

"Updated Experimental Investigation of the NexGen Burner"

The NexGen (Sonic) burner is the new burner developed by the Federal Aviation Administration Technical Center, FAATC, to replace old oil burners used for the required fire certification tests on powerplant related materials, as it provides the capability to control the both air and fuel flow rates. Parametric research was conducted on the NexGen burner at University of Cincinnati, aimed at determining which factors most influence test outcome and drive inconsistencies between different test houses. Initial testing, presented previously, was conducted on the sensitivity of the original configuration of the NexGen burner to input parameters, including fuel and air flow rates and temperatures, and burner orientation.

In the present work, burner sensitivity studies were conducted on the updated NexGen burner configuration, consisting of the Flame Retention Head (FRH) and static disk. Test parameters included the different FRHs, fuel nozzle types, fuel and air flow rates and temperatures, assembly tolerances and burner orientations. Burner performance was studied via analyzing flame temperature profile maps, calibration data and burnthrough results of aluminum panels (24"x24"x1/8"). The effect of changes in the burner internal configuration, including fuel nozzle and cone position, deformation of FRH, on the burner performance was investigated. Additionally, test fixture designs, and effect of exhaust settings were tested to study the impact of test cell settings on the burner. For the parameters which affected burner performance, suitable tolerances are specified.