

20 August, 2018

American Earth Anchors, Inc. 20 Grove Street, Unit 6 Franklin, MA 02038

Attn: Mr. Cy Henry

Subject: Penetrator Anchor Testing – Pull-Out Resistance

Dear Mr. Henry;

This is by way of a summary letter report on the recent testing conducted for American Earth Anchors, Inc. (AEA) to determine the capacity of your 'Penetrator' products to resist a vertical pull-out load when installed in a variety of soils.

Technical Products, Inc. (TPI) conducted instrumented pull tests on all products provided to us in a range of soils covering Classes 1 to 4 and hard-pan. After the anchor was installed as per instructions an increasing load was applied along the long axis of the anchor as shown in the figure until the anchor failed as demonstrated by a sudden decrease in load bearing capacity. Each anchor was tested three times and results averaged and rounded down (if > 1,000-lb rounded to lower 100-lb, if < 1,000-lb rounded down to lower 50-lb). The test results are summarized in the table below.

It is important to note that the pull out resistance data provided may NOT be able to be repeated. Load capacity is not just a function of Soil Class but also of real time moisture content, local compaction, vegetation coverage and root penetration, installation method (anchor wobble), load application axis, etc. The ONLY method of accurately determining the local pull-out capacity of any anchor at any specific site is by on-site test of the anchor under local conditions and installed and loaded in the same manner as for the intended application.

Should you have any questions or require any additional information please feel free to contact the undersigned directly.

Yours sincerely;

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Paul Chambers Vice-President



		PULLOUT RESISTANCE (LB)				
ANCHOR	MINIMUM BURIAL DEPTH	HARD PAN Asphalt	Sandy Gravel Very dense sand	MEDIUM SAND & GRAVEL	LOOSE MEDIUM TO FINE SAND	LOOSE FINE UNCOMPACTED SAND
ANCHOR	(in)	(Soil Class 1)	(Soli Class 2)	(Soli Class 3)	(Soil Class 4)	(Soli Class 4B)
46-in Penetrator	46	14,000	9,500	3,300	2,000	1,100
36-in Penetrator	36	8,400	6,000	2,100	1,000	500
26-in Penetrator	26	4,500	3,100	1,100	600	350
18-in Penetrator	18	2,500	1,700	600	350	200
14-in Penetrator	14	2,500	1,700	600	350	200
10-in Penetrator	10	1,000	700	350	200	100

Table 1: Pullout Resistance Of Penetrator Anchors*

* Load capacity is not just a function of Soil Class but also of real time moisture content, local compaction, vegetation coverage and root penetration, installation method (anchor wobble), load application axis, etc. The ONLY method of accurately determining the local pull-out capacity at any specific site is by on-site test of anchors under local conditions and installed and loaded in the same manner as for the intended application.

 

20 August 2018

American Earth Anchors, Inc. 20 Grove Street, Unit 6 Franklin, MA 02038

Attn: Mr. Cy Henry

Subject: Anchor Testing – Lateral Pull Resistance

Dear Mr. Henry;

This is by way of a summary letter report on the recent testing conducted for American Earth Anchors, Inc. (AEA) to determine the capacity of your 'Penetrator' products to resist a lateral load when installed.

Technical Products, Inc. (TPI) conducted instrumented pull tests on all products provided to us in a non-compacted, non-virgin Class 2/3 Soil (medium sand/gravel). After the anchor was installed as per instructions an increasing load was applied orthogonal to the long axis of the anchor as shown in the figure until the anchor failed as demonstrated by a sudden decrease in load bearing capacity. Each anchor was tested three times and results averaged. The test results are summarized in the table below. It is our professional opinion that in more cohesive and dense or better compacted soils this load bearing capacity will increase.



ANCHOR	LATERAL LOAD CAPACITY (Ib)*
PE46	2,300
PE36	1,520
PE26	950
PE18	510
PE14	230
PE10	210
	*In Class 2/3 soil

Should you have any questions on the above summary or require any additional information please feel free to contact the undersigned directly.

Yours sincerely;

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Paul Chambers Vice-President

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20 August, 2018

American Earth Anchors, Inc. 20 Grove Street, Unit 6 Franklin, MA 02038

Attn: Mr. Cy Henry

Subject: PE-46 Penetrator – Vertical Load Bearing Testing

Dear Mr. Henry;

This is by way of a summary letter report on the recent testing conducted for American Earth Anchors, Inc. (AEA) to determine the vertical load bearing capacity versus vertical displacement of your 'Penetrator PE-46' screw anchor.

Technical Products, Inc. (TPI) conducted instrumented load tests on the product provided to us as shown in the attached photographs. The vertical downward load was applied to the anchor with a hydraulic press fitted with an electronic load cell. The load was resisted by 10,000-lb of concrete blocks. The vertical displacement from the starting position of the anchor flange measured with a dial indicator gauge. Soil at the test site is considered IBC Class 3 soil (sandy gravel).

After the anchor was installed as per instructions an increasing load was applied along the long axis of the anchor and the vertical displacement from the start position measured. The table and graph attached summarize those results. At a vertical load of 9,000-lb the anchor had settled less than 0.12-in

It is important to note that the load capacity is not just a function of Soil Class but also of real time moisture content, local compaction, vegetation coverage and root penetration, installation method (anchor wobble), load application axis, etc. The ONLY method of accurately determining the local load bearing capacity of any anchor at any specific site is by on-site test of the anchor under local conditions and installed and loaded in the same manner as for the intended application.

Should you have any questions or require any additional information please feel free to contact the undersigned directly.

Yours sincerely;

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Paul Chambers Vice-President





Figure 1: Vertical Load Bearing Versus Displacement Test Set-Up

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Table 1: Load Versus Displacem	ent Of PE46 Anchor In Class 3 Soil
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Load (Ib)	Negative Displacement (in)
0	0.000
2,850	0.010
3,000	0.012
3,500	0.020
4,000	0.028
4,500	0.037
5,000	0.042
5,500	0.050
6,000	0.058
6,500	0.067
7,000	0.080
7,500	0.091
8,000	0.102
9,000	0.119



NOTES:

1. Load capacity is not just a function of Soil Class but also of real time moisture content, local compaction, vegetation coverage and root penetration, installation method (anchor wobble), load application axis, etc. The ONLY method of accurately determining the local load bearing capacity at any specific site is by on-site test of anchors under local conditions and installed and loaded in the same manner as for the intended application.

2. Anchor must be installed to full design depth. Anchor must be installed vertically. If anchor is installed at an angle other than vertical then its load capacity will diminish. Actual load capacity when installed at an angle must be derived from on-site testing and experimental installation of anchors and subsequent load testing of those anchors.

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