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15. Supplementary Notes (Funding programs, titles of related publications, etc.)

Several research reports for testing of de/anti-icing technologies were produced for previous winters on behalf of Transport Canada. These are available from the Transportation Development Centre (TDC). Nine reports (including this one) were produced as part of this winter's research program. Their subject matter is outlined in the preface. This project was co-sponsored by the Federal Aviation Administration.

16. Abstract

Deicing procedures commonly used by field operators and based on SAE ARP 4737 assume that deicing fluids mixed to fluid freeze points (FFP) not more than 3ºC above ambient temperature will provide at least three minutes of protection time. In a two-step procedure, this allows time for the application of the second step anti-icing fluid. However, SAS Braathens reported an incident where ice was found on a wing following takeoff. The aircraft had been deiced and anti-iced using this procedure, which led the operator to question the 3 minute assumption and the adequacy of the fluid freeze point buffer.

In response to the reported incident, APS reviewed data it had previously collected. While APS found that previous research did not support changing the minimum FFP buffer in the Type I application procedure, some experts suggested that further research on the subject was required. APS therefore undertook a research project in the winter of 2005-06 to determine the effect the FFP buffer of first-step deicing fluids has on protection time. Tests were conducted with fluids mixed to -3ºC, 0ºC and +10ºC FFP buffers in natural and simulated precipitation.

The status quo -3ºC FFP buffer fluid generally provided protection for at least three minutes, but showed weakness in cold temperatures and under high precipitation rates. In conditions where it provided less than three minutes protection time, fluids with higher FFP buffers provided only minimal improvements. This supported the premise that an increased FFP buffer gives longer protection in conditions when it is not needed, but little increase in protection when it is needed.

It was recommended that the current application procedure (-3ºC FFP buffer fluid) remain in place and that operators wishing to follow a more conservative approach may choose to increase the FFP buffer of first-step fluids.

A supplemental test indicated that if diluted Type I fluid freezes to an aircraft surface, it will dissolve after Type IV fluid has been applied.

17. Key Words	18. Distribution Statement
Anti-icing, deicing, deicing fluid, holdover times, precipitation, endurance times, Type I, aircraft, ground, test, winter, buffer, fluid freeze point, application procedure	Limited number of copies available from the Transportation Development Centre

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