

\_HIGHLIGHTS

# ConeFit™ for maximum flexibility.



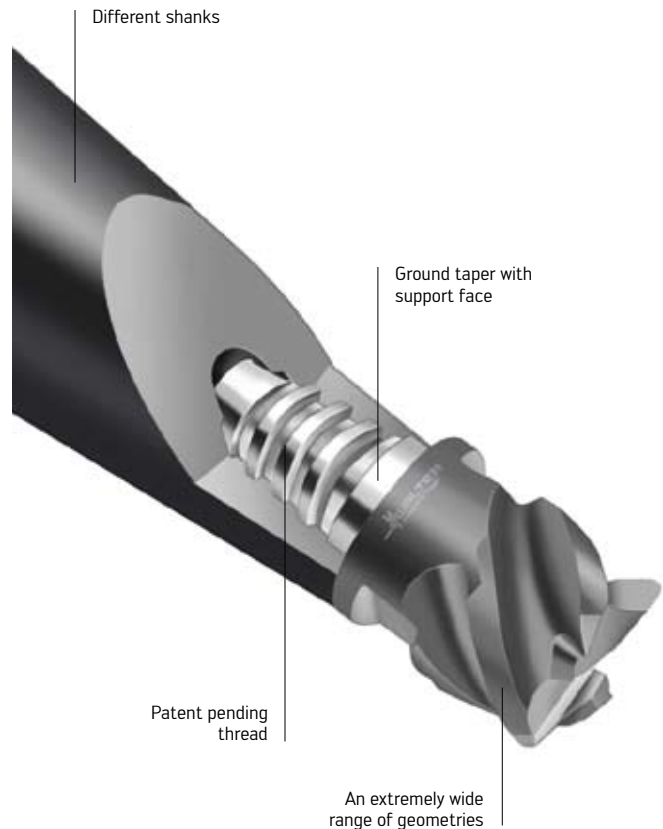
# Walter Prototyp ConeFit™: Modular system for milling.

## THE TOOL SYSTEM

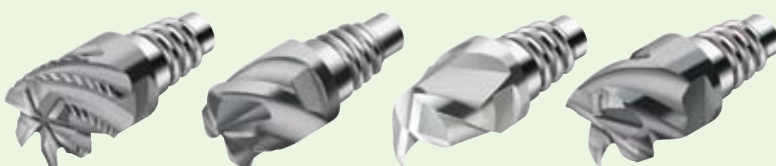
- Modular solid carbide milling system with patented pending self-centring thread
- Highest concentricity due to conical centring
- The axial support face provides the highest rigidity
- Diameter range from 10 to 20 mm
- Wide range of high-performance, changeable heads
- TAX-coated
- Steel shanks in different versions

## THE APPLICATION

- For the ISO material groups P, M, K, N, S
- For roughing and finishing of all contours and machining different shapes
- For use in general engineering, the automotive industry, energy industry, aerospace industry and mold and die.



## ROUGHING



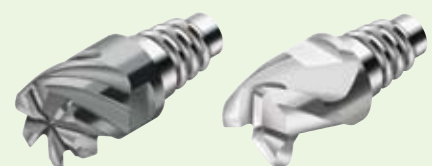
Qmax HR

Flash

AL 45

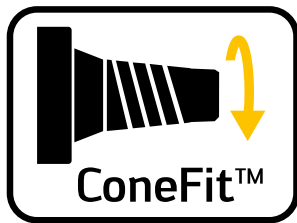
Tough Guys

## FINISHING



Multiflute  
N50

AL 45



**Type A**  
Straight version with reinforced shank



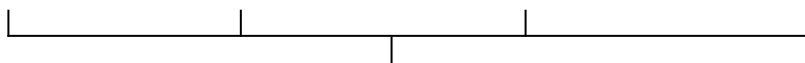
**Type A**  
Straight version



**Type B**  
89° version



**Type C**  
85° version



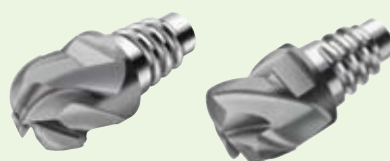
### YOUR ADVANTAGES

- ConeFit™ is flexible and can be used for any type of machining
- Modular design with different shank variants
- Different tool geometries
- Highest stability and precision thanks to support and taper face with patented pending self-centring thread
- Reduction in storage costs thanks to very flexible and universal tooling system
- Highly productive machining thanks to the highest rigidity



**Tough Guys**

### COPYING



**Ball-nose end mill N40**

**Flash**

### PROFILING



**Chamfering cutter**

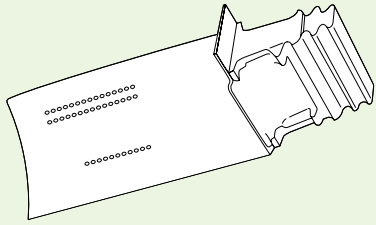
**Corner rounding end mill**

# Synopsis of programme – varied applications – successful performance.

**H3E82378**  
**H3E85378**  
**H3E93718**  
**H3E94718**  
**H3E29148**  
**H3E21138**  
**H3E23138**  
**H6E2511**  
**H3E23138**  
**H3E20317**  
**H6E2311**  
**H8E11118**  
**H3E58518**  
**H3E68118**

**Type A**  
**Type A**  
**Type B**  
**Type C**

**Turbine blade:  
Slot milling**

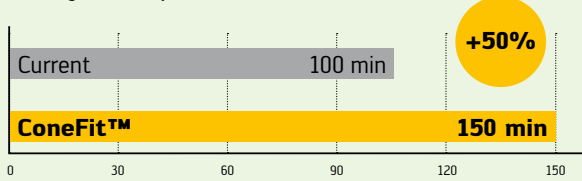


**Workpiece material:** 1.4057 (X22CrMoV12-1)  
**Tool:** ConeFit™ Tough Guys  
 H3E20317-E10-10-3  
 dia. 10 mm, Z=4, R=3

**Cutting data**

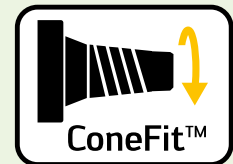
	Current	ConeFit™
$v_c$	130 m/min	150 m/min
$n$	4,138 rpm	3,183 rpm
$z$	3	4
$f_z$	0.04 mm/tooth	0.05 mm/tooth
$V_f$	496 mm/min	636 mm/min
$a_p$	3.6 mm	3.6 mm
$a_e$	10 mm	10 mm

**Tool edge life comparison (min)**



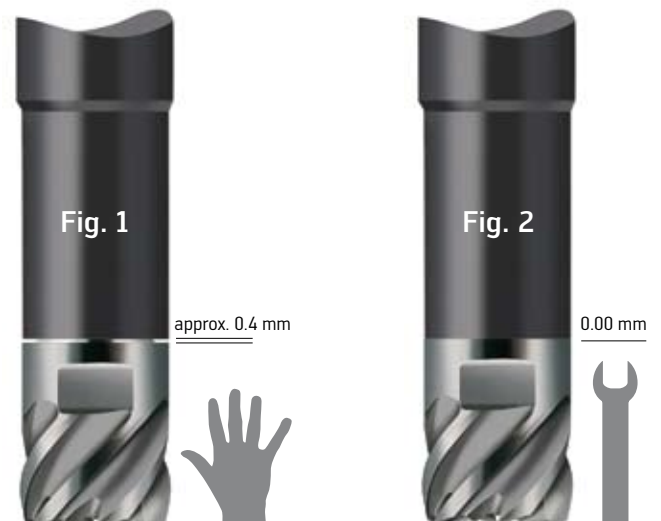
**Result:**  
 Increase in productivity of 23 % along with increase in tool edge life of 50 %.

# Assembly instructions.



## ASSEMBLY INSTRUCTIONS

- Clean the interface and support face on the milling cutter and tool holder
- Place the ConeFit™ tool holder in its adapter
- Twist the ConeFit™ milling cutter by **hand** into the ConeFit™ tool holder (fig. 1)
- Using a **torque wrench** and the specified torque (see table), tighten the ConeFit™ milling cutter to ensure a form-fit connection
- Ensure that the gap is closed and that there is a support face (fig. 2)



## Torques for fitting the milling heads

E	SW	Nm
10	8	12
12	10	15
16	12	30
20	16	50

## Safety information:

Please wear safety gloves when assembling with the tool holder, because the edges of the ConeFit™ milling heads are sharp.



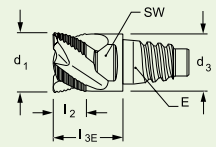
## ConeFit™ now also available on TEC-CCS.

The "TEC+CCS" software makes it easier to search for the most economical drilling and threading tools and milling cutters. By entering all the important parameters, e.g. application, material, machine and cutting data, the user obtains the best available tool solution, including various alternatives. Not only does this include just the cutting data, but also an economic efficiency calculation incl. unit costs.

TEC+CCS is available free of charge on CD-ROM.

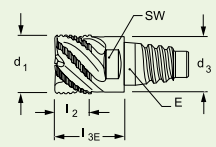
## Roughers

### Qmax HR Kordel F 40 - ConeFit™



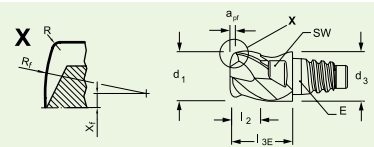
$d_1$ h12 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 82 378 TAX
10	5.5	12.4	9.7	4	8	10	-E10-10
12	6.5	14.5	11.7	4	10	12	-E12-12
16	8.5	18.7	15.5	4	12	16	-E16-16

### Qmax HR Kordel F 45 - ConeFit™



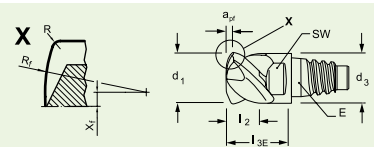
$d_1$ h12 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 85 378 TAX
12	6.5	14.5	11.7	5	10	12	-E12-12
16	8.5	18.7	15.5	6	12	16	-E16-16
20	11	21.3	19.3	6	16	20	-E20-20

### Flash 3 Cutting edges - ConeFit™



$d_1$ h12 mm	$a_{Pf}$ mm	$x_f$ mm	$R_f$ mm	$R_{ers}$ mm	$R$ mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 83 718 TAX
10	0.3	1.70	5	1.99	1.5	5.5	12.4	9.7	3	8	10	-E10-10
12	0.8	2.25	6	2.1	1.5	6.5	14.5	11.7	3	10	12	-E12-12
16	1.0	3.10	8	2,747	2	8.5	18.7	15.5	3	12	16	-E16-16
20	1.3	4.00	10	3,072	2	11	21.3	19.3	3	16	20	-E20-20

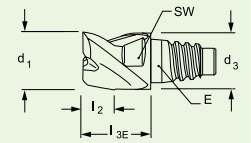
### Flash 4 Cutting edges - ConeFit™



$d_1$ h12 mm	$a_{Pf}$ mm	$x_f$ mm	$R_f$ mm	$R_{ers}$ mm	$R$ mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 94 718 TAX
10	0.3	1.70	5	1.99	1.5	5.5	12.4	9.7	4	8	10	-E10-10
12	0.8	2.25	6	2.1	1.5	6.5	14.5	11.7	4	10	12	-E12-12
16	1.0	3.10	8	2,747	2	8.5	18.7	15.5	4	12	16	-E16-16
20	1.3	4.00	10	3,072	2	11	21.3	19.3	4	16	20	-E20-20

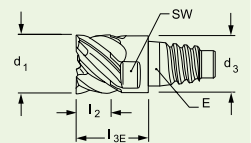
## Square End

### N 45 - ConeFit™



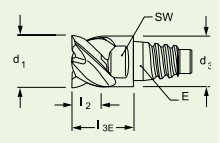
$d_1$ h10 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 29 148 TAX
10	5.5	12.4	9.7	3	8	10	-E10-10
12	6.5	14.5	11.7	3	10	12	-E12-12
16	8.5	18.7	15.5	3	12	16	-E16-16
20	11	21.3	19.3	3	16	20	-E20-20

### N 50 - ConeFit™



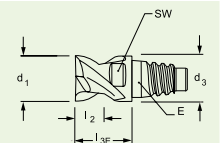
$d_1$ h10 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 21 138 TAX
10	5.5	12.4	9.7	6	8	10	-E10-10
12	6.5	14.5	11.7	6	10	12	-E12-12
16	8.5	18.7	15.5	6	12	16	-E16-16
20	11	21.3	19.3	8	16	20	-E20-20

### Tough Guys N 50 - ConeFit™



$d_1$ h10 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H3E 21 317 TAX
10	5.5	12.4	9.7	4	8	10	-E10-10
12	6.5	14.5	11.7	4	10	12	-E12-12
16	8.5	18.7	15.5	4	12	16	-E16-16
20	11	21.3	19.3	4	16	20	-E20-20

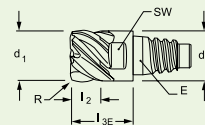
### AL 45 - ConeFit™



$d_1$ h9 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$z$	SW mm	E	Code H6E 25 11
10	5.5	12.4	9.7	2	8	10	-E10-10
12	6.5	14.5	11.7	2	10	12	-E12-12
16	8.5	18.7	15.5	2	12	16	-E16-16
20	11	21.3	19.3	2	16	20	-E20-20

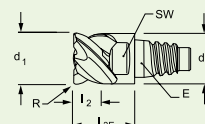
## Corner radius

### N 50 - ConeFit™



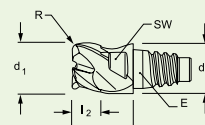
$d_1$ h9 mm	$l_2$ mm	R mm	$l_{3E}$ mm	$d_3$ mm	z	SW mm	E	Code H3E 23 138 TAX
10	5.5	0.5	12.4	9.7	6	8	10	-E10-10-0.5
10	5.5	1.0	12.4	9.7	6	8	10	-E10-10-1
12	6.5	0.5	14.5	11.7	6	10	12	-E12-12-0.5
12	6.5	1.0	14.5	11.7	6	10	12	-E12-12-1
12	6.5	1.5	14.5	11.7	6	10	12	-E12-12-1.5
16	8.5	0.5	18.7	15.5	6	12	16	-E16-16-0.5
16	8.5	1.0	18.7	15.5	6	12	16	-E16-16-1
16	8.5	2.0	18.7	15.5	6	12	16	-E16-16-2
20	11	1.0	21.3	19.3	8	16	20	-E20-20-1
20	11	2.0	21.3	19.3	8	16	20	-E20-20-2
20	11	4.0	21.3	19.3	8	16	20	-E20-20-4

### Tough Guys N 50 - ConeFit™



$d_1$ h9 mm	$l_2$ mm	R mm	$l_{3E}$ mm	$d_3$ mm	z	SW mm	E	Code H3E 20 317 TAX
10	5.5	0.5	12.4	9.7	4	8	10	-E10-10-0.5
10	5.5	1.0	12.4	9.7	4	8	10	-E10-10-1
10	5.5	1.5	12.4	9.7	4	8	10	-E10-10-1.5
10	5.5	2.0	12.4	9.7	4	8	10	-E10-10-2
12	6.5	1.0	14.5	11.7	4	10	12	-E12-12-0.5
12	6.5	1.5	14.5	11.7	4	10	12	-E12-12-1.5
12	6.5	2.0	14.5	11.7	4	10	12	-E12-12-2
12	6.5	3.0	14.5	11.7	4	10	12	-E12-12-3
16	8.5	1.0	18.7	15.5	4	12	16	-E16-16-1
16	8.5	2.0	18.7	15.5	4	12	16	-E16-16-2
16	8.5	3.0	18.7	15.5	4	12	16	-E16-16-3
16	8.5	4.0	18.7	15.5	4	12	16	-E16-16-4
20	11	1.0	21.3	19.3	4	16	20	-E20-20-1
20	11	2.0	21.3	19.3	4	16	20	-E20-20-2
20	11	3.0	21.3	19.3	4	16	20	-E20-20-3
20	11	4.0	21.3	19.3	4	16	20	-E20-20-4

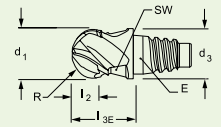
### AL 45 - ConeFit™



$d_1$ h9 mm	$l_2$ mm	R mm	$l_{3E}$ mm	$d_3$ mm	z	SW mm	E	Code H6E 23 11
10	5.5	1.0	12.4	9.7	3	8	10	-E10-10-1
10	5.5	2.5	12.4	9.7	3	8	10	-E10-10-2.5
12	6.5	1.0	14.5	11.7	3	10	12	-E12-12-1
12	6.5	2.5	14.5	11.7	3	10	12	-E12-12-2.5
16	8.5	2.5	18.7	15.5	3	12	16	-E16-16-2.5
16	8.5	4.0	18.7	15.5	3	12	16	-E16-16-4
20	11	2.5	21.3	19.3	3	16	20	-E20-20-2.5
20	11	4.0	21.3	19.3	3	16	20	-E20-20-4

## Ball nose

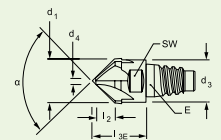
### N 40 - ConeFit™



$d_1$ h9 mm	$l_2$ mm	R mm	$l_{3E}$ mm	$d_3$ mm	z	SW mm	E	Code H8E 11 118 TAX
10	5.5	5	12.4	9.7	4	8	10	-E10-10
12	6.5	6	14.5	11.7	4	10	12	-E12-12
16	8.5	8	18.7	15.5	4	12	16	-E16-16
20	11	10	21.3	19.3	4	16	20	-E20-20

## Profile

### Chamfering 60° - ConeFit™



□	$d_1$ h9 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$d_4$ mm	z	SW mm	E	Code H3E 58 518 TAX
60	12	6.5	14.5	11.7	4.5	6	10	12	-E12-12

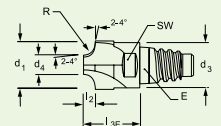
### Chamfering 90° - ConeFit™

□	$d_1$ h9 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$d_4$ mm	z	SW mm	E	Code H3E 58 318 TAX
90	12	4.5	14.5	11.7	3	6	8	10	-E12-12
90	16	6.5	18.7	15.5	3	8	10	12	-E16-16

### Chamfering 120° - ConeFit™

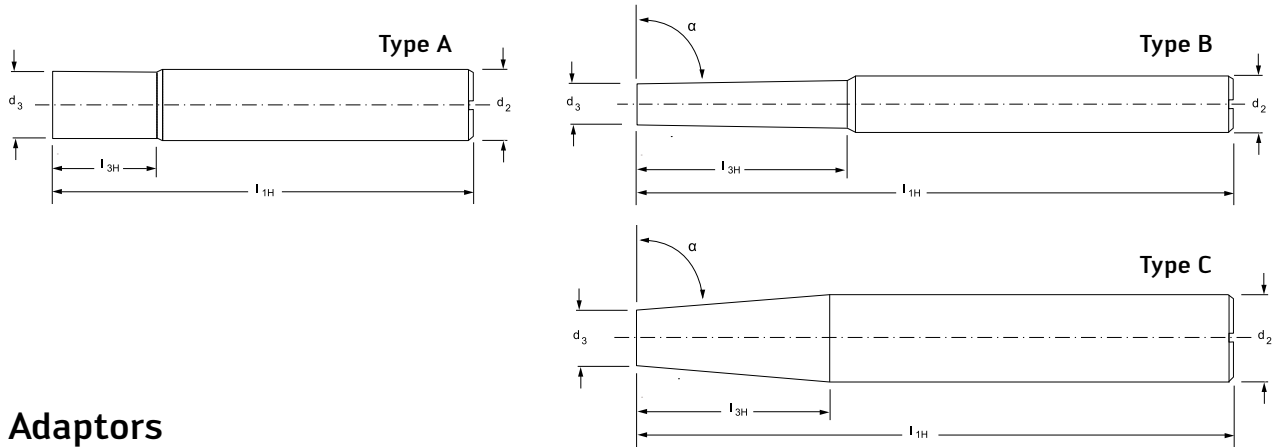
□	$d_1$ h9 mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$d_4$ mm	z	SW mm	E	Code H3E 58 118 TAX
120	12	2.6	14.5	11.7	4.5	6	8	10	-E12-12

### Corner rounding - ConeFit™



R mm	$d_1$ mm	$l_2$ mm	$l_{3E}$ mm	$d_3$ mm	$d_4$ mm	z	SW mm	E	Code H3E 68 118 TAX
3	12	3	14.5	11.7	5	4	10	12	-E12-12-3
4	16	4	18.7	15.5	6	4	12	16	-E16-16-4
5	16	5	18.7	15.5	6	4	12	16	-E16-16-5
6	20	6	21.3	19.3	8	4	16	20	-E20-20-6

## \_ ORDER INFORMATION



## Adaptors

### E10 - ConeFit™

E	$l_{3H}$ mm	$d_3$ mm	$\alpha$	$l_{1H}$ mm	$d_2$ h6 mm	Type	Max. speed min <sup>-1</sup>	Code
10	5	9.6	---	65	16	A	40,000	AK610.Z16.E10.005
10	20	9.6	---	75	10	A	40,000	AK610.Z10.E10.020
10	50	9.6	89°	160	16	B	12,000	AK610.Z16.E10.050
10	36.5	9.6	85°	140	16	C	16,000	AK610.Z16.E10.036

### E12 - ConeFit™

E	$l_{3H}$ mm	$d_3$ mm	$\alpha$	$l_{1H}$ mm	$d_2$ h6 mm	Type	Max. speed min <sup>-1</sup>	Code
12	5	11.6	---	65	16	A	40,000	AK610.Z16.E12.005
12	22	11.6	---	100	12	A	31,000	AK610.Z12.E12.022
12	60	11.6	89°	170	16	B	10,000	AK610.Z16.E12.060
12	25.1	11.6	85°	140	16	C	16,000	AK610.Z16.E12.025

### E16 - ConeFit™

E	$l_{3H}$ mm	$d_3$ mm	$\alpha$	$l_{1H}$ mm	$d_2$ h6 mm	Type	Max. speed min <sup>-1</sup>	Code
16	5	15.4	---	70	20	A	40,000	AK610.Z20.E16.005
16	25	15.4	---	110	20	A	31,000	AK610.Z20.E16.025
16	75	15.4	89°	190	20	B	11,000	AK610.Z20.E16.075
16	54.8	15.4	85°	170	25	C	18,000	AK610.Z25.E16.054

### E20 - ConeFit™

E	$l_{3H}$ mm	$d_3$ mm	$\alpha$	$l_{1H}$ mm	$d_2$ h6 mm	Type	Max. speed min <sup>-1</sup>	Code
20	5	19.2	---	80	25	A	40,000	AK610.Z25.E20.005
20	30	19.2	---	120	20	A	34,000	AK610.Z20.E20.030
20	73.1	19.2	85°	180	32	C	20,000	AK610.Z32.E20.073

## Set

### ConeFit™ SET-E12-MULTI

E	Code	Content	Remark
12	CONEFIT-SET-E12-MULTI	H3E82378-E12-12	Qmax - Roughing cutter
		H3E21138-E12-12	N 50 - Finishing cutter
		H3E21317-E12-12	Tough guys N50 - Tough guys
		H3E58318-E12-12	Chamfering cutter 90°
		AK610.Z12.E12.022	Holder type A
		AK610.Z16.E12.025	Holder type E
		FS2125-E12	Flat wrench

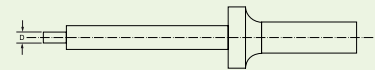
## Wrenches

### Flat wrench - ConeFit™



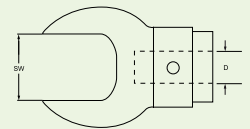
E	SW	Type	Code
10	8	Twin head	FS2124-E10
12	10	Twin head	FS2125-E12
16	12	Twin head	FS2126-E16
20	16	Single head	FS2127-E20

### Torque wrench - ConeFit™







D	Torque range	Code
16	2-25 Nm	FS1384
16	10-100 Nm	FS1385











### Key for torque wrench - ConeFit™



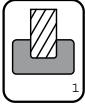
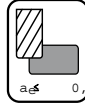
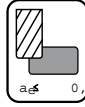
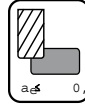
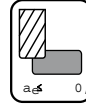
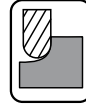
E	SW	D	Nm	Code
10	8	16	12	FS2135-E10-R
12	10	16	15	FS2136-E12-R
16	12	16	30	FS2137-E16-R
20	16	16	50	FS2138-E20-R

\_ CUTTING DATA  $v_c$

ISO material group	Walter Prototyp material group	Walter Prototyp Material group description	Roughing cutters								
			Type		Qmax HR Kordel F 40; F 45		Flash				
			Helix angle	40°	45°	50°	50°				
			No. of teeth	4	5-8	3	4				
			Coating	TAX	TAX	TAX	TAX				
											
			Dia. range	(10 to 16)	(12 to 20)	(10 to 20)	(10 to 20)				
			Code	H3E 82378	H3E 85378	H3E 93718	H3E 94718				
			Tensile strength	$v_c$ m/min	VT	$v_c$ m/min	VT	$v_c$ m/min	VT		
P	<b>Steel</b>										
	1.1	Magnetic soft iron	200 - 400 N/mm <sup>2</sup>	210	A	210	A	190	D	190	D
	1.2	Construction steel, non-alloyed steel	500 - 700 N/mm <sup>2</sup>	210	A	210	A	190	D	190	D
	1.3	Carbon steel	350 - 850 N/mm <sup>2</sup>	200	A	200	A	155	D	155	D
	1.4	Alloy steel, soft	500 - 850 N/mm <sup>2</sup>	175	A	175	A	155	D	155	D
	1.5	Alloy steel, hardened and tempered	850 - 1,200 N/mm <sup>2</sup>	125	A	125	A	130	D	130	D
	1.6.1	Alloy steel, hardened and tempered	1,200 - 1,400 N/mm <sup>2</sup>					100	D	100	D
1.6.2	Alloy steel, hardened and tempered	1,400 - 1,600 N/mm <sup>2</sup>					90	D	90	D	
M	<b>Stainless steel</b>										
	2.1	Stainless steel, sulphurised	400 - 850 N/mm <sup>2</sup>	90	B	90	B	100	D	100	D
	2.2	Stainless steel, austenitic	450 - 850 N/mm <sup>2</sup>	75	B	75	B	80	D	80	D
	2.3	Stainless steel, ferritic/martensitic	450 - 1,100 N/mm <sup>2</sup>	60	B	60	B	60	D	60	D
2.4	High tensile Cr-Ni alloys	1,100 - 1,400 N/mm <sup>2</sup>					50	D	50	D	
K	<b>Cast iron</b>										
	3.1	Grey cast iron	50 - 150 HB	165	A	165	A	175	D	175	D
	3.2	Grey cast iron, hardened and tempered	150 - 300 HB	140	A	140	A	155	D	155	D
	3.3	Spheroidal cast iron	150 - 200 HB	165	A	165	A	175	D	175	D
	3.4	Spheroidal cast iron, hardened and tempered	200 - 300 HB	125	A	125	A	140	D	140	D
3.5	Grey cast iron with vermicular graphite	200 - 300 HB	110	A	110	A	120	D	120	D	
N	<b>Non-ferrous metals</b>										
	6.1	Copper non-alloyed	250 - 350 N/mm <sup>2</sup>	320	C	320	C	490	D		
	6.2	Copper alloys, short chipping	350 - 700 N/mm <sup>2</sup>	320	C	320	C	490	D	490	D
	6.3	Copper alloys, long chipping	400 - 700 N/mm <sup>2</sup>	320	C	320	C	490	D	490	D
	6.4	Cu-Al-Fe alloys	700 - 1,500 N/mm <sup>2</sup>	65	C	65	C	70	D	70	D
	6.5	Cu-Al-Ni alloys, short chipping	400 - 850 N/mm <sup>2</sup>	110	C	110	C	170	D	170	D
	6.6	Cu-Al-Ni alloys, long chipping	450 - 850 N/mm <sup>2</sup>	110	C	110	C	170	D	170	D
	7.1	Al non-alloyed	200 - 350 N/mm <sup>2</sup>					760	D		
	7.2	Al alloyed (Si<0.5%)	300 - 600 N/mm <sup>2</sup>					760	D		
	7.3.1	Al alloyed (Si 0.5 to 4%)	300 - 600 N/mm <sup>2</sup>					760	D	760	D
	7.3.2	Al alloyed (Si>4 to 10%)	300 - 600 N/mm <sup>2</sup>	440	C	440	C	670	D	670	D
	7.4	Al alloyed (Si>10%)	300 - 600 N/mm <sup>2</sup>	150	C	150	C	390	D	390	D
	7.5.1	Mg standard cast alloy	120 - 300 N/mm <sup>2</sup>	510	C	510	C	760	D	760	D
7.5.2	Mg high tensile alloy	240 - 400 N/mm <sup>2</sup>	445	C	445	C	680	D	680	D	
7.5.3	Mg heat-resistant alloy	120 - 300 N/mm <sup>2</sup>	380	C	380	C	580	D	580	D	
S	<b>Heat-resistant alloys and titanium alloys</b>										
	4.1	Pure titanium	400 - 700 N/mm <sup>2</sup>					200	D		
	4.2	Titanium alloys	700 - 900 N/mm <sup>2</sup>	80	A	80	A	80	D		
	4.3	Titanium alloys	900 - 1,400 N/mm <sup>2</sup>	60	A	60	A	60	D		
	5.1	Pure nickel	400 - 500 N/mm <sup>2</sup>					250	D		
	5.2	Nickel alloys	500 - 900 N/mm <sup>2</sup>	60	B	60	B	60	D		
	5.3	Nickel alloys	900 - 1,600 N/mm <sup>2</sup>	30	B	30	B	35	D		
	9.1	TiC - hard materials	1,500 - 1,700 N/mm <sup>2</sup>	10	B	10	B	10	D	10	D
	9.2	Wolfram alloys	1,400 - 1,800 N/mm <sup>2</sup>	70	B	70	B			80	D
	9.3	Cobalt base alloys	500 - 1,200 N/mm <sup>2</sup>	30	B	30	B			35	D
9.4	Molybdenum alloys	500 - 1,200 N/mm <sup>2</sup>	65	B	65	B			70	D	
H	<b>Hardened materials</b>										
	1.7.1	Steel hardened, short chipping	49 - 55 HRC							80	C
	1.7.2	Steel hardened, long chipping	49 - 55 HRC							80	C
	1.8.1	Steel, hardened	55 - 60 HRC								
1.8.2	Steel, hardened	60 - 65 HRC									
O	<b>Synthetic materials / others</b>										
	8.1	Thermoplasts	<50 N/mm <sup>2</sup>					390	D		
	8.2	Thermosetting plastic and plastic compounds	<80 N/mm <sup>2</sup>	180	C	180	C	190	D	190	D
	8.3	Fibre-reinforced plastics	240 - 440 N/mm <sup>2</sup>	80	C	80	C	90	D	90	D
	10.1	Standard graphite	<100 N/mm <sup>2</sup>								
10.2	Wear-resistant graphite	<100 N/mm <sup>2</sup>									

Shank cutters				Shank cutters with corner radius				Radius cutters	Profiles										
N 45		N 50		Tough Guys N 50		AL 45		N 50		Tough Guys N 50		AL 45		N 40					
45°		50°		50°		45°		50°		50°		45°		40°		0°			
3		6-8		4		2		6-8		4		3		4		6-8			
TAX		TAX		TAX		Uncoated		TAX		TAX		Uncoated		TAX		TAX			
																			
(10 to 20)		(10 to 20)		(10 to 20)		(10 to 20)		(10 to 20)		(10 to 20)		(10 to 20)		(10 to 20)		(12 to 16)		(12 to 20)	
H3E 29148		H3E 21138		H3E 21317		H3E 2511		H3E 23138		H3E 20317		H6E 2311		H8E 11118		H3E 58518 H3E 58318 H3E 58118		H3E 68118	
v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min		v <sub>c</sub> VT m/min	
250	A	250	A	250	A			280	A	280	A			280	A	280	A	280	A
250	A	250	A	250	A			280	A	280	A			280	A	280	A	280	A
250	A	250	A	250	A			280	A	280	A			280	A	280	A	280	A
200	A	200	A	200	A			220	A	220	A			220	A	220	A	220	A
150	A	150	A	150	A			170	A	170	A			170	A	170	A	170	A
120	A	120	A	120	A			135	A	135	A			135	A	135	A	135	A
100	B	100	B					110	B										
100	B	100	B	100	B			110	B	110	B			110	B	110	B	110	B
80	B	80	B	80	B			90	B	90	B			90	B	90	B	90	B
60	B	60	B	60	B			70	B	70	B			70	B	70	B	70	B
50	B	50	B	50	B			55	B	55	B			55	B	55	B	55	B
200	A	200	A	200	A			220	A	220	A			220	A	220	A	220	A
170	A	170	A	170	A			190	A	190	A			190	A	190	A	190	A
200	A	200	A	200	A			220	A	220	A			220	A	220	A	220	A
150	A	150	A	160	A			170	A	170	A			170	A	170	A	170	A
130	A	130	A	140	A			140	A	140	A			140	A	140	A	140	A
560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C
560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C
560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C	560	C
80	C	80	C	80	C			80	C	80	C			80	C	80	C	80	C
200	C	190	C					190	C										
200	C	190	C					190	C										
1,800	C			1,800	C	1,800	C			1,800	C	1,800	C	1,800	C	1,800	C	1,800	C
1,800	C			1,800	C	1,800	C			1,800	C	1,800	C	1,800	C	1,800	C	1,800	C
1,100	C			1,100	C	1,100	C			1,100	C	1,100	C	1,100	C	1,100	C	1,100	C
780	C			800	C	500	C			800	C	500	C	800	C	800	C	800	C
260	C	260	C	250	C	250	C	260	C	250	C	250	C	250	C	250	C	250	C
890	C	890	C	900	C	900	C	890	C	900	C	900	C	900	C	900	C	900	C
780	C	780	C	800	C	800	C	780	C	800	C	800	C	800	C	800	C	800	C
670	C	670	C	700	C	700	C	670	C	700	C	700	C	700	C	700	C	700	C
220	A	220	A	230	A	90	A	250	A	250	A	90	A	250	A	250	A	250	A
90	A	90	A	90	A			100	A	100	A			100	A	100	A	100	A
70	A	70	A	70	A			80	A	80	A			80	A	80	A	80	A
330	A	330	A	340	A	150	A	400	A	400	A	150	A	400	A	400	A	400	A
70	B	70	B	70	B			80	B	80	B			80	B	80	B	80	B
40	B	40	B	40	B			45	B	45	B			45	B	45	B	45	B
	B																		
80	B			85	B					95	B			95	B	95	B	95	B
40	B			40	B					45	B			45	B	45	B	45	B
80	B																		
80	B	80	B	80	B			80	B	80	B			80	B	80	B	80	B
80	B	80	B	80	B			80	B	80	B			80	B	80	B	80	B
	B																		
	B																		
440	C			480	C	150	C			480	C	150	C	480	C	480	C	480	C
220	C			220	C					220	C			220	C	220	C	220	C
100	C			100	C					100	C			100	C	100	C	100	C

## - $v_c$ CORRECTION FACTORS

Slot milling		Contour milling		Copy milling	
					
$v_c \times 0.7$	$v_c \times 0.9$	$v_c \times 1.0$	$v_c \times 1.2$	$v_c \times 1.6$	$v_c \times 2.5$
Roughing		Semi-finishing		Finishing	

Description	Metric
Speed	rpm
Cutting speed	$v_c$ [m/min]
Feed rate	$v_f$ [mm/min]
Diameter	$d_1$ [mm]
Feed per tooth	$f_z$ [mm]
No. of teeth	$z$
Axial feed	$a_p$ [mm]
Radial feed	$a_e$ [mm]

$v_c$ Correction factors - Toolholder		$d_2$	$l_{1H}$	$l_{3H}$	$l_4$	$d_3$	Type	$\square$	Max. speed
AK610.Z16.E10.005	$v_c \times 1$	16	65	5.0	7	9.6	A		40,000
AK610.Z10.E10.020	$v_c \times 0.9$	10	75	20.0	21	9.6	A		40,000
AK610.Z16.E10.050	$v_c \times 0.6$	16	160	20.0	52	9.6	B	89°	12,000
AK610.Z16.E10.036	$v_c \times 0.7$	16	140	36.5	-	9.6	C	85°	16,000
AK610.Z16.E12.005	$v_c \times 1$	16	65	5.0	7	11.6	A		40,000
AK610.Z12.E12.022	$v_c \times 0.9$	12	100	22.0	23	11.6	A		31,000
AK610.Z16.E12.060	$v_c \times 0.6$	16	170	60.0	62	11.6	B	89°	10,000
AK610.Z16.E12.025	$v_c \times 0.7$	16	140	25.1	-	11.6	C	85°	16,000
AK610.Z20.E16.005	$v_c \times 1$	20	70	5.0	7	15.4	A		40,000
AK610.Z20.E16.025	$v_c \times 0.9$	20	110	25.0	27	15.4	A		31,000
AK610.Z20.E16.075	$v_c \times 0.6$	20	190	75.0	78	15.4	B	89°	11,000
AK610.Z25.E16.054	$v_c \times 0.7$	25	170	54.8	-	15.4	C	85°	18,000
AK610.Z25.E20.005	$v_c \times 1$	25	80	5.0	7	19.2	A		40,000
AK610.Z20.E20.030	$v_c \times 0.8$	20	120	30.0	31	19.2	A		34,000
AK610.Z32.E20.073	$v_c \times 0.7$	32	180	73.1	-	19.2	C	85°	20,000

# \_VT FEED TABLES

## A Steel, titanium, cast materials

a <sub>e</sub> [mm] Radial feed in mm	Feed per tooth in mm f <sub>z</sub> [mm]			
	Dia. 10 mm	Dia. 12 mm	Dia. 16 mm	Dia. 20 mm
0.01	0.20			
0.05	0.20			
0.1	0.20	0.20	0.20	
0.2	0.18	0.20	0.20	0.25
0.5	0.15	0.15	0.15	0.25
1	0.12	0.12	0.12	0.20
2	0.11	0.12	0.12	0.20
3	0.11	0.12	0.12	0.18
5	0.10	0.12	0.12	0.15
6	0.08	0.10	0.12	0.15
8	0.07	0.09	0.12	0.15
10	0.06	0.08	0.12	0.14
12		0.07	0.11	0.14
14			0.10	0.13
16			0.09	0.12
18				0.11
20				0.10

## B Stainless steel, nickel, hardened materials

a <sub>e</sub> [mm] Radial feed in mm	Feed per tooth in mm f <sub>z</sub> [mm]			
	Dia. 10 mm	Dia. 12 mm	Dia. 16 mm	Dia. 20 mm
0.01	0.16			
0.05	0.16			
0.1	0.16	0.16	0.16	
0.2	0.14	0.16	0.16	0.20
0.5	0.12	0.12	0.12	0.20
1	0.10	0.10	0.10	0.16
2	0.09	0.10	0.10	0.16
3	0.09	0.10	0.10	0.14
5	0.08	0.10	0.10	0.12
6	0.07	0.08	0.10	0.12
8	0.06	0.08	0.10	0.12
10	0.05	0.07	0.10	0.12
12		0.06	0.09	0.12
14			0.08	0.12
16			0.07	0.10
18				0.10
20				0.08

## C Aluminium, copper, graphite, plastic

a <sub>e</sub> [mm] Radial feed in mm	Feed per tooth in mm f <sub>z</sub> [mm]			
	Dia. 10 mm	Dia. 12 mm	Dia. 16 mm	Dia. 20 mm
0.01	0.25			
0.05	0.25			
0.1	0.25	0.25	0.25	
0.2	0.25	0.25	0.25	0.25
0.5	0.25	0.25	0.25	0.25
1	0.22	0.22	0.22	0.25
2	0.22	0.22	0.22	0.25
3	0.22	0.22	0.22	0.25
5	0.22	0.22	0.22	0.25
6	0.14	0.18	0.22	0.25
8	0.12	0.16	0.22	0.25
10	0.10	0.14	0.22	0.25
12		0.12	0.20	0.25
14			0.18	0.25
16			0.16	0.22
18				0.20
20				0.18

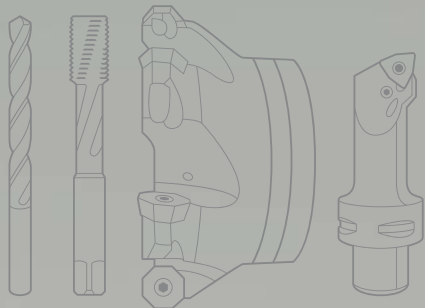
## D Flash

a <sub>e</sub> [mm] Radial feed in mm	Feed per tooth in mm f <sub>z</sub> [mm]			
	Dia. 10 mm	Dia. 12 mm	Dia. 16 mm	Dia. 20 mm
0.8				
1.5				
3				
5	0.30	0.35		
6	0.30	0.35	0.50	
8	0.30	0.35	0.50	0.70
10	0.30	0.35	0.50	0.70
12			0.50	0.70
14			0.50	0.70
16			0.50	0.70
18				0.70
20				0.70

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