

DEVELOPMENT OF A FLAME PROPAGATION TEST METHOD FOR INACCESSIBLE AREA MATERIALS

Robert Ochs

A lab scale fire test method is desired for the certification of composite transport airplanes to simplify the current certification method of Special Conditions that is used to demonstrate that a composite airplane is at least as safe as an aluminum airplane in the event of an inaccessible fire in-flight. Material performance data from intermediate scale hidden fire tests was used to correlate lab scale performance. A test apparatus was constructed consisting of a vertically mounted coil furnace facing a 6-inch by 12-inch test sample and a six-flamelet uni-directional pilot burner. Heat flux transducers were mounted in the test sample plane and the furnace was tuned to deliver a similar heat flux gradient as was measured in the intermediate scale test rig. A pilot flame impingement time was determined from the duration of the foam block temperature rise and fall, about sixty seconds. A general correlation between intermediate- and lab-scale tests was found. Multiple test apparatuses were constructed and tested in different laboratories to determine repeatability and reproducibility. The method is currently being investigated for use in testing other inaccessible materials including ducts, hoses, and wire insulation.