SAE G-12 Fluids Subcommittee
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AS5901
Proposed Revisions

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What is the AS5901 standard ?

Water Spray and High Humidity Endurance Test Methods

for

SAE AMS 1424 and SAE AMS 1428 Aircraft De-icing/Anti-icing Fluids

AS5901 BACKGROUND

Was originally the
Annex A of AMS 1424 and 1428
Specifications

Published for the first time
In February, 2003

And Now 4 Years later ….

…Needs to be revised…

Two Types of Proposed Changes

1st One General Change

2nd Some Specific Changes

1st Type of Proposed Change

TO HARMONIZE THE STANDARD WITH THE SAE AEROSPACE TECHNICAL REPORT STYLE MANUEL

And the

AMS 1424/1428 SPECIFICATIONS

Establish the uniformization of unit expression

1st Type of Proposed Change (cont.)

Units

g/dm²/hour

g/dm² per hour

→ g/dm²/h

-5 °C ± 0.5 °C → -5.0 °C ± 0.5 °C

2nd Type of Proposed Changes

Some Specific Proposed Changes

Editorial wording changes
in order to
add precisions and/or clarifications

Specific Change # 1 (WSET)

3.2 Water Spray Endurance Test:

... the time for ice formation to reach the failure zone defined as the area 25 mm below the upper edge of the test plate and 5 mm in from either side of the test plate (see Figure 1) or the formation of slush on 10% of plate's surface, when water spray intensity corresponds to …

… This is verified by observation of the untreated or ice catch plate. In order to obtain a valid average icing intensity measurement, the minimum duration of the test shall be at least thirty minutes.

Specific Change # 2 (Table 1)

TABLE 1 - Water Spray Endurance

Air Temperature	-5.0 °C ± 0.5 °C
Test Plate Temperature	-5.0 °C ± 0.5 °C
Test Plate Slope	10.0° ± 0.2° from horizontal
~~Water Spray Intensity~~	5.0 g/dm^2/h ± 0.2 g/dm^2 ~~per hour~~/h
Average Icing Intensity	
Test Duration	30 minutes minimum

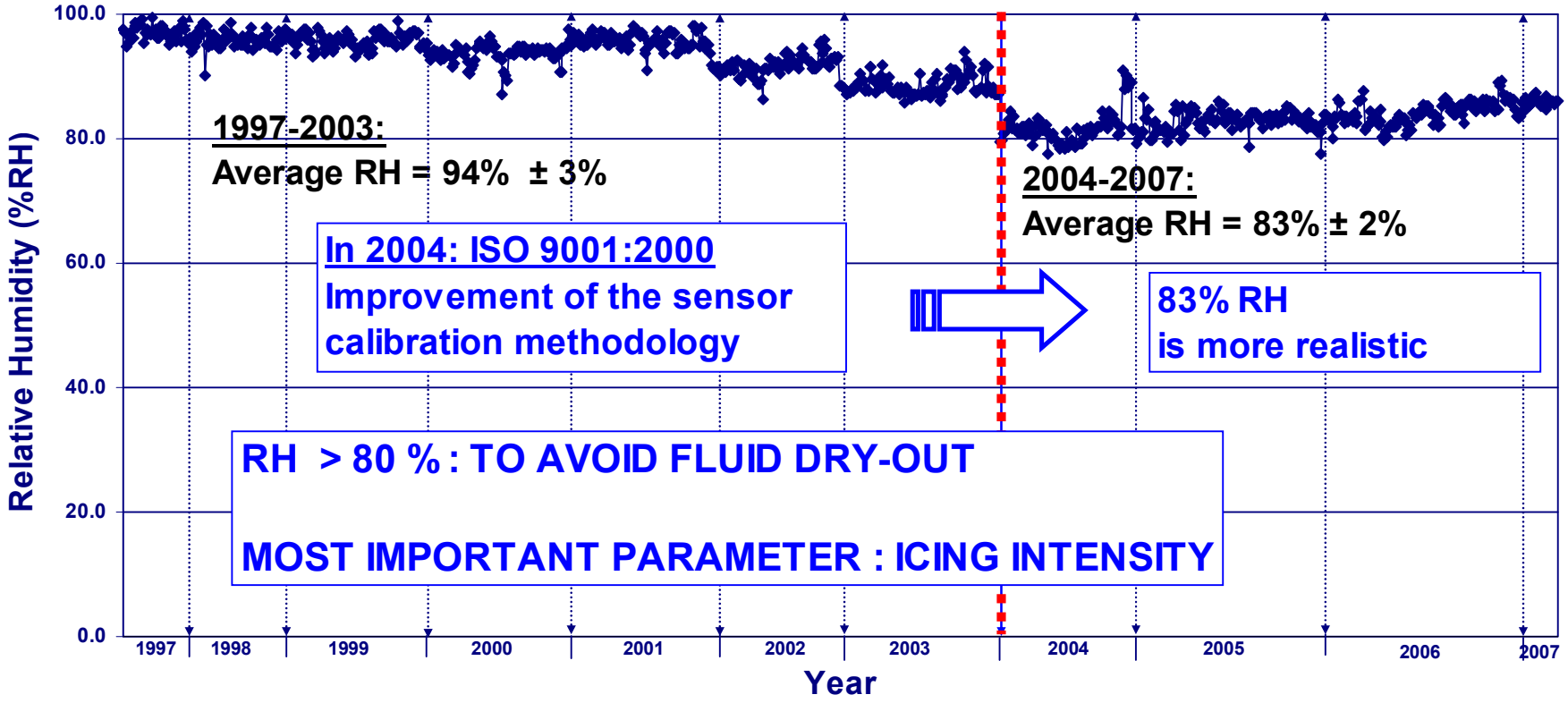
Specific Change # 3 (HHET)

3.3 High Humidity Endurance Test:

…and the Relative Humidity (RH) ~~is 96% ± 2%~~ more than 80%.

It is a fundamental requirement of this test that it be performed ~~the RH value is maintained to an accuracy of ±2% RH~~ in the absence of any visible precipitation (such as mist, fog, or drizzle). In order to obtain a valid average icing intensity measurement, ~~T~~the minimum duration of the test shall be at least two hours. ~~for SAE Type I and Type III, at least four hours for SAE Type II and at least eight hours for Type IV~~.

HHET tests at AMIL
Variation of the Relative Humidity % (1997-2007)



Specific Change # 4 (Table 2)

TABLE 2 - High Humidity Endurance

Air Temperature	0.0 °C ± 0.5 °C
Test Plate Temperature	-5.0 °C ± 0.5 °C
Test Plate Slope	10.0° ± 0.2° from horizontal
Relative Humidity	96% ± 2%
Horizontal Air Velocity	0.20 m/s ± 0.05 m/s
Test Duration	~~Type I :~~ 2 hours minimum ~~Type II, III, IV : 4 hours minimum~~
~~Frost Accumulation~~	0.30 g/dm^2/h ± 0.05 g/dm^2 ~~per hour~~/h
Average Icing Intensity	

Specific Change # 5 (Test Chamber)

4.2 Test Chamber:

One test chamber can be used to perform both WSET and HHET tests if it meets both of the environmental requirements described as follows:

4.2.1 WSET Test Chamber:

~~4.4.2~~ 4.2.1.1 Example of Spray Equipment:

4.2.2 HHET Test Chamber:

~~4.5~~ 4.2.2.1 Humidity Control Equipment:

Specific Change # 6 (Test Plate)

4.3 Test Plate:

… average surface roughness of ~~0.1 to 0.2~~ ≤ 0.5 µm Ra.

- Should have been added in the AS5901 (2003) : Error
- This change was accepted in the AMS 1428D (2002)
  (AMS 1428D should have been used as a reference)
- Included in the ARP 5485 (2004) : ≤ 0.5 µm Ra
- Wrong reference was used for the first issue of AS5901
  0.1 to 0.2 µm Ra comes from AMS 1424D (2001)
- Refer to the report presented to TC : TP 14161E

EFFECT OF PLATE SURFACE FINISH ON
ANTI-ICING ENDURANCE TIME

Specific Change # 7 (Test Description)

6.4 Test Description:

Pour the fluid onto each test plate in turn in the order shown in Figure 4. Cover the test plates with a protection shield and ~~S~~start the timing device. ~~after five minutes~~, ~~t~~Turn on the water spray or humidity generator and wait five minutes as an equilibration time. Remove the protection shield, observe the panels and, when the ice front touches the failure zone (or the formation of slush on 10% of plate's surface), record the time of this event...

Conclusion

AS5901A will be submitted for ballot this summer

Thank you !!

Questions / Comments ?