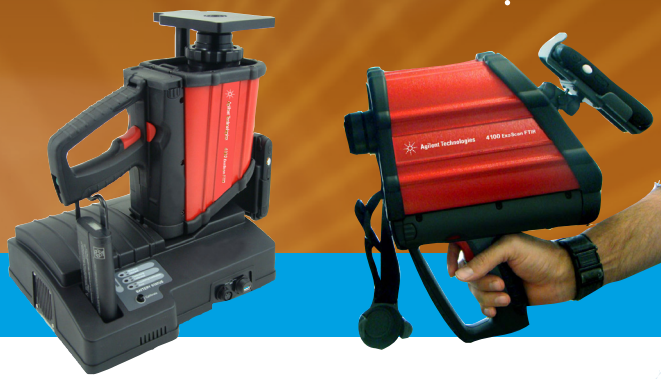
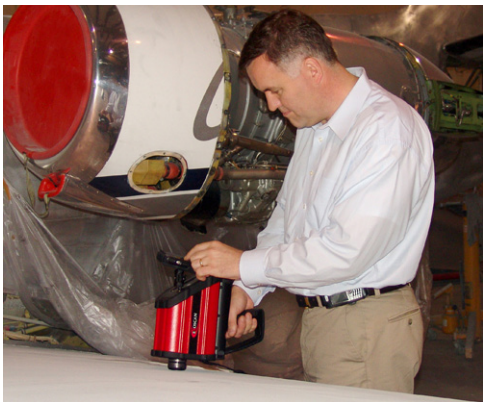
AGILENT 4100 EXOSCAN FOR ANALYSIS OF COMPOSITES USED IN BOEING AIRCRAFT

The Measure of Confidence



Data Sheet

Composites have become popular materials to use in a variety of applications; this includes their usage in the Aerospace and Aviation marketplaces. The 4100 ExoScan FTIR has been shown to be an effective, non-destructive technology for measuring heat exposure in composite materials ("Composite Heat Damage measurement using the handheld Agilent 4100 ExoScan FTIR" by J. Seelenbinder).



The ExoScan system identifies changes in the chemical structure of the epoxy polymer component of the composite matrix. The ExoScan software correlates these observed changes to the extent of exposure by comparing the data to pre-developed methods. In this way, the system is used as a non-destructive analyzer to determine the depth and breadth of thermal exposure which is particularly valuable in support of the composite repair processes.

A package containing methods for the 4100 ExoScan to measure thermal exposure of carbon composites on the Boeing 787 aircraft as specified in the 787 Service Repair Manual (SRM) is available. These include methods of both un-sanded and sanded composites for all composites listed in the SRM. Calibrations in these methods are conducted with Boeing certified standards. Pass / Fail thresholds within the methods have been set in accordance with the SRM as well.

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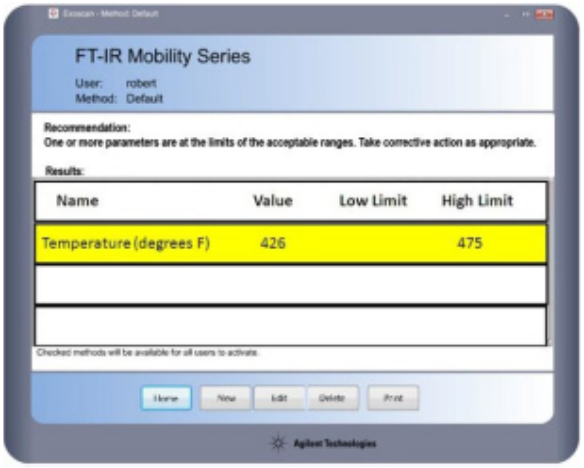
The 4100 ExoScan FTIR for Boeing 787 Aircraft (P/N G8036A) package contains the following hardware:

4100 Exoscan FTIR with Dedicated Diffuse Reflectance sampling interface, background and polystyrene reference caps, Socket Somo 650 PDA, power cables, power supply and battery charges for the PDA and Exoscan (where applicable), hardware and software manuals, MicroLab PC and MicroLab Mobile (preloaded on the PDA).



In addition to the hardware the following methods and validation standards are provided:

Method	Low Validation Std Included	High Validation Std Included
BMS 8-256 Fabric Sanded	✔	✔
BMS 8-256 Fabric Unsanded	✔	✔
BMS 8-276 Fabric Sanded	✔	✔
BMS 8-276 Unsanded	✔	✔
BMS 8-276 Tape Sanded	✔	✔
BMS 8-276 Tape Unsanded	✔	✔
BMS 8-331 Unsanded	✔	✔
BSM 8-341 Surface Master 905 Unsanded	✔	✔
BMS 8-341 Sanded	✔	✔

The methods display marginal and critical values that allow the user to visually see whether the sampling area is within or outside of specifications. Included are two (2) validation standards for each method, for a total of 16 validation standards covering all eight (8) methods. These validation standards are provided by Boeing's Technical Services, and are used to confirm both instrument and method performance at levels both above and below the acceptable threshold limits. This makes it easy for even the novice user to determine the extent of damage.

For more information on the use of the ExoScan on the Boeing 787 refer to the following publications:

- Arnaud, C. H. (2011). Handheld IR in the Hangar. Chemical and Engineering News, Vol 89 (34), 43-45.
- Boeing (2011) Boeing 787 Service Repair Manual Part 9, 51-00-03.
- Seelenbinder, J. (2009). Composite heat damage measurement using the handheld Agilent 4100 ExoScan FTIR. Agilent Technologies.

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