



# Inspection of Boreholes in Composite Materials – The ‘Daisy-Array’ Probe

Ultrasonic Application Solutions

## Application

Composite components are widely used in the transportation sector from aircrafts to cars. To reduce weight aluminum is being replaced by composite materials when possible.

The GE European Solutions Center developed a special ultrasonic phased array probe for the inspection of boreholes in composite materials.



Figure 1: Many parts of aircrafts need to be inspected

## Solution

The DYA 5PA32, illustrated on the right, is a 5MHz probe with 32 elements. The ultrasound beam is transmitted by a flat and circular transducer along the axis of the circle (like the petals of a daisy).

The concept is to place the phased array probe on the top of the component and center the probe in the borehole. The complete inspection of the borehole can be made without manually rotating the probe; the ultrasonic beam is electronically scanned through 360°.



Figure 2: The DYA 5PA32 with modular delay line

## The DYA 5PA32

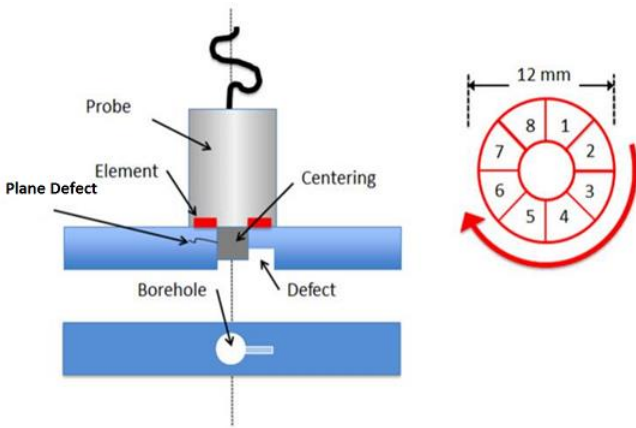


Figure 3: Setup. The elements of the circular transducer emit the ultrasound beam consecutively.

This probe allows detection of delamination and plane defects that could be the result of the drilling in the composite material. In order to provide an individual solution, the diameter is not fixed. With the help of delay lines only one probe is needed for a range of 3-14mm borehole diameters.

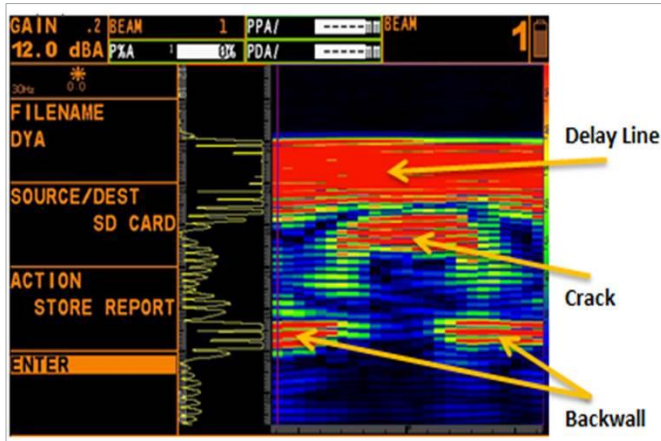


Figure 4: B-scan result demonstration

Figure 4 shows the result of an inspection with the DYA 5PA32 of a borehole with a plane defect inside. The defect is detected between element number 10 and 28. As it is shown in the B-scan, the backwall echo is interrupted by the detected echo of the defect.

### General solution information

- 5 MHz probe 32 elements (or other frequencies, numbers of elements, connector types, cable lengths)
- Electronic scanning with high resolution instead of manual rotation

### Your benefits

- Easily adaptable to a range of borehole sizes using delay lines
- Detection of plane breakouts while drilling
- Electronic scanning instead of manual rotation
- Connection to different kinds of phased array instruments

#### Part numbers

Phasor XS	0014372
DYA 5PA 32 (16mm)	0069923



GE imagination at work

Contact the GE European Solutions Center for your individual inspection problems:

GE Measurement & Control  
European Solutions Center  
www.utprobes.com  
Portable.utsolutions@ge.com