The Fire Safety Hazard of the Use of Flameless Ration Heaters On Board Commercial Aircraft

Flameless ration heaters (FRH) are devices used for the flameless cooking of a self-heating meal known as Meals, Ready to Eat (MRE). The technology behind flameless ration heaters is based on a combination of food grade iron and magnesium. When salt water is added to the iron-magnesium combination, the mixture results in an exothermic reaction, reaching temperatures of up to about 100°C in a relatively short amount of time. This rapid rise in temperature is used to then cook the MRE. They are used extensively by the military as a method of providing meals to soldiers while in the field; however, they are finding their way into other uses, and are now being used by campers, boaters, disaster response teams, etc. The potential use of these devices on board aircraft became of concern due to the high temperatures reached, as well as the release of hydrogen that occurs during heating of the meals.

Researchers performed experiments to determine if the amount of hydrogen generated during the heating of these meals would pose a fire safety threat to a commercial aircraft. Tests were performed with individual MREs under varying conditions in an open area, as well as multiple MREs placed in a confined space to examine the potential hazard associated with their use in an aircraft cabin, or the accidental activation of FRHs in a confined area aboard the aircraft such as in overhead storage bins or a cargo compartment. Temperatures in excess of 215°F and violent ignition events were observed, making it clear the release of hydrogen gas from these MREs is of a sufficient quantity to pose a potential hazard on board a passenger aircraft. Results of the testing was published in FAA Report DOT/FAA/AR-TN06/18, “The Fire Safety Hazard of the Use of Flameless Ration Heaters Onboard Aircraft”.

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