

# **New technologies for air-coupled ultrasonic inspection**

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In previous decades, transducer development in air-coupled ultrasonic inspection focused primarily on maximizing the sensitivity; however, this situation is starting to change. Thanks to newly available materials and technologies, it is now possible to optimize the overall performance of the transducer. Properties such as bandwidth, impulse width and impulse decay are also crucial to achieving the best inspection results. This shift in focus is illustrated through the increasing utilization of piezocomposites and the development of specially matched coupling and damping layers. The poster provides an overview of existing technologies and new possibilities. Traditional piezoceramic transducers are displayed alongside piezocomposites. The advantages and disadvantages of each technology are illustrated with specific inspection examples. Through individually adjustable sensors it is possible to further extend the application scope. In addition to classical ultrasonic transducers, we introduce a new CMUT-based transducer technology. With this technology, new opportunities arise with regards to aperture size, in particular for low frequency transducers, as it becomes possible to vary the aperture size independently of the frequency, in order to best suit the chosen application. The transducers are characterized by measuring the sound field, allowing calculation of the transducer-specific properties. Following this, the transducers are evaluated numerically through measurements on real test samples. These measurements are compared with those made by standard transducers. Finally, the advantages and disadvantages of the CMUT transducers are explained, in order to provide an overview of the potential application spectrum.