Data Sheet

Indexable carbide milling inserts and tooling

RS stock numbers 848-694 to 848-824

Introduction

Originally developed in the 1950s, tungsten carbide inserts are preformed shapes made from a mixture of cemented carbides. They are manufactured by a 'sintering' rather than a melting process.

Commonly known as 'tooling systems' the basic principle uses replacement carbide inserts fitted into a specific type of toolholder.

Milling cutter bodies and the clamping system can vary in detail from different manufacturers but all follow standard ISO (International Standards Organisation) identification codes. However, without exception, all standard carbide inserts conform to ISO codes in relation to shapes and profiles etc.

Milling

This is a machining process in which work is fed past a rotating cutter having its teeth on the periphery or sides, or both. Milling is used essentially for the rapid removal of metal and is particularly suitable for the production of flat surfaces or a combination of surfaces. It is also possible to produce contoured surfaces by using form cutters. Holes may also be drilled and bored. Generally tolerances of ±0.025mm may be held by milling, although 0.075mm is generally more practical.

The choice of cutter type and its size will depend upon several factors.

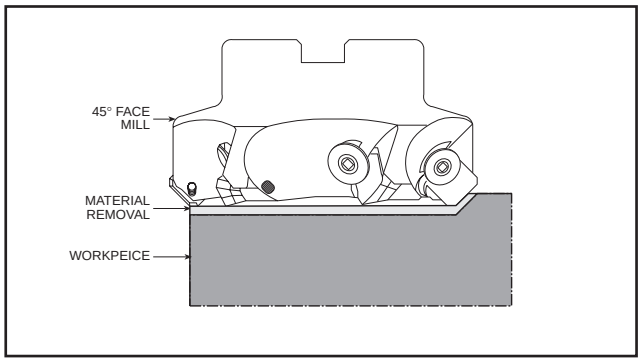
- Type of work being performed
- Power of machine available.

Generally, use of a cutter incorporating carbide inserts will reduce power requirement on the machine or allow use of increased feed and cutting speeds.

Milling cutters

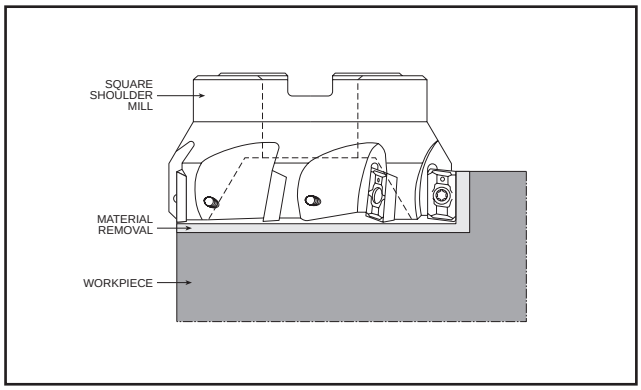
Applications

45° face mill



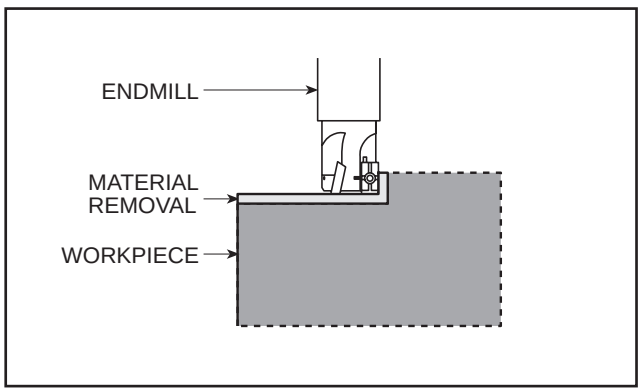
Primarily intended for surface preparation where the complete area is to be machined.

Square shoulder mill



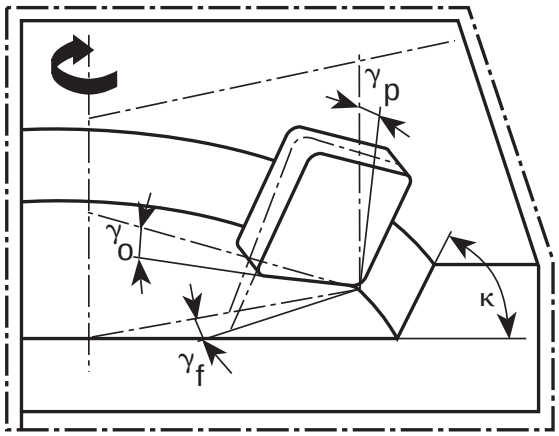
This cutter will produce steps with square edges, or can be used for surface preparation as per 45° face mills.

End mill



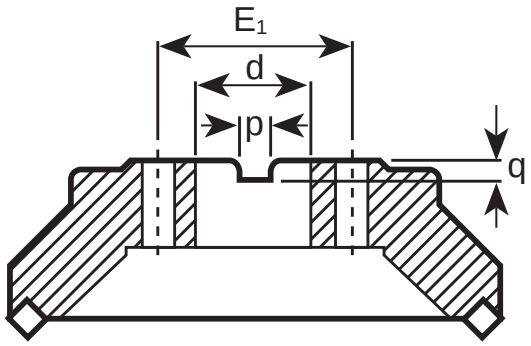
This cutter can be used to produce slots, ramps, shoulders etc.

Cutter geometry



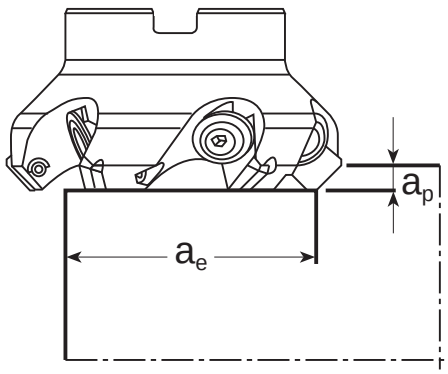
κ = Tool cutting edge angle
γ_o = Cutting rake
γ_p = Axial rake
γ_f = Radial rake

Dimensions of mounting



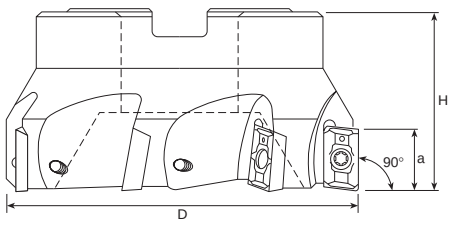
RS stock no.	d	p	q
848-694	22	10.4	6.3

Radial and axial depth of cut



a_p = Depth of cut - axial
a_e = width of cut - radial

Square shoulder mill

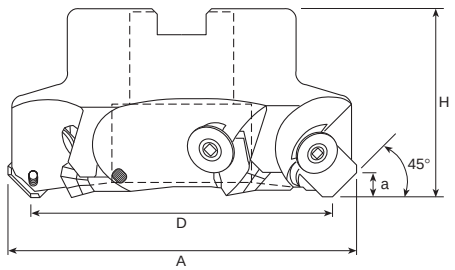


Tool angles.
Cutting rake -12° - -6°
Axial rake +7° - +10°
Radial rake -12° - -6°

RS stock no.	Dimensions in mm			No. of teeth
	D	H	a	
848-717	50	40	16	5
848-723	63	40	16	6
848-739	80	50	16	7

Milling cutters
Dimensions and specification

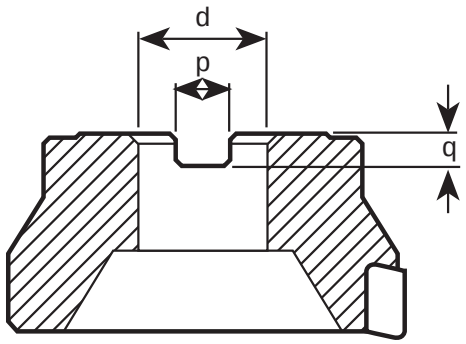
45° face mill



Tool angles.
Cutting rake +12°
Axial rake +20°
Radial rake -3°

RS stock no.	Dimensions in mm				No. of teeth
	D	A	H	a	
848-694	63	77	40	6	5

Dimensions of mounting



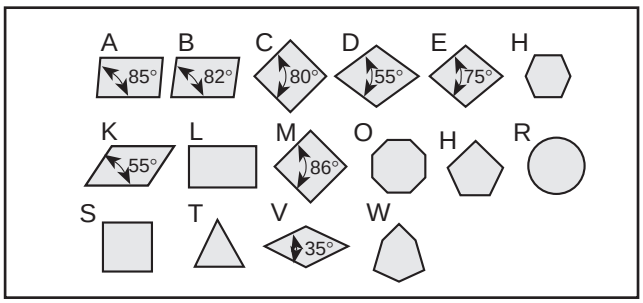
RS stock no.	d	p	q
848-717	22	10.4	6.3
848-723	22	10.4	6.3
848-739	27	12.4	7

Milling cutter inserts

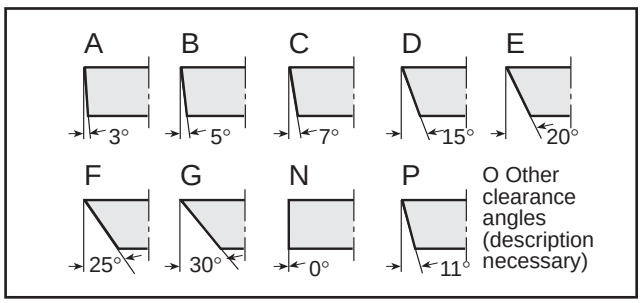
Metric series ISO 1832-1991

S	E	A	N	12	03	AF	T	N	-	M16
1	2	3	4	5	6	7	8	9		10

1 Shape



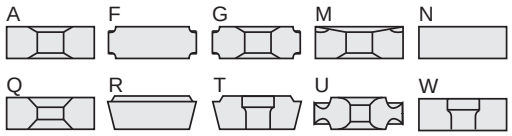
2 Clearance angle



3 Tolerances

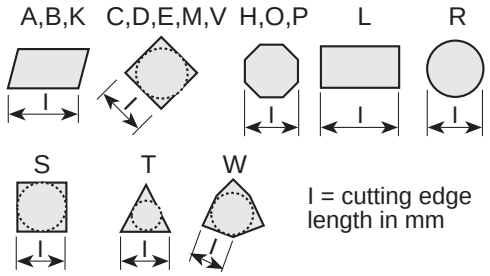
Tol class	Tolerance ±mm			For d,dimension mm					
	m	s	d	6,53	9,525	12,70	15,875	19,05	25,40
A	0,005	0,025	0,025	•	•	•	•	•	•
E	0,025	0,025	0,025	•	•	•	•	•	•
F	0,005	0,025	0,013	•	•	•	•	•	•
G	0,025	0,13	0,025	•	•	•	•	•	•
H	0,013	0,025	0,013	•	•	•	•	•	•
J	0,005	0,025	0,05	•	•				
	0,005	0,025	0,08			•			
	0,005	0,025	0,10				•	•	
	0,005	0,025	0,13						•
K	0,013	0,025	0,05	•	•				
	0,013	0,025	0,08			•			
	0,013	0,025	0,10				•	•	
	0,013	0,025	0,13						•
M	0,08	0,13	0,05	•	•				
	0,13	0,13	0,08			•			
	0,15	0,13	0,10				•	•	
	0,18	0,13	0,13						•
U	0,13	0,13	0,08	•	•				
	0,20	0,13	0,13			•			
	0,27	0,13	0,18				•	•	
	0,38	0,13	0,25						•

4 Type of insert



X Special design (description necessary)

5 Cutting edge length



l = cutting edge length in mm

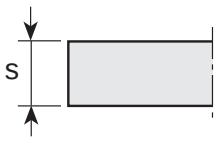
Comparison

Cutting edge length/I.C. (d)

IC (d)	Shape					
	C	D	R,S	T	V	W
	Cutting edge length					
5,56						03
6.35	06	07	06	11		04
12,70	09	11	09	16	16	06
15,88	16	19	15	22		08
19,05	19	23	19	33		
25,40	25	31	25	44		

IC = Theoretical diameter of inscribed circle

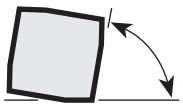
6 Thickness



mm	mm
01 = 1,59	05 = 5,56
T1 = 1,98	06 = 6,35
02 = 2,38	07 = 7,94
03 = 3,18	08 = 8,00
T3 = 3,97	09 = 9,52
04 = 4,76	

7 Insert with wiper edge/radius

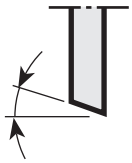
1st digit



A = 45°
D = 60°
E = 75°
F = 85°
P = 90°

Z = Special

2nd digit

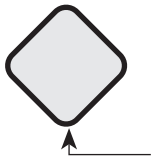


A = 3°
D = 5°
E = 7°
F = 15°
P = 20°

F = 25°
G = 30°
N = 0°
P = 11°

Z = Special

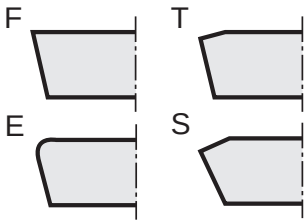
radius mm



M0* = round inserts
00 = sharp
01 = 0,1
02 = 0,2
04 = 0,4
08 = 0,8
12 = 1,2
etc,

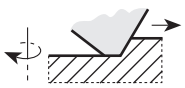
*metric sizes

8 Cutting edge condition

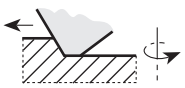


Non-obligatory information

9 Direction of cutting



R — Right-rotated



L — Left-rotated

N — Neutral — R- and L-rotated

10 Internal Manufacturers designation

M16

E = Easy machining conditions, (soft workpiece materials, thin chips, pre-machined work pieces, rolled workpieces, good chip flow). Insert with geometry designation E have sharp cutting edges.

ME= Medium to easy machining conditions

M = Medium machining condition

MD= Medium to difficult machining conditions

D = Difficult machining conditions, (hard workpiece materials, thick chips difficult rough surfaces, intermittent cutting process, chip jamming). Insert with geometry designation D have strong (protected) cutting edges.

16 = The digit combination indicates the most suitable average chip thickness for the geometry under normal conditions ie. 0.16mm.

ISO milling inserts

All RS inserts are held in the cutter bodies using torx screws. The torque values are given in the following table. For optimum performance ensure that screws are coated with grease (molcote 1000 or similar) before insertion.

This will reduce friction and ensure the screws can be released when required.Please note that some clamping screws have left-handed threads!

The maximum figures are shown, generally a value between 75% and 100% should be used.

Torx screw	Thread M	Torque values Nm	
		Max	75%
T07	M2,2	1,2	0,9
T07	M2,5	1,5	1,5
T09	M3	2,0	1,5
T15	M3,5	4,0	3,0
T15	M4	5,0	3,8
T15	M4,5	6,8	5,0
T15	M5	6,8	5,0
T20	M4,5	6,8	5,0
T20	M5	6,8	5,0
T20	M6	10,0	8,0
T25	M8	12,0	10,0

Grade

All RS inserts are supplied in manufacturers grade T25M. The relationship between this designation and the ISO grades is given below.

Coated grades

	ISO-P						ISO-M				ISO-K				
	P01	P10	P20	P30	P40	P50	M10	M20	M30	M40	K01	K10	K20	K30	K40
T25M			●	●	●			●	●	●		●			

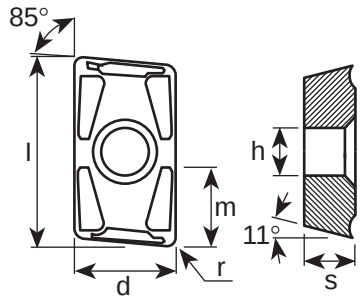
Cross reference

In many cases one insert will fit several cutters. The compatibility is shown in the following table.

RS Insert ISO code	Cutter description	**RS** stock no.
APFT 1604 PDTR	Square shoulder cutter 50mm	848-717
APFT 1604 PDR	Square shoulder cutter 63mm	848-723
	Square shoulder cutter 80mm	848-739
SEKN 1203 AFN	Face cutter 63mm	848-694

Insert specifications

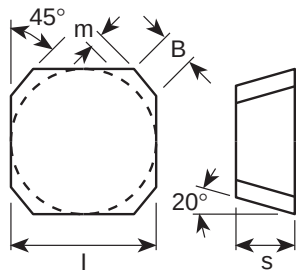
APFT 1604 PDTR D15 T25M



RS stock no. 848-802

Tolerances (±mm)			Dimensions in mm				
d	s	m	d	l	s	r	h
0.013	0.015	0.005	9.525	17	4.76	0.8	4.5

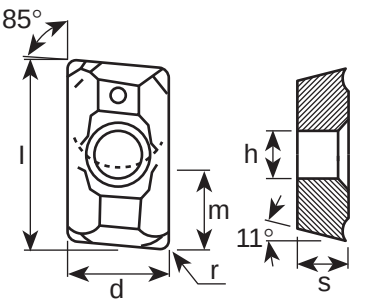
SEKN 1203 AFTN M14 T25M



RS stock no. 848-767

Tolerances (±mm)			Dimensions in mm		
l	s	m	l	s	B
0.08	0.025	0.010	12.70	3.18	1.6

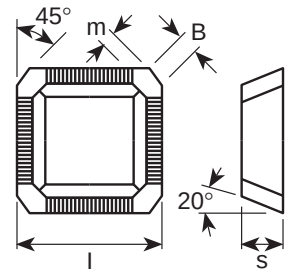
APFT 1604 PDR M12 T25M



RS stock no. 848-795

Tolerances (±mm)			Dimensions in mm				
d	s	m	d	l	s	r	h
0.013	0.015	0.005	9.525	17	4.76	0.8	4.5

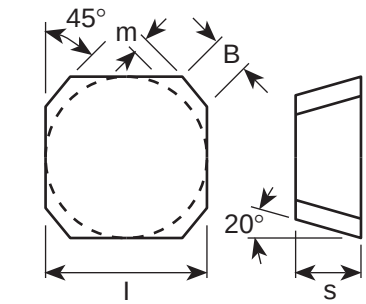
SEKR 1203 AFTN ME10 T25M



RS stock no. 848-773

Tolerances (±mm)			Dimensions in mm		
l	s	m	l	s	B
0.08	0.025	0.010	12.70	3.18	1.5

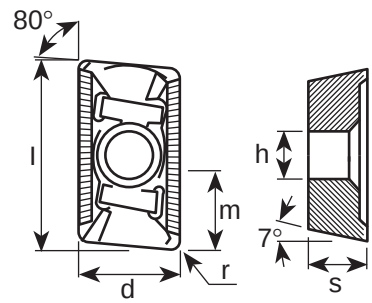
SEKN 1203 AFN E12 T25M



RS stock no. 848-751

Tolerances (±mm)			Dimensions in mm		
l	s	m	l	s	B
0.08	0.025	0.010	13.44	3.36	3.5

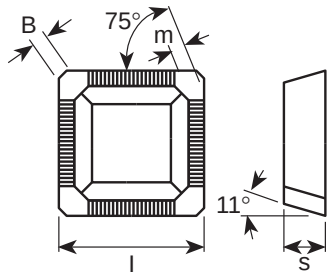
XCKX 13 T304 R ME10 T25M



RS stock no. 848-789

Tolerances (±mm)			Dimensions in mm				
d	s	m	d	l	s	r	h
0.050	0.025	0.013	7.922	14.7	5.03	0.4	3.5

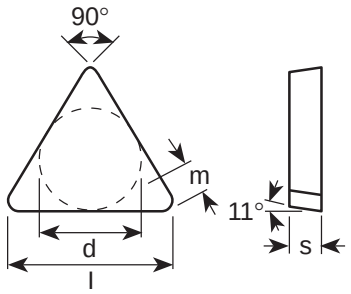
SPKR 1203 EDTR ME12 T25M



RS stock no. 848-818

Tolerances (±mm)			Dimensions in mm		
l	s	m	l	s	B
0.05	0.025	0.013	12.70	3.18	1.2

TPKN 1603 PDTR MD12 T25M



RS stock no. 848-824

Tolerances (±mm)			Dimensions in mm		
d	s	m	d	l	s
0.05	0.025	0.010	9.525	16.5	3.18