NexGen Burner for Seat Testing

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By: Robert Ian Ochs

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Introduction

- **Background**
- **Initial Measurements**
- **Planned Work**

Background

- **A Next-Generation oil burner was developed to provide for an alternative FAA-approved test apparatus to replace the out-of-production Park oil burner for thermal acoustic insulation burnthrough testing**
- **The burner, called the NexGen (or sonic) burner, was developed and tested vs. the Park oil burner**
- **The NexGen burner was found to provide similar results**
- **Multiple NexGen burners were constructed and also provided similar results**

Objective

- **The objective is to use a NexGen burner to provide similar results to a Park oil burner that is properly calibrated for fire testing of seat cushions**

Procedure – Matching Air Velocity

- **Measure the inlet velocity on the Park oil burner according to the handbook - 1800±50 fpm**
- **With the inlet velocity set, measure the exit velocity at the end of the draft tube (~1130 fpm)**
- **Place the same anemometer at the end of the draft tube on the NexGen burner**
- **Starting from 0 psig, gradually increase the sonic choke inlet pressure until the same exit velocity is achieved (~1130 fpm)**
- **Note the inlet pressure (45 psig). This will be the operating pressure for the NexGen burner for seat testing.**

Procedure – Matching Fuel Flow Rate

- **Install a 2.0 gph-rated CC 80° nozzle into the NexGen burner**
- **Adjust fuel tank pressure accordingly until 126 mL/min flow rate is achieved (2.0 gph)**
- **95 psig fuel pressure measured at the burner gives 126 mL/min for this particular nozzle**

Procedure – Matching Calibration

- **Perform burner calibration procedures as outlined in the handbook**
- **Measure flame temperatures with 1/16” thermocouples**
- **Measure heat flux with 0-25 BTU/ft^2*s heat flux transducer**
- **Adjust burner component configuration to achieve calibration**
  - Stator
    - Depth
    - Orientation
  - Turbulator
    - Orientation
  - Ignitor and fuel nozzle depth
- **If calibration is still not achieved, work within tolerance limits of air and fuel flowrate to adjust NexGen burner inlet air and fuel pressure**
- **At this point, still actively working on achieving temperature calibration without resorting to the use of tabs or other flame altering external devices**

Work to be Completed

- **Perform side by side comparison between a properly calibrated Park oil burner and the NexGen burner**
  - Compile a sample set of seat cushions with known fire performance
  - Compare Park, NexGen, as well as with other labs that have run these cushions
- **Enter the NexGen burner into a seat round robin**

Questions?