

APPROVAL REPORT

APPROVAL EXAMINATION OF S-MS 10-12X3/4 HHWH AND S-MS 10-12X1 HHWH FASTENERS FOR SECURING STEEL DECK SIDE LAPS

Prepared for:

Hilti, Inc.
5400 S. 122nd E. Avenue
Tulsa, OK 74146

Project ID: 3031144

Class: 4451

Date of Approval:

Authorized by:

January 4, 2008

George A. Smith, Director / AVP

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AND S-MS 10-12X1 HHWH FASTENERS
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from

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I INTRODUCTION

- 1.1 Hilti, Inc. submitted samples of their S-MS 10-12x3/4 HHWH and S-MS 10-12x1 HHWH Fasteners to determine if they meet the Approval requirements of the Standards listed below for use as a method for securing the side laps of steel roof deck in Class 1 Insulated Steel Deck Roof Construction.
- 1.2 Previous tests have been conducted with Hilti, Inc. steel deck side lap fasteners. See FM Approvals Reports 2Y8A7.AM, 0V9A3.AC, S/N 21893.1 and 3011115 for details.
- 1.3 This Report may be reproduced only in its entirety and without modification.
- 1.4 **Standards:**

Title	Class Number	Date
Class 1 Insulated Steel Deck Roof	4450	February, 1989
Approval Standard for Steel Deck Nominal 1-1/2 in. (38 mm deep) as a Component of Class I Insulated Steel Roof Deck Construction	4451	October, 1978

- 1.5 Testing included small scale deck/fastener withdrawal testing.
- 1.6 Examination and tests show that the Hilti fasteners, as tested or evaluated, meet the Approval requirements of the **Standards** listed above for use in Class 1 insulated steel deck roof construction.
- 1.7 **Listings:** The evaluated products meet the Approval criteria of FM Approvals when installed as described in the **CONCLUSIONS** of this report and will be listed in RoofNav.

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II DESCRIPTIONS

- 2.1 A brief description of the steel roof deck side lap attachment fasteners are as follows:
- 2.2 S-MS 10-12X1 HHWH side lap fastener is 1 in. (25 mm) long and contains 23 threads per 1 in. (25 mm) length of threaded shaft and a 0.41 in. (10.5 mm) diameter washer head. The threads have a minimum 0.19 in. (4.8 mm) major diameter, 0.16 in. (4.15 mm) minimum minor diameter and a minimum 0.01 in. (0.35 mm) point diameter. The fastener is a self drilling steel screw with a 5/16 in. (7.74 mm) hexagon drive head.
- 2.3 S-MS 10-12x3/4 HHWH steel deck side lap fasteners are 3/4 in. (19 mm) long and contain 23 threads per 1 in. (25 mm) length of threaded shaft and a 0.40 in. (10.15 mm) diameter washer head. The threads have a minimum 0.19 in. (4.8 mm) major diameter, 0.14 in. (3.5 mm) minimum minor diameter and a minimum 0.01 in. (0.35 mm) point diameter. The fastener is a self drilling steel screw with a 5/16 in. (7.74 mm) hexagon drive head.

III EXAMINATIONS AND TESTS

- 3.1 Testing is required to evaluate each steel deck side lap fastener for its ability to resist various forces when installed for its intended design use.
 - 3.1.1 Tests conducted were as required by the **Standards** listed in paragraph 1.4 above.
 - 3.1.2 Fasteners incorporated into test samples were selected by FM Approvals personnel. Samples were prepared by, or under the supervision of, FM Approvals personnel. The samples were prepared using FM Approved commercial deck section of thickness in accordance with the Manufacturer's Standard Gauge (MSG). Samples were submitted for examination and testing as follows:
- 3.2 Pull-Out Resistance of Fasteners – A series of tests was completed to determine the ability of the fastener to resist forces which would pull the fastener out of the adjacent sheet of deck as follows:
- 3.3 A series of deck/fastener pullout tests was completed using 22 gauge [0.0295 in. (0.75 mm) thick] steel decking. The averaged test results are shown below:

<u>Fastener - S-MS10-12x3/4</u>	<u>Max lbf (N)</u>
Sample 1	421.82 (1876.27)
Sample 2	449.21 (1998.08)
Sample 3	459.14 (2042.27)
Sample 4	412.25 (1833.68)
Avg.	435.61 (1937.57)

IV MARKING

- 4.1 The manufacturer shall mark each packing container with the manufacturer's name and product trade name. In addition, the container 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

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and on the premises of manufacturing locations that are under the FM Approvals Facilities and Procedures 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.

V 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 1-29.
- 5.2 The roof system must be installed using a roof perimeter flashing system Approved by FM Approvals. See the current edition of the FM Approval Guide.

VI FACILITIES AND PROCEDURES AUDITS

The Hilti manufacturing location at Jau Yeou Industry Co. Ltd. in Kangshan, 82023 Kaoshiung, Taiwan, R.O.C. is subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

VII MANUFACTURER'S RESPONSIBILITIES

- 7.1 To assure compliance with his procedures in the field, the manufacturer shall supply to the roofer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.2 The manufacturer shall notify FM Approvals of any planned change in the Approved products, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

VIII DOCUMENTATION

Document	Issue or Revision	Description
Hilti Item No. 386789	10/08/07	Drawing for S-MS 10-12X3/4 HHWH
Hilti Item No. 386790	10/09/07	Drawing for S-MS 10-12X1 HHWH
F&PAM	11/05/07	Facilities & Procedures Audit Manual

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IX CONCLUSIONS

- 9.1 The test results indicate that the Hilti S-MS 10-12X3/4 HHWH and S-MS 10-12X1 HHWH steel deck side lap fasteners submitted for testing and evaluation meet the Approval requirements when installed as follows:
- 9.1.1 S-MS 10-12X3/4 HHWH and S-MS 10-12X1 HHWH steel deck side lap fasteners are for securing side laps of Approved steel roof deck. The longitudinal edge of the deck must possess an overlap type joint. Spacing between side lap fasteners shall not exceed 3 ft (0.9 m).
- 9.2 Tests show that the tested roof constructions in and of themselves would not create a need for automatic sprinklers.
- 9.3 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.4 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

TESTING SUPERVISED BY: Michael Burke

PROJECT DATA RECORD: 3031144

ORIGINAL TEST DATA: none

ATTACHMENTS: none

REPORT BY:



Michael Burke
Engineer - Materials Group

REPORT REVIEWED BY:



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Technical Team Manager - Materials Group