

## Evaluation Report

**Vulcraft**

**"3N-32"**

Roof Deck Panels

### Manufacturer

**Nucor Corporation – Vulcraft Division**

1501 West Darlington Street

Florence, South Carolina 29501

(843) 662-0381

*for*

**Florida Product Approval**

**# FL 28867.1 R2**

**Florida Building Code FBC 8th Edition (2023)**

**Method: 2-B**

**Category: Structural Components**

**Sub - Category: Roof Deck**

**Product: 3N-32**

**Material: Steel**

### Prepared by:

James L. Buckner, P.E., S.E.C.B.

Florida Professional Engineer # 31242

Florida Evaluation ANE ID: 1916

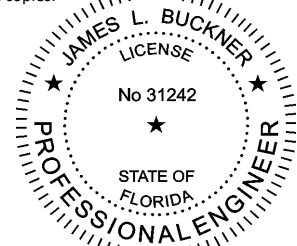
Project Manager: Diana Galloway

Report No. 23-575-3N32-ER

*(Revises 20-235-3N32-ER, FL28867.1 R1)*

Date: 08/16/2023

This item has been electronically signed and sealed by James L. Buckner, P.E., on this date using a Digital Signature. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.



A handwritten signature in blue ink, appearing to read "James L. Buckner".

Date: 2023.08.16  
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### Contents:

Evaluation Report

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**Manufacturer:** Nucor Corporation – Vulcraft Division  
P.O. Box 100520  
Florence, South Carolina 29501  
(843) 662-0381  
<http://nucor.com/>

**Product Name(s):** Vulcraft “3N-32” Roof Decks:  
“3NI-32, 3NL-32, 3PLN-32 & 3NIA-32, 3NLA-32, 3PLNA-32”

**Product Category:** Structural Components

**Product Sub-Category:** Roof Deck

**Compliance Method:** State Product Approval Rule 61G20-3.005 (2) b)

**Product Description:** Vulcraft Deep Rib Deck, 32” Wide Structural Steel Roof Decks:  
1. 3NI-32 Interlocking Sidelap  
2. 3NL-32 Nestable Sidelap  
3. 3PLN-32 PunchLok® II system Sidelap  
4. 3NIA-32 Web Perforated Accoustical Deck w/Interlocking Sidelap  
5. 3NLA-32 Web Perforated Accoustical Deck w/Nestable Sidelap  
6. 3PLNA-32 Web Perforated Accoustical Deck w/ PunchLok® II system Sidelap

**Support:** **Type:**  
Steel Supports  
(Design of steel support system is outside the scope of this evaluation.)

**Performance:** Wind Resistance:  
• Design Uplift Pressure:  
(Refer to Tables 3.0 - 3.7 details herein) **-45 PSF (Max.)**

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Performance Standards:</b>             | The product described herein has demonstrated compliance with:<br><b>FM 4471 (1992) – Approval Standard for Class I Roof Panels</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Standards Equivalency:</b>             | The FM 4451(12) standard version used to evaluate the product meets the prescribed standards for wind uplift in FM 4471 (1992) standard version adopted by the Florida Building Code 8th Edition (2023) for use as evaluated in this report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Code Compliance:</b>                   | The product described herein has demonstrated compliance with Florida Building Code 8th Edition (2023), Section 1708.2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Evaluation Report Scope:</b>           | This product evaluation is limited to compliance with the structural requirements of the Florida Building Code, as related to the scope section to Florida Product Approval Rule 61G20-3.001.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Limitations and Conditions of Use:</b> | <ul style="list-style-type: none"><li>• <u>Scope of “Limitations and Conditions of Use” for this evaluation:</u><br/>This evaluation report for “Optional Statewide Approval” contains technical documentation, specifications and installation method(s) which include “Limitations and Conditions of Use” throughout the report in accordance with Rule 61G20-3.005. Per Rule 61G20-3.004, the Florida Building Commission is the authority to approve products under “Optional Statewide Approval”.</li><li>• <u>Option for application outside “Limitations and Conditions of Use”</u><br/>Rule 61G20-3.005(1)(e) allows engineering analysis for “project specific approval by the local authorities having jurisdiction in accordance with the alternate methods and materials authorized in the Code”. Any modification of the product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others.</li><li>• This report is a building code product evaluation per FLPE rule (FAC) 61G15-36 to comply with Florida product approval rule (FAC) 61G20-3. This evaluation report is part of the Florida Building Commission approval for the listed code related criteria. This report by James Buckner, P.E. and CBUCK Engineering is not a design certification of code compliance construction submittal documentation, per FBC section 107, for any individual structure, site specific or permit design.</li><li>• All metal components and fasteners shall be corrosion resistant in accordance with applicable sections of FBC, including but limited to Sections 1504.3.2, 1506.6 and 1507.4.4.</li><li>• Design of support system is outside the scope of this report. Support shall be designed by others and shall comply with the FBC Chapters 22 for steel and Chapter 16 for structural loading.</li><li>• Fire Classification is outside the scope of Rule 61G20-3 and is therefore not included in this evaluation.</li><li>• This evaluation report does not evaluate the use of this product for use in the High Velocity Hurricane Zone code section. (Dade &amp; Broward Counties)</li></ul> |
| <b>Quality Assurance:</b>                 | The manufacturer has demonstrated compliance of roof panel products in accordance with the Florida Building Code and Rule 61G20-3.0005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity <b>FM Approvals, Norwood, MA</b> (FBC Organization Number: QUA1860).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Components/Materials  
(by Manufacturer):**

**Roof Deck Panel(s):**

Vulcraft "3NI-32, 3NL-32, 3PLN-32 & 3NIA-32,  
3NLA-32, 3PLNA-32"

Material:

Steel

Thicknesses:

Refer to Tables

Panel Width:

32" Max. Coverage

Rib Height:

3"

Yield Strength:

50 ksi min. or 80 ksi min.

Steel Grade:

50 or 80

Corrosion Resistance:

ASTM A 653

Material Standard:

In compliance with FBC Section 2203.2

Steel shall comply with American Iron and Steel  
Institute's "North American Specification for  
the Design of Cold-Formed Steel Structural  
Members", AISI S100-16.

**Fastener/Attachment Options:**

**Roof Deck to Supports:**

OPTION 1:

Type:

Self-tapping sheet metal screws

Size :

Site specific design by Design Professional

Corrosion Resistance:

Per FBC Section 1506.6 and 1507.4.4

Standard:

Factory Mutual approved

OPTION 2:

Type:

Power-driven fastener

Size :

Site specific design by Design Professional

Corrosion Resistance:

Per FBC Section 1506.6 and 1507.4.4

Standard:

Factory Mutual approved

OPTION 3:

Type:

Quality welding procedure

Size :

Site specific design by Design Professional

Corrosion Resistance:

Per FBC Section 1506.6 and 1507.4.4

Standard:

American National Standards

Institute/American Welding Society Standard

(ANSI/AWS), "Specification for Welding of

Sheet Metal" or applicable standard in FBC

Section 2214.4.

**Panel to Panel, Side Lap Stitching:**

Type:

Button punch, Nucor Vulcraft PunchLok® II  
system Sidelap or FM approved fasteners

Spacing:

Refer to details herein this report

Standard:

Factory Mutual approved

**Installation:**

**Installation Method:**

(Refer to tables and drawings at the end of this report.)

**Roof Deck to Supports:**

Fastener Attachment to Steel Supports May Be Designed By A Qualified Design Professional As Required By The Florida Building Code For Site Specific Projects.

**OPTION 1 or 2: FM Approved Fasteners**

- Attachment Spacing: 8" o.c. max.  
FM Approved fasteners secured at each support and panel lap intersection across the width of the panel
- Support Spacing: Refer to Tables 3.0-3.1

**OPTION 3: FM Approved Puddle Welds**

- Puddle Weld Diameter: Refer to Tables 3.2-3.7
- Puddle Weld Pattern: Refer to Tables 3.2-3.7  
(at bottom ribs of support and support side laps)
- Support Spacing: Refer to Tables 3.2-3.7

**PANEL TO PANEL, SIDE LAP STITCHING:**

**"3NI-32, 3NIA-32"**

- Side laps fastened along the panel laps with Button Punch Tool
- Spacing: 8.1" o.c. max.

**"3PLN-32, 3PLNA-32"**

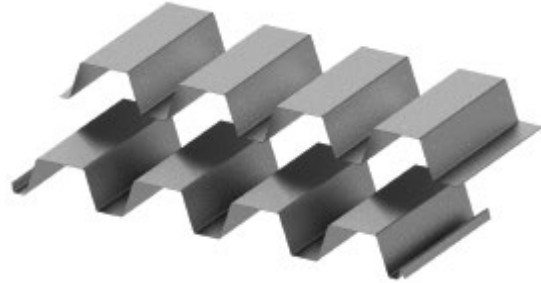
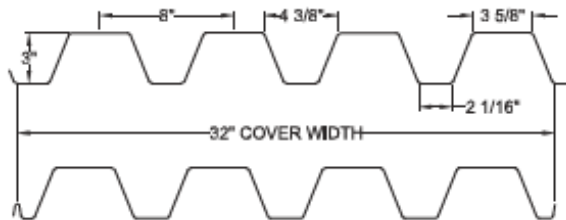
- Side laps fastened along the panel laps with Nucor Vulcraft Punchlock II Side Lap Crimping Tool
- Spacing: 24.7" o.c. max.

Install the Vulcraft "3N-32" roof decks in compliance with the installation method listed in this report and applicable code sections of FBC 8th Edition (2023). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guide for attachment.

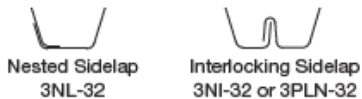
**Referenced Data:**

1. FM Certification  
By FM Approvals (FBC Organization #CER ID: 1840)  
FM Approval Links:  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=HWW8FWd3HyE=>  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=DDN9guYjwIU=>  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=kCFZ6a9xhXY=>  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=8HPTNEtIKrM=>  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=z6ehasLF/Xc=>  
<https://roofnav.fmglobal.com/DocumentData/ProductDocument?documentId=C3tgF9hHdss=>  
Verified 4/11/2019
2. FM 4451 Roof Deck Test  
By Factory Mutual Research Corp.  
(FBC Organization #TST ID: 1867)  
Report No. PR451493, Report Date: 12/21/2018
3. Quality Assurance  
By FM Approvals, (FBC Organization #QUA ID:1860)
4. Certification of Independence  
By James L. Buckner, P.E. @ CBUCK Engineering  
(FBC Organization # ANE 1916)

## Engineering Properties Nucor Corp. – Vulcraft Group Vulcraft “3N-32,” Steel Roof Deck Panels



“3NL-32, 3NI-32, 3PLN-32”  
Typical Panel Profile



Sidelap Detail

Table 1.0  
Section Properties<sup>1</sup>  
“3NI-32, 3NL-32, 3PLN-32” GRADE 50 STEEL

| Deck<br>Gage | Deck<br>Weight<br>$w_{dd}$<br>(psf) | Base Metal<br>Thickness<br>$t$<br>(in.) | Yield<br>Strength<br>$F_y$<br>(ksi) | Effective Moment of Inertia<br>at Service Load<br>$I_d = (2I_o + I_y)/3$ |                                   | Effective Section<br>Modulus at<br>$F_y = 50$ ksi |                                   | Vertical<br>Web<br>Shear<br>$V_r/\Omega$<br>(lb/ft) |
|--------------|-------------------------------------|-----------------------------------------|-------------------------------------|--------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------------------------|
|              |                                     |                                         |                                     | $I_{d+}$<br>(in <sup>4</sup> /ft)                                        | $I_{d-}$<br>(in <sup>4</sup> /ft) | $S_{e+}$<br>(in <sup>3</sup> /ft)                 | $S_{e-}$<br>(in <sup>3</sup> /ft) |                                                     |
| 22           | 1.8                                 | 0.0295                                  | 50                                  | 0.643                                                                    | 0.715                             | 0.345                                             | 0.372                             | 2176                                                |
| 20           | 2.2                                 | 0.0358                                  | 50                                  | 0.806                                                                    | 0.886                             | 0.448                                             | 0.476                             | 3761                                                |
| 19           | 2.6                                 | 0.0418                                  | 50                                  | 0.965                                                                    | 1.052                             | 0.554                                             | 0.579                             | 5127                                                |
| 18           | 2.9                                 | 0.0474                                  | 50                                  | 1.123                                                                    | 1.200                             | 0.660                                             | 0.675                             | 6598                                                |
| 16           | 3.7                                 | 0.0598                                  | 50                                  | 1.479                                                                    | 1.524                             | 0.869                                             | 0.885                             | 9064                                                |

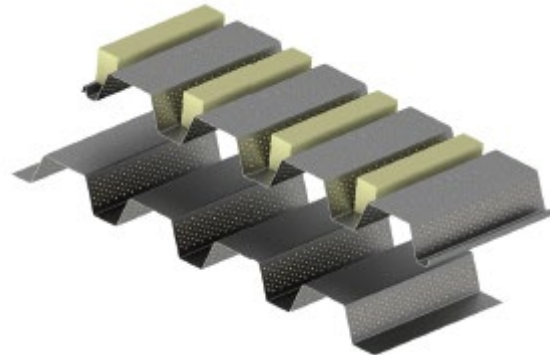
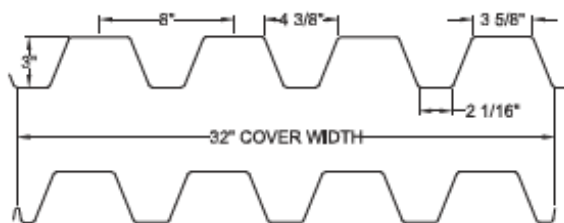
Note: <sup>1</sup>Section properties have been calculated in accordance with ANSI/SDI RD-2023

Table 1.1  
Section Properties<sup>1</sup>  
“3NI-32, 3NL-32, 3PLN-32” GRADE 80 STEEL

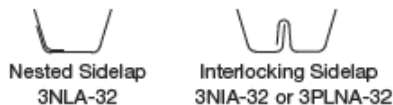
| Deck<br>Gage | Deck<br>Weight<br>$w_{dd}$<br>(psf) | Base Metal<br>Thickness<br>$t$<br>(in.) | Yield<br>Strength<br>$F_y$<br>(ksi) | Effective Moment of Inertia<br>at Service Load<br>$I_d = (2I_o + I_y)/3$ |                                   | Effective Section<br>Modulus at<br>$F_y = 60$ ksi |                                   | Vertical<br>Web<br>Shear<br>$V_r/\Omega$<br>(lb/ft) |
|--------------|-------------------------------------|-----------------------------------------|-------------------------------------|--------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------------------------|
|              |                                     |                                         |                                     | $I_{d+}$<br>(in <sup>4</sup> /ft)                                        | $I_{d-}$<br>(in <sup>4</sup> /ft) | $S_{e+}$<br>(in <sup>3</sup> /ft)                 | $S_{e-}$<br>(in <sup>3</sup> /ft) |                                                     |
| 22           | 1.8                                 | 0.0295                                  | 60                                  | 0.635                                                                    | 0.707                             | 0.335                                             | 0.346                             | 2176                                                |
| 20           | 2.2                                 | 0.0358                                  | 60                                  | 0.794                                                                    | 0.876                             | 0.434                                             | 0.463                             | 3899                                                |
| 19           | 2.6                                 | 0.0418                                  | 60                                  | 0.950                                                                    | 1.040                             | 0.536                                             | 0.563                             | 5616                                                |
| 18           | 2.9                                 | 0.0474                                  | 60                                  | 1.103                                                                    | 1.195                             | 0.637                                             | 0.659                             | 7227                                                |

Note: <sup>1</sup>Section properties have been calculated in accordance with ANSI/SDI RD-2023

### Engineering Properties Nucor Corp. – Vulcraft Group Vulcraft “3N-32,” Steel Roof Deck Panels



“3NLA-32, 3NIA-32, 3PLNA-32”  
Typical Panel Profile



Sidelap Detail

Table 2.0

Section Properties<sup>1</sup>

“3NIA-32, 3NLA-32, 3PLNA-32” GRADE 50 STEEL

| Deck<br>Gage | Deck<br>Weight<br>$w_{dd}$<br>(psf) | Base Metal<br>Thickness<br>$t$<br>(in.) | Yield<br>Strength<br>$F_y$<br>(ksi) | Effective Moment of Inertia<br>at Service Load<br>$I_d = (2I_s + I_g)/3$ |                                   | Effective Section<br>Modulus at<br>$F_y = 50$ ksi |                                   | Vertical<br>Web<br>Shear<br>$V_w/\Omega$<br>(lb/ft) |
|--------------|-------------------------------------|-----------------------------------------|-------------------------------------|--------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------------------------|
|              |                                     |                                         |                                     | $I_{d+}$<br>(in <sup>4</sup> /ft)                                        | $I_{d-}$<br>(in <sup>4</sup> /ft) | $S_{e+}$<br>(in <sup>3</sup> /ft)                 | $S_{e-}$<br>(in <sup>3</sup> /ft) |                                                     |
| 22           | 1.7                                 | 0.0295                                  | 50                                  | 0.611                                                                    | 0.680                             | 0.328                                             | 0.353                             | 1632                                                |
| 20           | 2.1                                 | 0.0358                                  | 50                                  | 0.766                                                                    | 0.842                             | 0.424                                             | 0.452                             | 2821                                                |
| 19           | 2.4                                 | 0.0418                                  | 50                                  | 0.917                                                                    | 1.000                             | 0.526                                             | 0.550                             | 3846                                                |
| 18           | 2.8                                 | 0.0474                                  | 50                                  | 1.067                                                                    | 1.140                             | 0.627                                             | 0.641                             | 4948                                                |
| 16           | 3.5                                 | 0.0598                                  | 50                                  | 1.405                                                                    | 1.448                             | 0.826                                             | 0.841                             | 6798                                                |

Note: <sup>1</sup>Section properties have been calculated in accordance with ANSI/SDI RD-2023

Table 2.1

Section Properties<sup>1</sup>

“3NIA-32, 3NLA-32, 3PLNA-32” GRADE 80 STEEL

| Deck<br>Gage | Deck<br>Weight<br>$w_{dd}$<br>(psf) | Base Metal<br>Thickness<br>$t$<br>(in.) | Yield<br>Strength<br>$F_y$<br>(ksi) | Effective Moment of Inertia<br>at Service Load<br>$I_d = (2I_s + I_g)/3$ |                                   | Effective Section<br>Modulus at<br>$F_y = 60$ ksi |                                   | Vertical<br>Web<br>Shear<br>$V_w/\Omega$<br>(lb/ft) |
|--------------|-------------------------------------|-----------------------------------------|-------------------------------------|--------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------------------------|
|              |                                     |                                         |                                     | $I_{d+}$<br>(in <sup>4</sup> /ft)                                        | $I_{d-}$<br>(in <sup>4</sup> /ft) | $S_{e+}$<br>(in <sup>3</sup> /ft)                 | $S_{e-}$<br>(in <sup>3</sup> /ft) |                                                     |
| 22           | 1.7                                 | 0.0295                                  | 60                                  | 0.604                                                                    | 0.672                             | 0.318                                             | 0.329                             | 1632                                                |
| 20           | 2.1                                 | 0.0358                                  | 60                                  | 0.754                                                                    | 0.832                             | 0.412                                             | 0.440                             | 2924                                                |
| 19           | 2.4                                 | 0.0418                                  | 60                                  | 0.903                                                                    | 0.989                             | 0.509                                             | 0.535                             | 4213                                                |
| 18           | 2.8                                 | 0.0474                                  | 60                                  | 1.048                                                                    | 1.136                             | 0.605                                             | 0.626                             | 5420                                                |

Note: <sup>1</sup>Section properties have been calculated in accordance with ANSI/SDI RD-2023

## Engineering Data

### Nucor Corp. – Vulcraft Group

### Vulcraft “3N-32,” Steel Roof Deck Panels

**Notes for Tables 3.0 – 3.7:**

- <sup>1</sup> Allowable negative load based on FM Class I-90 OR I-60
- <sup>2</sup> Values do not include a 1/3 stress increase
- <sup>3</sup> Diaphragm and axial load capacity is outside the scope of this evaluation.
- <sup>4</sup> Weld Electrode, E70XX 60 ksi

| 3NI-32, 3NL-32 & 3PLN-32                                                                                                      |                |                       |     |
|-------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|-----|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3</sup>                                                             |                |                       |     |
| ATTACHMENT METHOD:                                                                                                            |                |                       |     |
| 3NL-32, 3NI-32 ATTACHED WITH BUTTON PUNCH TOOL @ 8.1" O.C.,<br>PLN-32 ATTACHED WITH PUNCHLOK® II SYSTEM SIDELAPS @ 24.7" O.C. |                |                       |     |
| GAUGE                                                                                                                         | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF |
| 16                                                                                                                            | SINGLE         | 207                   | -45 |
|                                                                                                                               | DOUBLE         | 237                   | -45 |
|                                                                                                                               | 3 OR MORE      | 244                   | -45 |
| 18                                                                                                                            | SINGLE         | 185                   | -45 |
|                                                                                                                               | DOUBLE         | 207                   | -45 |
|                                                                                                                               | 3 OR MORE      | 218                   | -45 |
| 19                                                                                                                            | SINGLE         | 174                   | -45 |
|                                                                                                                               | DOUBLE         | 190                   | -45 |
|                                                                                                                               | 3 OR MORE      | 205                   | -45 |
| 20                                                                                                                            | SINGLE         | 161                   | -45 |
|                                                                                                                               | DOUBLE         | 171                   | -45 |
|                                                                                                                               | 3 OR MORE      | 190                   | -45 |
| 22                                                                                                                            | SINGLE         | 146                   | -45 |
|                                                                                                                               | DOUBLE         | 150                   | -45 |
|                                                                                                                               | 3 OR MORE      | 167                   | -45 |

Table 3.0

| 3NIA-32, 3NLA-32 & 3PLNA-32                                                                                                   |                |                       |     |
|-------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|-----|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3</sup>                                                             |                |                       |     |
| ATTACHMENT METHOD:                                                                                                            |                |                       |     |
| 3NL-32, 3NI-32 ATTACHED WITH BUTTON PUNCH TOOL @ 8.1" O.C.,<br>PLN-32 ATTACHED WITH PUNCHLOK® II SYSTEM SIDELAPS @ 24.7" O.C. |                |                       |     |
| GAUGE                                                                                                                         | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF |
| 16                                                                                                                            | SINGLE         | 202                   | -45 |
|                                                                                                                               | DOUBLE         | 237                   | -45 |
|                                                                                                                               | 3 OR MORE      | 238                   | -45 |
| 18                                                                                                                            | SINGLE         | 180                   | -45 |
|                                                                                                                               | DOUBLE         | 207                   | -45 |
|                                                                                                                               | 3 OR MORE      | 213                   | -45 |
| 19                                                                                                                            | SINGLE         | 169                   | -45 |
|                                                                                                                               | DOUBLE         | 190                   | -45 |
|                                                                                                                               | 3 OR MORE      | 200                   | -45 |
| 20                                                                                                                            | SINGLE         | 157                   | -45 |
|                                                                                                                               | DOUBLE         | 171                   | -45 |
|                                                                                                                               | 3 OR MORE      | 185                   | -45 |
| 22                                                                                                                            | SINGLE         | 143                   | -45 |
|                                                                                                                               | DOUBLE         | 150                   | -45 |
|                                                                                                                               | 3 OR MORE      | 167                   | -45 |

Table 3.1

| 3NI-32, 3NL-32 & 3PLN-32                                            |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.5            | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 207                   | -30     |
|                                                                     | DOUBLE         | 141                   | -30     |
|                                                                     | 3 OR MORE      | 176                   | -30     |
| 18                                                                  | SINGLE         | 185                   | -30     |
|                                                                     | DOUBLE         | 193                   | -30     |
|                                                                     | 3 OR MORE      | 218                   | -30     |
| 19                                                                  | SINGLE         | 174                   | -30     |
|                                                                     | DOUBLE         | 173                   | -30     |
|                                                                     | 3 OR MORE      | 205                   | -30     |
| 20                                                                  | SINGLE         | 161                   | -30     |
|                                                                     | DOUBLE         | 150                   | -30     |
|                                                                     | 3 OR MORE      | 187                   | -30     |
| 22                                                                  | SINGLE         | 146                   | -30     |
|                                                                     | DOUBLE         | 125                   | -30     |
|                                                                     | 3 OR MORE      | 156                   | -30     |

Table 3.2

| 3NIA-32, 3NLA-32 & 3PLNA-32                                         |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.5            | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 202                   | -30     |
|                                                                     | DOUBLE         | 141                   | -30     |
|                                                                     | 3 OR MORE      | 176                   | -30     |
| 18                                                                  | SINGLE         | 218                   | -30     |
|                                                                     | DOUBLE         | 180                   | -30     |
|                                                                     | 3 OR MORE      | 141                   | -30     |
| 19                                                                  | SINGLE         | 205                   | -30     |
|                                                                     | DOUBLE         | 169                   | -30     |
|                                                                     | 3 OR MORE      | 200                   | -30     |
| 20                                                                  | SINGLE         | 187                   | -30     |
|                                                                     | DOUBLE         | 157                   | -30     |
|                                                                     | 3 OR MORE      | 150                   | -30     |
| 22                                                                  | SINGLE         | 156                   | -30     |
|                                                                     | DOUBLE         | 143                   | -30     |
|                                                                     | 3 OR MORE      | 156                   | -30     |

Table 3.3

## Engineering Data

### Nucor Corp. – Vulcraft Group

### Vulcraft “3N-32,” Steel Roof Deck Panels

**Notes for Tables 3.0 – 3.7:**

- <sup>1</sup> Allowable negative load based on FM Class I-90 OR I-60
- <sup>2</sup> Values do not include a 1/3 stress increase
- <sup>3</sup> Diaphragm and axial load capacity is outside the scope of this evaluation.
- <sup>4</sup> Weld Electrode, E70XX 60 ksi

| 3NI-32, 3NL-32 & 3PLN-32                                            |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.625          | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 207                   | -45     |
|                                                                     | DOUBLE         | 198                   | -45     |
|                                                                     | 3 OR MORE      | 244                   | -45     |
| 18                                                                  | SINGLE         | 185                   | -45     |
|                                                                     | DOUBLE         | 161                   | -45     |
|                                                                     | 3 OR MORE      | 201                   | -45     |
| 19                                                                  | SINGLE         | 174                   | -45     |
|                                                                     | DOUBLE         | 143                   | -45     |
|                                                                     | 3 OR MORE      | 179                   | -45     |
| 20                                                                  | SINGLE         | 161                   | -45     |
|                                                                     | DOUBLE         | 150                   | -45     |
|                                                                     | 3 OR MORE      | 155                   | -45     |
| 22                                                                  | SINGLE         | 146                   | -45     |
|                                                                     | DOUBLE         | 103                   | -45     |
|                                                                     | 3 OR MORE      | 129                   | -45     |

Table 3.4

| 3NIA-32, 3NLA-32 & 3PLNA-32                                         |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.625          | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 202                   | -45     |
|                                                                     | DOUBLE         | 237                   | -45     |
|                                                                     | 3 OR MORE      | 238                   | -45     |
| 18                                                                  | SINGLE         | 187                   | -45     |
|                                                                     | DOUBLE         | 207                   | -45     |
|                                                                     | 3 OR MORE      | 143                   | -45     |
| 19                                                                  | SINGLE         | 169                   | -45     |
|                                                                     | DOUBLE         | 143                   | -45     |
|                                                                     | 3 OR MORE      | 179                   | -45     |
| 20                                                                  | SINGLE         | 157                   | -45     |
|                                                                     | DOUBLE         | 124                   | -45     |
|                                                                     | 3 OR MORE      | 155                   | -45     |
| 22                                                                  | SINGLE         | 143                   | -45     |
|                                                                     | DOUBLE         | 103                   | -45     |
|                                                                     | 3 OR MORE      | 129                   | -45     |

Table 3.5

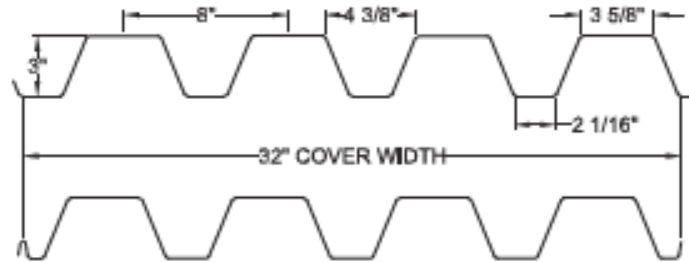
| 3NI-32, 3NL-32 & 3PLN-32                                            |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.75           | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 207                   | -45     |
|                                                                     | DOUBLE         | 237                   | -45     |
|                                                                     | 3 OR MORE      | 244                   | -45     |
| 18                                                                  | SINGLE         | 185                   | -45     |
|                                                                     | DOUBLE         | 196                   | -45     |
|                                                                     | 3 OR MORE      | 218                   | -45     |
| 19                                                                  | SINGLE         | 174                   | -45     |
|                                                                     | DOUBLE         | 174                   | -45     |
|                                                                     | 3 OR MORE      | 205                   | -45     |
| 20                                                                  | SINGLE         | 161                   | -45     |
|                                                                     | DOUBLE         | 150                   | -45     |
|                                                                     | 3 OR MORE      | 188                   | -45     |
| 22                                                                  | SINGLE         | 146                   | -45     |
|                                                                     | DOUBLE         | 125                   | -45     |
|                                                                     | 3 OR MORE      | 156                   | -45     |

Table 3.6

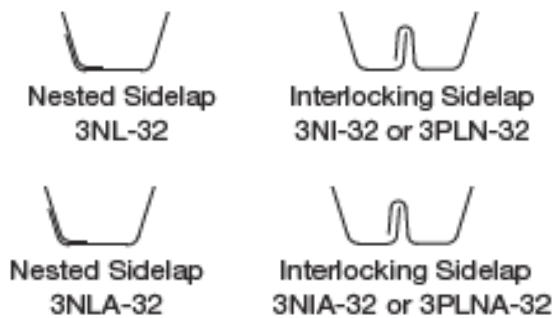
| 3NIA-32, 3NLA-32 & 3PLNA-32                                         |                |                       |         |
|---------------------------------------------------------------------|----------------|-----------------------|---------|
| ALLOWABLE LOAD (PSF) FOR NOMINAL SUPPORT SPACING <sup>1,2,3,4</sup> |                |                       |         |
| ATTACHMENT METHOD: PUDDLE WELDS                                     |                |                       |         |
| WELD DIAMETER (IN.)                                                 | 0.75           | WELD SPACING          | 8" O.C. |
| GAUGE                                                               | SPAN CONDITION | SUPPORT SPACING (IN.) | PSF     |
| 16                                                                  | SINGLE         | 202                   | -45     |
|                                                                     | DOUBLE         | 237                   | -45     |
|                                                                     | 3 OR MORE      | 238                   | -45     |
| 18                                                                  | SINGLE         | 180                   | -45     |
|                                                                     | DOUBLE         | 196                   | -45     |
|                                                                     | 3 OR MORE      | 213                   | -45     |
| 19                                                                  | SINGLE         | 169                   | -45     |
|                                                                     | DOUBLE         | 174                   | -45     |
|                                                                     | 3 OR MORE      | 200                   | -45     |
| 20                                                                  | SINGLE         | 157                   | -45     |
|                                                                     | DOUBLE         | 150                   | -45     |
|                                                                     | 3 OR MORE      | 185                   | -45     |
| 22                                                                  | SINGLE         | 143                   | -45     |
|                                                                     | DOUBLE         | 125                   | -45     |
|                                                                     | 3 OR MORE      | 156                   | -45     |

Table 3.7

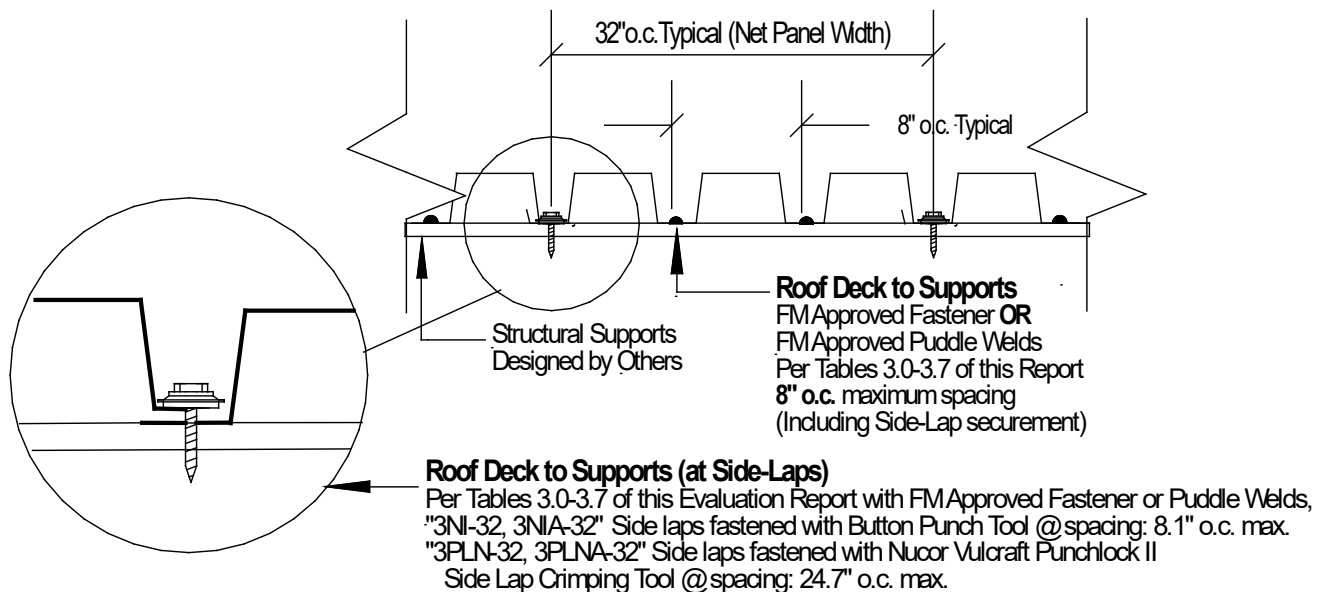
## Installation Method Nucor Corporation – Vulcraft Group Vulcraft “3N-32,” Steel Roof Deck Panels



Typical Panel Profile



Sidelap Detail



Typical Assembly Profile View