



Certificate of Compliance

This certificate is issued for the following:

X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR
X-HSN 24, X-EDN19 THQ12, X-EDN19 THQ12M
X-EDNK22 THQ12, X-EDNK22 THQ12M
S-MD 12-24 x 1-5/8 M HWH5
S-SLC 01 HWH, S-SLC 01 M HWH
S-SLC 02 HWH, S-SLC 02 M HWH
S-MS 01 Z4,8 X 20M, S-MS 01 Z4,8 X 20
S-MD 12-14 X 1 HHWH Stitch
S-MD 10-16 x 7/8 HHWH Pilot Point

Prepared for:

Hilti Inc
7250 Dallas Parkway,
Suite 1000
Plano, TX 75024
United States

FM Approvals Class: 4451

Approval Identification: 3054498

Approval Granted: 11/3/2015

To verify the availability of the Approved product, please refer to www.roofnav.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in RoofNav, an online resource of FM Approvals.

A handwritten signature in dark ink that reads 'Cynthia E. Frank'.

Cynthia Frank
AVP - Manager of Materials
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APPROVAL REPORT

Project No: 0003054498 – Reissue 1

Class: 4451/4470

Product Name: X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR
 X-HSN 24
 X-EDN19 THQ12, X-EDN19 THQ12M
 X-EDNK22 THQ12, X-EDNK22 THQ12M
 S-MD 12-24 x 1-5/8 M HWH5
 S-SLC 01 HWH, S-SLC 01 M HWH
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 S-MS 01 Z4,8 X 20M, S-MS 01 Z4,8 X 20
 S-MD 12-14 X 1 HHWH Stitch
 S-MD 10-16 x 7/8 HHWH Pilot Point

Name of Listing Company: Hilti Inc

Address of Listing Company: 7250 Dallas Parkway, Suite 1000
 Plano, TX 75024
 United States

Customer ID: 1000004113-1

Customer website: www.us.hilti.com

Prepared by

John Cauley
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Phillip Smith
AVP, Principal Engineer, Materials

Cynthia E. Frank
AVP, Manager of Materials

11/3/15

Date of Approval

11/30/2015

Date of Reissue

1 INTRODUCTION

1.1 Hilti Inc requested Approval of their X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR, X-HSN 24, X-EDN19 THQ12, X-EDN19 THQ12M, X-EDNK22 THQ12, X-EDNK22 THQ12M and S-MD 12-24 x 1-5/8 M HWH5 fasteners to determine if they meet the Approval requirements of the standards listed in Section 1.3 with wind rating above Class 1-90.

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

1.3 Standards

Title	Number	Issue Date
Approval Standard for Profiled Steel Panels for Use as Decking in Class 1 Insulated Roof Construction	4451	6/2012
Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction	4470	6/2012
American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures	ANSI/FM Approvals 4474	3/2004

1.4 Listing

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

2 DESCRIPTION

All products are as described in RoofNav. Formulations, drawings and specifications are on file at FM Approvals.

3 EXAMINATIONS AND TESTS

3.1 All components were produced under the FM Approvals Surveillance Audit program as indicated by FM Approvals labels. 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 Standards have been waived due to previous successful testing. See Table 1 & 2 below for details.

Table 1

FM Standard 4451 Performance Requirement	Original Project ID's
Allowable Live Load Deflection	Waived, see 3049232
Combustibility From Below the Roof Deck	Waived ¹
Combination pull out / pull over resistance of fasteners (Testing)	Waived, see 3036326, 3021719, 3029102, and 2Y6A7.AM, 3049232

Pull over resistance of fasteners (Calculation)	Included
Combination pull off / pull over resistance of arc spot welds	Waived, not applicable
Side lap fastener and side lap crimping and interlocking resistance	Waived, see 3036326, 3021902, and 3011115
Fastener pull out resistance for above deck components	Waived, not applicable
Steel Deck Bending Stresses Under Service Wind Loads	Waived, not applicable
Wind Uplift Ratings Greater Than Class 1-90 and all assemblies that utilize steel deck with a design thickness less than 0.0295 in. (0.75 mm)	Included
Foot Traffic Resistance of Insulation	Waived, not applicable
Bearing Capacity of Insulation	Waived, not applicable
Corrosion Resistance Test (Optional Test)	Waived, not requested
Drivability Evaluation of Fasteners	Waived, see 3036326, 3049232, 3049232

Table 2

FM Standard 4470 Performance Requirement	Original Project ID(s)
Combustibility From Above the Roof Deck	Waived ¹
Combustibility From Below the Roof Deck	Waived ¹
Hail Damage Resistance Test	Waived ¹
Water Leakage Resistance Test	Waived ¹
Foot Traffic Resistance Test	Waived ¹
Susceptibility to Heat Damage Test	Waived ¹
Corrosion Resistance Test	Waived ²
Wind Uplift Resistance	Included

¹ All roof covers and insulations are Approved for the OEM, no new insulations included.

² All fasteners are Approved for the OEM, no new fasteners included.

3.3 FM Approvals 12x24 ft (3.7x7.3 m) Simulated Wind Uplift Pressure Test - One 12 x 24 ft wind uplift test was completed with the sample construction and results noted below.

Cap Ply:	DuraFlex 190 SBS, adhered with hot asphalt applied at 25 lb/sq
Base Ply:	DuraFlex 190S SBS, adhered with hot asphalt applied at 25 lb/sq
Base Sheet:	DuraFlex SBS PolyBase, adhered with hot asphalt applied at 25 lb/sq
Base Sheet Securement:	Trufast 3" Metal Insulation Plates and Trufast #15 EHD fasteners spaced 6 in. on center through the 4 in. wide base sheet laps and in two rows evenly spaced between the laps.
Cover Board:	0.625 in. thick Securock Gypsum-Fiber Roof Board, loose laid
Insulation:	1.5 in. thick H-Shield, loose laid
Steel Deck:	22 ga. [0.0295 in. (0.75 mm) thick], Grade 80, Type B, wide rib deck secured to 0.25 in. (6.4 mm) thick structural supports spaced 60 in. (1524 mm) o.c. with X-ENP-19 L15 MXR fasteners spaced 6 in. (150 mm) o.c. along each support. Deck side laps were fastened with Hilti S-MD 10-16 x 7/8 HHWH Pilot Point fasteners spaced 12 in. (305 mm) o.c.
Result:	The test sample met the 330 psf (15.8 kPa) minimum test requirement for Class 1-330 windstorm classification. The sample failed after maintaining a pressure of 345 psf (16.5 kPa) for 53 seconds due to base ply delamination from the base sheet.

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 1-29.
- 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 locations 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 Locations

Hilti, Plant 1 Feldkircherstrasse 100 P. O. BOX 333 FL-9494 Schaan Principality of Liechtenstein	Sheh Fung Screws Co., Ltd No. 810 Fu Hsing West Road Ding Yen Village-Chiao Tou Kaoshiung Hsien Taiwan, Republic Of China	Racing Point Industry Co., Ltd 1 Shengde Rd. Kangshan Kaoshiung Taiwan, 820 Taiwan, Republic Of China
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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

No new documents have been created as all products are currently Approved.

9 CONCLUSIONS

9.1 Testing and evaluation from this and previous FM Approvals programs indicate that Hilti Inc. X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR, X-HSN 24, X-EDN19 THQ12, X-EDN19 THQ12M, X-EDNK22 THQ12, X-EDNK22 THQ12M and S-MD 12-24 x 1-5/8 M HWH5 steel deck structural attachment fasteners meet the requirements of FM Approvals for use as a component in above Class 1-90 wind uplift rated insulated steel deck roof constructions when installed as described in RoofNav, an on-line resource of FM Approvals. The fasteners are spaced 6 in. (151 mm) on center along the structural support. Steel deck side laps are secured using S-SLC 01 HWH, S-SLC 01 M HWH, S-SLC 02 HWH, S-SLC 02 M HWH, S-MS 01 Z4,8 X 20M, S-MS 01 Z4,8 X 20, S-MD 12-14 X 1 HHWH Stitch or S-MD 10-16 x 7/8 HHWH Pilot Point fasteners. Wind rating per securement of the deck and securement of the above deck components.

- **X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR** fasteners are for structural support of greater than or equal to 0.25 in. (6.4 mm) thickness
- **X-HSN 24** fastener is for structural supports of greater than or equal to 0.125 in. (3.2 mm) but less than or equal to 0.375 in. (9.5 mm) thickness
- **X-EDN19 THQ12, X-EDN19 THQ12M** fasteners are for structural supports of greater than or equal to 0.25 in. (6.4 mm) but less than or equal to 0.375 in. (9.5 mm) thickness
- **X-EDNK22 THQ12, X-EDNK22 THQ12M** fasteners are for structural supports of equal to 0.25 in. (6.4 mm) thickness
- **S-MD 12-24 x 1-5/8 M HWH5** fastener is for structural supports of greater than 0.125 in. (3.2 mm) but less than or equal to 0.25 in. (6.4 mm) thickness

9.1.1 The X-ENP-19 L15, X-ENP-19 L15MX, X-ENP-19 L15MXR, X-HSN 24, X-EDN19 THQ12, X-EDN19 THQ12M, X-EDNK22 THQ12, X-EDNK22 THQ12M and S-MD 12-24 x 1-5/8 M HWH5 fasteners shown above are for use with current FM Approved mechanically attached roof coverings when the in-row fastener spacing is greater than one-half of the deck span, per proprietary listings. Wind rating per securement of the deck and securement of the above deck components.

9.1.2 The maximum support spacing and wind uplift ratings are per the following tables for use with FM Approved fully or partially adhered roof coverings or with mechanically attached roof coverings when the in-row fastener spacing is less than or equal to one-half of the deck span, per proprietary listings. Wind rating per securement of the deck and securement of the above deck components.

Wind Rating	22 ga (0.0295 [0.75])				20 ga (0.0358 [0.91])				18 ga (0.0474 [1.20])			
	33 ksi		80 ksi		33 ksi		80 ksi		33 ksi		80 ksi	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1-105	72	1828	72	1828	72	1828	72	1828	72	1828	72	1828
1-120	72	1828	72	1828	72	1828	72	1828	72	1828	72	1828
1-135	72	1828	72	1828	72	1828	72	1828	72	1828	72	1828
1-150	72	1828	72	1828	72	1828	72	1828	72	1828	72	1828
1-165	72	1828	72	1828	72	1828	72	1828	72	1828	72	1828
1-180	68	1727	72	1828	72	1828	72	1828	72	1828	72	1828
1-195	63	1600	72	1828	72	1828	72	1828	72	1828	72	1828
1-210	59	1498	72	1828	72	1828	72	1828	72	1828	72	1828
1-225	55	1397	72	1828	67	1701	72	1828	72	1828	72	1828
1-240	51	1295	72	1828	63	1600	72	1828	72	1828	72	1828
1-255	48	1219	72	1828	59	1498	72	1828	72	1828	72	1828
1-270	45	1143	72	1828	56	1422	72	1828	72	1828	72	1828
1-285	43	1092	72	1828	53	1346	72	1828	72	1828	72	1828
1-300	41	1041	72	1828	50	1270	72	1828	69	1752	72	1828
1-315	39	990	71	1803	48	1219	72	1828	65	1651	72	1828
1-330	37	939	68	1727	46	1168	72	1828	62	1574	72	1828

9.1.3 The maximum support spacing and wind uplift ratings are per the following tables for use with Carlisle Syntec Inc., United States Gypsum Company or US Ply, Inc. FM Approved fully or partially adhered roof coverings or with mechanically attached roof coverings when the in-row fastener spacing is less than or equal to one-half of the deck span, per proprietary listings. Wind rating per securement of the deck and securement of the above deck components.

Wind Rating	22 ga (0.0295 [0.75])				20 ga (0.0358 [0.91])				18 ga (0.0474 [1.20])			
	33 ksi		80 ksi		33 ksi		80 ksi		33 ksi		80 ksi	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1-345	35	889	65	1651	44	1117	72	1828	60	1524	71	1803
1-360	34	863	62	1574	42	1066	72	1828	57	1447	68	1727
1-375	33	838	60	1524	40	1016	72	1828	55	1397	65	1651
1-390	31	787	57	1447	39	990	71	1803	53	1346	62	1574
1-405	30	762	55	1397	37	939	68	1727	51	1295	60	1524
1-420	29	736	53	1346	36	914	66	1676	49	1244	58	1473
1-435	28	711	51	1295	35	889	63	1600	47	1193	56	1422
1-450	27	685	50	1270	33	838	61	1549	46	1168	54	1371
1-465	26	660	48	1219	32	812	59	1498	44	1117	52	1320

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.

PROJECT DATA RECORD: 0003054498

ATTACHMENTS: None

ORIGINAL TEST DATA See PDRs for projects in Tables 1 & 2

Rev	Change Description	Date	Originator	Approver
1	Page 1 - Changed address from Plano, OK 75024 to Plano, TX 75024 Page 6, Section 9.1.3, removed word "Meets"	11/24/15	Cauley	Smith