International Aircraft Materials Fire Test Working Group Meeting

Seat Test Training Video, Handbook Updates, and Cargo Airflow Study

Presented to: International Aircraft Materials Fire Test Working Group

By: Tim Salter, FAA Technical Center

Date: October 30-31, 2017, Atlantic City, NJ

Federal Aviation Administration

Presentation Outline

- **Sonic Burner Seat Test Training Video**
  - Finalized and available for viewing
- **New Video Releases**
  - Plans for future instructional videos
- **Fire Test Handbook Chapters**
  - Formatting, version identification, and notes
- **2017 Sonic Cargo Liner Test Airflow Study**
  - Updates, latest test results, and planned outcome
- **Sonic Burner Configuration Notes**

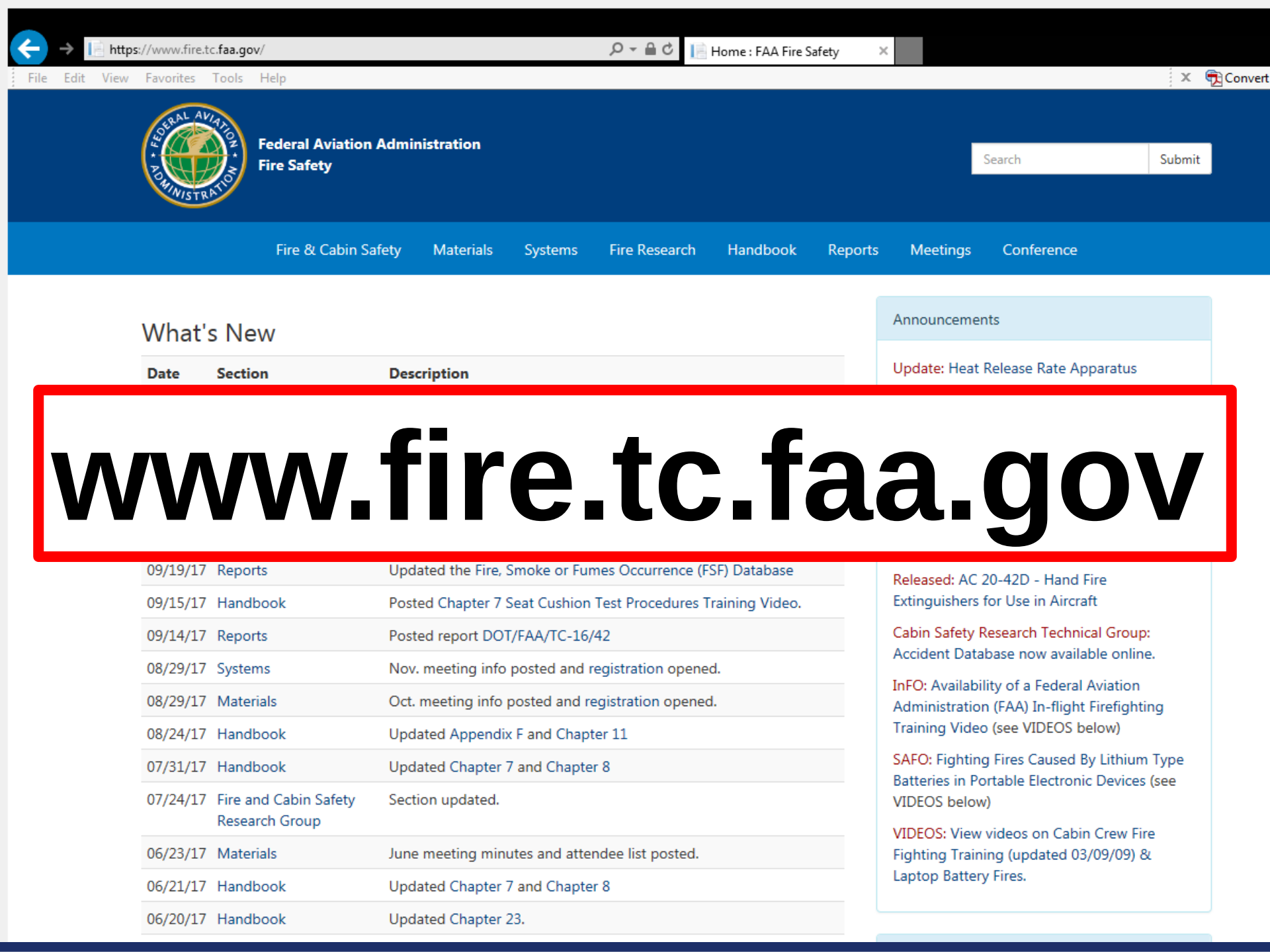
Sonic Seat Test Training Video

Sonic Seat Test Training Video

- **Video production timeline**
  - Initial video footage created in March 2017
  - Preview of video reviewed by seat task group members during previous meeting in June 2017
  - Feedback provided from seat task group members and incorporated into video footage
  - Additional video footage shot following June meeting
  - Final video edits completed and reviewed
  - Completed video posted to Fire Safety website for download or online viewing September 2017

Sonic Seat Test Training Video

- **"Oil Burner Test for Seat Cushions"**
  - Video is intended as a "supplement" to Chapter 7 of the Fire Test Handbook, *not alternative instruction*
  - Handbook chapter text supersedes video
- **Instructions specific to the *Sonic* burner**
  - Test method background information
  - Sonic burner and test sample apparatus design
  - Sample construction and preparation
  - Test procedures and acceptance criteria
  - Examples of pass/fail test scenarios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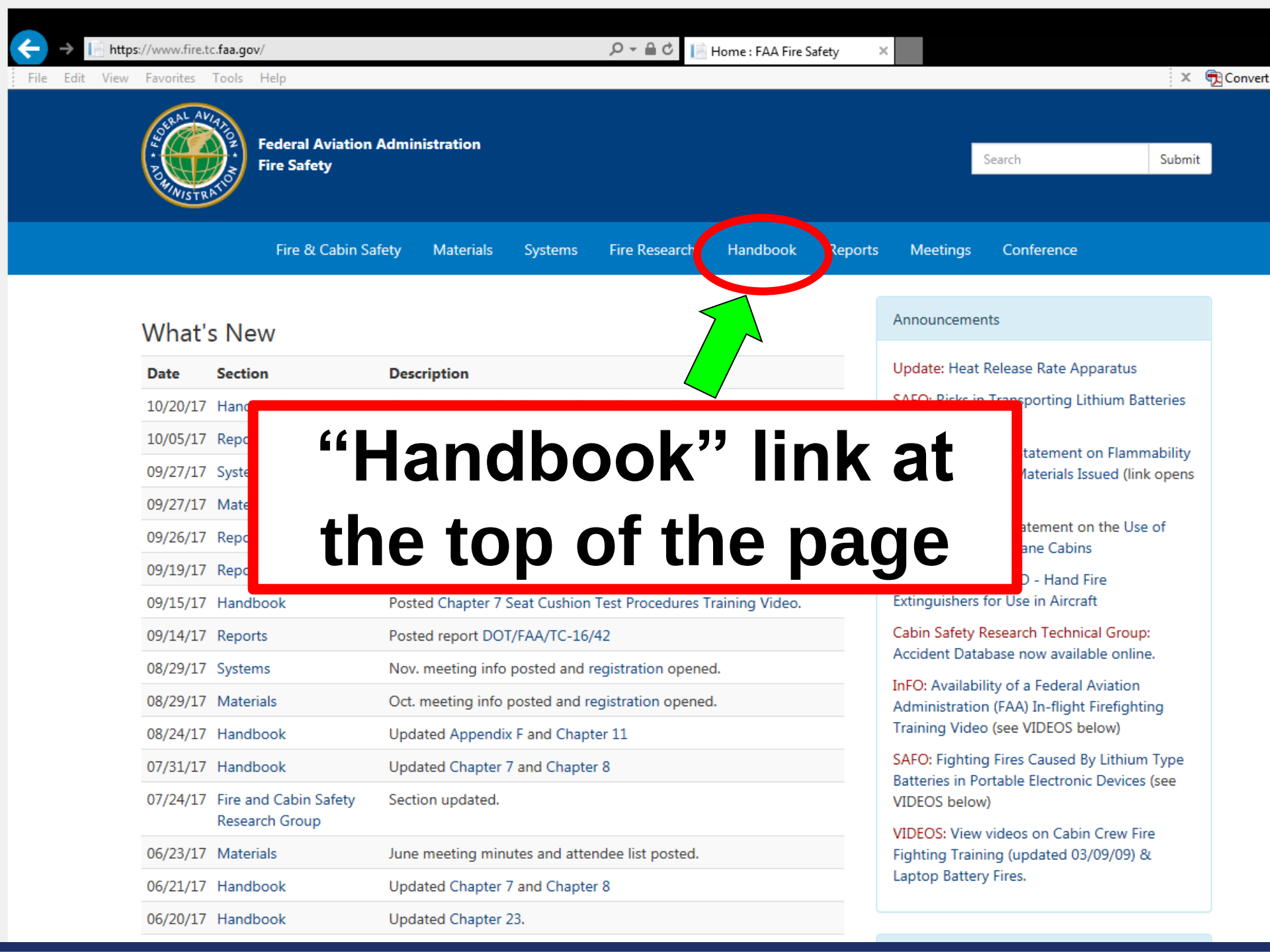
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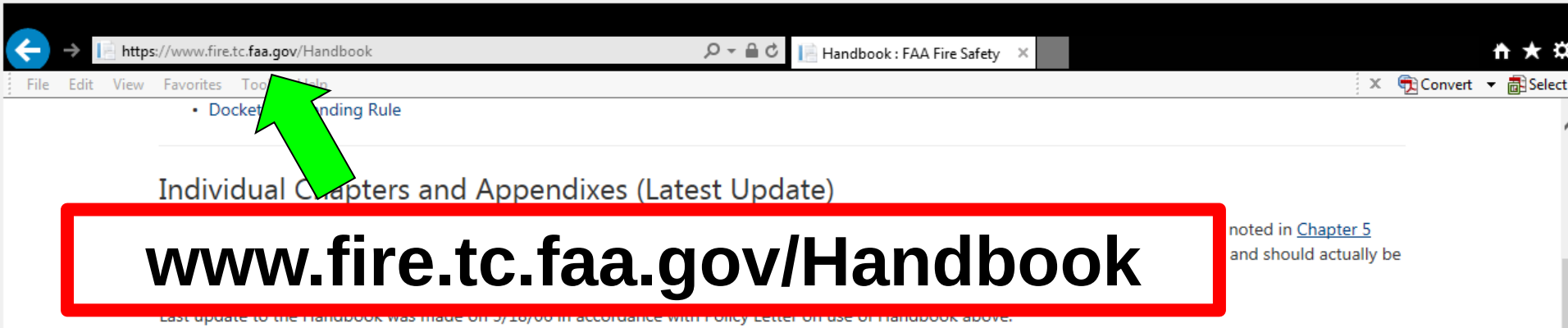
"Handbook" link at the top of the page



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Individual Chapters and Appendixes (Latest Update)

noted in Chapter 5 and should actually be

Last update to the Handbook was made on 5/18/06 in accordance with Policy Letter on use of Handbook above.

Chapter	Title
Chapter 1	Vertical Bunsen Burner Test for Cabin & Cargo Compartment Materials Burn Length Determination Lab Test Form - Bunsen Burner Test
Chapter 2	45-Degree Bunsen Burner Test for Cargo Compartment Liners and Waste Stowage Compartment Material Lab Test Form - Bunsen Burner Test
Chapter 3	Horizontal Bunsen Burner Test for Cabin, Cargo Compartment, and Miscellaneous Materials Lab Test Form - Bunsen Burner Test
Chapter 4	60-Degree Bunsen Burner Test for Electric Wire Lab Test Form - Bunsen Burner Test
Chapter 5	Heat Release Rate Test for Cabin Materials Lab Test Form - OSU Heat Release Test Heat Release Rate Calibration Factor
Chapter 6	Smoke Test for Cabin Materials Lab Test Form - NBS Smoke Burner Test Report on the Smoke Chamber Furnace New Furnace
Chapter 7 October Update	Oil Burner Test for Seat Cushions Advisory Circular on Flammability Requirements for Aircraft Seat Cushions. Lab Test Form - Oil Burner Seat Cushion Test Seat Cushion Test Procedures Training Video: View Online | Download
Chapter 8 October Update	Oil Burner Test for Cargo Liners Lab Test Form - Oil Burner Cargo Liner Test Cargo Liner Test Procedures Training Video: View Online | Download
Chapter 9	Radiant Heat Testing of Evacuation Slider, Ramps, and Rafts

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Chapter 7: Oil Burner Test for Seat Cushions

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Handbook : FAA Fire Safety

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Video Links

Sonic Seat Test Training Video

- **Video viewing for Seat Task Group**
  - Meeting tomorrow 10:00-12:00 PM
  - Question and answer session after video
- **View video from Fire Safety website**
  - Streaming “online video” from website has better resolution than “download” or DVD
- **Limited DVD hardcopies available**
  - No closed caption on DVD hardcopies

Planned Video Production

Planned Training Videos

- **Sonic Burner Assembly and Operation**
  - Video shooting to begin 2018
  - Details of burner components
  - Assembly and configuration
  - Working principles
  - User operation instruction
  - Proper calibration (fuel flow, air metering, etc.)
  - Common issues and troubleshooting tips
  - Additional suggestions from task group members

Planned Training Videos

- **Cargo Liner Patching**
  - Video shooting to begin 2019
  - Method of conducting certification testing
  - Liner patch types
  - Construction of patch samples
  - Test sample and frame configuration
  - Deviations from typical liner tests
  - Specific testing procedures
  - Additional suggestions from task group members

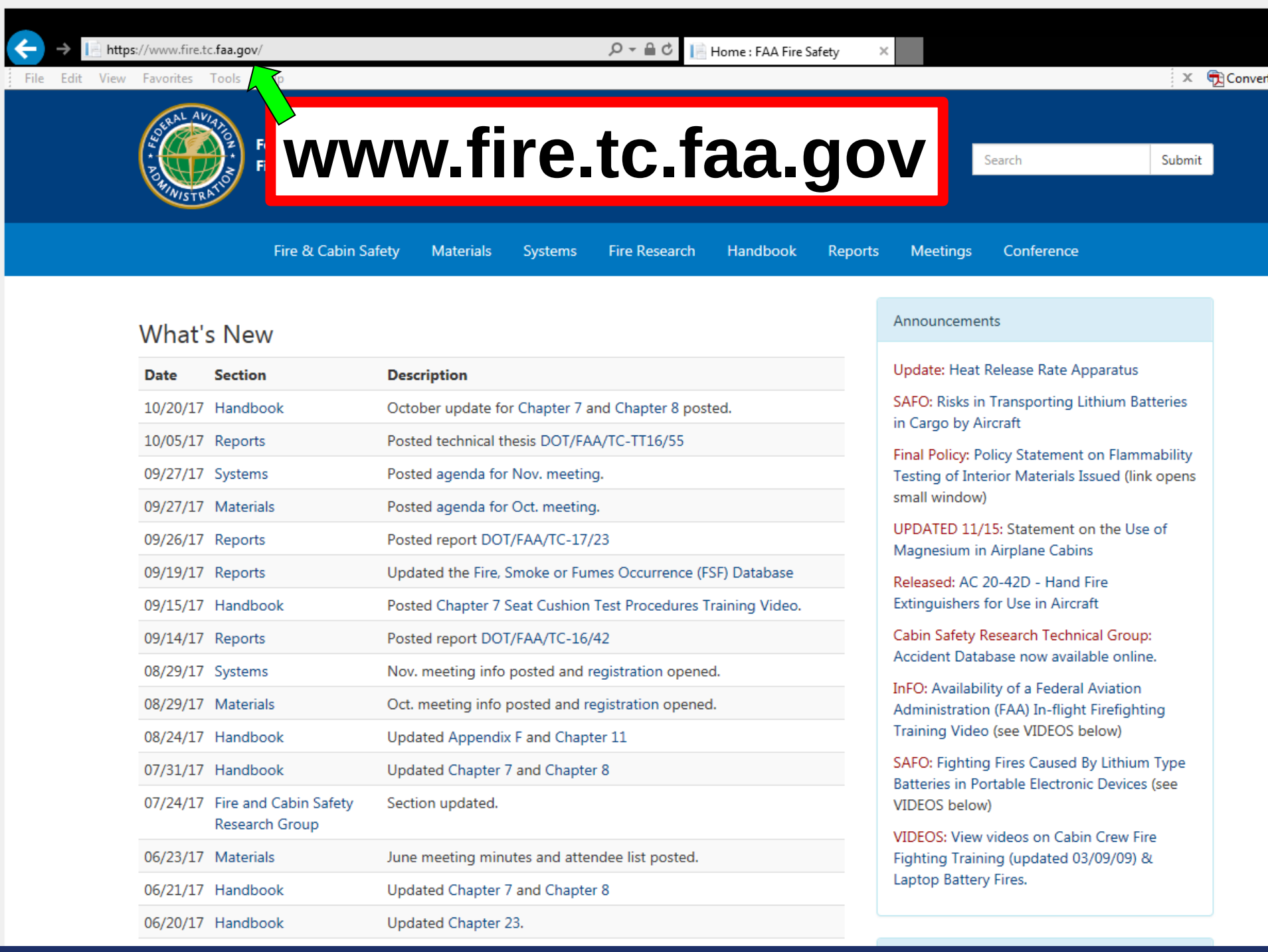
Planned Training Videos

- **Current video production rate is one yearly**
  - Limited availability of video lab personnel
- **Planned order of future training videos:**
  - Bunsen Burner Testing
  - OSU Heat Release Apparatus
  - Magnesium Flammability Test
  - Insulation Burnthrough Test
  - Additional test method videos to follow…..
- **Order of video release subject to change**

Fire Test Handbook Updates

Fire Test Handbook Updates

- **Fire Safety Website (New Look!)**
  - Recently updated the look of the website
  - Layout and location of items has not changed
- **Fire Test Handbook Update Frequency**
  - May occur as frequently as once a month
  - Only if changes or additions are required
  - Updates to Handbook and all other updates on the Fire Safety website are listed on the front page



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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

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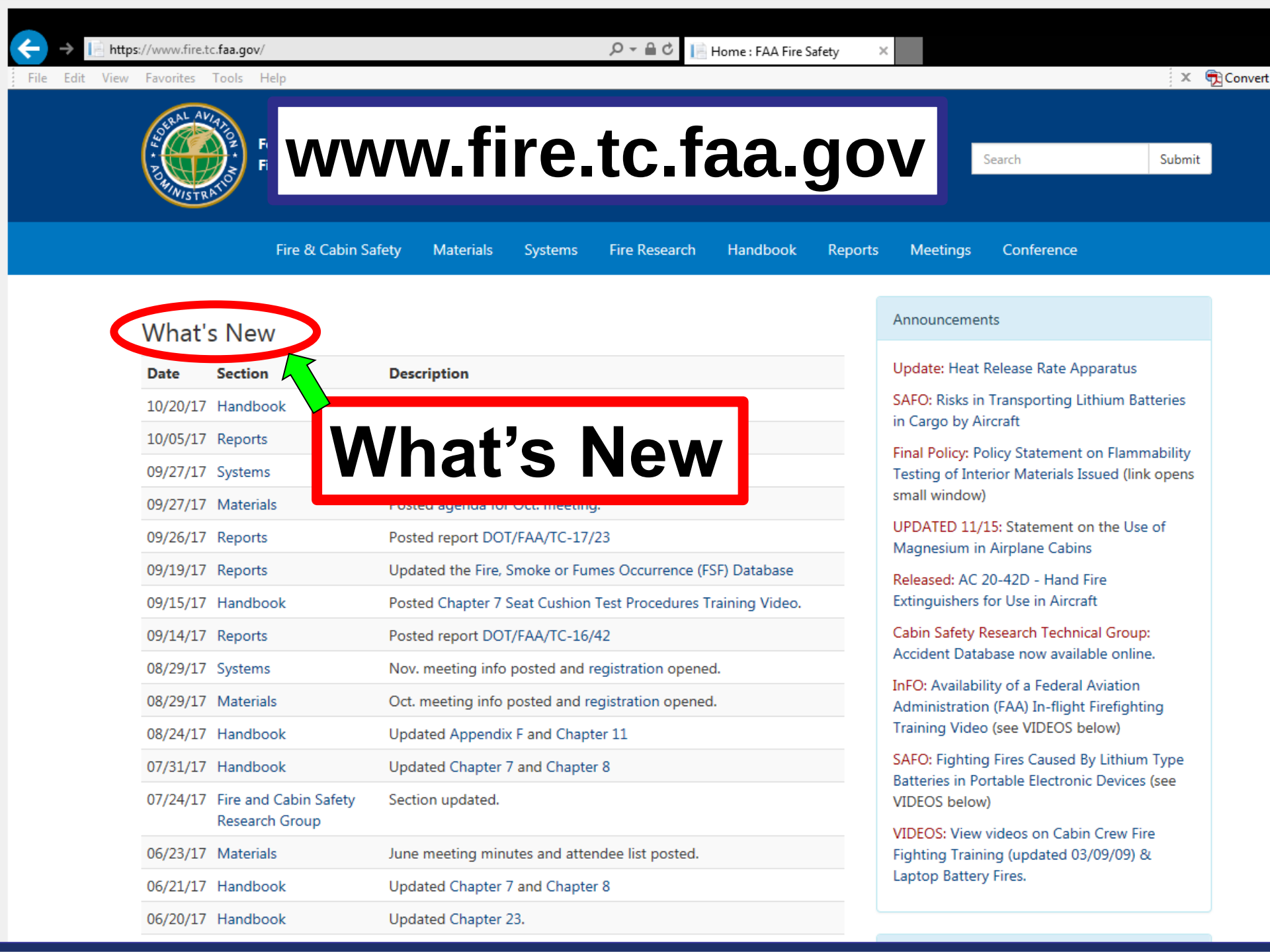
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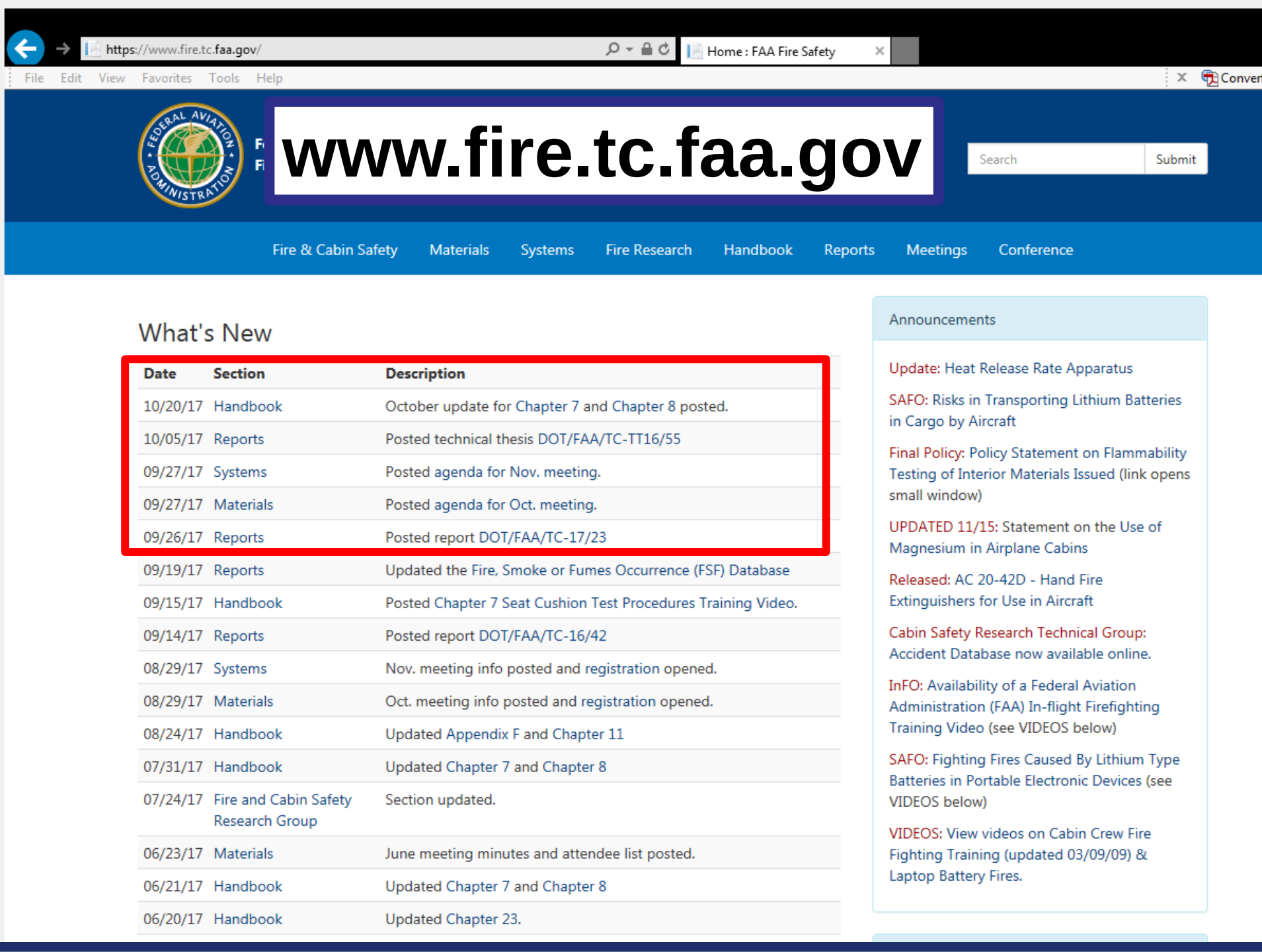
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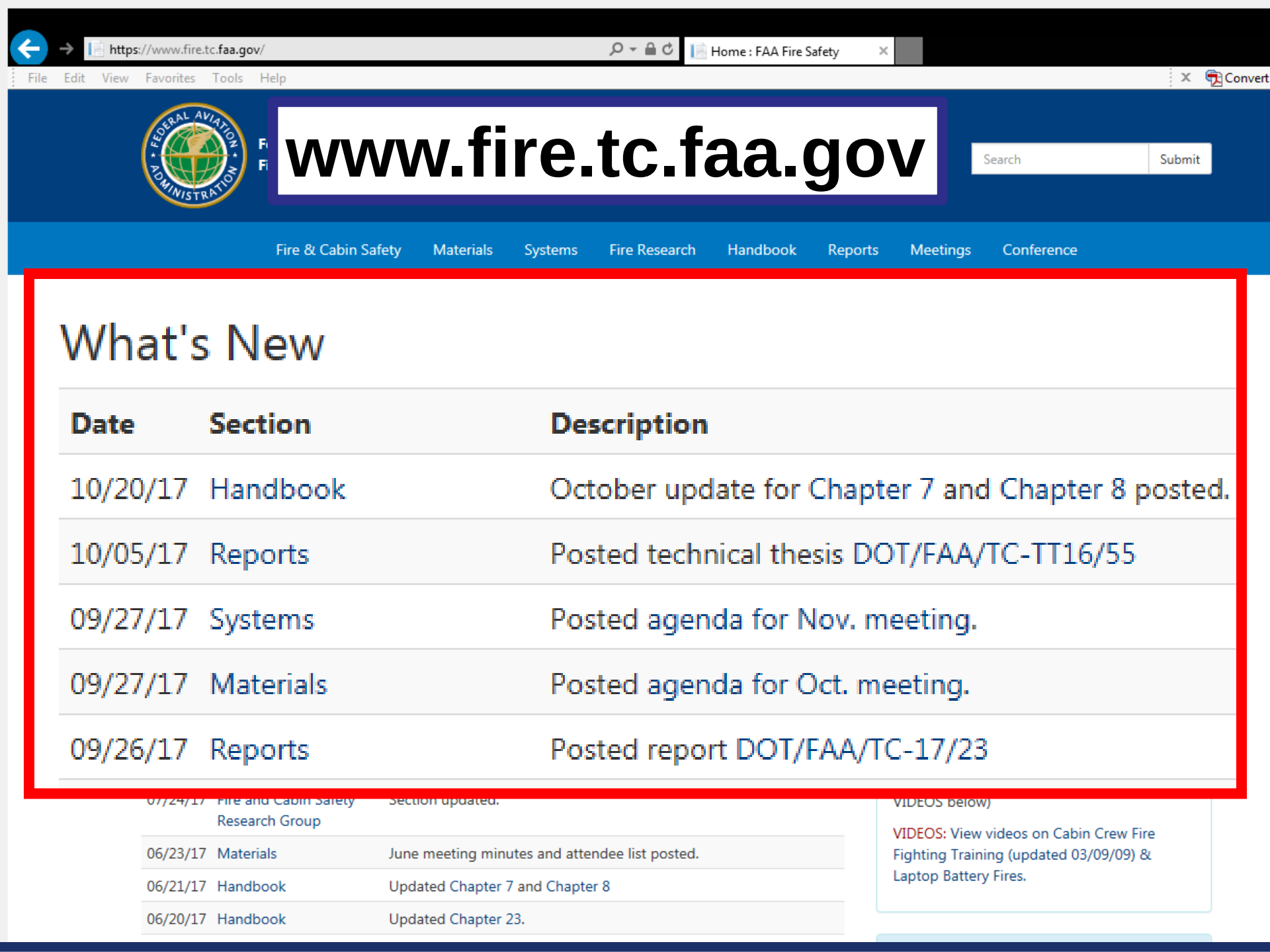
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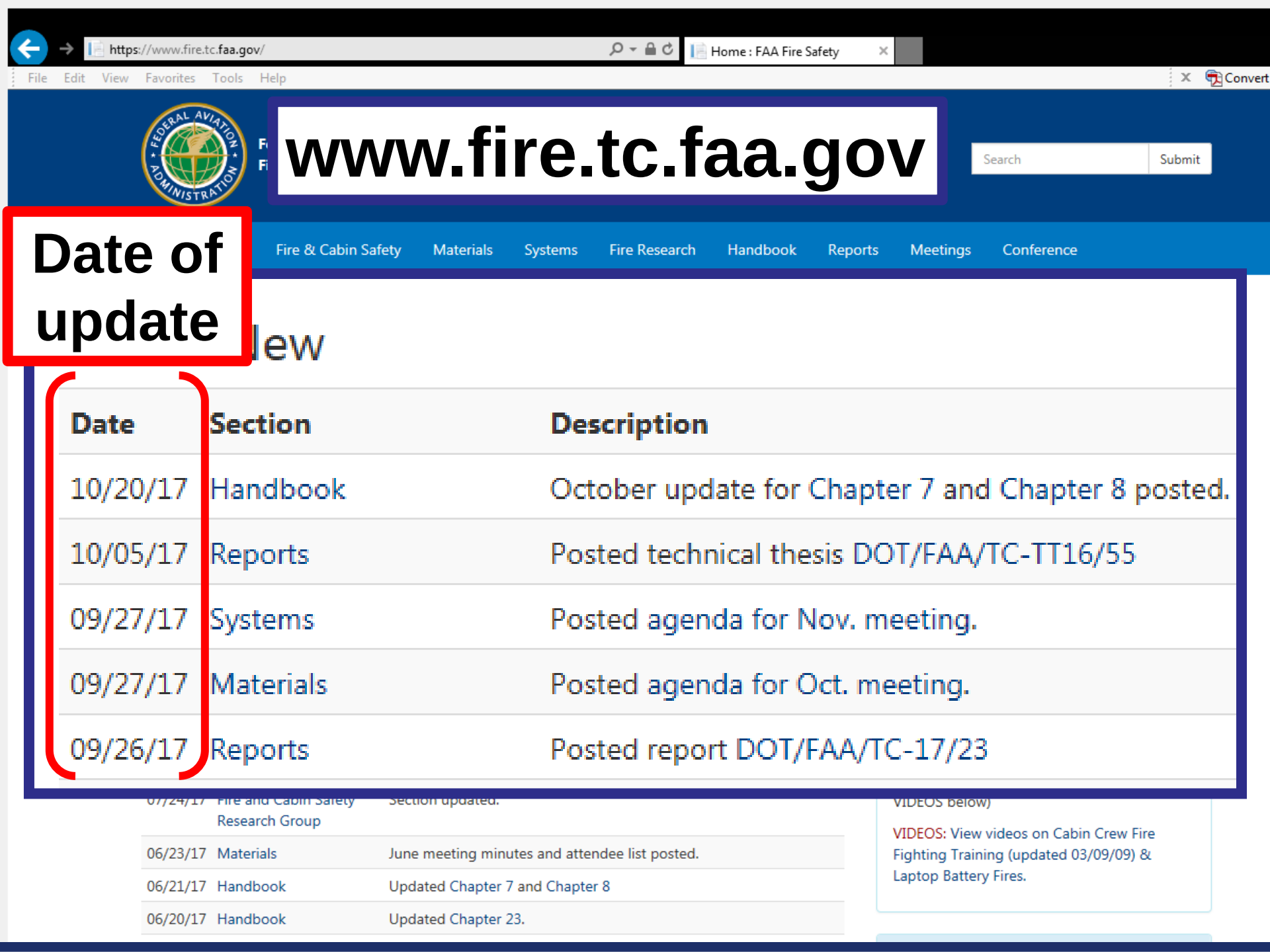
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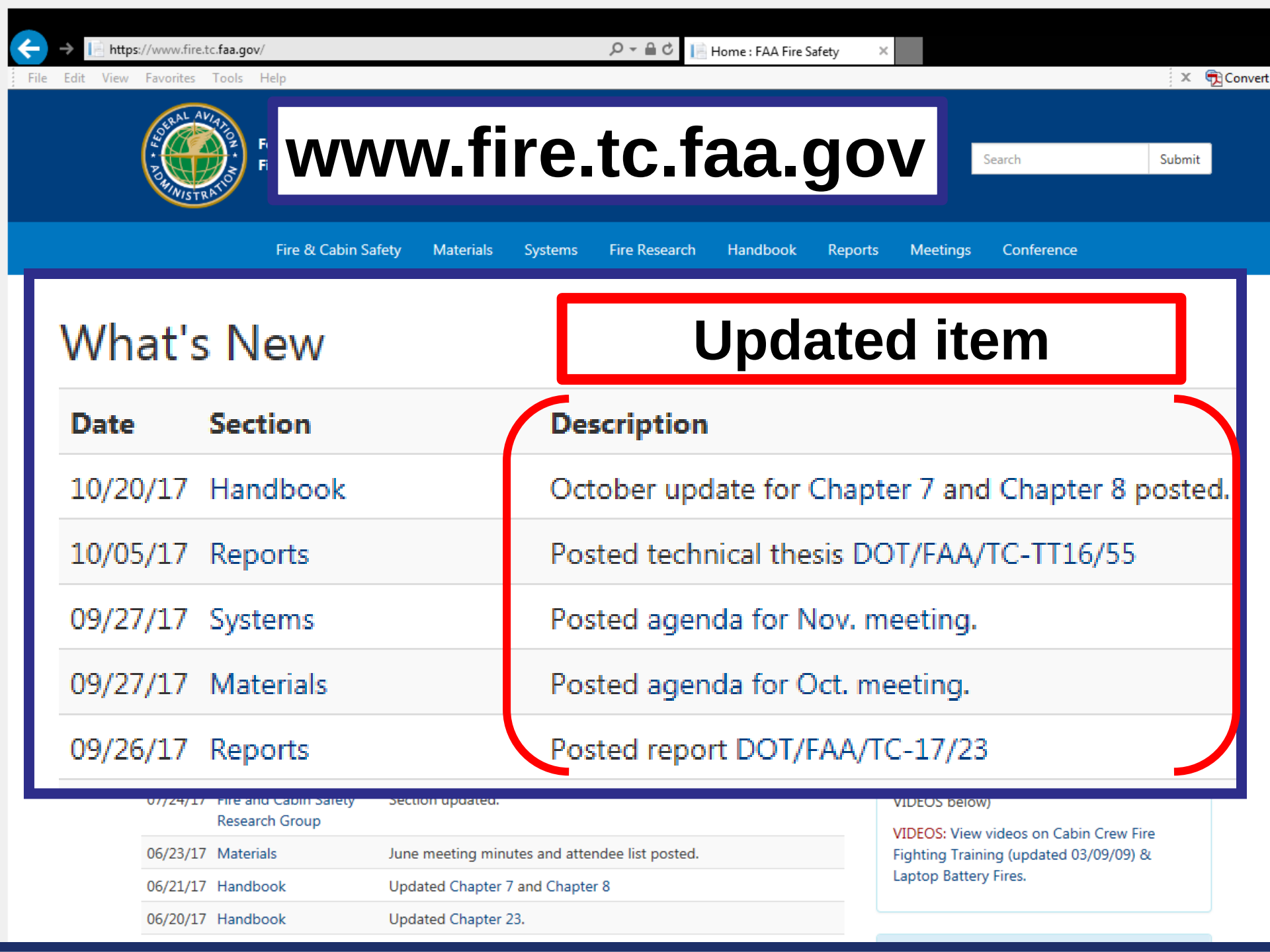
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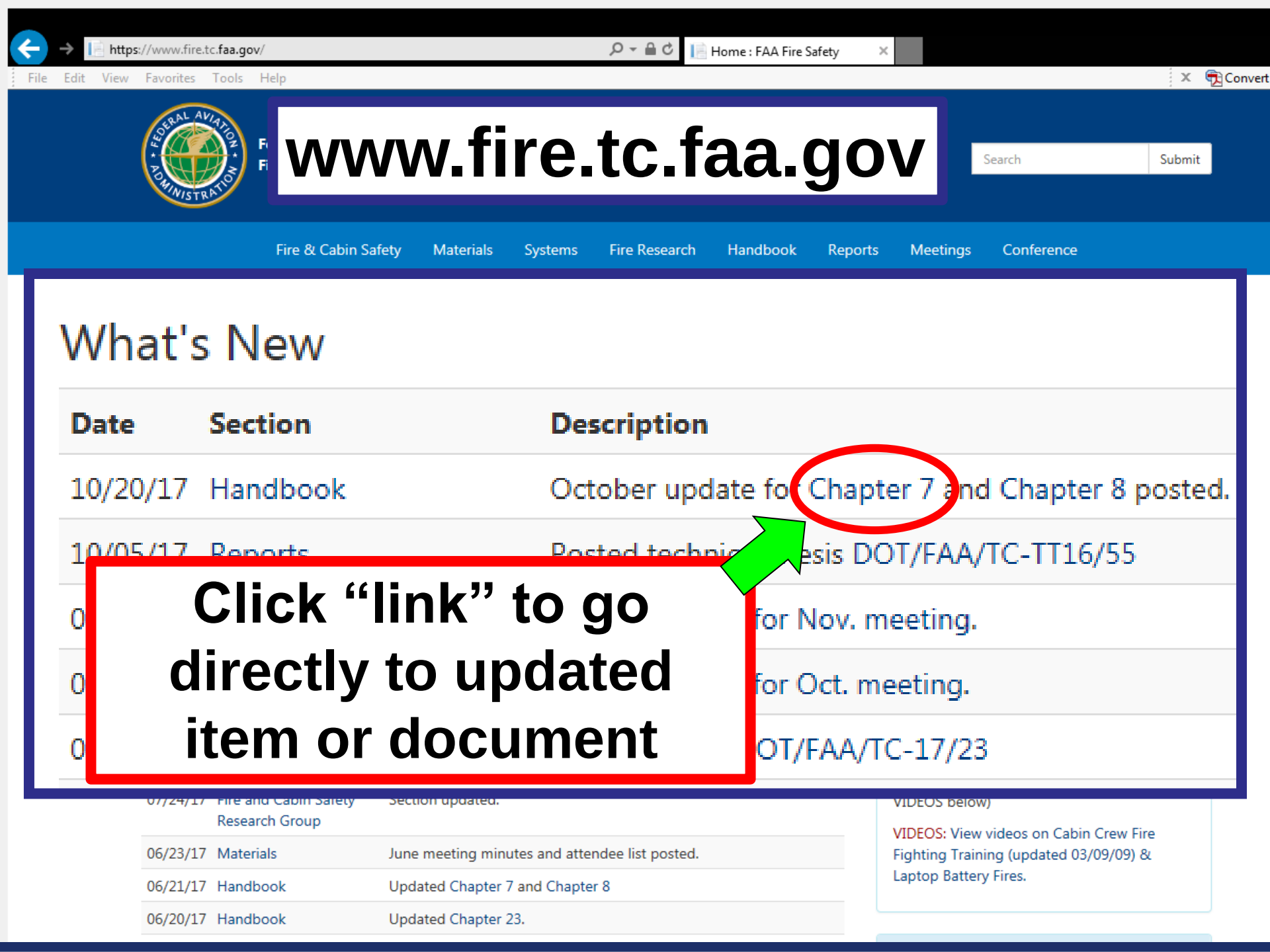
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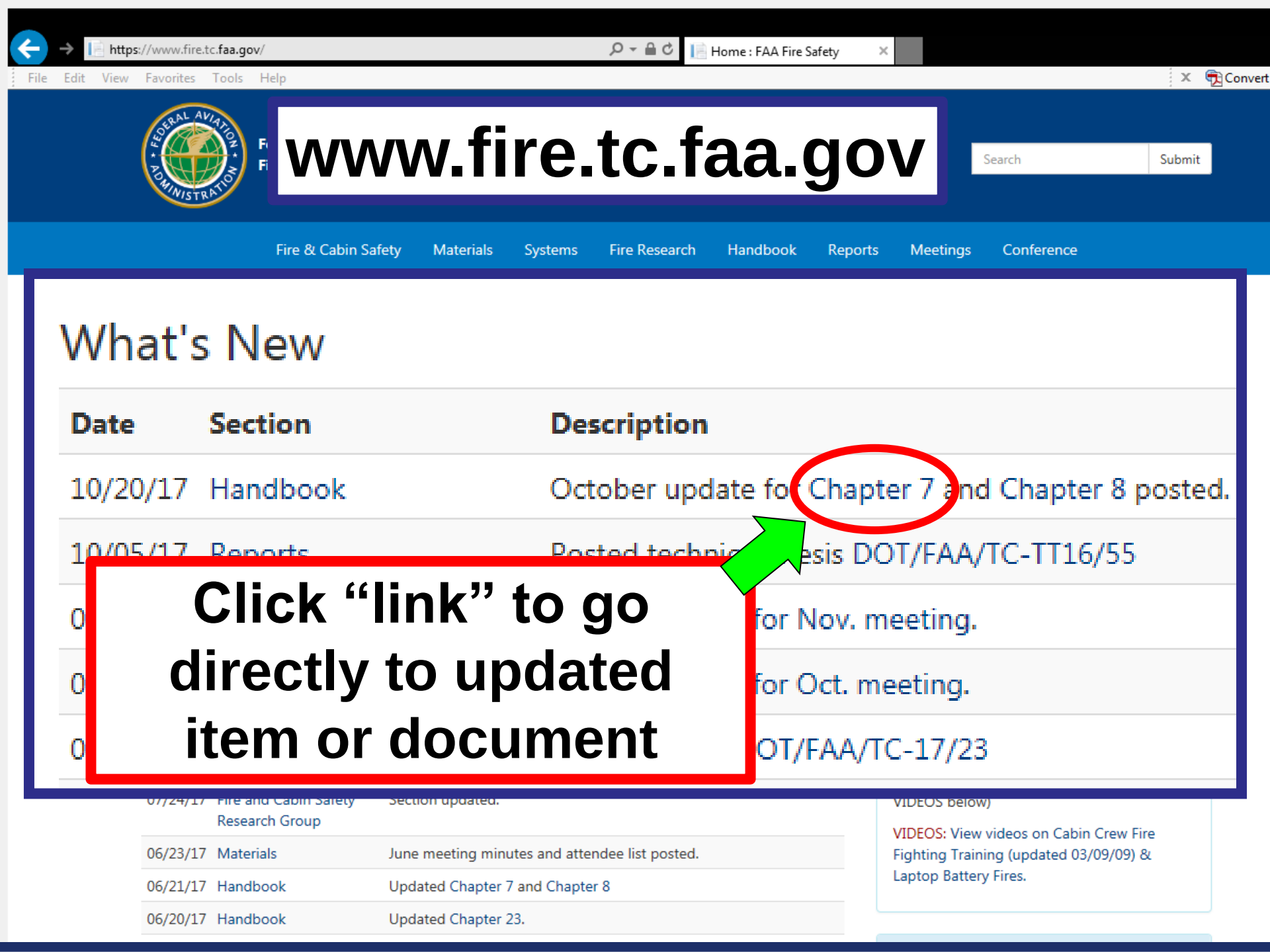
Fire Test Handbook Updates

- **Chapter release version identification**
  - Month and year of release located at the bottom (footer) of the chapter document pages
  - Previous versions archived on website
- **Edits, additions, other changes**
  - **Red text** indicates updated chapter information
- ***"NOTE"***
  - Supplemental instruction, information or example
  - Not required unless explicitly stated in "*NOTE*"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October update for Chapter 7 and Chapter 8 posted.
esis DOT/FAA/TC-TT16/55
for Nov. meeting.
for Oct. meeting.
OT/FAA/TC-17/23
Click "link" to go directly to updated item or document
Research Group
06/23/17 Materials
June meeting minutes and attendee list posted.
06/21/17 Handbook
Updated Chapter 7 and Chapter 8
06/20/17 Handbook
Updated Chapter 23.
VIDEOS below)
VIDEOS: View videos on Cabin Crew Fire Fighting Training (updated 03/09/09) & Laptop Battery Fires.

	Heat Release Rate Calibration Factor
Chapter 6	Smoke Test for Cabin Materials Lab Test Form - NBS Smoke Burner Test Report on the Smoke Chamber Furnace New Furnace
Chapter 7 October Update	Oil Burner Test for Seat Cushions Advisory Circular on Flammability Requirements for Aircraft Seat Cushions. Lab Test Form - Oil Burner Seat Cushion Test Seat Cushion Test Procedures Training Video: View Online | Download
Chapter 8 October Update	Oil Burner Test for Cargo Liners Lab Test Form - Oil Burner Cargo Liner Test Cargo Liner Test Procedures Training Video: View Online | Download
Chapter 9	Radiant Heat Testing of Evacuation Slider, Ramps, and Rafts
Chapter 10	Fire Containment Test of Waste Stowage Compartments
Chapter 11 Updated	Powerplant Hose Assemblies Test
Chapter 12	Powerplant Fire Penetration Test
Chapter 13	Test for Electrical Connectors used in Firewalls
Chapter 14	Test for Electrical Wire used in Designated Fire Zones
Chapter 15	Two Gallon per hour Oil Burner Certification Testing for Repaired Cargo Compartment Liners
Chapter 18	Recommended Procedure for the 4-Ply Horizontal Flammability Test for Aircraft Blankets Lab Test Form - Bunsen Burner Test
Chapter 19	Smoke test for Insulated Aircraft Wire
Chapter 20	Dry Arc Tracking Test Procedure
Chapter 21	Dry Arc-Propagation Resistance
Chapter 22	Cotton Swab Test for Thermal Acoustic Insulation Blankets
Chapter 23 Updated	Test Method To Determine the Flammability and Flame Propagation Characteristics of Thermal/Acoustic Insulation Materials Advisory Circular on Thermal/Acoustic Insulation Flame Propagation Test Method Details Radiant Panel Procedures Training Video: View Online | Download
Chapter 24	Test Method To Determine the Burnthrough Resistance of Thermal/Acoustic Insulation Materials Advisory Circular on Installation of Thermal/Acoustic Insulation for Burnthrough Protection

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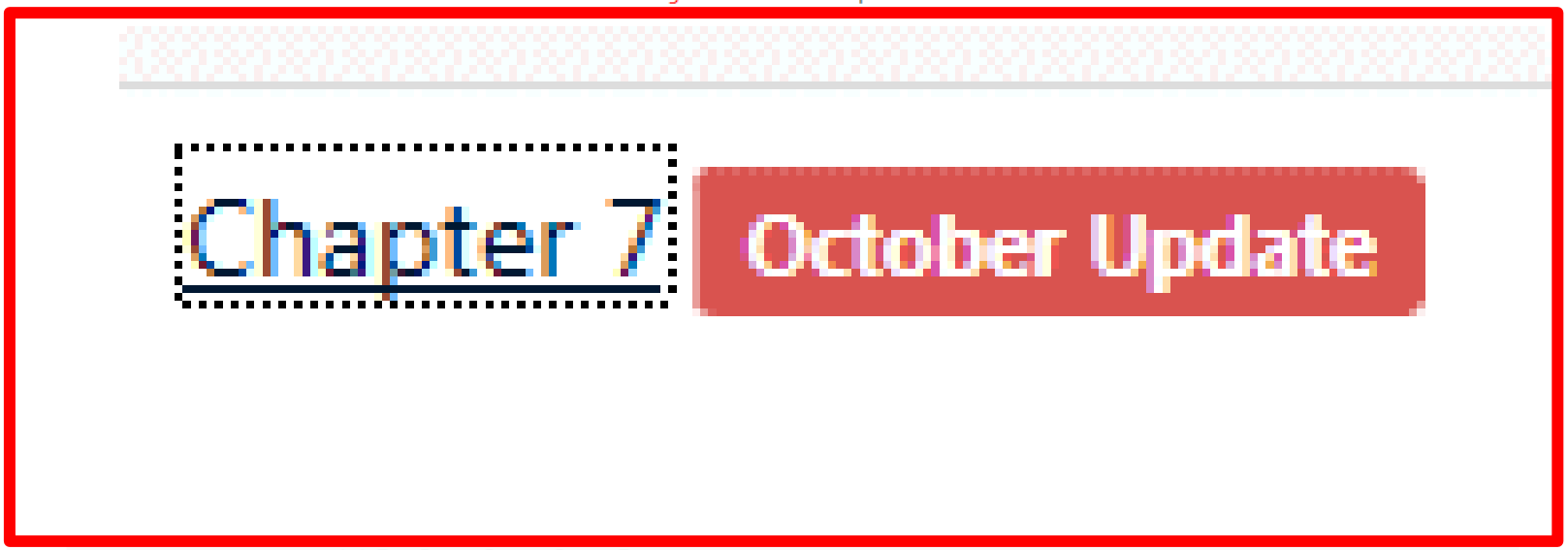

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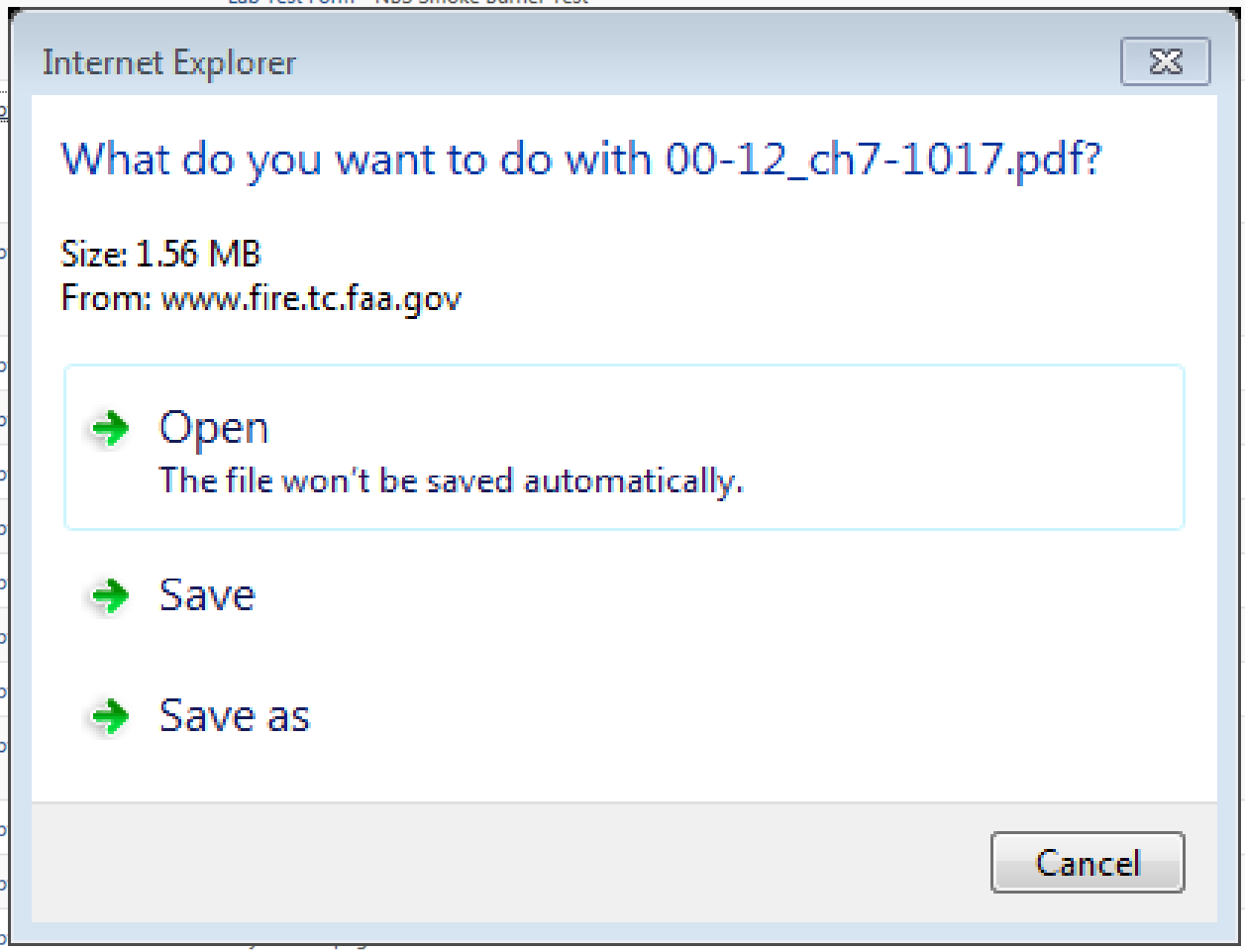
Heat Release Rate Calibration Factor

Chapter 6	Smoke Test for Cabin Materials Lab Test Form - NBS Smoke Burner Test



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NOTE 1: The thermocouples are subjected to high temperature durations during calibration. Because of this type of cycling, the thermocouples may degrade with time. Small but continuing decreases or extreme variations in temperature or "no" temperature reading at all are signs that the thermocouple or thermocouples are degrading or open circuits have occurred. In this case, the thermocouple or thermocouples should be replaced in order to maintain accuracy in calibrating the burner. It is recommended that a record be kept for the amount of time the thermocouples are exposed to the oil burner's flame.

NOTE 2: The Sonic burner is sensitive to proper alignment of the fuel nozzle. It is crucial that the fuel nozzle be aligned to the geometric center of the turbulator. A slight adjustment of the fuel tube between the stator and fuel nozzle may be required to obtain an even temperature profile across the thermocouple rake. The center point of the nozzle where the fuel exits should not deviate more than 0.0625 inches from the geometric center of the turbulator exit plane when looking into the burner draft tube. This should be performed only after checking the burner for proper configuration.

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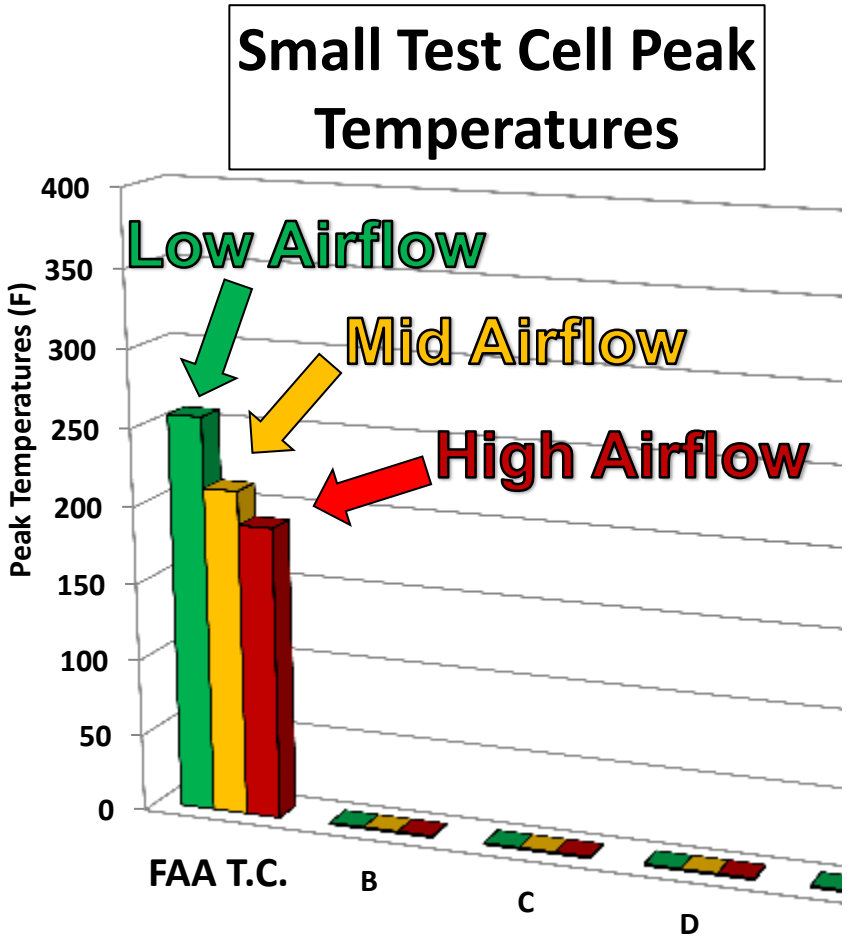
7-26
(October 2017)

Sonic Burner Cargo Liner Test Airflow Study Update

Test Cell Airflow Interlab Study



- FAA T.C. test results showed lower peak temperatures measured above liner samples with increased exhaust airflow
- Interlab study performed in 2016 to further investigate relationship
- Study results were inconclusive
- Continued study ongoing at FAA T.C. test facilities

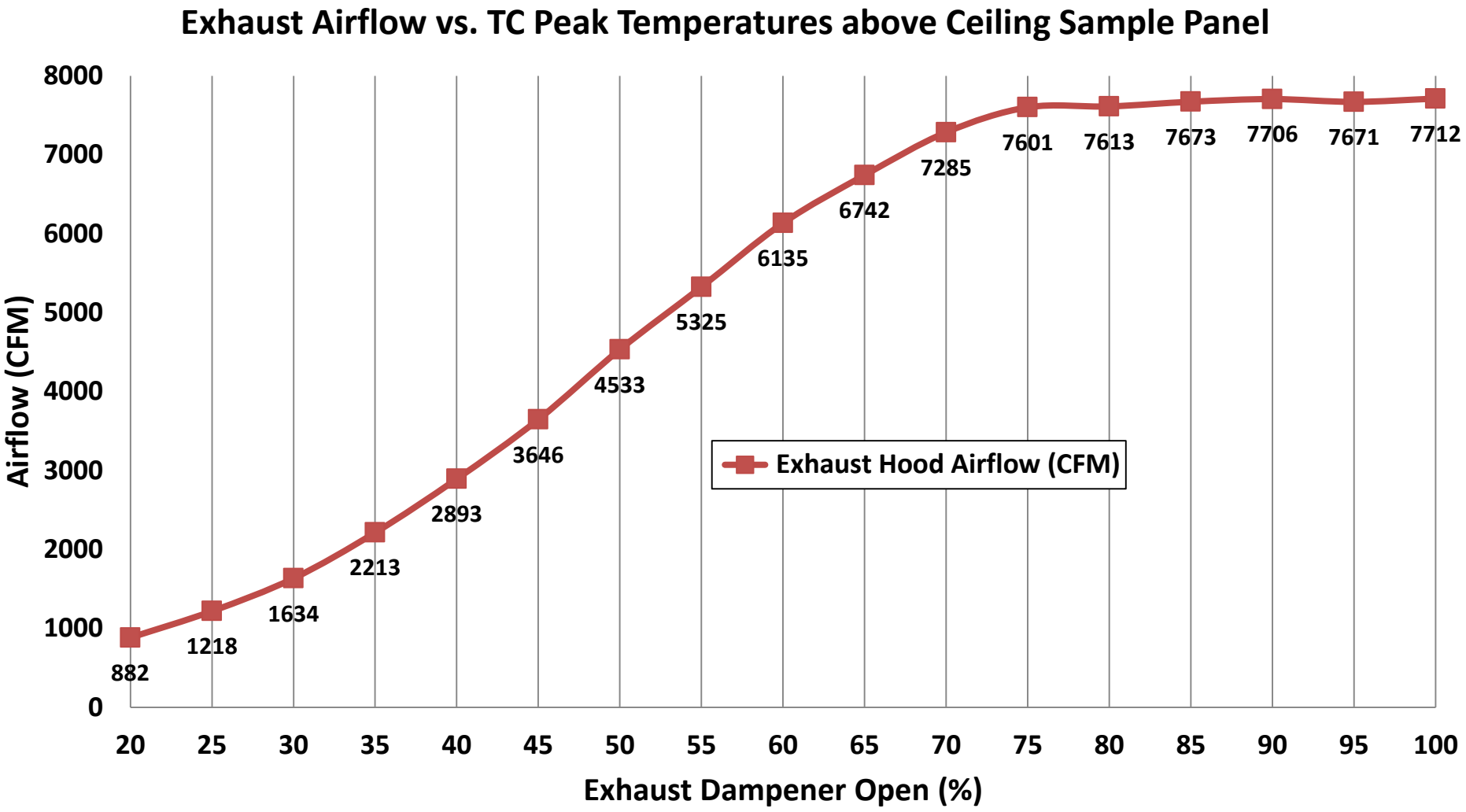
Sonic Cargo Liner Airflow Study

- **Small test cell**
  - Limited control of exhaust airflow rate
  - No means to alter test cell size/configuration
  - Limited use for extensive airflow study of this nature

Sonic Cargo Liner Airflow Study

- **Large test cell**
  - Wide range of exhaust airflow rates
  - Digital control of exhaust dampener
  - Excellent repeatability of desired airflow
  - Ability to reduce test cell size using partitions if necessary

Sonic Cargo Liner Airflow Study



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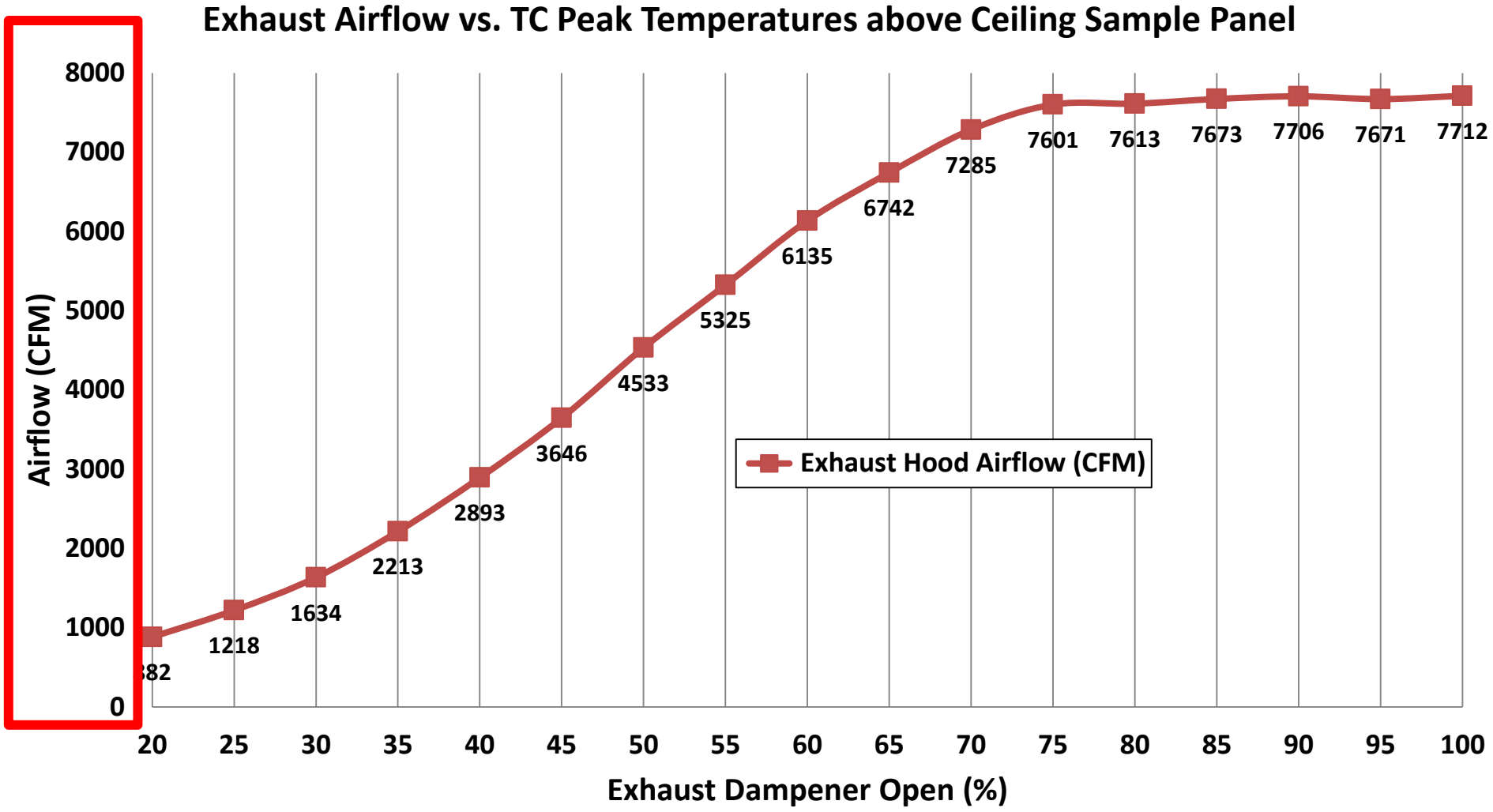

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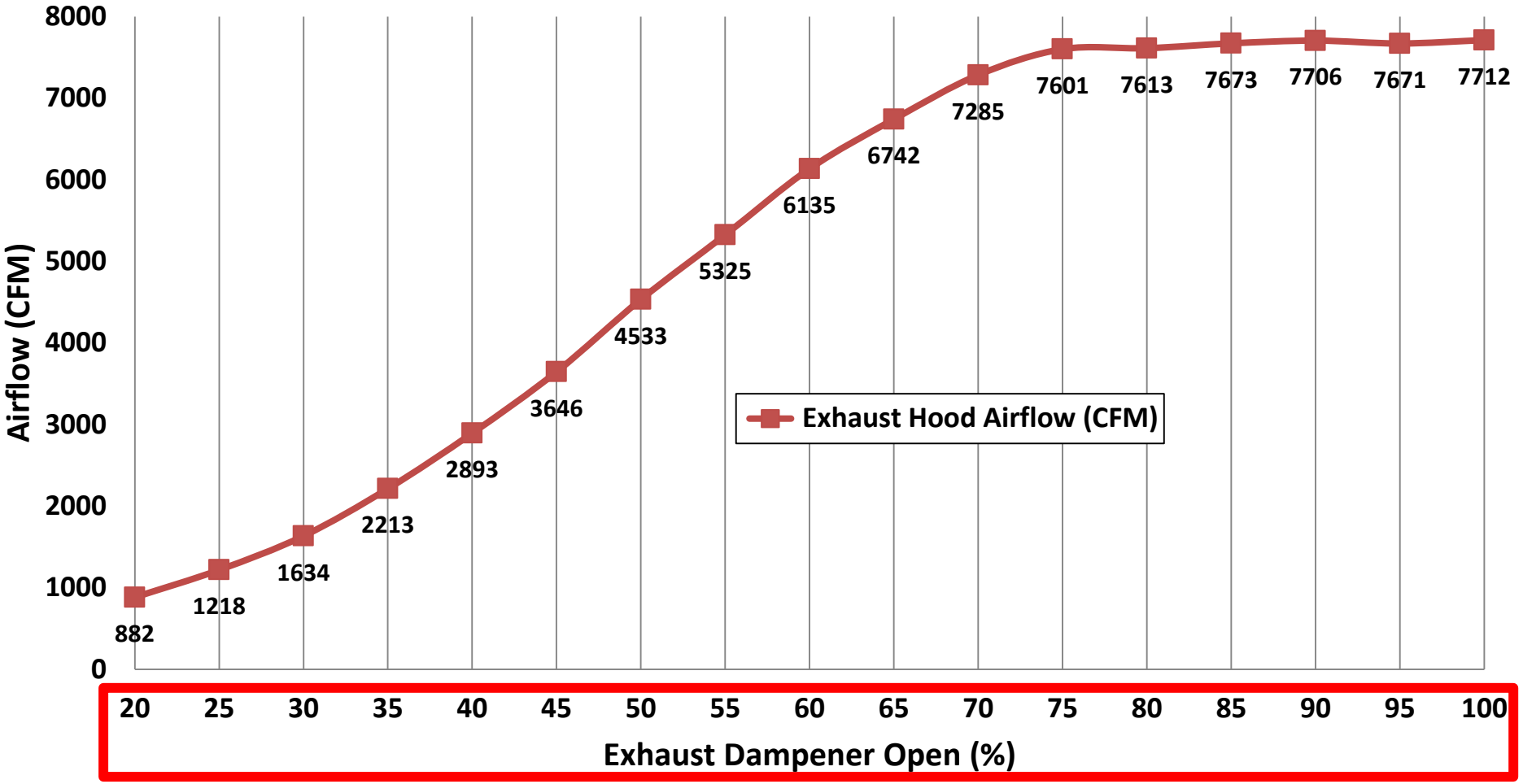

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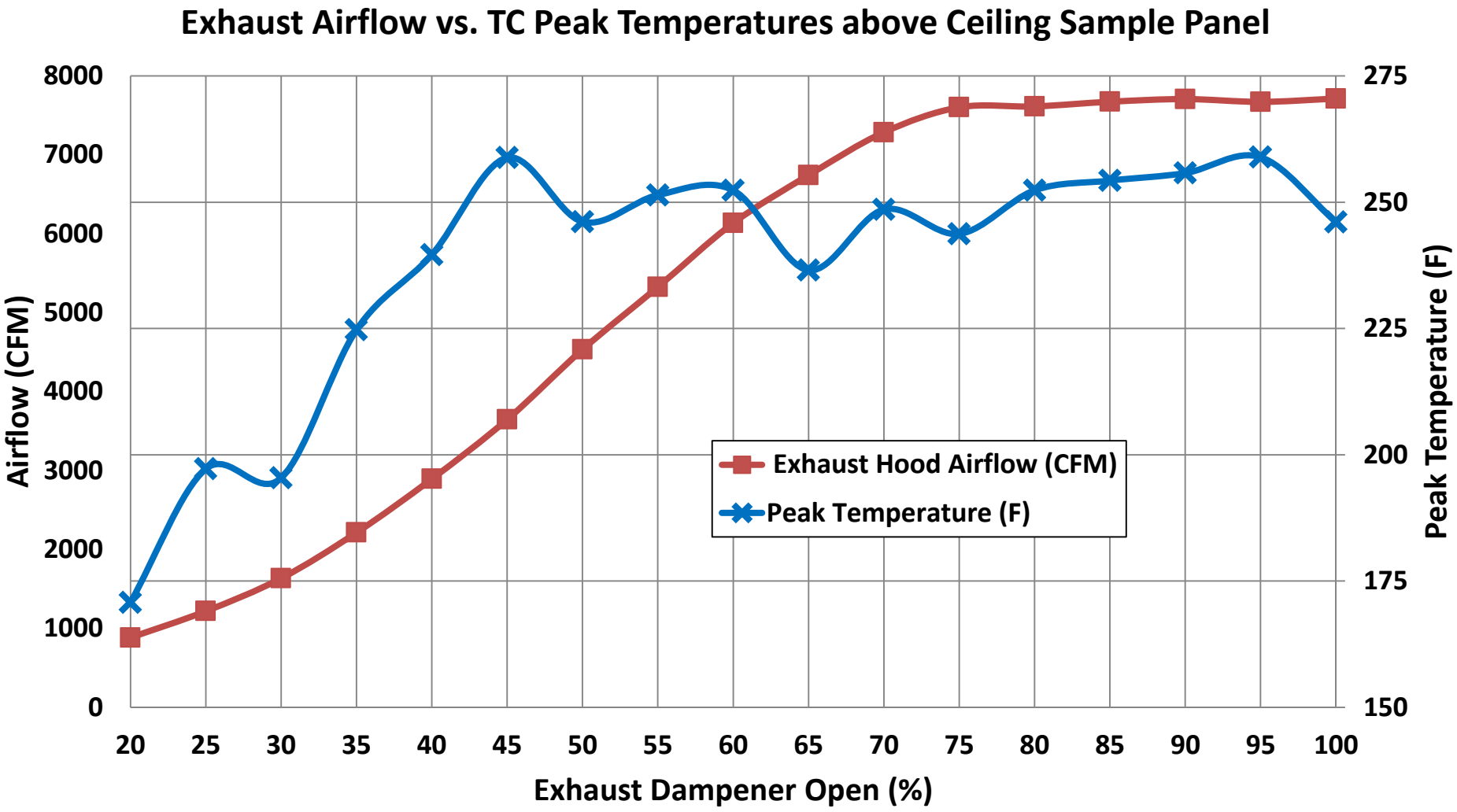

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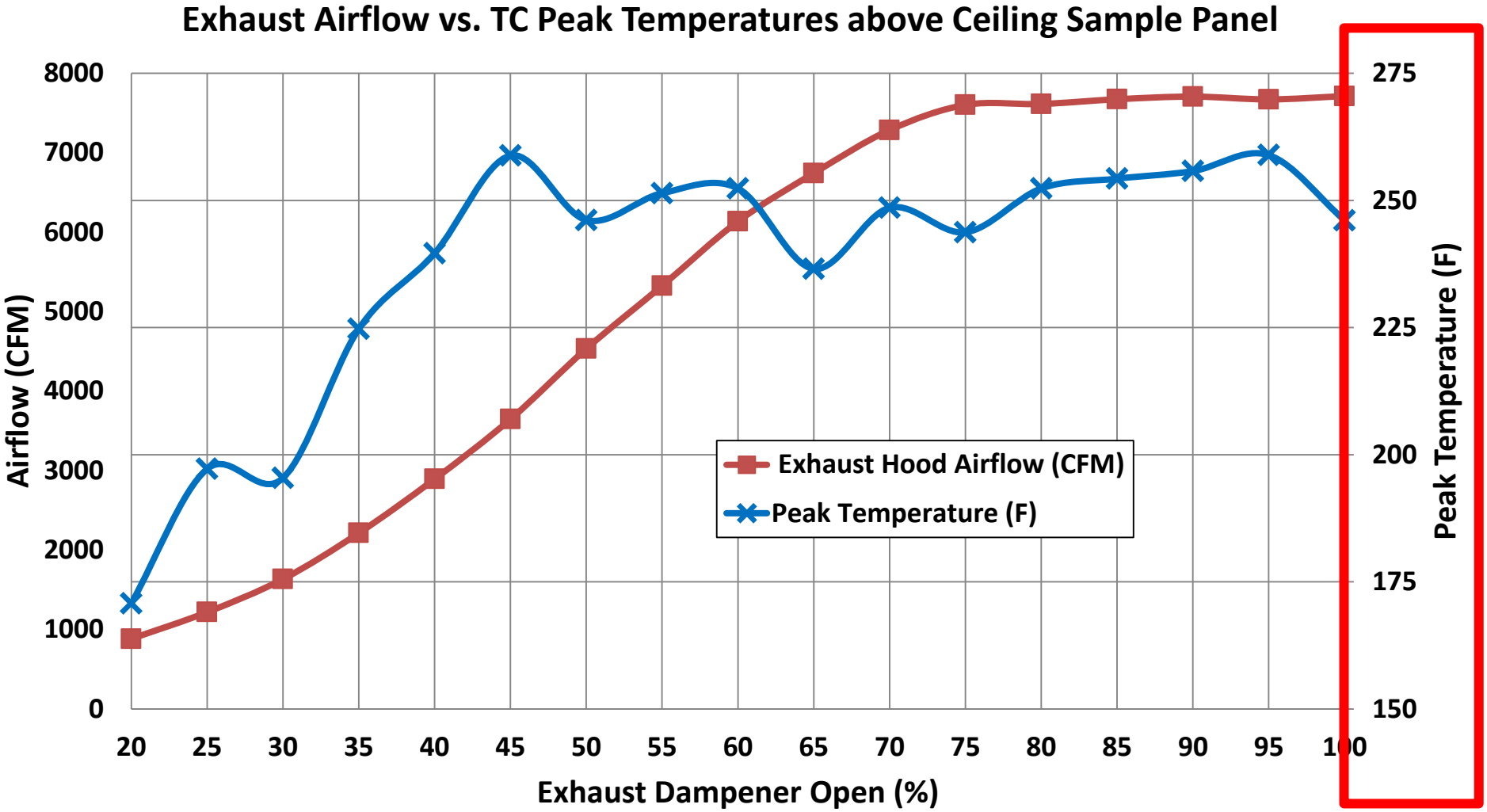

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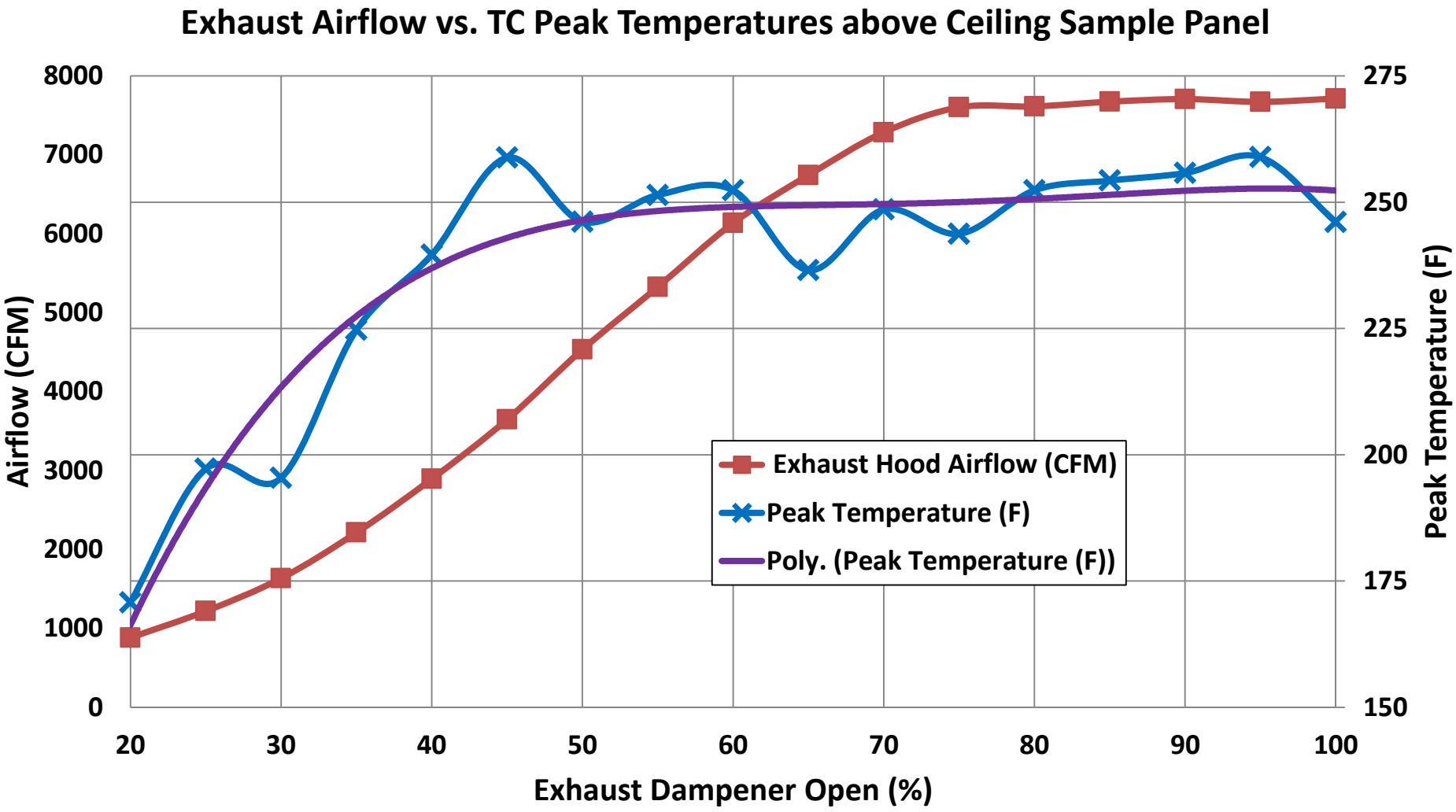

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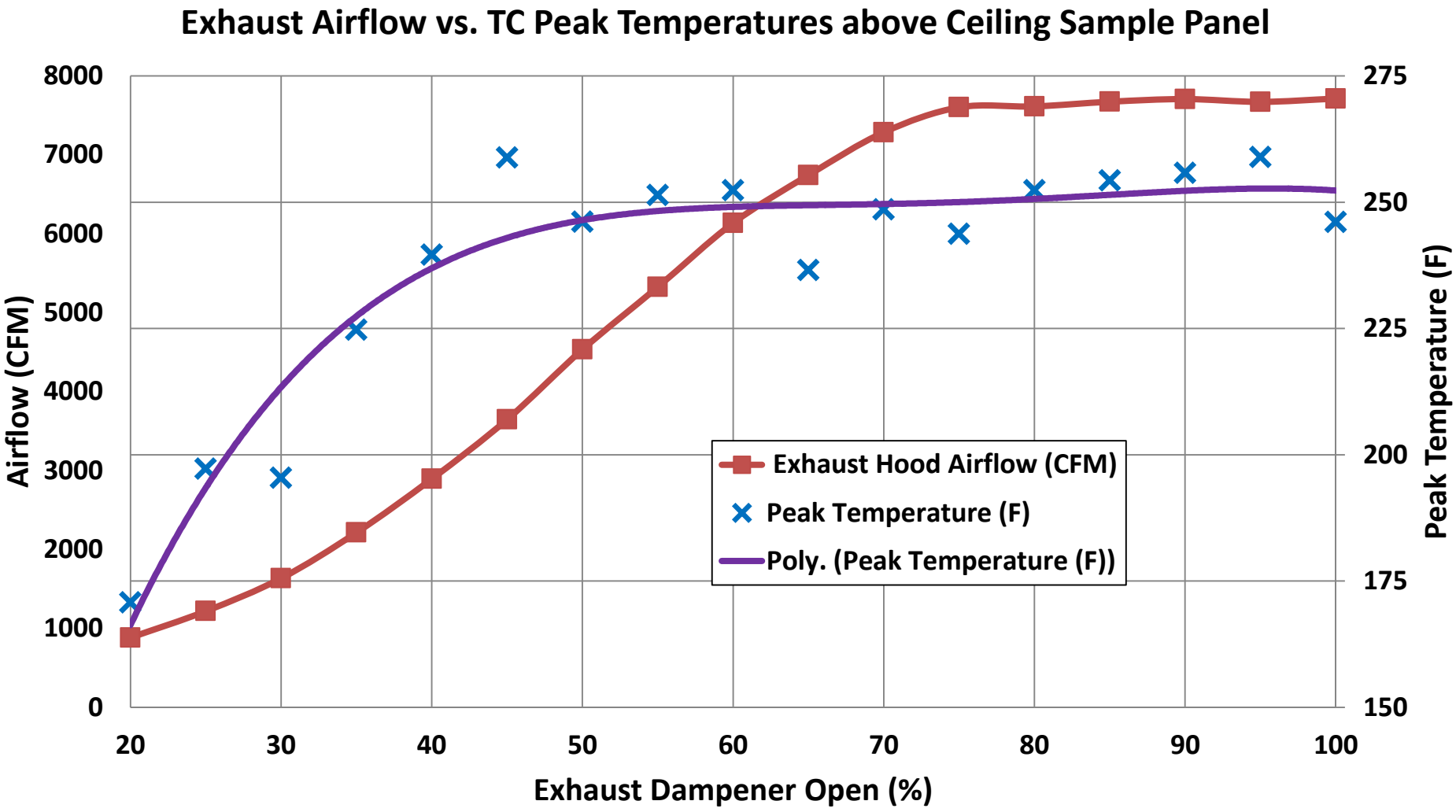

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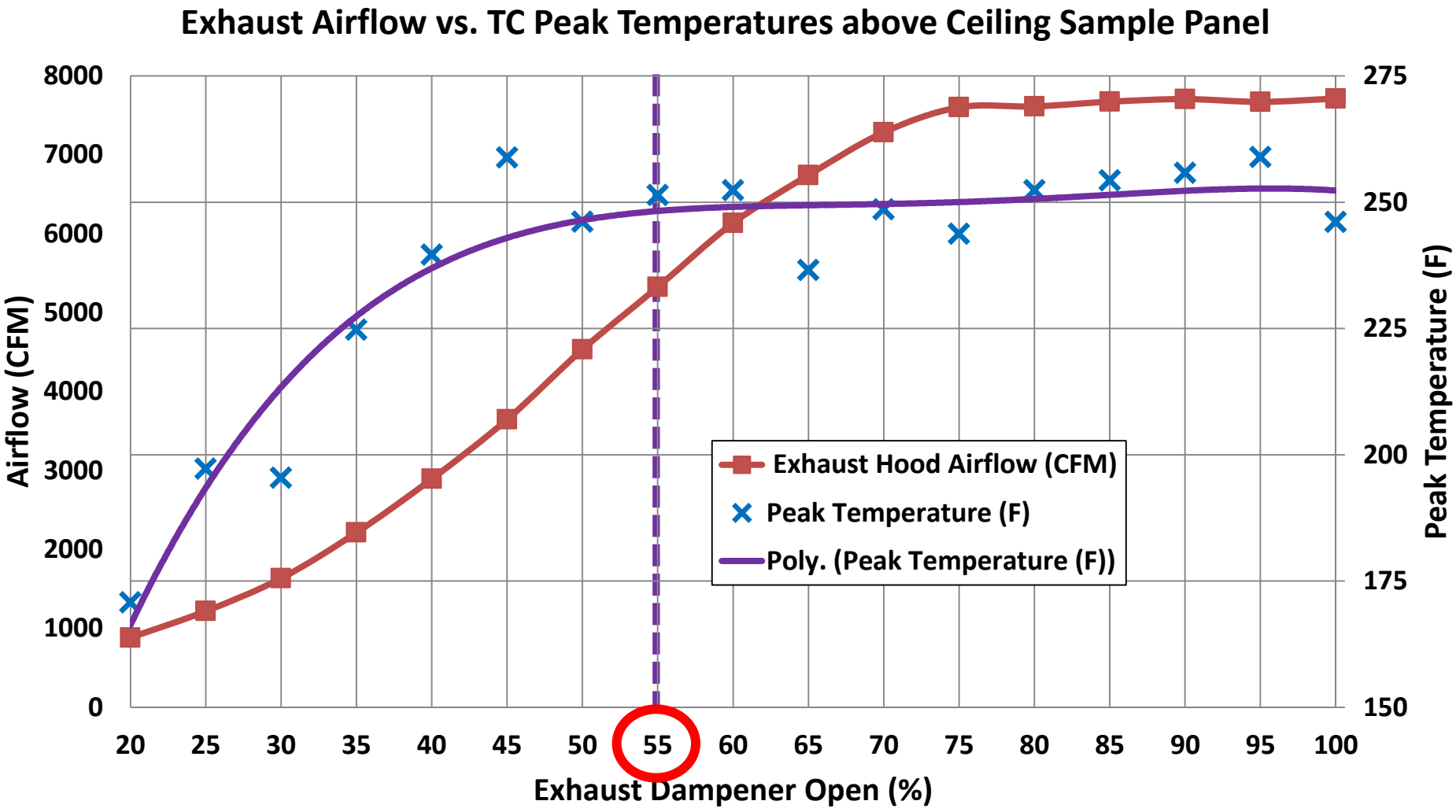

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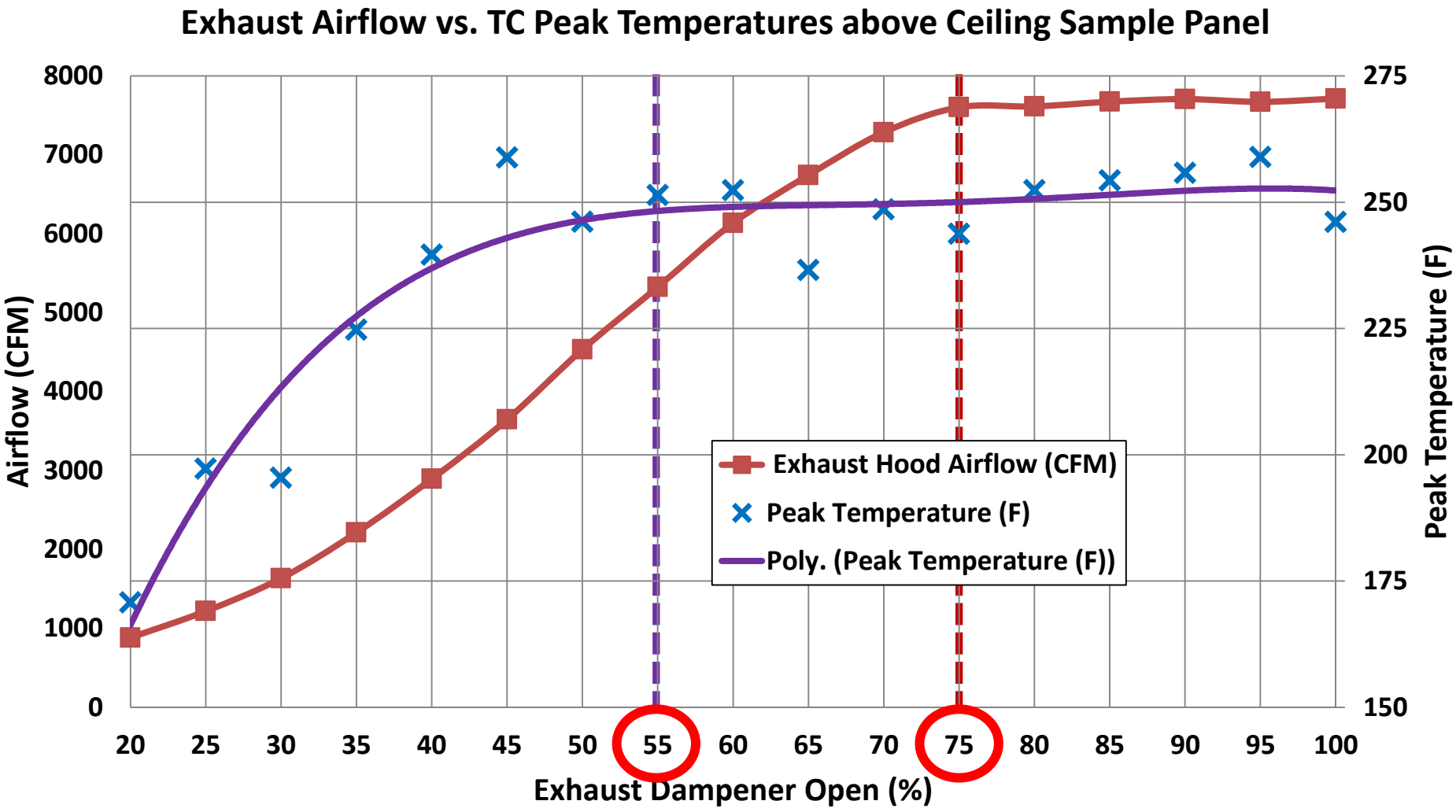

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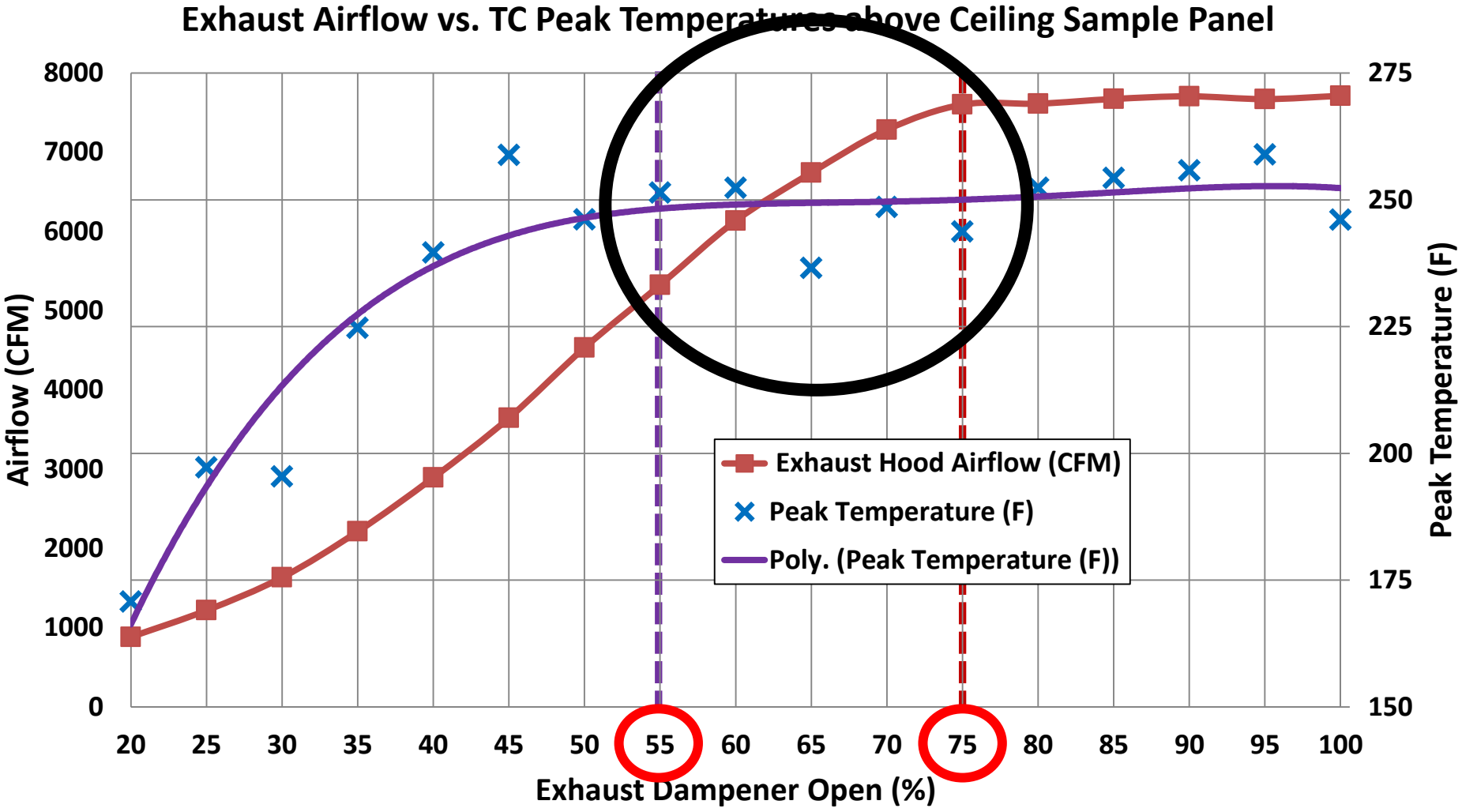

Sonic Cargo Liner Airflow Study

- **Summary**
  - Results indicate an exhaust airflow range at which measured sample peak temperatures remained relatively steady
  - May be possible to specify an airflow or air velocity range to minimize test result disparities among labs
- **Next phase**
  - Collect air velocity data at multiple points near the sample throughout this range
  - Repeat process in a more confined test space

Correct Configuration of the Sonic Burner

Sonic Burner Configuration

- **Instances where Sonic burners have not been configured properly**
  - Must follow configuration in the respective chapter
  - Deviations will alter flame characteristics
  - This includes all burner components form the sonic nozzle inlet to the burner cone exit plane
- **Examples**
  - Improper sonic nozzle orientation relative to burner, stator clocking (rotation) incorrect, fuel rod enters burner housing on opposite side as specified

Planned Research and Work

Planned Research and Work

- **Produce new training videos**
  - Sonic Burner Assembly and Operation (2018)
- **Update Handbook chapters**
  - On an as-needed basis
- **Continue cargo liner airflow study**
  - More updates for next meeting
- **Additional items**
  - Task group suggestions


Well…
Whatcha' wanna know?

Questions?

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