

BondaScope 3100

Multimode Composite Bond Tester



Applications

- Integrity of composites and adhesively bonded structures
- Multi-layered laminates, glass fiber/ carbon fiber composites, honeycomb and foam cores, metal to metal bonding, adhesively bonded fittings
- Delaminations, disbonds, skin to core flaws, far-side defects, impact damage, liquid ingress

Features

- Resonance, Pitch-Catch and Mechanical Impedance (MIA) modes
- Display modes: RF, Impedance plane, Flying dot, Sweep, time-encoded profile
- Automatic Probe recognition and probe library
- Programmable user setups
- Tone burst, high energy pulsed mode, swept frequency



BondaScope 3100- Multimode bond tester for checking the integrity of bondlines

Introduction

As the use of adhesively bonded joints and fittings has increased across many industries, the need for testing bond integrity has grown. Metal to metal bonded joints, sandwich constructions with various skin and core materials, bonded carbon fiber composite structures have all become important in manufacturing as well as in-service repair patches and adhesively bonded re-enforcements. The integrity of these bonds is critical to the quality of the final product. Conventional ultrasonic methods can be limited for these applications and so a variety of alternative methods have been developed to handle this range of material combinations.

Portable Bond Testing

The BondaScope 3100 is a handheld, battery operated ultrasonic bond tester that uses 3 different testing modes to cover a range of applications. Operating typically between 20kHz-400kHz, the lower frequency, compared

to conventional ultrasonic testing, enables deeper penetration through attenuating materials, across multiple glue lines and even sandwich cores to detect far-side defects. The different display modes are optimized for different applications with a variety of gates and alarms to easily identify a flaw.

Multimode Operation

The most common **Pitch-catch (P/C)** and **Resonance** modes are suited to laminates, bonded and sandwich structures. Pitch-catch is dry coupled, easy to use and works well on larger defects, >0.5". Resonance mode requires couplant, but can identify smaller defects and even determine which layer the defect occurred in with multi-layered bonded structures.

Mechanical Impedance Analysis (MIA) mode is dry coupled and most suited to metal-to-metal bonding and stiffer skin to core constructions. It has less penetration but works well on irregular and curved surfaces and with the small tip can accurately position the location of the defect.

BondaScope 3100



6 Inspection Methods

When a probe is connected to the Bondascope 3100, the automatic recognition optimizes the settings for the probe type. There are 6 inspection methods available:

Pitch-Catch RF:

Transmits a short burst of acoustic energy to the part and measures the amplitude and phase change of the received signal directly. A disbond reduces sound attenuation into the part leading to a higher amplitude at the receiver.

Pitch-Catch Pulsed:

Transmits a spike pulse of broadband acoustic energy into the part and measures the amplitude of the received signal.

Pitch-Catch Swept:

Transmits a short burst of acoustic energy to the part across a pre-defined swept frequency range. The system measures the amplitude and phase change of the received signal

MIA Fixed Frequency:

Probe tip driven at fixed frequency and the receiver, also coupled to the tip, measures the changes in probe loading across the part using amplitude and phase change. This is related to the stiffness of the bond.

MIA Swept Frequency:

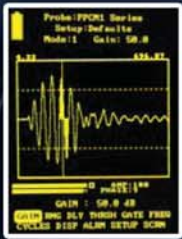
Probe tip driven with a swept frequency and the receiver, also coupled to the tip, measures the changes in probe loading across the part using amplitude and phase change.

Resonance:

Probe driven at the resonance frequency and the damping caused by contact with the part is analysed. Defects are identified by a change in the phase and amplitude of the probe resonance caused by a change in acoustic impedance of the part.

Results can be displayed in different modes including live RF envelope or impedance plane display. The Impedance-plane display (flying dot or swept) is a polar coordinate system showing the phase shift and amplitude of the test area compared to a nulled out good bond. A time-encoded profile of phase and amplitude can also be used for rapid scanning.

There is a range of probes available for each inspection method and the system is also compatible with probes from other manufacturers for added functionality.



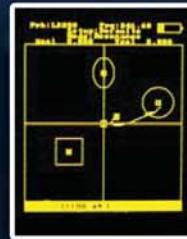
Pitch-Catch RF



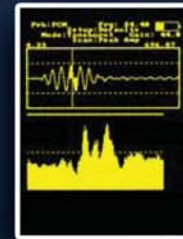
MIA Swept



Resonance



Multiple Gates



Profile Display



Flying Dot

TECHNICAL SPECIFICATIONS			
Package Includes	Standard package includes Bondascope 3100 instrument, Pelican style shipping case, manual, battery, AC charger (110-240V) and Calibration Certificate		
Physical Dimensions	9.25"H x 5.5"W x 2.9"D (235x140x74mm)		
Physical Weight	5lb (2.26kg) including battery		
Cable Length	6ft (1.83m) standard		
Operating Modes	Pitch-Catch: tone burst, pulsed & swept frequency; Mechanical Impedance (MIA): fixed & swept frequency; Resonance.		
Display Modes	RF, Impedance plane (flying dot, swept mode), Profile mode		
Display Type	240 x 320 pixels, quarter-VGA, 5.7"(14.4mm) diagonal high-bright EL		
Probe Connector	Standard 11-pin Fischer & 8-pin Lemo (compatible with probes of other manufacturers)		
Frequency Range	250Hz-1.5MHz probe and setup specific- adjustable frequency, cycles		
Alarms/ Gates	Box, polar and up to 8 individual and individually sizeable "ring gates" centered at stored reference dot locations in impedance plane operation. Positive or negative operation		
Storage	100 setups and 250 screens with real-time date and time stamp		
Power Source	Field-replaceable Li-ion Battery (8-10hrs) or AC mains		
Operating Temperature	15 °F to 105 °F (-10 °C to 40 °C)		
Probe Types	Pitch-Catch: Spring loaded or fixed tips Tone burst or Pulsed Low, medium or high frequency High voltage option	Mechanical Impedance: 1/4", 3/8", 1/2" tip diameter (6.35mm, 9.53mm, 12.70mm)	Resonance: Standard- 110kHz, 165kHz, 200kHz, 250kHz, 280kHz, 330 kHz, 370 kHz. Honeycomb- 18kHz, 26kHz, 53kHz
OPTIONS	Pitch-catch, MIA and Resonance probes, USB data transfer kit		

The specifications in this document are subject to change without notice.

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