



Lightweight HSC milling cutter for a perfect surface finish
FLYCUTTER – SYSTEM ECO





MAPAL FlyCutter – System Eco

The FlyCutter series represent a new dimension in face milling for HSC operations. The series includes numerous innovations. By using replaceable milling cartridges the reduction in logistics costs from handling is impressive, likewise the positioning of the milling blade in the aluminium tool body. Centrifugal forces which occur during machining are compensated for by a precision dovetail guide.

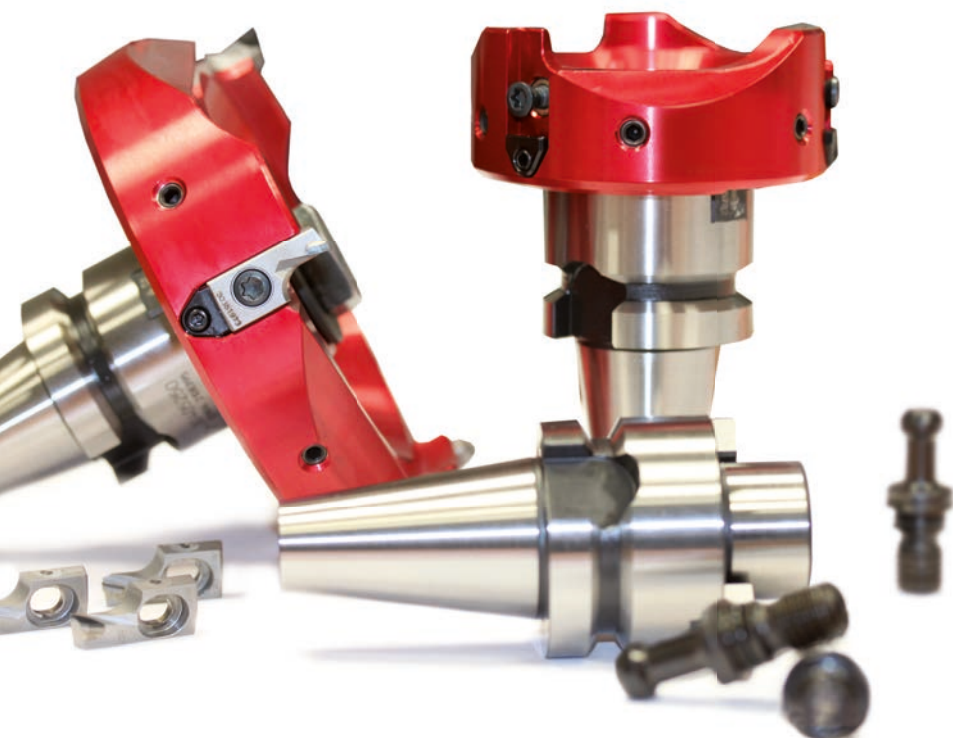
The new arrangement of the milling blades with integral swarf protection plate clearly increases the life of the milling cutter body. Perfect surface finish is achieved with this milling cutter as a result of the sensitive and effective wedge adjustment on the blades in the Z direction. Initially designed for finishing operations, this milling head is notable for extremely quiet running which it easily achieves despite the high feed rates.





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FlyCutter

Modular system + perfect finish

For this modular system all the components have been matched. All different milling head diameters can be mounted on the same milling cutter arbor to suit the size of your part.

The selection of the PCD milling cartridges is dependent on the part or on the surface to be produced.

The milling cartridges are very easy to change and can be adjusted axially to the μm . You will find an appropriate setting fixture on page 11.

The FlyCutter was specially developed for very soft, long-chipping aluminium.

This system with its PCD milling cartridges demonstrates its abilities during finishing even on thin-walled parts. Due to the special cutting geometry, the part is machined without any stress whatsoever; as a result no stresses are produced in the part and deformation of the part is also prevented.

The low cutting forces also permit the machining of vacuum-clamped parts.

The specially developed large chip spaces on the milling cartridges and the milling heads ensure, particularly with long-chipping aluminium, that the chips produced are quickly transported away from the surface to be machined.

The weight reduction achieved during the development of this milling head system now also permits the usage of larger diameters on small machines without exceeding the weight limit.

The milling cartridges are very easy to set using a wedge. The finely balanced components guarantee extremely quiet operation. MAPAL FlyCutters can therefore withstand high spindle speeds, significantly reducing machining time.

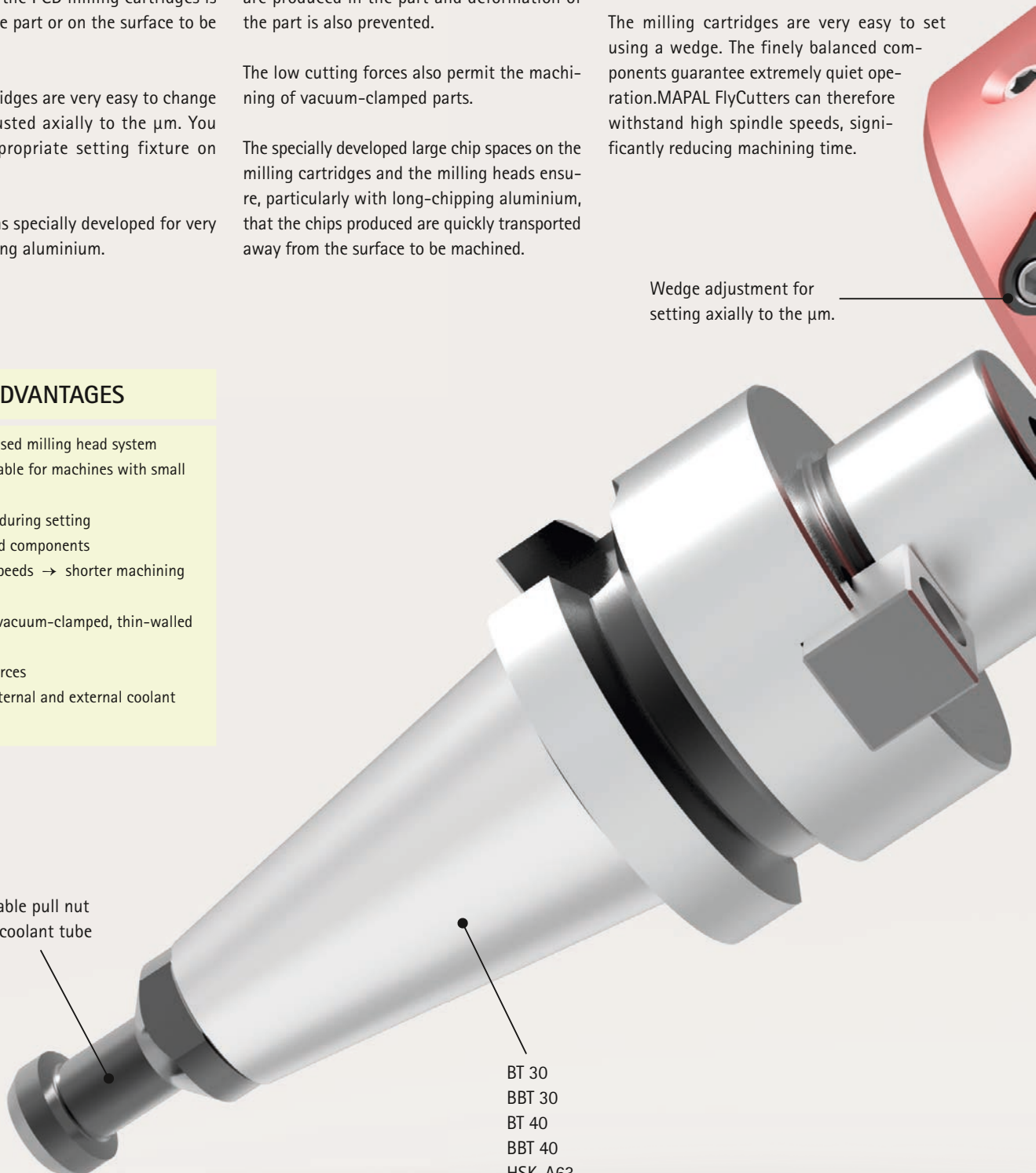
Wedge adjustment for setting axially to the μm .

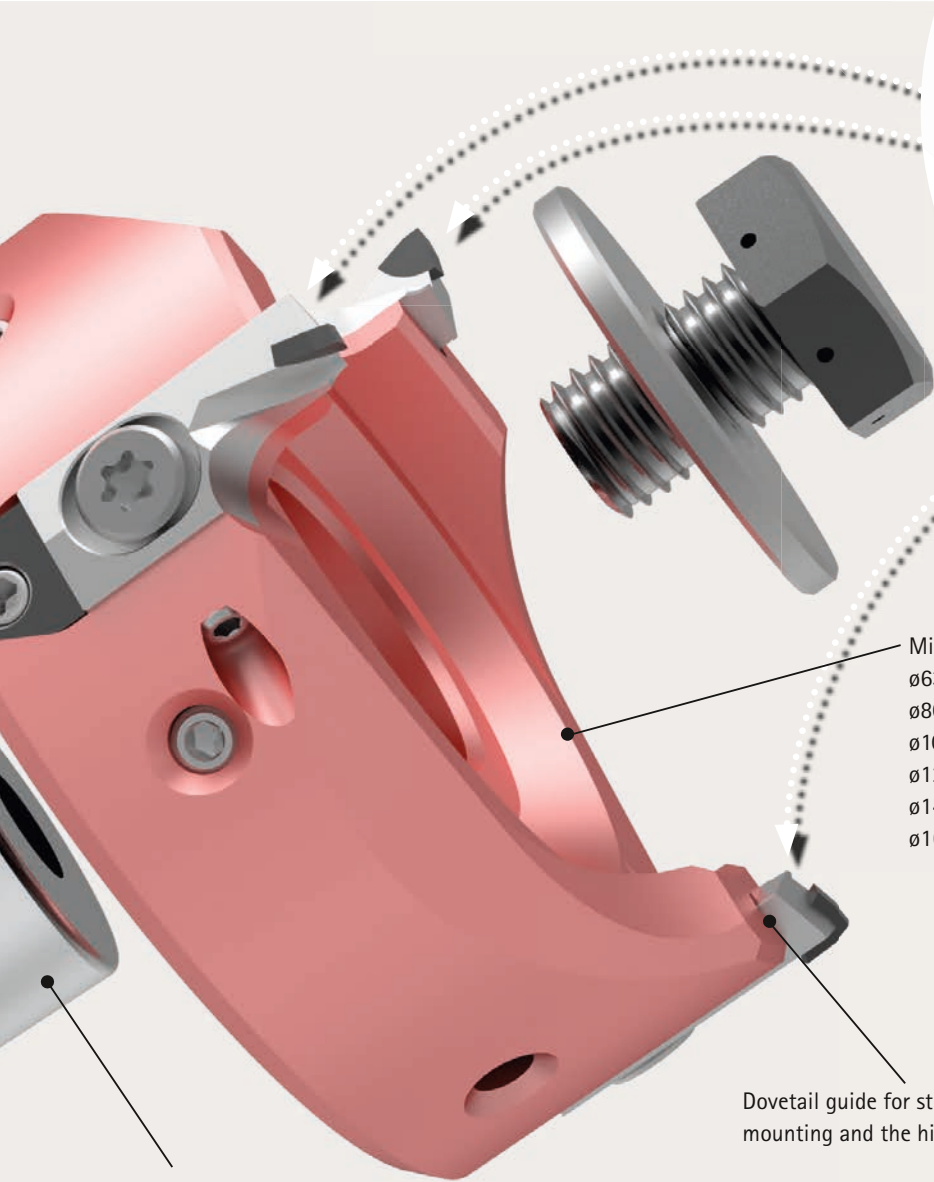
ADVANTAGES

- Weight-optimised milling head system
- Especially suitable for machines with small BT 30 spindles
- Easy handling during setting
- Finely balanced components
- High spindle speeds → shorter machining times
- Machining of vacuum-clamped, thin-walled parts
- Low cutting forces
- Suitable for internal and external coolant supply

Suitable pull nut and coolant tube

BT 30
BBT 30
BT 40
BBT 40
HSK-A63





Milling head diameter
 ø63
 ø80
 ø100
 ø125
 ø140
 ø160

Dovetail guide for straightforward mounting and the highest safety standard

ø27 mm for all heads



PCD milling cartridges with positive cutting geometry, for low cutting forces
 → brilliant for „soft“ long-chipping aluminium



FlyCutter

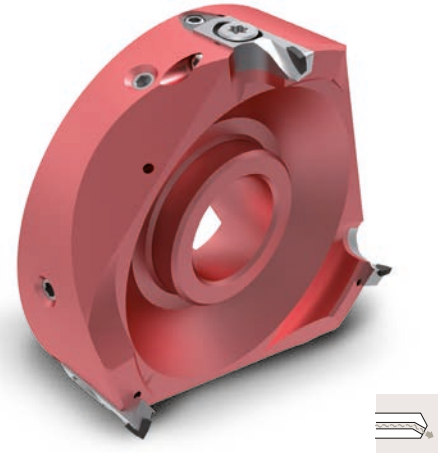
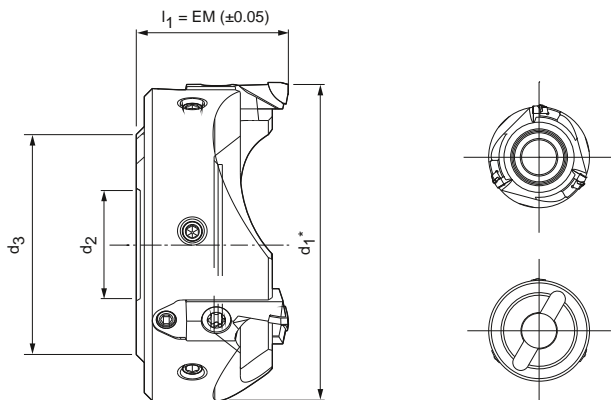
Internal coolant

Design:

Milling cutter diameter: 63.0 - 160.0 mm

No. of blades: 3 - 4

Coolant supply: internal

**Aluminium tool body**

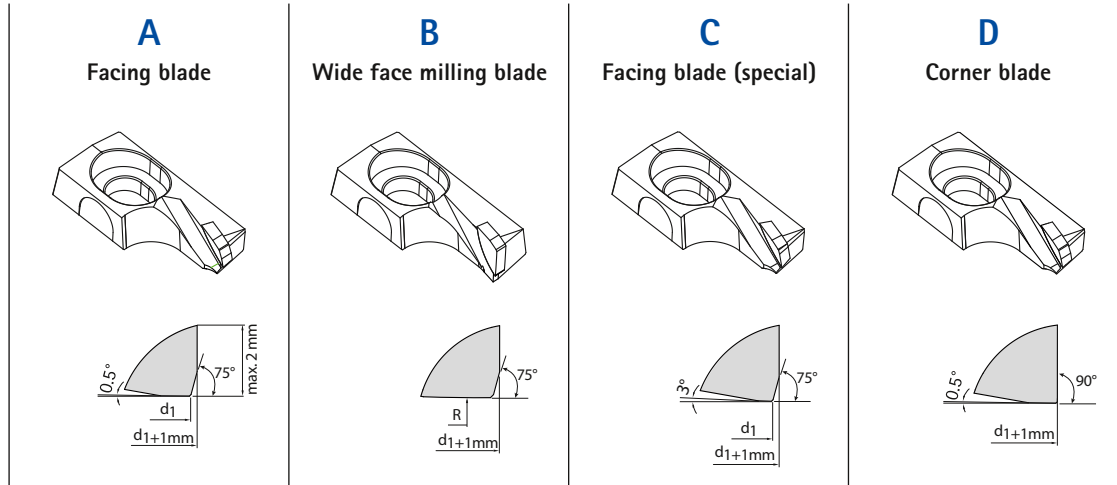
Dimensions				No. of blades z	Weight incl. milling cart- ridges (kg)	Spindle speed max. (min ⁻¹)	Specification	Order No.
d ₁ *	d ₂	d ₃	l ₁					
63	27	55	42	3	0.220	33.000	CFM901-063-CA27-Z03R-FMC-A	30772751
80	27	59	38	3	0.299	33.000	CFM901-080-CA27-Z03R-FMC-A	30388951-200
100	27	59	38	3	0.418	30.000	CFM901-100-CA27-Z03R-FMC-A	30381973-200
125	27	59	38	3	0.627	25.000	CFM901-125-CA27-Z03R-FMC-A	30388952-200
140	27	59	38	4	0.800	23.000	CFM901-140-CA27-Z04R-FMC-A	30466716-200
160	27	59	50	4	1.469	21.000	CFM901-160-CA27-Z04R-FMC-A	30508209

Dimensions in mm.

* d₁ depends on type of milling cartridge, see page 7.

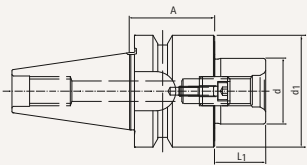
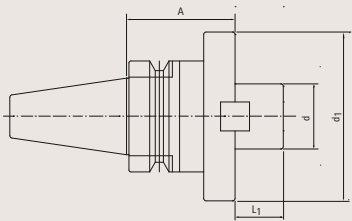
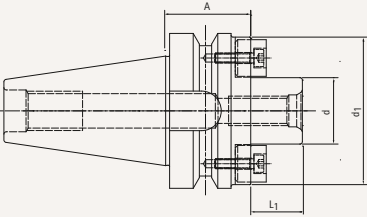
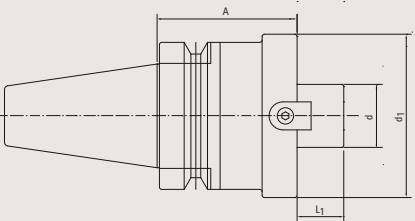
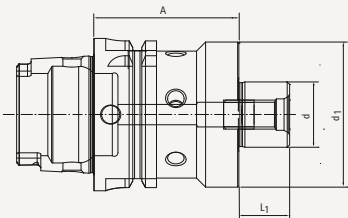
Milling Cartridges for MAPAL Face milling heads

From the FlyCutter - System Eco



Type	Top rake	Depth of cutting max.	Cutting material	Height	Weight (g)	Specification	Order No.
A	15°	2	PCD	26.5	6.9	FMC-751-0-PU611	30410278-300
B	10°	1	PCD	26.5	6.9	FMC-841-0-PU611	30410278-301
C	15°	2	PCD	26.5	6.9	FMC-754-0-PU611	30410278-302
D	15°	1.5	PCD	26.5	6.9	FMC-651-0-PU611	30410278-303

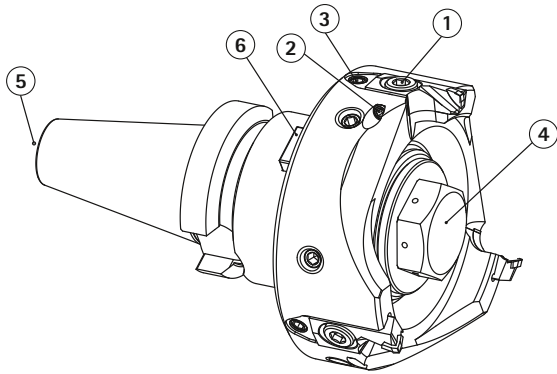
Milling cutter arbors

Picture	Nominal Size	Dimensions				Weight kg	Order No.
		d	d ₁	A	L ₁		
	BT30	27	46	35	21	0.7	50016666
	BBT30	27	70	45	20	1.0	30487186
	BT40	27	60	35	21	1.4	10073630
	BBT40	27	70	60	20	2.0	30475457
	HSK-A63	27	60	60	21	1.3	10066803

Dimensions in mm.

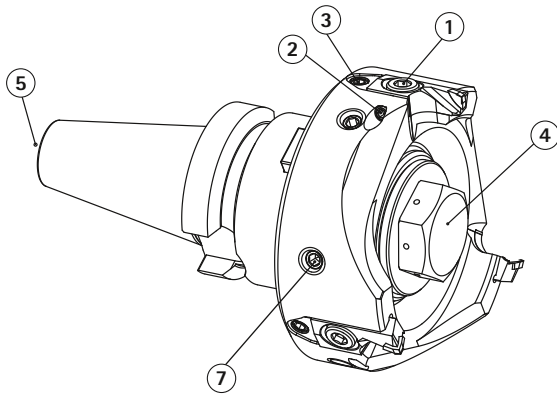
Holding screw and washer are not included → see page 9 | No. 4

Accessories and Spare parts



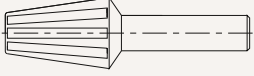
No.	Picture	Description	Size	Shank type	Order No.
①		Socket head screw	M5x8 TORXx25		30499981
①		Socket head screw	M5x8 DIN6912		30454362
②		Threaded spindle	M4x6		30367364
③		Adjusting wedge	M5x0.5		7-03002-05
③		Threaded spindle	M5x0.5		7-03002-04
④		Washer for holding screw	ø12.5 / ø36.0		30381973-600
④		Holding screw	M12		30772751-600 (ø 63) 30381973-601 (ø 80-160)
⑤		Coolant tube HSK-A63	M18x1	HSK-A63	30326006
⑤		Tightening bolt	M12	BT30 / BBT30	10017954
⑤		Tightening bolt	M12	BT30 / BBT30	10066211
⑤		Tightening bolt	M16	BT40 / BBT40	10022405
⑤		Tightening bolt	M16	BT40 / BBT40	10018129
⑥		Drive key		BT30	50016666-600
⑥		Drive key		BT40 / HSK-A63	10005165
⑥		Hexagon socket head cap screw		BT30 / BT40 / HSK-A63	10003586
⑥		Drive key		BBT30 / one set (2pcs.)	30487219
⑥		Drive key		BBT40 / one set (2pcs.)	30479114
⑥		Hexagon socket head cap screw		BBT30 / BBT40 / one set (2pcs.)	30479115

Assembly tools

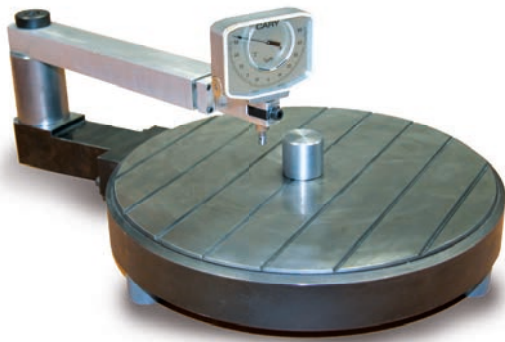


No.	Picture	Description	Size	Torque	Shank type	Order No.
①		Hexagonal insert	SW4			30462241
①		torque wrench		4Nm		10103019
①		Hexagonal insert	SW4			30468446
①		torque wrench		8Nm		30462219
①			SW4			30493727
①		Torx insert	25			30500491
②		Hexagonal insert	SW2			10044838
②		torque wrench		3Nm		10103019
③		wrench	SW2,5			10006233
④		socket wrench with internal hexagon 24	SW24			30478313
④		torque wrench		70Nm (ø 63) 80Nm (ø 80 - 160)		30475667
⑤		wrench	size 19		BT40 / BBT40	30394090
⑤		torque wrench		80Nm	BT40 / BBT40	30475678
⑤		wrench	Size 13		BT30 / BBT30	30376392
⑤		torque wrench		25Nm	BT30 / BBT30	30462224
⑤		wrench	ø17		HSK-A63	10040110
⑦		wrench	SW3			10006234

Cleaning utensils

No.	Picture	Description	Cone	Order No.
		Cone cleaner	BT30	10013439
			BT40	10013427
			HSK-A63	30325983

MAPAL Measuring Equipment



Description	Mandrel d	Order No.
Setting device for all dimensions	27	30486767

Handling notes

for FlyCutter - System Eco

Easy handling for high precision results

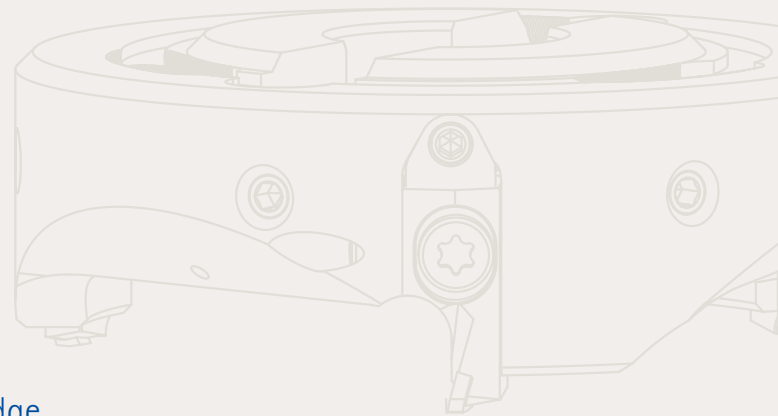


Based on this technology, a new type of wedge adjustment was developed for the EcoMill series. Here the adjusting element has a wedge-shaped surface which lies directly against the milling cartridge. By turning the right-hand and left-hand threaded spindle the axial running can be effortlessly set within the required high-precision range. Combined with the easy handling, the accuracy to be achieved surpasses all the previous results.

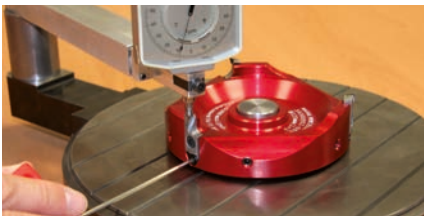
High precision fine adjustment

The basis for perfect finish machining of a milled surface is the exact axial setting of all the blades to maximum precision. This factor was given particular attention when designing the PowerMill and EcoMill series. While with conventional face milling cutters, whose technology is often based on clamped blades, these have to be positioned in 3 planes in relation to each other, here setting in one direction is quite sufficient.

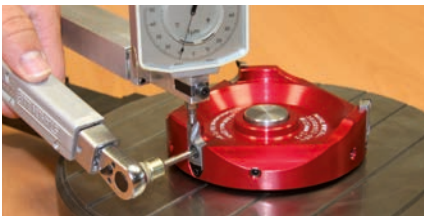
A decisive factor for this is the precision with which the milling tool body and also the milling cartridges are themselves manufactured. Costly setting devices, time-consuming setting procedures and expensive setting equipment are not required. One setting fixture, whose construction is designed for the primary requirement, plus a precision indicator, is quite sufficient.



System Eco – fine adjustment with adjusting wedge



- Position face milling head in setting fixture
- Fit milling cartridge with holding screw onto tool body
- Fasten the safety screw slightly first
- Fasten the holding screw at 4Nm
- Preadjust the cartridge with the adjusting wedge



- Tighten the holding screw at 8Nm
- Tighten the safety screw at 2Nm



- Finely adjust milling cartridge with the adjusting wedge

MAPAL Competence - Face milling

FlyCutter machining example



Thin-walled aluminium housing

Material	AlSi0
Tool	MAPAL WWS FlyCutter $\varnothing 100$
Inserts	3x PCD facing blade
Requirement	Ra < 0.2
Cutting depth	0.5 mm
Result	Improving the flatness of more than 1/4 compared with conventional cutters. Reduction of cutting force and power consumption by 1/3 each.



Machining values

Spindle	BT30
Spindle speed	n = 10.000 rpm
Feed per tooth	f _z = 0.027 mm



MAPAL Maintenance Services – reconditioning for face milling heads

Considerable cost savings thanks to reliable, fast and precise reconditioning

For machining, customers must be able to rely on their tools, particularly after a regeneration, over the entire process. Cleanliness, care and precision are the essential factors that MAPAL focuses on for reconditioning the milling heads. With reconditioning in original quality and milling head

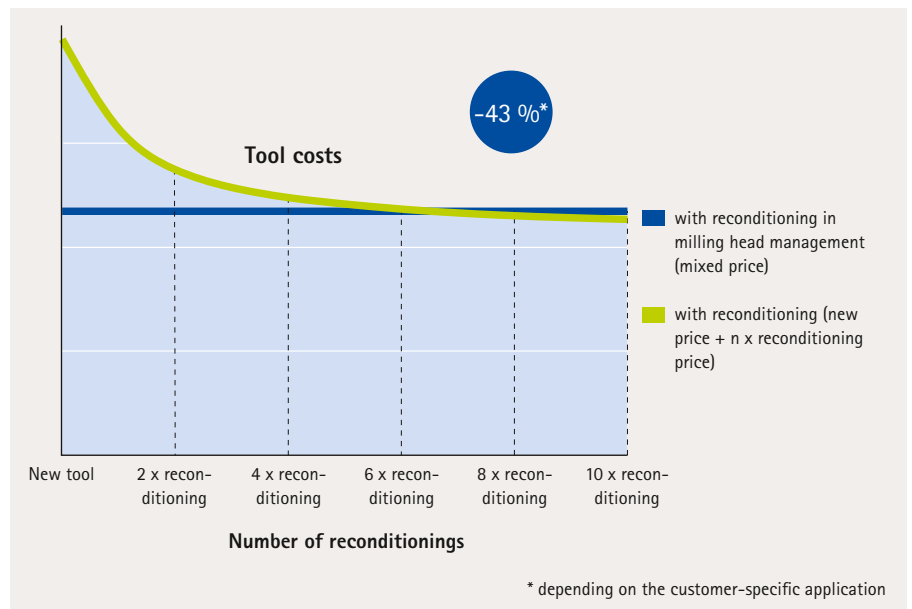
management, MAPAL offers two reconditioning systems for face milling heads that guarantee precise and reliable tools with the full performance range. Through each reconditioning, the life of tools is significantly extended and costs for new tools are saved. The customer receives

tools that are immediately ready for use and that easily reach the already known tool life. The tools are picked up from or delivered directly to the customer via a parcel service. The standardised process ensures uncomplicated and fast processing within a maximum of five days.

ADVANTAGES

- Increased tool life
- Reduced tool costs
- Operational tools in original quality
- On-time pick-up and delivery
- Increased process reliability
- Reduction of capital commitments*

* in conjunction with milling head management





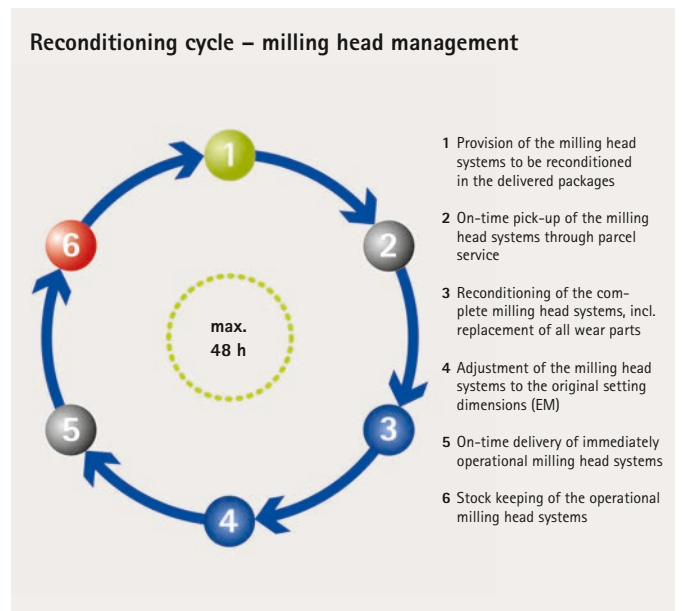
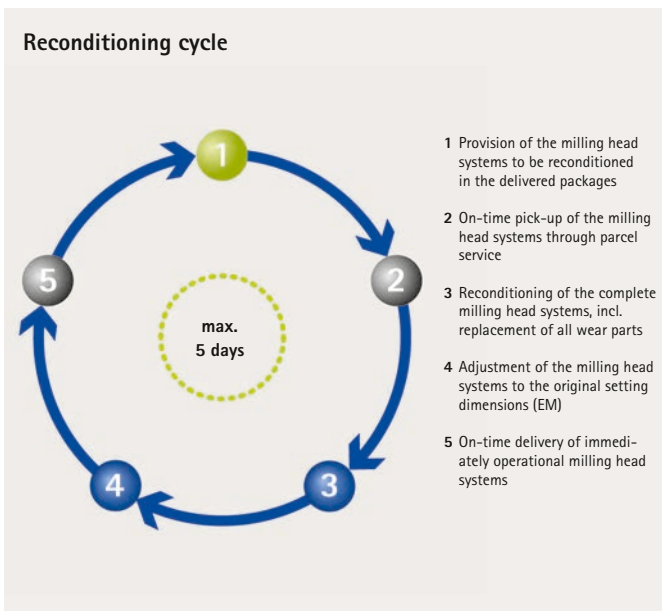
Reconditioning in original quality

After dismantling, MAPAL thoroughly cleans the tools, wear parts are replaced and the system is built up again from the ground up. Worn milling inserts go through a repair cycle and the tool is refitted with stockable, regenerated blades. After assembly with the appropriate milling cutter receptacle, the milling inserts are adjusted to the original setting dimension (EM). Within 5 days the customer receives tools that are immediately ready for use and that easily reach the already known tool life.



Milling head management

Milling head management includes stock keeping in addition to the reconditioning in original quality. Customers profit from 24 h tool availability at the implementation site, as well as reduced capital commitments. Billing is based on withdrawal at a calculated mixed price. The customer maintains full cost control. Expensive procurement costs for new tools are dispensed with. Bottlenecks due to tool availability are a thing of the past. Through a customer agreement, a specific workflow is defined that enables delivery times of a maximum of 48 hours.



Comment: As a technology partner, MAPAL supports you in selecting the optimal reconditioning process for your specific machining case.



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