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# APPROVAL REPORT

**Project No:** 3057375  
**Supplements Project No.:** N/A  
**Class:** 4451  
**Product Name:** Type 1.5BI, Type 1.5BIA, 3NI, 3NIA, BI0.0334, BI0.0376, and BI0.0398  
**Name of Listing Company:** Nucor Vulcraft Group  
**Address of Listing Company:** 1601 W Omaha Ave  
PO Box 729  
Norfolk NE 68702-0729  
United States  
**Customer ID:** 1000000591-1  
**Customer website:** www.vulcraft.com

**Prepared by**

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**4/6/2016**

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**Date of Approval**

## 1 INTRODUCTION

1.1 Nucor Vulcraft Group requested Approval examination of their Type 1.5BI, Type 1.5BIA, 3NI, 3NIA, BI0.0334, BI0.0376, and BI0.0398 steel roof decks with interlocking side laps secured using the Nucor Vulcraft PunchLok II Side Lap Crimping Tool to determine if they meet 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 Standards

Title	Number	Issue Date
Approval Standard for Profiled Steel Panels for Use as Decking in Class 1 Insulated Roof Construction	4451	6/2012

### 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

2.1 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 Standard have been waived due to previous successful testing. See Table 1 below for details.

Table 1

FM Standard 4451 Performance Requirement	Submissions Required / Waivers
Allowable Live Load Deflection	Waived, see Project ID 3049081
Combustibility From Below the Roof Deck	Waived, see Project ID 3035661
Combination pull out / pull over resistance of fasteners (Testing)	Waived <sup>1</sup>
Pull over resistance of fasteners (Calculation)	Waived <sup>1</sup>
Combination pull off / pull over resistance of arc spot welds	Waived, see Project ID 3049081

<b>FM Standard 4451 Performance Requirement</b>	<b>Submissions Required / Waivers</b>
Side lap fastener and side lap crimping and interlocking resistance	Included
Fastener pull out resistance for above deck components	Not required
Steel Deck Bending Stresses Under Service Wind Loads	Waived, see Project ID 3049081
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)	Not requested
Foot Traffic Resistance of Insulation	Waived, see Project ID 3049081
Bearing Capacity of Insulation	Not required
Corrosion Resistance Test (Optional Test)	Not required
Drivability Evaluation of Fasteners	Waived <sup>1</sup>

<sup>1</sup> All fasteners are Approved by the OEM, no new fasteners included.

**3.3** Side Lap Fastener and Side Lap Crimping and Interlocking Resistance

**3.3.1** One (1) sample was tested. The components and sequence of installation were as follows:

<u>Sample 1:</u>	Two (2) beams spaced approximately 12 ft. (3.7 m) apart (centerline to centerline).
	Three (3) joists spaced at 84 in. (2.1 m) on center secured to the beams.
	Three (3) sections of Nucor Vulcraft Group 22ga. (0.0295 in [0.75 mm]) Type 1.5BI steel roof deck installed over the joists, yielding a two-span continuous configuration, three (3) deck sheets wide.
	Each section of steel roof deck secured to the joists using FM Approved mechanical fasteners spaced at 6 in. (152 mm) on center.
	Interlocking side laps of the Type 1.5BI steel roof deck secured using the Nucor Vulcraft PunchLok II tool spaced 42 in (1.1 m) on center

**3.3.2** The results of the test were as follows:

<u>Sample 1:</u>	Differential Deflection (difference in displacement measured from either side of side lap securement
	0.0192 in. (0.4877 mm)

**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. A Form 797 shall be submitted to FM Approvals for requesting to manufacture products at any additional or alternate manufacturing facilities not listed below.

**Audit Locations**

1601 W. Omaha Avenue Norfolk, NE 68702	1501 W. Darlington Street Florence, SC 29501	6610 County Road 60 St. Joe, IN 46785
175 CR 2345 Grapeland, TX 75844	7205 Gault Avenue North Ft. Payne, AL 35967	5362 Railroad Street Chemung, NY 14825

**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 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** Evaluation from this examination indicates that the Nucor Vulcraft Group Type 1.5BI, Type 1.5BIA, 3NI, 3NIA, BI0.0334, BI0.0376, and BI0.0398 steel roof decks with a minimum yield strength of 40 ksi (276 MPa) and a minimum tensile strength of 52 ksi (358 MPa) meet the Approval requirements of FM Approval Standard 4451 for use as a component in Class 1-60, Class 1-75, and Class 1-90 wind uplift rated insulated steel deck roof constructions when installed as described in RoofNav, an on-line resource of FM Approvals and steel roof deck side laps are secured as follows:
- 9.2** The steel roof deck side laps of Type 1.5BI, Type 1.5BIA, 3NI, 3NIA, BI0.0334, BI0.0376, and BI0.0398 steel roof decks are secured using the Nucor Vulcraft PunchLok II Side Lap Crimping Tool, spaced at maximum 36 in. (914 mm) on center.
- 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:** 3057375

**ATTACHMENTS:** N/A  
**ORIGINAL TEST DATA** See PDRs for projects in Table 1