



# ENGINEERING EVALUATION

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## EVALUATION CENTER

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## RENDERED TO

**International Materials, Inc.**  
**2045 Placentia Avenue**  
**Costa Mesa, CA 92627**

PRODUCT EVALUATED: Sure-Board® Series 200 and 200W  
EVALUATION PROPERTY: Fire Resistance

**Engineering Evaluation of Sure-Board® Series 200 and 200W for compliance with the applicable requirements of the following criteria: ASTM E-119-08 and CAN/ULC S101-07 Standard Methods For Fire Tests of Building Construction and Materials.**

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## 2 Introduction

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Intertek is conducting an engineering evaluation for International Materials, Inc., on Sure Board® Series 200 and 200W, to evaluate fire resistance. The evaluation is being conducted to determine if wall assemblies using Sure Board® will provide 1 and 2 hour ratings in accordance with ASTM E119 -09c and CAN/ULC S101-07 Standard Methods for Fire Tests of Building Construction materials.

## 3 Product and Assembly Description

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### 3.1. Product and/or Assembly Description:

Sure-Board® 200 is a 22 gage steel sheet that is supplied in 4 ft. widths, and various lengths, Laminated to all available gypsum, Magnesium Oxide Board and cement based non-combustible sheathing materials that is fastened to wall studs to provide structural stability to the wall. It is adhered to gypsum wallboard for ease of installation. Sure-Board® 200W is the same steel sheet but it is adhered to 1/8" thickness MDF or other non-combustible sheathing materials, for ease of operation

### 3.2. Product and/or Assembly Traceability:

Due to the simple nature of this product, and its performance characteristics, the test specimens were documented at the laboratory. As part of this project, Teresa Jiang visited the factory on December 15, 2009 to document the materials and quality control procedures, to confirm consistency with the test report information.

### 3.3. Product and/or Assembly Certification:

- International Materials is an Intertek testing client but not yet an Intertek Listing and Follow-up Service client, which means Sure-Board® Series 200 and 200W are not Intertek certified products and Intertek does yet not have any Listings for these products contained in the Intertek Directory of Listed Building Products.

*Authorities Having Jurisdiction (AHJ) should be consulted in all cases as to the particular requirements covering the installation and use of Intertek certified products, equipment, systems, devices and materials. The AHJ should be consulted before construction. Fire resistance assemblies and products are developed by the design submitter and have been investigated by Intertek for compliance with specific requirements. The published information (product and design listings) cannot always address every construction nuance encountered in the field. When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the test standard referenced for each Intertek certified product. The test standard includes specifics concerning alternate materials and alternate methods of construction. Only products which bear Intertek's Mark are considered as certified. The appearance of a company's name or product in Intertek Directory of Listed Building Products does not in itself assure that products so identified have been manufactured under Intertek's Follow-Up Service. Only those products bearing the Intertek Mark should be considered to be Listed and covered under Intertek's Follow-Up Service. Always verify the Mark on the product before using it.*

## 4 Reference Documents

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As part of this evaluation, Intertek has directly or indirectly used the following referenced documents:

- The Gypsum Association Fire Resistance Design Manual
- ASTM E119-08a "Standard Test Method for Fire Tests of Building Construction and Materials".
- CAN/ULC S101-07 "Standard Method of Fire Tests of Building Construction and Materials".
- T. Z. Harmathy "Ten Rules of Fire Resistance Rating" *Fire Tech*, 1, p. 93 (1965).
- ASTM E 2032 "Standard Guide For Extension of Data From Fire endurance Tests
- Intertek Test Report No. 3056688(a) and 3056688(b) dated May 2004 and 3101556-001, 002 dated November 30, 2006
- Test Report WHI 495-1687 dated 8/19/2002
- Quality Control Manual – Sure-Board® 200
- Quality Control Manual – Sure-Board® 200W

## 5 Evaluation Method

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The objective of this evaluation is to review the test documentation, and in-plant information to determine if the referenced products are eligible for Listing, and to develop wall design Listings for publication in the Intertek Directory of Listed Products. The client also requested that we provide commentary on the effect of the Sure-Board® products on the wall systems Listed in the Gypsum Association Fire Resistance Design Manual.

*This evaluation is being conducted solely for the above italicized referenced project or use or both. Due to the variables that exist from project to project and the fact that each evaluation requires review of the most current existing data and information, this evaluation is not to be used as justification for any other opinion nor used for any other project, without the express written consent of Intertek. This report should serve as Intertek's opinion regarding the use of the certified product in the conditions described herein. The materials used on the project, which are applied in compliance with Intertek Design Listings, must bear the Intertek listing mark. All certified products must be installed in accordance with the details contained in Intertek's Directory of Listed Building Products.*

The primary function of the Sure-Board® steel sheets is to provide shear stability to the wall assembly, and hence improve the structural performance. In buildings required to be of non-combustible construction, Sure-Board® Series 200 is used, in buildings of combustible construction, Sure-Board® Series 200 or 200W may be used. The Series 200 steel sheet is supplied adhered to Type X or Type C gypsum wallboard or cement based sheathing for ease of application. The gypsum wallboard screws used to fasten the wallboard also fasten the steel sheets to the studs. Hence once the product is installed, the adhesive between the board and the gypsum is no longer needed. Our test program revealed that the presence of the Series 200 and 200W steel sheet products improved fire resistance of the wall assembly. The steel tended to even out the unexposed side temperatures, and the wall assemblies tested passed the hose stream tests after the full fire exposure rating period, which is unusual for conventional gypsum wallboard assemblies. The steel sheets provided a solid barrier, and hence prevented the passage of a stream of water through the assemblies. The MDF of the 200W improved the fire resistance of the wall assemblies, as is expected according to the "Ten Rules of Fire Resistance Rating" by T.Z. Harmathy, which states that adding materials to an assembly will add fire resistance. The steel sheets also add lateral stability to reduce the ability for the studs to buckle under load, hence improving the load bearing characteristics. For these reasons, the addition of Sure-Board® products described should not reduce the fire resistance of the assemblies described in the Gypsum Association Fire Resistance Design Manual.

The four fire resistance designs enclosed represent commonly used assemblies that describe conventional rated wall assemblies for 1 and 2 Hour ratings with the addition of the Sure-Board® products, as per the fire test program. The assemblies were tested without thermal insulation in the stud cavities, as this is a worst case for temperature rise and for softening of the studs. For this reason, fiberglass or rock wool insulation may be added to the assemblies. The Listing Design CEM/MSF 120-02 is based on Test #3 of report 3056688(a) which was tested with 7/8" sand cement plaster on the fire exposed side. This assembly met the 2 Hour rating requirements but with reduced loading. To improve the fire resistance so that reduced loading is not required, the design was changed to require adding a layer of 5/8" Type X gypsum wall board under the plaster layer. A layer of 5/8" Type X gypsum wallboard will add typically 35 minutes of fire resistance to a wall assembly. Since the load was first reduced at 85 minutes into the test, this added layer will resolve the need for load reduction, and hence the assembly so modified will provide a 2 hour rating under full design load.

The factory inspection confirmed the Series 200 steel gauge and specification was as per the information noted in the original test file. The gypsum wallboard used in the program was conventional Type X which is generic, and the adhesive used is required for installation only, and not product performance in the fire test. The Series 200 consequently is eligible for Listing. The Series 200W uses 1/8" MDF and Magnesium Board in place of gypsum wallboard. The MDF and magnesium board is generic, and is specified based on minimum thickness, as per the test program. The Series 200W is consequently eligible for Listing.

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## 6 Conclusion

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Intertek is conducting an engineering evaluation for International Materials, Inc., on Sure-Board® 200 and 200W, to evaluate fire resistance. The evaluation is being conducted to determine if wall assemblies using Sure Board® will provide 1 and 2 hour ratings in accordance with ASTM E119 -08 and CAN/ULC S101-07 Standard Methods for Fire Tests of Building Construction materials.

Based on the information contained and referenced herein, it is Intertek's professional judgment based on sound engineering principles that the following is true:

- The Sure-Board® Series 200 and 200W are eligible for Listing, and the following Listings were developed; CEM/MSF 60-01, CEM/MSF 60-02, CEM/MSF 120-01, and CEM/MSF 120-02.
- The addition of Sure-Board® Series 200 and 200W will not reduce the fire resistance of the wall assemblies described in the Gypsum Association Fire Resistance Design Manual.

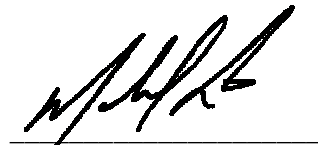
**INTERTEK Testing Services NA Ltd.**

Reported by:



Greg Philp  
**Senior Project Leader, Construction Products**

Reviewed by:



Michael E. Luna  
**General Manager, Building Products**

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## **7 APPENDIX**

### **Listing Designs**

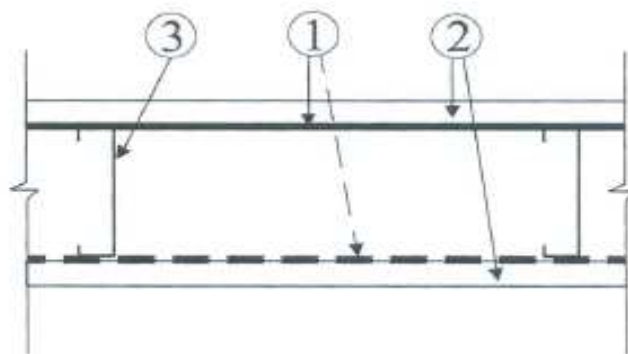
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## 7.1. Design Number CEM/MSF 60-01

### Division 05 – Metals 05 41 00 Structural Metal Framing

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#### DESIGN NUMBER CEM/MSF 60-01 Wall Assembly Rating 60 Minutes, Loadbearing ASTM E-119, CAN/ULC S101-M



1. Shear Panel - Sure-Board® Series 200 or 200W located on one side or both sides of the stud framing, oriented vertically or horizontally, and fastened in accordance with the manufacturer's instructions.
2. Wall Finish Material – One layer of 5/8" Type X or 1/2" Type C gypsum wallboard or sure-Board® Series 200 (item #1) with layer of 5/8 in. Type X or 1/2 in. Type C wallboard already attached. joints oriented vertically or horizontally and fastened with min. 1 1/4" drywall screws located 6" OC maximum on edge 12" OC maximum at field.

**Note** If Sure-board Series 200 panels are used gypsum wallboard is already installed

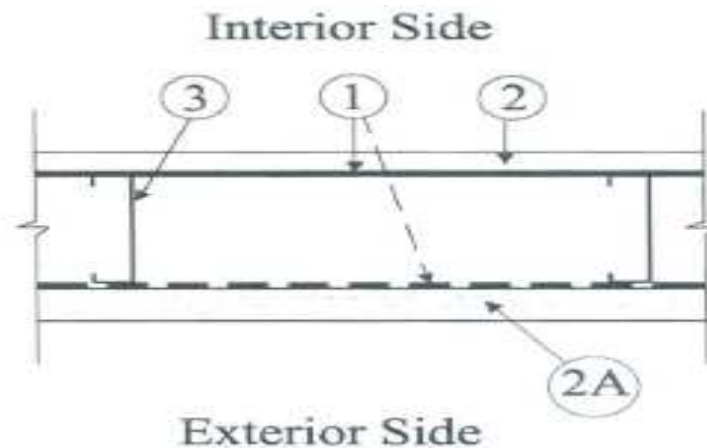
3. Wall Studs – Minimum 20 gage, Minimum 3 5/8" depth X 1 5/8" CFS Loadbearing Studs, at 24" OC Maximum.
  4. Insulation (not shown) – Fiberglass or rockwool insulation may be added to wall cavities to enhance thermal or acoustic performance.
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## 7.2. Design Number CEM/MSF 60-02

### Division 05 – Metals 05 41 00 Structural Metal Framing

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#### DESIGN NUMBER CEM/MSF 60-02 Exterior Wall Assembly Rating 60 Minutes, Loadbearing ASTM E-119, CAN/ULC S101-M



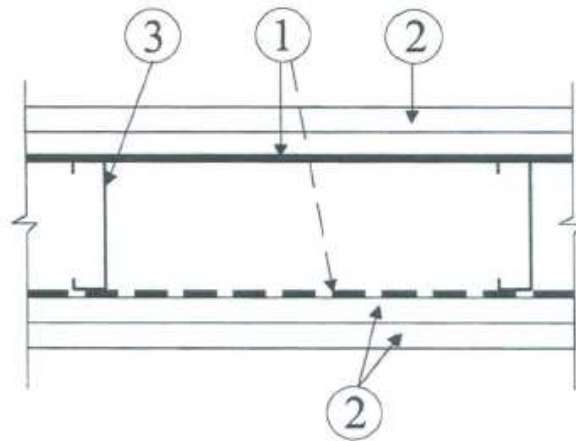
1. Shear Panel - Sure-Board® Series 200 or 200W located on one side or both sides of the stud framing oriented vertically or horizontally, and fastened in accordance with the manufacturer's instructions.
  2. Wall Finish Material – **Interior Side:** One layer of 5/8 " Type X or 1/2 ". Type C gypsum wallboard or Sure-Board® Series 200 (item #1) with layer of 5/8 in. Type X or 1/2 in. Type C wallboard already attached. joints oriented vertically or horizontally and fastened with min. 1 1/4" drywall screws located 6" OC maximum on edge 12" OC maximum at field.
  - 2A Wall Finish Material – **Exterior Side:** Minimum 7/8 in. thick sand/cement plaster conforming to code requirements
  3. Wall Studs – Minimum 20 gage, Minimum 3 5/8" depth X 1 5/8" CFS Loadbearing Studs, at 24" OC Maximum.
  4. Insulation (not shown) – Fiberglass or rockwool insulation may be added to wall cavities to enhance thermal or acoustic performance.
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### 7.3. Design Number CEM/MSF 120-01

**Division 05 – Metals**  
**05 41 00 Structural Metal Framing**

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**DESIGN NUMBER CEM/MSF 120-01**  
**Exterior Wall Assembly**  
**Rating 120 Minutes, Loadbearing**  
**ASTM E-119, CAN/ULC S101-M**



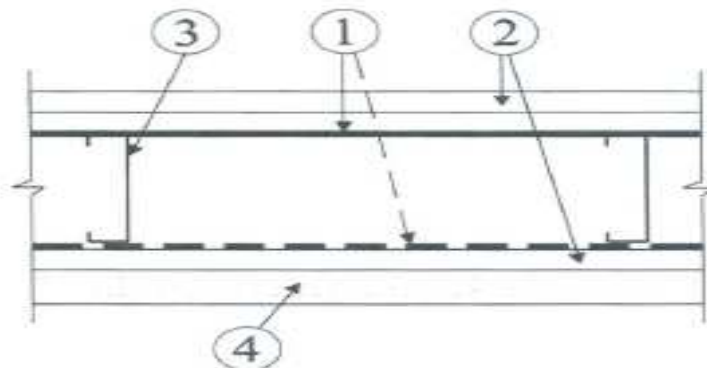
1. Shear Panel - Sure-Board® Series 200 or 200W located on one side or both sides of the stud framing, oriented vertically or horizontally and fastened in accordance with the manufacturer's instructions.
  2. Wall Finish Material – **Base layer** of 5/8". Type X or 1/2" Type C gypsum wallboard, oriented vertically or horizontally and fastened with minimum 1 1/4" drywall screws located 6" OC maximum on all edges and 12" OC maximum at field. If **Base Layer** is Sure-Board® Series 200 (item #1) with a layer of 5/8 in. Type X or 1/2 in. Type C wallboard already attached **Finish Layer** of 5/8 in. Type X or 1/2 in. Type C gypsum wallboard, oriented vertically or horizontally with joints staggered over base layer joints and fastened using 1 3/4 in. drywall screws located 6" OC maximum on all edges and 12" OC maximum at field  
**Note** alternate attachment if Sure-Board® is Base Layer. Finish layer of gypsum wallboard may be fastened to the steel sheet on Sure-Board® instead of framing members.
  3. Wall Studs – Minimum 20 gage, Minimum 3 5/8" depth X 1 5/8" CFS Loadbearing Studs, at 24" OC Maximum.
  4. Insulation (not shown) – Fiberglass or rockwool insulation may be added to wall cavities to enhance thermal or acoustic performance.
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## 7.4. Design Number CEM/MSF 120-02

### Division 05 – Metals 05 41 00 Structural Metal Framing

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#### DESIGN NUMBER CEM/MSF 120-02 Wall Assembly Rating 120 Minutes, Loadbearing ASTM E-119, CAN/ULC S101-M



1. Shear Panel - Sure-Board® Series 200 or 200W located on one side or both sides of the stud framing, oriented vertically or horizontally and fastened in accordance with the manufacturer's instructions.
  2. Gypsum Wallboard – Interior/Exterior **Base Layer**: One layer of 5/8" Type X or 1/2" Type C gypsum wallboard, oriented vertically or horizontally and fastened with min. 1 1/4" drywall screws located 6"OC maximum on all edges and 12" OC maximum at field. If **Base Layer** is Sure-Board® Series 200 (item#1) a layer 5/8 in. Type X or 1/2 in. Type C wallboard already attached. **Interior Finish Layer**. 5/8 in. Type X or 1/2 in. Type C gypsum wallboard, oriented vertically or horizontally with joints staggered over base layer joints and fastened using 1 3/4 in. drywall screws located 6"OC maximum on all edges and 12" OC maximum at field  
**Note** alternate attachment if Sure-Board® is Base Layer. Finish layer of gypsum wallboard may be fastened to the steel sheet on Sure-Board® instead of framing members.
  3. Wall Studs – Minimum 20 gage, Minimum 3 5/8" depth X 1 5/8" CFS Loadbearing Studs, at 24" OC Maximum.
  4. Exterior Side: Minimum 7/8" thick sand / cement plaster conforming to Code requirements.
  5. Insulation (not shown) – Fiberglass or rockwool insulation may be added to wall cavities to enhance thermal or acoustic performance.
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## 8 LAST PAGE & REVISION SUMMARY

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<b>DATE</b>	<b>SUMMARY</b>
May 23, 2010	Original
July 5, 2010	Update design listings