ENGINEERING EVALUATION

REPORT NUMBER: 3172904SAT-004,-014 EEV
ORIGINAL ISSUE DATE: March 24, 2009
REVISED DATE: Original

EVALUATION CENTER
Intertek Testing Services, Inc.
16015 Shady Falls Road
Elmendorf, TX 78112

RENDERED TO

United Plastics Corporation
511 Hay Street
Mt. Airy, NC 27030
Phone: 336-429-1355

PRODUCT EVALUATED: dB-3™ Professional Series Sound, Air & Moisture Barrier
EVALUATION PROPERTY: Fire Resistance

Engineering Evaluation of dB-3™ Professional Series Sound, Air & Moisture Barrier **for compliance with the applicable requirements of the following criteria:** ***ASTM E119-08, Fire Tests of Building Construction and Materials; UL 263, Fire Tests of Building Construction and Materials – Thirteenth Edition; CAN/ULC S101-07, Standard Methods of Fire Endurance Tests of Building Construction Materials.***

1 Introduction

Intertek is conducting an engineering evaluation for United Plastics Corporation on a product described by the client as dB-3™ Professional Series Sound, Air & Moisture Barrier. The evaluation being conducted is to determine if the product dB-3™ Professional Series Sound, Air & Moisture Barrier as submitted by the client will maintain compliance or show equivalency with ASTM E119-08*, Fire Tests of Building Construction and Materials* and UL 263*, Fire Tests of Building Construction and Materials – Thirteenth Edition* and meet the conditions of compliance to achieve the following:

I. Fire Resistance Ratings
- *A. A 1-hour symmetric fire-rated wall with one layer of gypsum on each side of the wall.*
- *B. A 2-hour symmetric fire-rated wall with two layers of gypsum on each side of the wall.*

II. Wall Types
- *A. Non-loadbearing wall containing wood studs.*
- *B. Non-loadbearing wall containing steel studs.*

III. Stud Spacings
- *A. 12" o.c. stud spacing*
- *B. 16" o.c. stud spacing*
- *C. 24" o.c. stud spacing*

IV. Insulation
- *A. Without insulation filling the stud cavity*
- *B. With insulation filling the stud cavity*

The client has requested that Intertek also evaluate whether the dB-3™ product will also maintain compliance or show equivalency in the combinations identified as a result of the evaluation above with CAN/ULC S101-07, *Standard Methods of Fire Endurance Tests of Building Construction and Materials - Fourth Edition*.

This Engineering Evaluation is based on data obtained from fire resistance testing performed for the client between February 26 and March 5, 2009 (see Intertek Test Report Nos. 3172904-1 and 3172904-2, -3).

United Plastics Corporation is an Intertek testing client but has not completed our program to become an Intertek Listed client for dB-3™ Professional Series Sound, Air & Moisture Barrier, which means Intertek does not have any Listings for United Plastics Corporation's dB-3™ product contained in our *Directory of Listed Building Products*. This letter will serve as Intertek's opinion on non-loadbearing wall assembly testing using dB-3™. It does not address specifics of the product, including traceability of test samples and installation, or actual test data generated.

2 Product Description

dB-3™ Professional Series Sound, Air & Moisture Barrier manufactured by United Plastics Corporation is described by the client as a flexible sound, air and moisture barrier sheeting material formed from ethylene vinyl acetate (EVA). The following description of the product is from of the United Plastics Corporation website for the dB-3™ product, found at http://www.db-3sam.com/:

> *dB-3™ is an effective product for soundproofing rooms in a cost efficient manner. dB-3™ is a flexible, dense product that comes in rolls or sheets to meet your construction capabilities. Perfect for personal home theater rooms, multi-family dwellings — anywhere noise is an issue and needs to be reduced. Also ideal for construction to act as a moisture barrier and to prevent heat loss, thus improving the efficiency of HVAC systems.*
>
> *dB-3™ is made in the USA in Mount Airy, North Carolina.*

Product Specs of dB-3™

Surface Weight	*ASTM D792*	*1 lb/ft2*
Thermal Resistance	*ASTM C518*	*R-Value=0.3*
Acoustical	*SAE J1400*	*STC=25*
Tear Strength	*ASTM D624*	*200 N/cm*
*Flammability**	*ASTM E84*	*Class 1 / Class A*
*Flame Spread Index**	*ASTM E84*	*5*
*Smoke Developed Index**	*ASTM E84*	*0*

* *Flammability ratings are based on installation behind 3/8" or thicker, Class 1-rated gypsum wallboard*
* *Test Report T-12435 tested 10/17/07 at HPVA Laboratory and Test Services*

Figure 1. Example of installation of dB-3™.

Figure 2. Example of Installation of dB-3™ - detail.

The client describes the dB-3™ product as being designed to be attached to wall studs prior to the installation of gypsum wallboard, in an overlap pattern. For the purposes of this evaluation, it should be noted that the product was applied to both sides of the wall assembly. Please note that the images above (Figures 1 and 2, obtained from the client's website), show an asymmetric application of the product, and are for reference only. The client has stated that there are no additional materials added to a wall assembly for the installation of the product other than appropriate fasteners to hold the product in place until the gypsum wallboard is attached to the structural members.

The client elected not to have the test samples witnessed or selected by an Intertek inspector. The samples tested were selected and shipped by the manufacturer to the Intertek San Antonio Laboratory.

No elements of traceability are discussed in this document. As part of the Intertek product certification program a Quality Control Manual would be developed for dB-3™. A product traceability procedure is an integral part of that document.

When United Plastics Corporation becomes an Intertek certified client and the dB-3™ Professional Series Sound, Air & Moisture Barrier becomes an Intertek certified product, the Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of Intertek certified products. Authorities Having Jurisdiction 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 applicable requirements. The published information cannot always address every construction nuance encountered in the field. When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the test standard 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 our Directory of Listed 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.

3 Reference Documents

As part of this evaluation, Intertek ES SAT has used the following referenced documents:

- ANSI/ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials.*
- ANSI/ASTM E2032, *Standard Guide for Extension of Data from Fire Resistance Tests Conducted in Accordance with ASTM E 119.*
- CAN/ULC S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials.*
- Egan, M. D., *Concepts in Building Fire Safety*, 1978.
- Harmathy T.Z., *Ten Rules of Fire Endurance Ratings*, May 1965 Edition of Fire Technology (35).
- 2006 INTERNATIONAL BUILDING CODE®

- Lie, T. T., *Fire and Buildings*, Applied Science Publishers, Ltd., 1972.
- Sultan, M.A., Lougheed, G.D., *IR-833: Results of Fire Resistance Tests on Full-Scale Gypsum Board Wall Assemblies*, National Research Council of Canada, August 2002.
- TECHNICAL REPORT ISO/TR 12470 First edition 1998-07-15 Fire resistance tests — Guidance on the application and extension of results.
- The SFPE Handbook of Fire Protection Engineering, 3rd Edition.
- The NFPA Fire Protection Handbook, Eighteenth Edition.
- Intertek Test Report No. 3172904-1
- Intertek Test Report No. 3172904-2, -3

4 Evaluation Method

1. *Determine, based on the available fire-resistance testing data, for which of the following combinations of designs the product dB-3™ Professional Series Sound, Air & Moisture Barrier as submitted by the client will maintain compliance or show equivalency with ASTM E119-08, Fire Tests of Building Construction and Materials and UL 263, Fire Tests of Building Construction and Materials – Thirteenth Edition:*

   I. *Fire Resistance Ratings*
      A. *A 1-hour symmetric fire-rated wall with one layer of gypsum on each side of the wall.*
      B. *A 2-hour symmetric fire-rated wall with two layers of gypsum on each side of the wall.*
   II. *Wall Types*
      A. *Non-loadbearing wall containing wood studs.*
      B. *Non-loadbearing wall containing steel studs.*
   III. *Stud spacings*
      A. *12" o.c. stud spacing*
      B. *16" o.c. stud spacing*
      C. *24" o.c. stud spacing*
   IV. *Insulation*
      A. *Without insulation filling the stud cavity*
      B. *With insulation filling the stud cavity*

2. *Determine if the combinations identified as a result of the evaluation in 1, above, will also maintain compliance with CAN/ULC S101-07 Standard Methods of Fire Endurance Tests of Building Construction and Materials – Fourth Edition.*

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 letter 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 letter should serve as Intertek's opinion regarding the use of the non-certified product in the conditions described herein.

It is our understanding that the client requests that Intertek perform an engineering evaluation, based on data obtained from fire-resistance testing performed to ASTM E119-08*, Fire Tests of Building Construction and Materials* and UL 263*, Fire Tests of Building Construction and Materials – Thirteenth Edition* by the client between February 26 and March 5, 2009 at Intertek

SAT, to determine compliance of United Plastic's dB-3^{TM} Professional Series Sound, Air & Moisture Barrier product for additional scenarios.

Please note: For product certification purposes, the manufacturing facility at which the dB-3^{TM} Professional Series Sound, Air & Moisture Barrier product is produced would need a Level III audit performed. At that time, the manufacture of the dB-3^{TM} product would be documented and samples would be collected for fire testing. An Intertek Quality Control Manual would then be drafted for the facility to help ensure that the certified product meets the same requirements as the originally tested product. At this time, Intertek has no knowledge of the quality assurance or manufacturing provisions of the untraceable product that was tested between February 26 and March 5, 2009.

4.1 Background

Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E 119-08a
1. Scope

1.1 The test methods described in this fire-test-response standard are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including bearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

1.2 It is the intent that classifications shall register comparative performance to specific fire-test conditions during the period of exposure and shall not be construed as having determined suitability for use under other conditions or after fire exposure.

1.3 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products or assemblies under actual fire conditions.*

1.4 These test methods prescribe a standard fire exposure for comparing the test results of building construction assemblies. The results of these tests are one factor in assessing predicted fire performance of building construction and assemblies. Application of these test results to predict the performance of actual building construction requires the evaluation of test conditions.

1.5 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.7 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

Fire Tests of Building Construction and Materials
UL 263
1 Scope

1.1 These fire tests are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including bearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

1.2 The classifications for building construction and materials are intended to register performance during the period of fire exposure and are not intended to be interpreted as having determined their acceptability for use after fire exposure.

1.3 These requirements are intended to evaluate the length of time that the types of assemblies specified in 1.1 will contain a fire or retain their structural integrity, or both, dependent upon the type of assembly involved, during a predetermined test exposure. The test evaluates the assembly's resistance to heat, and in some instances to a hose stream, while carrying an applied load, if the assembly is load bearing.

1.4 Under these requirements a specimen is subjected to a standard fire exposure controlled to achieve specified temperatures throughout a specified time period. In some instances, the fire exposure may be followed by the application of a specified standard fire hose stream. This exposure by itself may not be representative of all fire conditions; conditions may vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat sink characteristics of the compartment. These requirements provide a relative measure of fire performance of comparable assemblies under these specified fire exposure conditions. Any variation from the construction or conditions that are tested such as size, method of assembly, and materials, may substantially change the performance characteristics of the assembly.

1.5 These requirements cover the following measurements and determinations during the test exposure:

1. Measurement of the transmission through the assembly of heat, and of gases sufficiently hot to ignite cotton waste in walls, partitions, floors, and roofs.
2. Measurement of the load carrying ability of load bearing elements in wall, partition, floor, and roof assemblies.
3. Measurement of the load carrying ability of individual load bearing assemblies, such as beams and columns, with consideration for the end support conditions, either restrained or not restrained.

1.6 These requirements do not cover:

1. Accumulation of data as to performance of assemblies constructed with components or lengths other than those tested.

2. Evaluation of the contribution of the assembly to generation of smoke, toxic gases, or other products of combustion.
3. Measurement of the degree of control or limitation of the passage of smoke or products of combustion through the assembly.
4. Simulation of the fire behavior of joints between building elements, such as floor-wall or wall-wall, and like connections.
5. Measurement of flame spread over the surface of the tested element.
6. The effect on fire endurance of conventional openings in the assembly, such as openings for electrical receptacle outlets, plumbing pipe, or the like, unless specifically provided for in the construction tested.

1.7 Tests for burning characteristics of building materials, based on the rate of flame spread, can be found in the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723.

1.8 The tests described herein may be cited as the "Standard Fire Tests," and the performance of exposure expressed as "2-hour," "6-hour," "1/2-hour," or the like.

1.9 The results of these tests represent one factor in assessing fire performance of building construction and assemblies. These requirements prescribe a standard fire exposure for comparing the performance of building construction assemblies. Application of these test results to predict the performance of actual building construction requires careful evaluation of test conditions.

1.10 If a factor of safety exceeding that inherent in the test conditions is desired, a proportional increase should be made in the specified time classification period.

STANDARD METHODS OF FIRE ENDURANCE TESTS OF BUILDING CONSTRUCTION AND MATERIALS
CAN/ULC-S101-07
1. SCOPE

1.1 This Standard covers fire endurance tests applicable to walls, partitions, floors, roofs, ceilings, columns, beams, and girders, as well as to some components of these building sub-assemblies.

Note: It should be recognized that the performance displayed by a component in one assembly would not necessarily be the same when such component is tested in a dissimilar assembly.

1.2 It is the intent that the fire endurance period established by this test method indicates performance only during the fire exposure period and shall not be construed as having determined suitability for use after fire exposure.

1.3 Separate fire endurance test methods are prescribed for various building constructions and materials, as follows:

Walls and Partitions, Loadbearing	(Section 6)
Walls and Partitions, Non-loadbearing	(Section 7)

Columns	(Section 8)
Columns, Steel, Tests of Protection for	(Section 9)
Floor and Roof Assemblies	(Section 10)
Beams or Joists, Loaded, Restrained	(Section 11)
Beams or Joists, Loaded, Alternative Classification Procedure	(Section 12)
Beams and Girders, Steel, Alternative Tests of Protection for	(Section 13)
Framing and Facings, Combustible, Tests of Protection for	(Section 14)
Ceiling Membranes	(Section 15)

1.4 The fire exposure and hose stream tests are not intended to be representative of all fire conditions. It is likely that conditions will vary with changes in the amount, nature and distribution of fire, loading, ventilation, size and configuration of assembly installed. This fire endurance test Standard provides a relative measure of fire performance of comparable assemblies under specified fire exposure conditions.

4.2 Evaluation

1. Determination, based on the available fire-resistance testing data, of which of the stated combinations of designs the product dB-3™ Professional Series Sound, Air & Moisture Barrier as submitted by the client will maintain compliance or show equivalency with ASTM E119-08, Fire Tests of Building Construction and Materials and UL 263, Fire Tests of Building Construction and Materials – Thirteenth Edition.

The product in question is an internal, symmetrically-installed component of the wall assembly. It is not the major fire-resisting component of the wall assembly, nor is it a major structural component of the wall assembly. As such, the evaluation will determine for which of the stated assembly design scenario options desired by the client the successful testing performed was the worst-case scenario of adding the internal component to the wall assembly.

The following is a list of every scenario which would be tested if every test for the desired scenario options was performed.

1. 1-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
2. 1-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
3. 1-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side dB-3™ on each side.
4. 1-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.

5. 1-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
6. 1-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side dB-3™ on each side.
7. 1-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
8. 1-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
9. 1-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., with insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
10. 1-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
11. 1-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
12. 1-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, dB-3™ on each side.
13. 2-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
14. 2-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
15. 2-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
16. 2-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
17. 2-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
18. 2-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
19. 2-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
20. 2-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
21. 2-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., with insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.

22. 2-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
23. 2-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.
24. 2-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., without insulation filling the stud cavities, two layers of gypsum wallboard on each side, dB-3™ on each side.

There are numerous factors that must be considered in determining whether the fire-resistance-rating results of given tested wall assembly design scenarios are applicable to other wall assembly design scenarios. The addition of an internal component can have multiple effects on the fire resistance of a wall assembly. These effects can be positive or negative in nature.

The client tested two wall assembly design scenarios to the ASTM E119-08 *Standard Test Methods for Fire Tests of Building Construction and Materials.*

1. A 1-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., without insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side was tested. One of the thermocouples on the unexposed side of the wall exceeded the maximum allowable temperature for any one thermocouple during the fifty-eighth minute of the fire resistance test on this wall. No hose stream test was performed on this assembly. See Intertek Test Report No. 3172904-1 for a detailed description of the assembly and test results.

2. A 1-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side was tested. During the 60-minute fire test, there was no passage of flame or gases hot enough to ignite cotton waste, the rise in temperature for any individual TC on the unexposed side did not exceed 325°F and the rise in the average TC temperature on the unexposed side did not exceed 250°F. A successful hose stream test was performed on a duplicate wall assembly that had a fire-test exposure of 30 minutes, as required by ASTM E119 for a 1-hour fire resistance rating. See Intertek Test Report No. 3172904-2, -3 for a detailed description of the assembly and test results.

The industry standard regarding stud spacing is to test the largest spacing desired for use. Data from a passing fire test of a wall assembly consisting of the largest stud spacing may be used to allow the smaller stud spacings. Therefore, the passing 1-hour non-loadbearing steel-frame wall assembly, with studs spaced at 24" o.c., 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side, may be used to allow similar wall assemblies with smaller stud spacings of 16” o.c. and 12” o.c.

A wood-frame wall assembly has the disadvantage of being combustible. As a wood-frame wall assembly heats from the standard fire exposure, the wood studs begin to char on the fire side (exposed side) of the wall assembly when the ignition temperature of the wood is reached. Wood studs do have the advantage of containing small amounts of moisture which is released as the wood heats, as described by Harmathy[1]:

[1] Harmathy T.Z., *Ten Rules of Fire Endurance Ratings*, May 1965 Edition of Fire Technology (35).

"Rule 8: The presence of moisture, if it does not result on explosive spalling, increases the fire endurance."

This small amount of moisture does delay the wood reaching the ignition temperature of the wood. The ignition temperature of common wood species used for wall assemblies is approximately 500˚F. The extreme temperatures of the furnace in fire test surpass the 500˚F mark in the first five minutes. The wood studs are shielded by the gypsum board which must become fully calcined before the wood studs will begin to be adversely affected by the standard fire exposure. The ignition of wood creates a char on the wall that will provide some protection to the interior of the wood member. In the wall assembly scenarios being discussed, protection by char would be a minimum.

A steel-frame wall assembly has the advantage of being non-combustible as defined by the building codes. Many properties of steel increase its performance in a fire test. The thermal inertia of steel (thermal inertia is the product of a materials thermal conductivity (k), density (ρ), and heat capacity (c)) is higher then that of wood. The thermal inertia is a property that describes the material's resistance to temperature change. A material with a higher thermal inertia will resist temperature change longer then that of a material with a lower thermal inertia. But the thermal mass of common steel studs is small due to the small amount of material used in common steel studs. The high thermal conductivity of steel allows it to transfer heat to surrounding materials. In the design scenarios under discussion, this transfer of heat may cause negative effects on the assembly. At approximately 1100˚F, steel will loose about 60 percent of its yield stress when compared to the yield stress of the same steel at room temperature. Steel also has a high coefficient of expansion. In a fire test, steel will expand. This expansion increases the stresses on the steel members.

The tested assemblies that provided the data used for this evaluation were non-loadbearing walls. However, based on the number of design listings available, it is uncommon to test a wood-frame wall assembly in a non-loadbearing scenario. For example, the Gypsum Association Fire Resistance Design Manual (at http://www.gypsum.org/GA60006.html) only includes two non-loadbearing wood-framed wall assemblies, and those assemblies use a stud configuration where the studs are turned flat-wise in the plane of the assembly, rather than a more typical configuration where the wood studs are placed so as to have the wider dimension perpendicular to the plane of the assembly.

The worst-case scenario for fire testing a wall assembly usually consists of a loadbearing wall. This is because the loadbearing situation not only tests a wall assembly's ability to withstand the standard fire exposure for the desired fire rating period, but also the ability of the wall to support the superimposed load applied as the fire degrades the structural integrity of the wall assembly.

As a result, a generic wood-frame wall assembly that has been fire-rated as a loadbearing assembly but is tested in an unloaded condition would perform better than a similar, but non-loadbearing, steel-frame wall assembly with the same fire-resistance rating, tested under the same conditions. Therefore, the passing 1-hour non-loadbearing steel-frame wall assembly, with studs spaced at 24" o.c., 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side, may be used to allow the use of a similar non-loadbearing wall assembly using wood studs in a configuration where the wood studs are placed so as to have the wider dimension perpendicular to the plane of the assembly.

The gypsum wallboard provides protection for the framing members of a light-frame wall assembly through calcination. Gypsum wallboard contains moisture, which when heated is released, effectively slowing the transmission of heat through the gypsum wallboard. The fire resistance of gypsum wallboard has been shown to increase at a greater-than-linear rate when an additional layer of equal size and composition is added. This has been established as a rule for fire resistance as follows:

> "Rule 1: The "thermal" fire endurance of a construction consisting of a number of parallel layers is greater than the sum of the "thermal" fire endurances characteristic of the individual layers when exposed separately to fire.[2]"
>
> "Rule 2: The fire endurance of a construction does not decrease with the addition of further layers.[3]"

There are limitations to these rules which include the addition of a layer that "is liable to undergo some chemical reaction accompanied by large exothermic effects at elevated temperatures.[4]" As stated, gypsum wallboard as been repeatedly shown to be fire resistant in nature. In the scenarios under discussion, since the passing fire test wall assembly was of a non-loadbearing type, the question of fire rating mainly relies on the ability of the gypsum wallboard to remain in place when exposed to the extreme temperatures of a fire test.

Evaluating test data from fire testing of a one-hour non-loadbearing wall assembly with an internal component may qualify a two-hour non-loadbearing assembly of a similar configuration. Therefore, the passing 1-hour non-loadbearing steel-frame wall assembly, with studs spaced at 24" o.c., 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side, may be used to allow a two-hour fire-resistance-rated non-loadbearing assembly of a similar configuration.

The filling of the stud cavities of a light-frame wall assembly with an insulating material can have multiple effects on the fire resistance of an assembly. Those effects also vary depending on the type of insulating material used. In general, the presence of an insulating material in the wall stud cavities retards the flow of heat through an assembly. This results in a slower rise of temperature on the unexposed surface of the wall assembly, which results in an increase in the time at which an assembly will fail a fail due to rise of temperature on the unexposed side. However, since heat cannot escape through the assembly at the same rate when insulating material is in the wall stud cavities compared to when they are empty, more heat is trapped against the gypsum wallboard on the exposed side, which accelerates the rate of calcination of the gypsum wallboard. An accelerated rate of calcination can result in the gypsum wallboard not remaining in place as long as when there is no insulation in the wall stud cavities. Since the majority of fire resistance of a light-frame assembly is provided by the gypsum wallboard, something that reduces the time at which the gypsum wallboard falls off can reduce the fire resistance of the assembly. This reduction can be offset in some cases, depending on whether the insulation remains in place within the wall stud cavities, and if so, for how long. For example, glass fiber insulation degrades quickly when exposed directly to the exposure temperatures of the standard fire resistance test, and therefore provides only some additional protection to the structural members and the gypsum wallboard on the unexposed side of the assembly once the gypsum wallboard on the exposed side has fallen off. On the other hand,

[2] Harmathy T.Z., *Ten Rules of Fire Endurance Ratings*, May 1965 Edition of Fire Technology (35).
[3] Ibid.
[4] Ibid.

mineral wool insulation typically degrades more slowly and at higher temperatures than glass fiber insulation, and therefore may remain in place for a longer period of time once the gypsum wallboard on the exposed side of the assembly has fallen off, protecting the gypsum wallboard on the unexposed side and the sides of the structural members from the full heat of the furnace for a longer time. Research has shown that in non-loadbearing wall assemblies, with all other variables remaining the same, the installation of mineral fiber insulation in the stud wall cavities provides an overall increase in fire resistance compared to a non-insulated wall assembly.[5] It has also shown that in non-loadbearing wall assemblies, the installation of glass fiber or wet-sprayed cellulose fiber insulation did not affect the fire resistance of the assembly compared to a non-insulated wall assembly.[6] Therefore, the passing 1-hour non-loadbearing steel-frame wall assembly, with studs spaced at 24" o.c., 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side, may not be used to allow similar fire-resistance-rated non-loadbearing assemblies with other types of insulation.

Upon examination of the test results for the two assemblies tested (1-hour non-loadbearing steel-frame wall assembly, studs spaced at 24" o.c., one layer of gypsum wallboard on each side, and dB-3™ on each side, with 2.5-pcf-density mineral wool insulation filling the wall stud cavities or without insulation filling the wall stud cavities), there is insufficient information to support the usage of those tests to allow a 2-hour non-loadbearing steel-frame wall assembly, studs spaced at 24" o.c., one layer of gypsum wallboard on each side, and dB-3™ on each side, with no insulation in the wall stud cavity.

2. Determination whether the combinations identified as a result of the evaluation in 1 (above) will also maintain compliance with CAN/ULC S101-07 Standard Methods of Fire Endurance Tests of Building Construction and Materials – Fourth Edition.

To determine whether the wall assembly scenario combinations identified as a result of the evaluation above will maintain compliance with CAN/ULC S101, technical differences between CAN/ULC S101 and ASTM E119 that could affect the outcome of the testing of the identified wall assembly configurations must be identified and the potential effect of those differences must be evaluated.

Time•temperature Curves

The time•temperature curve established by CAN/ULC S101 is defined at one-minute intervals, while the ASTM E119 time•temperature curve is defined at five-minute intervals. However, the resultant curve is very similar - the CAN/ULC S101 temperatures at the 5-minute intervals are the same values as the values defined in ASTM E119.

One can also compare the two time•temperature curves using the 'heat load' concept as a measure of how similar the resultant exposures are. Heat load is the amount of heat applied to an object multiplied by the amount of time that heat is maintained. The general presumption is that equivalent heat loads yield equivalent test results. For example, a 1000°F temperature applied for 10 minutes should be equivalent to a 2000°F temperature applied for 5 minutes provided the object's physical properties can withstand that increased temperature. Both of these heat loads are expressed in terms of degree-minutes (°F•min) and, in this example, both

[5] Sultan, M.A., Lougheed, G.D., *IR-833: Results of Fire Resistance Tests on Full-Scale Gypsum Board Wall Assemblies*, National Research Council of Canada, August 2002.
[6] Ibid.

equal 10,000 °F•min. This method is actually referenced in the ASTM E119 standard and used to determine a correction factor to apply to an endurance rating when the furnace temperature varies from the specified time•temperature curve.

Heat load is determined by integrating the area under the time•temperature curve, and is calculated using the average of all furnace control thermocouples. The area under the curve between each minute of the test is called an increment. Reference Figure 1 as an example of how the increment is defined by the change in time (Δt) related to the change in temperature, which forms the boundaries of the area calculated.

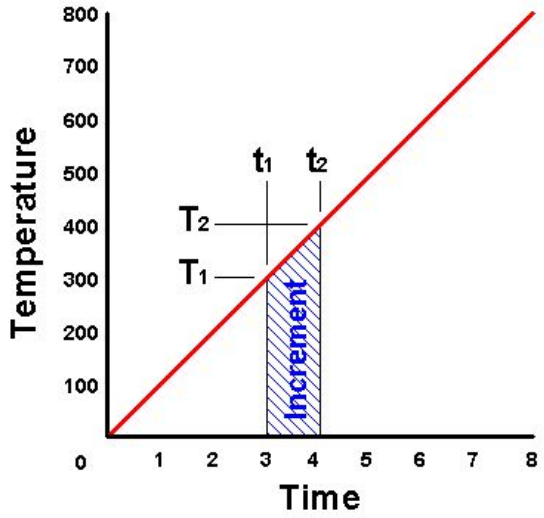

FIGURE 1 – Example of an Incremental Area under a Curve

To calculate the area under a single time increment, the temperature plot is assumed to be linear between t_1 and t_2.

$$A = \frac{T_1 + T_2}{2}\left(t_2 - t_1\right)$$

where:

t_1 = Time at beginning of incremental period
t_2 = Time at end of incremental period
T_2 = Temperature at t_2
T_1 = Temperature at t_1
A = Incremental area under curve

The total area under the curve is the sum of the increments. Consequently, an entire fire exposure period is equal to the sum of all incremental areas. Total Integrated Area is:

$$\sum A = \int_0^n \left(\frac{A_{n-1} + A_n}{2} \right) \Delta t$$

where:

$\sum A$ = Total integrated area under curve
Δt = Change in time
n = End point of integration period

The integral can also be expressed as a function of time at each temperature data point taken at a specific time increment that is as follows:

$$A_T = \int_0^n T_{(t)} dt$$

A_T = Total integrated area under curve

The integration is time and temperature based. Therefore, the time increments and method of measuring and reporting the furnace temperature used in the calculation must be the same. The integration used is based on minutes and degrees Fahrenheit (ºF) or degrees Celcius (ºC).

Both the ASTM E119 test standard and the CAN/ULC S101 test standard provide heat load values for their respective time•temperature curves at various intervals of time. At 30 minutes, the calculated heat load based on the ASTM E119 time•temperature curve is 35,360 ºF•min (19,650 ºC•min); the corresponding calculated heat load based on the CAN/ULC S101 time•temperature curve is 19,648 ºC•min. At 1 hour, the calculated heat load based on the ASTM E119 time•temperature curve is 82,330 ºF•min (45,740 ºC•min); the corresponding calculated heat load based on the CAN/ULC S101 time•temperature curve is 45,738 ºC•min. At 2 hours, the calculated heat load based on the ASTM E119 time•temperature curve is 185,440 ºF•min (103,020 ºC•min); the corresponding calculated heat load based on the CAN/ULC S101 time•temperature curve is 103,025 ºC•min. This indicates a negligible difference between the ASTM E119 time•temperature curve and the CAN/ULC S101 time•temperature curve for at least the first 2 hours of the respective curves, and can be accounted for by rounding error.

Test Specimen Size

ASTM E119 requires that non-loadbearing wall assemblies have an area exposed to fire not less than 100 ft^2 (9 m), with neither dimension less than 9 ft (2.7 m). CAN/ULC S101 requires that non-loadbearing wall assemblies have an area exposed to fire not less than 9.3 m^2, with neither dimension less than 2.75 m. ASTM E119 provides a 'soft' (simplified) conversion of inch-pound units to S.I. units. Performing a 'hard' (exact) conversion reveals that the test specimen size requirements of the both standards are the same.

(*Note: The 'soft' conversion within ASTM E119 of inch-pound units to S.I. units is taken into consideration within the rest of this report without additional explanation at each instance. Therefore, while values quoted from ASTM E119 may appear to be slightly different from those quoted from CAN/ULC S101 in some instances, the differences are only discussed if they are not as a result of the 'soft' conversion.)*

Thermocouples & Control of Furnace Temperatures

Table 1 provides a summary of the requirements for control of furnace temperatures and for furnace thermocouples for the two test standards. The requirements are such that there are only minor differences between the two standards that should not significantly affect the heat exposure applied to test specimens.

	ASTM E119	CAN/ULC S101
Number of thermocouples	Not fewer than 9	Not fewer than 9
Thermocouple specifications	Enclosed in protection tubes of such materials and dimensions that prove a time constant within specified range	Enclosed in sealed porcelain tubes 19 mm in outside diameter and 3.2 mm in wall thickness
Time constant of protected thermocouple assembly	Within range of 5.0 to 7.2 minutes	The same as provided by specified thermocouples, within the limit of accuracy that applies for furnace-temperature measurements
Location of thermocouples	• Symmetrically distributed • Near all parts of test specimen • 6 inches (152 mm) away from exposed face of test specimen	• One furnace thermocouple provided for every 1.5 m^2 of furnace cross-sectional area • 150 ± 10 mm from the exposed face of test specimen
Temperature reading intervals	Not exceeding 5 minutes during the first 2 hours	Not exceeding 1 minute during first 2 hours
Accuracy of furnace control for fire test of 1 h or less duration	Area under the furnace time•temperature curve (average of furnace thermocouples) is to be within 10% of corresponding area under standard time•temperature curve	Area under the furnace time•temperature curve (average of furnace thermocouples) is to be within ±10% of the corresponding area under the standard time•temperature curve

TABLE 1 – Comparison of Furnace Temperature Control and Furnace Thermocouple Requirements in ASTM E119 and CAN/ULC S101

Furnace Pressure

In ASTM E119, Appendix X5 Commentary explains that “furnace pressure is not specified and is generally slightly negative.” In CAN/ULC S101, while the standard describes how furnace pressure should be measured and controlled, it does not specify a particular furnace pressure.

Thermocouples & Monitoring of Unexposed Surface Temperatures

Table 2 provides a summary of the requirements for monitoring of unexposed surface temperatures on the test specimen and for the thermocouples used to do so for the two test standards. The practice by Intertek to take temperature readings at an interval of 1 minute conforms to both the requirements of ASTM E119 and CAN/ULC S101. The remaining requirements are such that differences between the two standards are negligible.

Hose Stream Test

Both ASTM E119 and CAN/ULC require that a fire-resistance-tested wall assembly undergo a hose stream test. ASTM E119 requires that the test be applied in accordance with ASTM Practice E2226. CAN/ULC S101 contains the requirements for the hose stream test. Both ASTM E2226 and CAN/ULC S101 provide a detailed methodology for applying the hose stream to the assembly. Table 3 provides a summary of the requirements for the hose stream test for the two test standards. The requirements are such that there are only negligible differences between the two standards.

	ASTM E119	CAN/ULC S101
Number of thermocouples	Not fewer than 9	Not fewer than 9
Thermocouple specifications	• Placed under dry, felted thermocouple pads • Not less than 3.5 inches (89 mm) of wire lead in contact with unexposed surface of specimen, under pad • Wire lead under pad not to be heavier than No. 18 B & S gage (0.04 in.) (1.02 mm), electrically insulated with heat-resistant and moisture-resistant coatings	• Placed under dry, felted thermocouple pads • Not less than 90 mm of wire lead in contact with unexposed surface of specimen, under pad • Wire lead under pad not to be greater than 1 mm in diameter, electrically insulated with heat-resistant and moisture-resistant coatings
Location of thermocouples	• 5 symmetrically disposed – one at approximate center of test specimen; four at approximate center of specimen's quarter sections • Not fewer than 4 located to obtain representative information on performance • Not nearer the edges than 1.5 times the thickness of the construction or 12 in. (305 mm) • Not located on top or opposite fasteners, if less than 1% of any 6-in. (152-mm) diameter circle	• 5 symmetrically disposed – one at approximate center of test specimen; four at approximate center of specimen's quarter sections • Not fewer than 4 located at discretion of testing authority, to obtain representative information on performance • Not nearer the edges than 1.5 times the thickness of the construction or 300 mm, whichever is greater • Not located on top or opposite fasteners, if less than 0.8% of any 130 mm x 130 mm area
Temperature reading intervals	Not exceeding 15 min, but can be taken more frequently at discretion of testing body	Not exceeding 5 min, but can be taken more frequently at discretion of testing body

TABLE 2 – Comparison of Monitoring of Unexposed Surface Temperature Requirements and Corresponding Thermocouple Requirements in ASTM E119 and CAN/ULC S101

	ASTM E119	CAN/ULC S101
Assembly on which test is conducted	• Duplicate wall assembly subjected to fire-resistance test for a time period of one-half the fire resistance rating period; or, • Initially-fire-resistance-tested wall assembly	• Duplicate wall assembly subjected to fire-resistance test for a time period equal to one-half the intended fire resistance rating period; or, • Initially-fire-resistance-tested wall assembly
Time of Hose Stream Test application	Immediately following fire-resistance test	Within 3.5 min of the termination of the fire resistance test
Water pressure at base of nozzle	For 1-h and 2-h fire-resistance rating: 30 psi (207 kPa)	For 1-h and 2-h fire-resistance rating: 205 kPa
Duration of application	• For 1-h fire resistance rating: 1 min/100 ft^2 (9 m^2) exposed area • For 2-h fire resistance rating: 2.5 min/100 ft^2 (9 m^2) exposed area	• For 1-h fire resistance rating: 65 s/10 m^2 exposed area • For 2-h fire resistance rating: 162 s/10 m^2 exposed area

TABLE 3 – Comparison of Hose Stream Test Requirements in ASTM E119 and CAN/ULC S101

Protection and Conditioning of Test Specimen

Both ASTM E119 and CAN/ULC S101 require that the test specimen be protected during and after fabrication to assure its "quality and condition at the time of test." As well, prior to the fire test, test specimens are to be conditioned "with the objective of providing [within a reasonable time] a moisture condition with the specimen representative of that in similar construction in buildings." Both standards go on to say that "for purposes of standardization, this condition is to be considered as that which would be established at equilibrium resulting from drying in an ambient atmosphere of 50% relative humidity" at 73ºF or 23ºC, respectively. Both standards have alternative requirements if equilibrium cannot be easily established within a reasonable amount.

Both standards also require that the ambient air temperature at the beginning of the test to be in the same range (50 to 90ºF, or 10 to 32ºC), and that the velocity of air across the unexposed surface of the test specimen should not exceed the same value (4.4 ft/s or 1.3 m/s).

Loading

There are several methodological factors that could result in differences in the amount of loading applied to a wall assembly during testing to the ASTM E119 test standard versus the CAN/ULC S101 test standard. However, the wall assembly scenarios under discussion are non-loadbearing; therefore, those potential differences do not need to be examined in this evaluation.

Conditions of Acceptance

For non-loadbearing wall assemblies, the conditions of acceptance in the ASTM E119 test standard are as follows:

1. "The wall or partition has withstood the fire endurance test without passage of flame or gases hot enough to ignite cotton waste, for a period equal to that for which classification is desired."
2. "The wall or partition has withstood the fire and hose stream test without passage of flame, of gases hot enough to ignite cotton waste, or of passage of water from the hose stream. The assembly shall be considered to have failed the hose stream test if an opening develops that permits a projection of water from the stream beyond the unexposed surface during the time of the hose stream test."
3. "Transmission of heat through the wall or partition during the fire endurance test shall not have been such as to raise the temperature on its unexposed surface more than 50°F (139°C) above its initial temperature."

For non-loadbearing wall assemblies, the conditions of acceptance in the CAN/ULC S101 test standard are as follows:

1. "The wall or partition shall have withstood the specified fire exposure without passage of flame or passage of gases hot enough to ignite cotton pads."
2. "The wall or partition shall have withstood the fire and hose stream tests without passage of flame or passage of gases hot enough to ignite cotton pads and passage of hose stream. The assembly shall be considered to have failed the hose stream test if an opening develops that permits a projection of water from the stream beyond the unexposed face during the time of the hose stream test."
3. "Transmission of heat through the test specimen throughout the fire endurance test shall not raise the average temperature measured by the stationary thermocouples on its unexposed surface more than 140ºC above its initial average temperature; nor shall the temperature rise at any individual point exceed 180ºC…"

From this it can be seen that the conditions of acceptance in both standards are essentially the same.

As there are no requirements in CAN/ULC S101 that are significantly different enough to affect the performance of the given non-loadbearing wall assembly scenarios, and the conditions of acceptance are the fundamentally the same, it can be concluded that the combinations identified as a result of the evaluation in 1 (above) will also maintain compliance with CAN/ULC S101-07 Standard Methods of Fire Endurance Tests of Building Construction and Materials – Fourth Edition.

5 Conclusion

Intertek has conducted an engineering evaluation for United Plastics Corporation on dB-3™ Professional Series Sound, Air & Moisture Barrier to determine if the product dB-3™ Professional Series Sound, Air & Moisture Barrier as submitted by the client will maintain compliance or show equivalency with ASTM E119-08*, Fire Tests of Building Construction and Materials* and UL 263*, Fire Tests of Building Construction and Materials – Thirteenth Edition* and meet the conditions of compliance to achieve the scenarios discussed in this evaluation.

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

The data generated by fire-resistance testing performed for the client between February 26 and March 5, 2009 utilizing the dB-3™ product, as recorded in Intertek Test Report Nos. 3172904-1 and 3172904-2, -3, supports a determination of compliance of United Plastics Corporation's dB-3™ product, as submitted for testing, to ASTM E119-08*, Fire Tests of Building Construction and Materials* and UL 263*, Fire Tests of Building Construction and Materials – Thirteenth Edition* for the following related scenarios:

- 1-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side.
- 1-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side.
- 1-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side and dB-3™ on each side.
- 1-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side.
- 1-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side.
- 1-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, one layer of gypsum wallboard on each side, and dB-3™ on each side.

- 2-hour non-loadbearing wood-frame wall assembly, studs at 24" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.
- 2-hour non-loadbearing wood-frame wall assembly, studs at 16" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.
- 2-hour non-loadbearing wood-frame wall assembly, studs at 12" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.
- 2-hour non-loadbearing steel-frame wall assembly, studs at 24" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.
- 2-hour non-loadbearing steel-frame wall assembly, studs at 16" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.
- 2-hour non-loadbearing steel-frame wall assembly, studs at 12" o.c., with 2.5-pcf-density mineral wool insulation filling the stud cavities, two layers of gypsum wallboard on each side, and dB-3™ on each side.

As well, Intertek also conducted an engineering evaluation for United Plastics Corporation on dB-3™ to determine whether the dB-3™ product will also maintain compliance or show equivalency in the combinations identified as a result of the evaluation above with CAN/ULC S101-07, *Standard Methods of Fire Endurance Tests of Building Construction and Materials - Fourth Edition*.

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

> The data generated by fire-resistance testing performed for the client between February 26 and March 5, 2009 utilizing the dB-3™ product, as recorded in Intertek Test Report Nos. 3172904-1 and 3172904-2, -3, also supports a determination of compliance of United Plastics Corporation's dB-3™ product, as submitted for testing, to CAN/ULC S101-07, *Standard Methods of Fire Endurance Tests of Building Construction and Materials - Fourth Edition* for the scenarios listed above.

INTERTEK

Reported by: _____
Ineke Van Zeeland
Sr. Project Engineer, Engineering Services US

Reviewed by: _____
Michael E. Luna
General Manager, Building Products

ATTACHMENTS:

REVISION SUMMARY

DATE	SUMMARY
Original	March 24, 2009