Form # P 04

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING INSPECTION

PERMIT

Permit Number: 100620

Please Read Application And Notes, If Any, Attached

This is to certify that PENOBSCOT BAY MEDICAL ASSOCIATES/Pizzagalli

has permission to Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices

AT 331 VERANDA ST CBL 434 C001001

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

PERMIT ISSUED

JUN - 7 2010

City of Portland

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and written permission procured before this building or part thereof is lathed or otherwise closed-in. 24 HOUR NOTICE IS REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. _____

Health Dept. _____

Appeal Board _____

Other _____ Department Name

Director - Building & Inspection Services

6/7/10

PENALTY FOR REMOVING THIS CARD

SCANNED

CITY OF PORTLAND, MAINE
Department of Building Inspections

Original Receipt

6 4 20 10

Received from Pizzarelli Construction

Location of Work 331 Veranda

Cost of Construction $_____ Building Fee: 30.00

Permit Fee $_____ Site Fee: _____

Certificate of Occupancy Fee: _____

Total: 30.00

Building (IL) X Plumbing (I5) ___ Electrical (I2) ___ Site Plan (U2) ___

Other _____

CBL: _____

Check #: 1897 **Total Collected $** 30.00

No work is to be started until permit issued.
Please keep original receipt for your records.

Taken by: Kay

WHITE - Applicant's Copy
YELLOW - Office Copy
PINK - Permit Copy

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
10-0620		434 C001001

Location of Construction:	Owner Name:	Owner Address:	Phone:
331 VERANDA ST	PENOBSCOT BAY MEDICAL AS	PO BOX 9746	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Pizzagalli	131 Presumpscot St Portland	2078742323
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		Amendment to Commercial	R-P

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Parking Lot	Parking Garage/Medical Office Building Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices	$30.00	$30.00	4

FIRE DEPT: ☒ Approved ☐ Denied

w/conditions

Signature: JMB per KNG

INSPECTION: Use Group: B/S-2 Type: 2B

IBC-2003

Signature: JMB 6/1/10

Proposed Project Description:
Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
jmb	06/04/2010

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☒ Shoreland Over 75' to Hwm to New Constr.	☐ Variance	☒ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☐ Flood Zone Panel 8 zone C	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☒ Site Plan Previously Approved # 2008-0123	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐	☐ Denied	☐ Denied
Date: JMB 6/7/10	Date:	Date: JMB

PERMIT ISSUED

JUN - 7 2010

City of Portland

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and th I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representati shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable such permit.

SIGNATURE OF APPLICANT | ADDRESS | DATE | PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE | DATE | PHONE

7-1-10

All ceiling penetrations that were not sealed on the 3rd floor were sealed on the ceiling on 2nd floor parking garage. Steel has been fire proofed and SBCCI Code has Special Inspections. 5/8 Mold and moisture resistant Sheetrock covering entire ceiling on site ok to close in

MLP

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the City of Portland Inspection Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months, if the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue with construction.**

X **Final inspection required at completion of work.**

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OR CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

CBL: 182 C004001 **Building Permit #:** 10-0634

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
10-0620	06/04/2010	434 C001001

Location of Construction:	Owner Name:	Owner Address:	Phone:
331 VERANDA ST	PENOBSCOT BAY MEDICAL AS	PO BOX 9746	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Pizzagalli	131 Presumpscot St Portland	(207) 874-2323
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Amendment to Commercial	

Proposed Use:	Proposed Project Description:
Parking Garage/Medical Office Building Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices	Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 06/07/2010 **Ok to Issue:** ☑

Note:

1) All previous conditions apply

Dept: Building **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 06/07/2010 **Ok to Issue:** ☑

Note:

1) All previous conditions apply

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Capt Keith Gautreau **Approval Date:** 06/07/2010 **Ok to Issue:** ☑

Note:

1) All previous conditons apply

Comments:

6/4/2010-jmb: Spoke to Keith about the new design, he is ok if it meets the 2 hour rating and is based on UL listings.

PERMIT ISSUED

JUN - 7 2010

City of Portland

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
10-0620	06/04/2010	434 C001001

Location of Construction:	Owner Name:	Owner Address:	Phone:
331 VERANDA ST	PENOBSCOT BAY MEDICAL AS	PO BOX 9746	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Pizzagalli	131 Presumpscot St Portland	(207) 874-2323
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Amendment to Commercial	

Proposed Use:	Proposed Project Description:
Parking Garage/Medical Office Building Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices	Amend permit #09-0308 to revise the 2 hour floor/ceiling design that separates the garage and offices

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 06/07/2010

Note: **Ok to Issue:** ☑

1) All previous conditions apply

Dept: Building **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 06/07/2010

Note: **Ok to Issue:** ☑

1) All previous conditions apply

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Capt Keith Gautreau **Approval Date:** 06/07/2010

Note: **Ok to Issue:** ☑

1) All previous conditons apply

Comments:

6/4/2010-jmb: Spoke to Keith about the new design, he is ok if it meets the 2 hour rating and is based on UL listings.

PERMIT ISSUED

JUN - 7 2010

City of Portland

General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

MAP

Location/Address of Construction: 331 Veranda Street		
Total Square Footage of Proposed Structure/Area	Square Footage of Lot	Number of Stories
Tax Assessor's Chart, Block & Lot Chart# Block# Lot#	Applicant *must be owner, Lessee or Buyer* Name Pizzagalli Construction Co. (Jared Ballard) Address 131 Presumpscot St. City, State & Zip Portland, ME 04104	Telephone: 207.899.0575
Lessee/DBA (If Applicable)	Owner (if different from Applicant) Name Martins Point Healthcare Address 331 Veranda St. City, State & Zip Portland, ME 04104	Cost Of Work: $ No Add'l C of O Fee: $ Total Fee: $ 30.00

Current legal use (i.e. single family) _____ Number of Residential Units _____

If vacant, what was the previous use? _____

Proposed Specific use: _____

Is property part of a subdivision? _____ If yes, please name _____

Project description:

Amendment to general building permit (Attn Jeanie) #09-308

RECEIVED

JUN - 4 2010

Dept. of Building Inspections
City of Portland Maine

Contractor's name: Pizzagalli Construction Co. Telephone: _____

Address: 131 Presumpscot St

City, State & Zip Portland, ME 04104

Who should we contact when the permit is ready: I call 899-0575 Jared Ballard Telephone: _____

Mailing address: _____

Please submit all of the information outlined on the applicable Checklist. Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at www.portlandmaine.gov, or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature: _____ Date: 6/4/10

This is not a permit; you may not commence ANY work until the permit is issued

Revised 01-20-10

Jeanie Bourke - Martin's Point Medical Office Building - Revised Garage Ceiling System

From: "Ballard, Jared" <JBallard@pizzagalli.com>
To: Jeanie Bourke <JMB@portlandmaine.gov>
Date: 6/3/2010 3:45 PM
Subject: Martin's Point Medical Office Building - Revised Garage Ceiling System
CC: "Bertolini, Garret" <GBertolini@pizzagalli.com>, "Street, Tim" <tstreet@...

Jeannie,

This is a no cost change to the project. We received a credit from the framing contractor which offsets the fireproofing cost. Please confirm an amendment to the permit is not required.

I would be glad to meet with you and discuss further if needed. Please call with questions.

Thanks.

Jared

From: Jeanie Bourke [mailto:JMB@portlandmaine.gov]
Sent: Thursday, June 03, 2010 3:35 PM
To: Ballard, Jared
Cc: Bertolini, Garret; Street, Tim; Penny Littell; Tammy Munson
Subject: Re: Martin's Point Medical Office Building - Revised Garage Ceiling System

Hello Jared,
Just an FYI, I am not familiar with this project, Chris Hanson did the plan review and approval. It will take me some time to research the original approved design and review the 118 page pdf attachment for the proposed revision of the 2 hour fire rated floor ceiling and structural support system separating the garage from the medical facility.

I imagine this is a substantial change from the approved design and should be documented as an amendment to the permit. I understand you would like to proceed with this new design immediately and I will make all efforts to review and respond once this has been submitted.

Please include hard copy and pdf formats and payment for any additional costs incurred for material and installation of the proposed design.

Thank you

Jeanie Bourke
CEO/Plan Reviewer

City of Portland
Planning & Urban Development Dept./ Inspections Division
389 Congress St. Rm 315
Portland, ME 04101
jmb@portlandmaine.gov
(207)874-8715

>>> "Ballard, Jared" <JBallard@pizzagalli.com> 6/3/2010 8:41 AM >>>
Good Morning Jeannie,

Approximately one year ago, the building permit for the new health center at Martin's Point was issued by the City of Portland. The project includes two levels of parking structure covered by a single level of medical office building. You may remember one of the significant building elements was a fire rated ceiling system separating the parking structure from the occupied medial office space. The original system included ceiling suspension grid, light gauge framing with mineral wool insulation , and an exterior rated gypsum board. This design was comprised of various UL design assemblies modified to meet the code required two hour fire separation, and overall design intent. You can see the original design in the building permit set submitted with the permit application.

After further review and development of the original system, the contractor responsible for the design and installation of the system has proposed a simplified system that is comprised of two UL design which will provide the required fire separation. The revised system includes fireproofing of the steel structure supporting the occupied floor with light gauge framing supporting fire rated gypsum board as the ceiling substrate.
Attached is a revised submittal which includes cementitious fireproofing, revised framing shop drawings, and a stamped letter / details from a Maine licensed fire protection engineer. All elements of this system will be installed in strict accordance with the UL design numbers referenced in the attached documentation. Our team is confident that the revised system is equal or superior to the original system in all regards. This submittal has been previously reviewed and approved by the architect / engineer of record.

Please review the attached submittal and confirm the city's acceptance. We would like to proceed with this work immediately. Please do not hesitate to call with questions or comments or if you would like to discuss any portion of this submittal.

Regards,

Jared Ballard
Senior Project Engineer
Pizzagalli Construction Company

207.899.0575
jballard@pizzagalli.com

From: Margaret Kakalis [mailto:MKAKALIS@SMRTInc.com]
Sent: Thursday, May 27, 2010 9:39 AM
To: Ballard, Jared; Street, Tim; LaPointe, Derek
Cc: Mark Estabrook
Subject: 08139-12 Martins Point Submittals #223, 225

Margaret Kakalis
Administrative Assistant

TRANSMITTAL

No. 0439

pizzagalli
construction company
P O Box 2009, So. Burlington, VT 05407-2009

Pizzagalli Construction
331 Veranda Street
Portland ME 04103

PROJECT: Martin's Point Medical Office Building

DATE: 06/07/2010

RE: Cold-Formed Metal Framing Submittals

TO: Portland, City of
389 Congress St.
Portland ME 04112-0544

JOB: 12800

ATTN: Jeanie Bourke

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
☐ Shop Drawings	☐ Approval	☐ Approved as Submitted
☐ Letter	☐ Your Use	☑ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	**SENT VIA:**	☐ Returned
☑ Specifications	☑ Attached ☐ Separate Cover	☐ Returned for Corrections
☐ Other:		☐ Due Date:
		☐ Other:

Line	*Item*	*Package*	*Code*	*Qty*	*Date*	*Description*	*Status*
1	Submittal	054000	054000-001	1	06/07/2010	Cold-Formed Metal Framing Submittals	Approved As Noted

REMARKS:

ADL

RECEIVED
JUN - 7 2010
Dept. of Building Inspections
City of Portland Maine

CC: Pizzagalli Construction, Jared Ballard
Pizzagalli Construction, Tim Street

Signed: _____
Nick Duncan

Letter of Transmittal

ATTN: Jared Ballard	**Date:** 5/27/2010
Company: Pizzagalli Construction	**From:** Margaret Kakalis
Address: 131 Presumpscot Street	**RE:**
Portland, ME 04103	**Project:** MPHC MOB - Constr Administration
	Site: Portland, ME
	Job #: 0813912

We are sending you:

- ☐ Attached
- ☐ Under separate cover via _____ the following:
- ☑ Submittals
- ☐ Prints
- ☐ Change Order
- ☐ Plans
- ☐ Other:
- ☐ Samples
- ☐ Specifications
- ☐ Copy of letter

Copies	Date	No	Description
1		225	Cold-Formed Metal Framing Submittals

These are transmitted as checked below:

- ☐ For approval
- ☐ As requested
- ☐ For your use
- ☐ For review and comment

Action Approved

Remarks:

Signature: Margaret Kakalis

cc:
1 - Tim Street, 1 - File

Thursday, May 27, 2010

Submittal Review Memo

Project Name: MPHC MOB - Constr Administration **Job #:** 0813912

Submittal #: 225-054000-1

To: Jared Ballard
Pizzagalli Construction
131 Presumpscot Street
Portland, ME 04103

Submittal Title: Cold-Formed Metal Framing Submittals

08139-12 # 225

ACTION: Please take action below:

The review was performed for the limited purpose of determining general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Modifications or comments made on the submittal during this review do not relieve the contractor from compliance with the requirements of the drawings and specifications. Approval of a specific item does not include approval of the assembly of which the item is a component. The Contractor is responsible for quantities and dimensions to be confirmed and correlated at the job site: information that pertains solely to the fabrication processes or to the means, methods, techniques sequences and procedures of construction:coordination of the work of all trades; and for performing all work in a safe and satisfactory manner.

SMRT, Inc.

REVIEW DATE: 2/26/2010

BY: MLE

- [x] APPROVED
- [ ] PROVIDE AS NOTED
- [ ] REVISE AND RESUBMIT
- [ ] RESUBMIT SPECIFIC ITEM
- [ ] REJECTED:
  - [ ] Not a specified product
  - [ ] Incomplete
  - [ ] Other
- [ ] INFORMATIONAL SUBMITTAL FOR RECORD ONLY
- [ ] NOT A REQUIRED SUBMITTAL - NOT REVIEWED

Remarks:

pizzagalli construction company
131 Presumpscot Street
Portland, ME 04103
T: 207.874.2323
F: 207.874.2727
E:

Project No. 12800
Martin's Point Medical Office Building
131 Presumpscot Street
Portland, ME 04103

Submittal 054000-001
Review Cycle 4

Title	**Cold-Formed Metal Framing Submittals**
Type	**Alternate**
Sent Date	**13-May-2010**
Due Date	**03-Jun-2010**

08139-12 #225

Sent To For Review
Margaret Kakalis
SMRT, Inc.

Responsible Subcontractor / Vendor
Jon Clark
Porter Drywall, Inc.

RECEIVED
MAY 13 2010
SMRT, INC.

Item Being Submitted
Cold-Formed Metal Framing Submittals
- Product Data
- LEED Documents
- Shop Drawings
- Mill Certs will be submittted once received
- Qualification Data
- Product Test Reports
- Research/Eval Reports

Submittal #054000-001-002 Resubmittal of specific items
-Resubmittal of shop drawings incorporating SMRT resubmittal comments.
-Resubmittal of calculation sheets affected by shop drawing revisions. Note: Detail 12 on drawing LSF-6.1 has been revised to account for the slab thickness at the top of the deck flutes. Page 56 from the calculations has not been revised and resubmitted as the anchor diameter has not changed, and the anchor is now thru bolted. Please confirm.
Submittal #054000-001-003 Resubmittal of Specific Items

-Resubmittal of drawings LSF-2.0 and 2.1 including calculations for the subject pages.
Note, in accordance with phone conversations between PCC and SMRT, we have not resubmitted the drawings LSF-5.0 as the ceiling framing is interior non-structural framing and is not part of this submittal. Also note, SMRT added plate strips where the framing runs parrallel with the deck flutes at the penthouse, which is a change from the contract documents. This detail has not been included in this resubmittal as it is not part of the contract documents. The work was put in place at the locations identified by SMRT in submittal #165.

5/13/10 - Resubmittal of revised parking garage ceiling system including SAFRM submittal

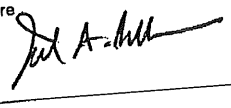
-WR Grace Monokote MK-6 submittal

Ceiling Framing and Sheathing Submittal
-Product Data
-Shop Drawings
-Calculations

Contractor's Review Stamp
I hereby certify that I have examined the enclosed submittal(s) and have determined and verified all field

Architect's Review Stamp

measurements, construction criteria, materials, catalog numbers, and similar data, coordinated the submittal(s) with other submissions and the work of other trades and contractors and, to the best of my knowledge and belief, the enclosed submittal(s) is/are in full compliance with the Contract requirements, except as noted above.

Signature 	Date 5/13/10
Name Jared Ballard Pizzagalli Construction	

This approval does not release subcontractor / vendor from the contractual responsibilities.

PORTER DRYWALL, INC.
"AN EMPLOYEE OWNED COMPANY"

MARTIN'S POINT HEALTH CARE

5/12/2010

REVISED GARAGE CEILING SUBMITTAL

1. Letter from Fire Risk Management (FRM)
2. Stamped SK-1- Ceiling Assembly FRM
3. Framing Engineering Calculations
4. Framing Shop Drawings
5. Expansion/Control Joint Details
6. Product Data

(207) 878-2024 (800) 898-2024 Fax: (207) 878-2085
655 Riverside Street • Portland, Maine 04103

FIRE RISK MANAGEMENT, INC.
Custom House, 2nd Floor • Bath • ME • 04530
207/442-7200 -7272 (Fax)
www.fireriskmgt.com

23 March 2010

Mr. Jon Clark
Porter Drywall
655 Riverside Street
Portland, ME 04103

Re: Martin's Point Parking Garage, Floor/Ceiling Assembly, Portland, ME

Dear Mr. Clark:

As requested, Fire Risk Management, Inc. (FRM) has continued to investigate potential alternative methods to obtain a 2-hour fire-rated floor/ceiling assembly between the open second level parking garage and the third level medical offices of the Martin's Point facility. Information sources used for this latest review included: architectural and structural drawings provided by SMRT, Inc. dated 5/8/09, Underwriters Laboratories (UL) Fire Resistance Directory, a letter from the United States Gypsum Company dated 2/17/10, and technical information on the floor and ceiling construction provided by your office.

The floor is constructed of a composite concrete slab over steel decking, with integrated steel structural beams. The 18 Gauge galvanized floor steel decking has 3" deep flutes. The normal weight (150 pcf), 4000 psi strength concrete slab extends 3.5" past (above) the deck fluting. The concrete is reinforced by a welded wire fabric. The main design intent was to create a practical fire resistant gypsum board ceiling hung below the floor structural beams with 6" of fiberglass insulation placed just above the ceiling to create a temperature controlled space between the hung membrane ceiling and the floor slab. This will prevent the freezing of building services, such as plumbing and mechanical piping, passing through the space.

Fire testing data using national standard ASTM E 119/ UL 263 are very limited for composite steel/concrete decks and gypsum board ceiling assemblies, especially with insulation installed above the ceiling. In fact, currently only three configurations are UL listed for the slab type in this building floor, and only one configuration is listed for use with insulation (UL Design No. D502). That assembly will only provide a one hour fire resistance rating when used with insulation. Thus obtaining a practical, alternative assembly design to achieve a proposed two hour fire resistance required using a combination of a number of features in several similar published floor/ceiling UL design assemblies, along with employing fire protection engineering judgment.

After reviewing several options, one potential design solution was found to be most acceptable in meeting the general requirements of both Porter Drywall and FRM. This solution is highlighted in the attached sketch; SK-1. This proposed floor/ceiling assembly design combines a membrane type C gypsum board ceiling assembly; (combining the design intent of UL Design No. D502, but using gypsum board attached with resilient channels tested in UL Design No. G564 and 6" of fiberglass batt insulation), which is judged to provide a minimum of a one hour fire resistance, with the composite steel/concrete deck assembly (UL Design D902), known to provide a one hour fire rating due to the 3.5" thickness of the normal-weight concrete floor slab and using a fire resistive material applied to the structural steel members.

The UL Design No. D502 with gypsum board ceiling assembly normally provides a 2-hour fire resistance rating when used in combination with a 2.5" thick normal-weight concrete slab. It is important to note that the actual ceiling slab at the Martin's Point facility has a 3.5" thickness of normal-weight concrete. However, since 6" of fiberglass insulation will be added above the gypsum ceiling, a reduction in fire resistance of this assembly to one hour is specified by the UL Fire Resistance Directory and also requires a closer spacing, 16"on center (OC), of the cross tee supporting members directly attached to the gypsum board. This is due to the fact that the insulation reduces the rate at which heat can dissipate from the unexposed side of the gypsum ceiling assembly, possibly causing a faster deterioration of the gypsum material than would otherwise occur.

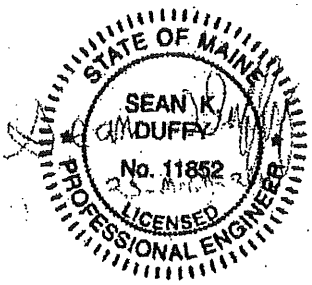
As previously mentioned, UL Design No. D502 is the only configuration listed for composite steel/concrete decks and gypsum board ceiling assemblies with insulation. While this design is based on a proprietary, engineered "gridded" gypsum suspension system, another method of suspending gypsum board with insulation has been successfully tested by UL under a different structural floor slab. A 2-hour fire rated ceiling assembly was achieved in UL Design No. G564 with a single layer of 5/8" Type C gypsum wallboard and insulation back-loaded on the ceiling membrane, with the resilient channels attached directly to C shaped ceiling joists (joists are 16 MSG min, spaced 24" OC) and the wallboard. Although UL Design No. G564 was tested with a different structural floor slab, a non-composite concrete slab and closely spaced steel joists, we believe the performance of this ceiling membrane will be applicable to what's being proposed for this situation. The proposed design incorporates resilient channels that are attached to the gypsum board in accordance with UL Design G564. The resilient channels have been found to be resistant to thermal expansion due to their light gauge, slots and perforations. The resilient channels will be spaced a maximum of 16" OC with 8" maximum spacing from each side of butted gypsum board ends. The increased spacing of resilient channel cross tees, as opposed to the normal cross tee spacing of 24" OC in UL Design No. 502, will result in more support attachments to the gypsum board to compensate for any increased gypsum deterioration due to the addition of insulation. The main runners used for the gypsum support system are cold rolled steel channels (minimum size 1-1/2" deep and MSG 16) spaced a maximum of 24" OC installed perpendicular to the resilient channels. The use of cold-rolled steel channels as the main runner supports will provide resistance to failure due to their vertical support arrangement. The use of cold rolled channels for use as main runner supports has been outlined in the UL Fire Resistance Guide and the cross tee resilient channels will be attached to the main runner cold channels in the same manner outlined in UL Design No. G564. The attachment is with ½" inch type S-12 screws, and the with a 24" spacing the cold rolled channels will have the same attachment spacing to the resilient channels as outlined in UL Design No. G564.

It is our understanding that the assembly components will be installed in accordance with the requirements of the current UL Fire Resistance Directory. As needed, the actual thickness of the fire resistive material applied to the steel structural members will be adjusted for specific beams or girders installed at the Martin's Point facility, per UL and manufacturer's requirements.

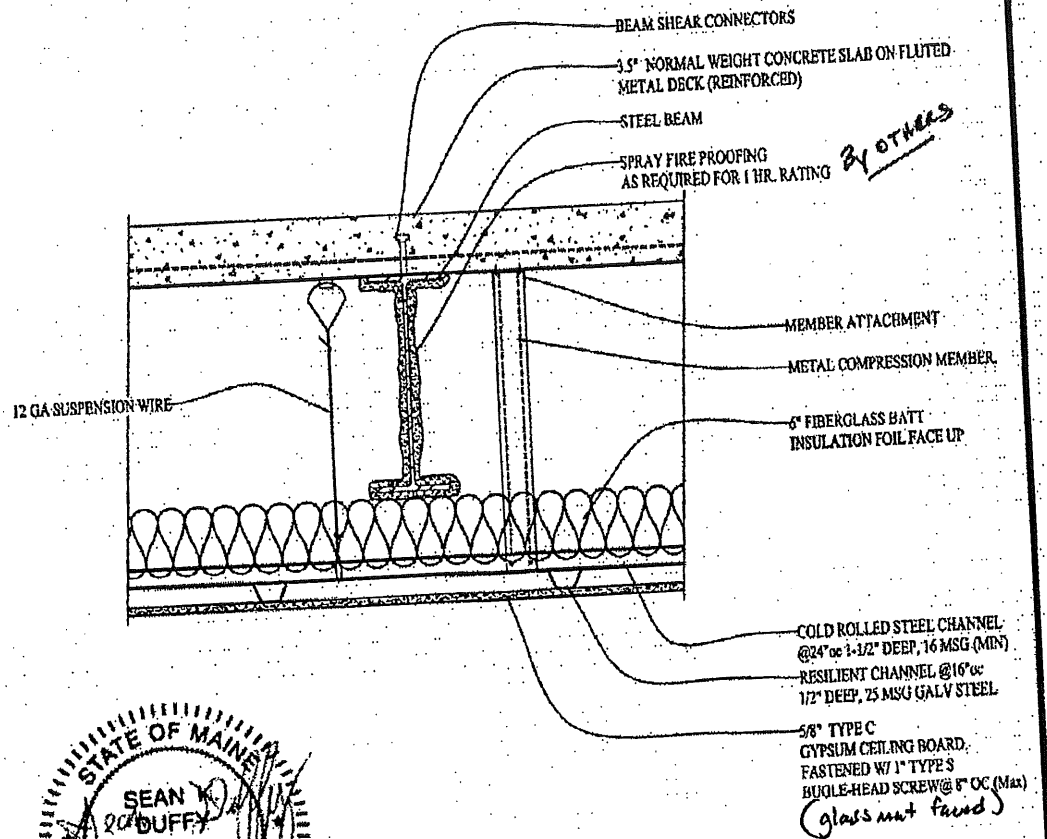
Based on these understandings, it is our judgment that this proposed design would provide an equivalent 2-hour fire resistance performance to that of the listed 2-hr rated ceiling assembly, were it to be tested in accordance with the Standard ASTM E 119/ UL 263 testing protocols. This judgment statement is based on the information available to us at this time and does not take into account unknown factors or issues not addressed by this letter.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Sean K. Duffy, P.E.
Fire Protection Engineer



STATE OF MAINE
SEAN K. DUFFY
No. 11852
LICENSED PROFESSIONAL ENGINEER

FOR USE WITH FIRE LETTER DATED 23 MARCH 2010

NOTE: ORIGINAL SKETCH BY PORTER DRYWALL MODIFIED BY FIRE RISK MANAGEMENT, INC. 3/22/10

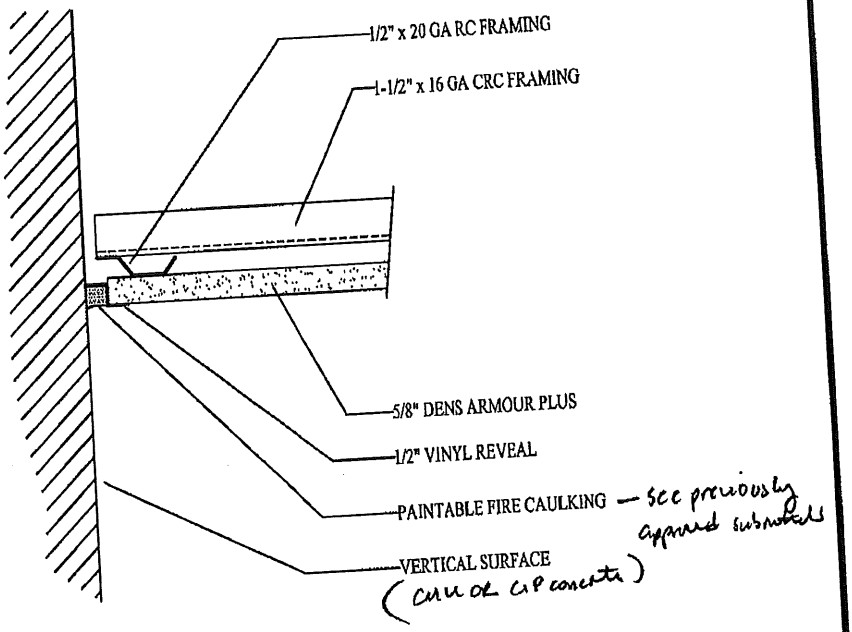
PROJECT: MARTINS POINT GARAGE CEILING

TITLE: SUSPENDED CEILING SYSTEM

DATE: 02/02/10
SCALE: 1" = 1'-0"
DRAWN BY: MDB
CHECKED BY: JC

NOTE:

DWG. NO. SK-1



PORTER DRYWALL
655 RIVERSIDE STREET PORTLAND, ME 04103
PH: (207) 878-2024 FAX: (207) 878-2085
WWW.PORTERDRYWALL.COM

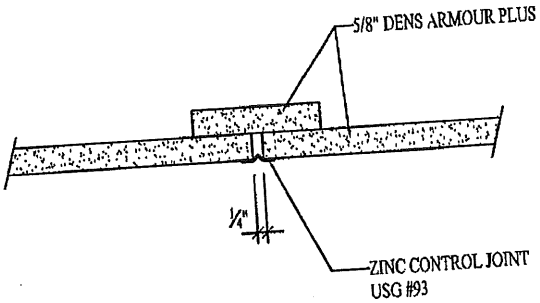
PROJECT: MARTINS POINT

TITLE: SUSPENDED CEILING SYSTEM PERIMETER DETAIL

DATE: 05/12/10
SCALE: 3" = 1'-0"
DRAWN BY: MDB
CHECKED BY: JC

NOTE:

DWG. NO. SK-3



655 RIVERSIDE STREET PORTLAND, ME 04103
PH: (207) 878-2024 FAX: (207) 878-2085
WWW.PORTERDRYWALL.COM

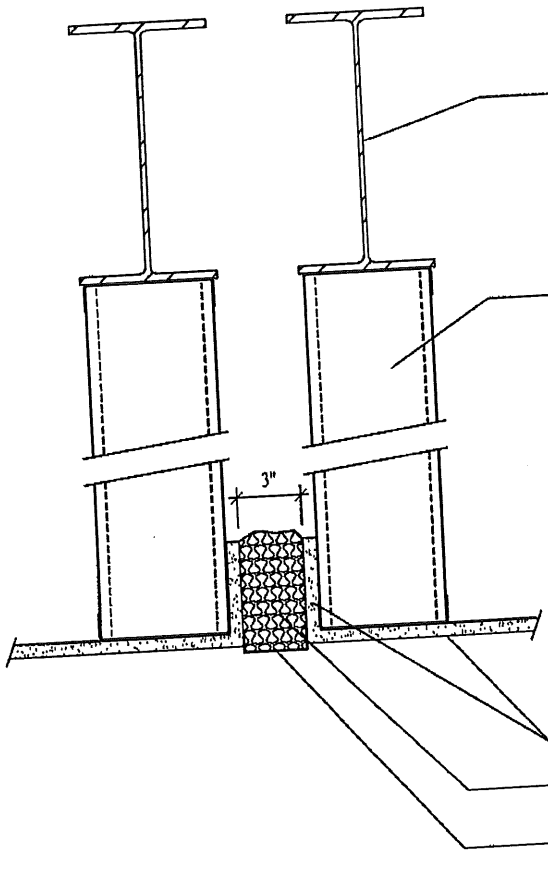
PROJECT:
MARTINS POINT

TITLE:
SUSPENDED CEILING SYSTEM
CONTROL JOINT

DATE: 05/12/10
SCALE: 1" = 1'-0"
DRAWN BY: MDB
CHECKED BY: JC

NOTE:

DWG. NO.
SK-4



(see previously approved EJ submittal)

PORTER DRYWALL
655 RIVERSIDE STREET PORTLAND, ME 04103
PH: (207) 878-2024 FAX: (207) 878-2085
WWW.PORTERDRYWALL.COM

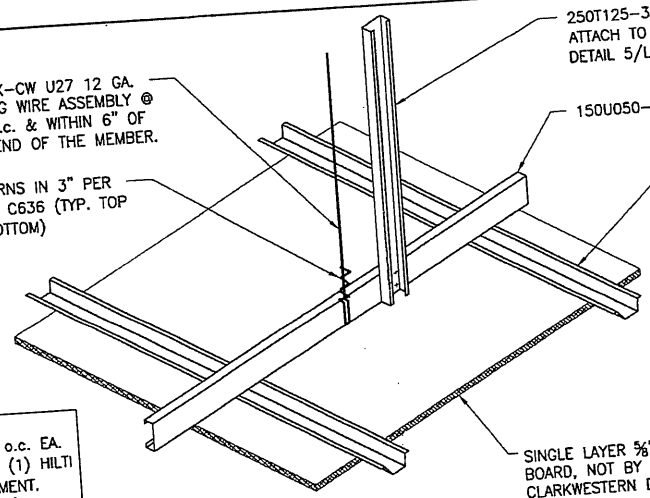
PROJECT:
MARTINS POINT

TITLE:
SUSPENDED CEILING SYSTEM
BUILDING EXPANSION JOINT

DATE: 05/12/10
SCALE: 1-1/2" = 1'-0"
DRAWN BY: MDB
CHECKED BY: JC

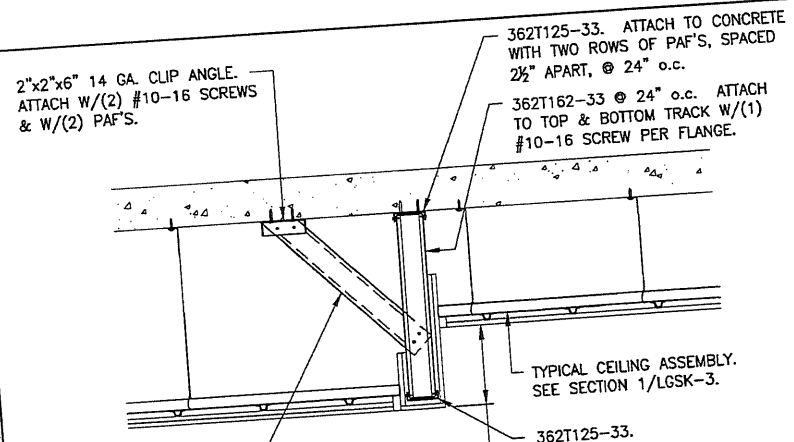
NOTE:

DWG. NO.
SK-5

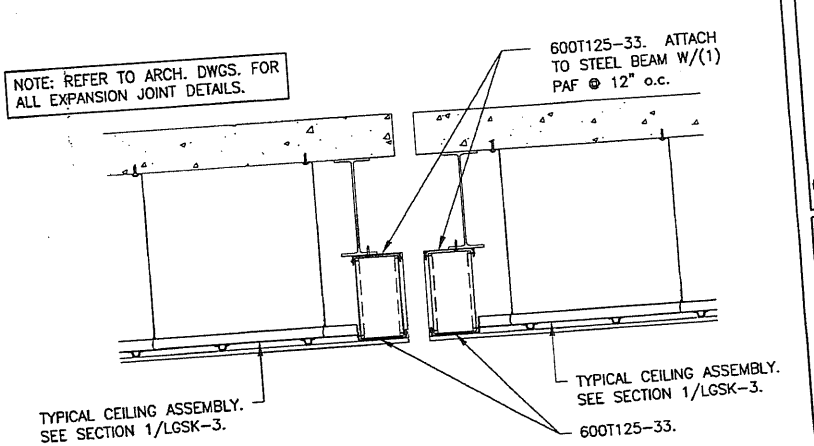


NOTE:
PROVIDE 12 GA., 45° DIAGONAL WIRE @ 12' o.c. EA. DIRECTION, ANCHORED TO STRUCTURE USING (1) HILTI TIE-WIRE HEAD HLC-T ¼"Ø, 1" MIN. EMBEDMENT. (SEE DETAIL 4/LGSK-4 FOR TOP ATTACHMENT). LOCATE BOTTOM OF DIAGONAL WIRES AT COMPRESSION POSTS.

1 GARAGE CEILING



2 CEILING TRANSITION DETAIL



3 EXPANSION JOINT DETAIL

20 Mansell Court East, Suite 350B
Roswell, GA 30076
phone 678.990.3540 fax 678.990.3542
toll free 877.832.3206 fax 877.832.3208

6510 General Drive
Riverside, Ca. 92509
phone 760.603.6560 fax 760.603.6599
toll free 877.832.3206 fax 877.832.3208

383 U.S. Route One, Suite 2E
Scarborough, ME 04074
phone 207.885.6000 fax 207.885.6001
toll free 877.832.3206 fax 877.832.3208

STATE OF MAINE
5-4-10
NATHANIEL J. BACON
No. 11825
REGISTERED PROFESSIONAL ENGINEER

ClarkWestern BUILDING SYSTEMS
Design Services

MARTIN'S POINT
PARKING GARAGE CEILING
PORTLAND, MAINE
Treated Ply
PORTER DRYWALL
Portland, Maine

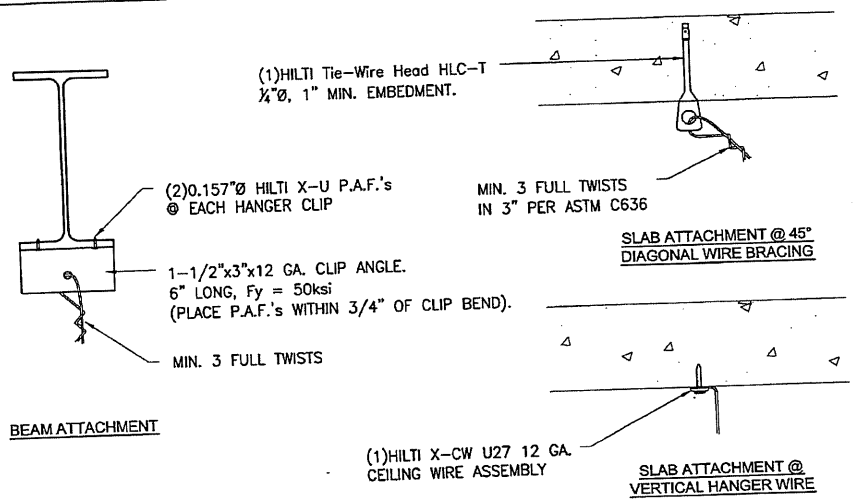
Revisions

Drawn:	Engineer:	Reviewed:
NJB	NJB	NJB

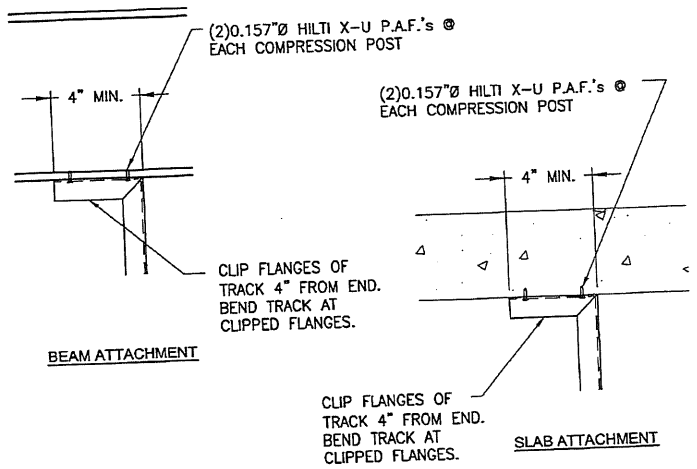
Date: 05/04/10
Project No.: 1809068-2

Sheet Title: SECTIONS AND DETAILS

Sheet No.: LGSK-3



4 TOP HANGER WIRE ATTACHMENT



5 COMPRESSION POST TOP ATTACHMENT

20 Mansell Court East, Suite 350B
Roswell, GA 30076
phone 678.990.3540 fax 678.990.3542
toll free 877.832.3206 fax 877.832.3208

6510 General Drive
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phone 760.603.6560 fax 760.603.6599
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383 U.S. Route One, Suite 2E
Scarborough, ME 04074
phone 207.885.6000 fax 207.885.6001
toll free 877.832.3206 fax 877.832.3208

STATE OF MAINE
5-4-10
NATHANIEL J. BACON
No. 11825
REGISTERED PROFESSIONAL ENGINEER

ClarkWestern Building Systems Design Services

MARTIN'S POINT
PARKING GARAGE CEILING
PORTLAND, MAINE
Prepared For:
PORTER DRYWALL
Portland, Maine

Revisions

Drawn:	Engineer:	Reviewed:
NJB	NJB	NJB

Date: 05/04/10
Project No.: 1809068-2

Sheet Title: SECTIONS AND DETAILS

Sheet No.: LGSK-4

May 11, 2010 - 1:48pm Z:\2009 Projects\068_1809068-01\068_1809068-01.DWGs\1809068-1_LSF-4 Wall Sections_11x17.dwg

Martin's Point Portland, ME	Pizzagalli Construction Company 131 Presumpscot St. Portland, ME 04103
Section: Sprayed-On Fireproofing	May 7, 2010

Contents:

1. Cementitious Fireproofing Guidelines
2. Fireproofing Design Submittals
   a. Including document entitled "Guide to Understanding Weight-to-Heated Perimeter Ratios or W/D Ratios"
3. Fireproofing Product Material Data Sheets
   a. MK-6/HY
   b. MK-6/ES
   c. Firebond
4. W.R. Grace Letter confirming absence of asbestos in fireproofing materials
5. W.R. Grace Letter confirming absence of reactive VOC's in fireproofing materials
6. W.R. Grace Letter confirming New England Fireproofing's experience and qualifications
7. Fireproofing Material Independent Lab Test Results
   a. MK-6/HY
8. MSDS Sheets
   -MK-6/HY
   -MK-6/ES
   -Accelerator
   - Firebond

New England Fireproofing, Inc. - 491 US Route 1, Suite 24 - Freeport, ME 04032
Telephone: 207-869-9090 - Fax: 207-869-9091 – Email:
kcapen@newenglandfireproofing.com
www.newenglandfireproofing.com

Application Guidelines to Spray Applied Cementitious Fireproofing

1. Spray applied fireproofing must be applied prior to the installation of duct work, piping or conduit, metal studs, and block walls.

2. Clips, short hangars (6"), support sleeves or items that penetrate the fireproofing may be installed, as practical, prior to fireproofing.

3. The floor area must be finished concrete and clear to roll mobile scaffolding along the area to be fireproofed.

4. Clutter, tools, debris and other items stored on the floor must be located where they will not interfere with the fireproofing. Protection of these items is not the responsibility of New England Fireproofing.

5. Prior to application of fireproofing to the underside of non-concrete roof decks, all roofing applications shall be completed. All roof traffic shall be prohibited upon commencement of fireproofing application and until the fireproofing material is fully cured and dried (30 days minimum). Areas to be sprayed must be weather tight.

6. Requirements for winter application of spray applied fireproofing:
   a. Maintain temperature of 40° F for twenty-four (24) hours before, during and 24 hours after spraying. A minimum substrate temperature of 40° F is required prior to application.
   b. During extremely cold temperatures (0° - 15° F) it may be necessary to enclose the floor above the spray area in order to maintain a 40° F temperature on the steel in the spray area.
   c. Ventilation is as important as temperature in getting proper adhesion and surface hardness. Care must be taken to provide balance between heating and ventilation.

7. The scope of contract work for spray applied fireproofing typically EXCLUDES the following:
   a. Continuous water supply to the spraying area (by G.C.);
   b. Uninterrupted 240 volt, 50 amp electrical power to mixer station (by G.C.);
   c. Dumpster (by G.C.);
   d. Convenient area for storage of materials (by G.C.)
   e. Temporary lighting (by G.C.);
   f. Winter heat and ventilation – four air exchanges per hour (by G.C.);
   g. Weather protection (by G.C.);
   h. Cleaning or priming of steel;
   i. Masking;
   j. Sealer;
   k. Testing; and
   l. Patching of fireproofing due to damage by others.

Appendix 1

Guide to Understanding WEIGHT-TO-HEATED PERIMETER RATIOS or W/D RATIOS

Structural steel shapes are identified by Standard A.I.S.C. nomenclature. An example of A.I.S.C. nomenclature is W 36 x 300. A.I.S.C. nomenclature describes the section number (W36) and weight (300 lbs./ft.) of a structural steel column, truss or beam. According to Underwriters Laboratories Inc. (ULI) *Fire Resistance Directory* and UBC Standard No. 7-6, the amount of spray-applied fireproofing protection to structural steel members is a function of the "size" of the member. According to ULI and UBC, the size of a structural member shall be determined based upon a ratio of the weight per lineal foot of the member to the heated perimeter of the member. The heated perimeter is defined as the surface area of a structural member that would be directly exposed to heat in a fire. This ratio is called a W/D ratio. W/D ratios are nothing more than the solution to an equation where the weight per lineal foot (lbs.) of the member is divided by the heated perimeter (inches).

W / D Ratios

W = Weight (lbs.) per lineal foot
D = Heated Perimeter (inches)

To determine the weight per lineal foot of a member, one generally only has to know the last designation in the A.I.S.C. nomenclature. For example, a W36 x 300 weighs 300 pounds per lineal foot. For other shapes such as angles, the weight per lineal foot can be found in the *Manual of Steel Construction ASD* (M016, 9th edition) available from A.I.S.C. (One E. Wacker Dr., Suite 3100, Chicago IL 60601, 312-670-2400). One also needs the *Manual of Steel Construction ASD* to determine the heated perimeter of these members. Figure 1 illustrates commonly used formulas for calculating "D" or the heated perimeter of structural steel members. As you can see in Figure 1, the formula for determining the heated perimeter of a column differs from the formula for a beam. The difference in formulas is required because columns are exposed to fire on all four sides while beams are only exposed to a fire on three sides (the top flange of a beam is not directly exposed to fire when it is directly under the floor or roof deck). Generally, the heated perimeter of diagonal bracing is determined using the same formula as a column since bracing is exposed to fire on all sides.

The ULI *Fire Resistance Directory* and UBC Standard No. 7-6 describes procedures for calculating the heated perimeter to determine the W/D ratio for W, M and S shaped columns and beams.

Why are W/D Ratios Important?

In fire-resistive designs for spray-applied fireproofing in the ULI *Fire Resistance Directory*, a minimum size column or beam is described. For example, the minimum beam size under item one in UL design N-708 is a W8x28. The thickness of fireproofing found in each design is the amount of spray-applied fireproofing protection required to protect the member listed under item one. In most fire-resistive floor assemblies, the minimum size member described in item one is a W8x28 which has a W/D ratio of 0.80. A minimum size member is also found under item one in each of the numerous column, floor and roof assembly designs for spray-applied fireproofing products. The minimum size beam or column in Monokote or Retro-Guard ICBO Evaluation Reports are identical to the equivalent designs in the UL *Fire Resistance Directory*. If the columns and beams on your project have a W/D ratio larger than the W/D ratio for the minimum size member found under item one of the design you selected, equal or less fireproofing thickness is required for those larger members. If the columns and beams on your project have W/D ratios smaller than the W/D ratio for the minimum size member found under item one of the UL design you selected, more fireproofing is required for those smaller members. In other words: the heavier the steel member, the less structural fire protection needed.

A mathematical formula using W/D ratios appears in the introduction to the ULI *Fire Resistance Directory* ("Adjustment of Sprayed Protection Material Thickness For Unrestrained Beam Ratings For Various Beam Sizes") and UBC Standard No. 7-7. This formula is used to determine what additional thickness of spray-applied fireproofing is required to protect "unrestrained" members with lower W/D ratios than the W/D ratio for the member under item one of the design selected. Likewise, the formula may be used to determine what reduction in thickness of spray-applied fireproofing is available for members with higher W/D ratios than the W/D ratio for the member under item one of the design selected.

Design Submittal Information

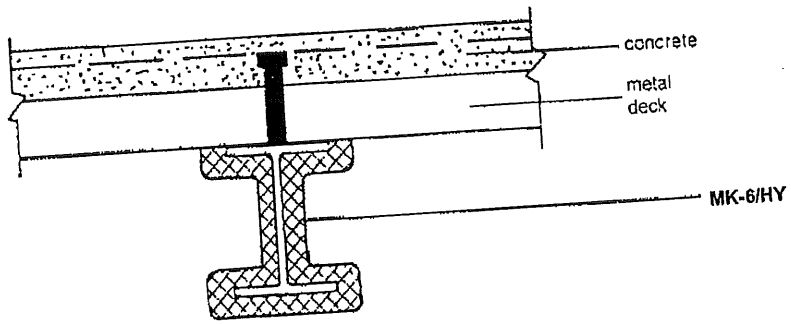
Monokote Fireproofing

SECTION: Sprayed-On Fireproofing

Date: **May 7, 2010**

Project: **Martins' Point**
Portland, ME

Beam Fireproofing for Unprotected Floor Assemblies



Hourly Rating: 1 hour(s)

Monokote Thickness: See notes below inch(es)

Reference/Authority

UL Design No. N782 ICBO #1578 Other

Notes: SFRM would be applied to UNPRIMED STRUCTURAL STEEL. See sheets with W/D's for thicknesses (Page 1).

This data, meant to assist you, will not replace your reference to job specifications, engineering drawings and building code regulations.

From New England Fireproofing
Tel: 207 869-9090 Fax: 207 869-9091

GRACE Construction Products Division

Crest areas above the beam shall be filled with Spray-Applied Fire Resistive Materials.

Rating Hr	Normal Weight Concrete Restrained Min Thkns In. Beam	Deck	Unrestrained Min Thkns In. Beam	Deck	Lightweight Concrete Restrained Min Thkns In. Beam	Deck	Unrestrained Min Thkns In. Beam	Deck
1	5/16	None	5/16	None	5/16	None	5/16	None
1-1/2	3/8	None	5/8	None	7/16	3/8	11/16	3/8
2	9/16	None	7/8	None	11/16	3/8	1	3/8
3	1	None	1-1/4	1/2	1-3/16	1/2	1-5/16	1/2
4	1-7/16	None	1-5/8	1/2	1-5/8	1/2	1-5/8	1/2

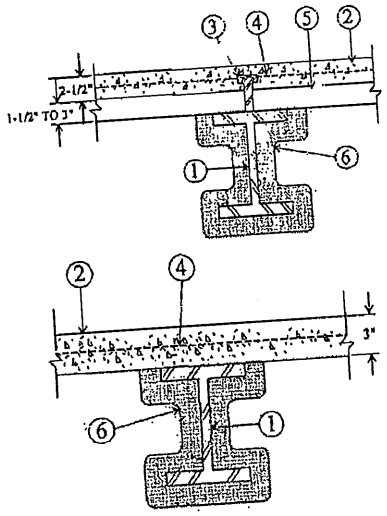
GRACE KOREA INC —Types Monokote® MK-6/HY, MK-6s, MK-6/HY Extended Set, RG, Z-106, Z-106/HY, Z-106/G, Z-146 investigated for exterior use.

W R GRACE & CO - CONN —Types Monokote® MK-6/HY, MK-6s, MK-6/HY Extended Set, RG, Z-106, Z-106/HY, Z-106/G, Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC investigated for exterior use.

*Bearing the UL Classification Mark

Design No. N781

Restrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr
Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr
Load Restricted for Canadian Applications — See Guide BXUV7



1. Steel Beam — W8x28 min size.
2. Normal Weight or Lightweight Concrete — Compressive strength, 3000 psi. For normal weight concrete either carbonate or siliceous aggregate may be used. Unit weight, 148 pcf. For lightweight concrete, unit weight 110 pcf.
3. Shear Connector — (Optional) — Studs, 3/4 in. diam headed type. Welded to the top flange of beam through the steel floor units.
4. Welded Wire Fabric — 6x6 W1.4x W1.4.
5. Steel Floor and Form Units* — 1-1/2 to 3 in. corrugated or fluted units.
6. Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying to the beam to a final min thickness shown below. Beam surfaces must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 22/19 pcf, respectively. For method of density determination, see Design Information Section. Crest areas above the beam shall be filled with Spray-Applied Fire Resistive Materials.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	7/16	7/16
1-1/2	1/2	3/4
2	13/16	1
3	1-5/16	1-5/16
4	1-5/8	1-5/8

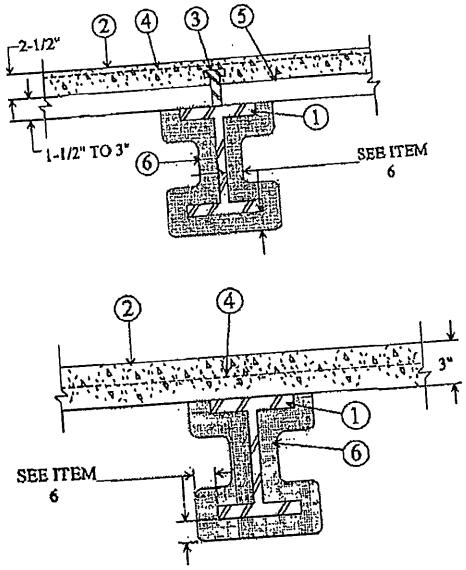
GRACE KOREA INC —Types Monokote Acoustic 5, Z-106, Z-106/G, Z-106/HY.

W R GRACE & CO - CONN —Types Monokote Acoustic 5, Z-106, Z-106/G, Z-106/HY.

*Bearing the UL Classification Mark

Design No. N782

Restrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr
Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr
Load Restricted for Canadian Applications — See Guide BXUV7



1. Steel Beam — W8x28 min size.
2. Normal Weight or Lightweight Concrete — Compressive strength, 3000 psi. For normal weight concrete either carbonate or siliceous aggregate may be used. Unit weight, 148 pcf. For lightweight concrete unit weight 110 pcf.
3. Shear Connector — (Optional) — Studs, 3/4 in. diam headed type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units.
4. Welded Wire Fabric — (Optional) — 6x6-10/10 SWG.
5. Steel Floor and Form Units* — 1-5/16 in. deep corrugated units; or 1-1/2 to 3 in. deep fluted units welded to beam.
6. Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying in more than one coat to the beam to the final thicknesses shown below. When fluted or corrugated steel floor units are used, crest areas shall be filled with Spray-Applied Fire Resistive Materials above the beam. Beam surfaces must be clean and free of dirt, loose scale and oil. Min average and min ind. density of 15/14 pcf respectively. Min avg and min ind density of 22/19 pcf respectively for Types Z-106, Z-106/HY, Z-106/G. Min avg and min ind density of 40/36 pcf respectively for Types Z-146, Z-146PC and Z-146T cementitious mixture. Min avg and min ind density of 50/45 pcf respectively for Types Z-156, Z-156T and Z-156PC. For method of density determination, see Design Information Section.

The thicknesses of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with lightweight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	5/16	5/16
1-1/2	7/16	11/16
2	11/16	1
3	1-3/16	1-5/16
4	1-5/8	1-5/8

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are only applicable when the beams are supporting solid, normal weight, concrete slabs or floor assemblies containing only fluted floor or form units, topped with normal weight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	5/16	5/16
1-1/2	3/8	5/8
2	9/16	7/8
3	1	1-7/16

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
4	1-7/16	2

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the thickness applied to the beams' lower flange edges is reduced by one-half and the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with lightweight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	7/16+	7/16+
1-1/2	7/16+	3/4
2	11/16	1
3	1-3/16	1-7/16
4	1-11/16	1-15/16

+ — Thickness applied to beams' lower flange edges shall be a min of 1/4 in.

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the thickness applied to the beams' lower flange edges is reduced by one-half and the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with normal weight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	7/16+	7/16+
1-1/2	7/16+	3/4
2	11/16	1-1/16
3	1-3/16	1-11/16
4	1-11/16	2-5/16

+ — Thickness applied to beams' lower flange edges shall be a min of 1/4 in.

ARABIAN VERMICULITE INDUSTRIES —Types MK-6/HY, MK-6/HY Extended Set, MK-6s, Z-106, Z-106/G, Z-146 investigated for exterior use.

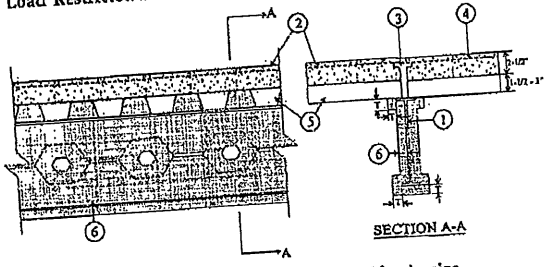
W R GRACE & CO - CONN —Types MK-6/HY, MK-6/HY Extended Set, MK-6s, RG, Z-106, Z-106/G, Z-106/HY, Z-146, Z-146T, Z146PC, Z-156, Z-156T and Z-156PC investigated for exterior use.

GRACE KOREA INC —Types MK-6/HY, MK-6/HY Extended Set, MK-6s, Z-106, Z-106/G, Z-106/HY, Z-146 investigated for exterior use .

*Bearing the UL Classification Mark

Design No. N784

Restrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr
Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr
Load Restricted for Canadian Applications — See Guide BXUV7



1. Structural Steel Members* — Tye CB12 x 10 min size.
   CMC STEEL PRODUCTS
2. Normal Weight or Lightweight Concrete — Compressive strength 3500 psi. For normal weight concrete either carbonate or silicious aggregate may be used. Unit weight 146 (plus or minus 3) pcf. For lightweight concrete, unit weight 110 (plus or minus 3) pcf.
3. Shear Connector (Optional) — Studs, 1/2 in. diam headed type or equivalent per AISC specifications. Welded to top flange of beam through the steel floor units.
4. Welded Wire Fabric — 6x6, W1.4xW1.4.
5. Steel Floor And Form Units — 1-1/2, 2 or 3 in. deep fluted units, welded to beam.
6. Spray-Applied Fire Resistive Materials* — Applied by mixing with water and spraying to the beam surfaces to the final min thicknesses shown below. Crest areas above the beam shall be filled with the Spray-applied fire resistive material. Surfaces must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 15/14 pcf. Min avg and min individual density of 22/19 pcf respectively for Types Z-106, Z-106/G, and Z-106/HY. Min avg and min individual density of 40/36 pcf respectively for Types Z-146 and Monokote

Acoustic 35. For method of density determination see Design Information Section.

Rating Hr	Thickness, In. Unrestrained Beam Rating Hr Normal Weight Concrete	Lightweight Concrete	Restrained Beam Rating Hr Normal Weight Concrete	Lightweight Concrete
1	13/16	7/8	13/16	7/8
1-1/2	1-1/8	1-1/4	15/16	1
2	1-1/2	1-9/16	1-1/4	1-5/16
3	2-3/16	2-1/4	1-15/16	2
4	2-13/16	2-15/16	2-9/16	2-5/8

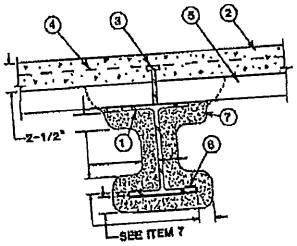
GRACE KOREA INC —Types MK-6/CBF, MK-6/HY, MK-6S, Monokote Acoustic 1, Z-106, Z-106/G, Z-106/HY, Type Z-146 investigated for exterior use, Monokote Acoustic 35, MK-6/HY Extended Set.

W R GRACE & CO - CONN —Types MK-6/HY, MK-6S, Monokote Acoustic 1, RG, Z-106, Z-106/G, Z-106/HY, Type Z-146 investigated for exterior use, Monokote Acoustic 35, MK-6/HY Extended Set.

*Bearing the UL Classification Mark

Design No. N785

Restrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr(See Item 8)
Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 & 4 Hr(See Item 8)
Load Restricted for Canadian Applications — See Guide BXUV7



1. Steel Beam — W8X28 min size.
2. Normal Weight or Lightweight Concrete — Compressive strength 3000 psi. For normal weight concrete either carbonate or siliceous aggregate may be used. Unit weight is 148 pcf. For lightweight concrete, unit weight is 112 pcf.
3. Shear Connector (Optional) — Studs, 3/4 in. diam headed type or equivalent per AISC specifications. Welded to top flange of beam through the steel floor units.
4. Welded Wire Fabric — 6X6, W1.4XW1.4.
5. Steel Floor and Form Units — 1-5/16 in. deep corrugated units; or 1-1/2 to 3 in. deep fluted or cellular units, welded to beam.
6. Metal Lath — (Optional — See tables in Item 7) 3.4 lbs/sq yd galv or painted expanded steel. Secured to beam by bending tight around flanges a min of 1-1/2 in. toward web of beam.
7. Spray-Applied Fire Resistive Materials* — See table below for appropriate thicknesses. Where metal lath is present, thicknesses are measured to surface of metal lath, all other thicknesses are measured to steel surface. Prepared by mixing with water according to instructions on each bag of material. Mixture can be spray or trowel applied on beam surfaces and over lath, as shown. When fluted or corrugated steel floor units are used, crest areas above the beam shall be sealed with Spray-Applied Fire Resistive Materials. Avg density of 44.50 pcf with min ind value of 42 pcf. For method of density determination, see Design Information Section, Sprayed Material. Surface of material may be lightly finished with a trowel. The thicknesses shown in the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is required.

Rating Hr	Min Thkns In. Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	7/16	7/16
1-1/2	1/2	1/2
2	3/4	13/16
3	1-1/8	1-1/4
4	1-9/16	1-13/16

The thicknesses shown on the following table are for normal weight or lightweight concrete. Metal lath, Item 6, is optional.

Rating Hr	Min Thkns In. Restrained Beam Rating Hr	Unrestrained Beam Rating Hr
1	11/16	11/16

New England Fireproofing, Inc.
491 US Route 1 Suite 24
Freeport, ME 04032
Tel: (207) 869-9090
Fax: (207) 869-9091

5/7/2010

Martin's Point

Section: Sprayed-On Fireproofing

Materials: MK-6/HY Low Density Cementitious Fireproofing Material by WR Grace applied over Firebond bonding agent

Drawing No. : SF102 - Third floor framing

Rating: **UL N782 for 1 hour, 1/2 flange tip**

Members	# of Members*	W/D **	Thickness (Inches)	Notes/Locations
W12x14	31	0.405	5/8	
W12x22	2	0.623	9/16	
W14x22	5	0.534	9/16	
W16x26	46	0.558	9/16	
W18x35	4	0.672	1/2	Requires Metal Lathe applied to beam web
W18x55	2	0.963	7/16	Requires Metal Lathe applied to beam web
W21x44	34	0.746	1/2	Requires Metal Lathe applied to beam web
W21x50	27	0.838	7/16	Requires Metal Lathe applied to beam web
W24x55	30	0.828	7/16	Requires Metal Lathe applied to beam web
W24x62	5	0.934	7/16	Requires Metal Lathe applied to beam web
W24x68	3	0.942	7/16	Requires Metal Lathe applied to beam web
W24x76	2	1.05	7/16	Requires Metal Lathe applied to beam web
W24x84	2	1.15	3/8	Requires Metal Lathe applied to beam web
L4x4x3/8	57	0.613	9/16	Requires Metal Lathe applied to beam web

* Numbers are approximate and are provided for the benefit of NEF's crew.

** See document entitled "Weight-to-Heated Perimeter Ratios or W/D Ratios" enclosed as part of this submittal.

www.graceconstruction.com

Fireproofing Products

DATA SUBMITTAL

Monokote® MK-6®/HY®

Product Data and Application Instructions

Product Information/Description

Monokote® MK-6®/HY® is a single component, mill-mixed fireproofing plaster which requires only the addition of water on the job site to form a consistent, pumpable slurry. MK-6/HY is designed for use on structural steel columns, beams, joists, trusses and floor and roof decking.

Features/Benefits

Monokote cementitious fireproofing offers many significant advantages to the architect, owner, applicator and building occupant. These include:

- Proven in-place performance
- Low in-place cost
- Fast, efficient application
- UL tested and factory inspected
- Universal Building code compliance (ICBO, SBCCI, BOCA, NBCC, ICC)

Delivery and Storage

a. All material to be used for fireproofing shall be delivered in original unopened packages bearing the name of the manufacturer, the brand and proper Underwriters Laboratories Inc. labels for fire hazard and fire resistance classifications.

b. The material shall be kept dry until ready for use. Packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.

Steel and Concrete Surfaces

a. Prior to the application of Monokote MK-6/HY, an inspection shall be made to determine that all steel surfaces are acceptable to receive fireproofing. The steel to be fireproofed shall be free of oil, grease, excess rolling compounds or lubricants, loose mill scale, excess rust, noncompatible primer, lock down agent or any other substance that will impair proper adhesion. Where necessary, the cleaning of steel surfaces to receive fireproofing shall be the responsibility of the general contractor.

b. The project architect shall determine if the painted/primed structural steel to receive fireproofing has been tested in accordance with ASTM E119, to provide the required fire resistance rating.

c. Many Fire Resistance Designs allow the use of painted metal floor or roof deck in place of galvanized decking. Painted decking must be UL listed in the specific fire resistance designs and must carry the UL classification marking. Consult your local Grace sales representative for details.

d. Prior to application of Monokote MK-6/HY, a bonding agent, approved by the fireproofing manufacturer, shall be applied to all concrete substrates to receive MK-6/HY.

e. Fireproofing to the underside of roof deck assemblies shall be done only after roofing application is complete and roof traffic has ceased.

f. No fireproofing shall be applied prior to completion of concrete work on steel decking.

Performance Characteristics

Physical Properties	Values	Test Method
Dry density, minimum average	240 kg/m³ (15 pcf)	ASTM E605 UBC STD 7-6
Bond strength	16.2 KPa (339 psf)	ASTM E736
Compression, 10% deformation	68.9 KPa (1,440 psf)	ASTM E761
Air erosion	0.000 g/m² (0.000 g/ft²)	ASTM E859
High velocity air erosion	No continued erosion after 4 hours	ASTM E859 UMC STD 6-1
Corrosion	Does not contribute to corrosion	ASTM E937
Bond impact	No cracking, spalling or delamination	ASTM E760
Deflection	No cracking, spalling or delamination	ASTM E759
Resistance to mold growth	No growth after 28 days	ASTM G21
Surface burning characteristics	Flame spread = 0 Smoke developed = 0	ASTM E84
Combustibility	Less than 5 MJ/m² total, 20 kw/m² peak heat release	ASTM E1354
Impact penetration	3.3 cm³	Developed by City of San Francisco
Abrasion resistance	8.3 cm³	Developed by City of San Francisco

GRACE Construction Products

g. Other trades shall not install ducts, piping, equipment, or other suspended items until the fireproofing is completed and inspected.
h. Other trades shall install clips, hangers, support sleeves, and other attachments required to penetrate the fireproofing, prior to application of the fireproofing material.

Mixing

a. Monokote Fireproofing shall be mixed by machine in a conventional, plaster-type mixer or a continuous mixer specifically modified for cementitious fireproofing. The mixer shall be kept clean and free of all previously mixed material. The mixer speed in a conventional mixer shall be adjusted to the lowest speed which gives adequate blending of the material and a mixer density of 640 - 720 kg/m^3 (40 - 45 pcf) of material.
b. Using a suitable metering device and a conventional mixer, all water shall be first added to the mixer as the blades turn. Mixing shall continue until the mix is lump-free, with a creamy texture. All material is to be thoroughly wet. Target density of 688 ± 16 kg/m^3 (43 ± 1 pcf) is most desirable. Overmixing Monokote will reduce pumping rate.

Application

a. Application of Monokote Fireproofing can be made in the following sequence:
   1. For thicknesses of approximately 13 mm (½ in.) or less, apply in one pass.
   2. For thicknesses of 16 mm (⅝ in.) or greater, apply subsequent passes after the first coat has set.
b. Spatterkote® SK-3 shall be applied to all flat plate cellular deck units and below all bottomless trench headers prior to application of MK-6/HY. Spatterkote shall be applied in accordance with the manufacturer's application instructions.
c. Spatterkote SK-3 shall be applied to roof decking where required prior to application of Monokote.
d. Monokote Fireproofing material shall not be used if it contains partially set, frozen or caked material.
e. Monokote shall have a minimum average dry, in-place density of 240 kg/m^3 (15 lbs/ft^3).
f. Monokote is formulated to be mixed with water at the job site.
g. Monokote Accelerator is to be used with Monokote MK-6/HY to enhance set characteristics and product yield. The Monokote Accelerator is injected into the Monokote MK-6/HY at the spray gun. Monokote Accelerator shall be mixed and used according to manufacturers recommendations.
h. Monokote is applied directly to the steel, at various rates of application which will be job dependent, using standard plastering type equipment or continuous mixer/pump units. A spray gun, with a properly sized orifice and spray shield and air pressure at the nozzle of approximately 38 kPa (20 psi), will provide the correct hangability, density and appearance. NOTE: If freshly sprayed Monokote does not adhere properly, it is probably due either to a too wet mix, poor thickness control, or an improperly cleaned substrate.

Temperature and Ventilation

a. An air and substrate temperature of 4.4°C (40°F) minimum shall be maintained for 24 hours prior to application, during application and for a minimum of 24 hours after application of Monokote.
b. Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation must be provided to achieve a minimum total air exchange rate of 4 times per hour until the material is substantially dry.

Field Tests

a. The architect will select an independent testing laboratory (for which the owner will pay) to sample and verify the thickness and density of the fireproofing in accordance with the provisions of ASTM E605-93, "Standard Test Method for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members" or Uniform Building Code Standard No. 7-6 "Thickness and Density Determination for Spray Applied Fireproofing."
b. The architect will select an independent testing laboratory (for which the owner will pay) to randomly sample and verify the bond strength of the fireproofing in accordance with the provisions of ASTM E736.
c. Results of the above tests will be made available to all parties at the completion of pre-designated areas which shall have been determined at a pre-job conference.

Safety

a. Monokote is slippery when wet. The general contractor and applicator shall be responsible for posting appropriate cautionary SLIPPERY WHEN WET signs. Signs should be posted in all areas in contact with wet fireproofing material. Anti-slip surfaces should be used on all working surfaces.
b. A Material Safety Data Sheet for Monokote MK-6/HY is available upon request by calling 866-333-3SBM (3726).

W. R. Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140-1692
Tel.: (866) 333-3SBM (3726)
Fax: (617) 498-4311

W. R. Grace & Co.-Conn.
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W. R. Grace (Hong Kong) Limited
Grace Industrial Building
6 On Chuen Street
On Lok Tsuen, Fanling
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Fax: 852-2-675-9193

For Technical Assistance call toll free at 866-333-3SBM (3726).

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MK-514H Printed in USA 4/05 FA/LI/1M

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Construction Products

MONOKOTE® MK-6®/HY® EXTENDED SET™ FIREPROOFING

Product performance data and information

Description

Monokote® MK-6®/HY® Extended Set™ fireproofing is a single component, mill-mixed fireproofing plaster (cementitious) which has a delayed set feature. Extended Set is the same as MK-6/HY, except this product can be left unattended in the delivery system for up to 4 days. The Extended Set product requires the addition of water to form a consistent, pumpable slurry. To achieve proper setting time, Monokote Accelerator must be injected into Monokote MK-6/HY Extended Set fireproofing during product application. In addition, a dye marker material should be added when Extended Set is introduced per mixing and application instructions. This product can be used on structural steel columns, beams, joists, trusses and floors and roof decking.

Features & Benefits

Monokote MK-6/HY Extended Set fireproofing offers the following features and benefits to fireproofing applicators:

Feature	Benefit
Delayed set time	• Allows applicator to significantly reduce or eliminate time consuming pump-in/pump-out procedure • Allows applicator to increase daily productivity rate (bags/day) up to 20% • Allows applicator to reduce waste water disposal and material scrap • Allows applicator to complete fireproofing jobs in less time
Same in-place performance and fire rating performance as MK-6/HY	• Durable • UL listed (MK-6/HY) • Factory inspected to ensure product performance • Compliance with UBC, NBC, SBC and IBC Building Codes
Superior technical service & support	• Provides application training and support • Provides timely troubleshooting and follow-up service

Delivery & Storage

a. All material to be used for fireproofing shall be delivered in original unopened packages bearing the name of the manufacturer, the brand and proper Underwriters Laboratories Inc. labels for fire hazard and fire-resistance classifications.

b. The material shall be kept dry until ready for use. Packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.

Steel & Concrete Surfaces

a. Prior to the application of Extended Set, an inspection shall be made to determine that all steel surfaces are acceptable to receive fireproofing. The steel to be fireproofed shall be free of oil, grease, excess rolling compounds or lubricants, loose mill scale, excess rust, noncompatible primer, lock down agent or any other substance that will impair proper adhesion. Where necessary, the cleaning of steel surfaces to receive fireproofing shall be the responsibility of the general contractor.

b. The project architect shall determine if the painted or primed structural steel to receive fireproofing has been tested in accordance with ASTM E119, to provide the required fire-resistance rating.

c. Many fire-resistance designs allow the use of painted metal floor or roof deck in place of galvanized decking. Painted decking must be UL listed in the specific fire-resistance designs and must carry the UL classification marking. Consult your local Grace sales representative for details.

d. Prior to application of Extended Set, a bonding agent approved by the fireproofing manufacturer shall be applied to all concrete substrates.

e. Apply fireproofing to the underside of roof deck assemblies only after roofing application is complete and roof traffic has ceased.

f. No fireproofing shall be applied prior to completion of concrete work on steel decking.

Performance Characteristics

Physical Properties	Recommended Specification	Typical Values	Test Method
Dry density, minimum average	15 pcf (240 kg/m³)	15 pcf (240 kg/m³)	ASTM E605
Bond strength	200 psf (9.6 KPa)	339 psf (16.2 KPa)	ASTM E736
Compression, 10% deformation	1,200 psf (51 KPa)	1,440 psf (68.9 KPa)	ASTM E761
Air erosion	Max 0.000 g/ft² (0.00 g/m²)	0.000 g/ft² (0.00 g/m²)	ASTM E859
High velocity air erosion	No continued erosion after 4 hours	No continued erosion after 4 hours	ASTM E859
Corrosion	Does not contribute to corrosion	Does not contribute to corrosion	ASTM E937
Bond impact	No cracking, spalling or delamination	No cracking, spalling or delamination	ASTM E760
Deflection	No cracking, spalling or delamination	No cracking, spalling or delamination	ASTM E759
Resistance to mold growth	No growth after 28 days	No growth after 28 days	ASTM G21
Surface burning characteristics	Flame spread = 0 Smoke developed = 0	Flame spread = 0 Smoke developed = 0	ASTM E84
Combustibility	Less than 5 MJ/m² total, 20 kw/m² peak heat release	Less than 5 MJ/m² total, 20 kw/m² peak heat release	ASTM E1354
Impact penetration	Max 6 cm³ abraded	3.3 cm³	Developed by City of San Francisco
Abrasion resistance	Max 15 cm³ abraded	8.3 cm³	Developed by City of San Francisco

Temperature & Ventilation

a. An air and substrate temperature of 40°F (4.4°C) minimum shall be maintained for 24 hours prior to application, during application and for a minimum of 24 hours after application of Monokote MK-6/HY Extended Set Fireproofing.

b. Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation must be provided to achieve a minimum total air exchange rate of 4 times per hour until the material is substantially dry.

Field Tests

a. The architect will select and the owner will pay for an independent testing laboratory to randomly sample and verify the thickness and density of the fireproofing in accordance with the provisions of ASTM E605, *Standard Test Method for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members* or Uniform Building Code Standard No. 7-6 *Thickness and Density Determination for Spray Applied Fireproofing.*

b. The architect will select and the owner will pay for an independent testing laboratory to randomly sample and verify the bond strength of the fireproofing in accordance with the provisions of ASTM E736.

c. Results of the above tests will be made available to all parties at the completion of pre-designated areas which shall have been determined at a pre-job conference.

Safety

a. Monokote Extended Set is slippery when wet. The general contractor and applicator shall be responsible for posting appropriate cautionary "SLIPPERY WHEN WET" signs. Signs should be posted in all areas in contact with wet fireproofing material. Anti-slip surfaces should be used on all working surfaces.

b. A Material Safety Data Sheet (MSDS) for Monokote Extended Set is available upon request by calling 866-333-3SBM (3726) or by visiting our web site at www.graceconstruction.com.

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

MK-605C Printed in U.S.A. 12/07 FA/LI/1M

GRACE

DATA SUBMITTAL

Firebond® Concentrate

Bonding Agent

Description

Firebond® is an Underwriters Laboratories Inc. (UL) classified bonding agent approved for use with any of the fire protection products manufactured by W. R. Grace & Co. Firebond is water based, nonflammable and ready to use. Firebond is classified for use with Grace fire protection products in accordance with ASTM E119 and E84 and listed in the UL Fire Resistance Directory, category CBUI encapsulants.

Use

Firebond may be used as a bonding agent or surface sealer for the following applications:

1. As a bonding agent over polystyrene or urethane foam insulation prior to application of Monokote® Z-3306 Thermal Barrier.
2. As a bonding agent over primed/painted structural steel (columns and beams)[1] prior to application of Monokote MK-6®/HY®, MK-6/HY ES™, MK-6s, Z-106, Z-106/HY, Z-106/G, Z-146 and Retro-Guard® RG.[2]
3. As a bonding agent over concrete floor and/or roof units (including slab, panjoist, hollow-core or precast plank or TEE units) prior to application of the products listed in item 2.
4. As a surface sealer (where specified) over any of the above products. Coverage rate requirements will vary based on the project requirements. Where specified, a surface sealer shall be installed in one or more coats in such a manner that the sealer does not saturate the fire protection product. The fire protection product shall be substantially dry prior to sealer application.

Application

Firebond can be applied with most major brands of airless latex paint spray equipment. Firebond may also be applied with a common garden sprayer, paint brush or roller.

- Coverage:
  Firebond at full concentrated strength – up to 1000 ft^2/gal
  Firebond diluted 1:1 (with water) – up to 500 ft^2/gal

Clean Up

Clean tools and drippings with warm soapy water before Firebond dries.

Physical Properties

Volatile	Water
Actual VOC content	14.3 ± 10 g/L
Average particle size	0.2 microns
Flash point	Noncombustible (water-based)
Odor	Similar to latex house paint
Shelf life at 78°F	36 months minimum, (in originally factory sealed containers)
Weight per gallon at 78°F	8.8 lbs
Dry time at 78°F	To touch: 1–2 hours Additional coats: (when dry)
Fire rating ASTM E84	Class "A"
Flame spread	5
Smoke developed	5

GRACE
Construction Products

Technical Support

Refer to W. R. Grace & Co. product literature to determine acceptability of fire protection products for the intended use. Any inquiry related to products manufactured by W. R. Grace & Co. should be addressed to:

W.R. Grace & Co.
62 Whittemore Avenue
Cambridge, MA 02140
or call toll free: 866-333-3SBM (3726) – Customer Service Center

Firebond is manufactured by Fiberlock Technologies Inc. for W. R. Grace & Co. Any inquiry related to products manufactured by Fiberlock Technologies, Inc., should be addressed to:

Fiberlock Technologies, Inc.
150 Dascomb Road
Andover, MA 01810
or call toll free: 800-FIBERLK

Grace Construction Products provides technical support for all of its products. The Fiberlock Technologies, Inc. Material Safety Data Sheet for Firebond is available at our web site, www.graceconstruction.com.

Warranty

All statements, technical information and recommendations contained herein are based on tests we believe to be reliable. However, since the conditions of use and application are beyond our control, Grace Construction Products shall not be liable for any damage, direct or consequential, resulting from the use of this material or design. Grace Construction Products' only warranty shall be to replace any of its products found to be defective.

Safety

KEEP OUT OF REACH OF CHILDREN. Keep from freezing. Do not store at temperatures above 100°F.

Availability

Grace Construction Products is the exclusive supplier of Firebond Concentrate.

Description	Part No.	Volume	Std. Pack
5 gal (19 L) pail	1378	1,155 $in.^3$ ($18,942\ cm^3$)	1
55 gal (208.2 L) drum	1379	12,705 $in.^3$ ($208,197\ cm^3$)	1

Footnotes

1. All paints and primers require prior testing and approval by W. R. Grace & Co. for verification of compliance with the "Coating Materials" section of the Underwriters Laboratories, Inc. Fire Resistance Directory for requirements/restrictions to the use of primed/painted structural steel in fire resistance designs.
2. The use of Retro-Guard RG is often associated with abatement projects. These products are not substitutes for UL classified post-removal lockdowns. Refer to the Encapsulant Materials (CBUI) category of the UL Fire Resistance Directory for additional information.

CLASSIFIED C UL US

For Technical Assistance call toll free at 866-333-3SBM (3726).

web **Visit our web site at www.graceconstruction.com**

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MK-005 Printed in USA 3/06 FA/pdf

GRACE Construction Products

Grace Construction Products

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Paul E. Korenberg
Grace Technical Services
Fire Protection Products

21 February 2008

To our valued customers and friends.

As part of the bidding process and occasionally after our products are installed we are asked to supply letters detailing the specific tests and results regarding the asbestos content of or sprayed fireproofing products. In response to these requests we can confirm as follows:

The Monokote® brand fireproofing products listed below, manufactured by Grace Construction Products were analyzed for fibrous asbestos content by an independent testing laboratory. Production bag samples were randomly selected from each manufacturing plant and shipped to the RJ Lee Group, Inc. for analysis. The RJ Lee Group is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos fiber analysis (PLM) and airborne asbestos fiber analysis (TEM) and by the American Industrial Hygiene Association (AIHA).

The Polarized Light Microscopy (PLM) method, as outlined in EPA /600/ R-23/116, Method for Determination in Bulk Building Materials was utilized to analyze the bulk material samples. There was no asbestos detected in the Monokote fire protection materials.

Transmission Electron Microscopy (TEM) was used to analyze composite samples. TEM is universally recognized as the most state-of-the-art asbestos detection method available today. There was no asbestos detected in the Monokote fire protection materials using this very precise test method. The test results are summarized in Table 1.

Table 1. Monokote Fireproofing Test Results

MONOKOTE PRODUCT	ASBESTOS CONTENT *
MK-6/HY	None detected
MK-6s	None detected
Retroguard	None detected
Z-106/HY	None detected
Z-146	None detected
Z-156PC	None detected

* Detection limit 0.0000002%
Note: EPA asbestos reporting level is 1%.
OSHA carcinogen warning and labeling requirement level is 0.1%.

The test reports are available upon request.

If you have any questions concerning this issue, please feel free to contact me.

Sincerely,

Paul E. Korenberg

Grace Technical Services
Fire Protection Products

GRACE

Grace Construction Products

W. R. Grace & Co.
30 East Street
Sudbury, MA 01776

(978) 440-8454 Office
(978) 440-8464 Fax

FAX TO: Paul Roy

FROM: George M. Guanci

DATE: 01/14/00

SUBJECT: Certification of Organic Compound Content of Fire Protection Products

PAGES: 01

Paul:

This letter serves to certify that Fire Protection Products manufactured by Grace Construction Products do not contain reactive volatile organic compounds (VOC) believed to contribute to the formation of ozone, at concentrations currently regulated by federal, state and local agencies for the prevention of ozone generation. This also applies to the accelerator for MK-6HY.

If you require any additional information, please feel free to contact Mr. Jay Burrill, Department of Environment, Health & Safety, Grace Construction Products, Cambridge, Massachusetts, at 617-876-1400.

Regards

George M. Guanci
Specialty Fireproofing Consultant

GRACE

Grace Construction Products
Fire Protection Products

W.R. Grace & Co.-Conn.

January 14, 2000

To Whom It May Concern:

RE: Grace Fireproofing

W. R. Grace & Co. does not license our fireproofing applicators. Also, there is no formal approved applicator program at W. R. Grace & Co.-Conn.

This letter is to verify that New England Fireproofing is very experienced in the application of our fireproofing products. New England has applied our products in many projects, and of varying size and complexity. Their work has been highly efficient and effective.

New England's crews are extremely knowledable in application practices, and they are very proficient in their work.

If I can be of any further assistance concerning this matter please give me a call.

Sincerely,

George Guanci
Specialty Fireproofing Consultant

IMPACT PENETRATION TEST

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

IMPACT PENETRATION

ABSTRACT

Significance: This test determines the effect of impact on the surface of sprayed fire-resistive material. The test was conducted in accordance with ASTM proposed method for testing " Sprayed Fire-Resistive Material applied to Structural Members", published in 1978.

Results: The average amount of Monokote Type MK-6 HY lost through impact by this test was 3.3 cubic centimeters.

REPORT DETAILS

Date of Test: January 7, 1991

Identification of Specimen: Bags were selected at random of Monokote Type MK-6 HY as produced by the Construction Products Division, W. R. Grace, & Company. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag, to produce a cohesive uniform slurry having a mixer density of 43.7 p.c.f. and a nozzle density of 32.1 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

(1) Apparatus
- (a) Impact Penetration Apparatus described in the ASTM proposed method for testing, "Spray Fire Resistive Material Applied to Structural Members".
- (b) Ottawa Sand
- (c) Graduated Cylinder, 50-cm^3 capacity

(2) Test Specimen: Two, 12 x 18 inch (305 by 460mm) test specimens consisting of sprayed fire resistive Monokote Type MK-6 HY applied to a rigid 11 gauge cold rolled steel substrate. The specimens were allowed to dry to a constant weight at laboratory atmospheric conditions. Thickness measurements which did not vary by more than 3/16 inch (5mm) from the average were taken in nine equally spaced points on the specimen. These specimens were also used to test "Abrasion".

(3) Procedure: A test specimen was place into the test apparatus, and all adjustable stops were placed tight against the specimen and locked. The impact device was attached to the apparatus and adjusted such that the low point of the swing of the impact device was at a point 1/2 inch (12mm) into the specimen. The impact device was rotated to the horizontal to one side of the support structure and allowed to free fall on to the specimen.

Three impacts on each side of the impact device support structure were made in the above manner. The impactor at no time encroached upon tracks in the test specimen made during the above referenced "Abrasion" test.

Upon its removal from the apparatus, each specimen was turned over and loose material was removed by lightly shaking and then tapping the specimen. Tapping on the back of the inverted specimen was made with 16 ounce (454g) rod, 8 inch (200mm) long, held at one end at 2 inch (50mm) along the rod. The rod was held 3 inches above the specimen in a horizontal position and the long end of the rod was allowed to drop onto the back of the specimen by pivoting about the 2 inch point. The rod was so dropped four times over each of the impacted areas.

Sand was then placed in the 50cm^3 graduate to its maximum mark. The graduate was tapped with a glass stirring rod twenty (20) times to achieve uniform compaction. Any reduction in volume was made up with sand again to the 50cm^3 mark and the tapping procedure was repeated. Sand was placed slowly into the gouged impact area, filling the gouged area level with the adjacent original surface. The amount of sand used was recorded after the graduate was again tapped. The procedure was repeated for the second impact-gouged area on the specimen and on the second specimen for both gouged areas. In addition, provisions were made to determine the thickness and density of the test specimens in accordance to ASTM E 605-77.

(4) **Results:**

First Specimen:

Volume of sand first gouged area	4.0cm^3
Volume of sand second gouged area	3.0cm^3
Thickness of Monokote Type MK-6 HY	.968 inches

Second Specimen:

Volume of sand first gouged area	3.0cm^3
Volume of sand second gouged area	3.0cm^3
Thickness of Monokote Type MK-6 HY	.922 inches

Average:

Volume of sand	3.3cm^3
Thickness	1.05 inches
Density of Monokote Type MK-6 HY	16.10 p.c.f.

Official Observers:

Rick Grubbs - Froehling & Robertson, Inc.

Gerald L. Stewart - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis

James P. Willis, C.W.I.
Technical Services

WDH/cwm

HIGH VELOCITY AIR EROSION TEST

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

AIR EROSION TEST

ABSTRACT

Significance: This test measures the effect of an air stream upon fire-resistive materials in plenums during normal service conditions, and evaluates the resistance to dusting, flaking, spalling, and delamination of the fire-resistive material.

The test was conducted in accordance with ASTM E-859 "Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members."

Results: Monokote Type MK-6 HY when subjected to tangential air stream of a velocity of 2575 feet per minute (29.3 m.p.h.) resulted in a weight loss of 0.006 grams at one hour, 0.000 grams at six hours, and no weight loss between six and twenty-four hours. The total weight loss at 24 hours was 0.006 grams per square foot of material tested.

REPORT DETAILS

Date of Test: December 18, 1990

Identification of Specimen: Bags of Monokote Type MK-6 HY were selected at random as produced by the Construction Products Division, W. R. Grace, & Company. Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag, to produce a cohesive uniform slurry having a mixer density of 43.7 p.c.f. and a nozzle density of 34.0 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

I. Apparatus

A. Application Base - 16 gauge galvanized steel sheet 14.5" by 67.5".

B. Duct System - A duct made of 12 gauge galvanized steel 8 feet, 8 inches long, rectangular in cross section, with a 10.5" by 63.5" opening in the top to accept the test sample (4.63 feet square exposed area).

C. Blower - capable of moving air through the entire cross section of the duct at a velocity of 2575 feet per minute (29.3 m.p.h.).

D. Pilot Tube - used in conjunction with a manometer to measure air velocity in the duct.

E. Filters - (2) one at the intake end of the duct (blower end), and a collecting filter at the exhaust end of the duct. Filter fabric was 30 denier nylon constructed, 94 ends per inch and 82 picks per inch.

F. Scale - balance having a capacity of 100 grams with sensitivity of ± 0.001 gram.

II. Test Specimen: A 16 gauge galvanized steel sheet 14.5" by 67.5" square onto which the Monokote Type MK-6 HY was spray applied at 0.910 inch thickness. The specimens were allowed to dry to constant weight at laboratory conditions.

III. Procedure:

A. The collecting filter was dried for one hour at 120 degrees Fahrenheit and placed in the apparatus.

B. The specimen was placed into the duct opening so the face of the specimen and the inside face of the duct opening were flush on in the same plane. The edges overlapped the duct opening by two (2) inches.

C. The pilot tube was positioned four (4) inches from the upstream edge of the specimen at the center line of the duct, and two (2) inches below the top.

D. With both filters in place, the blower was maintained at an average velocity of 2575 feet per minute. (29.3 miles per hours).

E. The blower was stopped at intervals of 1, 6, and 24 hours, the collecting filter removed, dried and reweighed.

IV. **TEST DATA:**

A. Density= 16.27 p.c.f.

B. Thickness tested = 0.910 inches

C. Exposed Area = 4.63 feet square

Filter weight (grams) at:	1 hour	6 hours	24 hours
Ending	3.293	3.246	3.263
Starting	3.287	3.246	3.263
Weight loss by sample	0.006	0.000	0.000

Total weight loss (24 hours) = 0.006 grams
Total weight loss per square foot (24 hours) = 0.001 grams

Official Observers:

W. Donald Holliday - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis,
Technical Services

JPW/cwm

COHESION/ADHESION

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY-CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

COHESION/ADHESION

ABSTRACT

Significance: This test measures the adhesive force required to separate the material from the base, or the cohesive force within the material and is an indication of the ability of sprayed fire-resistive material to remain in place and resist separation during anticipated service conditions.

The test was conducted in accordance with ASTM E-736 "Cohesion/Adhesion of Sprayed Fire-Resistive Material Applied to Structural Members".

Results: The average cohesive strength of Monokote Type MK-6 HY on galvanized steel was 339 lbs. per square foot.

REPORT DETAILS

Date of Test: November 23, 1988

Identification of Specimen: Bags were selected at random of Monokote Type MK-6 HY as produced by Construction Products Division, W. R. Grace & Company. Each bag contained the label of Underwriters Laboratory, Inc. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on the bag to produce a uniform slurry, having a mixer density of 38.8 p.c.f. and a nozzle density of 29.4 p.c.f. The procedures represented typical field construction practices and complied with instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

(1) Apparatus
- (a) Metal screw cap 3.81 inches in diameter and 0.5 inches deep (11.4 sq. in. area), with a hook attached at the center.
- (b) Two component urethane resin system.
- (c) Scale accurate to 1/4 lb. and a capacity of 50 lbs.
- (d) Steel substrate 11.5" x 12.5" x 16 gage, to which Monokote Type MK-6 HY was spray applied and allowed to dry in laboratory conditions (72° F ± 3° F).

(2) Test Specimen:
- (a) Galvanized steel sheet (2 tests)

(3) Procedure: The two component urethane resin was mixed in the metal dish and placed against the surface of the Monokote Type MK-6 HY and the urethane allowed to set and cure.

The test specimen was suspended by it's edges facing down, with a clear span of 11.5 inches. The scale with a hook was engaged to the dish, and step wise force was applied at approximately 7.5 lbs. per minute perpendicular to the surface. The test was continued to failure or until the capacity of the scale was reached.

(4) Calculations: The cohesive/adhesive force is:

$$CA = F/A$$

Where:

CA = Cohesive/adhesive force, (lbs./ft^2)
F = Recorded force, (lb.)
A = Area of the wood cap, (ft.^{2})

TEST DATA:
(Average of 2)

		Nature of Failure	F(lbs.)	C/A(lbs/ft^2)
(a)	Galv. Steel (Sample 1)	Cohesive	32.87	415
(b)	Galv. Steel (Sample 2)	Cohesive/ Adhesive	20.87	264
			Average	339

Thickness Tested - 0.861"
Monokote Type MK-6 HY Density - 14.43 p.c.f.

Official Observers:
Rick Grubbs - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,
FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

12

INDENTATION HARDNESS

MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS DIVISION

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

INDENTATION HARDNESS
ABSTRACT

Significance: This test measures the force required to indent a sprayed fire-resistive material. The hardness of such a material is measured in order to judge a product's resistance to physical damage during the initial construction of a building as well as for the life of the structure.

The test was conducted in accordance with ASTM C-569 "Indentation Hardness of Performed Thermal Insulations".

Results: The average depth of indentation of MK-6 HY applied to steel was .123 inches.

REPORT DETAILS

Date of Test: December 14, 1989

Identification of Specimen: Bags were selected at random of MK-6 HY as produced by Construction Products Division, W.R. Grace and Company. Each bag contained the label of Underwriters' Laboratory, Inc. Each bag of the MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on the bag to produce a uniform slurry having a mixer density of 30.7 p.c.f. and a nozzle density of 35.7 p.c.f. The procedures represented typical field construction practices and complied with the instructions printed on the MK-6 HY bags.

Description of Test:

I. Apparatus

A. The test jig was equipped with a 1 inch diameter spherical-ended indentor, weighing 2 lbs. with a 10 lb. weight which may be lowered onto the indentor. This jig had a .001 inch dial gauge to read the penetration of the indentor.

II. Test Specimen

A. The material was applied to a 6 in. x 12 in. steel plate at a thickness of .75 inches. The specimen was then conditioned according to the ASTM C-569 test procedure.

III. Procedure

A. The 2 lb. indentor head was applied perpendicular to the top surface of the specimen. An initial dial gauge reading was taken, then a load of 10lbs. was applied to the indentor. Dial gauge readings were then taken at 30 seconds.

IV. TEST DATA

Depth of Indentation

#1	.121
#2	.129
#3	.118
Average	.123

Thickness Tested - .854 in.

Mk-6 HY Density - 15.66 p.c.f.

Official Observers:

Rick Grubbs - Froehling & Robertson, Inc.

Gerald L. Stewart - W.R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis
Technical Services

JPW/cm

DEFLECTION TEST (1/60)

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W.R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

DEFLECTION

ABSTRACT

Significance: The deflection test measures the behavior of sprayed fire-resistive materials when subjected to deflection and evaluates such phenomena as spalling and delamination under bending stress. It is an indication of the ability of the sprayed fire-resistive material to remain in place and resist removal during anticipated service conditions.

The test was conducted in accordance with ASTM E-759 "Effect of Deflection on Sprayed Fire-Resistive Materials Applied to Structural Members."

Results: MK-6 HY did not crack, spall, or delaminate and remained unchanged in every aspect when the backing to which it was applied was subjected to deflection of twice the required 1/120th of the span (2 inches instead of the required 1 inch). Test density was 15.75 p.c.f.

REPORT DETAILS

Date of Test: November 9, 1992

Identification of Specimen: Randomly selected bags of MK-6 HY as produced by the Construction Products Division, W.R. Grace, & Company were used. Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag, to produce a cohesive uniform slurry having a mixer density of 36.1 p.c.f. and a nozzle density of 31.8 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the MK-6 HY bags.

Description of Test:

I Apparatus

A. Supports - A rigid base to provide four (4) inch bearing and a clear span between supports of 10 feet.

B. Load - Pre-weighed bars of iron.

C. Deflection Gauge - A dial micrometer graduated to 0.001 inch.

II **Test Specimen:** The test specimen consisted of cellular steel deck of non-composite type, nominal 1.5 inches, 24 inches wide by 12 feet long, consisting of an 18 gauge galvanized steel fluted top section and an 20 gauge galvanized steel flat bottom section welded together to form four cells 6 inches on center. MK-6 HY fire-resistive material was spray-applied to the underside of the steel deck to a 3/4 inch thickness. The dry in-place density was 15.75 p.c.f. The MK-6 HY was not applied to an area 12 inches in from each end of the specimen in order to permit the steel deck to bear directly on the supports of the test fixture. The prepared specimen was allowed to condition at room temperature and atmospheric conditions. The test was conducted thirty-one (31) days after the completed application of the sprayed fire-resistive material.

III **Procedure:** The test specimen was placed on the fixtures supports to simulate the field condition of a floor construction with the MK-6 HY sprayed fire-resistive material as the lower surface. The specimen had a clear span between supports of 10 feet. A vertical load was applied to the upper face of the specimen to develop a deflection of one-one-hundred twentieth (1/120) of the clear span, that is 2.0 inch instead of 1.0 inch. To measure the deflection the initial reading of the dial micrometer was recorded prior to the application of the load and deformation monitored as the load was applied.

IV **Results:** The test specimen was examined upon completion of the test and there was no evidence of cracking, spalling, delamination, loss of bond, or any other change in the MK-6 HY after being subjected to the above described deflection test procedure.

Official Observers:

Heather Crawford - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

JPW/ cwm

BOND IMPACT TEST

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W.R. GRACE & COMPANY

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

BOND IMPACT

ABSTRACT

Significance: The Bond Impact Test measures the behavior of sprayed fire resistive material when the floor construction to which it is applied is subjected to the impact of shock loading and evaluates adhesion and resistance to spalling, cracking and delamination. It is an indication of the ability of the sprayed fire-resistance material to remain in place and resist removal during anticipated service conditions.

The test was conducted in accordance with ASTM E-760 "Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members."

Results: Monokote Type MK-6 HY did not crack, spall, or delaminate and remained unchanged in every aspect when the floor construction to which it was applied was subjected to an impact shock loading of 240 feet pounds (60 pounds dropped from 4.0 feet). Test density was 14.13 p.c.f.

REPORT DETAILS

Date of Test: November 9, 1992

Identification of Specimen: Randomly selected bags of Monokote Type MK-6 HY as produced by the Construction Products, W. R. Grace, & Company. Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag of material to produce a cohesive uniform slurry having an average mixer density of 36.7 p.c.f. and a nozzle density of 30.4 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

I. Apparatus

A. Supports - A rigid base to provide four inch bearing and a clear span between supports of 10 feet.

B. Sandbag - The sandbag used was as described in the proposed test method for sprayed fire-resistive material Rev. 7/1/76.

C. Measuring Stick - was used to measure accurately the height of drop.

II. **Test Specimen:** The test specimen consisted of a complete deck assembly consisting of a cellular steel deck and a concrete topping. The cellular steel deck was of the non-composite type, nominal 1.5 inches, 24 inches wide by 12 feet long, consisting of an 18 gauge galvanized steel fluted top section and an 20 gauge steel flat bottom section welded together to form four cells 6 inches on center. The concrete was nominal 3000 psi, 2.5 inches deep as measured to the top plane of the steel decking. The fire-resistive material was then spray applied to the underside the steel deck to a 3/4 inch thickness. The dry in-place density of the actually tested Monokote Type MK-6 HY was 14.13 p.c.f. The Monokote Type MK-6 HY was not applied to an area 12 inches in from each end of the specimen, in order to permit the steel deck to bear directly on the supports of the test fixture. The prepared specimen was allowed to condition at atmospheric conditions for 28 days.

III. **Procedure:** The test specimen was placed on the test fixture supports to simulate the field condition of a floor construction with sprayed Monokote Type MK-6 HY fire-resistive material as the lower surface and the concrete as the upper surface. The specimen had a clear span between supports of 10 feet. An impact load was applied once to the middle of the upper face to the specimen by dropping the sandbag from a height of 4 feet. The height of the bag was measured from the upper face of the specimen prior to release.

IV. **Results:** The test specimen was examined upon completion of the test and there was no evidence of cracking, spalling, delamination, loss of bond or any other change in the Monokote Type MK-6 HY after being subjected to the above described test procedure.

Official Observers:

Heather Crawford - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

JPW/cwm

COMPRESSIVE STRENGTH

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

COMPRESSIVE STRENGTH
ABSTRACT

Significance: This test measures the compressive strength of sprayed fire-resistive materials and is a measure of the resistance to deformation under a compressive load.

The test was conducted in accordance with ASTM E-761 "Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members."

Results: Monokote Type MK-6 HY required a uniform compressive load of 12.6 p.s.i. (1,820 p.s.f.) to compress it to 10 percent deformation.

REPORT DETAILS

Date of Test: December 28, 1988

Identification of Specimen: Bags of Monokote Type MK-6 HY were selected at random as produced by the Construction Products Division, W. R. Grace, & Company. (Each bag contained the label of Underwriters' Laboratories, Inc.) Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag, to produce a cohesive uniform slurry having a mixer density of 38.3 p.c.f. and a nozzle density of 31.1 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

I. Apparatus

A. A standard hydraulic compression machine.

B. Spherical bearing block assembly having a plane bearing surface of 6 inches by 6 inches square.

C. Load Cell - 1,000 pound capacity.

II. Test Specimen:

A. Substrate - 7 inch by 24 inch by 16 gauge galvanized steel sheet.

B. Monokote Type MK-6 HY was spray-applied at 0.765 inch thickness. The specimen was allowed to dry to constant weight at laboratory conditions.

C. Surface - was capped level and parallel to the steel backing sheet.

III. Procedure:

A. Two compression tests were made on the test specimen. The remaining area was used for density measurement.

B. The load was applied perpendicular to the face of the test specimen, with the bearing block on top of the specimen. The initial thickness for the deformation calculation was measured between the bearing surfaces and the steel substrate after the initial load of 0.1 p.s.i. had been applied.

C. The crosshead speed of the testing machine was 0.05 inches per minute during compression to 10 percent deformation.

IV. TEST DATA:

A. Density = 16.14 p.c.f.

B. Thickness tested = 0.765 inches

Official Observers:

Rick Grubbs - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

JPW/cwm

CORROSION TEST

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

CORROSION

ABSTRACT

Significance: This test evaluates the corrosion to steel induced by sprayed fire-resistive materials and determines whether the presence of these materials increases, decreases, or had no effect on the corrosion characteristics of steel. The test was conducted in accordance with ASTM E-937 "Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members".

Results: Monokote Type MK-6 HY did not contribute to corrosion of steel when exposed to higher temperature and humidity.

REPORT DETAILS

Date of Test: October 31, 1988

Identification of Specimen: Bags were selected at random from Monokote Type MK-6 HY as produced by Construction Products Division, W. R. Grace & Company. Each bag contained the label of Underwriters Laboratory, Inc. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on the bag to produce a uniform slurry, having a mixer density of 37.6 p.c.f. and a nozzle density of 28.6 p.c.f. The procedures represented typical field construction practices and complied with instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

(1) Apparatus
   (a) A temperature humidity cabinet equipped to maintain the temperature at 90° ± 3° F and a relative humidity of 70 ± 3%. The cabinet was constructed of clear plastic.
   (b) Scale with a capacity of 2200 Kg and a sensitivity of 0.1 g
   (c) Wire brush described as "cement mold brush" with brass wire bristles.

(2) Test Specimen: Duplicate sets of 8" x 8" x 12 gage sheets of each of galvanized, bare, and shop-coated steel, to which Monokote Type MK-6 HY fire-resistive material was spray applied. The sheets were cleaned with trichlorethylene to remove any oil or grease. For the purpose of sample identification, each plate was marked Ia (control) or IIa (exposed to 90° and 70% R.H.).

RESULTS:

Weight loss of control sprayed with Monokote Type MK-6 HY (Ia - Ib)

Bare Steel = 0.4 grams

Shop Coated = 0.0 grams

Galvanized = 0.0 grams

Weight loss of conditioned specimens: (IIa - IIb)

Bare Steel = 0.4 grams

Shop Coated = 0.0 grams

Galvanized = 0.0 grams

Difference in weight loss:

Bare Steel = None

Shop Coated = None

Galvanized = None

Official Observers:

Rick Grubbs - Froehling & Robertson, Inc.

Walter Payment - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

JPW/cwm

ABRASION

MONOKOTE TYPE MK-6 HY

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

W. R. GRACE & COMPANY - CONNECTICUT

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

FROM NEW ENGLAND FIREPROOFING
Tel: 207-872-0804 Fax: 207-872-2535

ABRASION

ABSTRACT

Significance: This test measures the amount of material removed from sprayed fire-resistive material when subjected to abrading forces. The test was conducted in accordance with ASTM proposed method for testing "Sprayed Fire-Resistive Material applied to Structural Members", published in 1978.

Results: The average amount of Monokote Type MK-6 HY abraded by this test was 8.3 cubic centimeters.

REPORT DETAILS

Date of Test: January 7, 1991

Identification of Specimen: Bags were selected at random of Monokote Type MK-6 HY as produced by the Construction Products Division, W. R. Grace, & Company. Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the Monokote Type MK-6 HY was mixed with water in a mechanical mixer in accordance with the instructions on each bag; to produce a cohesive uniform slurry having a mixer density of 43.7 p.c.f. and a nozzle density of 32.1 p.c.f. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type MK-6 HY bags.

Description of Test:

(1) Apparatus
- (a) Abrasion Test apparatus described in the ASTM proposed method for testing, "Spray Fire Resistive Material Applied to Structural Members".
- (b) Ruler, 12 inches (305 mm).
- (c) Ottawa Sand, 100% passing 30-mesh sieve.
- (d) Graduated cylinder, 50 cm^3 capacity.
- (e) Steel-pointed strips of varying widths.
- (f) Rigid substrate, 1/8" steel plate 12 by 18 in. (305mm by 460mm).
- (g) Rod, 8 in. (200mm) long, 1 lb. (454g) in weight.

(2) Test Specimen: Two, 12 x 18 inch (305 by 460mm) test specimens consisting of sprayed fire-resistive Monokote Type MK-6 HY applied to a 11 gauge cold rolled steel substrate. The specimens were allowed to dry to a constant weight at laboratory atmospheric conditions. Thickness measurements which did not vary by more than 3/16 inch (5mm) from the average were taken in nine equally spaced points on the specimen.

(3) Procedure: A test specimen was placed into the abrasion test apparatus, and all adjustable stops were placed tight against the specimen and locked. The test vehicle guide was placed over the specimen so that the guide centerline was 3 in. (75mm) from one edge of the specimen and adjusted to permit transfer of the test vehicle to the sample without dropping. The guide was adjusted at each end and locked. The test vehicle was placed in the guide with the restraining trigger in place. The pulling cable was then attached to the test vehicle and passed over the pulley at the end of the guide. The weights were fastened to the cable. The trigger was then removed and the test vehicle made a complete pass over the test specimen being drawn by he falling weights. There was a drop of not more than 0.1 in. (2.5mm) of the test vehicle to reach the specimen.

Three such complete passes were made, with adjustments to the guide such that the 0.1 in. (2.5mm) drop to the specimen was not exceeded. Each pass of the test vehicle exceeded 12 in. (300mm) in length on the specimen and spanned its centerline. The guide was then repositioned such that the guide centerline was 3in. (75mm) from the other edge of the specimen and three more turns of the test vehicle were made in the same manner as the first test series. The test was repeated for the second specimen as described above.

Upon its removal from the apparatus, each specimen was turned over and loose material was removed by lightly shaking and then tapping the specimen. Tapping on the back of the inverted specimen was made with 16 ounce (454g) rod, 8 inch (200mm) long, held at one end at 2 inch (50mm) along the rod. The rod was held 3 inch above the specimen in a horizontal position and the long end of the rod was allowed to drop onto the back of the specimen by pivoting about the 2 inch point. The rod was so dropped at four equal distant points along the test track and parallel to the line of the track.

Before removal of the test specimen from the test apparatus, a centerline on the surface perpendicular to the travel of the test vehicle was scribed. The 6 in. (150mm) measuring length was then used for the determination of abrasion.

Thin steel strips were used to mark the 6 in. (150mm) length and confine the sand used for measurement. Sand was first placed in the 50 cm^3 mark and the tapping procedure was repeated. Sand was placed slowly into the grooves made by the test vehicle, filling them level to the surface of the original surrounding area. The graduate was again tapped and the amount of sand used to fill the groove was recorded. The second track was measured in the same manner and the measurement procedure was repeated for the second specimen. All measurements were recorded. In addition, provisions were made to determine the thickness and density of the test specimens.

(4) **Results**

First Specimen:

Volume of sand first pass	9.0cm^3
Volume of sand second pass	7.0cm^3
Thickness of Monokote Type MK-6 HY	.968 inches

Second Specimen:

Volume of sand first pass	10.0cm^3
Volume of sand second pass	7.0cm^3
Thickness of Monokote Type MK-6 HY	.922 inches

Average:

Volume of sand	8.3cm^3
Thickness of Monokote Type MK-6 HY	1.05 inches
Density of Monokote Type MK-6 HY	16.01 p.c.f.

Official Observers:

Rick Grubbs - Froehling & Robertson, Inc.

Gerald L. Stewart - W. R. Grace & Co.

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

James P. Willis, C.W.I.
Technical Services

JPW/cwm

W. R. GRACE
MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: MK-6 HY
MSDS Number: Z-01686
Cancelled MSDS Number: Z-01607
MSDS Date: 03/12/2007
Chemical Family Name: Lightweight Gypsum Aggregate Plaster
Product Use: Fireproofing Product.
Chemical Formula: Mixture-NA
CAS # (Chemical Abstracts Service Number): Mixture-NA

Manufactured by:

W.R.Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

Grace Canada, Inc.
294 Clements Road West
Ajax, Ontario L1S 3C6

In Case of Emergency Call:

In USA: (617) 876-1400 In Canada: (905) 683-8561

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS#	Percent (max)
Calcium Carbonate.	1317-65-3	1-10
Calcium sulfate	007778-18-9	50-100
Cellulose.	65996-61-4	1-10
Polystyrene	009003-53-6	1-10
Quartz	014808-60-7	1-10

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Caution!
Causes eye irritation.
Causes skin irritation.
Causes respiratory irritation
May cause risk of lung disease (i.e. silicosis and/or lung cancer).

HMIS Rating:

Health: 1*
Flammability: 0
Reactivity: 0
Personal Protective Equipment: B (See Section 8)

Potential Health Effects:

Inhalation: May be irritating if inhaled resulting in coughing and sneezing.
May aggravate chronic respiratory conditions such as asthma or bronchitis.
Long term inhalation of dust may increase risk of contracting pneumoconiosis ("dusty lungs") and decrease lung function.
Prolonged inhalation of respirable crystalline silica dust can result in lung disease (i.e. silicosis and/or lung cancer). Symptoms include coughing, shortness of breath, wheezing and reduced pulmonary function.
Eye Contact: Eye contact causes irritation.
Skin Contact: Skin contact causes irritation.
May dry skin.
During hardening (rehydration) this product may slowly develop sufficient heat to cause severe burns possibly resulting in permanent injury. Do not allow product to harden around any body part or while in continuous, prolonged contact with the skin.
Skin Absorption: Not expected to be harmful if absorbed through the skin.
Ingestion: Ingestion not expected to be harmful.

SECTION 4 - FIRST AID MEASURES:

Skin Contact: Wash with soap and water.
If discomfort or irritation persists, consult a physician.
Remove contaminated clothing and wash before reuse.
Eye Contact: Flush eyes with water for at least 15 minutes while holding eyelids open.
If discomfort or irritation persists, consult a physician.
Ingestion: Do not induce vomiting.
Never give anything by mouth to an unconscious person.
If discomfort or irritation persists, consult a physician.
Inhalation: If symptoms develop, get fresh air. If symptoms persist, consult a physician.
If breathing has stopped, give artificial respiration then oxygen if needed.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not Applicable
Flash Point Method:	Not Applicable
Lower Explosion Limit:	Not Available
Upper Explosion Limit:	Not Available
Auto-Ignition Temperature:	Not Available

NFPA Rating:

Health:	0
Flammability:	0
Reactivity:	0

Extinguishing Media: Not Applicable. Product will not burn.
Special Fire Fighting Procedures: None
No special procedures specific to this product.
Unusual Fire and Explosion Hazards: None unless noted below.

SECTION 6 - ACCIDENTAL RELEASE MEASURES:

Spills/Leaks: Use proper personal protective equipment. Do not flush to sewer or allow to enter waterways. Keep unnecessary people away.
If spilled, prevent material from entering water systems. Observing the listed Precautionary Measures found in Section 7 of this document. Dry spills should be immediately swept up and placed in a suitable container to prevent further release of material. Slurry spills should be immediately contained (to minimize the extent of the spill) and absorbed with an inert, non-combustible material. Place material in a suitable container to prevent further release.

SECTION 7 - HANDLING AND STORAGE

Precautionary Measures: Avoid contact with eyes, skin and clothing.
Avoid creating and inhaling airborne dust or particulates.
Practice good personal hygiene to avoid ingestion.
Use only with adequate ventilation.
Wash clothing before reuse.
Equip mixers with dust covers.
Provide respiratory protection if needed.
Wear skin and eye protection to avoid contact with dust or spray.
Post "Slippery When Wet" signs where appropriate.
Use anti-slip surfaces on working platforms.
FOR PROFESSIONAL USE ONLY. KEEP OUT OF CHILDREN'S REACH.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT

EXPOSURE GUIDELINES (US)

Ingredient	ACGIH TLV			OSHA PEL			Other
	TWA	STEL	Ceiling	TWA	STEL	Ceiling	
Calcium Carbonate.	10 mg/m3 TWA (particulate matter containing no asbestos and <1% crystalline silica)	-	-	-	-		-
Calcium sulfate	10 mg/m3 TWA (particulate matter containing no asbestos and < 1% crystalline silica)	-	-	15 mg/m3 TWA; 5 mg/m3 TWA (respirable fraction)	-		-
Cellulose.	10 mg/m3 TWA	-	-	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)	-		-
Polystyrene	-	-	-	-	-		-
Quartz	0.05 mg/m3 TWA (respirable fraction)	-	-	0.1 mg/m3 TWA (respirable dust)	-		-

In addition to the exposure limits referenced above, the following non-specific limits for dust apply to this product; OSHA, 15 mg/m3-TWA or Total Dust and 5 mg/m3-TWA as Respirable Dust, ACGIH, 10 mg/m3-TWA as Total Dust and 3 mg/m3-TWA as Respirable Dust.

EXPOSURE GUIDELINES (CANADA)

Employers should consult local Provincial regulatory limits for exposure guidelines which may vary locally.

Engineering Controls: Exhaust fans may be necessary when mixing in enclosed areas.

Personal Protective Equipment:

Respiratory Protection: Wear approved respiratory protection (generally a N-95 dust mask is appropriate) to prevent employee exposure from exceeding the limits specified.
Skin Protection: Work gloves or hand creams are recommended to prevent drying of skin.
Eye Protection: At minimum, safety glasses with side shields should be worn where exposure to excessive dust or spray is likely.
Work/Hygienic Practices: Use good personal hygiene practices.
Use bag opening and disposal procedures which minimize dust release. Equip mixers with dust covers to minimize dust released during mixing cycle. After each work shift, workers should shower with soap and water. Work clothing should be changed daily.
All trades should minimize the release of dust during removal of materials by:

Wetting using water, prior to its removal.
Removing small areas of fireproofing at one time.
Maintaining a clean worksite.

Prior to welding or cutting, product must be removed from steel surfaces in those immediate areas where exposure to excessive heat, applied either directly or through conduction, from cutting or welding operations is possible.
Quartz (Crystalline silica) is a naturally-occurring mineral that is commonly contained in materials that are mined from the earth's surface such as sand, limestone, clay and gypsum (Calcium sulfate). Total quartz is a value usually representing the combined fractions of large, non-respirable sized particles and of respirable sized particles (less than ten microns in aerodynamic diameter). It is only the respirable fraction of total quartz that is recognized as hazardous by professionals in the field of Occupational Health and by most regulatory agencies.
This product contains compounds subject to exposure guidelines and/or identified as carcinogens. (See Sections 8 and 11).

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Appearance/Odor:	Coarse, free flowing white to black powder, no odor.
Odor Threshold: (ppm)	Not Determined
pH:	Not Available
Vapor Pressure: (Mm Hg)	Unknown
Vapor Density: (Air = 1)	Unknown
Solubility In Water:	Unknown
Specific Gravity: (Water = 1)	Not Available
Evaporation Rate: (Butyl Acetate = 1)	Unknown
Boiling Point:	Not Applicable
Viscosity:	Unknown
Bulk Density: (Pounds/Cubic Foot)(Pcf)	12-16 PCF
% Volatiles (gr/L): (70°F) (21°C)	Not Available

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability:	Stable
Conditions To Avoid:	None known for this product.
Hazardous Polymerization:	Will not polymerize.
Hazardous Decomposition Products:	Carbon dioxide, Carbon monoxide and Monomers (C8H8) and various polymers (C8H8). Temperatures in excess of 4000°F from cutting or welding operations may generate Sulfur dioxide. Upon complete combustion, Carbon monoxide and Carbon dioxide are released.

SECTION 11 - TOXICOLOGICAL INFORMATION

Ingredient(No data unless listed.)	CAS Number	LD50 and LC50
Calcium Carbonate.	1317-65-3	Oral LD50 Rat: 6450 mg/kg
Cellulose.	65996-61-4	Inhalation LC50 Rat: >5800 mg/m3/4H; Oral LD50 Rat: >5 g/kg; Dermal LD50 Rabbit: >2 g/kg

Carcinogenicity:

Ingredient	IARC Group 1	IARC Group 2A	IARC Group 2B	NTP Known	NTP Suspect	OSHA
Calcium Carbonate.	No	No	No	No	No	No
Calcium sulfate	No	No	No	No	No	No
Cellulose.	No	No	No	No	No	No
Polystyrene	No	No	No	No	No	No
Quartz	Yes	No	No	Yes	Yes	Yes

Mutagenicity:	Not applicable.
Teratogenicity:	Not applicable.
Reproductive Toxicity:	Not applicable.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate:	No data available for product.
Ecotoxicity:	No data available for product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Procedures: Consult all regulations (federal, state, provincial, local) or a qualified waste disposal firm when characterizing waste for disposal. According to EPA (40 CFR § 261), waste of this product is not defined as hazardous. Dispose of waste in accordance with all applicable regulations.

Wastes of this product such as empty bags and excess material are typically not defined as hazardous.

SECTION 14 - TRANSPORTATION INFORMATION

Proper Shipping Name:	Not Applicable
UN/NA Number:	Not Applicable
Domestic Hazard Class:	Nonhazardous
Surface Freight Classification:	Wall Plaster
Label/Placard Required:	Not Applicable

SECTION 15 - REGULATORY INFORMATION

REGULATORY CHEMICAL LISTS:

CERCLA (Comprehensive Response Compensation and Liability Act):
(None present unless listed below)

Chemical Name	CAS #	Wt %	CERCLA RQ

SARA Title III (Superfund Amendments and Reauthorization Act)

SARA Section 312/Tier I & II Hazard Categories:

Health Immediate (acute)	Yes
Health Delayed (chronic)	Yes
Flammable	No
Reactive	No
Pressure	No

302 Reportable Ingredients (Identification Threshold 1%.):

Chemical Name	CAS #	Wt %	SARA 302 TPQ

313 Reportable Ingredients (Chemicals present below reporting threshold are exempt):

Chemical Name	CAS #	Wt %

National Volatile Organic Compound Emission Standards For Architectural Coatings:

Volatile Organic Content: (gr/L) 0

WHMIS Classification(s): D2 A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR). This MSDS contains all the information required by the CPR.

State Regulatory Information:

California Proposition 65: WARNING! This product contains substances known to the state of California to cause cancer, birth defects or other reproductive harm.

Massachusetts Hazardous Substance List(Identification threshold 0.001%(1ppm)):

Chemical Name	CAS #	Wt %
Quartz	014808-60-7	4.3924

New Jersey Hazardous Substance List(Identification threshold (0.1%)):

Chemical Name	CAS #	Wt %
Pentane	000109-66-0	.1179

Pennsylvania Hazardous Substance List(Identification threshold 0.01%):

Chemical Name	CAS #	Wt %

CHEMICAL INVENTORY STATUS:

All chemicals in this product are listed or exempt from listing in the following countries:

US	CANADA		EUROPE	AUSTRALIA	JAPAN	KOREA	PHILIPPINES
TSCA	DSL	NDSL	EINECS/ELINCS	AICS	ENCS	ECL	PICCS
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

SECTION 16 - OTHER INFORMATION

Non-Hazardous Ingredient Disclosure:

Chemical Name	CAS Number

Prepared by: EH&S Department
Approved by: EH&S Department
Approved Date: 03/12/2007

Disclaimer:

"The data included herein are presented in accordance with various environment, health and safety regulations. It is the responsibility of a recipient of the data to remain currently informed on chemical hazard information, to design and update its own program and to comply with all national, federal, state and local laws and regulations applicable to safety, occupational health, right-to-know and environmental protection."

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Extended Set MK-6
MSDS Number: Z-01741
Cancelled MSDS Number: Z-01715
MSDS Date: 07/11/2008
Chemical Family Name: Lightweight Gypsum Aggregate Plaster
Product Use: Fireproofing Product.
Chemical Formula: Mixture-NA
CAS # (Chemical Abstracts Service Number): Mixture-NA
Manufactured by:

W.R.Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

Grace Canada, Inc.
294 Clements Road West
Ajax, Ontario L1S 3C6

In Case of Emergency Call:
In USA: (617) 876-1400 In Canada: (905) 683-8561

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS#	Percent (max)
Calcium Carbonate.	1317-65-3	1-10
Calcium sulfate	007778-18-9	50-100
Cellulose.	65996-61-4	1-10
Polystyrene	009003-53-6	1-10
Quartz	014808-60-7	1-10

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Caution!
Causes eye irritation.
Causes skin irritation.
Causes severe respiratory tract irritation.
Prolonged exposure may cause risk of lung disease (i.e. silicosis and/or lung cancer).

HMIS Rating:

Health: 1*
Flammability: 0
Reactivity: 0
Personal Protective Equipment: B,E (See Section 8)

Potential Health Effects:

Inhalation: May be irritating if inhaled, resulting in coughing and sneezing.
May aggravate chronic respiratory conditions such as asthma or bronchitis.
Prolonged inhalation of respirable crystalline silica dust can result in lung disease (i.e. silicosis and/or lung cancer). Symptoms include coughing, shortness of breath, wheezing and reduced pulmonary function.
Eye Contact: Eye contact causes irritation.

Skin Contact: Skin contact causes irritation.
May dry skin.
During hardening (rehydration) this product may slowly develop sufficient heat to cause severe burns possibly resulting in permanent injury. Do not allow product to harden around any body part or while in continuous, prolonged contact with the skin.
Skin Absorption: Not expected to be harmful if absorbed through the skin.
Ingestion: Ingestion not expected to be harmful.
If ingested, causes irritation to the linings of the mouth, esophagus and stomach.

SECTION 4 - FIRST AID MEASURES:

Skin Contact: Wash with soap and water.
If discomfort or irritation persists, consult a physician.
Remove contaminated clothing and wash before reuse.
Eye Contact: Flush eyes with water for at least 15 minutes while holding eyelids open.
If discomfort or irritation persists, consult a physician.
Ingestion: Do not induce vomiting.
Never give anything by mouth to an unconscious person.
If discomfort or irritation persists, consult a physician.
Inhalation: If symptoms develop, get fresh air. If symptoms persist, consult a physician.
If breathing has stopped, give artificial respiration then oxygen if needed.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not Applicable
Flash Point Method:	Not Applicable
Lower Explosion Limit:	Not Available
Upper Explosion Limit:	Not Available
Auto-Ignition Temperature:	Not Available

NFPA Rating:

Health:	Not Applicable
Flammability:	Not Applicable
Reactivity:	Not Applicable

Extinguishing Media: Not Applicable. Product will not burn.
Special Fire Fighting Procedures: No special procedures specific to this product.
Unusual Fire and Explosion Hazards: None unless noted below.

SECTION 6 - ACCIDENTAL RELEASE MEASURES:

Spills/Leaks: Use proper personal protective equipment. Do not flush to sewer or allow to enter waterways. Keep unnecessary people away.
If spilled, prevent material from entering water systems. Observing the listed Precautionary Measures found in Section 7 of this document. Dry spills should be immediately swept up and placed in a suitable container to prevent further release of material. Slurry spills should be immediately contained (to minimize the extent of the spill) and absorbed with an inert, non-combustible material. Place material in a suitable container to prevent further release.

SECTION 7 - HANDLING AND STORAGE

Precautionary Measures:

Keep containers tightly closed. Store product between 40°F and 120°F.
Avoid contact with eyes, skin and clothing.
Do not take internally.
Practice good personal hygiene to avoid ingestion.
Use only with adequate ventilation.
Wash clothing before reuse.
Equip mixers with dust covers.
Provide respiratory protection if needed.
Wear skin and eye protection to avoid contact with dust or spray.
Post "Slippery When Wet" signs where appropriate.
Use anti-slip surfaces on working platforms.
FOR PROFESSIONAL USE ONLY. KEEP OUT OF CHILDREN'S REACH.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT

EXPOSURE GUIDELINES (US)

Ingredient	ACGIH TLV			OSHA PEL			Other
	TWA	STEL	Ceiling	TWA	STEL	Ceiling	
Calcium Carbonate.	10 mg/m3 TWA (particulate matter containing no asbestos and <1% crystalline silica)	-	-	-	-		-
Calcium sulfate	10 mg/m3 TWA (particulate matter containing no asbestos and < 1% crystalline silica)	-	-	15 mg/m3 TWA; 5 mg/m3 TWA (respirable fraction)	-		-
Cellulose.		-	-		-		-
Bauxite	-	-	-	-	-		-
Polystyrene	-	-	-	-	-		-
Quartz	0.025 mg/m3 TWA (respirable fraction)	-	-	((250)/(%SiO 2 + 5) mppcf TWA (respirable)); ((10)/(%SiO2 + 2) mg/m3 TWA (respirable)); ((30)/(%SiO2 + 2) mg/m3 TWA (total dust))	-	-	

In addition to the exposure limits referenced above, the following non-specific limits for dust apply to this product; OSHA, 15 mg/m3-TWA or Total Dust and 5 mg/m3-TWA as Respirable Dust, ACGIH, 10 mg/m3-TWA as Total Dust and 3 mg/m3-TWA as Respirable Dust.

EXPOSURE GUIDELINES (CANADA)

Employers should consult local Provincial regulatory limits for exposure guidelines which may vary locally.

Engineering Controls: Exhaust fans may be necessary when mixing in enclosed areas.

Personal Protective Equipment:

Respiratory Protection: Wear approved respiratory protection (generally a N-95 dust mask is appropriate) to prevent employee exposure from exceeding the limits specified.

Skin Protection: Work gloves or hand creams are recommended to prevent drying of skin.

Eye Protection: At minimum, safety glasses with side shields should be worn where exposure to excessive dust or spray is likely.

Work/Hygienic Practices: Use good personal hygiene practices.

Prior to welding or cutting, product must be removed from steel surfaces in those immediate areas where exposure to excessive heat, applied either directly or through conduction, from cutting or welding operations is possible.

Remove material in a manner so as to minimize the creation of dust. All trades should minimize the release of dust during removal of materials by:

- Applying a spray mist of water to wet product, prior to its removal.
- Removing small areas of fireproofing at one time.
- Maintaining a clean worksite.

Quartz (Crystalline silica) is a naturally-occurring mineral that is commonly contained in materials that are mined from the earth's surface such as sand, limestone, clay and gypsum (Calcium sulfate). Total quartz is a value usually representing the combined fractions of large, nonrespirable sized particles and of respirable sized particles (less than ten microns in aerodynamic diameter). It is only the respirable fraction of total quartz that is recognized as hazardous by professionals in the field of Occupational Health and by most regulatory agencies.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Appearance/Odor:	Coarse, free flowing white to black powder, no odor.
Odor Threshold: (ppm)	Not Determined
pH:	Not Available
Vapor Pressure: (Mm Hg)	Not Applicable
Vapor Density: (Air = 1)	Not Applicable
Solubility In Water:	Slight
Specific Gravity: (Water = 1)	Not Applicable
Evaporation Rate: (Butyl Acetate = 1)	Not Applicable
Boiling Point:	Not Applicable
Viscosity:	Unknown
Bulk Density: (Pounds/Cubic Foot)(Pcf)	12-16 PCF
% Volatiles (gr/L): (70°F) (21°C)	Not Applicable

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability: Stable
Conditions To Avoid: Polyunsaturated liquids.
Hazardous Polymerization: Will not polymerize.
Hazardous Decomposition Products: Carbon dioxide, Carbon monoxide and Monomers (C8H8) and various polymers (C8H8). Temperatures in excess of 4000°F from cutting or welding operations may generate Sulfur dioxide. Upon complete combustion, Carbon monoxide and Carbon dioxide are released.

SECTION 11 - TOXICOLOGICAL INFORMATION

Ingredient(No data unless listed.)	CAS Number	LD50 and LC50
Calcium Carbonate.	1317-65-3	Oral LD50 Rat: 6450 mg/kg
Cellulose.	65996-61-4	Inhalation LC50 Rat: >5800 mg/m3/4H; Oral LD50 Rat: >5 g/kg; Dermal LD50 Rabbit: >2 g/kg

Carcinogenicity:

Ingredient	IARC Group 1	IARC Group 2A	IARC Group 2B	NTP Known	NTP Suspect	OSHA
Calcium Carbonate.	No	No	No	No	No	No
Calcium sulfate	No	No	No	No	No	No
Cellulose.	No	No	No	No	No	No
Bauxite	No	No	No	No	No	No
Polystyrene	No	No	No	No	No	No
Quartz	Yes	No	No	Yes	No	Yes

Mutagenicity: Not applicable.
Teratogenicity: Not applicable.
Reproductive Toxicity: Not applicable.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate: No data available for product.
Ecotoxicity: No data available for product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Procedures: Consult all regulations (federal, state, provincial, local) or a qualified waste disposal firm when characterizing waste for disposal. According to EPA (40 CFR § 261), waste of this product is not defined as hazardous. Dispose of waste in accordance with all applicable regulations.
Wastes of this product such as empty bags and excess material are typically not defined as hazardous.

SECTION 14 - TRANSPORTATION INFORMATION

Proper Shipping Name: Not Applicable
UN/NA Number: Not Applicable
Domestic Hazard Class: Nonhazardous
Surface Freight Classification: Wall plaster
Label/Placard Required: Not Applicable

SECTION 15 - REGULATORY INFORMATION

REGULATORY CHEMICAL LISTS:

CERCLA (Comprehensive Response Compensation and Liability Act):
(None present unless listed below)

Chemical Name	CAS #	Wt %	CERCLA RQ

SARA Title III (Superfund Amendments and Reauthorization Act)

SARA Section 312/Tier I & II Hazard Categories:

Health Immediate (acute)	Yes
Health Delayed (chronic)	Yes
Flammable	No
Reactive	No
Pressure	No

302 Reportable Ingredients (Identification Threshold 1%.):

Chemical Name	CAS #	Wt %	SARA 302 TPQ

313 Reportable Ingredients (Chemicals present below reporting threshold are exempt):

Chemical Name	CAS #	Wt %

National Volatile Organic Compound Emission Standards For Architectural Coatings:

Volatile Organic Content: (gr/L) 0

WHMIS Classification(s): D2 A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR). This MSDS contains all the information required by the CPR.

State Regulatory Information:

California Proposition 65: WARNING! This product contains substances known to the state of California to cause cancer, birth defects or other reproductive harm.

Massachusetts Hazardous Substance List(Identification threshold 0.001%(1ppm)):

Chemical Name	CAS #	Wt %
Quartz	014808-60-7	4.2204

New Jersey Hazardous Substance List(Identification threshold (0.1%)):

Chemical Name	CAS #	Wt %
Pentane	000109-66-0	.114

Pennsylvania Hazardous Substance List(Identification threshold 0.01%):

Chemical Name	CAS #	Wt %

CHEMICAL INVENTORY STATUS:

All chemicals in this product are listed or exempt from listing in the following countries:

US	CANADA		EUROPE	AUSTRALIA	JAPAN	KOREA	PHILIPPINES
TSCA	DSL	NDSL	EINECS/ELINCS	AICS	ENCS	ECL	PICCS
Yes	Yes	No	Yes	Yes	Yes	Yes	No

SECTION 16 - OTHER INFORMATION

Non-Hazardous Ingredient Disclosure:

Chemical Name	CAS Number

Prepared by: EH&S Department
Approved by: EH&S Department
Approved Date: 07/11/2008

Disclaimer:

"The data included herein are presented in accordance with various environment, health and safety regulations. It is the responsibility of a recipient of the data to remain currently informed on chemical hazard information, to design and update its own program and to comply with all national, federal, state and local laws and regulations applicable to safety, occupational health, right-to-know and environmental protection."

W. R. GRACE
MATERIAL SAFETY DATA SHEET

Product Name: Monokote® Accelerator
MSDS ID Number: Z-01650 MSDS Date: 04/11/2006

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Monokote® Accelerator
MSDS Number: Z-01650
Cancelled MSDS Number: Z-01557
MSDS Date: 04/11/2006
Chemical Family Name: Aluminum Sulfate Hydrate
Product Use: Plaster Set-time Accelerator
Chemical Formula: $AL_2 (SO_4)_3$+18 H_2O approx.
CAS # (Chemical Abstracts Service Number): 10043-01-3

Manufactured by:

W.R.Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

Grace Canada, Inc.
294 Clements Road West
Ajax, Ontario L1S 3C6

In Case of Emergency Call:

In USA: (617) 876-1400 In Canada: (905) 683-8561

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS#	Percent (max)
Aluminum sulfate	010043-01-3	50-100

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Warning !
Causes eye burns.
Causes skin irritation.
May be harmful if ingested.
Causes digestive tract burns if ingested.

HMIS Rating:

Health: 2
Flammability: 0
Reactivity: 0
Personal Protective Equipment: E (See Section 8)

Potential Health Effects:

Inhalation: Causes respiratory tract irritation. If prolonged exposure to vapor or mist occurs, effects may be more severe resulting in coughing and breathing difficulties.
Effects include: Coughing, shortness of breath, difficulty breathing, chest tightness and sore throat.
Eye Contact: Eye contact causes severe chemical irritation and burns.
Prolonged eye contact can result in redness and itching.
Skin Contact: Skin contact causes irritation.
Prolonged skin contact may cause skin rash and can result in burns.
Skin Absorption: Not expected to be harmful if absorbed through the skin.
Ingestion: Harmful if ingested.
If ingested, causes burns to the linings of the mouth, esophagus and stomach.
Effects include: Nausea, vomiting and diarrhea.

SECTION 4 - FIRST AID MEASURES:

Skin Contact: Wash with soap and water.
If discomfort or irritation persists, consult a physician.
Remove contaminated clothing and wash before reuse.
Eye Contact: Flush eyes with water for at least 15 minutes while holding eyelids open.
Get immediate medical attention.
Ingestion: Do not induce vomiting.
Never give anything by mouth to an unconscious person.
If discomfort or irritation persists, consult a physician.

Inhalation: If symptoms develop, get fresh air. If symptoms persist, consult a physician. If breathing has stopped, give artificial respiration then oxygen if needed.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Not Applicable
Flash Point Method:	Not Applicable
Lower Explosion Limit:	Not Available
Upper Explosion Limit:	Not Available
Auto-Ignition Temperature:	Not Available

NFPA Rating:

Health:	0
Flammability:	0
Reactivity:	0

Extinguishing Media: Dry chemical, carbon dioxide, water spray, or chemical foam.
Special Fire Fighting Procedures: Wear self contained breathing apparatus and complete personal and protective equipment when potential exposure to vapor or products of combustion exist. Prevent run off from fire control or dilution from entering streams or drinking water supplies.
No special procedures specific to this product.
Unusual Fire and Explosion Hazards: None unless noted below.

SECTION 6 - ACCIDENTAL RELEASE MEASURES:

Spills/Leaks: Use proper personal protective equipment. Keep unnecessary people away.
If spilled, prevent material from entering water systems, observing the listed Precautionary Measures found in Section 7 of the MSDS.
Dry spills should be immediately swept up and placed in a suitable container to prevent further release of material. Slurry spills should be immediately contained (to minimize the extent of the spill) and absorbed with an inert, non-combustible material. Place material in a suitable container to prevent further release.

SECTION 7 - HANDLING AND STORAGE

Precautionary Measures: Avoid contact with eyes, skin and clothing.
Do not take internally.
Practice good personal hygiene to avoid ingestion.
Use only with adequate ventilation.
Keep bags closed when not in use.
Wash clothing before reuse.
Equip mixers with dust covers.
Provide respiratory protection if needed.
Wear skin and eye protection to avoid contact with dust or spray.
FOR PROFESSIONAL USE ONLY. KEEP OUT OF CHILDREN'S REACH.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT

EXPOSURE GUIDELINES (US)

Ingredient	ACGIH TLV			OSHA PEL			Other
	TWA	STEL	Ceiling	TWA	STEL	Ceiling	
Aluminum sulfate	-	-	-	-	-	-	-

In addition to the exposure limits referenced above, the following non-specific limits for dust apply to this product; OSHA, 15 mg/m3-TWA or Total Dust and 5 mg/m3-TWA as Respirable Dust, ACGIH, 10 mg/m3-TWA as Total Dust and 3 mg/m3-TWA as Respirable Dust.

EXPOSURE GUIDELINES (CANADA)

Employers should consult local Provincial regulatory limits for exposure guidelines which may vary locally.

Engineering Controls: Exhaust fans may be necessary when mixing in enclosed areas.

Personal Protective Equipment:

Respiratory Protection: Wear approved Dust/Mist respiratory (N-95) protection to prevent employee exposure from exceeding the limits specified in this section.

Skin Protection: Work gloves or hand creams are recommended to prevent drying of skin.
Eye Protection: At minimum, safety glasses with side shields should be worn. Where exposure to excessive dust or spray is likely, splash goggles should be worn.
Work/Hygienic Practices: Use good personal hygiene practices.
Use bag opening and disposal procedures which minimize dust release. Equip mixers with dust covers to minimize dust released during mixing cycle.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Appearance/Odor:	White odorless powder.
Odor Threshold: (ppm)	Not Applicable
pH:	1% solution-3.5
Vapor Pressure: (Mm Hg)	Not Applicable
Vapor Density: (Air = 1)	Not Applicable
Solubility In Water:	50% @ 0°C
Specific Gravity: (Water = 1)	1.61
Evaporation Rate: (Butyl Acetate = 1)	Not Applicable
Boiling Point:	>212°F/100°C
Viscosity:	Unknown
Bulk Density: (Pounds/Cubic Foot)(Pcf)	Not Applicable
% Volatiles (gr/L): (70°F) (21°C)	Not Applicable

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability:	Stable
Conditions To Avoid:	None known for this product.
Hazardous Polymerization:	Will not polymerize.
Hazardous Decomposition Products:	None known for this product.

SECTION 11 - TOXICOLOGICAL INFORMATION

Ingredient(No data unless listed.)	CAS Number	LD50 and LC50
Aluminum sulfate	010043-01-3	Oral LD50 Mouse : 6207 mg/kg

Carcinogenicity:

Ingredient	IARC Group 1	IARC Group 2A	IARC Group 2B	NTP Known	NTP Suspect	OSHA
Aluminum sulfate	No	No	No	No	No	No

Mutagenicity:	Not applicable.
Teratogenicity:	Not applicable.
Reproductive Toxicity:	Not applicable.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate:	No data available for product.
Ecotoxicity:	No data available for product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Procedures: Consult all regulations (federal, state, provincial, local) or a qualified waste disposal firm when characterizing waste for disposal. According to EPA (40 CFR § 261), waste of this product is not defined as hazardous. Dispose of waste in accordance with all applicable regulations. Wastes of this product such as empty bags and excess material are typically not defined as hazardous.

SECTION 14 - TRANSPORTATION INFORMATION

Proper Shipping Name:	Not Applicable
UN/NA Number:	Not Applicable
Domestic Hazard Class:	Nonhazardous
Surface Freight Classification:	Aluminum Sulfate, Solid
Label/Placard Required:	Not Applicable

SECTION 15 - REGULATORY INFORMATION

REGULATORY CHEMICAL LISTS:

CERCLA (Comprehensive Response Compensation and Liability Act):
(None present unless listed below)

Chemical Name	CAS #	Wt %	CERCLA RQ
Aluminum sulfate	010043-01-3	100	final RQ = 5000 pounds (2270 kg)

SARA Title III (Superfund Amendments and Reauthorization Act)

SARA Section 312/Tier I & II Hazard Categories:

Health Immediate (acute)	Yes
Health Delayed (chronic)	No
Flammable	No
Reactive	No
Pressure	No

302 Reportable Ingredients (Identification Threshold 1%.):

Chemical Name	CAS #	Wt %	SARA 302 TPQ

313 Reportable Ingredients (Chemicals present below reporting threshold are exempt):

Chemical Name	CAS #	Wt %

National Volatile Organic Compound Emission Standards For Architectural Coatings:

Volatile Organic Content: (gr/L) Not Applicable

WHMIS Classification(s): D2 B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR). This MSDS contains all the information required by the CPR.

State Regulatory Information:

California Proposition 65: This product does not contain substances known to the state of California to cause cancer, birth defects or other reproductive harm.

Massachusetts Hazardous Substance List(Identification threshold 0.001%(1ppm)):

Chemical Name	CAS #	Wt %

New Jersey Hazardous Substance List(Identification threshold (0.1%)):

Chemical Name	CAS #	Wt %

Pennsylvania Hazardous Substance List(Identification threshold 0.01%):

Chemical Name	CAS #	Wt %

CHEMICAL INVENTORY STATUS:

All chemicals in this product are listed or exempt from listing in the following countries:

US	CANADA		EUROPE	AUSTRALIA	JAPAN	KOREA	PHILIPPINES
TSCA	DSL	NDSL	EINECS/ELINCS	AICS	ENCS	ECL	PICCS
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

SECTION 16 - OTHER INFORMATION

Non-Hazardous Ingredient Disclosure:

Chemical Name	CAS Number

Prepared by: EH&S Department
Approved by: EH&S Department
Approved Date: 04/11/2006

Disclaimer:

"The data included herein are presented in accordance with various environment, health and safety regulations. It is the responsibility of a recipient of the data to remain currently informed on chemical hazard information, to design and update its own program and to comply with all national, federal, state and local laws and regulations applicable to safety, occupational health, right-to-know and environmental protection."

MATERIAL SAFETY DATA SHEET

(Essentially similar to OSHA form 174, Sept. 1985 - For Compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200)

Section I - Product Identity: Firebond® Concentrate(7460)/Adhesive(7450)

Manufacturer's Name:
Fiberlock Technologies, Inc.
150 Dascomb Road
Andover, MA 01810

Date of Preparation: April 29, 2003
Information Telephone Number: (978) 623-9987
Emergency Telephone Numbers:
Weekdays: (978) 623-9987
After hours, weekends & holidays: (978) 887-5926, or
"CHEM-TEL" Emergency Contact Number: (800) 255-3924

Section II - Hazardous Ingredients/Identity Information

HAZARDOUS COMPONENT	COMMON NAME(S)	%	CAS. NO.	OSHA PEL	OR	ACGIH TLV

None per the limits for reporting set forth in 29CFR 1910.1200

Section III - Physical/Chemical Characteristics [See reference note(s) No. 1, 2 on Reverse]

Boiling Points of Major Constituent: (Water)	212°F	Specific Gravity (H_2O=1) Wgt./gal.	8.8
Vapor Pressure (mm Hg) @ 68°F	17	Melting Point Water (Ice)	32°F
Vapor Density (AIR=1) Heavier Lighter	 X 	Evaporation Rate (Butyl Acetate=1)	Slower
Solubility in Water	Total	Appearance: liquid Odor: slight odor	Maximum VOC's 100 g/l (0.9 lbs/gal)

Section IV - Fire and Explosion Hazard Data (Nonflammable)

Flash Point: Noncombustible	Flammable Limits: LEL: N/A UEL:N/A	DOT Hazard Class: Not Regulated	Marking: "Keep From Freezing"

Section V - Reactivity Data

Hazardous Polymerization: Will not occur.
Stability: Stable
Incompatibility: Avoid Contact with: Strong oxidizing agents (e.g., nitric acid, permanganates), etc.
Hazardous Decomposition Products: Some carbon monoxide.

Section VI - Health Hazard Data, Toxicity Data

Route(s) of Entry: N/A
Carcinogenicity?: No
Health Hazards (Acute and Chronic): N/A

EFFECTS OF OVEREXPOSURE: Inhalation: Vapors or spray mists may be slightly irritating to eye, nose, throat, and mucous membranes of respiratory tract producing symptoms of headache, nausea in poorly ventilated areas. Skin Contact: Prolonged or repeated contact with coating may cause slight skin irritation. Eye Contact: Direct contact; inconsequential eye irritation.

EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Eye and Skin Contact: Immediately flush eyes with plenty of water for at least 15 minutes and consult physician; wash skin thoroughly with soap and water. If drenched, remove and wash clothing before reuse. Ingestion: If swallowed, call a physician immediately. If victim is conscious, give 2 glasses of water. Never give anything to an unconscious person. Treat symptomatically.

TOXICITY INFORMATION: The effects of overexposure shown in Section VI are based on acute toxicity profiles for a number of special emulsions that are compositionally similar to this product. Typical values are: Rat, oral LD 50:>5.0 g/kg; Rabbit, dermal LD 50:>5.0 g/kg; Rabbit, skin irritation: practically non irritating –72 hour Mean Irritation Score = 0 to 2: Rabbit, eye irritation: inconsequentially irritating.

SUPPLEMENTAL INFORMATION

To comply with New Jersey DOH Right-To-Know labeling law
(N.J.A.C. 8:59 - 5.1 & 5.2)

CAS. No.:	CHEMICAL INGREDIENTS:
7732-18-5	Water
Not Avail.*	Proprietary defoamer
Not Avail.*	Acrylic resin solids

*Contents partially unknown

HMIS HAZARD RATING			
Health 1	Flammability 0	Physical Hazard 0	Personal Protection A
HAZARD INDEX: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe			
PERSONAL PROTECTION CODE			
A=Safety Glasses			

Section VII: Precautions for Safe Handling and Use

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Keep unnecessary people away. Floor may be slippery; use care to avoid falling. Dike and contain material with inert material (e.g. sand, earth). Transfer liquid to containers for recovery or disposal and solid diking material to separate containers for disposal. Keep spills and runoffs out of municipal sewers and open bodies of water.
WASTE DISPOSAL METHOD: The coating and any contaminated diking material should be thoroughly air dried and collected into drums. The drums should then be sealed and properly labeled with waste designation and disposed of in a landfill or incinerated according to current local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Maximum storage temperature 100°F. Keep closure tight and container upright to prevent leakage. Precautionary Labeling: "Keep from Freezing".
OTHER PRECAUTIONS: Do not get in eyes. Avoid skin contact. Prevent prolonged or repeated breathing of vapors or spray mists. Do not handle until the manufacturer's safety precautions and label instructions have been read and understood. Avoid breathing sanding dust.

Section VIII: Control Measures

RESPIRATORY PROTECTION: None required if good ventilation is maintained. Wear respirator (MSHA/NIOSH-approved or equivalent) suitable for concentrations and types of air contaminants encountered. Use approved chemical/mechanical filters designed to remove particulates in open and restricted ventilation areas. Use MSHA/NIOSH-approved airline type respirators or hood in confined areas.
VENTILATION: Sufficient ventilation, in pattern and volume, should be provided to keep the air contaminant concentration below applicable exposure limits. All application areas should be ventilated in accordance with OSHA regulation 29CFR Part 1910.94.
PROTECTIVE GLOVES: Impervious gloves should be worn if prolonged skin contact is likely. Use neoprene or rubber gloves to prevent prolonged skin contact.
EYE PROTECTION: Use safety eyewear including side shields, face shields, or chemical splash goggles (ANSIZ-87.1 or approved equivalent).
OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Use protective cream if prolonged skin contact is likely.
HYGIENIC PRACTICES: Wash hands before eating, smoking, or using the washroom. Food or beverages should not be consumed anywhere this product is being applied.

References:

1. Sax, N.I., "Dangerous Properties of Industrial Materials", 8th ed., Van Nostrand Reinhold Company, Inc., NY, 1992.
2. American Conference of Governmental Industrial Hygienists, "TLV's and Biological Exposure Indices" for the current year (published annually).
3. U.S. Code of Federal Regulations (CFR) U.S. Dept. of Labor, No. 29, Parts 1900 to 1910.1200. OSHA Communications Standard 29 CFR 1910.1200.
4. Sax, N.I., R.J. "Hazardous Chemicals Desk Reference", Van Nostrand Reinhold Co., Inc., NY, 1987.
5. Fire Protection Guide to Hazardous Materials, 12th edition, National Fire Protection Association, Quincy, MA, 1997.
6. Title III List of Lists, U.S. Environmental Protection Agency publication EPA 560/4-90-011, January 1990.

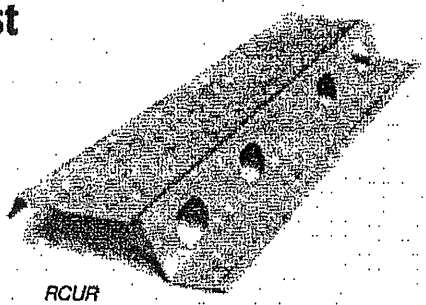
One of the most efficient low-cost methods of reducing sound transmission in wood or steel-framed partition or ceiling assemblies.

- *Lab-Certified STC-rated up to 54.*
- *Single and double leg channels.*
- *Knurled face to prevent screw ride.*
- *RC Deluxe™ (RCSD) has extra-wide screw surface for easy attachment.*
- *Available in 12' lengths.*

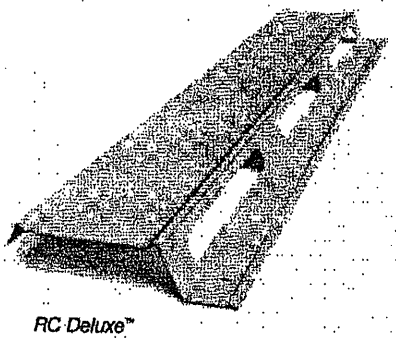
Dietrich™ resilient channel is one of the most efficient low-cost methods developed to reduce transmission of airborne sound through partition and ceiling assemblies. The resilient channel dampens sound waves effectively, dissipating the energy and reducing sound transmission by suspending gypsum wallboard 1/2" from the stud or joist. Sound absorption can be maximized by utilizing sound attenuation blankets within the wall or floor cavity.

Resilient channel is manufactured from 25- and 20-gauge corrosion-resistant galvanized steel and is available with single or double legs. The single leg resilient channel is available in regular (RCUR) and deluxe (RCSD/RCSE) sizes. Dietrich™ high-performance single leg resilient channel (RCUR) has a 1-1/4" screw flange. The RCUR is commonly used in wall applications. Dietrich™ RC Deluxe™ resilient channel (RCSD/RCSE) is the preferred resilient channel in many applications because of its extra-wide 1-1/2" screw flange. The extra-wide flange provides added rigidity and a wider surface for faster and easier installation of sheathing materials.

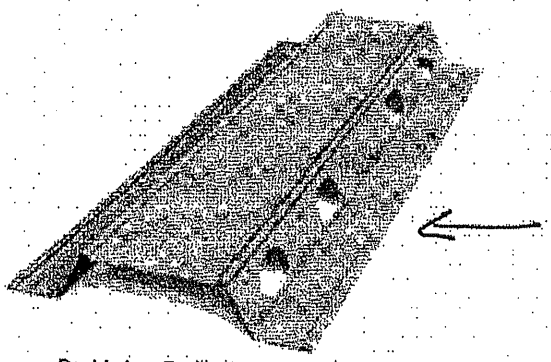
Dietrich™ double leg resilient channel (RCDN/RCDE) has two legs for rapid installation. Double leg resilient installation is typically used for ceiling applications with multiple layers of gypsum board. Double leg resilient is easier to install, but offers a lower STC rating.



RCUR



RC Deluxe™



Double Leg Resilient

20gA

Resilient Channel (RC-Series™), Walls and Ceilings

DMF Product Code	Thickness				Size		Length		Weight/ft.		Packaging	
	Gauge	Mils	Design Thickness		Inches	(mm)	ft.	(m)	lbs.	(kg)	Pcs./ Bundle	Pcs./ Skid
			Inches	(mm)								
RCUR	25	18	0.0188	0.48	1-1/4	31.8	12	3.66	0.160	0.072	20	1000
RCSD	25	18	0.0188	0.48	1-1/2	38.1	12	3.66	0.220	0.100	20	1000
RCSE	20	30	0.0312	0.79	1-1/2	38.1	12	3.66	0.310	0.140	20	1000
RCDN	25	18	0.0188	0.48	1-1/4	31.8	12	3.66	0.210	0.095	20	1000
RCDE	20	30	0.0312	0.79	1-1/4	31.8	12	3.66	0.400	0.181	20	1000

DIETRICH METAL FRAMING
A Worthington Industries Company

Product Specification

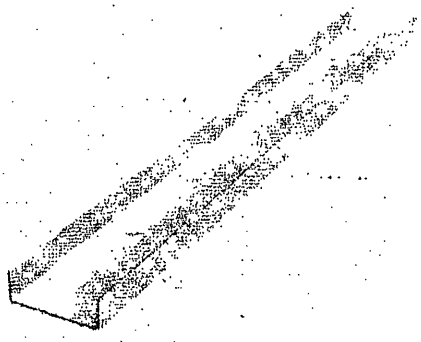
DIETRICH METAL FRAMING
A Worthington Industries Company

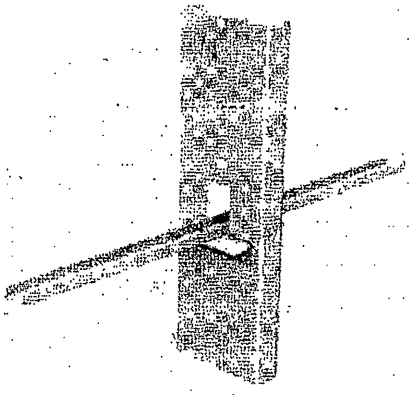
ACCESSORIES

Product Code:	CHN2
Gauge:	16
Width (Inches):	1.5000

U-CHANNEL 1-1/2"FL.

SSMA Code:	150U050-54
Weight (lbs/ft):	.42





Compliance:

Code
A1003
ER-4782
See appendix A for more detail

Dietrich Metal Framing
Corporate Headquarters
200 Old Wilson Bridge Road
Columbus, OH 43085
Phone: (800)873-2604

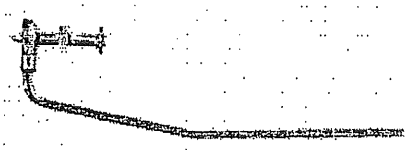
Dietrich Design Group (North)
1414 Field St. Building C, Suite 1
Hammond, IN 46320
Phone: (800)873-2443 or (219)853-8474
Fax: (219)932-4141

Dietrich Design Group (West)
2262 Rutherford Rd., Suite 104
Carlsbad, CA 92008
Phone: (800)873-2443 or (760)931-0465
Fax: (760)931-9824

Dietrich Design Group (South)
330 Greenwood Place
McDonough, GA 30253
Phone: (800)873-2443 or (678)304-5525
Fax: (678)304-5556

Hilti USA:
(866) 445-8827

X-CW U27 4': Item No.: 00388447



Package quantity	100
Number of packages	1

Technical Data

For Use With	CT, DX 35
Base Materials	Concrete, Concrete (light) over metal deck
Point type	Ballistic
Premounted nail type	X-U27
Collated	No
Washer type	P8
Material Coating/Plating/Finish	Galvanized 5-13µm
Corrosion Protection	Galvanized Zinc coated 5-13µm
Diameter	4 mm
Shank length	1.06 in
Shank diameter	0.16 in

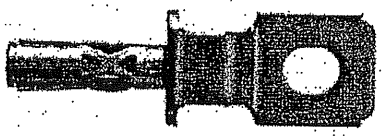
Related Products

Go back to previous page

Hilti. Outperform. Outlast.

Hilti USA:
(866) 445-8827

HLC-T Sleeve anchor



For various suspension applications.

Related Products

Learn how to see prices

Package quantity	Item No.	Price / Package	Package quantity	Number of packages
HLC T 1/4X1-3/8 MC (600/MC)				
1	00338087	QUOTE ONLY	1	0
HLC T 1/4 X 1-3/8 (50/BOX)				
50	00336241	QUOTE ONLY	50	0

Related Products

UH 240-A 24 V Universal Hammer Drill
TE 6-S Rotary Hammer Drill
TE 6-A 36 V Rotary Hammer Drill
Go to top of page
Go back to previous page

Hilti. Outperform. Outlast.

DIETRICH METAL FRAMING

Product Specification

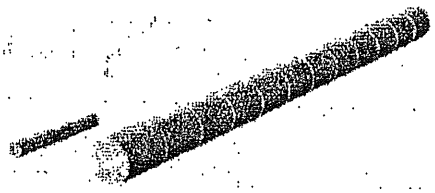
DIETRICH METAL FRAMING

ACCESSORIES

Product Code:	HW12
Gauge:	12
Width (inches):	.12500

HANGER WIRE 50# BDL.

SSMA Code:	N/A
Weight (each):	50



Compliance:

Code
C1063
A641
See appendix A for more detail

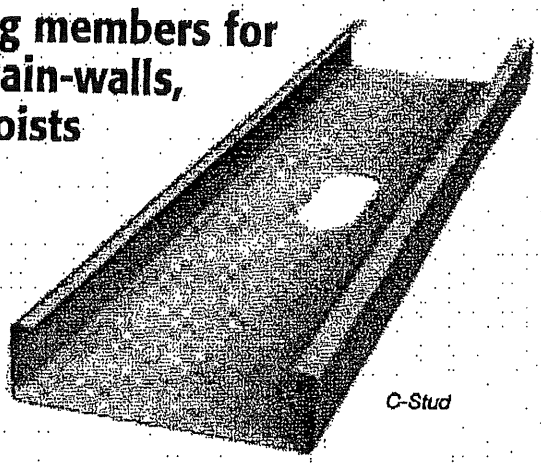
Dietrich Metal Framing
Corporate Headquarters
200 Old Wilson Bridge Road
Columbus, OH 43085
Phone: (800)873-2604

Dietrich Design Group (North)
1414 Field St. Building C, Suite 1
Hammond, IN 46320
Phone: (800)873-2443 or (219)853-8474
Fax: (219)932-4141

Dietrich Design Group (West)
2262 Rutherford Rd., Suite 104
Carlsbad, CA 92008
Phone: (800)873-2443 or (760)931-0465
Fax: (760)931-9824

Dietrich Design Group (South)
330 Greenwood Place
McDonough, GA 30253
Phone: (800)873-2443 or (678)304-5525
Fax: (678)304-5556

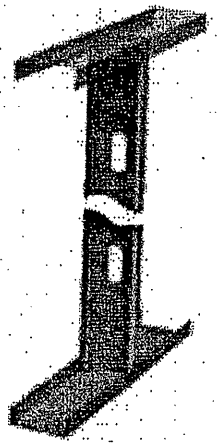
Light-gauge C-shaped framing members for axial load-bearing walls, curtain-walls, tall interior partitions, floor joists and roof truss assemblies.



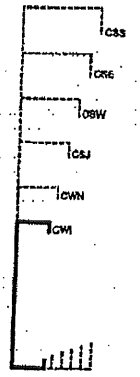
C-Stud

- *Size (Web): 2-1/2", 3-1/2", 3-5/8", 4", 5-1/2", 6", 8", 10", 12", 14".*
- *Flange Sizes: 1-1/4", 1-3/8", 1-5/8", 2", 2-1/2", 3".*
- *Gauges: 20 (33 mils), 18 (43 mils), 16 (54 mils), 14 (68 mils) and 12 (97 mils).*
- *33 and 50 KSI yield strengths. 33 KSI is standard. 50 KSI must be specified at time of order.*
- *G-60 Galvanized coating or equivalent.*
- *Custom sizes, lengths and coatings available.*

Dietrich™ C Studs are light-weight, cold-formed galvanized steel members used in axial load-bearing walls, curtain-walls, floor joists and roof truss framing. C-Studs are available in a wide array of sizes, flanges, gauges and yield strengths to obtain optimal performance at minimal costs.



One of the key differences between the various C-Stud/Joist framing members is the flange and return dimensions. The flange is typically the bearing surface for cladding materials and a key contributor to the load-bearing capacity of the member. Flange sizes include 1-1/4", 1-3/8", 1-5/8", 2", 2-1/2" and 3".



Dietrich™ CWI™ light-duty curtain-wall studs have a 1-1/4" flange and 1/4" return and are used to support the exterior skin in ultra-light applications. CWI studs are available only in the Pacific Northwest.

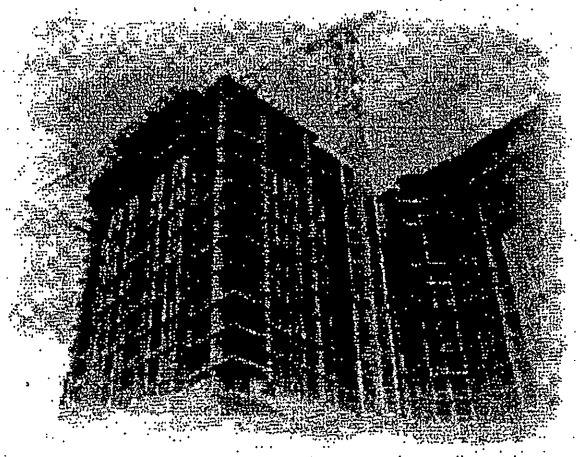
Dietrich™ CWN™ curtain-wall studs have a 1-3/8" flange and 1/2" return and are used to support the exterior skin or cladding material (metal, stone, tile, glass, etc.) and the wind loads to which they are subjected.

Dietrich™ CSJ™ studs/joist have a 1-5/8" flange and a 1/2" return and are considered the industry standard. CSJ members are the most widely used and specified framing members. They provide the vertical strength necessary for demanding load-bearing structural applications and sufficient strength for many joist applications.

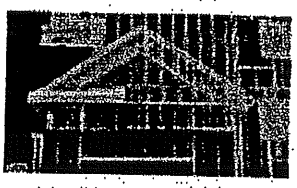
Dietrich™ CSW™ wide studs/joist have a 2" wide flange and a 5/8" return that provides a larger bearing surface for attaching sub-flooring or sheathing materials. This framing member is also used in axial load-bearing wall assemblies.

Dietrich™ CSE™ extra-wide studs/joist have a 2-1/2" wide flange and a 5/8" return and are used in floor joist assemblies and heavy loading conditions.

Dietrich™ CSS™ super-wide studs/joist have a 3" flange and a 1" return and are used in very heavy loading and long spanning conditions.



NOTE: This catalog does not provide load data (load capacities, limiting heights, physical and structural properties and span data) necessary for building design. Consult the Dietrich™ Technical Design Guide. Additional assistance is available at www.dietrichmetalframing.com or by calling Dietrich Design Group at 1-800-873-2443.



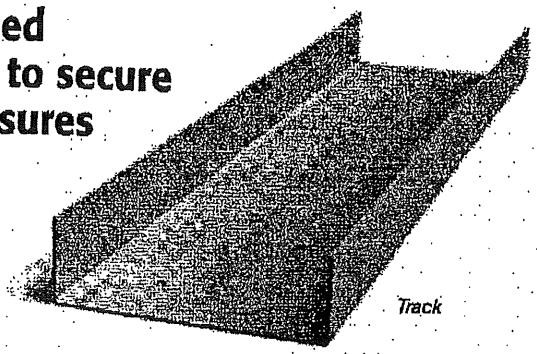
C-Studs

DMF Product Code*	SSMA Reference	Thickness Gauge (mils)	Depth Inches	Depth (mm)	Flange Inches	Flange (mm)	Return Inches	Return (mm)
CWI (3)	250S125-x	20 (33), 18 (43), 16 (54), 14 (68)	2-1/2	63.5	1-1/4	31.8	1/4	6.4
	362S125-x		3-5/8	92.1	1-1/4	31.8	1/4	6.4
	600S125-x		6	152.4	1-1/4	31.8	1/4	6.4
	800S125-x		8	203.2	1-1/4	31.8	1/4	6.4
CWN (3)	250S137-x	20 (33), 18 (43), 16 (54), 14 (68)	2-1/2	63.5	1-3/8	34.9	3/8	9.5
	362S137-x		3-5/8	92.1	1-3/8	34.9	3/8	9.5
	400S137-x		4	101.6	1-3/8	34.9	3/8	9.5
	600S137-x		6	152.4	1-3/8	34.9	3/8	9.5
	800S137-x		8	203.2	1-3/8	34.9	3/8	9.5
CSJ (3, 5)	250S162-x	20 (33), 18 (43), 16 (54), 14(68), 12 (97)	2-1/2	63.5	1-5/8	41.3	1/2	12.7
	350S162-x		3-1/2	88.9	1-5/8	41.3	1/2	12.7
	362S162-x		3-5/8	92.1	1-5/8	41.3	1/2	12.7
	400S162-x		4	101.6	1-5/8	41.3	1/2	12.7
	550S162-x		5-1/2	149.7	1-5/8	41.3	1/2	12.7
	600S162-x		6	152.4	1-5/8	41.3	1/2	12.7
	800S162-x		8	203.2	1-5/8	41.3	1/2	12.7
	1000S162-x		10	254.0	1-5/8	41.3	1/2	12.7
	1200S162-x		12	304.8	1-5/8	41.3	1/2	12.7
	1400S162-x		14	355.6	1-5/8	41.3	1/2	12.7
CSW (3, 5)	362S200-x	20 (33), 18 (43), 16 (54), 14(68), 12 (97)	3-5/8	92.1	2	50.8	5/8	15.9
	400S200-x		4	101.6	2	50.8	5/8	15.9
	600S200-x		6	152.4	2	50.8	5/8	15.9
	800S200-x		8	203.2	2	50.8	5/8	15.9
	1000S200-x		10	254.0	2	50.8	5/8	15.9
	1200S200-x		12	304.8	2	50.8	5/8	15.9
	1400S200-x		14	355.6	2	50.8	5/8	15.9
CSE (3, 5)	362S250-x	20 (33), 18 (43), 16 (54), 14(68), 12 (97)	3-5/8	92.1	2-1/2	63.5	5/8	15.9
	400S250-x		4	101.6	2-1/2	63.5	5/8	15.9
	600S250-x		6	152.4	2-1/2	63.5	5/8	15.9
	800S250-x		8	203.2	2-1/2	63.5	5/8	15.9
	1000S250-x		10	254.0	2-1/2	63.5	5/8	15.9
	1200S250-x		12	304.8	2-1/2	63.5	5/8	15.9
	1400S250-x		14	355.6	2-1/2	63.5	5/8	15.9
CSS (3, 5)	600S300-x	18 (43), 16 (54), 14(68), 12 (97)	6	152.4	3	76.2	1	25.4
	800S300-x		8	203.2	3	76.2	1	25.4
	1000S300-x		10	254.0	3	76.2	1	25.4
	1200S300-x		12	304.8	3	76.2	1	25.4
	1400S300-x		14	355.6	3	76.2	1	25.4

*3 or 5 indicates ksi. 33 ksi is standard. 50 ksi must be specified at time of order.
*CWI (3) available in limited geographical areas
X= mil thickness identifier

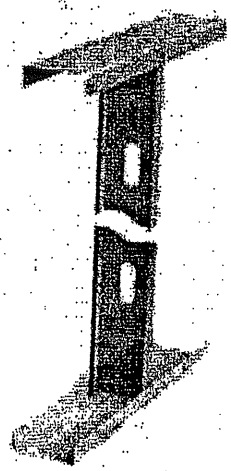
For more information or to contact a sales representative, see page 3.

U-shaped channel runners used as the top and bottom tracks to secure wall studs or end support closures for floor joist framing.


Track

- *Sizes (Web): 2-1/2", 3-1/2", 3-5/8", 4", 5-1/2", 6", 8", 10", 12", 14".*
- *Leg heights: 1", 1-1/4", 1-1/2", 2" and 3" legs.*
- *Gauges: 20 (33 mils), 18 (43 mils), 16 (54 mils), 14 (68 mils) and 12 (97 mils).*
- *33 KSI yield strength. 50 KSI available on request.*
- *G-60 Galvanized coating or equivalent.*
- *Standard 10' lengths.*
- *Custom sizes, lengths and coatings available.*

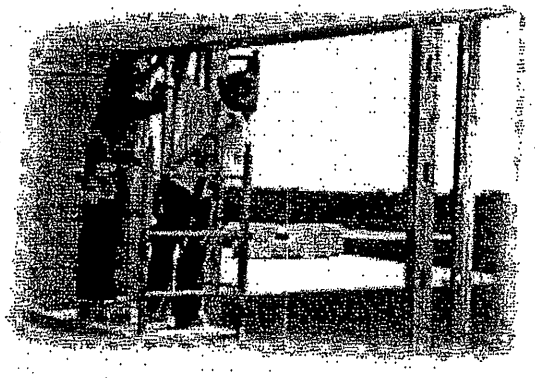
Dietrich™ structural track is a U-shaped framing component used as top and bottom runners to secure wall studs. Dietrich™ structural track is produced to ASTM C955 standards. Structural track is also used as end support closures for joists at exterior or foundation walls, head and sill plates of wall openings and solid blocking. Track is normally ordered in corresponding size and gauge to the wall studs. Longer leg track is used for deflection conditions or to accommodate uneven or inconsistent floor or ceiling conditions. Slip track for track-over-track assemblies is also available.



Track

DMF Product Code	SSMA Reference	Thickness Gauge (mils)	Leg Height inches	Leg Height (mm)
TSA	x-T100-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	1	25.4
TSB	x-T125-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	1-1/4	31.8
TSF	x-T150-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	1-1/2	38.1
TSC	x-T200-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	2	50.8
TSE	x-T300-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	3	76.2
OTSF	z-T150-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	1-1/2	38.1
OTSC	z-T200-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	2	50.8
OTSE	z-T300-y	20 (33), 18 (43), 16 (54), 14 (68), 12 (97)	3	76.2

x = Part depth. Tracks are available to match all stud and joist depths.
y = mil thickness of steel.
z = Part depth. Overtracks are available in all standard stud depths. The track width is sized to fit over a standard TS series track.



For more information or to contact a sales representative, see page 3.

DIETRICH METAL FRAMING
A Worthington Industries Company

Georgia-Pacific

DensArmor Plus®

High-Performance Interior Panel

Technical Service Hotline 1.800.225.6119 or
www.gpgypsum.com

Sizes and Edges

DensArmor Plus® Thickness: 1/2" (12.7 mm); Width: 4' (1219 mm); Lengths: 8'-12' (2438 mm-3658 mm); Edges: Tapered

DensArmor Plus® Fireguard C™ Thickness: 1/2" (12.7 mm); Width: 4' (1219 mm); Lengths: 8'-12' (2438 mm-3658 mm); Edges: Tapered

DensArmor Plus® Fireguard® Thickness: 5/8" (15.9 mm); Width: 4' (1219 mm); Lengths: 8'-12' (2438 mm-3658 mm); Edges: Tapered

Installation

DensArmor Plus High-Performance Interior Panels should be installed according to the most current versions of Gypsum Association Publication GA-216 "Application and Finishing of Gypsum Board for Non-Fire-Rated Construction."

For fire-rated installations, the installation and details shall be in conformity with those assemblies published in the Gypsum Association Fire Resistance Design Manual GA-600, UL and ULC Fire Resistance Directories.

↓ C-CORE

Physical Properties

Properties	½" DensArmor Plus®	½" DensArmor Plus® Fireguard C™	⅝" DensArmor Plus® Fireguard® and Fireguard C™
Thickness, nominal	1/2" (12.7 mm) ± 1/64" (0.4 mm)	1/2" (12.7 mm) ± 1/64" (0.4 mm)	5/8" (15.9 mm) ± 1/64" (0.4 mm)
Width, standard	4' (1219 mm) ± 3/32" (2.4 mm)	4' (1219 mm) ± 3/32" (2.4 mm)	4' (1219 mm) ± 3/32" (2.4 mm)
Length, standard	8' (2438 mm) to 12' (3658 mm) ± 1/4" (6.4 mm)	8' (2438 mm) to 12' (3658 mm) ± 1/4" (6.4 mm)	8' (2438 mm) to 12' (3658 mm) ± 1/4" (6.4 mm)
Weight[1], lbs./sq. ft., nominal (kg/m²)	2.02 (9.9)	2.2 (10)	2.5 (12.2)
Edges	Tapered	Tapered	Tapered
Surfacing	Coated fiberglass mat on face, back	Coated fiberglass mat on face, back	Coated fiberglass mat on face, back
Flexural strength, parallel, lbf. (N)	>80 (356)	>80 (356)	>100 (444)
Flexural strength, perpendicular, lbf. (N)	>100 (444)	>100 (444)	>140 (622)
R Value[2] °F•ft²•hr/BTU (K•m²/W)	.56 (0.099)	.56 (0.099)	.67 (0.118)
Nail pull resistance minimum, lbf. (N)	80 (356)	80 (356)	90 (400)
Hardness core, edges and ends, lbf. (N)	>15 (67)	>15 (67)	>15 (67)
Water absorption (% of weight)	<5%	<5%	<5%
Surface burning characteristics (per ASTM E 84 or CAN/ULC-S102): flame spread/smoke developed	0/0	0/0	0/0
Humidified deflection	2/8" (6.4 mm)	2/8" (6.4 mm)	1/8" (3 mm)
Bending Radius[3]	6' (1829 mm)	6' (1829 mm)	8' (2438 mm)

[1] *Represents approximate weight for design and shipping purposes.*
[2] *Tested in accordance with ASTM C 518.*
[3] *Double fasteners on ends as needed.*
NOTE: Specified minimum value are as in ASTM C 1658 and applicable standards of ASTM C 1177, ASTM C 1396 Section 7.

Georgia-Pacific Gypsum

U.S.A.– Georgia-Pacific Gypsum LLC
Canada – Georgia-Pacific Canada LP

SALES INFORMATION AND ORDER PLACEMENT
U.S.A. Midwest: **1-800-876-4746** West: **1-800-824-7503**
South: **1-800-327-2344** Northeast: **1-800-947-4497**
CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL INFORMATION
U.S.A. and Canada: **1-800-225-6119**
www.gpgypsum.com

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UPDATES AND CURRENT INFORMATION The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

CAUTION For product fire, safety and use information, go to www.gp.com/safetyinfo or call 1-800-225-6119.

HANDLING AND USE–CAUTION This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

FIRE SAFETY CAUTION Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

OC1600-2 (2.3.D)

POSI-GRIP®, POSI-SET®, POSI-FIT®

* POSI-GRIP®, POSI-SET®, POSI-FIT® are registered trade names of Star Sales & Distributing Corp. *

Posi-Grip® Screws:

These screws are internationally recognized as a premier quality fastener and are manufactured under strict guidelines in an ISO 9002 approved factory. Our sharp point screws meet and exceed ASTM C-1002-93 Standards and our self-drilling screws meet and exceed ASTM C-954-86 Standards.

Markets:

Professional Drywall, General Construction, HVAC & Electrical

Application:

For efficiently and cost effectively attaching a wide variety of steel, steel stud, metal & wood decking, standard lumber, cement board & Exterior Insulation Finish Systems (EIFS).

Product:

Posi-Grip® Screws: 250 different combinations of size and finish, including: all purpose, hi-thread, deck screws, acoustical lags, trim screws, ceramic coated, stainless steel, concrete screws, and many varieties of specialty self-drilling screws.

Solution:

Posi-Grip® products provide the end user with: faster work speed, improved cost efficiency and high-level performance and quality.

Posi-Set® Screws:

These standard grade drywall, concrete & tek screws provide our customers with a consistent quality product at a competitive price that they need to complete in today's marketplace.

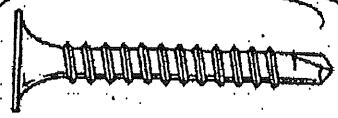
Posi-Fit® Nails:

These superior quality common nails & collated nails provide our customers with a wide variety of framing, roofing, finishing & stapling options that fit most brand name pneumatic tools.

061600-2
(2.3.D)

DRYWALL SELF DRILLING SCREWS

Bugle Head Self-Drill



Used for fastening drywall to 14-20 gauge metal studs.
- Posi-Grip drill point provides easier cutting and faster penetration.
- Available in Black Phosphate or Zinc plated.

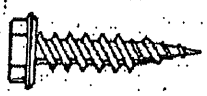
Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1	SD100	10 M	33 lbs
6 x 1 1/8	SD118	10 M	34 lbs
6 x 1 1/4	SD114	8 M	30 lbs
6 x 1 5/8	SD158	6 M	23 lbs
6 x 1 7/8	SD178	4 M	27 lbs
8 x 2 3/8	SD238	3 M	24 lbs
8 x 2 5/8	SD258	2.5 M	24 lbs
8 x 3	SD300	2 M	25 lbs
10 x 3 1/2	SD312	1 M	16.1 lbs
10 x 4	SD400	.5 M	10.3 lbs

Trim Head Self-Drill

Used for attaching wood trim or base to 14-20 gauge metal studs. Zinc coating.
- Square drive.

Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1	TSD100Z	10 M	30 lbs
6 x 1 5/8	TSD158Z	5 M	22 lbs
7 x 2 1/4	TSD7214Z	3 M	19 lbs

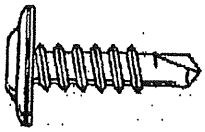
Self-Piercing (Slotted) Hex Washer Head Needle Point



Used in light metal assembly such as electrical outlets, framing, and various other sheet metal applications. Slotted head. Zinc Plated.
- Extra sharp point for faster penetration.
- Twin lead thread makes for easier installation.

Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1/2	HSS6012	15 M	45 lbs
6 x 3/4	HSS6034	10 M	43 lbs
8 x 1	HSS8100	7.5 M	37 lbs
8 x 1 1/4	HSS8114	6 M	36 lbs
8 x 1 1/2	HSS8112	5 M	37 lbs
8 x 2	HSS8200	3 M	30 lbs
10 x 1/2	HSS10012	14 M	50 lbs
10 x 3/4	HSS10034	7.5 M	35 lbs
10 x 1	HSS10100	5 M	34 lbs
10 x 1 1/2	HSS10112	3 M	35 lbs
10 x 2	HSS10200	2 M	35 lbs

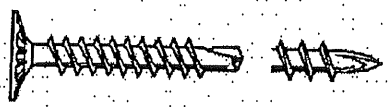
Wafer Lath Self-Drill



For attaching metal lath to heavy gauge (14-20) metal studs.
- Zinc plated, Phil drive.

Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1/2	WD012Z	10 M	41 lbs
6 x 3/4	WD034Z	8 M	44 lbs
6 x 1	WD100Z	5 M	29 lbs
6 x 1/4	WD114Z	6 M	34 lbs
6 x 5/8	WD158Z	4 M	34 lbs

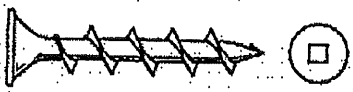
Cement Board Self-Drill Screws



For attaching cement board to 14-20 gauge metal studs. Special exterior coating provides over 500 salt spray hours.
- Self-Drill.
- Type "S" point.

Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1 1/4	DR114	5 M	34 lbs
6 x 1 5/8	DR158	4 M	35 lbs
8 x 2 1/4	DR214	2 M	22 lbs
8 x 1 1/4	SR114	5 M	34 lbs
8 x 1 5/8	SR158	4 M	35 lbs

Wood Screws/Flat Square Head/ Coarse Thread



For cabinet installation and other hard wood to wood applications. Square drive creates more positive driving. Type 17 point. Nibbs under head.
- Phillips and square drive.
- Black or Zinc finish.

Size	Part No.	Qty./Box	Approx. Wt./Box
6 x 1	CS6100	10 M	38 lbs
8 x 1/2	CS8112	8 M	32 lbs
8 x 1 3/4	CS8134	4 M	26 lbs
8 x 2	CS8200	3.5 M	25 lbs
8 x 2 1/4	CS8214	3 M	21 lbs
8 x 2 1/2	CS8212	2.5 M	23 lbs
8 x 3	CS8300	2 M	24 lbs

SHEETROCK

Fiberglass Drywall Tape

061600-3 (2.4.B)

que cross-fiber construction provides greater wall joint strength and crack resistance

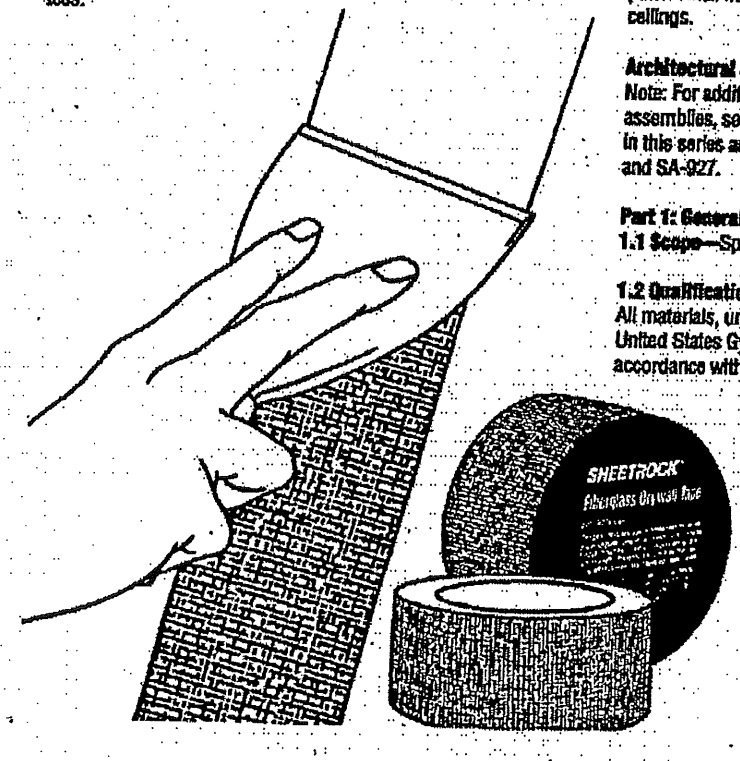
elf-adhesive tape goes on quickly—eliminates bedding oat and provides smooth finished joints in only two oats.

se SHEETROCK Setting-Type (DURABOND) or Lightweight etting-Type (EASY SAND) Joint Compound for first coat ver tape.

rovides 2-coat, 1-day joint finishing.

cription

ETROCK Fiberglass Drywall Tape is made with a unique cross-rglass construction to provide greater drywall joint strength conventional fiberglass leno-weave mesh tapes. SHEETROCK rglass Drywall Tape resists shrinking, tearing, stretching and ortion. It also resists joint cracking that can occur when entional fiberglass leno-weave mesh tape is used. In orcing joints and corners in drywall interiors, setting-type joint pounds (not ready-mixed or powder drying-type joint pounds) are recommended for use in the first coat over ETROCK Fiberglass Drywall Tape. For the second coat, setting- or drying-type (ready-mixed or powder) joint compounds may sed in joint finishing. SHEETROCK Fiberglass Drywall Tape is mmended for use with either setting-type or drying-type joint pounds to repair small cracks and holes in drywall and plaster aces.



Advantages

Unique construction. Conventional fiberglass leno-weave mesh tapes can allow the glass fibers to stretch out slightly when the joint is deflected. When stretching occurs, joints can crack. For th reason, conventional fiberglass tape is recommended only for use with special high-strength setting-type powder compounds (SHEETROCK Setting-Type Joint Compound (DURABOND LC)). In contrast, SHEETROCK Fiberglass Drywall Tape's unique cross-fiber construction resists stretching to prevent cracking in drywall join The unique construction of SHEETROCK Fiberglass Drywall Tape provides greater joint strength than conventional fiberglass tapes therefore, it is recommended for finishing drywall joints with regular setting-type compounds (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound for the first coat and either setting-type or drying-typ (powder or ready-mixed) joint compounds for the second coat.

Fewer coats of joint compound. Since SHEETROCK Fiberglass Drywall Tape is self-adhesive, the embedding or taping coat of joi compound necessary with conventional paper tape/drywall joint systems is eliminated. Joint finishing is simpler and quicker. By using SHEETROCK Setting-Type (DURABOND) or Lightweight Settin Type (EASY SAND) Joint Compound, joint finishing can be completed in one day.

Ideal for patching. Use SHEETROCK Fiberglass Drywall Tape to patch small holes and cracks in drywall and plaster walls and ceilings.

Architectural Specifications

Note: For additional information on related products and assemblies, see other United States Gypsum Company data shee in this series and Architectural Technical Folders SA-923, SA-924 and SA-927.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured b United States Gypsum Company and shall be installed in accordance with its current printed directions.

USG

061600-3 (2.4.B)

SHEETROCK®

Fiberglass Drywall Tape

1.3 Delivery and Storage of Materials
All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions
In cold weather during gypsum panel application and joint finishing, temperatures within the building shall be maintained at a minimum of 55°F (13°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products
2.1 Materials
a. Gypsum Panels: (thickness) (width) (length) (type).
b. Screws: (length) (type).
c. Nails: (length) (type) (conforming to Gypsum Association and AWCI specifications) (as specified in fire-resistive construction) (obtain locally).
d. Joint Reinforcement: SHEETROCK Fiberglass Drywall Tape.
e. Joint Treatment: First coat of joint compound: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound). Second coat of joint compound: (SHEETROCK Lightweight All Purpose Joint Compound (PLUS 3)—Ready-Mixed) (SHEETROCK All Purpose or Topping Joint Compound—Ready-Mixed) (SHEETROCK Lightweight All Purpose Joint Compound (AP LITE)—Powder) (SHEETROCK All Purpose or Topping Joint Compound—Powder) (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound).

Part 3: Execution
3.1 Gypsum Panel Application
a. Position and apply SHEETROCK brand Gypsum Panels in accordance with manufacturer's recommendations.

3.2 Joint Treatment
Be sure drywall surface is dry and clean. Center and apply SHEETROCK Fiberglass Drywall Tape directly over joint, pressing tape firmly so that it adheres evenly to surface. To eliminate wrinkles and ensure maximum bond, press entire length of tape with drywall knife. Avoid overlapping tape at intersections. Cut tape with drywall knife. Cover with a layer of setting-type joint compound, forcing compound through the tape with a drywall knife/trowel to completely fill and level the joint. Failure to completely fill the joint may result in cracking. Let dry and sand lightly as required. Apply second coat of setting-type or drying-type (powder or ready-mixed) joint compound, feathering approximately two inches beyond first coat. Let dry and sand lightly as required.

To finish inside corners, bend the tape with your fingers to form a U. Apply tape along one side only. Press it into the corner for approximately 12 inches and then apply the other side. Work down the corner in this alternate manner until tape is pressed firmly in place. Apply setting-type joint compound on one side for the length of the corner and then repeat the same process on the other side. Force the compound through the tape, but be sure not to cut the tape with drywall knife during the compound application. Let dry and sand lightly as required.

Apply second coat of setting-type or drying-type (powder or ready-mixed) compound, feathering approximately two inches beyond first coat. Let dry and sand lightly as required. Finish fastener heads, corner bead and trim as required with at least three coats of joint compound, (only two coats if using SHEETROCK Lightweight All Purpose Joint Compound (PLUS 3), SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) feathered out onto panel faces and sanded as required to a smooth surface.

3.3 Finishing
a. For painting and decorating, follow manufacturers' directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free and not glossy before decorating. A prime coat of SHEETROCK First Coat or a good quality interior latex flat wall paint with high solids content should be applied undiluted and allowed to dry before painting, texturing or wallpapering.

b. To improve fastener concealment where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and decorated with paint, apply a skim coat of SHEETROCK All Purpose Joint Compound Ready-Mixed, SHEETROCK Lightweight All Purpose Joint Compound (PLUS 3) or COVER COAT Compound. Refer to Data Sheet J-510 for complete directions on skim coating.

Product Data
Width: 1⅞" (47 mm) and 2⅛" (63.5 mm).
Coverage: Approximately 370 ft/1000 ft² (121.4 m/100 m²) gypsum panels.
Packaging: The 75-ft roll (1⅞" width only) is ideal for the occasional small drywall job, patching work, etc. The 250-ft roll is a popular size for hand-application joint treatment. Master cartons contain 24 ea. 75-ft rolls per carton, 20 ea. 250-ft rolls.
Storage: Shelf life up to nine months under good storage conditions. Store at a minimum temperature of 45°F. (7°C).

Note: All products described here may not be available in all geographic markets. Consult your local U.S. Gypsum sales office or representative for information.

United States Gypsum Company
125 South Franklin Street
P.O. Box 806278
Chicago, Illinois 60680-4124
A Subsidiary of USG Corporation

061600-3 (2.4.C)

Georgia-Pacific
Gypsum

ToughRock®

Joint System Products

Georgia-Pacific
Gypsum

061600-3 (2.4.C)

What's in a Name?

Quite a lot! When you purchase ToughRock® joint system products from Georgia-Pacific Gypsum, you receive more than you might realize. Georgia-Pacific Gypsum has a full line of joint systems and textures — from pre-mixed compounds to dry powder products for both hand tool and mechanical applications. Backed by the resources of a proven leader in the manufacture of gypsum products, all ToughRock joint system products conform to ASTM Standard C 475. These quality products offer:

- Smooth Application. ToughRock joint compounds have a creamy consistency that applies freely, creating smoother surfaces.
- Secure Bonding. ToughRock joint treatment compounds recommended for taping provide a tight bond and joints that are as strong as the gypsum board.
- Low Shrinkage. ToughRock joint compounds are formulated for minimal shrinkage, which means better jobs and fewer callbacks.
- Consistently High Quality. ToughRock joint treatment compounds undergo ongoing testing to maintain uniform and dependable quality that exceeds industry standards.

ToughRock®

D61600-3 (2.4.C)

Georgia-Pacific Gypsum

ToughRock® Setting Compounds

Georgia-Pacific Gypsum's ToughRock® Setting Compounds are specially formulated powdered compounds that chemically set (harden) quickly, allowing same-day joint finishing. These quick-setting, very low shrinking joint compounds contain vinyl adhesive that hardens prior to drying, substantially reducing the need for extra coats. The setting action versus drying by evaporation also provides additional bonding and is harder and stronger than conventional joint compounds. Because of the excellent bond and low shrinkage, ToughRock setting compounds are ideal for quick repairs of cracks and holes in most surfaces and as a leveling material on above-grade concrete ceilings to conceal form joints, voids and irregularities.

They can also be used to laminate gypsum boards together or to other surfaces such as above-grade interior masonry or concrete, plaster, expanded foam, plywood walls or other surfaces.

ToughRock setting compounds can be used as a prefill agent with ToughRock® CD Ceiling Board and round-edge gypsum board prior to normal taping and finishing.

These products are available with either a 45-minutes (ToughRock 45) or 90-minute (ToughRock 90) setting time. Working time is approximately 60% of setting time. For example, 90-minute setting compound has approximately 60 minute working time. When set, ToughRock setting compounds exhibit extremely low shrinkage as compared to regular drying type compounds. The shelf life of setting compound products is twelve months from date of manufacturing.

ToughRock® Setting Compounds

ToughRock® 90 and ToughRock® 45 setting compounds can be used for applying tape, filling metal corner beads, concealing nail heads, fasteners or other metal accessories, texturing, skim coating, leveling and finishing joints.

ToughRock® Sandable Setting Compounds

ToughRock® Sandable 90, ToughRock® Sandable 45 and ToughRock® Sandable 20 setting compounds feature the same one-day joint finishing/next-day decorating as ToughRock® 90 and ToughRock® 45 setting compounds, yet sand almost as easily as conventional non-setting compounds.

Application Instructions/Finishing Gypsum Board Joints/Repairs

- Apply ToughRock setting compound to all flat joints or repair areas and embed tape. Glass mesh tape 10 x10 per inch is recommended with any of these setting type products.
- Leave a uniform thickness of compound under paper tape and skim off excess material, or apply glass mesh tape and press setting compound into tape against board. Shear or wipe off excess compound.
- Allow application to harden thoroughly before proceeding. No additional drying time is needed to control shrinkage.

Helpful Hints

- Do not mix more material than can be applied in 1 hour or less depending on set time.
- Do not mix with other joint compounds in either wet or dry form.
- Clean tools and mixing equipment after each batch to prevent acceleration of setting time.
- If stiffening occurs (except within the first 10 minutes), setting action is starting and material should be discarded.
- Do not retemper mix. Never add part of a previous batch to a fresh batch.

Coverage

Approximately 50 to 60 lbs. per 1,000 square feet of gypsum board when used for both taping and finishing.

Availability

- ToughRock® 90 and ToughRock® 45 Setting Compounds
  - 33-lb. bags
  - 15-kg bags
- ToughRock® 90, ToughRock® 45 and ToughRock® 20 Sandable Setting Compounds
  - 18-lb. bags
  - 24-lb. bags
  - 11-kg bags

061600-3 (2.4.C)

Georgia-Pacific Gypsum

ToughRock™ Textures and Plaster

ToughRock™ textures can be applied over most solid, properly prepared surfaces including gypsum board, above-grade interior concrete, stucco or plaster. During application, a minimum air, surface and material temperature of 50°F must be maintained during application and until product is dry.

ToughRock™ Wall and Ceiling Texture

ToughRock™ Wall and Ceiling Texture is a specially formulated, non-aggregated, pre-mixed product for light texturing of interior ceilings. Application can be performed using a roller, trowel, sponge or spray machine. Pattern design is left to the applicator's discretion. ToughRock Wall and Ceiling Texture dries to a white finish.

Coverage

Approximately 400 to 1000 sq. ft. per 50-lb. bag depending on desired texture surface.

Availability

50-lb. bags*

*Not available in all locations. Please check with your Georgia-Pacific Gypsum sales representative for availability.

ToughRock™ Regency Ceiling Texture/Polystyrene

ToughRock™ Regency Ceiling Texture/Polystyrene is a specially formulated, dry, white powder containing chopped or round polystyrene aggregate. It is designed, when mixed with water, to be applied to interior ceilings using a spray texture machine. ToughRock Ceiling Texture Spray dries to a rough texture with a bright white finish.

Coverage

Approximately 20.0 m² (225 sq. ft.) per 16-kg. bag (35 lbs.), depending on desired texture finish.

Availability

16-kg. bags (35 lbs.)

Texture Application to Concrete

- Check all surfaces to ensure they are clean, dry and sound with no chalkiness or efflorescence.
- Prime all exposed metal with a rust-inhibitive primer.
- New concrete may need to be aged at least 60 days or as specified by manufacturer.
- Irregularities and form marks must be smoothed. High spots can be ground down. Depressions and holes can be filled with ToughRock Ready Mix Joint Compound. For deep fills, ToughRock® 90 or ToughRock® Sandable 90 Setting Compound is recommended.
- Seal entire surface with a flat, alkyd paint, or a full-strength latex primer/sealer. Allow to dry thoroughly before texturing.
- Spray ToughRock texture in two applications at right angles to each other allowing the first coat to dry before applying the second.

Roll-On Applications (Pre-mixed texture only)

- Check surfaces, including joints, to ensure they are clean and dry. If surface has been painted previously with a glossy paint, roughen it and clean well.
- Apply a flat, alkyd paint or a full-strength latex primer/sealer to new drywall prior to texturing. Allow to dry thoroughly before texturing. No primer is necessary on prepainted surfaces that are properly prepared and in good condition.
- Submerge the roller completely in the texture and work texture into the nap of the roller.
- Roll the texture in different directions to achieve the desired effect. Allow enough time to complete an entire surface in one session. It is easier to blend in an edge before it dries.

PearlCote™ Interior Veneer Plaster

PearlCote™ Interior Veneer Plaster is designed for thin coat application to Veneer Base gypsum board. Designed for residential and commercial construction requiring a fast, economical finish for walls and ceilings as part of the PearlCote Veneer System. PearlCote Interior Veneer Plaster offers one-day installation; a monolithic appearance similar to conventional plaster; a high-strength finish; and superior resistance to ridging and beading of joints, cracking, nail popping, impact and abrasion in high traffic areas. This product sets in one hour and dries to a hard, white uniform finish at a slightly lower in-place cost than two-coat systems. PearlCote Interior Veneer Plaster may be applied directly to properly prepared concrete block.

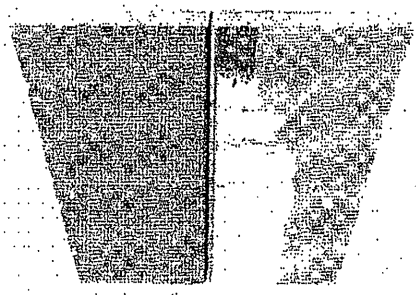
DIETRICH METAL FRAMING

Product Specification

DIETRICH METAL FRAMING

ACCESSORIES

Product Code:	ZNCJ	**093 ZINC CONTROL JT**	
Gauge:	N/A	**SSMA Code:**	N/A
Width (Inches):	.43750	**Weight (lbs/ft):**	.09



Compliance:

Code
ER-4782
C1063
See appendix A for more detail

Dietrich Metal Framing
Corporate Headquarters
200 Old Wilson Bridge Road
Columbus, OH 43085
Phone: (800)873-2604

Dietrich Design Group (North)
1414 Field St. Building C, Suite 1
Hammond, IN 46320
Phone: (800)873-2443 or
(219)853-9474
Fax: (219)932-4141

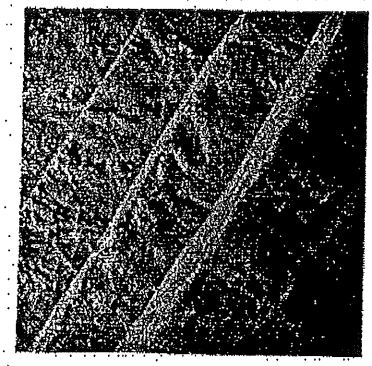
Dietrich Design Group (West)
2262 Rutherford Rd., Suite 104
Carlsbad, CA 92008
Phone: (800)873-2443 or
(760)931-0465
Fax: (760)931-9824

Dietrich Design Group (South)
330 Greenwood Place
McDonough, GA 30253
Phone: (800)873-2443 or
(678)304-6525
Fax: (678)304-5556

Submittal Sheet

Thermal Batt Insulation

Insulation



☐ Unfaced
☐ Kraft-Faced
☒ Foil-Faced

Description

Thermal Batts are flexible, fiberglass insulation, made in R-values from 11 to 38. Thermal Batts are available plain, or faced with either a kraft or foil vapor retarder. The product is manufactured in thicknesses from 3 1/2" to 12".

Uses

Thermal Batt Insulation can be used in a wide range of exterior wall and roof/ceiling applications. The product can be installed in wood or metal framing cavities, or can be installed between furring channels.

Features and Benefits

Superior Thermal Control

With the range of R-values and thicknesses available, Thermal Batts can meet most thermal specifications with ease. The R 30C and R 38C provide optimum thermal performance in the limited space of cathedral ceilings.

Effective Acoustical Control

Thermal Batt Insulation enhances interior noise control by improving the Sound Transmission Class (STC) of walls and floor/ceiling assemblies.

Long Term Performance

Thermal Batt Insulation is dimensionally stable and will not slump within the wall cavity. Due to its inorganic nature, Thermal Batt Insulation will not rot or mildew and is noncorrosive to steel, copper and aluminum.

Easy Installation

Thermal Batt Insulation is easy to handle and install. Sized for installation in either wood or metal stud construction, Thermal Batt Insulation can either be friction-fit or stapled into place. Trimming and fabrication can be done with an ordinary utility knife.

SpaceSaver Packaging

Thermal Batts are compression packaged in exclusive SpaceSaver packaging from Owens Corning. SpaceSaver packaging reduces freight and speeds job site handling/installation.

Design Considerations

Kraft and standard foil facings on this insulation will burn and must not be left exposed. Install facings in substantial contact with the finish material. Protect from open flame or other heat source.

Buildings utilizing curtainwall construction may be required to be equipped with a sprinkler system to provide adequate fire protection. Check local building codes for specific requirements.

Commercial roof/ceiling thermal applications require that the building envelope block the movement of air from the outdoor environment to the conditioned space. Neither the insulation nor its facing should be relied upon to provide an air barrier. Failure to provide an adequate air barrier could lead to loss of thermal control, discomfort of the building occupants and frozen pipes.

When insulation is added to the inside perimeter of a structure, the area outside the insulation becomes exposed to greater temperature extremes. Building structures should be inspected to ensure they can withstand the additional expansion and contraction forces. Check for piping which should be protected against freezing.

The need for and placement of a vapor retarder in commercial construction depends on many factors. The architect or specifier should evaluate the requirements of each project. If a vapor retarder is specified, maintaining the facing integrity may be important for effective moisture/humidity control. Repair any punctures or tears in the facing by taping. Follow the tape manufacturer's application recommendations.

Insulation installed too close to light fixtures may affect the luminaire's performance. Do not install insulation on top of or within 3 inches of recessed light fixtures unless the fixtures are approved for such use. This is a requirement of the National Electrical Code.

Due to the potential for skin irritation, unfaced Thermal Batt Insulation should not be used for exposed applications where it will be subject to human contact.

Installation

Between Wood Studs/Rafters

Thermal Batt Insulation fits between studs with the flanges stapled to either the face or the side of the stud every 8-12" to prevent gaping or "fishmouthing" of the vapor retarder.

Thermal Batt Insulation

Unfaced insulation can be friction-fit between studs after the cover material has been installed on one side of the cavity. Use wire or metal straps to hold insulation in place in applications without a cover material, or where the insulation does not fill the depth of the cavity.

Cathedral ceiling products (R30C and R38C) are intended to be friction-fit between rafters. Cathedral ceiling insulation should be installed to provide a minimum 1" ventilation passageway between the roof deck and insulation. Where necessary use a vent baffle to assure proper clearance.

Between Metal Studs

Thermal Batt Insulation can be friction-fit in place until the interior finish is applied. Insulation should fill the cavity and the wall should eventually be closed on both sides.

In areas where it will be applied in heights over 8 feet, use wire or metal straps to hold the product in place until the interior finish is applied. When faced insulation is used, the attachment flanges may be taped to the face of the metal stud prior to applying the interior finish. Wire or metal straps should also be used to hold the product in place in applications without a cover material or where the stud depth is larger than the insulation thickness.

Furring Strips

Thermal Batt Insulation can be applied between furring strips, hat channels, or Z-shaped furring in areas where a finish surface will be installed. Contact the furring strip manufacturer for appropriate fastening system.

Applicable Standards

Unfaced Thermal Batt Insulation complies with ASTM C 665, Type I and ASTM E 136. Kraft-faced Thermal Batt Insulation complies with ASTM C 665, Type II, Class C. Foil-faced Thermal Batt Insulation complies with ASTM C 665, Type III, Class B and C. Federal Specification HH-I-521F has been canceled and is replaced by ASTM C 665.

The thermal resistance values for Thermal Batt Insulation were tested in accordance with ASTM C 518; R-value for insulation only.

The surface burning characteristics of Thermal Batt Insulation were derived from products tested in accordance with ASTM E 84. This standard is used solely to measure and describe properties of products in response to heat and flame under controlled laboratory conditions, and should not be used to describe or approve the fire hazard of materials under actual fire conditions. However, the results of these tests may be used as elements of a fire risk assessment that takes into account all of the factors pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest five rating.

The vapor retarder permeance of the kraft and foil facings on Thermal Batt Insulation were developed from tests conducted in accordance with ASTM E 96, desiccant method.

Thermal Batt Insulation Technical Data/Wall or Ceiling

	Width			Length		Thickness	R-value*
Metal Frame Construction	16"/406mm		24"/609mm	48"	96"/2438mm	3.5"/89mm	11.0
	16"/406mm		24"/609mm	48"	96"/2438mm	3.5"/89mm	13.0
	16"/406mm		24"/609mm		96"/2438mm	3.5"/89mm	15.0
	16"/406mm		24"/609mm	48"	96"/2438mm	6.25"/159mm	19.0
	16"/406mm		24"/609mm		96"/2438mm	5.5"/139mm	21.0
Wood Frame Construction	15"/381mm	19.25"	23"/584mm	48"	93"/2362mm	3.5"/89mm	11.0
	15"/381mm	19.25"	23"/584mm	48"	93"/2362mm	3.5"/89mm	13.0
	15"/381mm		23"/584mm		93"/2362mm	3.5"/89mm	15.0
	15"/381mm	19.25"	23"/584mm	48"	93"/2362mm	6.25"/159mm	19.0
	15"/381mm		23"/584mm		93"/2362mm	5.5"/139mm	21.0
	15"/381mm		23"/584mm	48"		6.75"/171mm	22.0
Wood Frame Roof/ Ceiling Construction	15"/381mm	19.25"	23"/584mm	48"	93"/2362mm	6.25"/159mm	19.0
	15"/381mm		23"/584mm	48"		6.75"/171mm	22.0
	15"/381mm		23"/584mm		48"/1219mm	8"/203mm	25.0
	15 1/2"/394mm		23 3/4"/603mm		48"/1219mm	8.25"/209mm	30.0 C**
	16"/406mm	19.25"	24"/609mm		48"/1219mm	9.5"/241mm	30.0
	15 1/2"/394mm		23 3/4"/603mm		48"/1219mm	10.25"/260mm	38.0 C**
	16"/406mm		24"/609mm		48"/1219mm	12"/305mm	38.0

Unfaced Thermal Batt Insulation complies with the property requirements of ASTM C 665, Type I and ASTM E 136. Kraft-faced Thermal Batt Insulation complies with ASTM C 665, Type II, Class C. Foil-faced Thermal Batt Insulation complies with ASTM C 665, Type III, Class B and C.

*R-values differ. Find out why in the seller's fact sheet on R-values. Higher R-values mean greater insulating power.

**C = Cathedral Ceilings

Surface Burning Characteristics/Building Code Construction Classification

Products	Flame Spread	Smoke Developed	ICBO	BOCA	SBCCI	ICC
Unfaced	10	10	All Types	All Types	All Types	All Types
Foil Faced	75	150	III, IV, V	All Types	All Types	III, IV, V
Kraft Faced	N/R	N/R	III, IV, V	III, IV, V	III, IV, V	III, IV, V

Thermal Batt Insulation complies with ICC (International Building Code), ICBO (Uniform Building Code), BOCA (National Building Code) and SBCCI (Standard Building Code) model code requirements for building construction types listed above.

Kraft and standard foil facing on Thermal Batt Insulation will burn and must not be left exposed.

The facing must be installed in substantial contact with an approved interior partition construction material. Protect facing from open flame of other heat source.

Due to the potential for skin irritation, unfaced Thermal Batt Insulation should not be used for exposed applications where it will be subject to human contact.

Available Vapor Retarder Facings	Kraft	Foil
Perms Maximum*	1	0.5

Water Absorption	
Maximum by Volume	Less than 0.05%

Dimensional Stability	
Linear Shrinkage	Less than 0.1%

* Products are tested in accordance:

R-value	ASTM C 518
Surface Burning characteristics	ASTM E 84
Perm Rating	ASTM E 96

R-values differ. Find out why in the sellers fact sheet on R-values. Higher R-values mean greater insulating power.

Specified Technologies, Inc.

PRODUCT DATA SHEET

SpecSeal® Series ES Elastomeric Sealant

FEATURES

- **Water-Based** for easy installation and cleanup.
- **Non-halogenated.**
- **Thixotropic** for high-build application.
- **Auto bonding.**
- **Safe...** No solvents! No asbestos!
- **Elastomeric!**
- **Water-Resistant!**
- **UL Classified.**
- **Acoustical** sealant!

CLASSIFIED UL

FILL, VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC.® FOR USE IN JOINT SYSTEMS. SEE UL FIRE RESISTANCE DIRECTORY

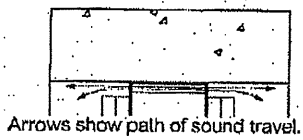
3L73

CLASSIFIED C UL

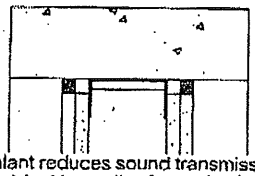
FILL, VOID, OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC. FOR USE IN JOINT SYSTEMS. SEE UL DIRECTORY OF PRODUCTS CERTIFIED FOR CANADA AND UL FIRE RESISTANCE DIRECTORY

FM APPROVED

FIG. 1: EXAMPLE OF MAINTAINING STC VALUES OF WALL AND CREATING AN EFFECTIVE SOUND BARRIER



Arrows show path of sound travel.



Sealant reduces sound transmission by blocking path of sound travel.

1. PRODUCT DESCRIPTION

SpecSeal® Elastomeric Sealant is a non-halogenated latex-based, highly elastomeric caulk designed to provide passive smoke and fire protection in construction joints. This material is also designed to restore sound attenuation properties to sound-rated ceilings and partitions.

SpecSeal® Elastomeric Sealant is engineered to adhere to virtually all construction surfaces and may be applied using standard caulking equipment or by troweling. SpecSeal® Elastomeric Sealant dries to form a flexible shield against the propagation of fire. Its premium latex binder system is totally resistant to water and will not re-emulsify after drying. SpecSeal® Elastomeric Sealant contains no inorganic fibers, asbestos, solvents.

2. APPLICATIONS

SpecSeal® Elastomeric Sealant is designed primarily for the protection of construction joints.

3. PHYSICAL PROPERTIES

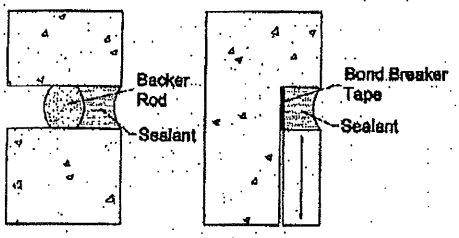
See Table A.

4. PERFORMANCE

When applied to a wet film thickness of 1/4" (6.3 mm) to 1/2" (12.5 mm) over appropriate backing materials, SpecSeal® Elastomeric Sealant has been successfully tested in one, two, three and four hour joints when tested in accordance with UL2079 (ASTM E1966). All tested systems have been cycled 500 times at total movement up to ± 25%. Consult factory for individual system designs and application requirements.

LIMITATIONS: Use product as per manufacturer's instructions. Use only in applications per the manufacturer's tested and published designs or per specific recommendations. End user must ultimately determine the suitability of the product and designs to his specific requirement and assumes responsibility for its use.

FIG 2: RECOMMENDED JOINT DESIGNS - AVOIDING THREE-POINT ADHESION



In the example shown above, sealant is applied (over foam backer rod) flush with wall surface. Backer rod provides a release surface allowing sealant to contract after drying to the recommended hour glass cross-sectional profile.

This example illustrates sealant applied to three planes. Bond breaker tape is applied to one surface to prevent three-point adhesion, eliminating stress on joint as sealant dries and enhancing movement capabilities.

Table A:
PHYSICAL PROPERTIES

Product Name	Series ES Elastomeric Sealant
Color	Pale Blue
Odor	Mild Latex
Density	10 Lb/Gal
Solids	66%
pH	7.5
In-Service Temp.	≤120°F (49°C)
Flame Spread	5*
Smoke Development	5*
Movement	±25%**
Solvent Content	None
Drying Time	Tack Free 2 Hours^
	Dry Through 5 to 7 Days^
Acoustical	STC = 50
VOC	15 g/l

*. Tested to ASTM E84 (UL723) at 14% surface
**500 Cycles per UL2079, AC30 (ICBO) and ASTM E1399
^Dependent on temperature and humidity

5. SPECIFICATIONS

Consult factory for recommended specification.

6. INSTALLATION INSTRUCTIONS

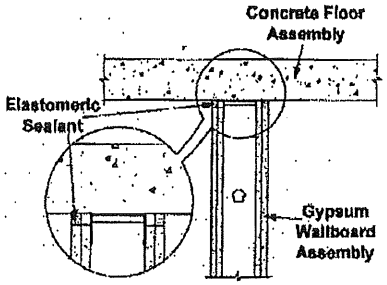
GENERAL: Areas to be protected must be clean and free of oil, loose dirt, rust or scale. Recommended storage and application temperatures range between 40°F (4°C) and 95°F (35°C). When applying product at the lower end of the temperature range, warming the material to 70°F (21°C) will enhance drying characteristics. Drying time will vary according to prevailing temperature and humidity. Allow to thoroughly dry before exposure to moisture.

Consult appropriate manufacturer's drawing for system design requirements. Forming or packing materials may be required as an integral part of various system designs. See Table B on Page 4 for estimation information.

Sealant is auto-bonding and may be applied in stages. DO NOT ATTEMPT TO THIN PRODUCT BY ADDING WATER.

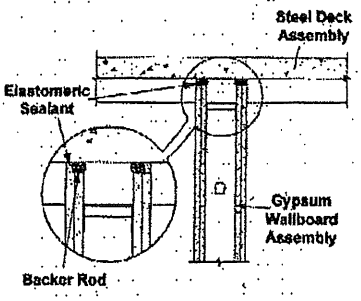
THIS PRODUCT IS DESIGNED FOR PROFESSIONAL INSTALLATION ONLY. This sealant is designed to contract while drying. Proper joint design is critical to

FIG. 3: HEAD-OF-WALL JOINT - GYPSUM WALLBOARD WALL TO CONCRETE FLOOR



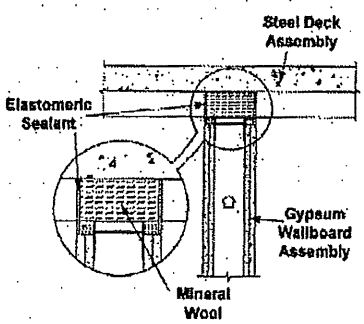
UL System No. HW-D-0079
Assembly Rating – 1 & 2 Hr • Movement Capabilities: 25% Compress.
Nominal Joint Width: 3/4" • Forming Material: In 1 hr walls, apply bond breaker tape to ceiling track.
Sealant Depth: 5/8" depth on both sides.

FIG. 4: HEAD-OF-WALL JOINT - GYPSUM WALLBOARD WALL CUT TO FIT CONTOURS OF STEEL DECK



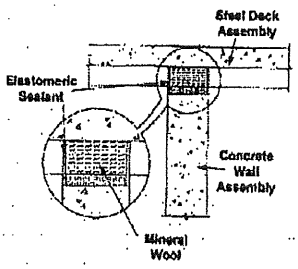
UL System No. HW-D-0103
Assembly Rating – 1 & 2 Hr • Movement Capabilities: 25% Compress.
Nominal Joint Width: 3/4" • Forming Material: In 1 hr walls, apply bond breaker tape to ceiling track.
Sealant Depth: 1/2" depth on both sides.

FIG. 5: HEAD-OF-WALL JOINT - GYPSUM WALLBOARD WALL TO CONCRETE OVER STEEL DECK



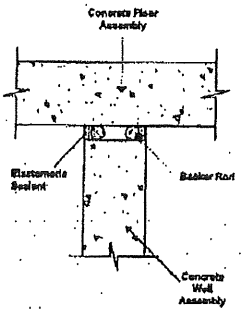
UL System No. HW-D-0034
Assembly Rating – 1 & 2 Hr • Movement Capabilities: ±25% Compress/Extend.
Nominal Joint Width: 1" • Forming Material: Nom 4 pcf mineral wool to full depth.
Sealant Depth: 1/2" depth on both sides.

FIG. 6: HEAD-OF-WALL JOINT - MASONRY WALL TO CONCRETE OVER STEEL DECK



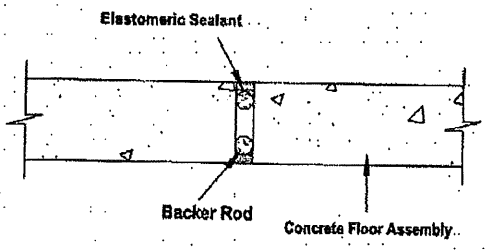
UL System No. HW-D-0039
Assembly Rating – 2 Hr
Movement Capabilities: ±25% Compress/Extend.
Nominal Joint Width: 1"
Forming Material: Nom 4 pcf mineral wool to full depth.
Sealant Depth: 1/4" depth on both sides.

FIG. 7: HEAD-OF-WALL JOINT - MASONRY WALL TO CONCRETE FLOOR



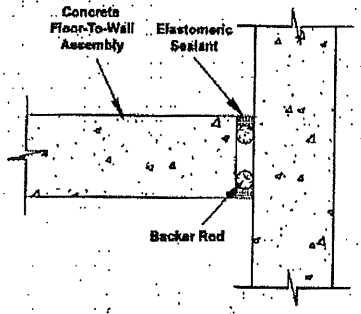
UL System No. HW-D-0041
Assembly Rating – 3 Hr.
Movement Capabilities: ±12.5% Compress/Extend or 25% Compress.
Nominal Joint Width: 1" or 3/4" (See System).
Forming Material: Optional foam backer rod.
Sealant Depth: 1" or 1/2" (See System) on both sides.

FIG. 8: FLOOR-TO-FLOOR JOINT - CONCRETE FLOOR TO CONCRETE FLOOR



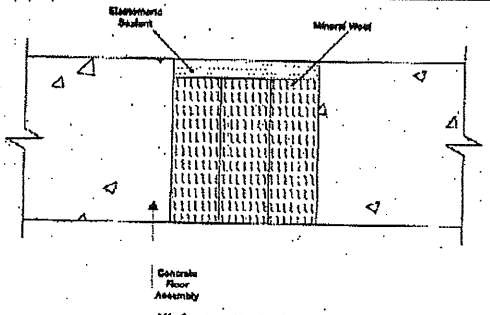
UL System No. FF-D-0005
Assembly Rating – 3 Hr
Movement Capabilities: ±12.5% Compress/Extend
Nominal Joint Width: 1"
Forming Material: Optional foam backer rod.
Sealant Depth: 1/2" top and bottom.

FIG. 9: FLOOR-TO-WALL JOINT - CONCRETE FLOOR TO CONCRETE WALL



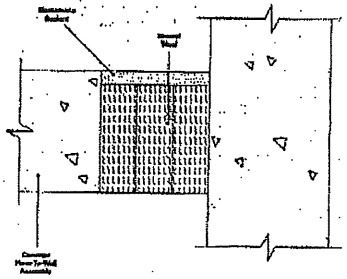
UL System No. FW-D-0005
Assembly Rating – 3 Hr
Movement Capabilities: ±12.5% Compress/Extend
Nominal Joint Width: 1"
Forming Material: Optional foam backer rod.
Sealant Depth: 1/2" top and bottom.

FIG. 10: FLOOR-TO-FLOOR JOINT - CONCRETE FLOOR TO CONCRETE FLOOR



UL System No. FF-D-1008
Assembly Rating – 3 Hr
Movement Capabilities: ±15% Compress/Extend
Nominal Joint Width: 4"
Forming Material: Nom 4 pcf mineral wool to 4" depth.
Sealant Depth: 1/2" depth of sealant.

FIG. 11: FLOOR-TO-WALL JOINT - CONCRETE FLOOR TO CONCRETE WALL



UL System No. FW-D-1007
Assembly Rating – 3 Hr
Movement Capabilities: ±15% Compress/Extend
Nominal Joint Width: 4"
Forming Material: Nom 4 pcf mineral wool to 4" depth.
Sealant Depth: 1/2" depth of sealant.

sealant performance. Avoid three point adhesion through the use of appropriate backing or bond-breaking materials.

See Figure 2 for recommended joint designs. Consult ASTM C1193 Standard Guide for Use of Joint Sealants for additional guidelines concerning the proper application of sealant materials.

7. MAINTENANCE

Inspection: Installations should be inspected periodically for subsequent damage. Following safety precautions listed below (See 9. Precautionary Information) and pertinent installation guidelines, remove coating in damaged areas down to undamaged material. Reapply fresh coating material to original coating thickness.

8. TECHNICAL SERVICE

Specified Technologies Inc. provides toll free technical support to assist in product selection and appropriate installation design. UL Systems, Material Safety Data Sheets and other technical information is available at the Technical Library at www.stifirestop.com.

9. PRECAUTIONARY INFORMATION

Consult Material Safety Data Sheet for additional information on the safe handling and disposal of this material. Wash areas of skin contact with soap and water. Avoid contact with eyes. Apply in areas with adequate ventilation.

10. AVAILABILITY

SpecSeal® Elastomeric Sealant is available from authorized distributors nationwide. Consult factory for the names and locations of the nearest sales representatives or distributors. Packaging information and catalog numbers are listed in Table C.

Table B: PRODUCT ESTIMATION INFORMATION
(Construction Joints)

JOINT	PER 1/4" INSTALLED DEPTH			PER 1/2" INSTALLED DEPTH			PER 1" INSTALLED DEPTH		
WIDTH	CU IN/FT	FT/GAL	GAL/100 FT	CU IN/FT	FT/GAL	GAL/100 FT	CU IN/FT	FT/GAL	GAL/100 FT
0.5	1.5	154	.65	3	77.0	1.3	6	38.5	2.6
0.75	2.3	102	.95	4.5	51.3	1.9	9	25.7	3.9
1.0	3.0	77	1.3	6.0	38.5	2.6	12	19.3	5.2
1.5	4.5	51	2	9.0	25.7	3.9	18	12.8	7.8
2.0	6.0	38	2.6	12	19.3	5.2	24	9.6	10.4
2.5	8.0	31	3.3	15	15.4	6.5	30	7.7	13.0
3.0	9.0	25	3.9	18	12.8	7.8	36	6.4	15.6
3.5	11	22	4.6	21	11.0	9.1	42	5.5	18.2
4.0	12	19	5.2	24	9.6	10.4	48	4.8	20.8
5.0	15	15	6.5	30	7.7	13.0	60	3.9	26.0
6.0	18	12	7.8	36	6.4	15.6	72	3.2	31.2

TABLE C: ORDERING INFORMATION

SpecSeal® Elastomeric Sealant is available in caulk tubes, sausages and pails.

Cat. No.	Description
ES100	10.1 oz. Tube (300 ml) 18.2 cu.in.
ES129	29.0 oz. Tube (858 ml) 52 cu.in.
ES120	20 oz. Sausage (592 ml) 36 cu. in.
ES105	5 Gal. Pail (19.0 liters) 1,155 cu.in.

Additional SpecSeal Products...

Series AS200 Spray
Inexpensive water-based Elastomeric Spray Coating for construction joint applications. Designed to provide up to ±25% movement.

Series SSS Sealant
The industry's most versatile sealant provides the firestoppping solutions for a wide range of combustible and noncombustible applications. Water-based intumescent sealant expands up to 8x!

SSP Firestop Putty
Available both in bar form and in pads, putty provides easy retrofit for through-penetrations and economical protection for electrical boxes.

SSB Firestop Pillows
Durable, monolithic pillows for installations requiring quick and easy retrofitting. Systems designed for pipes, cables and cable tray in all types of construction!

Firestop Mortar
Lightweight, versatile and economical! The best choice for large or complex installations.

Pensil® Silicones
Sealants and foam for through-penetrations and construction joints. Unexcelled aging characteristics and flexibility.

Intumescent Wrap Strips
Three grades of intumescent wrap strips provide an unmatched combination of flexibility, economy, and expansion (up to 30x). Systems for plastic pipes including FR Polypropylene up to 8" trade size!

CITY OF NEW YORK MEA 290-98M

Important Notice: All statements, technical information, and recommendations contained herein are based upon testing believed to be reliable, but the accuracy and completeness thereof is not guaranteed.
WARRANTY: Specified Technologies Inc. manufactures its goods in a manner to be free of defects. Should any defect occur in its goods (within one year), Specified Technologies Inc., upon prompt notification, will at its option, exchange or repair the goods or refund the purchase price.
Limitations and Exclusions: THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS EXPRESSED OR IMPLIED (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL SPECIFIED TECHNOLOGIES INC. BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGE OR LOSSES. PRIOR TO USE, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR ITS INTENDED USE, AND THE USER ASSUMES ALL RISKS AND LIABILITY FOR SUBSEQUENT USE. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

Specified Technologies Inc.
200 Evans Way • Somerville, NJ 08876
Phone: (800) 992-1180 • Fax: (908) 526-9623
STI on the WEB: www.stifirestop.com

ClarkWestern Building Systems

Design Services

LIGHT GAUGE STEEL FRAMING COMPUTATIONS

Project Information:

1809068-2

Martin's Point: Parking Garage Ceiling

LGSK-3 p4. 1-11

Project Location:

Portland, ME

Prepared For:

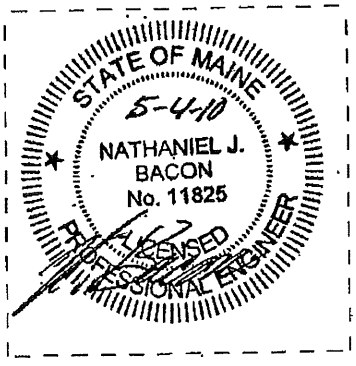
Porter Drywall, Inc.

655 Riverside St.

Portland, ME 04103

Submittal Date:

Tuesday, May 04, 2010



Sealed By:

ClarkWestern Building Systems
Atlanta, GA
Scarborough, ME
(P) 1-877-832-3206
(F) 1-877-832-3208

JOB TITLE Martin;s Point Point Med. Office Bldg
Portland, Maine
JOB NO. 1809068-1 SHEET NO.
CALCULATED BY LFP DATE 12/7/09
CHECKED BY DATE

www.struware.com

CODE SUMMARY

Code: International Building Code 2006

Wind Design Data:

Basic Wind speed	100 mph
Mean Roof Ht (h)	21.0 ft
Building Category	II
Importance Factor	1.00
Exposure Category	C
Enclosure Classif.	Partially Enclosed
Internal pressure Coef.	+/-0.55
Directionality (Kd)	0.85

Component and cladding wind pressures

Select method : C&C<90 feet

Roof	Surface Pressure (psf)			User Input	
Area	10 sf	50 sf	100 sf	10 sf	10 sf
Negative Zone 1	-28.8	-27.4	-26.8	-28.8	-28.8
Negative Zone 2	-44.6	-37.7	-34.7	-44.6	-44.6
Negative Zone 3	-62.5	-54.1	-50.6	-62.5	-62.5
Positive All Zones	20.8	18.0	16.9	20.8	20.8
Overhang Zone 2	-43.6	-43.6	-43.6	-43.6	-43.6
Overhang Zone 3	-73.4	-56.7	-49.6	-73.4	-73.4

Wall	Surface Pressure (psf)			User Input	
Area	10 sf	100 sf	500 sf	0 sf	0 sf
Negative Zone 4	-32.7	-29.2	-26.8	-32.7	-32.7
Negative Zone 5	-38.7	-31.7	-26.8	-38.7	-38.7
Positive Zone 4 & 5	30.7	27.2	24.8	30.7	30.7

ClarkWestern
Building Systems
Design Services

20 Mansell Court East, Suite 350B
Roswell, GA 30076
Toll Free: 877-832-3206 Fax: 877-832-3208
clarkwestern.com

6510 General Drive
Riverside CA 92509

383 US Route One, Ste 2E
Scarborough, ME 04074

Project Number: 1809068-2
Project Name: MARTIN'S POINT
Eng. Name: NB
Date: 5/10

2

CEILING ASSEMBLY AT PARKING GARAGE (ALTERNATE)

- (1) LAYER OF 5/8" GYP
- RC-2
- CRC
- R21 FIBERGLASS ON TOP

LOADS:

- DEAD LOADS
  - GYP = 2.75 PSF
  - R21 FIBERGLASS = 0.3 PSF/in (5 1/2") = 1.65 PSF
  - GRID = 1.0 PSF
  - COLLATERAL = 5 PSF

  10.4 PSF

  USE 15.0 PSF FOR SEISMIC CALC. (CONSERVATIVE)

- WIND LOADS
  - +20.8 PSF ↑
  - -26.8 PSF ↓

- MAX GRAVITY = 34.2 PSF (1.0D + 1.0W)
- MAX UPLIFT = 14.6 PSF (0.6D + 1.0W)

* USE RC-2 AT 12" o.c.; CRC AT 24" o.c.; HANGER WIRE AT 24" o.c.; COMPRESSION POSTS AT 48" o.c.; DIAG. WIRE AT 12' o.c.

CFS Version 6.0.2
Section: resilient channel RC-2a-ribs.sct
Resilient Channel

Rev. Date: 3/25/2010 2:02:26 PM
By: Madhu Kukkala

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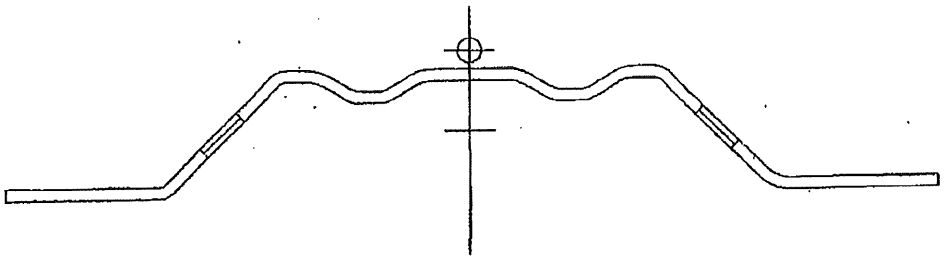
mkukkala@clarkwestern.com

3-SPAN DL+L/L4



Section Inputs

Material: A653 SS Grade 33
No strength increase from cold work of forming.

Modulus of Elasticity, E	29500 ksi
Yield Strength, Fy	33 ksi
Tensile Strength, Fu	45 ksi
Warping Constant Override, Cw	0 in^6
Torsion Constant Override, J	0 in^4

Part 1, Thickness 0.0346 in (20 Gage)
Placement of Part from Origin:

X to center of gravity	0 in
Y to center of gravity	0 in

Outside dimensions, Open shape

	Length (in)	Angle (deg)	Radius (in)	Web	k Coef.	Hole Size (in)	Distance (in)
1	0.50000	0.000	0.028300	None	0.000	0.00000	0.25000
2	0.50000	45.000	0.028300	None	0.000	0.15000	0.25000
3	0.12500	0.000	0.028300	None	0.000	0.00000	0.06250
4	0.13915	-30.000	0.093750	None	0.000	0.00000	0.02336
5	0.10558	0.000	0.050000	None	0.000	0.00000	0.05279
6	0.13915	30.000	0.050000	None	0.000	0.00000	0.02336
7	0.30000	0.000	0.093750	None	0.000	0.00000	0.15000
8	0.13915	-30.000	0.093750	None	0.000	0.00000	0.02336
9	0.10558	0.000	0.050000	None	0.000	0.00000	0.05279
10	0.13915	30.000	0.050000	None	0.000	0.00000	0.02336
11	0.12500	0.000	0.093750	None	0.000	0.00000	0.06250
12	0.50000	-45.000	0.028300	None	0.000	0.15000	0.25000
13	0.50000	0.000	0.093750	None	0.000	0.00000	0.25000

CFS Version 6.0.2
Analysis: Analysis 2.anl
3-Span Continuous Beam

Rev. Date: 3/25/2010 2:11:55 PM
By: Madhu Kukkala

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Analysis Inputs

Members

	Section File	Revision Date and Time
1	resilient channel RC-2a-ribs.sct	3/25/2010 2:02:26 PM

	Start Loc. (ft)	End Loc. (ft)	Braced Flange	R	kϕ (lb)	ex (in)	ey (in)
1	0.0000	6.0000	None	0.0000	0.0000	0.0000	0.0000

Supports

	Type	Location (ft)	Bearing (in)	Fastened	K
1	XYT	0.0000	0.500	No	1.0000
2	XYT	2.0000	0.500	No	1.0000
3	XYT	4.0000	0.500	No	1.0000
4	XYT	6.0000	0.500	No	1.0000

Loading: Dead Load

	Type	Angle (deg)	Start Loc. (ft)	End Loc. (ft)	Start Magnitude	End Magnitude	
1	Distributed	90.000	0.0000	6.0000	-39.200	-39.200	lb/ft

Load Combination: D
Specification: 2007 North American Specification - US (ASD)
Inflection Point Bracing: Yes

	Loading	Factor
1	Beam Self Weight	1.0000
2	Dead Load	1.0000

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Member Check - 2007 North American Specification - US (ASD)

Load Combination: D
Design Parameters at 2.0000 ft, Right side:

Lx	2.0000 ft	Ly	0.5528 ft	Lt	0.5528 ft
Kx	1.0000	Ky	1.0000	Kt	1.0000

Section: resilient channel RC-2a-ribs.sct
Material Type: A653 SS Grade 33, Fy=33 ksi

Cbx	1.6667	Cby	1.0000	ex	0.0000 in
Cmx	1.0000	Cmy	1.0000	ey	0.0000 in

Braced Flange: None Red. Factor, R: 0 Stiffness, kϕ: 0 lb

Loads:	P (lb)	Mx (lb-in)	Vy (lb)	My (lb-in)	Vx (lb)
Total	0.00	-189.95	39.57	0.00	0.00
Applied	0.00	-189.95	39.57	0.00	0.00
Strength	508.69	227.78	0.00	785.85	0.00

Effective section properties at applied loads:

Ae	0.109573 in^2	Ixe	0.002282 in^4	Iye	0.071143 in^4
		Sxe(t)	0.012311 in^3	Sye(l)	0.050267 in^3
		Sxe(b)	0.011841 in^3	Sye(r)	0.050210 in^3

Interaction Equations

NAS Eq. C5.2.1-1	(P, Mx, My)	0.000 + 0.834 + 0.000 = 0.834	<= 1.0
NAS Eq. C5.2.1-2	(P, Mx, My)	0.000 + 0.834 + 0.000 = 0.834	<= 1.0
NAS Eq. C3.3.1-1	(Mx, Vy)	Sqrt(0.679 + 9.999)= 3.268	> 1.0
NAS Eq. C3.3.1-1	(My, Vx)	Sqrt(0.000 + 9.999)= 3.162	> 1.0

OK
Section contains no web elements for vertical shear.
Section contains no web elements for horizontal shear.
Edge stiffener D/w exceeds 0.8.

Maximum Shears, Moments, and Deflections

Load Combination: D, Y Direction

Location (ft)	Shear(l) (lb)	Shear(r) (lb)	Reaction (lb)
0.0000	0.000	31.658	31.658
2.0000	-47.487	39.573	87.060
4.0000	-39.573	47.487	87.060
6.0000	-31.658	0.000	31.658

Location (ft)	Moment (lb-in)	Location (ft)	Deflection (in)	Inflections (ft)
0.8000	151.96	0.8921	-0.11190	1.6000
2.0000	-189.95	2.2254	0.00677	2.5528
3.0000	47.49	3.0000	-0.00847	3.4472
4.0000	-189.95	3.7746	0.00677	4.4000
5.2000	151.96	5.1079	-0.11190	

CFS Version 6.0.2
Analysis: Analysis 2.anl
3-Span Continuous Beam

Rev. Date: 3/25/2010 2:11:55 PM
By: Madhu Kukkala

Madhu Kukkala
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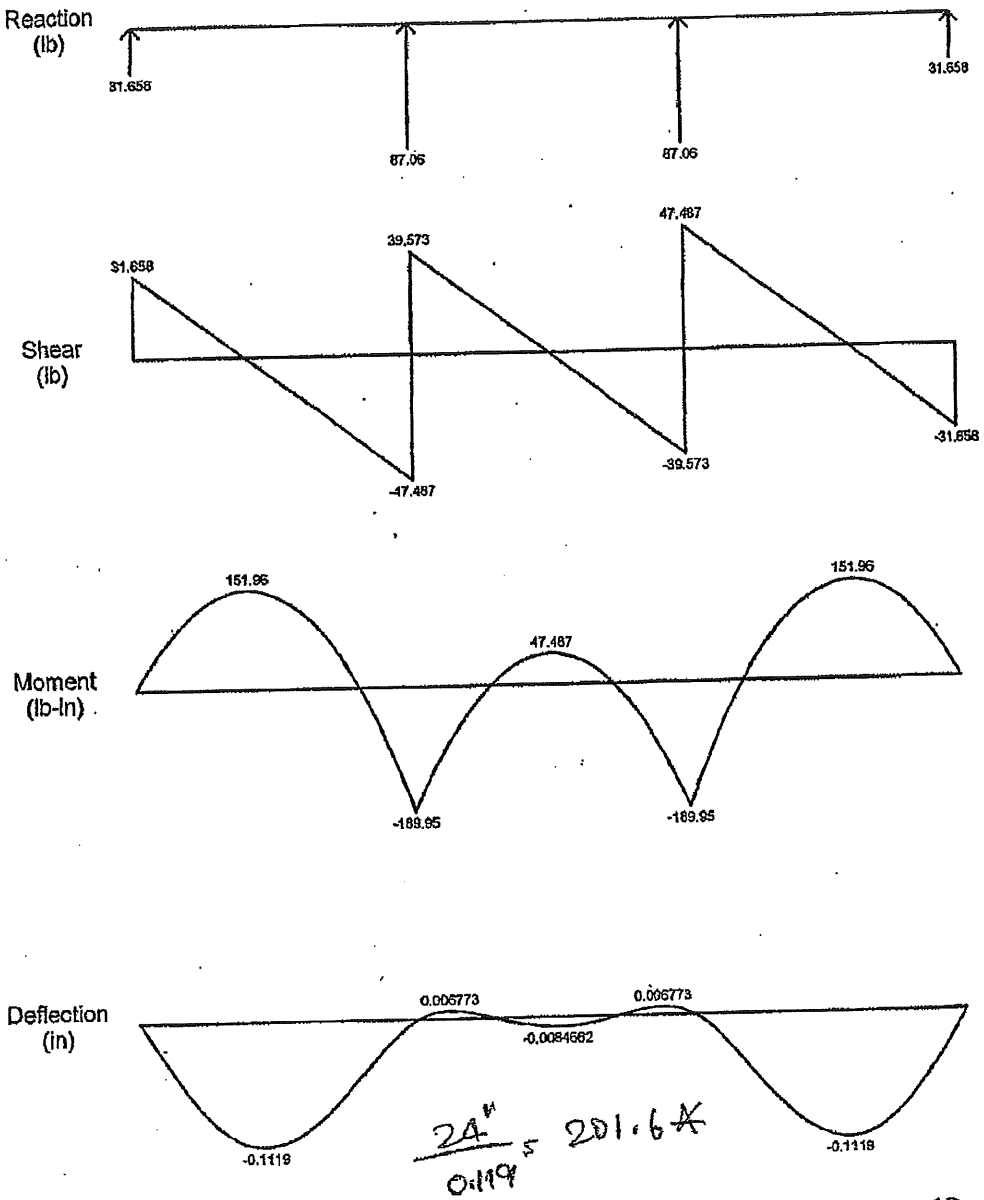
Load Combination: D, Y Direction



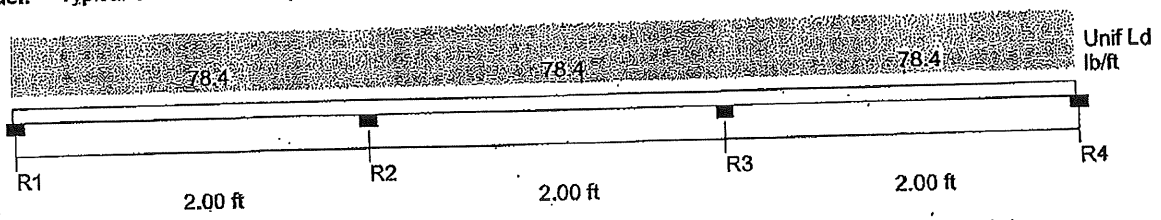
$\frac{24''}{0.119} = 201.6$ A

A DOES NOT INCLUDE 0.7 REDUCTION FOR WL ∴ ✓

2001 NASPEC w/2004 Supplement

Date: 5/4/2010

Project: Martin's Point
Model: Typical CRC at 24" o.c. (Gravity Loading)



Section : 150CRC16 Single (X-X Axis)
Maxo = 101.8 Ft-Lb
Moment of Inertia, I = 0.039 in^4

Fy = 33.0 ksi
Va = 840.0 lb

Loads have not been modified for strength checks
Loads have not been modified for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Left Span	31.4	0.308	25.1	None	74.1	0.338	0.013	L/1836
Center Span	31.4	0.308	7.8	None	77.4	0.101	0.001	L/24038
Right Span	31.4	0.308	25.1	None	74.1	0.338	0.013	L/1836

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bmg (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffen Req'd ?
R1	62.7	1.00	346.0	622.8	0.0	0.09	No
R2	172.5	1.00	608.5	1095.2	31.4	0.33	No
R3	172.5	1.00	608.5	1095.2	31.4	0.33	No
R4	62.7	1.00	346.0	622.8	0.0	0.09	No

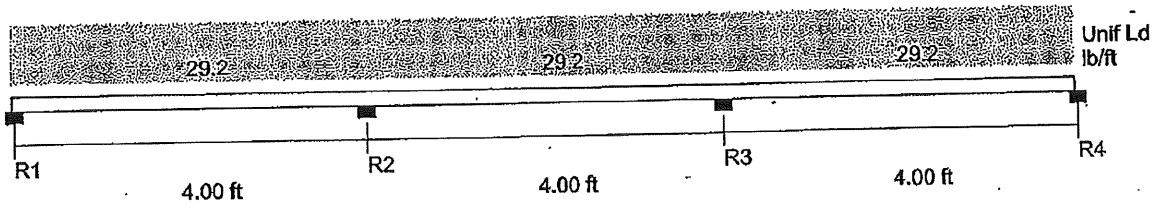
Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffen	Intr. Stiffen
R1	62.7	0.0	1.00	0.07	0.00	0.01	NA
R2	94.1	31.4	1.00	0.11	0.31	0.11	NA
R3	94.1	31.4	1.00	0.11	0.31	0.11	NA
R4	62.7	0.0	1.00	0.07	0.00	0.01	NA

2001 NASPEC w/2004 Supplement

Project: Martin's Point
Model: Typical CRC at 24" o.c. (Uplift Loading)

Date: 5/4/2010



Section : 150CRC16 Single (X-X Axis)
Maxo = 101.8 Ft-Lb
Moment of Inertia, I = 0.039 in^4

Fy = 33.0 ksi
Va = 840.0 lb

Loads have not been modified for strength checks
Loads have not been modified for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Left Span	46.7	0.459	37.4	24	69.0	0.541	0.078	L/616
Center Span	46.7	0.459	11.7	24	71.8	0.163	0.006	L/8033
Right Span	46.7	0.459	37.4	24	69.0	0.541	0.078	L/616

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Brng (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffen Req'd ?
R1	46.7	1.00	346.0	622.8	0.0	0.07	No
R2	128.5	1.00	608.5	1095.2	46.7	0.38	No
R3	128.5	1.00	608.5	1095.2	46.7	0.38	No
R4	46.7	1.00	346.0	622.8	0.0	0.07	No

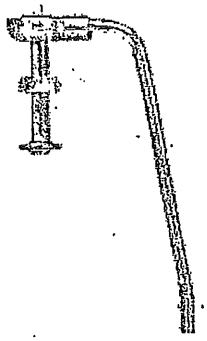
Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffen	Intr. Stiffen
R1	46.7	0.0	1.00	0.06	0.00	0.00	NA
R2	70.1	46.7	1.00	0.08	0.46	0.22	NA
R3	70.1	46.7	1.00	0.08	0.46	0.22	NA
R4	46.7	0.0	1.00	0.06	0.00	0.00	NA

Hilti X-CW Ceiling Wire Assembly

1.1 Product Description

The Hilti X-CW Ceiling Wire Fastening Assembly consists of a pre-mounted powder-actuated fastener, either X-U or X-C type, with a pre-mounted 0.06 in. (1.5 mm) thick steel clamping washer and a 12 gauge (0.106 in./2.7 mm) diameter galvanized, soft annealed mild carbon steel wire for supporting direct and indirect hung suspended lay-in panel ceilings.



1.2 Material Specifications

Fastener Designation	Powder-Actuated Fastener Material	Powder-Actuated Fastener Plating	Steel Clamping Washer Material	Steel Clamping Washer Plating	Ceiling Wire Material	Ceiling Wire Plating
X-CW	Carbon Steel	5 µm Zinc[1]	Carbon Steel	16 µm Zinc[2]	Carbon Steel	6 µm Zinc[3]

1 ASTM B 633, SC 1, Type III
2 ASTM A 653/A 653M, Z120
3 ASTM A 641/A 641M, Class 1

1.3 Technical Data

Allowable Loads for Hilti X-CW Ceiling Wire Assemblies Installed in Normal Weight Concrete[1,2,3,4]

Ceiling Wire Type	Concrete Compressive Strength			
	4000 psi		6000 psi	
	Tension	45-Degree	Tension	45 Degree
X-CW C27	210	210	–	–
X-CW C32	210	210	–	–
X-CW U22	–	–	100	90
X-CW U27	210	210	130	150

1 The tabulated allowable loads apply to the X-CW ceiling wire assembly using a minimum safety factor of 5 in accordance with ICC-ES AC70 if controlled by the powder-actuated fastener pullout or 2.5 in accordance with ICC-ES AC368 if controlled by the wire yielding and fracture.
2 Allowable values are for fasteners installed in concrete having the designated compressive strength at the time of installation.
3 Concrete thickness at the point of penetration must be a minimum of the fastener embedment depth plus 1-1/2".
4 Mulitple fasteners must be used for suspended ceiling applications.

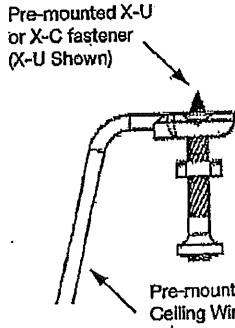
Allowable Loads for Hilti X-CW Ceiling Wire Assemblies Installed in Structural Lightweight Concrete over Composite Floor Deck[1,2,3,4]

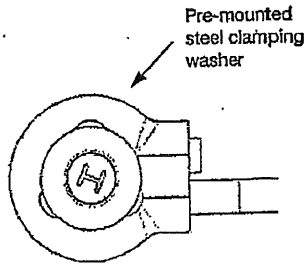
Ceiling Wire Type	3,000 psi Concrete Compressive Strength			
	Upper Flute		Lower Flute	
	Tension	45-Degree	Tension	45 Degree
X-CW C27	110	210	100	145
X-CW C32	150	210	100	145
X-CW U27	170	210	100	145

1 The tabulated allowable loads apply to the X-CW ceiling wire assembly using a minimum safety factor of 5 in accordance with ICC-ES AC70 if controlled by the powder-actuated fastener pullout or 2.5 in accordance with ICC-ES AC368 if controlled by the wire yielding and fracture.
2 Allowable values are for fasteners installed in concrete having the designated compressive strength at the time of installation.
3 Testing completed in composite floor deck having a minimum thickness of 20 gauge (0.0358") and a minimum yield strength (Fy) of 38 ksi. Figures 2 – 4 show nominal flute dimensions, fastener locations and load orientations for the deck profile. Concrete thickness at the point of penetration must be a minimum of the fastener embedment depth plus 1-1/2".
4 Mulitple fasteners must be used for suspended ceiling applications.

Approvals

ICC-ES (International Code Council)
Pending
COLA (City of Los Angeles)
Pending





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Riverside CA 92509

383 US Route One, Ste 2E
Scarborough, ME 04074

Project Number: 1809068-1
Project Name: MARTIN'S PT
Eng. Name:
Date: 12/09

9

SEISMIC BRACING CHECK

- SEISMIC DEAD LOAD = 15 PSF (CONSERVATIVE)
- PER ASCE 7-05, SECT. 13.3.1,

$$F_p = \frac{0.4\, a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\frac{z}{h}\right) \leq 1.6 S_{DS} I_p W_p = 0.408 W_p$$
$$\geq 0.3 S_{DS} I_p W_p = 0.076 W_p$$

- $a_p = 1.0$ } ASCE TABLE 13.5-1
- $R_p = 2.5$ }
- $S_{DS} = 0.255$ PER CONTRACT STRUCT. DWGS
- $I_p = 1.0$ ASCE SECT. 13.1.3
- $z = 28'-6"$
- $h = 35'-0"$
- $F_p = 0.091 W_p$ $\geq 0.076 W_p$ $\leq 0.408 W_p$
- $F_p = 1.36$ PSF

— BRACE W/ITH 12 GA. DIAG. WIRES @ 12' O.C. MAX

$$P_{BRACE} = \frac{(12')(12')(1.36\,psf)}{\cos 45^\circ} = 277\#$$

* BREAKING POINT, 12 GA WIRE = 282# ⟵ CONTROLS
* PULLOUT - INNER WIRE HOLES = 375#
  * INCLUDES $\phi = 0.75$

— ANCHOR @ 3000 PSI CONCRETE W/ (1) 1/4" Ø HILTI TIE-WIRE HEAD HUC-T ANCHOR WITH 1" MIN. EMBEDMENT.

$T_{ALLOW} = 400\#$

$V_{ALLOW} = 560\#$

$R_x = R_y = 196\#$

$$\frac{196}{400} + \frac{196}{560} = 0.84 < 1.0 \checkmark$$

TO BE APPROVED BY OWNER'S ARCHITECT AND ENGINEER