ESPRIT
The Right Choice

ESPRIT FreeForm 5-Axis

ESPRIT offers freeform simultaneous 5-axis machining cycles that deliver machine-optimized toolpaths for 5-axis, 4+1, and 3+2 applications. These toolpaths produce parts for a variety of industries, including aerospace, automotive, energy, and medical. ESPRIT's Adaptive Machining™ cycles are optimized to run on any CNC capable of 5-axis, including mills, multitasking millturns, and Swiss-type machines. As a full-spectrum CAM system, combine ESPRIT's 5-axis cycles with other cycles to make one complete part program that supports the needs of all machining and on-machine inspection.

FreeForm

FreeForm 5-Axis Machining Cycles

For simultaneous 5-axis freeform machining, ESPRIT has nine families of rough and finish machining cycles for a wide variety of parts. Use this powerful suite of cycles in full 5-axis, lock one axis for 4-axis applications like screws and blades, or lock two axes for maximum rigidity in heavy cuts. Each of these cycles has high-speed machining built in. For roughing, ESPRIT's patented ProfitMilling strategy is available to improve tool life.

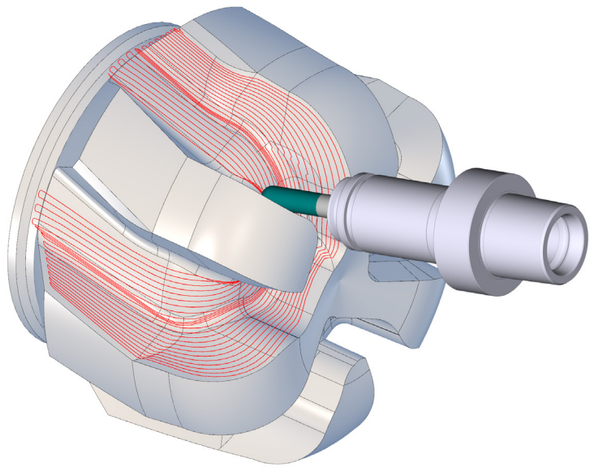
ESPRIT's patented FreeForm 5-axis Composite cycle is a combination of six different machining patterns and tool orientation strategies for a total of 36 different toolpath types. This high-performance cycle uses a simple workflow and offers extensive control over the cutting tool movements to support the unique requirements of a variety of applications.

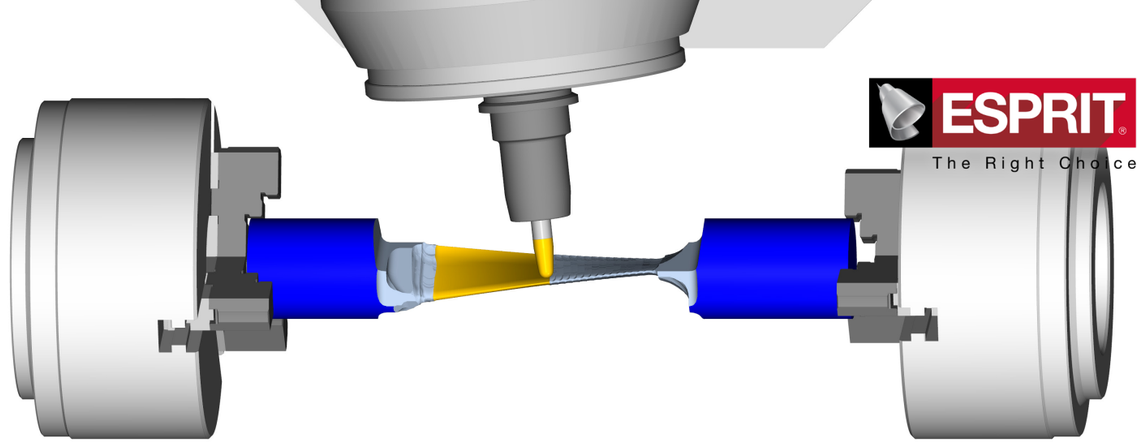
- 5-axis freeform machining of complex geometry with extensive tool control and high-speed machining built in

Machine-Optimized G-Code

Machine-optimized, edit-free G-code produces shorter setup times and faster cycle times.

- Optimum point distribution for faster look-ahead processing in the CNC control and better surface quality
- Full support for RTCP (TCP) with rotary axis output or vector output for G-code independent from the machine kinematic
- 3D tool compensation to adjust for tool wear





Knowledge of the Machine Optimizes the Program

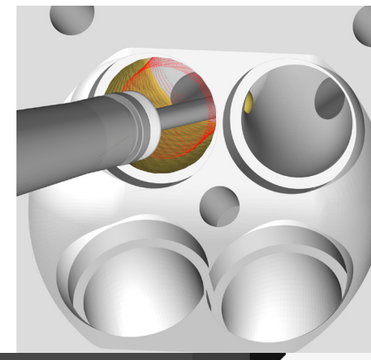
ESPRIT uses a digital twin of the CNC machine, providing an awareness of the machining environment to simplify programming and optimize the G-code.

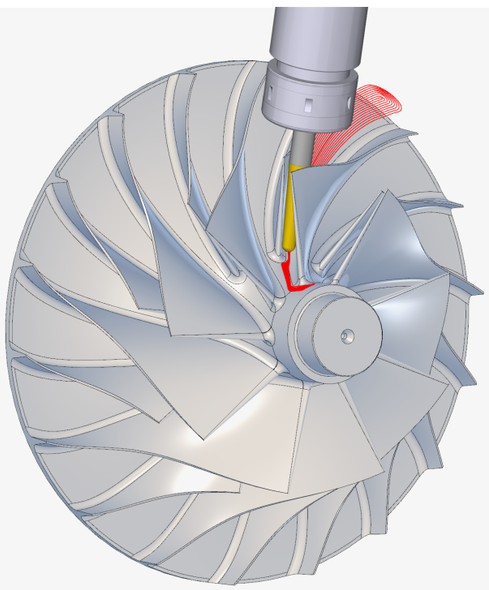
- Fully automated linking moves with collision-free, optimized motions tailored to the machine
- Optimized rotary solutions maximizing usage of the CNC machining envelope
- ESPRIT monitors the position, acceleration, and velocity of the axes to attain programmed feed rates while also producing smooth movements
- Machine-aware feed rate optimization significantly improves surface quality and extends tool life

Full Machine Simulation

ESPRIT's built-in machine simulator uses a digital twin of the CNC machine to verify the program and save significant setup time on the shop floor.

- Analysis provides a detailed view of the toolpath
- Comparison offers a color map of remaining stock
- Simulation provides an animated view of the entire machining process
- Analytics provide views of potential collisions, axes overtravel, acceleration exceptions, and part violation

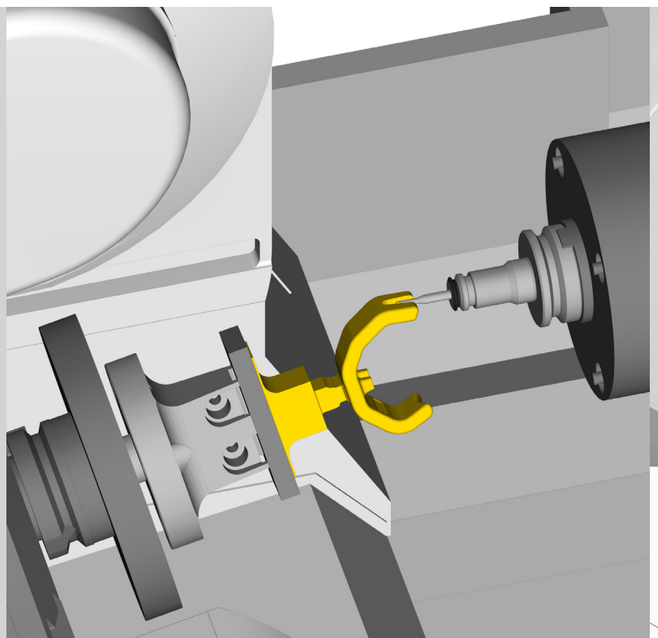


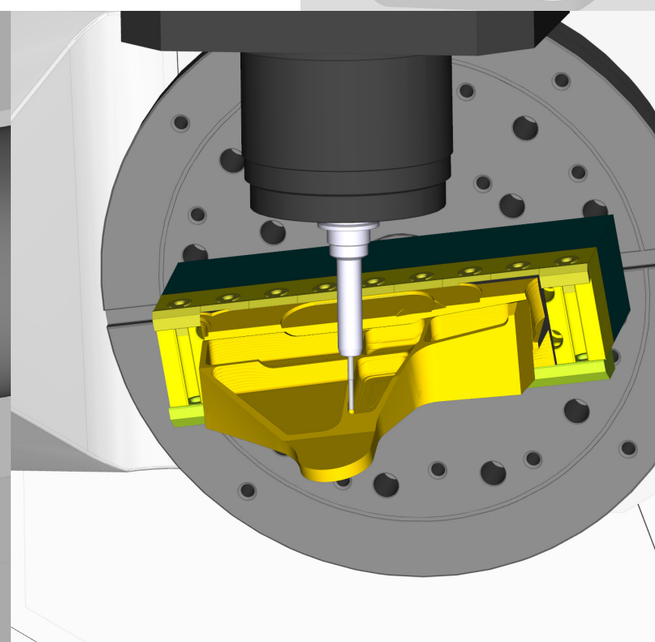


Dynamic Stock-Aware Toolpath

ESPRIT's FreeForm milling cycles are dynamically optimized based on the real-time state of the stock, cutting tool, tool holder, workpiece setup, and machine tool, resulting in safer, shorter-cycle, collision-free machining with minimized repositioning and no air cutting.

- Roughing and re-roughing optimized to remaining stock in real time
- Immediate visualization of the machining result
- Multithreading, GPUs, and background calculation for maximum performance





5-Axis

Channel Roughing & Finishing: A 5-axis milling operation to remove material inside a channel bounded by two walls, including 5-axis trochoidal roughing strategy

Composite Milling: AAn extremely versatile set of 36 machining cycles, based upon six machining patterns and six tool-axis orientation strategies

Contour Machining: Produces a 4- or 5-axis milling operation to machine along one or more 3D profiles

Impeller Cutting: Impeller creates a 5-axis milling operation to rough, re-rough, or finish the channel between the blades of an impeller

Port Roughing & Finishing: This cycle follows a helical spiraling pattern to rough, finish, or machine an area that is accessed through a restricted opening

Spiral Milling: A 5-axis milling operation that spirals continuously between a start profile and end profile along a set of surfaces

Swarf Cutting: Used to machine tilted walls using the flank of the cutting tool with simultaneous 4- or 5-axis toolpath

Z-Level Roughing: Using 3-, 4-, or 5-axis to rough machine a workpiece while maintaining constant loads on the cutters for smooth, high-speed toolpath

Z-Level Finishing: A 3-, 4-, or 5-axis finishing operation to cut vertical and near-vertical walls at incremental Z-levels and to cut floors with complex freeform shapes

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High-Performance CNC Programming

Using the ESPRIT Digital Machine—machine skin models, controller emulators, machine parameters, and universal post processors—ESPRIT delivers powerful programming, accurate simulation, and machine-optimized G-code. ESPRIT is backed by world-class technical support to get started quickly and keep running at top efficiency.