# TESTING THE FUTURE OF SUSTAINABLE MATERIALS

A new materials research and development center has been designed to increase the rate of sustainable innovation across the tire and rubber sectors

Tire technology expert Black Donuts has launched Intire Labs – a cutting-edge material research center designed to accelerate sustainable innovation across the rubber and tire industry. The facility is a high-performance platform for researching, developing and validating next-generation sustainable rubber materials and compounds. Compliance with ISO/IEC 17025 standards is currently in process.

Intire Labs provides a comprehensive range of services, including compounding, compound mixing and analysis, physical and material testing, and tailored research and development projects.

The facility supports every stage of the material innovation lifecycle – from early-stage compound formulation and full-scale development to final performance validation. Its in-house precision equipment for mixing and sample preparation and analytical testing replicates real-world production conditions. Capabilities span from reverse engineering to comprehensive evaluation of compound performance.

One of the lab's central missions is to support the industry's shift away from fossil-based materials. Research focuses on developing renewable, recycled, recyclable and biodegradable alternatives to reduce environmental impact, particularly microplastic pollution caused by tire treadwear.

Intire Labs is equipped with advanced instrumentation for testing physical, vulcanization, processability, fatigue, durability, abrasion and dynamic characteristics under controlled conditions. Pilot-scale compound development enables early-stage formulation and performance validation, while advanced analytical tools – such as Fourier transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA), differential scanning calorimetry (DSC) and dynamic mechanical analysis (DMA) – provide deep insights into molecular structure, thermal profiling, and aging and oxidation analysis of rubber compounds. These methods offer insights into material fingerprinting and help ensure consistency in formulation throughout the development process.

**Left:** An array of advanced instruments is available for use. The Intire Labs project is funded by NextGenerationEU

The lab supports every stage, starting with rheological and thermal analysis and extending to evaluation of key mechanical properties such as rolling resistance, fatigue strength, damping behavior and friction wear. Rubber compound testing replicates the whole processing cycle – mixing and sample preparation – and enables accurate measurement of key parameters such as permeability and durability.


Intire Labs is also exploring new raw materials made with pyrolysis or post-treatment technologies, to upcycle end-of-life rubber into high-quality secondary materials. The resulting data is used to develop digital material twins that enable tire designs based on more accurate tire performance simulation, and support faster data-driven product development cycles.

**Below left:** The lab can support every stage of materials development

The facility operates as an independent, confidential and neutral environment. It welcomes all industry stakeholders, from raw material suppliers to tire manufacturers, OEMs, startups and research institutions. The lab provides a collaborative platform for developing the next generation of sustainable, bio-based rubber solutions. By combining Black Donuts' expertise in tire technology with a cutting-edge research facility, Intire Labs sets a new benchmark in sustainable rubber R&D.

Black Donuts provides complete solutions across the entire tire lifecycle – from tire design and smart factory setup to advanced material research and testing – all under one roof.

**Black Donuts**

To find out more, scan the QR code or visit: www.blackdonuts.com

# InTire Labs

## Collaborative Platform for Joint R&D Innovations

At **InTire Labs,** we offer comprehensive solutions, from individual material testing and development to complete compound technology innovations.

## OUR SERVICES

### LABORATORY

- Mixing of compounds
- Testing of compounds and materials
- Comprehensive physical testing capabilities of compounds and materials

### R&D

- New material and compound development for targeted needs
- Analyzing and optimizing material properties for superior performance

Funded by the European Union
NextGenerationEU

## ADVANCED MATERIAL SOLUTIONS FOR TIRES AND RUBBER APPLICATIONS

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