Frost is an important consideration in aircraft deicing. The irregular and rough frost accretion patterns can result in a significant loss of lift on critical aircraft surfaces. This potential hazard is amplified by the frequent occurrence of frost accretion during winter airport operations. Testing was conducted by APS to substantiate the fluid holdover times currently issued in the HOT Guidelines.

Data from tests performed over the last six winters measuring fluid endurance time on flat plates during natural frost conditions were analysed. The results indicated that for Type I fluids, the measured endurance times do not violate the long used HOT of 45 minutes. The results also indicated that for Type III fluids, the issued HOT is satisfactory. The endurance time data collected for Type II and Type IV fluids indicated HOT reductions were necessary; fluid failure was experienced prematurely and was a result of the fluid and plate temperature reaching the fluid freeze point rather than a typical failure occurring as a result of fluid dilution. Results from 2008-09 testing in the wind tunnel and with the full-scale JetStar wing support the previously collected flat plate results which indicate a need for reductions to the current Type II and Type IV HOT’s.

A separate frost table has been added to the HOT guidelines which will include changes to the temperature ranges to allow greater flexibility for fluid use and to minimize the operational impact of necessary HOT reductions. Use of fluid dilutions will not be restricted; however, HOT reductions will apply when nearing the fluid lowest operational use temperature (LOUT).