Title

Discussion on the Effect of Airflow Variation on Material Heat Release Results

Presenter

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Abstract

In an effort to improve the consistency in the reported Heat Release Results required for a given material, as required for certification per 14 CFR 25.853(d), a multitude of experiments were performed focusing on the effect of airflow variation. A large sample of laboratories internal to Boeing and throughout the industry contributed to the study. It was determined that varying the total airflow into the OSU as well as varying the split ratio between bypass and chamber airflows will both result in different heat release results.

An examination of why the airflow may be unique in each individual laboratory was also undertaken and found that additional contributing factors included but were not limited to different geometries of the piping system setup, different input pressures, orifice plate variation, and specification tolerance creep. The effects of these factors are being studied and results are intended to be used for the dual purpose of improving the OSU consistency, and act as contributing data inputs to the development of future flammability test methodologies such as the HR2.

Although airflow has been determined to be a large variable in the results, a recent discovery by the Boeing team also shows there is a contributing variable in the fluctuation of supply voltage (reference presentation by B. Johnson et. al). At the time of this submittal, there is an intent to perform a series of validation studies that will determine the weight of each variable (airflow & voltage fluctuation), with the hypothesis that the interaction between the two will be evident in the statistical analysis of the heat release results.

The above studies are being performed in order to provide industry with a repeatable and scientifically sound methodology of developing and reporting heat release results. The direct benefit is an increase in the understanding of each material's true performance under post-crash flammability conditions thereby improving the survivability of such an event.