

Cargo Compartment Smoke Detector Standard
AS8036 Update

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▶ Background

- FAA Approached SAE to update the AS8036 Standard to include nuisance tests
- AS8036 forms the basis of TSO C1
- Aim is to provide a better standard with the intent of reducing false alarms from smoke detectors
- Current standard hasn't been updated since 1985
- Also has no requirements for Nuisance Testing
- Working group was put together in April/May 2011 to look at updating the document

▶ International Participation

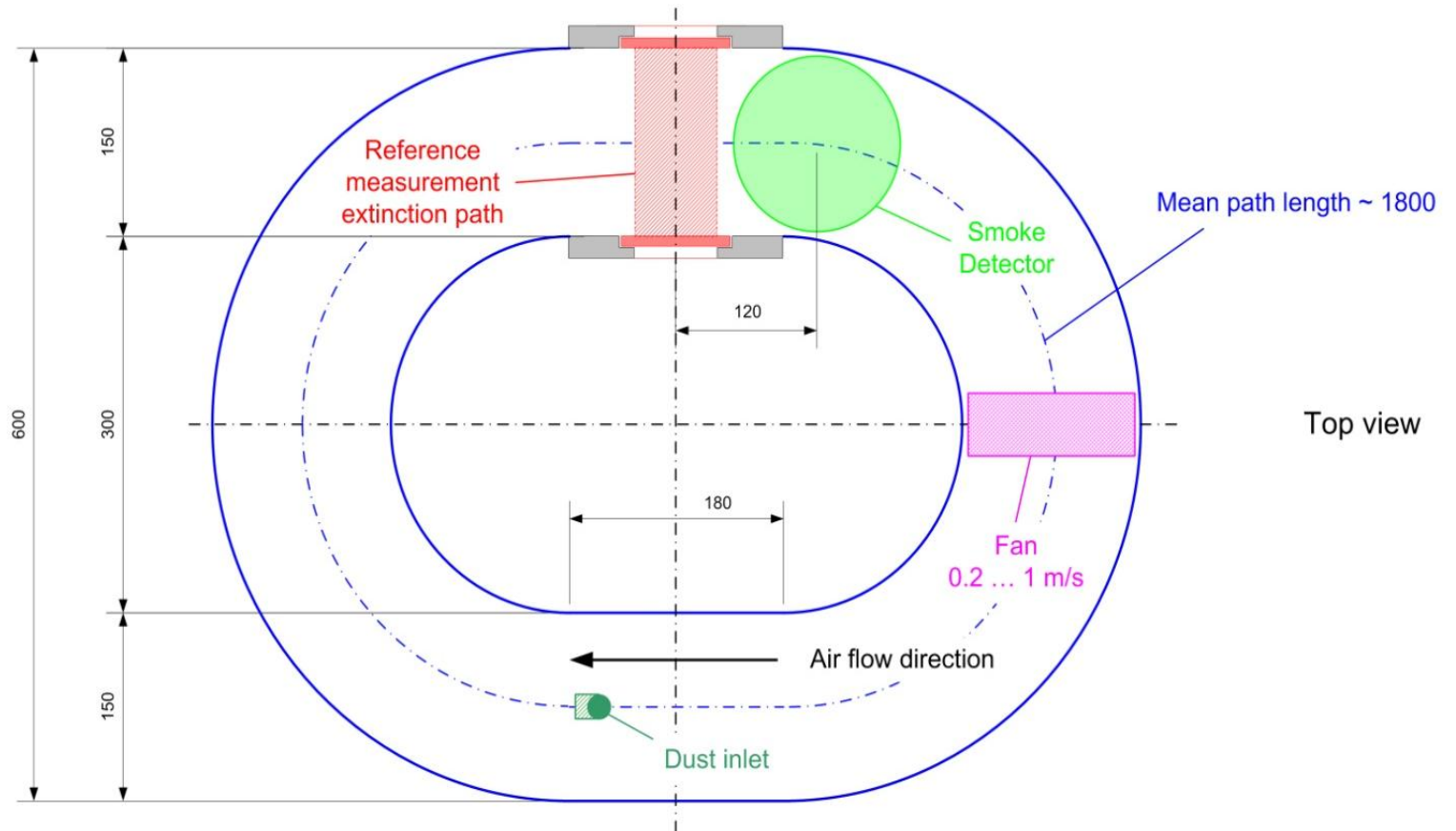
Participants	Organization	Participants	Organization
Andre Freiling	Airbus	Ken Bell (Chair)	Kidde Aerospace
Gerd Welder	Apparatebau Gauting	Ian Campbell	Meggitt Safety Systems
Ulrich Wollenweber	Apparatebau Gauting	Keely Andrews	SAE
Bruce Miller	Boeing	David Alexander	SAE
Stephen Happenny	FAA	Laura Feix	SAE
Joan Hughson	FAA	Bruce Mahone	SAE
Dave Blake	FAA Tech Center	Bertrand Chabaud	Siemens
Larry Lamberth	Honeywell	Loic Frere	Siemens

- ▶ Progress Since Cologne 2012
 - Dust Test
 - Insecticide Test
 - Ambient Light Test
 - Fog Test - Combined Environments

▶ Dust Testing

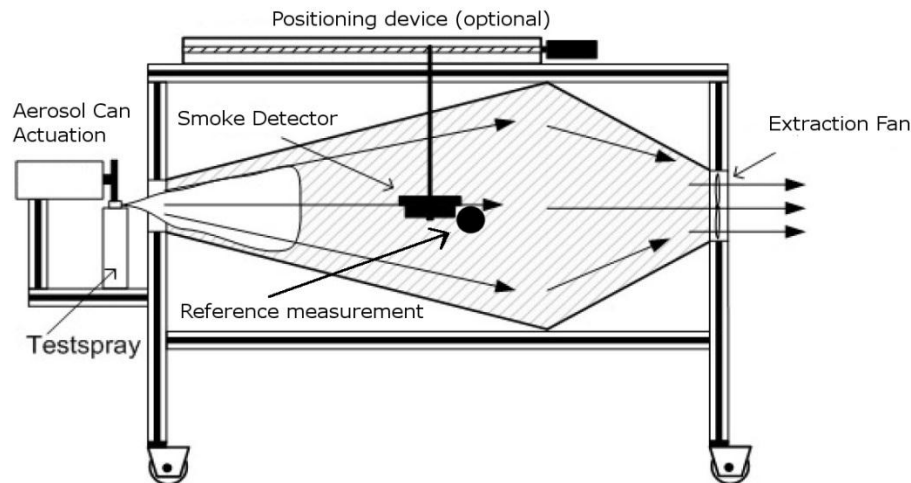
- Originally suggested to be 10%/ft in Cologne
 - Based on peak values from FAATC Tests
 - Unrealistic value, based on consensus – moved to average values from FAATC testing
 - Unrealistic peak value was overly conservative and difficult to show compliance
 - Working group agreed by consensus to move to average values from FAATC testing
- Updated to the following
 - At least 7%/ft Obscuration for Alarm setpoints of $\leq 5\%/ft$ (Obs)
 - +2%/ft (Obs) above $>5\%/ft$ alarm setpoints
- ISO 12103-1 Ultrafine or equivalent
- Calls out /provides details of suggested test apparatus

▶ Dust Testing

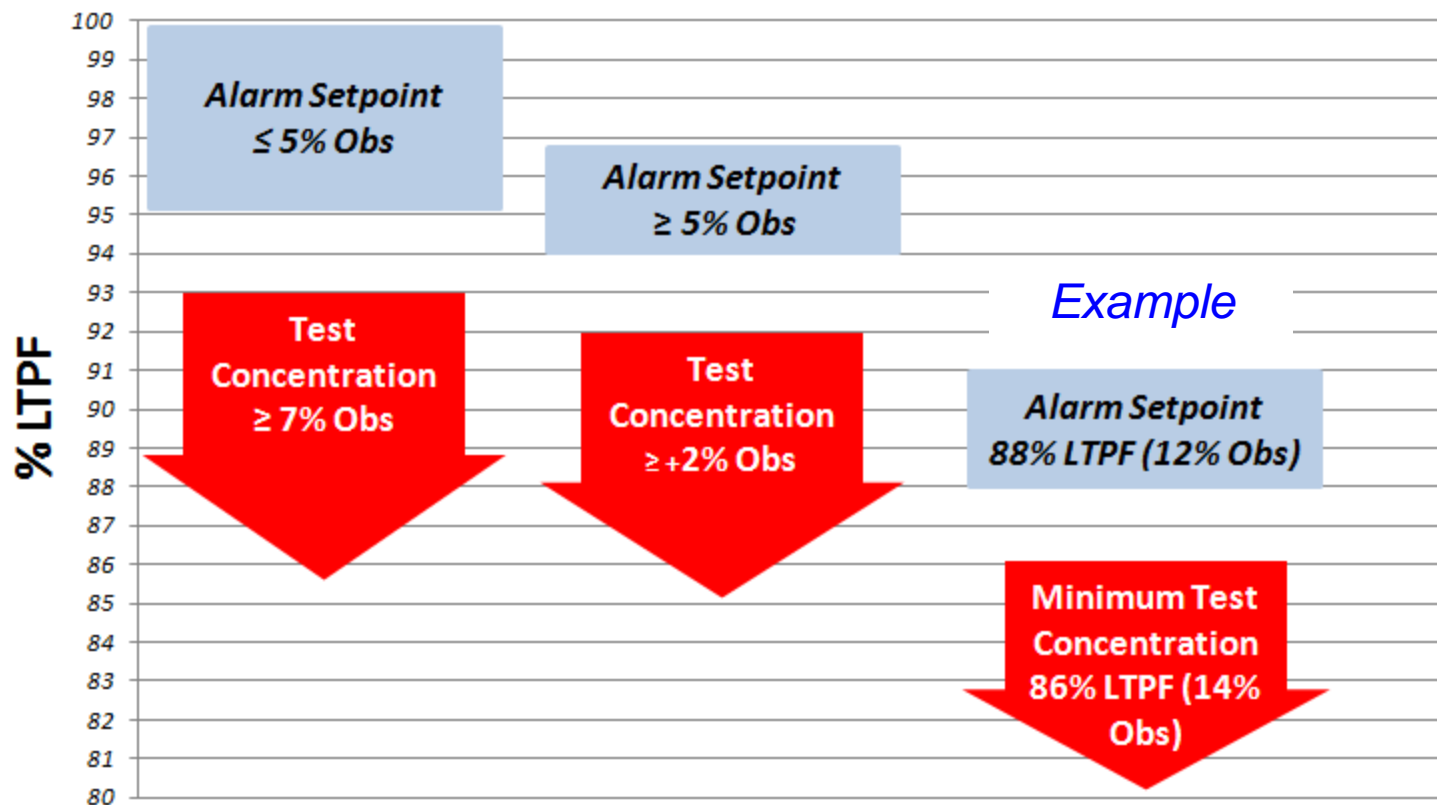


▶ Aerosol/Insecticide Testing

- At least 7%/ft Obscuration for Alarm setpoints of $\leq 5\%/ft$ (Obs)
- +2%/ft (Obs) above $>5\%/ft$ alarm setpoints
- Callington One-Shot or equivalent
- Calls out /provides details of suggested test apparatus



▶ Dust & Aerosol Test Levels Summary



LTPF – Light Transmission Per Foot
LTPF = 100 – Obscuration (%)

▶ Thanks to

- Airbus / University of Duisburg
- AK Brandgas

- Dust / Aerosol Test Equipment was developed as part of a European initiative for standardizing smoke detector testing for Aerospace & building applications (AK Brandgas)

- Equipment designs are supplied for use in As8036

▶ Ambient Light

- Simple Test - *Primary*
 - Using five (5) fluorescent circular tubes
 - Ensure there are no false alarms / faults with the lights on
- EN54 Part 7 (Dazzle Test) - *Alternate*
 - Same as above but measuring smoke / aerosol during the test
- Reason for the two (2) options is due to the EN54 type test not necessarily being readily available in North America

▶ EN54 Part 7

- Actual smoke/aerosol being measured with and without lights on
- Detector is normally rotated 3 times
- No false alarms or faults with the lights on
- Output change with the lights on must be within $M_{min}:M_{max} < 1.6 \text{ dBm}^{-1}$

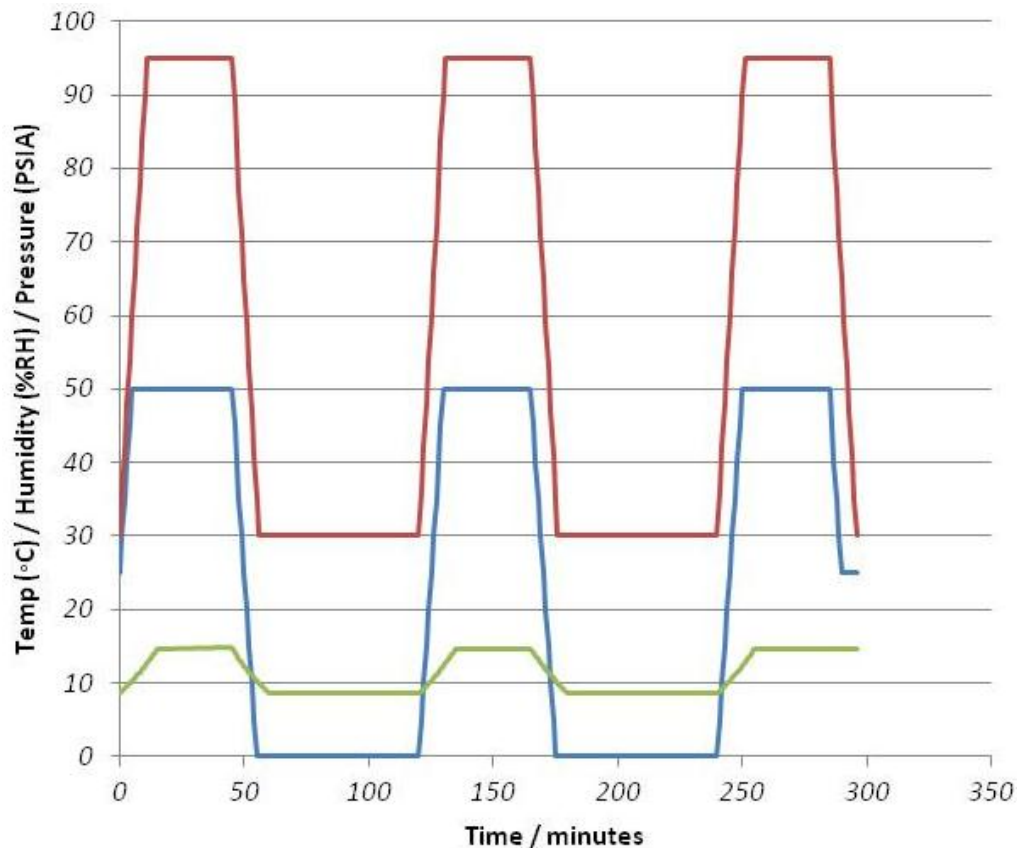


▶ Combined Environments – Modified Mil-Std 810

Procedure

- **Bring the environment to Warm/Moist.** With the test item operating, ramp the humidity to 95 percent relative humidity (RH) at an average 6%/min. Ramp the chamber from 15000 ft pressure altitude to the test site altitude pressure at a ramp rate of 1000 ft/min. Ramp the temperature to 50°C at a rate of 5°C per minute.
- **Warm/Moist Dwell.** Maintain 50°C, site pressure, and 95 percent relative humidity for 30 minutes.
- **Ramp to Cold Altitude.** With the test item operating, ramp the temperature to 0°C at a rate of 5°C per minute. Ramp the humidity to ambient conditions at an average ramp rate of 6% RH/min. Ramp the chamber from the test site pressure to 15000 ft pressure altitude. Perform the pressure ramp at 1000 ft/min.
- **Cold Soak.** Allow the test item to soak at 0°C, 15000ft and uncontrolled humidity for 1 hour.
- **Repeat the cycle two (2) times**
- **Bring to ambient conditions**

▶ Combined Environments



Comment from Loic:

Slide 10: in the graphic, there should be a interval between humidity/temp curves and pressure curve. Pressure always increase or decrease once Temp and Humidity step are stabilized. Otherwise this is not possible to perform. – this is based on the text of the procedure – does it need to change or verbage added to allow for above?

— Temp/C
— Humidity / %RH
— Pressure/psia

- ▶ Combined Environments
 - Not yet tested
 - Planned series of tests to determine suitability / effectiveness

▶ Summary

- AS8036 committee is WebExing weekly
- Achievements so far:
 - Agreement on levels for dust and insecticide
 - Agreement on light test procedure
 - Agreement on insecticide test procedure
 - Fog Test procedure developed (untested)
 - Draft document updated - 90% complete
- To Do:
 - Fog test procedure testing
 - Complete draft and submit to SAE for formal review