

Deicing Fluid Holdover Times

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Many of you have responded to the November/December 2000 *Air Line Pilot* article on deicing. In particular, many questions were raised about the information regarding the reduced holdover times of Type I deicing fluids.

First of all, the article was factual in its content. Outdoor testing of Type I fluids in snow did produce holdover times as low as two minutes. This is not news. We have seen data below the previous lowest limits before. What is news, though, is that the entire range was driven down because so many data points fell below those low limits in the testing.

As a review, holdover times are not scientifically derived. Data is collected, and then a committee debates and votes on what the range should be. Obviously, each member on this committee comes with their own personal ideas and biases, the idea being that the varied biases will balance. The results of this are holdover times published with warnings and disclaimers.

Based on the subjective nature of the debates, the Holdover Time Committee embarked on a program to use mathematical formulas to interpret the data. Initially, this seemed to work well, as it did take some of the subjectivity out of the work, while validating the original six-to-15-minute range for snow. However, with the testing that was done this past year, the original interpretations did not hold up. A logical question would be: Why has the data changed, since the fluids are the same and the conditions and test procedures are the same? The answer is that there are over 50 variables that affect holdover times, and many of those variables came into place.

Based on these latest studies, the SAE Aerospace published new Type I tables with new reduced holdover times. Normally, the FAA accepts this data and approves the use of the tables in the airlines' deicing program. In a surprise move, both the FAA and Transport Canada have decided to ignore these new holdover times, simply publishing the old ones. Most air carriers, including US Airways, have followed suit. What is even more surprising is that the representatives from the FAA and Transport Canada are the co-chairmen of the Holdover Time Committee! They have chosen to ignore the results of their own work.

While your ALPA representatives believe that the new times should be used, it's the typical good news, bad news scenario. While the use of the longer six-to-15-minute range gives you more flexibility to use your judgement if the snow is extremely light (low water content), the time is still relatively short so that Type II or Type IV fluid would be the logical choice for almost all snow conditions. On the downside, it is easy to fall into the Type I fluid trap when you think that you need a very short holdover time only to be unexpectedly delayed at the runway. That is why it is important to be aware of these new testing results.

It is important to note that these new holdover times highlight the limited holdover capacity of Type I fluids. Equally important is that the effectiveness of Type I varies greatly. When Type I fluids fail, they fail very quickly. I have personally witnessed fluids on a test airplane go from a slushy consistency to solid ice in approximately 30 seconds. The failure of Type II and Type IV fluids do tend to be more gradual.

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However, the upper end of the holdover range appears to be subject to a good deal of variability.

Realizing that our deicing program has evolved a great deal over the last eight years, and that we are fortunate to have many new hires with us, the following guidelines are intended as a historical update for those new to the program and a review for the rest of us:

- Holdover times are only a guide. Fluids may fail prior to the shortest time in the range.
- Type I fluids have limited holdover capability and fail quickly.
- Type I fluids are applied heated and at high pressure. The heat and pressure make them effective as a deicer. Regardless of pressure, only a thin film remains, resulting in limited holdover protection.
- The proportion of fluid to water in Type I *does not* affect the holdover capabilities.
- Type II and Type IV fluids are normally applied at ambient temperature and low pressure. A thicker film remains, resulting in greater holdover capability.
- Stall angle of attack is reduced with a contaminated wing, which is why we have special takeoff procedures in the F-100.

- Most transport aircraft stall at approximately 15 degrees angle of attack. A rotation to 15 degrees pitch in an aircraft without slats will result in approximately 15 degree angle of attack until the flight path changes (see previous bullet point).
- Only the crew has the full situational awareness during deicing. You have the full responsibility of determining the type of fluid necessary.
- We may not operate in moderate or heavy freezing rain, or heavy snow.
- Type II or Type IV fluid is required for light freezing rain or freezing drizzle.
- The water content of the precipitation determines our deicing fluids' holdover capability. This is why we adjust the reported intensity.

US Airways pilots are among the most knowledgeable in the industry. Because of this, you have asked many questions. We hope that this article has helped. Thank you for your continued professionalism.

