VFP Update

Presented to: IAMFTWG, Savannah GA

By: Rick Whedbee, FAA

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Introduction

- Development of a flammability test for fuselage skins and structural components; as well as other materials extensively used in inaccessible areas.

- Proposed test method can accommodate variety of known materials to include:
  - Structural and skin components
  - Wiring
  - Sleeving
  - Duct material
  - Future possibilities

Topics

- Sleeving, Wraps
- Wires
- Methane vs Propane
- Marlin VFP Test Drive

Sleeving

- **No current test method**
- **Various sizes**
- **Securing sample during tests**
  - Maintain the intended in-use shape throughout a test
- **Accommodate wraps and tube type**

Sleeving

- **Alumina substrate**

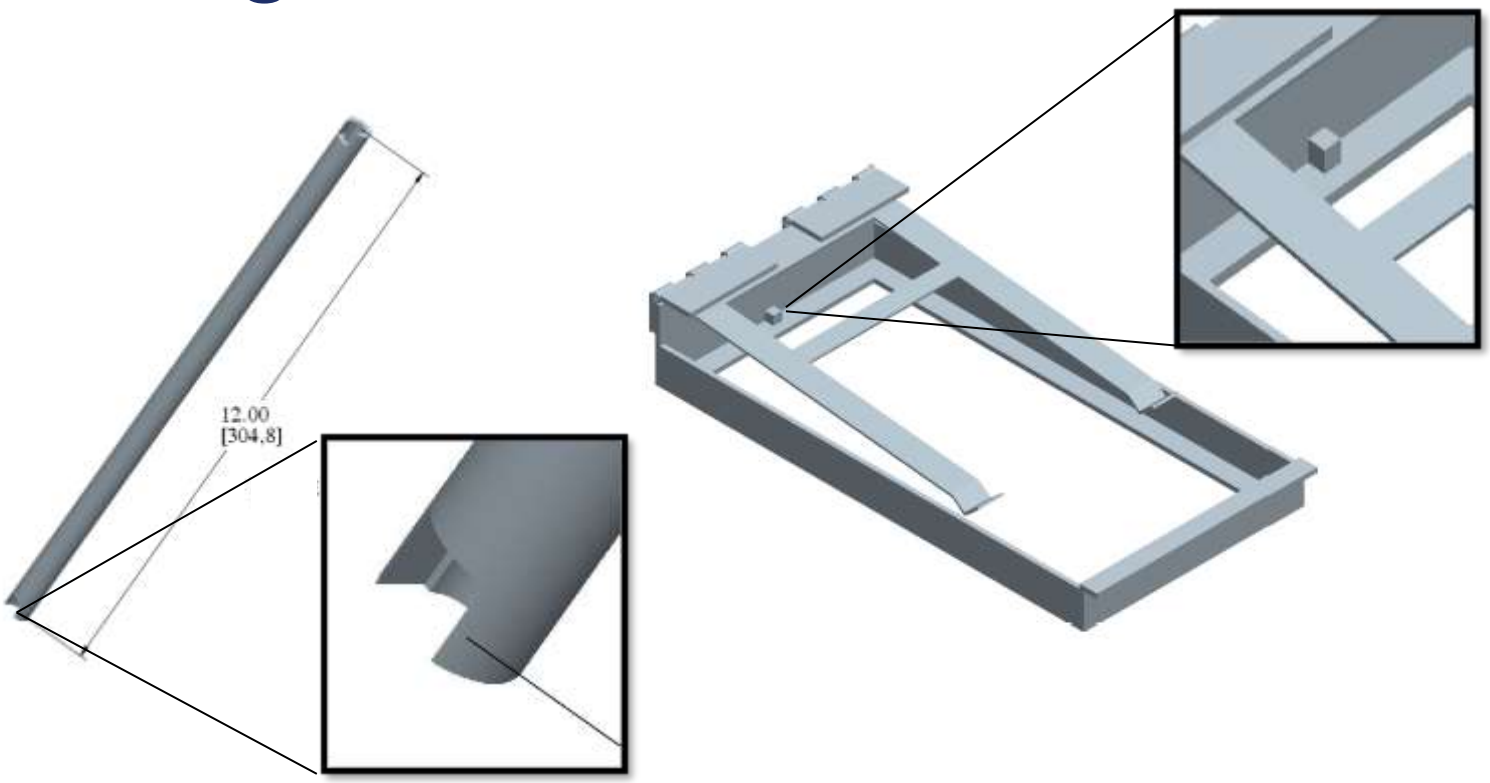
  -low cost to performance ratio ($15USD)

  -various sizes

  -customizable, machinable

  -1800^{0}C max

Sleeving



Alumina rod with key way notch and proposed sample holder with positioning tabs.

Sleeving

Wiring

- **60-degree test does not accommodate bundles**

-Single wire not a good real-world representation

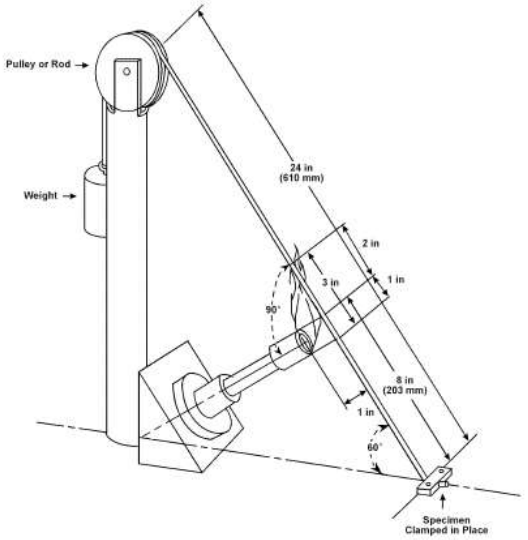
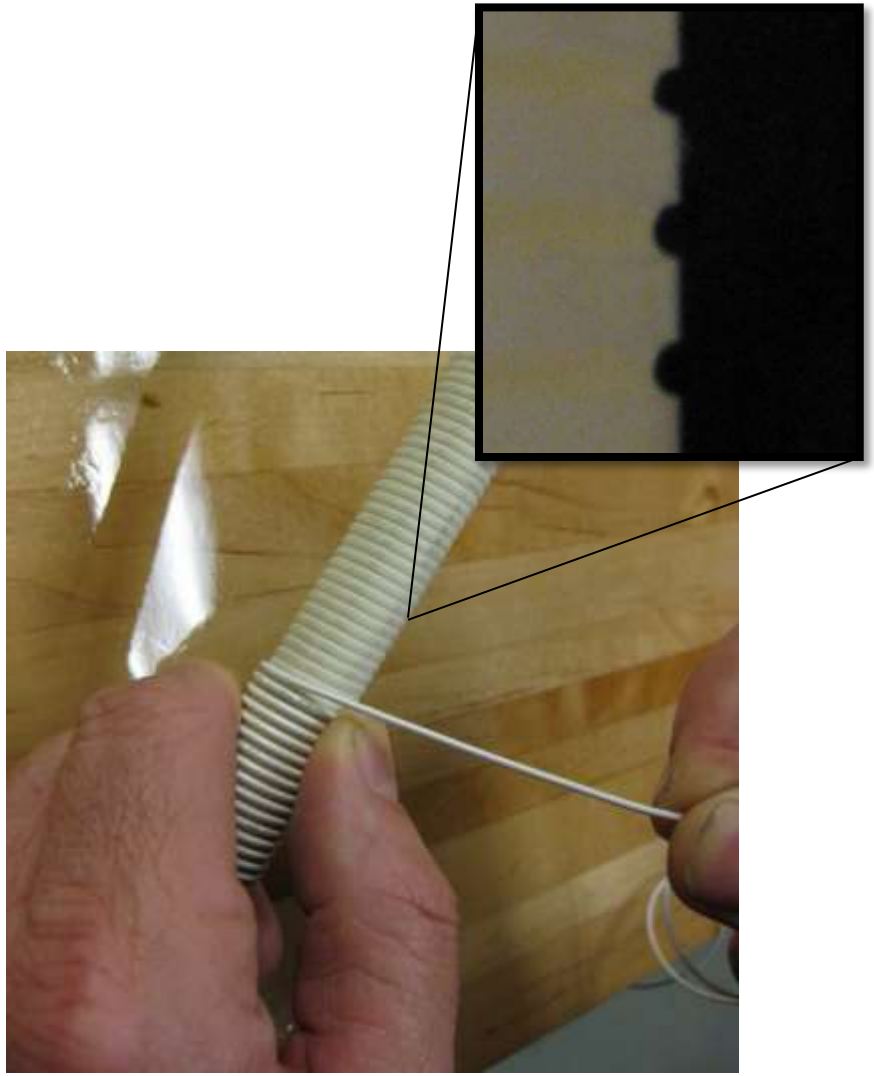


Figure 4-1. 60-Degree Electrical Wire Bunsen Burner Test Setup

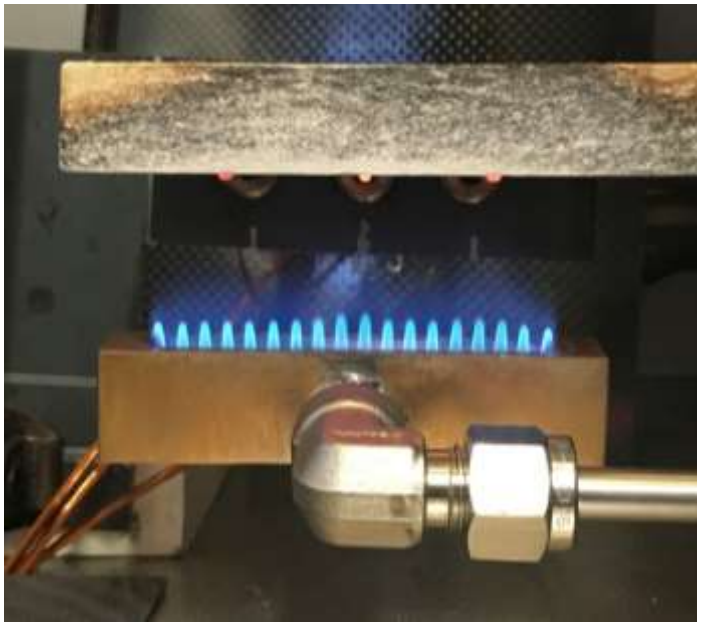
Wiring

- Custom Alumina Rods
- Same key way system and sample holder as used for sleeving
- Grooves of predetermined diameter and spacing
- Multiple Rods to accommodate various wires of various diameters

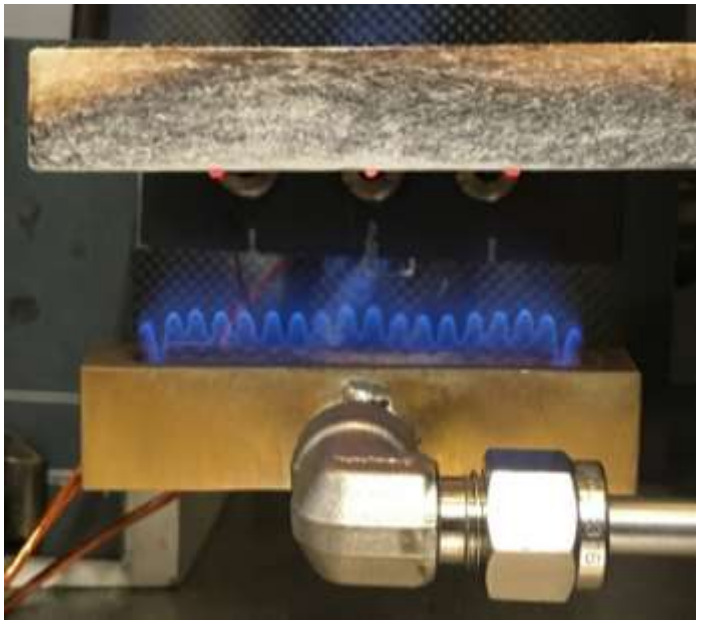


Fuel Comparison

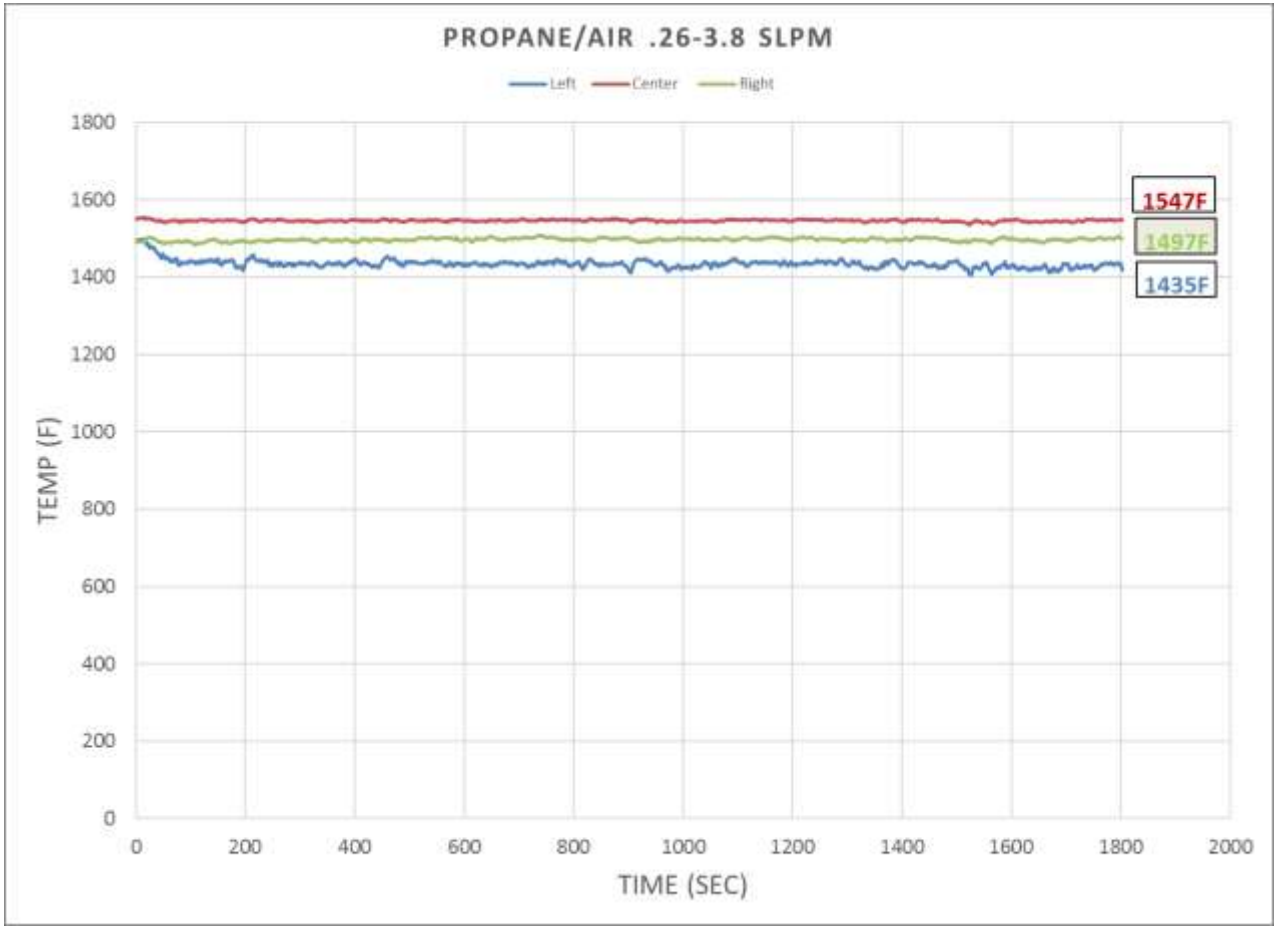
Propane



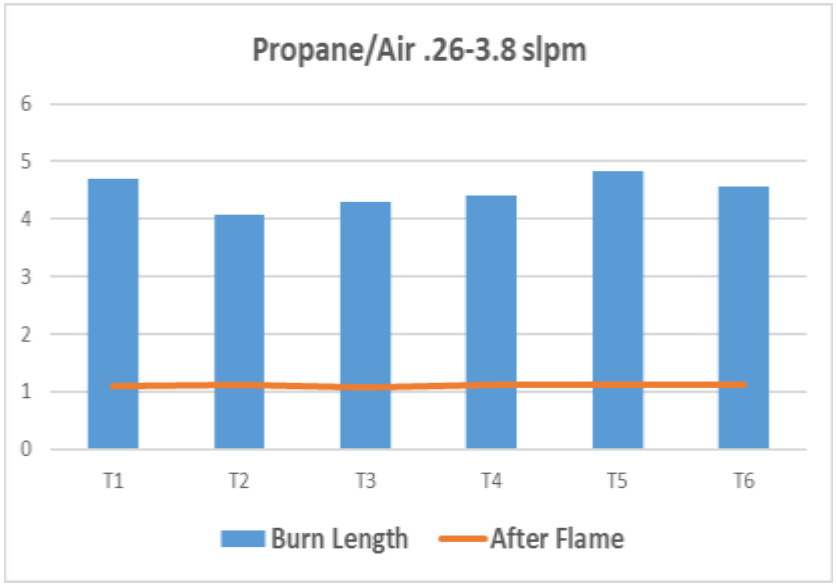
Methane

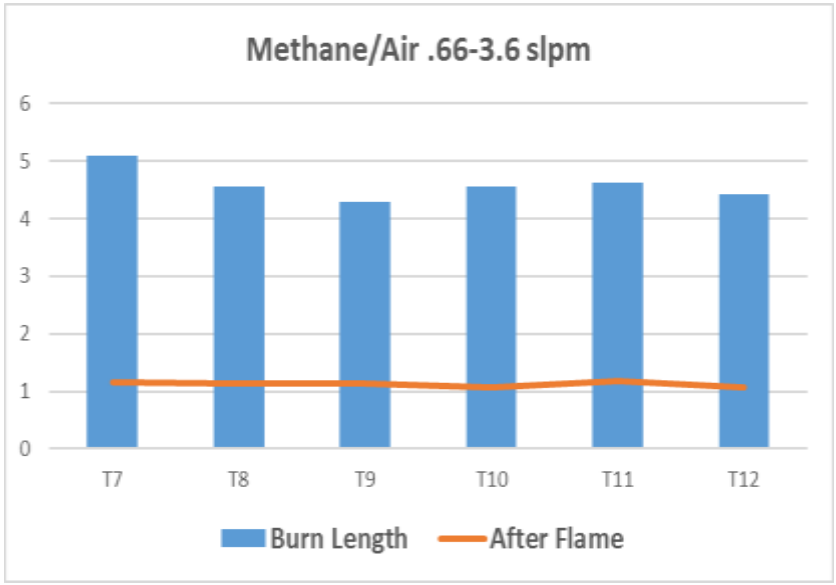


Fuel Comparison- Measured Flame Temp



Fuel Comparison- CFRP Burn Lengths

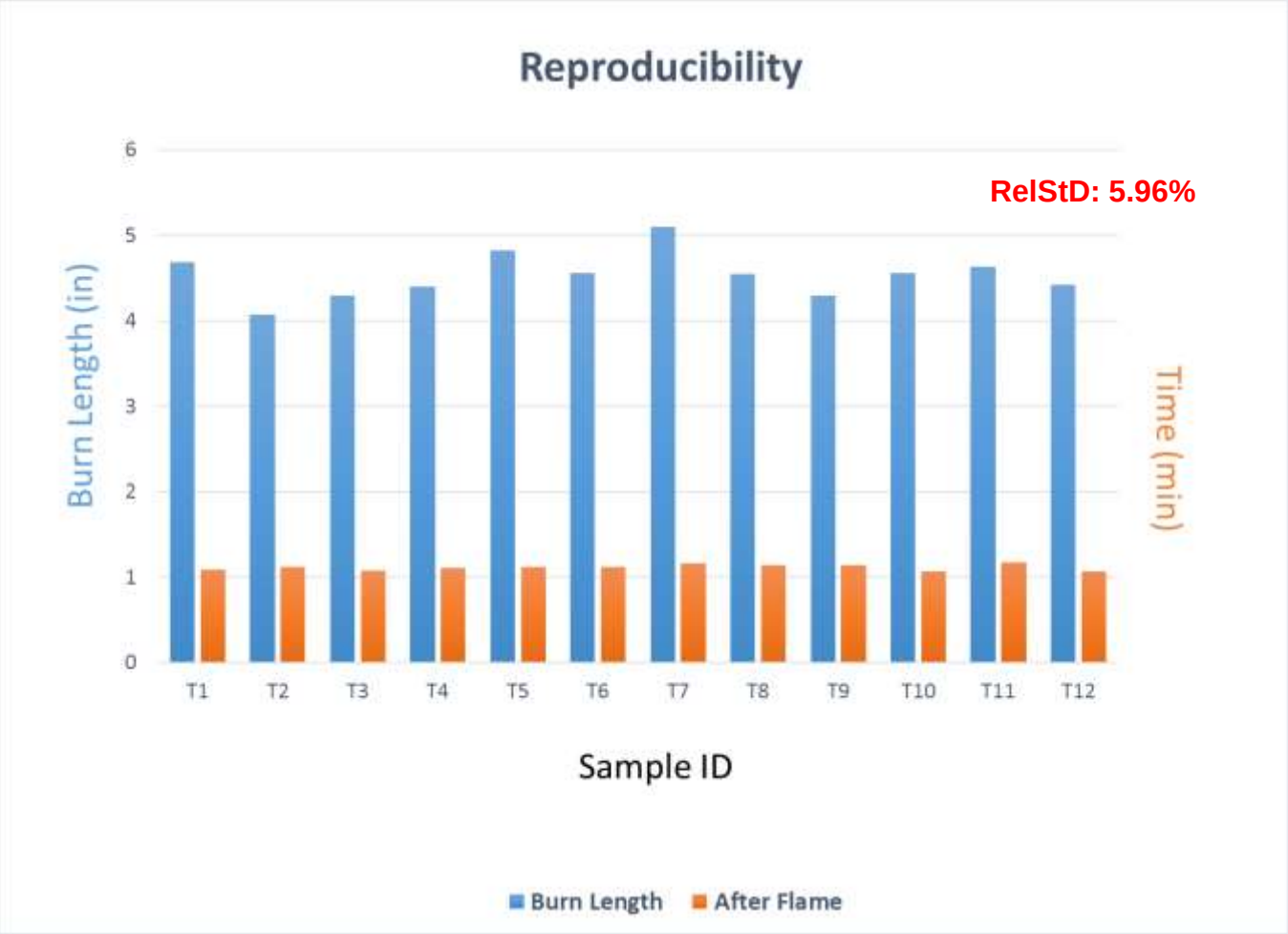




- McMaster Carr #8181K34
- 4.47” AVG Burn Length
- 6% RelStD

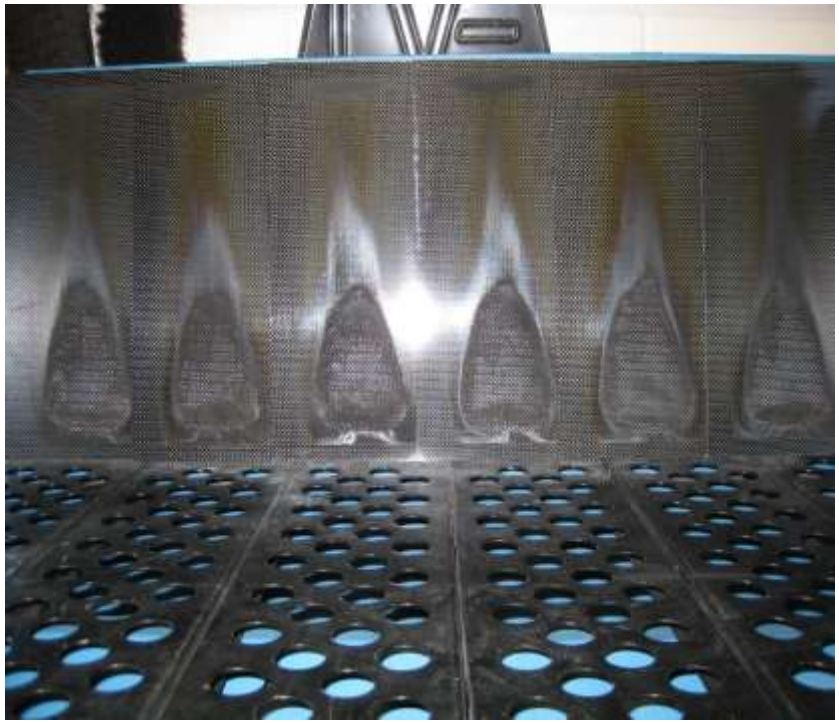
- McMaster Carr #8181K34
- 4.59” AVG Burn Length
- 6% RelStD

Fuel Comparison- Reproducibility

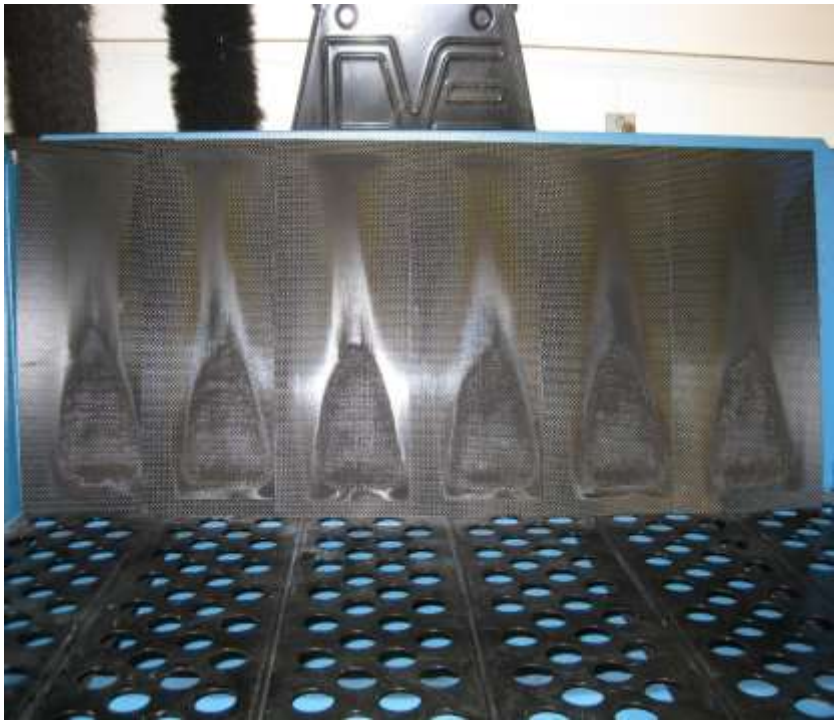


Fuel Comparison

Propane



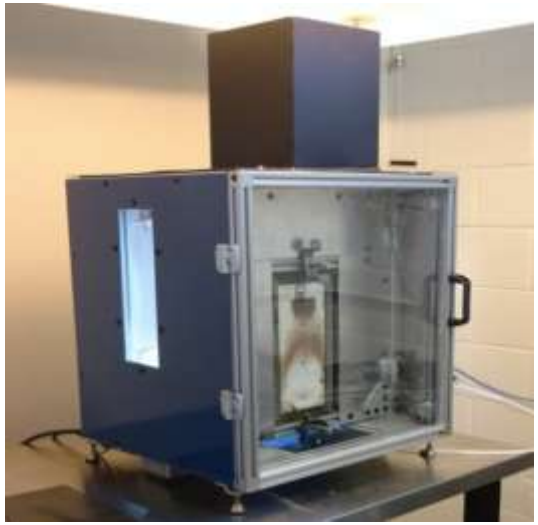
Methane



VFP 3 - Marlin VFP

FAA VFP 3

- 4757in^3 internal volume
- Furnace power >706 watts
- 133.7^{o}F (56.5^{o}C) internal temp
- 156 fpm exhaust velocity



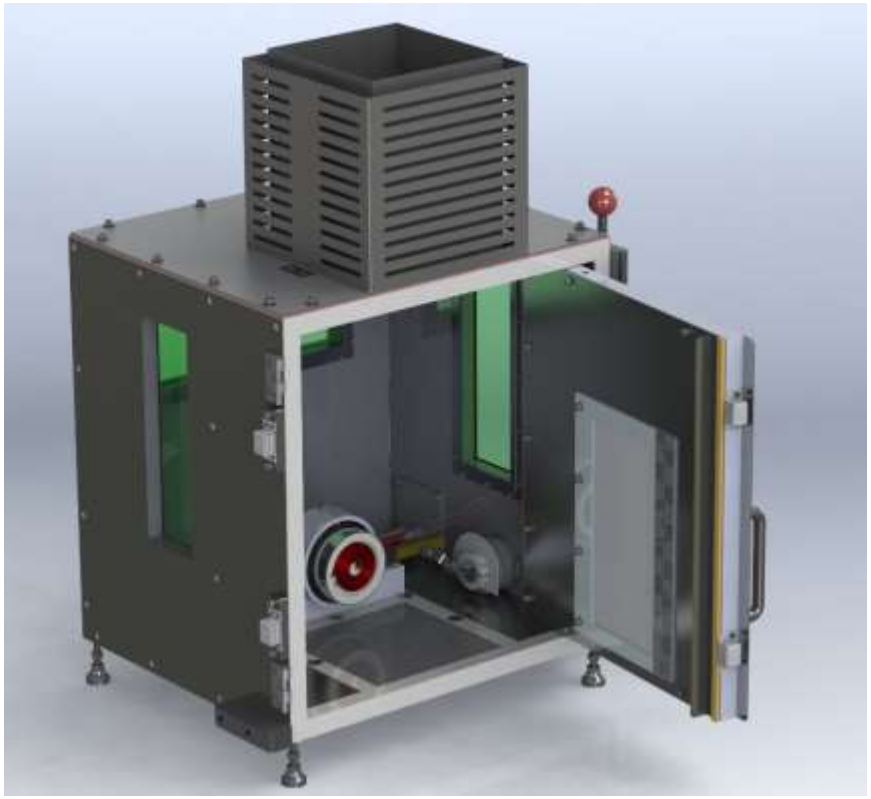
Marlin VFP

- 5687in^3 internal volume
- Furnace power <700 watts
- 176.4^{o}F (80.2^{o}C) internal temp
- 158 fpm exhaust velocity

Conclusion

- Additional features/mods?
- Proposed Round Robin
  - FAA, Boeing, Airbus
  - Anyone else?
- Validate wiring and sleeving concepts
- Data, data, more data

Coming Soon…



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FAA Contact

Rick Whedbee
Fire Safety Branch
Bldg 275, ANG-E212
William J. Hughes Technical Center
Atlantic City, NJ 08405
(609) 485-4610
Rick.Whedbee@faa.gov

Tina Emami
Fire Safety Branch
Bldg 275, ANG-E212
William J. Hughes Technical Center
Atlantic City, NJ 08405
(609) 485-4277
Tina.Emami@faa.gov