

# CCMC 13353-R

## CCMC Canadian code compliance evaluation

<b>CCMC number:</b>	13353-R
<b>Status:</b>	Active
<b>Issue date:</b>	2010-08-16
<b>Modified date:</b>	2022-02-14
<b>Evaluation holder:</b>	<p><b>Pieux Xtreme Inc.</b>            1425 Route 116            Danville QC J0A 1A0            Canada            Website: <a href="http://www.pieuxxtreme.com/en.html">www.pieuxxtreme.com/en.html</a>            Telephone: 819-839-3911            Email: <a href="mailto:dpearson@xtremepost.com">dpearson@xtremepost.com</a></p>
<b>Product name:</b>	Pieux Xtreme
<b>Code compliance:</b>	NBC 2015, OBC
<b>Evaluation requirements:</b>	CCMC-TG-316216.01-15A "CCMC Technical Guide for Augered-Installed Steel Piles"

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

[Learn more about CCMC recognition](#)

## Code compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as an auger-installed 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>
9.4.1.1.(1)(c)(i) Part 9, or	<u>Acceptable</u>

### Ontario Building Code

Ruling No. 15-02-323 (13353-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 2015-01-05 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

Pieux Xtreme

## Product description

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

The product is available in blade diameters of 175 mm with a thickness of 6.3 mm, and in diameters of 200 mm, 250 mm and 300 mm with a thickness of 8.0 mm. The anchors come with a single helical blade. The diameter of the blade is chosen based on the bearing capacity of the soil and the load that 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 blades. The diameter of the shaft is either 48 mm or 60 mm with a wall thickness of 4.8 mm. The foundation system comes with other accessories such as support plates to adapt to the building structure, extension shafts and connectors.

The steel shaft, blades and accessories of the product conform to CSA-G40.21-04(R2009), "General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel." They also have a galvanic coating of 610 g/m<sup>2</sup> that meets the requirements of CAN/CSAG164-M92(R2003), "Hot Dip Galvanizing of Irregularly Shaped Articles."

The figure below shows a typical auger installed steel pile with a single helical blade.

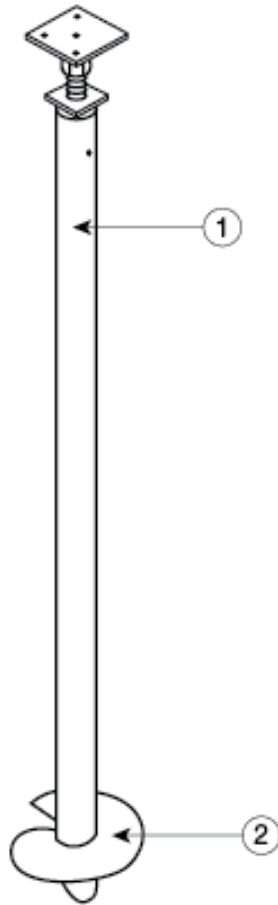


Figure 1. Pieux Xtreme

- 1. Shaft
- 2. Helical blade

## Manufacturing plant

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

Product name	Danville, Québec, Canada
Pieux Xtreme	◇

◇ 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;
  - Accessory buildings such as sheds, gazebos, sunrooms, carports, and decks/porches within the scope of Part 9 of NBC 2015.

Other applications are beyond the scope of this evaluation, wherein 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 structures and must be installed according to the manufacturer's current instructions.
- The structural application of this product must be in strict accordance with the design analysis as prepared for Pro Pieux Inc. by Labo S.M. Inc. and included in Report No. 02465 (N/Ref. F098278-001), February 2010, from which the table under Technical information is reproduced.
- When the product is installed in granular soil or silt, there is a direct relationship between the applied torque and the allowable compressive load. The table under Technical information indicates the allowable compressive loads as a function of the applied torque.
- When the auger-installed steel pile is installed in a cohesive soil such as clay, the relationship between the applied torque and the allowable compressive load is not predictable. As a result, the allowable compressive 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 table under Technical information. The tests must be conducted under the direct supervision of a professional geotechnical engineer skilled in such design and licensed to practise under the appropriate provincial or territorial legislation.
- In all cases, a registered professional engineer skilled in such design and licensed to practise under the appropriate provincial or territorial legislation must determine the number and spacing of the auger-installed steel piles required to carry all the loads.
- The installation of the auger-installed steel pile must be carried out as per the manufacturer's instructions. The anchors must be screwed into the ground using mechanized equipment. The anchor must be rotated into the ground with sufficient applied downward pressure (crowd) to advance the anchor one pitch distance per revolution. The anchor must be advanced until the applied torque value attains a specified value. Extensions must be 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.
- 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 practise 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 A123/A123M-17) with a minimum thickness of 610 g/m<sup>2</sup>, or another method that provides an equivalent level of protection and abrasion resistance deemed acceptable by the CCMC.

- To be permitted to install Pieux Xtreme auger-installed steel piles, the installer must be certified by Pieux Xtreme Foundation Inc. Using approved equipment, the installer must follow the manufacturer's installation instructions and heed the conditions and limitations specified in this Report. Each installer must carry a certification card with their signature and photograph.
- Each Pieux Xtreme auger-installed steel pile must be identified with a label that contains the manufacturer's identification and the phrase "CCMC 13353-R."

## Technical information

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

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

Pieux Xtreme auger-installed steel piles were tested in accordance with the requirements of:

- ASTM D 1143/D 1143M-07, "Standard Test Methods for Deep Foundations Under Static Axial Compressive Load," and
- ASTM D 3689/D 3689-08, "Standard Test Methods for Deep Foundations Under Static Axial Tensile Load."

A series of 17 tests were conducted on two different sites, one with granular soil and the other cohesive soil. The intent of the testing was to determine a correlation between the torque applied during installation and the allowable compressive and tensile loads. The results showed that in granular soils there was a correlation between the torque applied during installation and the allowable load. For the compressive loads noted in the table below, the factor of safety varied from 2.0 to 3.2. For the tensile loads, the factor of safety varied from 1.8 to 3.2.

**Table 1. Allowable compressive loads and tensile loads <sup>(1)</sup> for the Pieux Xtreme auger-installed pile in granular soil <sup>(2)</sup> or silt <sup>(3)</sup>**

Applied torque		Allowable loads			
		Compression		Tension	
Nm	lbf	kN	lb	kN	lb
678	500	12	2 700	5	1 125
1 017	750	16	3 600	8	1 800
1 356	1 000	22	4 950	10	2 250
1 695	1 250	26	5 850	13	2 925
2 034	1 500	30	6 750	15	3 375
2 373	1 750	34	7 650	18	4 050
2 712	2 000	38	8 550	20	4 500
3 051	2 250	42	9 450	22	4 950
3 390	2 500	48	10 800	25	5 625
3 728	2 750	50	11 250	28	6 300
4 067	3 000	54	12 150	30	6 750
4 406	3 250	58	13 050	32	7 200
4 745	3 500	62	13 950	35	7 875
5 084	3 750	66	14 850	38	8 550
5 424	4 000	70	15 750	40	9 000

**Notes:**

- <sup>1</sup> The allowable loads are only valid when the product is installed in granular soil or silt. 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 or in cohesive soils. In these cases, this table does not apply and the allowable loads need to be determined by on-site confirmatory testing.
- <sup>2</sup> Granular soils (coarse grained soil) are non-cohesive soils; for example, sand, gravel or silt with little or no clay content and little to no cohesive strength.
- <sup>3</sup> Silt is that portion of soil material passing through a 200 (75-µm) U.S. standard sieve that is non-plastic or very slightly plastic and exhibits little or no strength when air-dried.



# 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

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Ottawa, Ontario, K1A 0R6  
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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)



(Alberta Building Officials Associations (ABOA))

Saskatchewan Building Officials Association (SBOA)



(Saskatchewan Building Officials Association (SBOA))

Manitoba Building Officials Association (MBOA)



(Manitoba Building Officials Association (MBOA))

Ontario Building Officials Association (OBOA)



(Ontario Building Officials Association (OBOA))

New Brunswick Building Officials Association (NBBOA)



(New Brunswick Building Officials Association (NBBOA))

Nova Scotia Building Officials Association (NSBOA)



(Nova Scotia Building Officials Association (NSBOA))

The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. [Learn more about how the CCMC provides a unique service for Canada.](#)

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

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