



Grip-Twist[®]

TTGT DoughNUT[™]

**THREADED END
ANCHORAGES FOR
REINFORCING BARS**



PERFORMANCE TEST DATA

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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™ end anchorage 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 mechanical anchorage strength requirements of ACI (American Concrete Institute) 318-2014 Section 25.4.5.1 (ACI 318-2011 Section 12.6) 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 318-2014*, namely 100% x specified yield strength of Grade 60 rebar.

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 rebar which equates to 90,000 psi or 150% x specified yield for A615 rebar and 80,000 psi or 133% x specified yield for A706 rebar.

* In meeting the strength requirements of ACI-318, the TTGT DoughNUT™ system complies with IBC 2015 Section 1901.2.

TABLE 1: TTGT DoughNUT™ TENSILE TEST RESULTS

BAR SIZE	TEST LAB ID # & REF #			PEAK STRENGTH	
				MAX STRESS (psi)	% GR. 60 SPEC. YIELD
No. 4	4T387*	TDX 10Ab	4A	96,425	161%
	4T465	TDS 5Ab	4A	106,700	178%
			4B	103,850	173%
	4T1711	TDX 10Ab	4A	106,600	178%
	4T2353	TDS 5Ab	4A	105,600	176%
			4B	104,000	173%
4T2670	TDS 5Ab	4A	122,200	204%	
		4B	121,100	202%	
No. 5	5T624	TDS 5Ab	5A	113,670	189%
			5B	113,926	190%
	5T806*	TDX 10Ab	5A	93,629	156%
	5T1047	TDS 5Ab	5A	106,129	177%
			5B	107,419	179%
	5T6659	TDS 5Ab	5A	108,484	181%
5B			108,226	180%	
5T7301	TDS 5Ab	5A	101,484	169%	
		5B	101,839	170%	
No. 6	6T571A	TDS 5Ab	6A	111,495	186%
			6B	110,618	184%
	6T611A	TDS 5Ab	6A	106,640	178%
			6B	107,312	179%
	6T1023	TDX 10Ab	6A	111,205	185%
			6B	109,250	182%
6T1024	TDS 5Ab	6A	108,864	181%	
		6B	113,614	189%	
No. 7	7T285	TDS 5Ab	7A	111,025	185%
			7B	112,161	187%
	7T312	TDS 5Ab	7A	105,249	175%
			7B	106,497	177%
	7T1408	TDX 10Ab	7A	108,467	181%
			7B	106,217	177%
7T1860	TDS 5Ab	7A	106,467	177%	
		7B	111,767	186%	
No. 8	8T3187	TDX 10Ab	8A	117,000	195%
			8B	113,785	190%
	8T3161	TDS 5Ab	8A	107,405	179%
			8B	106,367	177%
	8T3203	TDS 5Ab	8A	107,456	179%
			8B	108,038	180%
8T3604	TDS 5Ab	8A	109,177	182%	
		8B	110,316	184%	

BAR SIZE	TEST LAB ID # & REF #			PEAK STRENGTH	
				MAX STRESS (psi)	% GR. 60 SPEC. YIELD
No. 9	9T1314*	TDS 5Ab	9A	98,530	164%
	9T1792	TDX 10Ab	9A	117,030	195%
			9B	116,560	194%
	9T1844	TDS 5Ab	9A	108,690	181%
			9B	106,480	177%
	9T2286	TDX 10Ab	9A	106,900	178%
9B			112,090	187%	
9T2314	TDS 5Ab	9A	111,760	186%	
		9B	112,180	187%	
No. 10	10T1260	TDS 5Ab	10A	108,764	181%
			10B	109,630	183%
	10T1701	TDS 5Ab	10A	104,008	173%
			10B	103,717	173%
	10T2066	TDX 10Ab	10A	105,087	175%
			10B	106,260	177%
10T2178	TDS 5Ab	10A	108,480	181%	
		10B	104,472	174%	
No. 11	11T3991	TDS 5Ab	11A	110,058	183%
			11B	109,641	183%
	11T4083	TDS 5Ab	11A	104,487	174%
			11B	103,513	173%
	11T4096	TDS 5Ab	11A	110,449	184%
			11B	108,141	180%
11T4196	TDX 10Ab	11A	108,756	181%	
		11B	108,192	180%	
No. 14	14T178*	TDX 10Ab	14A	95,250	159%
			14B	95,327	159%
	14T685	TDS 5Ab	14A	107,769	180%
			14B	105,249	175%
	14T888	TDS 5Ab	14A	113,116	189%
			14B	114,107	190%
14T925*	TDX 10Ab	14A	100,009	167%	
No. 18	18T190*	TDX 10Ab	18A	98,293	164%
			18B	98,690	164%
	18T403	TDS 5Ab	18A	104,630	174%
			18B	105,358	176%
	18T509	TDS 5Ab	18A	113,682	189%
			18B	112,040	187%
18T704	TDX 10Ab	18A	97,780	163%	
		18B	98,232	164%	

* Test conducted on ASTM A706 reinforcement bar

CHART 1: TTGT DoughNUT™ TENSILE TEST RESULTS

