



Grip-Twist[®]

TTGT DoughNUT[™]

**THREADED END
ANCHORAGES FOR
REINFORCING BARS**



PERFORMANCE TEST DATA

JULY 2020

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INTRODUCTION

Barsplice Products, Inc. has conducted a series of in-air tests on the Taper Threaded Grip-Twist® (TTGT) DoughNUT™ system of reinforcing bar mechanical end anchorages, 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 (TDS) are designated as 5Ab and heads with a cross-sectional area exceeding 10x the rebar area (TDX) are designated as 10Ab.

TENSILE TEST PROCEDURE

Test specimens were loaded monotonically in tension to failure to determine the capability of the TTGT DoughNUT™ 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 mechanical anchorage strength requirements of ACI (American Concrete Institute) 318-19 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 A615, Grade 60 and ASTM A706, Grade 60.

TEST RESULTS

Results of the TTGT DoughNUT™ 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 Grade 60 reinforcement, specifically 60,000 psi (420 MPa).

Additionally, the tension test specimens exceeded the strength requirements stated in ASTM A970, Class A and Class HA, namely the specified tensile strength of Grade 60 bar, specifically 80,000 psi (550 MPa).

* In meeting the strength requirements of ACI-318, the TTGT DoughNUT™ system complies with IBC 2018 Section 1901.2.

TABLE 1: TTGT DoughNUT™ TENSILE TEST RESULTS

BAR SIZE	TEST LAB ID # & REF #			PEAK STRENGTH	
				MAX STRESS (psi)	% GR. 60 SPEC. TENSILE
No. 4	4T387*	TDX 10Ab	4A	96,425	121%
	4T465	TDS 5Ab	4A	106,700	133%
			4B	103,850	130%
	4T1711	TDX 10Ab	4A	106,600	133%
	4T2353	TDS 5Ab	4A	105,600	132%
			4B	104,000	130%
4T2670	TDS 5Ab	4A	122,200	153%	
		4B	121,100	151%	
No. 5	5T624	TDS 5Ab	5A	113,670	142%
			5B	113,926	142%
	5T806*	TDX 10Ab	5A	93,629	117%
	5T1047	TDS 5Ab	5A	106,129	133%
			5B	107,419	134%
	5T6659	TDS 5Ab	5A	108,484	136%
5B			108,226	135%	
5T7301	TDS 5Ab	5A	101,484	127%	
		5B	101,839	127%	
No. 6	6T571A	TDS 5Ab	6A	111,495	139%
			6B	110,618	138%
	6T611A	TDS 5Ab	6A	106,640	133%
			6B	107,312	134%
	6T1023	TDX 10Ab	6A	111,205	139%
			6B	109,250	137%
6T1024	TDS 5Ab	6A	108,864	136%	
		6B	113,614	142%	
No. 7	7T285	TDS 5Ab	7A	111,025	139%
			7B	112,161	140%
	7T312	TDS 5Ab	7A	105,249	132%
			7B	106,497	133%
	7T1408	TDX 10Ab	7A	108,467	136%
			7B	106,217	133%
7T1860	TDS 5Ab	7A	106,467	133%	
		7B	111,767	140%	
No. 8	8T3187	TDX 10Ab	8A	117,000	146%
			8B	113,785	142%
	8T3161	TDS 5Ab	8A	107,405	134%
			8B	106,367	133%
	8T3203	TDS 5Ab	8A	107,456	134%
			8B	108,038	135%
8T3604	TDS 5Ab	8A	109,177	136%	
		8B	110,316	138%	

BAR SIZE	TEST LAB ID # & REF #			PEAK STRENGTH	
				MAX STRESS (psi)	% GR. 60 SPEC. TENSILE
No. 9	9T1314*	TDS 5Ab	9A	98,530	123%
	9T1792	TDX 10Ab	9A	117,030	146%
			9B	116,560	146%
	9T1844	TDS 5Ab	9A	108,690	136%
			9B	106,480	133%
	9T2286	TDX 10Ab	9A	106,900	134%
9B			112,090	140%	
9T2314	TDS 5Ab	9A	111,760	140%	
		9B	112,180	140%	
No. 10	10T1260	TDS 5Ab	10A	108,764	136%
			10B	109,630	137%
	10T1701	TDS 5Ab	10A	104,008	130%
			10B	103,717	130%
	10T2066	TDX 10Ab	10A	105,087	131%
			10B	106,260	133%
10T2178	TDS 5Ab	10A	108,480	136%	
		10B	104,472	131%	
No. 11	11T3991	TDS 5Ab	11A	110,058	138%
			11B	109,641	137%
	11T4083	TDS 5Ab	11A	104,487	131%
			11B	103,513	129%
	11T4096	TDS 5Ab	11A	110,449	138%
			11B	108,141	135%
11T4196	TDX 10Ab	11A	108,756	136%	
		11B	108,192	135%	
No. 14	14T178*	TDX 10Ab	14A	95,250	119%
			14B	95,327	119%
	14T685	TDS 5Ab	14A	107,769	135%
			14B	105,249	132%
	14T888	TDS 5Ab	14A	113,116	141%
			14B	114,107	143%
14T925*	TDX 10Ab	14A	100,009	125%	
No. 18	18T190*	TDX 10Ab	18A	98,293	123%
			18B	98,690	123%
	18T403	TDS 5Ab	18A	104,630	131%
			18B	105,358	132%
	18T509	TDS 5Ab	18A	113,682	142%
			18B	112,040	140%
18T704	TDX 10Ab	18A	97,780	122%	
		18B	98,232	123%	

* Test conducted on ASTM A706 reinforcement bar

CHART 1: TTGT DoughNUT™ TENSILE TEST RESULTS

