CCMC CANADIAN CODE COMPLIANCE EVALUATION

CCMC EVALUATION

CCMC 13059-R

CCMC Canadian code compliance evaluation

CCMC number:	13059-R
Status:	Active
Issue date:	2002-04-08
Modified date:	2022-02-07
Evaluation holder:	**Techno Pieux Inc.** 1700, rue Setlakwe Thetford Mines QC G6G 8B2 Canada Website: www.technopieux.com Telephone: 418-334-4272 Email: info@technometalpost.com
Product name:	Techno Metal Post™
Code compliance:	NBC 2015, OBC
Evaluation requirements:	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 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."	Acceptable
4.2.3.10.(1) Where conditions are corrosive to steel, ...	Acceptable
4.2.4.1.(1) The design of foundations, excavations a ...	Acceptable
9.4.1.1.(1)(c)(i) Part 9, or	Acceptable

Ontario Building Code

Ruling No. 03-06-95 (13059-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 2003-06-06 (revised 2018-03-07) 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

Techno Metal Post™

Product description

Techno Pieux™/Techno Metal Post™ is an earth anchor constructed of single, double or triple helical-shaped circular steel blades welded to a steel shaft.

The steel blades conform to CAN/CSA-G40.21-M98 and are available in diameters of 150 mm to 600 mm. They are constructed as a helix with a carefully controlled pitch. The diameter and number of blades are chosen based on the bearing capacity of the soil and the load that the auger-installed steel pile is designed to support.

The steel shaft conforms to ASTM A 500/A 500M-10a, grade C and is available in diameters of 47.6 mm, 60.3 mm, 88.9 mm, 101.6 mm, 141 mm and 168 mm, with a wall thickness of 3.7 mm, 3.9 mm, 5.5 mm or 7.6 mm, 5.7 mm, 6.6 mm and 7.1 mm, respectively. The shaft is covered with a ribbed polyethylene pipe, which acts as a frost sleeve to isolate the pile from being jacked up by annual frost heave in the surrounding soil. The central shaft is used to transmit torque during installation and to transfer axial loads to the helical blades.

The foundation system comes with various accessories, such as support plates to adapt it to the building structure, extension shafts and connectors, which conform to CAN/CSA-G40.21-M98.

The piles are screwed into the ground using mechanized equipment. Sufficient downward pressure (crowd) is applied to advance the anchor one pitch distance per revolution until the applied torque attains a specified value. Extensions are added to the central shaft as needed. The applied loads may be tensile (uplift) or compressive (bearing). The piles are rapidly installed in a variety of soil formations and are immediately ready for loading after installation.

Figure 1 shows a typical steel pile with a single helix.

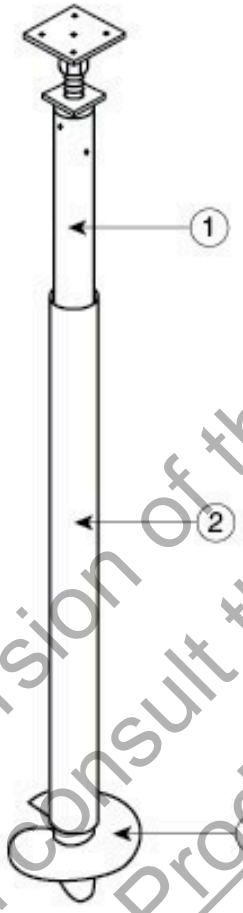

Figure 1. Techno Pieux™/Techno Metal Post™

1. Shaft
2. Sleeve
3. Helical blade

Manufacturing plant

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

Product name	Thetford Mines, Québec, Canada
Techno Metal Post™	◈

◈ 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.

- Techno Pieux™/Techno Metal Post™ may be used as 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 Report. A certificate attesting to the conformity of the installation and the allowable loads for the piles must be provided.
- Where the Techno Pieux™/Techno Metal Post™ is installed in granular or cohesive soils or silt, there is a direct relationship between the applied torque and the allowable compressive and tensile loads, which are indicated in the Allowable compressive and tensile loads for the Techno Pieux™/Techno Metal Post™ auger-installed pile in granular or cohesive soils or silt table.
- Where the allowable compressive and tensile loads exceed those stated in the Allowable compressive and tensile loads for the Techno Pieux™/Techno Metal Post™ auger-installed pile in granular or cohesive soils or silt table, site specific engineering by a professional engineer skilled in such design and licensed to practice under the appropriate provincial or territorial legislation of the project site is required to determine the pile capacity and other design parameters.
- 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.
- 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^2, or another method that provides an equivalent level of protection and abrasion resistance deemed acceptable by the CCMC.
- The installer of the Techno Pieux™/Techno Metal Post™ auger-installed steel piles must be certified by Techno Pieux Inc. Using approved equipment, the installer must follow the manufacturer's installation instructions and the uses and limitations specified in this Report. Each installer must carry a certification card bearing their signature and photograph.
- Each Techno Pieux™/Techno Metal Post™ auger-installed steel pile must be identified with a label containing the following information:
  - manufacturer's identification; and
  - the phrase "CCMC 13059-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

Performance requirements

Below is the NBC 2015 compliance data for Techno Pieux™/Techno Metal Post™ on which the CCMC based its opinion in the Code compliance opinion.

Techno Pieux™/Techno Metal Post™ auger-installed steel piles were tested to:

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

A total of 66 tests were conducted at 12 different sites in Canada, the United States and France on a variety of granular, silt-based and cohesive soils. Of the 66 tests performed, 37 were in compression and 29 in tension. The intent of the testing was to determine a correlation between the torque applied during installation and the allowable loads.

The test results indicated a factor of safety greater than 2 for 61/66 of the cases. This safety factor was obtained for both the compressive and tensile loads and for all three types of soil. For the other 5 tests (5/66), the factor of safety was 1.8 to 1.9, which was deemed acceptable because the displacement associated with these allowable loads was minimal (1 mm to 8 mm).

Table 1. Allowable compressive and tensile loads for the Techno Pieux™/Techno Metal Post™ auger-installed pile in granular or cohesive soils or silt (1)

Applied torque		Allowable loads			
		Compression		Tension	
N·m	(ft-lbs)	kN	(lb)	kN	(lb)
678	500	10.0	2 250	5.0	1 125
1 017	750	15.0	3 375	7.5	1 688
1 356	1 000	20.0	4 500	10.0	2 250
1 695	1 250	25.0	5 625	12.5	2 813
2 034	1 500	30.0	6 750	15.0	3 375
2 373	1 750	35.0	7 875	17.5	3 938
2 712	2 000	40.0	9 000	20.0	4 500
3 051	2 250	45.0	10 125	22.5	5 063
3 390	2 500	50.0	11 250	25.0	5 625
3 729	2 750	55.0	12 375	27.5	6 188
4 067	3 000	60.0	13 500	30.0	6 750
4 406	3 250	65.1	14 625	32.5	7 313
4 745	3 500	70.1	15 750	35.0	7 875
5 084	3 750	75.1	16 875	37.5	8 438
5 423	4 000	80.1	18 000	40.0	9 000
5 762	4 250	85.1	19 125	42.5	9 563
6 101	4 500	90.1	20 250	45.0	10 125
6 440	4 750	95.1	21 375	47.5	10 688
6 779	5 000	100.1	22 500	50.0	11 250

Note:

1 The allowable loads identified in this table are valid when the Techno Pieux™/Techno Metal Post™ is installed in granular or cohesive soils or silt. The applied torque is the average of the values attained within the last 600 mm of installation. Special attention is required when the auger-installed steel piles are installed in a recently backfilled site. In these cases, allowable compressive and tensile loads for the Techno Pieux™/Techno Metal Post™ auger-installed pile in granular or cohesive soils or silt does not apply and the allowable loads need to be determined by on-site confirmatory testing.

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)	(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

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.

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