

ASTM Testing on Picote's Epoxy Coating System

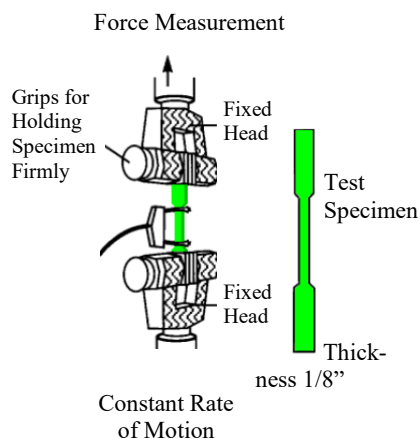
TESTED PRODUCT: Picote Dual Color Epoxy

TEST 1

A total of four tests were performed including:

1. Tensile Strength
2. Compression Strength
3. Flexural Modulus
4. Coating Pull Off Strength.

TEST 1: ASTM D638-14 "Tensile Strength"



A piece of finished product, with a maximum thickness of .125-inches, is machined into a dog-bone shape. Each end of the test specimen is placed in opposite facing clamps which then attempt to pull it apart.

The PSI that it takes to break the specimen is calculated as "**Tensile Strength at the Break**". The "**Tensile Elongation at the Break**" is an additional measurement that shows how much the product stretches during this test. The "**Tensile Modulus**" is a measure taken to test rigidity. All of these measurements make up the "Tensile Strength" test. The D638-14 test would simulate separating pipe joints and the effect that would have on the product in question.

TEST 1 RESULTS: Picote Epoxy Coating Tensile Test

Test Method:	ASTM D638-14
Test Conditions:	23±2°C, 50±10% R.H.
Conditioning:	40+ hours, 23±2°C, 50±10% R.H.
Preparation:	Machined from sample sent by client
Specimen:	Type I tensile bars (2-inch gage length)
Cross Head Speed:	0.2-inches per minute

Sample	Replicate	Width (inches)	Thickness (inches)	Tensile Strength at Break (psi)	Tensile Elongation at Break (%)	Tensile Modulus at Young's (ksi)
P/N Picote Dual Coat 1000E*						
		0.5117	0.2209	2970	0.62	586
Requirement				n/a	n/a	n/a

*Picote Dual Color Epoxy 2110001001



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TEST 2

A total of four tests were performed including:

1. Tensile Strength 2. Compression Strength 3. Flexural Modulus 4. Coating Pull Off Strength.

TEST 2: D695-15 "Compression Strength"



A sample of the product at approximately .25-inches is laid flat and a machine pushes down on the specimen until it begins to compress. The PSI it requires to shear the sample is its **"Compression Strength"**. The amount it swells when the pressure is applied is also measured.

This test will show how well the product can sustain loads.

Please note: This test does not measure the Compression Strength of the cylinder that is created by the product inside the pipe.

TEST 2 RESULTS: Picote's Epoxy Coating Compressive Test

Test Method:	ASTM D695-15
Test Conditions:	23±2°C, 50±10% R.H.
Conditioning:	40+ hours, 23±2°C, 50±10% R.H.
Preparation:	Machined from sample sent by client
Specimen:	Prism (1.0-inch length)
Cross Head Speed:	0.05 inches per minute

Sample	Replicate	Width (inches)	Thickness (inches)	Compressive Strength at Yield (PSI)
P/N Picote Dual Coat 1000E*				
		0.5260	0.2302	9570
Requirement				n/a

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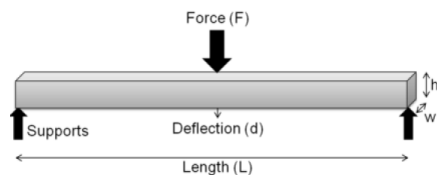
TESTED PRODUCT: Picote Dual Color Epoxy

TEST 3

A total of four tests were performed including:

1. Tensile Strength 2. Compression Strength 3. Flexural Modulus 4. Coating Pull Off Strength.

TEST 3: D 790-15e2 "Flexural Modulus"



This test is used to measure the horizontal strength of the material. Supports are placed under the sample at each end, and then a piston drives down at the center. The force to drive down and the amount of deflection are measured to come up with the specimen's "**Flexural Modulus**".

This test would simulate areas in a coated pipe that are being subjected to uneven stress.

TEST 3 RESULTS: Picote's Epoxy Coating Flexural Test

Test Method:	ASTM D790-15e2, Procedure A
Test Conditions:	23±2°C, 50±10% R.H.
Conditioning:	40+ hours, 23±2°C, 50±10% R.H.
Preparation:	Machined from sample sent by client
Support Span:	3.641 inches
Cross Head Speed:	0.090 inches per minute

Sample	Replicate	Width (inches)	Depth	Flexural Strength at Break (PSI)	Flexural Modulus (KSI)
P/N Picote Dual Coat 1000E*					
	2	0.5117	0.2142	6080	418
Requirement					

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TESTED PRODUCT: Picote Dual Color Epoxy

TEST 4

A total of four tests were performed including:

1. Tensile Strength 2. Compression Strength 3. Flexural Modulus 4. Coating Pull Off Strength.

TEST 4: D4541-09 "Coating Pull Off Strength"



In this test, a dolly is glued to the epoxy and allowed to cure. The sample is then cored using a hole saw. A device with a piston is attached that pulls away from the substrate until it breaks.

This test can look for two different outcomes depending upon the substrate used. When a brick or concrete substrate is used in a real-world application, it is testing whether or not that substrate breaks before the coating (product) does. If steel were to be used, however, the coating will always break before the substrate, so the PSI is also measured at the time of the break.

The D4541-09 test simulates a pipe (that has been coated with the product) breaking, failing, or becoming compromised in any way and how well the material would hold up and stay adhered under those circumstances.

TEST 4 RESULTS: Picote's Epoxy Coating Pull-off Strength Test

Test Method:	ASTM D4541-09
Test Conditions:	23±5°C, 50±35% R.H.
Conditioning:	As sent by client
Preparation:	Coating as sent by client.
Specimen:	Loading fixture glued to coating
Instrument:	Fixed alignment test modified to use a tensile tester
Cross Head Speed:	0.2 inches per minute

TEST 4 RESULTS: Picote's Epoxy Coating Pull-off Strength Test continued

Sample	Replicate	Loading Fixure Diameter (inches)	Pull-Off Strength (psi)	Failure Mode
P/N Picote Dual Coat 1000E – Brick Substrate				
		0.500	>700	1-10% Coating Failure
P/N Picote Dual Coat 1000E – Metal Substrate				
		0.500	>803	1-10% Coating Failure
P/N Picote Dual Coat 1000E – Concrete Substrate				
		0.500	>798	0.1-1% Coating Failure
Requirement			n/a	

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For more information on ASTM testing of Picote products, please contact:

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