

### Introduction

This application note shows setup and advantages of the echo to echo (E-E) technique on the Alphasage+.

When inspecting coated components using pulse echo inspection, the first echo depth will include the coating thickness, if this is not taken into account the inspection can show inaccurate results, with areas of internal loss this could skew the results from a rejectable state to an acceptable result. The solution to this is to remove the paint, causing additional expense, often the shutdown of the line and the requirement to reinstate the coating after the inspection.

Using the E-E technique the results discount the paint thickness giving an accurate result for the material under the coating.

Since coatings have roughly 2.5 times slower sound speeds than steel, a .010" coating would automatically introduce an error of .025' (.010" x 2.5). ECHO To ECHO measures the sound bouncing in the steel only thus ignoring the coating. We now also have the ability to measure the coating and the substrate at their independent velocities with the Alphasage+ CW or Alphasage+ CDLW. The use of the live waveform is recommended to look for mode converted echoes (Longitudinal waves becoming shear waves) as well as the ability to adjust gain and blanks...both main bang blank and blank after first detected echo.

To activate E-E mode on the Alphasage, turn the setting on in the measurement menu, this will assign a coating velocity if unknown.

### Industries

- Aerospace Aeronautical Inspection
- Aerospace Astronautical Inspection
- Rail Sector
- Maritime Shipping Industries
- Automotive Industry
- Technology & Research

### Application

- Corrosion / Thickness measurement

### Typical Parts

- Metallic panel coatings
- Composite panel coatings

### Inspection Techniques

- Manual UT

### Features and Benefits

- Accurate material thickness results under coatings
- Ease of use
- Display both coating and substrate thickness results on one screen.

MEASUREMENTS	
MEAS. TYPE	THICKNESS
RANGE	1.000 IN
RECTIFICATION	FULL
TEMPERATURE COMP	OFF
VEL	0.23300 IN/US
XDUCER	DK(S)537 5MHZ
ALARM TYPE	OFF
BLANK	ON
BSCAN	OFF
COATING THK.	ON
COATING VELOCITY	0.10180 IN/US
↑/↓ TO NAV, MENU/OK TO SELECT 60%	
BACK	MEASURE

Figure 1 – Measurements menu showing coating velocity assigned when E-E mode is active




Figure 2 – A-scan display showing the coating thickness in yellow in the top right, and the material thickness in white in the top right

Using E-E measurements the technician can acquire accurate thickness measurement of materials under coatings without the need for expensive paint removal and shutdown times.

For further information or support, please contact the Sonatest Applications Team: [applications@sonatest.com](mailto:applications@sonatest.com)

Recommended Tool Package

Category	Part #	Description
Acquisition Unit	Alphagage+ Precision	

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