

Updated Experimental Investigation of the NexGen Burner

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The heat flux produced by the NexGen burner during powerplant fire safety testing is measured to be vastly more than the desired range of values. Previous experimentation by the University of Cincinnati Fire Test Center has successfully yielded lower peak and average heat flux values, while maintaining acceptable temperature performance, by way of experimentation with modifications to the burner configuration. The present study aims to gain further improvement via continued experimentation with the internal formation of the burner, as well as more thoroughly examining the output of the configurations under consideration. The type and spacing of components utilized within the burner are varied iteratively to converge on a burner configuration with an optimal heat flux performance. The output of all burner configurations under consideration is investigated by burn-through testing of aluminum panels (round-robin test), Tex-Tech felt panels, as well as by mapping of the temperature and heat flux across the full range of the burner cone (using both a horizontally and vertically operated burner). Additionally, for each configuration the burner inputs (fuel and air pressure) are varied while maintaining a constant equivalence ratio to investigate the effect of total mass flow on temperature and heat flux calibration results. For one such configuration, a set of flow conditions is found to produce an especially desirable temperature and heat flux output.