Carboline-Southwest
Type 5GP
Injected with A-20 Accelerator
Submittal Package

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SOUTHWEST TYPE 5GP™

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	A gypsum based, Spray-applied Fire Resistive Material (SFRM) designed for the fire protection of interior structural steel. Formulated and applied to meet the minimum bond strength requirements of the IBC Code listed in the “High Rise Building Section" for buildings up to 75' (22.9 m).
Description	A 15 lb./ft³ (240 kg/m³) SFRM intended for the fire protection of interior structural columns, beams, joists, decks, walls, roofs, girders, floors and pre-cast concrete units. It is tested and certified for fire resistance ratings up to 4 hours. Southwest Type 5GP is a trademark of the Southwest Fireproofing Products Company.
Features	• Durable cementitious formulation • Noncombustible • Can be injected with Accelerator A-20 for fast set and increased yield (optional) • Asbestos-free – compliant with EPA and OSHA • Mineral Wool free – no airborne fibers. • Styrene free – no toxic decomposition gases • Economical – Maintains project on budget • Design flexibility with over 100 UL designs
Color	Non-Uniform Tan
Finish	Textured
Primer	Primers are not required or recommended. If a primer is specified, or steel is primed, bond strength must meet minimum UL criteria. A/D Type TC-55 Sealer is used as a primer/bonding agent to meet this requirement where specified. Southwest Type DK3 (spatter coat) must be used as a primer/bonding agent on cellular decks and roof decks per UL design requirements. Contact Carboline Technical Service for further information. Southwest Fireproofing materials neither promote nor prevent corrosion. Fireproofing should not be considered part of the corrosion protection system.
Application Thickness	1/2" - 5/8" (12.7 - 15.9 mm) on initial pass
Limitations	Not intended for permanent direct exposure to weather or excessive physical abuse beyond normal construction cycles. Not recommended for use as refractory cement or where operating temperatures exceed 200°F (93°C).
Topcoats	Generally not required. In severely corrosive atmospheres, consult Carboline Technical Service for selection of coating most suitable for the operating environment.

SUBSTRATES & SURFACE PREPARATION

General	Prior to application, all substrates must be clean and free of loose scale, dirt, oil, grease, condensation, or any other substance that would impair adhesion. Contact Carboline Technical Service for further information. Fireproofing shall be applied to the underside of roof deck assemblies only after all roofing work has been completed, and all roof traffic has ceased. When applying to flexible roof systems it is required that Southwest Type DK3 (spatter coat) is used. Also be sure that all roof work is completed and water tight before commencing installation of fire protection. Roof traffic shall be limited to maintenance after fire protection is applied and cured. No fireproofing shall be applied prior to completion of concrete work on steel floor decking.
Galvanized Steel	Prior to application, all substrates must be clean and free of loose scale, dirt, oil, grease, condensation, or any other substance that would impair adhesion. For certain designs, mechanical attachment or the application of Southwest Type DK3 (spatter coat) may be required. Contact Carboline Technical Service for further information.

SUBSTRATES & SURFACE PREPARATION

Painted/Primed Steel Decks

Apply to painted/primed steel decking only if permitted by the UL design. If the painted/primed deck is not an approved substrate, metal lath must first be secured to the deck surfaces in accordance with the UL requirements.

Painted/Primed Steel Joists

Painted steel joists do not require adhesive, lath or fastening devices. It is acceptable to apply directly to steel joists.

Painted/Primed Structural Steel

Painted/primed structural steel is generally not approved by UL as an acceptable substrate for SFRMs unless the paint or primer was included in the fire test and/or UL listed for SFRM applications to structural steel. UL has established conditions that must be satisfied for application to primed or painted structural steel, including: minimum bond strength criteria; dimensional limitations for the structural members; use of a bonding agent or adhesive such as A/D Type TC-55 Sealer; use of metal lath to provide a mechanical bond; or, use of mechanical breaks of metal lath strips or steel pins and disks. Refer to the UL Fire Resistance Directory-Volume 1 for details or contact Carboline Technical Service before applying to any painted/primed steel beams or columns.

PERFORMANCE DATA

Test Method	Results
ASTM 1042 DOD Classification	Type 1, NCR 50, Class (a), Category A
ASTM C384 Acoustics Noise Reduction Coefficient (NRC)	0.37 @ 0.30" (7.6 mm) 0.51 @ 0.45 (11.4 mm)
ASTM E136 Combustibility	Passed (non-combustible)
ASTM E605 Density[1]	15 pcf (240 kg/m³) minimum average
ASTM E736 Cohesion/Adhesion	>200 psf
ASTM E759 Deflection	Passed
ASTM E760 Impact	Passed
ASTM E761 Compresive Strength	3,700 psf (177 kPa)
ASTM E84 Surface Burning	Flame Spread: 0 Smoke Development: 0
ASTM E859 Air Erosion	0.00 g/ft² (0.00 g/m²)
ASTM E937 Corrosion	Passed
ASTM G21 Fungi Resistance	Passed (no growth)

[1] Air dry at ambient conditions to constant weight. Do not force cure. Use ASTM E605 Positive Bead Displacement method utilizing #8 lead shot. Test density in accordance with AWCI Technical Manual 12-A (Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials, an Annotated Guide).
All values derived under controlled laboratory conditions.
Test reports and additional data available upon written request.

MIXING & THINNING

Mixer

1. Use a minimum 12-16 cubic foot (340-453 liter) heavy-duty mortar mixer capable of rotating at 40 rpm with rubber tipped blades that wipe the sides.
2. Use continuous feed mixer. Contact Carboline Technical Service for recommendation. Densities may vary when using this type of mixing equipment.

MIXING & THINNING

Mixing	Always mix with clean potable water. The mixer shall be kept clean and free of any previously mixed materials which may cause premature setting of product. A 2 bag mix is recommended for paddle type mixers. Mix time should be approximately 2 minutes minutes at 40 rpm. Do not over mix. The material volume should not go over center bar of mixer. Use 10 to 11 gallons (37.8 to 41.6 liters) of water per 50 lb. (22.7 kg) bag. Add water to the mixer first with blades stopped. With mixer turned on, add material to the water and begin mixing.
Density	For information and recommendations obtaining the proper density and yield, contact the local Carboline representative or Carboline Fireproofing Technical Service.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Pump	This material can be pumped with a wide range of piston, rotor stator and squeeze pumps designed to pump cement & plaster materials including: Essick - model# FM9/FM5E (Rotor Stator/2L4) Putzmeister - model# S5EV(Rotor Stator/2L6) Hy-Flex - model# HZ-30E(Rotor Stator/2L6) Hy-Flex - model# H320E (Piston) Strong Mfg. - model# Spraymate 60 (Rotor Stator/2L6) Airtech - model# Swinger (Piston) Mayco - model# PF30 (Dual Piston) Thomsen - model# PTV 700 (Dual Piston) Marvel kit must be removed from piston pumps.
Ball Valves	Ball valves should be located at the manifold and at the end of the surge hose to facilitate cleaning of the pump and/or hoses.
Material Hose	Use 15 to 25 feet (4.5 m to 7.6 m) of 3” (76 mm) I.D. or larger surge hose from the manifold. Follow with a 16” (406 mm) tapered fitting to a 2” (50 mm) I.D. hose to the spray area. Taper to 15 to 20 feet (4.5 m to 6 m) of minimum 1-1/4” or 1” (25 mm) whip hose.
Standpipe	Use 3” (76 mm) I.D. aluminum tubing with quick external disconnections. Elbows should be 3” (76 mm) I.D. with minimum 36” (0.9 m).
Nozzle/Gun	Use a minimum 1” (25 mm) I.D. plaster type nozzle with shut off valve, swivel and air shut off valve.
Orifice Size and Shields	9/16 to 5/8” (9.5 mm - 15.9 mm) I.D. “blow-off” tips (mini shields optional)
Compressor	Compressor on pump must be capable of maintaining minimum 30 psi (206 kPa) and 9 to 11 cfm at the nozzle.
Air Line	Use 5/8” (15.9 mm) I.D. hose with a minimum bursting pressure of 100 psi (689 kPa).

APPLICATION PROCEDURES

General

Thicknesses of 1/2" - 5/8" (12.7 mm - 15.9 mm) or less can be applied in one pass. When additional coats are required to reach specified thickness, apply subsequent coats after prior coat has set. If preceding coat has dried, dampen the surface with water prior to application of additional coats. Material can be injected with Accelerator A-20 solution to increase set time and yield. Refer to Southwest Fireproofing Injection Procedures For High Production for detailed instructions. Type DK3 (spatter coat) shall be applied to all cellular floor units and to all roof deck systems where indicated by the UL design. For complete application instructions, refer to the Southwest Fireproofing Products Field Application Manual.

Field Tests

Test for thickness and density in accordance with the applicable building code, AWCI Technical Manual 12-A (Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials, an Annotated Guide), and ASTM E605 (Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members).

Finishing

Normally left as a sprayed texture finish.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	40°F (4°C)	40°F (4°C)	40°F (4°C)	0%
Maximum	100°F (38°C)	125°F (52°C)	110°F (43°C)	95%

Air and substrate temperatures shall be maintained 24 hours before, during and 24 hours after application. Gypsum based products are susceptible to water and must be protected accordingly. Contact Carboline Fireproofing Technical Service for recommendations.

CURING SCHEDULE

Surface Temp.	Dry to Recoat
77°F (25°C)	4 Hours

Recoat times will vary based upon ambient conditions and air movement. Material can be injected with Accelerator A-20 for fast set time and increased yield.

CLEANUP & SAFETY

Cleanup

Pump, mixer and hoses should be cleaned with potable water. Sponges should be run through the hoses to remove any material remaining in the hoses. Wet overspray must be cleaned up with clean, potable water. Cured overspray material may be difficult to remove and may require chipping or scraping to remove.

Safety

Follow all safety precautions on the Material Safety Data Sheet. It is recommended that personal protective equipment be worn, including spray suits, gloves, eye protection and respirators.

Overspray

Adjacent surfaces shall be protected from damage and overspray. Sprayed fireproofing materials may be difficult to remove from surfaces and may cause damage to architectural finishes.

Ventilation

In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour until the material is dry.

TESTING / CERTIFICATION / LISTING

Underwriters Laboratories, Inc.	Tested in accordance with ASTM E119/UL 263 at Underwriter's Laboratories, Inc. and listed by UL in the following designs (most commonly used in bold): **Protected Floor/Ceiling:** **D739, D788 (Restrained/Unrestrained)** Additional designs: A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D725, D726, D727, D728, D729, D730, D740, D742, D743, D744, D745, D746, D747, D748, D750, D751, D752, D753, D754, D756, D758, F817, F818 **Unprotected Floor/Ceiling:** **D949 (Restrained/Unrestrained)** Additional designs: D905, D907, D909, D910, D916, D917, D920, F906 **Concrete Floor/Roof:** **J718 (Restrained/Unrestrained)** Additional designs: G701, G702, G703, J701, J704, J705, J706, J709, J919, J957, J966 **Beam/Joist:** **N791, S740 (Restrained/Unrestrained)** Additional designs: N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739 **Protected Roof/Ceiling:** **P741 (Restrained/Unrestrained)** Additional designs: P675, P676, P701, P708, P709, P710, P711, P714, P717, R705 **Unprotected Roof/Ceiling:** **P921 (Restrained)** Additional designs: P901, P902, P907, P919, P920, P923, P937 **Metal Wall Assembly:** **U703 (Restrained/Unrestrained)** **Columns:** **X771, Y725** Additional designs: X527, X701, X704, X722, X723, X772, X751, X752, X808, X813, X819, X820, X821, X822, Z805, Z806, Z807, Z810
City of New York	MEA No. 55-04-M Vol. II (Wall) MEA No. 56-04-M Vol. II (Beam and Floor/Ceiling) MEA No. 409-02-M Vol. III (Columns and Roof/Ceiling

PACKAGING, HANDLING & STORAGE

Packaging	50 lb. (22.7 kg) bags
Shelf Life	12 months
Storage	Store indoors in a dry environment between 32°F - 125°F (0°C - 52°C) Material must be kept dry or clumping of material may occur.
Shipping Weight (Approximate)	50 lb. (22.7 kg)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

carboline®
Coatings - Linings - Fireproofing

CEMENTITIOUS FIREPROOFING PRODUCTS

March, 2015

TYPE 5GP & 5MD SHORT FORM APPLICATION GUIDE

Simply stated, product yield from a bag of Carboline / Southwest is basically a function of 4 items:

1. Machinery and job "set up"
2. Applied Density and thickness control
3. Amount of overspray, ie: Waste
4. Sprayer/crew effectiveness

It is normal for good contractors to achieve densities in the 15 lbs./ft^3 range for Type 5 GP. Let us assume a project of normal scope and applied at reasonable speeds, ie: application rates are in the 135 -160 bags per day, and the project is medium size, such as a 6-story building, with a total of 6000 bags. Larger work, and higher pump distances may require more pressure, perhaps larger machines and will result in somewhat higher densities and somewhat lower yields.

Let us take the project from start to finish:

A. Project Set Up:

Using the right and functioning equipment is paramount. Too many contractors are lax in this area, expect performance from smaller application units, and are as a result disappointed. Again, assuming the above medium size project, the following are what we suggest as an optimum set up: Also see last page of the current application manual for further details.

Pumps:	Sunspray 320 E or Diesel piston pumps(no longer in production) Putzmeister: Tommy gun, also electric or diesel piston pumps "Big Blue" high production pumps Mayco: FP 30-piston pump Excalibur Western
Mixers:	Sunspray Continuous units, Big Blue Continuous units Stone Hydro Blend FP continuous mixer Various paddle mixers, 12 –16 cu. ft. size with rubber tipped blades
Water:	An uninterrupted potable water supply of at least 5 gallons per minute flow. If using a paddle mixer use a 55-gallon barrel surge supply, with automatic shut off valve, water meter and pump to supply mixer. Also available from pump distributors.

Hoses: Always use a 3" or larger I.D. surge hose from the manifold, for the 1st 15 - 25 feet of the material transfer hose. Then use a 16" tapered fitting to a 2" I.D. hose until reaching the spray area, then taper to 1 ¼" or 1" whip hose no longer than 25 feet. If running short lengths of hoses, using 2" lines will be acceptable, but always use a larger surge hose. Do not use a smaller ID whip hose.

Note: The I.D. of material transfer hoses is important, as restrictions will cause excess back pressures and increase maintenance of pumps.

Standpipe: Use 2" aluminum tubing with quick external disconnections. Use large radius elbows at the ground floor to standpipe as well as at other end of standpipe.

Airlines: Minimum 30 psi required. Tape airline to material hose whenever practical.

Staging: Typically it is best to build a large platform as close as possible to the building at an area where materials can be delivered conveniently, and most importantly trailers can be switched. This platform should be at least 10' x 15' and covered for rainy days.

Equally, the rolling scaffold on the floor should be of similar size, but not smaller than 6" x 10' whenever practical, meet OSHA guidelines, and have large wheels for ease of mobility.

B. Application of Fireproofing: Density and Thickness Control

Proper Water Ratios:

Having the right equipment, the proper amount of water, proper mix and proper nozzle set up is crucial to obtaining maximum yield. The water content should be:

Type 5GP: 10-11 gallons per bag.
Type 5MD: 8-10 gallons per bag.

Type 5 will thicken as it is conveyed thru the hose, buy may look "too wet" in the pump hopper. Hence, there is a tendency by mixer personnel to use less water than recommended. **Water is free; takes up space; use it! See attached chart for other product water ratios.**

Thickness Control:

This part of the application process is very crucial, and is controlled by several factors:

1. Air pressure and spray pattern
2. Amount of water
3. Thickness Control and size of spray tip (use of shield is always recommended)
4. Distance from substrate
5. The sprayer should have a thickness gauge in his hands at all times

Air Pressure:

When too much air is used (observed by a high pitch sound) to create a beautiful smooth spray pattern, chances are that the impingement of material to the substrate will substantially increase the density. Use minimum amount of air to break up product, and create a reasonably smooth pattern.

Spray Tips:

Use 9/16" to 5/8" spray tips. We prefer 5/8", with a mini-shield. (Use 3/8" if spraying 7 HD)

Water:

As already mentioned, the amount of water is also important. Use as much water as possible to apply thicknesses not to exceed ¾" per single pass. It is less expensive to double - back than too try to spray excessive thicknesses per pass. This will usually result in excess overspray – waste and uneven applications, resulting in excessive corrections to the applied material to "fill in" low areas.

Thickness Control:

If the thickness required is a 1" application, and the sprayer averages 1 1/8", then 11 % extra product is being used. **If a floor requires 800 bags, the extra thickness this amounts to is an additional 85-90 bags.** If the building is 10 floors, an additional truckload may be required to finish the job. The result will be the estimator and the field personnel trading "barbs". Too often the final result is finger pointing at the manufacturer.

Distance from spray substrate:

Although this is not necessarily relative to density, the distance a sprayer is from the substrate will determine both the smoothness of the application and most importantly the amount of waste. Good applications will be less that 5 % waste. In excess of 5% usually means lack of control, interest or training. A good nozzle distance from the substrate is 12 – 14".

C. Spray Crew Effectiveness:

This is an area often not as controllable as other application portions outlined above. Personnel are crucial to the success of any endeavor and project. So pick your lead sprayer carefully. Use incentive programs to achieve required daily bag counts (at the correct thickness)

Target daily productivity, and make sure you stay on track with a predetermined schedule. Use the minimum crew size. The above project example should not require more than 3 men. A mixer, a hose/clean up man and a sprayer. The hose man should be able to spray to relieve the sprayer.

Attitude is best judged by performance. Let this be your guide to achieving maximum efficiency.

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Safety Data Sheet
prepared to UN GHS Revision 3

1. Identification of the Substance/Mixture and the Company/Undertaking

1.1 Product Identifier 24ADS1NL

Product Name: SOUTHWEST TYPE 5GP

Revision Date: 12/12/2016

Supercedes Date: 08/31/2016

1.2 Relevant identified uses of the substance or mixture and uses advised against Fireproofing Material

1.3 Details of the supplier of the safety data sheet

Manufacturer:
Carboline Company
2150 Schuetz Road
St. Louis, MO USA 63146

Regulatory / Technical Information:
Contact Carboline Technical Services at
1-800-848-4645

Datasheet Produced by: Alotta, Vicki - ehs@stoncor.com

1.4 Emergency telephone number:
CHEMTREC 1-800-424-9300 (Inside US)
CHEMTREC +1 703 5273887 (Outside US)
HEALTH - Pittsburgh Poison Control 1-412-681-6669

2. Hazard Identification

2.1 Classification of the substance or mixture

Carcinogenicity, category 1A

2.2 Label elements

Symbol(s) of Product

Signal Word

danger

Named Chemicals on Label

MICROCRYSTALLINE SILICA

HAZARD STATEMENTS

Carcinogenicity, category 1A	H350-1A	May cause cancer.

PRECAUTION PHRASES

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P284	Wear respiratory protection.
P308+313	IF exposed or concerned: Get medical advice/attention

2.3 Other hazards

No Information

Results of PBT and vPvB assessment:

The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

3. Composition/Information On Ingredients

3.2 Mixtures

Hazardous Ingredients

CAS-No.	Chemical Name	%
10034-76-1	CALCIUM SULFATE HEMIHYDRATE	50-75
1317-65-3	LIMESTONE	1.0-2.5
14808-60-7	MICROCRYSTALLINE SILICA	0.1-1.0

CAS-No.	GHS Symbols	GHS Hazard Statements	M-Factors
10034-76-1	GHS07	H302-320	0
1317-65-3	GHS07	H315-319	0
14808-60-7	GHS08	H350-370	0

Additional Information: The text for GHS Hazard Statements shown above (if any) is given in Section 16.

4. First-aid Measures

4.1 Description of First Aid Measures

AFTER INHALATION: Remove person to fresh air. If signs/symptoms continue, get medical attention.
AFTER SKIN CONTACT: Wash off with soap and plenty of water.
AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritating to respiratory system. This product contains silica which is classified by IARC as a known human carcinogen (Group 1). Crystalline silica is known to cause silicosis.

4.3 Indication of any immediate medical attention and special treatment needed

No Information

5. Fire-fighting Measures

5.1 Extinguishing Media:

Carbon Dioxide, Dry Chemical, Foam, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: No Information

5.2 Special hazards arising from the substance or mixture

No Information

5.3 Advice for firefighters

The product is not flammable.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Sweep up to prevent slipping hazard. Forms slippery/greasy layers with water.

6.2 Environmental precautions

No Information

6.3 Methods and material for containment and cleaning up

No Information

6.4 Reference to other sections

No Information

7. Handling and Storage

7.1 Precautions for safe handling

INSTRUCTIONS FOR SAFE HANDLING : Avoid breathing dust. Do not breathe vapours or spray mist. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.
PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust. Wash hands before eating, drinking, or smoking.

7.2 Conditions for safe storage, including any incompatibilities

CONDITIONS TO AVOID: Exposure to moisture.
STORAGE CONDITIONS: Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3 Specific end use(s)

No Information

8. Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with Occupational Exposure Limits (US)

Name	%	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	OEL Note
CALCIUM SULFATE HEMIHYDRATE	50-75	10 MG/M3	N/E	15 MG/M3 TOTAL, 5 MG/M3 RESPIRABLE	N/E	
LIMESTONE	1.0-2.5	N/E	N/E	5 MGM3	N/E	
MICROCRYSTALLINE SILICA	0.1-1.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E	

FURTHER INFORMATION: No Information

8.2 Exposure controls

Personal Protection
RESPIRATORY PROTECTION: Effective dust mask. Use NIOSH approved respiratory protection.
EYE PROTECTION: Safety glasses with side-shields.
HAND PROTECTION: For prolonged or repeated contact use protective gloves.
OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.
ENGINEERING CONTROLS: Avoid dust accumulation in enclosed space.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Grey Powder Mixture
Physical State	Solid
Odor	Low Odor
Odor threshold	N/D
pH	N/D
Melting point / freezing point (°C)	N/A
Boiling point/range (°C)	N/A - N/A
Flash Point, (°C)	999
Evaporation rate	N/A
Flammability (solid, gas)	Not determined
Upper/lower flammability or explosive limits	N/A - N/A
Vapour Pressure, mmHg	N/A
Vapour density	Heavier than Air
Relative density	Not determined
Solubility in / Miscibility with water	Slight
Partition coefficient: n-octanol/water	Not determined
Auto-ignition temperature (°C)	Not determined
Decomposition temperature (°C)	Not determined
Viscosity	Unknown
Explosive properties	Not determined
Oxidising properties	Not determined

9.2 Other information

VOC Content g/l:	0
Specific Gravity (g/cm3)	1.92

10. Stability and Reactivity

10.1 Reactivity
No Information

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
None known.

11. Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity:

Oral LD50: N/D

Inhalation LC50: N/D

Irritation: Unknown

Corrosivity: Unknown

Sensitization: Unknown

Repeated dose toxicity: Unknown

Carcinogenicity: Unknown

Mutagenicity: Unknown

Toxicity for reproduction: Unknown

If no information is available above under Acute Toxicity then the acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
10034-76-1	CALCIUM SULFATE HEMIHYDRATE	>1587 mg/kg, oral, rat	Not Available	Not Available
1317-65-3	LIMESTONE	6450 mg/kg, oral, rat	Not Available	Not Available
14808-60-7	MICROCRYSTALLINE SILICA	Not Available	Not Available	Not Available

Additional Information:
No Information

12. Ecological Information

12.1 Toxicity:

EC50 48hr (Daphnia): Unknown

IC50 72hr (Algae): Unknown

LC50 96hr (fish): Unknown

12.2 Persistence and degradability: Unknown

12.3 Bioaccumulative potential: Unknown

12.4 Mobility in soil: Unknown

12.5 Results of PBT and vPvB assessment: The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

12.6 Other adverse effects: Unknown

CAS-No.	Chemical Name	EC50 48hr	IC50 72hr	LC50 96hr
10034-76-1	CALCIUM SULFATE HEMIHYDRATE	No information	No information	(Fathead Minnow)1970 mg/L
1317-65-3	LIMESTONE	No information	No information	No information
14808-60-7	MICROCRYSTALLINE SILICA	No information	No information	No information

13. Disposal Considerations

13.1 WASTE TREATMENT METHODS: Dispose of in accordance with local regulations.

14. Transport Information

14.1	**UN number**	None
14.2	**UN proper shipping name**	Not Regulated
	Technical name	N/A
14.3	**Transport hazard class(es)**	None
	Subsidiary shipping hazard	N/A
14.4	**Packing group**	N/A
14.5	**Environmental hazards**	Unknown
14.6	**Special precautions for user**	Unknown
	EmS-No.:	None
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code**	Unknown

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation for the substance or mixture:

U.S. Federal Regulations: As follows -

CERCLA - Sara Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard, Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Sara 313 components exist in this product.

Toxic Substances Control Act:

All components of this product are either listed on the TSCA Inventory or are exempt.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS-No.
VERMICULITE	1318-00-9
CELLULOSE	9004-34-6

Pennsylvania Right-To-Know

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS-No.
VERMICULITE	1318-00-9
CELLULOSE	9004-34-6

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS-No.
MICROCRYSTALLINE SILICA	14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards.

No Proposition 65 Reproductive Toxins exist in this product.

International Regulations: As follows -

* Canadian DSL:

No Information

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

16. Other Information

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H320	Causes eye irritation.
H350	May cause cancer.
H370	Causes damage to organs.

Reasons for revision

No Information

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

Accelerator A-20

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Description	Accelerator A-20 is a powder mixed with water and injected into gypsum based fireproofing materials to reduce the set time and increase production rates. Accelerator A-20 can be used with Southwest Type 5 materials.

MIXING & THINNING

Mixing	CAUTION: The Accelerator A-20 solution is acidic and can irritate or injure skin, eyes and lungs. All personnel should wear proper protection when mixing or spraying with Accelerator A-20. Glove, coveralls, respirator and goggles are required to avoid injury. Avoid contact to bare skin. The fumes from the Accelerator A-20 solution are irritating. Review Accelerator A-20 MSDS prior to use.Mix one 50 lbs. bag of Accelerator A-20 with 10.0 gallons of clean potable water. The standard mix is four bags of Accelerator A-20 with 40 gallons of water. The total solution volume will be 51 gallons.Continue mixing until Accelerator A-20 powder is dissolved completely. A longer mix time will be required to dissolve Accelerator A-20 in colder temperatures. After mixing, allow bubbles to come out of the solution.
Set up	Open valve at base of tank to allow solution to flow to the injector pump. Close valve to injection hose. Open bypass valve and turn on injector pump to re-circulate Accelerator A-20 solution back into the mixing tank for 5 minutes. The Accelerator A-20 solution concentration can be checked with a hydrometer or by weight of a known volume. By hydrometer measurement, the target specific gravity is 1.245 with range of 1.235 to 1.255. To check by net weight of a filled container, a full 1 liter container should weigh 1245 grams ± 10 grams. Next, fill the alum hose with solution. Close the valve on the end of the hose near the injection housing. Close the bypass valve and open the injector pump valve to alum hose. With the end of the alum hose going back into the mixing tank, open the valve to allow solution to flow through the hose. Continue pumping back into the tank until all air bubbles are out of the solution.Using the injector knob, turn the knob out to decrease the solution percentage and turn the knob in to increase the solution percentage to be injected.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Pump	Use an alum injection pump with a minimum 600 psi pressure capacity. Contact Carboline technical service for more information. Use 55 gallon plastic drum(s) with 110 volt electric mixer for each drum.
Valves	A backflow valve must be used at the injection point to prevent the Accelerator A-20 from dripping and setting up the material in the off position. The flow of Accelerator A-20 must be turned off and flushed out of conveyance line before stopping the conveyance pump.
Material Hose	3/8” hose set up with the backflow valve and an injection module placed at 25 foot back from the nozzle. A 15 foot ¾” I.D. material whip hose can be used.
Nozzle/Gun	Use a minimum 1” I.D. plaster type nozzle with shut off valve, swivel and air shut off valve.
Orifice Size and Shields	9/16 to 5/8” I.D. minimum. Use mini-shields or super-shields depending on project conditions.

Accelerator A-20

PRODUCT DATA SHEET

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	40°F (4°C)	40°F (4°C)	40°F (4°C)	0%

Air and substrate temperatures shall be 40°F minimum, and shall be maintained 24 hours before, during and for 24 hours after spraying occurs.

CURING SCHEDULE

Surface Temp.	Dry to Recoat	Final Cure
70°F (21°C)	20 Minutes	28 Days

Newly installed Southwest Type 5 materials must be protected from rain and running water for 24 hours. Injected material will have reduced set time, and will be ready to recoat in 15-20 minutes at 70°F. Colder temperatures will require more time. Material must be set and firm before receiving the next coat. Material requires 28 days to reach full cure.

CLEANUP & SAFETY

Cleanup	Pump, mixer and hoses should be cleaned with potable water. Cured overspray material may be difficult to remove and may require chipping or scraping to remove. Read and abide by the MSDS. Do not breathe dust. Use OSHA approved dust mask. Safety goggles or glasses should be worn.
Safety	For eye contact, flush with copious amount of water in accordance with OSHA instructions. Wash skin with clean water to prevent irritation. Follow equipment manufacturers' recommendations regarding safety and maintenance.
Overspray	Adjacent surfaces shall be protected from damage and overspray. Sprayed fireproofing materials may be difficult to remove from surfaces and may cause damage to architectural finishes.st
Ventilation	Ventilation in enclosed areas is very important, to assist products to set and dry properly. Total air exchange should be at least 4 times per hour.

PACKAGING, HANDLING & STORAGE

Packaging	50 lbs. bags
Shelf Life	24 months
Storage	Material should be kept dry, covered, and off the ground between -20°F to 150°F (-29°C to 66°C).
Shipping Weight (Approximate)	Bag Weight is 50 lbs (22.7 kg)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

Safety Data Sheet
prepared to UN GHS Revision 3

1. Identification of the Substance/Mixture and the Company/Undertaking

1.1 Product Identifier 50ADS1NL

Product Name: Accelerator A-20

Revision Date: 05/30/2015

Supercedes Date: 29/05/2015

1.2 Relevant identified uses of the substance or mixture and uses advised against Component of multicomponent industrial coatings - Industrial use.

1.3 Details of the supplier of the safety data sheet

Manufacturer:

Carboline Company
2150 Schuetz Road
St. Louis, MO USA 63146

Regulatory / Technical Information:
Contact Carboline Technical Services at
1-800-848-4645

Datasheet Produced by: Schlereth, Ken - ehs@stoncor.com

1.4 Emergency telephone number:

CHEMTREC 1-800-424-9300 (Inside US)
CHEMTREC +1 703 5273887 (Outside US)
HEALTH - Pittsburgh Poison Control 1-412-681-6669

2. Hazard Identification

2.1 Classification of the substance or mixture

Acute Toxicity, Oral, category 4
Eye Irritation, category 2

2.2 Label elements

Symbol(s) of Product

Signal Word

Warning

Named Chemicals on Label

ALUMINUM SULFATE

GHS HAZARD STATEMENTS

Acute Toxicity, Oral, category 4	H302	Harmful if swallowed.
Eye Irritation, category 2	H319	Causes serious eye irritation.

GHS PRECAUTION PHRASES

P264	Wash hands thoroughly after handling.
P270	Do no eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing/eye protection/ face protection.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

2.3 Other hazards

Not applicable

Results of PBT and vPvB assessment:

The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

3. Composition/Information On Ingredients

3.1 Substances

Hazardous Ingredients

CAS-No.	Chemical Name	%
10043-01-3	ALUMINUM SULFATE	75-100

CAS-No.	GHS Symbols	GHS Hazard Statements	M-Factors
10043-01-3	GHS07	H302-319	0

Additional Information: The text for GHS Hazard Statements shown above (if any) is given in Section 16.

4. First-aid Measures

4.1 Description of First Aid Measures

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call

a poison control centre or doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritating to respiratory system.

4.3 Indication of any immediate medical attention and special treatment needed

No Information

5. Fire-fighting Measures

5.1 Extinguishing Media:

Carbon Dioxide, Dry Chemical, Foam, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

5.2 Special hazards arising from the substance or mixture

No Information

5.3 Advice for firefighters

Evacuate personnel to safe areas. Use NIOSH approved respiratory protection. Use water spray to cool unopened containers.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

No Information

6.2 Environmental precautions

No Information

6.3 Methods and material for containment and cleaning up

No Information

6.4 Reference to other sections

No Information

7. Handling and Storage

7.1 Precautions for safe handling

INSTRUCTIONS FOR SAFE HANDLING : Keep containers dry and tightly closed to avoid moisture absorption and contamination. Prepare the working solution as given on the label(s) and/or the user instructions. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation/personal protection.
PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

CONDITIONS TO AVOID: Exposure to moisture.
STORAGE CONDITIONS: Keep container closed when not in use.

7.3 Specific end use(s)

No Information

8. Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with Occupational Exposure Limits (US)

Name	%	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	OEL Note
ALUMINUM SULFATE	75-100	2 MG/M3	N/E	2 MGM3	N/E	

FURTHER INFORMATION: No Information

8.2 Exposure controls

Personal Protection

RESPIRATORY PROTECTION: Dust safety masks are recommended when the dust concentration is more than 10 mg/m3.

EYE PROTECTION: Safety glasses with side-shields.

HAND PROTECTION: Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Impervious glovesRequest information on glove permeation properties from the glove supplier.

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location. Lightweight protective clothing

ENGINEERING CONTROLS: Use with adequate ventilation.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	White Granules
Physical State	Solid
Odor	None
Odor threshold	
pH	N/D
Melting point / freezing point (°C)	N/D
Boiling point/range (°C)	N/A - N/A
Flash Point, (°C)	999
Evaporation rate	
Flammability (solid, gas)	
Upper/lower flammability or explosive limits	Not determined
Vapour Pressure, mmHg	N/D
Vapour density	
Relative density	
Solubility in / Miscibility with water	50% @ 0C
Partition coefficient: n-octanol/water	
Auto-ignition temperature (°C)	
Decomposition temperature (°C)	
Viscosity	Unknown
Explosive properties	

Oxidising properties

9.2 Other information

VOC Content g/l:	0
Specific Gravity (g/cm3)	1.610

10. Stability and Reactivity

10.1 Reactivity
No Information

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
No Information

10.6 Hazardous decomposition products
None known.

11. Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity:

Oral LD50:	N/D
Inhalation LC50:	N/D
Irritation:	Unknown
Corrosivity:	Unknown
Sensitization:	Unknown
Repeated dose toxicity:	Unknown
Carcinogenicity:	Unknown
Mutagenicity:	Unknown
Toxicity for reproduction:	Unknown

If no information is available above under Acute Toxicity then the acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
10043-01-3	ALUMINUM SULFATE	1930 mg/kg, oral, rat		Not Available

Additional Information:

Irritating to respiratory system.

12. Ecological Information

12.1 Toxicity:

EC50 48hr (Daphnia): Unknown

IC50 72hr (Algae): Unknown

LC50 96hr (fish): Unknown

12.2 Persistence and degradability: Unknown

12.3 Bioaccumulative potential: Unknown

12.4 Mobility in soil: Unknown

12.5 Results of PBT and vPvB assessment: The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

12.6 Other adverse effects: Unknown

CAS-No.	Chemical Name	EC50 48hr	IC50 72hr	LC50 96hr
10043-01-3	ALUMINUM SULFATE	No information	No information	No information

13. Disposal Considerations

13.1 WASTE TREATMENT METHODS: Dispose of in accordance with local regulations.

14. Transport Information

14.1 UN number None

14.2 UN proper shipping name Not Regulated

Technical name N/A

14.3 Transport hazard class(es) None

Subsidiary shipping hazard N/A

14.4 Packing group N/A

14.5 Environmental hazards Unknown

14.6 Special precautions for user Unknown

EmS-No.: Unknown

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code Unknown

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation for the substance or mixture:

U.S. Federal Regulations: As follows -

CERCLA - Sara Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Sara 313 components exist in this product.

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

U.S. Clean Air Act:

EPA Coating Category:
EPA VOC Content Limit (g/l):
Product VOC Content (g/l)
Thinning Recommendations:
Application Recommendations:

May be harmful if swallowed.

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

No NJ Right-To-Know components exist in this product.

Pennsylvania Right-To-Know

The following non-hazardous ingredients are present in the product at greater than 3%.

No PA Right-To-Know components exist in this product.

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

No Proposition 65 Carcinogens exist in this product.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards.

No Proposition 65 Reproductive Toxins exist in this product.

International Regulations: As follows -

*** Canadian DSL:**

No Information

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

16. Other Information

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H302	Harmful if swallowed.
H319	Causes serious eye irritation.

Reasons for revision

No Information

No Information

SOUTHWEST TYPE DK3™

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	A cementitious, spray applied spatter coat.
Description	A cement and vermiculite based, spray applied spatter coat designed to be used in conjunction with Southwest fireproofing materials to enhance bonding properties on cellular steel decking and roof deck systems.
Features	• Excellent bonding properties • Fast overcoat time • Noncombustible • Asbestos-free – complies with EPA and OSHA regulations. • Mineral Wool free – no airborne fibers. • Styrene free – no toxic decomposition gases.
Color	Gray Product color may vary due to variations in color of Portland cement.
Finish	Textured
Primer	Primers are not required or recommended. If a primer is specified, or steel is primed, bond strength must meet minimum UL criteria. Contact Carboline Technical Service for further information. Southwest Fireproofing materials neither promote nor prevent corrosion. Fireproofing should not be considered part of the corrosion protection system.
Application Thickness	3/8" (9.5 mm)
Theoretical Coverage Rates	600-800 ft² (55-74 m²) per bag Apply product so that coverage does not exceed 70% of the surface area. Adjust spray pattern so that material does "spatter" from nozzle. 30% of the deck surface must be visible after material is applied to achieve correct coverage.
Limitations	Not intended for permanent direct exposure to weather or excessive physical abuse beyond normal construction cycles. Not recommended for use as refractory cement or where operating temperatures exceed 200°F (93°C).

SUBSTRATES & SURFACE PREPARATION

General	Prior to application, all substrates must be clean and free of loose scale, dirt, oil, grease, condensation, or any other substance that would impair adhesion. Material shall be applied to the underside of roof deck assemblies only after all roofing work has been completed, and all roof traffic has ceased. Also be sure that all roof work is completed and water tight before commencing installation of fire protection. Roof traffic shall be limited to maintenance after fire protection is applied and cured. No fireproofing shall be applied prior to completion of concrete work on steel floor decking.

MIXING & THINNING

Mixer	1. Use a minimum 12-16 cubic foot (340-453 liter) heavy-duty mortar mixer capable of rotating at 40 rpm with rubber tipped blades that wipe the sides. 2. Use continuous feed mixer. Contact Carboline Technical Service for recommendation. Densities may vary when using this type of mixing equipment.

MIXING & THINNING

Mixing	Always mix with clean potable water. The mixer shall be kept clean and free of any previously mixed materials which may cause premature setting of product. A 2 bag mix is recommended for paddle type mixers. Mix time should be approximately 1.5 minutes minutes at 40 rpm. Do not over mix. The material volume should not go over center bar of mixer. Use 9 to 10 gallons (34.1 to 37.8 liters) of water per 50 lb. (22.7 kg) bag. Add water to the mixer first with blades stopped. With mixer turned on, add material to the water and begin mixing. The mix will appear wet. Agitate occasionally if left standing so that mixture does not settle. If material is sandwiched between Southwest Type 5 mixes (in the same mixing equipment), the Type 5 batches before and after must have retarder blend added (usually 2 batches before and after is sufficient). Use 2.5 oz. (70.9 g) of retarder per batch of Type 5. Retarder is not required for Southwest Type 7 applications.
Pot Life	2 hours at 75°F (24°C) Pot life of material will be shorter at higher temperatures.
Density	For information and recommendations obtaining the proper density and yield, contact the local Carboline representative or Carboline Fireproofing Technical Service.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Pump	This material can be pumped with a wide range of piston, rotor stator and squeeze pumps designed to pump cement & plaster materials including: Essick - model# FM9/FM5E (Rotor Stator/2L4) Putzmeister - model# S5EV(Rotor Stator/2L6) Hy-Flex - model# HZ-30E(Rotor Stator/2L6) Hy-Flex - model# H320E (Piston) Strong Mfg. - model# Spraymate 60 (Rotor Stator/2L6) Airtech - model# Swinger (Piston) Mayco - model# PF30 (Dual Piston) Thomsen - model# PTV 700 (Dual Piston) Marvel kit must be removed from piston pumps.
Ball Valves	Ball valves should be located at the manifold and at the end of the surge hose to facilitate cleaning of the pump and/or hoses.
Material Hose	Use 15 to 25 feet (4.5 m to 7.6 m) of 3” (76 mm) I.D. or larger surge hose from the manifold. Follow with a 16” (406 mm) tapered fitting to a 2” (50 mm) I.D. hose to the spray area. Taper to 15 to 20 feet (4.5 m to 6 m) of minimum 1-1/4” or 1” (25 mm) whip hose.
Standpipe	Use 3” (76 mm) I.D. aluminum tubing with quick external disconnections. Elbows should be 3” (76 mm) I.D. with minimum 36” (0.9 m).
Nozzle/Gun	Use a minimum 1” (25 mm) I.D. plaster type nozzle with shut off valve, swivel and air shut off valve.
Orifice Size and Shields	9/16 to 5/8” (14.3 mm - 15.9 mm) I.D. “blow-off” tips (mini shields optional)
Compressor	Compressor on pump must be capable of maintaining minimum 30 psi (206 kPa) and 9 to 11 cfm at the nozzle.
Air Line	Use 5/8” (15.9 mm) I.D. hose with a minimum bursting pressure of 100 psi (689 kPa).

APPLICATION PROCEDURES

General	Thicknesses of 3/8" (9.5 mm) or less can be applied in one pass. Material is applied in one monolithic coat. Type DK3 (spatter coat) shall be applied to all cellular floor units and to all roof deck systems where indicated by the UL design. Allow material to set for a minimum of 30 minutes before applying fireproofing materials. It is acceptable to apply Type DK3 (spatter coat) the prior day, but it is not recommended to exceed 24 hours before fireproofing is applied. Do not start work if ambient temperature is expected to drop or remain below 32°F (0°C) for 48 hours after application. For complete application instructions, refer to the Southwest Fireproofing Products Field Application Manual.
Field Tests	Test for thickness and density in accordance with the applicable building code, AWCI Technical Manual 12-A (Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials, an Annotated Guide), and ASTM E605 (Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members).
Finishing	Normally left as a sprayed texture finish.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	40°F (4°C)	40°F (4°C)	40°F (4°C)	0%
Maximum	100°F (38°C)	125°F (52°C)	110°F (43°C)	95%

Air and substrate temperatures shall be maintained 24 hours before, during and 24 hours after application. Contact Carboline Fireproofing Technical Service for recommendations.

CLEANUP & SAFETY

Cleanup	Pump, mixer and hoses should be cleaned with potable water. Sponges should be run through the hoses to remove any material remaining in the hoses. Wet overspray must be cleaned up with soapy or clean, potable water. Cured overspray material may be difficult to remove and may require chipping or scraping to remove.
Safety	Follow all safety precautions on the Material Safety Data Sheet. It is recommended that personal protective equipment be worn, including spray suits, gloves, eye protection and respirators.
Overspray	Adjacent surfaces shall be protected from damage and overspray. Sprayed fireproofing materials may be difficult to remove from surfaces and may cause damage to architectural finishes.
Ventilation	In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour until the material is dry.

PACKAGING, HANDLING & STORAGE

Packaging	50 lb. (22.7 kg) bags
Shelf Life	12 months
Storage	Store indoors in a dry environment between 32°F - 125°F (0°C - 52°C) Material must be kept dry or clumping of material may occur.

PACKAGING, HANDLING & STORAGE

Shipping Weight (Approximate)	50 lb. (22.7 kg)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

Safety Data Sheet
prepared to UN GHS Revision 3

1. Identification of the Substance/Mixture and the Company/Undertaking

1.1 Product Identifier 28ADS1NL

Product Name: SOUTHWEST TYPE DK3

Revision Date: 10/02/2015

Supercedes Date: 06/02/2015

1.2 Relevant identified uses of the substance or mixture and uses advised against Fireproofing Material

1.3 Details of the supplier of the safety data sheet

Manufacturer:

Carboline Company
2150 Schuetz Road
St. Louis, MO USA 63146

Regulatory / Technical Information:
Contact Carboline Technical Services at
1-800-848-4645

Datasheet Produced by: Schlereth, Ken - ehs@stoncor.com

1.4 Emergency telephone number:

CHEMTREC 1-800-424-9300 (Inside US)
CHEMTREC +1 703 5273887 (Outside US)
HEALTH - Pittsburgh Poison Control 1-412-681-6669

2. Hazard Identification

2.1 Classification of the substance or mixture

Carcinogenicity, category 1A
Skin Corrosion, category 1
Skin Sensitizer, category 1

2.2 Label elements

Symbol(s) of Product

Signal Word

Danger

Named Chemicals on Label

CALCIUM OXIDE, MICROCRYSTALLINE SILICA, PORTLAND CEMENT

GHS HAZARD STATEMENTS

Skin Corrosion, category 1	H314-1	Causes severe skin burns and eye damage.
Skin Sensitizer, category 1	H317	May cause an allergic skin reaction.
Carcinogenicity, category 1A	H350-1A	May cause cancer.

GHS PRECAUTION PHRASES

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash hands thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/ face protection.
P284	Wear respiratory protection.
P301+310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302+352	IF ON SKIN: Wash with plenty of soap and water.
P303+361+353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
P308+313	IF exposed or concerned: Get medical advice/attention
P333+313	If skin irritation or rash occurs: Get medical advice/attention.

2.3 Other hazards

No Information

Results of PBT and vPvB assessment:

The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

3. Composition/Information On Ingredients

3.2 Mixtures

Hazardous Ingredients

CAS-No.	Chemical Name	%
65997-15-1	PORTLAND CEMENT	50-75
1317-65-3	LIMESTONE	2.5-10
1305-78-8	CALCIUM OXIDE	2.5-10
1309-48-4	MAGNESIUM OXIDE	2.5-10
14808-60-7	MICROCRYSTALLINE SILICA	0.1-1.0

CAS-No.	GHS Symbols	GHS Hazard Statements	M-Factors
65997-15-1	GHS05-GHS07	H315-317-318	0
1305-78-8	GHS05-GHS07	H315-318-335	0
1317-65-3	GHS07	H315-319	0
1309-48-4			0
14808-60-7	GHS08	H350-370	0

Additional Information: The text for GHS Hazard Statements shown above (if any) is given in Section 16.

4. First-aid Measures

4.1 Description of First Aid Measures

AFTER INHALATION: Remove person to fresh air. If signs/symptoms continue, get medical attention.
AFTER SKIN CONTACT: Wash off with soap and plenty of water.
AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritating to respiratory system.

4.3 Indication of any immediate medical attention and special treatment needed

No Information

5. Fire-fighting Measures

5.1 Extinguishing Media:

Carbon Dioxide, Dry Chemical, Foam, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: No Information

5.2 Special hazards arising from the substance or mixture

No Information

5.3 Advice for firefighters

The product is not flammable.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Sweep up to prevent slipping hazard. Forms slippery/greasy layers with water.

6.2 Environmental precautions

No Information

6.3 Methods and material for containment and cleaning up

No Information

6.4 Reference to other sections

No Information

7. Handling and Storage

7.1 Precautions for safe handling

INSTRUCTIONS FOR SAFE HANDLING : Avoid breathing dust. Do not breathe vapours or spray mist. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.
PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust. Wash hands before eating, drinking, or smoking.

7.2 Conditions for safe storage, including any incompatibilities

CONDITIONS TO AVOID: Exposure to moisture.
STORAGE CONDITIONS: Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3 Specific end use(s)

No Information

8. Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with Occupational Exposure Limits (US)

Name	%	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	OEL Note
PORTLAND CEMENT	50-75	10 MG/M3	N/E	5 MG/M3	N/E	

LIMESTONE	2.5-10	N/E	N/E	5 MGM3	N/E
CALCIUM OXIDE	2.5-10	2 MGM3	N/E	5 MGM3	N/E
MAGNESIUM OXIDE	2.5-10	N/E	N/E	N/E	N/E
MICROCRYSTALLINE SILICA	0.1-1.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E

FURTHER INFORMATION: No Information

8.2 Exposure controls

Personal Protection

RESPIRATORY PROTECTION: Respirator with a dust filterUse the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (dust). Use NIOSH approved respiratory protection.

EYE PROTECTION: Safety glasses with side-shields.

HAND PROTECTION: For prolonged or repeated contact use protective gloves.

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

ENGINEERING CONTROLS: Avoid dust accumulation in enclosed space.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Grey Powder Mixture
Physical State	Solid
Odor	Low Odor
Odor threshold	N/D
pH	7 to 9
Melting point / freezing point (°C)	N/A
Boiling point/range (°C)	N/A - N/A
Flash Point, (°C)	999
Evaporation rate	N/A
Flammability (solid, gas)	Not determined
Upper/lower flammability or explosive limits	N/A - N/A
Vapour Pressure, mmHg	N/A
Vapour density	N/A
Relative density	Not determined
Solubility in / Miscibility with water	Slight
Partition coefficient: n-octanol/water	Not determined
Auto-ignition temperature (°C)	Not determined
Decomposition temperature (°C)	Not determined
Viscosity	Unknown
Explosive properties	Not determined
Oxidising properties	Not determined

9.2 Other information

VOC Content g/l:	0

Specific Gravity (g/cm3) 1.92

10. Stability and Reactivity

10.1 Reactivity
No Information

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
None known.

11. Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity:

Oral LD50: N/D

Inhalation LC50: N/D

Irritation: Unknown

Corrosivity: Unknown

Sensitization: Unknown

Repeated dose toxicity: Unknown

Carcinogenicity: Unknown

Mutagenicity: Unknown

Toxicity for reproduction: Unknown

If no information is available above under Acute Toxicity then the acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
65997-15-1	PORTLAND CEMENT	Not Available		Not Available
1305-78-8	CALCIUM OXIDE	Not Available		Not Available
1317-65-3	LIMESTONE	6450 mg/kg, oral, rat	Not Available	Not Available
1309-48-4	MAGNESIUM OXIDE	Not Available		Not Available
14808-60-7	MICROCRYSTALLINE SILICA	Not Available	Not Available	Not Available

Additional Information:
Irritating to respiratory system.

12. Ecological Information

12.1 Toxicity:

EC50 48hr (Daphnia):	Unknown
IC50 72hr (Algae):	Unknown
LC50 96hr (fish):	Unknown

12.2 Persistence and degradability: Unknown

12.3 Bioaccumulative potential: Unknown

12.4 Mobility in soil: Unknown

12.5 Results of PBT and vPvB assessment: The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

12.6 Other adverse effects: Unknown

CAS-No.	Chemical Name	EC50 48hr	IC50 72hr	LC50 96hr
65997-15-1	PORTLAND CEMENT	No information	No information	No information
1317-65-3	LIMESTONE	No information	No information	No information
1305-78-8	CALCIUM OXIDE	No information	No information	No information
1309-48-4	MAGNESIUM OXIDE	No information	No information	No information
14808-60-7	MICROCRYSTALLINE SILICA	No information	No information	No information

13. Disposal Considerations

13.1 WASTE TREATMENT METHODS: Dispose of in accordance with local regulations.

14. Transport Information

14.1	**UN number**	None
14.2	**UN proper shipping name**	Not Regulated
	Technical name	N/A
14.3	**Transport hazard class(es)**	None
	Subsidiary shipping hazard	N/A
14.4	**Packing group**	N/A
14.5	**Environmental hazards**	No
14.6	**Special precautions for user**	Unknown
	EmS-No.:	None
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code**	Unknown

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation for the substance or mixture:

U.S. Federal Regulations: As follows -

CERCLA - Sara Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Sara 313 components exist in this product.

Toxic Substances Control Act:

All components of this product are either listed on the TSCA Inventory or are exempt.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS-No.
VERMICULITE	1318-00-9
CALCIUM SULFATE	13397-24-5
CELLUOSE	9004-34-6

Pennsylvania Right-To-Know

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS-No.
VERMICULITE	1318-00-9
CALCIUM SULFATE	13397-24-5
CELLUOSE	9004-34-6
No Chemical Name Found	TRADE SECRET

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name	CAS-No.
MICROCRYSTALLINE SILICA	14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards.

No Proposition 65 Reproductive Toxins exist in this product.

International Regulations: As follows -

* Canadian DSL:

No Information

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

16. Other Information

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H350	May cause cancer.
H370	Causes damage to organs.

Reasons for revision

No Information

No Information

LEED® v4 Technical Bulletin
Building Design + Construction

Background
This document outlines Carboline's contributions towards available LEED v4 credits. Carboline is committed to developing and manufacturing environmentally compliant coatings and fire protection products. Carboline fireproofing products can contribute towards points under the LEED Green Building Rating System. The LEED Green Building Rating System does not certify construction products and materials. Instead, entire projects are certified on the basis of the environmental impact of the building materials employed and the overall building design.

What is LEED?
Leadership in Energy and Environmental Design (LEED) is the most widely used green building rating system in the world. LEED was developed by the United States Green Building Council (USGBC) to evaluate the environmental performance of buildings and promote sustainable design methods. LEED certification provides independent verification of environmental features which allow for efficient, high performance, cost-effective building design and construction. There are four levels of certification that can be reached for LEED v4 which are awarded based on achieving a minimum number of points (Certified, Silver, Gold and Platinum).

Carboline products can contribute toward the following LEED v4 credit categories:

Energy & Atmosphere
- ✓ EA Prerequisite – Minimum Energy Performance
- ✓ EA Credit – Optimize Energy Performance

Materials and Resources
Materials and Resources
- ✓ MR Prerequisite: Construction and Demolition Waste Management Planning
- ✓ MR Credit: Building Life Cycle Impact Reduction
- ✓ MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials
- ✓ MR Credit: Building Product Disclosure and Optimization – Material Ingredients

Indoor Environmental Quality
- ✓ EQ Credit: Low-Emitting Materials

Energy and Atmosphere

EA Prerequisite: Minimum Energy Performance

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

Requirements: Follow the criteria in the LEED New Construction Energy Design Guide as specified in LEED v4 (page 66).

Carboline Contributions: Carboline wet mix materials provide thermal resistance and noise reduction coefficient values. This will reduce the amount of energy needed for climate control and any added materials needed for soundproofing. This credit only applies to Carboline materials when used within the building envelope.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

EA Credit: Optimize Energy Performance (1-18 points)

Note: This credit requires that an energy analysis be done that includes all energy costs within and associated with the building project. Points for this credit are assigned from 1-18 based on the percentage of energy cost savings the building materials or systems will provide.

Intent: Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements: Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1 in LEED v4 (page 75). Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building.

Carboline Contributions: Carboline wet mix materials provide thermal resistance and noise reduction coefficient values. This will reduce the amount of energy needed for climate control and reduce any added materials needed for soundproofing. This credit only applies to Carboline materials when used within the building envelope.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

Materials and Resources

MR Prerequisite: Construction and Demolition Waste Management Planning

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

Requirements:
Option 1 (page 106) Diversion (1–2 points)
Path1: Divert 50% and Three Material Streams (1 point)
Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

Path 2: Divert 75% and Four Material Streams (2 points)
Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows: 50%: 1 point, 75%: 2 points

Carboline Contributions: Carboline products are supplied in paper bags, plastic pails or metal pails which can be recycled. The pallets used for shipment are also recyclable.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Building Life-Cycle Impact Reduction (2-5 points)

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

Requirements: Reuse or salvage building materials from offsite or onsite as a percentage of the surface area as listed in Table 1 (page 91). 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 Material Disclosure and Optimization.

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

Carboline Contributions: Carboline wet mix and intumescent materials are utilized for retrofit and rehab construction. These materials provide fire resistance ratings to unprotected structural members which will bring the existing building up to code. This will eliminate the need to replace the structural elements that were not code compliant.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1 XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Building Product Disclosure and Optimization-Sourcing of Raw Materials (1-2 points)

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 1 (page 95) Raw Material Source and Extraction Reporting (1 point)
Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria

Carboline Contributions: Carboline has publicly released reports from their raw material suppliers which include raw material supplier extraction locations for our wet mix and intumescent materials fire resistive materials.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Option 2 (page 95). Leadership Extraction Practices (1 point)
Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.

Recycled content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost. Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation.

Carboline Contributions: Carboline wet-mix products are manufactured with post-consumer recycled materials.

Carboline Products That Contribute: Southwest™ Type 5GP (10% recycled content), Southwest™ Type 5MD (10% recycled content), Southwest™ Type 5EF (10% recycled content).

MR Credit: Building Product Disclosure and Optimization-Material Ingredients (1-2 points)

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 (Page 97) Material Ingredient Reporting (1 point)
Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product.

Carboline Contributions: Carboline wet mix and intumescent products have complete Declare Health Product Declaration: The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open standard.

Carboline Products That Contribute: Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 241, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Construction and Demolition Waste Management (1-2 points)

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

Requirements:
Option 1 (page 106) Diversion (1–2 points)
Path 1: Divert 50% and Three Material Streams (1 point)
Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

Path 2: Divert 75% and Four Material Streams (2 points)
Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows: 50%: 1 point, 75%: 2 points

Carboline Contributions: Carboline products are supplied in paper bags, plastic pails or metal pails which can be recycled. The pallets used for shipment are also recyclable.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Indoor Environmental Quality

EQ Credit: Low Emitting Materials (1-3 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 product manufacturing as well as project teams. It covers 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. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in seven categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system such as waterproofing membranes and air- and water-resistive barrier materials.

Option 1 (Page 118) Product Category Calculations (1-3 points)

Achieve the threshold level of compliance with emissions and content standards for the number of product categories listed in Table 2 (page 118).

Category	Threshold	Emission & Content Requirements
Interior paints and coatings applied onsite	At least 90% by volume for emissions, 100% for VOC content	• General Emissions Evaluation for paints and coatings applied to walls, floors and ceilings • VOC content requirements for wet applied products
Interior adhesives and sealants applied onsite	At least 90% by volume, for emissions 100% for VOC content	• General Emissions Evaluation • VOC content requirements for wet applied products
Ceilings, walls, thermal and acoustic insulation	100%	• General Emissions Evaluation • Healthcare, schools only
Healthcare and schools projects only: Exterior applied products	At least 90% by volume	• General Emissions Evaluation • Exterior applied products

Emissions and Content Requirements

To demonstrate compliance, a product or layer must meet all of the following requirements, as applicable.

Inherently non-emitting sources: Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.

General emissions evaluation: Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario. The default scenario is the private office scenario. The manufacturer's or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.

Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1:

- 0.5 mg/m3 or less;
- between 0.5 and 5.0 mg/m3; or
- 5.0 mg/m3 or more.

Additional VOC content requirements for wet-applied products: In addition to meeting the general requirements for VOC emissions (above), on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other trade workers who are exposed to these products. To demonstrate compliance, a product or layer must meet the following requirements, as applicable. Disclosure of VOC content must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation.

- All paints and coatings wet-applied on site must meet the applicable VOC 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, effective June 3, 2011.
- All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.
- For projects outside the U.S., all paints, coatings, adhesives, and sealants wet-applied on site must either meet the technical requirements of the above regulations or comply with applicable national VOC control regulations such as the European Decopaint Directive (2004/42/EC), the Canadian VOC Concentration Limits for Architectural Coatings, or the Hong Kong Air Pollution Control (VOC) Regulation.

As there is no fireproofing category in the LEED v4, the SCAQMD regulations are commonly used to designate specialty coatings classifications for LEED applications. The SCAQMD (Rule #1113) outlines the current VOC limits as of January 1, 2014 for several categories of specialty coatings as follows:

Specialty Coating Type	Current VOC Limit (g/l)
Concrete surface retarders	50
Driveway Sealers	50
Faux finishing coatings	200
Fireproofing coatings	**150**
Graphic art coatings	150
Mastic coatings	100
Metallic pigmented coatings	150
Anti-graffiti coatings	50

The following Carboline products meet current VOC requirements:

Carboline Compliant Fireproofing Products	VOC Limit (EPA Method 24) (g/l)
A/D Firefilm® III	20 g/l
A/D Firefilm® III C	20 g/l
Firefilm® IV	4 g/l
Thermo-Sorb® VOC	142 g/l
Thermo-Sorb® E	147 g/l
Thermo-Sorb® 263	148 g/l
Thermo-Lag® E100	13 g/l
Thermo-Lag® E100 S	64 g/l
Thermo-Lag® 3000 A	13 g/l
Thermo-Lag® 3000 SA	64 g/l
A/D Type TC-55	0 g/l
Pyroprime® 775 WB	81 g/l
Southwest™ Series	0 g/l
Pyrolite® Series	0 g/l
Pyrocrete® Series	0 g/l

Carboline Contributions: Carboline has wet mix and intumescent materials that meet the required VOC limits and VOC emissions requirements for this credit.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Manufacturing Locations

Products manufactured in Louisa, VA:
Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

Products manufactured in Green Bay, WI:
Pyroprime® 775, Thermo-Sorb® E, Thermo-Sorb® 263,

Products manufactured in Dayton, NV:
Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Products manufactured in Lake Charles, LA:
A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, A/D Type TC-55, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Raw Material Extraction Locations

NOTE: For raw material extraction locations and distance to manufacturing plants, please contact your local Carboline technical sales representative or Carboline fireproofing technical service.

Certificate of Compliance

Certificate Number 20070208-R8213A
Report Reference 2007 February 8
Issue Date 2007 February 8

Underwriters Laboratories Inc.®

Issued to: Southwest Fireproofing Products Co.
5119 Edith Bldv NE, Po Box 6287
Albuquerque, NM 87197

This is to certify that representative samples of Spray-applied Fire Resistive Materials
Type 5GP

Have been investigated by Underwriters Laboratories Inc.® (UL) or any authorized licensee of UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 263 Fire Tests of Building Construction and Materials
ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials

Additional Information: See addendum for system listings

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Conloute
Underwriters Laboratories Inc.

Reviewed by:
Fred Hervey
Underwriters Laboratories Inc.

Certificate of Compliance

Certificate Number 20070208-R8213A
Report Reference 2007 February 8
Issue Date 2007 February 8

Underwriters Laboratories Inc.®

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

Type 5GP Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D725, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D748, D750, D751, D752, D753, D754, D756, D758, D788, D905, D907, D909, D910, D916, D917, D920, D949, G701, G702, J701, J704, J705, J706, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P901, P902, P907, P908, P919, P920, P921, P923 and P937.

Wall-Partition Design No. U703.

Issued by:
Mona Coulonte
Mona Coulonte
Underwriters Laboratories Inc.

Reviewed by:
Fred Hervey
Underwriters Laboratories Inc.

CHPX.R8213
Spray-applied Fire-resistive Materials

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Spray-applied Fire-resistive Materials

See General Information for Spray-applied Fire-resistive Materials

SOUTHWEST FIREPROOFING PRODUCTS CO R8213

5119 Edith Blvd NE
PO Box 6287
Albuquerque, NM 87197-6287 USA

Type 4 Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 5 Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722 , X723 X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 5GP/AR Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N791, S715, S739, S740.

Column Design Nos. X771, Y725.

Floor-Ceiling Design Nos. D739, D743, D752, D754, D788, D949, J718.

Roof-Ceiling Design Nos. P741, P937.

Type 5EF/AR Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N791, S715, S739, S740.

Column Design Nos. X771, Y725.

Floor-Ceiling Design Nos. D739, D743, D752, D754, D788, D949, J718.

Roof-Ceiling Design Nos. P741, P937.

Type 5MD/AR Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N791, S715, S739, S740.

Column Design Nos. X771, Y725.

Floor-Ceiling Design Nos. D739, D743, D752, D754, D788, D949, J718.

Roof-Ceiling Design Nos. P741, P937.

Type DK Spray-Applied Fire Resistive Materials for use in

Floor-Ceiling Design Nos. D701, D703, D704, D705, D706, D708, D709, D711, D712, D716, D722, D723, D730, D739, D743, D758, D752, D754.

Roof-Ceiling Design Nos. P717, P741.

Type DK2 Spray-Applied Fire Resistive Materials for use in **Floor-Ceiling** Design Nos. D701, D703, D704, D705, D706, D708, D709, D711, D712, D716, D722, D723, D730, D739, D743, D758, D752, D754, **Roof-Ceiling** Design No. P741.

Type DK3 Spray-Applied Fire Resistive Materials for use in **Floor-Ceiling** Design Nos. D701, D703, D704, D705, D706, D708, D709, D711, D712, D716, D722, D723, D730, D739, D743, D758, D752, D754 and **Roof-Ceiling** Design No. P741.

Type 5GP Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, G701, G702, J701, J704, J705, J709, J718, J919, J957, and K912.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P901, P902, P907, P908, P919, P920, P921, P923 and P937.

Wall-Partition Design No. U703.

Type 5EF Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772 and

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 5MD Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957, and K912.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 5AR Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N791, S715, S739, S740.

Column Design Nos. X771, Y725.

Floor-Ceiling Design Nos. D739, D743, D752, D754, D788, D949, J718.

Roof-Ceiling Design Nos. P741, P937.

Type 8GP Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 8EF Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D949, D973, D974, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 8MD Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 9GP Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 9EF Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 9MD Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N732, N736, N754, N756, N791, S701, S702, S715, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X751, X752, X771, X772, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D920, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 7GP and 7HD Spray-Applied Fire Resistive Materials for use in

Beam Design Nos. N401, N404, N706, N708, N720, N732, N736, N763, N754, N756, N791, S701, S702, S715 S725, S739, S740.

Column Design Nos. X527, X701, X704, X722, X723, X738, X751, X752, X771, X772, X794, Y725.

Floor-Ceiling Design Nos. A702, D701, D703, D704, D705, D706, D708, D709, D710, D711, D712, D715, D716, D722, D723, D726, D727, D728, D729, D730, D739, D740, D742, D743, D744, D745, D746, D747, D750, D751, D752, D753, D754, D758, D788, D905, D907, D910, D916, D917, D949, D973, D974, D976, D977, G701, G702, G703, J701, J704, J705, J709, J718, J919, J957, and K912.

Roof-Ceiling Design Nos. P675, P676, P701, P708, P709, P710, P711, P714, P717, P741, P901, P902, P907, P908, P919, P920, P921, P923, P937.

Wall-Partition Design No. U703.

Type 7TB Spray-Applied Fire Resistive Materials for use in

Column Design No. X737 .

Types 7HX, Aerex-S Spray-Applied Fire Resistive Materials for use in Design No. XR708 .

Type FP-1A, TS-40, 1AX, FP-2B, TS-40G or 1BX Spray-Applied Fire Resistive Materials, investigated for exterior use, for use in

Beam Design No. N733.

Column Design Nos. X731, X739, X756, X757.

Roof-Ceiling Design No. P712.

Type FP-1A, TS-40G or 1BX Spray-Applied Fire Resistive Materials, investigated for exterior use, for use in

Beam Design Nos. N730, S707.

Type FP-1B, TS-40G or 1BX Spray-Applied Fire Resistive Materials, investigated for exterior use, for use in Design Nos. N731, P729, S708.

Types FP-1XR or 1XR Spray-Applied Fire Resistive Materials, investigated for exterior use, for use in

Beam Design Nos. N730, N731, N733, S707, S708.

Column Design Nos. X739, XR710.

Roof-Ceiling Design No. P729.

Type FP-2 or 7MP Spray-Applied Fire Resistive Materials for use in

Beam Design No. N709.

Column Design Nos. X717, X718, X796, X797.

Floor-Ceiling Design No. D923.

Roof-Ceiling Design No. P730.

Type 5 of Type 5GP for use in Joint System Nos. HW-D-0099 and HW-D-0252.

The thickness of Types 4, 5, 5GP, 5EM, 5MD, 7GP, 7HD, 8GP, 8EF, 8MD, 9GP, 9EF, and 9MD spray-applied fire resistive material for application to individual steel truss members or individual steel joist members may be determined based upon the following equation:

$$H = \frac{R}{0.9994\ (W/D) + 0.9438}$$

Where:

H = thickness (inches)

R = rating (hours)

W = weight of steel member per lineal foot (lb/ft)

D = heated perimeter of steel member (inches)

H_{min} = 0.25 inch H_{max} = 3.875 inch

W/D_{min} = 0.33 W/D_{max} = 6.62

Other Conditions of Use

The following conditions of use apply only to the conditions described and apply only to the UL Classified Southwest Fireproofing Products Co. spray-applied fire-resistive materials (SFRM) listed. For further technical assistance regarding field issues, contact the technical service staff of Southwest Fireproofing Products Co. Authorities Having Jurisdiction should be consulted as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, systems, devices and materials.

1. Patching

Types 4, 5, 5GP, 5EM, 5MD, 7GP, 7HD, 8GP, 8EF, 8MD, 9GP, 9EF, and 9MD may be hand patched in all designs, in areas up to 144 sq. in., following the guidelines listed below:

A) The material used for patching is of the same Type designation as the material being patched.

B) All loose material, including dirt and any other foreign material, that would impair adhesion of the patching material must be removed prior to patching. Where damaged material extends to the steel or concrete substrate, removal should be to the steel or concrete substrate.

C) Where well-bonded material exists below the damaged material, removal of the damaged material should extend to the well-bonded firm material. There is no requirement to remove well-bonded material that lies immediately beneath loosely bonded or

poorly adhered material.

D) The material is keyed into the material surrounding the patch. It should be understood that the integrity of the surrounding material shall not have been impaired and must be pre-wetted prior to applying the patching material.

E) All manufacturer's application instructions of the Spray-Applied Fire Resistive Material being used to patch the area must be followed.

F) The minimum in-place density and minimum thickness of the material, as specified in the fire resistance design, must be maintained.

G) Any clips or hangers being patched around are totally encased in material at the point of attachment to the structural member at a thickness equal to or greater than that being applied to the structural member.

H) Where hand applications will exceed 144 square inches, the spray applied fire resistive material shall be mechanically mixed, pumped and sprayed using standard application equipment as outlined in the manufacturer's application instructions.

2. Surface Coatings

Surface coatings such as water-based latex, vinyl acrylic, urethane or chlorinated rubber coatings may be used as overspray on Types 4, 5, 5GP, 5EF, 5MD, 7GP, 7HD, 8GP, 8EF, 8MD, 9GP, 9EF, and 9MD. If used, the coatings are intended for surface coloring only. Their application must be controlled so that the coatings do not saturate the Spray-Applied Fire Resistive Material (SFRM) and thus influence the bond between the SFRM and the steel substrate. Unless specifically indicated above, these systems have not been investigated for exterior use. The flame spread index of the surface coating shall be less than 200 as determined by the test method in ANSI/UL 723 (ASTM E84 and NFPA 255). Surface Burning Classifications are contained in the Building Materials Directory.

3. Top-Coat Materials

Gypsum plaster, Portland cement plaster, Types 7HD, 1BX or 1XR may be used as a top-coat over Types 4, 5, 5GP, 5EF, 5MD, or 7GP. If used, the coating is intended as a smooth surface coating only. Their application must be controlled to a maximum 1/4 in. thickness so that the coating does not affect the Spray-Applied Fire Resistive Material (SFRM) and thus influence the bond between the SFRM and the steel substrate. The minimum thickness and density for the SFRM being top-coated shall be as specified in the individual Design.

4. Spanning Gaps Between a Wide Flange Steel Beam and a Rated Concrete Block Wall

When the wide flange steel beam in a floor-or-roof ceiling assembly is in close proximity and parallel to a rated concrete block wall, preventing the entire perimeter of the beam from being properly protected with Spray-Applied Fire Resistive Material (SFRM), the following method may be used to maintain the fire resistance rating of the floor-or-roof ceiling assembly. Minimum 3.4 lb/sq yd galvanized or painted expanded steel lath shall be used to bridge the gap between the beam and the masonry wall. The lath shall be mechanically attached by welds, screws or powder-actuated fasteners to the lower flange of the beam and the masonry facade. The SFRM shall be applied to the entire metal lath surface at the thickness specified for the steel beam in the chosen design for the desired rating. The steel beam, lath and masonry wall shall be clean and free of dirt, loose scale and oil. The gap may not be greater than 18 in. The concrete block wall must have an hourly rating equal to or greater than the restrained assembly rating. The steel floor units between the beam and masonry wall need not be sprayed due to the protection provided by the box enclosure formed by the metal lath and the SFRM.

5. Spanning Gaps Between a Vertical Column and a Rated Concrete Block Wall

Where a vertical column is in close proximity to a rated concrete block wall, preventing the entire perimeter of the column from being properly protected with Spray-Applied Fire Resistive Material (SFRM), one of the following methods may be used to maintain the fire resistance rating of the column assembly, depending on the depth of the gap. The protection on the remaining sides of the column shall be in accordance with the requirements in the specified column design. The concrete block wall must have an hourly rating equal to or greater than the column rating. a) For gaps greater than 2 in. and up to 18 in., minimum 3.4 lb/sq yd galvanized or painted expanded steel lath shall be used to bridge the gap between the column and the masonry wall. The lath shall be mechanically attached by welds, screws or powder-actuated fasteners to both flanges of the column and the masonry facade. The SFRM shall be applied to the entire metal lath surface at the thickness specified for the column in the chosen design for the desired rating. The column, lath and masonry wall shall be clean and free of dirt, loose scale and oil. b) For gaps 2 in. or less, no metal lath is required to bridge the gap. The gap shall be completely filled with the SFRM.

Last Updated on 2014-07-14

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Intertek

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ICC-ES AC 23: Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials as detailed in ASTM E759: Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: ICC-ES AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E759: *Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members*

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6 CONCLUSION 6

2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 5GP cementitious fireproofing. Testing was conducted in accordance with ASTM E 759-92 (Reapproved 2005) Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek observation at the Intertek Evaluation Center.

Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The dry fireproofing material as removed from bags was mixed with water to produce a coherent pump able slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table.

Product - Bag No.	Net material weight (lbs)	Water added (lbs)	Substrate of Application
Type 5GP - Bag 2	46.5	88	Cellular roof deck assembly per ASTM E 759

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD 1 – E759

The substrate was a cellular 1 1/2 inch galvanized deck assembly with a flat surface, with no sprayed fire-resistive material applied to an area 13-in from each end of the specimen to allow the steel deck to bear directly on the supports. The sample was conditioned at a standard temperature and humidity until cured and dry. The fireproofing thickness is 3/4-in minimum per criteria. The sample was handled with special care to avoid impact or deflection before testing due to its size and weight.

The sample was placed on the test supports with the sprayed fire-resistive material as the lower surface. The initial reading of the dial micrometer was recorded prior to the application of the load, and deformation was recorded as the load (a bearing block) was applied to the upper face of the specimen.

4.2. TEST STANDARD 2 – E605

Thickness of each sample was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The densities of the tested materials were determined by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

E759 – Effect of Deflection

Prior to testing, the fireproofing was inspected for general appearance and condition. It was firm and monolithic with no observable defects. After deflection of the deck 1/120 of the deck span, the fireproofing had no change in appearance. Observation for cracking is not specified in the ASTM Standard, but was added at the sponsors request to provide information specified in ICC-ES AC23. Test results are tabulated below.

Sample Tested	Fireproofing Thickness (in.)	Density (lbs/ft^3)	Appearance after testing
5 GP	0.75	14.74	No change in appearance No spalling, delamination or cracking

6 Conclusion

Intertek has conducted testing for Southwest Fireproofing Products Co. on 5GP cementitious fireproofing. Testing was conducted in accordance with ICC-ES, following the standard methods of AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E759: *Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members*. This evaluation began April 14, 2009 and was completed September 21, 2009.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

APPENDIX A

Test Data

ASTM E759 DATA SHEET

Project #: ___3171245_____ Client: ____SWF_____

Date: _____4/13/09_____ Tech/Reviewer: Randy

Sample: 5GP_____ Temp: ___73.9 F_____

Thickness of SFRM: 3/4 in minimum

Density of SFRM: 14.74 (lbs/ft^3)

Place the specimen on the test supports with the SFRM as the lower surface.

Measure the deflection of the specimens and record the deformations as the load is applied.

Apply a vertical center load to the upper face of the specimen by means of a bearing block to develop a deflection of 1/120 of the clear span, that is, 1 inch.

Load applied. 5GP 942 lbs

Describe the final physical condition and appearance of the SFRM after Defection: Appearance did not chance.

Note any spalling, delamination, cracking: No Cracking, spalling, delamination

REVISION SUMMARY

DATE	SUMMARY
October 23, 2009	Original

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ASTM E937: Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: *ASTM E937: Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members*

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5 TESTING AND EVALUATION RESULTS 5

5.1. RESULTS AND OBSERVATIONS 5

6 CONCLUSION 6

2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 5GP cementitious fireproofing. Testing was conducted in accordance with ASTM E 937-93 (Reapproved 2005) Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.
Results are reported in accordance with the ASTM Standard specified above.

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek technical personnel observation at the Intertek Evaluation Center. Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The SFRM was applied in accordance with the manufacturer's published instructions and were representative of application in the field. The dry fireproofing material as removed from bags was mixed with water to produce a coherent pumpable slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table. The product was prepared and conditioned for testing in the as sprayed surface condition. No finishing techniques such as tamping, troweling, surface sealing or similar operations were made.

Product	Substrate of Application
Type 5GP	Bare, coated and galvanized steel plates per ASTM E 937

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD – E937

The substrates were twelve each 12-gauge plates measuring 8" x 8", four sheets were in each set of bare, shop coated and galvanized. Samples I and III of each set were conditioned for 240 hours and samples II and IV of each set were conditioned for 240 hours. The fireproofing thickness was 3/4" +/- 1/8". The samples were handled with special care to accommodate safe handling.

Each sheet of each set was weighed to the nearest 0.1 g and recorded as IA, IIA, IIIA and IVA. The edges and the sides opposite the fireproofing of each sheet were protected with a suitable coating. The sprayed fire-resistive material and protective coating were removed from the steel sheets identified as I and III from each set. All surface rust was removed from I and III of each set with a wire brush and cleaned with solvent. Sheets I and III of each set were weighed and recorded as Ib and IIIb. The remaining sheets, specimens II and IV of each set, were placed in the temperature humidity cabinet and kept at 95 +/- 3 0F and a 95 +/- 3% relative humidity for 240 hours. After 240 hours elapsed, the specimens were removed from the cabinet. The surface rust, sprayed fire-resistive material and protective coating were removed with a wire brush and cleaned with solvent. The sheets were weighed to the nearest 0.1 g and recorded as IIb and IVb.

4.2. TEST STANDARD 2 - ASTM E 605

Thickness of the applied material was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The density of the material was determined from separate sample plates prepared at the same time as the test samples by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

Initial weights of the four test plates in each of the three sets, final weights of two of the test plates in each set (sets I and III), and final weights of the other two test plates in each set (sets II and IV) were determine as specified in the standard. Data for Southwest Fireproofing Type 5GP are tabulated below. The fireproofing was applied at a thickness of 3/4 inch and density of 14.06 pcf. The weight loss of each set expressed in g/ mm2 is tabulated below.

E937 – Corrosion of Steel

	Initial Weights (g)			*Final Weights (g)*		
	Bare	**Coated**	**Gal. Steel**	**Bare**	**Coated**	**Gal. Steel**
I	802.9	801.6	822.9	800.7	800.8	822.5
II	798.7	813.4	822.9	797.1	812.7	821.5
III	801.2	805.6	828.6	799.3	805.2	828.0
IV	797.3	814.5	816.3	796.2	813.8	815.4

	Average Weight Loss (g/mm²)		
	Bare	**Coated**	**Gal. Steel**
I	0.0000533	0.0000194	0.0000097
II	0.0000388	0.0000170	0.0000339
III	0.0000460	0.0000097	0.0000145
IV	0.0000266	0.0000170	0.0000218

6 Conclusion

Intertek has conducted testing for Southwest Fireproofing Products Co. on 7GP, 5GP, 5MD and 7HD cementitious fireproofing. Testing was conducted in accordance with ICC-ES, following the standard methods of AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E937: *Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members*. This evaluation began April 14, 2009 and was completed September 21, 2009.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

APPENDIX A

Test Data

Test: **Corrosion of Steel by Spray Fire-Resistive Material (SFRM) Applied to Structural Members**
Test Date: Room Temp Corrosion on 4.23.09 Humidified Corrosion on 4.30.09
Client: **Southwest Fireproofing**
Project #: 3171245
Product: **5GP**
Date of Manufacture: Prepared on 3.3.09
Test Standard(s): ASTM E937-93 (2005) - *Standard Test Method for Corrosion of Steel by SFRM Applied to Structural Members*
Conditioning: *Samples I & III*: 20 days at 68 ± 9°F and a Relative Humidity < 60%
Samples II & IV: 240 hours at 95 ± 3°F and a Relative Humidity of 95 ± 3%
Equipment: *Scale:* Ohaus Scout Pro 4001 - MID Asset #1120 (Calibration due 11/18/09)
Conditioning: Cincinnati Sub-Zero Z32+ Environmental Chamber - MID Asset #1059 (Cal. due 11/10/09)

Area of Sheet: 64 in² 41290.24 mm²

	Initial Weights (g)			*Final Weights (g)*		
	Bare	**Coated**	**Gal. Steel**	**Bare**	**Coated**	**Gal. Steel**
I	802.9	801.6	822.9	800.7	800.8	822.5
II	798.7	813.4	822.9	797.1	812.7	821.5
III	801.2	805.6	828.6	799.3	805.2	828.0
IV	797.3	814.5	816.3	796.2	813.8	815.4

	Average Weight Loss (g/mm²)		
	Bare	**Coated**	**Gal. Steel**
I	0.0000533	0.0000194	0.0000097
II	0.0000388	0.0000170	0.0000339
III	0.0000460	0.0000097	0.0000145
IV	0.0000266	0.0000170	0.0000218

REVISION SUMMARY

DATE	SUMMARY
October 23, 2009	Original

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ICC-ES AC 23: Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials as detailed in ASTM E760: Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: ICC-ES AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E760: *Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members*

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4.2. TEST STANDARD 2 – ASTM E605 4

5 TESTING AND EVALUATION RESULTS 5

5.1. RESULTS AND OBSERVATIONS 5

6 CONCLUSION 6

2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 5GP cementitious fireproofing. Testing was conducted in accordance with ASTM E 760 - 92 (Reapproved 2005) Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek observation at the Intertek Evaluation Center.

Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The dry fireproofing material as removed from bags was mixed with water to produce a coherent pumpable slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table.

Product - Bag No.	Net material weight (lbs)	Water added (lbs)	Substrate of Application
Type 5GP - Bag 1	45.5	87	Concrete deck assembly per ASTM E 760

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD 1 – ASTM E760

The substrate was a cellular deck assembly with concrete topping and a galvanized flat surface. The sample was conditioned at a standard temperature and humidity until cured and dry. The fireproofing thickness is 3/4" minimum per criteria. The sample was handled with special care to avoid impact before testing due to its size and weight.

The specimen was placed on the test supports with the sprayed fire-resistive material as the lower surface and the concrete as the upper surface. The 60-lb. leather bag filled with shot was hoisted to a height of 4 ft, measured from the upper face of the specimen to the bottom of the bag. The bag was dropped, thus applying an impact load once to the middle of the upper face of the specimen.

4.2. TEST STANDARD 2 – ASTM E605

Thickness of each sample was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The densities of the tested materials were determined by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

E760 – Effect of Impact on Bonding

Prior to testing, the fireproofing was inspected for general appearance and condition. It was firm and monolithic with no observable defects. After testing, specimen had no change in appearance. Test results are tabulated below.

Sample Tested	Fireproofing Thickness (in.)	Density (lbs/ft^3)	Appearance after testing
5 GP	0.75	14.7	No change in appearance No spalling, delamination or cracking

6 Conclusion

Intertek has conducted testing for Southwest Fireproofing Products Co. on 5GP cementitious fireproofing. Testing was conducted in accordance with ICC-ES, following the standard methods of AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E760: *Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members*. This evaluation began April 14, 2009 and was completed September 21, 2009.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

APPENDIX A

Test Data

ASTM E760 DATA SHEET

Project #: ___3171245_____ Client: ____SWF_____

Date: _____4/13/09_____ Tech/Reviewer: Randy

Sample:.5GP_____ Temp: ___73.9 F_____

Weight of bag (Asset # 1137): _____60 lbs_____
Cal. Due date: __N/A_____

Thickness of SFRM: 3/4 in minimum

Density of SFRM: 14.74 (lbs/ft^3)

Place the specimen on the test supports with the SFRM as the lower surface and the concrete as the upper surface.

Hoist the impact bag to a height of 4 feet (1.2 m) as measured from the upper face of the specimen to the bottom of the impact bag.

Apply an impact load once to the middle of the upper face of the specimen by dropping the impact bag.

Describe the final physical condition and appearance of the SFRM after impact: _
Appearance did not chance.

Note any spalling, delamination, cracking: _No Cracking, spalling, delamination

REVISION SUMMARY

DATE	SUMMARY
October 23, 2009	Original

Intertek

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ICC-ES AC 23: Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials as detailed in ASTM E736: Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: ICC-ES AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E736: *Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members*

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2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 5GP cementitious fireproofing. Testing was conducted in accordance with ASTM E 736 - 00 (Reapproved 2006) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek observation at the Intertek Evaluation Center.

Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The dry fireproofing material as removed from bags was mixed with water to produce a coherent pump able slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table.

Product - Bag No.	Net material weight (lbs)	Water added (lbs)	Substrate of Application
Type 5GP - Bag 3	47	90	Steel plates per ASTM E 736

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD 1 – ASTM E736

The substrate was a 16 gauge galvanized steel sheet measuring 12" x 12". The sample was conditioned at 72 hours at a room temperature of 68 +/- 18 ℉ followed by oven drying at 110 +/- 10℉ at humidity not exceeding 60% until a constant weight was reached. The fireproofing thickness is 1/2" to 1". The sample was restrained to prevent flexing during the test. The hook and pulling force was centered in the cap.

Adhesive was applied at sufficient volume to fill the cap, and the cap was placed against the surface of the sprayed fire-resistive. The cap was supported until the adhesive dried, and any excess adhesive was removed. The sample was placed with the sprayed fire-resistive facing up, and restrained to prevent movement and flexing. A scale with hook was engaged and exerted an increasing force perpendicular to the surface until failure occurred.

4.2. TEST STANDARD 2 – ASTM E605

Thickness of each sample was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The densities of the tested materials were determined by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

E736 – Cohesion / Adhesion

Test results including the applied force, cup diameter, calculated Adhesive/Cohesive force, failure mode and the sample thickness and density are tabulated below. The density of the sample was determined on a second plate sprayed with the same batch of wet material prepared at the same time as the test sample.

Sample Tested	Applied force (lbf)	Cap diameter (in)	Cohesive Adhesive force (psf)	Mode of failure	Thickness (in.)	Density (lbs/ft^3)
5 GP	29.08618	3 1/4	505.0	Cohesive	0.75 avg	14.7

6 Conclusion

The Adhesive/Cohesive force at failure of the tested material is 505.0 pounds per square foot. This exceeds the 150 psf or 20 times the weight of the fireproofing requirement of ICC-ES AC23 acceptance criteria for this physical property.

Intertek has conducted testing for Southwest Fireproofing Products Co. Type 5GP cementitious fireproofing. Testing was conducted in accordance ASTM E 736 - 00 (Reapproved 2006) Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

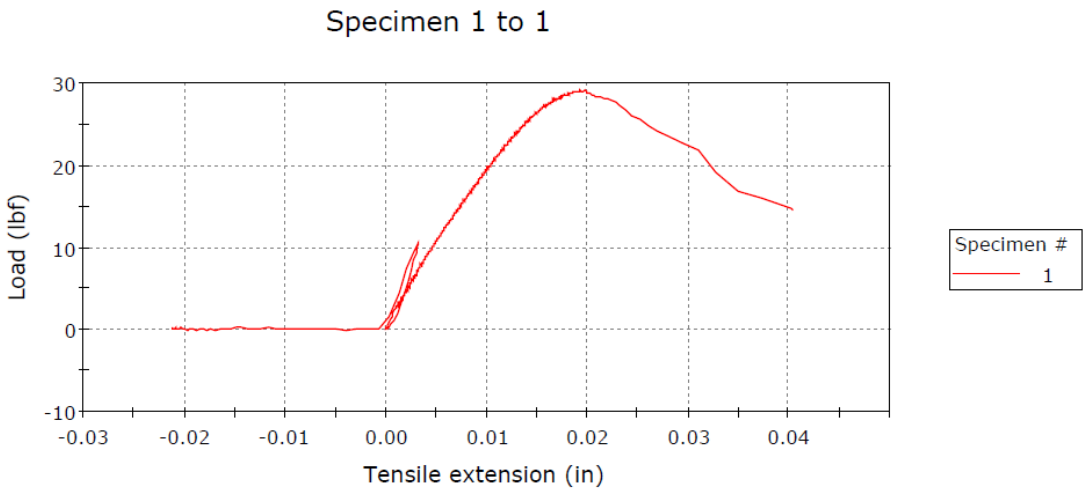
APPENDIX A

Test Data

Southwest Fireproofing Products Company
Project #3171245
April 15, 2009

ASTM E736: Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members

Type 5GP
Substrate: 16ga Galvanized Steel Sheet 12"x12"
Fireproofing Thickness: 1/2" to 1"



	Maximum Load (lbf)
1	29.08618
Mean	29.08618

REVISION SUMMARY

DATE	SUMMARY
October 23, 2009	Original

Intertek

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ICC-ES AC 23: Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials
ASTM E 859-93 (Reapproved 2006) Air Erosion of Sprayed Fire-Resistive Materials

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: ICC-ES AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials as detailed in. ASTM E 859-93 (Reapproved 2006) Air Erosion of Sprayed Fire-Resistive Materials*

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2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 7GP cementations fireproofing. Testing was conducted in accordance with ASTM E 859-93 (Reapproved 2006) Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek technical personnel observation at the Intertek Evaluation Center.

Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The SFRM was applied in accordance with the manufacturer's published instructions and were representative of application in the field. The dry fireproofing material as removed from bags was mixed with water to produce coherent pump able slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table. The product was prepared and conditioned for testing in the as sprayed surface condition. No finishing techniques such as tamping, toweling, surface sealing or similar operations were made.

Product	Substrate of Application
Type 5GP	Rigid plates per ASTM E 859

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD 1 –ASTM E859

The substrate was a rigid plate to cover a 4 square foot duct opening with a minimum 2 inch edge overlap. The sample was cured and dried to a constant weight. The fireproofing thickness is 3/4" +/- 1/8". The sample was handled with special care to avoid damage to the fireproofing surface.

After following the procedure for E605 (below), the first sample was measured to determine the thickness and density. The collecting filter was dried at 120℉ for one hour, weighed and placed in the apparatus. The second sample was placed into the duct opening so the face of the sample and inside face of the duct are flush and in the same plane. The tube was placed 4-in. from the upstream edge of the sample at the center line of the duct and 2-in. below the top side of the duct. The blower was maintained at a velocity of 20 ft/sec. At 1, 6 and 24 hours, the blower was stopped. The collecting filter was removed, folded and dried at 120℉. The test was continued until a constant weight was reached.

4.2. TEST STANDARD 2 –ASTM E605

Thickness of the duplicate sample was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The density of the materials on the duplicate sample was determined by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

E859 – Air Erosion

A weight of the collecting filter before and after each test period is tabulated below along with the accumulative weight gains and the tested specimen thickness and density. Calculation of sample weight loss per square foot is not specified in the ASTM Standard, but was added at the sponsors request to provide information specified in ICC-ES AC23. Test results are tabulated below.

Type 5GP Filter weights	Weight prior to test (g)	Weight after 1hour (g)	Weight prior to test (g)	Weight after 6 hours (g)	Weight prior to test (g)	Weight after 24 hours (g)	Thickness (in.)	Density (lbs/ft3)
Original test	11.465	11.487	11.482	11.499	11.499	11.499	0.75	14.06
Weight gain	NA	0.022	NA	0.017	NA	0	NA	NA
Accumulative weight gain	NA	0.022	NA	0.039	NA	0.039	NA	NA
Sample weight loss g/sq.ft.	NA	0.006	NA	0.009	NA	0.009	NA	NA

6 Conclusion

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 7GP cementations fireproofing. Testing was conducted in accordance with ASTM E 859-93 (Reapproved 2006) Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members. This evaluation began April 14, 2009 and was completed September 21, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

APPENDIX A

Test Data

ASTM E859 DATA SHEET

Project #: ___3171245_____ Client: ___SWF_____

Date: _4-14-09_____ Tech/Reviewer: __RS/JT_____

Sample: _5GP_____ Temp: __73°F, 35% R.H.

Scale (# 1045) cal due date: _2-4-10_____

Thickness of SFRM: 3/4 in minimum

Density of SFRM: 14.06 (lbs/ft^3)

Weight of dried filter prior to test (grams): __11.465_____

Weight of dried filter after 1 hour (grams): __11.487____

Weight of dried filter prior to test (grams): __11.482___

Weight of dried filter after 6 hours (grams): _11.499__

Weight of dried filter prior to test (grams): __11.499_____

Weight of dried filter after 24 hours (grams): __11.499_____

If the collecting filter continues to show a weight gain at 24 hours, continue the test, making measurements every 24 hours until a constant weight is reached.

REVISION SUMMARY

DATE	SUMMARY
October 23, 2009	Original

Intertek

TEST REPORT

REPORT NUMBER: 3171245MID-022
ORIGINAL ISSUE DATE: October 23, 2009

EVALUATION CENTER
Intertek
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

Southwest Fireproofing Products Co.
5119 Edith Blvd. NE
Albuquerque, NM 87107

PRODUCT EVALUATED: 5GP cementitious fireproofing
EVALUATION PROPERTY: ICC-ES AC 23: Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials as detailed in ASTM E761: Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.

Report of Testing 5GP cementitious fireproofing for compliance with the applicable requirements of the following criteria: ICC-ES AC 23: *Acceptance Criteria for Spray-Applied and Intumescent Mastic Coating Fire-Protection Materials* as detailed in ASTM E761: *Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.*

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6 CONCLUSION 6

2 Introduction

Intertek has conducted testing for Southwest Fireproofing Products Co. on Type 5GP cementitious fireproofing. Testing was conducted in accordance with ASTM E 761 - 92 (Reapproved 2005) Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members. This evaluation began April 14, 2009 and was completed October 27, 2009.

The thickness and density of the tested specimens were determined in accordance with ASTM E 605 – 93 (Reapproved 2006) Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

Results are reported in accordance with the ASTM Standard specified above and compared to the conditions of acceptance provided in ICBO Evaluation Service, Inc. publication AC23, "Acceptance Criteria For Spray-Applied Fire-Protection Materials".

3 Test Samples

3.1. SAMPLE SELECTION

The products to be tested arrived by commercial carrier shipment from Southwest Fireproofing Products Co. in factory packed bags with inspection agency labels. The required mixing of materials and spray application to the specified test substrate was performed by the client with Intertek observation at the Intertek Evaluation Center.

Aluminum sulfate hydrate (alum) solution was prepared with 6.39 lbs of alum and 10 lbs of water. The alum was dissolved in water and the solution filtered for injection at nozzle to accelerate gypsum set.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The dry fireproofing material as removed from bags was mixed with water to produce a coherent pumpable slurry. The mixed material was transferred to the hopper of a pump and pumped to a spray nozzle at the end of the hose. Alum solution was injected into the slurry within the hose close to the nozzle and the slurry was dispensed through the spray nozzle orifice with air injected through an air stem for dispersion.

The product identification, material weight, mix water used and the substrate of application are identified in the following table.

Product - Bag No.	Net material weight (lbs)	Water added (lbs)	Substrate of Application
Type 5GP - Bag 3	47	90	Steel plates per ASTM E 761

4 Testing and Evaluation Methods

The samples cured for 30 days at nominal conditioning levels.

4.1. TEST STANDARD 1 – ASTM E761

The substrate was a 16 gauge galvanized steel sheet measuring 7" x 24". The sample was conditioned at 72 hours at a room temperature of 68 +/- 18℉ followed by oven drying at 110 +/- 10℉ at humidity not exceeding 60% until a constant weight was reached. The fireproofing thickness is a minimum of 3/4" with a variation of thickness less than or equal to +/- 1/8". The surface was evened on opposite ends of the sample for testing.

The load (bearing block) of 0.1 psi was applied perpendicular to the face of the sample. The initial thickness, the distance between the plane bearing surface of the assembly and the steel plane, was recorded. The sample was compressed until a deformation of 10% or ultimate load was reached.

4.2. TEST STANDARD 2 – ASTM E605

Thickness of each sample was determined by inserting the penetrating pin of the thickness gage perpendicular into the sprayed fire-resistive material. When the pin touched the surface of the substrate, the disk was moved to the surface of the sprayed fire-resistive material with sufficient force to register the average plane. The gage was withdrawn to read the thickness.

The densities of the tested materials were determined by removing all of the in-place material from the substrate within a measured test area of the sample, conditioning the removed material as specified by the Standard and calculating the density from the thickness, area and weight.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

E761 – Compressive Strength

Test results including the compressive load, compressive strength, maximum extension, mode of failure at two locations. One at each end of the sample. The density of the sample was determined at the mid section. Results are tabulated below.

	Compressive Load (lbf)	Maximum extension (in)	Mode of failure	Thickness (in.)	Density (lbs/ft^3)
5 GP (1)	903.40900	.08899	Maximum extension	1	13.27
5 GP (2)	945.34799	.08906	Maximum extension	1	13.27

6 Conclusion

The average compressive strength of the two determinations is 25.7 pounds per square inch. This equates to 3,701 pounds per square foot which exceeds the 750 psf requirement of ICC-ES AC23 acceptance criteria for this physical property.

Intertek has conducted testing for Southwest Fireproofing Products Co. Type 5GP cementitious fireproofing. Testing was conducted in accordance ASTM E 761 - 92 (Reapproved 2005) Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members. This evaluation began April 14, 2009 and was completed October 27, 2009.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Randy Sundby
Project Engineer, Construction Products

Reviewed by:

Rhonda Byrne
Operations Manager

APPENDIX A

Test Data

ASTM E761 DATA SHEET

Project #: ___3171245_____ Client: ____SWF_____

Date: _____10/27/09_____ Tech/Reviewer: Randy

Sample:.5GP_____ Temp: ___74.2 F_____

Thickness of SFRM: 1 inch.

Density of SFRM: 13.27 (lbs/ft^3)

Mode of Failure: Maximum Extension

	Compressive load at Maximum Compressive extension (lbf)	Maximum Compressive extension (in)
1	903.40900	0.08899
2	945.34799	0.08906

REVISION SUMMARY

DATE	SUMMARY
October 27, 2009	Original

Intertek

TEST REPORT

ASTM E84-09

SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

Report No. 3171245SAT-003A Rev.1

Type 5GP Cementitious Fireproofing

June 8, 2009

Prepared for:
Southwest Fireproofing Products Co.
5119 Edith Blvd.Ne
Albuquerque, NM 87107

Intertek Testing Services NA, Inc.
16015 Shady Falls Road
Elmendorf, TX 78112
(voice) 210-635-8100
(fax) 210-635-8101
www.intertek-etlsemko.com

ABSTRACT

Test Specimen:	Type 5GP Cementitious Fireproofing		
Test Standard:	ASTM E84-09		
Test Date:	May 07, 2009		
Test Sponsor:	Southwest Fireproofing Products Co.		
Test Results:	FLAME SPREAD INDEX	=	0
	SMOKE DEVELOPED INDEX	=	0
		=	N/A ft. Beyond Burners Centerline

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Teodoro Alvarado Jr
E84 Operator

June 8, 2009

Reviewed and approved:

Miguel Zamarripa
Project Manager

June 8, 2009

I INTRODUCTION

This report describes the results of the ASTM E84-09 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS , a method for determining the comparative surface burning behavior of building materials,. This test is applicable to exposed surfaces, such as ceilings or walls, provided that the material or assembly of materials, by its own structural quality or the manner in which it is tested and intended for use, is capable of supporting itself in position or being supported during the test period.

The purpose of the method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke density developed are reported, however, there is not necessarily a relationship between these two measurements.

"The use of supporting materials on the underside of the test specimen may lower the flame spread index from that which might be obtained if the specimen could be tested without such support. This method may not be appropriate for obtaining comparative surface burning behavior of some cellular plastic materials. Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place."

This test method is also published under the following designations:

ANSI 2.5
NFPA 255
UBC 8-1 (42-1)
UL 723

This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.

II PURPOSE

The ASTM E84-09 (25 foot tunnel) test method is intended to compare the surface flame spread and smoke developed measurements to those obtained from tests of fiber cement board and select grade red oak flooring. The test specimen surface (18 inches wide and 24 feet long) is exposed to a flaming fire exposure during the 10 minute test duration, while flame spread over its surface and density of the resulting smoke are measured and recorded. Test results are presented as the computed comparisons to the standard calibration materials.

The furnace is considered under calibration when a 10 minute test of red oak decking will pass flame out the end of the tunnel in five minutes, 30 seconds, plus or minus 15 seconds. Fiber cement board forms the zero point for both flame spread and smoke developed indexes, while the red oak flooring smoke developed index is set as 100.

III DESCRIPTION OF TEST SPECIMEN

Specimen Identification:	Type 5GP Cementitious Fireproofing
Date Received:	3/27/2009
Date Prepared:	3/27/2009
Conditioning (73°F & 50% R.H.):	41 days
Specimen Width (in):	24
Specimen Length (ft):	24
Specimen Thickness:	1.3400-in.
Material Weight:	N/A oz./sq. yd
Total Specimen Weight:	216-lbs.
Adhesive or coating application rate:	N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The test specimen was described by the client as the "Type 5GP Cementitious Fireproofing received in bags with Underwriters Laboratories Inc. Labels. The Type 5GP was mixed with water and spray applied at the Intertek Laboratories to cement board Provided by Intertek with observation by laboratory personnel. Mixing and spraying used typical job site equipment and job experienced workmen. The samples were left with Intertek personnel for curing, conditioning and testing". The specimen consisted of (5) 5-ft. long x 24-in. wide x 1.3400-in. thick, panels. The specimen was identified by the client as "Type 5GP Cementitious Fireproofing." The samples were received in good condition.

IV TEST PROCEDURE

The tests were conducted in accordance with the procedures outlined in the American Society for Testing and Materials ASTM E84-09. The self- supporting specimens were placed directly on the tunnel ledges. As required by the standard, one or more layers of 0.25 inch thick reinforced concrete board was placed on top of the test sample between the sample and the tunnel lid. After the tests, the samples were removed from the tunnel, examined and disposed of.

The test was conducted on 5/7/2009, and not witnessed by any third parties.

V TEST RESULTS

The test results, computed on the basis of observed flame front advance and electronic smoke density measurements are presented in the following table. In recognition of possible variations and limitations of the test method, the results are computed to the nearest number divisible by five, as outlined in the test method for smoke developed index results greater than 200 the calculated value is rounded to the nearest 50 points.

While no longer a part of this standard test method, the Fuel Contributed Value has been computed, and may be found on the computer printout sheet in the Appendix.

Test Specimen	E84 (10 Minute) Flame Spread Index	E84 (10 Minute) Smoke Developed Index	NFPA 703 (30Minute) ft
Fiber Cement Board	0	0	N/A
Red Oak Flooring		100	N/A
Type 5GP Cementitious Fireproofing	0	0	N/A

The data sheets are included in the Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84-09 apparatus, and contain all calibration and specimen data needed to calculate the test results.

VI OBSERVATIONS

During the test, the specimen was observed to behave in the following manner: sample never ignited. The test continued for the 10:00 duration.

After the test the specimen was observed to be damaged as follows:
The panels were discolored from 0-ft. -4.5-ft. and no visible damage was seen from 4.5-ft. -24-ft.

APPENDIX

ASTM E84-09
Data Sheets

ASTM E84-09

Client SOUTHWEST FIREPROOFING
Date 5-7-09
Project Number 3171245SAT-003A Rev.1
Test Number 1
Operator TA/AM

Specimen ID "TYPE 5 GP CEMENTITIONS FIREPROOFING, CEMENT BOARD PRODUCT" THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 0

SMOKE DEVELOPED INDEX: 0

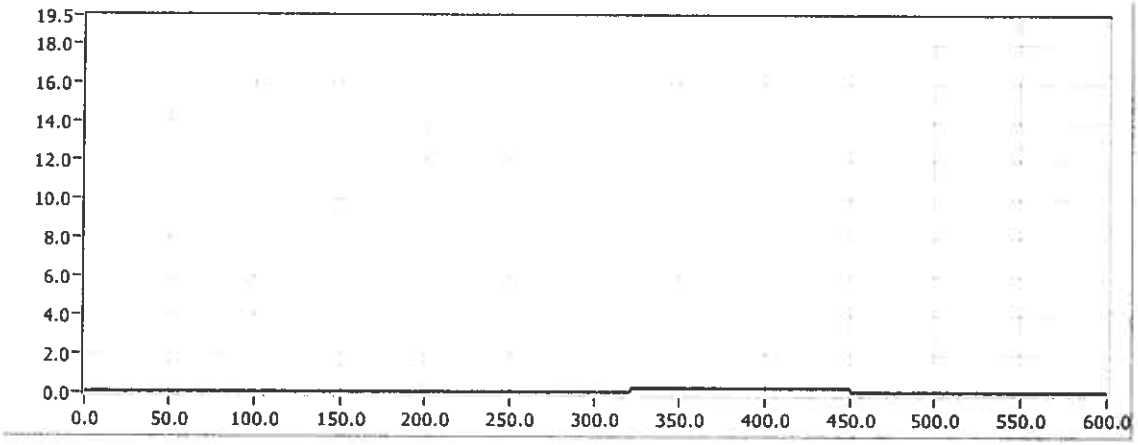
SPECIMEN DATA

Time to Ignition (sec)	0
Time to Max FS (sec)	322
Maximum FS (feet)	0.3
Time to 980 F (sec)	Never Reached
Time to End of Tunnel (sec)	Never Reached
Max Temperature (F)	587
Time to Max Temperature (sec)	547
Total Fuel Burned (cubic feet)	50.94
FS*Time Area (ft*min)	1.6
Smoke Area (%A*min)	0.8
Unrounded FSI	0.8

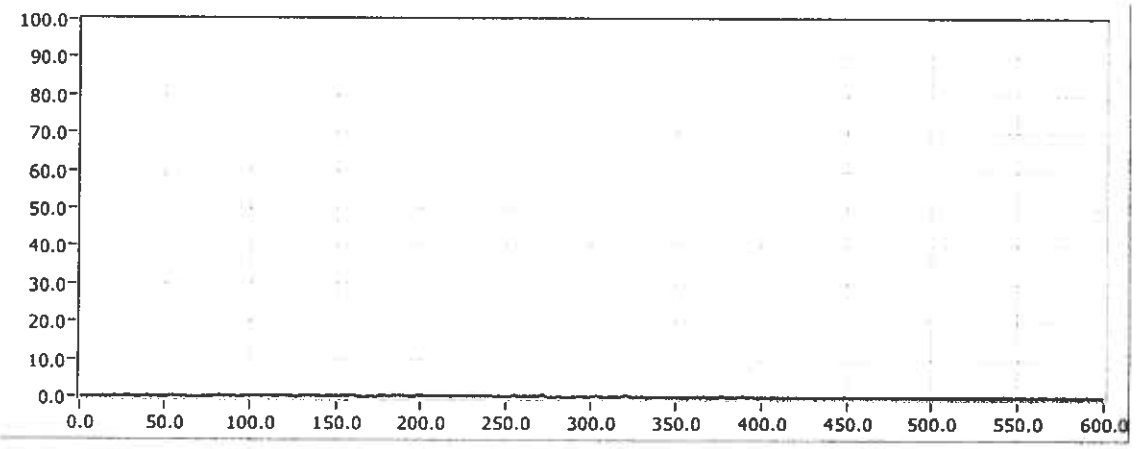
CALIBRATION DATA

Time to Ignition of Last Red Oak (Sec)	39.0
Red Oak Smoke Area (%A*min)	111.0

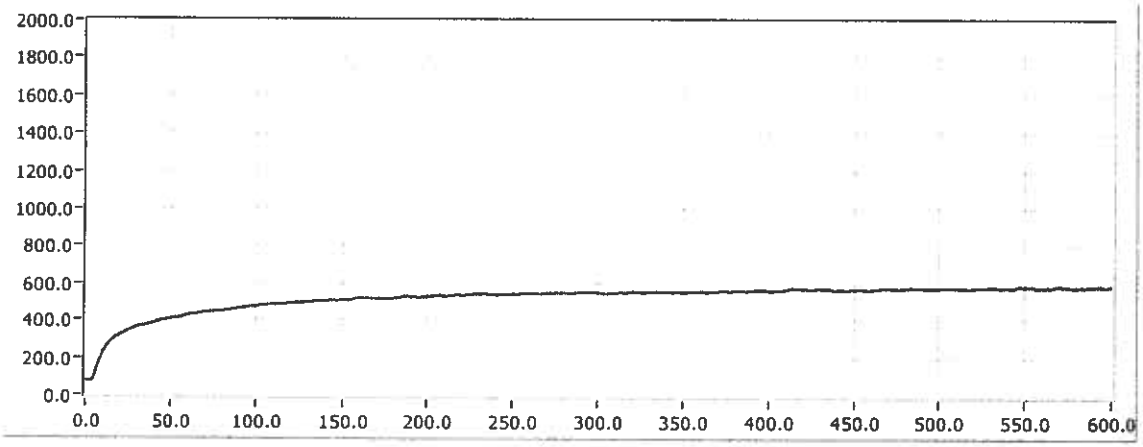
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)



Time (sec)

600

R.T. Vanderbilt Company, Inc.
INDUSTRIAL MINERALS AND CHEMICALS

30 WINFIELD STREET, P.O. BOX 5150, NORWALK, CONNECTICUT 06856-5150 • (203) 853-1400
FAX (203) 853-1452 • CABLE "BILTVAN", NORWALK, CONNECTICUT • TWX 710-468-2940

March 10, 1999

Mr. Jason Bergman
AD Fire Protection
420 Tapescott Road
Scarborough, Ontario
Canada M1B 1Y4

Dear Mr. Bergman:

Enclosed, please find my report on 70 days exposure of your fire protection material to fungi under increased temperature and humidity conditions. No growth was seen on any of the formulas tested.

I believe the report is self-explanatory; however, should you wish to discuss any of the details, please feel free to give me a call.

Sincerely,

Frank B. Flynn
Manager, Biochemical Products

FF/

fflynn@rtvanderbilt.com

The recommendations for use of our materials are based upon tests believed to be reliable. However, we do not guarantee the results to be obtained.

Frank B. Flynn
March 10, 1999

SUPPLEMENTAL REPORT

ES-136 Resistance of Fireproofing Material Containing Inhibitors to Fungi
AD Fire Protection Company

Introduction:

AD Fire Protection submitted 18 bags of a loose material along with directions on how to mix each with water. Each formula contains a biocide at an unrevealed level, except for Formula 1, which has no biocide.

Each sample was mixed in a paper cup using a spatula and according to directions. The test proceeded as detailed in the Procedures section, below. The results described here are from observations made after 70 days of incubation at 28°C.

Conclusions:

All samples contained in cups failed to exhibit fungi growth after 70 days of various temperature and humidity conditions.

Procedures:

Upon receipt, each formula was prepared in a 20-ounce wax paper cup according to provided directions. The specimens were allowed to dry at ambient conditions for 48 hours.

Each sample was then inoculated with a fungi spore suspension referenced from ASTM G-21, "Determining the Fungi Resistance of Synthetic Polymeric Materials to Fungi". All cups were subject to the following conditions:

- 14 days in an incubator at 28°C; cups covered; surfaces re-sprayed with fungi
- at 33 days, covers removed and cups re-sprayed. Open cups were placed into a plastic bag containing a pan of water for increased humidity then back into incubator;
- at 60 days, cups were removed from bag and read. Surfaces were re-sprayed and removed to a high humidity cabinet having a temperature of about 90F.
- at 70 days, plates were examined for final readings.

The grading system used to assess fungi resistance was from ASTM G-21-96, Determining the Fungi Resistance of Synthetic Polymeric Materials to Fungi".

Results:

See attached sheet.

FF/

AD FIRE PROTECTION COMPANY

Batch No.	Formula	Cups 70 Days
Batch 01	AD Type 5	0
Batch 02	AD Type 5	0
Batch 03	AD Type 5	0
Batch 04	AD Type 5	0
Batch 05	AD Type 5	0
Batch 06	AD Type 5	0
Batch 07	AD Type 5	0
Batch 08	AD Type 5	0
Batch 09	AD Type 5	0
Batch 10	AD Type 5	0
Batch 11	AD Type 7	0
Batch 12	AD 1XR	0
Batch 13	AD Type 7	0
Batch 14	AD Type 7	0
Batch 15	AD Type 7	0
Batch 16	AD 1XR	0
Batch 17	AD 1XR	0
Batch 18	AD 1XR	0

Key: 0 = No Growth
1 = Trace Growth (<10%)
2 = Slight Growth (10-30%)
4 = Moderate Growth (30-60%)
5 = Heavy Growth (60-100%)

3/10/99

REPORT
ETL TESTING LABORATORIES, INC.

INDUSTRIAL PARK CORTLAND, NEW YORK 13045

Order No. 117227-405 **Date:** September 5, 1996

Report No.: 568300

Rendered To:

A/D Fire Protection Systems, Inc.
420 Tapscott Road
Ontario, Canada M1B1Y4

STANDARD USED: ASTM E136-92

TEST: Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C

AUTHORIZATION OF TEST: The test was authorized by A/D Fire Protection Systems, Inc. Purchase Order No. 010567, dated August 7, 1996, by Don Falconer, representing the client A/D Fire Protection Systems, Inc..

DATE OF TEST: August 29, 1996

SPECIMEN DESCRIPTION: The test was performed on a specimen identified by the client as A/D Type 5.

All services undertaken subject to the following general policy: Reports are submitted for exclusive use of the clients to whom they are addressed. Their significance is subject to the adequacy and representative character of the samples and to the comprehensiveness of the tests, examinations or surveys made. No quotations from reports or use of ETL's name is permitted except as expressly authorized by ETL in writing.

INTRODUCTION

This report describes the results of the ASTM E136-82 Standard Test Method for Behavior of Materials In a Vertical Tube Furnace at 750°C, performed on specimens, previously described, submitted by A/D Fire Protection Systems, Inc.. The specimens were prepared and test evaluations were conducted at ETL Testing Laboratories, Inc.

TEST OBJECTIVE AND PROCEDURE

The method covers the performance of elementary building materials when exposed to 1382°F (750°C), to indicate those materials which do not act to aid combustion or add appreciable heat to an ambient fire. It is not intended to apply to laminated or coated materials. It should be used to measure and describe the properties of materials, products or systems in response to heat and flame under controlled laboratory conditions and should not be used for the description or appraisal of the fire hazards of materials, products or systems under actual fire conditions.

Each Specimen (minimum of four) is exposed to a temperature of 1382 ± 10°F (750 ± 5.5°C) in the center of an air stream in a furnace tube at an air velocity of 10 ft/minute (3 m/minute) for a 15-minute period. The surface and internal temperature of the specimen was measured. The weight loss is also determined.

TEST REQUIREMENTS

To be reported as passing this test, the following criteria must be met:

1. Specimen interior and surface temperatures do not increase more than 54°F (30°C) above the initial furnace temperature;

2. No flaming from the specimen after 30 seconds;

3. Average specimen weight loss less than 50 percent.

RESULTS:

Client: A/D Fire Protection Systems, Inc.
Order No.: 117227-405
Test No.: 1
Damage (yes/no): No

Date Received: 08/06/96
Date Completed: 08/29/96
Engineer: Amy Rice
Technician: Lisa Phinney

SPECIMEN DESCRIPTION: A/D Type 5

Specimen Length (in): 2 **Width(in):** 1 1/2 **Thickness(in):** 1 1/2

RESULTS:

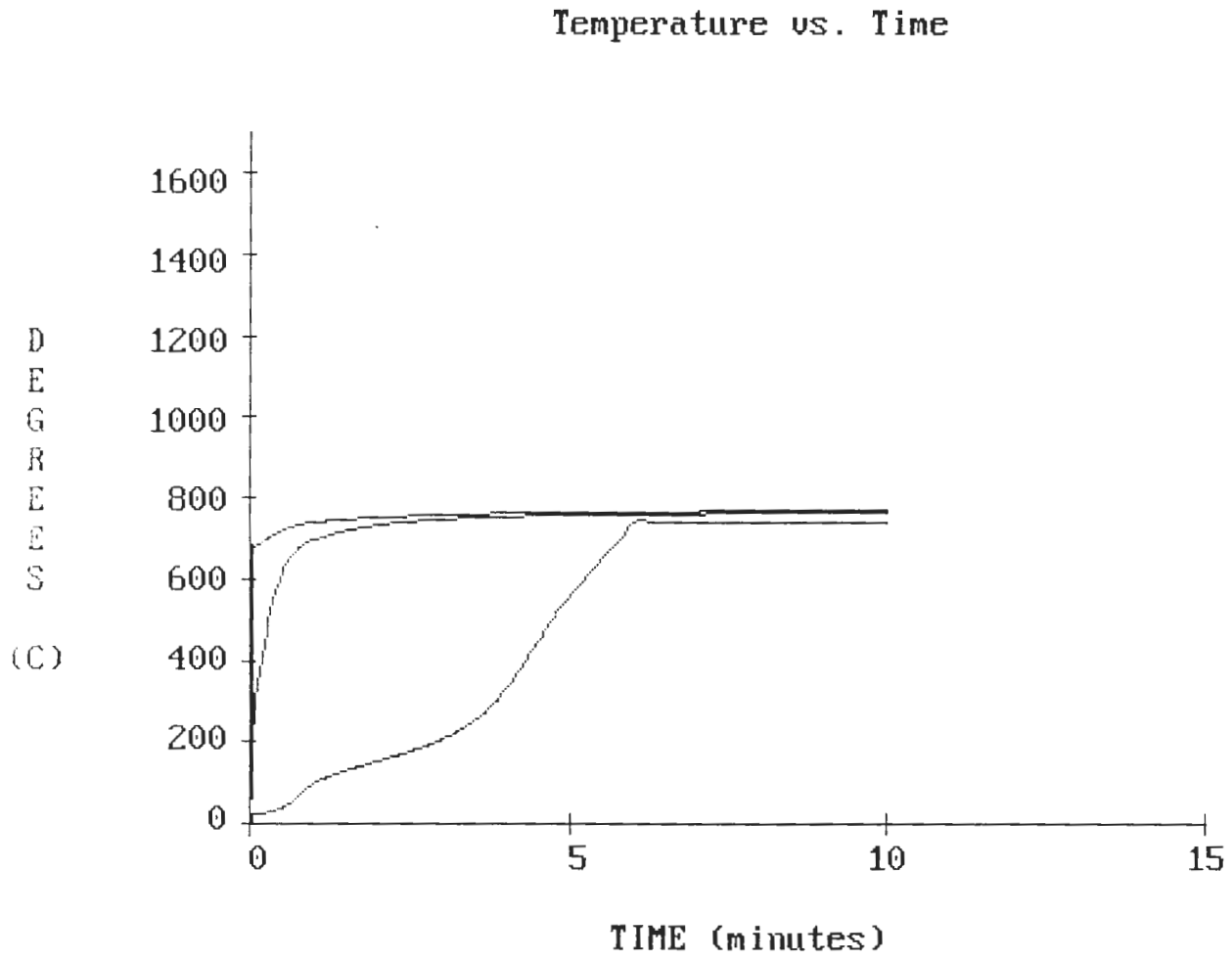
EQUILIBRIUM FURNACE TEMP. PRIOR TO TESTING = 758 °C

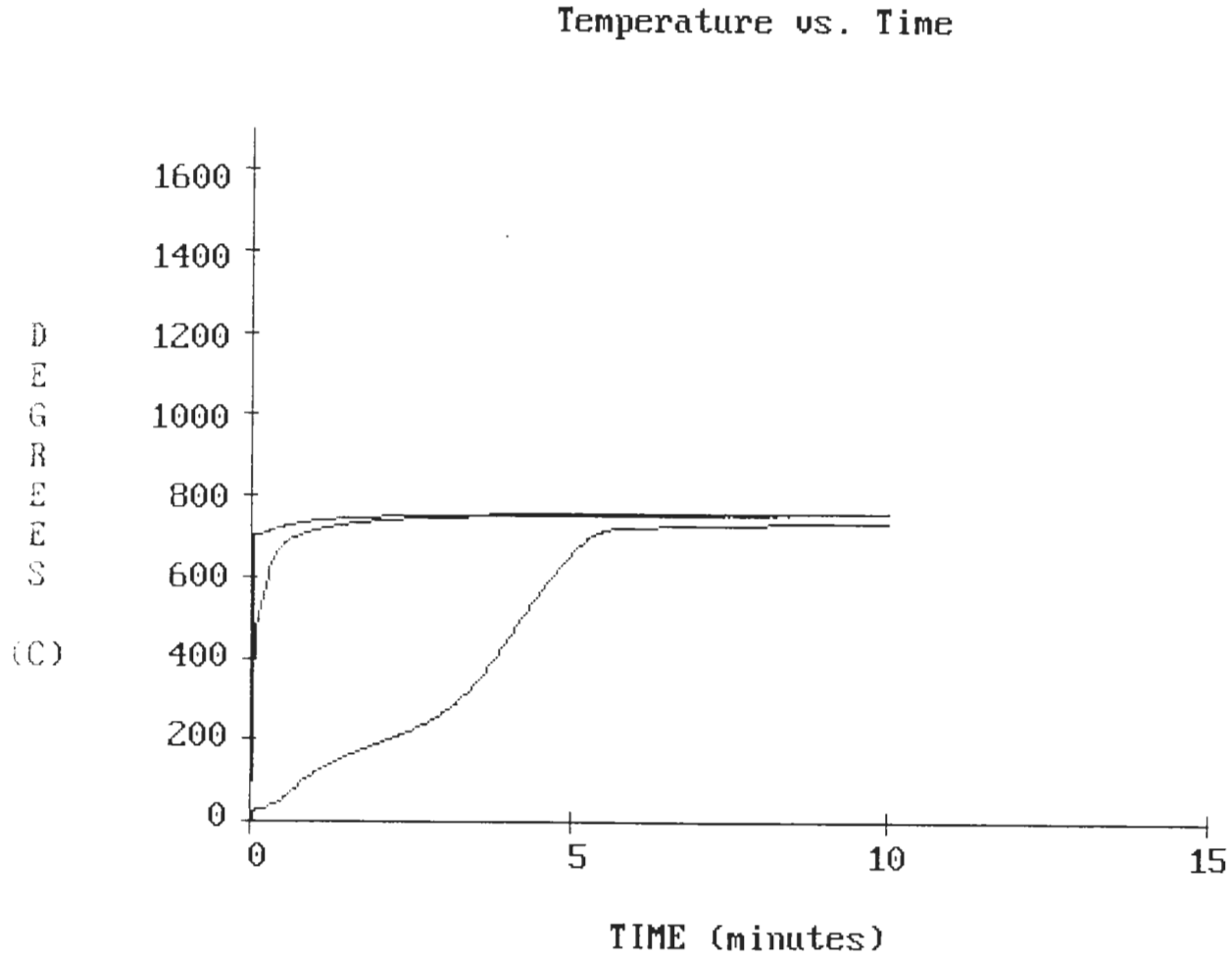
THERMOCOUPLE #1 IS LOCATED IN THE CENTER OF THE TEST SPECIMEN
THERMOCOUPLE #2 IS LOCATED ON THE SURFACE OF THE TEST SPECIMEN
THERMOCOUPLE #3 IS THE AIR TEMP. INSIDE THE FURNACE DURING THE TEST

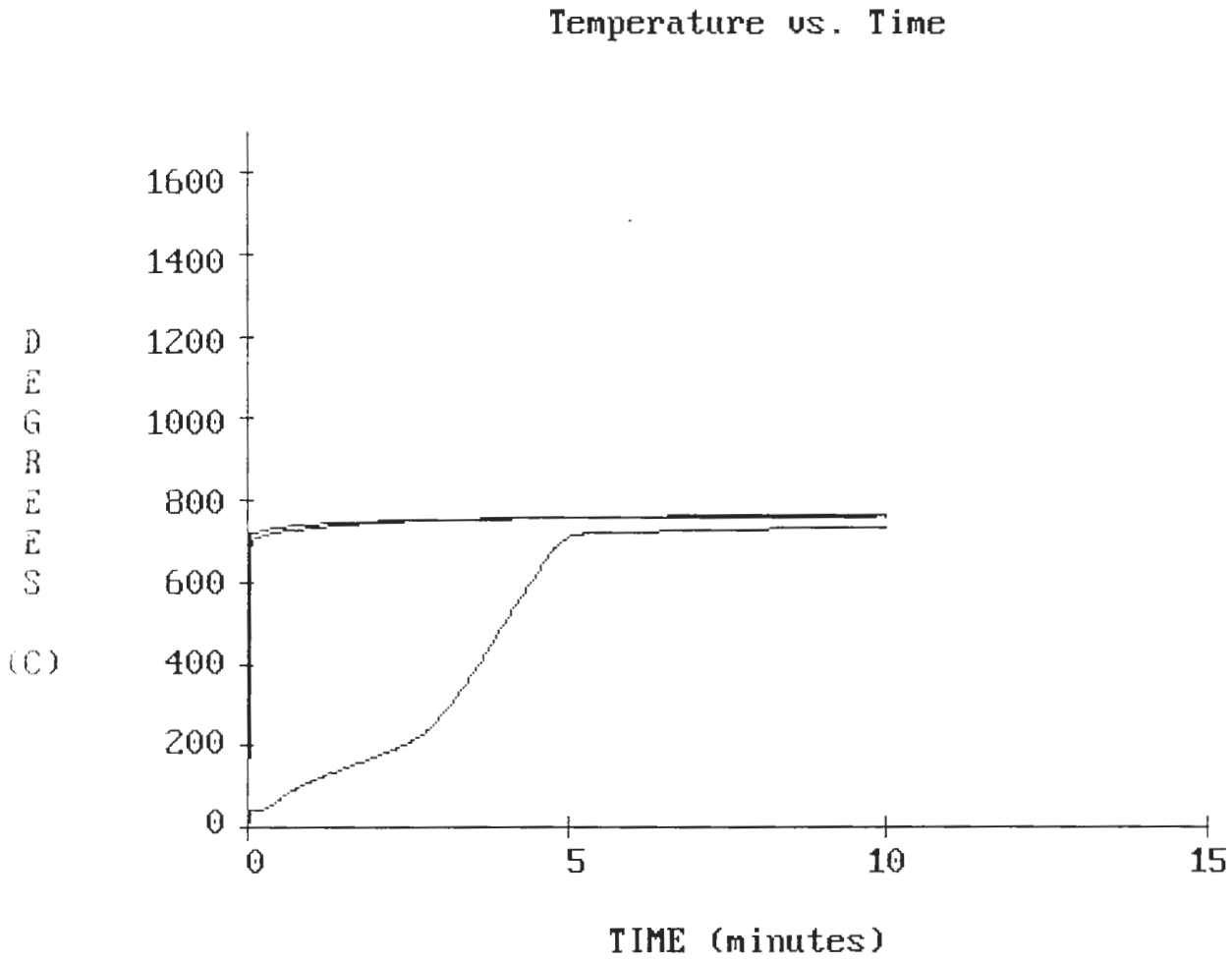
SPECIMEN NUMBER

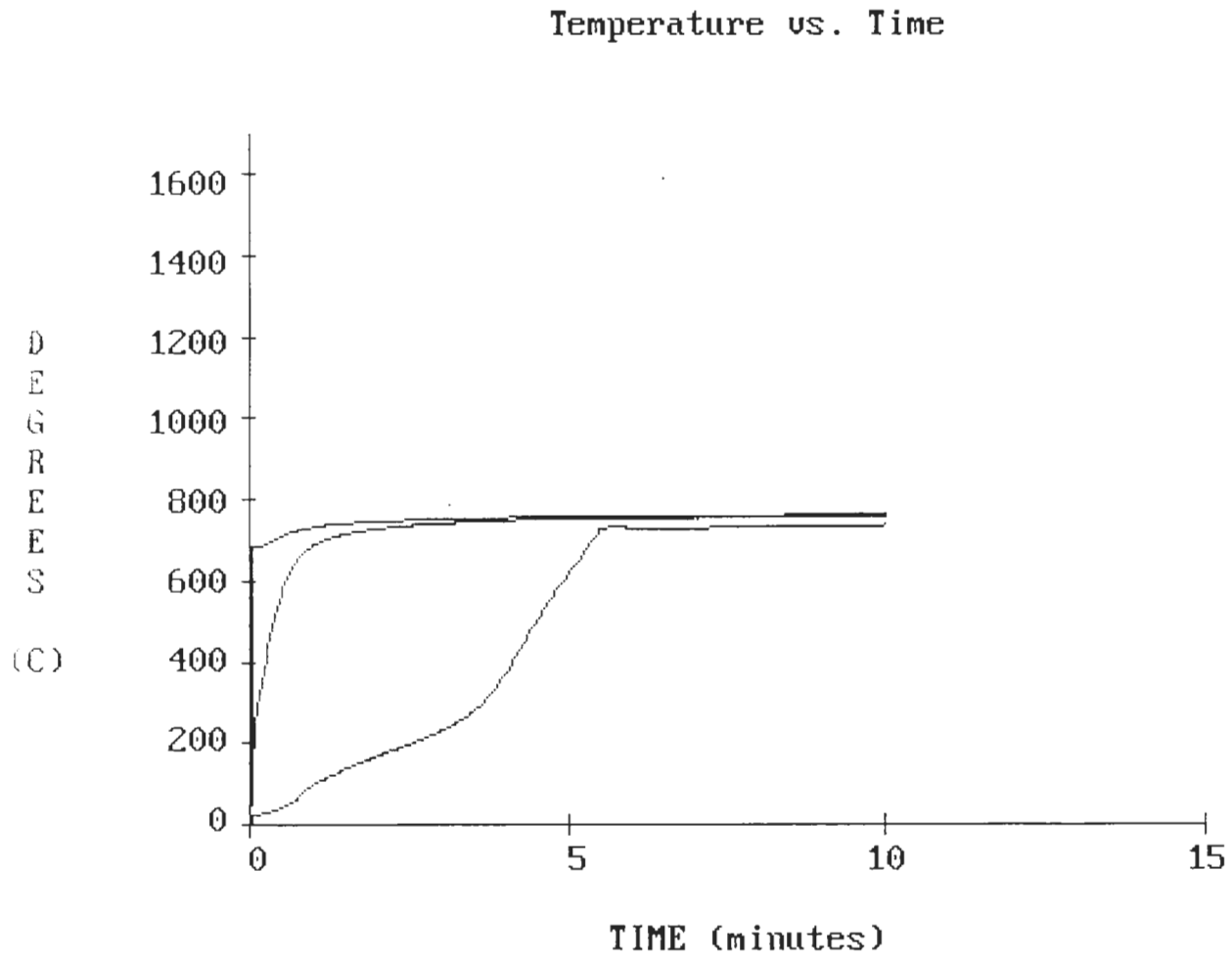
	1	2	3	4
INITIAL WEIGHT (g)	27.77	26.43	25.36	27.17
FINAL WEIGHT (g)	23.93	22.37	21.56	23.23
TIME TO FLAMING (min:sec)	---	---	---	---
FLAME OUT (min:sec)	---	---	---	---
MAX. TEMP. THERMOCOUPLE #1 (°C)	744.2	733.5	733.2	736.1
MAX. TEMP. THERMOCOUPLE #2 (°C)	764.2	755.9	764.2	758.4
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #1 (°C)	---	---	---	---
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #2 (°C)	6.2	---	6.2	0.4
PASS/FAIL	PASS	PASS	PASS	PASS

RESULTS (Cont'd):




Temperature vs. Time
1600
1400
1200
1000
800
600
400
200
0
DEGREES (C)
0
5
10
15
TIME (minutes)


Temperature vs. Time
DEGREES (C)
1600
1400
1200
1000
800
600
400
200
0
0
5
10
15
TIME (minutes)


Temperature vs. Time
1600
1400
1200
1000
800
600
400
200
0
DEGREES (C)
0
5
10
15
TIME (minutes)

CONCLUSION

The A/D Type 5, previously described, submitted byA/D Fire Protection Systems, Inc., was evaluated in accordance with ASTM E136-82 Standard Test Method for Behavior of Materials In a Vertical Tube Furnace at 750°C on 08/29/96.

The specimen was judged to be in compliance with the applicable standard.

Reviewed by:

Lisa Phinney
Technician
Performance Division

jaa

Approved by:

Amy Rice
Engineer
Performance Division

Declare.SM

Southwest Type 5GP
Carboline Company

Final Assembly: Louisa, Virginia, USA
Life Expectancy: Life of Structure
End of Life Options: Landfill (100%)

Ingredients:

Calcium Sulfate (Hemihydrate), Vermiculite, Cellulose, Calcium Carbonate, Calcium Hydroxide (Ca(OH)2), Quartz

Living Building Challenge Criteria:

CRB-0006
VOC Content: 0 g/L
Declaration Status

EXP. 01 NOV 2019
VOC Emissions: N/A
- [x] LBC Red List Free
- [ ] LBC Compliant
- [ ] Declared

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