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APPROVAL REPORT

Project No: 0003063115
Class: 4471
Product Name: #14-13 Concealor Pancake Head
Name of Listing Company: Berridge Mfg Co
Address of Listing Company: 1720 Maury
Engineering Dept
Houston TX 77026
United States
Customer ID: 1000000647-1
Customer website: www.berridge.com/

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7/9/18

Date of Approval

1 INTRODUCTION

1.1 Berridge Mfg Co requested Approval of their #14-13 Concealor Pancake Head to determine if it meets the Approval requirements of the standard listed in Section 1.3.

1.2 This report may be freely reproduced only in its entirety and without modification.

1.3 Standard

Title	Number	Issue Date
Approval Standard for Class I Panel Roofs	4471	3/2010

1.4 Listing

The products and assemblies will be listed in RoofNav, an on-line resource of FM Approvals. Drawings and specifications are on file at FM Approvals.

2 DESCRIPTION

The #14-13 Concealor Pancake Head is described as follows:

2.1 Fastening (Fastener)

Trade Name:	#14-13 Concealor Pancake Head
Material:	Steel
Fastener Diameter (Major):	0.230-0.235 in.
Fastener Diameter (Minor):	0.134-0.148 in.
Min Length:	0.750 in.
Max Length:	9 in.
Fastener Type:	Screw, self-drilling
Fastener Coating:	TRI-SEAL
Drive Head:	Pancake head w/ #2 Square

3 EXAMINATIONS AND TESTS

3.1 No components were produced under the FM Approvals Surveillance Audit program. All samples were considered to be representative of standard production and were examined and tested as indicated below. Components incorporated into test samples were selected by FM Approvals personnel. Test samples were prepared by, or under the supervision of, FM Approvals personnel. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.

3.2 Several performance requirements and tests required by the Standard have been waived due to previous successful testing. See Table 1 below for details.

Table 1

FM Standard 4471 Performance Requirement	Original Project ID(s)
Combustibility – From Below Roof Assembly	Waived ¹ , See Project ID 3012034
Combustibility – From Above Roof Assembly	Waived, See Project ID 3048395
Wind Uplift Resistance	Waived based on small scale testing results, See Project ID 3048395
Foot Traffic Resistance	Waived, See Project ID 2Y5A1.AM
Hail Damage Resistance	Waived, See Project ID 2Y5A1.AM
Corrosion Resistance	Included, required due to steel deck

¹A release of data was provided by Atlas Roofing Corp. for Project ID 3012034 where a more critical sample was tested.

3.3 Comparative Tensile Pull-Out Testing

The average results of the comparative tensile pull-out tests were as follows:

Trade Name	Substrate	Lbf (N)
#14-13 Concealor ¹	22 ga. steel deck	445 (1981)
#14-13 Concealor Pancake Head		430 (1915)

¹This fastener was used for the large scale wind uplift test in Project I.D.3048395.

Result: Pass, a standardized Z-Statistic analysis was performed and determined that the fasteners were comparable to one another.

3.4 FM Approvals Corrosion Resistance Testing

One series of corrosion tests was conducted using the FM Approvals Corrosion Test Apparatus to evaluate the potential resistance to corrosion of the #14-13 Concealor Pancake Head with the following result:

Fastener	Result
#14-13 Concealor Pancake Head	Passed

4 **MARKING**

- 4.1 The manufacturer shall mark each product and/or packaging with the manufacturer's name and product trade name. In addition, product and/or packaging must be marked with the Approval Mark of FM Approvals.
- 4.2 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Surveillance Audit program.

- 4.3** The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals.

5 REMARKS

- 5.1** The securement of the roof system must be enhanced at the building corners and perimeter as outlined in FM Global Property Loss Prevention Data Sheet 1-31.
- 5.2** The roof cover must be installed using a roof perimeter flashing system Approved by FM Approvals. See RoofNav.

6 SURVEILLANCE AUDIT

The manufacturing facilities at the following location(s) shall be visited on a routine basis. The facility processes and quality control procedures in place have been determined to be satisfactory to manufacture products identical to that tested and Approved. An FM Approved Products/Specification Tested Revision Request Form shall be submitted to FM Approvals for requesting to manufacture products at any additional or alternate manufacturing facilities which are not listed below.

Audit Location(s)

5f NO 470 Yucheng Rd
Tsoying Dist
Kaohsing 813,
Taiwan

7 MANUFACTURER'S RESPONSIBILITIES

- 7.1** The manufacturer shall notify FM Approvals of any planned change in the Approved products, prior to general sale or distribution, using the FM Approved Products/Specification Tested Revision Request Form. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization obtained from FM Approvals.
- 7.2** To ensure compliance with his procedures in the field, the manufacturer shall supply to the installer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.3** In accordance with the Master Agreement, the manufacturer shall make full and immediate disclosure to FM Approvals of all information concerning any defect in, or potential hazard of, the product or service manufactured or provided by the Customer which is Approved by, or being examined by, FM Approvals. The manufacturer shall make all necessary arrangements for the investigation of complaints / anomalies applicable to this approval and shall keep records of all complaints / anomalies including actions taken.

8 DOCUMENTATION

The following document describes the #14-13 Concealor Pancake Head and is on file at FM Approvals.

Document Title	Issue Date
Surveillance Audit Manual	01/23/2018

9 CONCLUSIONS

9.1 Test results from this and previous test programs indicate that the submitted product as evaluated, meets the requirements of the FM Approvals Standard listed in section 1.3 when installed as follows:

9.1.1

Assembly #1	
SSR:	Zee-Lock Double Lock and Zee Rib Clips, fastened at rate of 18 in. (457 mm) o.c. with one #14-13 Concealor Pancake Head
Insulation:	<i>Optional</i> Minimum 1.5 in. (38 mm) thick ACFoam-II, loose laid
Deck:	Steel deck, FM Approved minimum 22 ga. (0.0299 in. [0.76 mm]) Steel Deck secured to the ¼ in. (6mm) thick steel deck supports spaced maximum 6 ft (1.8 m) o.c. with one ITW #12 HWH Tekes 5 or one of the following Hilti fasteners: X-EDN19 THQ12, X-EDN19 THQ12M, X- EDNK22 THQ12, X-EDNK22 THQ12M, X-ENP-19 L15MX, X-ENP-19 L15MXR, X-HSN 24. Fasteners are spaced 6 in. (152 mm) o.c. The deck side laps secured with Hilti Fasteners: S-MD 10-16 x 7/8 HHWH Pilot Point, S-MS 01 Z4, 8 x 20, S-MS 01 Z4, 8 x 20 M, S-SLC 01 HWH, S-SLC 01 M HWH, S-SLC 02 HWH and S-SLC 02 M HWH or ITW Fasteners: #10 HWH Tekes 1, #10 HWH Tekes 3, #12 HWH Tekes 1, and #12 HWH Tekes 3 spaced 24 in. (610 mm) o.c.
ASTM E108:	Meets Class A @ 5 in 12 slope
Wind:	Meets Class 1-120
Hail:	SH

9.1.2

Assembly #2	
SSR:	Zee-Lock Double Lock and Zee Rib Clips, fastened at rate of 12 in. (305 mm) o.c. with one #14-13 Concealor Pancake Head
Insulation:	Same as Insulation in 9.1.1
Deck:	Same as deck 9.1.1
ASTM E108:	Meets Class A @ 5 in 12 slope
Wind:	Meets Class 1-150
Hail:	SH

- 9.2 Consult RoofNav for hail ratings and details of all assemblies.
- 9.3 Tests show that the tested roof constructions in and of themselves would not create a need for automatic sprinklers.
- 9.4 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.5 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

PROJECT DATA RECORD: 3063115

ORIGINAL TEST DATA See Project ID in Table 1