A277-16
(reaffirmed 2021)

Procedure for certification of prefabricated buildings, modules, and panels

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① *Preface*

This is the sixth edition of CSA A277, *Procedure for certification of prefabricated buildings, modules, and panels*. It supersedes the previous edition, published in 2008 under the title *Procedure for Factory-Certification of Buildings*, and editions published in 2001, 1990, 1981, and 1972, under the title *Procedure for Certification of Factory-Built Houses*.

Significant changes since the previous edition include the following:

a) explicit statement of application to modules and panels for buildings;
b) change in the terminology used to describe types of buildings to which this Standard applies consistent with the *National Building Code of Canada* occupancy classifications;
c) reorganization of the technical requirement to reference first the codes and regulations that apply at the location where the building, module, or panel will be installed, followed by references to specific documents where such codes or regulations are not in force;
d) new reference to the *National Energy Code for Buildings* where there are no codes or regulations addressing energy efficiency in force at the installation location;
e) reference to the authorities having jurisdiction for requirements for professional involvement and stamped drawings;
f) clarification of the compliance marking requirements (labels or stamps) as they apply to prefabricated buildings, and modules and panels;
g) provision of options for providing specification sheets for modules and panels;
h) reorganization of the specification sheet requirements based on the properties or functions of components, materials, services, or appliances installed in or provided with the building, module, or panel;
i) new specification sheet requirements to identify the date of manufacture, additional design loads, and energy performance; and
j) transfer of detailed information on instructions from Annex A to the body of this Standard.

This Standard provides a framework for certification programs for factory-constructed buildings, building modules, and fully or partially closed panels for panelized buildings. It applies to both residential and non-residential buildings. The requirements of this Standard are consistent with the requirements for the certification of manufacturers according to CAN/CSA-ISO 9001.

Annex A provides further information on the clauses in the body of this Standard.

This Standard is considered suitable for assessment of the conformity of prefabricated buildings, modules, and panels to building codes and standards mandated by authorities having jurisdiction.

This Standard was prepared by the Technical Committee on Factory Certification of Buildings, under the jurisdiction of the Construction and Civil Infrastructure Strategic Steering Committee, and has been formally approved by the Technical Committee.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:*
   a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

   Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are available on the Current Standards Activities page at standardsactivities.csa.ca.*
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   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change;*
   d) *rationale for the change.*

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Procedure for certification of prefabricated buildings, modules, and panels

0 Introduction

Most buildings are inspected for compliance with codes and standards during and after the installation of various components and subassemblies. Site-built structures are normally subject to inspection at key stages by the authority having jurisdiction. For products whose construction cannot be readily evaluated except during assembly, a certification program can assist consumers and those responsible for regulating products to confirm compliance with requirements.

This Standard specifies an approved in-factory certification procedure, applicable to prefabricated buildings, modules, and panels that complements required on-site inspections and testing.

1 Scope

1.1

This Standard specifies the procedure for certification of prefabricated buildings, and partially or fully enclosed modules and panels for buildings of any occupancy.

It provides requirements for

a) certification of the factory quality program;
b) certification of the prefabricated product;
c) auditing of the factory quality program; and
d) in-factory inspection of the prefabricated product.

Notes:

1) *This Standard applies to prefabricated buildings, modules, and panels constructed of any material. (See Annex A.)*
2) *This Standard applies to buildings of any occupancy. Use is limited only by certification listing for the manufacturer and the capabilities of the certification body. (See Annex A.)*

1.2

This Standard does not cover portions of buildings or services that are not completed in the factory. It also does not address the transport of buildings or their erection at the building site, except as provided in Clause 7.5.1.

Note: *Prefabricated buildings, modules, and panels should be designed to resist or accommodate loads and stresses imposed in transit and during placement. Loads and stresses imposed in transit will depend in part on the methods of transportation accepted by the transportation authority.*

1.3

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications. Where such reference is made and the publication is in force in the jurisdiction where the building will be placed for occupancy, it shall be to the edition and all amendments in force at the installation location at the time of construction. Where such reference is made and the publication is not in force at the installation location, the reference shall be to the edition listed below, including all amendments thereto.

Note: *See also Clause 4 (Clause 4 refers to codes or regulations in force, not in force, etc.).*

CSA Group

A23.4-09 (R2014)
Precast concrete — Materials and construction

A660-10 (R2014)
Certification of manufacturers of steel building systems

C22.1-15
Canadian Electrical Code, Part I

C22.2 No. 0.15-15 (R2012)
Adhesive labels

CAN/CSA-ISO 9001-08
Quality management systems — Requirements

W47.2-11
Certification of companies for fusion welding of aluminum

W47.1-09 (R2014)
Certification of companies for fusion welding of steel

Z240 MH Series-16
Manufactured homes

Z240.2.1-16
Technical requirements for manufactured homes

Z240.10.1-16
Site preparation, foundation, and installation of buildings

Government of Alberta
Alberta Building Code

Government of Japan
Building Standard Law of Japan

NRC (National Research Council Canada)
National Building Code of Canada, 2010

National Energy Code for Buildings, 2011

National Plumbing Code of Canada, 2010

① 3 Definitions

The following definitions shall apply in this Standard:

Audit — a planned, systematic, on-site verification activity by an accredited certification body to evaluate one or more aspects of the quality system to determine compliance with requirements.

Factory — a manufacturing facility that provides protection of construction materials, components, equipment, and products against adverse environmental effects during storage and fabrication.

Inspection — a random, on-site verification activity by an accredited certification body to evaluate one or more aspects of a product design or characteristics of a product to determine compliance with applicable technical or administrative requirements.

Prefabricated building — a building partially or fully constructed in a factory. (See Annex A.)

Prefabricated panel — an open or closed planar subassembly constructed in a factory and designed for use as an integral part of a building. (See Annex A.)

Prefabricated module — an open or closed non-planar subassembly constructed in a factory and designed for use as an integral part of a building. (See Annex A.)
Note: *Roof assemblies with trusses, sheathing and roofing, bathrooms, and kitchens are examples of prefabricated modules.*

Quality program — the procedures and activities implemented to achieve a quality system.

Quality system — the documented procedures and organizational structure established to ensure the compliance of a product or service with specified requirements and to provide evidence of such compliance.

Storey — that portion of a building that is situated between the top of any floor and the top of the floor next above it, and if there is no floor above it, that portion between the top of such floor and the ceiling above it.

4 General requirements

4.1 Technical requirements

4.1.1 Codes or regulations in force

Where codes or other regulations addressing building design and construction are in force at the installation location, prefabricated buildings, prefabricated modules, and prefabricated panels shall be designed and constructed to comply with those codes and regulations as applicable.

4.1.2 Codes or regulations not in force

Where codes or other regulations are not in force at the installation location to address some or all aspects of building design and construction, prefabricated buildings, prefabricated modules, and prefabricated panels shall be designed and constructed to comply, as applicable, with the following:

a) the *National Building Code of Canada* or the CSA Z240 MH Series;
b) the *Canadian Electrical Code, Part I*, for the installation of electrical systems;
c) the *National Plumbing Code of Canada*, for factory-installed plumbing and fixtures; and
d) the *National Energy Code for Buildings*.

4.2 Administrative requirements

Design, design review, and construction review shall be carried out by qualified persons, and stamped detail drawings and other documentation shall be provided as required by the regulations that apply at the location where the building is to be installed. (See Annex A.)

Notes:

1) *This requirement applies in addition to the requirements for inspection and auditing by the certification body.*
2) *Requirements for involvement by architects, engineers, or other qualified persons vary by jurisdiction. Involvement by architects or engineers generally relates to building occupancy (use) and size. Stamped detail drawings might be required for structural, electrical, plumbing, mechanical, gas, and life-safety systems.*
3) *Other required documentation can include, for example, letters of assurance or letters of undertaking.*

① 5 Certification requirements

Certification shall be conducted by an accredited certification body recognized by the authority having jurisdiction and shall include

a) certification of the manufacturer's quality system and quality program in accordance with requirements specified by the certification body; and
b) certification of prefabricated buildings, modules, or panels as complying with, as applicable
   i) regulations in force at the installation location or as described in Clause 4.1.1; and
   ii) regulations in force at the installation location with respect to involvement of qualified persons as described in Clause 4.1.2.

① 6 Certification — Quality system and program

6.1 General

The certification of the factory quality system and the factory quality program shall be based on an in-factory audit by the certification body to ensure compliance with the requirements of Clauses 6.2 and 6.3.

Note: *Documentation and forms required in Clause 6 may be printed or electronic. Where documentation or forms are electronic, compatible hardware and software must be maintained to allow ready access.*

6.2 Facilities and personnel

6.2.1 Suitability

For each factory, the manufacturer shall demonstrate to the satisfaction of the certification body that the equipment, procedures, factory personnel, and protection of materials and built products are suitable for the intended work and that the design and construction meets or exceeds the requirements of this Standard. The certification body shall be notified immediately of any changes affecting the quality program.

Note: *Protection is meant to minimize adverse effects of, for example, moisture, excessively high or low temperatures, freeze-thaw cycling, ultraviolet radiation, pests, mechanical or chemical damage during storage and construction.*

6.2.2 Quality program personnel

The person responsible for the quality program shall have the authority necessary to ensure compliance with this Standard. Quality program personnel shall demonstrate to the satisfaction of the certification body that they have adequate knowledge of the product, factory operations, and the codes and standards to which the product is being manufactured and shall also demonstrate the ability to perform their required duties.

6.2.3 Documentation

The quality program personnel shall be identified in writing and the documentation shall be made available to the certification body.

Note: *An organizational chart may be used to document the quality program personnel.*

6.3 Quality program manual

6.3.1 Development and implementation

The manufacturer shall develop and submit to the certification body a detailed quality program manual that outlines the in-factory quality program procedures. These procedures shall be implemented prior to certification and used as required by the accepted quality system at the manufacturing facilities.

6.3.2 Contents

The quality program manual shall include

a) an organizational chart (see Clause 6.2.3);
b) document initiation and control;
c) guidelines for the purchase of items;
d) procedures for in-factory inspection that ensure that items, construction, and installation comply with applicable technical requirements;
e) the use of quality program forms (see Clause 6.3.3);
f) procedures for a records retention system that retains valid records for a minimum of five years; and
g) a method for the disposition of nonconforming items.

① 6.3.3 Forms

Quality program forms shall be prepared by the manufacturer and shall list all necessary quality program checks and tests. Such forms shall accompany each product throughout all phases of production, and all deficiencies shall be recorded on the forms. Quality program personnel shall certify

that all checks and tests have been conducted adequately and that all deficiencies have been corrected. Each form shall bear the model and serial number (as applicable) of the product detailed thereon.

6.3.4 Document access

Completed quality program forms and other relevant documents shall be available upon request of the certification body.

6.3.5 Noncompliance

If quality program conditions result in the noncompliance of products, these conditions shall be promptly investigated, documented, and corrected. Such corrections may be initiated either by the manufacturer or by the certification body representative.

6.3.6 Changes

All changes to the quality program manual shall be submitted to the certification body for approval.

7 Certification — Products

7.1 In-factory inspection

Product certification shall be based on a periodic in-factory inspection of products by the certification body for compliance with the applicable technical requirements.

7.2 Documentation

Documents relevant to the design and construction of products shall be retained and shall be accessible by the certification body for review at the time of inspection.

Note: *Where documentation is retained in electronic form, compatible hardware and software must be maintained to provide ready access.*

7.3 Noncompliances

Where products do not comply with applicable technical requirements, the noncompliances shall be promptly corrected by the manufacturer, who shall further investigate and take steps to prevent recurrence.

7.4 Markings

Note: *See Annex A.*

7.4.1 Compliance marking

7.4.1.1 Building compliance marking

A permanent label identifying compliance with this Standard shall be applied to each prefabricated building in a location that will be visible on completion of the building. In the case of a multi-unit or multi-suite building, each unit or suite shall be marked. The label shall

a) identify the certifying body;
b) provide the serial number;
c) identify the applicable code(s) and/or standards with which the building complies; and
d) reference the specification sheet(s) for the building.

7.4.1.2 Module and panel compliance marking

For prefabricated modules and panels that are not part of a prefabricated building that is certified in accordance with this Standard and marked in accordance with Clause 7.4.1.1, a permanent label or stamp identifying compliance with this Standard shall be applied to each module or panel in a location that will be visible in order to confirm compliance at the installation site. Labels or stamps for modules and panels shall

a) identify the certifying body;
b) identify the manufacturer;
c) provide a serial number, product code, and part number as applicable; and
d) reference the specification sheet(s) for the module or panel.

Note: *See Annex A.*

7.4.1.3 Labels and stamps

Labels installed in accordance with Clauses 7.4.1.1 and 7.4.1.2 shall

a) comply with CSA C22.2 No. 0.15, Type B or C
   i) for indoor use where installed in a location that will not be exposed to the exterior in the completed building; or
   ii) for outdoor use where installed in a location that will be exposed to the exterior in the completed building;
b) be located only on surfaces identified by the label manufacturer as appropriate for the label; and
c) not be located on surfaces whose temperatures exceed the maximum specified by the manufacturer.

Stamps shall provide a performance level equivalent to that required for labels.

7.4.2 Specification sheet

7.4.2.1 Provision of specification sheets

Specification sheets shall be provided as follows:

a) for prefabricated buildings:
   i) be permanently affixed on the inside of each prefabricated building in a location that will be readily visible when the building is complete; and
   ii) in the case of a multi-unit or multi-suite building, be affixed on the inside of each unit or suite in a location that will be readily visible when the building is complete;
b) for prefabricated modules that are not part of a prefabricated building that is certified in accordance with this Standard and affixed with a specification sheet in accordance with Item a):
   i) be permanently affixed on the inside of the module or building in a location that will be readily visible in order to confirm compliance at the installation site; or
   ii) be provided to the purchaser, where the specification sheet cannot be affixed as described in Item i) (see Annex A); or
c) for prefabricated panels that are not part of a prefabricated building that is certified in accordance with this Standard and affixed with a specification sheet in accordance with Item a):
   i) be permanently affixed on the inside of the building in a location that will be readily visible when the building is complete; or
   ii) be provided to the purchaser.

Notes:

1) *Where multiple modules or panels are installed in a building, a single specification sheet may be provided for all modules or panels in the building.*

2) *Electronic access to the specification sheet information may be acceptable to the builder, building official, purchaser or other persons involved in construction review, at the time of delivery and may expedite acceptance of delivery and site approvals. This does not replace required hard copy to be affixed to the building or module or provided to the purchaser.*
3) *See also Clause A.7.4.2.1.*

① **7.4.2.2 Specification sheet information — General**

The specification sheet shall provide the following information:
a) the manufacturer's name and address;
b) the model, serial number, product code and part number as applicable;
c) the date of manufacture;
d) a statement indicating that construction was carried out in a factory;
e) as applicable, the building code(s) and standards met by the building, module, or panel and whether the building, module, or panel is designed and constructed in compliance with requirements that apply only to seasonal buildings;
f) as applicable, a list of components, assemblies and systems to be completed on site;
g) as applicable, information in accordance with Clauses 7.4.2.3 to 7.4.2.6; and
h) for buildings and modules, whether a sprinkler system has been installed.

7.4.2.3 Specification sheet information for prefabricated buildings and structural modules and panels

The specification sheet for prefabricated buildings, prefabricated structural modules, and prefabricated structural panels shall provide the following information as applicable:
a) for buildings, modules or panels, or parts thereof, designed in accordance with CSA Z240 MH Series, or Part 9 of the *National Building Code of Canada* or equivalent requirements in a provincial, territorial, or municipal code,
   i) the uniformly distributed live load floor load;
   ii) the specified snow load, or the 1-in-50-year ground snow load and associated rain load;
   iii) 1-in-50 year hourly wind pressure (for resistance to racking and up-lift);
   iv) where the building is to be installed on piers, the allowable 1-in-50 wind pressure for resistance to overturning without anchorage (see CSA-Z240.10.1); and
   v) seismic spectral response acceleration Sa(0.2);
b) for buildings, modules or panels, or parts thereof, designed in accordance with Part 4 of the *National Building Code of Canada* or equivalent requirements in a provincial, territorial, or municipal code,
   i) the specified loads, or the design loads and factors, used in the design; and
   ii) where the building is to be installed on piers, design or specified wind pressures for escarpment, open and rough terrain for resistance to overturning without anchorage; and
c) for buildings, a statement of compliance with the acceptance criteria for deformation resistance where the building has been tested and evaluated in accordance with the deformation resistance test in CSA Z240.2.1.

Note: *Prefabricated buildings designed to be installed on surface foundations as described in CSA Z240.10.1 must be installed on non-frost-susceptible soil or meet the requirements of the deformation resistance test specified in CSA Z240.2.1.*

7.4.2.4 Specification sheet information for prefabricated buildings and prefabricated modules and panels designed for exposure to unconditioned space, ground, or the exterior

7.4.2.4.1

The specification sheet for prefabricated buildings, and for prefabricated modules and panels designed for exposure to unconditioned space, ground, or the exterior, shall provide the following information as applicable:

a) where the product complies with prescriptive requirements for thermal performance
   i) the effective thermal resistance of roof-ceiling, wall and floor assemblies, or the thermal resistance of the insulation installed in roof-ceiling, wall and floor assemblies;
   ii) the overall thermal transmittance or energy rating for windows and doors;
   iii) the overall thermal transmittance for skylights; and
b) whether the cladding assembly is constructed with a capillary break.

Note: *The applicable technical requirements may specify required thermal resistance as minimum effective thermal resistance or minimum thermal resistance of the insulation. Where compliance is demonstrated by following a performance path, the applicable requirements specify the documentation that must be provided.*

7.4.2.4.2

Where trade-offs have been used to establish required thermal resistance performance, the specification sheet shall identify

a) the assembly or assemblies where trade-offs have been made;
b) the areas affected in m^2; and
c) the effective thermal resistances, nominal insulation thermal resistances or thermal transmittance as applicable for those areas.

Note: *Due to permitted exceptions and tradeoffs, actual thermal resistance over any particular area of a roof-ceiling, wall, or floor assembly could be higher or lower than the minimum thermal resistance specified in prescriptive requirements. This can make it difficult to determine if the product complies with the requirements for a particular climate zone. Variations resulting from exceptions need not be identified on the specification sheet.*

7.4.2.5 Specification sheet information for prefabricated buildings and modules delivered with appliances

The specification sheet for prefabricated buildings and modules delivered with appliances shall provide the following information as applicable:

a) where a required heating appliance is delivered, the outside design temperature used in heat-loss calculations;
b) where a cooling appliance is delivered, the outside design temperature used in heat-gain calculations; and
c) a list of the appliances that have been factory-installed, including the make, model, and type of energy used (e.g., oil, gas, electric, wood).

7.4.2.6 Specification sheet information for prefabricated buildings, modules, and panels with electrical service installed

The specification sheet for prefabricated buildings, modules and panels, where electrical service is installed shall provide the complete electrical rating (i.e., voltage, frequency, input current).

7.4.3 Buildings with limited-use running gear

Prefabricated buildings with limited-use running gear shall also have a label complying with Clause 7.4.1.3 affixed on the interior providing the following information:

a) running gear manufacturer;
b) model;
c) gross vehicle weight rating (GVWR);
d) vertical tongue load range; and
e) recommended tire size(s) and cold inflation pressure for each tire size for the maximum GVWR and for the empty weight, where significantly different.

7.5 Instructions

7.5.1 Instructions — General

The manufacturer shall provide, with each prefabricated building, module, or set of panels that are to be installed in the same manner, instructions that include, as applicable:

a) transport, lifting, placement and installation procedures; and
b) a module or panel layout.

Note: *Where multiple modules or panels are installed in a building, a single instruction document may be provided for all modules or panels.*

7.5.2 Instructions — Connections of prefabricated modules and panels

In the case of a building constructed on site with multiple modules or panels, the manufacturer shall provide, with each prefabricated module or set of panels that are to be installed in the same manner, instructions that describe, as applicable, the details for

a) connecting the modules or panels to provide the required structural strength and rigidity;
b) maintaining the integrity of the air barrier system, vapour barrier, insulation, sheathing membrane, cladding, roofing and flashing at the joints between each module or panel;
c) connecting ducting, piping and wiring; and
d) maintaining the integrity of fire separations and providing fire blocking between modules where required.

7.5.3 Instructions — Prefabricated buildings

The manufacturer shall provide, with each prefabricated building, instructions that include, as applicable

a) in the case of a building designed to be installed on a full perimeter foundation, foundation support and anchorage details;
b) in the case of a building designed to be installed on a foundation in accordance with CSA Z240.10.1,
    i) maximum pier loading, spacings, and any additional information necessary for the proper support of the building;
    ii) anchorage, including the location and required capacity of anchorage devices; and
    iii) skirting;
c) information on the connection of services; and
d) installation of all other items to be installed or completed on site.

8 Surveillance by the certification body

8.1 General

Surveillance shall be carried out by the certification body to ensure that the implementation and continuing operation of the quality program and the construction of the buildings or panels comply with this Standard. Surveillance shall consist of the following:

a) follow-up audits of the factory quality program; and
b) random inspections of products.

① 8.2 Frequency

The frequency of the audits and inspections specified in Clause 8.1 shall be determined, justified, and documented by the certification body. The frequency shall include consideration of the results of previous audits and inspections. In addition to normal random inspections, inspections of drawings, calculations and product shall be conducted for new products that differ significantly from previously certified products.

Note: *Significant differences would include, for example, changes with respect to occupancy, complexity, or requirements for qualified personnel.*

8.3 Certification body report

The certification body report shall include

a) changes made since the last report;
b) a review of manufacturing records;
c) a report on the compliance of products with applicable standards; and
d) a report on the updating of the quality program.

Deficiencies found in the quality program or products shall be promptly investigated, documented, and corrected. Changes to the quality program resulting from these corrections shall be documented in the quality program manual and promptly submitted to the certification body.

Annex A (informative)
Commentary

Notes:
1) *This Annex is not a mandatory part of this Standard.*
2) *This Annex provides explanation of and rationale for the requirements of this Standard.*
3) *The clause numbers in this Annex correspond to the clauses in this Standard.*

A.0 Introduction

Portions of buildings, modules, or panels fabricated in a manufacturing plant are not accessible for inspections and testing once interior finishes and exterior sheathing or cladding are applied. The certification procedure specified in this Standard is intended to provide a means of verifying that the prefabricated portion of a building, module, or panel, which may include factory-installed structural, plumbing, heating, and electrical systems, has been designed and built to meet or exceed the requirements of the appropriate building code or the CSA Z240 MH Series, as applicable. See also Clause A.4.1.

A.1 Scope

① A.1.1 Use of this Standard

Materials

While this Standard has traditionally been used to certify light wood-frame buildings, it may be used for buildings, modules and panels constructed of any building material, including used materials provided they comply with the requirements of the building code/regulation/standard that apply at the installation location (see NBC Division A, Sentence 1.2.2.3.(1).). The certification body should confirm that used materials comply with applicable code requirements. This could normally require professional involvement.

The following provides information on three materials where other certification standards apply.

Aluminum

Where the factory produces components for prefabricated buildings, modules or panels that are made of welded aluminum, the factory should be certified in accordance with CSA W47.2. Complete buildings, and modules and panels that include other materials, should also carry a CSA A277 certification.

Concrete

Similarly, where a factory produces modules or panels constructed of precast concrete, it should be certified in accordance with CSA A23.4. Complete buildings, and modules and panels that include materials other than those used in the construction of precast concrete, should also be certified according to CSA A277.

Steel

Manufacturers of steel building systems should be certified in accordance with CSA A660. While steel building systems may include other materials, it is recommended that steel buildings, modules and panels including a significant amount of other materials be certified according to CSA A277. Similarly, buildings, modules and panels incorporating elements that provide other than structural or environmental separation functions should be certified according to CSA A277.

Where the factory produces components that are made of welded steel, the factory should be certified in accordance with CSA W47.1. Complete welded steel buildings, and modules and panels that include other materials, should also carry a CSA A277 certification.

Where shipping containers are used in the construction of buildings or building modules, the container as modified must provide the required level of performance for the function(s) it is meant to serve, as specified by the requirements of the building code/regulation/standard that applies in the installation location. The compliance of a shipping container with a product standard prior to modification will not assist in ensuring that the modified container complies with the applicable requirements. For steel structures, professional involvement is typically required and should ensure compliance with the applicable structural requirements.

Limitations on certification

Certification of the factory process and products depends not only on the process and products but also on the qualifications of the certification body to evaluate design and construction of buildings of varying degrees of complexity. The types of buildings for which a factory is certified may be limited by the capabilities of the factory or the capabilities of the certification body. Information on the qualifications of the certification bodies can be obtained from the Standards Council of Canada. Information on factory certifications can be found on the web sites of the certification bodies.

Building occupancies

The major occupancy classifications used in the *National Building Code of Canada* (NBC) are

- A1 — Assembly occupancies intended for the production and viewing of the performing arts;
- A2 — Assembly occupancies not elsewhere classified in Group A;
- A3 — Assembly occupancies of the arena type;
- A4 — Assembly occupancies in which the occupants are gathered in the open air
- B1 — Detention occupancies in which persons are under restraint or are incapable of self-preservation because of security measures not under their control;
- B2 — Treatment occupancies;
- B3 — Care occupancies;
- C — Residential occupancies;
- D — Business and personal services occupancies;
- E — Mercantile occupancies;
- F1 — High-hazard industrial occupancies;
- F2 — Medium-hazard industrial occupancies; and
- F3 — Low-hazard industrial occupancies.

Alberta relocatable industrial accommodation

Part 10 of the *Alberta Building Code* (ABC) also provides requirements specific to relocatable industrial accommodation. Relocatable industrial accommodation includes prefabricated buildings that provide short-term accommodation for an industrial work force living and working in a temporary location.

A.1.2 On-site inspections

The portion of the building to be completed on site is subject to inspection by local building officials. Included in the on-site inspections are

- the foundation;
- connection of the building to the foundation or anchorage to the ground;
- assembly of multiple-module and panelized buildings; and

- the site installation of water, sewage, gas, and electrical services and the connections to the factory-installed portions of these services.

Gas installations and heating systems or portions of these installations or systems installed in the factory are inspected before transport. The on-site portions and hookups of heating systems are subject to local inspection, based on code requirements and printed connection instructions (provided inside each building or with each set of panels or modules) appropriate for factory-installed components and equipment.

A.3 Definitions

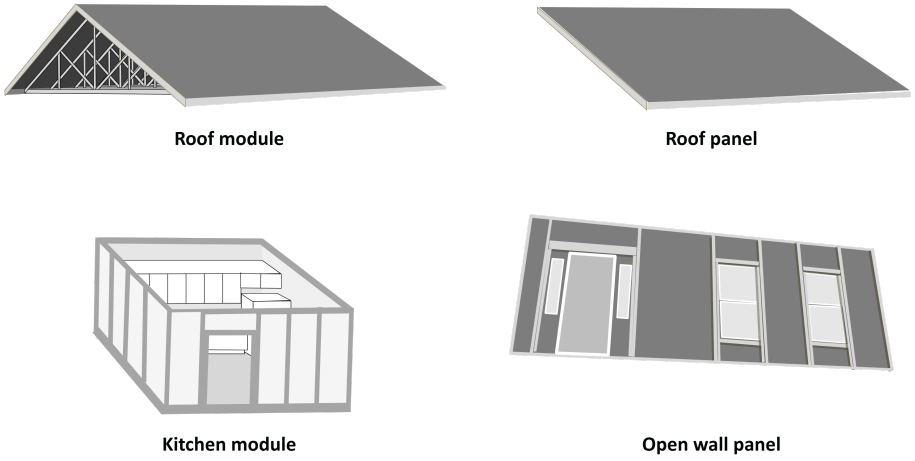
Prefabricated building

Prefabricated buildings include manufactured homes designed and constructed according to the CSA Z240 MH Series, modular homes and other single- and multi-module buildings.

Prefabricated modules and panels

A prefabricated panel or module may be “open” (constructed such that all elements are visible), or “closed” (containing concealed parts or processes of manufacture that cannot be inspected at the site without disassembly, damage or destruction). See Figure A.1.

Figure A.1
Examples of prefabricated modules and panels
(See Clause A.3.)



A.4 General requirements

① A.4.1 Technical requirements

Factory-certified buildings, modules, and panels must comply with the *National Building Code of Canada (NBC)* or applicable provincial, territorial, or municipal code requirements. Where a provincial, territorial, or municipal code(s) exists, it takes precedence over the NBC. In Canada, the authority for

building regulation rests with the provinces and territories, and with the City of Vancouver which exercises its authority under charter. Some provinces and territories delegate some or all authority to the municipalities and regional districts. The applicable edition of a code or regulation and the enforcement date are determined by the authority having jurisdiction.

Certain prefabricated buildings can be constructed to the requirements of the CSA Z240 MH Series where specified by provincial, territorial, or municipal regulations.

Prefabricated buildings, modules, and panels can be certified to any appropriate building code (e.g., to a city code for a building shipped to the United States, to the Japanese Housing Code for panels destined for Japan), provided that the manufacturer and the certification body have access to, and demonstrate knowledge of, the local codes at the final installation location. If the CSA Z240 MH Series or the NBC is accepted by the regulatory authority in a non-Canadian jurisdiction, compliance with the CSA Z240 MH Series or the NBC might be deemed to satisfy local requirements at the final installation location.

Where a design incorporates a solution that differs from the acceptable solutions provided in the regulation that applies in the jurisdiction where the product is to be installed, the alternative solution requirements provided in the applicable regulation apply. In the NBC, these are provided in Division C, Section 2.3. These provisions require documentation to demonstrate that the alternative solution meets or exceeds the performance levels provided by the acceptable solution with respect to the attributed code objectives, functional statements, and intents. Preparation of the required documentation typically requires the involvement of qualified persons licensed in the jurisdiction where the product is to be installed. The certification body should confirm that the required documentation is complete and correct. The manufacturer will need the local authority in the jurisdiction where the product is to be installed to accept the alternative solution.

Both CSA Z240.10.1 and the NBC state that foundations for buildings need not extend below the level of frost penetration when the building superstructure will not be damaged by differential soil movement caused by frost action. This may be achieved by installing the building on soil that is not frost-susceptible or by constructing the building to be deformation resistant. Sentence 9.12.3.3(6) and Article 9.15.1.3 of the NBC allow surface installations for any deformation-resistant building. Thus, Clause 7.4 of this Standard provides for the identification of deformation-resistant buildings (see also Clause A.7.4.2.2).

① A.4.2 Administrative requirements

As with technical requirements, administrative requirements that apply to building design, design review, and construction review at the location where the building is to be installed also apply to buildings constructed off-site.

As with any product certified by an accredited certification body, the construction of a building, module, or panel certified under this Standard may be accepted without inspection by the local authority at the installation location provided that the applicable regulations or local policies do not prohibit such acceptance. In addition to the certification label, it is expected that the local authority will review specification sheet to ensure that the building, module, or panel has been designed to comply with requirements specific to the installation location.

Where regulation requires in-factory review by qualified persons licensed in the jurisdiction where the product is to be installed, arrangements must be made for persons licensed to carry out the necessary reviews at the appropriate stages in the process.

For large or complex buildings, reviews by persons licensed in the jurisdiction where the product is to be installed may be appropriate to supplement inspections by the certification body, even where this is not required by local regulation.

① A.5 Certification requirements

For certification in accordance with this Standard, the quality program and products must be evaluated and certified by the certification body.

The quality program requirements specified in Clause 6 are consistent with the requirements in CAN/CSA-ISO 9001 for certification of manufacturers.

A.6 Certification — Quality program

A.6.1 General

The ability of a certification body to certify a factory quality program is verified through accreditation by a nationally recognized body. In Canada, this body is the Standards Council of Canada.

① A.6.2 Facilities and personnel

The ability of a manufacturer to consistently produce buildings, modules, and/or panels that meet the requirements of this Standard (including the applicable codes and standards referenced herein) is dependent on factory personnel and facilities, and their utilization.

One individual, irrespective of other responsibilities, should be given the final responsibility and authority to establish and implement the internal organization of personnel, facilities, and procedures as necessary for the successful operation of the quality program.

One function of the certification body is to review the organization of each quality program to determine whether it provides the internal controls, checks, tests, and corrective steps necessary to ensure that units are designed, constructed, and finished in accordance with required standards.

In addition to verifying the workability of the program, the certification body verifies whether the personnel assigned to various positions within the quality program are capable, through personal qualifications and in relation to delegated responsibilities and authorities, of carrying out their identified functions. Where regulation requires design, design review or construction review by qualified persons licensed in the jurisdiction where the product is to be installed or where qualified persons provide documentation to support an alternative solution, these persons should be identified and verified by the certification body. These persons may include, for example, persons responsible for the building structure, building envelope, HVAC systems, electrical systems, and fire safety. For large or complex buildings, reviews by qualified persons licensed in the jurisdiction where the product is to be installed may be appropriate to supplement inspections by the certification body, even where this is not required by local regulation.

Documentation of the quality program should include the assignment of responsibility for quality control work (as set out in the quality program manual) to qualified personnel.

A.6.3 Quality program manual

① A.6.3.1

The documentation of complete and effective procedures in a quality program manual is a prerequisite for the certification of a factory.

A.6.3.2

Clause 6.3.2 lists the minimum elements to be included in a quality program manual. The manual is a road map for the conduct of the quality program.

Design and development are reflected in the document initiation and include all applicable drawings and calculations.

In addition to the applicable codes and standards specified in Clause 4, the manual typically lists the specific technical procedures and quality-of-work requirements applicable to factory products.

When units are being shipped or exported to jurisdictions or locations where different codes or standards are in effect, a factory's internal requirements should reflect those at the various points of delivery, and its procedures, capabilities, and control structures should be sufficient to ensure that the code requirements in its diverse markets will be met or exceeded.

①

A.6.3.3

Quality program forms are unique to each manufacturing plant and may be tailored to each product. They should be created to reflect the structure of the particular manufacturing facility, its product categories, and the work sequences within the factory.

Quality program personnel are responsible for the individual inspection of prefabricated products (see Clauses A.8.1 and A.8.3). Thus, the traceability of inspection records and of corrective actions taken in response to deficiencies is built into the certification process. These records are also useful to the manufacturer for internal reviews of quality program effectiveness.

A.6.3.4

The responsibility for the conformance of the finished buildings, modules, or panels to applicable codes, standards, and regulations, and to the factory's in-house standards, rests with the manufacturer and the qualified persons who provide stamped drawings and other required documentation, and/or who carry out design and construction review (see Clause A.4.2). Clause 6.3.4 requires certification body access to a factory's completed forms and documentation to enable the certification body to evaluate and confirm that factory quality program activities, including all necessary inspections and tests, have been performed appropriately and that all nonconformances have been corrected.

A.6.3.5

When recurring deviations from the factory's in-house standards indicate systemic problems, appropriate adjustments should be made to procedures and then reflected in changes to the quality program manual. To ensure program effectiveness, the manual and procedures should be reviewed on a regular basis, regardless of the occurrence of problems.

A.6.3.6

Revisions to the manual, including personnel changes, must be approved by the certification body.

A.7 Certification — Products

A.7.1 In-factory inspection

Initial and continuing product certification are based on certification body inspections to verify that the products, as produced under the quality program of a qualified factory, meet or exceed all requirements set out in the approved quality program manual. See also Clause 6.3.2.

A.7.2 Documentation

The availability of design and construction documents allows the certification body to compare those products being inspected to the applicable requirements. These documents also allow for the ongoing verification that construction is proceeding accordingly.

A.7.3 Noncompliances

Periodic inspection by the certification body assists the manufacturer by identifying noncompliances. These frequently occur when codes or standards governing the construction of units or their components are revised or when clarifications of intent are issued. The certification body can help the manufacturer stay abreast of current requirements of which the manufacturer might not otherwise be aware. The certification body also looks for evidence during factory audits that the manufacturer is taking similar steps to correct deficiencies found during the manufacturer's continuing inspections.

A.7.4 Markings

Required markings allow traceability of certified prefabricated buildings, modules, and panels.

Certain jurisdictions in Canada require markings in French; it is the responsibility of the manufacturer to determine where this is required and to comply with the law.

A.7.4.1 Compliance marking and specification sheet

A.7.4.1.2 Module and panel compliance marking

Modules and panels may be covered in the finished building. Compliance marking, however, must be visible to verify compliance at the time the modules or panels are subject to site inspection by a building official.

Because the specification sheet may not be affixed to the module or building (see Clause 7.4.2), identifying the manufacturer on the label or stamp along with the serial number, or product code and part number, provides another route to track the product data.

A number of identical modules or panels may be installed in a building or in a number of buildings. These panels may be identified with a product code or part number rather than a unique serial number.

A.7.4.2.1 Provision of specification sheets

While drawings and specifications should provide all of the technical design information required on the specification sheet, those documents do not belong to the building owner and often do not remain with the building. Where specification sheets are not affixed to the building or module, they need to be provided to the purchaser, similar to other product documentation.

Provision of specification sheets for modules

If the specification sheet will not be visible when affixed to a module, or if affixing it will compromise the function or aesthetic value of the module, it may be delivered with the module and provided to the purchaser.

A.7.4.2.2 . Specification sheet information — General

The applicable building code(s) met by the building, module, or panel is to be identified (see Clauses 4.1 and A.4.1). A single design might meet the building codes of several jurisdictions. Building codes generally require compliance with local electrical and plumbing codes, for example.

A.7.4.2.3 Specification sheet information for prefabricated buildings and structural modules and panels

Because prefabricated buildings, modules, and panels can be designed and constructed before their final destination is known, local design criteria such as ground snow loads may not be known. Manufacturers may base their design and construction standards on load criteria that address the most severe conditions within their normal sales areas. For the convenience of local building officials and the certification body, Clause 7.4.2.3. requires manufacturers to identify the assumed loads on the specification sheet for each certified building/unit/suite, structural module or structural panel.

The deformation resistance test qualification is marked to identify models shown by the test to accommodate the independent vertical movement of foundation piers (see also Clause A.4.1).

A.7.4.2.4 Specification sheet information for prefabricated buildings and prefabricated modules and panels designed for exposure to unconditioned space, ground, or the exterior

As with structural loads, required energy performance levels at the final destination may not be known at the time of construction. Manufacturers may base their construction on the coldest climate region within their normal sales areas. For the convenience of local building officials and the certification body, Clause 7.4.2.4 requires manufacturers to identify energy performance levels of building envelope components and assemblies on the specification sheet for each certified building/unit/suite, module or panel.

A.8 Surveillance by the certification body

A.8.1 General

The ongoing role of the certification body, following initial qualification based on the factory's quality program and the conformance of its products to applicable codes and standards, is to verify that the manufacturer is maintaining and carrying out the quality program in accordance with this Standard.

During its periodic factory visits, the certification body reviews a random sample of the completed records and forms accompanying each unit to verify that specified construction and quality activities have been performed consistently, that deficiencies have been corrected, and that follow-up procedures have been instituted. In addition, the certification body carries out random inspections of completed and in-progress units to confirm that construction, inspections, and documentation conform to the factory's quality program manual and current applicable codes and standards.

① A.8.2 Frequency

For factories with good track records and where there are no significant changes in products, the certification body should conduct one audit and three plant inspections per year.

A.8.3 Certification body report

The certification body report documents the findings of its audits and provides the manufacturer with an independent review of its quality program. Findings of serious consistent deficiencies can lead to the need for required corrective action. Failure of the manufacturer to take appropriate corrective action through its quality program can lead to the delisting of a certified factory.

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