

Built-in cover page

078100-1.6.A-0:Applied Fireproofing - Certification of Compliance



Status	Open Submitted
Spec section	078100 APPLIED FIREPROOFING
Manager	Ryan Schelin (Je Dunn Construction Company (013735))
Responsible contractor	Braden Engelken (E & K Of Kansas City Inc (019435))
Reviewers step 01	Ryan Schelin (Je Dunn Construction Company (013735))

515 E. Locust St, Suite 301
Des Moines, IA 50309
tel 515.698.4400
fax 515.288.3049

Reviewed by JE Dunn: Ryan Schelin

Date: 11/20/2025 10:55:41 AM

Job: LSMC ED Expansion

Submittal ID: 078100

Bid Package: 100% CD's

Comments: Reviewed - Submitted for Approval



- Reviewed
- Revise and Resubmit
- Submit Specified Item
- Not Reviewed by General Contractor
- Review Not Required by the Contract Documents
- Furnish as Corrected
- Rejected

This review is only for general conformance with the design concept and the information given in the Construction Documents. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the plans and specifications. Review of a specific item shall not include review of an assembly of which the item is a component. The contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of the Work in a safe and satisfactory manner

Signed jvelazquez

Date 12/3/2025

Provide Design and Engineering for Deferred Submittal to AHJ, as noted on GI101

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NO MOCKUP REQUIRED
 PER MATT MCDANIEL AT
 DG. FIRST WORK WILL BE
 COORDINATED WITH
 DESIGN TEAM. - RS JE
 DUNN

October 23, 2025

Ryan Schelin
JE Dunn Construction
1001 Locust Street
Kansas City, MO 64106

RE: HCA Lee's Summit Medical Center ED Renovations
07 81 00 – Applied Fireproofing

Mr. Schelin,

This letter is regarding the Submittals pertaining to our scopes of work for the above noted project. Listed below is everything included in this submittal package:

➤ **1.6 Submittals**

➤ **C.3 - Product Data**

❖ **2.2 Concealed Cementitious SRFM**

- **Caico 300 AC** manufactured by **Isolatek International Corp.** ✓

APPROVED MANUF.
PER 078100-2.2-A.1



❖ **2.4 Auxillary Fire-Resistive Materials**

- **Qwik-Set** manufactured by **Isolatek International Corp.**
- **Bond Seal** manufactured by **Isolatek International Corp.**

➤ **C.4 – Shop Drawings**

➤ **D. Informational Submittals (See Submittal Documents)**

- ❖ **Safety Data Sheets**
- ❖ **Product Test Reports**
- ❖ **Manufacture Certification**
- ❖ **UL Certification of Compliance**
- ❖ **UI Evaluation Report**

➤ **1.7 Quality Assurance**

- ❖ **C. Additional Installer/ Applicator Qualifications**
- ❖ **H. Fire-Test-Response-Charecteristics**
 - **UL Design No. P723 (1 1/2 HR) – Beams & Roof Deck - Per Plan Page G101**
 - **UL Design No. X790 (2 HR) - Columns**



E & K OF KANSAS CITY, INC.
SINCE 1956

The products in this submittal package should meet or exceed specified requirements. If you have any questions or comments, do not hesitate to call.

Respectfully Submitted,

Braden Engelken

Braden Engelken
Project Manager



MINERAL FIBER, CEMENTITIOUS,
INTUMESCENT & RIGID BOARD
FIREPROOFING

THERMAL &
ACOUSTICAL
INSULATION

Product Submittal Information

Project Name: HCA Lee's Summit Medical Center - ED Expansion

Company Name: E&K of Kansas City

Products:
CAFCO® 300 AC

Documents:
Technical Data Sheets
Safety Data Sheets
Test Reports
LEED
Manufacturer Certification
UL Cert of Compliance
UL Evaluation Report
UL Designs
UL Thickness Tables

UL Designs:
P723
X790

Product Thickness Tables:
P723 CAFCO 300 400 Joists 4ft OC or greater
X790 CAFCO 300 400 Half Flange

Isolatek International
41 Furnace Street
Stanhope, NJ 07874
isolatek.com

DESCRIPTION

CAFCO 300 AC / ISOLATEK Type 300 AC is a durable, gypsum based, wet mix, commercial density Spray-Applied Fire Resistive Material (SFRM) designed to be used with the ISOLATEK QWIK-SET® system. CAFCO 300 AC / ISOLATEK Type 300 AC provides fire protection for concealed floor and roof assemblies, steel beams, columns, and joists in commercial construction projects.

In addition to fire resistance, CAFCO 300 AC / ISOLATEK Type 300 AC also provides thermal benefits. As a thermal insulator, it is effective in reducing heat loss, particularly when applied to the underside of a roof deck. The R-value added by CAFCO 300 AC / ISOLATEK Type 300 AC may also allow a reduction in roof insulation.

CAFCO 300 AC's / ISOLATEK Type 300 AC's enhanced application efficiencies, combined with its fire resistive ratings and thermal insulating properties, make it the most innovative commercial density wet mix SFRM on the market today.

PRODUCT ADVANTAGES

- Offers the most cost effective fire resistance performance per unit thickness and greatest productivity within the CAFCO 300 / ISOLATEK Type 300 series
- Lightweight gypsum based material is easy to apply
- Provides additional value as a thermal insulator

Thermal Performance

Product	Conductivity(k)*	Resistance (R/inch)
CAFCO 300 AC ISOLATEK Type 300 AC	0.581 BTU in/hr ft ² °F @ 75°F (0.0838 W/m•K @ 24°C)	1.83

*When tested in accordance with ASTM C518

Physical Performance

Characteristic	ASTM Method	Industry Standard Performance*	Laboratory Tested Performance**
Density	E605	15 pcf (240 kg/m ³)	15 pcf (240 kg/m ³)
Combustibility	E136	Noncombustible	Noncombustible
Cohesion/Adhesion	E736	150 psf (7.2 kPa)	412 psf (19.7 kPa)
Deflection	E759	No Cracks or Delaminations	No Cracks or Delaminations
Bond Impact	E760	No Cracks or Delaminations	No Cracks or Delaminations
Compressive Strength	E761	1,440 psf (68.9 kPa)	3,167 psf (151.6 kPa)
Air Erosion Resistance	E859	Less than 0.025 g/ft ² (0.27 g/m ²)	0.000 g/ft ² (0.000 g/m ²)
Corrosion Resistance	E937	Does Not Promote Corrosion of Steel	Does Not Promote Corrosion of Steel
Sound Absorption	C423		0.50 NRC 1" (25 mm) on deck and beam
Fungal Resistance	G21	No Growth After 28 Days	Passed

* Standard performance based on MasterSpec®, Section 078100 APPLIED FIREPROOFING. Refer to UL design for density requirement.

** Values represent independent laboratory tests under controlled conditions.

FIRE TEST PERFORMANCE

CAFCO 300 AC / ISOLATEK Type 300 AC has been evaluated for fire resistance and is rated for up to 4 hours for floor assemblies, beams, joists, columns, and roof assemblies.

- Classified by UL in accordance with ANSI/UL 263 (ASTM E119)
- Classified by UL in accordance with CAN/ULC-S101 (ASTM E119)

CAFCO 300 AC / ISOLATEK Type 300 AC has also been tested for surface burning characteristics in accordance with ASTM E84 and is rated Class A.

Flame Spread0 Smoke Developed0

CODE COMPLIANCES

CAFCO 300 AC / ISOLATEK Type 300 AC satisfies the requirements of the following:

- IBC® - INTERNATIONAL BUILDING CODE®
- City of Los Angeles (LADBS, Category 1 Material)
- NBC - National Building Code of Canada
- ICC-ES, AC23 and AC10 Requirements (UL ER13348-01)

MAJOR SPECIFICATIONS

CAFCO 300 AC / ISOLATEK Type 300 AC complies with the requirements of the following specifications:

- MasterSpec®, Section 078100 APPLIED FIREPROOFING (AIA)
- MasterForma® 2014, Section 07 81 00 Applied Fireproofing (CSC,CSI)
- Unified Facilities Guide Specification, UFGS 07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA)
- Master Construction Specifications, Number 07 81 00 Applied Fireproofing (VA)
- Code of Federal Regulations, Title 40 Protection of the Environment (EPA)
- PBS-P100, Facilities Standards for the Public Buildings Services (GSA)



Brand



CAFCO 300 AC / ISOLATEK Type 300 AC Guide Specification

SECTION 078100 - APPLIED FIREPROOFING

The following is an outline/short language specification. Complete specifications for Spray-Applied Fire Resistive Materials are available on various media upon request.

PART 1 - GENERAL

1.1 Work included

- 1.1.1 Provide all labor, materials, equipment and services necessary for, and incidental to, the complete and proper installation of all sprayed fire protection and related work as shown on the drawings or where specified herein, and in accordance with all applicable requirements of the Contract Documents.
- 1.1.2 The material and installation shall conform to the applicable building code requirements of all authorities having jurisdiction.

1.2 Quality Assurance

- 1.2.1 Work shall be performed by a firm with expertise in the installation of fire protection or similar materials. This firm shall be recognized or otherwise approved by the spray-applied fire resistive material manufacturer.
- 1.2.2 Before proceeding with the fire protection work, approval of the proposed material thicknesses and densities shall be obtained from the architect and other applicable authorities having jurisdiction.

1.3 Related Sections

- 1.3.1 SECTION 051200 - STRUCTURAL STEEL FRAMING
- 1.3.2 SECTION 053100 - STEEL DECKING
- 1.3.3 SECTION 072100 - THERMAL INSULATION
- 1.3.4 SECTION 078123 - INTUMESCENT FIREPROOFING
- 1.3.5 SECTION 078443 - JOINT FIRESTOPPING

1.4 References

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM E119 - Fire Tests of Building Construction and Materials.
- C. ASTM E605 - Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
- D. ASTM E736 - Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- E. ASTM E759 - Effect of Deflection of Sprayed Fire-Resistive Materials Applied to Structural Members.
- F. ASTM E760 - Effect of Impact on Bonding of Sprayed Fire-Resistive Materials Applied to Structural Members.
- G. ASTM E761 - Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members.
- H. ASTM E859 - Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- I. ASTM E937 - Corrosion of Steel by Sprayed Fire-Resistive Materials Applied to Structural Members.
- J. CAN / ULC - S101 - Standard Methods of Fire Tests of Building Construction and Materials.
- 1.4.1 Underwriters Laboratories (UL) Fire Resistance Directory.
- 1.4.2 Underwriters Laboratories of Canada (ULC) List of Equipment and Materials.
- 1.4.3 IBC® INTERNATIONAL BUILDING CODE® CHAPTER 17 STRUCTURAL TESTS AND SPECIAL INSPECTIONS, Section 1705 Special Inspections.

- 1.4.4 AWC Publication: Technical Manual 12-A Standard Practice for the Testing and Inspection of Field-Applied Sprayed Fire Resistive Materials; an Annotated Guide.

1.5 Submittals

- 1.5.1 Manufacturer's Data: Submit Manufacturer's specification, including certification as may be required to show material compliance with Contract Documents.
- 1.5.2 Test Data: Independent laboratory test results shall be submitted for all specified performance criteria.

1.6 Delivery, Storage and Handling

- 1.6.1 Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data. Packaging shall bear the UL labels for fire hazard and fire-resistance classifications.
- 1.6.2 Store materials above ground, in a dry location, protected from the weather. Damaged packages found unsuitable for use must not be used.

1.7 Project Conditions

- 1.7.1 When the prevailing outdoor temperature at the building is less than 40° F (4°C), a minimum substrate and ambient temperature of 40° F (4°C) shall be maintained prior to, during, and a minimum of 24 hours after application of spray-applied fire resistive material. If necessary for job progress, General Contractor shall provide enclosures and heat to maintain proper temperatures and humidity levels.
- 1.7.2 General Contractor must provide adequate ventilation to allow proper drying of the sprayed fire protection during and subsequent to its application.
- 1.7.2.1 Ventilation must not be less than 4 complete air exchanges per hour until the material is dry. When spraying in enclosed areas such as basements, stairwells, shafts, and small rooms, additional air exchanges may be necessary.

1.8 Sequencing/Scheduling

- 1.8.1 All fire protection work on a floor shall be completed before proceeding to the next floor.
- 1.8.2 The Contractor shall cooperate in the coordination and scheduling of fire protection work to avoid delays in job progress.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

- 2.1.1 The spray-applied fire resistive material shall be manufactured under the CAFCO® / ISOLATEK® brand name, by authorized producers.

2.2 Materials

- 2.2.1 Materials shall be CAFCO 300AC, (UL/ULC designation: ISOLATEK Type 300AC) applied to conform to the drawings, specifications and following test criteria.
- 2.2.1.1 Deflection: When tested in accordance with ASTM E759, the material shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical centerload resulting in a downward deflection of 1/120th of the span.
- 2.2.1.2 Bond Impact: When tested in accordance with ASTM E760, the material shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.

- 2.2.1.3 Cohesion/Adhesion (bond strength): When tested in accordance with ASTM E736, the material applied over uncoated or galvanized steel shall have a minimum bond strength of 150 psf (7.2 kPa).

- 2.2.1.4 Air Erosion: When tested in accordance with ASTM E859, the material shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft. (0.27 grams per square meter).

- 2.2.1.5 Compressive Strength: When tested in accordance with ASTM E761, the material shall not deform more than 10 percent when subjected to a crushing force of 1,440 psf (68.9 kPa).

- 2.2.1.6 Corrosion Resistance: When tested in accordance with ASTM E937, the material shall not promote corrosion of steel.

- 2.2.1.7 Surface Burning Characteristics: When tested in accordance with ASTM E84, the material shall exhibit the following surface burning characteristics:
Flame Spread 0
Smoke Developed 0

- 2.2.1.8 Density: When tested in accordance with ASTM E605, the material shall meet the minimum individual and average density values as listed in the appropriate UL / ULC design or as required by the authority having jurisdiction.

- 2.2.2 The material shall have been tested and classified by Underwriters Laboratories (UL) or Underwriters Laboratories of Canada (ULC) in accordance with the procedures of UL 263 (ASTM E119) or CAN/ULC-S101.

- 2.2.3 Spray-applied fire resistive materials shall be applied at the appropriate minimum thickness and density to achieve the following ratings:
Floor assemblies ____hr.
Roof assemblies ____hr.
Beams ____hr.
Girders ____hr.
Columns ____hr.
Joists ____hr.

- 2.2.4 Potable water shall be used for the application of spray-applied fire resistive materials.

- 2.2.5 Spray-applied fire resistive materials shall contain no detectable asbestos. Material manufacturer shall provide certification of such upon request.

PART 3 - EXECUTION

3.1 Preparation

- 3.1.1 All surfaces to receive spray-applied fire resistive material shall be free of oil, grease, loose mill scale, dirt, paints/primers or other foreign materials which would impair satisfactory bonding to the surface. Manufacturer shall be contacted for procedures on handling primed/painted steel. Any cleaning of surfaces to receive sprayed fire protection shall be the responsibility of the General Contractor or Steel Erector, as outlined in the structural steel or steel deck section.

- 3.1.2 Clips, hangers, supports, sleeves and other attachments to the substrate are to be placed by others prior to the application of spray-applied fire resistive materials.

- 3.1.3 The installation of ducts, piping, conduit or other suspended equipment shall not take place until the application of spray-applied fire resistive materials is complete in an area.

- 3.1.4 The spray-applied fire resistive material shall only be applied to steel deck which has been fabricated and erected in accordance with the criteria set by the Steel Deck Institute.

- 3.1.5 When roof traffic is anticipated, as in the case of periodic maintenance, roofing pavers shall be installed as a walkway to distribute loads.

3.2 Application

- 3.2.1 Equipment, mixing and application shall be in accordance with the manufacturer's written application instructions.

- 3.2.2 The application of spray-applied fire resistive material shall not commence until certification has been received by the General Contractor that surfaces to receive sprayed fire protection have been inspected by the applicator and are acceptable to receive spray-applied fire resistive material.

- 3.2.3 All unsuitable substrates must be identified by the installer and made known to the General Contractor and corrected prior to application of the spray-applied fire resistive material.

- 3.2.4 Spray-applied fire resistive material shall not be applied to steel floor decks prior to the completion of concrete work on that deck.

- 3.2.5 The application of spray-applied fire resistive material to the underside of roof deck shall not commence until the roofing is completely installed and tight, all penthouses are complete, all mechanical units have been placed, and after construction roof traffic has ceased.

- 3.2.6 Proper temperature and ventilation shall be maintained as specified in 1.7.1, 1.7.2, and 1.7.2.1.

- 3.2.7 Provide masking, drop cloths or other suitable coverings to prevent overspray from coming in contact with surfaces not intended to be sprayed.

- 3.2.8 CAFCO BOND-SEAL (ISOLATEK Type EBS) adhesive shall be applied as per the appropriate UL/ULC fire resistance design and manufacturer's written recommendations.

3.3 Repairing and Cleaning

- 3.3.1 All patching of and repair of damaged spray-applied fire resistive material shall be performed under this section and paid for by the trade responsible for the damage.

- 3.3.2 After the completion of the work in this section, equipment shall be removed and all surfaces not to be sprayed shall be cleaned to the extent previously agreed to by the applicator and General Contractor.

3.4 Inspection and Testing

- 3.4.1 The spray-applied fire resistive material shall be tested for thickness and density in accordance with one of the following procedures:
ASTM E605 - Standard Test Method of Sprayed Fire-Resistive Materials Applied to Structural Members.
AWCI Publication: Technical Manual 12-A Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials; an Annotated Guide.
IBC® INTERNATIONAL BUILDING CODE® CHAPTER 17 STRUCTURAL TESTS AND SPECIAL INSPECTIONS, Section 1705 Special Inspections.

Product Availability

Isolatek International Spray-Applied Fire Resistive Materials are available to trained, recognized applicators around the world from strategically located production and distribution points in the U.S., Canada, Mexico, Europe and the Pacific Basin.



ISOLATEK INTERNATIONAL is registered with the
AIA Continuing Education System (AIA/CES)



We support our customers with unsurpassed technical expertise and customer service, complemented by an extensive global network of experienced sales representatives and recognized applicators. For detailed product information or for the name of the sales representative in your area please contact us.

The performance data herein reflect our expectations based on tests conducted in accordance with recognized standard methods under controlled conditions. The applicator, general contractor, property owner and/or user MUST read, understand and follow the directions, specifications and/or recommendations set forth in Isolatek International's publications concerning use and application of these products, and should not rely merely on the information contained in this Technical Data Sheet. Isolatek International is not responsible for property damage, bodily injuries, consequential damages, or losses of any kind that arise from or are related to the applicator's general contractor's, or property owner's failure to follow the recommendations set forth in Isolatek International's publications. The sale of these products shall be subject to the Terms and Conditions set forth in the Company's invoices.



Isolatek International provides passive fireproofing materials under the CAFCO® and FENDOLITE® trademarks throughout the Americas and under the ISOLATEK® trademark throughout the world.

800.631.9600 or 973.347.1200
www.isolatek.com | technical@isolatek.com
technical-international@isolatek.com



PRODUCT DESCRIPTION

ISOLATEK QWIK-SET is a gypsum accelerator that is specifically manufactured for utilization with the following CAFCO[®] / ISOLATEK[®] gypsum-based Spray-Applied Fire Resistive Materials:

- CAFCO 300 / ISOLATEK Type 300
- CAFCO 300 AC / ISOLATEK Type 300 AC
- CAFCO 300 ES / ISOLATEK Type 300 ES
- CAFCO 300 HS / ISOLATEK Type 300 HS
- CAFCO 300 SB / ISOLATEK Type 300 SB
- CAFCO 304 / ISOLATEK Type 304
- CAFCO 3000 / ISOLATEK Type 3000
- CAFCO 3000 ES / ISOLATEK Type 3000 ES
- CAFCO 400 AC / ISOLATEK Type 400 AC
- CAFCO 400 ES / ISOLATEK Type 400 ES

ISOLATEK QWIK-SET is simply mixed with water and is applied with a standard chemical metering pump which conveys the solution through a hose to the nozzle or in line where it is then mixed with the CAFCO / ISOLATEK SFRM slurry.

Its labor saving benefits along with the ease of use during the application process has resulted in ISOLATEK QWIK-SET becoming the preferred means of installation method.

PRODUCT ADVANTAGES

- *Reduces SFRMs set times*
- *Increases SFRM yields*
- *Allows SFRMs to be applied in multiple passes per day*
- *Fast, easy, cost-effective application*

MAJOR SPECIFICATIONS

ISOLATEK QWIK-SET is recognized by Underwriters Laboratories (UL) for use as a gypsum accelerator.

ISOLATEK QWIK-SET complies with the requirements of the following specifications when used in conjunction with the referenced SFRMs:

- MasterSpec[®], Section 078100 APPLIED FIREPROOFING (AIA)
- MasterFormat[®] 2014, Section 07 81 00 Applied Fireproofing (CSC,CSI)
- Unified Facilities Guide Specification, UFGS 07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA)
- Master Construction Specifications, Number 07 81 00 Applied Fireproofing (VA)
- Code of Federal Regulations, Title 40 Protection of the Environment (EPA)
- PBS-P100, Facilities Standards for the Public Buildings Services (GSA)



ISOLATEK INTERNATIONAL is registered with the
AIA Continuing Education System (AIA/CES)



We support our customers with unsurpassed technical expertise and customer service, complemented by an extensive global network of experienced sales representatives and recognized applicators. For detailed product information or for the name of the sales representative in your area please contact us.

The performance data herein reflect our expectations based on tests conducted in accordance with recognized standard methods under controlled conditions. The applicator, general contractor, property owner and/or user MUST read, understand and follow the directions, specifications and/or recommendations set forth in Isolatek International's publications concerning use and application of these products, and should not rely merely on the information contained in this Technical Data Sheet. Isolatek International is not responsible for property damage, bodily injuries, consequential damages, or losses of any kind that arise from or are related to the applicator's general contractor's, or property owner's failure to follow the recommendations set forth in Isolatek International's publications. The sale of these products shall be subject to the Terms and Conditions set forth in the Company's invoices.

Isolatek International provides passive fireproofing materials under the CAFCO® and FENDOLITE® trademarks throughout the Americas and under the ISOLATEK® trademark throughout the world.

800.631.9600 or 973.347.1200
www.isolatek.com

From exterior industrial environments, to open air parking garages, mechanical rooms and elevator shafts, you can be sure there is a ISOLATEK® coating or sealant which meets your needs. Only Isolatek International offers such a wide variety of surface coatings and sealants for Spray-Applied Fire Resistive Materials (SFRMs) as well as sprayed Thermal and Acoustical materials. Isolatek has several products which provide multiple degrees of enhanced surface integrity. Each has been specifically engineered to provide tough, reliable performance and protection.

SEALANTS

CAFCO® BOND-SEAL / ISOLATEK TYPE EBS

PRODUCT DESCRIPTION

Water based sealer designed to provide a firmer surface. Inexpensive, quick, and easy to apply. Ideal for elevator shafts, mechanical rooms, areas next to air shafts, or anywhere high velocity air flow or vibration occurs. CAFCO® BOND-SEAL / ISOLATEK Type EBS is also used as an adhesive for ISOLATEK SFRMs and Thermal and Acoustical Insulation Products.

PRODUCT ADVANTAGES

- *Certified by UL. Will not adversely affect fire resistive performance when used in accordance with UL guidelines*
- *Clear drying. May be tinted to meet specification requirements*
- *Available in Black color for use as a sealant only.*
- *Easily applied by airless spray equipment*
- *Can be applied over SFRMs, Thermal Insulation and Acoustical Materials*
- *Inorganic formulation*
- *Locks down loose particulates which may result from abuse*
- *Low VOC*

CAFCO® BOND-SEAL / ISOLATEK TYPE X

PRODUCT DESCRIPTION

Green tinted, water based surface encapsulant used as a lock down after abatement. Also can be applied as a surface sealer over SFRMs to identify areas of abatement or respray.

PRODUCT ADVANTAGES

- *Certified by UL*
- *Inorganic formulation*
- *Water soluble*
- *Dries to a green tint which allows for easy identification after use*
- *Easily applied with airless spray equipment*
- *For application with all ISOLATEK SFRMs*
- *Encapsulates loose particulates which may result from abatement work*
- *Low VOC*

CAFCO® HEAT-SHIELD® ADHESIVE / ISOLATEK HEAT-SHIELD ADHESIVE

PRODUCT DESCRIPTION

Water-based adhesive designed for use exclusively with CAFCO HEAT-SHIELD / ISOLATEK HEAT-SHIELD Spray-Applied Thermal/Acoustical Treatment. Applied as an adhesive to all approved substrates prior to the spray-application of CAFCO HEAT-SHIELD / ISOLATEK HEAT-SHIELD, and as an "Admix" for applications over 3 inches.

COATINGS

CAFCO TOP-COTE™ / ISOLATEK TOP-COTE™

PRODUCT DESCRIPTION

Water based, permeable surface coating designed to provide multiple degrees of flexibility and abrasion resistance, CAFCO TOP-COTE / ISOLATEK TOP-COTE forms a tough, yet aesthetically pleasing and bright appearance. Ideal for indirect weather exposures and high wear applications such as covered parking garages, elevator shafts, mechanical rooms, work centers, or anywhere an attractive, abrasion resistant, and resilient surface coating is required.

PRODUCT ADVANTAGES

- *Will not adversely affect fire resistive performance when used in accordance with application guidelines*
- *Dries to white color and has high light reflective properties*
- *Easy to apply by brush, roller, or airless spray equipment*
- *Can be applied over SFRMs, Thermal Insulation and Acoustical Materials*
- *Bridging encapsulant binds together loose particulates which may result from abuse*

APPLICATION/COVERAGE

CAFCO TOP-COTE / ISOLATEK TOP-COTE offers the design flexibility of various levels of protection and appearance. Simply by applying the material at different coverage rates, a number of textures and abrasion resistant levels can be achieved. By rolling or tamping flat the surface of the base material prior to applying CAFCO TOP-COTE / ISOLATEK TOP-COTE, a smooth and pleasing appearance can be created.

For a tight surface texture which must stand up to high velocity air flow, apply CAFCO TOP-COTE / ISOLATEK TOP-COTE at 120 ft²/U.S. gal (2.9 m²/liter). This coverage ensures that the surface is bound together to form a tight, durable texture.

A tougher coating that stands up to wear and tear in work areas can be obtained by applying CAFCO TOP-COTE / ISOLATEK TOP-COTE at a 60 ft²/U.S. gal (1.5 m²/liter) rate. Yielding a tougher, abrasion resistant coat, this coverage rate also provides a whiter and brighter appearance. Such a resilient finish is ideal for mechanical rooms, generator rooms, automotive bays, and anywhere occasional physical contact with the SFRMs or insulation material may occur.

When an extreme wear and abrasion resistant surface is called for, apply CAFCO TOP-COTE / ISOLATEK TOP-COTE at 30 ft²/U.S. gal (0.74 m²/liter). This application rate provides almost continuous, solid coverage. Clean

in appearance and extremely abrasion resistant, this coating rate is also permeable and offers a high level of light reflectance.

Other application rates can be used to obtain desired coverage and surface characteristics; however, CAFCO TOP-COTE™ / ISOLATEK TOP-COTE™ is not recommended for coverage rates beyond 15 ft²/U.S. gal (0.37 m²/liter) applied to a tamped flat surface material.

COATINGS

FENDOLITE® M-II / ISOLATEK® TYPE M-II

PRODUCT DESCRIPTION

High density, portland cement based Spray-Applied Fire Resistive Material used alternately as a coating. Provides the highest degree of damage and abrasion resistance. Ideal for indirect weather exposures, or anywhere a rigid, tough, cement-like finish is desired.

Quick-Reference Selection Chart

Product Characteristics	CAFCO BOND-SEAL ISOLATEK Type EBS	CAFCO BOND-SEAL ISOLATEK TYPE X	FENDOLITE M-II ISOLATEK Type M-II	CAFCO TOP-COTE ISOLATEK TOP-COTE
Drying Color	Clear or Black	Green Tint	Light Gray	White
Enhancement Type	Water Based Surface sealer. Enhances the surface texture.	Water based surface encapsulant. Locks down particulates during abatement.	High density, cement based coating. Forms a rigid, weather resistant surface.	Water based, permeable surface coating. Forms flexible, abrasion resistant finish.
UL Classified	✓	✓	✓	*
Suitable Over Wet Mix Products	✓	✓	✓	✓
Suitable Over Dry Mix Products	✓	✓	✓	✓
Sample Applications				
Abated Surfaces		▲		
Automotive Bays	●	●	●	▲
Correctional Facilities	●	●	●	▲
Elevator Shafts	▲	●	●	●
Generator Rooms	●	●	●	▲
Indirect Weather Exposures			▲	●
Loading Docks	●	●	▲	●
Locker Rooms	●	●	●	▲
Machine Shops	●	●	●	▲
Mechanical Rooms	●	●	●	▲
Open Air Parking Decks	●	●	▲	●
Parking Garages	●	●	●	▲
Warehouses	▲	●	●	●
* Acceptable for use over Isolatek Spray-Applied Fire Resistive Materials. ▲ Primary Recommendation ● Secondary Selection				



ISOLATEK INTERNATIONAL is registered with the
AIA Continuing Education System (AIA/CES)



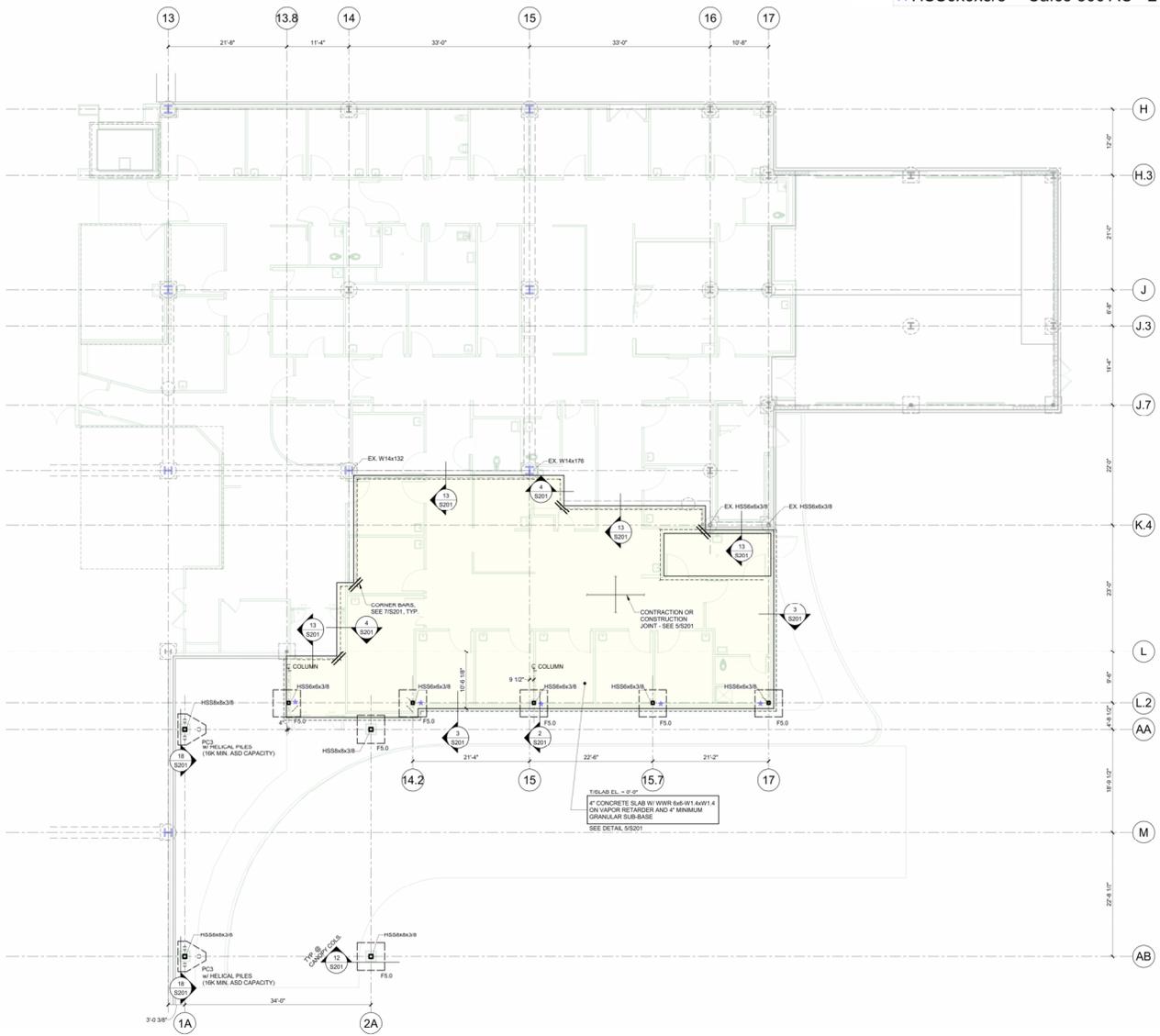
We support our customers with unsurpassed technical expertise and customer service, complemented by an extensive global network of experienced sales representatives and recognized applicators. For detailed product information or for the name of the sales representative in your area please contact us.

The performance data herein reflect our expectations based on tests conducted in accordance with recognized standard methods under controlled conditions. The applicator, general contractor, property owner and/or user MUST read, understand and follow the directions, specifications and/or recommendations set forth in Isolatek International's publications concerning use and application of these products, and should not rely merely on the information contained in this Technical Data Sheet. Isolatek International is not responsible for property damage, bodily injuries, consequential damages, or losses of any kind that arise from or are related to the applicator's general contractor's, or property owner's failure to follow the recommendations set forth in Isolatek International's publications. The sale of these products shall be subject to the Terms and Conditions set forth in the Company's invoices.

Isolatek International provides passive fireproofing materials under the CAFCO® and FENDOLITE® trademarks throughout the Americas and under the ISOLATEK® trademark throughout the world.

800.631.9660 or 973.347.1200
www.isolatek.com

Name
 ★ HSS6x6x3/8" - Cafco 300 AC - 2 HR - X790 - 1"

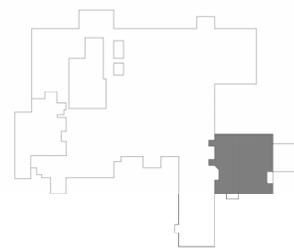


- SHEET NOTES:**
1. REFERENCE ELEVATION 0'-0" = 100.00' (REFER TO CIVIL DRAWINGS).
 2. TOP OF FOUNDATION ELEVATIONS ARE 2'-0" BELOW FINISHED FLOOR ELEVATION UNLESS NOTED OTHERWISE.
 3. FOUNDATION ELEMENTS ARE CENTERED UNDER COLUMNS UNLESS NOTED OTHERWISE.
 4. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS.
 5. REFER TO ARCHITECTURAL DRAWINGS FOR EDGE OF SLAB DIMENSIONS.
 6. COORDINATE ALL SLAB DEPRESSIONS WITH MEP AND ARCHITECTURAL DRAWINGS.
 7. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS RELATIVE TO THE NEW STRUCTION PRIOR TO FABRICATION AND CONSTRUCTION. NOTIFY ARCHITECT/STRUCTURAL ENGINEER OF ANY DISCREPANCIES.
 8. SHEET AND TYPICAL DETAIL REFERENCES:

30 SERIES	STRUCTURAL NOTES
15201	FOOTING SCHEDULE
15201	FILE CAPS
S201	SLAB ON GROUND
MARK AND LEGEND KEY	FOOTING
FE #	FILE CAP
PC#	FILE CAP

1" CONCRETE SLAB W/ WWR 6x6-W1.4XW1.4 ON VAPOR RETARDER AND 4" MINIMUM GRANULAR SUB-BASE
 SEE DETAIL 5/5301

LEVEL 1 / FOUNDATION PLAN



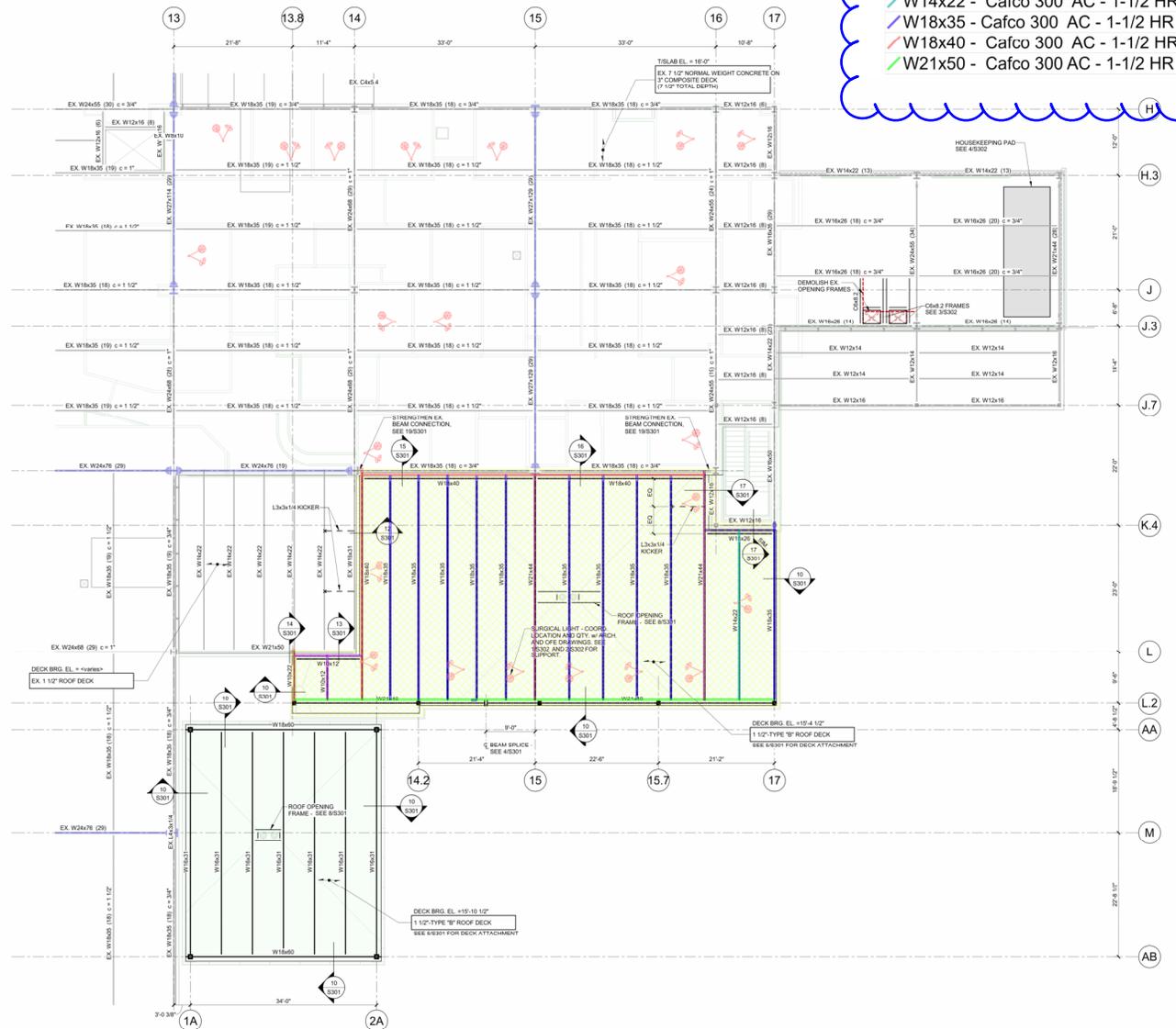
- Name**
- W10x12 - Cafco 300 AC - 1-1/2 HR - P723 - 15/16"
 - Roof Deck - Cafco 300 AC - 1-1/2 HR - P723 - 1 - 3/16"
 - W12x16 - Cafco 300 AC - 1-1/2 HR - P723 - 7/8"
 - W10x22 - Cafco 300 AC - 1-1/2 HR - P723 - 3/4"
 - W21x44 - Cafco 300 AC - 1-1/2 HR - P723 - 11/16"
 - W14x22 - Cafco 300 AC - 1-1/2 HR - P723 - 13/16"
 - W18x35 - Cafco 300 AC - 1-1/2 HR - P723 - 3/4"
 - W18x40 - Cafco 300 AC - 1-1/2 HR - P723 - 11/16"
 - W21x50 - Cafco 300 AC - 1-1/2 HR - P723 - 5/8"

**ARCH, PLEASE
CONFIRM - RS JE
DUNN**

- SHEET NOTES:**
- ALL BEAMS SHALL BE SPACED EQUALLY IN COLUMN BAYS, UNLESS NOTED OTHERWISE.
 - EDGE OF SHEARPLATE PLATE LOCATED 1/4" OFF OF BEAM CENTERLINES AT INTERIOR OPENINGS, UNLESS NOTED OTHERWISE.
 - REFER TO FOUNDATION PLAN AND ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS.
 - REFER TO ARCHITECTURAL DRAWINGS FOR EDGE OF BENT PLATE DIMENSIONS.
 - COORDINATE ALL SLAB OPENINGS AND DEPRESSIONS WITH MEP AND ARCHITECTURAL DRAWINGS.
 - WEIGHTS SHOWN FOR MECHANICAL EQUIPMENT ARE MAXIMUMS. VERIFY CONTRACTOR'S PROPOSED IF ACTUAL WEIGHTS EXCEED THE VALUE GIVEN.
 - COORDINATE THE LOCATION OF FRAMING SUPPORTING MECHANICAL EQUIPMENT WITH THE EQUIPMENT SUPPLIER. NOTIFY STRUCTURAL ENGINEER IF EQUIPMENT SUPPORT REQUIREMENTS DIFFER FROM WHAT IS SHOWN IN THE STRUCTURAL DOCUMENTS.
 - CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS RELATED TO THE NEW STRUCTURE PRIOR TO FABRICATION AND CONSTRUCTION.
 - SEE LIST AND TYPICAL DETAILS REFERENCES.
 - 30 SERIES - STRUCTURAL NOTES
 - 3530 - WELD THROUGH MOMENT CONNECTIONS
 - 3501 - FRAMING SECTIONS AND DETAILS
 - MARK AND LEGEND KEY:
 - WELD THROUGH MOMENT CONNECTION
 11. ULTIMATE (LRF) REACTIONS FOR STEEL BEAMS SUPPORTING NON-COMPOSITE DECK SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE.

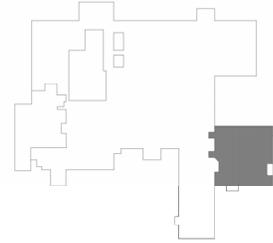
SIZE	REACTION	SIZE	REACTION	SIZE	REACTION
W8	12 KIPS	W10	30 KIPS	W24	48 KIPS
W10	12 KIPS	W18	30 KIPS	W27	66 KIPS
W12	12 KIPS	W21	48 KIPS	W30	66 KIPS
W14	30 KIPS				
 12. STEEL BEAM SCHEDULE:

MARK	SIZE	ULTIMATE (LRF) REACTION
B1	W10x12	12 KIPS
B2	W12x16	12 KIPS
B3	W14x22	12 KIPS
C1	CBX11.5	12 KIPS



LEVEL 2 / ROOF FRAMING PLAN

0 4'-0" 8'-0" 16'-0"



SECTION 1: Identification

1.1. Identification

Product form Mixture
Trade name CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

1.2. Recommended use and restrictions on use

Use of the substance/mixture Spray-Applied Fire Resistive Materials
Recommended use For professional use only

1.3. Supplier

Manufacturer:
USMPC Buyer Inc, dba Isolatek International
41 Furnace Street
Stanhope NJ 07874
technical@isolatek.com
Toll Free: 1 800 631 9600

1.4. Emergency telephone number

Emergency number CHEMTREC 1 800 424 9300 (North America), +1 703 527 3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Reproductive toxicity Category 1B May damage fertility or the unborn child (Oral)

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US)

Danger

Hazard statements (GHS US)

May damage fertility or the unborn child (Oral)

Precautionary statements (GHS US)

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear eye protection, protective gloves.
If exposed or concerned: Get medical advice/attention.
Store locked up.
Dispose of contents/container to waste collection point, in accordance with local/national regulations.

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification This product may contain trace amounts of crystalline silica. Prolonged and/or massive inhalation of respirable crystalline silica dust may cause lung fibrosis, commonly referred to as silicosis. Principal symptoms of silicosis are cough and breathlessness.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Name	Product identifier	%	GHS-US classification
Disodium octaborate, tetrahydrate	(CAS-No.) 12280-03-4	< 1	Repr. 1B, H360

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general	Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). IF exposed or concerned: Get medical advice/attention.
First-aid measures after inhalation	Remove person to fresh air and keep comfortable for breathing.
First-aid measures after skin contact	Wash skin with plenty of water. Seek medical attention if irritation develops.
First-aid measures after eye contact	Rinse eyes with water as a precaution. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention if irritation develops.
First-aid measures after ingestion	Rinse mouth. Do NOT induce vomiting. Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation	Not expected to present a significant inhalation hazard under anticipated conditions of normal use.
Symptoms/effects after skin contact	Not expected to present a significant skin hazard under anticipated conditions of normal use. Dust may cause mechanical irritation.
Symptoms/effects after eye contact	May cause slight temporary irritation. Dust may cause mechanical irritation.
Symptoms/effects after ingestion	May damage fertility or the unborn child.
Chronic symptoms	May damage fertility or the unborn child.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Fire hazard	None known.
-------------	-------------

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	Exercise caution when fighting any chemical fire.
Protection during firefighting	Do not attempt to take action without suitable protective equipment. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	Avoid all unnecessary exposure. Avoid creating or spreading dust.
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6.1.1. For non-emergency personnel

Protective equipment	Wear recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
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6.1.2. For emergency responders

Protective equipment	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
----------------------	---

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up	: Mechanically recover the product. On land, sweep or shovel into suitable containers. Minimize generation of dust. Store away from other materials. Notify authorities if product enters sewers or public waters.
Other information	: Dispose in a safe manner in accordance with local/national regulations.



CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

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6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of residues refer to section 13: "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Ensure good ventilation of the work station. Wear personal protective equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
- Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Separate working clothes from town clothes. Launder separately. Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for safe storage, including any incompatibilities

- Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Strong acids. Keep container closed when not in use. Store locked up.
- Incompatible materials : Strong acids.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

CAFCO® 300, CAFCO® 300 SB, CAFCO® 300 HS, CAFCO® 300 AC, CAFCO® 300 ES

No additional information available

Disodium octaborate, tetrahydrate (12280-03-4)

Not applicable

8.2. Appropriate engineering controls

- Appropriate engineering controls : Ensure good ventilation of the work station.
- Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Safety glasses. Insufficient ventilation: wear respiratory protection.

Hand protection:

Impermeable protective gloves.

Eye protection:

Chemical goggles or safety glasses.

Respiratory protection:

In case of inadequate ventilation wear respiratory protection. Where excessive dust may result, wear approved mask

Personal protective equipment symbol(s):



Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid



Brand

CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

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according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Appearance	Powder.
Color	Light gray, Yellow-brown, Light green
Odor	Characteristic
Odor threshold	No data available
pH	8 - 10
Melting point	981 °C
Freezing point	No data available
Boiling point	No data available
Flash point	No data available
Relative evaporation rate (butyl acetate=1)	No data available
Flammability (solid, gas)	Non flammable.
Vapor pressure	No data available
Relative vapor density at 20 °C	No data available
Relative density	No data available
Solubility	No data available
Log Pow	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity, kinematic	Not applicable
Viscosity, dynamic	Not applicable
Explosion limits	No data available
Explosive properties	No data available
Oxidizing properties	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

None under normal conditions.

10.4. Conditions to avoid

Strong acids.

10.5. Incompatible materials

Strong acids.

10.6. Hazardous decomposition products

No hazardous decomposition products known at room temperature.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal)	Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	Not classified (Based on available data, the classification criteria are not met)

Disodium octaborate, tetrahydrate (12280-03-4)

LD50 oral rat	2500 mg/kg
---------------	------------

Skin corrosion/irritation	Not classified (Based on available data, the classification criteria are not met)
	H: 8 - 10



CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

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according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Serious eye damage/irritation	Not classified (Based on available data, the classification criteria are not met) pH: 8 - 10
Respiratory or skin sensitization	Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity	Not classified (Based on available data, the classification criteria are not met)
Reproductive toxicity	May damage fertility or the unborn child (Oral).
Specific target organ toxicity – single exposure	Not classified (Based on available data, the classification criteria are not met)
Specific target organ toxicity – repeated exposure	Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard	Not classified (Based on available data, the classification criteria are not met)
Viscosity, kinematic	No data available
Likely routes of exposure	Ingestion. Inhalation. Skin and eye contact.
Symptoms/effects after inhalation	Not expected to present a significant inhalation hazard under anticipated conditions of normal use.
Symptoms/effects after skin contact	Not expected to present a significant skin hazard under anticipated conditions of normal use. Dust may cause mechanical irritation.
Symptoms/effects after eye contact	May cause slight temporary irritation. Dust may cause mechanical irritation.
Symptoms/effects after ingestion	May damage fertility or the unborn child.
Chronic symptoms	May damage fertility or the unborn child.
Other information	Likely routes of exposure: ingestion, inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general This material has not been tested for environmental effects.

12.2. Persistence and degradability

CAFCO 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

Persistence and degradability	Not established.
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12.3. Bioaccumulative potential

CAFCO 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

Bioaccumulative potential	Not established.
---------------------------	------------------

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the ozone layer No additional information available

Other information Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Product/Packaging disposal recommendations Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

Transportation of Dangerous Goods

Not regulated



CAFCO® 300, CAFCO 300 SB, CAFCO 300 HS, CAFCO 300 AC, CAFCO 300 ES

Safety Data Sheet

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Transport by sea

Not regulated

Air transport

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

No additional information available

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

National regulations

Disodium octaborate, tetrahydrate (12280-03-4)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

No additional information available

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 07 August 2019

Other information : None.

Full text of H-phrases:

H360

May damage fertility or the unborn child

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.





CAFCO® 300 AC Test Reports

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CAFCO 300 AC ASTM E-84 Flame Spread Smoke Develop	Page 4
CAFCO 300 AC ASTM E-136 Combustibility	Page 11
CAFCO 300 AC ASTM E-736 Cohesion Adhesion	Page 13
CAFCO 300 AC ASTM E-759 Deflection	Page 15
CAFCO 300 AC ASTM E-760 Bond Impact	Page 18
CAFCO 300 AC ASTM E-761 Compressive Strength	Page 21
CAFCO 300 AC ASTM E-859 Air Erosion Resistance	Page 23
CAFCO 300 AC ASTM E-937 Corrosion Resistance	Page 26
CAFCO 300 AC ASTM G-21 Fungal Resistance	Page 28



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 2905233ML01

Date: January 8, 2013

SAMPLE ID: One (1) Field applied sprayed fire-resistive material identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: September 24, 2012

TESTING PERIOD: October 5, 2012

TESTS REQUESTED: The submitted sample was tested for Density in accordance with the procedures outlined in ASTM E 605-93 (2011).

TEST RESULTS: Continued on the following pages

PREPARED BY:

SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.

Andrew Franzonia, Technician
Materials Lab

J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab

Page 1 of 2

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Report No.: 2905233ML01

Date: 1/8/13

Page: 2 of 2

CLIENT: Isolatek International

RESULTS:

DENSITY
ASTM E 605-93 (2011)

<u>Specimen</u>	<u>Thickness (in.)</u>	<u>Density (Lbs/ft³)</u>
1	0.906	15.4

Notes: Sample ID: CAFCO® 300AC™

Sample size: 16" x 16"

Lab Environment: Temperature 23° C, Humidity 50 %

Specimen Conditioning: 48 hours minimum

Equipment used : 82-11297173 Thickness Gauge, 82-11299939 Tape Measure, 051/108 Scale

End of Report



Report On
Surface Burning Characteristics Determined By
ASTM E84/ (UL 723) Twenty-Five Foot Tunnel
Furnace Test Method

PREPARED FOR:
Isolatek International
41 Furnace Street
Stanhope, NJ

TEST NUMBER T-14289

MATERIAL TESTED:
CAFECO® 300AC™

DATE OF ISSUE 9/24/2013



I. SCOPE

This report contains the reference to the test method, purpose, test procedure, rounding procedures, preparation and conditioning of specimens, description of materials, test and post test observation data, and test results.

II. TEST METHOD

The test was conducted in accordance with ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials." The 25-foot tunnel method is also described by NFPA 255 and UL 723.

III. PURPOSE

The purpose of the test is to determine the relative performance of the test material under standardized fire exposure. Results are given for Flame Spread and Smoke Developed Index. The values obtained from burning the test material represent a comparison with that of 1/4" inorganic reinforced cement board expressed as zero and red oak flooring expressed as 100.

The flame spread results of 25-foot tunnel tests are frequently used by building code officials and regulatory agencies in the acceptance of interior finish material for various applications. The most widely accepted classification system is epitomized by the National Fire Protection Association Life Safety Code, NFPA 101:

Class A*	0 - 25	flame spread	0-450	smoke developed
Class B*	26 - 75	flame spread	0-450	smoke developed
Class C*	76 - 200	flame spread	0-450	smoke developed

*Class A, B and C correspond to I, II and III, respectively, in other code references.

This flame spread classification system is based on the premise that the higher the flame spread numbers, the greater the fire spread potential. The actual relationship between the numbers developed under this test and life safety from fire has not been adequately established.

IV. TEST PROCEDURE NOTES

The furnace was preheated to a minimum of 150°F as measured by an 18 AWG thermocouple embedded in cement 1/8" below the floor surface of the chamber, 23-1/4' from the centerline of the ignition burners. The furnace was then cooled to 105°F (± 5°F) as measured by a thermocouple embedded 1/8" below the floor surface of the test chamber 13' from the fire end.

Prior 10-minute tests with 1/4" inorganic reinforced cement board provided the zero reference for flame spread. Periodic 10-minute tests with unfinished select grade red oak flooring provided for the 100 reference for flame spread and smoke developed as noted in Section III.



A. Flame Spread

The flame spread distance is observed and recorded at least every 15 seconds or every 2 feet of progression. The peak distance is noted at the time of occurrence. The flame spread distance is plotted over time. The total area under the flame spread distance-time curve is determined; flame front recessions are ignored. The flame spread is then calculated as a function of the area under the curve relative to the standard red oak curve area. The value for flame spread classification for the tested material may be compared with that of inorganic reinforced cement board and select grade red oak flooring.

B. Smoke Developed

The smoke developed during the test is determined by the reduction in output of a photoelectric cell. A light beam vertically orientated across the furnace outlet duct is attenuated by the smoke passing through the duct. The output of the photoelectric cell is related to the obscuration of the light source through the duct caused by the smoke. A curve is developed by plotting photoelectric cell output against time. The value of smoke developed is derived by calculating the net area under the curve for the test material and comparing this area with the net area under the curve for unfinished select grade 23/32" red oak flooring.

V. **FLAME SPREAD AND SMOKE DEVELOPED ROUNDING PROCEDURES**

Single test calculated flame spread and smoke developed values are rounded to the nearest multiple of 5 and reported as the Flame Spread or Smoke Developed Index. Actual test values are available on request.

For multiple tests, the individual calculated flame spread and smoke developed values are recorded, averaged, and the results rounded to the nearest multiple of 5. The averaged, rounded number is reported as the Flame Spread or Smoke Developed Index.

VI. **PREPARATION AND CONDITIONING OF TEST SAMPLES**

Three or four sections are generally used in the preparation of a complete test specimen which is 20-1/2" wide and 24' long. Materials 8' in length may be tested by using three sections 20-1/2" wide by 8' long for a total specimen length of 24'. A 14" length of uncoated 16 gauge steel sheet is used to make up the remainder of the test specimen; it is placed at the fire end of the test chamber. Prior to testing, three 8' long sections of 1/4" inorganic reinforced cement board are placed on the back side of the specimens to protect the furnace lid assembly. Test specimens are conditioned at a controlled temperature of 73.4°F ($\pm 5^\circ\text{F}$) and a controlled relative humidity of 50 ± 5 percent.



IX: TEST RESULTS

Test results calculated on the basis of the area under the curves of flame spread distance and smoke developed versus time are provided in the table below for calibration materials and for:

CAFCO® 300AC™

Material Description	Flame Spread Index	Smoke Developed Index
High Density Inorganic Reinforced Cement Board	0	0
Red Oak Flooring	100	100
T-14289	0	0

Observations:

None.

Remarks:

The sample consisted of 4 pieces 60 inches long and 1 piece 48 inches long laid end-to-end.

Conclusions:

Meets Class A, Flame Spread Index 25 or less and Smoke Developed Index 450 or less.

REPORT PREPARED BY:

Tom Wilson

Manager of Fire Testing

REPORT REVIEWED BY:

Brian Sause

Director of Testing, Standards, and Certification

Conformance to the test standard is verified by a registered professional engineer. This is a factual report of the results obtained from laboratory tests of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. The HPVA does not verify the description of materials and products when the description is provided by the client. The report is not a recommendation or a disapprobation by the Hardwood Plywood and Veneer Association of the material or product tested. While this report may be used for obtaining product acceptance; it may not be used in advertising.



DATE OF TEST 9/24/2013

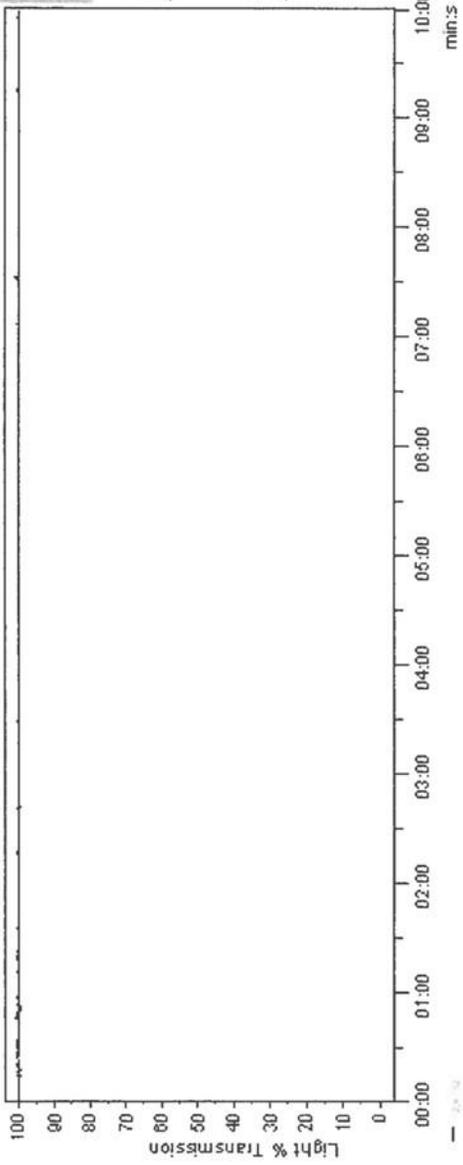
Page 6 of 7

TEST NUMBER T-14289

Test Time 600 seconds FS Counts 0.4
 Fuel Counts 758
 Smk Cts 0

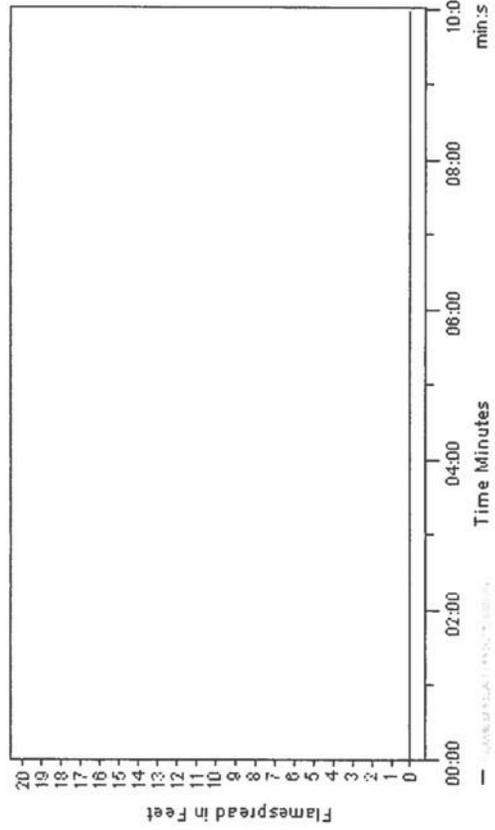
STOP Early
 NEW TEST
 program

Flame Progression, Feet 1.20
 Smoke MV 9.00
 24 Ft. Temp, Deg. F 617
 13 Ft. Temp, Deg. F 178
 24 Foot Floor TC, Deg. F 121



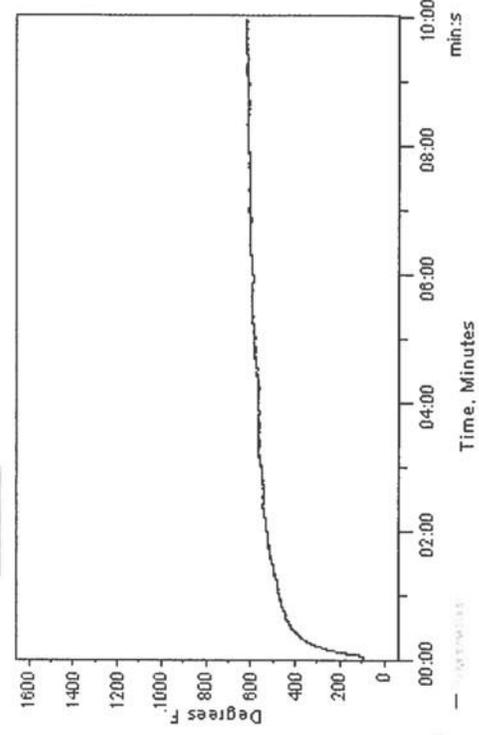
Max Temp = 621
 @ Time = 594

Smoke Data



Flamespread Data

test ON/OFF
 Test Off
 Cool



Fuel Data



LABORATORY ACCREDITATION

The HPVA has met the requirements of the International Accreditation Service, Inc. (IAS) Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ANSI/ISO/IEC Standard 17025:2005, *General criteria for the competence of testing and calibration laboratories*, and is accredited for the ASTM E84 and other test methods listed in the approved scope of accreditation: Testing Laboratory TL-224.

The HPVA's product certifications, inspections, and test procedures are accredited by IAS and the HPVA has demonstrated compliance with ISO/IEC 17025, 17020, and Guide 65. These accreditations and the HPVA's test reports are recognized by the International Code Council (ICC) to satisfy testing requirements specified in the model building codes adopted by state and local jurisdictions which include but are not limited to The International Building Code (IBC), International Residential Codes (IRC), and International Fire Code (IFC).

HPVA FLAME SPREAD PROPERTY VERIFICATION PROGRAM

The Hardwood Plywood & Veneer Association provides a product property verification program for flame spread properties. This program is based on the selection and testing of panels within a given marketing line on the basis of that combination of factors that theoretically should give the highest flame spread values. Such factors as panel thickness, specific gravity, color of stain, type of lamination, surface texture, and product mix are taken into consideration in the selection of flame spread samples.

While it is standard procedure to include smoke developed values in test reports, the HPVA label identifies only the flame spread class. The HPVA label is evidence that the marketing line has been tested and inspected in accordance with the HPVA Flame Spread Inspection and Verification Program Procedures.

The HPVA label displayed below indicates conformance of the tested samples to the Type II glue bond requirements as set forth in ANSI/HPVA HP-1-2009 Standard For Hardwood And Decorative Plywood, and conformance to Flame Spread Class C (200 or less) as determined by the test procedures described in ASTM E 84. Depending on the type of product, the label may also include other information such as structural and formaldehyde emission ratings.

HARDWOOD PLYWOOD VENEER ASSOCIATION		
BOND LINE TYPE II ANSI/HPVA HP-1-2009		FLAME SPREAD 200 OR LESS CLASS C ASTM E 84
	MILL 00 SPECIALTY GRADE	SIMULATED DECORATIVE FINISH ON PLYWOOD

CLIENT: ISOLATEK INTERNATIONAL.

41 Furnace Street
Stanhope, NJ 07874
Frank Voris

Test Report No: RJ2096-1

Date: September 18, 2012

SAMPLE ID: The following test material was identified and submitted by the Client as CAFCO® 300AC™.

DATE OF RECEIPT: Samples were received on September 10, 2012.

TESTING PERIOD: September 14, 2012.

TEST REQUESTED: ASTM E136-09 "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace of 750°C".

TEST RESULTS: See detailed results on page 2.

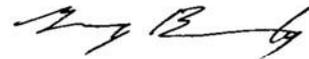
CONCLUSION: The submitted sample **passes** the test as specified in ASTM E136. See requirements on page 2.

Prepared By



Brian Ortega
Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**



Greg Banasky
Senior Technician



TEST RESULTS:

<u>Specimen</u>	<u>Maximum Furnace Temperature, °F</u>	<u>Maximum Surface Temperature, °F</u>	<u>Interior Temperature, °F</u>	<u>Weight Loss %</u>	<u>Time of Flaming</u>
1	1386	1387	1317	25	None
2	1388	1385	1310	29	None
3	1383	1390	1321	26	None
4	1385	1385	1312	27	None

REQUIREMENTS: Record the material passing the test if at least three of the four specimens tested meet the individual test specimen criteria.

When the weight loss of the test specimen is 50% or less, the material passes the test if, the recorded temperatures of the surface and interior thermocouples do not at anytime during the test rise more than 30°C (54°F) above the stabilized furnace temperature and there is no flaming of the specimen after the first 30 seconds. If the weight loss of the specimen exceeds 50%, the material passes the test if, the recorded temperatures of the surface and interior thermocouples do not at anytime during the test rise above the stabilized furnace temperature and no flaming of the specimen is observed at any time during the test.



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 3011947ML03	Date: 22 February 2013
------------------------------------	-------------------------------

SAMPLE ID: Six (6) Field applied sprayed fire-resistive materials identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: 7 January 2013

TESTING PERIOD: 18 January 2013

TESTS REQUESTED: The submitted samples were tested for Bond Strength (Cohesion/Adhesion) in accordance with the procedures outlined in ASTM E 736-00 (2011).

TEST RESULTS: Continued on the following pages

PREPARED BY:

**Andrew Franzonia, Technician
Materials Lab**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.**

**J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab**

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CLIENT: Isolatak International

RESULTS:

BOND STRENGTH (COHESION/ADHESION)
 ASTM E 736-00 (2011)

	<u>Maximum Load</u> <u>(lbf)</u>	<u>Bond Strength</u> <u>Cohesion/Adhesion</u> <u>(lbs/ft²)</u>	<u>Cap Test Area</u> <u>(in²)</u>	<u>Density</u> <u>(lb/ft³)</u>
1	29.59	484	8.81	15.6
2	24.25	396	8.81	16.3
3	28.60	468	8.81	16.7
4	21.89	357	8.81	16.5
5	28.28	462	8.81	16.5
6	18.72	305	8.81	16.3
Average	25.22	412	8.81	16.3

Notes: Sample ID: CAFCO® 300AC™
 Sample size: 12" x 12"
 Lab Environment: Temperature 23° C, Humidity 50 %
 Specimen Conditioning: 48 hours minimum
 Equipment used: 046/29 Instron 5585, 82-11298490

End of Report



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 2942571ML11	Date: January 11, 2013
------------------------------------	-------------------------------

SAMPLE ID: One (1) Field applied sprayed fire-resistive material identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: November 5, 2012

TESTING PERIOD: November 16, 2012

TESTS REQUESTED: The sample was tested for Deflection in accordance with the procedures outlined in ASTM E 759-92 (2011) at clients facility.

TEST RESULTS: Continued on the following pages

PREPARED BY:

SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.

Andrew Franzonia, Technician
Materials Lab

J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab

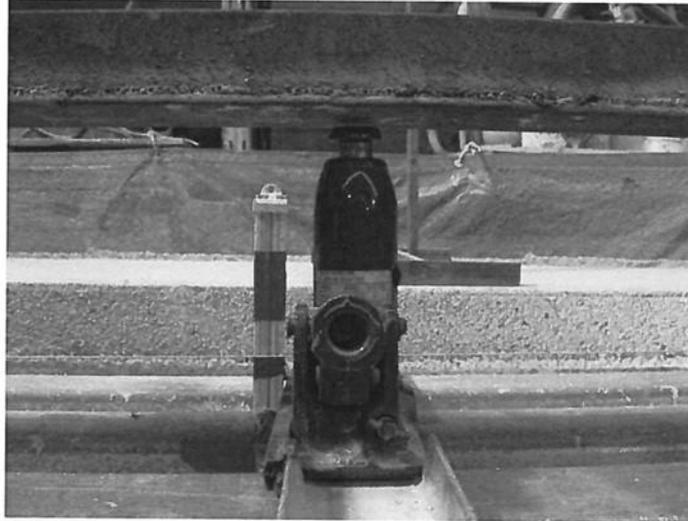
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CLIENT: Isolatek International

PHOTOS

Photo 1 -Test Setup with Jack, I-Beam and Reference



RESULTS

DEFLECTION
ASTM E 759-92 (2011)

<u>Specimen</u>	<u>Results</u>
1	No spalling or delamination.

Notes: Sample ID: CAFCO® 300AC™
Completed at Isolatek Lab



Report No.: 2942571ML11

Date: 1/11/13

Page: 3 of 3

CLIENT: Isolatek International

COMMENTS

The deflection test was completed using an I-Beam and Jack setup (refer to Photo 1). A bearing block was used in order to distribute the deflective load across the entire width of the specimen. The specimen was rigidly supported and had a clear span of at least 10ft. between the supports. The loading was applied until the deflection reached 1". The specimen was inspected under loading and no spalling or delamination was observed.

Please note that the test was conducted at Isolatek in Stanhope, NJ using Isolatek's equipment. SGS verified testing was performed correctly however does not take responsibility for equipment used since it is not under SGS calibration control.

End of Report



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 2942571ML07	Date: January 11, 2013
------------------------------------	-------------------------------

SAMPLE ID: One (1) Field applied sprayed fire-resistive material identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: November 5, 2012

TESTING PERIOD: November 16, 2012

TESTS REQUESTED: The sample was tested for Bond Impact in accordance with the procedures outlined in ASTM E 760-92 (2011) at clients facility.

TEST RESULTS: Continued on the following pages

PREPARED BY:

**Andrew Franzonia, Technician
Materials Lab**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.**

**J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab**

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CLIENT: Isolatak International

PHOTOS

Photo 1- SFRM Specimen



Photo 2 – Test Specimen and Rule

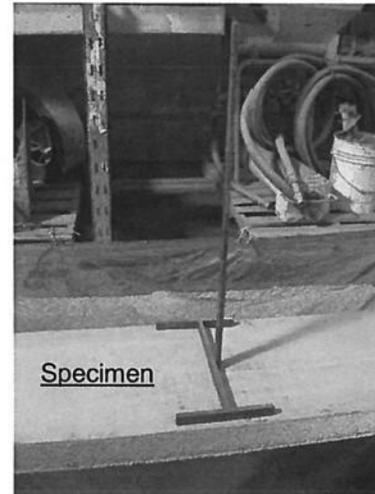


Photo 3 – 60 Lb. Leather Bag Pre-Drop

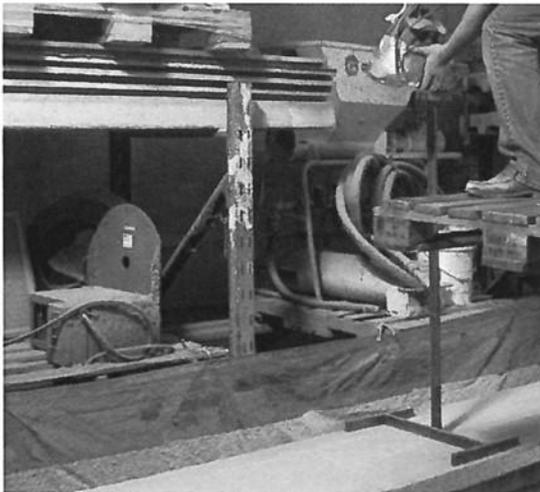


Photo 4 – 60 lb. Leather Bag Post Drop



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Report No.: 2942571ML07

Date: 1/11/13

Page: 3 of 3

CLIENT: Isolatak International

RESULTS

BOND IMPACT
ASTM E 760-92 (2011)

<u>Specimen</u>	<u>Results</u>
1	No cracking, delamination, or spalling.

Notes: Sample ID: CAFCO® 300AC™
Completed at Isolatak Lab

COMMENTS

The bond impact test was completed using a 60lb. leather bag dropped from a height of 4ft. The specimen was rigidly supported and had a clear span of at least 10ft. between the supports. The specimen exhibited no cracking, delamination, or spalling after the test was performed.

Please note that the test was conducted at Isolatak in Stanhope, NJ using Isolatak's equipment. SGS verified testing was performed correctly however does not take responsibility for equipment used since it is not under SGS calibration control.

End of Report

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CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 3011947ML01

Date: 22 February 2013

SAMPLE ID: One (1) Field applied sprayed fire-resistive materials identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: 7 January 2013

TESTING PERIOD: 18 January 2013

TESTS REQUESTED: The submitted sample was tested for Compression Strength in accordance with the procedures outlined in ASTM E 761-92 (2011).

TEST RESULTS: Continued on the following pages

PREPARED BY:

**Andrew Franzonia, Technician
Materials Lab**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.**

**J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab**

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Report No.: 3011947ML01
Date: 2/22/13
Page: 2 of 2

CLIENT: Isolatek International

RESULTS:

COMPRESSION STRENGTH
ASTM E 761-92 (2011)

	<u>Compression Load at 10% Deformation (lbf)</u>	<u>Compression Stress at 10% Deformation (psf)</u>	<u>Compression Test Area (in²)</u>	<u>Depth (in)</u>
1	684	2734	36	1.307
2	900	3599	36	1.228
Average	792	3167	36	1.268

Notes: Sample ID: CAFCO® 300AC™

Sample size: 7" x 24"

Density: 16.9 lb/ft³ (ASTM E-605)

Lab Environment: Temperature 23° C, Humidity 50 %

Specimen Conditioning: 48 hours minimum

Equipment used: 046/29 Instron 5585, 046/30 Load Cell 67000lb, 82-11297173 Thickness Gauge

End of Report



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 2942571ML03

Date: December 14, 2012

SAMPLE ID: One (1) Field applied sprayed fire-resistive material identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: November 5, 2012

TESTING PERIOD: November 19-20, 2012

TESTS REQUESTED: The submitted sample was tested for Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members in accordance with the procedures outlined in ASTM E859-93 (2011).

TEST RESULTS: There was no air erosion of the exposed area from the CAFCO® 300AC™ sample surface after 24 hours with a velocity of 20 ft/s (6 m/s).

PREPARED BY:

**Andrew Franzonia, Technician
Materials Lab**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.**

**J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab**

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CLIENT: Isolatek International

RESULTS:

SAMPLE DESCRIPTION:

One (1) 12" x 76" specimen comprising of 5/8" thick concrete backer board substrate onto which CAFCO® 300AC™ was Spray Applied to a nominal thickness of 3/4 inch.

TEST DETAILS:

The 12" x 76" specimen was exposed to the Air Erosion Test detailed in the referenced ASTM Method. The panel was tested after a curing period in excess of the 28 day minimum, maintained at the Client's facility. Prior to testing, the specimen was conditioned in a controlled laboratory environment. Salient features are summarized below:

APPARATUS:

- A) Duct System, 8 ft. 10 inches long, horizontally positioned with a 72" x 8" opening in the center of the top to accept the test sample (4 ft.² exposed area).
- B) A Dwyer Series 471 Thermo-Anemometer was used to measure air velocity. The test apparatus, test measuring velocity equipment was supplied by the client and set up in our laboratory.
- C) Blower, capable of moving air through the entire cross section of the duct at a velocity of 20 ft/s (6 m/s).
- D) Two filters upstream of the test specimen, one located at blower intake and the other located at output of blower and a collecting filter downstream of the test specimen. Downstream filter fabric was 30-denier nylon, constructed with 94 ends per inch and 81 picks per inch.
- E) Scale, having a capacity of 100 grams and a sensitivity of ± 0.001 grams.

PROCEDURE:

- A) The collecting filter was initially allowed to dry for one hour at 50°C (120°F). It was then weighed then placed over the exit end of the duct apparatus.
- B) The specimen was placed over the duct opening so the face of the specimen and the inside face of the duct were flush. The edges of the specimen, extending at least 2 inches (50mm) beyond the duct opening were sealed to the duct to prevent system leakage.
- C) The anemometer was positioned 4 inches (100mm) from the upstream edge of the specimen at the center line of the duct and 2 inches (50mm) below the top side of the duct.



Report No.: 2942571ML03

Date: 12/14/12

Page: 3 of 3

CLIENT: Isolatek International

RESULTS:

- D) With filters and the specimen in position, the blower was maintained at an average velocity of 20 ft/s (6 m/s).
- E) The blower was stopped at intervals of 1, 6, and 24 hours, the collecting filter removed, dried for one hour at 50°C (120°F) and re-weighed.

TEST RESULTS: CAFCO® 300AC™

<u>Time Period</u>	<u>Wt. Increase of Filter</u>	<u>Cumulative Weight Increase of Filter</u>
hrs	gm	g/ft ²
0-1	0.002	0.0005
1-6	0.000	0.0005
6-24	0.000	0.0005

The density of the CAFCO® 300AC™ was measured as 18.2 lb/ft.³ when tested in accordance with ASTM E605-93.

End of Report



CLIENT: Isolatek International
41 Furnace Street
Stanhope, NJ 07874
Attn.: Rudy Jagnandan

Test Report No: 2942571ML15	Date: January 11, 2013
------------------------------------	-------------------------------

SAMPLE ID: Twelve (12) Field applied sprayed fire-resistive materials identified by the client as: CAFCO® 300AC™

DATE OF RECEIPT: November 5, 2012

TESTING PERIOD: December 4-13, 2012

TESTS REQUESTED: The submitted samples were tested for Corrosion Resistance in accordance with the procedures outlined in ASTM E 937-93 (2011).

TEST RESULTS: Continued on the following pages

PREPARED BY:

**Andrew Franzonia, Technician
Materials Lab**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.**

**J. Sherrier, CPLP, Lab Manager
Packaging & Materials Lab**

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Report No.: 2942571ML15

Date: 1/11/13

Page: 2 of 2

CLIENT: Isolatek International

RESULTS:

Corrosion Resistance
ASTM E 937-93 (2011)
CAFCO® 300AC™

240-Hours Exposure at 73° F, 50% R.H.			
Substrate	Weight Loss L1	Weight Loss L3	Average Weight Loss
	gm/mm ²	gm/mm ²	gm/mm ²
Bare Steel	-0.00011	*	-0.000055
Shop-Coated Steel	*	*	*
Galvanized Steel	*	*	*

240-Hours Exposure at 95° F, 95% R.H.			
Substrate	Weight Loss L2	Weight Loss L4	Average Weight Loss
	gm/mm ²	gm/mm ²	gm/mm ²
Bare Steel	-0.00011	-0.00011	-0.00011
Shop-Coated Steel	*	*	*
Galvanized Steel	*	*	*

Difference in Weight Loss Between Both Exposures	
Substrate	Difference in Weight Loss
	gm/mm ²
Bare Steel	-0.000055
Shop-Coated Steel	*
Galvanized Steel	*

Note: Sample size : 8" x 8"

Average Thickness: 1"

* - No corrosion present (No measurable weight loss)

Equipment Used: 82-11294255 Digital Scale, 82-11302024 Thermotron Chamber

End of Report

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Isolatek International
Microbiological Analysis Report

Project No: 4983
Date Received: 9/6/2012
Date of Analysis: 9/6/2012

Subject: Fungal Resistance Testing

Background & Objectives

One sample was submitted for analysis using the ASTM G21-96 method.

Protocol

ASTM G21-96, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi, test was strictly followed.

Overview of Test Protocol

This test method is designed for the qualitative determination of mildew (fungus) resistance of synthetic polymeric materials, particularly those types which have been given a fungus resistant treatment.

Specifics of the Test

Sample Identification

4983 CAFCO® 300AC

Test Inoculum

The fungal inoculum consisted of five species:

Aspergillus niger ATCC 9642

Chaetomium globosum ATCC 6205

Penicillium funiculosum ATCC 11797

Trichoderma virens ATCC 9645

Aureobasidium pullulans ATCC 15233

Test samples, tested in triplicate, were placed in petri dishes on mineral salts agar and inoculated with the test fungi. The samples were incubated at 28°C for 4 weeks and examined weekly for the growth of the test organisms.

10/10/2012

Isolatek International
Microbiological Analysis Report

Project No: 4983

Evaluation of Results

For the evaluation of the relative resistance of synthetic polymeric materials, the following rating system was used:

Fungal Growth Rating Legend	
None	0
Traces of growth (less than 10%)	1
Light growth (10-30%)	2
Medium growth (30-60%)	3
Heavy growth (60% to complete coverage)	4

Results

Table 1 shows the Fungal Resistance Test results.

Conclusions

The Isolatek International sample 'CAFCO® 300AC' showed fungal resistance in the ASTM G21 Test. There was no fungal growth observed on the triplicate samples after four weeks incubation.

David S. Mashinter
QA Manager

Katalin Rossmore, Ph. D
Chief Science Officer

10/10/2012

Isolatek International
Microbiological Analysis Report

Project No: 4983

Table 1. Fungal Resistance of Polymeric Surfaces

Lab Identification	Sample	¹ Observed Fungal Growth on Treated Surface after 28 days incubation at 28-30°C		
		1	2	3
4983	CAFCO® 300AC	0	0	0
PC	Growth Control (Whatman filter paper)	4	4	4

Fungal Growth Rating Legend	
None	0
Traces of growth (less than 10%)	1
Light growth (10-30%)	2
Medium growth (30-60%)	3
Heavy growth (60% to complete coverage)	4

Isolatek International is committed to sound environmental practice and operating in a sustainable manner. We are also committed to reducing our environmental impact while continually improving our environmental performance as an integral part of our business and operations. We encourage customers, suppliers, and other stakeholders to join us with this continuing and evolving environmental and business responsibility. [View Isolatek International's Corporate Environmental Policy.](#)

What is LEED?

Leadership in Energy and Environmental Design (LEED) is a rating system that was developed by the United States Green Building Council (USGBC) to evaluate the environmental performance of a building and encourage a market change towards sustainable design.

There are four levels of Certification levels that can be reached for LEED v4 which are awarded based on achieving a minimum number of points.

What points do Isolatek materials qualify for?

At this current time, Isolatek International can assist in achieving points in the following LEED v4 categories:

- Energy & Atmosphere
 - Prerequisite 2 – Minimum Energy Performance
 - Credit 2 – Optimize Energy Performance
- Materials and Resources
 - Prerequisite 2 – Construction and Demolition Waste Management Planning
 - Credit 1 – Building Life Cycle Impact Reduction
 - Credit 3 – Building Product Disclosure and Optimization – Sourcing of Raw Materials
 - Credit 4 – Building Product Disclosure and Optimization – Material Ingredients
- Indoor Environmental Quality
 - Credit 2 – Low Emitting Materials

What is Isolatek doing to further enhance point qualifications?

As we feel that it is of utmost importance to continually improve our products' impact and footprint, we are working diligently to provide materials and testing to qualify for points in additional categories.



Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

ENERGY AND ATMOSPHERE

EA Prerequisite 2 – [Minimum Energy Performance](#)

REQUIRED

Intent:

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

Requirements:

Use the options and strategies as specified in the LEED BD+C: New Construction, Minimum Energy and Performance Guide.

How Isolatek Contributes:

Isolatek International's wet-spray, dry-spray, and rigid board fireproofing materials provide, in addition to their fire resistance, both NRC (Noise Reduction Coefficient) values and Thermal Resistance (R) values. These values allow for the reduction of the amount of energy needed for climate control, and reduce the need for additional materials required for soundproofing within the building envelope.

Products that Contribute:

- CAFCO® 300 Series Products
- CAFCO® 400 Series Products
- CAFCO® BLAZE-SHIELD® Series Products
- CAFCO® FENDOLITE® Products
- CAFCO® HEAT-SHIELD®
- CAFCO-BOARD®
- CAFCO® SOUND-SHIELD® 40

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

ENERGY AND ATMOSPHERE

EA Credit 1 – [Optimize Energy Performance](#)

UP TO 18 POINTS

Intent:

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

Requirements:

Establish an energy performance target no later than the schematic design phase using the options and strategies as specified in the LEED BD+C: New Construction, Optimize Energy Performance Guide.

How Isolatek Contributes:

Isolatek International's wet-spray, dry-spray, and rigid board fireproofing materials provide, in addition to their fire resistance, both NRC (Noise Reduction Coefficient) values and Thermal Resistance (R) values. These values allow for the reduction of the amount of energy needed for climate control, and reduce the need for additional materials required for soundproofing within the building envelope.

Products that Contribute:

- CAFCO® 300 Series Products
- CAFCO® 400 Series Products
- CAFCO® BLAZE-SHIELD® Series Products
- CAFCO® FENDOLITE® Products
- CAFCO® HEAT-SHIELD®
- CAFCO-BOARD®
- CAFCO® SOUND-SHIELD® 40

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

MATERIALS AND RESOURCES

MR Prerequisite 2 – [Construction and Demolition Waste Management](#)

REQUIRED

Intent:

To reduce construction and demolition waste disposed in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements:

Divert at least 50% of the total construction and demolition material for Path 1 (1 point) or 75% of materials for Path 2 (1 point); diverted materials must include at least three material streams. Or, as an option (2 points), do not generate more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building's floor area.

How Isolatek Contributes:

This credit is provided for diversion of waste materials. Consider recycling construction materials. Isolatek's products are supplied in either plastic or kraft paper bags that are able to be recycled. The pallets that our products are shipped on can also be recycled. Our pailed products are supplied in 5 gallon plastic containers, which can also be recycled. Our products are not considered hazardous (refer to SDS).

Products that Contribute:

- CAFCO® 300 Series Products
- CAFCO® 400 Series Products
- CAFCO® BLAZE-SHIELD® Series Products
- CAFCO® FENDOLITE® Products
- CAFCO® HEAT-SHIELD®
- CAFCO-BOARD®
- CAFCO® SOUND-SHIELD® 40
- CAFCO® SprayFilm® Intumescent Coatings

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

MATERIALS AND RESOURCES

MR Credit 1 – Building Life-Cycle Impact Reduction

UP TO 5 POINTS

Intent:

To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements:

Demonstrate reduced environmental effects during initial project decision-making by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment using Option 3 as specified in the LEED BD+C: New Construction, Building life-cycle impact reduction Guide.

Reuse or salvage building materials from off site or on site as a percentage of the surface area, as listed in the table below. Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems). Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Materials contributing toward this credit may not contribute toward MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials.

% of completed project surface area reused	Points BD&C	Points BD&C (Core and Shell)
25%	2	2
50%	3	3
75%	4	5

How Isolatek Contributes:

Isolatek International's wet-spray, dry-spray, and rigid board fireproofing materials are also utilized for retrofit and rehab construction projects. These materials will provide the required fire resistance ratings to previously unprotected or abated structural element steel members (e.g. floor and roof ceiling assemblies, beams and columns) to bring the building up to current model building code. This will eliminate the need to replace the existing structural elements, which were previously not code compliant. Keep in mind that this credit only applies when at least 55% of the surface area of the building is re-used.

Products that Contribute:

- CAFCO® 300 Series Products
- CAFCO® 400 Series Products
- CAFCO® BLAZE-SHIELD® Series Products
- CAFCO® FENDOLITE® Products
- CAFCO® HEAT-SHIELD®
- CAFCO-BOARD®
- CAFCO® SOUND-SHIELD® 40
- CAFCO® SprayFilm® Intumescent Coatings

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

MATERIALS AND RESOURCES

MR Credit 3 – [Building Product Disclosure and Optimization – Sourcing Raw Materials](#) 1 POINT

Intent:

To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements:

Option 2 (1 point) credit, indicates that products must demonstrate leadership in the sourcing of raw materials. Several paths are provided to meet this credit, which includes material reuse and recycling. Reuse includes salvaged, refurbished, or reused products. Products meeting materials reuse criteria are valued at 100% of their cost for the purposes of credit achievement calculation. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content. Both based on cost. Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation. Products sourced (extracted, manufactured, and purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost. The base contributing cost of individual products compliant with multiple responsible extraction criteria is not permitted to exceed 100% its total actual cost (before regional multipliers) and double counting of single product components compliant with multiple responsible extraction criteria is not permitted and in no case is a product permitted to contribute more than 200% of its total actual cost.

How Isolatek Contributes:

Our various products are manufactured with recycled materials. The breakdown list below identifies the recycled content percentage by weight.

Post-consumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the products, which can no longer be used for intended purpose.

Pre-consumer material is defined as material diverted from a waste stream during the manufacturing process. Excluded is the reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Products that Contribute:

CAFCO® BLAZE-SHIELD® II - 67% Pre-consumer:

- Total Recycled content for this credit is 33.5%

CAFCO® BLAZE-SHIELD® II HS/HP - 56% Pre-consumer:

- Total Recycled content for this credit is 28%

CAFCO® 300/300AC/300HS/300SB/300ES/304 - 10% Post-consumer:

- Total Recycled content for this credit is 10%

CAFCO® 3000/3000ES - 10% Post-consumer:

- Total Recycled content for this credit is 10%

CAFCO® 400/400AC/400ES - 10% Post-consumer:

- Total Recycled content for this credit is 10%

CAFCO-BOARD® - >70% Pre-consumer:

- Total Recycled content for this credit is >35%

CAFCO® HEAT-SHIELD® - 90% Pre-consumer:

- Total Recycled content for this credit is 45%

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

MATERIALS AND RESOURCES

MR Credit 4 – [Building Product Disclosure and Optimization – Material Ingredients](#)

1 POINT

Intent:

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements:

Option 1 (1 point) credit is provided if 20 products in the building disclose chemical ingredients in their products using acceptable methodology, including a Health Product Declaration (HPD), or other approved programs, such as a Declare product label. The products must demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

How Isolatek Contributes:

Isolatek currently provides a self-declared Health Product Declaration (HPD) for all of its Applied Fireproofing and Intumescent Fireproofing materials, along with [Declare labels](#).

Products that Contribute:

- CAFCO[®] 300 Series Products [HPD, Declare Label]
- CAFCO[®] 400 Series Products [HPD, Declare Label]
- CAFCO[®] BLAZE-SHIELD[®] Series Products [HPD, Declare Label]
- CAFCO[®] FENDOLITE[®] Products [HPD, Declare Label]
- CAFCO[®] SprayFilm[®] Intumescent Coatings [HPD, Declare Label]

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

INDOOR ENVIRONMENTAL QUALITY

EQ Credit 2 – Indoor Environmental Quality - Low Emitting Materials

UP TO 5 POINTS

Intent:

To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

Requirements:

This credit includes requirements for volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined.

To meet the general emissions requirements, the products must comply with California Department of Public Health (CDPH) Standard Method v1.1.

To meet the VOC content requirements, the wet applied paints and coatings must meet the applicable VOC content limits of the California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113.

How Isolatek Contributes:

Isolatek has evaluated its products to EPA, Method 24, which is the acceptable method for determining VOC Content (*VOC Content listed on Page 9*). Isolatek has also evaluated its products for VOC Emissions in accordance with CDPH Standard Method v1.1.

Products that Contribute:

- CAFCO® 300 Series Products [VOC Content, VOC Emissions]
- CAFCO® 400 Series Products [VOC Content, VOC Emissions]
- CAFCO® BLAZE-SHIELD® Series Products [VOC Content, VOC Emissions]
- CAFCO® FENDOLITE® Products [VOC Content, VOC Emissions]
- CAFCO® SprayFilm® Intumescent Coatings [VOC Content, VOC Emissions]

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

MANUFACTURING LOCATIONS

CAFCO® 300, 304, SB, AC, HS, ES; CAFCO® 3000, ES; CAFCO® 400, AC, ES; CAFCO® FENDOLITE M-II, TG, M-II/P; CAFCO® SOUND-SHIELD® 40:

- Stanhope, New Jersey
- Houston, Texas
- San Bernardino, California

CAFCO® BLAZE-SHIELD® II, II HS, HP; CAFCO® HEAT-SHIELD®:

- Huntington, Indiana

CAFCO-BOARD®:

- Wabash, Indiana

CAFCO SprayFilm WB 3, WB 4, WB 5, Topseal; CAFCO BOND-SEAL:

- Lawrence, Massachusetts

VOC CONTENT (EPA, METHOD 24)

CAFCO® SprayFilm® WB 3:

- <13.0 g/L (<0.11 lb/gal)

CAFCO® SprayFilm® WB 4:

- <13.0 g/L (<0.11 lb/gal)

CAFCO® SprayFilm® WB 5:

- 0.0 g/L (0.0 lb/gal)

CAFCO® SprayFilm® Topseal®:

- <24.0 g/L (0.20 lb/gal)

CAFCO® BOND-SEAL®:

- 0.0 g/L (0.0 lb/gal)

CAFCO® BLAZE-SHIELD® II, II HS, HP:

- 0.0 g/L (0.0 lb/gal)

CAFCO® 300, 304, SB, AC, HS:

- 0.0 g/L (0.0 lb/gal)

CAFCO® 400:

- 0.0 g/L (0.0 lb/gal)

CAFCO® 3000:

- 8.1 g/L (<0.07 lb/gal)

CAFCO® 400, AC:

- 8.1 g/L (<0.07 lb/gal)

CAFCO® FENDOLITE® M-II, TG, M-II/P:

- 0.0 g/L (0.0 lb/gal)

Isolatek International's Contributions to LEED v4 New Construction and Major Renovation

RAW MATERIAL SOURCING

Please contact Isolatek Technical Services Department at 800-631-9600 or technical@isolatek.com in order to obtain extraction locations for the following ingredients that are pertinent to the following CAFCO® products.

CAFCO® 300, 304, SB, AC, HS, ES; CAFCO® 3000, ES; CAFCO® 400AC, ES:

- Stucco/Gypsum Plaster
- Cellulose⁺

CAFCO® 400:

- Portland Cement
- Cellulose⁺

CAFCO® FENDOLITE M-II, TG, M-II/P; CAFCO® SOUND-SHIELD® 40:

- Portland Cement

CAFCO® BLAZE-SHIELD® II, II HS, HP; CAFCO® HEAT-SHIELD®:

- Portland Cement
- Mineral Wool⁺⁺

CAFCO-BOARD®:

- Mineral Wool⁺⁺

CAFCO® SprayFilm WB 3, WB 4, WB 5, Topseal; CAFCO® BOND-SEAL:

- N/A

⁺ Contributes to Post-Consumer Recycled Content

⁺⁺ Contributes to Pre-Consumer (formerly Post-Industrial) Recycled Content

USEFUL LINKS & RESOURCES

LEED | U.S. Green Building Council (USGBC):

- <http://www.usgbc.org/leed>

LEEDuser:

- <http://www.leeduser.com/browsev4>

HPD Collaborative:

- <http://www.hpd-collaborative.org/leed-v4-credit-achievement>

Distance Calculators:

- <https://www.freemaptools.com/how-far-is-it-between.htm>
- <http://tjpeiffer.com/crowflies.html>



Isolatek International provides passive fireproofing materials under the CAFCO® trademark throughout the Americas and other markets and under the ISOLATEK® trademark throughout the world.

800.631.9600 or 973.347.1200
www.isolatek.com | technical@isolatek.com



5/19

CAFCO[®] 300 AC Manufacturer's Certificate

We are submitting the following information regarding the application of CAFCO[®] 300 AC Spray-Applied Fire Resistive Material (SFRM):

CAFCO 300 AC has been tested for fire endurance by Underwriters Laboratories (UL) in accordance with ANSI/ UL 263, ASTM E119. From these tests, various hourly ratings for floor/ceiling, beam, column and roof/ceiling assemblies have been developed. These tests are summarized in the form of fire resistance designs, and are published in the current UL Fire Resistance Directory.

CAFCO 300 AC has been tested in accordance with ASTM E84 (UL 723), and has been classified as to the following Surface Burning Characteristics:

Flame Spread: 0
Smoke Developed: 0

CAFCO 300 AC, if applied and used only in such a manner as Isolatek International specifies and recommends in writing shall meet and exceed the following Standard Performance Guidelines based on MasterSpec[®], Section 078100 APPLIED FIREPROOFING:

1. Shall yield an average 15 pcf (240 kg/m³)* density when tested in accordance with ASTM E605, "Standard Test Methods for Thickness and Density of Sprayed Fire Resistive Material Applied to Structural Members".
2. Shall not crack, spall or delaminate from the substrate to which it is applied when subjected to a downward deflection of 1/120th of the tested span in accordance with ASTM E759, "Effect of Deflection on Sprayed Fire Resistive Material Applied to Structural Members".
3. Shall not crack, spall or delaminate from the substrate to which it is applied when tested in accordance with ASTM E760, "Effect of Impact on Bonding of Sprayed Fire Resistive Material Applied to Structural Members".
4. Shall yield an average bond strength of 150 psf (7.2 kPa) when applied at an average 15 pcf density and tested in accordance with ASTM E736, "Cohesion/Adhesion of Sprayed Fire Resistive Material Applied to Structural Members".
5. Shall yield an average compressive strength of 750 psf (35.9 kPa) when compressed 10 percent and tested in accordance with ASTM E761, "Compressive Strength of Sprayed Fire Resistive Material Applied to Structural Members".
6. Shall not yield more than 0.025 g/ft² (0.27 g/m²) weight loss when tested in accordance with ASTM E859, "Test Method for Air Erosion of Sprayed Fire Resistive Material Applied to Structural Members".
7. Shall meet the corrosion resistance requirements of ASTM E937, "Standard Test Method for Corrosion of Steel by Sprayed Fire Resistive Material Applied to Structural Members".

8. Shall be considered Noncombustible when tested in accordance with ASTM E136, "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C".

CAFECO 300 AC is formulated with a mold inhibitor, which is included in the product at the time of manufacturing. CAFECO 300 AC is tested and meets the criteria of ASTM G-21. In accordance with the test, it does not promote the growth of bacteria or fungi.

All CAFECO products are formulated and manufactured free of asbestos and/or asbestos containing materials.

Refer to the product Technical Data Sheets for Product Description, Fire Test Performance, Code Compliance, and Major Specification Approvals.

** Shall yield an average density of 17.5 pcf when applied to cellular steel floor and form units in protected deck floor / ceiling assemblies.*

We trust this information will be of assistance to you. Please do not hesitate to contact the undersigned at (973) 347-1200 if you should have any further questions regarding this subject.

Sincerely,



Daniel Eehalt
Sr. Technical Services Manager
CAFECO® Fire Protection Products

CERTIFICATE OF COMPLIANCE

Certificate Number 20190507-R13348
Report Reference R13348
Issue Date 2019-May-07

Issued to: Isolatek International
41 FURNACE ST
STANHOPE, NJ 07874-2624 USA

**This certificate confirms that
representative samples of**

Spray-applied Fire-resistive Materials
Types CP-2, P-20, PC, DC/F, II, II HS, 280, 304, 404, HP,
300, SB, 300AC, 300ES, 300HS, 300N, 3000, 3000ES,
400AC, 400ES, 400, 800, M-II, M-II/P and TG

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 263, "Fire Tests of Building Construction and
Materials,"
ANSI/UL 1709, "Rapid Rise Fire Tests of Protection
Materials for Structural Steel."

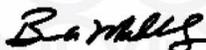
Additional Information: See the UL Online Certifications Directory at
<https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up
Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's
Follow-Up Services.

Look for the UL Certification Mark on the product.

See addendum page 2-5



Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please
contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



CERTIFICATE OF COMPLIANCE

Certificate Number 20190507-R13348
Report Reference R13348
Issue Date 2019-May-07

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Types DC/F, HP, II or II HS Spray-Applied Fire Resistive Materials investigated for exterior use in:

Floor-Ceiling Design Nos. A811, A815, D814, D816, D822, D824, D825, D826, D827, D829, D830, D831, D832, D833, D835, D836, D837, D840, D846, D847, D858, D859, D860, D861, D862, D865, D867, D868, D871, D902, D904, D908, D913, D914, D919, D921, D924, D926, D942, D947, D974, D977, D984, D988, D991, E701, E702, E706, G801, G802, G805, G809, J801, J803, J804, J805, J809, J957 and

Roof-Ceiling Design Nos. P301, P801, P807, P810, P811, P812, P815, P819, P822, P825, P826, P901, P902, P907, P908, P920, P922, P923 and

Beam Design Nos. N803, N804, N805, N814, N815, N816, N820, N823, N824, N825, N826, N830, N860, N868, N869, S801, S802, S803, S805, S806, S812 and

Wall Design Nos. U357, U401, U431, U450, U804 and

Column Design Nos. X525, X827, X829, X835, X840, X841.

Types CP-2, P-20 Spray-Applied Fire Resistive Materials for use in:

Floor-Ceiling Design Nos. D764, D922, G709, J711 and

Roof-Ceiling Design Nos. P722, P726, P731, P925 and

Beam Design Nos. N765, N767, S727, S730 and

Column Design Nos. X798, X799, Y705.

Type PC Pre-Coat for use in:

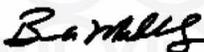
Floor-Ceiling Design Nos. D759, D860, G705, J708, J710, J804, J805, J809.

Type 280 Spray-Applied Fire Resistive Materials for use in

Floor-Ceiling Design Nos. D755, D902, D974, D976, D977, J708 and

Roof-Ceiling Design Nos. P713, P901, P902, P907, P908, P920, P922, P923 and

Beam Design Nos. N735, N761, S729 and



Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



CERTIFICATE OF COMPLIANCE

Certificate Number 20190507-R13348
Report Reference R13348
Issue Date 2019-May-07

Column Design No. X790.

Types 304 and 404 Spray-Applied Fire Resistive Materials for use in:

Floor-Ceiling Design Nos. D796, G716, J725 and

Wall Design No. U706.

Types 300, SB, 300AC, 300ES, 300HS, 300N, 3000, 3000ES, 400AC, 400ES Spray-Applied Fire Resistive Materials for use in:

Floor-Ceiling Design Nos. D759, D797, D799, D859, D860, D902, D904, D921, D942, D947, D974, D976, D977, D984, D988, D991, G705, G717, J708, J710, J804, J805, J809, J957, L701 and

Roof-Ceiling Design Nos. P301, P675, P676, P719, P723, P744, P752, P826, P901, P902, P907, P908, P920, P922, P923 and

Beam Design Nos. N735, N743, N759, N761, N792, N869, N873, S721, S729, S751 and

Column Design Nos. X790, Y729.

Type 300AC Spray-Applied Fire Resistive Materials for use in:

Roof-Ceiling Design No. P754.

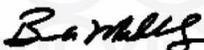
Types 300, SB may be trowel-applied provided the materials are first mixed and pumped through standard application equipment as outlined in the manufacturer's application instructions. The minimum thickness and minimum in-place density of the Types 300 and SB stated in the individual designs shall be maintained.

Types 300AC, 300ES, 300HS, 3000, 3000ES, 400AC, 400ES must be used with Type Isolatek Qwik-Set® accelerator in accordance with the manufacturers mixing instructions. Types 300, SB, and 300N may optionally use Type Isolatek Qwik-Set® accelerator.

Type 400 Spray-Applied Fire Resistive Material for use in:

Floor-Ceiling Design Nos. D759, D799, D859, D860, D902, D904, D921, D942, D947, D974, D976, D977, D984, D988, D991, G705, G717, J708, J710, J804, J805, J809, J957, L701 and

Roof-Ceiling Design Nos. P675, P676, P719, P723, P744, P752, P826, P901, P902, P907, P908, P920, P922, P923 and



Bruce Mahrenholz, Director North American Certification Program

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CERTIFICATE OF COMPLIANCE

Certificate Number 20190507-R13348
Report Reference R13348
Issue Date 2019-May-07

Beam Design Nos. N735, N743, N759, N761, N792, N873, S721, S729, S751 and
Column Design No. X790.

Type 400 may be trowel-applied provided the materials are first mixed and pumped through standard application equipment as outlined in the manufacturer's application instructions. The minimum thickness and minimum in-place density of the Type 400 stated in the individual designs shall be maintained.

Type 800 Spray-Applied Fire Resistive Material investigated for exterior use in:

Floor-Ceiling Design Nos. D744, D974 and

Roof-Ceiling Design Nos. P819, P908 and

Beam Design Nos. N742, N760, S720 and

Column Design No. Y714.

Types M-II, TG Spray-Applied Fire Resistive Materials investigated for exterior use, and additionally evaluated for acid and solvent spray exposure in:

Floor-Ceiling Design Nos. D744, D759, D781, D799, D902, D922, D974, D976, D977, D988, G717, J809 and

Roof-Ceiling Design Nos. P720, P721, P819, P826, P908, P922 and

Beam Design Nos. N742, N743, N755, N759, N760, N761, N792, S720, S723, S751 and

Column Design Nos. X764, X768, XR704, XR729, XR730.

As an alternate to spraying, Type M-II may be machine mixed and trowel applied as an alternate to spraying. The minimum thickness and minimum in-place density of the Type M-II stated in the individual designs shall be maintained.

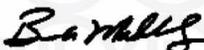
Type M-II/P Spray-Applied Fire Resistive Material investigated for exterior use, and additionally evaluated for acid and solvent spray exposure in:

Floor-Ceiling Design Nos. D744, D759, D799, D902, D988, G717.

Beam Design Nos. N742, N743, N759, N761, N792, S751 and

Column Design Nos. X764, X768, XR704, XR723, XR725, XR729, XR730, XR739.

Roof-Ceiling Design, No. P819



Bruce Mahrenholz, Director North American Certification Program

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CERTIFICATE OF COMPLIANCE

Certificate Number 20190507-R13348
Report Reference R13348
Issue Date 2019-May-07

As an alternate to spraying, Type M-II/P may be machine mixed and trowel applied as an alternate to spraying. The minimum thickness and minimum in-place density of the Type M-II/P stated in the individual designs shall be maintained.

Types D-C/F, II, II HS, HP, 300, SB, 300AC, 300ES, 300HS, 300N, 3000, 3000ES, 400AC, 400ES and 400 Spray-Applied Fire Resistive Materials for application with or without Type EBS or Type X adhesive/sealer. Refer to specific Design to determine if Type EBS or Type X adhesive/sealer is required. For information on Type EBS or Type X adhesive/sealer refer to Adhesives category (BYWR), Isolatek International.



Bruce Mahrenholz, Director North American Certification Program

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UL Solutions Evaluation Report

UL ER13348-01

Issued: 2016-08-23

Revised: 2024-12-11

Visit the UL Solutions [Product iQ® database](#) for current status of report.

UL Category Code: ULFE – Fire and Smoke Protection

CSI MasterFormat®

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION

Sub-level 2: 07 80 00 – Fire and Smoke Protection

Sub-level 3: 07 81 00 – Applied Fireproofing

Sub-level 4: 07 81 16 – Cementitious Fireproofing

Sub-level 4: 07 81 23 – Intumescent Fireproofing

Company:

Isolatek International

41 Furnace St.

Stanhope, NJ 07874

973-347-1200

www.isolatek.com



UL Solutions Evaluation Report

1. Subject

	Product Trade Name	UL Product Designation
Spray-Applied Fire Resistant Materials	CAFCO® BLAZE-SHIELD® II	Type II
	CAFCO® BLAZE-SHIELD® II HS	Type II HS
	CAFCO® BLAZE-SHIELD® HP	Type HP
	CAFCO® 300	Type 300
	CAFCO® 300 AC	Type 300AC
	CAFCO® 300 HS	Type 300HS
	CAFCO® 300 ES	Type 300ES
	CAFCO® 300 SB	Type SB
	CAFCO® 400	Type 400
	CAFCO® 400 AC	Type 400AC
	CAFCO® 400 ES	Type 400ES
	CAFCO® 3000	Type 3000
	CAFCO® 3000 ES	Type 3000ES
	CAFCO® FENDOLITE® M-II	Type M-II
Hand-Applied Fire-Resistant Materials	CAFCO® FIBER-PATCH	Type P
	CAFCO® FENDOLITE® TG	Type TG
Adhesives/Additives	CAFCO® BOND-SEAL	Type EBS
	CAFCO® PRE-COAT	Type PC
	ISOLATEK® QWIK-SET®	
Intumescent Fire-Resistant Coatings	CAFCO® SprayFilm® WB 3	Type SprayFilm-WB 3, Type WB 3
	CAFCO® SprayFilm® WB 4	Type SprayFilm-WB 4, Type WB 4
	CAFCO® SprayFilm® WB 5	Type SprayFilm-WB 5, Type WB 5
	FIRE SOLVE SB	Type FIRE SOLVE SB

2. Scope of evaluation

- 2024, 2021, 2018, 2015, 2012, 2009, 2006 *International Building Code*® (IBC)
- ICC-ES Acceptance Criteria for Sprayed Fire-Resistant Materials (SFRMs), Intumescent Fire-Resistant Coatings and Mastic Fire-Resistant Coatings Used to Protect Structural Steel Members (AC23), dated December 2012
- ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated January 2019

The products were evaluated for the following properties:

- Fire Resistance (ANSI/UL 263, ASTM E119)
- Surface Burning Characteristics (ANSI/UL 723, ASTM E84)
- Tensile Bond (ASTM E736)
- Steel Deck Deflection (ASTM E759)
- Impact Resistance (ASTM E760)
- Compressive Strength (ASTM E761)
- Air-stream Resistance (ASTM E859)
- Mold Growth and Humidity Resistance (ASTM G21)
- Environmental Exposures (ANSI/UL 263, ASTM E119)

3. Referenced documents

- ANSI/UL 263 (ASTM E119), Fire Tests of Building Construction and Materials
- ANSI/UL 723 (ASTM E84), Test for Surface Burning Characteristics of Building Materials
- ASTM E736, Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
- ASTM E759, Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
- ASTM E760, Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
- ASTM E761, Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
- ASTM E859, Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
- ASTM G21, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

4. Uses

CAFECO® BLAZE-SHIELD® II, CAFECO® BLAZE-SHIELD® II HS, BLAZE-SHIELD® HP, 300, 300 AC, 300 HS, 300 ES, 300 SB, 400, 400 AC, 400 ES, 3000, 3000 ES, and FENDOLITE® M-II are spray-applied fire resistive materials (SFRMs) intended for use in steel roof and floor assemblies and on structural steel beams, joists, columns, trusses, and walls.

CAFECO® FIBER-PATCH is a hand or trowel-applied fire resistive material intended for use for patching the CAFECO® BLAZE-SHIELD® II, CAFECO® BLAZE-SHIELD® II HS, BLAZE-SHIELD® HP, 300, 300 AC, 300 HS, 300 ES, 300 SB, 400, 400 AC, 400 ES, 3000, 3000 ES spray-applied materials. FENDOLITE® TG is a hand or trowel-applied fire resistive material intended for use in steel roof and floor assemblies and on structural steel beams, joists, columns, and trusses, for patching the FENDOLITE® M-II spray-applied material.

CAFECO® FENDOLITE® M-II and TG have been evaluated for exterior use in accordance with AC23. CAFECO® BOND-SEAL, CAFECO® PRE-COAT, and ISOLATEK QWIK-SET are additional materials that may be used in conjunction with several of the SFRMs covered in this report, to aid in the application process.

CAFECO® SprayFilm® WB 3, CAFECO® SprayFilm® WB 4, CAFECO® SprayFilm® WB 5 and FIRESOLVE SB are intumescent fire resistive materials (IFRMs) that are applied to structural steel beams, columns and floor assemblies for use as fire protection.

5. Product description

5.1 Spray-Applied Fire Resistive Materials

The spray-applied and hand-applied fire resistive materials covered in this report are of various densities that are specified in the UL Fire-Resistive Designs listed on the CHPX.R13348 Classification Card.

In general, CAFECO® BLAZESHIELD® II, CAFECO® BLAZE-SHIELD® II HS, 300, 300 AC, 300 HS, 300 ES, 300 SB, 3000, and 3000 ES are commercial density products for use in construction applications. The CAFECO® BLAZESHIELD® HP, 400, 400 AC, and 400 ES are medium density SFRMs for use in construction applications. CAFECO® FENDOLITE® M-II and FENDOLITE® TG are high density SFRMs for use in construction applications and are acceptable for use in exterior locations.

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CAFECO® FIBER-PATCH may be used to hand patch CAFECO® BLAZESHIELD® II, II HS, HP, 300, 300 AC, 300 HS, 300 ES, 300 SB, 3000, 3000 ES, 400, 400 AC, and 400 ES products. CAFECO® FENDOLITE® TG may be used to hand patch FENDOLITE® M-II. Refer to guidelines for patching specified in the CHPX.R13348 Classification Card.

CAFECO® BOND-SEAL is an off-white liquid adhesive/sealant required in specific applications, as identified in the designs listed in the CHPX.R13348 UL Classification Card. If required, it shall be applied to the substrate prior to patching material. It is required on all cellular decks, as well as fluted steel deck that does not contain concrete, as shown in the appropriate UL Fire-Resistive Designs listed on the CHPX.R13348 Classification Card.

CAFECO® PRE-COAT is an adhesive/primer packaged as a grey, dry powder, and is required in specific application, as identified in the designs listed in the CHPX.R13348 UL Classification Card. When required, it shall be applied before application of the following SFRMs: CAFECO® 300, 300 AC, 300 HS, 300 ES, 300 SB, 3000, 3000 ES, 400, 400 AC, or 400 ES.

ISOLATEK QWIK-SET is an off-white set accelerator in powder form that is required for the CAFECO® 300 AC, 300 HS, 300 ES, 3000, 3000ES, 400AC, and 400 ES; it is optional for CAFECO® 300 and 300 SB.

5.2 Intumescent Fire Resistive Materials

The intumescent fire resistive materials covered in this report can be applied in the various thicknesses as specified in the UL Fire-Resistive Designs listed on the CDWZ.R16640 Classification Card.

CAFECO® SprayFilm® WB 3, CAFECO® SprayFilm® WB 4 CAFECO® SprayFilm® WB 5 and FIRESOLVE SB are water-based intumescent fire-resistive coatings for installation in construction applications. CAFECO® SprayFilm® WB 3 and SprayFilm® WB 4 provide up to 4-hour fire-resistance ratings, and CAFECO® SprayFilm® WB 5 provides up to and including 3-hour fire-resistance ratings, in accordance with ANSI/UL 263.

The SFRMs and IFRMs covered in this report have a flame spread index of 25 or less and a smoke developed index of 50 or less when tested in accordance with ANSI/UL 723 (ASTM E84).

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6. Installation

6.1 General:

The SFRMs and IFRMs covered in this report must be installed in accordance with this report and the manufacturer's published installation instructions, which must be available to the applicators during installation at the jobsite.

The CAFCO® 300, 300 AC, 300 HS, 300 ES, 300 SB, 3000, 3000 ES, 400, 400 AC, 400 ES, or M-II SFRMs are mixed in a paddle or ribbon type mixer and machine-applied to the surface using varying air pressure and pumping rates to ensure accurate coverage. The products may be hand-patched using the guidelines outlined in the UL CHPX.R13348 Classification Card.

The CAFCO® BLAZE-SHIELD II, II HS, and HP materials are mixed by conditioning the material through the application equipment and pneumatically conveying it through the hose to the nozzle where mixed with water. The products may be hand-patched using CAFCO® FIBER-PATCH following the guidelines outlined in the UL CHPX.R13348 Classification Card.

CAFCO® FIBER-PATCH and FENDOLITE® TG are hand or trowel applied to the surface until the thickness required to meet the specified fire resistance rating is achieved.

The thickness and densities of each product shall comply with the requirements of the various assemblies and applications as specified in the corresponding designs listed on the CHPX.R13348 Classification Card. The materials shall be applied immediately after mixing, without retempering. The equipment and mixer shall be clean prior to mixing the material.

CAFCO® 300, 300 AC, 300 HS, 300 ES, 300 SB, 3000, 3000ES, 400AC, and 400 ES products may be injected with ISOLATEK QWIK-SET in the field, to aid in product yield and the setting process.

CAFCO® SprayFilm® WB 3, CAFCO® SprayFilm® WB 4, CAFCO® SprayFilm® WB 5 and FIRESOLVE SB are machine-applied, brush or trowel applied, after the application of approved primers on the steel surface.

6.2 Preparation of Substrate, Site and Surface Conditions

Prior to application of material, the substrate to receive the fire resistive materials shall be free of any substances or conditions that interfere with adhesion of the material, in accordance with the 2024 IBC Section 704.12.3 and 2021, 2018, 2015, 2012, 2009 IBC Section 704.13.3. Primers, paints, and encapsulants are allowed, provided they comply with the 2024 IBC Sections 704.12.3.1 and 704.12.3.2 and 2021, 2018, 2015, 2012, 2009 IBC Sections 704.13.3.1 and 704.13.3.2.

The temperature of the substrate and ambient temperature should be kept at a minimum of 40°F (4.4°C) for SFRMs before, during, and for a minimum of 24 hours after application. For the intumescent materials, the substrate and ambient temperatures should be maintained between 50°F (10°C) and 100°F (38°C) before, during, and for a minimum of 72 hours after application.

CAFCO® BOND-SEAL may be applied as an adhesive prior to the SFRM material, directly to the steel surface, or as a sealer on the surface of the SFRM material itself.

CAFCO® PRE-COAT is applied prior to SFRMs to cover approximately 70% of the steel surface, as required by the relevant designs specified on the CHPX.R13348 Classification Card. Thickness of the PRE-COAT is included in the total final thickness of the SFRM.

If minimum bond strengths are not met at the jobsite, and for wide flange structural steel shape dimensions that do not meet the conditions specified in 2024 IBC Section 704.12.3.2 and 2021, 2018, 2015, 2012, 2009 IBC Section 704.13.3.2 for allowing primers, paints, and encapsulants at the jobsite, a mechanical break is required. Refer to the various UL Fire-Resistive Designs in the CHPX.R13348, as

UL Solutions Evaluation Report

well as the Guide Information Card for UL Category Code BXUV for specific requirements on the required mechanical break to facilitate the spray application of SFRMs.

6.3 Fire Resistive Assemblies

The SFRMs covered in this report shall be installed as specified in one or more of the UL Fire-Resistive Designs listed in the CHPX.R13348 Classification Card, for each of the corresponding SFRMs. The IFRMs in this report shall be installed as specified in one or more of the UL Fire-Resistive Designs listed in the CDWZ.R16640 Classification Card, for each of the corresponding IFRMs. Refer to the table in Section 1 of this report for the UL Product Designation for each Trade Name.

6.4 Thickness Tolerances

6.4.1 Spray-Applied Fire Resistive Materials

The minus tolerance of the SFRM thickness must be no greater than 1/4 inch (6.4 mm), or 25% of a design thickness of less than 1 inch (25.4 mm). When applicable, additional material must be applied to meet this tolerance.

When an individually measured SFRM thickness exceeds the design thickness by 1/4 inch (6.4 mm) or more, the thickness shall be recorded as the design thickness plus 1/4 inch (6.4 mm).

6.4.2 Intumescent Fire Resistive Materials

The minus tolerance of any individual IFRM thickness must be no less than 80% of the thickness specified in the applicable designs. When applicable, additional material must be applied to meet this tolerance.

When an individually measured IFRM thickness exceeds the design thickness by 20% or more, the thickness shall be recorded as the design thickness plus 20%. The average thickness shall not exceed the maximum tested thickness specified in the applicable designs by more than 10%.

6.5 Special Inspections

Special inspections are required for the SFRMs covered in this report, in accordance with 2024 and 2021 Section 1705.15, 2018 and 2015 IBC Section 1705.14, 2012 IBC Section 1705.13, 2009 IBC Section 1704.12, or 2006 IBC Section 1704.10.

Special inspections are required for the IFRMs covered in this report, in accordance with 2024 and 2021 IBC Section 1705.16, 2018 and 2015 IBC Section 1705.15, 2012 IBC Section 1705.14, 2009 IBC Section 1704.13, or 2006 IBC Section 1704.11.

6.6 Physical Protection

The CAFCO® FENDOLITE® M-II and TG may be applied on exposed structural shapes less than 8 ft (2438 mm) from a floor, landing, or occupied space.

Where SFRMs are applied to a structural member and are subject to impact damage, the structural members shall be protected with FENDOLITE® M-II or TG applied at the required thickness in accordance with the fire-resistive design, or the fire resistive material shall be protected by corner guards or any other substantial jacket of metal or noncombustible material to at least 5 ft (1524 mm) from the finished floor, in accordance with 2024 IBC Section 704.8 or 2021, 2018, 2015, 2012, 2009 IBC Section 704.9, or 2006 IBC Section 714.4.

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7. Conditions of use

7.1 General:

The fire-resistive materials described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 2 of this report, subject to the following conditions:

- 7.2 The products must be manufactured, identified, and installed in accordance with this report, the manufacturer's published installation instructions, and the applicable code. If there is a conflict between the manufacturer's installation instructions and this report, the report governs.
- 7.3 All assemblies shall be built in accordance with the applicable published UL designs, or as otherwise described in this report.
- 7.4 The density, thickness, and bond strength of the fire-resistive materials in this report must be measured in accordance with 2024 and 2021 IBC Section 1705.15, 2018 and 2015 IBC Section 1705.14, 2012 Section 1705.13, 2009 IBC Section 1704.12, or 2006 IBC Section 1704.10.
- 7.5 The CAFCO® 300 ES, CAFCO® 300 HS, and CAFCO® BLAZESHIELD® II HS SFRMs recognized in this report have been evaluated for use in high-rise buildings up to 420 feet (128) in height in accordance with 2024 and 2021 IBC Section 403.2.3 and Table 403.2.3 and 2018, 2015, 2012, 2009 IBC Section 403.2.4 and Table 403.2.4.
- 7.6 The CAFCO® BLAZESHIELD® HP, 400, 400 AC, 400 ES, 3000, 3000 ES, and FENDOLITE® M-II SFRMs recognized in this report have been evaluated for use in high-rise buildings up to and greater than 420 feet (128 m) in height in accordance with 2024 and 2021 IBC Section 403.2.3 and Table 403.2.3 and 2018 and 2015 IBC Section 403.2.4 and Table 403.2.4.
- 7.7 See UL Solutions Product iQ® under UL File R13348 for Spray-applied Fire-Resistive Materials ([CHPX](#)) evaluated as a part of fire-resistance-rated assemblies in accordance with ANSI/UL 263.
- 7.8 See UL Solutions Product iQ® UL File R13348 for Mastic and Intumescent Coatings ([CDWZ](#)) evaluated as a part of fire-resistance-rated assemblies in accordance with ANSI/UL 263.
- 7.9 The fire resistive materials covered in this Evaluation Report are manufactured by Isolatak International, located at the manufacturing location(s) named below, under the UL LLC Listing/Classification and Follow-Up Service Program, which includes inspections in accordance with the quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC 10.

Plant Location
Huntington, IN
Stanhope, NJ
Houston, TX
San Bernardino, CA
Lawrence, MA
Federalsburg, MD

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8. Supporting evidence

- 8.1 Manufacturer's product literature and installation instructions.
- 8.2 Data in accordance with ICC-ES Acceptance Criteria for Quality Documentation (AC10)
- 8.3 Data in accordance with ICC-ES Acceptance Criteria for Sprayed Fire-Resistant Materials (SFRMs), Intumescent Fire-Resistant Coatings and Mastic Fire-Resistant Coatings Used to Protect Structural Steel Members (AC23)
- 8.4 UL Classification reports in accordance with ANSI/UL 263. See UL Product Certification Category, Spray-applied Fire-Resistive Materials ([CHPX](#)).
- 8.5 UL Classification reports in accordance with ANSI/UL 263. See UL Product Certification Category, Mastic and Intumescent Coatings ([CDWZ](#)).
- 8.6 UL Classification reports in accordance with ANSI/UL 723. See UL Product Certification Category, Cementitious Cement and Plaster Mixtures ([BLPR](#)).
- 8.7 Data in accordance with ASTM E84.

9. Identification

The products described in this evaluation report are identified by a marking bearing the report holder's name, Isolatek International, the plant identification, the UL Listing/Classification Mark, and the evaluation report number UL ER13348-01. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Listing/Classification Mark certificate.

10. Use of UL Evaluation Report

- 10.1 The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.
- 10.2 UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- 10.3 The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via UL Solutions Product iQ® :

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UL Solutions Headquarters
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
T: 847.272.8800
[UL.com/Solutions](https://www.ul.com/Solutions)

BXUV.P723

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

[See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States Design Criteria and Allowable Variances](#)

[See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada Design Criteria and Allowable Variances](#)

Design No. P723

Restrained Assembly Ratings — 1, 1-1/2, 2 and 3 Hr
(See Items 3 and 8)

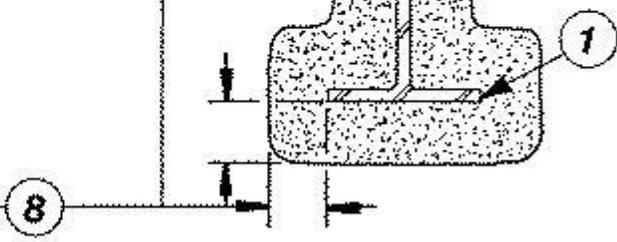
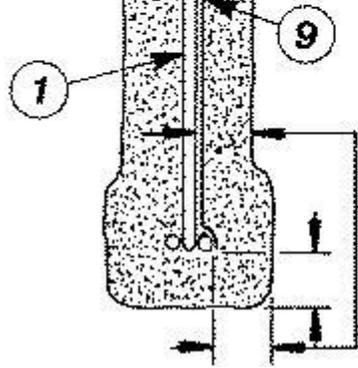
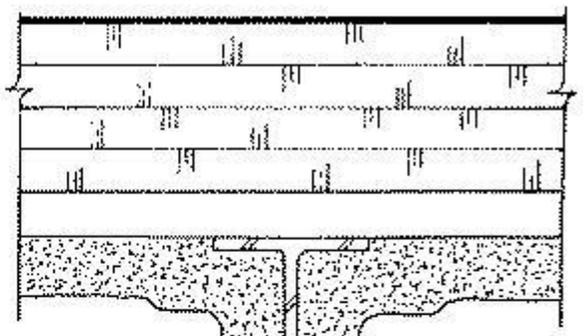
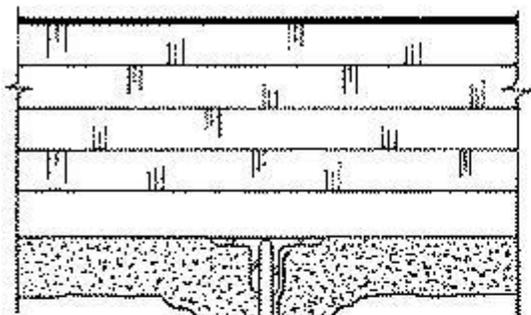
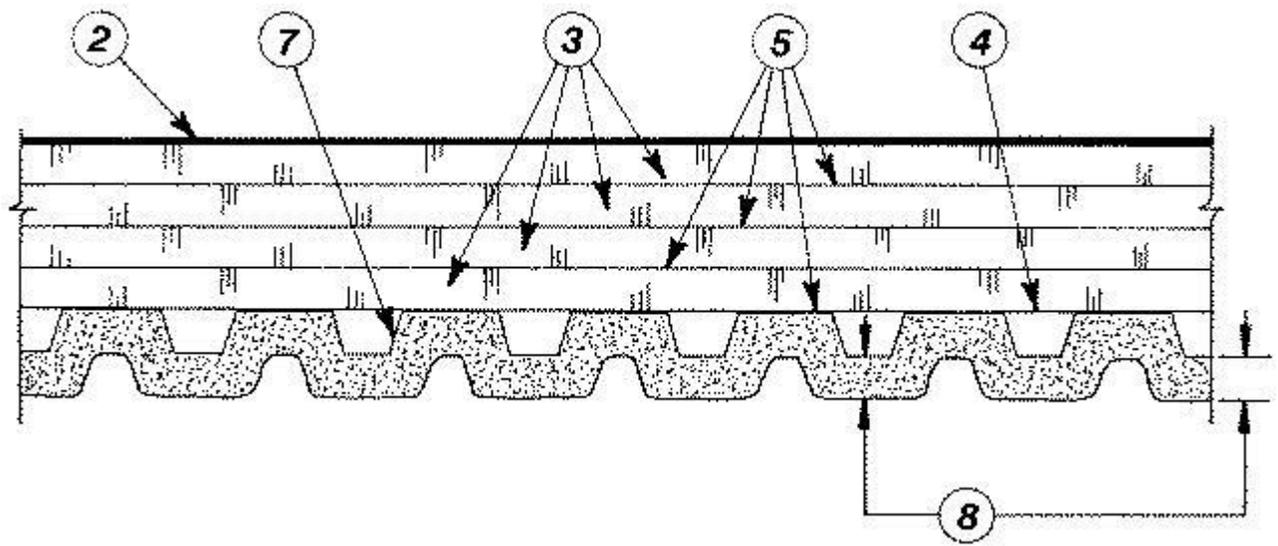
Unrestrained Assembly Ratings — 1, 1-1/2, 2 and 3 Hr
(See Items 3 and 8)

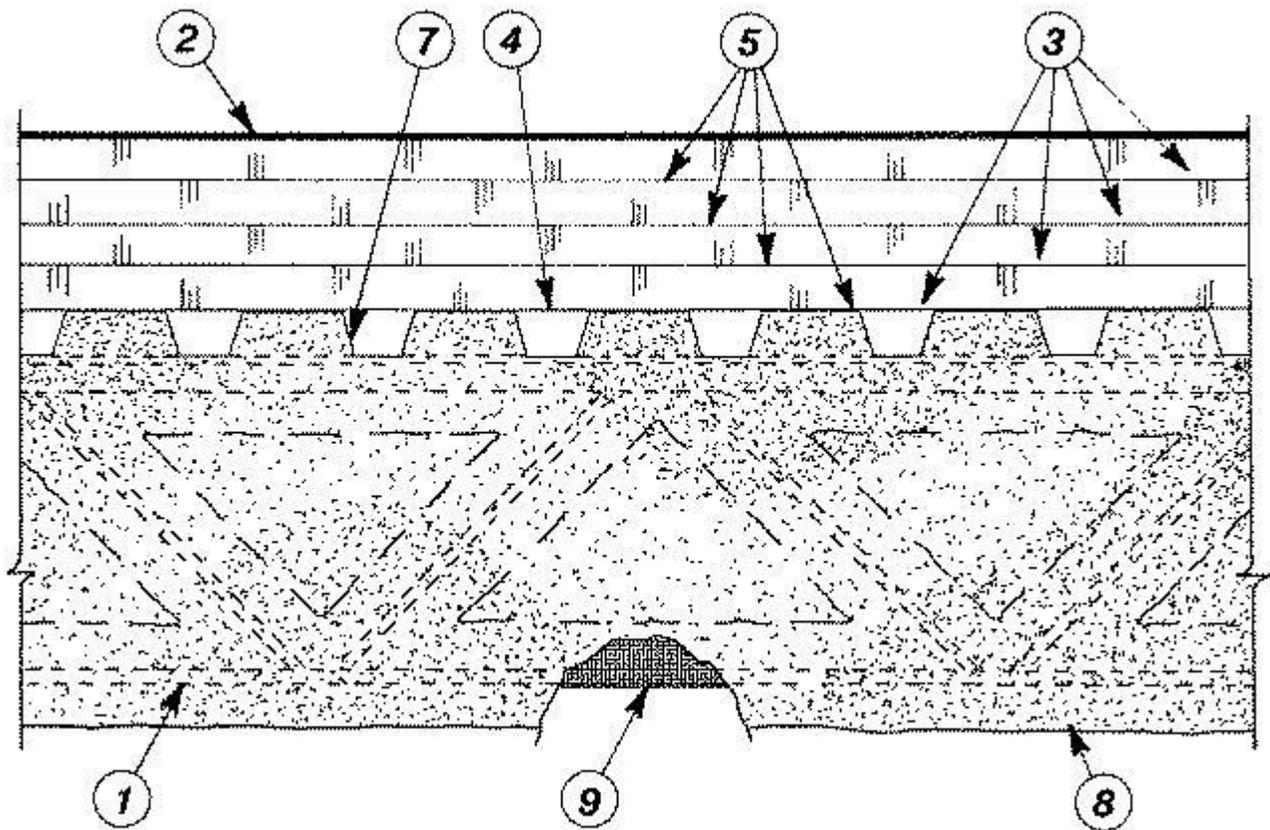
Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr.
(See Items 3 and 8)

Restricted Load Condition — See Item 8

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide [BXUV](#) or [BXUV7](#)

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**





1. **Steel Supports** — W6x16 steel beam, 10K1 or 12K5 steel joists min size (See Item 8).

2. **Roof Covering** — Consisting of hot mopped or cold application bituminous materials compatible with the insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).

2A. **In lieu of Item 2, roof covering consisting of single-ply Roofing Membranes*** — that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Roofing Membranes (CHCI) category for names of manufacturers.

2B. **Metal Roof Deck Panels** — (Not Shown) — In addition to or in lieu of items 2 or 2A, the Roof Covering may consist of mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory — Metal Roof Deck Panels (CETW).

3. **Roof Insulation — Foamed Plastics*** — 36 by 48 in. (min size) polyisocyanurate foamed plastic insulation boards applied in one or more layers. Min thickness is 2.0 in. (No limit on max overall thickness.) Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints. Polyisocyanurate foamed plastic insulation may be installed over a max 1 in. thick layer of Mineral and Fiber Boards* (Item 3B) with each layer offset in both directions as described above.

ATLAS ROOFING CORP — AC Foam II, Tapered AC Foam II, AC Foam II NH, Tapered AC Foam II NH, AC Foam III, AC Foam III NH, Tapered AC Foam III NH, AC Foam IV, AC Foam Supreme, AC Foam Supreme NH, AC Foam Recover Board, AC Foam Recover Board NH

MULE-HIDE PRODUCTS CO INC — POLY ISO 2

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Types HP, HP-H, HP-N, HP-W, SecurShield CD, InsulBase NH, SecurShield NH, SecurShield HD Composite NH, Polyiso HP-F NH, InsulBase RL, SecurShield RL, Polyiso HP-F.

DOW ROOFING SYSTEMS L L C — "Dow Termico Polyisocyanurate Insulation", "Dow Termico ISO 3000 Insulation", "Dow Termico ISO HP-FR".

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ GL", "ISO 95+ FK", "ISO 95+ CAN", "ISO 95+ GL NH", "ISOGARD HD Composite Board", "RESISTA", "ISOGARD GL", "ISOGARD CG".

GAF — EnergyGuard™ RA

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H Shield, H-Shield-F, H-Shield-CG, H-Shield-C, H-Shield Premier, H-Shield HD Composite, H-Shield HD Composite CG, H-Shield RL, H-Shield CG RL, H Shield NH, H-Shield-F NH, H-Shield-CG NH, H-Shield-C NH, H-Shield Premier NH, H-Shield HD Composite CG NH.

MULE-HIDE PRODUCTS CO INC — Poly ISO 1, Tapered Poly ISO 1, Poly ISO 1-DWD, Tapered Poly ISO 1-DWD, Poly ISO 1-HD, Poly ISO 1-HD90, Poly ISO 1-HD-Composite

JOHNS MANVILLE — ENRGY 3 25 psi, ENRGY 3, Tapered ENRGY 3, Tapered ENRGY 3 25 psi, ENRGY 3 AGF, Tapered ENRGY 3 AGF, ENRGY 3 25 psi AGF, Tapered ENRGY 3 25 psi AGF, ENRGY 3 CGF, Tapered ENRGY 3 CGF, ENRGY 3 25 psi CGF, Tapered ENRGY 3 25 psi CGF, ISO-3, Tapered ISO-3, ValuTherm, Tapered ValuTherm, ValuTherm 25 psi, Tapered ValuTherm 25 psi, ValuTherm AGF, Tapered ValuTherm AGF, ValuTherm 25 psi AGF, Tapered ValuTherm 25 psi AGF, ValuTherm CGF, Tapered ValuTherm CGF, ValuTherm 25 psi CGF, Tapered ValuTherm 25 psi CGF.

LOADMASTER SYSTEMS INC — Loadmaster Polyisocyanurate Insulation.

MARTIN FIREPROOFING CORP — "Perform-A-Deck I"

RMAX, A BUSINESS UNIT OF SIKA CORPORATION — Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, Tapered Thermarroof-3, Tapered Thermarroof FA-3, Tapered Ultra-Max.

SIKA SARNAFIL INC — Sarnatherm-R Insulation, Sarnatherm-R CG Insulation, Sarnatherm-R Tapered Insulation, Sarnatherm-R CG Tapered Insulation.

SOPREMA INC — Sopra-ISO s, Sopra-ISO s Tapered, Sopra-ISO+ s, Sopra-ISO+ s Tapered, Sopra-ISO H+ s, Sopra-ISO H+ s Tapered.

VERSICO INC — SecurShield HD Composite, WeatherBond XFP HD Composite, VersiCore MP-H NH, WeatherBond XP NH, SecurShield NH, WeatherBond XFP NH, VersiCore RL, SecurShield RL, Polyiso MP-HF NH

3A. Roof Insulation — Mineral and Fiber Boards* — (Not Shown) For 1, 1-1/2 and 2 h Ratings— As an alternate to Item 3. To be applied in one or more layers with or without adhesive applied between vapor barrier and roof deck units, vapor barrier and board and each layer of board. When more than one layer is required, each layer of board to be offset in both directions from layer below a min of 6 in. in order to lap all joints. Min thickness is 2 in. when Item 2A is used. When installed as a base layer for Item 3 (polyisocyanurate roof insulation) max thickness is 1 in.

GAF — GAFTEMP Perlite.

JOHNS MANVILLE

3B. Building Units* — (Not Shown) — As an alternate to Items 3 and 3A. Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board or plywood. For the building units, min thickness (as measured at core) of the polyisocyanurate foamed plastic insulation is 2.0 in. (No limit on max thickness). Building units to be installed with end joints staggered a min 6 in. in adjacent rows.

ATLAS ROOFING CORP — ACFoam Nail Base Insulation, ACFoam Nail Base Insulation NH, Vented-R, ACFoam CrossVent, ACFoam CrossVent NH, ACFoam III Nail Base Insulation, ACFoam III Nail Base Insulation NH, ACFoam III CrossVent, ACFoam III CrossVent NH

FIRESTONE BUILDING PRODUCTS CO L L C — Hailgard, "ISOGARD HG".

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-NB, H-Shield-NB NH

JOHNS MANVILLE — Nailboard.

SOPREMA INC — Sopra-ISO CV s.

3C. **Building Units*** — As an alternate to Items 3 through 3B, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Wood Fiberboard Composite".

JOHNS MANVILLE — ENRGY 2 Plus.

3D. **Building Units*** — As an alternate to Items 3 through 3C, polyisocyanurate foamed plastic insulation boards faced on the underside (or both sides) with mineral fiber board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Composite".

JOHNS MANVILLE — Fesco-Foam.

3E. **Building Units*** — Not Shown — As an alternate to Items 3 and 3D, composite polyisocyanurate foamed plastic insulation board with an adhered nailing surface, nom 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation, min 2 in. thick. May be installed over a max 1 in. thick layer of mineral and fiber boards (Item 3B) with joints offset a min of 6 in., in each direction. There is no limit on the max insulation thickness.

JOHNS MANVILLE — Type ISO-VENT.

3F. **Building units*** — As an alternate to Items 3 through 3E, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is 2.0 in. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

JOHNS MANVILLE — ENRGY 2 Gypsum Composite.

3G. **Foamed Plastic*** — Optional - (Not Shown) - Used in addition to the foam insulation required to achieve fire rating:

3Ga. **Foamed Plastic*** — Optional - (Not Shown) - Maximum 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

FIRESTONE BUILDING PRODUCTS CO L L C — "ISOGARD HD".

3Gb. **Foamed Plastic*** — Optional — (Not Shown) — Maximum 5/8 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

RMAX, A BUSINESS UNIT OF SIKA CORPORATION — "Ultra-Max HD"

SIKA SARNAFIL INC — Sarnatherm Roof Board-R

3Gc. **Foamed Plastic*** — Optional — (Not Shown) — Maximum 1/2 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — SecurShield HD, SecurShield HD Plus, SecurShield HD NH, SecurShield HD Plus NH, SecurShield HD RL

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield HD, H-Shield HD90, H-Shield HD RL, H-Shield HD NH, H-Shield HD90 NH

VERSICO INC — SecurShield HD Plus, WeatherBond XFP HD Plus Cover Board, SecurShield HD NH, WeatherBond XFP HD NH Cover Board, SecurShield HD Plus NH, WeatherBond XFP HD Plus NH Cover Board, SecurShield HD RL

3Gd. **Foamed Plastic*** — Optional — (Not Shown) — Maximum 1 inch thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

ATLAS ROOFING CORP — AC Foam HD CoverBoard and AC Foam CoverBoard FR

3H. **Building Units*** — (Not Shown) — As an alternate to Item 3. Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with wood fiber board. For the building units, min thickness (as measured at core) of the polyisocyanurate foamed plastic insulation is 2.0 in. (No limit on max thickness). Building units to be installed with end joints staggered a min 6 in. in adjacent rows.

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-H Composite NH

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-WF, H-Shield-WF NH

VERSICO INC — MP-HWF NH, WeatherBond XP-WF NH

3I. **Building Units*** — (Not Shown) — As an alternate to Item 3. Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with perlite composite board. For the building units, min thickness (as measured at core) of the polyisocyanurate foamed plastic insulation is 2.0 in. (No limit on max thickness). Building units to be installed with end joints staggered a min 6 in. in adjacent rows.

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-P, H-Shield-RP, H-Shield-P NH, H-Shield-RP NH

3J. **Building Units*** — (Not Shown) — As an alternate to Item 3. Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with glass mat faced gypsum panel. For the building units, min thickness (as measured at core) of the polyisocyanurate foamed plastic insulation is 2.0 in. (No limit on max thickness). Building units to be installed with end joints staggered a min 6 in. in adjacent rows.

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-HDD, Polyiso HP-HDD NH

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-DD, H-Shield-DD NH

VERSICO INC — MP-HDD, MP-HDD NH

3K. **Foamed Plastic*** — **As an alternate to Items 3 through 3F** — Polyurethane foamed plastic roof insulation. Formed by the simultaneous spraying of two liquid components applied over the gypsum wallboard (item 3L) in accordance with the manufacturer's instructions. Minimum nominal thickness is 2.0 in. with no maximum thickness.

BASF CORP — Types FE348-2.5, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81285, ELASTOSPRAY 81305, SKYTITE C1

BASF CORP — Elastospray 5100-2.0, Elastospray 5100-2.5, Elastospray 81302, Elastospray 81272, Elastospray Alpha System, Elastospray 81252.

3L. **Gypsum Board** — (Classified or unclassified) — For use with Item 3K. Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in. thick. Min weight 2.0 psf. Applied perpendicular to steel roof deck or direction with adhesive or laid loosely. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows.

See **Gypsum Board** (CKNX) category for names of manufacturers.

4. **Vapor Retarder — Sheathing Material*** — (Optional) — Vinyl film or paper scrim vapor barrier, applied to steel roof deck with adhesive (Item 5), asphalt (Item 5A) or laid loosely, overlapped approx 2 in. on adjacent sheets. See Sheathing Materials (CHIZ) category for names of manufacturers.

4A. **Sheathing Material*** — (Optional) — In lieu of Item 4, a self adhered rubberized asphalt roofing underlayment membrane which may be placed on top of the steel roof deck (Item 7).

GCP APPLIED TECHNOLOGIES INC — Grace Ice and Water Shield, Grace Ice and Water Shield-HT®, Grace Select, Grace Ultra, and Grace Basik.

5. **Adhesive*** — (Optional) — May be applied between crests of steel roof deck and vapor retarder, between vapor retarder and first layer of insulation, and between layers of insulation. Applied in 1/2 in. wide ribbons 6 in. OC at 0.4 gal/100 sq ft. See Adhesives (BYWR)

category for names of manufacturers.

5A. **Asphalt Or Coal Tar Pitch*** — (Optional — Not Shown) — In lieu of Item 5, used to attach the first layer of insulation to vapor retarder and each additional layer of roof insulation. Applied at a max rate of 25 lbs/100 sq ft.

5B. **Adhesive* -(Optional)** — (Bearing the UL Classification Marking for Roof Systems (TGFU)) - When FAST 100 adhesive is used, the Unrestrained Assembly Ratings are limited to 1, 1-1/2 and 2 hr. The vapor retarder, the gypsum wallboard or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of insulation. Applied at a max rate of 19.8 g/ft². When FAST 100 adhesive is used, additional **Spray-Applied Fire Resistance Materials* (CHPX)** is required on the deck for the 1-1/2 and 2 hr Unrestrained Assembly Ratings. The thickness specified for the deck shall be increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating.

CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — FAST 100.

6. **Mechanical Fasteners** — (Optional — Not Shown) — Mechanical screw-type fastener with metal washer designed for the purpose may be used to attach one or more layers of insulation to steel roof deck.

7. **Steel Roof Deck — (Unclassified)** — Min 1-1/2 in. deep and 30 or 36 in. wide galv fluted steel deck. Flutes 6 in. OC with crest width ranging from 3-5/8 to 5-1/16 in. Min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps and a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC. **Classified Steel Floor and Form Units*** — Noncomposite, 1-1/2 in. deep, galv units, min gauge is 22 MSG. Ends overlapped at supports min 1-1/2 in. and welded to supports at deck laps and a max of 12 in. OC between sides of units. Side laps of adjacent units welded, button-punched or secured together with No. 12 by 3/4 in. long self-drilling, self-tapping steel screws spaced a max of 36 in. OC.

ASC STEEL DECK, DIV OF ASC PROFILES L L C — Types BH-36, BHN-36, BHN-35-1/4, DGB-36, B-36, BN-36, BN-35-1/4, DGN-32, N-32, NN-32, 2WH-36, 2WS-36, 3WH-36, 3WH-36. All units may be galvanized or Prime Shield™. Non-cellular decks may be vented designated with a "V" suffix to the product name.

CANAM GROUP INC — Type P-3606 or P-3615; 36 in. wide Types 1.5B, 1.5BI

CANAM STEEL CORP — Type P-3606 or P-3615.

CANAM STEEL CORP — Types B, NS. Units may be ptd/ptd.

NEW MILLENNIUM BUILDING SYSTEMS L L C — Type B, BD, BI, F, FD, N, ND, NW32 and NW32I. Units may be phos/painted or galvanized.

STEEL MASTERS INTERNATIONAL DEPENDABLE STEEL — 36 in. wide Types 2WH-36, 3WH-36. Units may be phos/painted or galvanized.

VERCO DECKING INC - A NUCOR CO — Deck types PLB, HSB, PLN3, HSN3, PLN, N; FORMLOK™ deck types PLB, B, PLN3, N3, PLN, N, PLW2, W2, PLW3, W3. Units may be galvanized or phos./ptd. Deck may be vented or non-vented.

VULCRAFT, DIV OF NUCOR CORP — Types 1.5F, 1.5B, 1.5BI, 1.5PLB, 3N, 3NI, 3.0 PLN, 3NL-32, 3NI-32, 3PLN-32; ptd/ptd units may be used for ratings up to 2 hr; Types BW, N. Type BW may be ptd/ptd.

8. **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in more than one coat to the thickness shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 15 and 14 pcf, respectively, for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400AC and 400ES min average and min individual density of 22 and 19 pcf, respectively. Min avg density of 44 pcf with min ind value of 40 pcf for Types M-II and TG. Min avg density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material. Spray-Applied Fire Resistive Materials on steel deck shall cover screw tips by 1/2 in. min. Use of adhesive (Item 11) is required.

The min thicknesses of Spray-Applied Fire Resistive Materials required for various fire resistance ratings are shown in the table below:

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Protection Mtl Thkns In.		
			on Deck#	on Beam	on Joist
1	1	1	7/8	7/16	3/4
1	1	1	1-7/16+	7/16	3/4
1-1/2	1-1/2	1-1/2	1-3/16	9/16	1-3/16
1-1/2	1-1/2	1-1/2	2+	9/16	1-3/16
2	1	1	1-7/16	11/16	1-3/16
2	1-1/2	1-1/2	1-7/16	11/16	1-3/16
2	2	2	1-7/16	13/16	1-3/16
2	2	2	2-5/8+	13/16	1-3/16
3	1-1/2	1-1/2	1-7/16	1-3/16	1-5/8
					(1-1/2**)
3	2	2	1-7/8	1-3/16	1-5/8
					(1-1/2**)
3	3	3	1-7/8	1-1/4	1-5/8
					(1-1/2**)

The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating when Item 5B is used.

+ No minimum insulation thickness required.

** The 1-1/2 in. thickness may be applied when minimum size joist is 12K5.

BERLIN CO LTD — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P.

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, M-II, or M-II/P.

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 400AC, M-II, TG and M-II/P.

ISOLATEK INTERNATIONAL — Types 300, 300AC, 300ES, 300HS, 300N, SB, 400AC, 400ES, 3000, 3000ES, M-II, TG and M-II/P.

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P.

8A. (As an alternate to Item 8) Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying in more than one coat to the thickness shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 17.5 and 16 pcf, respectively, for Types 300TW. . Min average and min individual density of 22 and 19 pcf, respectively, for Type 400. For method of density determination, see Design Information Section, Sprayed Material. Spray-Applied Fire Resistive Materials on steel deck shall cover screw tips by 1/2 in. min. Use of adhesive (Item 11) is required.

GREENTECH ASIA PACIFIC SDN BDH — Type 400.

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Type 400.

ISOLATEK INTERNATIONAL — Type 300TW, Type 400.

NEWKEM PRODUCTS CORP — Type 400.

8B. Sprayed Fiber Insulation* — (Optional, Not Shown) — Spray applied fiber insulation applied over Spray-Applied Fire Resistive Material (Item 8) on both steel floor and form units (Item 7) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 8) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47
1/2	8	8	8	8	8
3/4	8	8	8	8	8
13/16	8	8	8	8	8
15/16	8	8	8	8	8
1-1/16	7-3/4	8	8	8	8
1-1/8	7-1/2	8	8	8	8
1-1/2	5-7/8	6-7/8	8	8	8
1-11/16	5-1/16	5-15/16	7-7/16	8	8

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)				
	15	17.5	22	44	47
7/16	3-3/4	4-3/8	5-1/2	8	8
9/16	3-3/16	3-3/4	4-11/16	8	8
13/16	2-1/8	2-1/2	3-1/8	8	8
1-1/4	1/4	5/16	3/8	3-1/8	3-3/8

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Joist	SFRM Density (pcf)				
	15	17.5	22	44	47
3/4	8	8	8	8	8
15/16	8	8	8	8	8
1	8	8	8	8	8
1-3/16	7-1/4	8	8	8	8

1-5/8	5-3/8	6-1/4	7-7/8	8	8
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INTERNATIONAL CELLULOSE CORP — Type K13, URE-K, or Sonospray FC

8D. **Sprayed Fiber Insulation*** — (Optional, Not Shown) — Spray applied fiber insulation Classified for Noncombustible Building Materials (BICW), having a maximum applied density of 3.5 pcf, applied over Spray-Applied Fire Resistive Material (Item 8) on both steel floor and form units (Item 7) and supports (Item 1). Sprayed fiber insulation may be over Spray-Applied Fire Resistive Material (Item 8) according to the following tables:

Allowable Spray-Applied Fiber Insulation Thickness Over Steel Deck

Installed SFRM Thickness (in.) on Deck	SFRM Density (pcf)				
	15	17.5	22	44	47
7/8	5	5	5	5	5
1 3/16	5	5	5	5	5
1 1/4	5	5	5	5	5
1 7/16	5	5	5	5	5
1 1/2	5	5	5	5	5
1 11/16	5	5	5	5	5
1 7/8	4 5/16	5	5	5	5
2	3 3/4	4 3/8	5	5	5
2 1/16	3 1/2	4 1/16	5	5	5
2 1/8	3 3/16	3 3/4	4 11/16	5	5
2 5/8	1 1/16	1 1/4	1 9/16	5	5
2 7/8	0	0	0	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Beam

Installed SFRM Thickness (in.) on Beam	SFRM Density (pcf)				
	15	17.5	22	44	47
7/16	5	4 1/16	5	5	5
9/16	5	3 7/16	5	5	5
11/16	5	2 13/16	5	5	5
13/16	4 9/16	2 3/16	5	5	5
1 3/16	2 15/16	5/16	4 5/16	5	5

Allowable Spray-Applied Fiber Insulation Thickness Over Joist

Installed SFRM Thickness (in.) on Joist	SFRM Density (pcf)
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	15	17.5	22	44	47
3/4	5	5	5	5	5
1 3/16	4 9/16	5	5	5	5
1 1/2	3 3/16	3 3/4	4 11/16	5	5
1 5/8	2 11/16	3 1/8	3 15/16	5	5

THERMACOUSTICS IND — Type TC-417

9. **Glass Fiber Mesh** — (Optional) — May be used to facilitate the spray application of the protection material to the steel bar joists. Min 3/32 in. sq mesh, coated fiberglass scrim fabric, weighing a min of 1.9 oz/sq yd shall be attached to one side of each joist web member. The method of attachment must be sufficient to hold the mesh and fire protection material during application and curing of the material. An acceptable method of attaching the mesh is by embedding the mesh in min 1/4 in. long beads of hot-melted glue. The beads of glue shall be spaced min 12 in. OC along the top chord of the bar joists. Another method of attachment is the use of 1-1/4 in. long 1/2 in. wide hairpin clips formed from 0.064 in. diam steel wire, alternating from top to bottom of the joist web member.

9A. **Metal Lath** — (Optional — Not Shown) — In lieu of Item 9, diamond mesh, 3/8 in. expanded steel, min 2.5 lb/sq yd fastened to one side of joists using No. 18 SWG steel tie wire, located at the midheight of every other web member or 18 in. OC whichever is less. Both sides of lath must be completely coated with Spray-Applied Fire Resistive Materials but with no minimum thickness requirements.

9B. **Metal Lath** — (For use on steel roof deck with Types M-II, TG, and M-II/P Spray Applied Fire Resistive Material) - 3/8 in. diamond mesh, min 2.5 lbs per sq yd painted or galv expanded steel. Fastened to steel roof deck with ribs (if any) facing down using. No. 8 by 1/2 in. wafer head self-drilling, self-tapping, coated steel screws spaced max 15 in OC in both directions for 1 and 1-1/2 hr ratings. Spaced a max 12 in. OC in both directions for 2 hr ratings. Lath edges overlapped approx 3 in.

10. **Bridging** — (Not Shown) — Min 1-1/4 by 1-1/4 by 1/8 in. thick steel angles welded to top and bottom chords of each joist. Number and spacing of bridging angles per Steel Joist Institute specification. Bridging coated with the same thickness of Spray-Applied Fire Resistive Materials as the joist to a min distance of 12 in. beyond each side of the joist.

11. **Adhesive*** — Applied to steel roof deck in accordance with manufacturer's instructions.

ISOLATEK INTERNATIONAL — Type EBS or Type X.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2021-05-18

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BXUV.X790 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States Design Criteria and Allowable Variances

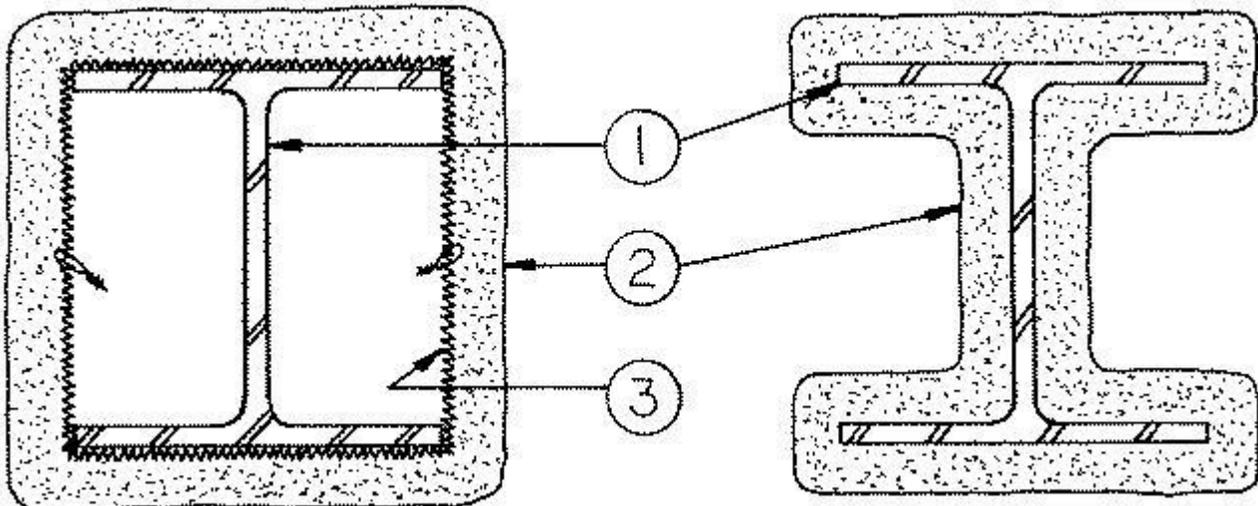
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada Design Criteria and Allowable Variances

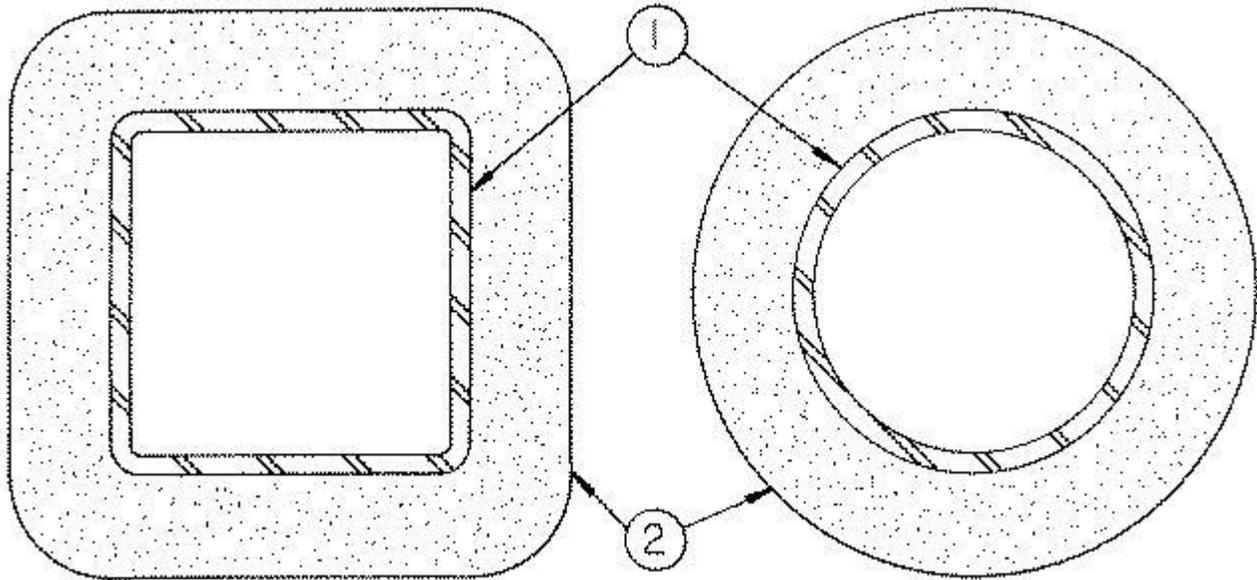
Design No. X790

October 09, 2019

Ratings — 1, 1-1/2, 2, 3 and 4 Hr.

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1. **Steel Column, Steel Pipe or Steel Tube** — Wide flange steel column (W) or steel circular pipe (SP) or steel square or rectangular tube (ST), min sizes as shown in the tables below.

2. **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 15 and 14 pcf, for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400AC and 400ES min average and min individual density of 22 and 19 pcf, respectively. Min avg density of 44 pcf with min ind value of 40 pcf for Types M-II and TG. Min avg density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material.

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings of contour sprayed or boxed wide flange columns are shown in the table below:

Column Size	W/D	Min Thkns In.				
		1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	0.33	15/16	1-1/4	1-9/16	2-1/8	2-11/16
W6x12	0.43	13/16	1-1/8	1-7/16	2	2-9/16
W6x16	0.57	11/16	1	1-5/16	1-7/8	2-3/8
W8x28	0.68	5/8	15/16	1-1/4	1-13/16	2-5/16
W10x49	0.83	9/16	13/16	1-1/8	1-5/8	2-1/8
W12x106	1.46	3/8	9/16	13/16	1-1/4	1-11/16
W14x233	2.52	1/4	3/8	1/2	7/8	1-3/16
W14x730	6.68	1/4	1/4	1/4	3/8	1/2

As an alternate to the above table, the required thickness of Spray-Applied Fire Resistive Materials to be applied to all surfaces of the steel columns for all rating periods may be determined from the following equations:

$$h = \frac{R}{75 (W/D) + 32}$$

(for column W/D range of 0.33 to 2.51)

R

$$h = \frac{75 (W/D) + 15}{100}$$

(for column W/D range of 2.51 to 6.68)

Where:

h = Spray-Applied Fire Resistive Materials thickness in the range of 1/4 to 4-1/2 in. (rounded up to the nearest 1/16 in.)

R = Fire resistance rating period in minutes (60-240 mins.)

D = Heated perimeter of the steel column in inches.

W = Weight of the steel column in lbs per foot.

The thicknesses contained in the table below are applicable when the Spray-Applied Fire Resistive Materials applied to the column's flange tips are reduced to one-half that shown in the table below (for contour application):

Column Size In.	Min Thkns In.				
	1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	1	1-3/8	1-3/4	2-7/16	3-1/8
W6x12	7/8	1-1/4	1-5/8	2-5/16	3-1/16
W6x16	3/4	1-1/8	1-7/16	2-1/16	2-11/16
W8x28	11/16	1	1-5/16	1-15/16	2-1/2
W10x49	5/8	15/16	1-3/16	1-3/4	2-3/8
W12x106	3/8	5/8	7/8	1-3/8	1-13/16
W14x233	5/16	3/8	9/16	15/16	1-5/16
W14x730	5/16	5/16	5/16	7/16	5/8

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings of contour sprayed steel pipes or tubes are shown on the table below:

Min Column Size In.	A/P	Min Thkns In.				
		1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
SP 4x0.237	0.22	11/16	1	1-3/8	2-1/16	2-3/4
ST 4x4x0.1875	0.18	3/4	1-1/16	1-7/16	2-1/16	2-11/16
ST 4x4x0.3125	0.29	1/2	13/16	1-1/8	1-3/4	2-5/16
ST 4x4x0.375	0.34	7/16	3/4	1	1-9/16	2-1/8
ST 4x4x0.5	0.44	3/8	9/16	7/8	1-3/8	1-7/8
ST20x20x0.75 in.	0.72	5/16	1/2	11/16	1-1/16	1-7/16
ST20x20x1 in.	0.95	1/4	3/8	1/2	13/16	1-1/8
ST20x20x1.5 in.	1.39	1/4	1/4	3/8	5/8	13/16
ST20x20x1.75 in.	1.60	1/4	1/4	3/8	1/2	3/4
ST32x32x1.25 in.	1.20	1/4	5/16	7/16	11/16	15/16

ST 36x24x0.5	0.49	5/16	7/16	11/16	1-1/8	1-9/16
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As an alternate to the table above, the required thickness of Spray-Applied Fire Resistive Materials to be applied to all surfaces of the steel pipes or tubes for all rating periods may be determined from the following equation:

$$h = \frac{R}{188 (A/P) + 45}$$

Where:

h = Spray-Applied Fire Resistive Materials thickness in the range of 5/16 to 4-1/4 in. (rounded up to the nearest 1/16 in.)

R = Fire resistance rating in minutes (60-240 mins.)

A = Cross-sectional area of pipe or tube.

P = Heated perimeter of steel pipe or tube.

A/P = 0.18 to 0.49.

The A/P ratio of a circular pipe is determined by:

$$A/P = \frac{t (d - t)}{d}$$

Where:

d = the outer diameter of the pipe (in.)

t = the wall thickness of the pipe (in.)

The A/P ratio of a rectangular tube is determined by:

$$A/P = \frac{t (a + b - 2t)}{a + b}$$

Where:

a = the outer width of the tube (in.)

b = the outer length of the tube (in.)

t = the wall thickness of the tube (in.)

BERLIN CO LTD — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P.

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, 300HS, M-II, or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 400AC, M-II, TG and M-II/P.

ISOLATEK INTERNATIONAL — Type 300, 300AC, 300ES, 300HS, 300N, 400AC, 400ES, SB, 3000, 3000ES, M-II, TG and M-II/P.

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P

2A. **(As an alternate to Item 2) Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 17.5 and 16 pcf, respectively, for Type 300TW. Min average and min individual density of 22 and 19 pcf, respectively, for Type 400. For method of density determination, see Design Information Section, Sprayed Material.

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings is shown in Item 2.

BERLIN CO LTD — Type 400.

GREENTECH ASIA PACIFIC SDN BDH — Type 400

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Type 400.

ISOLATEK INTERNATIONAL — Type 300TW or Type 400.

NEWKEM PRODUCTS CORP — Type 400.

2B. **(As an alternate to Item 2 and 2A) — Spray-Applied Fire Resistive Materials*** — Prepared by mixing with water according to instructions on each bag of mixture and spray- or trowel-applied to steel surfaces which are free of dirt, oil or scale. Min average density of 17.5 pcf with min individual value of 17.0 pcf. For method of density determination, see Design Information Section, Sprayed Material.

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings is shown in Item 2.

ISOLATEK INTERNATIONAL — Type 280.

3. **Metal Lath** — (Optional for contour application) — 3.4 lb/sq yd galv or painted expanded steel lath. Lath shall be lapped 1 in. and tied together with No. 18 SWG galv steel wire spaced vertically 6 in. OC.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2019-10-09

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DESIGN P723

Protected Roof Deck

Polyisocyanurate/Mineral & Fiber Board Insulation

CAFCO® 300 Series and CAFCO® 400

&

ISOLATEK® Type 300 Series and ISOLATEK® Type 400

Use **Design S721** Table

The above listed alternate design is a "beam substation" in accordance with UL Guidelines or contains the same thicknesses as those in the referenced design.

S721 - Half-Flange Tip Option

Unrestrained Beam

Protected Roof Deck

CAFCO® 300 Series, CAFCO® 400 & ISOLATEK® Type 300 Series, ISOLATEK® Type 400

ASTM Desig.	W/D	Metric Desig.	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour	4-Hour
W21 x 166	2.09	W530 x 248	123.3	64.1	3/8	3/8	1/2	11/16	7/8
147	1.87	219	110.3	71.6	3/8	3/8	1/2	3/4	1
132	1.68	196	99.1	79.8	3/8	7/16	9/16	13/16	1-1/16
122	1.57	182	92.6	85.3	3/8	7/16	9/16	7/8	1-1/8
111	1.43	165	84.4	93.7	3/8	7/16	5/8	15/16	1-3/16
101	1.3	150	76.7	103.1	3/8	1/2	11/16	1	1-1/4
93	1.4	138	82.6	95.7	3/8	1/2	5/8	15/16	1-3/16
83	1.26	123	74.3	106.3	3/8	1/2	11/16	1	1-1/4
73	1.11	109	65.5	120.7	3/8	9/16	3/4	1-1/8	1-3/8
68	1.04	101	61.4	128.8	7/16	9/16	3/4	1-1/8	1-7/16
62	0.95	92	56.1	141.0	7/16	5/8	13/16	1-3/16	1-1/2
57	0.95	85	56.1	141.0	7/16	5/8	13/16	1-3/16	1-1/2
55	0.85	82	50.2	157.6	1/2	5/8	7/8	1-5/16	1-5/8
50	0.83	74	49.0	161.4	1/2	5/8	7/8	1-5/16	1-5/8
48	0.75	72	44.3	178.6	1/2	11/16	15/16	1-3/8	1-3/4
44	0.74	66	43.7	181.1	1/2	11/16	15/16	1-3/8	1-3/4
W18 x 175	2.46	W460 x 260	145.1	54.5	3/8	3/8	7/16	5/8	13/16
158	2.24	235	132.2	59.8	3/8	3/8	7/16	11/16	7/8
143	2.05	213	121.0	65.4	3/8	3/8	1/2	3/4	15/16
130	1.88	193	110.9	71.3	3/8	3/8	1/2	3/4	15/16
119	1.72	177	101.5	77.9	3/8	7/16	9/16	13/16	1
106	1.55	158	91.5	86.4	3/8	7/16	9/16	7/8	1-1/8
97	1.42	144	83.8	94.4	3/8	7/16	5/8	15/16	1-3/16
86	1.27	128	74.9	105.5	3/8	1/2	11/16	1	1-1/4
76	1.13	113	66.7	118.6	3/8	9/16	3/4	1-1/8	1-3/8
71	1.22	106	72.0	109.8	3/8	1/2	11/16	1-1/16	1-5/16
65	1.13	97	66.7	118.6	3/8	9/16	3/4	1-1/8	1-3/8
60	1.04	89	61.4	128.8	7/16	9/16	3/4	1-1/8	1-7/16
55	0.96	82	56.6	139.6	7/16	5/8	13/16	1-3/16	1-1/2
50	0.88	74	51.9	152.3	7/16	5/8	13/16	1-1/4	1-5/8
46	0.87	68	51.3	154.0	7/16	5/8	7/8	1-5/16	1-5/8
40	0.76	60	44.8	176.3	1/2	11/16	15/16	1-3/8	1-3/4
35	0.67	52	39.5	200.0	9/16	3/4	1	1-1/2	1-7/8
W16 x 100	1.59	W410 x 149	93.8	84.3	3/8	7/16	9/16	7/8	1-1/16
89	1.43	132	84.4	93.7	3/8	7/16	5/8	15/16	1-3/16
77	1.25	114	73.8	107.2	3/8	1/2	11/16	1	1-5/16
67	1.09	100	64.3	122.9	7/16	9/16	3/4	1-1/8	1-3/8
57	1.09	85	64.3	122.9	7/16	9/16	3/4	1-1/8	1-3/8
50	0.96	74	56.6	139.6	7/16	5/8	13/16	1-3/16	1-1/2
45	0.87	67	51.3	154.0	7/16	5/8	7/8	1-5/16	1-5/8

Note: The thickness applied to the lower flange tips may be reduced to one-half the listed thickness in this design.

S721 - Half-Flange Tip Option

Unrestrained Beam

Protected Roof Deck

CAFCO® 300 Series, CAFCO® 400 & ISOLATEK® Type 300 Series, ISOLATEK® Type 400

ASTM										
Desig.	W/D	Metric Desig.	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour	4-Hour	
W16 x 40	0.78	W410 x 60	46.0	171.8	1/2	11/16	7/8	1-3/8	1-11/16	
36	0.7	53	41.3	191.4	1/2	11/16	15/16	1-7/16	1-13/16	
31	0.66	46	38.9	203.0	9/16	3/4	1	1-1/2	1-7/8	
26	0.55	39	32.5	243.6	9/16	13/16	1-1/16	1-5/8	2-1/16	
W14 x 808	8.75	W360 x 1202	516.3	15.3	3/8	3/8	3/8	3/8	3/8	
730	8.08	1086	476.7	16.6	3/8	3/8	3/8	3/8	3/8	
665	7.49	990	441.9	17.9	3/8	3/8	3/8	3/8	3/8	
605	6.96	900	410.6	19.3	3/8	3/8	3/8	3/8	3/8	
550	6.43	818	379.4	20.8	3/8	3/8	3/8	3/8	3/8	
500	5.95	744	351.1	22.5	3/8	3/8	3/8	3/8	3/8	
455	5.53	677	326.3	24.2	3/8	3/8	3/8	3/8	7/16	
426	5.21	634	307.4	25.7	3/8	3/8	3/8	3/8	7/16	
398	4.93	592	290.9	27.2	3/8	3/8	3/8	3/8	7/16	
370	4.63	551	273.2	28.9	3/8	3/8	3/8	3/8	1/2	
342	4.32	509	254.9	31.0	3/8	3/8	3/8	3/8	1/2	
311	3.98	463	234.8	33.7	3/8	3/8	3/8	7/16	9/16	
283	3.66	421	215.9	36.6	3/8	3/8	3/8	7/16	9/16	
257	3.36	382	198.2	39.9	3/8	3/8	3/8	1/2	5/8	
233	3.08	347	181.7	43.5	3/8	3/8	3/8	1/2	11/16	
211	2.81	314	165.8	47.7	3/8	3/8	3/8	9/16	11/16	
193	2.6	287	153.4	51.5	3/8	3/8	3/8	5/8	3/4	
176	2.38	262	140.4	56.3	3/8	3/8	7/16	5/8	13/16	
159	2.16	237	127.4	62.0	3/8	3/8	7/16	11/16	7/8	
145	1.99	216	117.4	67.3	3/8	3/8	1/2	3/4	15/16	
132	1.89	196	111.5	70.9	3/8	3/8	1/2	3/4	15/16	
120	1.71	179	100.9	78.4	3/8	7/16	9/16	13/16	1-1/16	
109	1.57	162	92.6	85.3	3/8	7/16	9/16	7/8	1-1/8	
99	1.43	147	84.4	93.7	3/8	7/16	5/8	15/16	1-3/16	
90	1.31	134	77.3	102.3	3/8	1/2	11/16	1	1-1/4	
82	1.45	122	85.6	92.4	3/8	7/16	5/8	15/16	1-3/16	
74	1.32	110	77.9	101.5	3/8	1/2	5/8	1	1-1/4	
68	1.22	101	72.0	109.8	3/8	1/2	11/16	1-1/16	1-5/16	
61	1.1	91	64.9	121.8	7/16	9/16	3/4	1-1/8	1-3/8	
53	1.06	79	62.5	126.4	7/16	9/16	3/4	1-1/8	1-7/16	
48	0.97	72	57.2	138.1	7/16	9/16	13/16	1-3/16	1-1/2	
43	0.87	64	51.3	154.0	7/16	5/8	7/8	1-5/16	1-5/8	
38	0.8	57	47.2	167.5	1/2	11/16	7/8	1-3/8	1-11/16	
34	0.72	51	42.5	186.1	1/2	11/16	15/16	1-7/16	1-13/16	
30	0.64	45	37.8	209.3	9/16	3/4	1	1-1/2	1-7/8	
26	0.62	39	36.6	216.1	9/16	3/4	1	1-9/16	1-15/16	
22	0.53	33	31.3	252.8	5/8	13/16	1-1/16	1-11/16	2-1/16	

Note: The thickness applied to the lower flange tips may be reduced to one-half the listed thickness in this design.

S721 - Half-Flange Tip Option

Unrestrained Beam

Protected Roof Deck

CAFCO® 300 Series, CAFCO® 400 & ISOLATEK® Type 300 Series, ISOLATEK® Type 400

ASTM Desig.	W/D	Metric Desig.	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour	4-Hour
W12 x 336	4.85	W310 x 500	286.2	27.6	3/8	3/8	3/8	3/8	7/16
305	4.49	454	264.9	29.8	3/8	3/8	3/8	3/8	1/2
279	4.19	415	247.2	32.0	3/8	3/8	3/8	7/16	1/2
252	3.84	375	226.6	34.9	3/8	3/8	3/8	7/16	9/16
230	3.55	342	209.5	37.7	3/8	3/8	3/8	1/2	9/16
210	3.27	313	192.9	41.0	3/8	3/8	3/8	1/2	5/8
190	3	283	177.0	44.7	3/8	3/8	3/8	9/16	11/16
170	2.72	253	160.5	49.3	3/8	3/8	3/8	9/16	3/4
152	2.45	225	144.6	54.7	3/8	3/8	7/16	5/8	13/16
136	2.23	202	131.6	60.1	3/8	3/8	7/16	11/16	7/8
120	1.99	179	117.4	67.3	3/8	3/8	1/2	3/4	15/16
106	1.77	158	104.4	75.7	3/8	3/8	9/16	13/16	1
96	1.61	143	95.0	83.2	3/8	7/16	9/16	7/8	1-1/16
87	1.47	129	86.7	91.1	3/8	7/16	5/8	15/16	1-1/8
79	1.34	117	79.1	100.0	3/8	1/2	5/8	1	1-1/4
72	1.23	107	72.6	108.9	3/8	1/2	11/16	1-1/16	1-5/16
65	1.11	97	65.5	120.7	3/8	9/16	3/4	1-1/8	1-3/8
58	1.1	86	64.9	121.8	7/16	9/16	3/4	1-1/8	1-3/8
53	1.02	79	60.2	131.4	7/16	9/16	3/4	1-3/16	1-7/16
50	1.06	74	62.5	126.4	7/16	9/16	3/4	1-1/8	1-7/16
45	0.97	67	57.2	138.1	7/16	9/16	13/16	1-3/16	1-1/2
40	0.86	60	50.7	155.8	1/2	5/8	7/8	1-5/16	1-5/8
35	0.81	52	47.8	165.4	1/2	5/8	7/8	1-5/16	1-11/16
30	0.69	45	40.7	194.2	1/2	11/16	15/16	1-7/16	1-13/16
26	0.61	39	36.0	219.6	9/16	3/4	1	1-9/16	1-15/16
22	0.62	33	36.6	216.1	9/16	3/4	1	1-9/16	1-15/16
19	0.54	28	31.9	248.1	9/16	13/16	1-1/16	1-5/8	2-1/16
16	0.45	24	26.6	297.7	5/8	7/8	1-3/16	1-13/16	2-1/4
14	0.4	21	23.6	335.0	11/16	15/16	1-1/4	1-7/8	2-3/8
W10 x 112	2.17	W250 x 167	128.0	61.7	3/8	3/8	7/16	11/16	7/8
100	1.97	149	116.2	68.0	3/8	3/8	1/2	3/4	15/16
88	1.74	131	102.7	77.0	3/8	7/16	9/16	13/16	1
77	1.54	115	90.9	87.0	3/8	7/16	9/16	7/8	1-1/8
68	1.38	101	81.4	97.1	3/8	1/2	5/8	15/16	1-3/16
60	1.22	89	72.0	109.8	3/8	1/2	11/16	1-1/16	1-5/16
54	1.11	80	65.5	120.7	3/8	9/16	3/4	1-1/8	1-3/8
49	1.01	73	59.6	132.7	7/16	9/16	3/4	1-3/16	1-1/2
45	1.06	67	62.5	126.4	7/16	9/16	3/4	1-1/8	1-7/16
39	0.92	58	54.3	145.6	7/16	5/8	13/16	1-1/4	1-9/16
33	0.78	49	46.0	171.8	1/2	11/16	7/8	1-3/8	1-11/16
30	0.8	45	47.2	167.5	1/2	11/16	7/8	1-3/8	1-11/16

Note: The thickness applied to the lower flange tips may be reduced to one-half the listed thickness in this design.

S721 - Half-Flange Tip Option

Unrestrained Beam

Protected Roof Deck

CAFCO® 300 Series, CAFCO® 400 & ISOLATEK® Type 300 Series, ISOLATEK® Type 400

ASTM Desig.	W/D	Metric Desig.	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour	4-Hour
W10 x 26	0.7	W10 x 39	41.3	191.4	1/2	11/16	15/16	1-7/16	1-13/16
22	0.6	33	35.4	223.3	9/16	3/4	1	1-9/16	1-15/16
19	0.6	28	35.4	223.3	9/16	3/4	1	1-9/16	1-15/16
17	0.54	25	31.9	248.1	9/16	13/16	1-1/16	1-5/8	2-1/16
15	0.48	22	28.3	279.1	5/8	7/8	1-1/8	1-3/4	2-3/16
12	0.39	18	23.0	343.5	11/16	15/16	1-1/4	1-7/8	2-3/8
W8 x 67	1.65	W200 x 100	97.4	81.2	3/8	7/16	9/16	7/8	1-1/16
58	1.44	86	85.0	93.0	3/8	7/16	5/8	15/16	1-3/16
48	1.21	71	71.4	110.7	3/8	1/2	11/16	1-1/16	1-5/16
40	1.03	59	60.8	130.1	7/16	9/16	3/4	1-3/16	1-7/16
35	0.9	52	53.1	148.9	7/16	5/8	13/16	1-1/4	1-9/16
31	0.8	46	47.2	167.5	1/2	11/16	7/8	1-3/8	1-11/16
28	0.81	42	47.8	165.4	1/2	5/8	7/8	1-5/16	1-11/16
24	0.7	36	41.3	191.4	1/2	11/16	15/16	1-7/16	1-13/16
21	0.67	31	39.5	200.0	9/16	3/4	1	1-1/2	1-7/8
18	0.58	27	34.2	231.0	9/16	3/4	1-1/16	1-9/16	2
15	0.55	22	32.5	243.6	9/16	13/16	1-1/16	1-5/8	2-1/16
13	0.48	19	28.3	279.1	5/8	7/8	1-1/8	1-3/4	2-3/16
10	0.37	15	21.8	362.1	11/16	15/16	1-1/4	1-15/16	2-7/16
W6 x 25	0.83	W150 x 37	49.0	161.4	1/2	5/8	7/8	1-5/16	1-5/8
20	0.67	30	39.5	200.0	9/16	3/4	1	1-1/2	1-7/8
16	0.68	24	40.1	197.0	1/2	11/16	15/16	1-7/16	1-13/16
15	0.52	22	30.7	257.7	5/8	13/16	1-1/8	1-11/16	2-1/8
12	0.52	18	30.7	257.7	5/8	13/16	1-1/8	1-11/16	2-1/8
9	0.39	14	23.0	343.5	11/16	15/16	1-1/4	1-7/8	2-3/8
8.5	0.37	13	21.8	362.1	11/16	15/16	1-1/4	1-15/16	2-7/16
W5 x 19	0.77	W130 x 28	45.4	174.0	1/2	11/16	15/16	1-3/8	1-3/4
16	0.66	24	38.9	203.0	9/16	3/4	1	1-1/2	1-7/8
W4 x 13	0.67	W100 x 19	39.5	200.0	9/16	3/4	1	1-1/2	1-7/8

Note: The thickness applied to the lower flange tips may be reduced to one-half the listed thickness in this design.

X790

Structural Steel Square Tube Columns

CAFCO® 300 Series, CAFCO® 400 & ISOLATEK® Type 300 Series, ISOLATEK® Type 400

ASTM Desig.	Wall Thk	A/P	Metric Desig.	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour	4-Hour
6 x 6	1/2	0.46	152 x 152 x 12.7	86.6	91.3	3/8	9/16	7/8	1-3/8	1-7/8
	3/8	0.35	x 9.5	67.6	116.9	7/16	3/4	1	1-9/16	2-1/8
	5/16	0.30	x 7.9	57.4	137.7	1/2	13/16	1-1/8	1-3/4	2-5/16
	1/4	0.24	x 6.4	46	171.8	11/16	1	1-3/8	2	2-11/16
	3/16	0.18	x 4.8	35.7	221.4	3/4	1-1/16	1-7/16	2-1/16	2-11/16
5 x 5	1/2	0.45	127 x 127 x 12.7	83.9	94.2	3/8	9/16	7/8	1-3/8	1-7/8
	3/8	0.35	x 9.5	66	119.8	7/16	3/4	1	1-9/16	2-1/8
	5/16	0.29	x 7.9	56.3	140.4	1/2	13/16	1-1/8	1-3/4	2-5/16
	1/4	0.24	x 6.4	46.1	171.5	11/16	1	1-3/8	2	2-11/16
	3/16	0.18	x 4.8	35.3	223.9	3/4	1-1/16	1-7/16	2-1/16	2-11/16
4 x 4	1/2	0.44	102 x 102 x 12.7	79.8	99.1	3/8	9/16	7/8	1-3/8	1-7/8
	3/8	0.34	x 9.5	63.7	124.1	7/16	3/4	1	1-9/16	2-1/8
	5/16	0.29	x 7.9	54.7	144.5	1/2	13/16	1-1/8	1-3/4	2-5/16
	1/4	0.23	x 6.4	45	175.7	11/16	1-1/16	1-3/8	2-1/16	2-11/16
	3/16	0.18	x 4.8	35	225.9	3/4	1-1/16	1-7/16	2-1/16	2-11/16

Note: A/P Ratio based on Design Formula