The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11.

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development lengths specified for the development and splices of reinforcement shall not be subject to a strength reduction factor in accordance with Section 25.4.1.3 of ACI 318-14 or Section 9.3.3 of ACI 318-11 or -08.

When designed in accordance with Section 25.4.4.2 of ACI 318-14 or Section 12.6.2 of ACI 318-11 or -08, longitudinal headed deformed bars extending from a beam or a slab terminating at a support member, such as a column shall extend through the joint to the far face of the confined supporting member per Figure R25.4.4.2b of ACI 318-14 Commentary or Figure R12.6 (b) of the ACI 318-11 or -08 Commentary.

Splices of reinforcement to headed deformed reinforcing bars in tension shall comply with Section 18.10.2.3 of ACI 318-14 or Sections 12.14 and 12.15 of ACI 318-11 or -08.

3.2.1 Design of Anchorage to Concrete: For compliance with Section 1901.3 of the 2018 IBC, or Section 1909 of the 2015 or 2012 IBC, ACI 318-14 Chapter 17, or ACI 318-11 or -08 Appendix D as anchorage, additional data shall be prepared by a registered design professional and approved by the building official to justify how the No.14 and No.18 headed bars are substantiated in accordance with Section 17.1.3 of ACI 318-14 or Section D.2.3 of ACI 318-11 or comply with ANSI/ASME B1.1, B18.2.1 and B18.2.6.

3.3 Installation: The ButtonHead BNH and BNX Headed Devices shall be installed in accordance with the IBC, ACI 318, this evaluation report and the manufacturer’s installation instructions. Where conflicts occur the more restrictive shall govern.

The ButtonHead BNH and BNX Headed Device System consists of two general components: one piece of reinforcing bar and a donut-shaped headed end. One end of the reinforcing bar is fully inserted into the central hole of the headed end. Final assembly take place in the field or are factory assembled, by swaging the headed end on the reinforcing bar using the hydraulically-actuated press.

3.4 Special Inspection: Special inspection of the headed bars shall be provided at the jobsite as required by Sections 1704.4 and 1705.3 of the 2018, 2015 or 2012 IBC, as applicable. The special inspector is responsible for verifying identification of the headed deformed reinforcing bars, grade and size of reinforcing bars, installation of reinforcing bar splices to the headed deformed reinforcing bars, as well as placement of the headed bars.

4.0 PRODUCT DESCRIPTION

4.1 Product information: The ButtonHead BNH and BNX Headed Devices for Reinforcing Bar in Tension are Class HA headed deformed bars complying with the requirements ASTM A970 Annex 1A. The BNH headed devices are composed of No. 4 through No.18 size reinforcing steel bars and the BNX are composed of No. 4 through No. 11 size reinforcing steel bars with a cold-swaged headed devices that are field, or factory assembled at one end or both ends of the reinforcing bar using the hydraulically-actuated press. Use of other headed devices that fit onto deformed bar ends in lieu of cold-swaging process shall comply with Section 5.1.8 of EC 006-2018.

The net bearing area of the BNH and BNX headed systems exceed four times the nominal cross-sectional area of the reinforcing bar. Dimensions and illustrations are shown in Table 1 and Figure 1 of this report.

4.2 Material information

4.2.1 Headed Ends: The ButtonHead BNH and BNX headed devices are formed from steel conforming to ASTM A108 or ASTM A576.

4.2.2 Steel Reinforcing Bars: Steel reinforcing bars shall be uncoated, deformed reinforcing bars complying with ASTM A615 Grades 60, 75 or 80, or ASTM A706 Grades 60 or 80.

5.0 IDENTIFICATION

All ButtonHead BNH and BNX Headed Devices are packaged with a label bearing the manufacturer’s name (BarSplice Products, Inc.), address, model, size, the IAPMO Uniform ES Mark of Conformity and the Uniform Evaluation Report Number (ER-331). The heads are permanently marked with the letter “H” to indicate that the product has been produced to the ASTM A970 Annex A1 specification. Products prepared by officially licensed fabricators, may have additional unique identifiers that corresponds to the fabricator. Either Mark of Conformity may be used as shown below:
6.0 SUBSTANTIATING DATA


7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on The ButtonHead BNH and BNX Headed Devices for Reinforcing Bars in Tension to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.7 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

Brian Gerber, P.E., S.E.
Vice President, Technical Operations
Uniform Evaluation Service

Richard Beck, PE, CBO, MCP
Vice President of Uniform Evaluation Service

GP Russ Chaney
CEO, The IAPMO Group

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org
### TABLE 1 – Dimensions of ButtonHead BNH and BNX Headed Devices

**BUTTONHEAD HEADED DEVICES EVALUATED**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Head Type</th>
<th>Diameter, $d_b$ (in)</th>
<th>Area, $A_b$ (in)</th>
<th>$B_{min}$ (in)</th>
<th>$D$ (in)</th>
<th>$A_{avg}$ (in$^2$)</th>
<th>$A_{avg} &gt; 4A_b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>BNH</td>
<td>0.500</td>
<td>0.20</td>
<td>0.875</td>
<td>1.375</td>
<td>1.28</td>
<td>YES</td>
</tr>
<tr>
<td>No. 5</td>
<td>BNH</td>
<td>0.625</td>
<td>0.31</td>
<td>0.938</td>
<td>1.750</td>
<td>2.10</td>
<td>YES</td>
</tr>
<tr>
<td>No. 6</td>
<td>BNH</td>
<td>0.750</td>
<td>0.44</td>
<td>1.250</td>
<td>1.875</td>
<td>2.32</td>
<td>YES</td>
</tr>
<tr>
<td>No. 7</td>
<td>BNH</td>
<td>0.875</td>
<td>0.60</td>
<td>1.375</td>
<td>2.375</td>
<td>3.83</td>
<td>YES</td>
</tr>
<tr>
<td>No. 8</td>
<td>BNH</td>
<td>1.000</td>
<td>0.79</td>
<td>1.500</td>
<td>2.750</td>
<td>5.15</td>
<td>YES</td>
</tr>
<tr>
<td>No. 9</td>
<td>BNH</td>
<td>1.128</td>
<td>1.00</td>
<td>1.750</td>
<td>2.875</td>
<td>5.49</td>
<td>YES</td>
</tr>
<tr>
<td>No. 10</td>
<td>BNH</td>
<td>1.270</td>
<td>1.27</td>
<td>1.875</td>
<td>3.375</td>
<td>7.68</td>
<td>YES</td>
</tr>
<tr>
<td>No. 11</td>
<td>BNH</td>
<td>1.410</td>
<td>1.56</td>
<td>2.125</td>
<td>3.813</td>
<td>9.86</td>
<td>YES</td>
</tr>
<tr>
<td>No. 14$^{1,2}$</td>
<td>BNH</td>
<td>1.693</td>
<td>2.25</td>
<td>2.875</td>
<td>3.875</td>
<td>9.54</td>
<td>YES</td>
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<tr>
<td>No. 18$^{1,2}$</td>
<td>BNH</td>
<td>2.257</td>
<td>4.00</td>
<td>4.375</td>
<td>5.045</td>
<td>16.0</td>
<td>YES</td>
</tr>
</tbody>
</table>

**TABLE 1 – Dimensions of ButtonHead BNH and BNX Headed Devices**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Head Type</th>
<th>Diameter, $d_b$ (in)</th>
<th>Area, $A_b$ (in)</th>
<th>$B_{min}$ (in)</th>
<th>$D$ (in)</th>
<th>$A_{avg}$ (in$^2$)</th>
<th>$A_{avg} &gt; 9A_b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>BNX</td>
<td>0.500</td>
<td>0.20</td>
<td>0.875</td>
<td>1.750</td>
<td>2.21</td>
<td>YES</td>
</tr>
<tr>
<td>No. 5</td>
<td>BNX</td>
<td>0.625</td>
<td>0.31</td>
<td>0.938</td>
<td>2.188</td>
<td>3.45</td>
<td>YES</td>
</tr>
<tr>
<td>No. 6</td>
<td>BNX</td>
<td>0.750</td>
<td>0.44</td>
<td>1.250</td>
<td>2.375</td>
<td>3.99</td>
<td>YES</td>
</tr>
<tr>
<td>No. 7</td>
<td>BNX</td>
<td>0.875</td>
<td>0.60</td>
<td>1.375</td>
<td>2.875</td>
<td>5.89</td>
<td>YES</td>
</tr>
<tr>
<td>No. 8</td>
<td>BNX</td>
<td>1.000</td>
<td>0.79</td>
<td>1.500</td>
<td>3.250</td>
<td>7.51</td>
<td>YES</td>
</tr>
<tr>
<td>No. 9</td>
<td>BNX</td>
<td>1.128</td>
<td>1.00</td>
<td>1.750</td>
<td>3.570</td>
<td>9.01</td>
<td>YES</td>
</tr>
<tr>
<td>No. 10</td>
<td>BNX</td>
<td>1.270</td>
<td>1.27</td>
<td>1.875</td>
<td>4.030</td>
<td>11.5</td>
<td>YES</td>
</tr>
<tr>
<td>No. 11</td>
<td>BNX</td>
<td>1.410</td>
<td>1.56</td>
<td>2.125</td>
<td>4.500</td>
<td>14.3</td>
<td>YES</td>
</tr>
</tbody>
</table>

*For SI: 1 inch = 25.4 mm, 1 sq.in. = 645 mm², 1 foot = 305 mm*

1 Note: For compliance with Section 1901.3 of the 2018 IBC and Section 1909 of the 2015 and 2012 IBC, ACI 318-14 Chapter 17, and ACI 318-11 and -08 Appendix D as anchorage, additional data needs to be prepared by the registered design professional and approved by the building official to justify how the No.14 and No.18 headed bars are substantiated per Section 17.1.3 of ACI 318-14 or Section D.2.3 of ACI 318-11 or comply with ANSI/ASME B1.1, B18.2.1 and B18.2.6.

2 In accordance with Section 25.4.4 of ACI 318-14 and Section 12.6 of ACI 318-11 or -08 the use of the No.14 and No.18 bars for development length is outside the scope of this report.

**FIGURE 1— ButtonHead BNH and BNX Headed Devices**

[Images of ButtonHead BNH and BNX Headed Devices]
1.0 RECOGNITION

The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension described in ER-331 and this LABC and LARC supplemental report have been evaluated for use as mechanical anchorage in concrete. The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension have been evaluated for structural performance properties, subject to the requirements in ER-331 and this LABC and LARC supplemental report. The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension were evaluated for compliance with the following codes and regulations:

- 2020 and 2017 City of Los Angeles Building Code (LABC)
- 2020 and 2017 City of Los Angeles Residential Code (LARC)

2.0 LIMITATIONS

Use of the ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension recognized in this supplement is subject to the following limitations in addition to the limitations shown in the master ER-331:

2.1 Calculations and specifications verifying compliance with the ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension shall be submitted to plan check engineer at the time of permit application. The ButtonHead BNH and BNX Headed Devices calculations shall be prepared by a Civil or Structural Engineer registered in the State of California.

2.2 Periodic special inspection shall be provided by The Registered Deputy Inspector in accordance with Section 1705 of the LABC during installations of the ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension.

2.3 The use of headed and mechanical anchored deformed reinforcement for lap splices is outside the scope of this report.

2.4 The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension shall be installed in accordance with the LABC or LARC, as applicable, manufacturer’s installation instructions, and this supplement. A copy of the manufacturer’s installation instructions shall be available on site for all Registered Deputy Inspectors. Where conflicts occur, the more restrictive shall govern.

2.5 The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension listed in this supplement shall include the unique heat code identification, and the letter “H” to indicate that the product has been produced to the ASTM A970 Annex A1 specification. Products prepared by officially licensed fabricators, may have additional unique identifiers that corresponds to the fabricator.

2.6 For use in foundation walls, minimum concrete cover and spacing between bars or sleeves shall be provided in accordance with Section 1808.8.2 of the LABC. Concrete cover and spacing shall be measured from the outer surface of the ButtonHead reinforcing bar’s head.

2.7 Headed steel reinforcing bars shall not be used on compression reinforcement, epoxy and other coated bars.

2.8 The cold-swaged headed device shall be fabricated by a City of Los Angeles approved fabricator.

2.9 The clear spacing between bars shall be at least 4d, in accordance with Section 25.4.4.1 (g) of ACI 318-14 and Section 12.6.1 (f) of ACI 318-11.

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