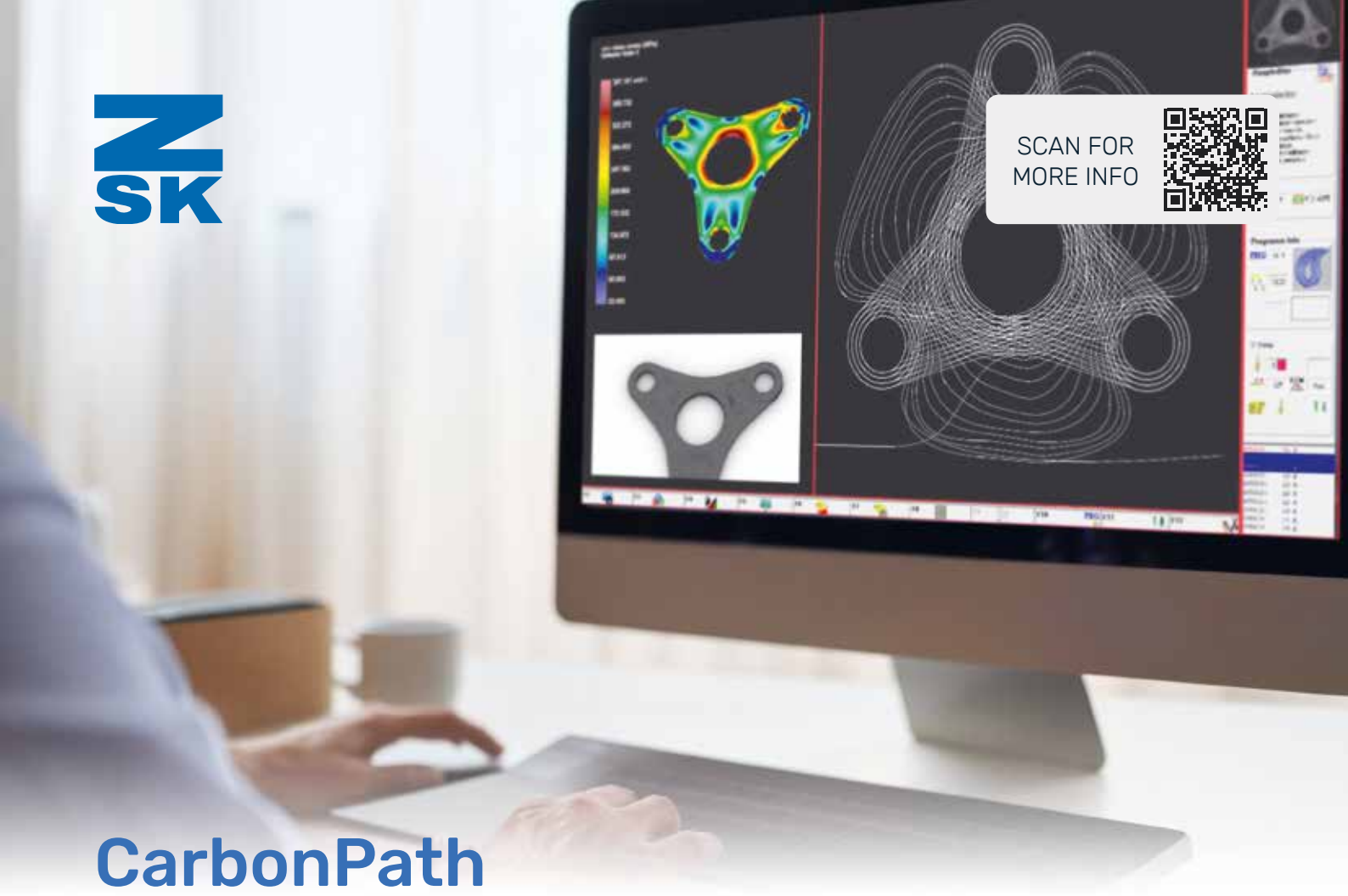

CarbonPath

Integrated Software Platform for Automated Carbon Fiber Placement

From 3D model to finished embroidery program – in one seamless digital workflow.

CarbonPath is ZSK's proprietary software platform for Tailored Fiber Placement (TFP).
It combines structural analysis, automated path generation, and volume optimization in a single, end-to-end process – from CAD geometry to the finished embroidery program in EPCwin.
Where multiple standalone tools and manual interfaces were previously required, CarbonPath offers an integrated approach: Import your component, calculate the load, generate load-optimized fiber paths, and export the data directly to your ZSK embroidery machine.

Your Benefits at a Glance

> End-to-End Workflow
From STEP import through FEA analysis to embroidery program – all in one platform.

> Iterative Optimization
Automatic feedback loop between structural analysis and fiber placement until target load capacity is reached.

> Automatic Path Generation
Load-optimized fiber placement paths are automatically calculated and exported as DXF.

> Volume Optimization
Material usage of fiber and epoxy resin is reduced to the minimum – with maximum performance.

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The CarbonPath Workflow (for flat parts – separate workflow for complex 3D parts)

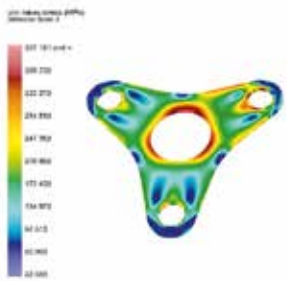
In six clearly defined steps, CarbonPath guides you from CAD model to the finished component program. The iterative process ensures your component precisely meets the required load specifications.

1

Import 3D Model (STEP)

Load your input model in STEP format. CarbonPath supports complex 3D geometries and prepares them for subsequent structural analysis.

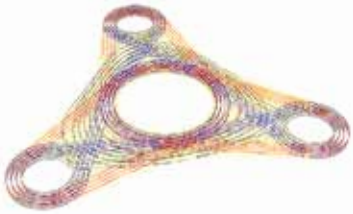
2



Initial Static Analysis (FEA)

First finite element analysis of the original model: stress distribution and load zones are visualized and form the basis for path optimization.

3



Automatic Fiber Paths (DXF)

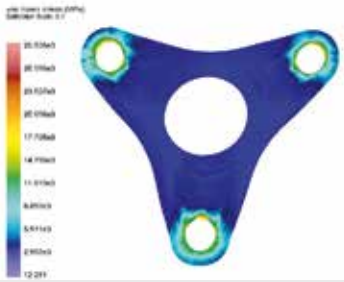
CarbonPath automatically generates load-optimized fiber placement paths. Output in DXF format – ready for direct use in embroidery program creation.

4

Volume Optimization

Optimization of material volume based on fiber quantity and epoxy resin requirements. The resulting shape can be used to manufacture a lamination mold or for integration into larger assemblies.

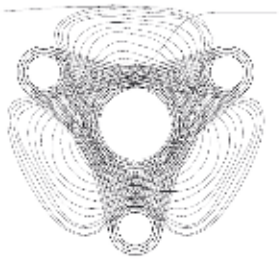
5



Iterative Structural Analysis

FEA based on the laid fiber trajectories. If defects are detected, the process automatically returns to step 3 – reinforcement is applied precisely at critical points until the target load is achieved.

6



Export & Embroidery Program (EPCwin)

The finished fiber paths are exported and directly converted into an embroidery program for your ZSK machine in EPCwin. Seamless integration into your existing production process.