

60th Annual Technical Meeting of the Institute of Environmental Sciences and Technology (ESTECH 2014)

Technical Presentations

**San Antonio, Texas, USA
13 – 16 May 2014**

ISBN: 978-1-63439-124-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2014) by IEST
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact IEST
at the address below.

IEST
Arlington Place One
2340 South Arlington Heights Road, Suite 100
Arlington Heights, IL 60005-4516

Phone: (847) 981-0100
Fax: (847) 981-4130

iest@iest.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

CLEANROOM OPERATIONS

The Use of Polymeric Flooring to Reduce Contamination in a Cleanroom Changing Area	1
<i>M. Vaughn</i>	

DESIGNING CLEANROOM FACILITIES

Updated Cleanroom Pressure Differential Criteria and Adaptive Control of Room Pressures	20
<i>W. Sun</i>	

ELECTROSTATIC FORCES AND CLEANROOM PERFORMANCE

Environmental Effects on Corona Ionization	33
<i>L. Levit, G. Weil</i>	
Electrostatic Charge/Discharge Challenges in c-Si PV Manufacturing	42
<i>A. Rudack</i>	
Selection Criteria for Ionization in Clean Room Manufacturing	56
<i>C. Zander</i>	
Corona Discharge Ionizer Interactions with AMC	67
<i>M. Camenzind, W. York, H. Gots, J. Balazs, L. Levit</i>	

FILTER TESTING PART 1

HEPA and ULPA filter Testing with Sodium Flame Photometers	82
<i>F. Jiang, X. Feng, R. Vijayakumar, Z. Yu</i>	
The New "Old" Way to Test HEPA Media	92
<i>T. McDiarmid, D. Largent</i>	
Aerosol Photometry for Filter Testing in the 21st Century - A Need for Change	104
<i>N. Stephenson</i>	

FILTER TESTING PART 2

Filter Standards for Brazil	112
<i>M. Adolph, J. Senatore</i>	

MOLECULAR CONTAMINATION

Clean Manufacturing to Promote Adhesion	121
<i>K. Archuleta</i>	
Holographic Measurement of Real Time Surface Deposition for Cleanroom Monitoring	136
<i>J. Gerbrands</i>	
Analysis of Ionic Containments in Clean Room Environment on Cr Coated Si Wafer	149
<i>Y. Kobayashi, Y. Sasaki</i>	

NANOTECHNOLOGY HOT TOPICS

Removal Efficiency of Carbon Nanotubes from Contaminated Surfaces	154
<i>P. Su, Z. Karimi, S. Hassan, B. Haghpanah, W. Doerr, A. Vaziri</i>	
Vibration Control of the USTC Nanotechnology Center	169
<i>T. Xu</i>	

TESTING AND RESEARCH

New Developments in Particle Deposition Measurement	178
<i>K. Agricola</i>	
Hydraulic System Contaminate Performance Simulation and Optimization Design	194
<i>J. Li</i>	
Trace Metal Analysis of Cleanroom Dry Wipers by ICP-MS.....	204
<i>S. Liu, B. Liu</i>	

USP 797 COMPLIANCE

Cleaning and Disinfection of Cleanrooms.....	217
<i>J. Polarine</i>	
Disinfectant Efficacy Testing	244
<i>M. Rogers</i>	

ACCELERATED TESTING

Introduction to Practical Physics of Failure Test Design and Analysis.....	272
<i>D. Aldridge</i>	
Improving Product Reliability through HALT & HASS Testing of Electronics and PCB's.....	292
<i>M. Chrusciel</i>	
Accelerated Tests Design for Vehicle Carried Systems	307
<i>P. Lelan</i>	

CLIMATICS TESTING

Solar Thermal Load Testing Large Scale Vehicle / Systems Evaluations	317
<i>G. Coonley</i>	
Blowing Sand Test: A Method for Evaluating Sand Concentration Uniformity	330
<i>M. Lucas</i>	
Research on Climatic Chamber Measurement Correction	338
<i>S. Wu</i>	

MIMO PART 1

A Practical Guide To Using MIMO Vibration Control For MIL-STD-810 Single Axis Transport Testing Of Large, Resonant Land Based Military Payloads	356
<i>C. Flynn, A. Williamson, T. Bidwell</i>	

MIMO PART 2

Defining the Global Error of a Multi-Axis Vibration Test: An Application of MIL-STD-810G Method 527 Annex C	375
<i>J. Hoksbergen</i>	
A Revised Algorithm for Controlling a Multiple Input/ Multiple Output Vibration Test	391
<i>D. Smallwood</i>	
Creating MDOF Test Formulations while Maintaining Positive Definite Characteristics.....	399
<i>M. Underwood</i>	

MIMO PART 3

Compensating for Overturning Moments During Horizontal Satellite Vibration Testing.....	409
<i>M. Underwood, T. Keller, R. Ayres</i>	
MESA Random Vibration Testing Plans: Simulation and Practice	422
<i>S. Wu, J. Ye</i>	

PRODUCT RELIABILITY

Introduction to Practical Weibull Analysis	441
<i>D. Aldridge</i>	
Reliability Strategies for Combating Obsolescence Risks	469
<i>C. Tulkoff</i>	
The Step-Down-Stress Accelerated Storage Life Evaluation Methods Of Electronic Products Based On The Arrhenius Model	489
<i>J. Zhou</i>	

SENSOR SELECTION AND DATA PROCESSING

Guidance for the Filtering of Dynamic Force, Pressure, Acceleration (and Other) Signals.....	498
<i>P. Walter</i>	
Using RPs to Assist Sensor Selection.....	518
<i>J. Wilson</i>	

SHOCK TESTING

Building a Legacy for a Family of Damped Piezoresistive Accelerometers through Laboratory and Field Testing.....	523
<i>V. Bateman, J. Letterneau</i>	
Aliasing Error in Modern Data Systems and Applications.....	539
<i>B. Allen, M. Underwood</i>	

VIBRATION AND SHOCK TEST FIXTURES

Fixture Design and Analysis for Vibration, Shock and HALT Tests	549
<i>C. Kiran, A. Gupta, F. Fey</i>	
Author Index	