



# ButtonHead

**GRADE 100 & 120**

**COLD-SWAGED HEADED  
DEFORMED BARS FOR  
GRADE 100 & GRADE 120  
REINFORCEMENT**



## PERFORMANCE TEST DATA

SEPTEMBER 2019

Barsplice Products, Inc., 4900 Webster Street, Dayton OH 45414, USA  
Tel: (937) 275-8700 • Fax: (937) 275-9566 • e-mail: [bar@barsplice.com](mailto:bar@barsplice.com)

Copyright © 2019, Barsplice Products, Inc., "BPI". All rights reserved. [www.barsplice.com](http://www.barsplice.com)

## INTRODUCTION

Barsplice Products, Inc. has conducted a series of in-air tests on the ButtonHead system of headed deformed bars, sizes No. 4 through No. 18. The purpose of this testing is to ensure that they are manufactured to the quality standards of BPI's ISO 9001 Quality System and are capable of exceeding various Building Codes strength requirements.

Two head diameter designs are available, depending on application requirements, and test results for both are included. Heads with a cross-sectional area exceeding 5x the rebar area (BNH) are designated as 5A<sub>b</sub> and heads with a cross-sectional area exceeding 10x the rebar area (BNX) are designated as 10A<sub>b</sub>.

## TENSILE TEST PROCEDURE

Test specimens were loaded monotonically in tension to failure to determine the capability of the ButtonHead headed bar system. The tests were conducted in accordance with ASTM A370, "Standard Test Methods and Definitions for Mechanical Testing of Steel Products." Loads were applied through the bearing area of the head. The testing was performed to exceed the headed deformed bar strength requirements of ACI (American Concrete Institute) 318-2019 Section 25.4.5.1 and ASTM A970, Class A & Class HA.

All monotonic tension tests were carried out in a 600 kip Forney universal testing machine, located at the Barsplice manufacturing facility. Current calibration certificates for the test machine are on file.

The reinforcing steel used in these tests conforms to the requirements of ASTM A1035, Gr. 100.

## TEST RESULTS

Results of the ButtonHead tension testing described above are summarized in Table 1 and represented in Chart 1.

### SUMMARY

Tension test specimens exceeded the strength requirements of ACI 318\*, namely 100% x specified yield strength of Grade 80 reinforcement.

Tension test specimens also exceeded 100% x specified yield strength of ASTM A615 Grade 100 and ASTM A1035 Grades 100 & 120.

Additionally, the tension test specimens exceeded the strength requirements stated in ASTM A970, Class A and Class HA, namely the specified tensile strength of ASTM A615 Grade 100 bar which equates to 115,000 psi, and ASTM A1035 Grade 100 & 120 bar which equates to 150,000 psi.

\* In meeting the strength requirements of ACI-318 for Grade 80 reinforcement, the ButtonHead system complies with IBC 2018 Section 1901.3.

**TABLE 1: BUTTONHEAD TENSILE TEST RESULTS**

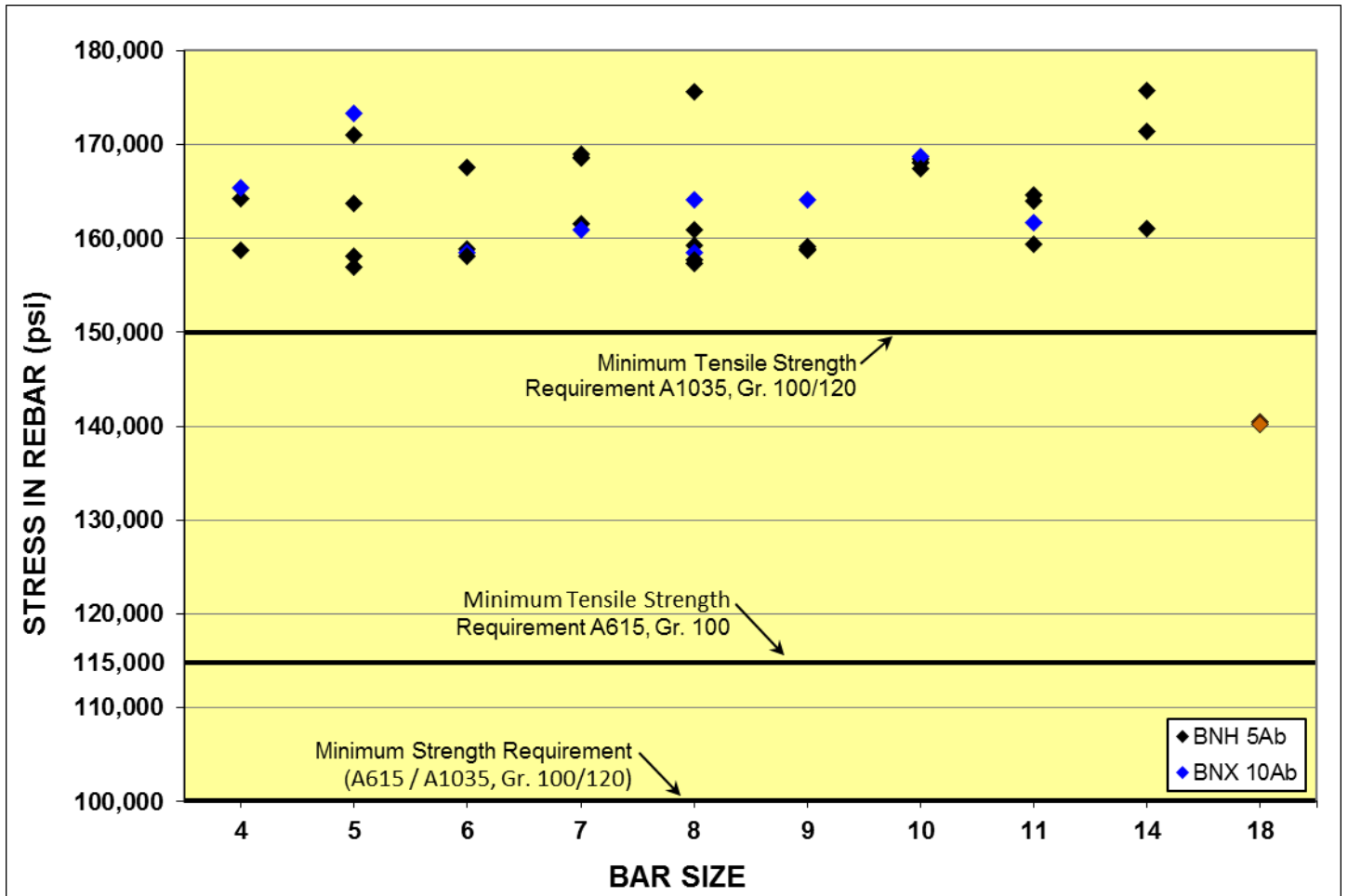
BAR SIZE	BAR TYPE	TEST LAB ID # & REF #		PEAK STRENGTH	
				MAX STRESS (psi)	% SPEC. TENSILE* GR. 100/120
No. 4	4T3644	BNH 5Ab	4A	158,750	106%
			4A	164,300	110%
	4T3702	BNX 10Ab	4A	165,350	110%
No. 5	5T4932	BNH 5Ab	5A	171,032	114%
			5B	163,774	109%
	5T9560	BNH 5Ab	5A	158,065	105%
			5B	156,903	105%
	5T9716	BNX 10Ab	5A	173,387	116%
No. 6	6T4152	BNH 5Ab	6A	158,091	105%
	6T4153	BNX 10Ab	6A	158,500	106%
	6T6426	BNH 5Ab	6A	158,864	106%
			6B	167,523	112%
No. 7	7T1503	BNX 10Ab	7A	160,950	107%
	7T3053	BNH 5Ab	7A	168,650	112%
			7B	168,983	113%
	7T3109	BNH 5Ab	7A	168,583	112%
			7B	161,600	108%
No. 8	8T2142	BNH 5Ab	8A	157,722	105%
			8B	175,646	117%
	8T2231	BNX 10Ab	8A	164,165	109%
	8T2652	BNH 5Ab	8A	159,316	106%
	8T2653	BNX 10Ab	8A	158,468	106%
	8T3948	BNH 5Ab	8A	160,873	107%
			8B	157,342	105%

BAR SIZE	BAR TYPE	TEST LAB ID # & REF #		PEAK STRENGTH	
				MAX STRESS (psi)	% SPEC. TENSILE* GR. 100/120
No. 9	9T1333	BNH 5Ab	9A	158,770	106%
	9T2514	BNH 5Ab	9A	158,930	106%
			9B	159,090	106%
	9T2557	BNX 10Ab	9A	164,150	109%
No. 10	10T2315	BNH 5Ab	10A	167,512	112%
			10B	168,488	112%
	10T2332	BNH 5Ab	10A	168,055	112%
			10B	168,079	112%
10T2333	BNX 10Ab	10A	168,748	112%	
No. 11	11T3278	BNH 5Ab	11A	159,391	106%
	11T3417	BNX 10Ab	11A	161,673	108%
	11T4403	BNH 5Ab	11A	163,955	109%
			11B	164,622	110%
No. 14	14T1436	BNH 5Ab	14A	175,729	117%
			14B	171,382	114%
	14T1495	BNH 5Ab	14C	161,009	107%
No. 18	18T932 ♦	BNH 5Ab	18A	140,225	93% ♦
		BNH 5Ab	18A	140,490	94% ♦

\* % fu shown is for ASTM A1035. For comparison to ASTM A615, see the chart on the following page.

♦ Test stopped at 140ksi proof load due to machine limitations.

# CHART 1: BUTTONHEAD TENSILE TEST RESULTS



◆ 18BNH tests stopped at 140ksi proof load due to machine limitations.