



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## HSS/CO - HSSP

GENERAL PURPOSE

🇬🇧 The Osawa catalogue includes a wide range of HSS/Co - HSSP end mills, both coated and uncoated.

🇮🇹 Il catalogo Osawa include un'ampia scelta di frese in HSS/Co - HSSP nudo e rivestito.

🇩🇪 Der Osawa Katalog umfasst eine große Auswahl an beschichteten und unbeschichteten Fräsern aus HSS/Co - HSSP.

🇫🇷 Le catalogue Osawa inclut une large gamme de fraises en HSS/Co - HSSP, soit revêtues, soit non revêtues.

🇪🇸 El catálogo Osawa incluye una amplia variedad de fresas de HSS/Co - HSSP con o sin recubrimiento.

🇷🇺 В каталоге Osawa также представлена широкая гамма концевых фрез изготовленных из HSS/Co - HSSP с покрытием и без покрытия.

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# WS2-TAWS2-UMWS2

weldon shank, 2 flutes



WS2

**N** HSS/Co  
BR



TAWS2

**N** HSS/Co  
PV200



UMWS2

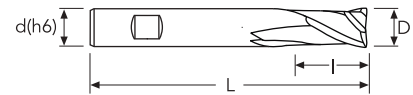
**UM** HSS-P  
PV200

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WS2-TAWS2  
UMWS2



★ 1st choice ☆ suitable

D(e8)	D Tol.	d(h6)	l	l1	L	z	WS2		TAWS2		UMWS2	
							EDP No.	Stock	EDP No.	Stock	EDP No.	Stock
1	-0.014/-0.028	6	2.5		47	2	WS2010	●	TAWS2010	●		
1.5	-0.014/-0.028	6	3		47	2	WS2015	●	TAWS2015	●		
2	-0.014/-0.028	6	4		48	2	WS2020	●	TAWS2020	●	UMWS2020	●
2.5	-0.014/-0.028	6	5		49	2	WS2025	●	TAWS2025	●		
3	-0.014/-0.028	6	5		49	2	WS2030	●	TAWS2030	●	UMWS2030	●
3.5	-0.020/-0.038	6	6		50	2	WS2035	●	TAWS2035	●		
4	-0.020/-0.038	6	7		51	2	WS2040	●	TAWS2040	●	UMWS2040	●
4.5	-0.020/-0.038	6	7		51	2	WS2045	●	TAWS2045	●		
5	-0.020/-0.038	6	8		52	2	WS2050	●	TAWS2050	●	UMWS2050	●
5.5	-0.020/-0.038	6	8		52	2	WS2055	●	TAWS2055	●		
6	-0.020/-0.038	6	8		52	2	WS2060	●	TAWS2060	●	UMWS2060	●
6.5	-0.025/-0.047	10	10		60	2	WS2065	●	TAWS2065	●		
7	-0.025/-0.047	10	10		60	2	WS2070	●	TAWS2070	●		
7.5	-0.025/-0.047	10	10		60	2	WS2075	●	TAWS2075	●		
8	-0.025/-0.047	10	11		61	2	WS2080	●	TAWS2080	●	UMWS2080	●
8.5	-0.025/-0.047	10	11		61	2	WS2085	●	TAWS2085	●		
9	-0.025/-0.047	10	11		61	2	WS2090	●	TAWS2090	●		
9.5	-0.025/-0.047	10	11		61	2	WS2095	●	TAWS2095	●		
10	-0.025/-0.047	10	13		63	2	WS2100	●	TAWS2100	●	UMWS2100	●
10.5	-0.032/-0.059	12	13		70	2	WS2105	●	TAWS2105	●		
11	-0.032/-0.059	12	13		70	2	WS2110	●	TAWS2110	●		
11.5	-0.032/-0.059	12	13		70	2	WS2115	●	TAWS2115	●		
12	-0.032/-0.059	12	16		73	2	WS2120	●	TAWS2120	●	UMWS2120	●
12.5	-0.032/-0.059	12	16		73	2	WS2125	●	TAWS2125	●		
13	-0.032/-0.059	12	16		73	2	WS2130	●	TAWS2130	●		
13.5	-0.032/-0.059	12	16		73	2	WS2135	●	TAWS2135	●		
14	-0.032/-0.059	12	16		73	2	WS2140	●	TAWS2140	●	UMWS2140	●
15	-0.032/-0.059	12	16		73	2	WS2150	●	TAWS2150	●		
16	-0.032/-0.059	16	19		79	2	WS2160	●	TAWS2160	●	UMWS2160	●
17	-0.032/-0.059	16	19		79	2	WS2170	●	TAWS2170	●		
18	-0.032/-0.059	16	19		79	2	WS2180	●	TAWS2180	●	UMWS2180	●
19	-0.040/-0.073	16	19		79	2	WS2190	●	TAWS2190	●		
20	-0.040/-0.073	20	22		88	2	WS2200	●	TAWS2200	●	UMWS2200	●
22	-0.040/-0.073	20	22		88	2	WS2220	●	TAWS2220	●		
24	-0.040/-0.073	25	26		102	2	WS2240	●				
25	-0.040/-0.073	25	26		102	2	WS2250	●	TAWS2250	●		
26	-0.040/-0.073	25	26		102	2	WS2260	●				
28	-0.040/-0.073	25	26		102	2	WS2280	●				
30	-0.040/-0.073	25	26		102	2	WS2300	●				

● stock standard ○ non-standard stock ▽ stock exhaustion

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWS2

UMWS2 (Vc = +20%) - WS2 (Vc = -20% ÷ -30%)

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>0.5D x D</b>			
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.002	0.002
2	0.006	0.005	0.005	0.004
3	0.009	0.008	0.007	0.006
4	0.013	0.012	0.010	0.009
5	0.017	0.015	0.013	0.012
6	0.022	0.020	0.017	0.015
8	0.032	0.029	0.024	0.022
10	0.040	0.036	0.030	0.028
12	0.048	0.043	0.036	0.034
14	0.057	0.051	0.043	0.040
16	0.067	0.060	0.050	0.047
18	0.077	0.069	0.058	0.054
20	0.088	0.079	0.066	0.062
22	0.098	0.088	0.074	0.069
24	0.105	0.095	0.079	0.074
25	0.110	0.099	0.083	0.077
26	0.116	0.104	0.087	0.081
28	0.122	0.110	0.092	0.085
30	0.128	0.115	0.096	0.090
ap x ae	≤ D3	0.25D x D		



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>			
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.003	0.003
2	0.007	0.006	0.006	0.004
3	0.007	0.006	0.006	0.005
4	0.011	0.010	0.009	0.008
5	0.016	0.014	0.012	0.011
6	0.020	0.018	0.016	0.014
8	0.026	0.024	0.021	0.018
10	0.038	0.035	0.031	0.027
12	0.048	0.043	0.038	0.034
14	0.058	0.052	0.046	0.040
16	0.068	0.062	0.055	0.048
18	0.080	0.072	0.064	0.056
20	0.092	0.083	0.074	0.065
22	0.106	0.095	0.084	0.074
24	0.118	0.106	0.094	0.082
25	0.126	0.113	0.101	0.088
26	0.132	0.119	0.106	0.092
28	0.139	0.125	0.111	0.097
30	0.146	0.132	0.117	0.102
ap x ae	≤ D3	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D



CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWS2

UMWS2 (Vc= +20%) - WS2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>30÷50</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.005	0.003	0.002	0.002
<b>4</b>	0.007	0.004	0.003	0.003
<b>5</b>	0.009	0.006	0.005	0.005
<b>6</b>	0.011	0.008	0.006	0.006
<b>8</b>	0.016	0.010	0.008	0.008
<b>10</b>	0.020	0.014	0.012	0.011
<b>12</b>	0.024	0.018	0.015	0.014
<b>14</b>	0.029	0.022	0.018	0.017
<b>16</b>	0.034	0.026	0.021	0.020
<b>18</b>	0.039	0.030	0.025	0.023
<b>20</b>	0.044	0.035	0.029	0.027
<b>22</b>	0.049	0.040	0.033	0.031
<b>24</b>	0.053	0.044	0.037	0.034
<b>25</b>	0.055	0.047	0.039	0.037
<b>26</b>	0.058	0.050	0.041	0.039
<b>28</b>	0.061	0.052	0.044	0.041
<b>30</b>	0.064	0.055	0.046	0.043

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# WL2-TAWL2

weldon shank, 2 flutes, long

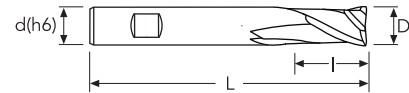
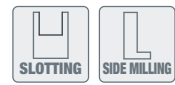
DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	ZZ
		WL2	TAWL2			

INFO



P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(e8)	D Tol.	d(h6)	l	l1	L	z	WL2		TAWL2	
							EDP No.	Stock	EDP No.	Stock
3	-0.014/-0.028	6	8		56	2	WL2030	●	TAWL2030	●
4	-0.020/-0.038	6	11		63	2	WL2040	●	TAWL2040	●
5	-0.020/-0.038	6	13		68	2	WL2050	●	TAWL2050	●
6	-0.020/-0.038	6	13		68	2	WL2060	●	TAWL2060	●
7	-0.025/-0.047	10	16		80	2	WL2070	●		
8	-0.025/-0.047	10	19		88	2	WL2080	●	TAWL2080	●
9	-0.025/-0.047	10	19		88	2	WL2090	●		
10	-0.025/-0.047	10	22		95	2	WL2100	●	TAWL2100	●
11	-0.032/-0.059	12	22		102	2	WL2110	●		
12	-0.032/-0.059	12	26		110	2	WL2120	●	TAWL2120	●
13	-0.032/-0.059	12	26		110	2	WL2130	●		
14	-0.032/-0.059	12	26		110	2	WL2140	●	TAWL2140	●
15	-0.032/-0.059	12	26		110	2	WL2150	●		
16	-0.032/-0.059	16	32		123	2	WL2160	●	TAWL2160	●
18	-0.032/-0.059	16	32		123	2	WL2180	●	TAWL2180	●
20	-0.040/-0.073	20	38		141	2	WL2200	●	TAWL2200	●
22	-0.040/-0.073	20	38		141	2	WL2220	●		
24	-0.040/-0.073	25	45		166	2	WL2240	○		
25	-0.040/-0.073	25	45		166	2	WL2250	●		
28	-0.040/-0.073	25	45		166	2	WL2280	●		
30	-0.040/-0.073	25	45		166	2	WL2300	●		

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWL2

WL2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
Vc (m/min)	<b>30+50</b>	<b>25+35</b>	<b>20+30</b>	<b>12+18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.005	0.005	0.004
4	0.008	0.007	0.007	0.006
5	0.011	0.010	0.009	0.008
6	0.014	0.012	0.011	0.010
8	0.020	0.018	0.016	0.015
10	0.025	0.023	0.020	0.019
12	0.030	0.027	0.024	0.023
14	0.036	0.032	0.029	0.027
16	0.042	0.038	0.034	0.032
18	0.048	0.043	0.038	0.036
20	0.053	0.048	0.043	0.040
22	0.060	0.054	0.048	0.045
25	0.070	0.063	0.056	0.053
28	0.077	0.069	0.062	0.058
30	0.084	0.076	0.067	0.063

HSS  
DRILLS

ap x ae	≤ D5	0.25D x D
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LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>
Vc (m/min)	<b>35+55</b>	<b>30+40</b>	<b>25+35</b>	<b>12+20</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.005
4	0.009	0.008	0.007	0.007
5	0.012	0.011	0.009	0.009
6	0.015	0.014	0.012	0.011
8	0.022	0.020	0.018	0.017
10	0.028	0.025	0.022	0.021
12	0.033	0.030	0.027	0.025
14	0.040	0.036	0.032	0.030
16	0.046	0.042	0.037	0.035
18	0.052	0.047	0.042	0.039
20	0.059	0.053	0.047	0.044
22	0.065	0.059	0.052	0.049
25	0.077	0.069	0.062	0.058
28	0.085	0.076	0.068	0.064
30	0.092	0.083	0.074	0.069

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

ap x ae	≤ D5	1.5D x 0.05D
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CARBIDE  
BURRS

# WSA2

weldon shank, 2 flutes for aluminium

DIN 844 ALU HSS/Co BR 42° SQUARE ZZ

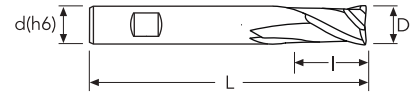
INFO



P
M
K
N
S
H

★ 1st choice ☆ suitable

SLOTTING
SIDE MILLING
DRILLING



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH**

HSS END-MILLS

CARBIDE BURRS

D(e8)	D Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
2	-0.014/-0.028	6	7		51	2	WSA2020	●
2.5	-0.014/-0.028	6	8		52	2	WSA2025	●
3	-0.014/-0.028	6	8		52	2	WSA2030	●
4	-0.020/-0.038	6	11		55	2	WSA2040	●
5	-0.020/-0.038	6	13		57	2	WSA2050	●
6	-0.020/-0.038	6	13		57	2	WSA2060	●
8	-0.025/-0.047	10	19		69	2	WSA2080	●
10	-0.025/-0.047	10	22		72	2	WSA2100	●
12	-0.032/-0.059	12	26		83	2	WSA2120	●
14	-0.032/-0.059	12	26		83	2	WSA2140	●
16	-0.032/-0.059	16	32		92	2	WSA2160	●
18	-0.032/-0.059	16	32		92	2	WSA2180	●
20	-0.040/-0.073	20	38		104	2	WSA2200	●

● stock standard ○ non-standard stock ∇ stock exhaustion

INFO

### WSA2

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	90±110	70±90	60±80	100±140
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.015	0.014	0.012	0.018
3	0.020	0.018	0.016	0.024
4	0.030	0.027	0.024	0.036
5	0.035	0.032	0.028	0.042
6	0.042	0.038	0.034	0.050
8	0.056	0.050	0.045	0.067
10	0.073	0.066	0.058	0.088
12	0.090	0.081	0.072	0.108
14	0.106	0.095	0.085	0.127
16	0.120	0.108	0.096	0.144
18	0.135	0.122	0.108	0.162
20	0.150	0.135	0.120	0.180
ap x ae	≤ D3		0.2D x D	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D
Vc (m/min)	100±140	90±110	70±90	130±150
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.018	0.016	0.014	0.020
3	0.018	0.016	0.014	0.020
4	0.024	0.022	0.019	0.027
5	0.036	0.032	0.029	0.040
6	0.042	0.038	0.034	0.047
8	0.050	0.045	0.040	0.056
10	0.067	0.060	0.054	0.075
12	0.088	0.079	0.070	0.098
14	0.108	0.097	0.086	0.121
16	0.127	0.114	0.102	0.142
18	0.144	0.130	0.115	0.161
20	0.162	0.146	0.130	0.181
ap x ae	≤ D3		1.2D x 0.1D	

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D
Vc (m/min)	70±90	55±75	50±60	90±110
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.010	0.007	0.006	0.009
4	0.015	0.009	0.008	0.012
5	0.018	0.014	0.012	0.018
6	0.021	0.016	0.014	0.021
8	0.028	0.019	0.017	0.025
10	0.037	0.025	0.022	0.034
12	0.045	0.033	0.029	0.044
14	0.053	0.041	0.036	0.054
16	0.060	0.048	0.042	0.064
18	0.068	0.054	0.048	0.072
20	0.075	0.061	0.054	0.081

CARBIDE BURRS



# WS3-TAWS3

weldon shank, 3 flutes

DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	Z3
		WS3	TAWS3			

INFO



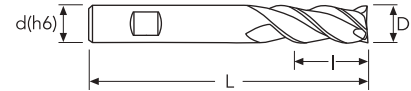
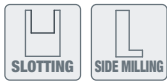
WS3



TAWS3

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(e8)	D Tol.	d(h6)	l	l1	L	z	WS3		TAWS3	
							EDP No.	Stock	EDP No.	Stock
1	-0.014/-0.028	6	3		47	3	WS3010	●	TAWS3010	○
1.5	-0.014/-0.028	6	7		51	3	WS3015	●	TAWS3015	○
2	-0.014/-0.028	6	7		51	3	WS3020	●	TAWS3020	●
2.5	-0.014/-0.028	6	8		52	3	WS3025	●	TAWS3025	●
3	-0.014/-0.028	6	8		52	3	WS3030	●	TAWS3030	●
3.5	-0.020/-0.038	6	10		54	3	WS3035	●	TAWS3035	●
4	-0.020/-0.038	6	11		55	3	WS3040	●	TAWS3040	●
4.5	-0.020/-0.038	6	11		55	3	WS3045	●	TAWS3045	●
5	-0.020/-0.038	6	13		57	3	WS3050	●	TAWS3050	●
5.5	-0.020/-0.038	6	13		57	3	WS3055	●	TAWS3055	●
6	-0.020/-0.038	6	13		57	3	WS3060	●	TAWS3060	●
6.5	-0.025/-0.047	10	16		66	3	WS3065	●	TAWS3065	●
7	-0.025/-0.047	10	16		66	3	WS3070	●	TAWS3070	●
8	-0.025/-0.047	10	19		69	3	WS3080	●	TAWS3080	●
8.5	-0.025/-0.047	10	19		69	3	WS3085	●	TAWS3085	●
9	-0.025/-0.047	10	19		69	3	WS3090	●	TAWS3090	●
10	-0.025/-0.047	10	22		72	3	WS3100	●	TAWS3100	●
11	-0.032/-0.059	12	22		79	3	WS3110	●	TAWS3110	●
12	-0.032/-0.059	12	26		83	3	WS3120	●	TAWS3120	●
13	-0.032/-0.059	12	26		83	3	WS3130	●	TAWS3130	●
14	-0.032/-0.059	12	26		83	3	WS3140	●	TAWS3140	●
15	-0.032/-0.059	12	26		83	3	WS3150	●	TAWS3150	●
16	-0.032/-0.059	16	32		92	3	WS3160	●	TAWS3160	●
18	-0.032/-0.059	16	32		92	3	WS3180	●	TAWS3180	●
20	-0.040/-0.073	20	38		104	3	WS3200	●	TAWS3200	●
22	-0.040/-0.073	20	38		104	3	WS3220	●	TAWS3220	●
25	-0.040/-0.073	25	45		121	3	WS3250	●	TAWS3250	●
30	-0.040/-0.073	25	45		121	3	WS3300	●		
32	-0.050/-0.089	32	53		133	3	WS3320	●		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWS3

WS3 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>			
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.002	0.002	0.002
2	0.005	0.005	0.004	0.004
3	0.008	0.007	0.006	0.006
4	0.012	0.011	0.009	0.008
5	0.015	0.014	0.011	0.011
6	0.020	0.018	0.015	0.014
8	0.029	0.026	0.022	0.020
10	0.036	0.032	0.027	0.025
12	0.043	0.039	0.032	0.030
14	0.051	0.046	0.038	0.036
16	0.060	0.054	0.045	0.042
18	0.069	0.062	0.052	0.049
20	0.079	0.071	0.059	0.055
22	0.088	0.079	0.066	0.062
25	0.099	0.089	0.074	0.069
28	0.122	0.110	0.090	0.085
30	0.128	0.115	0.093	0.090
32	0.136	0.116	0.095	0.093
ap x ae	≤ D3	0.25D x D		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.002	0.002
2	0.006	0.006	0.005	0.005
3	0.006	0.006	0.005	0.005
4	0.010	0.009	0.008	0.007
5	0.014	0.013	0.011	0.010
6	0.018	0.017	0.015	0.013
8	0.024	0.021	0.019	0.017
10	0.035	0.031	0.028	0.024
12	0.043	0.039	0.035	0.030
14	0.052	0.047	0.041	0.036
16	0.062	0.055	0.049	0.043
18	0.072	0.065	0.058	0.051
20	0.083	0.075	0.067	0.058
22	0.095	0.086	0.076	0.067
25	0.113	0.102	0.091	0.079
28	0.139	0.125	0.111	0.097
30	0.143	0.130	0.115	0.100
32	0.146	0.132	0.117	0.102
ap x ae	≤ D3	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D

HSS  
END-MILLS

CARBIDE  
BURRS

# WL3-TAWL3

weldon shank, 3 flutes, long

DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	Z3
		WL3	TAWL3			

INFO



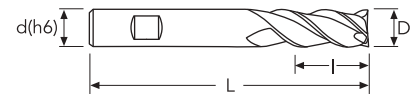
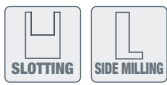
WL3



TAWL3

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(e8)	D(e8) Tol.	d(h6)	l	l1	L	z	WL3		TAWL3	
							EDP No.	Stock	EDP No.	Stock
3	-0.014/-0.028	6	12		56	3	WL3030	●	TAWL3030	●
4	-0.020/-0.038	6	19		63	3	WL3040	●	TAWL3040	●
5	-0.020/-0.038	6	24		68	3	WL3050	●	TAWL3050	●
6	-0.020/-0.038	6	24		68	3	WL3060	●	TAWL3060	●
8	-0.025/-0.047	10	38		88	3	WL3080	●	TAWL3080	●
10	-0.025/-0.047	10	45		95	3	WL3100	●	TAWL3100	●
12	-0.032/-0.059	12	53		110	3	WL3120	●	TAWL3120	●
14	-0.032/-0.059	12	53		110	3	WL3140	●	TAWL3140	●
16	-0.032/-0.059	16	63		123	3	WL3160	●	TAWL3160	●
18	-0.032/-0.059	16	63		123	3	WL3180	●	TAWL3180	●
20	-0.040/-0.073	20	75		141	3	WL3200	●	TAWL3200	●
22	-0.040/-0.073	20	75		141	3	WL3220	●		
25	-0.040/-0.073	25	90		166	3	WL3250	●		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWL3

WL3 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>30÷50</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.005	0.005	0.004
4	0.008	0.007	0.007	0.006
5	0.011	0.010	0.009	0.008
6	0.014	0.012	0.011	0.010
8	0.020	0.018	0.016	0.015
10	0.025	0.023	0.020	0.019
12	0.030	0.027	0.024	0.023
14	0.036	0.032	0.029	0.027
16	0.042	0.038	0.034	0.032
18	0.048	0.043	0.038	0.036
20	0.053	0.048	0.043	0.040
22	0.060	0.054	0.048	0.045
25	0.070	0.063	0.056	0.053
<b>ap x ae</b>	<b>≤ D5</b>	0.25D x D		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
Vc (m/min)	<b>40÷50</b>	<b>30÷40</b>	<b>25÷35</b>	<b>10÷20</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.005
4	0.009	0.008	0.007	0.007
5	0.012	0.011	0.009	0.009
6	0.015	0.014	0.012	0.011
8	0.022	0.020	0.018	0.017
10	0.028	0.025	0.022	0.021
12	0.033	0.030	0.027	0.025
14	0.040	0.036	0.032	0.030
16	0.046	0.042	0.037	0.035
18	0.052	0.047	0.042	0.039
20	0.059	0.053	0.047	0.044
22	0.065	0.059	0.052	0.049
25	0.077	0.069	0.062	0.058
<b>ap x ae</b>	<b>≤ D5</b>	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# TAWSH3

weldon shank 3 flutes



DIN  
844

N

HSS/Co  
PV200

50°

SQUARE

Z3

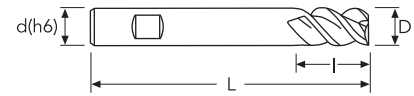
INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice    ☆ suitable



D	D Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
6	0/+0.048	6	13		57	3	TAWSH3060	●
8	0/+0.058	10	19		69	3	TAWSH3080	●
10	0/+0.058	10	22		72	3	TAWSH3100	●
12	0/+0.070	12	26		83	3	TAWSH3120	●
14	0/+0.070	12	26		83	3	TAWSH3140	●
16	0/+0.070	16	32		92	3	TAWSH3160	●
18	0/+0.070	16	32		92	3	TAWSH3180	●
20	0/+0.084	20	38		104	3	TAWSH3200	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion

INFO

## TAWSH3

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.020	0.018	0.015	0.014
<b>8</b>	0.029	0.026	0.022	0.020
<b>10</b>	0.036	0.032	0.027	0.025
<b>12</b>	0.043	0.039	0.032	0.030
<b>14</b>	0.051	0.046	0.038	0.036
<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.069	0.062	0.052	0.049
<b>20</b>	0.079	0.071	0.059	0.055

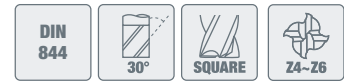


Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.018	0.017	0.015	0.013
<b>8</b>	0.024	0.021	0.019	0.017
<b>10</b>	0.035	0.031	0.028	0.024
<b>12</b>	0.043	0.039	0.035	0.030
<b>14</b>	0.052	0.047	0.041	0.036
<b>16</b>	0.062	0.055	0.049	0.043
<b>18</b>	0.072	0.065	0.058	0.051
<b>20</b>	0.083	0.075	0.067	0.058

HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS

# WS4(6)-TAWS4(6)-UMWS4

weldon shank, 4 flutes-6 flutes



INFO



**N** HSS/Co  
BR



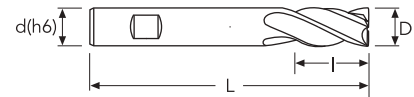
**N** HSS/Co  
PV200



**UM** HSS-P  
PV200

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WS4(6)-TAWS4(6)  
UMWS4



★ 1st choice ☆ suitable

D	D Tol.	d(h6)	l	l1	L	z	WS4(6)		TAWS4(6)		UMWS4	
							EDP No.	Stock	EDP No.	Stock	EDP No.	Stock
2	0/+0.040	6	7		51	4	WS4020	●	TAWS4020	●		
3	0/+0.040	6	8		52	4	WS4030	●	TAWS4030	●	UMWS4030	●
4	0/+0.040	6	11		55	4	WS4040	●	TAWS4040	●	UMWS4040	●
5	0/+0.040	6	13		57	4	WS4050	●	TAWS4050	●	UMWS4050	●
6	0/+0.040	6	13		57	4	WS4060	●	TAWS4060	●	UMWS4060	●
7	0/+0.040	10	16		66	4	WS4070	●	TAWS4070	●		
8	0/+0.040	10	19		69	4	WS4080	●	TAWS4080	●	UMWS4080	●
9	0/+0.040	10	19		69	4	WS4090	●	TAWS4090	●		
10	0/+0.040	10	22		72	4	WS4100	●	TAWS4100	●	UMWS4100	●
11	0/+0.040	12	22		79	4	WS4110	●	TAWS4110	●		
12	0/+0.040	12	26		83	4	WS4120	●	TAWS4120	●	UMWS4120	●
13	0/+0.040	12	26		83	4	WS4130	●	TAWS4130	●		
14	0/+0.040	12	26		83	4	WS4140	●	TAWS4140	●	UMWS4140	●
15	0/+0.040	12	26		83	4	WS4150	●	TAWS4150	●		
16	0/+0.040	16	32		92	4	WS4160	●	TAWS4160	●	UMWS4160	●
17	0/+0.040	16	32		92	4			TAWS4170	●		
18	0/+0.040	16	32		92	4	WS4180	●	TAWS4180	●	UMWS4180	●
19	0/+0.040	16	32		92	4			TAWS4190	●		
20	0/+0.040	20	38		104	4	WS4200	●	TAWS4200	●	UMWS4200	●
22	0/+0.040	20	38		104	4	WS4220	●	TAWS4220	●		
24	0/+0.040	25	45		121	6	WS6240	●				
25	0/+0.040	25	45		121	4	WS4250	●	TAWS4250	●		
28	0/+0.040	25	45		121	6	WS6280	●	TAWS6280	●		
30	0/+0.040	25	45		121	6	WS6300	●	TAWS6300	●		
32	0/+0.040	32	53		133	6			TAWS6320	●		
36	0/+0.040	32	53		133	6			TAWS6360	●		
40	0/+0.040	32	63		143	6			TAWS6400	●		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWS4

UMWS4 (Vc = +20%) - WS4 (Vc = -20% ÷ -30%)

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)		<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	4	0.006	0.005	0.005	0.004
3	4	0.006	0.005	0.005	0.004
4	4	0.009	0.008	0.007	0.006
5	4	0.012	0.011	0.010	0.009
6	4	0.016	0.015	0.013	0.012
8	4	0.021	0.019	0.017	0.016
10	4	0.031	0.028	0.025	0.023
12	4	0.038	0.035	0.031	0.029
14	4	0.046	0.041	0.037	0.035
16	4	0.055	0.049	0.044	0.041
18	4	0.064	0.058	0.051	0.048
20	4	0.074	0.067	0.059	0.055
22	4	0.084	0.076	0.068	0.063
24	6	0.088	0.079	0.071	0.066
25	4	0.106	0.095	0.084	0.079
28	6	0.102	0.092	0.082	0.077
30	6	0.108	0.097	0.086	0.081
32	6	0.113	0.102	0.091	0.085
36	6	0.127	0.114	0.101	0.095
40	6	0.139	0.125	0.111	0.104
ap x ae	≤ D3	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D



# WL4(6)-TAWL4(6)

weldon shank, 4 flutes-6 flutes, long

DIN 844

N

HSS/Co  
BR

HSS/Co  
PV200

30°

SQUARE

Z4-Z6

WL4(6) TAWL4(6)

INFO



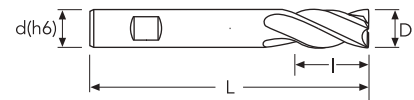
WL4(6)



TAWL4(6)

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	d(h6)	l	l1	L	z	WL4(6)		TAWL4(6)	
							EDP No.	Stock	EDP No.	Stock
3	0/+0.040	6	12		56	4	WL4030	●	TAWL4030	●
4	0/+0.040	6	19		63	4	WL4040	●	TAWL4040	●
5	0/+0.040	6	24		68	4	WL4050	●	TAWL4050	●
6	0/+0.040	6	24		68	4	WL4060	●	TAWL4060	●
7	0/+0.050	10	30		80	4	WL4070	●	TAWL4070	●
8	0/+0.050	10	38		88	4	WL4080	●	TAWL4080	●
9	0/+0.050	10	38		88	4	WL4090	●	TAWL4090	●
10	0/+0.050	10	45		95	4	WL4100	●	TAWL4100	●
11	0/+0.050	12	45		102	4	WL4110	●	TAWL4110	●
12	0/+0.050	12	53		110	4	WL4120	●	TAWL4120	●
13	0/+0.050	12	53		110	4	WL4130	●	TAWL4130	●
14	0/+0.050	12	53		110	4	WL4140	●	TAWL4140	●
15	0/+0.050	12	53		110	4	WL4150	●	TAWL4150	●
16	0/+0.050	16	63		123	4	WL4160	●	TAWL4160	●
17	0/+0.050	16	63		123	4	WL4170	●	TAWL4170	●
18	0/+0.050	16	63		123	4	WL4180	●	TAWL4180	●
19	0/+0.050	16	63		123	4	WL4190	●	TAWL4190	●
20	0/+0.050	20	75		141	4	WL4200	●	TAWL4200	●
22	0/+0.050	20	75		141	6	WL6220	●	TAWL6220	●
25	0/+0.050	25	90		166	6	WL6250	●	TAWL6250	●
30	0/+0.050	25	90		166	6			TAWL6300	●
32	0/+0.050	32	106		186	6			TAWL6320	●
36	0/+0.050	32	106		186	6			TAWL6360	●
40	0/+0.050	40	125		217	6			TAWL6400	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWL4

WL4 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
Vc (m/min)		<b>40÷50</b>	<b>30÷40</b>	<b>25÷35</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	4	0.004	0.004	0.003	0.003
4	4	0.006	0.005	0.005	0.004
5	4	0.009	0.008	0.007	0.006
6	4	0.012	0.011	0.010	0.009
8	4	0.015	0.013	0.012	0.011
10	4	0.021	0.019	0.017	0.016
12	4	0.027	0.024	0.021	0.020
14	4	0.032	0.029	0.026	0.024
16	4	0.038	0.034	0.030	0.028
18	4	0.045	0.040	0.036	0.033
20	4	0.050	0.045	0.040	0.038
22	6	0.056	0.051	0.045	0.042
25	6	0.068	0.061	0.054	0.051
30	6	0.074	0.066	0.059	0.053
32	6	0.077	0.069	0.062	0.054
36	6	0.085	0.077	0.068	0.060
40	6	0.095	0.086	0.076	0.067
ap x ae		≤ D5	1.5D x 0.05D	1.2D x 0.05D	1.2D x 0.05D

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# TAWSR

weldon shank, roughing NR



DIN 844
N
HSS/Co PV200
30°
SQUARE
NR COARSE
Z3-Z4

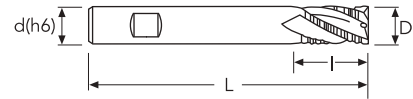
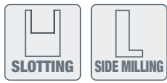
INFO

CARBIDE DRILLS

PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(js12)	D Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
6	+/-0.060	6	13		57	3	TAWSR060	●
7	+/-0.075	10	16		66	3	TAWSR070	●
8	+/-0.075	10	19		69	3	TAWSR080	●
9	+/-0.075	10	19		69	3	TAWSR090	●
10	+/-0.075	10	22		72	4	TAWSR100	●
11	+/-0.090	12	22		79	4	TAWSR110	●
12	+/-0.090	12	26		83	4	TAWSR120	●
13	+/-0.090	12	26		83	4	TAWSR130	●
14	+/-0.090	12	26		83	4	TAWSR140	●
15	+/-0.090	12	26		83	4	TAWSR150	●
16	+/-0.090	16	32		92	4	TAWSR160	●
17	+/-0.090	16	32		92	4	TAWSR170	●
18	+/-0.090	16	32		92	4	TAWSR180	●
20	+/-0.105	20	38		104	4	TAWSR200	●

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

### TAWSR

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.022	0.020	0.018	0.017
<b>8</b>	0.028	0.025	0.022	0.019
<b>10</b>	0.035	0.032	0.028	0.025
<b>12</b>	0.045	0.041	0.036	0.032
<b>14</b>	0.055	0.050	0.044	0.039
<b>16</b>	0.065	0.059	0.052	0.046
<b>18</b>	0.075	0.068	0.060	0.053
<b>20</b>	0.085	0.077	0.068	0.060

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.026	0.024	0.021	0.018
<b>8</b>	0.033	0.030	0.026	0.023
<b>10</b>	0.042	0.038	0.034	0.029
<b>12</b>	0.054	0.049	0.043	0.038
<b>14</b>	0.066	0.059	0.053	0.046
<b>16</b>	0.078	0.070	0.062	0.055
<b>18</b>	0.090	0.081	0.072	0.063
<b>20</b>	0.102	0.092	0.082	0.071

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

# WSFR-TAWSFR-UMWSFR

weldon shank, roughing HR



INFO



WSFR

**N** HSS/Co  
BR



TAWSFR

**N** HSS/Co  
PV200

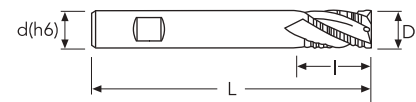
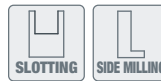


UMWSFR

**UM** HSS-P  
PV200

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WSFR-TAWSFR  
UMWSFR



★ 1st choice ☆ suitable

D(js12)	D Tol.	d(h6)	l	l1	L	z	WSFR		TAWSFR		UMWSFR	
							EDP No.	Stock	EDP No.	Stock	EDP No.	Stock
6	+/-0.060	6	13		57	3	WSFR060	●	TAWSFR060	●	UMWSFR060	●
7	+/-0.075	10	16		66	3			TAWSFR070	●	UMWSFR070	●
8	+/-0.075	10	19		69	3	WSFR080	●	TAWSFR080	●	UMWSFR080	●
9	+/-0.075	10	19		69	3			TAWSFR090	●	UMWSFR090	●
10	+/-0.075	10	22		72	4	WSFR100	●	TAWSFR100	●	UMWSFR100	●
11	+/-0.090	12	22		79	4			TAWSFR110	●		
12	+/-0.090	12	26		83	4	WSFR120	●	TAWSFR120	●	UMWSFR120	●
13	+/-0.090	12	26		83	4			TAWSFR130	●		
14	+/-0.090	12	26		83	4	WSFR140	●	TAWSFR140	●	UMWSFR140	●
15	+/-0.090	12	26		83	4			TAWSFR150	●		
16	+/-0.090	16	32		92	4	WSFR160	●	TAWSFR160	●	UMWSFR160	●
17	+/-0.090	16	32		92	4			TAWSFR170	●		
18	+/-0.090	16	32		92	4	WSFR180	●	TAWSFR180	●	UMWSFR180	●
20	+/-0.105	20	38		104	4	WSFR200	●	TAWSFR200	●	UMWSFR200	●
22	+/-0.105	20	38		104	5			TAWSFR220	●		
25	+/-0.105	25	45		121	5			TAWSFR250	●		
28	+/-0.105	25	45		121	6 CH			TAWSFR280	●		
30	+/-0.105	25	45		121	6			TAWSFR300	●		
32	+/-0.125	32	53		133	6			TAWSFR320	●		
36	+/-0.125	32	53		133	6			TAWSFR360	●		
40	+/-0.125	32	63		155	6			TAWSFR400	●		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWSFR

UMWSFR (Vc = +20%) - WSFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.022	0.020	0.018	0.017
8	3	0.028	0.025	0.022	0.019
10	4	0.035	0.032	0.028	0.025
12	4	0.045	0.041	0.036	0.032
14	4	0.055	0.050	0.044	0.039
16	4	0.065	0.059	0.052	0.046
18	4	0.075	0.068	0.060	0.053
20	4	0.085	0.077	0.068	0.060
22	5	0.086	0.077	0.068	0.060
25	5	0.099	0.089	0.079	0.069
28	6	0.100	0.090	0.080	0.070
30	6	0.108	0.097	0.086	0.076
32	6	0.116	0.104	0.093	0.081
36	6	0.130	0.111	0.104	0.091
40	6	0.145	0.123	0.116	0.102

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)		<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.026	0.024	0.021	0.018
8	3	0.033	0.030	0.026	0.023
10	4	0.042	0.038	0.034	0.029
12	4	0.054	0.049	0.043	0.038
14	4	0.066	0.059	0.053	0.046
16	4	0.078	0.070	0.062	0.055
18	4	0.090	0.081	0.072	0.063
20	4	0.102	0.092	0.082	0.071
22	5	0.103	0.092	0.082	0.072
25	5	0.119	0.107	0.095	0.083
28	6	0.120	0.108	0.096	0.084
30	6	0.130	0.117	0.104	0.091
32	6	0.139	0.125	0.111	0.097
36	6	0.156	0.140	0.125	0.109
40	6	0.174	0.157	0.139	0.122

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# WLFR-TAWLFR

weldon shank, roughing HR, long

DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	HR FINE	Z3-Z6
		WLFR	TAWLFR				

INFO



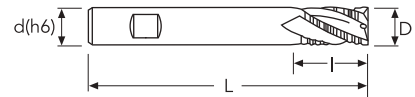
WLFR



TAWLFR

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(js12)	D Tol.	d(h6)	l	l1	L	z	WLFR		TAWLFR	
							EDP No.	Stock	EDP No.	Stock
6	+/-0.060	6	24		68	3	WLFR060	●	TAWLFR060	●
8	+/-0.075	10	38		88	3	WLFR080	●	TAWLFR080	●
10	+/-0.075	10	45		95	4	WLFR100	●	TAWLFR100	●
12	+/-0.090	12	53		110	4	WLFR120	●	TAWLFR120	●
14	+/-0.090	12	53		110	4	WLFR140	●	TAWLFR140	●
16	+/-0.090	16	63		123	4	WLFR160	●	TAWLFR160	●
18	+/-0.090	16	63		123	4	WLFR180	●	TAWLFR180	●
20	+/-0.105	20	75		141	4	WLFR200	●	TAWLFR200	●
22	+/-0.105	20	75		141	5			TAWLFR220	●
25	+/-0.105	25	90		166	5			TAWLFR250	●
30	+/-0.105	25	90		166	6			TAWLFR300	●
32	+/-0.105	32	106		186	6			TAWLFR320	●
36	+/-0.125	32	106		186	6			TAWLFR360	●
40	+/-0.125	32	125		217	6			TAWLFR400	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWLFR

WLFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>
Vc (m/min)		<b>35÷45</b>	<b>25÷35</b>	<b>20÷30</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.014	0.013	0.011	0.011
8	3	0.020	0.018	0.016	0.014
10	4	0.025	0.022	0.020	0.017
12	4	0.032	0.028	0.025	0.022
14	4	0.039	0.035	0.031	0.027
16	4	0.046	0.041	0.036	0.032
18	4	0.053	0.047	0.042	0.037
20	4	0.060	0.054	0.048	0.042
22	5	0.060	0.054	0.048	0.042
25	5	0.069	0.062	0.055	0.049
28	6	0.070	0.063	0.056	0.049
30	6	0.076	0.068	0.060	0.053
32	6	0.081	0.073	0.065	0.057
36	6	0.091	0.077	0.073	0.064
40	6	0.102	0.086	0.081	0.071

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)		<b>35÷45</b>	<b>25÷35</b>	<b>20÷30</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.017	0.015	0.013	0.012
8	3	0.024	0.022	0.019	0.017
10	4	0.029	0.026	0.024	0.021
12	4	0.038	0.034	0.030	0.026
14	4	0.046	0.042	0.037	0.032
16	4	0.055	0.049	0.044	0.038
18	4	0.063	0.057	0.050	0.044
20	4	0.071	0.064	0.057	0.050
22	5	0.072	0.065	0.057	0.050
25	5	0.083	0.075	0.067	0.058
28	6	0.084	0.076	0.067	0.059
30	6	0.091	0.082	0.073	0.064
32	6	0.097	0.088	0.078	0.068
36	6	0.109	0.098	0.087	0.076
40	6	0.122	0.110	0.097	0.085

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



# WSB2-TAWSB2

weldon shank, 2 flutes ball nose

DIN 327	N	HSS/Co BR	HSS/Co PV200	30°	BALL NOSE	ZZ BALL
		WSB2 TAWSB2				

INFO



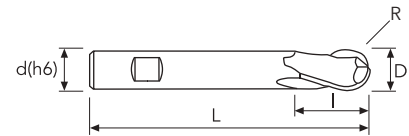
WSB2



TAWSB2

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(e8)	D(e8) Tol.	R	R Tol.	d(h6)	l	l1	L	z	WSB2		TAWSB2	
									EDP No.	Stock	EDP No.	Stock
2	-0.014/-0.028	1.00	+0.020/-0.020	6	4		48	2	WSB2020	●	TAWSB2020	○
3	-0.014/-0.028	1.50	+0.020/-0.020	6	5		49	2	WSB2030	●	TAWSB2030	●
4	-0.020/-0.038	2.00	+0.020/-0.020	6	7		51	2	WSB2040	●	TAWSB2040	●
5	-0.020/-0.038	2.50	+0.020/-0.020	6	8		52	2	WSB2050	●	TAWSB2050	●
6	-0.020/-0.038	3.00	+0.020/-0.020	6	8		52	2	WSB2060	●	TAWSB2060	●
8	-0.025/-0.047	4.00	+0.020/-0.020	10	11		61	2	WSB2080	●	TAWSB2080	●
10	-0.025/-0.047	5.00	+0.020/-0.020	10	13		63	2	WSB2100	●	TAWSB2100	●
12	-0.032/-0.059	6.00	+0.020/-0.020	12	16		73	2	WSB2120	●	TAWSB2120	●
14	-0.032/-0.059	7.00	+0.020/-0.020	12	16		73	2	WSB2140	●	TAWSB2140	●
16	-0.032/-0.059	8.00	+0.020/-0.020	16	19		79	2	WSB2160	●	TAWSB2160	●
18	-0.032/-0.059	9.00	+0.020/-0.020	16	19		79	2	WSB2180	●	TAWSB2180	●
20	-0.040/-0.073	10.00	+0.020/-0.020	20	22		88	2	WSB2200	●	TAWSB2200	●
25	-0.040/-0.073	12.50	+0.020/-0.020	25	26		102	2	WSB2250	●		
28	-0.040/-0.073	14.00	+0.020/-0.020	25	26		102	2	WSB2280	○		
30	-0.040/-0.073	15.00	+0.020/-0.020	25	26		102	2	WSB2300	○		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWSB2

WSB2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	1.20	0.020	0.018	0.016	0.015
3	1.80	0.040	0.036	0.032	0.030
4	2.40	0.060	0.054	0.048	0.045
5	3.00	0.070	0.063	0.056	0.053
6	3.60	0.082	0.074	0.066	0.062
8	4.80	0.094	0.085	0.075	0.071
10	6.00	0.110	0.099	0.088	0.083
12	7.20	0.130	0.117	0.104	0.098
14	8.40	0.150	0.135	0.120	0.113
16	9.60	0.170	0.153	0.136	0.128
18	10.80	0.190	0.171	0.152	0.143
20	12.00	0.210	0.189	0.168	0.158
22	13.20	0.232	0.209	0.186	0.174
25	15.00	0.262	0.236	0.210	0.197
28	16.80	0.285	0.257	0.228	0.214
30	18.00	0.292	0.263	0.233	0.219

HSS  
DRILLS



α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# WLB2-TAWLB2

weldon shank, 2 flutes ball nose, long

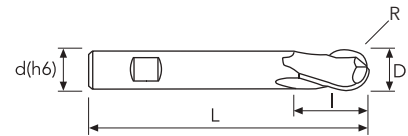
DIN 1889	N	HSS/Co BR	HSS/Co PV200	30°	BALL NOSE	ZZ BALL
		WLB2	TAWLB2			

INFO



P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE DRILLS  
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

D(e8)	D(e8) Tol.	R	R Tol.	d(h6)	l	l1	L	z	WLB2		TAWLB2	
									EDP No.	Stock	EDP No.	Stock
3	-0.014/-0.028	1.50	+0.020/-0.020	6	8		56	2	WLB2030	●	TAWLB2030	○
4	-0.020/-0.038	2.00	+0.020/-0.020	6	11		63	2	WLB2040	●	TAWLB2040	○
5	-0.020/-0.038	2.50	+0.020/-0.020	6	13		68	2	WLB2050	●	TAWLB2050	○
6	-0.020/-0.038	3.00	+0.020/-0.020	6	13		68	2	WLB2060	●	TAWLB2060	○
8	-0.025/-0.047	4.00	+0.020/-0.020	10	19		88	2	WLB2080	●	TAWLB2080	○
10	-0.025/-0.047	5.00	+0.020/-0.020	10	22		95	2	WLB2100	●	TAWLB2100	○
12	-0.032/-0.059	6.00	+0.020/-0.020	12	26		110	2	WLB2120	●	TAWLB2120	○
14	-0.032/-0.059	7.00	+0.020/-0.020	12	26		110	2	WLB2140	●	TAWLB2140	○
16	-0.032/-0.059	8.00	+0.020/-0.020	16	32		123	2	WLB2160	●	TAWLB2160	○
18	-0.032/-0.059	9.00	+0.020/-0.020	16	32		123	2	WLB2180	●	TAWLB2180	○
20	-0.040/-0.073	10.00	+0.020/-0.020	20	38		141	2	WLB2200	●	TAWLB2200	○

HSS DRILLS  
 LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS  
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

INFO

**TAWLB2****WLB2 (Vc = -20% ÷ -30%)**CARBIDE  
DRILLSPU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>
Vc (m/min)		<b>30÷40</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	1.80	0.034	0.031	0.027	0.026
<b>4</b>	2.40	0.051	0.046	0.041	0.038
<b>5</b>	3.00	0.060	0.054	0.048	0.045
<b>6</b>	3.60	0.070	0.063	0.056	0.052
<b>8</b>	4.80	0.080	0.072	0.064	0.060
<b>10</b>	6.00	0.094	0.084	0.075	0.070
<b>12</b>	7.20	0.111	0.099	0.088	0.083
<b>14</b>	8.40	0.128	0.115	0.102	0.096
<b>16</b>	9.60	0.145	0.130	0.116	0.108
<b>18</b>	10.80	0.162	0.145	0.129	0.121
<b>20</b>	12.00	0.179	0.161	0.143	0.134



$\alpha$	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MHHSS  
END-MILLSCARBIDE  
BURRS

# FM-TAFM

shell mill, multi flute

DIN  
1880

N

HSS/Co  
BR

HSS/Co  
PV200

30°

SQUARE

Z8-Z14

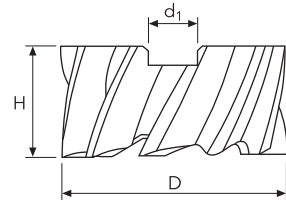
FM

TAFM



P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	d1	d1 Tol.	H	H Tol.	z	FM		TAFM	
							EDP No.	Stock	EDP No.	Stock
40	+0.250/-0.150	16	+0.020/0	32	+0.50/0	8	FM40	●	TAFM40	●
50	+0.250/-0.150	22	+0.020/0	36	+0.50/0	8	FM50	●	TAFM50	●
63	+0.250/-0.150	27	+0.020/0	40	+0.50/0	8	FM63	●	TAFM63	●
80	+0.250/-0.150	27	+0.020/0	45	+0.50/0	10	FM80	○	TAFM80	○
100	+0.250/-0.150	32	+0.020/0	50	+0.50/0	10	FM100	○	TAFM100	○

INFO

CARBIDE DRILLS  
PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS  
LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS  
G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAFFM

FM (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>
Vc (m/min)		<b>40+60</b>	<b>30+50</b>	<b>25+35</b>	<b>15+25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>40</b>	8	0.060	0.054	0.048	0.045
<b>50</b>	8	0.070	0.063	0.056	0.053
<b>63</b>	8	0.080	0.072	0.064	0.060
<b>80</b>	10	0.100	0.090	0.080	0.075
<b>100</b>	10	0.120	0.108	0.096	0.090

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# FFR-TAFFR

shell mill, multi flute, roughing HR



FFR



TAFFR

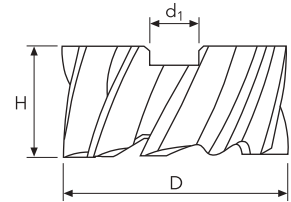
P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



<b>DIN</b> 1880	<b>N</b>	<b>HSS/Co</b> <b>BR</b>	<b>HSS/Co</b> <b>PV200</b>				
		<b>FFR</b>	<b>TAFFR</b>				

INFO



CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	d1	d1 Tol.	H	H Tol.	z	FFR		TAFFR	
							EDP No.	Stock	EDP No.	Stock
40	+0.250/-0.150	16	+0.020/0	32	+0.50/0	6	FFR40	●	TAFFR40	●
50	+0.250/-0.150	22	+0.020/0	36	+0.50/0	8	FFR50	●	TAFFR50	●
63	+0.250/-0.150	27	+0.020/0	40	+0.50/0	8	FFR63	●	TAFFR50	●
80	+0.250/-0.150	27	+0.020/0	45	+0.50/0	10	FFR80	○	TAFFR63	○
100	+0.250/-0.150	32	+0.020/0	50	+0.50/0	10	FFR100	○	TAFFR100	○

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAFFR

FFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>40</b>	8	0.080	0.072	0.064	0.060
<b>50</b>	8	0.100	0.090	0.080	0.075
<b>63</b>	8	0.120	0.108	0.096	0.090
<b>80</b>	10	0.120	0.108	0.096	0.090
<b>100</b>	10	0.140	0.126	0.112	0.105

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



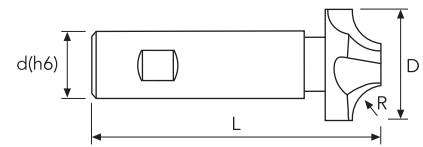
# WCR

corner rounding



P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	R	R(H11) Tol.	d(h6)	L	z	EDP No.	Stock
8	1.00	+0.060/0	10	60	4	WCR080	●
9	1.50	+0.060/0	10	60	4	WCR090	●
10	2.00	+0.060/0	10	60	4	WCR100	●
11	2.50	+0.060/0	10	60	4	WCR110	●
12	3.00	+0.060/0	12	60	4	WCR120	●
13	3.50	+0.075/0	12	60	4	WCR130	●
14	4.00	+0.075/0	12	60	4	WCR140	●
15	4.50	+0.075/0	12	60	4	WCR150	●
16	5.00	+0.075/0	12	60	4	WCR160	●
19	5.50	+0.075/0	16	67	4	WCR190	●
20	6.00	+0.075/0	16	67	4	WCR200	●
21	6.50	+0.090/0	16	71	4	WCR210	●
22	7.00	+0.090/0	16	71	4	WCR220	●
23	7.50	+0.090/0	16	71	4	WCR230	●
24	8.00	+0.090/0	16	71	4	WCR240	●
25	8.50	+0.090/0	25	85	4	WCR250	●
26	9.00	+0.090/0	25	85	4	WCR260	●
27	9.50	+0.090/0	25	85	4	WCR270	●
28	10.00	+0.090/0	25	85	4	WCR280	●
32	11.00	+0.110/0	25	90	4	WCR320	●

INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# WCR

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513	P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm	≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>
Vc (m/min)	<b>30+50</b>	<b>15+25</b>	<b>30+40</b>	<b>60+80</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.006	0.004	0.005	0.007
9	0.008	0.006	0.007	0.009
10	0.010	0.007	0.009	0.011
11	0.012	0.008	0.010	0.013
12	0.015	0.010	0.012	0.016
13	0.017	0.012	0.014	0.019
14	0.020	0.014	0.017	0.021
15	0.023	0.016	0.019	0.025
16	0.025	0.018	0.021	0.028
17	0.026	0.018	0.022	0.029
18	0.027	0.019	0.023	0.030
19	0.029	0.020	0.024	0.031
20	0.030	0.021	0.026	0.033
21	0.033	0.023	0.028	0.036
22	0.035	0.025	0.030	0.039
23	0.038	0.026	0.032	0.041
24	0.040	0.028	0.034	0.044
25	0.042	0.029	0.035	0.046
26	0.043	0.030	0.037	0.047
27	0.045	0.031	0.038	0.049
28	0.046	0.032	0.039	0.051
32	0.050	0.035	0.043	0.055

# WDC

Dovetail cutter



DIN 1833
N
HSS/Co BR
 $\alpha$  45°
 $\alpha$  60°
Z6-Z12

**WDC 45 WDC 60**

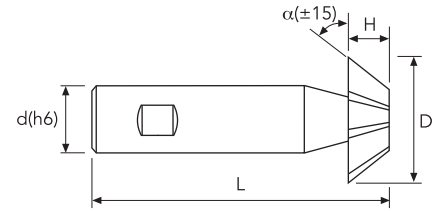
INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	d(h6)	H	L	alfa	z	EDP No.	Stock
16	+/-0.065	12	4	60	45°	6	WDC45160	●
20	+/-0.065	12	5	63	45°	6	WDC45200	●
22	+/-0.065	12	6	67	45°	6	WDC45220	●
25	+/-0.065	16	6.3	67	45°	8	WDC45250	●
28	+/-0.065	16	7.5	67	45°	8	WDC45280	●
32	+/-0.080	16	8	71	45°	10	WDC45320	●
38	+/-0.080	16	10	80	45°	12	WDC45380	○
16	+/-0.065	12	6.3	60	60°	6	WDC60160	●
20	+/-0.065	12	8	63	60°	6	WDC60200	●
22	+/-0.065	12	9	67	60°	6	WDC60220	●
25	+/-0.065	16	10	67	60°	8	WDC60250	●
28	+/-0.065	16	11	67	60°	8	WDC60280	●
32	+/-0.080	16	12.5	71	60°	10	WDC60320	●
38	+/-0.080	16	16	80	60°	12	WDC60380	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ∇ stock exhaustion

INFO

## WDC 45° - 60°

Material Group ISO 513		P1 P2 P3 P4				P7 M1		K1 K2		N1 N2 N3 N4			
		≤800 N/mm <sup>2</sup>				≤750 N/mm <sup>2</sup>		≤350 HB					
Hardness/Rm													
ap x ae		0.2D x 0.15D				0.2D x 0.15D		0.2D x 0.15D		0.2D x 0.15D			
Vc (m/min)		30÷50				15÷25		30÷40		50÷70			
D (mm)	z	fz (mm/z)				fz (mm/z)		fz (mm/z)		fz (mm/z)			
<b>16</b>	6	0.015				0.011		0.013		0.017			
<b>20</b>	6	0.017				0.012		0.014		0.018			
<b>22</b>	6	0.018				0.013		0.015		0.020			
<b>25</b>	8	0.020				0.014		0.017		0.022			
<b>28</b>	8	0.023				0.016		0.019		0.025			
<b>32</b>	10	0.025				0.018		0.021		0.028			
<b>38</b>	12	0.028				0.020		0.024		0.031			

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS

# WDD

Dovetail cutter



DIN 1833	N	HSS/Co BR	$\alpha$ 45°	$\alpha$ 60°	Z6-Z12
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**WDD 45 WDD 60**

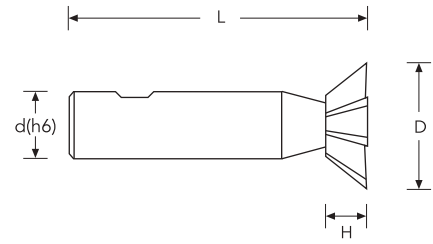
INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	d(h6)	H	L	alfa	z	EDP No.	Stock
16	+/-0.065	12	4	60	45°	6	WDD45160	●
20	+/-0.065	12	5	63	45°	6	WDD45200	●
22	+/-0.065	12	6	67	45°	6	WDD45220	●
25	+/-0.065	16	6.3	67	45°	8	WDD45250	●
28	+/-0.065	16	7.5	67	45°	8	WDD45280	●
32	+/-0.080	16	8	71	45°	10	WDD45320	●
38	+/-0.080	16	10	80	45°	12	WDD45380	○
16	+/-0.065	12	6.3	60	60°	6	WDD60160	●
20	+/-0.065	12	8	63	60°	6	WDD60200	●
22	+/-0.065	12	9	67	60°	6	WDD60220	●
25	+/-0.065	16	10	67	60°	8	WDD60250	●
28	+/-0.065	16	11	67	60°	8	WDD60280	●
32	+/-0.080	16	12.5	71	60°	10	WDD60320	●
38	+/-0.080	16	16	80	60°	12	WDD60380	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

## WDD 45° - 60°

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm		≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae		<b>0.2D x 0.15D</b>	<b>0.2D x 0.15D</b>	<b>0.2D x 0.15D</b>	<b>0.2D x 0.15D</b>
Vc (m/min)		<b>30÷50</b>	<b>15÷25</b>	<b>30÷40</b>	<b>50÷70</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>16</b>	6	0.015	0.011	0.013	0.017
<b>20</b>	6	0.017	0.012	0.014	0.018
<b>22</b>	6	0.018	0.013	0.015	0.020
<b>25</b>	8	0.020	0.014	0.017	0.022
<b>28</b>	8	0.023	0.016	0.019	0.025
<b>32</b>	10	0.025	0.018	0.021	0.028
<b>38</b>	12	0.028	0.020	0.024	0.031

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

# WTM

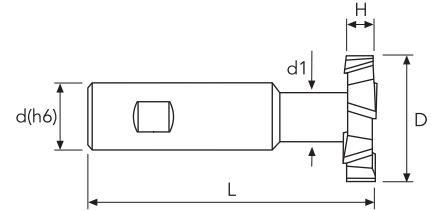
T-slot



INFO

<b>P</b>	<b>M</b>	<b>K</b>	<b>N</b>	<b>S</b>	<b>H</b>
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH**

HSS END-MILLS

CARBIDE BURRS

D(d11)	D(d11) Tol.	d(h6)	d1(h12)	d1 Tol.	H(d11)	H Tol.	L	z	EDP No.	Stock
12.5	-0.050/-0.160	10	5	0/-0.012	6	-0.030/-0.105	57	6	WTM125	●
16	-0.050/-0.160	10	6.5	0/-0.015	8	-0.040/-0.130	62	6	WTM160	●
18	-0.050/-0.160	12	8	0/-0.015	8	-0.040/-0.130	70	6	WTM180	●
19	-0.065/-0.195	12	8	0/-0.015	9	-0.040/-0.130	71	6	WTM190	●
21	-0.065/-0.195	12	10	0/-0.015	9	-0.040/-0.130	74	6	WTM210	●
22	-0.065/-0.195	12	10	0/-0.015	10	-0.040/-0.130	75	6	WTM220	●
25	-0.065/-0.195	16	12	0/-0.018	11	-0.050/-0.160	82	6	WTM250	●
28	-0.065/-0.195	16	13	0/-0.018	12	-0.050/-0.160	83	6	WTM280	●
32	-0.080/-0.240	16	15	0/-0.018	14	-0.050/-0.160	90	8	WTM320	●
36	-0.080/-0.240	25	17	0/-0.018	16	-0.050/-0.160	103	8	WTM360	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# WTM

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm		≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae		<b>DIN Norm 650</b>	<b>DIN Norm 650</b>	<b>DIN Norm 650</b>	<b>DIN Norm 650</b>
Vc (m/min)		<b>25+35</b>	<b>12+18</b>	<b>20+30</b>	<b>40+60</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>12.5</b>	6	0.010	0.007	0.009	0.011
<b>16</b>	6	0.025	0.018	0.021	0.028
<b>18</b>	6	0.030	0.021	0.026	0.033
<b>19</b>	6	0.035	0.025	0.030	0.039
<b>21</b>	6	0.040	0.028	0.034	0.044
<b>22</b>	6	0.043	0.030	0.036	0.047
<b>25</b>	6	0.045	0.032	0.038	0.050
<b>28</b>	6	0.050	0.035	0.043	0.055
<b>32</b>	8	0.057	0.040	0.048	0.063
<b>36</b>	8	0.065	0.046	0.055	0.072

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



# WWK

Woodruff

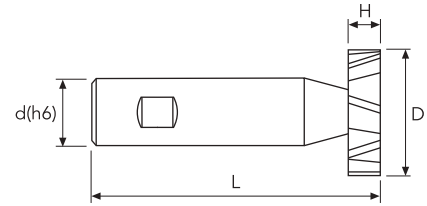


DIN 850	N	HSS/Co BR	10°	SQUARE	Z8-Z14
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INFO

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

D(h11)	D Tol.	d(h6)	H(e8)	H Tol.	L	z	EDP No.	Stock
10.5	0/-0.110	6	2	-0.032/-0.059	50	8	WWK105A	●
10.5	0/-0.110	6	2.5	-0.032/-0.059	50	8	WWK105B	●
10.5	0/-0.110	6	3	-0.032/-0.059	50	8	WWK105C	●
13.5	0/-0.110	10	2	-0.032/-0.059	56	8	WWK135A	●
13.5	0/-0.110	10	2.5	-0.032/-0.059	56	8	WWK135B	●
13.5	0/-0.110	10	3	-0.032/-0.059	56	8	WWK135C	●
13.5	0/-0.110	10	4	-0.032/-0.059	56	8	WWK135D	●
16.5	0/-0.110	10	2.5	-0.032/-0.059	56	8	WWK165B	●
16.5	0/-0.110	10	3	-0.032/-0.059	56	8	WWK165C	●
16.5	0/-0.110	10	4	-0.032/-0.059	56	8	WWK165D	●
16.5	0/-0.110	10	5	-0.032/-0.059	56	8	WWK165E	●
19.5	0/-0.130	10	3	-0.040/-0.073	63	8	WWK195C	●
19.5	0/-0.130	10	4	-0.040/-0.073	63	8	WWK195D	●
19.5	0/-0.130	10	5	-0.040/-0.073	63	8	WWK195E	●
19.5	0/-0.130	10	6	-0.040/-0.073	63	8	WWK195F	●
22.5	0/-0.130	10	4	-0.040/-0.073	63	10	WWK225D	●
22.5	0/-0.130	10	5	-0.040/-0.073	63	10	WWK225E	●
22.5	0/-0.130	10	6	-0.040/-0.073	63	10	WWK225F	●
22.5	0/-0.130	10	8	-0.040/-0.073	63	10	WWK225H	●
25.5	0/-0.130	10	5	-0.040/-0.073	63	10	WWK255E	●
25.5	0/-0.130	10	6	-0.040/-0.073	63	10	WWK255F	●
25.5	0/-0.130	10	7	-0.040/-0.073	63	10	WWK255G	●
25.5	0/-0.130	10	8	-0.040/-0.073	63	10	WWK255H	●
28.5	0/-0.130	10	5	-0.040/-0.073	63	10	WWK285E	●
28.5	0/-0.130	10	6	-0.040/-0.073	63	10	WWK285F	●
28.5	0/-0.130	10	7	-0.040/-0.073	63	10	WWK285G	●
28.5	0/-0.130	10	8	-0.040/-0.073	63	10	WWK285H	●
32.5	0/-0.160	12	5	-0.050/-0.089	71	12	WWK325E	●
32.5	0/-0.160	12	6	-0.050/-0.089	71	12	WWK325F	●
32.5	0/-0.160	12	7	-0.050/-0.089	71	12	WWK325G	●
32.5	0/-0.160	12	8	-0.050/-0.089	71	12	WWK325H	●
32.5	0/-0.160	12	10	-0.050/-0.089	71	12	WWK325L	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# WWK

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm		≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae		<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>
Vc (m/min)		<b>25+35</b>	<b>12+18</b>	<b>20+30</b>	<b>40+60</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>10.5</b>	8	0.010	0.007	0.009	0.011
<b>13.5</b>	8	0.018	0.012	0.015	0.019
<b>16.5</b>	8	0.025	0.018	0.021	0.028
<b>19.5</b>	8	0.033	0.023	0.028	0.036
<b>22.5</b>	10	0.040	0.028	0.034	0.044
<b>25.5</b>	10	0.045	0.032	0.038	0.050
<b>28.5</b>	10	0.050	0.035	0.043	0.055
<b>32.5</b>	12	0.055	0.039	0.047	0.061

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS