

PRESS RELEASE

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Fraunhofer IZFP to present its award-winning “AloX” measurement system at SENSOR+TEST 2026

Reliable and precise detection of inclusions in aluminum melts using ultrasound

At SENSOR+TEST, the international trade fair for sensor, measurement, and testing technology, the Fraunhofer Institute for Nondestructive Testing IZFP in Saarbrücken will showcase its “AloX” measurement system—winner of the Joseph-von-Fraunhofer Prize—which enables the rapid, continuous, and precise determination of the level of non-metallic inclusions in aluminum melts. This addresses a key challenge in aluminum casting, as non-metallic inclusions have a decisive impact on the quality of the resulting components, and the increasing use of secondary aluminum further exacerbates this issue. Experts from Fraunhofer IZFP will present the efficient and cost-effective “AloX” system from June 9 to 11, 2026, at SENSOR+TEST in Nuremberg (Nuremberg Exhibition Center, 1-317/Hall 1).

In times of scarce resources and strict climate targets, aluminum is becoming increasingly important. It can be recycled with minimal energy consumption and, with its very low weight combined with good strength, offers a unique combination of properties. This makes aluminum indispensable for many applications, such as lightweight construction. Sufficiently high material quality is crucial for the safe and sustainable use of aluminum. Molten aluminum should be as pure as possible, as foreign substances in the form of particles can later have a negative impact on component properties. These mostly nonmetallic inclusions reduce mechanical properties, as they act like notches or cracks within the component. Particularly in the automotive industry or aerospace, resulting material damage can have serious consequences. Therefore, inclusions in the melt should be detected as early as possible, to prevent them from remaining in the final component. Previous approaches to detecting particles in melts were

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either too time-consuming, too expensive, inaccurate, nonreproducible, or only feasible for experts.

Adapting ultrasonic measurement technology to the conditions of the melt breaks new ground

With the AloX measurement system from Fraunhofer IZFP, industry now has access to a revolutionary method that is fast, reliable, and cost-effective. The system employs an innovative ultrasound-based approach. Because AloX detects impurities in the aluminum melt during production, a high level of product quality can be ensured. This relies on the principle of ultrasonic backscattering: Ultrasound is coupled into the aluminum melt, and the reflected ultrasound components are detected. This allows the number of inclusions, their size, and their distribution to be quantified. AloX is highly flexible and can measure both in the channel and in the crucible. The system can also be used in difficult measurement positions, ensuring seamless monitoring of melt quality. Furthermore, its operation requires no expert knowledge. The measurement can therefore be performed by employees in the foundry.

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Tailored to the industry's specific requirements: AloX at SENSOR+TEST 2026 in Nuremberg.

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Live at SENSOR+TEST: Researchers demonstrate the AloX measurement system

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Our project leaders, Dr. Thomas Waschkies and Andrea Mroß, will present AloX at the trade fair in Nuremberg. They will have a system on site for this purpose. Visitors will thus be able to get a sense of the system's many advantages and engage in discussion with the two researchers.

Prospects for the technology

As a next step, the researchers plan to expand the technology of the measurement system: "What works in aluminum melts could also work in other melts. For now, we are primarily focusing on low-melting-point alloys, particularly magnesium, tin, and zinc, all of which have melting points below 600°C. In the long term, however, steel could also be considered as a target melt," explain Dr. Thomas Waschkies and Andrea Mroß.