
Cargo Compartment Smoke Detector
AS8036 Standard revision
International Aircraft Systems
Fire Protection Working Group
Cologne, May 22-23 2013
Dr. André Freiling, Head of Fire Protection, Airbus
FIRE
DUST
LIGHT
FOG
INSECTICIDE
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AEROSPACE STANDARD

AS 8036

Issued 4-1-85
Revised

CARGO COMPARTMENT FIRE DETECTION INSTRUMENTS

1. PURPOSE: This standard establishes minimum requirements for cargo compartment fire detection instruments primarily for use in reciprocating and turbine engine powered aircraft.

2. SCOPE:

2.1 This standard covers the following types of fire detection instruments intended for use in protecting aircraft cargo compartments, galleys, electronic equipment bays and other similar installations.

2.2 Types:

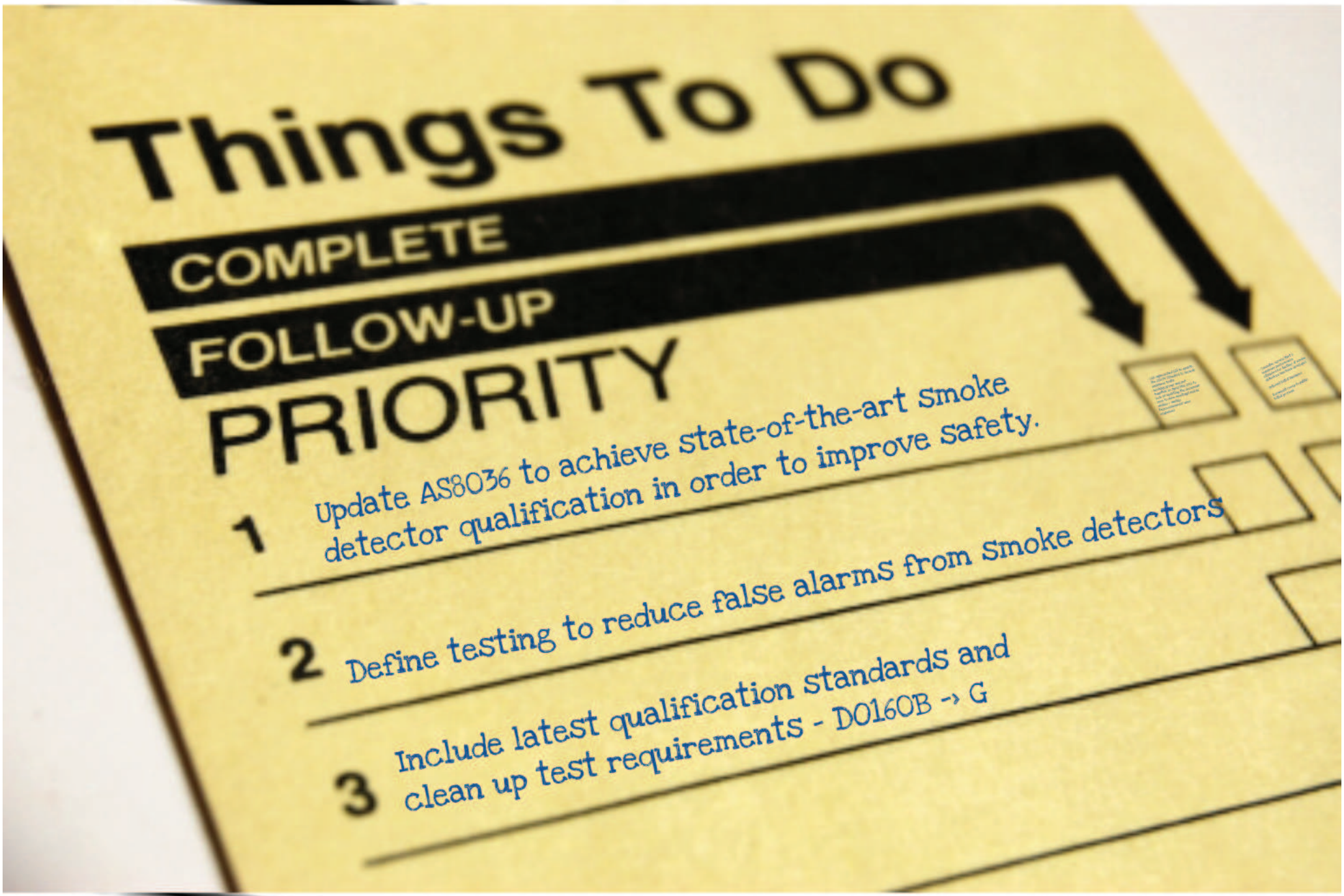
Type I: Carbon monoxide, an instrument which will actuate an alarm signal when the concentration of carbon monoxide in air exceeds a specified value.

Type II: Smoke detector, electronic, an instrument operating on the principle of smoke particles modifying the relationship between a light beam and electronic light sensor which will actuate an alarm signal when the concentration of smoke in air exceeds a specified value.

Type III: Smoke detector, visual, an instrument which, by visual means, will show in a positive manner the presence of smoke when the concentration of smoke in air exceeds a specified value.

Type IV: Smoke detector, electronic, an instrument operating on the principle of smoke particles modifying the current in an ionization chamber which will actuate an alarm signal when the concentrations of smoke in air exceeds a specified value.

Type V: Same as Type IV except maximum operating altitude is 18,000 ft. (5,486 M) when installed in a non-pressurized area.


Things To Do
COMPLETE
FOLLOW-UP
PRIORITY
1 Update AS8036 to achieve state-of-the-art smoke detector qualification in order to improve safety.
2 Define testing to reduce false alarms from smoke detectors
3 Include latest qualification standards and clean up test requirements - DO160B -> G

- FAA Approached SAE to update the AS8036 Standard to include nuisance tests
- Working group was put together in April/May 2011 to look at updating the document
- Face-to-face meetings and bi-weekly / weekly teleconferences were organized

- Commitee agreed that a minimum performance standard for testing of smoke detectors has been developed.
- Internal ballot finalized
- Document ready fo public ballot process

The Committee Team

David Alexander, SAE
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Ken Bell, Kidde
Dave Blake, FAA Tech Center
Ian Campbell, Meggitt
Laura Feix, SAE
Andre Freiling, Airbus
Loic Frère, Siemens
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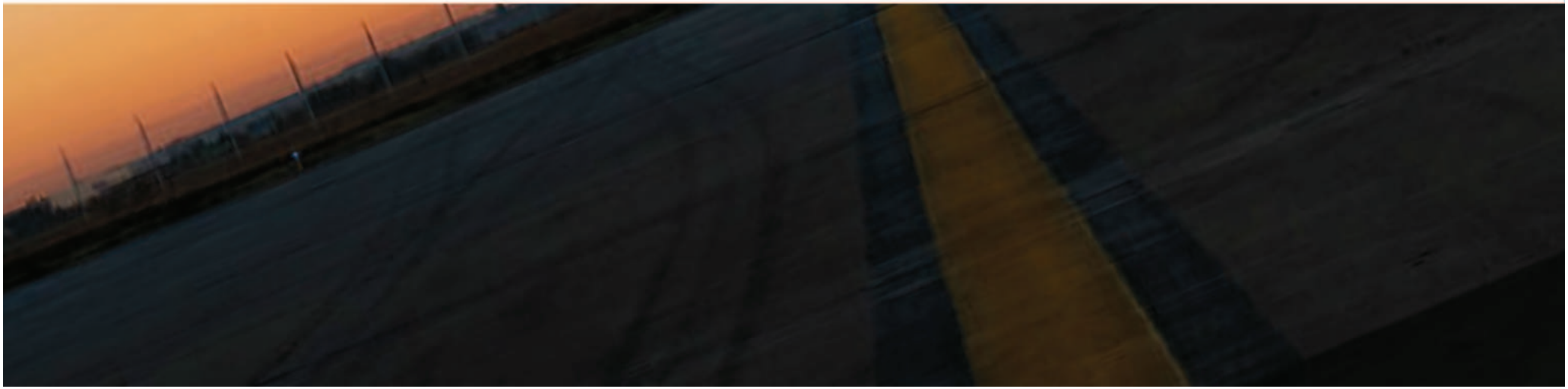
AEROSPACE STANDARD

AS8036	REV. A

Issued 1985-04
Revised 2013-3-5

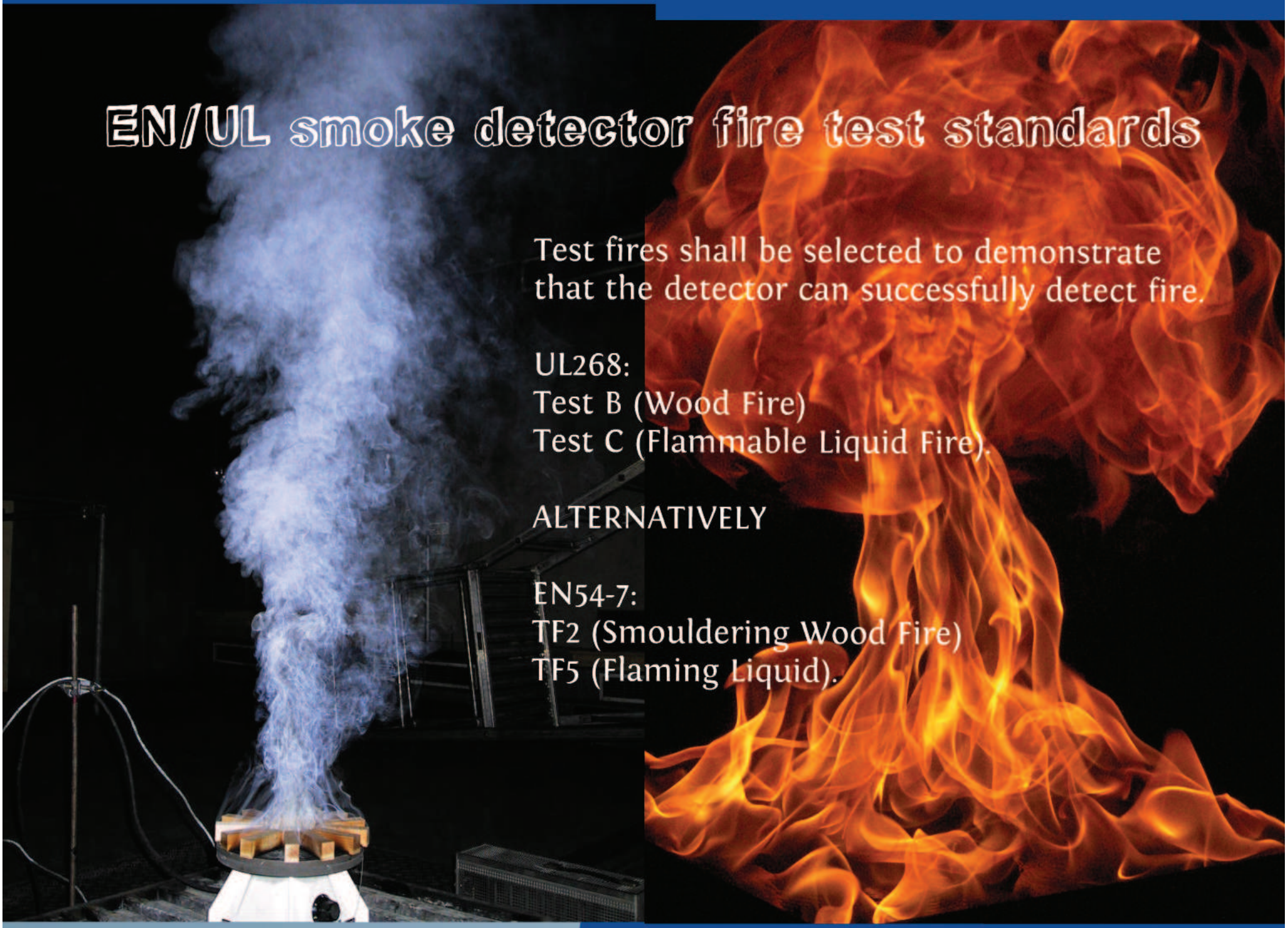
Superseding AS8036

Cargo Compartment Fire Detection Instruments




FIRE

EN/UL smoke detector fire test standards



Test fires shall be selected to demonstrate that the detector can successfully detect fire.

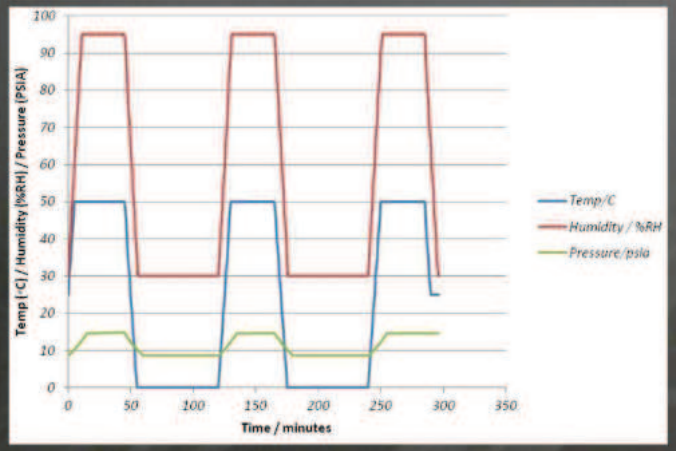
UL268:
Test B (Wood Fire)
Test C (Flammable Liquid Fire).

ALTERNATIVELY

EN54-7:
TF2 (Smouldering Wood Fire)
TF5 (Flaming Liquid).


FOG

Combined temperature, pressure and humidity cycling



Test Procedure

1) Bring the environment to Warm/Moist. With the test item operating, the chamber from the test site altitude pressure to 15000 ft pressure altitude at a ramp rate of 1000 ft/min ramp. Ramp the humidity to 95 percent relative humidity (RH) at an average 6%/min. Ramp the temperature to 50°C at a rate of 5K per minute.

2) Warm/Moist Dwell. Maintain 50°C, site pressure, and 95 percent relative humidity for 30 minutes.

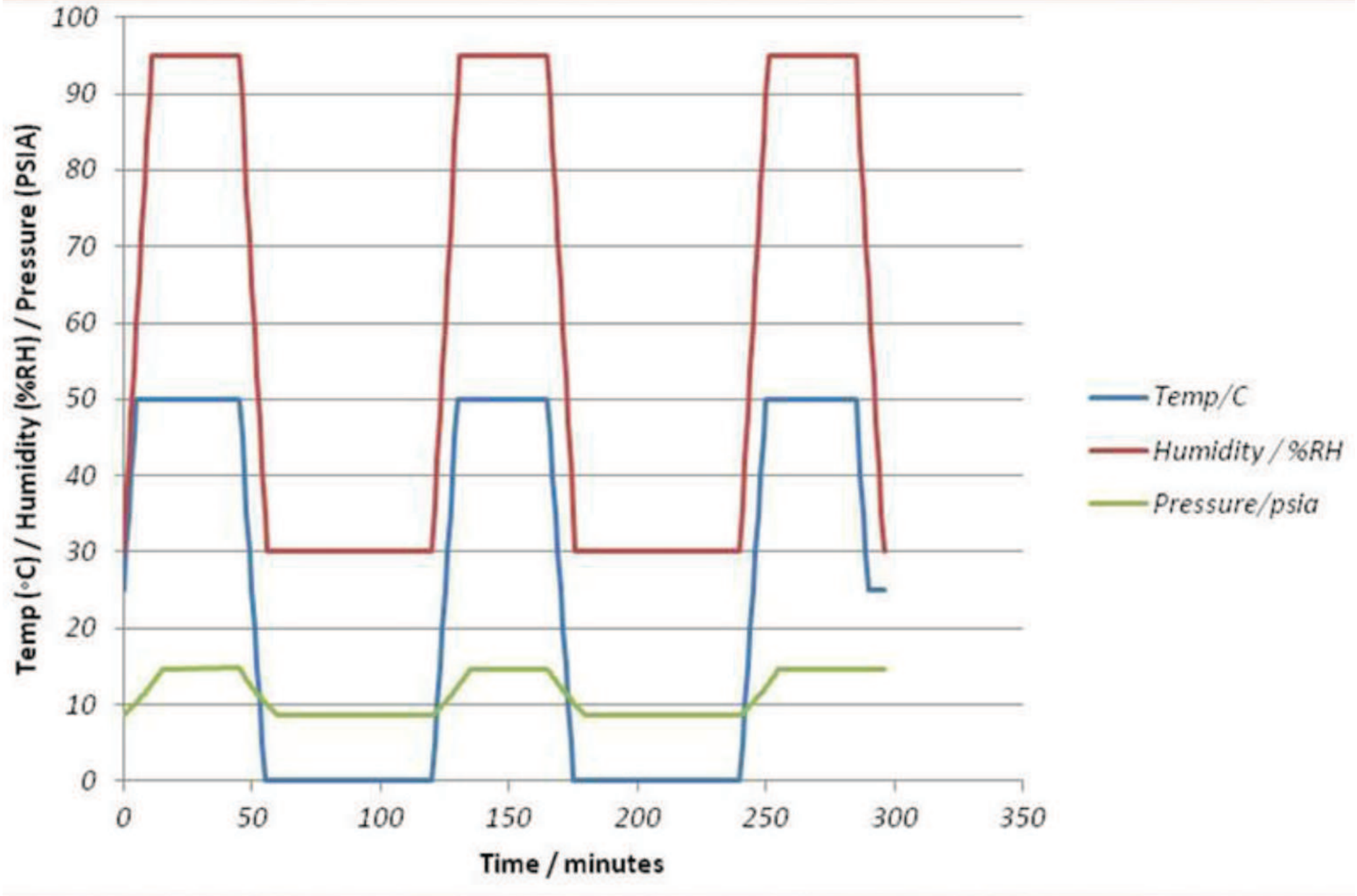
3) Ramp to Cold Altitude. With the test item operating, ramp the temperature to 0°C at a rate of 5K per minute. Ramp the humidity to ambient conditions at an average ramp rate of 6% RH/min. Ramp the chamber from the test site pressure to 15000 ft pressure altitude. Perform the pressure ramp at 1000 ft/min.

4) Cold Soak. Allow the test item to soak at 0°C, 15000ft and uncontrolled humidity for 1 hour.

5) Repeat the cycle (steps 1 to 4) two (2) times

6) Bring to ambient conditions

Note. Depending on equipment capability, temperature, humidity and pressure ramping should be performed as coincidentally as possible.


100
90
80
70
60
50
40
30
20
10
0
Temp (°C) / Humidity (%RH) / Pressure (PSIA)
0
50
100
150
200
250
300
350
Time / minutes
Temp/C
Humidity / %RH
Pressure/psia

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LSNG

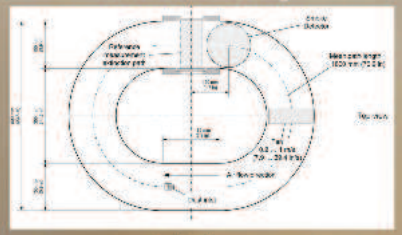
Test Procedure

When subjected to dust [...] the instrument must not suffer a false alarm and operate electrically and/or mechanically, where appropriate.

The test dust shall be ISO12103-1 Ultra Fine or equivalent.

Minimum test concentration: 7%/ft (23%/m). The average test concentration shall be maintained for at least one minute.

Test setup



- reproducible slope
- controlled dust injection
- rotational air spead
- laminar flow


Test campaign at
FAA Tech Center

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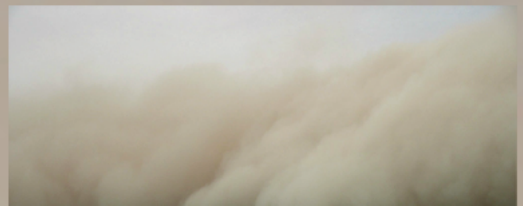
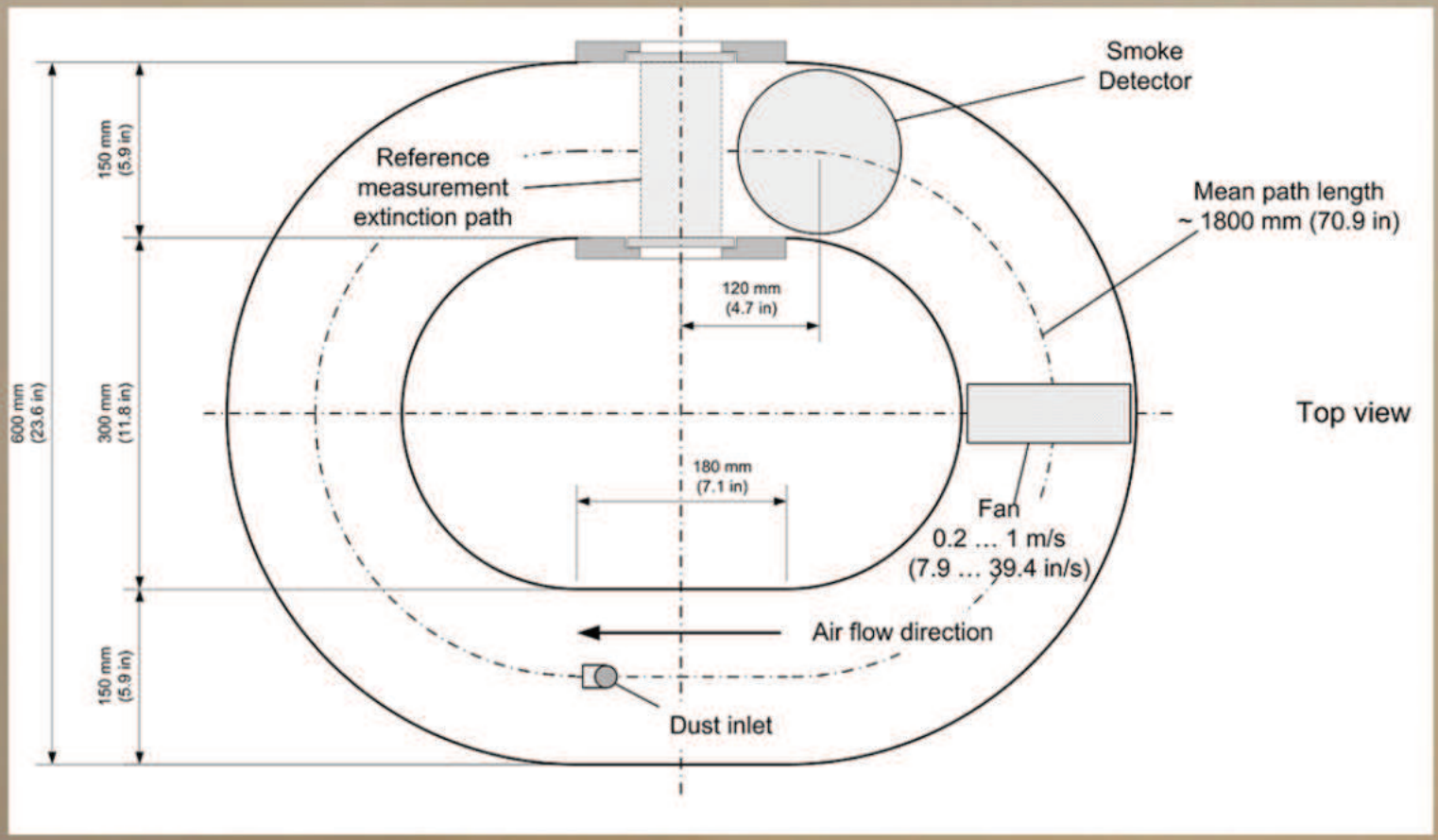


For detectors calibrated to alarm at a smoke level X (where X 5%/ft (16.4%/m)) obscuration, the detector shall not alarm when subjected to a minimum test dust concentration of 7%/ft (23%/m).

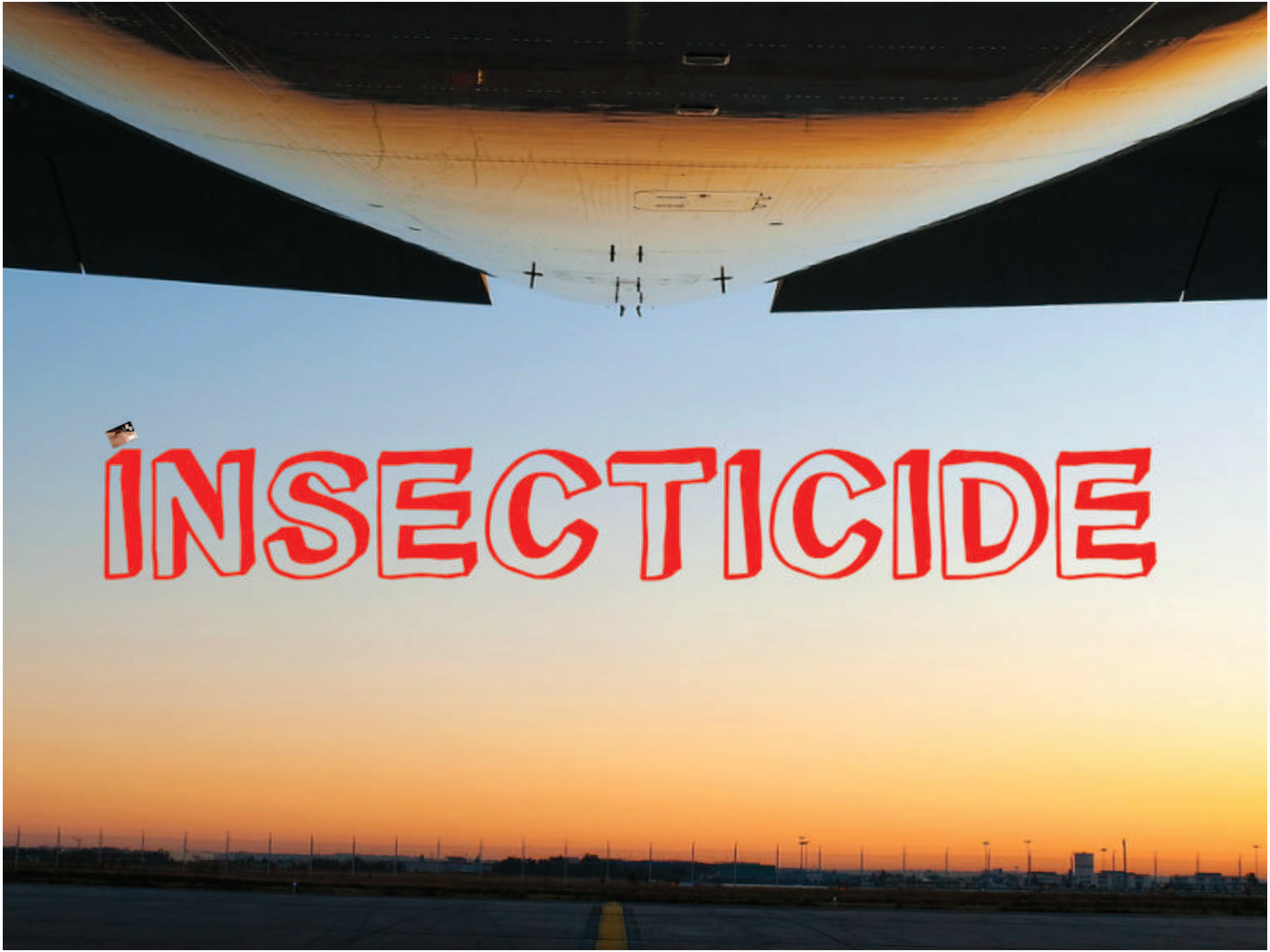
For detectors calibrated to alarm at a smoke level Y (where Y › 5%/ft (16.4%/m)) obscuration, the detector shall not alarm when subjected to a minimum test dust concentration of Y + 2 %/ft (6.6%/m).

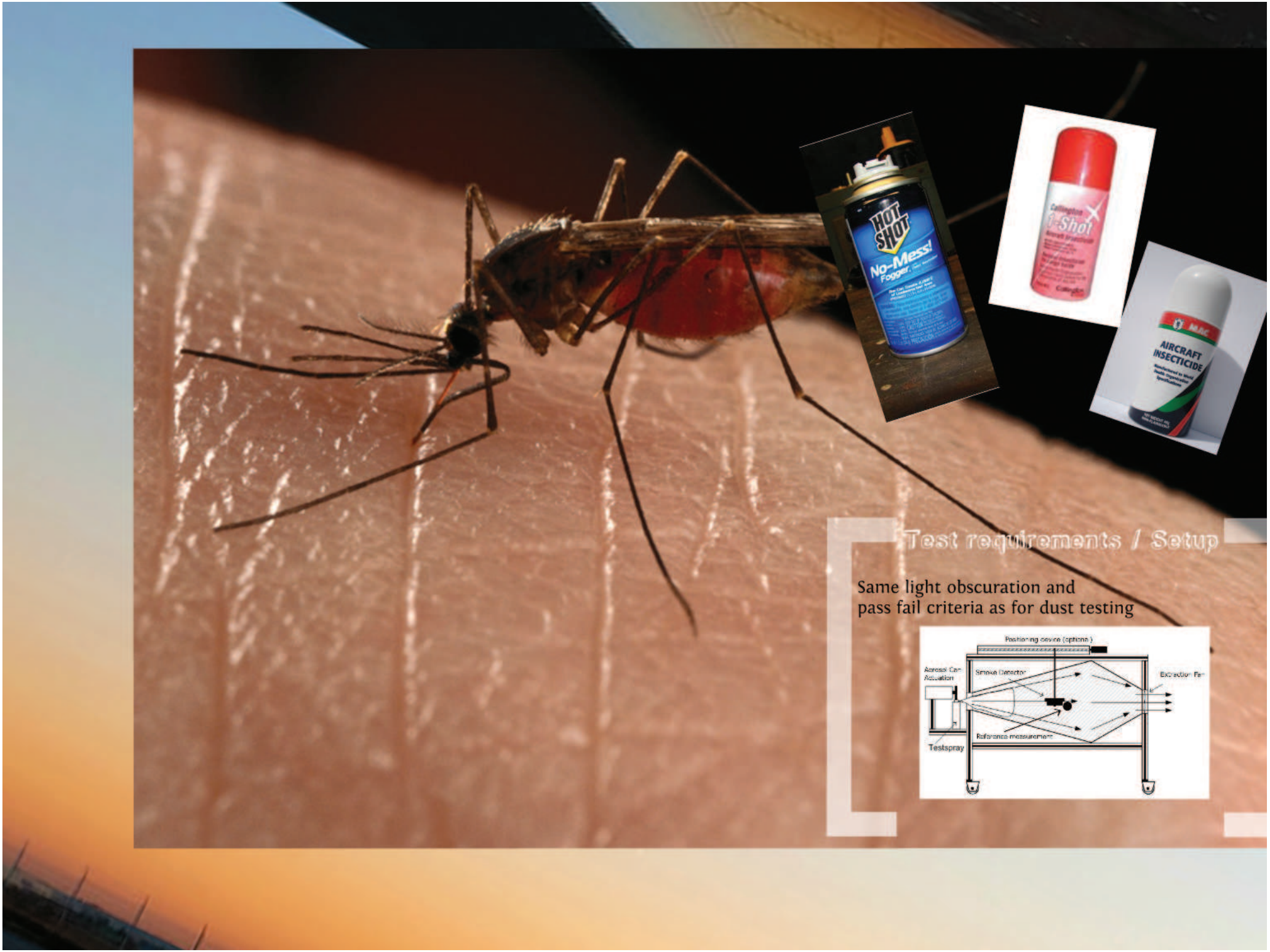
The test shall be repeated 3 times. All consecutive tests shall be passed.

Test setup



- reproducible slope
- controlled dust injection
- rotational air speed
- laminar flow


INSECTICIDE



Test requirements / Setup

Same light obscuration and
pass fail criteria as for dust testing

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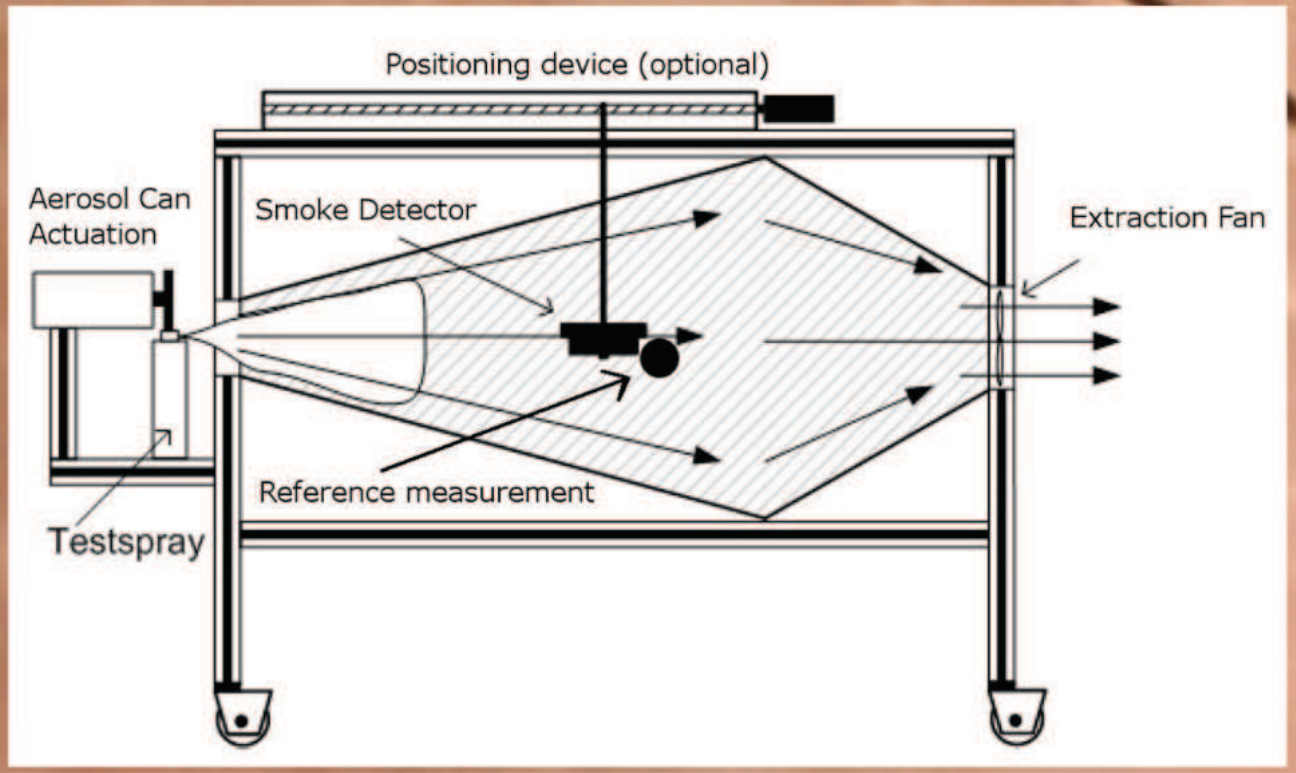
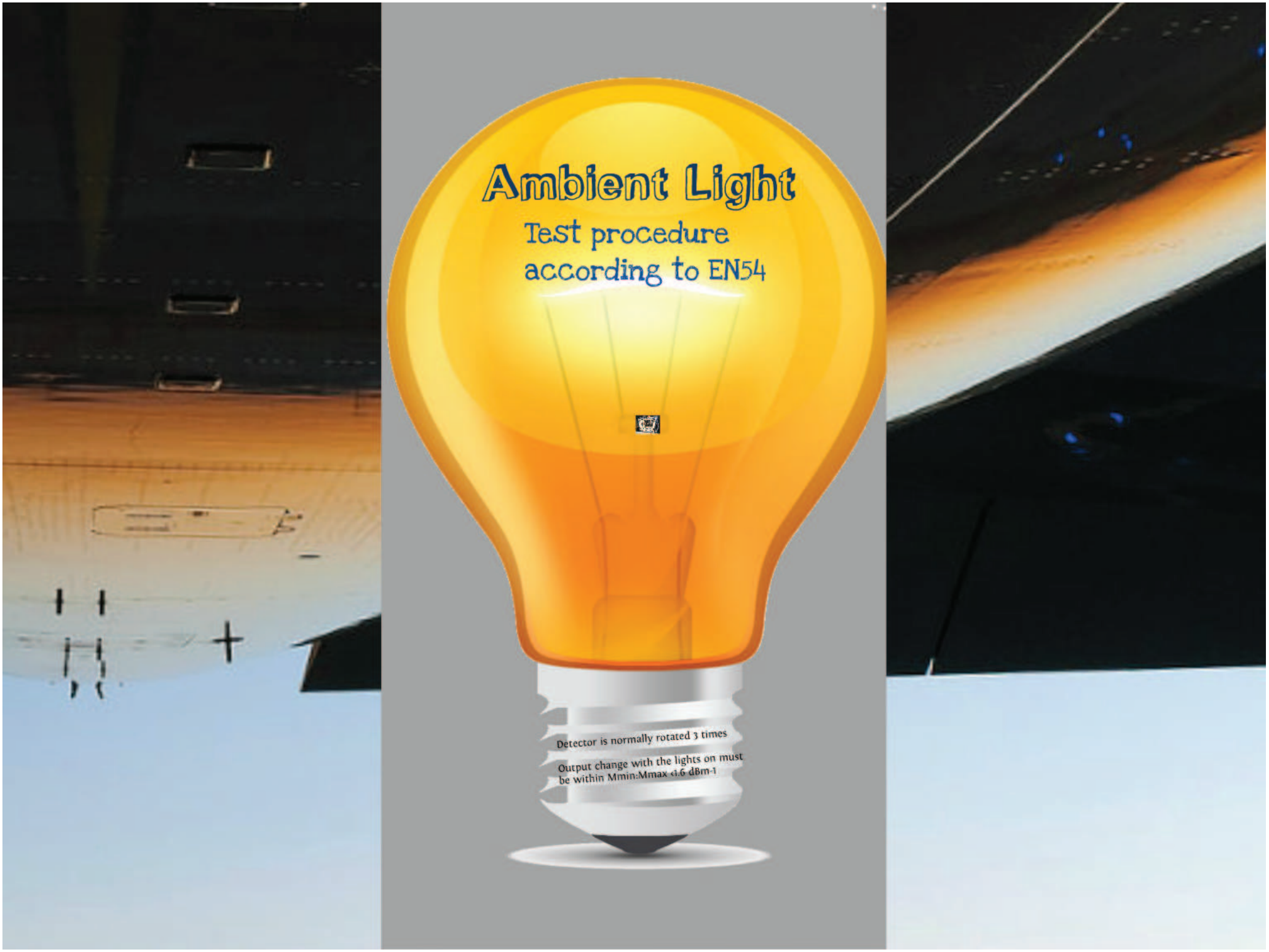
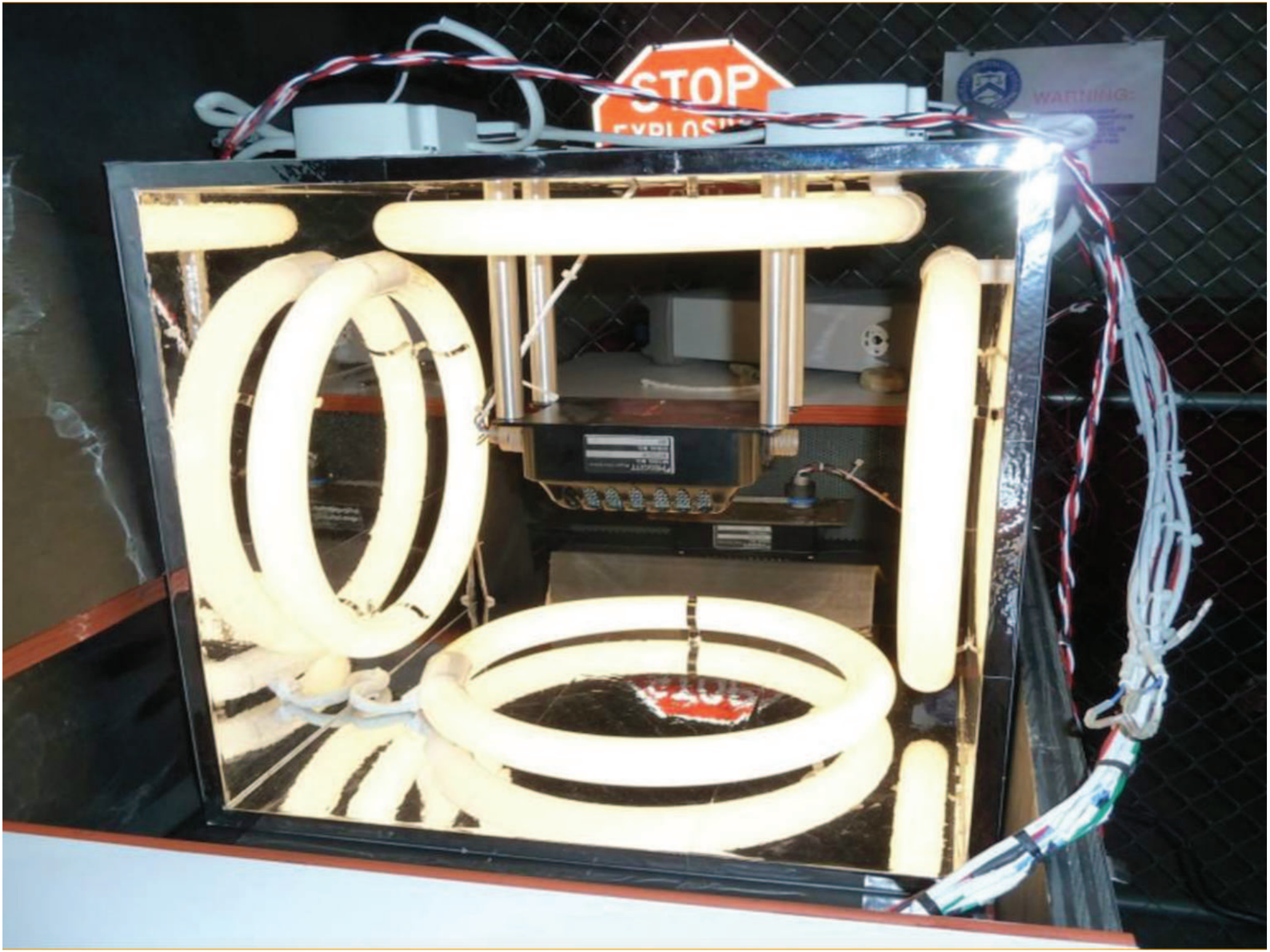



LIGHT
Ambient Light


Ambient Light
Test procedure
according to EN54
Detector is normally rotated 3 times
Output change with the lights on must
be within Mmin:Mmax ‹3.6 dBm-1


STOP


Detector is normally rotated 3 times
Output change with the lights on must be within Mmin:Mmax <1.6 dBm-1

Summary

- AS8036 working committee has finalized the work on the SAE standard
- Public ballot to start
- TSO C1e to be issued after release of AS8036