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Barsplice Products, Inc.  
4900 Webster Street  
Dayton, OH 45414

Attention: Tim Cartwright  
(937) 275 8700 X191

RESEARCH REPORT: RR25996  
(CSI # 03 21 00)

BASED UPON IAPMO UES  
REPORT NO. ER. 0331

REEVALUATION DUE  
DATE: October 1, 2018  
Issued Date: October 1, 2016  
Code: 2014 LABC

**GENERAL APPROVAL-** ButtonHead BNH and BNX Headed Devices for Reinforcing Bar in Tension.

**DETAILS**

The above assemblies and/or products are approved when in compliance with the use, description, design, installation, condition of approval, and identification of Uniform Evaluation Report No.ER-0331, revised on 08/2016, of the IAPMO Uniform ES,. The report, in its entirety, is attached and made part of this general approval.

The parts of Report No. ER-0331 marked by the asterisks are modified by the Los Angeles Building Department from this approval.

**The approval is subject to the following conditions:**

The approval is subject to the following conditions:

1. Periodic Special inspection by Deputy Inspectors shall be provided during installations of the headed steel reinforcing bars in accordance with Section 1705 of the Los Angeles Building Code.
2. The use of headed deformed reinforcement bars for lap splices are outside the scope of this report.

RR25996  
Page 1 of 3

Barsplice Products, Inc.

RE: ButtonHead BNH and BNX Headed Devices for Reinforcing Bar in Tension.

3. The ButtonHead BNH and BNX Headed devices are approved only for bar sizes no. 4 through no. 11.
4. The fabricator, in processing steel for the headed steel reinforcing bars through his works, shall maintain identity of the material and shall maintain suitable procedures and records attesting that the specified grade has been furnished in conformity with the applicable ASTM Standard. The ASTM or other specification designation shall be included near the erection mark on each shipping assembly or important construction component over any shop coat of paint prior to shipment from the fabricator's plant. The fabricator's identification mark system shall be established and on record prior to fabrication.  
Steel which is not readily identifiable as to grade from marking and test records shall be tested to determine conformity to such standard. The fabricator shall, when requested, furnish an affidavit of compliance with such standard. Test data shall be provided upon request.
5. Except as specified herein, installation of the headed steel reinforcing bars shall be in accordance with the manufacturer's specifications. A copy of the specifications shall be provided at the job site and be made available to all Deputy Inspectors on the job.
6. Headed steel reinforcing bars locations shall be fully detailed on the plans and approved by Plan check engineer. The calculations for headed steel reinforcing bars shall be prepared by a Civil or Structural Engineer registered in the State of California.
7. Requirements for concrete cover, space between bars or sleeves, and minimum anchor length shall be applicable to headed steel reinforcing bars.
8. Minimum concrete cover shall be in accordance with the 2014 LABC, and shall be measured from the outer surface of the ButtonHead reinforcing bar's head.
9. Headed steel reinforcing bars shall not be used on compression reinforcement and epoxy and other coated bars.
10. For use as reinforcement resisting earthquake-induced flexural and axial forces in frame members and boundary elements of special structural walls, the reinforcing bar component of the headed bars shall comply with Section 21.1.5 of ACI 318-11.
11. The cold swaging is done at a shop of a City of Los Angeles approved fabricator.
12. The clear spacing of the headed bar shall not be less than as required in Section 12.6.1 (f) of ACI 318-11.

Barsplice Products, Inc.  
RE: ButtonHead BNH and BNX Headed Devices for Reinforcing Bar in Tension.

## DISCUSSION

This report is in compliance with the 2014 City of Los Angeles Building Code.

The approval is based on tests in accordance with IAPMO EC 006-2014.

Note: Headed devices for bar sizes #14 and #18 are currently not allowed by the City of LA because supporting in-concrete test data does not originate from an approved City of LA Test Lab.

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revision to the report must be submitted to this Department for review with appropriate fee to continue the approval of the revised report.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.



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QN  
RR258893  
R09/28/2016  
TLB1600305  
ACI 318-11 Sec. 3.5.9

Attachment: IAPMO Report No. 0331 (3 Pages)



## EVALUATION SUBJECT: THE BUTTONHEAD BNH AND BNX HEADED DEVICE FOR REINFORCEMENT BARS IN TENSION

**REPORT HOLDER:**  
**Barsplice Products, Inc.**  
4900 Webster Street  
Dayton, OH 45414  
(937) 275-8700  
[www.barsplice.com](http://www.barsplice.com)

**CSI Division: 03 CONCRETE**  
**CSI Section: 032100 Reinforcing Steel**

### 1.0 SCOPE OF EVALUATION

#### 1.1 Compliance to the following codes & regulations:

- 2012 and 2009 International Building Code® (IBC)
- 2012 and 2009 International Residential Code® (IRC)

#### 1.2 Evaluated in accordance with:

- IAPMO UES EC 006-2016

#### 1.3 Properties assessed:

- Structural

### 2.0 PRODUCT USE

The ButtonHead BNH and BNX Headed Device for Reinforcing Bars in Tension are Class HA headed deformed bars complying with Section 12.6 of ACI 318-11 for use as mechanical anchorage to develop steel reinforcing bars in tension in normal-weight concrete as an alternative to standard hooks or development lengths of straight deformed reinforcing bars in reinforced concrete.

### 3.0 PRODUCT DESCRIPTION

**3.1 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. The BNH headed devices are composed of <sup>11</sup>\*\* 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 device at one end or both ends of the bar. 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.

### 3.2 Material information

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

**3.2.2 Steel Reinforcing Bars:** Steel reinforcing bars shall be uncoated, Grade 60 deformed reinforcing bars complying with ASTM A615 or ASTM A706.

### 4.0 DESIGN AND INSTALLATION

**4.1 General:** 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.

#### 4.2 Design

**4.2.1 Development Length:** When utilizing the equation in Section 12.6.2 of ACI 318-11 and ACI 318-08 to calculate development length of deformed bars in tension, the proposed heads conforms with ASTM A970-09, the maximum compressive design strength of the concrete used in the calculation is 6,000 psi (41.4 MPa), and those conditions referenced in Section 12.6.1 of ACI 318-11 have been achieved.

Development lengths specified for the development and splices of reinforcement shall not require a strength reduction factor in accordance with Section 9.3.3 of ACI 318.

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

**4.2.2 Design of Anchorage to Concrete:** For compliance with Section 1909 of the IBC and ACI 318 Appendix D as anchorage, additional data needs to 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 per Section D.2.3 of ACI 318-11 or comply with ANSI/ASME B1.1, B18.2.1 and B18.2.6.

**4.2.3 Termination of Headed Bars:** When designed in accordance with Section 12.6.2 of ACI 318-11, 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 ACI 318 Figure R12.6 (b).

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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**4.3 Special Inspection:** Special inspection of the headed bars shall be provided at the jobsite as required by Sections 1704 and 1705 of the 2012 IBC (Section 1704 of the 2009 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.

**5.0 LIMITATIONS**

The Buttonhead BNH and BNX Headed Devices described in this report comply with, or are suitable alternatives to what is specified in, the codes listed in Section 1.0 of this report, subject to the following conditions:

**5.1** The headed devices shall be installed in accordance with the applicable code, the manufacturer's instructions, and this report. In the event of a conflict, the more restrictive governs.

**5.2** The use of headed and mechanical anchored deformed reinforcement for lap splices is outside the scope of this criteria.

**5.3** Anchorage system calculations and installation details shall be designed in conformance with the IBC and ACI 318 by the registered design professional and approved by the building official.

**5.4** For structures regulated by ACI 318 Chapter 21, as required by 2012 IBC Section 1905.1 (2009 IBC Section 1908.1), where the ButtonHead BNH and BNX Headed reinforcing bars resisting earthquake-induced flexure, axial force, or both, in special moment frames, special structural walls, and all components of special structural walls including coupling beams and wall piers, mill certificates shall be submitted to the code official as evidence that the steel reinforcing bars comply with Section 21.1.5.2 of ACI 318.

**5.5** Special inspections shall be provided in accordance with Section 4.3 of this report.

**5.6** Minimum concrete cover shall be in accordance with Section 7.7 of ACI 318-11, and shall be measured from the outer surface of the ButtonHead reinforcing bar's head.

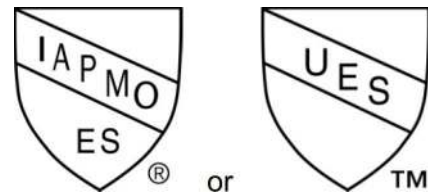
**6.0 SUBSTANTIATING DATA**

Data in accordance with IAPMO UES Evaluation Criteria for Headed and Mechanically Anchored Deformed Reinforcement Bars in Tension (EC 006-2016), approved

January 2016.

**7.0 IDENTIFICATION**

All Buttonhead BNH and BNX 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.



**IAPMO ER #331**

*Brian Gerber*

**Brian Gerber, P.E., S.E.**

**Vice President, Technical Operations  
Uniform Evaluation Service**

*Richard Beck*

**Richard Beck, PE, CBO, MCP**

**Director of Uniform Evaluation Service**

*Russ Chaney*

**GP Russ Chaney**

**CEO, The IAPMO Group**

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)





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

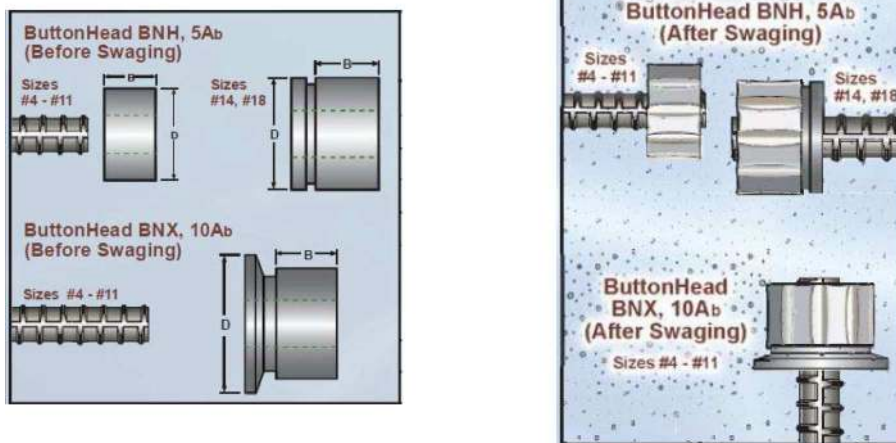
BUTTONHEAD HEADED DEVICES EVALUATED							
		REBAR		HEAD			
Bar Size	Head Type	Diameter, db (in)	Area, Ab (in)	Bmin (in)	D (in)	Abrg (in <sup>2</sup> )	Abrg > 4Ab
No. 4	BNH	0.500	0.20	0.875	1.375	1.28	YES
No. 5	BNH	0.625	0.31	0.938	1.750	2.10	YES
No. 6	BNH	0.750	0.44	1.250	1.875	2.32	YES
No. 7	BNH	0.875	0.60	1.375	2.375	3.83	YES
No. 8	BNH	1.000	0.79	1.500	2.750	5.15	YES
No. 9	BNH	1.128	1.00	1.750	2.875	5.49	YES
No. 10	BNH	1.270	1.27	1.875	3.375	7.68	YES
No. 11	BNH	1.410	1.56	2.125	3.813	9.86	YES
No. 14 <sup>1</sup>	BNH	1.693	2.25	2.875	3.875	9.54	YES
No. 18 <sup>1</sup>	BNH	2.257	4.00	4.375	5.045	16.0	YES

Bar Size	Head Type	Diameter, db (in)	Area, Ab (in)	Bmin (in)	D (in)	Abrg (in <sup>2</sup> )	Abrg > 9Ab
No. 4	BNX	0.500	0.20	0.875	1.750	2.21	YES
No. 5	BNX	0.625	0.31	0.938	2.188	3.45	YES
No. 6	BNX	0.750	0.44	1.250	2.375	3.99	YES
No. 7	BNX	0.875	0.60	1.375	2.875	5.89	YES
No. 8	BNX	1.000	0.79	1.500	3.250	7.51	YES
No. 9	BNX	1.128	1.00	1.750	3.570	9.01	YES
No. 10	BNX	1.270	1.27	1.875	4.030	11.5	YES
No. 11	BNX	1.410	1.56	2.125	4.500	14.3	YES

For SI: 1 inch = 25.4 mm, 1 sq.in. = 645 mm<sup>2</sup>, 1 foot = 305 mm

<sup>1</sup>Note: For compliance with the IBC and ACI 318 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 D.2.3 of ACI 318-11 or comply with ANSI/ASME B1.1, B18.2.1 and B18.2.6.



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

\* Deleted by City of Los Angeles