ALTERNATIVE CLEANING TECHNOLOGIES

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Upholstery used on airplane seats is predominantly wool because of its aesthetic properties (comfort, color palette, etc.), durability, and ability to meet FAA flammability requirements when fire retarded. Airlines must either replace or clean soiled upholstery. After cleaning, it must still meet FAA flammability requirements. Traditionally dry cleaning with perchloroethylene (perc) has been the method. Perch does a good cleaning job and does not adversely affect available Zirpro fire retardant, as many cleaning solvents do. However perch is an environmental polluter and must be replaced. This research is Phase III of a 4-part study to ensure airline customers can maintain their 'continued compliance' to the seat fire blocking test after multiple cleanings in a commercially available process. This paper reports work done to evaluate three alternative cleaning technologies: DF-2000 (a hydrocarbon solvent from Exxon), GreenEarth® (a polysiloxane primarily from GE), and professional wet cleaning using specified detergents & conditioners to maintain dimensional stability. FAA flammability tests (12-sec vertical Bunsen burner and oil burner seat fire block) were run on upholstery material before and after 10 cleanings. Three fire hardened foams are evaluated and compared to the 2000 (phase II) study which incorporated identical materials and technologies with a fireblocked foam. The results of the dimensional and seat fire blocking studies conducted by WRONZ (Wool Research Organization of New Zealand) will be included if the information is available.

Preliminary trials with commercially available related technologies included various detergent types, and processing parameters to ensure materials would not shrink unnecessarily due to an inappropriate cleaning cycle or fail the seat fire blocking as result of chemical components in the detergent/conditioner, thus effecting the outcome of the tests. The FAA participated in the study by underwriting a portion of the Phase II research, and in Phase III by providing a videographer, the use of their burn test facilities and an engineer to run the test equipment.