



**Federal Aviation
Administration**

International Aircraft Materials Fire Test Forum Meeting

Short Takes and Current Projects

Presented to: International Aircraft Materials Fire Test
Forum, Atlantic City, NJ

By: Tim Marker, FAA Technical Center

Date: October 29, 2018



New Name, Same Group

We are now:

International Aircraft Materials Fire Test Forum (IAMFTF)

Previously:

**International Aircraft Materials
Fire Test Working Group (IAMFTWG)**



Federal Aviation Administration

Notice of Meetings; A Notice by the Federal Aviation Administration

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Notice of meeting.

SUMMARY: The Federal Aviation Administration (FAA) is announcing the upcoming meetings of the International Aircraft Materials Fire Test Forum (IAMFTF) and the International Aircraft Systems Fire Protection Forum (IASFPF). The IAMFTF and IASFPF were established to provide a forum for interested parties to review and provide feedback on FAA fire safety research driven by current and emerging aircraft systems fire threats and test methods. This notification provides details of where to find the date, location, and agenda for the upcoming meetings.



What's New

Date	Section	Description
10/22/18	Handbook	Chapter 26 posted.
10/18/18	Materials	MCC Guidance Updated Rev B. posted.
10/11/18	Reports	Posted report DOT/FAA/TC-18/16.
09/13/18	Materials	Posted Oct. meeting details, agenda, and opened registration.
09/12/18	Systems	Posted Oct. meeting details, agenda, and opened registration.
09/12/18	Handbook	Chapter 24 September Update posted.
08/06/18	Handbook	Appendix F June Update posted.
07/10/18	Handbook	Chapter 23 June Update posted.
06/19/18	Materials	Posted presentations, minutes, and attendee lists from June meeting.
06/18/18	Systems	Posted minutes and attendee lists.
05/15/18	Systems	Posted presentations from May meeting.
04/10/18	Handbook	Posted Red Line Process for Updating Fire Test Handbook.
04/06/18	Reports	Posted report DOT/FAA/TC-TT18/9.
03/29/18	Materials	June meeting details posted and registration opened.
03/28/18	Systems	Posted agenda for May meeting.

Announcements

Federal Register: Notice of Meetings; A Notice by the Federal Aviation Administration

SAFO: Risks in Transporting Lithium Batteries in Cargo by Aircraft

Final Policy: Policy Statement on Flammability Testing of Interior Materials Issued (link opens small window)

UPDATED 11/15: Statement on the Use of Magnesium in Airplane Cabins

Released: AC 20-42D - Hand Fire Extinguishers for Use in Aircraft

Cabin Safety Research Technical Group: Accident Database now available online.

InFO: Availability of a Federal Aviation Administration (FAA) In-flight Firefighting Training Video (see VIDEOS below)

SAFO: Fighting Fires Caused By Lithium Type Batteries in Portable Electronic Devices (see VIDEOS below)

VIDEOS: View videos on Cabin Crew Fire Fighting Training (updated 03/09/09), Laptop Battery Fires & ...



Date and Location: The meeting dates and locations are determined based upon the availability of host organizations to provide meeting space. The FAA Fire Safety Branch website (<https://www.fire.tc.faa.gov/Meetings/meetings.asp>) contains all information for upcoming meetings and meeting registration. The meetings are open to the public but due to limited capacity, registration is mandatory.

FOR FURTHER INFORMATION CONTACT:

April Horner, Meeting Coordinator,
William J. Hughes Technical Center,
Building 287, Atlantic City International
Airport, NJ 08405, telephone: (609) 485-
4471, email: april.ctr.horner@faa.gov.

SUPPLEMENTARY INFORMATION: The
LAMFTF and IASFPF began in the early
1990's as forums to discuss aircraft fire
safety research.

Red Line Process for Updating Fire Test Handbook

Posted 4/10/18

The Fire Test Handbook can be considered a living document, which can be edited and updated as new information becomes available. Some of these updates are simple corrections that are discovered with wording, terminology, or unit conversions. Other updates are procedural in nature, in which the execution of the test or the test arrangement or apparatus is improved.



7.2.6 Percent Weight Loss

The percentage weight loss for a seat test sample is the pretest weight of the seat test sample less the posttest weight of the seat test sample expressed as the percentage of the pretest weight. All droppings falling from the seat test sample and test sample mounting frame are to be discarded prior to determining the posttest weight.

7.3 Apparatus

7.3.1 Test Sample Apparatus

The test sample apparatus includes the seat test sample mounting frame and drip pan. The arrangement of the test sample apparatus is shown in figures 7-1 and 7-2.

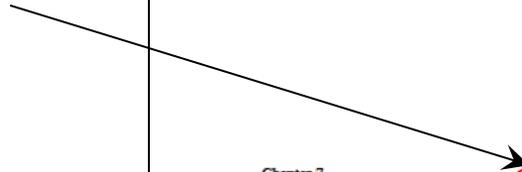
7.3.1.1 Test Sample Mounting Frame

Fabricate the sample mounting frame for the seat test sample from 1- by 1- by 0.125-inch steel angle and 1- by 0.125-inch steel flat stock as shown in figure 7-1. The dimensions listed for the test sample mounting frame are all inside measurements. The frame's upright section used for mounting the vertical assembly must be 33 ± 0.125 inches high and 18.125 ± 0.125 inches wide. The frame's bottom section used for mounting the horizontal assembly must be 18.125 ± 0.125 inches wide and 22.125 ± 0.125 inches long. The vertical and horizontal mounting surfaces should have two supporting braces made from 1- by 0.125 inch steel flat-stock. The centerlines of the flat stock braces are 6 ± 0.125 inches measured from the outer edges of the steel angle on the left and right sides of the frame. Four legs fabricated of 1- by 1- by 0.125-inch steel angle, and 12 ± 0.125 inches tall, are located below the four corners of the horizontal assembly mounting section of the frame. All connecting joints of the stand are welded and the flat stock components are butt-welded. The test sample mounting frame is used for mounting the seat test sample horizontal and vertical assemblies. The position of the test sample mounting frame relative to the burner cone during testing must be positioned as shown in figure 7-2.

Revised Text



Date



Chapter 7

7-2
(October 2017)

Red Line Process for Updating Fire Test Handbook

(Cont'd)

With the exception of minor corrections to spelling, wording, or incorrectly converted units, all changes must first be discussed during International Aircraft Materials Fire Test Forum (IAMFTF) meetings, which are held three times per year.

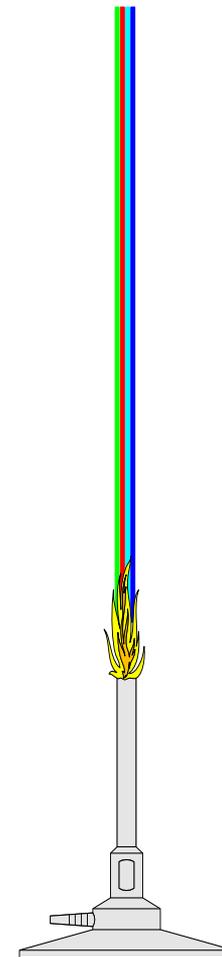
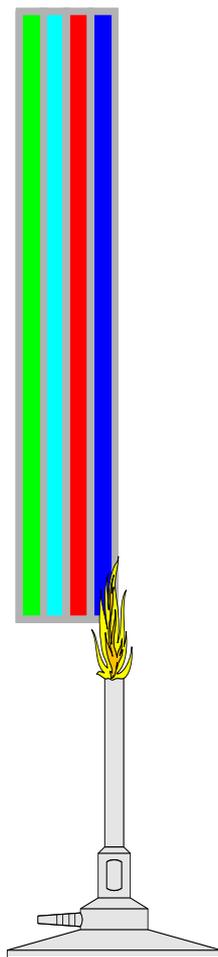
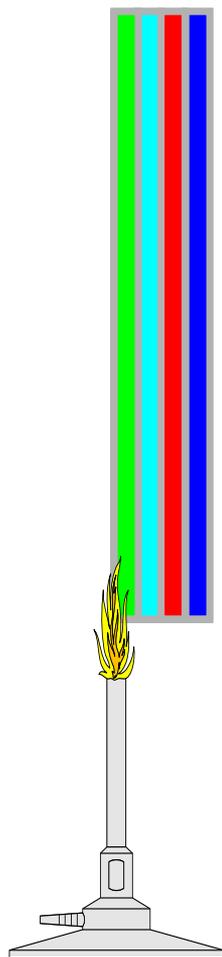
All changes will remain in red text for a minimum period of 6 months, to allow sufficient time for review and discussion at IAMFTF meetings. Following the 6-month discussion period, if there are no objections, the change will be made permanent with all strikethrough removed, and red text changed to black.*

*Please note the previous version of the Handbook chapter will remain current until the revised chapter becomes permanent. This may require more than a 6-month period, to allow for additional experimentation and discussion.

Questions?



Update to Chapter 1, Bunsen Burner Location



Greater Than $\frac{1}{4}$ inch

Less Than or = $\frac{1}{4}$ inch

Update to Chapter 1, Bunsen Burner Location

At the conclusion of the 2 previous IAMFTF meetings:

“Updated 1/4- inch criteria would create additional testing”

From the Handbook, prior to update: “Position the burner so that the flame impinges on the midpoint of the lower edge of the front face of the test specimen. This flame position should be used for all specimen thicknesses.”

Handbook Chapter 1, Supplement to 1.6.2.4

“Historically, test practices regarding burner flame placement have not been uniform or consistent within either the FAA or aircraft manufacturers. The most common placement used in the past was specified in the original issue of this handbook, viz.: For specimens that are 3/4 inch (19 mm) thick or less, place the burner barrel centerline under the center of the bottom surface of the specimen. For specimens thicker than 3/4 inch (19 mm), center the burner barrel under the bottom surface of the specimen 3/8 inch (10 mm) in from the surface exposed to the airplane interior, test each surface separately unless the surfaces are of the same materials and construction.”

“Historical Discussion”

Handbook Chapter 1, Supplement to 1.6.2.4

“Another placement that has been less commonly used is that specified here, viz., directly under the middle of the lower edge of the face of the specimen that is exposed to the airplane interior. For specimens thinner than the burner barrel thickness (3/8 inch; 10 mm), test results are relatively insensitive to exactly where “along the centerline of the lower edge” the burner flame is placed. For samples of greater thickness, however, burn lengths are typically an inch or so longer if the burner barrel centerline is placed under or near the specimen face, and flame times are sometimes a little longer than if the flame is placed per the original handbook, Report DOT/FAA/CT-89/15, September 1990.”

“Historical Discussion”

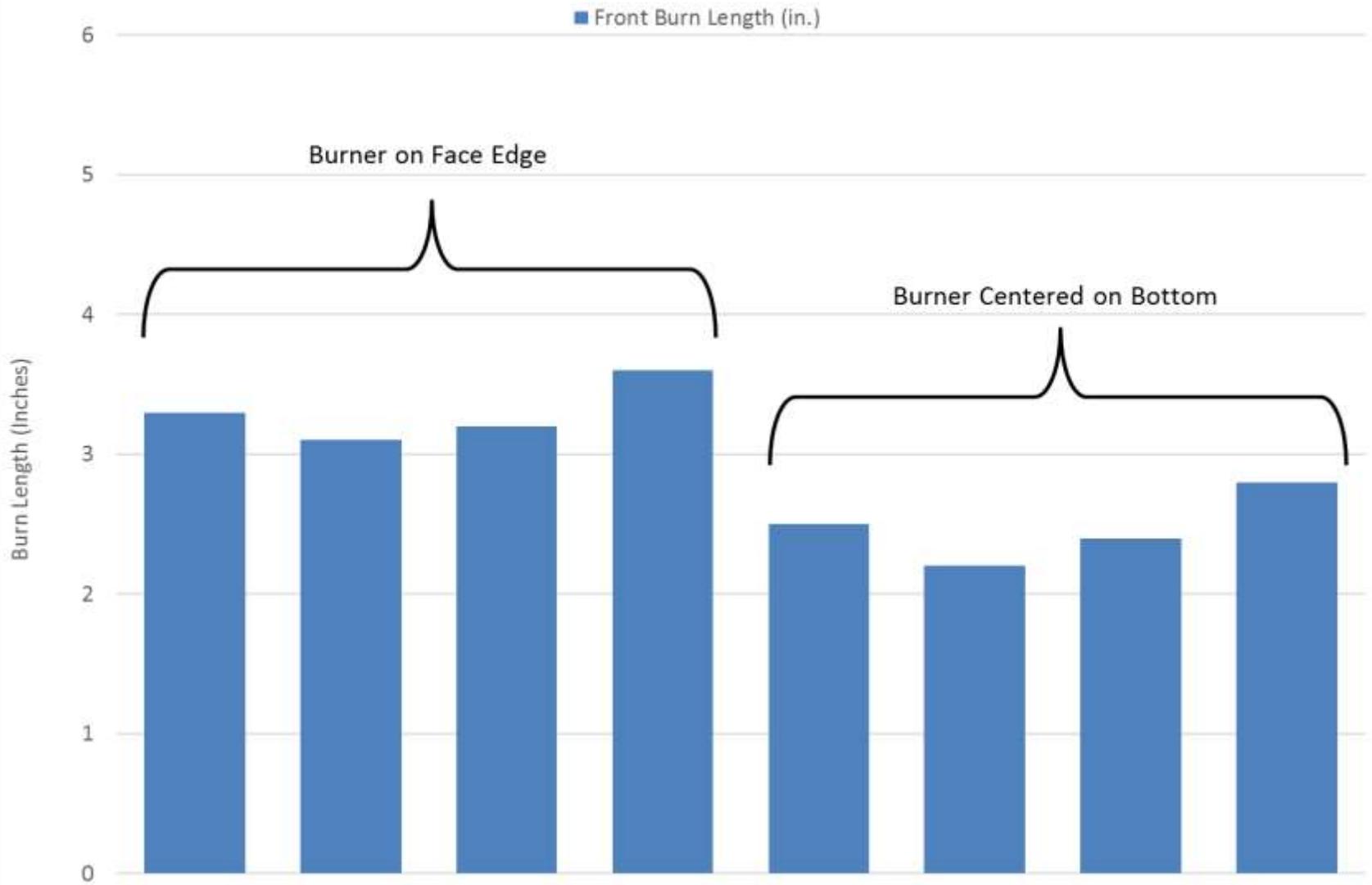
Handbook Chapter 1, Supplement to 1.6.2.4

Here is the Problem:

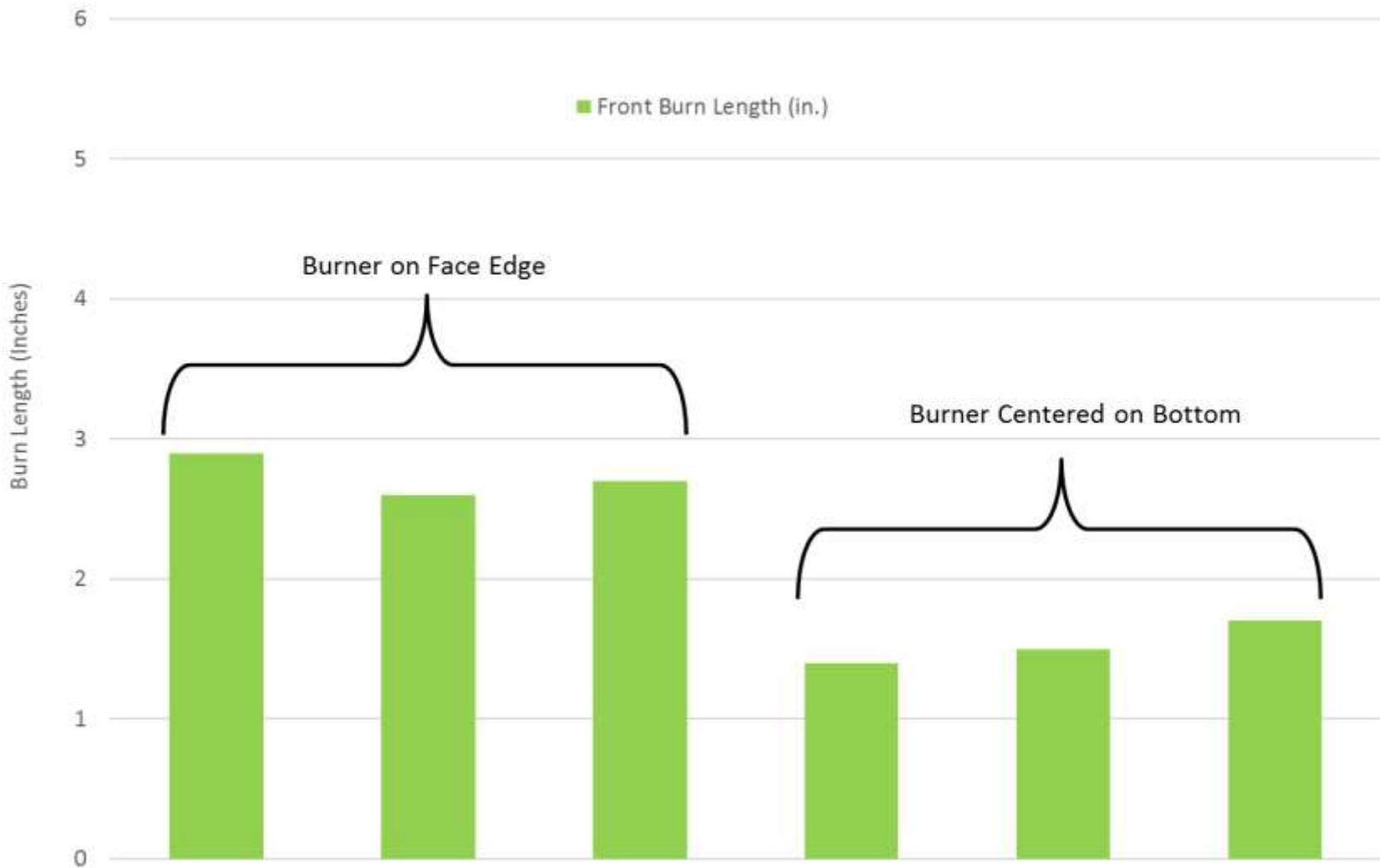
“The FAA should accept data for certification using the flame placement described in the original portion of this handbook, or using the flame placed under the exposed face of the test specimen. However, the FAA and aircraft manufacturers have agreed that in the future, the preferred placement of the burner flame is under the middle of the lower edge of the face of the specimen.”

(we are currently “in the future”)

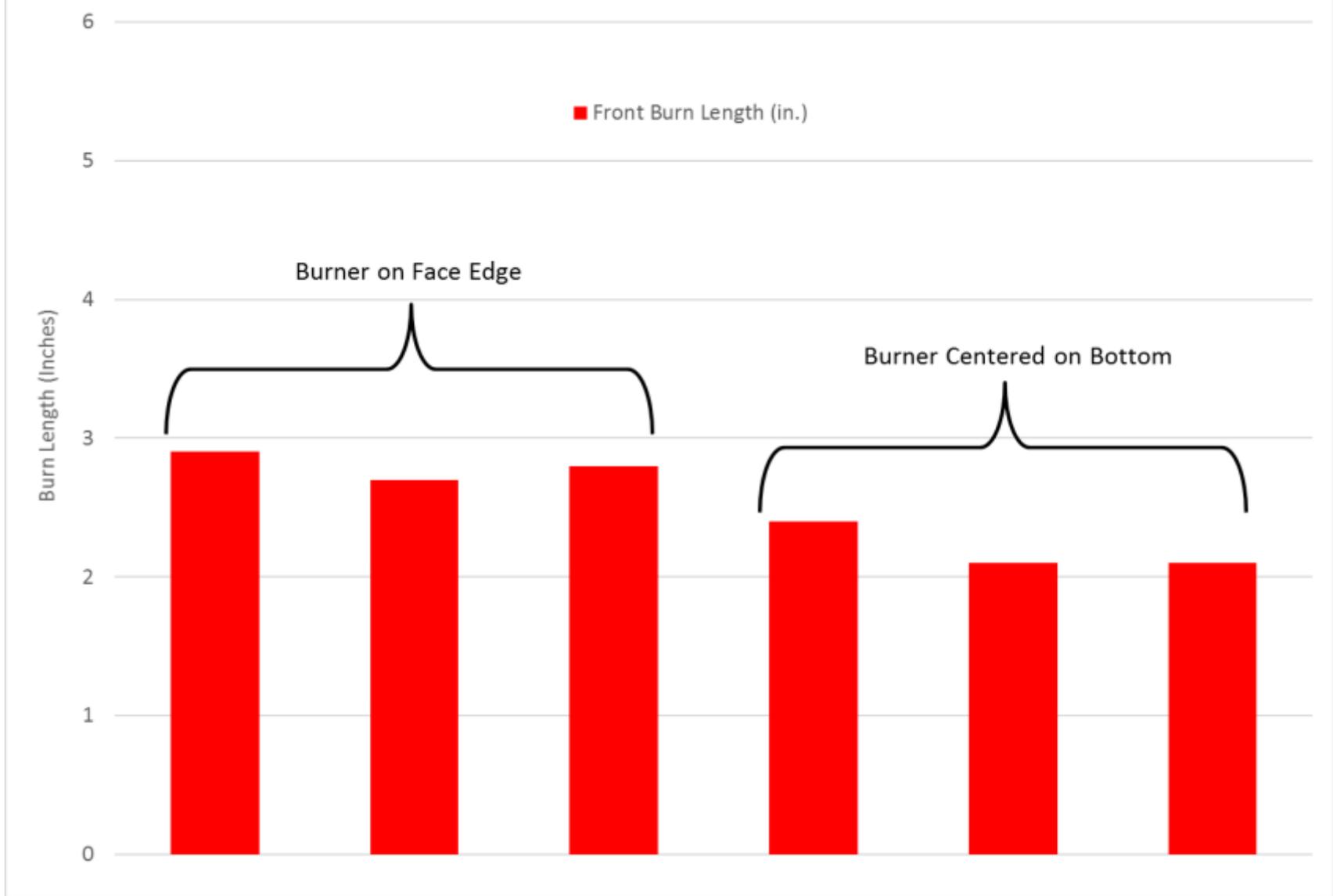
Comparison of Face vs Bottom-Centered Burner Placement on 3/8-Inch Panel



Comparison of Face vs Bottom-Centered Burner Placement on 0.405-inch Panel



Comparison of Face vs. Bottom-Center Burner Placement on 0.2675-inch Panel



Update to Chapter 1, Bunsen Burner Location

Webex meeting arranged September 5, 2018. Following the discussion several questions were sent along to the FAA for response

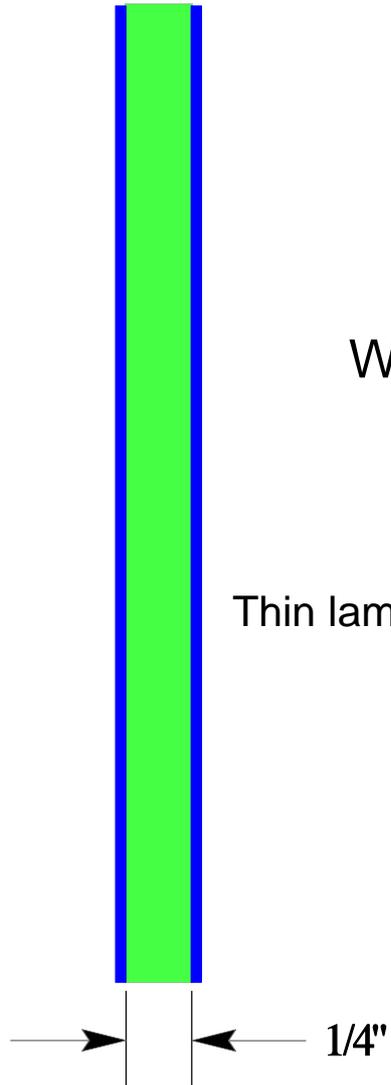
Recommendations:

Begin testing panels on edge of face (1/4-inch or greater), from this point forward

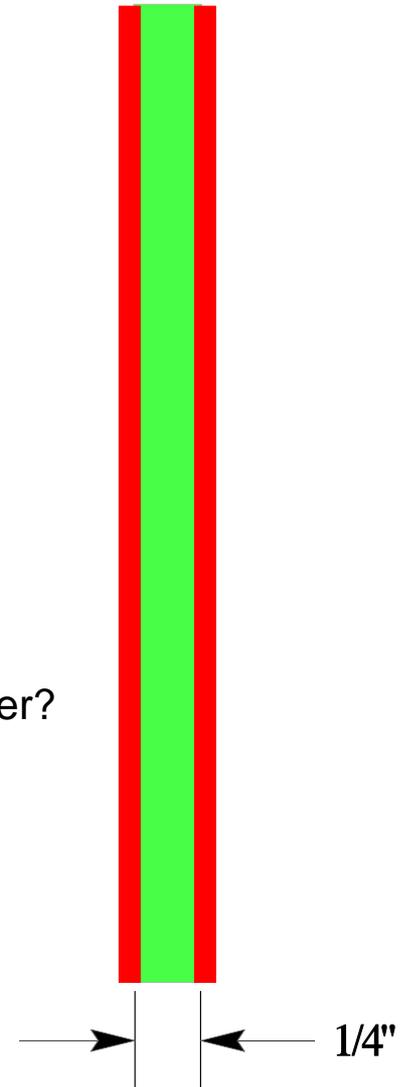
If burn length is 3 inches or less, allow sample to be “flipped” for additional test

The bigger question...

What does 1/4-inch requirement include?



Thick veneer?



Questions?



Handbook Chapter 10 *(the forgotten one)*

Fire Containment Test of Waste Stowage Compartments

10.3.4.1.3 For the waste compartment/waste cart, combustibles will be crumpled and consist of the following proportions of materials or an equivalent:

Eight 2-ply paper and towels, approximately 10 by 11 inches (40 percent by number)

Five 2-ply paper napkins, approximately 16 by 16 inches (25 percent by number)

Four 8-ounce paper hot drink cups (20 percent by number)

Two 3-ounce paper cold drink cups (10 percent by number)

One empty cigarette package (5 percent by number)

The total amount of the above crumpled combustibles in the above proportions will be sufficient to fill the waste compartment or waste container to three fourths capacity.

Is this fire load still representative?

Typical C-Fold Paper Hand Towels



Typical C-Fold Paper Hand Towels



55 “Loosely Crumpled” Paper Hand Towels



55 “Tightly Crumpled” Paper Hand Towels



Crumpling, Anyone?

(Taken from the Lavex MPS)

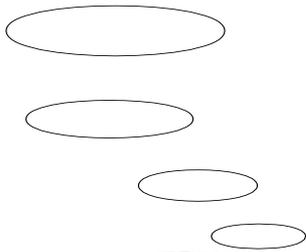
5.3.2 Paper Crumpling Specification.

Prior to loading the paper towels into the test receptacle, they must be opened and crumpled to simulate used hand towels. This can be accomplished by performing a free fill density procedure in which 340 + 10 paper towels, are crumpled to fill an 18- x 18- x 18-inch container to the top level to ensure similarity of crumpling between the various testing facilities. This procedure may require several attempts in order to achieve the proper crumpling tightness.

Save Questions for Scott



How can we make this better?



Research Process for Updating Heat Release Test

Goal: Simplify, Standardize, Improve Repeatability

OSU → HR2
(2010 through 2015)

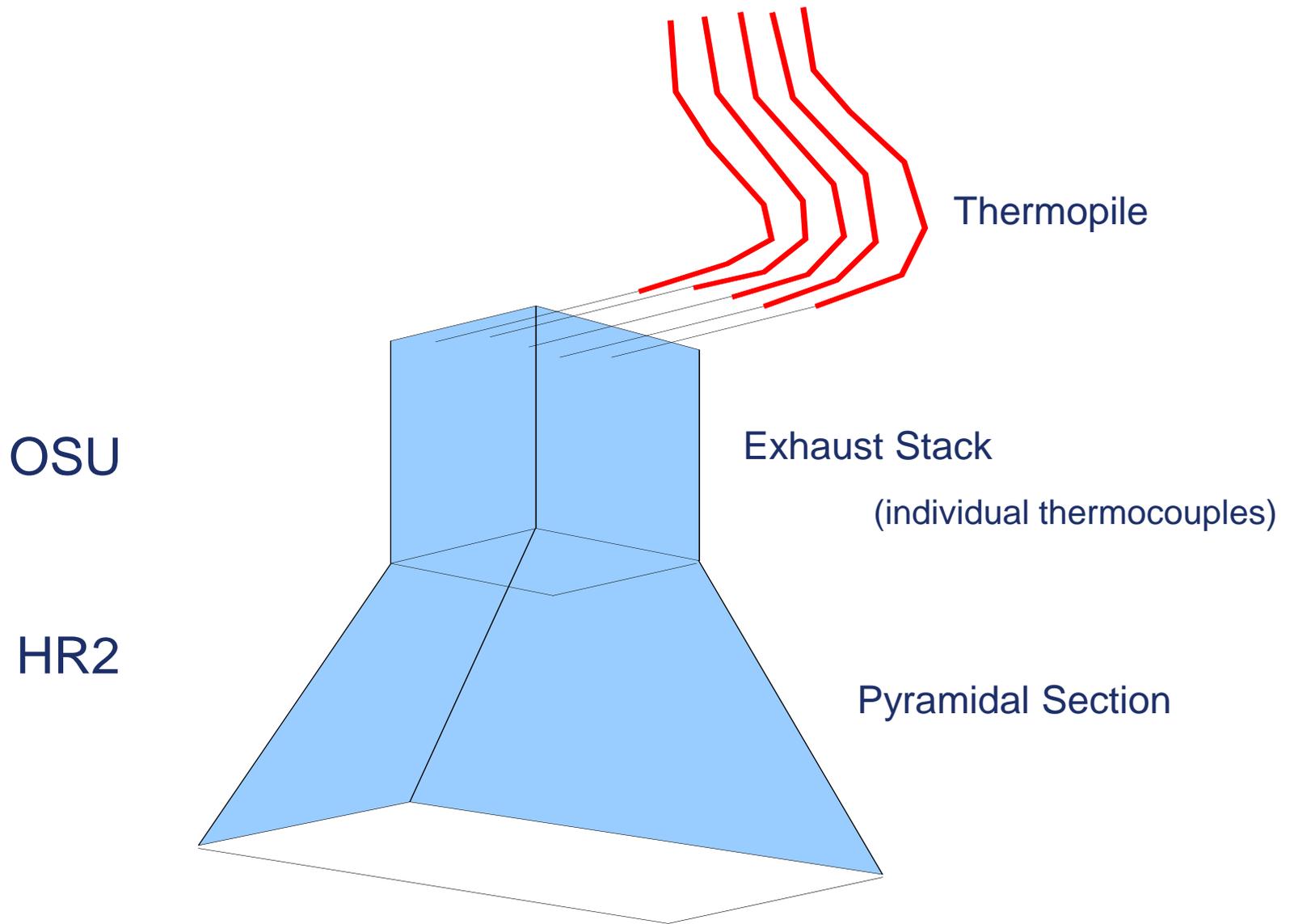
- Rev A vs Rev B

Rev A: System modifications / maintain by-pass airflow

Rev B: System modifications / eliminate by-pass airflow (simplify) ✓

- Thermopile (simplify) ✓

- Calibration process (simplify): reduced from 30 minutes to 6 minutes ✓



Research Process for Updating Heat Release Test

(2015 through 2017)

Thermoplastic comparative testing conducted at FAATC (SABIC)

- HR2 resulted in higher Peak and Total heat release on some materials
- In a prior task group breakout session concerns were raised:

Is HR2 new configuration more severe?

FAATC experimentation followed, looking into potential influences

- Reduced heat flux – not much impact
- Reduced airflow – required 50% reduction for thermoplastics to behave similarly
- Reduced airflow – honeycomb results do not match

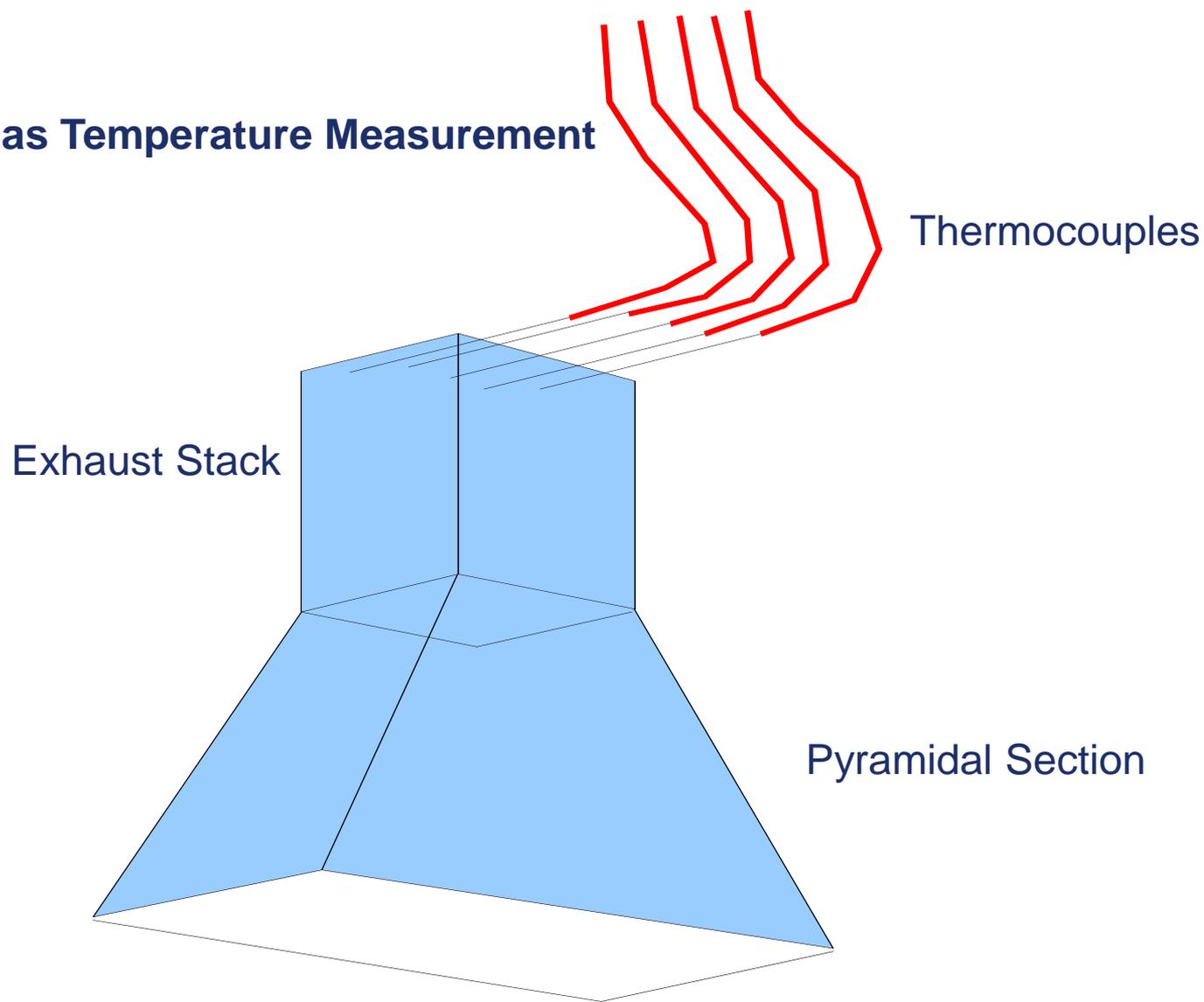
Research Process for Updating Heat Release Test

(2018)

Comparative measurements of OSU inner cone temperatures and HR2 exhaust gas temperatures were conducted.

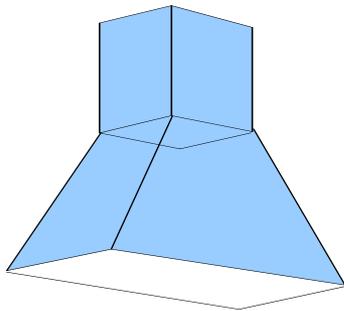
Is there a difference??

OSU Exhaust Gas Temperature Measurement



Research Process for Updating OSU Test

Problem: EGT's not in agreement / possible contributor



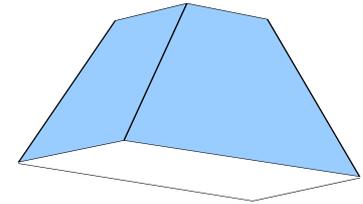
Return Complexity?

Pro's

- History of use
- Cooler EGT
- Dampened signal/mixing (TC's)

Con's

- Large system Lag
- Additional components
- Higher operating cost



Keep Simple?

Pro's

- Fewer components
- Reduced operating cost
- Quick response

Con's

- Higher EGT
- Buoyancy of hotter air / noisy signal
- Unknown's

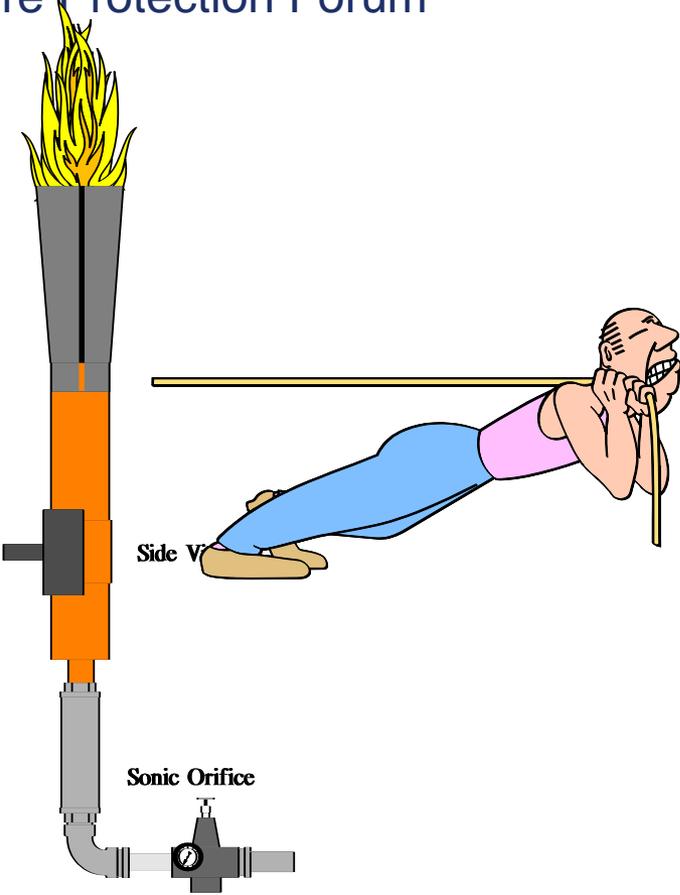
Specific details to follow...



Powerplant Fire Testing (Chapters 11, 12)

Systems Fire Protection Forum

Materials Fire Testing Forum



Questions?



