BarSplice PRODUCTS INC.

ButtonHead™

GRADE 75 & 80

COLD-SWAGED STEEL HEADED DEFORMED BARS FOR GRADE 75 & GRADE 80 REINFORCEMENT

PERFORMANCE TEST DATA

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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 $5A_b$ and heads with a cross-sectional area exceeding 10x the rebar area (BNX) are designated as $10A_b$.

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" and ASTM A1034, " Standard Test Methods for Testing Mechanical Splices for Steel Reinforcing Bars." 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) 318-19 Chapter 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 A615, Grade 75 & 80 and ASTM A706, Grade 80.

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 318-19*, namely 100% x specified yield strength of ASTM A615 Grade 75 & 80, and ASTM A706 Grade 80 reinforcement.

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 75/80 bar & ASTM A706 Grade 80 bar, specifically 100,000 psi (690 MPa).

* In meeting the strength requirements of ACI-318, 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)	PEAK STRENGTH % SPEC. TENSILE GR. 75/80
No. 4	GR.80	4T3184*	4A	106,600	107%
		4T3232*	4A	111,050	111%
		4T3233*	4A	110,400	110%
No. 5	GR.75	5T7679	5A	107,419	107%
			5B	110,903	111%
	GR.80	5T8052*	5A	107,710	108%
		5T8237*	5A	107,968	108%
		5T8238*	5A	108,387	108%
		5T12105*	5A	109,241	109%
			5B	109,750	110%
		5T13755*	5B	109,932	110%
No. 6	GR.75	6T4057	6A	123,000	123%
			6B	118,818	119%
			6C	117,273	117%
		6T4340	6A	110,000	110%
	GR.80	6T5550*	6A	113,750	114%
		6T5666*	6A	111,977	112%
		6T8876*	6B	117,826	118%
		6T8980*	6B	120,648	121%
No. 7	GR.80	7T2642*	7A	117,933	118%
		7T2700*	7A	113,200	113%
		7T2701*	7A	114,217	114%
		7T3843*	7A	124,332	124%
		7T3940*	7B	119,663	120%
		7T4415*	7B	116,268	116%
No. 8	GR.75	8T2423	8A	114,747	115%
			8B	113,506	114%
			8C	114,354	114%
			8D	113,519	114%
	GR.80	8T2571	8A	118,038	118%
			8B	116,823	117%
			8C	116,734	117%
		8T3466*	8A	121,291	121%
		8T3532*	8A	122,658	123%
		8T5487*	8B	119,182	119%
		8T5528*	8B	113,494	113%
No. 9	GR.75	9T1616	9A	111,210	111%
	GR.80	9T1763	9A	114,900	115%
			9B	115,770	116%
			9C	114,990	115%
		9T2244*	9A	117,200	117%
		9T2284*	9A	112,800	113%
		9T2518*	9B	120,930	121%
		9T3570*	9B	114,123	114%

BAR SIZE	BAR TYPE	TEST LAB ID # & REF #		PEAK STRENGTH MAX STRESS (psi)	PEAK STRENGTH % SPEC. TENSILE GR. 75/80
No. 10	GR.75	10T1621	10A	129,016	129%
			10B	128,835	129%
			10C	128,795	129%
			10D	128,764	129%
	GR.80	10T1687	10A	128,984	129%
			10B	128,394	128%
			10C	129,213	129%
		10T2132*	10A	113,551	114%
		10T2162*	10A	115,512	116%
		10T2727*	10A	124,671	125%
		10T2800*	10B	120,100	120%
No. 11	GR.75	11T3136	11A	119,833	120%
			11B	119,705	120%
			11C	119,244	119%
			11D	120,647	121%
	GR.80	11T3250	11A	125,295	125%
		11T4069*	11A	117,032	117%
		11T4071*	11A	115,987	116%
		11T4560*	11A	122,224	122%
			11B	123,071	123%
		11T5438*	11A	109,677	110%
			11B	110,496	110%
No. 14	GR.75	14T841	14A	116,236	116%
			14B	115,973	116%
			14C	114,244	114%
			14D	115,396	115%
	GR.80	14T1338*	14A	109,511	110%
		14T1361*	14A	109,253	109%
		14T1797*	14B	113,015	113%
		14T1798*	14B	113,759	114%
		14T1800*	14B	113,307	113%
No. 18	GR.75	18T478	18A	115,932	116%
		18T482	18A	114,690	115%
		18T986	18A	113,695	114%
		18T988	18A	115,362	115%
	GR.80	18T881*	18A	113,618	114%
		18T1134	18A	107,277	107%

* Test conducted on ASTM A706 Grade 80 reinforcement bar

CHART 1: BUTTONHEAD™ TENSILE TEST RESULTS