

CCMC 13102-R

CCMC Canadian code compliance evaluation

CCMC number:	13102-R
Status:	Active
Issue date:	2003-02-13
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Evaluation holder:	<p>Pieux Vistech - Postech Screw Piles Inc.</p> <p>10260 boulevard Bourque Sherbrooke QC J1N 0G2 Canada Telephone: 819-843-3003 Email: info@pieuvistech.com</p>
Product name:	Postech Screw Piles
Code compliance:	NBC 2015, OBC
Evaluation requirements:	CCMC-TG-316216.01-15B "CCMC Technical Guide for Augered-Installed Steel Piles"

In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.

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Code compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as an augered steel pile in a foundation system in accordance with the conditions and limitations stated in this evaluation, complies with the following code:

National Building Code of Canada 2015

Code provision	Solution type
4.2.3.8.(1)(e) CSA G40.21, "Structural Quality Steel."	<u>Acceptable</u>
4.2.3.10.(1) Where conditions are corrosive to steel, ...	<u>Acceptable</u>
4.2.4.1.(1) The design of foundations, excavations a ...	<u>Acceptable</u>
4.3.4.1.(1) Buildings and their structural members m ...	<u>Acceptable</u>
9.4.1.1.(1)(c)(i) Part 9, or	<u>Acceptable</u>

Ontario Building Code

Ruling No. 04-16-120 (13102-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 2004-07-20 (revised 2012-07-27) pursuant to s.29 of the Building Code Act, 1992 (see Ruling for terms and conditions). This Ruling is subject to periodic revisions and updates.

The above opinion is based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

Postech Screw Piles

Product description

The product is an earth anchor constructed of helical-shaped circular steel blade(s) that is (are) welded to a steel shaft. The blade is constructed as a helix with a carefully controlled pitch.

The anchors come in seven pile types: P178, P238, P312, P400, P412, P512, and P658. The Properties of the product pile type table indicates the properties for each pile type.

Table 1. Properties of the product pile type

Type	Exterior diameter of post	Wall thickness of post	Diameter of helix blade	Thickness of blade
Pile P178	48 mm	3.7 mm	200 mm	8 mm
			255 mm	
			300 mm	
Pile P238	60 mm	3.9 mm	200 mm	8 mm
			255 mm	
			300 mm	
			355 mm	9.5 mm
			300 mm	12.7 mm
			355 mm	
455 mm				
Pile P312	89 mm	5.5 mm	255 mm	9.5 mm
			300 mm	
			355 mm	
			405 mm	12.7 mm
			455 mm	
Pile P400	101 mm	5.7 mm	255 mm	9.5 mm
			300 mm	
			355 mm	
			405 mm	12.7 mm
			455 mm	
			505 mm	
Pile P412	114 mm	6.0 mm	300 mm	9.5 mm
			355 mm	
			405 mm	12.7 mm
			455 mm	
			505 mm	
			555 mm	
Pile P512	140 mm	6.5 mm	355 mm	12.7 mm
			405 mm	

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Type	Exterior diameter of post	Wall thickness of post	Diameter of helix blade	Thickness of blade
			455 mm	
			505 mm	
			555 mm	
			610 mm	
Pile P658	168 mm	7.1 mm	355 mm	12.7 mm
			405 mm	
			455 mm	
			505 mm	
			555 mm	
			610 mm	
			660 mm	

The anchor type and blade diameter are chosen based on the bearing capacity of the soil and the load the auger-installed steel pile is designed to support. The central shaft is used to transmit torque during installation and to transfer axial loads to the helical plate.

The foundation system comes with various other accessories, such as plates, to adapt to the building structure, extension shafts and connectors, which conform to CSA G40.20-13/G40.21-13, “General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel” All accessories with treaded rods conform to ASTM A 325-14.

The steel shaft, blades and accessories conform to the 350 MPa requirement of CSA G40.20/G40.21 or ASTM A 500/A 500M-10a, “Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.” They have a galvanic coating that meets the 610 g/m² requirement of ASTM A 123/A 123M, “Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.” All welders at Pieux Vistech / Postech Screw Pile Inc. are certified in accordance with the Canadian Welding Bureau to produce welds conforming to CSA W59-13, “Welded Steel Construction (Metal Arc Welding)”.

Figure 1 shows a typical steel pile with a single helical blade.

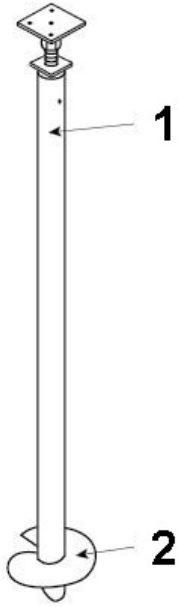


Figure 1. Pieux Vissés Vistech / Postech Screw Piles

- 1. shaft
- 2. helical blade

Manufacturing plant

This evaluation is valid only for products produced at the following plant:

Product name	Sherbrooke, Québec, Canada
Postech Screw Piles	◇

◇ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The product under this evaluation is intended to be used as a foundation system to support the following types of construction:
 - Single storey residential buildings within the scope of Part 9 of NBC 2015; and
 - Accessory buildings such as sheds, gazebos, sunrooms, carports, decks or porches within the scope of Part 9 of NBC 2015.

Other applications are beyond the scope of this evaluation, and a professional engineer skilled in such design and licensed to practice under the appropriate provincial or territorial legislation must determine the pile capacity and other design parameters.

- The product may be used as part of a foundation system to support various constructions, provided that it is installed according to the manufacturer's current instructions and within the scope of this evaluation.
- When the product is installed in granular soil or silt, there is a direct relationship between the applied torque and the allowable compressive and tensile loads. The Allowable compressive and tensile loads for the product in granular soil or silt table indicates the allowable compressive and tensile loads as a function of the applied torque.
- When the product is installed in a cohesive soil, such as clay, there is a direct relationship between the applied torque and the allowable compressive and tensile loads. The Allowable compressive and tensile loads for the product in cohesive soil table indicates the allowable compressive and tensile loads as a function of the applied torque.
- When the auger-installed steel pile is installed in a soil with granular material that exceeds 200 mm in diameter, the relationship between the applied torque and the allowable compressive and tensile loads is not as predictable. When it is installed in such soils, the allowable compressive and tensile loads have to be confirmed by on-site load tests. These load tests are also required if the allowable loads need to be greater than those stated in the above-referenced tables. The tests need to be conducted under the direct supervision of a professional geotechnical engineer, skilled in such design and licensed to practice under the appropriate provincial or territorial legislation.
- In all cases, a registered professional engineer skilled in such design and licensed to practice under the appropriate provincial or territorial legislation must determine the number and spacing of the auger-installed steel piles required to carry all the factored loads. A certificate attesting to the conformity of the installation and the allowable loads for the piles must be provided by a certified installer.
- Where conditions (soil and environmental) are determined to be corrosive to steel, protection of the steel shall be provided. The determination of the presence of corrosive conditions and the specification of the corrosion protection shall be carried out by a registered professional engineer licensed to practice under the appropriate provincial or territorial legislation. If the determination of the presence of corrosive conditions is not completed before installation, the product, including all its accessories, is required to be hot-dipped galvanized, meeting the requirements of CAN/CSA-G164 (ASTM A 123/A 123M-17) with a minimum thickness of 610 g/m², or another method that provides an equivalent level of protection and abrasion resistance deemed acceptable by the CCMC.
- The installation of the auger-installed steel pile must be carried out as per the manufacturer's instructions. The Pieux Vissés Vistech / Postech Screw Piles must be screwed into the ground to below the frost line using mechanized equipment. The anchor is rotated into the ground with sufficient applied downward pressure (crowd)

to advance the anchor one pitch distance per revolution. The anchor is advanced until the applied torque value attains a specified value. Extensions are added to the central shaft as needed. The applied loads may be tensile (uplift) or compressive (bearing). Helical anchors are rapidly installed in a wide variety of soil formations using a variety of readily available equipment. They are immediately ready for loading after installation.

- The installer of the proposed auger-installed steel piles must be certified by Pieux Vistech – Postech Screw Piles Inc. Using approved equipment, the installer must follow the manufacturer’s installation instructions and the uses and limitations specified in this evaluation. Each installer must carry a certification card bearing their signature and photograph.
- Each Pieux Vissés Vistech / Postech Screw Pile must be identified with a label containing the following information:
 - manufacturer’s identification; and
 - the phrase “CCMC 13102-R.”

Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-316216.01-15B	CCMC Technical Guide for Augered-Installed Steel Piles

The proposed auger-installed steel piles were tested to:

- ASTM D 1143/D 1143M-07(2013), “Standard Test Methods for Deep Foundations Under Static Axial Compressive Load,”
- ASTM D 3689/D 3689M-07(2013)e1, “Standard Test Methods for Deep Foundations Under Static Axial Tensile Load,” and
- ASTM D 3966/D 3966M-07(2013)e1, “Standard Test Methods for Deep Foundations Under Lateral Load.”

Testing was conducted on four different sites across Canada. Two sites had granular and clay soil; the other two had cohesive soil. A series of 32 tests was performed. The intent of the testing was to determine a correlation between the torque applied during installation and the allowable loads. In the granular and silt-based soils and in the cohesive soils, there was a good correlation between the torque applied during installation and the allowable loads. In the granular and silt-based soils, for the compressive loads noted in the Allowable compressive and tensile loads for the product in granular soil or silt, the factor of safety varied from 1.7 to 3.0. For the tensile loads, the factor of safety varied from 2.0 to 2.4. For the lateral loads, no correlation was possible.

Table 2. Allowable compressive and tensile loads for the product in granular soil or silt ⁽¹⁾

Applied torque		Allowable loads			
		Compression		Tension	
N·m	(lbf·ft)	kN	(lb)	kN	(lb)
678	500	20	4 500	4	900
1 017	750	24	5 400	8	1 800
1 356	1 000	29	6 525	11	2 475
1 695	1 250	34	7 650	14	3 150
2 034	1 500	39	8 775	18	4 050
2 373	1 750	44	9 900	21	4 725
2 712	2 000	49	11 025	25	5 625
3 051	2 250	53	11 925	31	6 975
3 390	2 500	58	13 050	31	6 975
3 728	2 750	63	14 175	35	7 875
4 068	3 000	68	15 300	40	9 000
4 407	3 250	73	16 425	44	9 900
4 746	3 500	78	17 550	48	10 800
5 085	3 750	82	18 450	50	11 250
5 424	4 000	87	19 575	52	11 700
5 763	4 250	92	20 700	54	12 150
6 102	4 500	97	21 825	56	12 600
6 441	4 750	-	-	58	13 050
6 780	5 000	-	-	60	13 500

Note:

- ¹ The allowable loads identified in this table are only valid when the product is installed in granular soil or silt. The applied torque is the average of the values attained within the last 500 mm of installation. Special attention is required when the auger-installed steel piles are installed in a recently backfilled site or where the granular material exceeds 200 mm in diameter. In these cases, the values in the Allowable compressive and tensile loads for the product in granular soil or silt table do not apply and the allowable loads need to be determined by on-site confirmatory testing. In cohesive soils, the values in the Allowable compressive and tensile loads for the product in cohesive soil table apply.

Table 3. Allowable compressive and tensile loads for the product in cohesive soil ⁽¹⁾

Applied torque		Allowable loads			
		Compression		Tension	
N·m	(lbf·ft)	kN	(lb)	kN	(lb)
1 017	750	8	1 800	6	1 350
1 356	1 000	11	2 475	8	1 800
1 695	1 250	14	3 150	10	2 250
2 034	1 500	17	3 825	12	2 700
2 373	1 750	19	4 275	14	3 150
2 712	2 000	22	4 950	16	3 600
3 051	2 250	25	5 625	19	4 275
3 390	2 500	28	6 300	21	4 725
3 728	2 750	31	6 975	23	5 175
4 068	3 000	33	7 425	25	5 625
4 407	3 250	36	8 100	27	6 075
4 746	3 500	39	8 775	29	6 525
5 085	3 750	42	9 450	32	7 200
5 424	4 000	44	9 900	34	7 650
5 763	4 250	47	10 575	36	8 100
6 102	4 500	50	11 250	38	8 550

Note:

- ¹ The allowable loads identified in this table are only valid when the product is installed in a cohesive soil. The applied torque is the average of the values attained within the last 500 mm of installation.

Administrative information

Disclaimer

This evaluation is issued by the Canadian Construction Materials Centre (CCMC), a part of the Construction Research Centre at the National Research Council of Canada (NRC). The evaluation must be read in the context of the entire [CCMC Registry of Product Assessments](#) and the legislated applicable building code in effect.

The CCMC was established in 1988 on behalf of the applicable regulator (i.e., the provinces and territories) to ensure—through assessment—conformity of alternative and acceptable solutions to regional building codes as determined by the local authority having jurisdiction (AHJ) as part of the issuance of a building permit. It is the responsibility of the local AHJs, design professionals, and specifiers to confirm that the evaluation is current and has not been withdrawn or superseded by a later issue. Please refer to [the website](#) or contact:

Canadian Construction Materials Centre

Construction Research Centre
National Research Council of Canada
1200 Montreal Road
Ottawa, Ontario, K1A 0R6
Telephone: 613-993-6189
Fax: 613-952-0268

The NRC has evaluated the material, product, system or service described herein only for those characteristics stated herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (i.e., AHJs, design professionals and specifiers). This evaluation is only valid when the product is installed in strict compliance with the stated conditions and limitations of evaluation and the applicable local building code. In circumstances where no applicable local building permit is issued and that no confirmation of compliance 'for use in the intended field application' is undertaken, this evaluation is null and void in all respects. This evaluation is provided without representation, warranty, or guarantee of any kind, expressed, or implied, and the NRC provides no endorsement for any evaluated material, product, system or service described herein. The NRC accepts no responsibility whatsoever arising in any way from any and all use and reliance on the information contained in this evaluation with respect to its compliance to the referenced code(s) and standard(s). The NRC is not undertaking to render professional or other services on behalf of any person or entity nor to perform any duty owed by any person or entity to another person or entity.

Language

Une version française de ce document est disponible.

In the case of any discrepancy between the English and French version of this document, the English version shall prevail.

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CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

CCMC assessments are recognized by construction authorities across Canada:

Alliance of Canadian Building Official Associations (ACBOA)



[\(Alliance of Canadian Building Official Associations \(ACBOA\)\)](#)

First Nations National Building Officers Association (FNNBOA)



[\(First Nations National Building Officers Association \(FNNBOA\)\)](#)

Canadian Home Builders' Association (CHBA)



[\(Canadian Home Builders' Association \(CHBA\)\)](#)

Alberta Building Officials Association (ABOA)



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Saskatchewan Building Officials Association (SBOA)



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Manitoba Building Officials Association (MBOA)



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Ontario Building Officials Association (OBOA)



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[\(Nova Scotia Building Officials Association \(NSBOA\)\)](#)

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For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

Where a design differs from the acceptable solutions in Division B, then it should be treated as an **"alternative solution."** A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

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