# Press Release

**August 2026**

AZL Aachen GmbH
Excellence in Lightweight Production

## AZL consortium establishes common benchmarking basis for CFRP rotor sleeve materials, processes and test technology

*Manufacturing and test concepts enter implementation – new partners can help steer characterization methods and gain access to exclusive comparative data*

Aachen, August 2026 – An industry consortium coordinated by AZL Aachen GmbH is starting the practical implementation of a systematic benchmark for CFRP rotor sleeves. Following its first report meeting, the project will now investigate press-fit and direct-winding concepts, multiple manufacturing technologies, and both high-end and cost-performance-oriented material systems under consistent conditions. In parallel, the consortium is developing and validating new characterization methods for mechanical, thermal and long-term loading.

**Series production requires more than maximum material performance**

As CFRP rotor sleeves enter broader series applications, material and process solutions must be optimized not only technically but also economically. Suppliers, material producers and equipment manufacturers need to understand which performance attributes are actually required for a specific motor architecture and how they can be achieved at competitive production cost.

**Three manufacturing routes, two design strategies, one comparison basis**

The consortium compares press-fit and direct winding as well as wet filament winding, towpreg winding and thermoplastic tape winding. A reference rotor with a surface speed of around 200 metres per second provides the common basis, ensuring that differences in materials and processes are not obscured by inconsistent design assumptions.

**Direct comparison of high-end and industrial cost-performance materials**

A central element of the project is the direct comparison of different material classes. The programme includes both high-end solutions, which are often selected today as the technically safe option because reliable comparative data on the added performance per added cost is missing, and industrial cost-performance materials. For carbon fibres, the spectrum ranges from economical industrial grades to high-performance fibres with different stiffness and strength levels and correspondingly different prices. On the matrix side, the consortium is investigating epoxy resins and several thermoplastic polymers. Their mechanical properties - particularly close to the allowable temperature limits - affect not only strength, pre-stress retention and long-term behaviour, but also processing windows, cycle times, production capacity and total cost. The benchmark is therefore designed to show which additional performance can be achieved for which additional material and process expenditure.

**Characterization as the connecting element**

The programme includes an adapted split-disk test, pre-stress measurement, a non-rotating radial-load test rig, and high-temperature and long-duration testing. These methods are not simply applied; they are built, analysed, optimized and validated within the project to create a consistent evaluation chain for different material types, temperature levels and load cases.

**From raw material cost to the finished sleeved rotor**

In addition to mechanical and thermal performance, the project evaluates production capacities, process chains and costs. The economic assessment covers the route from raw material to the finished sleeved rotor. Particular attention is paid to achievable material utilization because it affects wall thickness, rotor expansion, air gap and ultimately overall motor performance.

**Exclusive deliverables for project partners**

Participants receive a benchmarking matrix, CAE-to-test correlations, cost comparisons, a detailed process-cost assessment, material-selection criteria, recommendations by motor type and a validated test methodology. Specific values, rankings and material- or process-specific conclusions remain exclusive to the consortium.

The project runs until November 2026. Production of the sleeve variants and direct windings begins in August, together with the build-up and optimization of the test concepts. New partners can therefore still help steer the remaining work and the details of the characterization methods. Continuous communication in meetings and workshops links the composites value chain with electric-motor manufacturers, developers and users.

> *"AZL and Conbility contribute many years of experience in rotor sleeve development, direct-winding processes and production systems. At the same time, the Joint Partner Project is designed as a shared decision platform: it connects electric-motor users, manufacturers and developers with the composites industry and creates a robust basis for assessing materials, designs and manufacturing technologies from both technical and economic perspectives. This is how we help companies turn growth-market opportunities into informed action,"* says Philipp Fröhlig, Head of Industrial Services at AZL.

The ongoing consortium is open to companies across the entire value chain. It addresses automotive and aerospace OEMs, electric-motor manufacturers and e-drive developers, Tier 1 suppliers, material and semi-finished product suppliers, rotor sleeve manufacturers, machinery and equipment suppliers, and providers of test and measurement technology. Participating companies can help steer the remaining test campaigns and the characterization methods currently being developed and validated, while gaining access to the detailed benchmarking results. Philipp Fröhlig is the contact for discussing potential participation.

## Contact

Philipp Fröhlig
Head of Industrial Services
Email: philipp.froehlig@azl-aachen-gmbh.de
Telephone: +49 241 475 735 14

## Picture for Download:

https://hidrive.ionos.com/share/1cq7-x3889

*Figure 1: Rotor Sleeves for Electric Motors*

## About AZL Aachen GmbH

AZL Aachen GmbH is a development and cooperation platform for lightweight, plastics and composite technologies. Under the claim "Explore. Access. Leverage Peak Trends.", AZL supports companies in identifying relevant technology and market trends at an early stage, gaining access to industrial know-how, partner networks and development infrastructure, and deriving concrete strategies, projects and industrial applications from these insights.

Through the international AZL Partnership Network, industry-driven Joint Partner Projects and its own development, production and testing infrastructure, AZL brings together companies along the value chain to jointly evaluate new applications, technologies and industrialization approaches and make them economically viable.

www.lightweight-production.de