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Thermal & Ignition Barrier Requirements for Foamed Plastic

July 2025

A construction products technologies company

National Fireproofing Contractors Association

Thermal Barriers

John Dalton, Technical Service Manager
Monokote-Saint Gobain

NFCA FREE Webinar Series

Learn – Network – Grow

Thanks Members…

- NFCA Contractors
- NFCA Associates
- NFCA Manufacturers

Thanks 2025 NFCA Board of Directors

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What Does NFCA Provide?

National Fireproofing Contractors Association

- **Fireproofing Education & Exams**
  - World-Class SFRM & IFRM Fireproofing Instruction
- **NFCA Contractor Accreditation Program for IFRM & SFRM**
  - Educated fireproofing Companies – UL QFCP
- **Week of Learning - Educational Conference**
  - Network with top Fireproofing Contractors, Manufacturers, Associates
  - A forum for suppliers and contractors to learn from one another

- **NFCA 100-400 Standards** for quality and life safety
- **NFCA Handbook of Fireproofing Knowledge**
- **NFCA Website** to find Fireproofing Leaders – www.NFCA-online.org
- **Technical expertise, Standards and Code development….**

What does NFCA Do?

- NFCA @ ASTM Task Groups - Fireproofing
- NFCA @ NFPA Fire Protection Features
- NFCA @ AISC, AISI, CSI/CSC
- NFCA @ National Codes, Canada – NBCC, NFCC
- NFCA @ American Institute of Steel Construction (AISC)
- Industry Articles
- NFCA @ SFPE/ASCE Meetings
- NFCA Committee ACTIONS
- NFCA International Efforts
  - Middle East
  - Mexico
  - India
  - More…

CSI NATIONAL CONFERENCE 2024

2024 INTERNATIONAL CODE COUNCIL CONFERENCE EXPO+HEARINGS

ASTM INTERNATIONAL

AMERICAN INSTITUTE OF STEEL CONSTRUCTION AISC FOUNDED 1921

NFPA

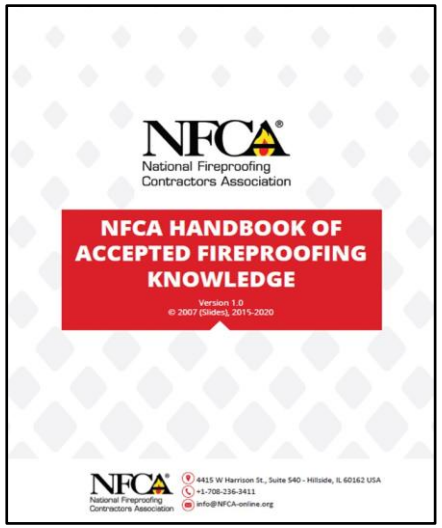
National Fireproofing Contractors Association

2027 Code Development Process (CDP) IBC, NFPA
2025/2030 CDP – NBCC, NFCC

Bill McHugh, Technical Director, NFCA
Rich Walke, Consultant to the NFCA

Contractor Qualifications – NFCA Contractor Accreditation Program (CAP)

- Contractor DRI's
- Inspection Agency Personnel
- Commitment to Fireproofing Installation
- NFCA Accreditation Seal - Registered mark



IFRM Accredited Contractor
NFCA®
National Fireproofing Contractors Association

SFRM Accredited Contractor
NFCA®
National Fireproofing Contractors Association

IFRM and SFRM Accredited Contractor
NFCA®
National Fireproofing Contractors Association

Contractor Qualifications – UL QFCP

- UL Qualified SFRM Fireproofing Contractors
  - NFCA Education
    - NFCA HAFK, DRI
    - UL Program Guide, Product iQ
  - NFCA SFRM Fireproofing Exam
  - Management System
  - UL Audits –
    - Office
    - Field

CERTIFIED
MANAGEMENT SYSTEM
QUALIFIED FIRESTOP CONTRACTOR

NFCA Educational Events

National Fireproofing Contractors Association

- NFCA/FCIA PasFiPro Canada Symposium
  - Members, Code Officials
- NFCA/FCIA PasFiPro Dubai, Doha
- NFCA @ Mexico LATAM/PCI
- NFCA's Week of Learning

NFCA – "Associate – Advocate" Fire & Life Safety

- Webinars, FSBI - Fire Safe Build India
- CSI – Construction Specifications Institute
- CSC – Construction Specifications Canada
- NFPA Expo & Committees
- ICC Expo & Hearings
- Dubai, UAE & Doha, Qatar
  & Riyadh, Saudi Arabia,
  Australia, New Zealand…
- ***Accreditation, Education, More…***

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Foamed Plastic

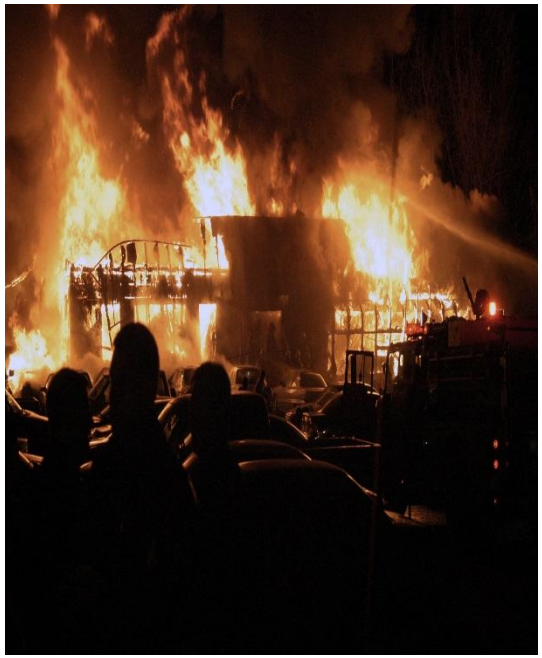
- Foamed plastic → a plastic that is intentionally expanded via the use of a foaming agent to produce a reduced density plastic that is used for acoustical or thermal properties.
- Density < 2.0 pcf
- Common types
  - Expanded Polystyrene
  - Extruded Polystyrene
  - Polyurethane
  - Polyisocyanurate
- R-values: 3 – 6 per inch
- They bring enormous value in terms of energy savings……but add enormous risk.

WHY THE NEED?

Station nightclub fire – USA – 2003 – 100 fatalities

Kiss nightclub fire – Brazil – 2013 – 242 fatalities

Grenfell – UK - 2017 – 72 fatalities



Common denominator = foamed plastic

Jail.

WHY THE NEED?

Why do building codes require thermal & ignition barriers?

- Unprotected foamed plastic (Sprayed Polyurethane Foam) will ignite when exposed to fire. It is extraordinarily combustible producing enormous amounts of smoke, and we have seen a dramatic increase in the amount of insulation used in houses over the past 40 years as the need for energy efficiency continues to rise.
- Smoke and combustible gases can accumulate in interior spaces during fire conditions and lead to flashover fires (near simultaneous combustion of all combustible material in an enclosed area).
- Most foamed plastics have flame retardants added to slow flame spread but those flame retardants will not prevent the product from burning when exposed to fires

Often the end user, specifier, AHJ is bombarded with similarly sounding terms, such as flame retardant, ignition barrier, etc, and so there is some confusion in the market.

- A thermal Barriers is any material applied between the foamed plastic and the interior space designed to delay the temperature rise of the foam and to delay the introduction of the combustible foam to the fire.

- An ignition barriers is any material applied between the foamed plastic and the **attic or crawl space** designed to delay the temperature rise of the foam and to delay the introduction of the combustible foam to the fire.

The code position; requires separation of foamed plastic and building interiors

- Required by International Building- and Residential- Codes
- Designed to delay combustion / ignition of foamed plastic – Separate the folks from the foam.
- Requirements for Foam Plastics listed in
  - IBC Chapter 26, Section 2603
  - IRC Chapter 3, Section R316

Where do I need a TB?

- IBC → “Foamed plastic shall be separated from the interior of a building”

→ Separate foam plastic from all interior spaces with approved 15-minute thermal barrier.

- IBC → No thermal barrier required in these conditions:
  - Inside masonry or concrete walls [IBC 2603.4.1.1 / IRC R316.5.2]
  - Cooler and freezer walls (< 400 SF floor space)* [IBC 2603.4.1.2-3]
  - Exterior walls – one story buildings [IBC 2603.4.1.4]
  - Roofing assembly with foam plastic passing UL 1256 [IBC 2603.4.1.5 / IRC R316.5.2]
  - Doors not required to have fire protection [IBC 2603.4.1.7-8 / IRC R316.5.5]
  - Garage doors [IBC 2603.4.1.9 / IRC R316.5.6]
  - Siding backer board [IBC 2603.4.1.10 / IRC R316.5.7]
  - Interior trim and signs
  - **Attics and Crawl spaces (Ignition barrier required)**
    - **Attic can not be used for storage**

Approvals for Thermal Barrier

- Approved Thermal Barriers [IBC 2603.4 / IRC R316.4]
  - Prescriptive Thermal Barrier ~ ½" gypsum wallboard or wood structural panel (IRC only)

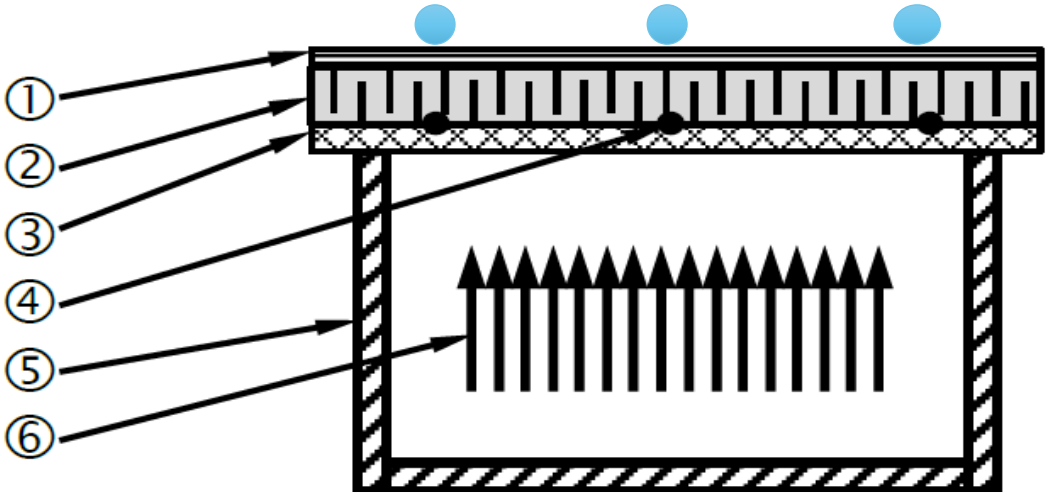
or

- Comply with NFPA 275 – this is a combination of
  - Thermal Transmission test - ASTM E-119 and a
  - Room corner test - NFPA 286, UL 1715, FM 4880, UL 1040

or

- Product specific approval

NFPA 275 Requirements – Temperature Transmission test – similar to the ULC S124 test in Canada



①	Supporting material
②	Foam plastic insulation
③	Thermal barrier (product / material)
④	Thermocouples (position)
⑤	Furnace
⑥	Flames

Product specific approvals

- IBC grants a special Approval or Alternate method of approval in (IBC 2603.9 / IRC R316.6)
- Alternate Assemblies (e.g. Exposed SPF or SPF with a protective covering) must:

➢ Remain in place 15 minutes during specified large-scale fire tests such as NFPA 286, UL 1715, UL 1040 or FM 4880

➢ This approval path is very product specific i.e. the approval is only good for TB Brand A when tested on Foamed Plastic Brand B, and in the configuration tested.

Room corner tests

- Fire Testing Basics: Room-Corner (NFPA 286, UL 1715, UL 1040 or FM 4880)
- Room Corner Test Procedure
  - Room constructed using typical wall and ceiling assemblies
  - Controlled fire source placed in corner
  - Typically a wood crib or gas burner
- Fire source ignited and observations recorded
  - Heat Release Rate
  - Temperatures at Ceiling
  - Heat Flux
  - Target Ignition
  - Flame-Over
  - Smoke developed

NFPA 286 – Room corner test

- NFPA 286 is now the most widely run of the room corner tests.
- 15-minute fire of a standard room with a burner in the corner
  - Standard has 2 different exposures
  - 40 kW fire for the first 5 minutes
  - 160 kW fire for the remaining 10 minutes

The standard does not list pass / fail criteria but they are given in the IBC – Chapter 8. (Section 803 – Wall and Ceiling Finishes).

- During 40kW exposure , flames shall not spread to the ceiling
- Flame shall not spread to any outer extremity
- Flashover shall not occur
- Peak heat release rate shall not exceed 800 kW
- Total smoke released throughout the test shall not exceed 1,000 m^2.

Ignition Barriers

- As noted earlier, the IBC and IRC grant an exemption to the requirement for a thermal barrier in attics and crawlspaces where entry is made for repairs or maintenance or the service of utilities → this is often misunderstood.

  - Not as stringent as the thermal barrier requirements
  - AHJ may also accept alternative assemblies based upon large scale tests such as outlined in ICC-ES Acceptance Criteria AC 377 (AC 456 is essentially the same but does have some additional requirements for QC of the manufactured product).
    - → these are not thermal barriers (Flame proof, Flame stop, Fire – retardant, etc)

Ignition Barriers

- Ignition Barrier [IBC 2603.4.1.6 / IRC R316.5.3] - Ignition barrier is required separating attic/crawlspace space from foam
- Prescriptive ignition barriers include:
  - 1.5” mineral fiber insulation
  - 0.25” wood structural panels
  - 0.375” particleboard
  - 0.25” hardboard
  - 0.375” gypsum board
  - Corrosion-resistant steel with a base metal thickness of 0.016 “
- Alternative Assemblies by Special Approval Testing via **Modified NFPA 286 Room Corner Test**
  - Specified Pass/Fail Time 4:18

Inspection and verification

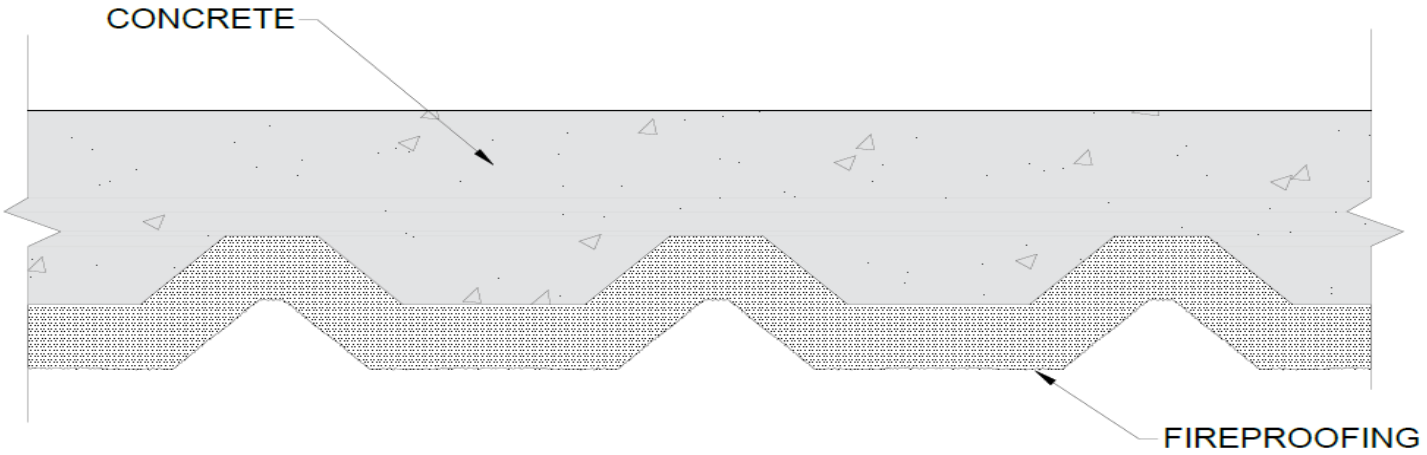
- Not an easy situation
- Lots of competing information from various testing agencies running lots of similarly sounding tests
- Evaluation Service reports seeking to fill the void

  → in many cases the ESR is provided by a non-traditional approver such as The International Association of Plumbing and Mechanical Officials
- No UL- or Intertek - type depository of test results or products that have been tested according to a recognized standard and are part of a follow-up-service.

A note on the use of foams in commercial construction

- Application of foam insulation over SFRM or IFRM has not been tested by UL or any other testing agency that we are aware of.
  - Not sure if the assembly will provide the rating
  - Room corner tests are an order of magnitude less severe than ASTM E-119
  - Measured in hours Vs minutes
  - Old “get out of jail” card about the acceptability of applying products with low flame spread is no longer valid
- A sandwich of fire protection + foamed plastic + a thermal barrier would does not meet the code requirements that the products be tested in the anticipated configuration.

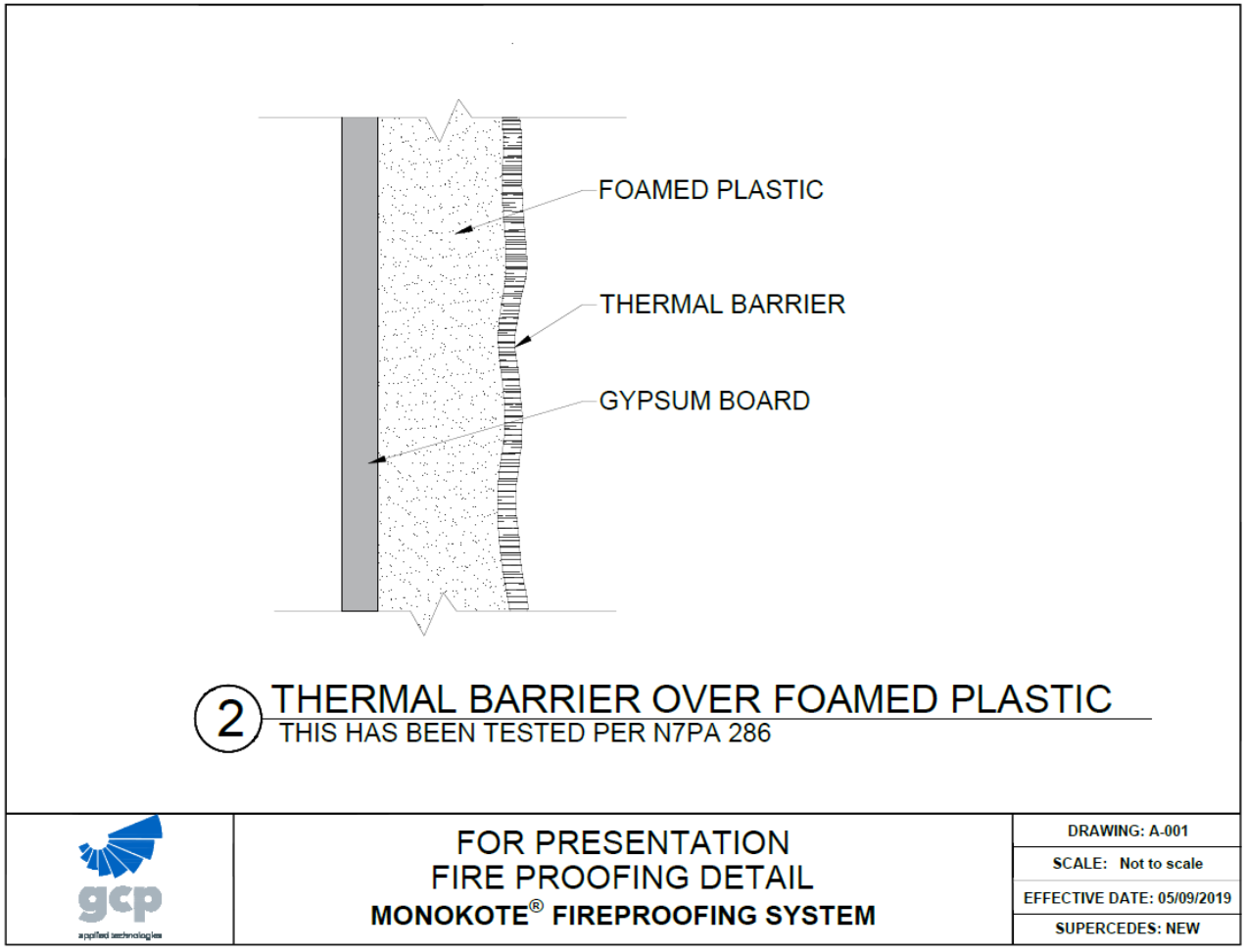
A note on the use of foams in commercial construction – this is okay – has been tested



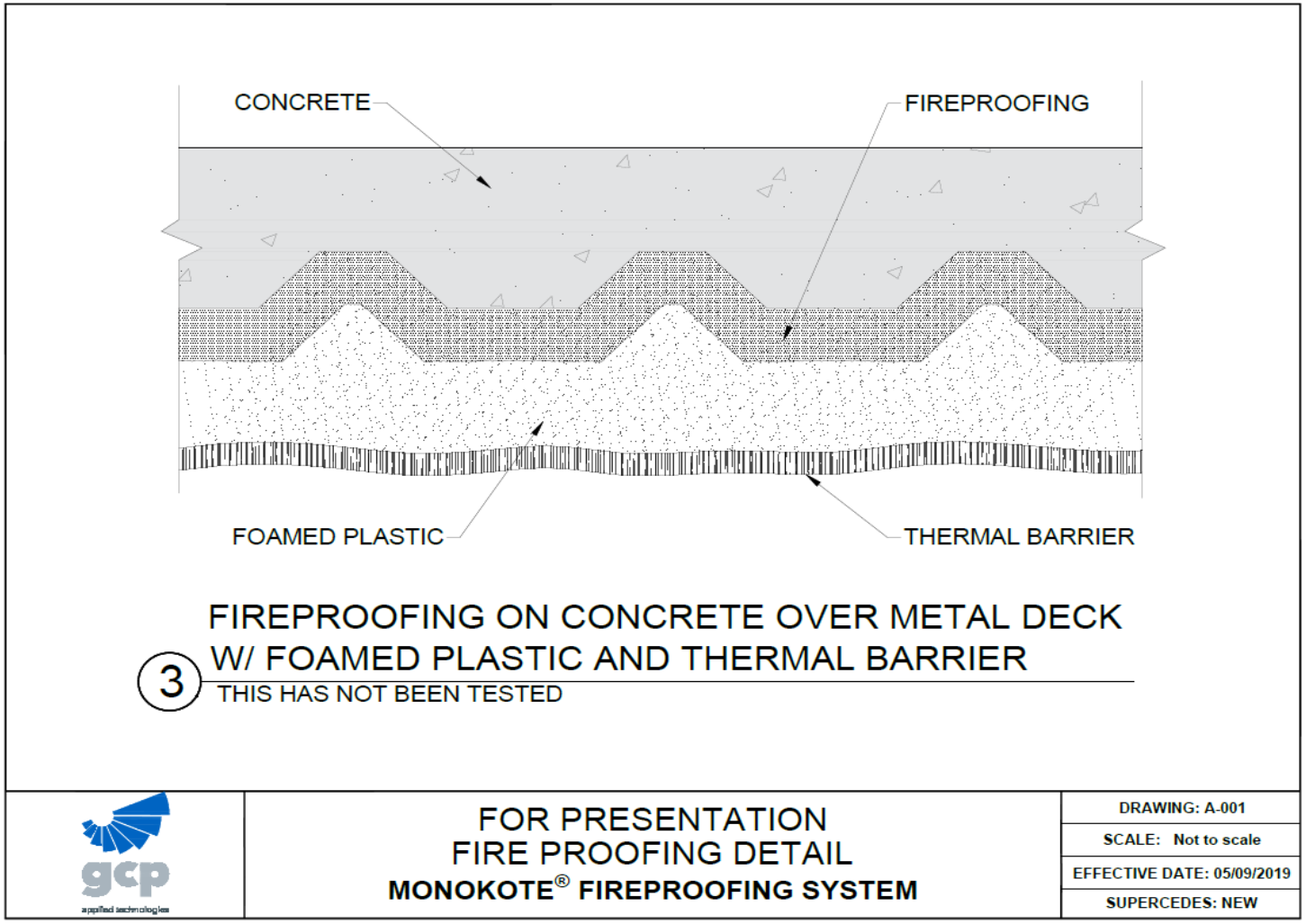
1 FIREPROOFING ON CONCRETE OVER METAL DECK
THIS HAS BEEN TESTED PER ASTM E-119

gcp applied technologies	FOR PRESENTATION FIRE PROOFING DETAIL **MONOKOTE® FIREPROOFING SYSTEM**	DRAWING: A-001 SCALE: Not to scale EFFECTIVE DATE: 05/09/2019 SUPERCEDES: NEW

A note on the use of foams in commercial construction this is okay – has been tested



A note on the use of foams in commercial construction – not okay – not been tested



May 2, 2018

To: Subscribers of UL Categories CDWZ, Mastic and Intumescent Coatings and CHPX, Spray-applied Fire-resistive Materials

Re: Application of Sprayed Polyurethane Foam over Sprayed Fire Resistive Materials (SFRM) or Intumescent Fire Resistive Materials (IFRM) Coatings

Unless otherwise noted in the individual design or certification published in UL's Online Certifications Directory, the application of sprayed polyurethane foam or other insulation over Sprayed Fire Resistive Materials (SFRM) or Intumescent Fire Resistive Materials (IFRM) coatings has not been investigated.

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Questions?

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National Fireproofing Contractors Association

Thanks for Attending!!!

National Fireproofing Contractors Association

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