

MillLine

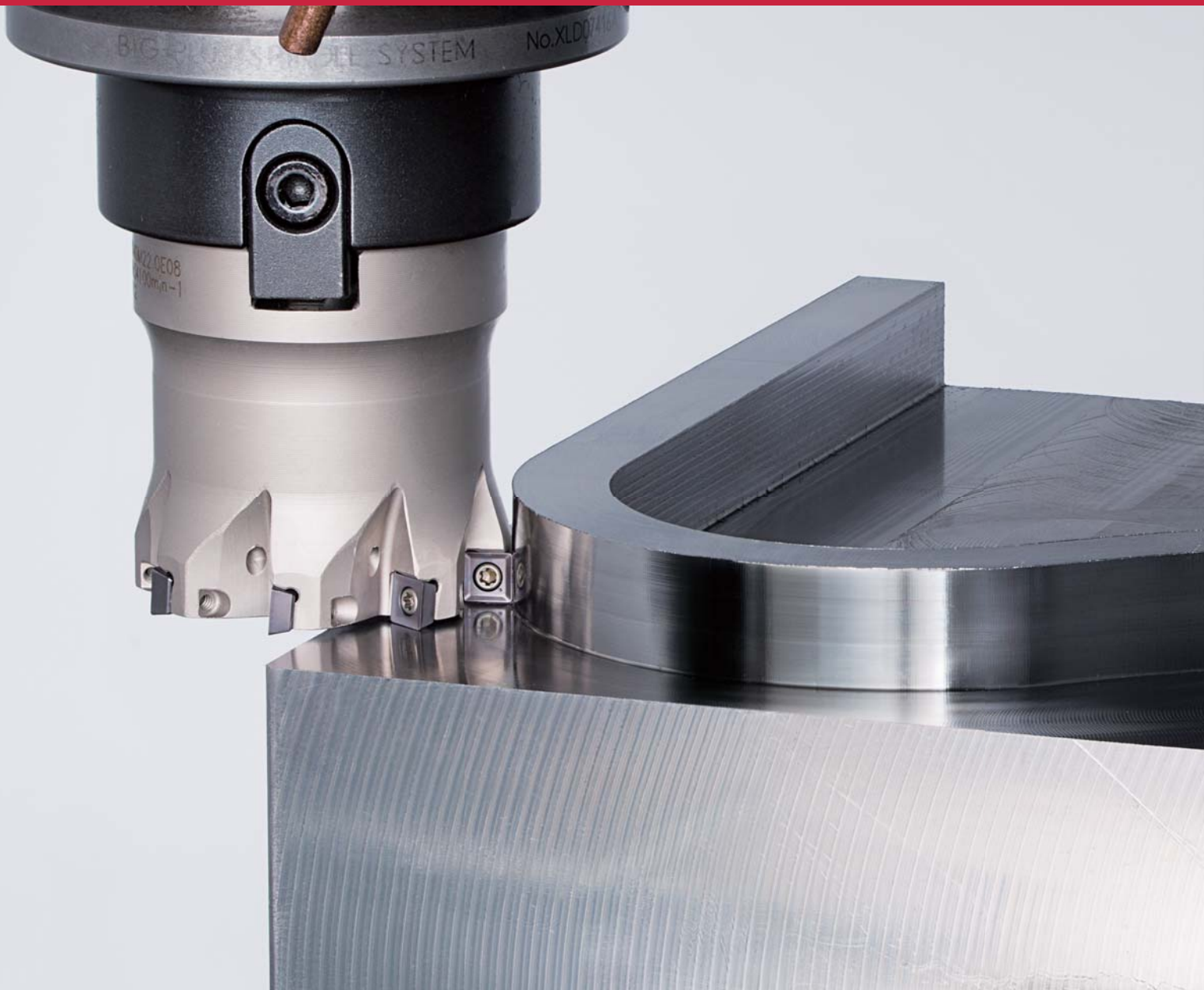
TUNGQUAD

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Tungaloy Report No. 379-G

TUNGQUAD

Stay competitive in small part milling



Member IMC Group
Tungaloy



ACCELERATED MACHINING

MillLine

TUNGQUAD
TUNGALOY



**High density shoulder mill for
outstanding performance in small machines**

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Perfect shoulder mill for small part machining

High insert density for maximum productivity

A small diameter square shoulder mill with close-pitched insert orientations enables a high product output in various materials.

Number of inserts per cutter diameter

Tool diameter ϕD_c (mm)	25	32	40
TUNGQUAD	5	6	8
Conventional	4	5	6
Competitor	3	4	5

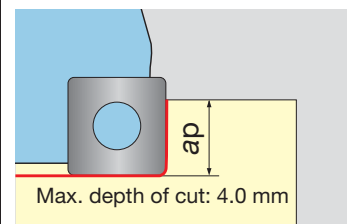


- Through-coolant**
To improve chip controllability
- Nickel-plated body**
The coated surface protects the tool from wear and corrosion

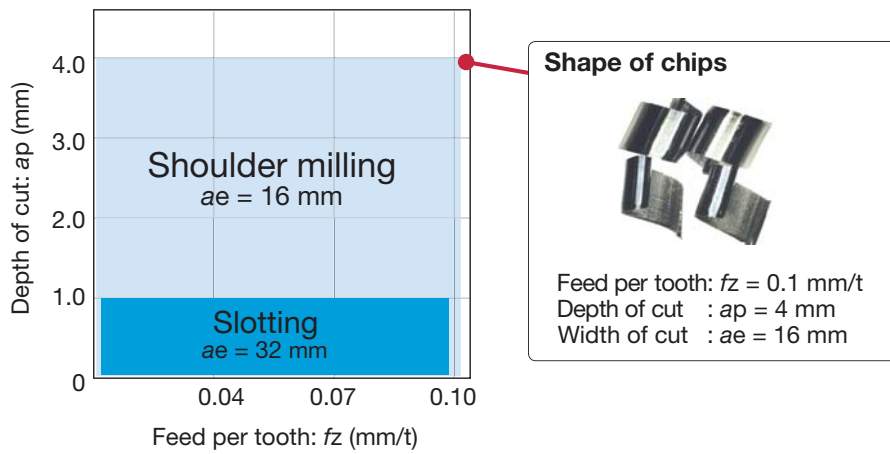
Optimized insert geometry

The cutter carries four-edged, positive inserts with light cutting geometry in combination with high performance grades. A smooth chip control, resulting from free-cutting geometry, assures high stability and productivity in small part milling on a less rigid machine tool.

Chipbreakers	Work material	Sharpe	Features	Cross-sections of the cutting edge (Outline figure)
MJ	P Steel M Stainless K Cast Iron		Well balanced sharpness and strength	Land width Rake angle
AJ	N Non-ferrous		Sharp edge and lapped surface	Rake angle

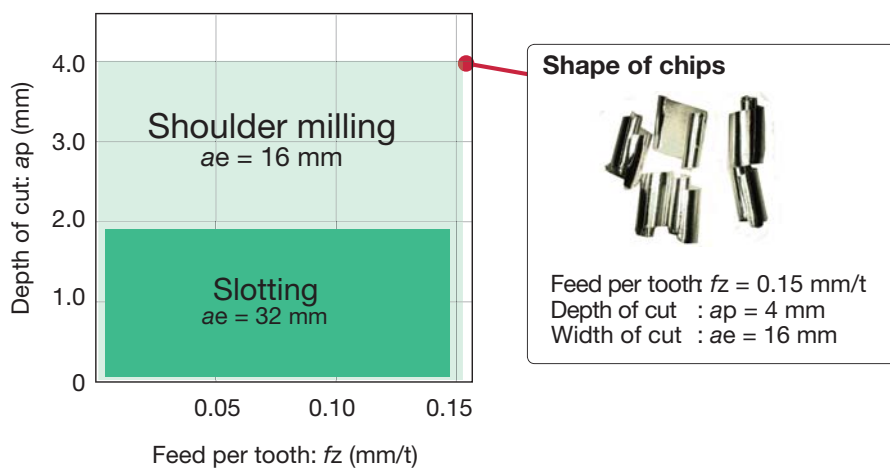


- Application range for steel, S55C (C55E)



Cutter : TPD05R032M16.0E06 ($\phi 32$ mm)
 Insert : SDMT050204PN-MJ
 Grade : AH725
 Cutting speed : $Vc = 180$ m/min
 Cutting fluid : Dry cutting
 Machine : Vertical M/C, BT30

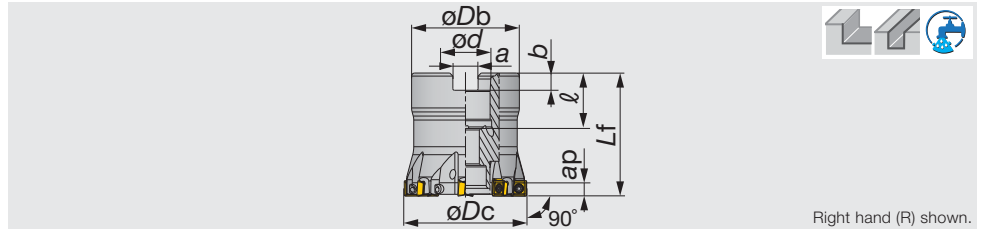
- Application range for aluminium, A7020 (EN AW-7020)



Cutter : TPD05R032M16.0E06 ($\phi 32$ mm)
 Insert : SDHT050204FN-AJ
 Grade : TH10
 Cutting speed : $Vc = 400$ m/min
 Cutting fluid : Dry cutting
 Machine : Vertical M/C, BT30

TPD05

Highly dense square shoulder mills with small SDMT/SDHT05 inserts



A.R. = +5°, R.R. = -7° ~ +12°

Designation	Max. ap	ϕDc	z	ϕDb	L_f	ϕd	ℓ	a	b	Kg	Air hole	Insert
TPD05R032M16.0E06	4	32	6	30	32	16	20	8.4	5.6	0.1	with	SD*T0502...
TPD05R040M22.0E08	4	40	8	38	40	22	22	10.4	6.3	0.2	with	SD*T0502...

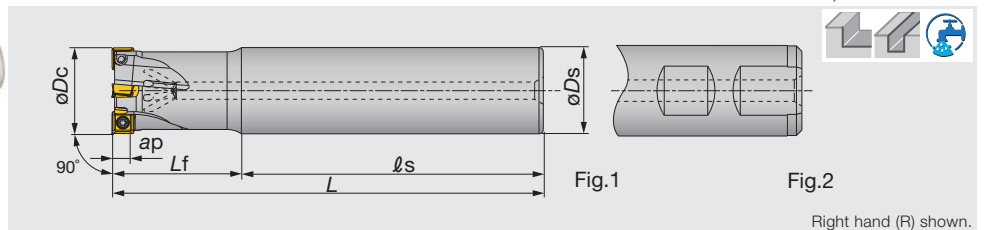
SPARE PARTS



Designation	Clamping screw	Shell locking bolt	Wrench
TPD05R032M16.0E06	CSPB-2L043	CM8X30H	IP-6DB
TPD05R040M22.0E08	CSPB-2L043	CM10X30H	IP-6DB

EPD05

Highly dense square shoulder endmills with small SDMT/SDHT05 inserts



A.R. = +5°, R.R. = -7° ~ +12°

Designation	Max. ap	ϕDc	z	ϕDs	ℓ_s	L_f	L	Kg	Air hole	Shank	Insert	Shank type
EPD05R012M12.0-02	4	12	2	12	62	18	80	0.1	with	Straight	SD*T0502...	Fig.1
EPD05R016M16.0-03	4	16	3	16	90	20	110	0.2	with	Straight	SD*T0502...	Fig.1
EPD05R020M20.0W04	4	20	4	20	80	25	105	0.2	with	Weldon	SD*T0502...	Fig.2
EPD05R025M20.0W05	4	25	5	20	90	25	115	0.3	with	Weldon	SD*T0502...	Fig.2
EPD05R032M25.0W06	4	32	6	25	98	32	130	0.5	with	Weldon	SD*T0502...	Fig.2
EPD05R040M32.0W08	4	40	8	32	100	40	140	0.8	with	Weldon	SD*T0502...	Fig.2

SPARE PARTS

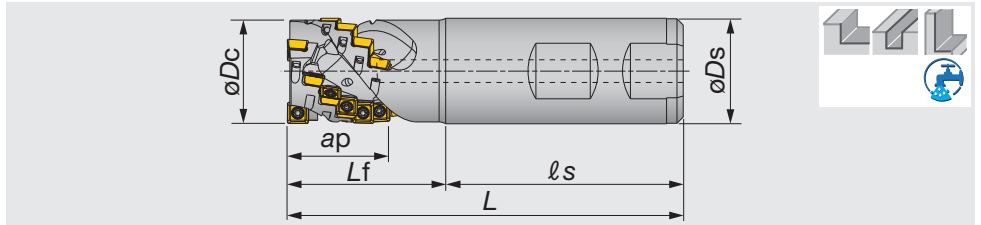


Designation	Clamping screw	Wrench
EPD05...	CSPB-2L043	IP-6DB

ELD05

Extended flute endmill with SDMT/SDHT05 inserts, for roughing operation

A.R. = +5°, R.R. = -3°



Designation	Max. ap	ϕDc	Z eff	z	ϕDs	l_s	L_f	L	Kg	Air hole	Insert
ELD05R020M20.0W02	20.3	20	2	10	20	53	32	85	0.2	with	SD*T0502...
ELD05R025M25.0W03	24.2	25	3	18	25	59	36	95	0.3	with	SD*T0502...

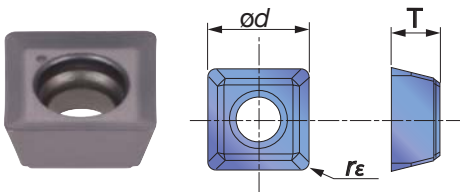
SPARE PARTS



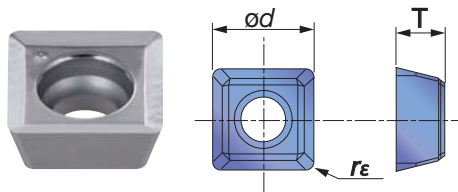
Designation	Clamping screw	Wrench
ELD05...	CSPB-2L043	IP-6DB

INSERT

SDMT05-MJ



SDHT05-AJ



P	Steel	★	★							
M	Stainless	★	☆							
K	Cast iron		★							
N	Non-ferrous			★						
S	Superalloys		★							
H	Hard materials									

★ : First choice
☆ : Second choice

Designation	$r\epsilon$	Max. ap	Coated		Uncoated		T	ϕd
			AH140	AH725	TH10			
SDMT050204FN-MJ	0.4	4	●	●	●		2.38	5.09
SDHT050204FN-AJ	0.4	4			●		2.39	5.09

● : Line up

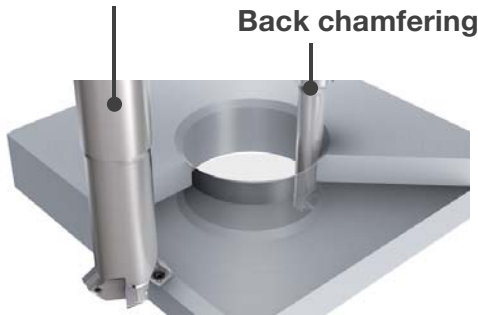
New

Versatile chamfering cutter

TungQuad now offers a chamfering cutter family, which allows the same cutter to handle multiple types of operations like front-/back-chamfering and counter-sinking of holes or along the edges. (for the cutting parameter recommendations, see page 11 and 12)

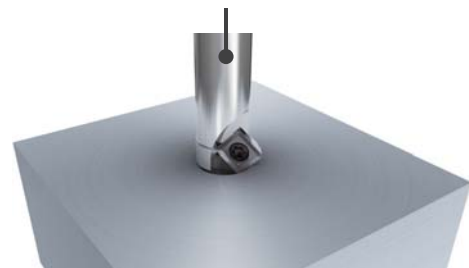
- Minimum workable diameters are $\varnothing 6$ mm for front chamfering and $\varnothing 12.5$ mm for back-chamfering
- Existing SD*T050204 TungQuad inserts are mountable on the cutter, exploiting the insert's free-cutting capability
- Grades available in: AH725, AH140, and TH10

Interpolated chamfering



Back chamfering

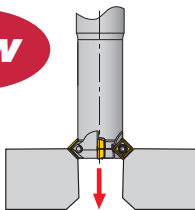
Chamfering & countersinking



CUTTING PERFORMANCE

Chamfering & countersinking

New



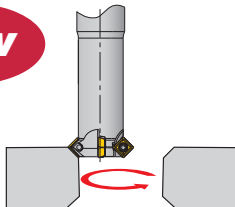
■ For C2.5 (45° x 2.5 mm)

Workpiece material: S55C / C55

Designation	Cutting speed V_c (m/min)	Feed rate f_z (mm/z)
EAD05R006M12.0-01	80 - 120	0.03 - 0.08
EAD05R008M12.0-02	80 - 120	0.03 - 0.08
EASD05M016C16.0R04 (*z=2)	80 - 120	0.03 - 0.08

Interpolated chamfering

New



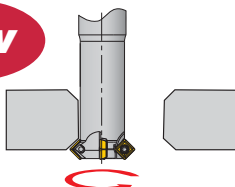
■ For C2.5 (45° x 2.5 mm)

Workpiece material: S55C / C55

Designation	Cutting speed V_c (m/min)	Feed rate f_z (mm/z)
EAD05R006M12.0-01	80 - 120	0.08 - 0.12
EAD05R008M12.0-02	80 - 120	0.08 - 0.12
EASD05M016C16.0R04	80 - 120	0.08 - 0.12

Back chamfering

New



■ For C1.0 (45° x 1.0 mm)

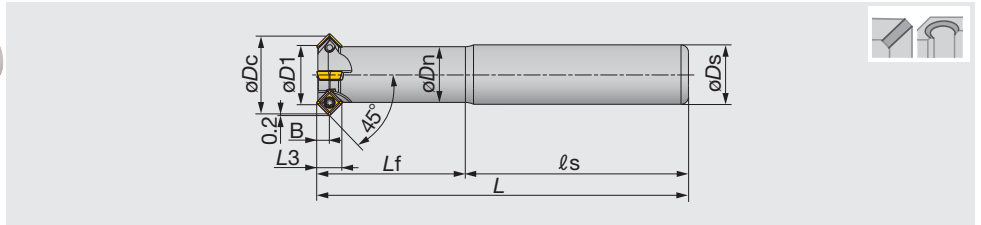
Workpiece material: S55C / C55

Designation	Cutting speed V_c (m/min)	Feed rate f_z (mm/z)
EAD05R006M12.0-01	80 - 120	0.08 - 0.12
EAD05R008M12.0-02	80 - 120	0.08 - 0.12
EASD05M016C16.0R04	80 - 120	0.08 - 0.12

EASD05

Chamfering endmills with SDMT/SDHT05 inserts

New



Designation	ϕDc	z	$\phi D1^*$	ϕDn	B	ϕDs	Lf	L3	ls	L	Insert
EASD05M006C12.0R01	12	1	5.7	7.5	3	12	40	6.8	60	100	SD*T0502...
EASD05M008C12.0R02	14	2	7.8	9.1	3	12	40	6.8	60	100	SD*T0502...
EASD05M016C16.0R04	22	4	15.7	15	3	16	40	6.8	60	100	SD*T0502...

* The minimum chamfering diameter (D1) measures up to the point where the insert's nose radius ends. This will offset the total tool length by shortening 0.3 mm.

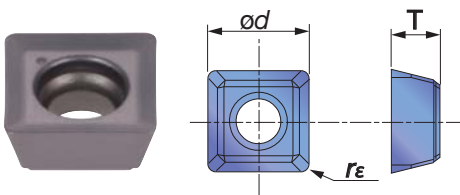
SPARE PARTS



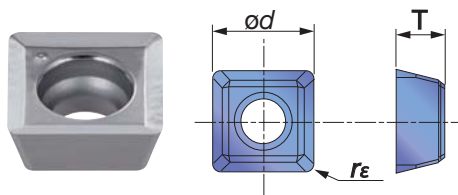
Designation	Clamping screw	Wrench
EASD05...	CSPB-2L043	IP-6DB

INSERT

SDMT05-MJ



SDHT05-AJ



	P	M	K	N	S	H
Steel						
Stainless		★ ☆				
Cast iron			★			
Non-ferrous				★		
Superalloys					★	
Hard materials						

★ : First choice
☆ : Second choice

Designation	$r\epsilon$	Max. ap	Coated		Uncoated		T	ϕd
			AH140	AH725	TH10			
SDMT050204PN-MJ	0.4	4	●	●	●		2.38	5.09
SDHT050204FN-AJ	0.4	4			●		2.39	5.09

● : Line up

STANDARD CUTTING CONDITIONS

■ Bore, shank type TPD05/EPD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steels S15C / C15E4, etc.	~ 200	AH725	230 ~ 320	0.04 ~ 0.1
	High carbon steels S45C / C45, etc.	200 ~ 300	AH725	150 ~ 230	0.04 ~ 0.1
	Alloyed steels SCM440 / 42CrMo4, etc.	150 ~ 300	AH725	150 ~ 230	0.04 ~ 0.1
	Tool steels SKD11 / X153CrMoV12, etc.	~ 300	AH725	110 ~ 130	0.03 ~ 0.09
M	Stainless steels SUS304 / X5CrNi18-9, etc.	-	AH140	100 ~ 200	0.03 ~ 0.09
K	Grey cast irons FC250 / 250, etc.	150 ~ 250	AH725	200 ~ 300	0.05 ~ 0.12
	Ductile cast irons FCD450 / 450-10S, etc.	150 ~ 250	AH725	160 ~ 240	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	-	TH10	350 ~ 500	0.05 ~ 0.15
	Aluminium alloys Si ≥ 13%	-	TH10	100 ~ 200	0.05 ~ 0.15

* For deep and wide cutting, set the Vc and fz to the lower recommended limits and check the vibration and spindle load of the machine.

■ Roughing type ELD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steels S15C / C15E4, etc.	~ 200	AH725	100 ~ 250	0.04 ~ 0.1
	High carbon steels S45C / C45, etc.	200 ~ 300	AH725	100 ~ 200	0.04 ~ 0.1
	Alloyed steels SCM440 / 42CrMo4, etc.	150 ~ 300	AH725	100 ~ 200	0.04 ~ 0.1
	Tool steels SKD11 / X153CrMoV12, etc.	~ 300	AH725	100 ~ 130	0.03 ~ 0.09
M	Stainless steels SUS304 / X5CrNi18-9, etc.	-	AH140	100 ~ 150	0.03 ~ 0.09
K	Grey cast irons FC250 / 250, etc.	150 ~ 250	AH725	100 ~ 250	0.05 ~ 0.12
	Ductile cast irons FCD450 / 450-10S, etc.	150 ~ 250	AH725	80 ~ 200	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	-	TH10	200 ~ 500	0.05 ~ 0.15
	Aluminium alloys Si ≥ 13%	-	TH10	100 ~ 200	0.05 ~ 0.15

New**■ Interpolated or back chamfering type**

ISO	Workpiece material	Grade	Cutting speed V _c (m/min)	Feed per tooth f _z (mm/t)
P	Low carbon steels S15C / C15E4, etc.	AH725	230 ~ 320	0.04 ~ 0.1
	High carbon steels S45C / C45, etc.	AH725	150 ~ 230	0.04 ~ 0.1
	Alloyed steels SCM440 / 42CrMo4, etc.	AH725	150 ~ 230	0.04 ~ 0.1
	Tool steels SKD11 / X153CrMoV12, etc.	AH725	110 ~ 130	0.03 ~ 0.09
M	Stainless steels SUS304 / X5CrNi18-9, etc.	AH140	100 ~ 200	0.03 ~ 0.09
K	Grey cast irons FC250 / 250, etc.	AH725	150 ~ 250	0.05 ~ 0.12
	Ductile cast irons FCD450 / 450-10S, etc.	AH725	100 ~ 180	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	TH10	350 ~ 500	0.05 ~ 0.15
	Copper alloys	TH10	100 ~ 200	0.05 ~ 0.15

New**■ Front chamfering type**

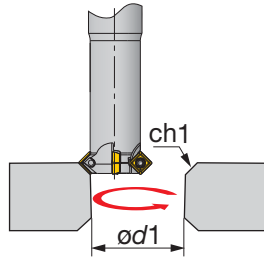
ISO	Workpiece material	Grade	Cutting speed V _c (m/min)	Feed per tooth f _z (mm/t)
P	Low carbon steels S15C / C15E4, etc.	AH725	160 ~ 220	0.04 ~ 0.1
	High carbon steels S45C / C45, etc.	AH725	110 ~ 160	0.04 ~ 0.1
	Alloyed steels SCM440 / 42CrMo4, etc.	AH725	110 ~ 160	0.04 ~ 0.1
	Tool steels SKD11 / X153CrMoV12, etc.	AH725	80 ~ 90	0.03 ~ 0.09
M	Stainless steels SUS304 / X5CrNi18-9, etc.	AH140	70 ~ 140	0.03 ~ 0.09
K	Grey cast irons FC250 / 250, etc.	AH725	110 ~ 180	0.05 ~ 0.12
	Ductile cast irons FCD450 / 450-10S, etc.	AH725	70 ~ 130	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	TH10	250 ~ 350	0.05 ~ 0.15
	Copper alloys	TH10	70 ~ 140	0.05 ~ 0.15

* When chamfering over C1.0 (45° x 1.0 mm), decrease the cutting parameters to 70% of the above parameters.

APPLICATION RANGE

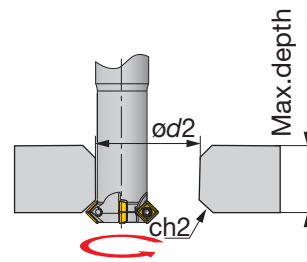
New

Front chamfering



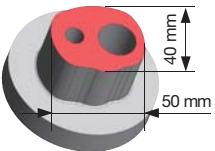
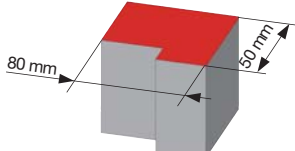
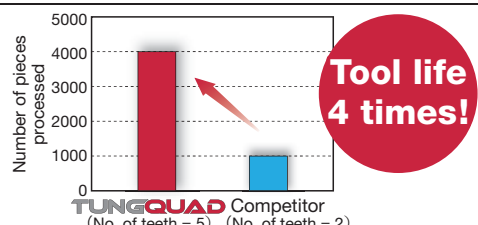
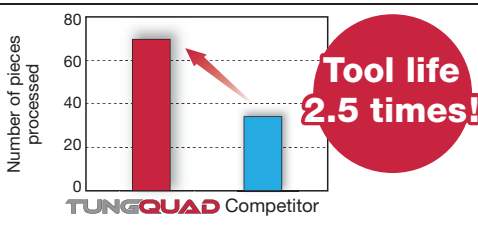
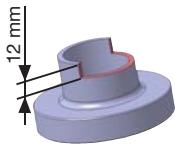
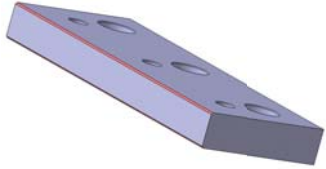
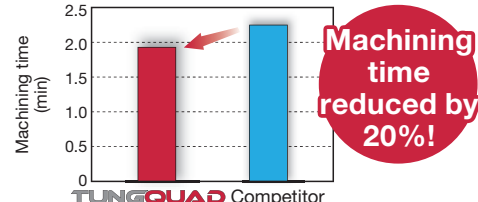
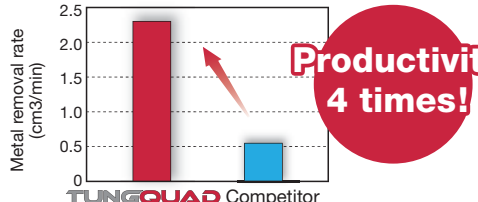
New

Back chamfering

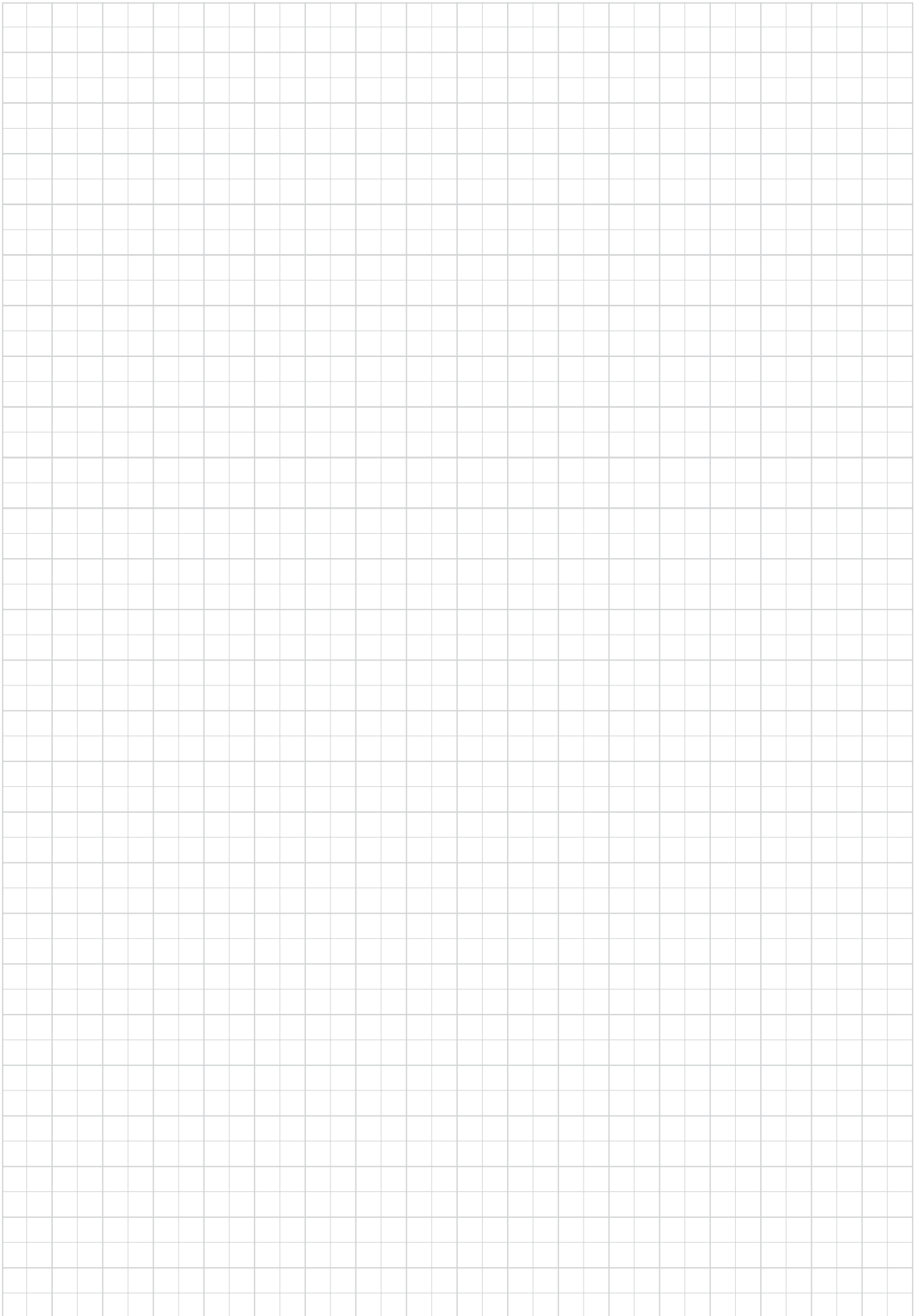


Designation	Minimum hole diameter to be chamfered (mm)		Maximum chamfer dimension (at 45°) (mm)		Maximum reachable hole distance when back chamfering (mm)
	Front-chamfer $\phi d1$	Back-chamfer $\phi d2$	Front ch1	Back ch2	Max. depth
EASD05M006C12.0R01	5.7	12.5	2.9 x 2.9	2 x 2	18.2
EASD05M008C12.0R02	7.8	14.5	2.9 x 2.9	1.5 x 1.5	33.2
EASD05M016C16.0R04	15.8	22.5	2.9 x 2.9	2.8 x 2.8	43.2

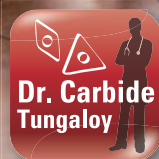
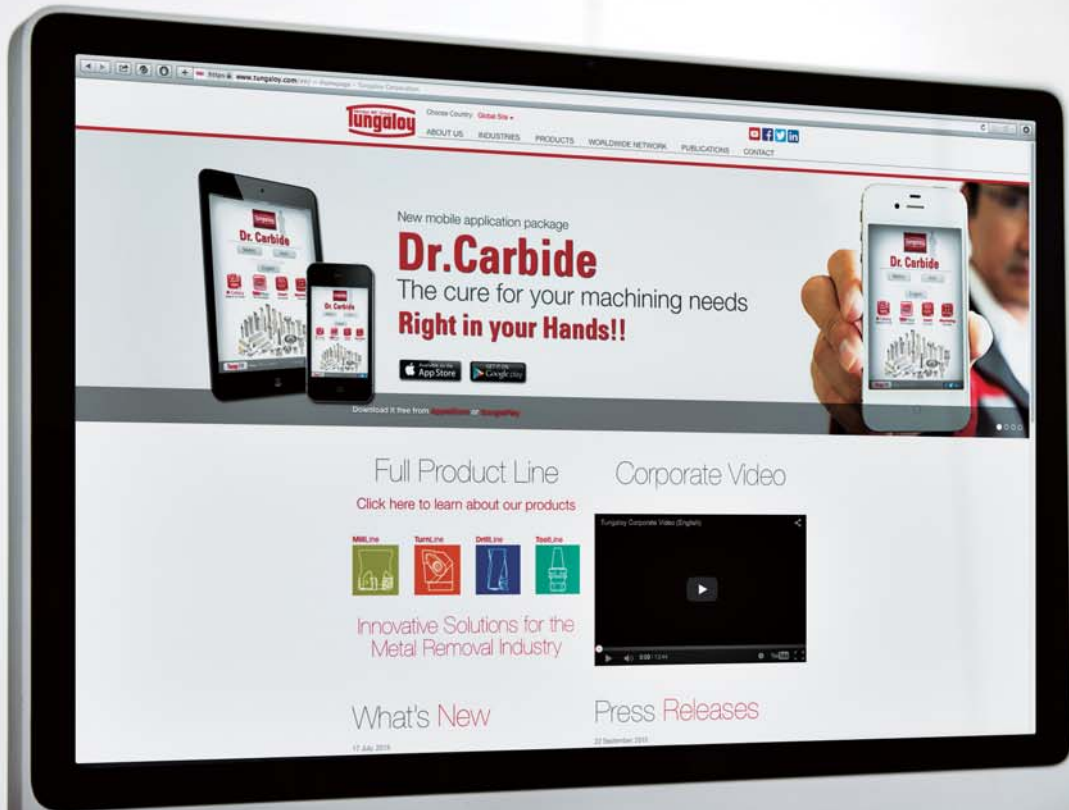
PRACTICAL EXAMPLES

Workpiece type		Compressor parts	Machine parts
Cutter		EPD05R025M20.0W05	EPD05R040M32.0W08
Insert		SDHT050204FN-AJ	SDMT050204PN-MJ
Grade		TH10	AH140
Workpiece material		Aluminium alloys ADC12	Stainless steels SUS304 / X5CrNi18-9
		N	
Cutting conditions	Cutting speed: V_c (m/min)	314	150
	Feed per tooth: f_z (mm/t)	0.08	0.06
	Feed speed: V_f (mm/min)	1500	573
	Depth of cut: a_p (mm)	1	3.5
	Width of cut: a_e (mm)	25	2
	Method of machining	Shoulder milling	Shoulder milling
	Coolant	Wet	Dry
	Machine	BT30	BT40
Results		 <p>Tool life 4 times!</p> <p>Productivity is Doubled! (Feed speed $V_f = 700$ mm/min \rightarrow 1500 mm/min)</p>	 <p>Tool life 2.5 times!</p> <p>No chipping on the edge. Stable machining.</p>
Workpiece type		Cover of machine	Plate
Cutter		ELD05R020M20.0W02 ($\phi 20$, $z = 2$)	EASD05M016C16.0R04 ($\phi 22$, $z = 4$)
Insert		SDMT050204PN-MJ	SDMT050204PN-MJ
Grade		AH725	AH725
Workpiece material		SCM440 / 42CrMo4	SS400 / E275A
		P	
Cutting conditions	Cutting speed: V_c (m/min)	100	100
	Feed per tooth: f_z (mm/t)	0.07	0.1
	Feed speed: V_f (mm/min)	230	580
	Depth of cut: a_p (mm)	12	2
	Width of cut: a_e (mm)	6 x 3 passes	2
	Method of machining	Shoulder milling	Chamfering along the edge
	Coolant	Wet	Dry
	Machine	Multi-axis machine BT40	Vertical M/C, BT40
Results		 <p>Machining time reduced by 20%!</p> <p>Higher productivity achieved than with competitor's solid end mills. Reduction of inventory due to the reduction of regrinding costs.</p>	 <p>Productivity 4 times!</p> <p>The number of the TungQuad inserts is fourfold the competitor's cutter. The MRR was therefore four times higher.</p>

MEMO

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

Check our site and our App to get more info!



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