

simmill9W
SIMTEK milling tools type 9W

The Best of Both Worlds

Modular simmill9W Milling System
with Monoblock Performance

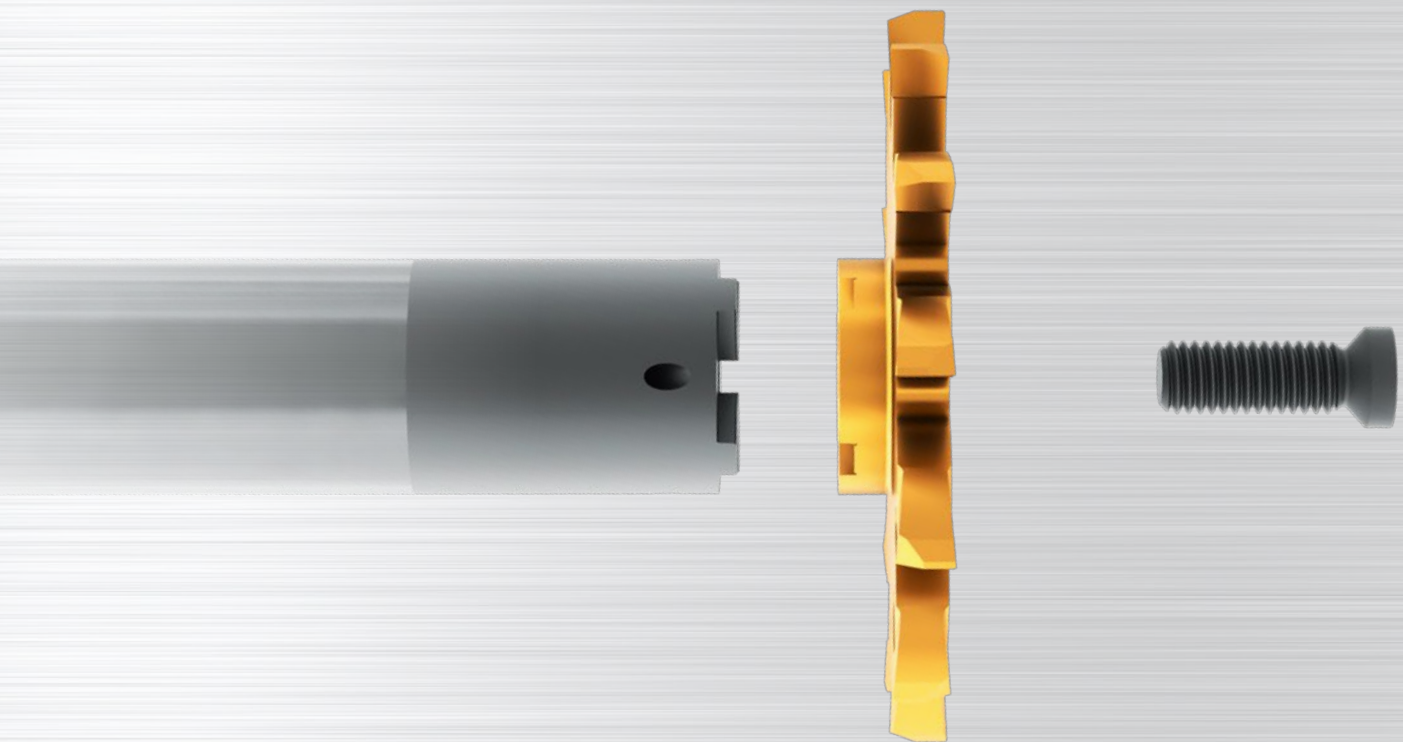


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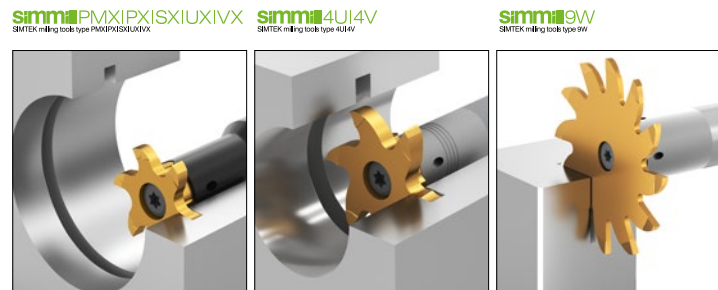
Modular Meets Monoblock: The Best of Both Worlds




Until now, users had to choose – either accept the limited load capacity and tolerances in terms of radial and axial runout of a tool with exchangeable cutting inserts, or forgo the flexibility and pay a considerable premium for a monoblock version with excellent mechanical properties. The **simmill 9W** family from SIMTEK puts an end to this difficult choice. These tools feature exchangeable milling inserts, yet they come very close to the level of power transmission and precision of monoblock tools – at a relatively low additional cost.

The idea for the **simmill 9W** system came from a customer request. A customer in the automotive industry wanted to machine an engine block. The specific location was difficult to reach, however, requiring a long, thin shank with a high milling depth and adequate power transmission. The customer had previously been using a monoblock (solid carbide) tool but wanted to switch to a tool with an interchangeable milling insert due to the high wear and high costs. Conventional interchangeable tools were too inaccurate in their positioning, however. A 4PSUV tool from SIMTEK offered some improvement – the positioning was accurate, but it couldn't withstand the extreme load and the cutting insert broke away.



Comparison of Circular Milling Systems:



	PSUV** with sintered toothing	4PSUV** with ground toothing	simmill9W with ground high-performance toothing	Monoblock***
				
Surcharge per cutting edge*	+0 €	approx. +6 €	approx. +12 €	more expensive
Power transmission	+	++	+++	++++
Holder wear	+	+++	+++	/
Radial run-out	0.03 mm	0.015 mm	0.015 mm	
Axial run-out	0.03 mm	0.015 mm	0.015 mm	
Diameter Teeth	up to 40 mm 6 teeth	up to 40 mm 6 teeth	up to 50 mm 12 teeth	no limit
Regrinding	no	no	yes	yes

*Indicative price point. Actual prices may vary.

**Designates SIMTEK standard and customized tools in the PMX, PX, SX, UX, VX, 4U and 4V families with cutting circle diameters from 6.7 mm to 39.7 mm.

***Refers to market-standard monoblock tools with comparable cutting circle diameters to simmill9W tools.

After months of work in CAD development and the in-house testing laboratory, the SIMTEK team presented the prototype of a milling tool with an interchangeable cutting insert that does numerous things differently and, above all, better. It combines excellent positioning accuracy and repeatability with high power transmission and a large cutting depth. **The tool has now been in use at the automotive customer's site for several years – where it fulfills all of the requirements. Its mechanical properties are comparable to those of monoblock tools, but it costs only a fraction of the price, thereby achieving significant cost savings in high-volume production.**

SIMTEK has named the new tool system **simmill 9W.** This designation refers to an entire family of cutting tools with interchangeable cutting inserts. The name is already well established among customers, with a growing number of them already using 9W tools.

In this context, 9W4 refers to just one of the versions ordered by the automotive customer at the time: a cutting tool with twelve teeth, with four teeth on the holder at the interface and four grooves on the carbide cutting insert. Meanwhile, there are further versions available with fewer or more grooves/teeth, as well as different shank and cutting circle diameters. Further versions, such as 9W1 and 9W2, are currently being developed or will soon be launched on the market. More on this below.

simmill 9W: **The Features**

simmill 9W is a high-performance system for groove, slot, and parting off milling with particularly high milling depths of up to 16.5 mm. Carrier tools and cutting inserts are available in different versions, with up to 12 teeth on the interchangeable inserts.

The secret of **simmill 9W** lies in the high-performance teeth. Thanks to precisely ground flanks, the grooves in the cutting insert and the teeth in the shank have a large, form-fitting contact surface, which allows for high torques and feed rates. Because the flanks are also very steep, the teeth are self-locking and can withstand high torsional forces at the interface between the milling insert and the holder.

“Most customers want to use tools with interchangeable cutting inserts, but so far this has not been possible due to accuracy issues and limited power transmission. But that’s now a thing of the past, because **9W pushes the boundaries of modular milling tool systems close to monoblock tools.**“

Norbert Seifermann, CEO of SIMTEK AG

Key Benefits and Features at a Glance

1. **High-performance tooling** for high torque transmission.
2. **Shorter tool change times**, since the cutting insert can usually be changed directly on the built-in milling insert shank.
3. Standard cutting widths **from 0.5 mm bis 6 mm**, with the ability to custom-order larger cutting widths.
4. Milling depths of **up to 16.5 mm**
5. Suitable for applications with **high cutting widths** and for **difficult-to-machine materials and extreme requirements**.
6. **Different shanks available**: milling shank made of tungsten carbide according to DIN 6535 or steel according to DIN 1835.
7. Internal coolant supply for **efficient cooling**, even in confined spaces.
8. Usable cantilever length **of up to 120 mm**
9. Cutting circle diameter **up to three times larger** than shank diameter for maximum milling depth with a modular tooling system.
10. **Various geometries available** with and without corner radii, cross-cut teeth, and variable pitch distribution.

These features make **simmill 9W** a genuine alternative to monoblock tools in many applications, but with greater flexibility and at a considerably more affordable price.

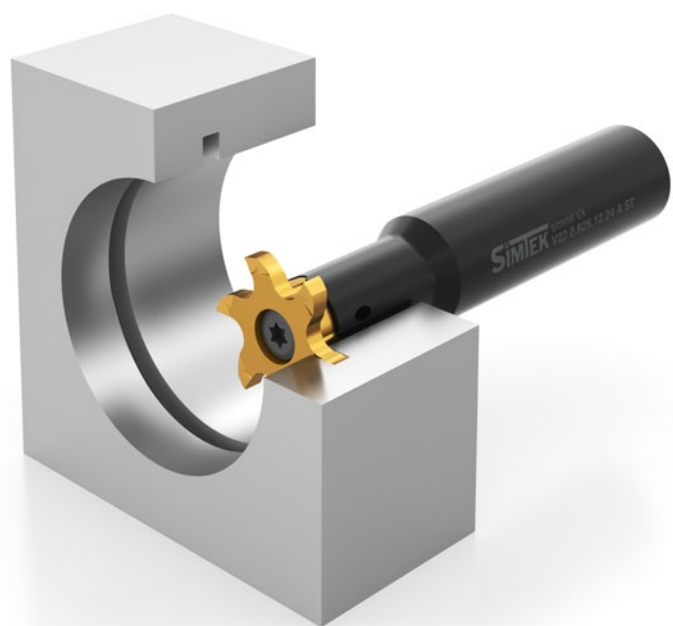
Evolution: From PSUV to 4PSUV to 9W

SIMTEK developed the **simmill 9W** over the course of several years. The first prototype was produced in 2019, followed by a second, close-to-production prototype in 2021. Customers have been using the tools since 2021, and since then the family has grown to include versions with different diameters and cutting geometries.

The superior properties of the new 9W milling tools come from the newly designed cutting insert teeth and holder. The evolution from conventional interchangeable cutting tools to 9W highlights the differences.

simmill PSUV

Common circular milling tools, such as SIMTEK's PSUV family, feature a V-shaped toothing with a flank angle of 30°. In this case, the V-shaped groove is in the shank and the teeth are on the cutting insert. The V shape makes it easier to assemble, but it has a serious disadvantage: the radial forces in the machine create an axial force on the flanks that tries to detach the cutting insert from the shank. If this force is too high, the clamping screw can no longer compensate for it, the cutting insert starts to wobble, and finally breaks off. In addition, the toothing is left in its sintered state, resulting in design-related tolerances of 10 µm on the flanks. Due to the sintering process, the flanks do not sit fully flush. The cutting edge is made of tungsten carbide and the insert seat is made of hardened and tempered steel. This causes the shape of the sintered teeth to become visible in the groove over time. The interface only performs optimally until the cutting edge comes into contact with the holder at the front. After that, there is no longer a precise three-point contact, and the cutting edge no longer centers itself in the toothing.



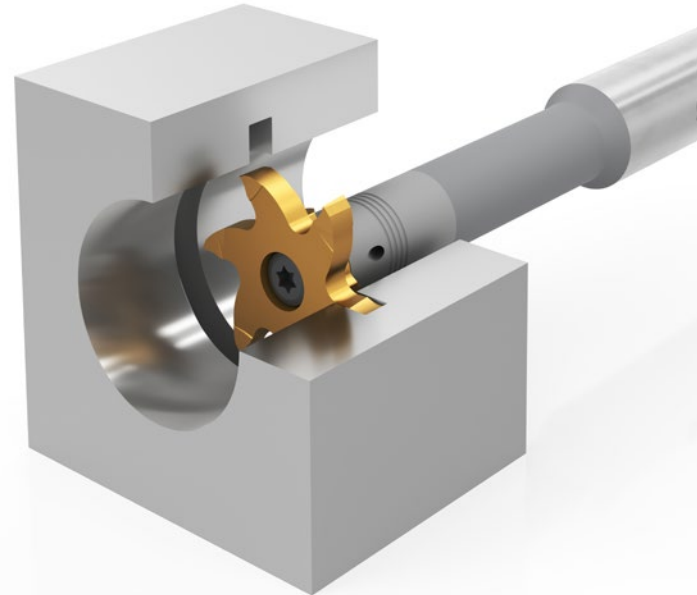
PSUV
with sintered teeth



Conventional interchangeable milling tools are therefore suitable for machining metal when a high degree of versatility is required, when only moderate forces are applied, and when the highest level of precision isn't essential. In return, these tools are reasonably priced.

simmill 4PSUV

This family of tools marks a significant step forward by SIMTEK. In this case, the V-groove flanks are ground, and the flanks are steeper, with an angle of 20° on each side. This increases the contact surface at the flanks, allowing a greater amount of force to be transferred to the workpiece and reducing the axial force on the fixing screw, thus decreasing wear. 4PSUV tools have better radial and axial runout. The additional cost of PSUV is low.



4PSUV
with ground teeth



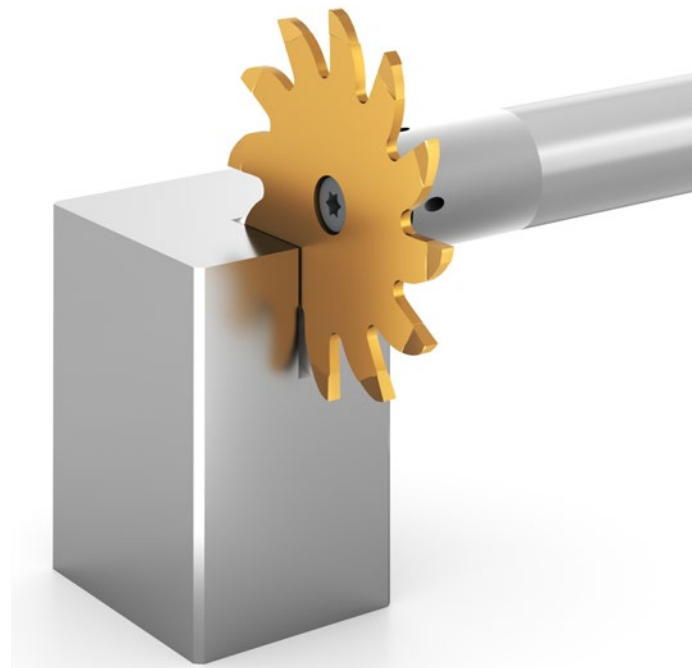
Monoblock

Monoblock tools are the ultimate in terms of stability, as well as in terms of radial and axial runout, since they are ground from a single block of material. They are, however, much more expensive and not as flexible as interchangeable systems because they do not have a replaceable cutting insert. Monoblock tools can be resharpened, but this is expensive and requires subsequent adjustments to the machine. There is a large gap in terms of both price and performance when compared to ground interchangeable systems such as 4PSUV. For this reason, an increasing number of customers are looking for an alternative that comes close to the mechanical properties of monoblock systems, but at a price that isn't too much higher than 4PSUV.

simmill 9W

This new tool family perfectly closes the gap between the conventional interchangeable milling tools and monoblock tools described above.

The additional cost compared to 4PSUV is moderate, at an average of €6 per cutting insert. At the same time, these tools open up new possibilities in machining metals. Where previously only monoblock tools could be used, modular tool systems are now also possible. They can also be resharpened.



simmill 9W
with high-performance
groundteeth




The secret lies in the newly designed holder. The groove and teeth are also V-shaped, but the flank has an angle of only 3°, and the flanks are ground with high precision. This means that the cutting insert and shank can still be easily connected, while the holder is self-locking due to the large contact surface and the high level of static friction. This allows a much higher amount of torque to be transmitted to the milling insert shank, which comes close to a monoblock tool. At the same time, the 9W features a radial and axial runout that both reach the same high level as monoblock systems, making it suitable for an even wider range of applications.



Which simmill 9W Tool is Right for Me?

Customers can now find various versions in the SIMTEK catalog. In this context, **9W** refers to the tool family, with the “9” being derived from the angle between the bottom of the groove and the flank of (just over) 90°. The number that follows is of particular interest to users, as it provides information about the application range of the milling tool system and currently extends from 1 to 4. The **9W-System** would also be able to handle larger diameters, but today’s powder presses aren’t suitable for such sizes.

When selecting a system, proceed as follows:

- 1** **Step 1**
Determine the **maximum milling depth** for the application
 - 2** **Step 2**
Determine the required **cutting width**
 - 3** **Step 3**
Determine the length of the **cantilever** required for machining
 - 4** **Step 4**
When machining a hole, the **ratio between the cutting insert diameter and the hole diameter must be taken into account**
- 

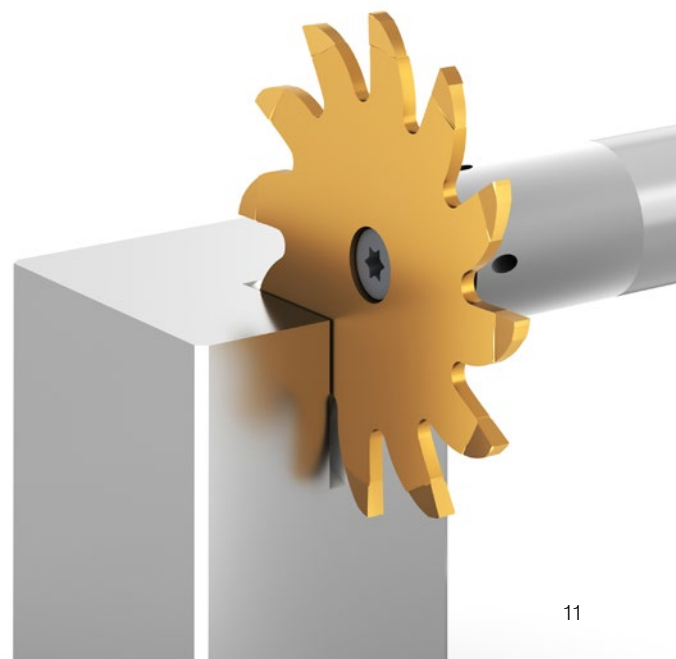
Can't find the
right standard tool?
Custom systems
also available!

GET IN TOUCH:
sales@simtek.com

Resource-efficient tool solution

The response from customers shows that **simmill 9W is the future.** Numerous companies are currently switching to the 9W family. Customers who were offered 9W as a solution because the systems they were previously using were inadequate often directly ask for the 9W system when looking for new tools. Distributors report an increase in demand. In this context, the excellent mechanical properties are only one aspect. **Companies have to conserve resources and reduce their carbon footprint. 9W offers the best opportunities to achieve this.**

Thanks to its rugged design, it lasts significantly longer than conventional interchangeable tools. 9W can also replace monoblock tools in many applications. When monoblock tools are worn out, they can initially be resharpened, but ultimately they have to be disposed of in their entirety. With 9W tools, on the other hand, the user only replaces the cutting insert – which can also be resharpened, if desired. In addition, monoblock tools consume significantly more material during production because the tool is always machined from solid blank. The precise interface makes it possible to change the cutting insert in the machine. This eliminates the need to keep a measured sister tool and also eliminates the need for tool adjustment when changing tools. The angle of the cutting edge also remains the same. When the production and utilization of a 9W4 tool are added up, it requires only about one-fifth of the material of a monoblock tool.



The Perfect Partner for Precision Tools

The SIMTEK **simmill 9W** system is the result of years of development and continuous improvement based on feedback from customers. It offers a cost-effective and flexible alternative to monoblock tools without compromising on performance. If you have any questions about the **simmill 9W** or need help choosing the right tool, please don't hesitate to contact us.



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SIMTEK Präzisionswerkzeuge GmbH – Tools for the Highest Expectations

SIMTEK Präzisionswerkzeuge GmbH was founded in **1994**. It is a central part of the SIMTEK Group. SIMTEK has **six locations worldwide** and **operates in 46 markets**. Approximately **600 passionate and highly motivated employees** are dedicated to the development, production, and distribution of precision tools that meet the highest expectations. The company is **headquartered in Mössingen, near Tübingen, Germany**, at the foot of the Swabian Alb.

SIMTEK is synonymous with tungsten carbide precision tools of the highest quality and performance. The standard range includes around 17,000 tools for recess turning, turning, circular milling, slotting, thread milling, and multi-edge milling. Tools for machining holes with a minimum diameter of 0.3 mm are just as much part of the standard range as highly complex, multi-row side milling cutters with a diameter of 200 mm.

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