Recent Considerations of New UL1703 Method

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Recent Considerations - New UL1703 Method

Discussion:

- Tests for Baseline Requirements
- Variation in Baseline Results
- UL790 Calibration
- Opportunities for Improvement – Baseline Solution
- UL1703 Burner Project

Tests for Baseline Requirements

- Using the proposed UL1703 assembly level procedure, exploratory baseline (roof only) tests were conducted on low & steep slope roofs

- Recent testing has shown challenges in obtaining commercially available products that meet the baseline performance limits – less than 6 feet; greater than 4 feet

- This led to discussions of variation in the baseline test results

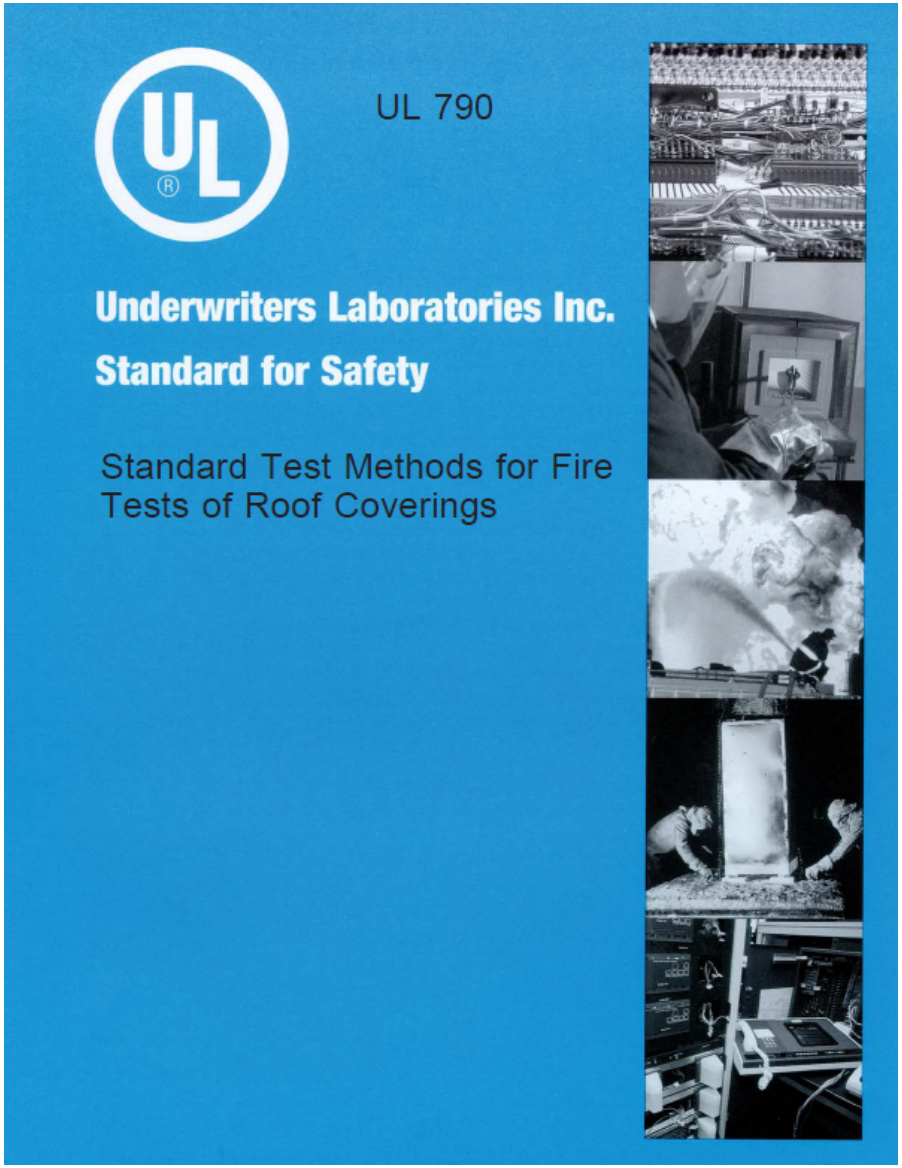
Tests for Baseline Requirements

Variation

- Variation in the test method
- Variation in the products tested

UL790 Calibration

- UL790 Calibration Procedure
- Air Flow
- Temperature Measurement
- Shape and Size of Flame



UL 790 Calibration

Measured Parameters:

- Airflow – 12 mph
- Temperature – 1400°F

Observed Parameters:

- Ignition Flame Length
- Ignition Flame Shape

Improvements / Refinement

To address Variation in Test Method

- Work has been conducted (and is being continued) to identify variation within the allowable UL1703 baseline procedures

- Better understand how these variables impact the results of baseline performance within the required limits

- UL will be in a position to offer recommendations for refining UL1703 baseline controls, resulting in improved repeatability in baseline testing

Variation in Products Tested

To address Variation in Commercially Available Baseline Products

Since the conception of the UL1703 system approach, it was known that variation of commercially available baseline roofing products may be a challenge

UL is working to identify commercially available baseline roofing products that will provide consistent results within the UL1703 baseline limits

Both low slope and steep slope roofing industries are aware of many factors that affect product variation

Example of Baseline Solution

Use of specific mounting procedure to lend greater confidence in results

Center batten bar on low slope membrane

Example Baseline Solution

Multiple Tests - Promising Results

Test #	Flame Spread (ft)
1	4.75
2	4.25
3	4.5
4	5
5	5.75
Average (ft)	4.85
Std. Dev (ft)	0.58

91% Confidence Level of results between 4 – 6 ft.

Baseline Solutions

UL continuing to explore other baseline solutions for both low and steep slope

UL1703 Burner Project

Solar ABCs Sponsored Burner Project

Determine the characteristics of energy (in kW) of the traditional Spread of Flame exposure

Oxygen Consumption Calorimetry Technique – Performed under a exhaust hood; measurements in a duct

Design a burner to replicate the energy characteristics of the traditional UL790 burner

UL1703 Burner Project

Solar ABCs Sponsored Burner Project

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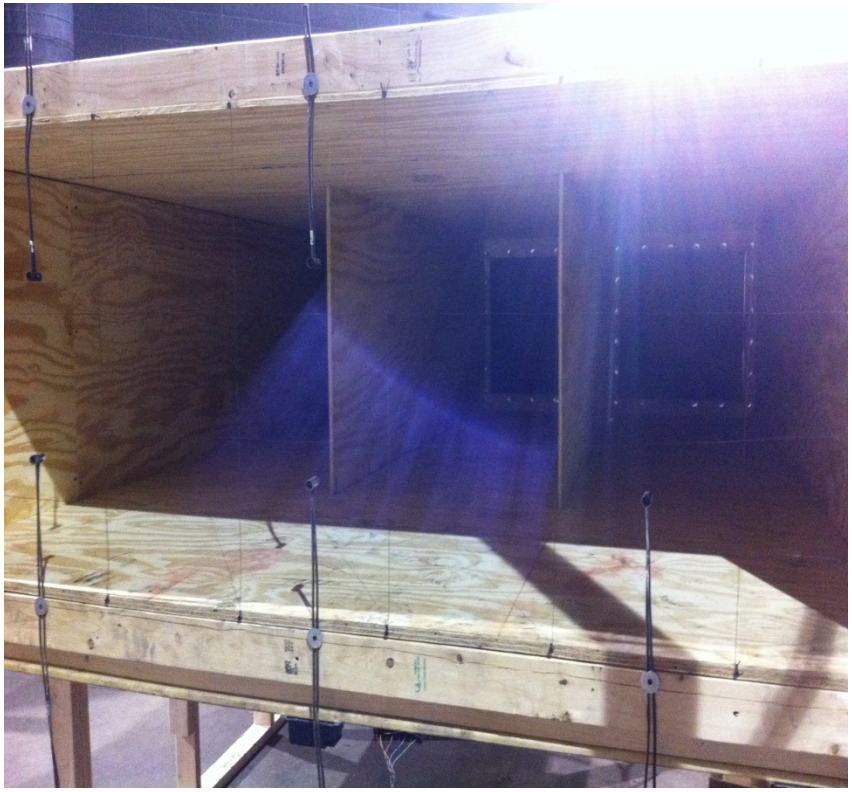


Questions?

“Is the UL 790 test repeatable?”

ASTM E691 - Standard Practice for Conducting an Inter-laboratory Study to Determine the Precision of a Test Method

Precision - the closeness of agreements between independent test results obtained under stipulated conditions

Repeatability - precision under repeatability conditions

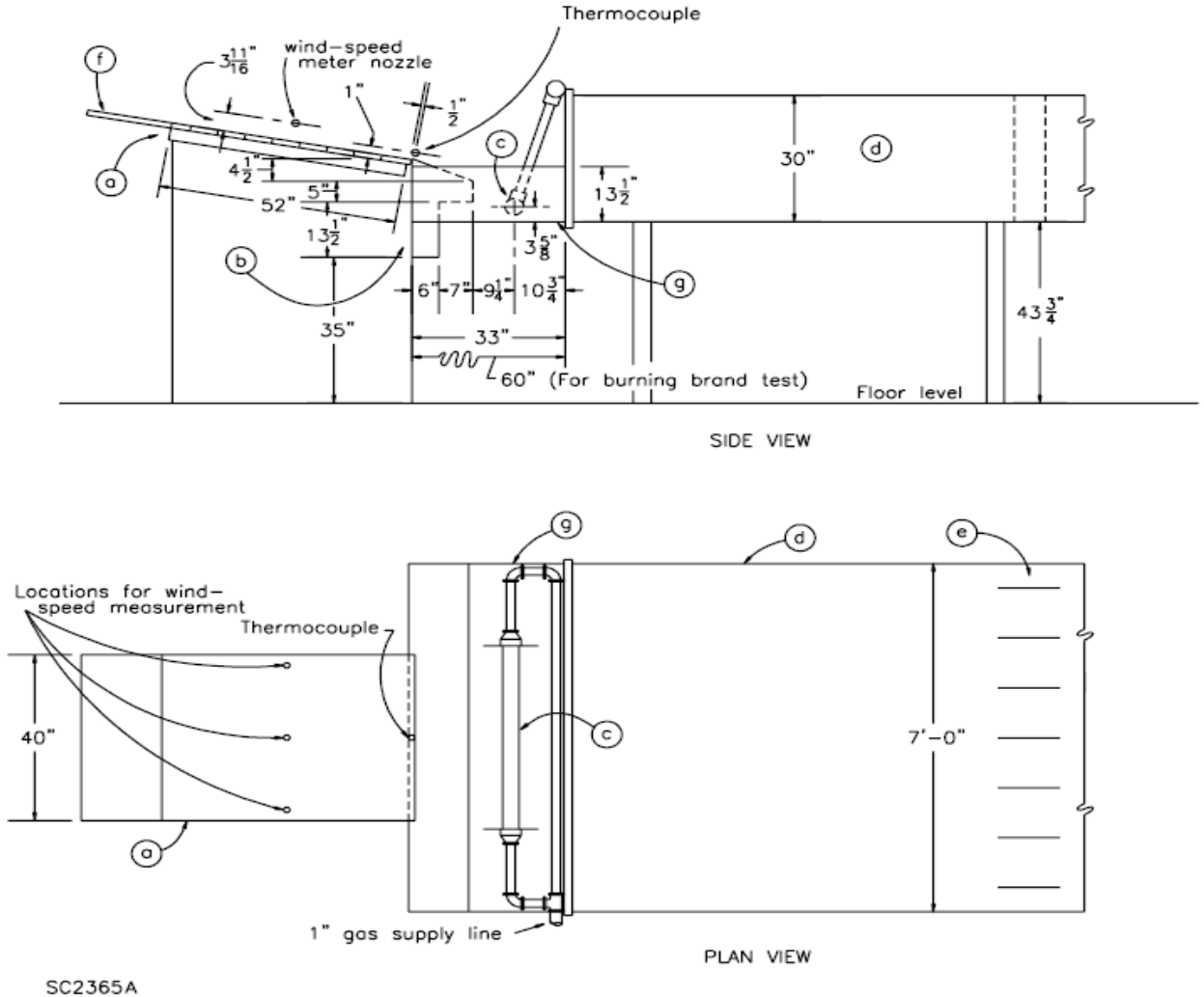
Repeatability conditions - conditions where independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time

Reproducibility - precision under reproducibility conditions

Reproducibility conditions - conditions where test results are obtained with the same method on identical test items in different laboratories with different operators using different equipment

UL 790 / 1703 Calibration Measurements

Figure 5.1
Apparatus for fire tests

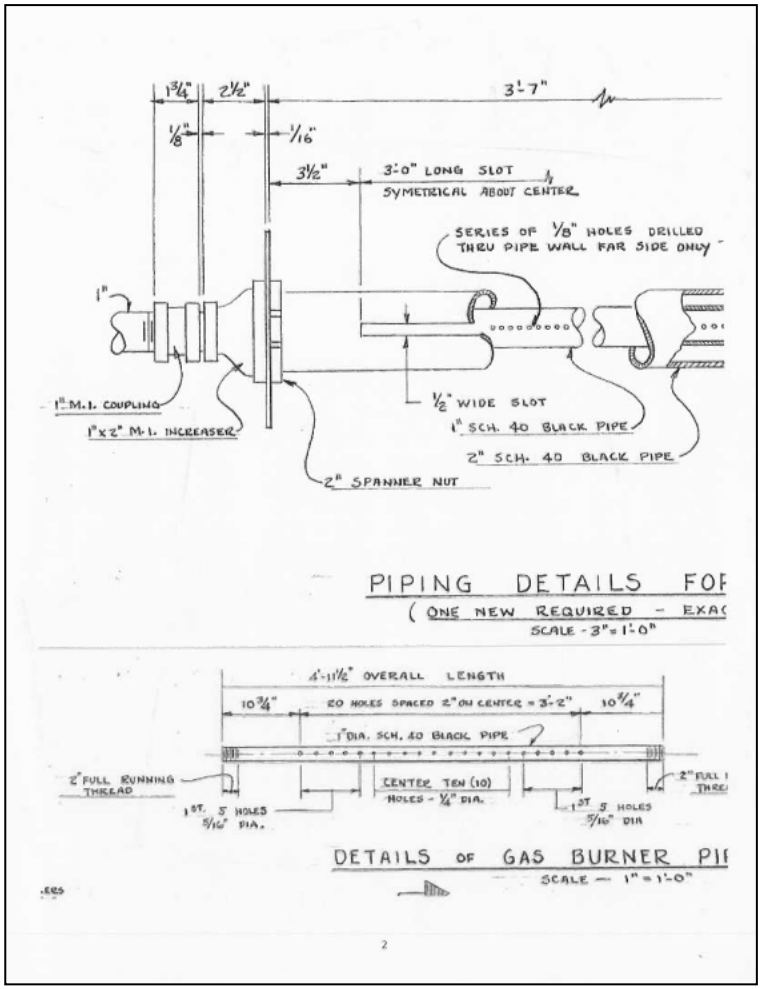


“Blue Flame” – Flame Type

With 12 mph airflow
Premixed flame

Without 12 mph airflow
Diffusion flame

Ignition Source Burner



Unknowns:

- Inconsistent construction drawing details (inner pipe hole size)
- Pipe has not been inspected since installed ~ 60 years.