

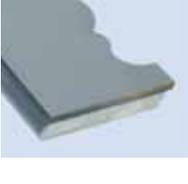
Profile tool systems

Leitz Lexicon Edition 7





10. Profile tool systems

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Profiling with Leitz: The perfect solution for every application

The market requirements for profile tool systems are diverse. On one hand, high numbers of the same parts, on the other small batches of customised products. A company cannot be expected to have a complete tool set for each profile, even less if the tool service life exceeds the life of the profile. The right tools are needed for efficient production. Whether windows, doors, furniture boards or panels – Leitz provides you with the perfect solution for every application.

Field of application and features	ProFix-Plus	ProFix F	ProFix C	ProfilCut Q, ProfilCut Q Premium	ProfilCut Q Diamond	ProfilCut-Plus	Vari-Form	PowerKnife System PKS®
Preferred applications	Furniture, windows, doors, panels, glue-joint profiles	Furniture, windows, glue-joint profiles	Windows, doors	Furniture, windows, doors, panels	Advanced Materials, furniture, windows, doors, panels	Furniture, windows, doors, panels	Furniture, panels	Panels, mouldings
Prototypes, samples, small series							•	•
Small and medium series				•	•	•	•	•
Medium and large series	•	•	•	•	•	•		•
MAN feed for spindle moulders				•	•	•	•	
MEC feed for continuous feed and machining centres	•	•	•	•	•	•	•	•
Multi-purpose profiles	•	•					•	•
High-speed delivery programs for customised profiles				•			•	•
Sharpenable	•	•	•		•	•	•	•
Diameter and constant profile	•	•	•	•	•			
Set tools with staggered cut for processing suitable material	•		•	•	•	•		
Aluminium design	•	•	•	•	•	•		
Combinability with other Leitz tool systems	•	•	•	•	•	•		

ProFix-Plus

The high-performance profile tool system for industrial applications. Lowest operating costs for high volumes. Can be resharpened with constant profile and constant diameter. Highly precise repeatable process, hence no adjustment after knife replacement.

ProFix F

Combination with planing cutterhead. Free choice of axial position. Multi-purpose tool body.

ProFix C

Complementing the sharpenable ProFix-Plus constant tool system for slot and tenon joints and as counter profiles.

ProfilCut Q, ProfilCut Q Premium

Multi-functional profile tool system for a perfect finish. Standardised clamping system for profile and turnblade knives.

ProfilCut Q Diamond

Combination of an aluminium tool body and sharpenable diamond profile knives with constant diameter.

ProfilCut-Plus

Sharpenable version of ProfilCut, but not constant in profile or diameter.

VariForm

Modular profile tool system for all applications with excellent value-for-money-ratio. For prototype, individual or small series production.

PowerKnifeSystem (PKS®)

The compatible tungsten carbide knife system for multi-purpose cutterheads with serrated back knives.

10. Profile tool systems

10.2 ProFix constant tool system

10.2.1 ProFix-Plus

**More efficient, more powerful,
more multi-purpose**

ProFix-Plus is unique worldwide. A system leaving nothing to be desired.

Using the same knives in several tool bodies allows production of exactly the same profile on continuous and stationary machines. The possibility to quickly change any profile in one body enables production of repeat profiles on the same line efficiently.

The construction design principle – resharpenable knives yet with the same profile – make tool dimension measurements and machine setting adjustments unnecessary. Production instead of proving.

ProFix-Plus is a pace-setting solution of the future. Its system variability offers technical, quality and economic advantages in production of panels, doors, windows, staircases and furniture, and interior and external construction.



10. Profile tool systems

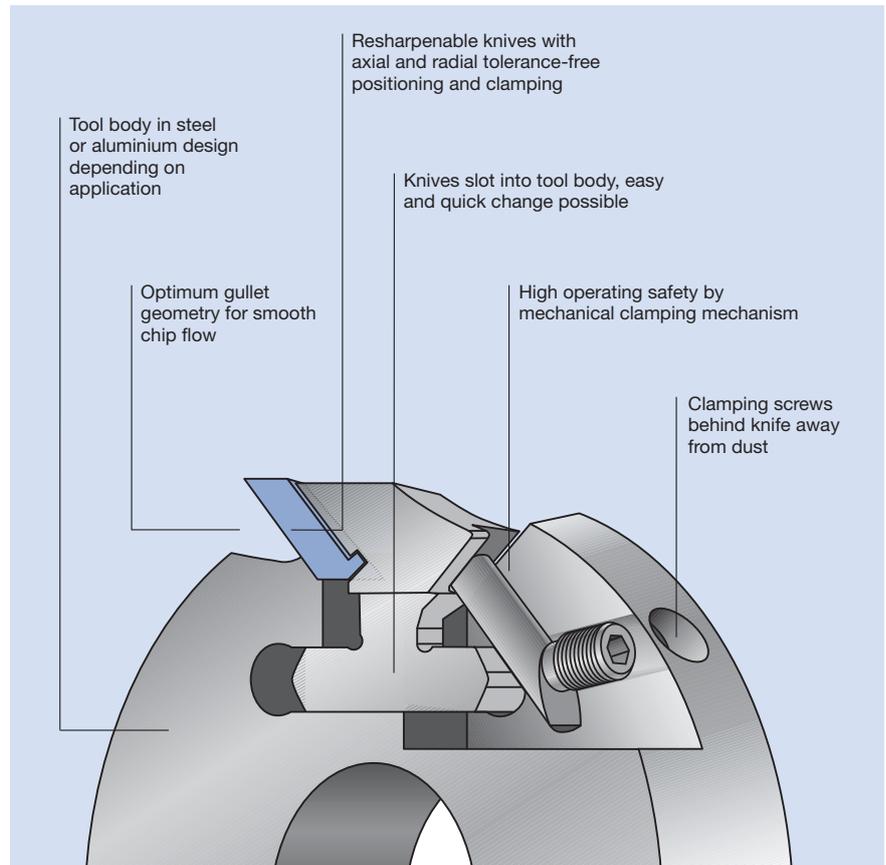
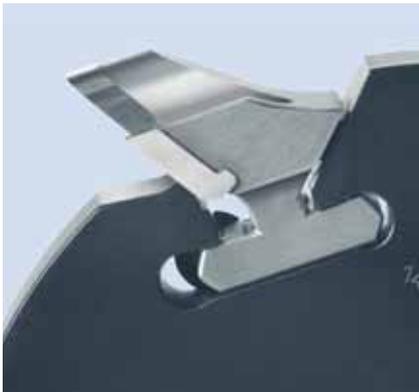
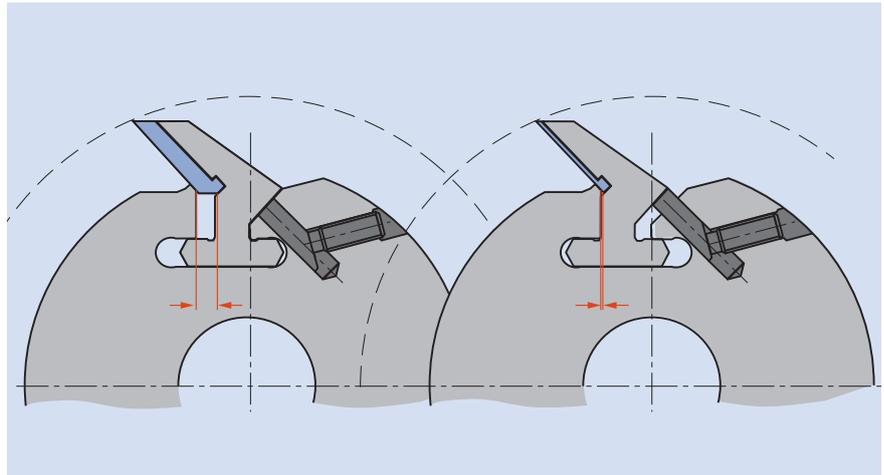
10.2 ProFix constant tool system

10.2.1 ProFix-Plus

The unique construction design principle

ProFix is different from all other multi-purpose profile tools. Its unique profile and diameter precision are guaranteed, despite repeated sharpening and varying knife thicknesses from the beginning to the end of its life. The patented slot guides the knife to the face stop and is clamped in place when the sharpened knife is inserted into the tool body.

The knives are securely fixed in the tool body T-slot and clamped radially by the centrifugal force.



10. Profile tool systems

10.2 ProFix constant tool system

10.2.1 ProFix-Plus

The exemplary variability...

Only a small selection from the wide range of products possible with the modular ProFix-Plus system. Same knives with different cutting geometries, used in several tool bodies depending on the type of machine allow for a diversity; no other tool system can offer such high efficiency. The basic principle of technology and multi-purpose and the design spectrum fulfil the customer requirements for cutting geometries and cutting materials matched to the needs of shape and specific materials.

ProFix-Plus enhances the manufacturing options and, at the same time, reduces production processes and set-up times. Last but not least, ProFix-Plus improves the processing quality and increases the overall efficiency.



ProFix knives are available as PF 20 profile depths up to 20 mm, and as PF 25 profile depths up to 25 mm. The cutting widths range from 12 mm to 120 mm. Depending on the application different cutting angles are available:

- 25° for softwood and cross grain processing
- 20° for hardwood and mixed wood processing
- 15° for panel materials and for splintery wood.



10. Profile tool systems

10.2 ProFix constant tool system

10.2.1 ProFix-Plus

...and easy handling

The ProFix-Plus system is characterised by ease of use and product quality! The advanced ProFix-Plus profile knives give excellent cutting quality. The special Leitz reptile ground finish, with the polished finish cutting face, produces razor-sharp cutting edges.

The knives can be resharpened. No setting gauges or special tools are required to change the knives. Machine corrections, usually necessary after resharpening, are a thing of the past. ProFix operators do not need a projector to measure the tools. Test pieces to check the workpiece dimensions are no longer necessary. Production instead of proving.

Loosen the clamping screw, remove and re-insert the knife. Tighten the clamping screw – the knife change is completed quickly and precisely.



The ProFix-Plus knife for profile depths of 20 and 25 mm. Reptile ground finish and mirror finish cutting face result in razor-sharp cutting edges.



10. Profile tool systems

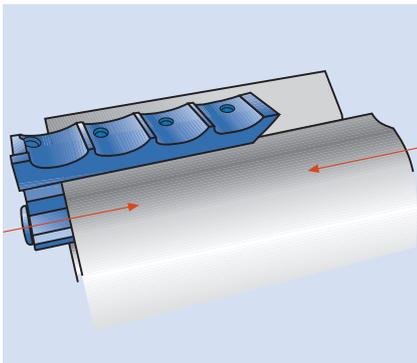
10.2 ProFix constant tool system

10.2.1 ProFix-Plus

ProFix F – for greater flexibility

The supplement F means increased flexibility. New ProFix profile knives in different tungsten carbide qualities allow for varying cutting widths up to 100 mm in one tool body. Moreover, the profile knives can be positioned any place on the tool body. The profile construction based on a constant zero diameter reduces machine set-up after profile change.

ProFix F is the perfect solution for any four-sided moulder applications, double-
ending tenoner or stationary overhead routers with frequently profile changes.



Knife insertion in the machine possible from left or right.



ProFix F incorporates a VariPlan moulding cutterhead, e.g. of manufacturing door frames of different widths etc.

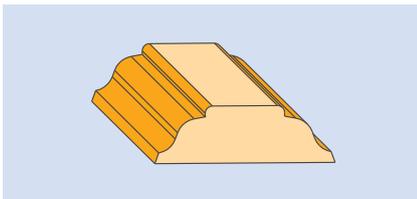
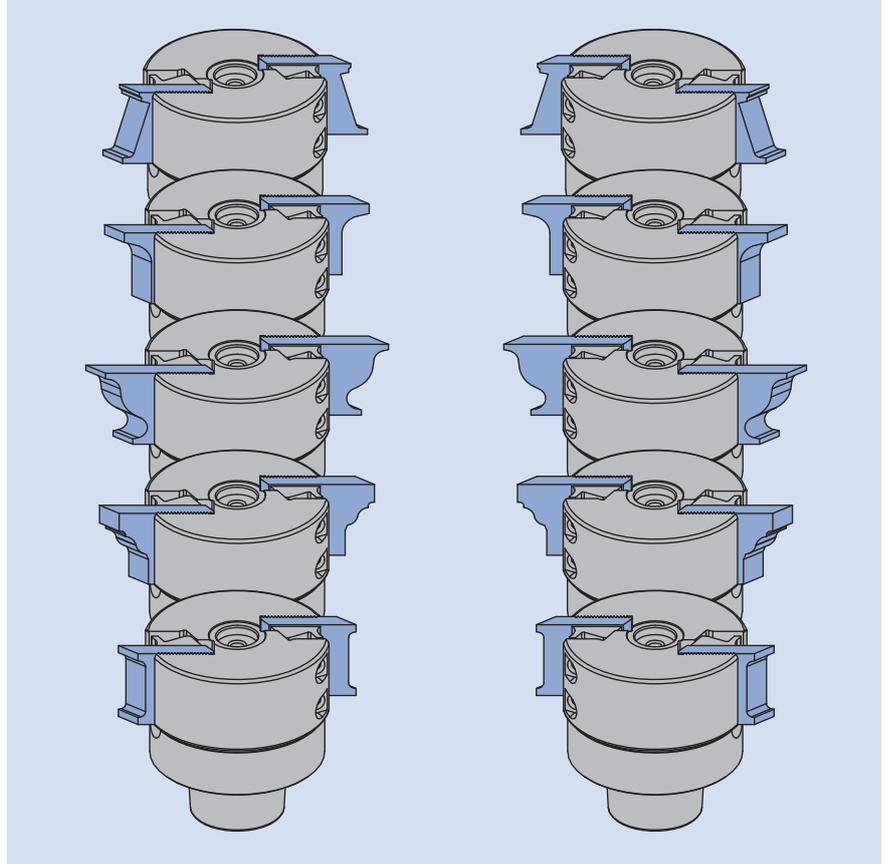
10. Profile tool systems

10.2 ProFix constant tool system

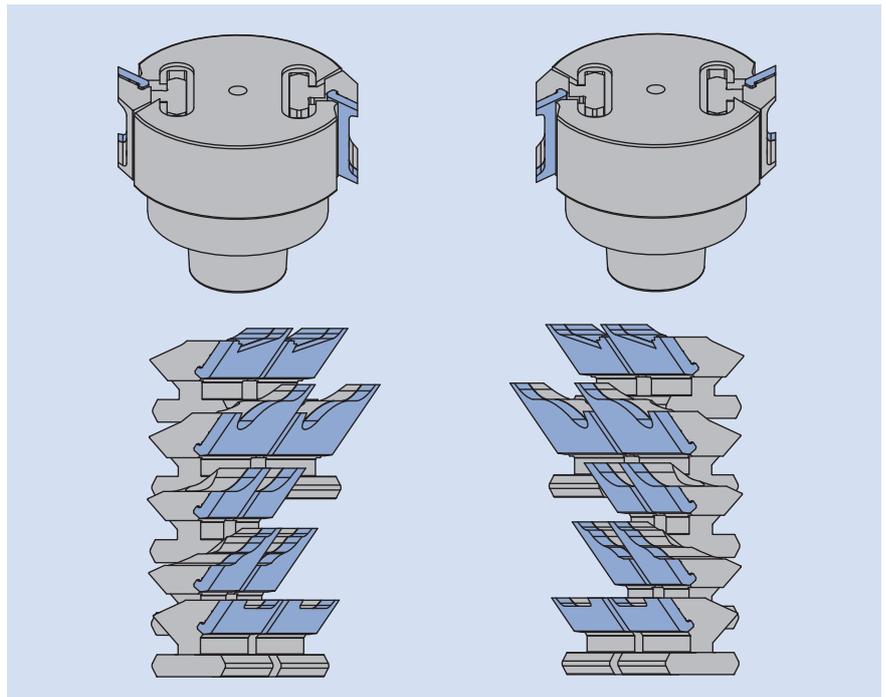
10.2.1 ProFix-Plus

ProFix reduces the tool changer

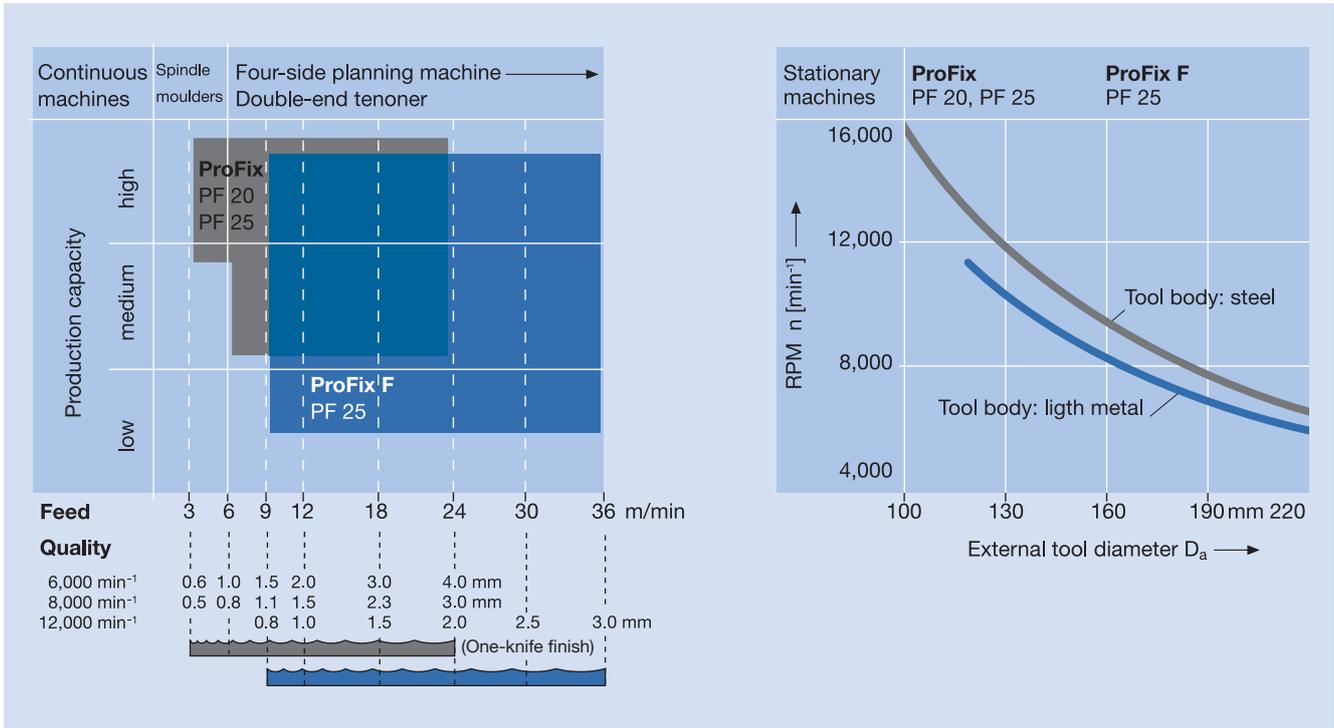
Compared to conventional profile cutterheads made to a unique profile, ProFix reduces the number of tools in the magazine. Only profile knives instead of complete tools are required. The design allows for precise profile replacement in the tool without set-up or measuring.



Example strip production:
Stockage of ProFix profile knives
instead of complete profile tools.



ProFix-Plus Overview



Performance data	Unit	ProFix PF 20		ProFix PF 25	ProFix F
		Tools with shank	Tools with bore	Tools with bore	Tools with bore
Profile depth max.	mm	20	20	25	25
Cutting width min./max.	mm	12-45	12-80	12-100	20-100
Sharpening range	mm	4	4	5	5
Cutting speed max.					
– steel tool body	m/s	80	80	80	80
– aluminium tool body	m/s	–	70	70	70
Concentricity	mm	0.05	0.05	0.05	0.05
Cutting angle min./max.		15°-25°	15°-25°	15°-25°	15°-25°
Shear angle from/to		0°	0°-20°	0°-25°	0°
Side relief angle		0°	0°	0°	0°
Angular knife seating		–	8°	8°	–

Applications

For processing all common materials, including solid wood, panels and compound materials, as well as complete synthetic materials.

For producing panels, furniture, doors, windows and staircases interior and external construction.

On all machines, CNC overhead routers and machining centres, four-sided moulders, hydro moulders, double-end tenoners.

Special features

Only multi-purpose tool system with resharpenable profile knives and guaranteed profile and diameter constancy.

Repeatable profile manufacture without tool measurement, test cutting or machine adjustment.

High overall efficiency.

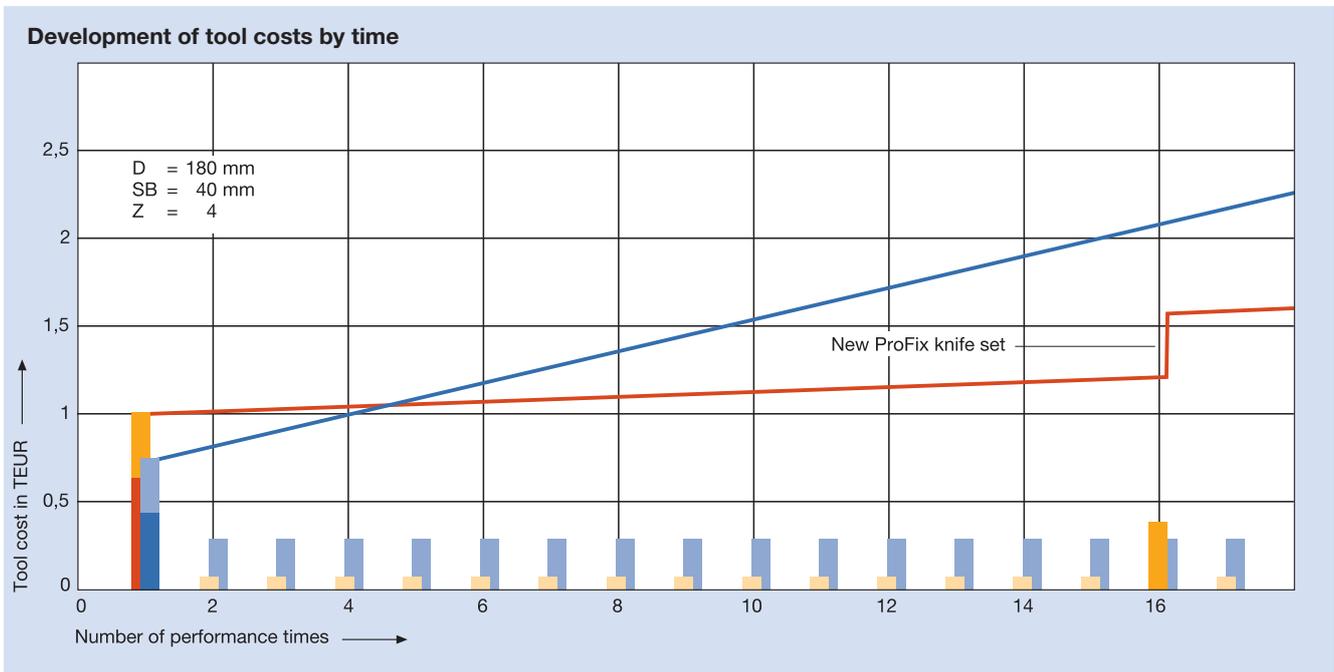
The conclusive efficiency ...

The diagram shows the efficiency of the ProFix-Plus system compared with conventional profile tools without reshaping. Basic features of both tool system are a diameter of 180 mm, a cutting width of 40 mm and 4 knives.

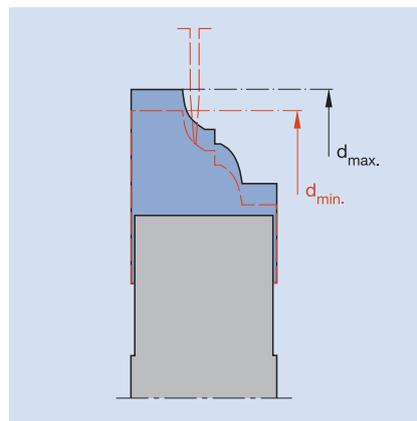
Whilst the conventional profile tools requires 15 replacement tips, ProFix can sharpen fifteen times in the same period. The minimum thickness of the ProFix-Plus knives is generally reached only after the fifteenth sharpening when a new set of knives are required.

The comparison confirmed in practice, shows a cost reduction of 30%. Given the increasing competition and pressure on costs, this represents an economic advantage clearly attributed to ProFix-Plus.

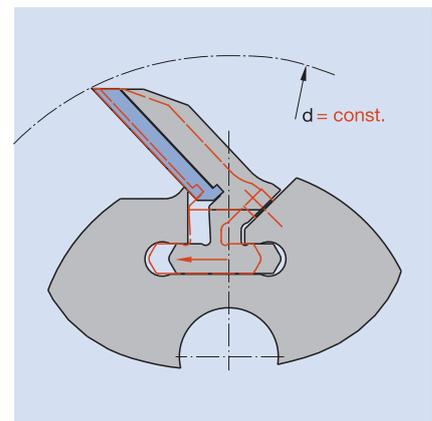
- ProFix-Plus tool body
- ProFix-Plus
Sharpened knives
- ProFix-Plus sharpening
- Profile cutterhead
- Replacement profile tips



Reduction in set-up time with ProFix-Plus by measurement constancy



- Conventional profile cutterheads change in profile and diameter after every sharpening
- unproductive set-up time
 - Adjustment of spindles
 - Test pieces



- ProFix-Plus constant tools with memo function for profile and diameter
- measurement constancy for entire service life
 - no tool measurement
 - production without test pieces

10. Profile tool systems

10.2 ProFix constant tool system

10.2.1 ProFix-Plus

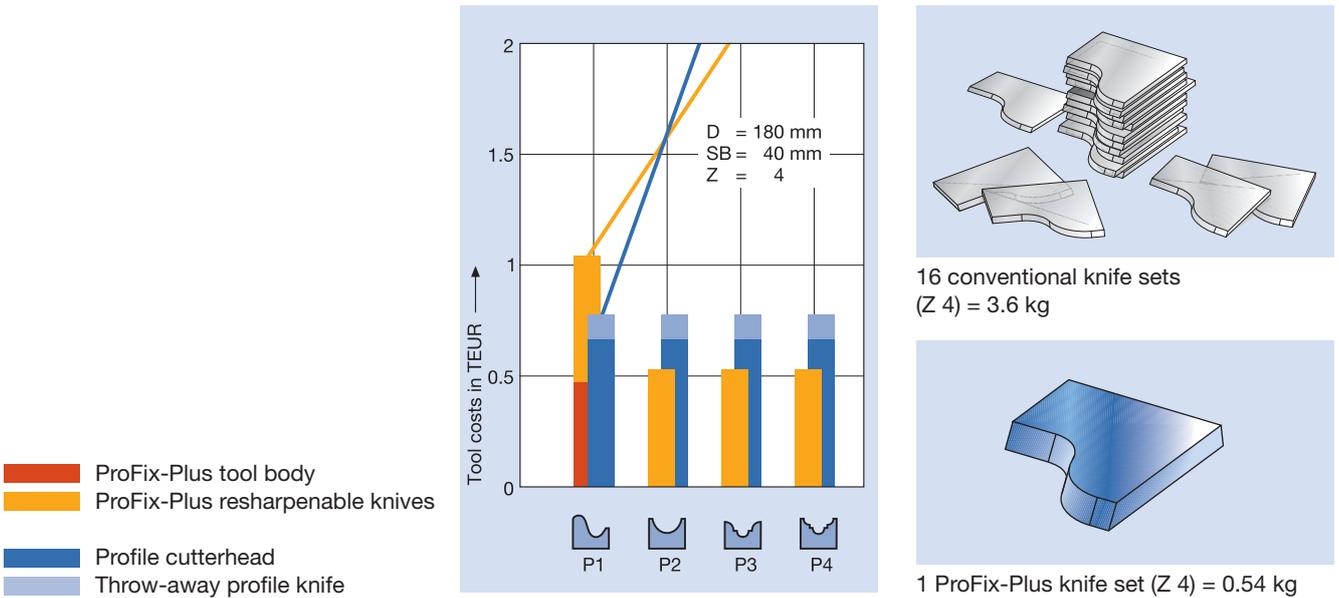
Relation of the profile diversity to the tool costs

The same efficiency is achieved by comparing the cost subject to increasing profile diversity. If different profiles are manufactured frequently, not only different knives, but different tool bodies are required for conventional profile tools. This results in significantly higher costs of conventional systems. Already after three different profiles, the investment savings clearly speak in favour of ProFix-Plus and against conventional tools.

... and the environmental compatibility

Last but not least, a comment on the environmental impact. The consumption of high-quality cutting material used in conventional, non-resharpenable tool systems is seven times higher than ProFix-Plus.

And, moreover, if a new tool body is required for each new, non-resharpenable profile, demand for steel or aluminium material increases.



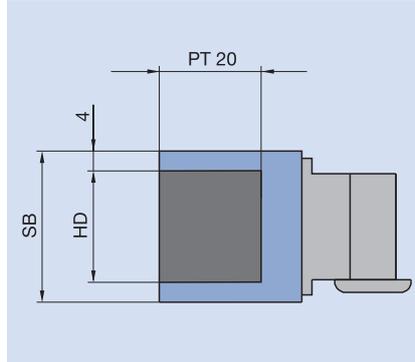
All-out efficient!

ProFix is combinable with the throw-away knife system ProfilCut. From this result unbeatable advantages e.g. in the window production:
 Main profiles with high production quantity or profile areas within a tool which require design freedom, are designed in ProFix. Low-importance profiles with low production quantity are designed in ProfilCut. Thus you don't have to make any compromises regarding to the efficiency.



Application information

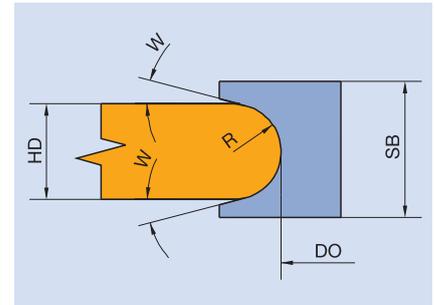
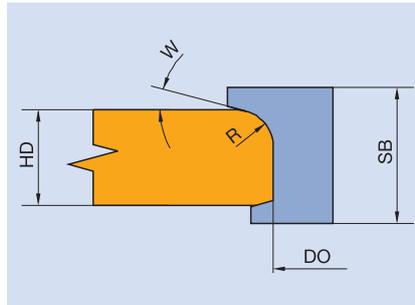
Example: Usable profile area of ProFix PF 20



Cutting angle

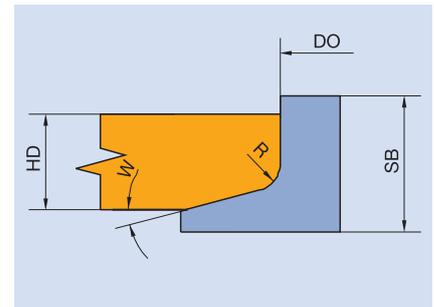
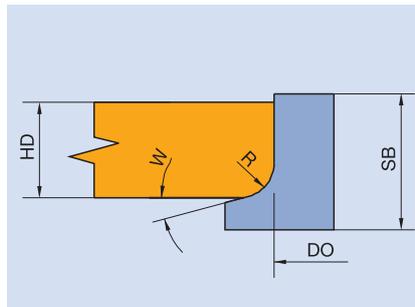
The cutting angle is chosen depending on the machining requirements and the material to be processed.
 Cutting angle 25° for softwood.
 Cutting angle 20° for hardwood.
 Cutting angle 15° for panel materials.

Shear angle (chip clearance relief)



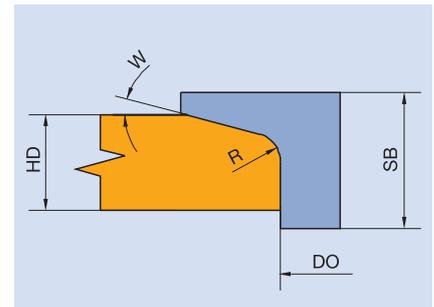
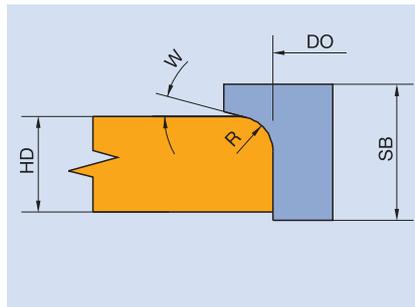
0° shear angle for all closed profiles such as e.g. round profiles, profile relief at least 10°.

With shear angle top cutting first



Shear angle top or bottom cutting first for all profiles open on one side with straight jointing edge and profile relief of at least 10°.

With shear angle bottom cutting first



10. Profile tool systems

10.2 ProFix constant tool system

10.2.2 Range of applications

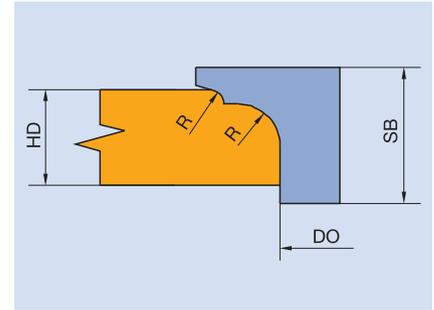
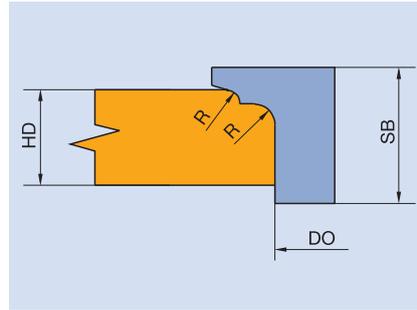
Knife seating 8° inclined,
bottom cutting

Shear angle and knife seating 8° inclined for all profiles without profile relief.

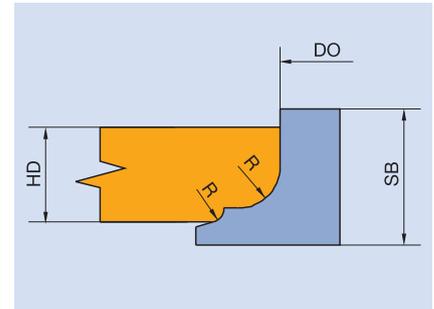
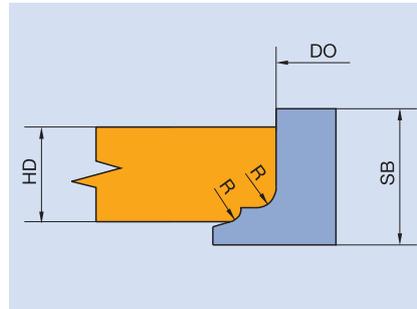
Please note:

ProFix knives do not have a radial lateral clearance angle! The knives are mounted in an inclined position for profiles without lateral profile relief. For closed profiles without profile relief the knives are mounted inclined alternately at the top and at the bottom.

One tool in Z 2 has Z 2 + 2, i.e. 4 knives on the tool periphery.



Knife seating 8° inclined,
top cutting



Minimum zero diameter depending on
Z 2 – Z 10

number of teeth	PF 20 with shank	PF 20	PF 25	ProFix S	ProFix F
Z 2	56 mm	80 mm	116 mm	160 mm	100 mm
Z 3		80 mm	116 mm	160 mm	100 mm
Z 4		95 mm	128 mm	160 mm	125 mm
Z 6		150 mm	180 mm	180 mm	170 mm
Z 8		240 mm	300 mm	300 mm	210 mm
Z 10		-	-	-	245 mm

The table applies for one-part tools.

The number of teeth corresponds to the cutting edges mounted in the tool.

Minimum zero diameter depending on
the tool body bore

bore BO	PF 20	PF 25	ProFix S	ProFix F
20	80 mm	116 mm	160 mm	100 mm
25	90 mm	116 mm	160 mm	105 mm
30	95 mm	116 mm	160 mm	110 mm
40	105 mm	116 mm	160 mm	116 mm
50	120 mm	128 mm	160 mm	128 mm
60	130 mm	140 mm	160 mm	140 mm

Note: The larger of the two diameters indicated in the two tables must be used.

ProFix C for counter and slot/tenon profiling

An extension to the ProFix constant tool system specially for window construction for slot : tenon and profile : counter profile joints.

The increasing popularity of profile splitting in modern window construction requires tools with constant diameters and constant profiles. As one tool is not used as frequently as another, the tools need to be refurbished at different times. In conventional window constructions with fixed tool sets, a constant slot width helps to ensure a durable long-term joint. Conventional resharpenable tools have the downside of changing diameters and profile widths. This means the machines need to be reprogrammed.

Throwaway knives are often seen as the way out of this dilemma. The new Leitz ProFix C tool system for making slot-tenon and counter profile joints is more beneficial to the resources and budget. ProFix C is resharpenable without any change in dimensions. It offers the trusted advantages of the ProFix-Plus constant tool and completes the system for all steps to profiling in wooden windows and doors.



ProFix C System benefits

- Constant cutting diameter and constant profile after resharpening
- Large hook and shear angles – ideal for cross grain
- Optimised gullets for large slotting depths
- Knife cutting widths 8 to 20 mm
- Slotting width \geq 10 mm without spurs
- Other slotting widths possible by exchanging the knives
- Knives can be profiled – profile depth up to 12 mm
- All knife types can be supplied in RipTec design
- HW qualities for all wood types
- HW edge can be resharpened 10 to 12 times
- Used knives can be re-tipped
- Tool body can be supplied in steel or optionally in aluminium
- High rotational speeds for high production

ProFix C Standardisation

- Three basic types of knife seatings cover all application cases
- Modular structure with standardised knife types enables a tool structure matching the profile and direction of wood fibre



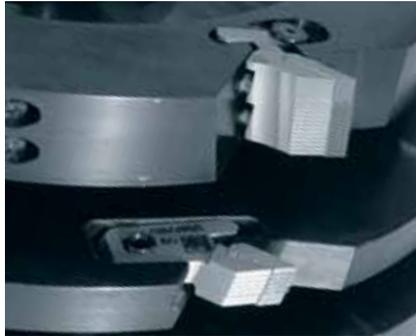
With shear angle and lateral clearance angle.



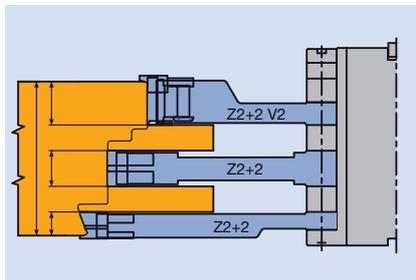
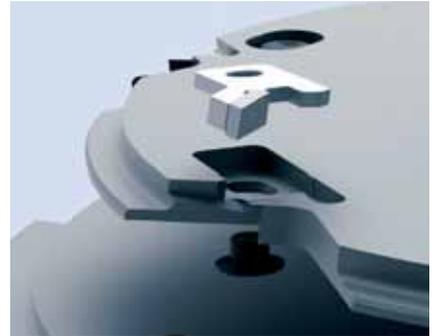
With advanced shear angle outside.



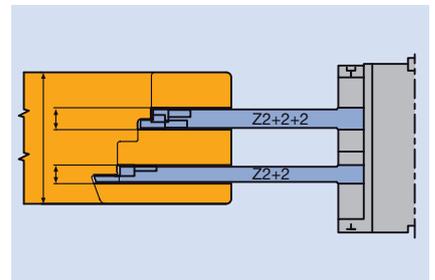
Profile knife with advanced shear angle inside.



Combination of ProFix and ProFix C knives in the same tool.
Example: Knives with RipTec profile for improved joints.



Application example ProFix C „frame tenon for top of jamba“: Cutting edges in RipTec design for improved quality of cut in cross grain.
Combination of ProFix knives for large cutting widths in the rail area.



Application example ProFix C „frame slot-cross“: Slot widths from 8 to 20 mm. No spurs are required for slot widths of 10 mm.

10. Profile tool systems

10.4 ProfilCut throwaway knives

10.4.1 ProfilCut Q

For a better performance – the system with an unbeatable variety

When cutting quality matters, the cutter head system ProfilCut Q is setting the standard. It exceeds all expectations, even for the most extraordinary profiling requirements. ProfilCut Q delivers precision results whether in the bespoke or industrial manufacturing of windows, doors or furniture production. With many possible applications and its guarantee of reliability, companies can increase profitability and take the lead in their market sectors.

ProfilCut Q has a diameter range from 0 to 650 mm. The uniform clamping system is designed for exchangeable knives and turnblades. Its light weight is a big advantage of the system.

With a lightweight aluminium supporting body, its effectiveness at high cutting speed is always guaranteed.

The knives are positioned form-fitting in the centrifugal force direction. The tightening of the clamping screws automatically secures an axial and radial centering, resulting in a zero-tolerance fitting. ProfilCut Q is a technical innovation which delivers substantially enhanced surface-quality and reduction of rejects and rework. Matching the profile, the clamping wedges and the guiding elements conduct chip removal, which contributes to a perfect finish.

The special circular tool design with its rounded edges reduces noise. The wear parts of ProfilCut Q are built in steel. The balancing of ProfilCut Q is effectively limiting vibrations, protecting the spindle bearings and leads to a better surface-quality and prolonged performance times.



10. Profile tool systems

10.4 ProfilCut throwaway knives

10.4.1 ProfilCut Q

More profitability

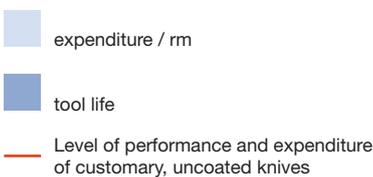
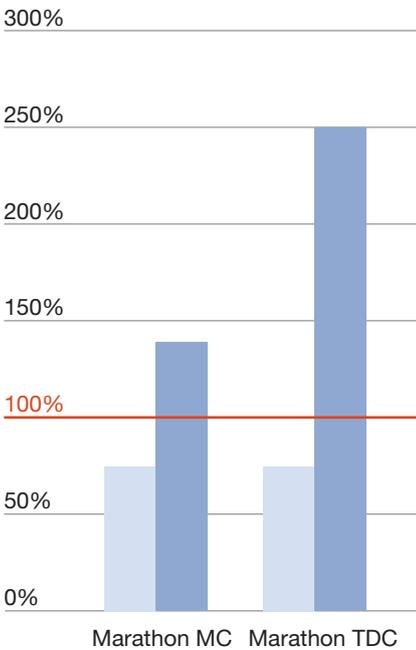
- Limited production expenditures due to
- longer tool life by Marathon high power coating
 - reduced maintenance
 - less machine down time
 - economy by combining standard straight and profiled throwaway knives

More quality

- Minimum rejects, less rework and machined surfaces to finish quality by
- extra-sharp cutting edges by polished face
 - innovative coating-technology for longer performance and cut quality
 - balanced to prevent vibration, therefore an enhanced cut quality surface finish

More usability

- Short set-up times combined with user friendliness due to
- automatic knife adjustment without setting gauges
 - changing the knives while the tool is in the machine is possible
 - lightweight construction of the tool body
 - clamping screws are dust-protected
 - perfect repetition accuracy, after every knife change
 - noise reducing design



10. Profile tool systems

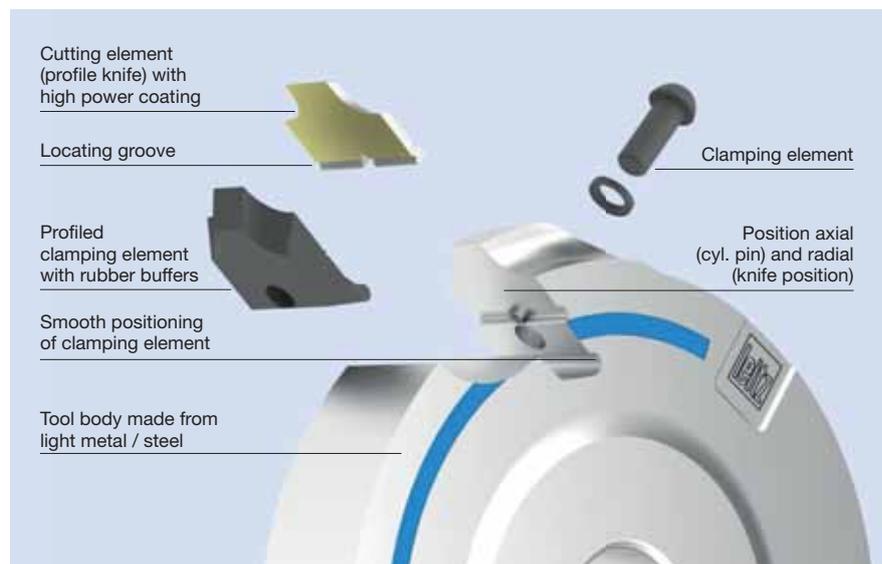
10.4 ProfilCut throwaway knives

10.4.1 ProfilCut Q

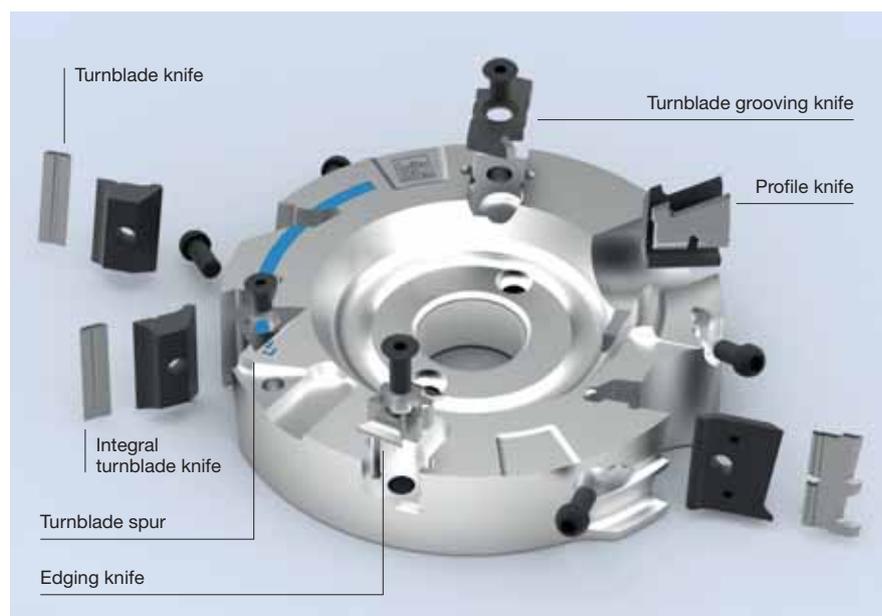
Technical specifications

Radius	Shank tool 0-400 mm Tools with bore 70-650 mm
Cutting width	8-80 mm ProfilCut Q 8-120 mm Turnblade knife
Closed profiles	Z 2, from zero diameter 60 mm max. number of teeth depends on diameter
Tool body	Aluminium/steel
Number of teeth	Single-sided profiles: Z 1, up to zero diameter to 40 mm Z 1/1, from zero diameter to 40 mm
Profile depth	PD max. 20 mm (straight tool body) PD > 20 mm (cranked tool body)

For special surface quality demands, we recommend splitting the cutting edge (2-part design instead of a 1-part design - independent of the cutting width).



Example for possible turnblade and throwaway knives combination



Application overview



Profile

- Window profiles
- Slot and tenon profiles
- Interior and exterior profiles
- Glue joint profiles
- Panel raising profiles
- Post- and Softforming profiles
- etc.

Machining processes

For every profiling tasks in small, medium-sized and large-scale production with a cutting speed (v_c) up to 90 m/s.

Machine types

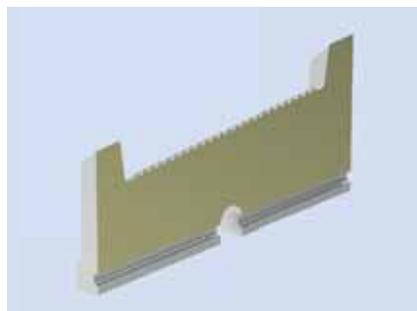
For all conventional cutting machines with manual feed (MAN) or mechanical feed (MEC).

Materials

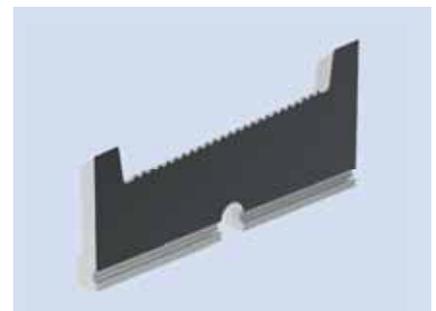
- Hardwoods and softwoods
- Wood derived materials such as: plywood, fibreboard, block board and chipboard
- Polymers such as: Duro- and Thermoplastics, laminated wood based panels as well as composite materials and aluminium

Coating

Marathon MC (Multicoating) for demanding profiling tasks. Marathon TDC (Tungsten Diamond Coating) for the processing of hardwoods, abrasive materials and for large scale production.



Marathon MC-coating – highest quality for soft woods.



Marathon TDC-coating – specialist for hard woods and abrasive materials.

10. Profile tool systems

10.4 ProfilCut throwaway knives

10.4.2 ProfilCut Q Premium

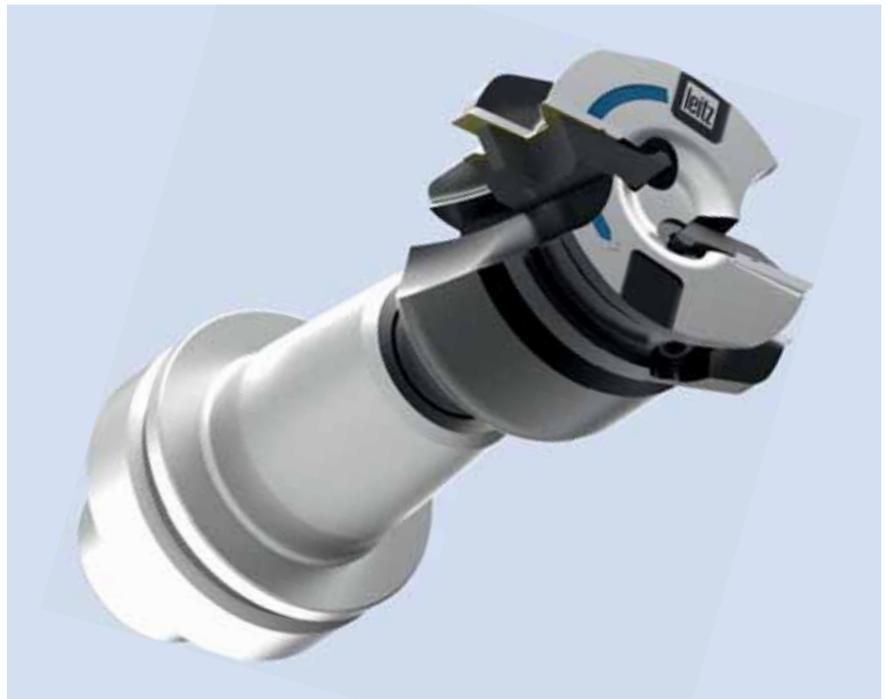
Extraordinary performance – more quality and quantity with every cut

The new ProfilCut Q Premium cutter head system from Leitz is the ultimate solution for companies who want to make the most from their production. With its unique tool design, ProfilCut Q Premium is the benchmark for performance, flexibility, handling, weight and durability, and manufacturing companies can rely on its extraordinary performance.

With a cutting speed up to 120 meters per second, the premium system is faster than any comparable tool, both in productivity and surface quality. Its accelerated process performance saves time and money.

The integration of Leitz technical innovations create a new standard. The latest clamping system has been designed for the highest radial speed and the unique surface coating reduces abrasion, dirt adhesion and heat build-up even more effectively. The lightweight design of the tool body maintains a greater dynamic. Additionally, changing knives is simple, fast and accurate.

A unified clamping system guarantees safe, form-fitting clamping and minimal set-up time. The knives are positioned in the centrifugal force direction. The special clamping wedges have the additional function as chip-guiding elements. This technical feature enables chip generation with reduced dust which consequently helps lead to a perfect finish. With the special contouring of the tool body, noise pollution is also reduced effectively.



10. Profile tool systems

10.4 ProfilCut throwaway knives

10.4.2 ProfilCut Q Premium

More speed

Maximise productivity by the reduction of processing time and a significantly better surface quality due to

- innovative and secure clamping system
- unique tool body coating reduces heat generation and friction
- lightweight construction of the tool body

More usability

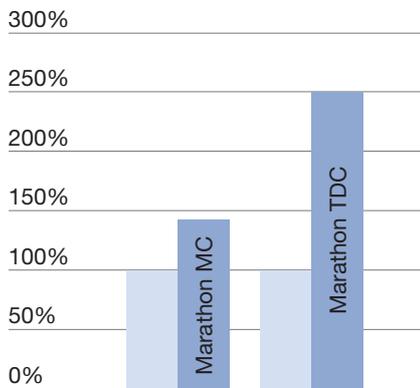
Short set-up times and best usability due to

- automatic knife adjustment without setting gauges
- changing the knives while the tool is in the machine is possible
- clamping screws are dust-protected
- perfect repetition accuracy, after every knife change
- noise reducing design

More endurance

Longer finish cutting quality due to

- knives with Marathon high power coating
- innovative coating technology for longer performance and cut quality
- balanced to prevent vibration, therefore an enhanced cut quality surface finish

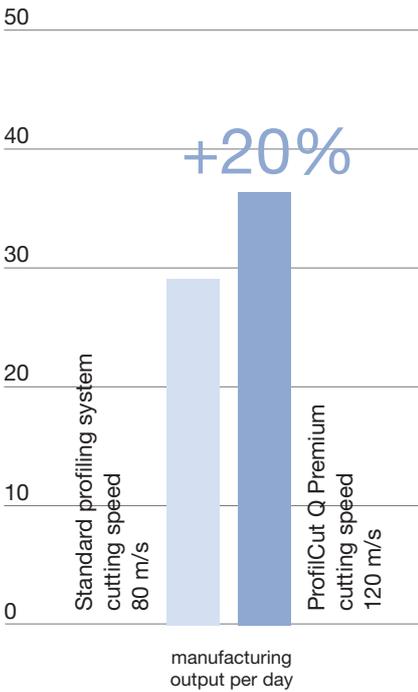


More profit at all levels



Typical production sample:

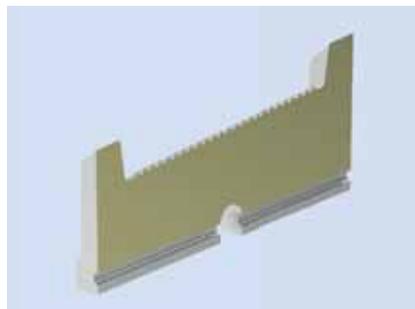
- manufacturing output 30 windows per day
- average cutting time 42 % per window
- comparison from an average profile tooling system with Leitz ProfilCut Q Premium



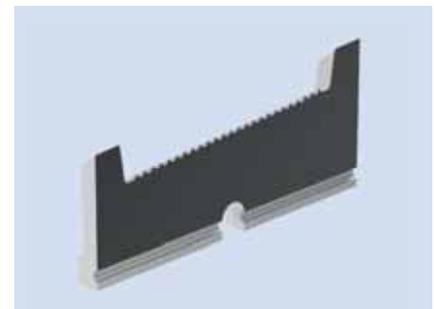
Application overview



<p>Profile</p>	<ul style="list-style-type: none"> - Window profiles - Slot and tenon profiles - Interior and exterior profiles - Glue joint profiles - Panel raising profiles - Post- and Softforming profiles - etc.
<p>Machining processes</p>	<p>For every profiling tasks in small, medium-sized and large-scale production with extremely high cutting speeds (v_c) up to 120 m/s.</p>
<p>Machine types</p>	<p>For all conventional milling machines with manual feed (MAN) and with mechanical feed (MEC). Particularly suitable for all high-performance machines in stationary technology and for systems with high part ejection or high tool performance.</p>
<p>Materials</p>	<ul style="list-style-type: none"> - Hardwoods and softwoods - Wood derived materials such as: plywood, fibreboard, block board and chipboard - Polymers such as: Duro- and Thermoplastics, laminated wood based panels as well as composite materials and aluminium
<p>Coating</p>	<p>Marathon MC (Multicoating) for demanding profiling tasks. Marathon TDC (Tungsten Diamond Coating) for the processing of hardwoods, abrasive materials and for large scale production.</p>



Marathon MC-coating – highest quality for soft woods.



Marathon TDC-coating – specialist for hard woods and abrasive materials.

10. Profile tool systems

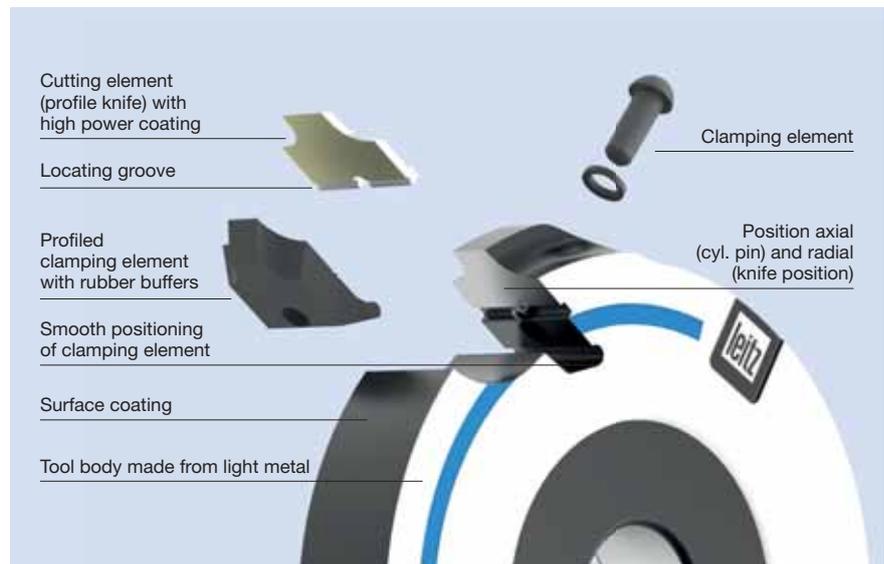
10.4 ProfilCut throwaway knives

10.4.2 ProfilCut Q Premium

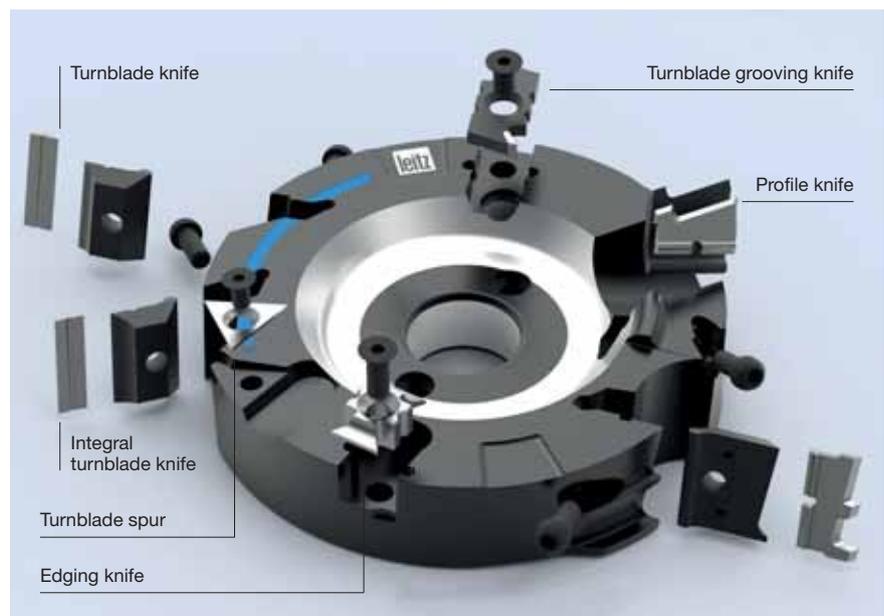
Technical specifications

Radius	Shank tool 0-400 mm Tools with bore 70-650 mm
Cutting width	8-80 mm ProfilCut Q Premium 8-120 mm Turnblade knife
Closed profiles	Z 2, from zero diameter 60 mm max. number of teeth depends on diameter
Tool body	Aluminium / steel
Number of teeth	Single-sided profiles: Z 1, up to zero diameter to 40 mm Z 1/1, from zero diameter to 40 mm
Profile depth	PD max. 20 mm (straight tool body) PD > 20 mm (cranked tool body)

For special surface quality demands, we recommend splitting the cutting edge (2-part design instead of a 1-part design - independent of the cutting width).



Example for possible turnblade and throwaway knives combination

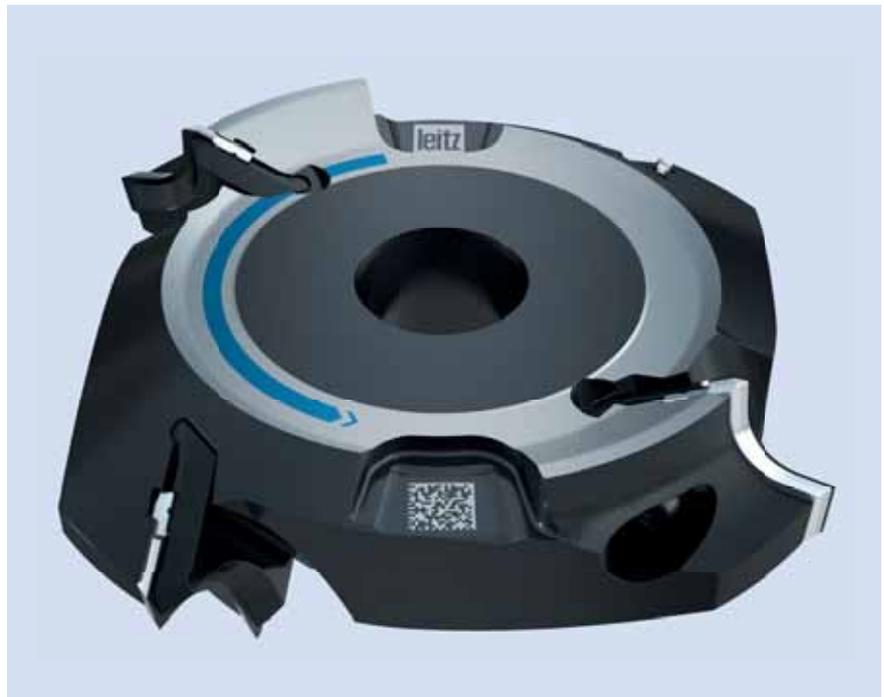


**ProfilCut Q Diamond –
Diamond in a new dimension**

The new replaceable knife system ProfilCut Q Diamond sets pioneering new standards in machine processing. ProfilCut Q Diamond is a unique combination of an ultralight aluminium tool body and re-sharpenable profile knives. This enables constant diameter diamond cutting, guaranteeing higher efficiency and maximum productivity and profitability.

This advanced technical innovation begins with a new diamond cutting edge made from the hardest material on earth: polycrystalline diamond (PKD). Process high-end and abrasive materials precisely with exact repeatability and no loss of performance. After sharpening, the diameter and profile of the cutting edge remains unchanged. ProfilCut Q Diamond can be sharpened five times, and with a service life many times longer than disposable carbide systems, ProfilCut Q Diamond provides significant cost savings.

High performance continues with the dynamics of the tool body's aluminium light-weight construction, and the clamping system has been designed for maximum peripheral speed. The coating effectively reduces impact, friction and heat generation. Even at a maximum rim speed up to 120 meters per second, the system produces first-class surface quality due to reduced vibration. The increased speed also allows faster feed rates with the same number of teeth, enabling higher productivity.



10. Profile tool systems

10.4 ProfilCut throwaway knives

10.4.3 ProfilCut Q Diamond

Work faster

Maximise productivity and reduce processing time by:

- significantly improving surface quality
- innovative clamping system for the toughest applications
- friction and heat reducing coating
- lightweight aluminium construction
- less vibration due to superior balance quality
- Diamond cutting

Easy to use

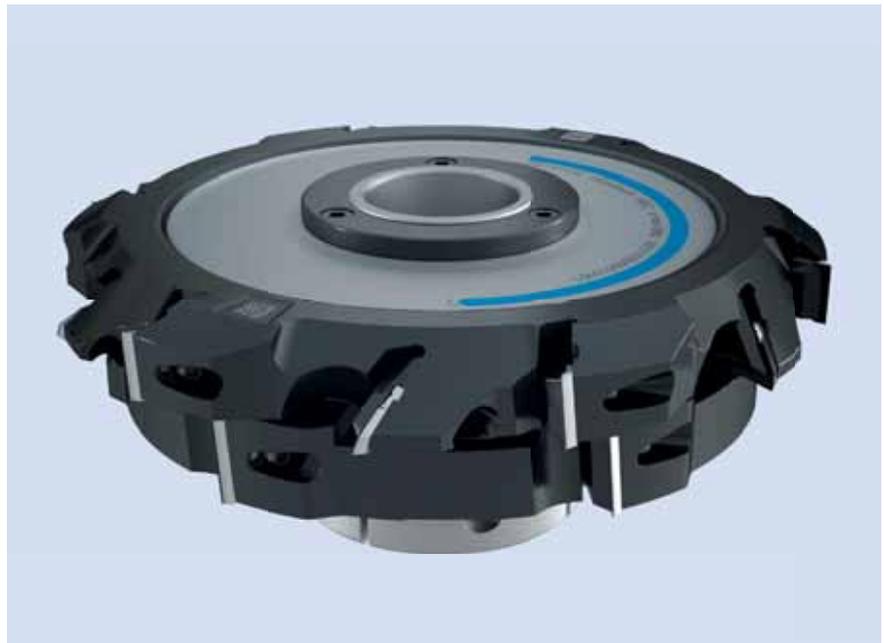
Short set-up times and easy-to-use:

- independent knife positioning without setting aids
- change knives on-site – no need to send the tool to the service centre
- knife change in the mounted set
- perfect repeatability after each knife change
- easy set-up after sharpening
- compatible with all other tooling systems
- noise-reduced design

Sustainable operation

Save on resources, thanks to:

- reusable tool body
- replaceable knives
- resharpen knives five times
- many times longer tool life
- reduced service costs



Impressive performance –
specialist for hardware



* compared to average carbide tools

Applications

- Versatile applications using advanced materials
- Mouldings
- Furniture manufacturing
- Aluminium processing
- Flooring manufacture
- Diverse profiles
- Window and door manufacturing with abrasive materials

Machining processes

For all profiling applications in small, medium and large production and manufacturing. Suitable for highspeed cutting (HSC) machining with extremely high rim speeds.

Machine types

For all conventional machines with manual feed (MAN) and mechanical feed (MEC). Particularly suitable for all high-performance CNC processing centres and for systems with high output and/or high tool performance.

Materials

- Particularly effective for applications using advanced materials such as aluminium, fibre reinforced or composite materials
- All wood materials (softwood, hardwood, plywood, fibreboard, block board and chipboard)
- All plastics (duromers, plastomers, laminate board, thermoplastics, laminated wood based panels as well as composites)

10. Profile tool systems

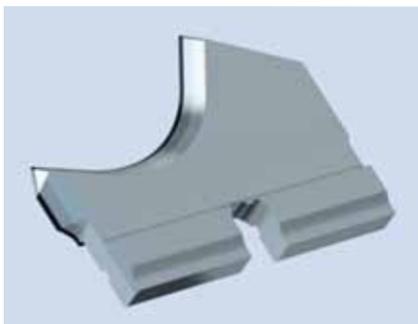
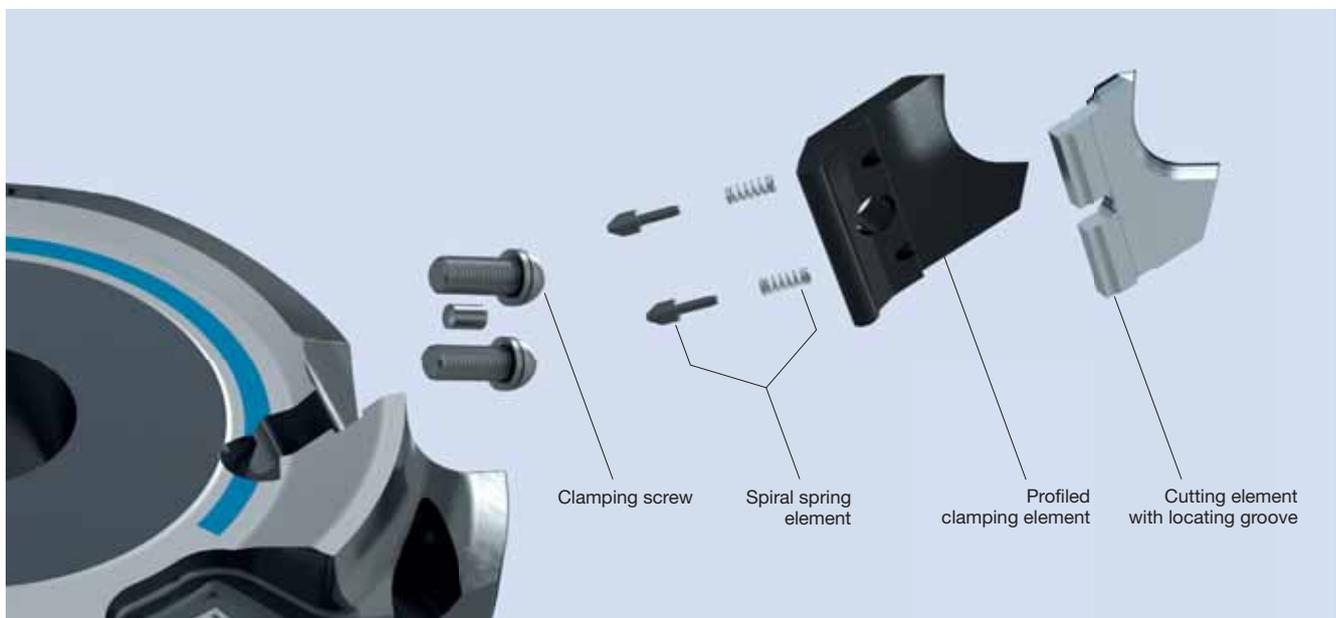
10.4 ProfilCut throwaway knives

10.4.3 ProfilCut Q Diamond

Technical specifications

- resharpen knives five times
- constant profile and diameter
- many times longer tool life
- polycrystalline diamond (PKD) – the hardest material on earth

Rim speed	$v_c = 120 \text{ m/s}$
Cutting width	Max. 50 mm to profile depth 15 mm
Datamatrix Code	Product information available
Diamond cutting edge	Resharpen knives five times polycrystalline diamond (PCD)
Lightweight	Combined lightweight construction with diamond cutting edges
Number of teeth	Single-sided profiles: Z 1, up to zero diameter to 45 mm Z 1/1, from zero diameter to 45 mm



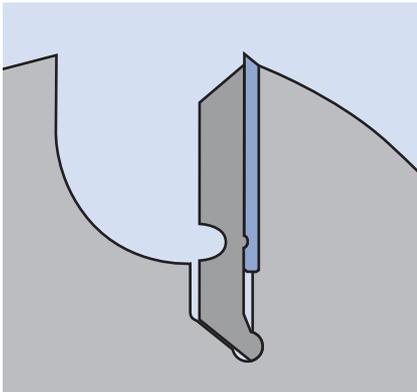
10. Profile tool systems

10.4 ProfilCut throwaway knives 10.4.4 ProfilCut Plus

ProfilCut Plus – the resharpenable system supplement

ProfilCut Plus is ideal for producing standard and special profiles, interior and exterior profiles for windows as well as post- and soft-forming profiles. The 0.3 mm sharpening zone allows repeated sharpening. For suitable applications, this considerably increases efficiency compared to a 1-life throwaway knife system.

The elastic deformation of the clamping elements guarantees uniform clamping of the resharpened knife. For safety reasons, resharpenable knives cannot be used in ProfilCut Q or ProfilCut Q Premium cutterheads.



ProfilCut Plus



10. Profile tool systems

10.5 VariForm Universal profile tool systems

A system which is both simple and versatile

VariForm – variable and multi-functional

For industrial or manual production: the VariForm tool system offers unique advantages to businesses of all sizes and gives a clear competitive edge to production and quality. Its concept is simple: a flexible tool body design, cost effective as the tools can be resharpener several times, and versatile with numerous knife profiles.

VariForm provides unlimited design opportunities with regard to profile and product form. At the same time it improves the cost effectiveness of your production.

Workpiece materials

Hardwood and softwood, laminated wood, chipboard and fibre material, plastics

Machines

- spindle moulders
- four-sided moulders
- edgebanding and sizing machines
- CNC router cutters and CNC machining centres

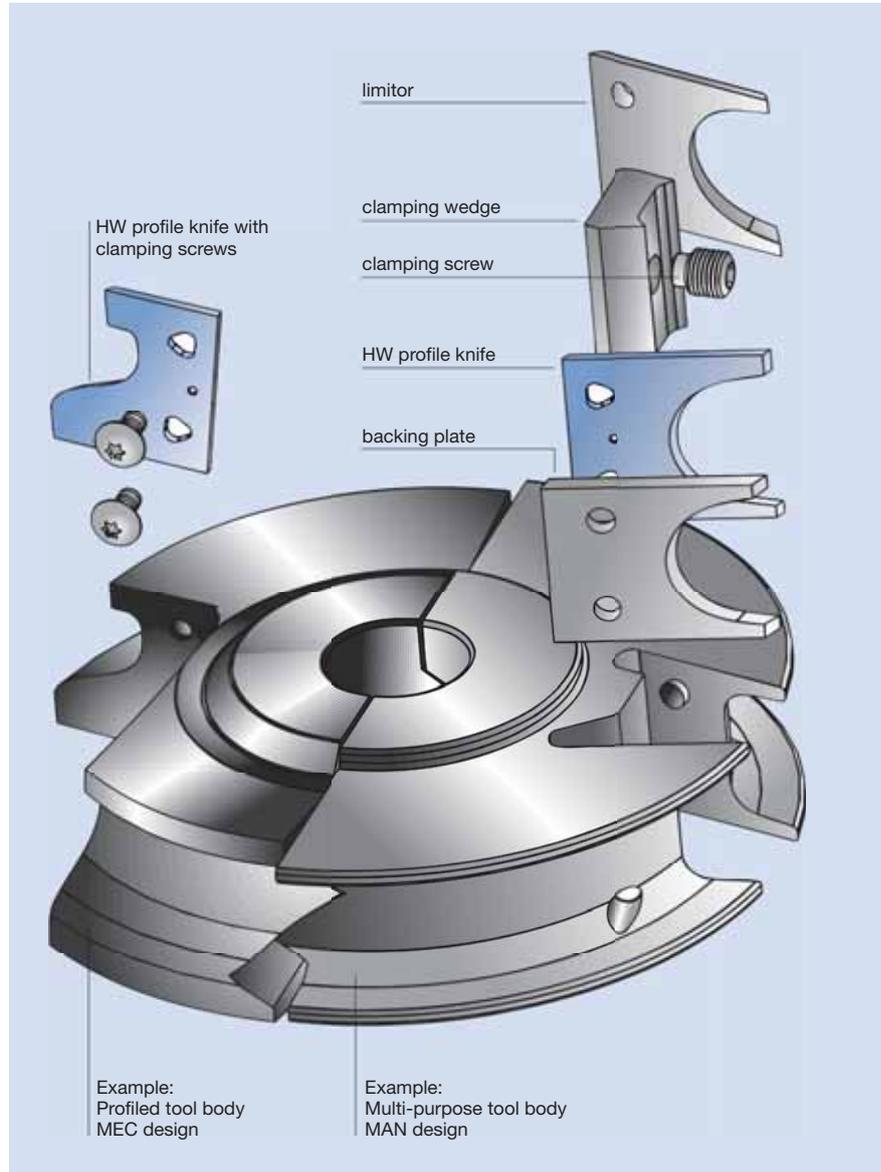
Applications

- furniture, mouldings
- prototypes, single pieces
- small and medium series
- etc.



Easy handling

The VariForm knife clamping “overrides centrifugal force”.
 3-point support, the knives are centered, clamped and positioned radially by the centrifugal force.
 That means no movement at high speeds and precise and safe working at the optimum cutting speed range of 70 to 80 m/s.
 Another advantage: As there are no side stops, you can profile the blank knives around the entire periphery.



Note:

Small tool diameters or profile depths exceeding 20 mm require profiled tool bodies.

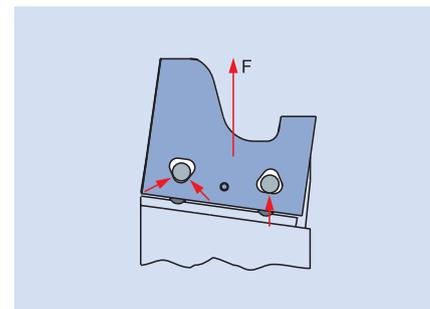
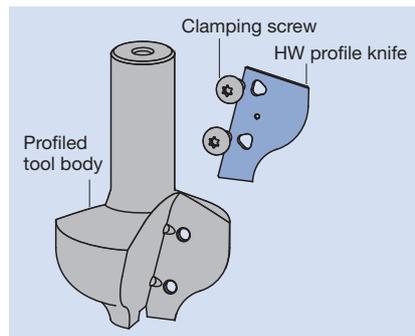


Diagram of the knife clamping.

10. Profile tool systems

10.5 VariForm Universal profile tool systems

VariForm – a first-rate tool system – made by Leitz

All advantages at a glance

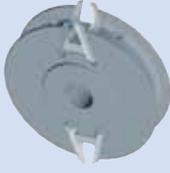
- Resharpenable three to four times.
- Different HW qualities for solid wood and panel materials.
- The right cutting material for every application.
- Modular system: Use the same profile knife in different tool bodies for different machines, suitable for all popular spindle diameters and for quick-clamping systems.
- Tool body designs adapted to the profile depth for a high degree of design freedom.
- Maximum precision and safety by three-point knife clamping.

And unique customer service as well

Over 120 Leitz service stations respond quickly, expertly and reliably to customer requests. Based on profile drawings or wood samples, special profile knives are produced accurately, quality tested and delivered at short notice to meet the customer deadlines – as standard with Leitz. As we archive the templates, resharpening and replacement are both quick and easy.



VariForm –
main designs and data at a glance

Design variants	Profile depth up to 15/19 mm	Profile depth up to 20 mm	Profile depth up to 35 mm
MAN feed for spindle moulders	 multi-purpose tool body	 partially profiled tool body, channel	 profiled tool body, cranked ri./le.
Cutting width:	40/45 mm and 50/60 mm	40 mm to 60 mm	40 mm to 60 mm
MEC feed for four-side planing machines, -edgebanding and sizing machines (suitable for quick-clamping systems)		 partially profiled tool body, channel, L profile, I profile	 profiled tool body, cranked ri./le.
Cutting width:		40 mm: L-, I-Profil 40/60 mm: U-Profil	40 mm to 60 mm
MEC feed (CNC) for CNC router cutters and CNC machining centres	 multi-purpose tool body		 profiled tool body, cranked ri./le.
Cutting width:	40/45 mm and 50/60 mm		30 mm to 50 mm



Manufacturing profiled mouldings is important. Profiled mouldings are used, for example, at floor level as skirting boards, around doors as frame profiles, and in cabinetry as decorative mouldings. Such products are usually manufactured on four-sided moulders on through-feed machines and pose specific requirements on the tool system.

- Profile changes need to be actioned quickly by suppliers. This means the user must be able to profile and sharpen the tool system.
- The increase in MDF lining profiles requires wear-resistant tungsten carbide.
- For high production volumes, the tool system needs to be either jointable or, in the case of new machine generations, be HSC-suitable, i. e. suited to high rotation speeds up to $n = 12000 \text{ min}^{-1}$.
- Furthermore, the number of staff required for tool preparation must not be too high, as the staff is needed to produce the mouldings.

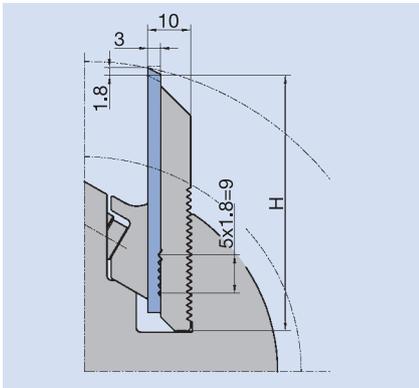


Leitz has developed a user-friendly and highly efficient knife system called PowerKnife System, or simply PKS®, specifically for the high requirements of profile moulding production.

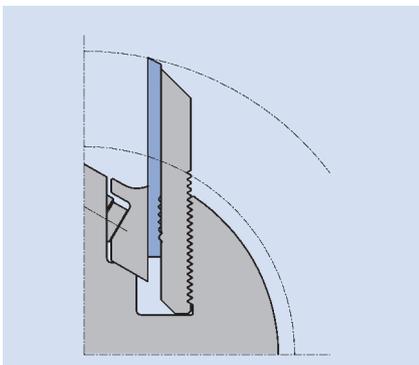
PKS® is a development of the Leitz MicroSystem, which has provided valuable service over the years. It is compatible with all serrated back profile cutterheads with 60° serration, either with bore or HSK. The system consists of a tungsten carbide blank knife and a hardened steel backing plate. Both parts are form-fitting via a serration, but can be separated from each other. The backing plate is secured in the serration of the cutterhead by its serrated back.

This system offers major advantages compared to tipped knives with brazed-on tungsten carbide, and other two-part knife designs:

PowerKnife System PKS® Tungsten carbide blank knife with backing plate for serrated back profile cutterheads



PKS®: New condition



PKS®: Resharpen several times, in end position

- For the maximum concentric running, the knives are profiled or resharpened when installed in the cutterhead, machining the tungsten carbide edges and the steel backing plate separately with the appropriate grinding wheel. The backing plate is profiled only once, while the tungsten carbide edge is resharpened several times and can be replaced separately. Thanks to the single-material machining of tungsten carbide or steel, grinding wheel consumption, processing time and tool cost are reduced.
- The resharpening depth of the tungsten carbide knife is 10.8 mm, approx. 40 single average performance times.
- The adjustment area of the knife system is defined by the design. It is not possible to project the knife too far out of the tool. This ensures safe operation of the system at all settings.
- The form-fitting connection between the tungsten carbide knife and the backing plate by just one serration ensures the parts are in contact over the whole surface, enabling maximum positioning accuracy, as one serration by definition does not lead to pitch errors.
- The comparatively large increments of 1.8 mm when adjusting the tungsten carbide knife enable six to eight resharpening processes in one installed position. In relation to the overall single performance time of one knife, this reduces knife mounting and setting time.
- The two-part design allows use of more wear-resistant tungsten carbide grades compared to brazed tungsten carbide knives and significantly increased performance times.
- Only ultra-fine tungsten carbide grain grades are used. And the cutting face has a mirror finish. Combined, these give extremely sharp cutting edges and a perfect surface finish.



The PowerKnife System PKS® is available as

- non-profiled blank knives with the heights 50, 60 and 70 mm for profiles to a profile depth of 33 mm
- knives with a height of 40 mm for planing or jointing. This knife height matches the tool diameters for jointing in the moulder.

Only ultra-fine grain tungsten carbide qualities are used as:

- HW-30F for solid wood, preferable hardwood
- HW-10F for wood materials such as MDF, WPC.



Tool example for PKS®:
Multi-profiling of MDF mouldings

The knives can be jointed in the moulder. When used with HSK tools, experience has shown that the ground accuracy is sufficient to allow a Z2 tool at 12000 min^{-1} , e. g. in MDF to run at a feed speed of 50 m/min, and give a finish quality even without jointing. Productivity can be increased still further through parallel profiling of several mouldings and subsequent splitting. PKS® with cutting widths of up to 310 mm are available.

Even if profiled by the user, it is sometimes necessary to use the competence, expertise and equipment of a specialist to prepare the tools. Leitz, with its service centres around the world, offers this service. The tools are mounted, ground and measured. The profile specific measuring points are defined as specified by the user and the measured data documented on the accompanying tool card. The tools are returned in a reusable transport container. Your production staff can concentrate more effectively and efficiently on their actual task – producing mouldings. This service package is extended still further by integrating the user's CAD profile data in the service centre grinding programs, as well as providing a telephone hotline for urgent cases.

