ENGINEERING EVALUATION

REPORT NUMBER: 3147019SAT-001
Reference OPL Test Report Number: 16683-115827 (Issue date: 10/29/03)
ORIGINAL ISSUE DATE: 4/28/08
REVISED DATE: Original

EVALUATION CENTER
Intertek
16015 Shady Falls Road
Elmendorf, TX 78112

RENDERED TO

Tenmat, Inc.
23 Copper Drive Unit #3
Newport, DE 19804

PRODUCT EVALUATED: "Tenmat FF 109 Down lighter Cover" (Design Listing no. Ten / FCA 60-01, OPL Listing no. LC 101)
EVALUATION PROPERTY: 60-minute Fire rating to ASTM E119-00a, when speakers are inserted into FF 109 installed in a floor ceiling assembly built as per Ten/FCA 60-01.

Engineering Evaluation of: "Tenmat FF 109 Down lighter Cover" (Design no. Ten / FCA 60-01, OPL Listing no. LC 101) for compliance with the applicable requirements of the following criteria: *ASTM E119-00a, Fire Tests of Building Construction and Materials".*

1 Introduction

Intertek has conducted an engineering evaluation for Tenmat Inc on: “Tenmat FF 109 Downlighter Cover” (Design no. Ten /FCA 60-01; OPL Listing no. LC 101), to evaluate its fire rating of 60-minutes when speakers are inserted into the covers. The evaluation was conducted to determine if Design No. Ten / FCA 60-01 will maintain compliance with ASTM E119-00a, Fire Tests of Building Construction and Materials”.

2 Sample and Assembly Description

The FF109 covers have been tested and certified by Intertek for applications in 1 Hour Floor-Ceiling/Roof-Ceiling/Beam & Column Assemblies.

Tested Floor /Ceiling Assembly was constructed as follows:

A. Plywood subfloor: Min. 5/8" thick SYP plywood. Long dimension of panels, or face grain of plywood, was perpendicular to joists (1B) with joints staggered. Plywood was secured to top side of joist assembly with min. No. 6, 1-7/8" long bugle-head drywall screws, and spaced max. 16" on center (o.c.) along joists.

B. Lumber Joists: Parallel nom. 2 x 10 or deeper, lumber joists were spaced a min. 16" o.c. and a maximum of 24" o.c.

C. Gypsum Wallboard: Nom. 5/8" Type X gypsum wallboard was secured to the underside of the lumber joists (1B) with min. No. 6, 1-7/8" long bugle-head drywall screws, spaced max. 6" o.c. along perimeter and on joists in the field. Vinyl or casein, dry or premixed joint compound is applied to face layers of gypsum wallboard in two coats to all exposed fastener heads and gypsum wallboard joints. A min. 2" wide paper, plastic, or fiberglass tape is embedded in first layer of compound over joints in gypsum wallboard.

The proposed speakers, to be installed inside the FF109, are described as follows (also see Appendix 1 for drawings):

D. Speaker Protection Cover: This is constructed from a proprietary high-temperature fiber matrix. It has intumescent properties.

Two sizes of covers are recognized within this Listing. The smaller cover has a base diameter of 14-1/2" and an overall height of 9" The larger cover has a base diameter of 17" and an overall height of 11-1/4" Covers are centered over speakers up to 8" in diameter that are installed into the gypsum ceiling. The cover may be slit to fit over obstructions in order to allow the cover to fit flush to the gypsum wallboard. When this occurs, caution is to be used to avoid damage to the cover. The covers are installed in the floor with the following conditions:

● Maximum one opening within a 16 sq.ft. Ceiling area;

● Minimum fixture spacing of 40" on center within same truss cavity;

● Minimum fixture spacing of 40" (center-to-center) for adjacent truss cavities;

● A minimum of 1/4" gap was maintained between the top of the cover and the underside of the subfloor (A).

E. In-ceiling speaker: (See sketch in appendix): A speaker is installed in accordance with its manufacturer's installation instructions. The speaker can be installed in an opening with a maximum diameter of 8". Electrical wiring leading to and from the fixture may penetrate the cover. When this occurs, caution is to be used to not damage the cover, and the wiring is to fit snugly through any opening.

3 Reference Documents

1. Test Report Number: 16683-115827 (Issue date: 10/29/03)
2. Intertek Design Listing no. Ten / FCA 60-01; OPL Listing no. LC 101
3. ASTM E-119-00a, "Fire Tests of Building Construction and Materials"
4. Speaker drawings and installations (See Appendix 1).

4 Evaluation Method

Analysis:

1. The original 60-minute fire test (Test Report Number: 16683-115827 (Issue date: 10/29/03): It was done on a 7'-0" x 7'-0" floor ceiling assembly consisting of nominal 2" x 10" wood joists clad on the underside (facing fire exposure) by a single layer of 5/8" type X gypsum wallboard. The unexposed face of the assembly (topside) was clad in a single layer of 5/8" thick plywood. One joist cavity served as "control" while the other contained a "Tenmat FF 109 Downlighter" hat shaped intumescent cover which covered an 8" diameter hole cut into the 5/8" thick, type X gypsum wallboard. The FF 109 was tested in the assembly as described above, in unrestrained, non-load bearing conditions. The overall test assembly size was less than that required for the full size test, but the fire exposure was to the standard time-temperature curve, as described in ASTM E-119-00a.

2. Effect of the 7'-0" x 7'-0" size of the overall test assembly: Given the relatively small size of FF 109, (see reference # 2 above for dimensional details) the result of the fire test would remain unchanged, even if it were tested in the full size assembly described in ASTM E-119-00a.

3. Result of the test: The test assembly, with the 8" diameter hole in its fire exposed face covered by FF 109 passed the 60-minute fire test. The temperatures registered by the thermocouples on the unexposed (plywood) surface over the FF109 averaged to 208.33ºF; in comparison the thermocouples on the unexposed surface over the gypsum wallboard averaged 215.66 ºF. This proves that the FF109 was able to have the same (actually, slightly better) fire resistance when it was placed directly above the 8" diameter

hole in the gypsum wallboard which was exposed to the furnace fire.

4. Addition of Fuel: The proposed addition of mostly metallic speakers to be mounted inside the FF109, adds very little to the fuel content of the FF109 assembly. Thus, the addition of either one of the proposed metallic speakers will have no effect on the 60-minute fire rating of the assembly listed with FF109 as described in Intertek Design Listing Ten/FCA 60-01.

5 Conclusion

Intertek has conducted an engineering evaluation for Tenmat Inc on: "Tenmat FF 109 Downlighter Cover" (Design no. Ten /FCA 60-01; OPL Listing no. LC 101), to evaluate its fire rating of 60-minutes when speakers are inserted into the covers. The evaluation was conducted to determine if Design No. Ten / FCA 60-01 will maintain compliance with ASTM E119-00a, Fire Tests of Building Construction and Materials".

Based on the analysis stated above, it is our opinion that the listed Design No. Ten / FCA 60-01 will maintain compliance with the 60-minute fire rating to ASTM E119-00a, ("Fire Tests of Building Construction and Materials") when the proposed speakers or speakers with similar low fuel content are installed into the FF109 installed as shown in the attached drawings. (See Appendix 1).

INTERTEK

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ATTACHMENTS:

Appendix 1 Speaker drawings and technical information.