34	113	36	57	56			
ATUM 18.5D2 SP.. 060204	●	18.5	25	34	115	38	59	56			
ATUM 19XD2 SP.. 060204	●	19	25	34	115	38	59	56			
ATUM 19.5XD2 SP.. 060204	○	19.5	25	34	119	40	63	56			
ATUM 20XD2 SP.. 060204	●	20	25	34	119	40	63	56			
ATUM 20.5XD2 SP.. 060204	○	20.5	25	34	121	42	65	56			
ATUM 21XD2 SP.. 060204	●	21	25	34	121	42	65	56			
ATUM 21.5XD2 SP.. 060204	○	21.5	25	34	123	44	67	56			
ATUM 22XD2 SP.. 07T308	●	22	25	34	123	44	67	56	SP.. 07T308	3208-M2.5x6.4	80-T08
ATUM 22.5XD2 SP.. 07T308	○	22.5	25	34	127	46	71	56			
ATUM 23XD2 SP.. 07T308	●	23	25	34	127	46	71	56			
ATUM 23.5XD2 SP.. 07T308	●	23.5	25	34	130	48	74	56			
ATUM 24XD2 SP.. 07T308	●	24	25	34	130	48	74	56			
ATUM 24.5XD2 SP.. 07T308	○	24.5	25	34	133	48	77	56			
ATUM 25XD2 SP.. 07T308	●	25	25	34	133	50	77	56			
ATUM 25.5XD2 SP.. 07T308	○	25.5	25	34	135	52	79	56			
ATUM 26XD2 SP.. 07T308	●	26	25	34	135	52	79	56			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

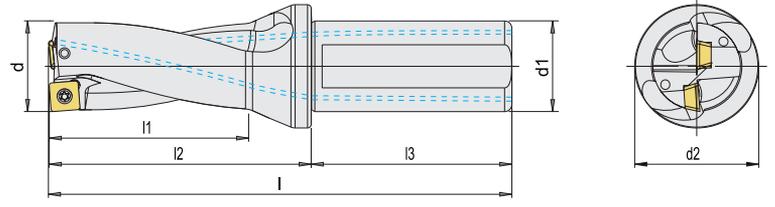
Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 12.5xD2 SP.. 050204  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143

# TAKMA UÇLU MATKAPLAR

## U-DRILL SYSTEM



Delme Derinliği = 2xÇap  
Drilling Depth = 2xDiameter



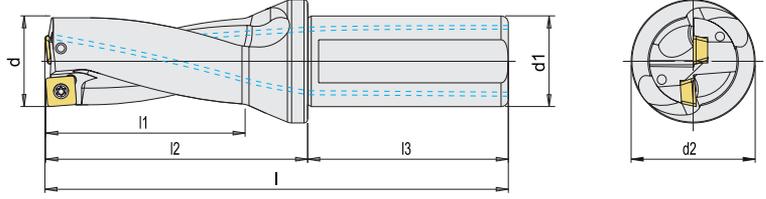
Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert SPMG-SPKX-SPGT	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
ATUM 26.5XD2 SP.. 07T308	○	26.5	25	34	137	54	81	56	SP.. 07T308	3208-M2.5x6.4	80-T08
ATUM 27XD2 SP.. 07T308	●	27	25	34	137	54	81	56			
ATUM 27.5XD2 SP.. 07T308	○	27.5	25	34	140	56	84	56			
ATUM 28XD2 SP.. 090408	●	28	25	34	140	56	84	56			
ATUM 28.5XD2 SP.. 090408	○	28.5	25	34	142	58	86	56			
ATUM 29XD2 SP.. 090408	○	29	25	34	142	58	86	56			
ATUM 29.5XD2 SP.. 090408	○	29.5	25	34	151	60	91	56			
ATUM 30XD2 SP.. 090408	●	30	32	44	151	60	91	60			
ATUM 31XD2 SP.. 090408	○	31	32	44	154	62	94	60			
ATUM 32XD2 SP.. 090408	●	32	32	44	156	64	96	60			
ATUM 33XD2 SP.. 090408	○	33	32	44	159	66	99	60			
ATUM 34XD2 SP.. 110408	●	34	32	44	161	68	101	60	SP.. 110408	1515-M4x11	80-T15
ATUM 35XD2 SP.. 110408	○	35	32	44	164	70	104	60			
ATUM 36XD2 SP.. 110408	●	36	32	44	167	72	107	60			
ATUM 37XD2 SP.. 110408	○	37	32	44	170	74	110	60			
ATUM 38XD2 SP.. 110408	○	38	32	44	173	76	113	60			
ATUM 39XD2 SP.. 110408	○	39	32	44	175	78	115	60			
ATUM 40XD2 SP.. 110408	○	40	32	44	178	80	118	60			
ATUM 41XD2 SP.. 110408	○	41	32	44	181	82	121	60			
ATUM 42XD2 SP.. 140512	○	42	32	44	183	84	123	60			
ATUM 43XD2 SP.. 140512	○	43	32	44	186	86	126	60			
ATUM 44XD2 SP.. 140512	○	44	32	44	188	88	128	60			
ATUM 45XD2 SP.. 140512	○	45	40	54	202	90	132	70	SP.. 140512	1020-M5x11	80-T20
ATUM 46XD2 SP.. 140512	○	46	40	54	205	92	135	70			
ATUM 47XD2 SP.. 140512	○	47	40	54	207	94	137	70			
ATUM 48XD2 SP.. 140512	○	48	40	54	210	96	140	70			
ATUM 49XD2 SP.. 140512	○	49	40	54	212	98	142	70			
ATUM 50XD2 SP.. 140512	○	50	40	54	215	100	145	70			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 26.5xD2 SP.. 07T308  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 3xÇap  
Drilling Depth = 3xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
									SPMG-SPKX-SPGT		
ATUM 12.5XD3 SP.. 050204	●	12.5	20	25	107	39	57	50	SP.. 050204	3006-M2x4	80-T06
ATUM 13XD3 SP.. 050204	●	13	20	25	107	39	57	50			
ATUM 13.5XD3 SP.. 050204	●	13.5	20	25	110	42	60	50			
ATUM 14XD3 SP.. 050204	●	14	20	25	110	42	60	50			
ATUM 14.5XD3 SP.. 050204	●	14.5	20	25	113	45	63	50			
ATUM 15XD3 SP.. 050204	●	15	20	25	113	45	63	50			
ATUM 15.5XD3 SP.. 060204	○	15.5	20	25	118	48	68	50	SP.. 060204	3007-M2.2x5	80-T07
ATUM 16XD3 SP.. 060204	●	16	25	34	124	48	68	56			
ATUM 16.5XD3 SP.. 060204	●	16.5	25	34	127	51	71	56			
ATUM 17XD3 SP.. 060204	●	17	25	34	127	51	71	56			
ATUM 17.5XD3 SP.. 060204	●	17.5	25	34	131	54	75	56			
ATUM 18XD3 SP.. 060204	●	18	25	34	131	54	75	56			
ATUM 18.5D3 SP.. 060204	●	18.5	25	34	134	57	78	56			
ATUM 19XD3 SP.. 060204	●	19	25	34	134	57	78	56			
ATUM 19.5XD3 SP.. 060204	●	19.5	25	34	139	60	83	56			
ATUM 20XD3 SP.. 060204	●	20	25	34	139	60	83	56			
ATUM 20.5XD3 SP.. 060204	●	20.5	25	34	142	63	86	56			
ATUM 21XD3 SP.. 060204	●	21	25	34	142	63	86	56			
ATUM 21.5XD3 SP.. 060204	○	21.5	25	34	145	66	89	56			
ATUM 22XD3 SP.. 07T308	●	22	25	34	145	66	89	56	SP.. 07T308	3208-M2.5x6.4	80-T08
ATUM 22.5XD3 SP.. 07T308	○	22.5	25	34	150	69	94	56			
ATUM 23XD3 SP.. 07T308	●	23	25	34	150	69	94	56			
ATUM 23.5XD3 SP.. 07T308	●	23.5	25	34	154	72	98	56			
ATUM 24XD3 SP.. 07T308	○	24	25	34	154	72	98	56			
ATUM 24.5XD3 SP.. 07T308	●	24.5	25	34	158	75	102	56			
ATUM 25XD3 SP.. 07T308	●	25	25	34	158	75	102	56			
ATUM 25.5XD3 SP.. 07T308	●	25.5	25	34	161	78	105	56			
ATUM 26XD3 SP.. 07T308	●	26	25	34	161	78	105	56			
ATUM 26.5XD3 SP.. 07T308	●	26.5	25	34	164	81	108	56			
ATUM 27XD3 SP.. 07T308	●	27	25	34	164	81	108	56			
ATUM 27.5XD3 SP.. 07T308	●	27.5	25	34	168	84	112	56			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

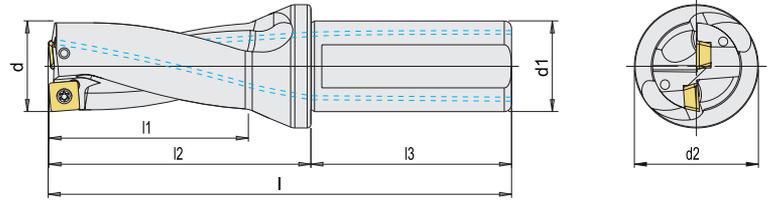
Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 12.5xD3 SP.. 050204  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143

# TAKMA UÇLU MATKAPLAR

## U-DRILL SYSTEM



Delme Derinliği = 3xÇap  
Drilling Depth = 3xDiameter



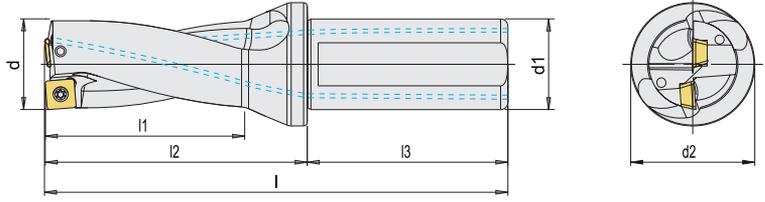
Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts				
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key			
									SPMG-SPKX-SPGT					
ATUM 28XD3 SP.. 090408	●	28	25	34	168	84	112	56	SP.. 090408	1015-M3.5x9	80-T15			
ATUM 28.5XD3 SP.. 090408	○	28.5	25	34	171	87	115	56						
ATUM 29XD3 SP.. 090408	●	29	25	34	171	87	115	56						
ATUM 29.5XD3 SP.. 090408	○	29.5	25	34	177	90	121	56						
ATUM 30XD3 SP.. 090408	●	30	32	44	181	90	121	60						
ATUM 31XD3 SP.. 090408	●	31	32	44	185	93	125	60						
ATUM 32XD3 SP.. 090408	●	32	32	44	188	96	128	60						
ATUM 33XD3 SP.. 090408	●	33	32	44	192	99	132	60						
ATUM 34XD3 SP.. 110408	●	34	32	44	195	102	135	60				SP.. 110408	1515-M4x11	80-T15
ATUM 35XD3 SP.. 110408	●	35	32	44	199	105	139	60						
ATUM 36XD3 SP.. 110408	●	36	32	44	203	108	143	60						
ATUM 37XD3 SP.. 110408	●	37	32	44	207	111	147	60						
ATUM 38XD3 SP.. 110408	●	38	32	44	211	114	151	60						
ATUM 39XD3 SP.. 110408	●	39	32	44	214	117	154	60						
ATUM 40XD3 SP.. 110408	●	40	32	44	218	120	158	60						
ATUM 41XD3 SP.. 110408	●	41	32	44	222	123	162	60						
ATUM 42XD3 SP.. 140512	●	42	32	44	225	126	165	60	SP.. 140512	1020-M5x11	80-T20			
ATUM 43XD3 SP.. 140512	●	43	32	44	229	129	169	60						
ATUM 44XD3 SP.. 140512	○	44	32	44	232	132	172	60						
ATUM 45XD3 SP.. 140512	○	45	40	54	247	135	177	70						
ATUM 46XD3 SP.. 140512	●	46	40	54	251	138	181	70						
ATUM 47XD3 SP.. 140512	○	47	40	54	254	141	184	70						
ATUM 48XD3 SP.. 140512	○	48	40	54	258	144	188	70						
ATUM 49XD3 SP.. 140512	●	49	40	54	261	147	191	70						
ATUM 50XD3 SP.. 140512	○	50	40	54	265	150	195	70						
ATUM 51XD3 SP.. 140512	○	51	40	60	268	153	198	70						
ATUM 52XD3 SP.. 140512	○	52	40	60	271	156	201	70						
ATUM 53XD3 SP.. 140512	○	53	40	60	274	159	204	70						
ATUM 54XD3 SP.. 140512	○	54	40	60	277	162	207	70						
ATUM 55XD3 SP.. 140512	○	55	40	60	280	165	210	70						
ATUM 56XD3 SP.. 140512	○	56	40	60	283	168	213	70						
ATUM 57XD3 SP.. 140512	○	57	40	60	286	171	216	70						
ATUM 58XD3 SP.. 140512	○	58	40	60	289	174	219	70						
ATUM 59XD3 SP.. 140512	○	59	40	60	292	177	222	70						
ATUM 60XD3 SP.. 140512	○	60	40	60	295	180	225	70						

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 28xD3 SP.. 090408  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143



Delme Derinliği = 4xÇap  
Drilling Depth = 4xDiameter



Takım Kodu Ordering Code	Stok Stock	Takım Ölçüleri (mm) Dimension (mm)							Kesici Uç Insert	Yedek Parçaları Spare Parts	
		d	d <sub>1</sub>	d <sub>2</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		Sıkma Vidası Clamp Screw	Tork Anahtar Torx Key
									SPMG-SPKX-SPGT		
ATUM 13XD4 SP.. 050204	○	13	20	25	120	52	70	50	SP.. 050204	3006-M2x4	80-T06
ATUM 14XD4 SP.. 050204	●	14	20	25	124	56	74	50			
ATUM 15XD4 SP.. 050204	○	15	20	25	128	60	78	50	SP.. 060204	3007-M2.2x5	80-T07
ATUM 16XD4 SP.. 060204	○	16	25	34	140	64	84	56			
ATUM 17XD4 SP.. 060204	○	17	25	34	144	68	88	56	SP.. 07T308	3208-M2.5x6.4	80-T08
ATUM 18XD4 SP.. 060204	●	18	25	34	149	72	93	56			
ATUM 19XD4 SP.. 060204	●	19	25	34	153	76	97	56	SP.. 090408	1015-M3.5x9	80-T15
ATUM 20XD4 SP.. 060204	●	20	25	34	159	80	103	56			
ATUM 21XD4 SP.. 060204	○	21	25	34	163	84	107	56	SP.. 110408	1515-M4x11	80-T15
ATUM 22XD4 SP.. 07T308	●	22	25	34	167	88	111	56			
ATUM 23XD4 SP.. 07T308	●	23	25	34	173	92	117	56	SP.. 140512	1020-M5x11	80-T20
ATUM 24XD4 SP.. 07T308	●	24	25	34	178	96	122	56			
ATUM 25XD4 SP.. 07T308	○	25	25	34	183	100	127	56	SP.. 140512	1020-M5x11	80-T20
ATUM 26XD4 SP.. 07T308	●	26	25	34	187	104	131	56			
ATUM 27XD4 SP.. 07T308	○	27	25	34	191	108	135	56	SP.. 140512	1020-M5x11	80-T20
ATUM 28XD4 SP.. 090408	○	28	25	34	196	112	140	56			
ATUM 29XD4 SP.. 090408	○	29	25	34	200	116	144	56	SP.. 110408	1515-M4x11	80-T15
ATUM 30XD4 SP.. 090408	●	30	32	44	211	120	151	60			
ATUM 31XD4 SP.. 090408	○	31	32	44	216	124	156	60	SP.. 140512	1020-M5x11	80-T20
ATUM 32XD4 SP.. 090408	●	32	32	44	220	128	160	60			
ATUM 33XD4 SP.. 090408	○	33	32	44	225	132	165	60	SP.. 110408	1515-M4x11	80-T15
ATUM 34XD4 SP.. 110408	○	34	32	44	229	136	169	60			
ATUM 35XD4 SP.. 110408	○	35	32	44	234	140	174	60	SP.. 140512	1020-M5x11	80-T20
ATUM 36XD4 SP.. 110408	○	36	32	44	239	144	179	60			
ATUM 37XD4 SP.. 110408	●	37	32	44	244	148	184	60	SP.. 140512	1020-M5x11	80-T20
ATUM 38XD4 SP.. 110408	○	38	32	44	249	152	189	60			
ATUM 39XD4 SP.. 110408	○	39	32	44	253	156	193	60	SP.. 140512	1020-M5x11	80-T20
ATUM 40XD4 SP.. 110408	○	40	32	44	258	160	198	60			
ATUM 41XD4 SP.. 110408	○	41	32	44	263	164	203	60	SP.. 140512	1020-M5x11	80-T20
ATUM 42XD4 SP.. 140512	○	42	32	44	267	168	207	60			
ATUM 43XD4 SP.. 140512	○	43	32	44	272	172	212	60	SP.. 140512	1020-M5x11	80-T20
ATUM 44XD4 SP.. 140512	○	44	32	44	276	170	216	60			

R: Sağ/Right L: Sol/Left ● Stokta/In Stock ○ Stokta Yok/Non Stock Item

Sipariş Örneği/Ordering Example : 1 ad./pcs. ATUM 13xD4 SP.. 050204  
Takma Uçlu Matkap Kullanım Kılavuzu : S 143 / User's Guide For U-Drills : P 143