

HOW MUCH WATER IS INSIDE YOUR HERMETICALLY SEALED ENCLOSURES?



AJA announces a new workshop on

MEASURING MOISTURE AND OTHER VOLATILES IN SEALED ENCLOSURES

For

Package, Product, and System Designers

**Engineers and Managers in Assembly, Production, Quality, and
Reliability**

WHY THIS COURSE?

SINCE THE 1970'S MOISTURE HAS BEEN A PRIMARY CAUSE OF FAILURES IN SEALED DEVICES - INCLUDING...

IC'S

HYBRID SYSTEMS

SEALED OPTICAL COMPONENTS

SEALED NANOMACHINES

MEDICAL DEVICES

BUT QUANTITATIVELY MEASURING MOISTURE IN ENCLOSURES IS CONTROVERSIAL!!

Are my parts really over the 0.5v% limit?



Different labs give different answers!!

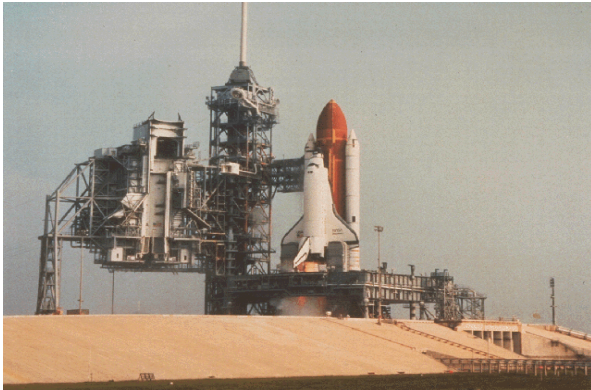


THE WORKSHOP

✓ History	<ul style="list-style-type: none">✓ Background and historical perspective✓ Mil spec development
✓ Failures and Measurements	<ul style="list-style-type: none">✓ Volatiles (H₂O, O₂, H₂, NH₃, hydrocarbons) and failures (corrosion, leakage, dendrites, instability, fogging, and clogging) in hermetics✓ Measurement methods
✓ Systems and Results	<ul style="list-style-type: none">✓ Mass spectrometer systems✓ Interpreting results and case studies
✓ Assurance and Control	<ul style="list-style-type: none">✓ Measurement assurance✓ Hermetic enclosure ambient control

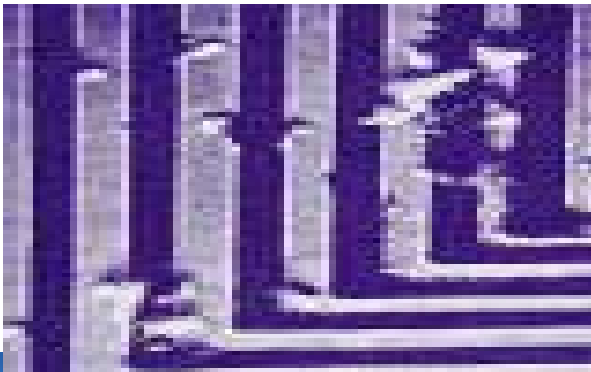
HISTORY

- Background and Historical Perspective



- Moisture failures of the 1960's-1980's
- Why the Trident fleet was almost recalled
- The Space Shuttle launch abort

- Mil-spec Development

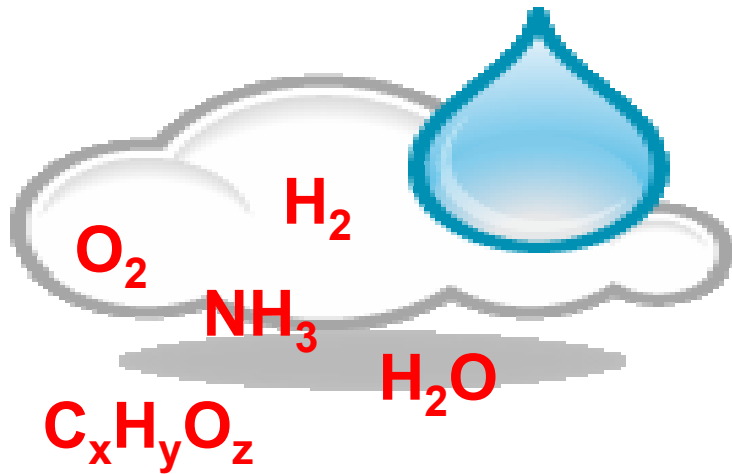


- Test Method 1018 for internal water vapor
- Where the 5000ppmv limit came from



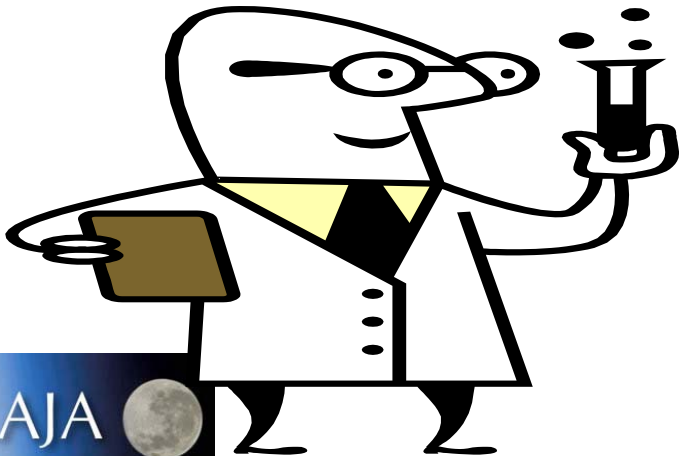
FAILURES AND MEASUREMENTS

- Volatiles and Failure in Hermetic Enclosures



- Moisture: corrosion, leakage, fog, dendrites
- Oxygen: solder degradation
- Hydrogen: instability; moisture generation
- Ammonia: corrosion, dendritic growth
- Condensible hydrocarbons: jammed moving parts

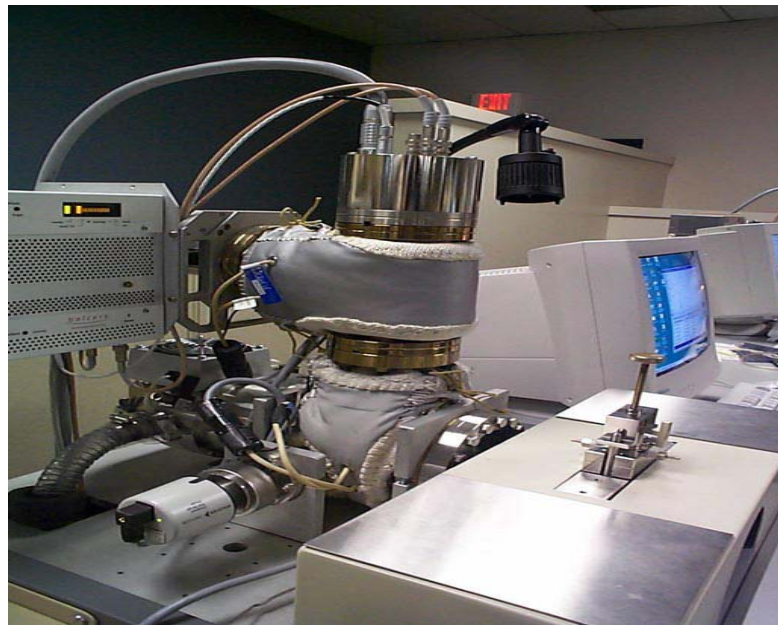
- Measurement Methods



- Three kinds of sensors
- Four kinds of gas phase chemical methods
- Mass spectrometry, the method of choice

SYSTEMS AND RESULTS

- Mass Spectrometer Systems
 - Quadrupole
 - Time of Flight
- Interpreting Results and Case Studies
 - Air, the benchmark
 - Examples from actual analytical data



ASSURANCE AND CONTROL

- Measurement Assurance
 - No primary standards
 - Round robin analyses
 - Inter-lab correlation
 - Single sample cylinder consensus standard
- Hermetic Enclosure Ambient Control
 - Materials selection
 - Pre-seal treatment
 - Gettering



AVOID UNCERTAINTY AND CONFUSION ABOUT VOLATILES IN SEALED ENCLOSURES

- **Select samples**
- **Test and analyze**
- **Understand the data**
- **Avoid product noncompliances and lab disagreements**
- **Most importantly, build dry product**



Contact Us

And we will tailor a workshop so you understand measuring volatiles inside sealed enclosures.

(This and the hermeticity and materials outgassing workshop can be combined in a single dynamic workshop enhancing both your efficiency and efficacy of moisture measurement and control in sealed devices.)

For more information and to discuss call:

Arthur Jonath at +1.650.851.8852

or

**Email us about “MOISTURE”
info@jonathassociates.com**

For other topical workshops and technical services visit

www.jonathassociates.com