



Engineering, Test & Technology
Boeing Research & Technology

FTWG Voltage Round Robin

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The Boeing Company

Presented by: Yaw Agyei, The Boeing Company, June 2018
FTWG

Voltage Round Robin

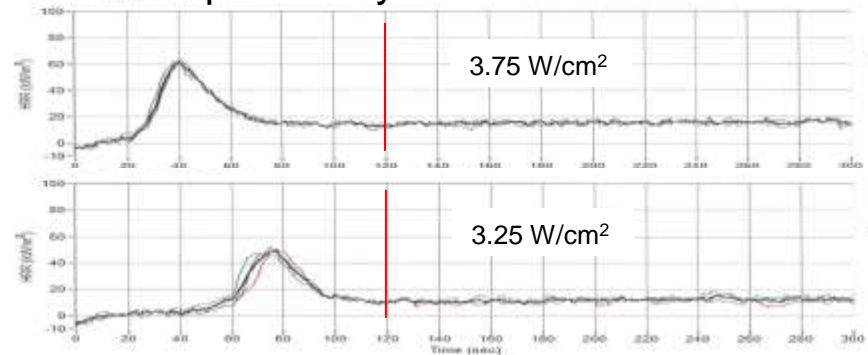
Continuation of Boeing's Voltage Study

- Supply voltage fluctuations at production lab affects heat flux density
- 220 V supply voltage cannot exceed ± 1.5 V to remain within specification after calibrating to 3.50 W/cm²
- Proposal by task group to characterize and assess range of industry supply voltage variation

Round Robin Lead Team

- Boeing
 - Yonas Behboud
 - Brian Johnson
 - Yaw Agyei
- FAA Tech Center
 - Mike Burns

Peak Shape / Delay vs. Heat Flux



General Observations with Lower Heat Flux

- Wider peaks
- Lower peak values
- Peaks start and end later (shift right)
- Lower 2 min total values

**Originally presented at the Nov 2017 MFTWG meeting*

Participants

22 participants

■ 13 domestic (USA)

- Jamco-America
- General Plastics
- Zodiac heath Tecna
- Krueger Testing & Consulting
- Elemen Materials & Technology
- HAECO Americas Cabin Solutions
- AccuFleet Testing Services
- Skandia
- SEKISUI SPI
- Schneller
- Herb Curry Inc.
- SGS Govmark
- TESTCORP

■ 9 International

- CTA (Centro de Tecnologias Aeronauticas)
- CSIR, MSM, Nonwovens & Composites Laboratory
- Jamco Singapore Pte Ltd
- AIRBUS
- Zodiac Aerospace (SELL)
- RESCOLL
- DGA Techniques Aeronautiques
- Test Center of Civil Aviation Administration of China (CAAC)
- F. List



Voltage Round Robin

Goal

- Record supply voltage and ambient load variations of FTWG labs operating OSU heat release rate units
- Use results to understand variation frequency and magnitude – average and range – to assess needs for conditioning
- Evaluate variation and conditioning solutions to determine HR2 specification criteria and OSU test method guidelines

Activity

- Fluke Model VR170 Voltage recorder supplied by Boeing
- Voltage recorder connected to unit power supply for 10 days
- Recorders returned to Boeing for data extraction, compilation, and analysis
- Results shared with FTWG (October 2018, March 2019)



Activities Plan

Phase 1 – Test Plan Development - complete

Phase 2 – Data Collection Ship Date

- Group 1 - June 11th
- Group 2 – July 12th
- Group 3 – August 14th
- Group 4 – September 28th
- Group 5 – November 14th

Phase 3 – Analysis and Sharing

- Results to date – October FTWG Meeting
- Scheduled for Jan 15th – Feb 20th

Voltage Recorder Logistics

Group	Participant	Contact	Package Shipment
1	<u>Jamco-America</u>	Nic Tormohlen	11-Jun
	General Plastics	Jerry Langston	
	<u>Zodiac Heath Tecna</u>	Doug Grimm	
	Krueger Testing & Consulting	Keith Krueger	
	Element Materials Technology	Michael Swisher	
2	HAECO Americas Cabin Solutions	<u>Chad Gadberry</u>	12-Jul
	<u>AccuFleet Testing Services</u>	Shawn King	
	Skandia	Gary Palmer	
	SEKISUI SPI	Nathan Wright	
	<u>Schneller</u>	David Baker	
3	Herb Curry Inc.	Kent W. Wenderoth	14-Aug
	<u>SGS Govmark</u>	Andrew <u>Niemczyk</u>	
	TESTCORP	Jim Nauman	
	<u>CTA (Centro de Tecnologías Aeronáuticas)</u>	Ion Lopez	
	CSIR, MSM, Nonwovens & Composites Laboratory	Steve <u>Chapple</u>	
4	<u>Jamco Singapore Pte Ltd</u>	Lloyd Ernest Lazaro	28-Sep
	AIRBUS	Sebastian MITTELBACH	
	Zodiac Aerospace (SELL)	Daniel Boesser Giuseppe <u>Vece</u>	
	RESCOLL	Nicolas <u>Vanel</u>	
	DGA Techniques <u>Aéronautiques</u>	Camille <u>Riera</u>	
5	Test Center of Civil Aviation Administration of China (CAAC)	Yu Xinhua	14-Nov
	F. LIST	Johannes <u>Steindl</u>	

Questionnaire / Activity Log

Lab and Company Information			
Company:			
Contact Name:			
Email Address:			
Phone Number:			
OSU Manufacture			
Voltage Recording Activity			
	Date	OSU Operation	
		Power ON?	Time of Power ON
Day 1 - Recorder Connection			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			
Day 9			
Day 10			
Questionnaire			
	Yes	No	
Presence of power conditioner?			
Lab adjacent to any manufacturing facility?			
Have you ever experienced difficulties calibrating heat flux density?			
Do you typically need to adjust power settings to the heaters during calibration?			
Anomalies / observations during data collection (please be as specific as possible)			

