

High-definition array sensors to Remote-Field Testing carbon steel tubing inspection

David Veilleux¹, Andreanne Potvin²

¹EM CoE, Eddyfi Technologies, Canada, ¹Director, Center of Excellence, Eddyfi Technologies, Canada

In downstream and petrochemical plant turnarounds and shutdowns, the inspection of shell and tube heat exchangers (HX) is a critical project element, often involving the examination of over 100 HXs within a single schedule. In North America, Remote-Field Testing (RFT) is commonly employed, while the rest of the world relies primarily on Internal Rotary Inspection System (IRIS). RFT probes typically consist of one or two circumferential coils that generate a low-frequency electromagnetic field, with two receivers measuring the signal as it passes through the tube wall. While effective, RFT signals can be difficult to interpret, limiting indication identification accuracy. Alternatively, IRIS measures tube wall thickness but requires extensive tube cleaning and constant access to a clean water source for submersion, resulting in data acquisition typically three to four times slower than RFT. To address these challenges, Eddyfi Technologies introduces Remote-Field Array (RFA) technology. The new probe design combines conventional RFT with an arrangement of multiple array sensors, enabling the display of both conventional and C-scan reconstructions while maintaining typical inspection speed. Unlike other available products, this design can be used for tube ODs ranging from 15.0 mm (0.591 in) to 31.8 mm (1.25 in), providing higher imaging resolution. This imaging improves visualization of defect morphology, simplifies signal interpretation, and enables efficient communication of results to stakeholders. Furthermore, the increased sensitivity of array sensors reduces blind zone length by three times, enhancing detection capabilities near interfering components. This presentation will highlight the key features of this new family of RFA probes and show typical signals obtained. Keywords: Eddy Current, Remote-Field, Heat Exchanger Tubing, Data Analysis, Carbon Steel