CAN/UL 2600:2020

STANDARD FOR SAFETY

Relocatable Buildings

SCC FOREWORD

National Standard of Canada

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UL Standard for Safety for Relocatable Buildings, CAN/UL 2600

Third Edition, Dated November 8, 2019

Summary of Topics

This revision of CAN/UL 2600 dated December 21, 2020 is issued to limit floor load application to buildings used for offices; removal of anchorage requirements; limit step dimension exception to specific buildings; revisions to Annex E to reflect other changes, provide clarification, and correct information; and editorial corrections; 6.1.2, 6.2.4.1, 7.1, 7.3.1.1, 8.3.1, 8.3.2, 10.3.1, 11.2.1, 12.1.2, E6, Table E6, Table E7, Table E10, E11, Table E11, Table E12.1, Table E12.2, and Table E15

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated August 28, 2020.

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CAN/UL 2600:2020

Standard for Relocatable Buildings

First Edition – April, 2017
Second Edition – September, 2018

Third Edition

November 8, 2019

This CAN/UL Safety Standard consists of the Third Edition including revisions through December 21, 2020.

This most recent edition of CAN/UL 2600 as a National Standard of Canada occurred on December 21, 2020.

This standard has been designated as a National Standard of Canada (NSC) on December 21, 2020.

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Preface

This is the Third Edition of the CAN/UL 2600, Standard for Relocatable Buildings.

UL is accredited by the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of SCC for accreditation of a Standards Development Organization.

Annexes A and B, identified as normative, forms a mandatory part of this Standard.

Annexes C, D, E, and F, identified as informative, are for informational purposes only.

This CAN/UL 2600 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at http://csds.ul.com.

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This Edition of the Standard has been formally approved by the STP on Relocatable Buildings, STP 2600.

This list represents the STP 2600 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

1 Scope

1.1 This standard provides the requirements for relocatable buildings.

Note: See Section 4 Glossary, Annex C and Section D3.

1.2 This Standard applies to relocatable buildings where the major occupancy, as defined in the National Building Code of Canada, is:

a) Group A, Division 2;

b) Group C, except that the standard does not apply to buildings containing dwelling units;

c) Group D, or

d) Group F, Division 3.

Note: See Annex C.

1.3 This Standard applies to relocatable buildings without a basement or heated crawl space where the building area does not exceed the maximums specified in Table 1.1.

Note: Buildings that exceed the building heights and building areas specified in 1.2 must comply with the building codes and regulations that apply at the building location.

Table 1.1
Maximum Building Area

Sleeping Accommodation	Maximum Building Area, m^2			
	Sprinklered	Not Sprinklered	Sprinklered	Not Sprinklered
	1-Storey		2-Storey	
No	2,400	1,200	1200	600
Yes	1,200	600	600	300

1.4 Buildings constructed in accordance with this standard are permitted to be of combustible construction or noncombustible construction, used singly or in combination.

1.5 This standard provides requirements that address:

a) construction of the building modules including

i) structural design

ii) ceiling heights

iii) accessibility

iv) stairs, handrails and guards

v) means of egress;

vi) fire protection in and between buildings

vii) electrical

viii) heating and ventilation;

ix) plumbing;

x) building envelope

xi) energy efficiency; and

b) site considerations including

i) site preparation

ii) egress routes

iii) spatial separation;

iv) fire fighting; and

c) instructions and marking.

Note: See Annex C.

2 Units of Measurement

2.1 Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

3 Reference Publications

3.1 References to codes or standards appearing in the requirements of this standard shall be interpreted as referring to the latest edition, except that when the latest edition of a standard is not applicable, the edition identified in this clause or elsewhere in the standard shall be used.

ASHRAE
ANSI/ASHRAE 62, Ventilation for Acceptable Indoor Air Quality

CSA
CSA A277, Procedure for certification of prefabricated buildings, modules, and panels
CSA B66, Design, material, and manufacturing requirements for prefabricated septic tanks and sewage holding tanks
CSA Z240.10.1, Site Preparation, Foundation and Installation of Buildings

NFPA
NFPA 13, Standard for Installation of Sprinkler Systems
NFPA 13R, Standard for Installation of Sprinkler Systems in Residential Occupancies
NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

ULC Standards
CAN/ULC-S524, Standard for Installation of Fire Alarm Systems

National Research Council of Canada
National Building Code of Canada
National Fire Code of Canada
National Energy Code of Canada for Buildings

4 Glossary

4.1 Words and phrases used in this Standard that are not included in the definitions below shall have

a) the meanings specified in the National Building Code of Canada; or

b) where such words or phrases are not defined in the National Building Code of Canada, the meanings that are commonly assigned to them in the context in which they are used, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

4.2 APPLIANCE – a device to convert electrical energy or fuel into thermal energy and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Standard.

4.3 BUILDING CLUSTER – a group of one storey relocatable buildings where the sum of the building areas and the space between the buildings is not greater than 1200 m^2 and where the limiting distance between buildings within the cluster may be reduced provided other requirements are met.

4.4 EGRESS ROUTE – a continuous path of travel provided for the escape of persons from any exterior door of a relocatable building in a building cluster, or contained open space in a building cluster, to an open public thoroughfare, or an exterior open space protected from fire exposure from the building cluster and having access to an open public thoroughfare.

4.5 MODULE – a relocatable unit constructed in a factory that, when installed on site forms all or part of a building.

4.6 MODIFIED RELOCATABLE MODULE – a relocatable module that has been subject to any change to structural, architectural, electrical, mechanical, plumbing, gas or HVAC assemblies or systems, or any change to the use and/or occupancy of a module.

Note: See 22.2.2.3 and C22.2.2.3.

4.7 PUBLIC USE – useable by the general public.

Note: See Annex C.

4.8 RAPID DEPLOYMENT – refers to a one-storey relocatable building that is not for public use, is designed and constructed for rapid removal, relocation and re-installation, and is used in any one location for not longer than 90 days.

Note: See Annex C.

4.9 RELOCATABLE BUILDING – a building that is constructed of one or more modules that are designed and constructed to be readily transported, installed, connected together, disconnected and uninstalled without damage numerous times over their service lives. Modules may be transported on their own running gear or on separate transport equipment.

4.10 WSRB (wheeled or skidded relocatable building) – a relocatable building that is a single module and constructed with running gear or on skids.

5 General Requirements

5.1 Compliance

5.1.1 Except as specifically provided in this Standard, relocatable buildings shall comply with

a) the National Building Code of Canada (NBC), and

b) the energy efficiency requirements provided in

i) as applicable considering building size and occupancy, the 2017 National Energy Code for Buildings, or

ii) the 2015 National Building Code Section 9.36, Energy Efficiency, regardless of building size and occupancy.

Note 1: The standard provides requirements that are in addition to the requirements of the referenced Codes and exceptions to those requirements. See Annex C for explanations of differences.

Note 2: See C5.1 and Annex C20 Energy Efficiency.

Note 3: As relocatable buildings do not contain dwelling units, sound transmission requirements in the National Building Code of Canada do not apply.

5.1.2 Relocatable buildings within the application of Part 9 of the National Building Code of Canada shall not be required to comply with NBC Subsection 9.10.21, Fire Protection for Construction Camps.

5.2 Building Occupancy and Use

5.2.1 Except as provided in 5.2.2, relocatable buildings containing sleeping accommodation shall not contain spaces for other uses.

5.2.2 Relocatable buildings containing sleeping accommodation are permitted to include spaces for other uses provided each of those spaces does not exceed 100 m^2 in area. (See also 12.1.2.1.)

6 Structural Design

6.1 Compliance

6.1.1 Except as provided in 6.2.3, 6.2.4 and 7.2.2 structural design of relocatable buildings shall be in accordance with NBC Part 4, Structural Design.

6.1.2 Structural design shall take into account:

a) effects of forces due to transportation and installation due to frequent relocation; and

b) climatic and seismic loads at the installation location.

Note: See Annex C.

6.2 Design Loads

Note: While the installation location for a relocatable module may not be known at the time the module is constructed, modules delivered to a particular site must comply with the design loads at that site.

6.2.1 Snow Loads

6.2.1.1 Specified snow load shall be the greater of:

a) the specified snow load at the installation site; or

b) 2 kPa.

Note: See Annex C.

6.2.2 Wind Loads

6.2.2.1 Specified wind load shall be based on the greater of:

a) the reference velocity pressure at the installation site; or

b) a reference velocity pressure not less than 0.7 kPa.

Note: See Annex C.

6.2.3 Earthquake Loads

6.2.3.1 Single-module wood frame buildings within the application of Part 9 shall be designed for earthquake in accordance with:

a) NBC Part 4; or

b) NBC 2015 Part 9 requirements for buildings subject to high earthquake loads.

Note: NBC Part 9 requirements for high seismic forces apply where the seismic spectral response acceleration, Sa(0.2), is greater than 0.70 but not more than 1.8. See also Annex C.

6.2.4 Floor Loads

6.2.4.1 Relocatable buildings need not have a specified uniformly distributed live floor load greater than 2.4 kPa provided these are:

a) single module constructed with running gear,

b) not more than 4.88 m (16 ft) wide, and

c) used for offices.

7 Site Preparation, Foundations and Anchorage

7.1 Site Preparation

Note: See F5.2 on removal of vegetation around buildings with sleeping accommodation.

7.1.1 Site preparation shall comply with accepted good practice considering building occupancy, duration of use and site properties.

7.2 Foundations

Note: See Annex C.

7.2.1 Foundations of relocatable buildings, regardless of building area, need not comply with the NBC provided the building complies with 7.2.2 and:

a) is installed on foundations constructed in accordance with CSA Z240.10.1 “Site Preparation, Foundation and Installation of Buildings”;

b) is a single module constructed with running gear; or

c) is a rapid deployment building constructed with skids or placed on a gravel pad or rig mat.

Note: See Annex C.

7.2.2 Buildings installed as described in 7.2.1 shall:

a) be one-storey in building height,

b) not be constructed with masonry, heavy roofing such as concrete or clay roof tile, or concrete floor topping;

c) have a maximum specified uniformly distributed design live load on the floor of 2.4 kPa (50 lb/ft^2), and

d) be

i) installed on rock or soil that is not moisture-susceptible, or

ii) in conformance with the requirements for deformation resistance provided in CSA Z240.2.1 “Technical Requirements for Manufactured Homes ” in CSA Z240 MH Series, “Manufactured Homes”.

Note: See 21.1.2 on junctions between modules installed on ground susceptible to moisture movement.

7.3 Anchorage

7.3.1 Means for Tie-Down

7.3.1.1 *Deleted*

8 Crawl Spaces

8.1 Compliance

8.1.1 Except as provided in 8.2 and 8.3, crawl spaces for relocatable buildings, regardless of building area or occupancy, shall comply with NBC Part 9, Section 9.18, Crawl Spaces.

Note: See Annex C.

8.2 Access Openings and Ventilation

8.2.1 The requirements for access openings and ventilation provided in NBC Part 9, Section 9.18, shall apply only where a crawlspace is skirted.

Note: See Annex C.

8.3 Ground Cover

8.3.1 Ground cover shall not be required under rapid deployment relocatable buildings constructed with skids or placed on a gravel pad or rig matt.

Note: See Section F3.

8.3.2 Ground cover shall not be required to be installed in crawl spaces for relocatable buildings where the net free ventilation area is not less than 0.2 m^2 for every 50 m^2 of floor area.

Note: See Section F3.

9 Barrier-Free Design and Ceiling Height

9.1 Barrier-Free Design

9.1.1 Relocatable buildings need not comply with barrier-free or other accessibility requirements unless the building is for public use.

Note: See Annex C.

9.2 Ceiling Heights

9.2.1 Except as permitted by 9.2.2, clear ceiling height shall be not less than 2.1 m.

9.2.2 In modules specifically produced to be transported by air plane, the clear ceiling height need not comply with 9.2.1 provided it is

a) not less than 2 m over at least 90% of the floor area; and

b) not less than 1.9 m over the remaining floor area.

10 Stairs, Ramps, Handrails and Guards

10.1 Application

10.1.1 This Section applies to relocatable buildings that are not for public use.

10.2 Minimum Number of Risers

10.2.1 A single riser is permitted at raised floors constructed to allow for the installation of building services in laundry rooms and washrooms.

10.2.2 Where a stair has less than three risers and serves a floor that is accessible to persons other than service personnel, the floor shall be a contrasting colour or have a distinctive pattern to demarcate the leading edge.

10.3 Step Dimensions

10.3.1 Steps shall have a maximum rise and minimum run of 200 mm where the stairs:

a) are exterior stairs and serve

i) a rapid deployment building,

ii) a single-module building constructed on a chassis with running gear, or

b) are interior stairs serving raised floors constructed to allow for the installation of building services in laundry rooms and washrooms.

10.4 Ramps

10.4.1 Interior ramps shall have a slope of not more than 1 in 6.

Note: Where a ramp has a slope greater than 1 in 8 and serves as an access to exit, the NBC specifies a minimum width for doorways and corridors of not less than 6.1 mm per person.

10.4.2 Where multi-module relocatable buildings are installed on surface foundations on moisture-susceptible soil, ramps or metal sills shall be installed in all locations where connections between modules occur.

10.4.3 Surfaces of interior ramps shall have either a colour contrast or a distinctive pattern to demarcate the beginning and end of a ramp.

10.5 Landings

Note: See Annex C.

10.6 Guards

10.6.1 Openings in guards shall comply with the requirements for guards in buildings of industrial occupancy.

11 Means of Egress

11.1 Walkways as Means of Egress

11.1.1 Subsection 11.1 applies to walkways that provide a required means of egress.

Note: See Annex C.

11.1.2 Walkways shall be enclosed or roofed.

11.1.3 Except as provided in 11.1.5, walkways shall be designed to serve no other purpose other than to facilitate the movement of persons to and from adjoining buildings.

11.1.4 Storage rooms, washrooms, toilet rooms, laundry rooms and similar ancillary rooms shall not open directly into a walkway.

11.1.5 Service rooms containing space heating equipment shall not open directly into an enclosed walkway except where:

a) the equipment serves only the walkway and the room is separated from the walkway by construction having a 45 min fire resistance rating;

b) openings in the service room fire separation are protected by closures; and

c) the room is equipped with a heat detector where the adjoining buildings are required to be protected by a fire alarm system.

Note: See Annex C.

11.2 Travel Distance

11.2.1 Exits shall be located so that the travel distance from any part of the relocatable building to at least one exit is not more than

a) where the building is not sprinklered

i) 25 m if the building is not a multi-module rapid deployment building constructed in accordance with the exceptions provided in 12.1.2.3 or 13.3.1; or

ii) 15 m if the building is a multi-module rapid deployment building constructed in accordance with the exceptions provided in 12.1.2.3 or 13.3.1; or

b) 40 m if the building is sprinklered.

Note: See 13.5 for criteria for egress routes from buildings in building clusters.

11.3 Number of Exits

11.3.1 Except as permitted by 11.3.2, every floor area shall be served by not less than 2 exits.

11.3.2 A floor area, with an occupant load not greater than 60, is permitted to be served by one exit provided:

a) for unsprinklered buildings less than 80 m^2 (860 sq. ft.) in building area, the travel distance from any point in the floor area to the exit is not more than

i) 15 m where there are no sleeping rooms; or

ii) 10 m with sleeping rooms, or

b) for sprinklered buildings, the travel distance from any point in the floor area to the exit is not more than 25 m and the building area is not more than

i) 200 m^2 where there are no sleeping rooms; or

ii) 150 m^2 where there are sleeping rooms.

Note 1: A connection to a walkway cannot be the only exit for a floor space of a building.

Note 2: Occupant load should be posted as part of factory construction.

11.4 Doors and Hardware

11.4.1 Service and Janitor Room Doors

11.4.1.1 Doors to service rooms and janitor rooms need not open inward:

a) from a corridor required for egress, and may obstruct required egress width, or

b) from a room or space of assembly occupancy.

Note: See Annex C.

11.4.2 Hardware for Doors in Means of Egress

11.4.2.1 Door hardware is permitted to comply with requirements for single dwelling units or suites of residential occupancy where

a) the building is a single module with an occupant load not more than 20; or

b) the door serves a sleeping room and opens directly to a corridor or the exterior.

Note: See NBC 2015, 3.3.1.13.(4).

11.4.2.2 Except where doors from sleeping rooms open directly to the exterior, egress doors including exit doors that serve more than 20 persons in relocatable buildings with sleeping rooms shall be equipped with hardware that will release and allow the door to swing open when a force not exceeding 90 N is applied to the hardware in the direction of exit travel.

11.4.2.3 Egress doors including exit doors serving an assembly use including dining or recreational facilities with an occupant load of more than 60 persons shall be equipped with hardware that will release and allow the door to swing open when a force not exceeding 90 N is applied to the hardware in the direction of exit travel.

11.5 Lighting

11.5.1 Exit Signs

11.5.1.1 An illuminated exit sign shall be installed at each exit location serving a relocatable building with sleeping accommodations of more than 10 persons or having an occupant load more than 50 persons.

11.5.2 Exterior Lighting for Building Clusters

11.5.2.1 Walking surfaces in exterior open areas that provide egress, including required egress routes between relocatable buildings in building clusters shall be provided with:

a) lighting to provide illumination to an average level of not less than 50 lx at the walking surface; and

b) emergency lighting with a minimum illumination not less than 10 lx at the walking surface.

(See 13.3.1.)

12 Fire Protection in Buildings

12.1 Fire Separations

12.1.1 Penetrations

12.1.1.1 Penetrations of fire separations or membranes forming part of an assembly required to have a fire-resistance rating shall be sealed by a fire stop in accordance with NBC Part 3.

Note: See Annex C.

12.1.2 Fire Protection between Rooms and Spaces and for Supporting Elements

12.1.2.1 Except as provided in 12.1.2.2 and 12.1.2.3, walls and floor-ceiling assemblies shall be constructed as fire separations and rated as specified in Table 12.1.2.

Table 12.1.2
Fire Separations and Fire Resistance Ratings

Assembly	Fire Separation Required	Minimum Fire Resistance Rating, min
Floor-ceiling assembly between storeys in 2-storey buildings	yes	45
Loadbearing walls, columns and arches supporting the floor of a second storey	n/a	45
Interior walls of exit stairways	yes	45
Interior walls of corridors (1)	yes	45
Walls separating sleeping rooms from other rooms or spaces (1)	no	45
Walls of rooms or spaces that are greater than 50 m^2 in area in relocatable buildings with sleeping rooms	yes	45
Note 1: See Annex C.		

12.1.2.2 Interior walls of corridors not serving sleeping rooms need not have a fire resistance rating provided the building is sprinklered throughout.

12.1.2.3 Separation in rapid deployment multi-module buildings need not be continuous across connections between modules provided the connection is not wider than 300 mm.

Note: See Annex C and also 13.3.1.

12.1.2.4 Walls separating sleeping rooms from other rooms or spaces shall have no openings except for doors and as described in 17.4.1.

Note: See Annex C.

12.1.2.5 Except for appliances serving a single sleeping room, fuel-fired appliances installed in a relocatable building containing sleeping rooms shall be located in a service room which is separated from the remainder of the building by a fire separation having a fire-resistance rating not less than 45 min.

12.2 Flame-Spread Rating

12.2.1 Except where sprinklered, the flame-spread rating of not less than 90% of the wall and ceiling finishes in corridors shall be not more than 25.

12.3 Closures

12.3.1 Fire Dampers

12.3.1.1 Where a duct penetrates a wall, floor or ceiling, a fire damper shall be installed in accordance with Table 12.3.1.

Table 12.3.1
Fire Dampers in Ducts Penetrating Assemblies

Assembly	Fire Resistance Rating	Fire Damper	
		Assembly is Not a Required Fire Separation	Assembly is a Required Fire Separation
Floor-ceiling	not required	not required	required
	required	required except in branch ducts that have a melting point higher than 760 °C, serve only sleeping rooms in a single module and only penetrate assemblies between sleeping rooms and floor or ceiling spaces, or furnace room and floor or ceiling spaces	required
Wall	not required	not required	required
	required	required except in branch ducts that have a melting point higher than 760 °C, serve only sleeping rooms in a single module and only penetrate assemblies between sleeping rooms	required

12.3.2 Smoke Dampers

Note: See Annex C.

13 Spatial Separation

13.1 Clear Space

13.1.1 Except for stairs and landings serving exterior required exit doors, no structures, including accessory buildings and decks, shall be constructed or services installed within the limiting distance between relocatable buildings.

Note: See Annex B and D4.2.

13.2 Spatial Separation – General

13.2.1 Construction of exposing building faces and walls above exposing building faces of relocatable buildings is not required to be non-combustible.

13.2.2 Except as provided in 13.3.1 and 13.4.3, exposing building faces and walls above exposing building faces of relocatable buildings shall have a fire resistance rating not less than 45 min.

Note: See Annex C.

13.2.3 Except as permitted by 13.4.2 and 13.5.1, limiting distance between relocatable buildings shall be not less than

a) 5 m where the area of unprotected glazed openings is not more than 15% of the exposing building face, or

b) as provided in the NBC.

Note: See Annex C.

13.3 Continuity of Fire Resistance Rating in Rapid-Deployment Buildings

13.3.1 Fire resistance rating of the exposing building face of rapid deployment multi-module buildings need not be continuous across connections between modules provided the connection is not wider than 300 mm.

Note: See Annex C and also 12.1.2.3 and C12.1.2.

13.4 Spatial Separation at Walkways

13.4.1 For the purpose of this Subsection, walkways shall be enclosed.

13.4.2 Where any portion of a building faces another building across a walkway but does not abut the walkway, the minimum limiting distance specified in Clause 13.2.3 shall apply to the walls of the walkway.

13.4.3 Limiting distance between relocatable buildings may be less than 5 m provided the exposing building face is not more than 10.7 m (35') wide and faces or abuts a walkway, and:

a) the buildings are not rapid deployment buildings constructed in accordance with the exceptions provided in 12.1.2.2 or 13.3.1;

b) the walkway

i) is not less than 3 m in width and not more than 9 m in width;

ii) is not more than 1 storey in building height; and

c) the exposing building faces abutting the walkway are constructed as fire separations that

i) have a fire resistance rating of not less than 1 hr rated from both sides,

ii) have no unprotected openings,

iii) extend through any crawl space to the ground; and

iv) have non-combustible cladding, including cladding on skirting where applicable (see 13.6.2.1); and

Note: See Annex C.

13.4.4 Walkways shall have walls with:

a) a fire-resistance rating not less than 1 hour; and

b) non-combustible cladding, including cladding on the skirting where applicable

13.4.5 Soffits of walkways and buildings abutting or connected by walkways shall be unvented and protected by:

a) noncombustible material having a minimum thickness of 0.38 mm and a melting point not below 650°C,

b) unvented aluminum conforming to CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use";

c) not less than 12.7 mm thick gypsum soffit board or gypsum board installed according to CSA A82.31-M, “Gypsum Board Application,”

d) not less than 11 mm thick plywood,

e) not less than 12.5 mm thick OSB or waferboard, or

f) not less than 11 mm thick lumber.

13.5 Spatial Separation within Building Clusters

13.5.1 Limiting distance shall be not less than 1.5 m between relocatable buildings arranged in a building cluster where:

a) the buildings are not rapid deployment buildings constructed in accordance with the exceptions provided in 12.1.2.2 or 13.3.1;

b) the buildings do not contain sleeping accommodation;

c) not less than 2 egress routes are provided from each building to the perimeter of the building cluster and the egress routes have a clear width of not less than 1100 mm;

d) there are no dead-end egress routes between buildings; and

e) travel distance is not more than 25 m from any point within the cluster to the edge of the cluster.

Note 1: See 4.3 for area restriction for building clusters.

Note 2: See Annex C.

13.5.2 Relocatable buildings installed in a building cluster shall not have connecting roof panels, canopies or similar constructions unless these are part of a building module as originally constructed.

13.6 Skirting

13.6.1 Required Skirting

13.6.1.1 Skirting shall be installed on those portions of relocatable buildings where the exterior wall is less than 15 m from:

a) an exterior wall of another building, or

b) an exterior wall of the same building where the walls intersect at an angle of less than 135° on the outside of the building.

13.6.1.2 Skirting shall be installed on those portions of relocatable buildings where the distance from finished ground level to the underside of the building is greater than 750 mm measured at the exterior face of the building.

13.6.2 Skirting Construction

13.6.2.1 Cladding on required skirting shall be non-combustible.

Note: See also 13.4.3(c)(iii).

14 Fire Suppression

Note: See Annex C.

14.1 Hose Stations

14.1.1 Required Hose Stations

14.1.1.1 For the purpose of 14.1, an aggregate of relocatable buildings shall be considered as being a group of buildings that:

a) function as one unit and are not more than 10 m from each other, or

b) are physically connected to each other by corridors, walkways or other facilities through which fire or smoke could spread.

14.1.1.2 If a relocatable building, or aggregate of buildings contains sleeping rooms designed to serve 30 or more persons, each building that is not sprinklered shall be provided with hose stations conforming to 14.1.2 and 14.1.3.

Note: See Annex C.

14.1.2 Location and Number of Hose Stations

14.1.2.1 Hose stations shall be located where they are protected from freezing.

14.1.2.2 Not less than one hose station shall be installed not more than 5 m from an exit.

14.1.2.3 A sufficient number of additional hose stations shall be provided so that all parts of the relocatable building can be reached by a water stream from a hose described in 14.1.3.2.

14.1.2.4 In determining the location of a hose cabinet, allowance for spray shall be made only from the door of a sleeping room to the back corner of the sleeping room.

14.1.3 Hoses and Nozzles

14.1.3.1 A hose shall be equipped with a nozzle that is adjustable from fog to a straight stream.

14.1.3.2 Hoses shall be not less than 38 mm diam. and not more than 30 m in length.

14.1.4 Water Supply

14.1.4.1 Where hose stations are installed:

a) the minimum residual pressure at the hydraulically most remote hose station shall be 300 kPa, with a flow rate not less than 5 L/s;

b) a firefighting water supply of not less than 13.5 m^3 for each relocatable building shall be supplied, but the total water supply at one site need not be more than 27 m^3;

c) the firefighting water system is permitted to be combined with the domestic system, however the water storage required for firefighting shall not be depleted by the domestic system; and

d) where the firefighting water system is combined with the domestic water system, it shall be separated as required by the NPC.

14.2 Sprinkler System

14.2.1 If a sprinkler system is installed, it shall be designed in conformance with NFPA 13, Installation of Sprinkler Systems, or NFPA 13R, Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, as applicable.

14.3 Portable Extinguishers

14.3.1 Portable extinguishers shall be installed in conformance with the National Fire Code of Canada.

15 Alarm and Detection Systems

15.1 Fire Alarm Systems

15.1.1 Fire alarm systems shall be installed in accordance with CAN/ULC-S524, Installation of Fire Alarm Systems, in relocatable buildings providing dining facilities for more than 100 persons.

Note: See Annex C.

15.1.2 Continuity of fire alarm systems shall be maintained between relocatable buildings separated by an enclosed walkway.

15.1.3 Where a fire alarm system is installed, air-handling systems shall be designed to shut down in order to prevent the circulation of smoke upon a signal from the fire alarm system if the air-handling system serves spaces other than a single sleeping room.

15.2 Fire Detectors

15.2.1 Except for sprinklered floor areas, where a fire alarm system is installed, fire detectors, shall be placed in each service room, janitor room, storage room, kitchen and clothes drying area, and rooms where hazardous substances are used or stored.

15.3 Smoke Detectors

15.3.1 Where a fire alarm system is installed, smoke detectors shall be installed in every corridor serving sleeping rooms.

15.3.2 Smoke detectors interlocked with the fire alarm system shall be installed in enclosed walkways adjoining buildings where a fire alarm system is installed.

15.4 Carbon Monoxide Alarms

15.4.1 Where a fuel-burning appliance is installed in a relocatable building with sleeping rooms, a carbon monoxide alarm shall be installed inside each sleeping room.

15.4.2 Combination smoke and carbon monoxide alarms are permitted.

15.5 Smoke Alarms

15.5.1 In buildings with sleeping rooms where no fire alarm system is installed:

a) a smoke alarm shall be installed in each sleeping room;

b) not less than one smoke alarm shall be installed in corridors serving the sleeping rooms; and

c) the smoke alarms in the sleeping rooms and corridors serving the sleeping rooms shall be interconnected so that the activation of any one smoke alarm causes all smoke alarms within the building to sound.

Note: See Annex C.

16 Electrical

16.1 Receptacles in Sleeping Rooms

16.1.1 Not less than 2 duplex receptacles shall be installed in each sleeping room.

17 Heating and Ventilation

17.1 Means of Securement

Note: Heating, ventilation and air-conditioning appliances should be secured when the relocatable building is being transported.

17.2 Ducts for Space Heating and Building Ventilation Systems

17.2.1 Main trunk ducts for space heating and ventilation systems shall be constructed of galvanized steel.

Note: See Annex C.

17.3 Space Heating

17.3.1 Design

17.3.1.1 In relocatable buildings not for public use, space heating equipment shall be capable of maintaining a minimum temperature of 20° C within a relocatable building at the 2.5% January mean design temperature.

17.4 Circulation of Heating and Ventilation Air

17.4.1 More than one sleeping room is permitted to be heated or cooled by a single forced-air heating, ventilation or cooling system provided

a) the sleeping rooms and the heating, ventilation or air-conditioning system are wholly contained in the same single module;

b) supply and return air systems in sleeping rooms are ducted.

Note: See Annex C.

17.5 Building Ventilation

17.5.1 Supply

17.5.1.1 Outdoor air shall be supplied to relocatable buildings for ventilation purposes in accordance with one of the following Sections of ANSI/ASHRAE 62.1, "Ventilation for Acceptable Indoor Air Quality", as a minimum:

a) Section 6.2, Ventilation Rate Procedure, excluding the exception stated in Section 6.2.7.1.2 and note H of Table 6.2.2.1,

b) Section 6.3, Indoor Air Quality Procedure, or

c) Section 6.4, Natural Ventilation Procedure, excluding residential occupancies.

17.5.2 Exhaust

17.5.2.1 Exhaust ventilation shall be provided in accordance with Section 6.5, Exhaust Ventilation, of ANSI/ASHRAE 62.1, "Ventilation for Acceptable Indoor Air Quality", as a minimum.

17.5.3 Screens

17.5.3.1 A relocatable building used for eating, cooking or sleeping shall have screens over openable windows to prevent the entrance of flies and other insects.

17.6 Kitchen Ventilation

17.6.1 Except as provided in 17.5.2 and 17.5.3, every kitchen containing commercial cooking equipment used in processes producing smoke or grease-laden vapours shall be equipped with a mechanical exhaust system conforming to NFPA 96, Ventilation Control and Fire Protection of Commercial Cooking Operations.

17.6.2 A demountable exhaust extension may be used if the connection is exposed and is grease-tight.

17.6.3 A sidewall fan may be used in combustible construction.

18 Plumbing

18.1 Means of Securement

Note: Service water heaters and vessels should be secured when the relocatable building is being transported.

18.2 Sewage Disposal

Note: See Annex C.

18.2.1 Septic Tanks and Sewage Holding Tanks

18.2.1.1 Septic tanks and sewage holding tanks shall comply with CSA B66, “Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks”.

18.3 Number of Facilities and Fixtures

18.3.1 18.3.2 and 18.3.3 apply to industrial sites with relocatable buildings with sleeping rooms.

18.3.2 The number of fixtures in a washroom shall be based on the number of persons using that washroom and, if persons of each sex are to be accommodated, a separate washroom shall be provided for each sex.

18.3.3 The site shall be provided with:

a) water closets on the basis of

i) 1 unit for every 5 persons or part thereof up to 15 persons,

ii) 1 unit for every 15 persons or part thereof in excess of 15 persons up to 54 persons, and

iii) in accordance with the NBC for persons in excess of 54;

b) urinals in washrooms for males on the basis of 1 unit for every 25 persons or part thereof

c) lavatories on the basis of 1 unit for every 5 persons or part thereof;

d) showers or tub baths on the basis of 1 unit for every 11 persons or part thereof; and

e) laundry facilities.

19 Building Envelope

19.1 Compliance

19.1.1 Relocatable buildings are permitted to comply with the building envelope requirements provided in NBC Part 9 regardless of building size or use.

19.2 Roof Ventilation

19.2.1 Cathedral ceilings and flat roofs shall not be required to be vented.

19.3 Insulation

19.3.1 Insulation shall be installed so that it cannot become dislodged during transportation.

19.3.2 Where multi-module buildings are designed for rapid deployment, insulation installed at the connections between modules shall be of a type that will accommodate differential movement so as to maintain continuity of the insulation.

Note: See Annex C.

19.4 Airtightness

19.4.1 Where multi-module buildings are designed for rapid deployment, insulated blankets installed at the connections between modules are deemed to comply with the NBC requirements for continuity of air barrier systems provided the blanket

a) complies with the airtightness requirement for materials serving as the airtight element of an air barrier system, and

b) is connected to the airtight materials of the air barrier system in the adjoining modules by a means providing a level of airtightness not less than a continuous strip of hook and loop.

Note: See Annex C.

20 Energy Efficiency

Note: See Annex C.

20.1 Compliance

20.1.1 Relocatable buildings are permitted to comply with the energy efficiency requirements provided in NBC Section 9.36, regardless of building size or use.

20.2 Building Envelope

20.2.1 Thermal Performance of Opaque Elements

Note: See Annex C.

20.2.1.1 Except as provided in 20.2.1.2 to 20.2.1.5, the minimum effective thermal resistance of walls, ceilings and floors separating conditioned space from unconditioned space or exterior air shall comply with

a) Table 20.2.1.1-A where a heat recovery ventilator (HRV) is not installed; or

b) Table 20.2.1.1-B where a heat recovery ventilator (HRV) is installed.

Note: See Annex C.

Table 20.2.1.1-A
Effective Thermal Resistance for Above-Ground Opaque Assemblies, without HRV, except WSRBs

	Heating Degree Days at Building Installation location					
	Zone 4 < 3000	**Zone 5 3000 to 3999**	**Zone 6 4000 to 4999**	**Zone 7A 5000 to 5999**	**Zone 7B 6000 to 6999**	**Zone 8 > 7000**
	Minimum Effective Thermal Resistance, (m^2 °K)/W					
Cathedral ceilings, and flat and nominally flat roofs*	4.67	4.67	4.67	4.76	4.76	4.76
Roof-ceiling assemblies with attics	6.91	8.67	8.67	10.43	10.43	10.43
Walls	3.08	3.08	3.08	3.08	3.08	3.08
Floors over unheated space	4.67	4.67	4.67	5.61	5.61	5.61
* Nominally flat roofs are roofs with only sufficient slope to drain.						

Table 20.2.1.1-B
Effective Thermal Resistance for Above-Ground Opaque Assemblies, with HRV, except WSRBs

	Heating Degree Days at Building Installation location					
	Zone 4 < 3000	**Zone 5 3000 to 3999**	**Zone 6 4000 to 4999**	**Zone 7A 5000 to 5999**	**Zone 7B 6000 to 6999**	**Zone 8 > 7000**
	Minimum Effective Thermal Resistance, (m^2 °K)/W					
Cathedral ceilings, and flat and nominally flat roofs*	4.67	4.67	4.67	4.76	4.76	4.76
Roof-ceiling assemblies with attics	6.91	6.91	8.67	8.67	10.43	10.43
Walls	2.97	2.97	2.97	2.97	3.08	3.08
Floors over unheated space	4.67	4.67	4.67	5.02	5.02	5.02
NOTE : * Nominally flat roofs are roofs with only sufficient slope to drain.						

20.2.1.2 For WSRBs, the minimum effective thermal resistance of walls, ceilings and floors separating conditioned space from unconditioned space or exterior air shall comply with Table 20.2.1.2.

Table 20.2.1.2
Effective Thermal Resistance for Above-Ground Opaque Assemblies for WSRBs

	Without HRV	With HRV
	Minimum Effective Thermal Resistance, (m^2 °K)/W	
Cathedral ceilings, and flat and nominally flat roofs*	4.76	4.76
Roof-ceiling assemblies with attics	10.43	10.43
Walls	3.08	3.08
Floors over unheated space	5.61	5.02
Note: * Nominally flat roofs are roofs with only sufficient slope to drain.		

20.2.1.3 The thermal resistance of nominally flat roofs is deemed to comply with Table 20.2.1.1-A and Table 20.2.1.1-B and Table 20.2.1.2 where:

a) the roof assembly is constructed with 38 mm x 240 mm lumber roof joists tapered to not less than 38 mm x 190 mm and spaced not less than 406 mm o.c.; and

b) the thermal insulation is 1 or more layers of glass fibre batt compressed to fit the joist spaces as follows

i) here the specified minimum effective thermal resistance is RSI 4.76, 3 layers with a nominal thermal resistance of 2.11 (R12) per batt,

ii) there the specified minimum effective thermal resistance is RSI 4.67,

A) a single layer with a nominal thermal resistance of 5.46 (R31),

B) 3 layers with a nominal thermal resistance of 2.11 (R12) per batt, or

C) 2 layers with a nominal thermal resistance of 2.11 (R12) per batt for a maximum 1.2 m measured from the shallow side of the roof and 3 layers for the remainder.

Note: The installation using RSI 5.46 batts provides an average nominal thermal resistance of 4.93 (R28). The installations using multiple layers of RSI 2.11 batts provide average nominal thermal resistances between 5.33 (R30.3) for 4.27 m-wide (14'-wide) roofs, and 5.55 (R31.5).

20.2.1.4 Except as provided in clause 20.2.1.5, a reduction in the effective thermal resistance of roof-ceiling assemblies with attics under sloped roofs is permitted for a length no greater than 1 200 mm but only to the extent imposed by the roof slope and minimum venting clearance, provided the nominal thermal resistance of the insulation directly above the exterior wall is not less than 3.52 (m^2·K)/W.

20.2.1.5 The thermal resistance of roof-ceiling assemblies with attics may be reduced to not less than 3.52 (m^2·K)/W for a distance not greater than 1500 mm where:

a) the relocatable building is installed in climate zone 7B or 8;

b) the roof has a slope of 4/12 or less; and

c) it is impractical due to the structural features of the building and transportation height limitations to comply with the specified minimum level with the exception provided in 20.2.1.4.

Note: See Annex C.

20.2.2 Skylights

20.2.2.1 Skylights shall not be installed in relocatable buildings.

Note: See Annex C.

20.2.3 Airtightness

Note: See Annex C.

20.2.3.1 Except as provided in 20.2.3.2, relocatable buildings shall comply with the prescriptive airtightness requirements provided in NBC 2015 9.36.2.9 and 9.36.2.10.

20.2.3.2 Where multi-module buildings are designed for rapid deployment, insulated blankets installed at the connections between modules are deemed to comply with the air tightness requirements provided

a) the interior surface of the blanket complies with the material airtightness requirements, and

b) the blanket is fastened, by a means providing a level of airtightness not less than a continuous strip of hook and loop, to materials in the adjoining modules that provide airtightness.

Note: See C19.4.1.

20.2.3.3 Relocatable buildings shall not be required to be tested for airtightness.

20.3 Lighting

20.3.1 Except as provided in 20.3.2 and 20.3.3, relocatable buildings shall not be required to comply with lighting power or control requirements.

Note: See Annex C.

20.3.2 Lighting power density shall not exceed:

a) 5.1 W/m^2 for sleeping rooms in dormitory buildings

b) 10.5 W/m^2 in washrooms

c) 6.5 W/m^2 in laundry areas

d) 7.1 W/m^2 in corridors and enclosed walkways

e) 7.0 W/m^2 in dining halls

f) 13.1 W/m^2 in food preparation areas

g) 4.6 W/m^2 in electrical/mechanical rooms

20.3.3 Lighting power shall not exceed 98 W/m of door width at entrances

20.4 Electrical Power Systems and Motors

20.4.1 Relocatable buildings shall not be required to comply with NECB requirements for electrical power systems and motors.

Note: See Annex C.

20.5 Space Heating

20.5.1 Fuel-fired forced air furnaces need not have a minimum annual fuel utilization efficiency (AFUE) greater than 82%.

Note: See Annex C.

20.6 Service Water Heating

20.6.1 The efficiency of fuel-fired service water heaters need not exceed the levels specified in NBC 2015 Section 9.36.

Note: See Annex C.

21 Connection of Modules in Multiple-Module Buildings

21.1 Compliance

21.1.1 Except as provided in 12.1.2.3, 13.3.1, 19.4.1 and 20.2.3.2, where relocatable buildings consist of more than one module, the modules shall be joined to maintain continuity of all constructions and services.

Note: See Annex C.

21.1.2 Where a relocatable building consists of more than one module and the building is installed surface foundations on moisture-susceptible soil, junctions between modules shall be designed and constructed to accommodate differential movement without damage.

Note: See Annex C.

22 Instructions and Marking

Note: See Annex C.

22.1 Instructions

22.1.1 Except as provided in 22.1.2, instructions or engineering drawings shall be provided in accordance with CSA A277, Procedure for Certification of Prefabricated Buildings, Modules and Panels.

22.1.2 Instructions for tie-downs, anchorage and other site-site specific instructions shall not be required.

Note: See Annex C.

22.2 Marking

22.2.1 Certification Labels

Note: See Annex C.

22.2.1.1 Single-module relocatable buildings shall be marked in accordance with the requirements of CSA A277, Procedure for Certification of Prefabricated Buildings, Modules and Panels that address

a) building compliance marking, and

b) labels and stamps.

22.2.1.2 Modules for multi-module relocatable buildings shall be marked in accordance with the requirements of CSA A277, Procedure for Certification of Prefabricated Buildings, Modules and Panels that address

a) module and panel compliance marking, and

b) labels and stamps.

22.2.1.3 Certification labels shall be installed on the outside of the relocatable module.

Note: See C22.2.2.6.

22.2.2 Module Nameplates

22.2.2.1 Relocatable building modules shall be clearly and permanently identified with a Nameplate showing the following information:

a) whether the module is new or has been modified;

b) name and address of the manufacturer and, where the module has been modified, the manufacturer responsible for the modifications;

c) editions of CAN/UL 2600 and NBC to which the module complies;

e) occupancy;

f) unit serial number;

g) project identifier number if applicable;

h) date of manufacture or, where the module has been modified, the date of modification;

j) electrical ratings – amps, volts, phases, and hertz; and

k) location within the module/building of the specification sheet.

22.2.2.2 Where a module is modified, an additional nameplate shall be installed reflecting the changes to the module after modification.

Note: See also Section A3.

22.2.2.3 For nameplates, modules are considered to be modified when any information provided on the specification sheet or nameplate needs to be changed to reflect the modification, except where appliances are replaced with new appliances that have the same capacity and use the same type of energy.

Note: See Annex C and also Section A3.

22.2.2.4 Nameplates shall:

a) for new modules

i) comply with Annex B Figure 1, and

ii) be red in colour or incorporate a bold red border; and

b) for modified modules

i) comply with Annex B Figure 2, and

ii) be green in colour or incorporate a bold green border.

22.2.2.5 Nameplates shall comply with the requirements for labels and stamps in CSA A277, Procedure for Certification of Prefabricated Buildings, Modules and Panels.

22.2.2.6 Nameplates shall be located on the outside of the module.

Note: See Annex C.

22.2.3 Specification Sheet

22.2.3.1 Specification sheets shall be provided in accordance with CSA A277, Procedure for Certification of Prefabricated Buildings, Modules and Panels.

22.2.3.2 Specification sheets shall be updated for modified relocatable modules.

22.2.3.3 For specification sheets, modules are considered to be modified when any information provided on the specification sheet needs to be changed to reflect the modification.

Note: See also Section A3.

22.2.3.4 A specification sheet shall be permanently affixed on the inside of relocatable modules in a location that will be readily visible or accessible before and after completion of the building.

Note: See Annex C.

22.2.3.5 Where more than 2 modules make up a relocatable building, a plan view of the building identifying the modules and their respective nameplate serial numbers shall be available to the authority having jurisdiction and the installer.

ANNEX A
Certification

(Normative)

A1 Purpose

Annex A provides information for regulators, owners, and the local authority having jurisdiction on administrative issues specific to relocatable buildings.

A2 Required Certification

A2.1 Relocatable buildings shall be certified by an accredited certification body.

A2.2 Certification of single-module relocatable buildings constructed on with running gear shall include confirmation of compliance with the applicable transportation regulations.

A3 Modified Relocatable Modules and Buildings

A3.1 To maintain certification, major modifications shall be carried out by:

a) a certified manufacturer;

b) trades contracted by a certified manufacturer; or

c) trades certified to modify relocatable buildings.

Note 1: As with new construction, modifications must be done by qualified personnel. Where major modifications are carried out by a certified manufacturer or certified trades, they are subject to normal inspections and audits by the certification body. Where major modifications are carried out under contract, the manufacturer and the contractor are responsible for compliance. In all cases, installation of the modified building or module is subject to permitting by the local authority.

Note 2: Certification of trades may not be an available option in all regions.

A3.2 Major modifications shall include all changes that would normally require permitting including changes to:

- occupancy;
- structural elements, excluding normal repairs to materials and components;
- elements affecting means of egress, excluding repair or replacement of doors and hardware;
- elements providing fire protection, excluding normal replacement of fire hoses, nozzles and extinguishers, replacement of smoke alarms and carbon monoxide alarms, and repair or replacement of skirting;
- electrical systems, excluding replacement of fixtures;
- HVAC systems, excluding replacement of equipment with the same capacity;
- plumbing systems, excluding normal repairs, replacement of fixtures, and replacement of tanks or equipment of the same capacity;
- building envelope assemblies, excluding normal repairs and replacement of materials and components providing the same level of performance.

Note 1: Major modifications do not include normal maintenance, repairs and replacements, such as replacement of light fixtures or heating equipment with the same capacity. Normal maintenance, repairs and replacements do not trigger the requirement for a

nameplate indicating modification. These can be carried out by persons other than the original manufacturer provided they are deemed to be qualified by the owner of the relocatable building.

Note 2: In-house quality assurance, and audits and inspections by the certification body, apply equally to major modifications. The manufacturer's modification process should be documented in the quality manual including identification of persons responsible for the work.

ANNEX B
Relocatable Module Nameplates

(Normative)

(See also C22.2.2.3 and C22.2.2.6)

B1 Nameplate for New Modules

Relocatable Module/Building NEW				**Module/Bâtiment Rélocalisable** NOUVEAU	
Manufacturer name		**Nom du fabricant**		**Complies with: CAN/UL 2600** year/année	**Conforme à : CAN/UL 2600**
Project identifier	**Identification du projet**	**Occupancy**	**Usage**	**NBC** year/année	**CNB**
Serial number	**Numéro de série**	**Electrical**	**Électrique**	**Location of specification sheet**	**Emplacement de la notice technique**
		Volts	Volts		
		Amps	Ampère		
		Phase	Phase		
		Hertz	Hertz		

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B2 Nameplate for Modified Modules

Relocatable Module/Building **Module/Bâtiment Rélocalisable**

MODIFIED **MODIFÉ**

Modifier name			**Nom du modificateur**	**Complies with: CAN/UL 2600**	**Conforme à : CAN/UL 2600**
Project identifier	**Identification du projet**	**Occupancy**	**Usage**	year/année **NBC**	**CNB**
Serial number	**Numéro de série**	**Electrical**	**Électrique**	year/année **Location of specification sheet**	**Emplacement de la notice technique**
		Volts	Volts		
		Amps	Ampère		
		Phase	Phase		
		Hertz	Hertz		

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ANNEX C
Explanatory Information

(Informative)

C1.1 Relocatable Buildings

Relocatable buildings are constructed as modules in an offsite facility. The modules are designed and constructed to be transported to the location where they are to be used. At the installation location, the buildings are generally required to be placed on foundations, multiple-module buildings are assembled, and services are hooked-up. Modules may be used in many different locations in different configurations over their service lives.

Because this standard applies to buildings that are not meant to remain in one place for an extended period, it includes a few requirements that are dependent on duration of use in a single location. Depending on the purpose of the building, use in one location could be for a week, six months or a year or more before the building is moved to a different location. The standard is intended to be applied to buildings that remain in one location for not more than five years. The actual duration of use in any one location will be regulated by the authority having jurisdiction. See Section D3.1.

C1.2 Application Depending on Occupancy

Relocatable buildings are used for many purposes including:

- temporary accommodation for workforces, often at remote sites;
- offices including construction site offices;
- classrooms;
- banks;
- restaurants;
- motels;
- emergency accommodations and command posts;
- blast buildings;
- storage;
- special events facilities.

See Figure C1.2.

Figure C1.2
Examples of Relocatable Buildings

a) Remote workforce accommodation. Victoria Gold Camp, Yukon. Photo courtesy of JDS Mining.

b) First aid unit. Photo courtesy of Alta-Fab Remote Modular Solutions.

c) Remote workforce accommodation. Photo courtesy of Alta-Fab Remote Modular Solutions.

d) Laboratory building. Photo courtesy of Alta-Fab Remote Modular Solutions.

e) Drill camp. Photo Courtesy of ATCO.

f) Offices for Union station Renovation, Toronto. Photo Courtesy of ATCO.

g) Offices for 2010 Vancouver Olympics. Photo Courtesy of ATCO.

h) Golf Course Clubhouse. Photo Courtesy of ATCO.

i) Special events facility Global Petroleum Show VIP Lounge. Photo Courtesy of ATCO.

j) Flood Relief Camp, Calgary 2013. Photo Courtesy of ATCO.

The standard applies to buildings that provide sleeping accommodation except for buildings containing dwelling units. Those buildings must comply with the applicable requirements in Parts 3 to 7 or Part 9 of the building code/regulation in force at the installation location, or with CSA Z240 MH Series, “Manufactured Homes” where that standard is referenced in the applicable code/regulation.

C1.5 Subjects Addressed

This standard follows the model of building codes in Canada and provides requirements that reflect minimum acceptable levels of performance specific to relocatable buildings for temporary use.

Safe use of relocatable buildings, particularly those in remote locations, depends on appropriate operation and maintenance. Information for regulators, owners and operators is provided in Annex F, Operation and Maintenance.

While requirements for instructions and marking are administrative, they are common to many product standards and facilitate determination of compliance. See also D4.5 regarding markings review.

The standard does not provide vehicular requirements for single-module relocatable buildings constructed with running gear. Vehicular elements must comply with the applicable provincial-territorial transportation regulations.

C4 Glossary

C4.7 Public Use

Examples of relocatable buildings that are designed for public use include schools, banks, restaurants, motels and special events buildings. Examples of buildings that are not designed for public use include those used by workers on drilling and other resource industry sites.

C4.8 Rapid Deployment Buildings

Rapid deployment buildings are used on projects where a work force is on a single site for a short period. They are used for projects such as pipeline construction where the building is moved along the pipeline as work proceeds – removed from one site when the crew goes to work and re-installed further along the pipeline and ready for occupancy at the end of the shift. See Figure C4.8.

Constructions specific to these buildings have been developed to facilitate rapid installation, removal, relocation and re-installation. See clauses 7.2.1, 8.3.1, 11.2.1, 12.1.2.2, 13.3.1, 19.3.2, 19.4.1, and 20.2.3.2 and corresponding Annex C notes.

Building services – electrical including fire alarm systems and communications, water, sewage and gas – are typically designed to have quick connections to allow for rapid connect/disconnect and flexibility to accommodate differential movement between modules.

Figure C4.8

Rapid Deployment Building on Skids – Travers Drill Camp

Photo Courtesy of ATCO.

C5.1 Compliance

The provisions of this standard address issues specific to relocatable buildings. As such, they provide requirements in addition to those in the NBC, or exceptions to requirements in the NBC or NECB that may provide more or less stringent criteria.

In some cases, it may appear that provisions repeat requirements that are in the NBC. This occurs where the Code requirement does not apply to both Part 9 and non-Part 9 buildings and is provided in the standard to apply to all relocatable buildings.

The National Building Code references the National Plumbing Code, the Canadian Electrical Code and numerous other codes and standards. Unlike other standards referenced in the national model codes, the requirements in this standard are meant to take precedence over those in the NBC, NECB and other standards referenced in those codes. For the requirements of the standard to apply, this variation in precedence must be reflected in Division A, Article 1.5.1.1, Application of Referenced Documents of the NBC and NECB or the corresponding provision in provincial territorial codes/regulations where the standard is referenced.

C6 Structural Design

C6.1.1 Design to Part 4

With three exceptions, relocatable buildings are required to be designed to NBC Part 4. Two exceptions are provided in Section 6, Structural Design; the third is provided in 7.2, Foundations. These are discussed below.

C6.1.2 Transport Loads

The effect of forces during transportation, such as head and cross winds, and rough terrain can be more than the design loads imposed on the building in its service condition. It is important to take special care when designing the structural elements of the modules to ensure safe transport and structural integrity of the building through frequent relocation.

C6.2.1.1 Snow Loads

By requiring all relocatable modules to be designed to meet a minimum of 2.0 kPa specified roof live load, those modules may be installed in 533 of the 679 locations described in Appendix C of the 2015 NBC. Relocatable buildings must have adequate live load roof capacity to resist the effects of snow, rain and drifting snow at the installation location.

Design for drifting snow must address known elements such as HVAC equipment, parapets, etc. at the time of manufacture. Drift shadow from other buildings and landscape are not always known at the time of manufacture and the owner must ensure that they are taken into account when locating the building at the site.

C6.2.2.1 Wind Loads

By requiring all relocatable modules to be designed to resist a minimum 1-in-50 hourly wind pressure of not less than 0.7 kPa, those modules may be installed in 659 of the 679 locations described in Appendix C of the 2015 NBC. Relocatable buildings must be designed to resist the 1-in-50 hourly wind pressure at the installation location. Transportation loads imposed on the building may be higher and must be taken into account when designing the building.

C6.2.3.1 Earthquake Loads

By permitting single-module relocatable buildings to be designed to resist a minimum seismic spectral response acceleration Sa(0.2) of 1.8, those buildings may be installed in all of the 679 locations described in Appendix C of the 2015 NBC.

C7 Site Preparation, Foundations and Anchorage

C7.1 Site Preparation

C7.2 Foundations

As with other buildings, most transportable structures must be installed on foundations in accordance with the applicable building regulations. Depending on the properties of the structure and the soil, these may be surface foundations or foundations that extend below frost, point load foundations or full-perimeter foundations. See Figure C7.2.

Figure C7.2

Dormatory Units on Screw Piles

Photo courtesy of Alta-Fab Remote Modular Solutions.

C7.2.1 Option to Foundations described in NBC Part 4

Pier Foundations Complying with CSA Z240.10.1

The building criteria provided in 7.2.2 are consistent with the application of CSA Z240.10.1 and requirements in NBC Part 9 with respect to soil conditions.

Rapid Deployment Buildings

Installation of rapid deployment buildings on foundations is inconsistent with the concept of rapid deployment. (See also C4.8). Rapid deployment buildings are designed and constructed for rough usage. Deformation resistance allows the buildings to be used without damage when they are not evenly supported. Because these buildings are used to provide very basic shelter, a lower level of performance is acceptable.

Rig mats are portable platforms that were developed for the resource industry to support drilling rigs. Their use has expanded to include support of buildings and other types of equipment, and to serve as temporary roads. See Figure C7.2.1.

Figure C7.2.1

Dormitory building on rig mats

Photo courtesy of Alta-Fab Remote Modular Solutions.

C8 Crawl Spaces

C8.1 Compliance

In addition to requirements for access, ventilation and clearance, NBC Section 9.18 requires that, unless it can be shown to be unnecessary, ingress of water into a crawl space must be controlled by grading or drainage. 8.2 provides an exception to the access and vent opening requirements where skirting is not installed.

C8.2 Access Openings and Ventilation for Crawl Spaces with Skirting

NBC Section 9.18 requires that crawl spaces with skirting have an access opening of not less than 500 mm by 900 mm and the opening must be fitted with a door or hatch and be ventilated by natural or mechanical means. Where a skirted crawl space is ventilated by natural means, NBC Section 9.18, requires the unobstructed vent area to be not less than 0.1 m^2 for every 50 m^2 of floor area and the vents to be uniformly distributed on opposite sides of the building and designed to prevent the entry of snow, rain and insects.

C9 Barrier-Free Design and Ceiling Height

C9.1 Barrier-Free Design

Relocatable buildings for public use are required to be barrier-free. Some relocatable buildings not for public use have been constructed in accordance with barrier-free requirements and this is encouraged. It is recognized, however, that there are situations, as on some industrial or construction sites, where barrier-free accessibility may not be practical for all relocatable buildings. The industry is reviewing its products and their installation to determine where relocatable buildings not for public use should be required to be barrier-free.

C10 Stairs, Ramps, Handrails and Guards

C10.5 Landings

While relocatable buildings have been built in the past without landings at the top of exterior stairs, this presents a significant safety hazard. Relocatable buildings must comply with the NBC in this regard.

C11 Means of Egress

C11.1 Walkways as Means of Egress

Walkways may be used as a required means of egress where these lead to a separate building, an open thoroughfare, or an exterior open space protected from fire exposure from the building of fire origin and having access to an open thoroughfare.

C11.1.5 Service Rooms

Where a walkway does not serve as a required means of egress, the NBC provides no restrictions on service rooms opening into the walkway.

C11.4.1 Service and Janitor Room Doors

Doors to service rooms and janitors' rooms may need to open outward due to inherent space limitations in relocatable buildings. Doors to storage rooms opening into a corridor or to a room or space of assembly occupancy must open inward.

The NBC requires self-closing and latching devices on these doors. Where there is a risk of service or janitor rooms being used for general storage, signage indicating that this is not permitted is preferable to locking. If locks are installed, keys should be readily available to allow fast access in the case of an emergency.

C12 Fire Protection in Buildings

C12.1.1 Penetrations through Rated Assemblies

NBC Part 3 references CAN/ULC-S115 which provides a range of ratings for fire stops. NBC Part 3 specifies minimum ratings.

C12.1.2 Fire Protection between Rooms and Spaces

Table 12.1.2. Corridors and Remainder of Building

Where a relocatable building is not for public use, the corridors are not public corridors. The NBC does not require non-public corridors to be separated from the rest of the building. The standard, however, requires a level of performance equivalent to that of the NBC for public corridors.

Table 12.1.2 Walls Separating Sleeping Rooms

While walls between sleeping rooms are required to be rated, they are not required to be constructed as fire separations. No continuity of separation is required at the ceiling and ceilings are not required to be rated in one story-buildings.

C12.1.2.3 Continuity of Fire Protection in Multi-Module Rapid-Deployment Buildings

The connections between modules in multi-module rapid deployment buildings that are not installed on foundations are soft connections to allow for differential movement. Continuity of fire protection at these connections is not practical. Other requirements, such as reduced travel distance, balance the reduced level of fire safety. See also C13.2.2.

C12.1.2.4 Openings in walls of sleeping rooms

Openings in these walls are permitted only for ducts for heating and ventilation as provided in 17.4.1.

C12.2 Flame Spread Ratings in Corridors

Where a relocatable building is not for public use, the corridors are not public corridors. The NBC does not require walls and ceilings of non-public corridors to have a flame spread rating.

C12.3.2 Smoke Dampers

Smoke dampers are required in non-Part 9 buildings; they are not required in Part 9 buildings.

C13 Spatial Separation

C13.1 Clear Spaces within Limiting Distance

Aside from stairs and landings serving required exist, no structures or services are permitted within the areas defined by the limiting distance between relocatable buildings. This includes but is not limited to accessory buildings and decks.

C13.2 Spatial Separation – General

C13.2.2 Fire-Resistance Rating for Exposing Building Faces and Walls Above Exposing Building Faces

Exterior wood frame walls will provide a 45 min fire resistance rating when constructed with:

- studs spaced not more than 400 mm o.c., and
- 1 layer of 12.7 mm Type X gypsum board

The fire resistance rating can be increased to 1 h where:

- 15.9 mm Type X gypsum board is used, or
- the stud space is filled with preformed insulation of rock or slag fibres conforming to CAN/ULC-S702, “Mineral Fibre Thermal Insulation for Buildings,” and with a mass per unit area of not less than 1.22 kg/m^2 of wall surface.

Joints are not required to be finished (taped or mudded).

(Ref. NBC Appendix D Tables D-2.3.4.-A, D-2.3.4.-E and D-2.3.4.-G)

C13.2.3 Limiting Distance and Unprotected Glazed Opening Area

The 5 m limiting distance where a relocatable building faces another relocatable building, and where the glazed area is not more than 15% of the exposing building face, is provided as an option for simplicity; it may be greater than required by the NBC. Where the minimum 5 m limiting distance applies, there must be a minimum 10 m between relocatable buildings. See Figure C13.4.3-A.

C13.3.1 Exception to Continuity of Fire Resistance Rating for the Exposing Building Face of Multi-Module Rapid-Deployment Buildings

The connections between modules in multi-module rapid deployment buildings that are not installed on foundations are soft connections to allow for differential movement. Continuity of fire protection at these connections is not practical. Other requirements balance the reduced level of fire safety.

C13.4.3 Reduced limiting distance between buildings abutting walkways

Where a relocatable building abuts a walkway and the exposing building face is constructed with additional fire protection, the limiting distance is permitted to be less than 5 m. See Figure C13.4.3-A and Figure C13.4.3-B.

Figure C13.4.3-A

Example configurations of relocatable buildings connected by a walkway.

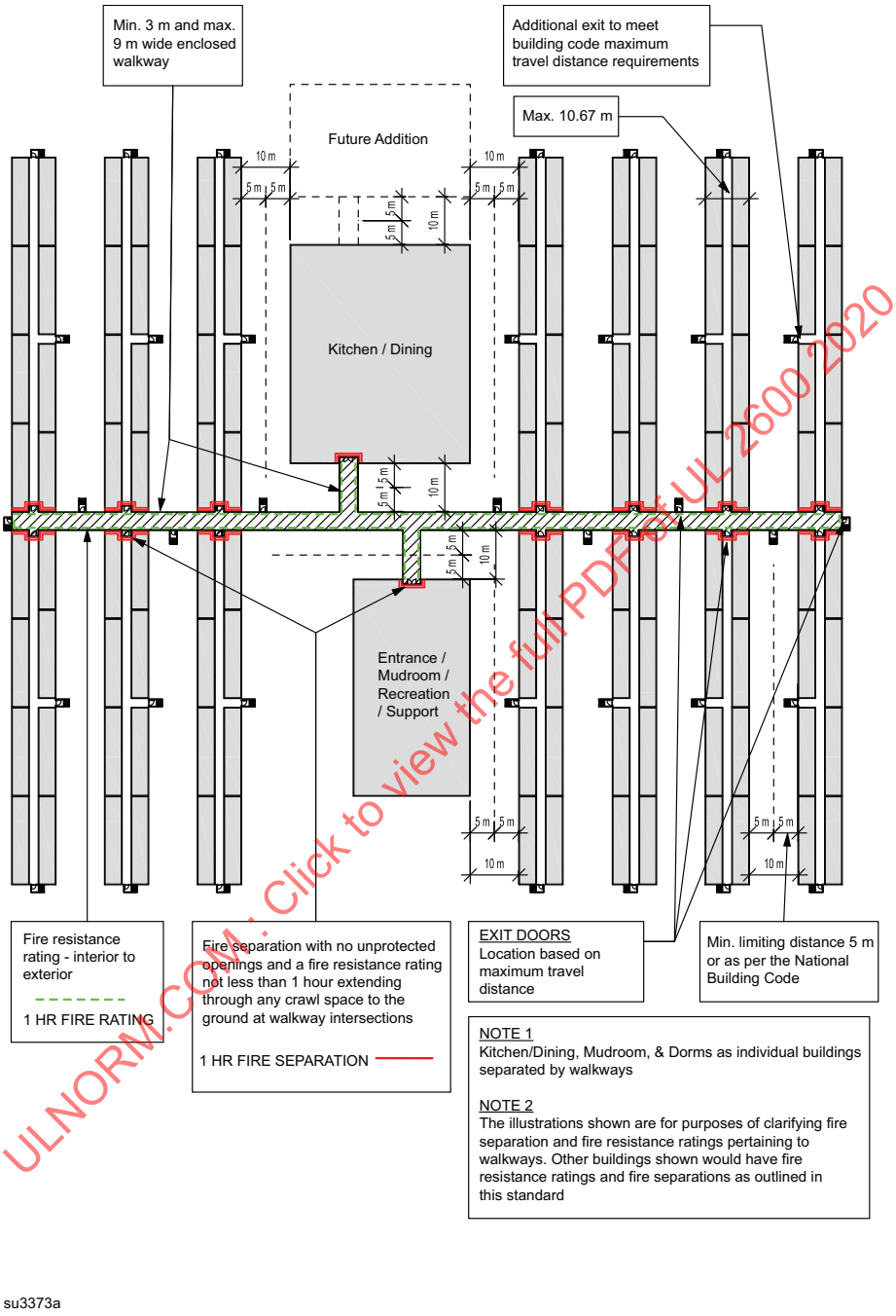


Figure C13.4.3-A(a)

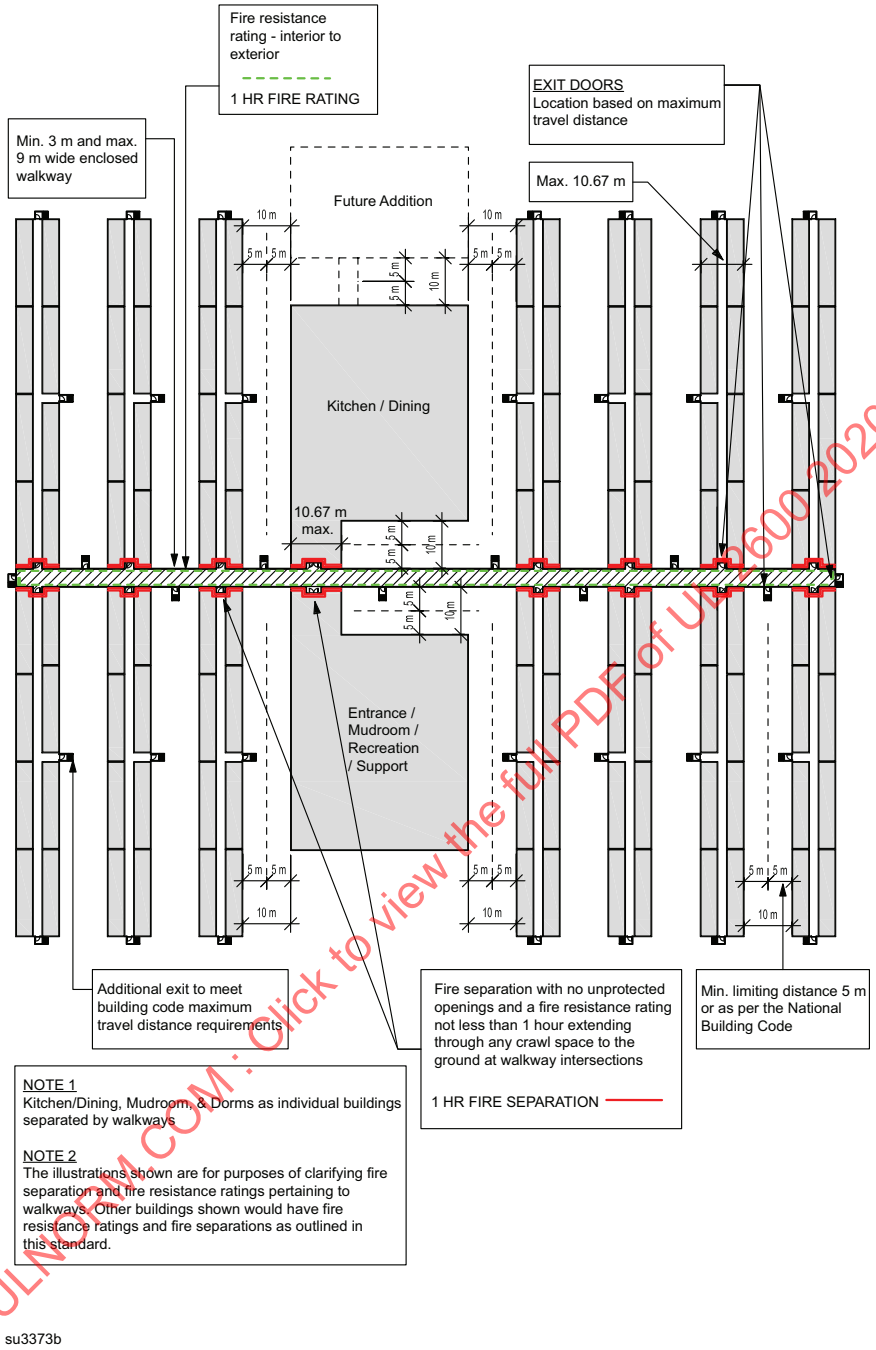


Figure C13.4.3-A(b)

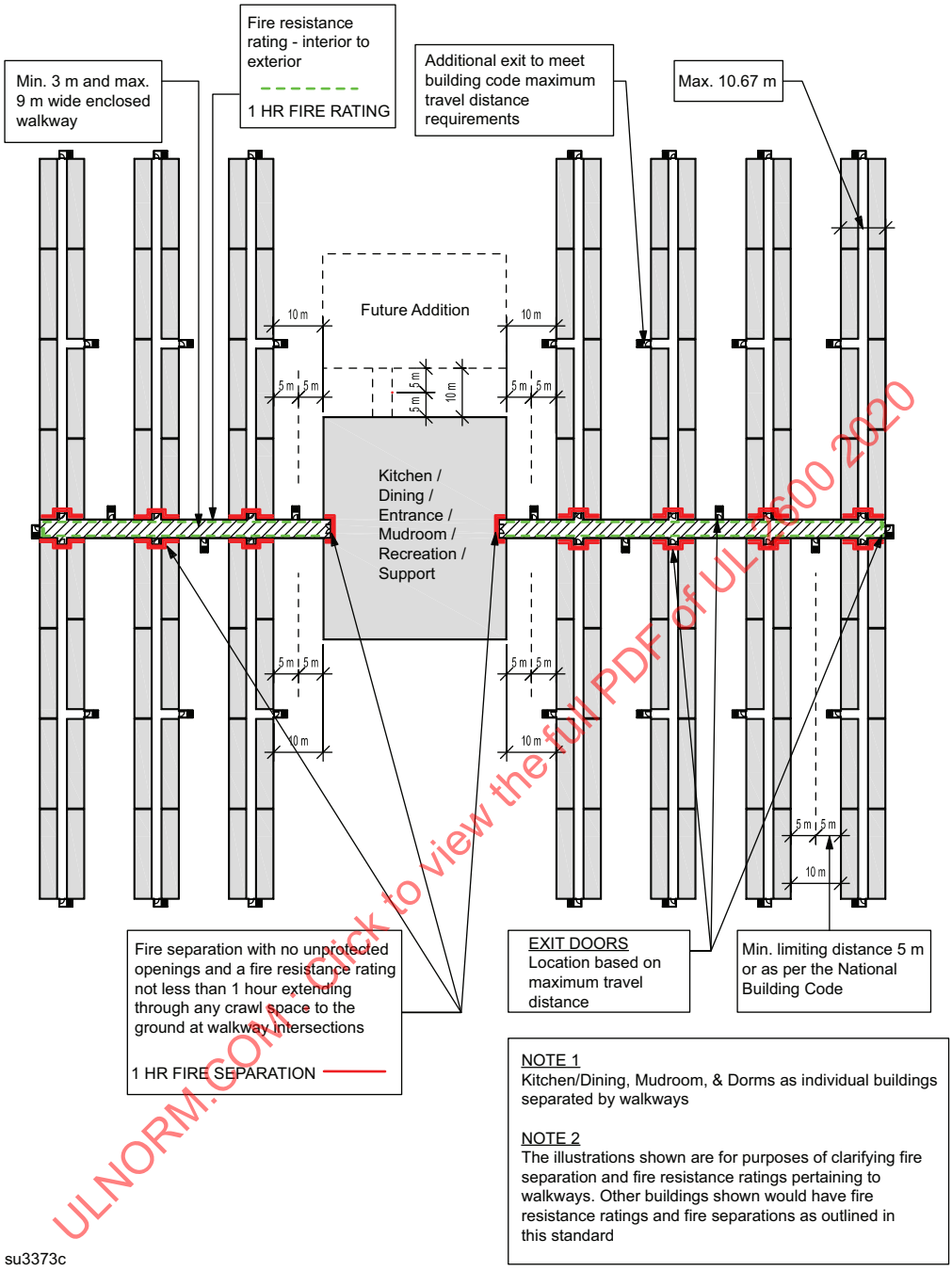
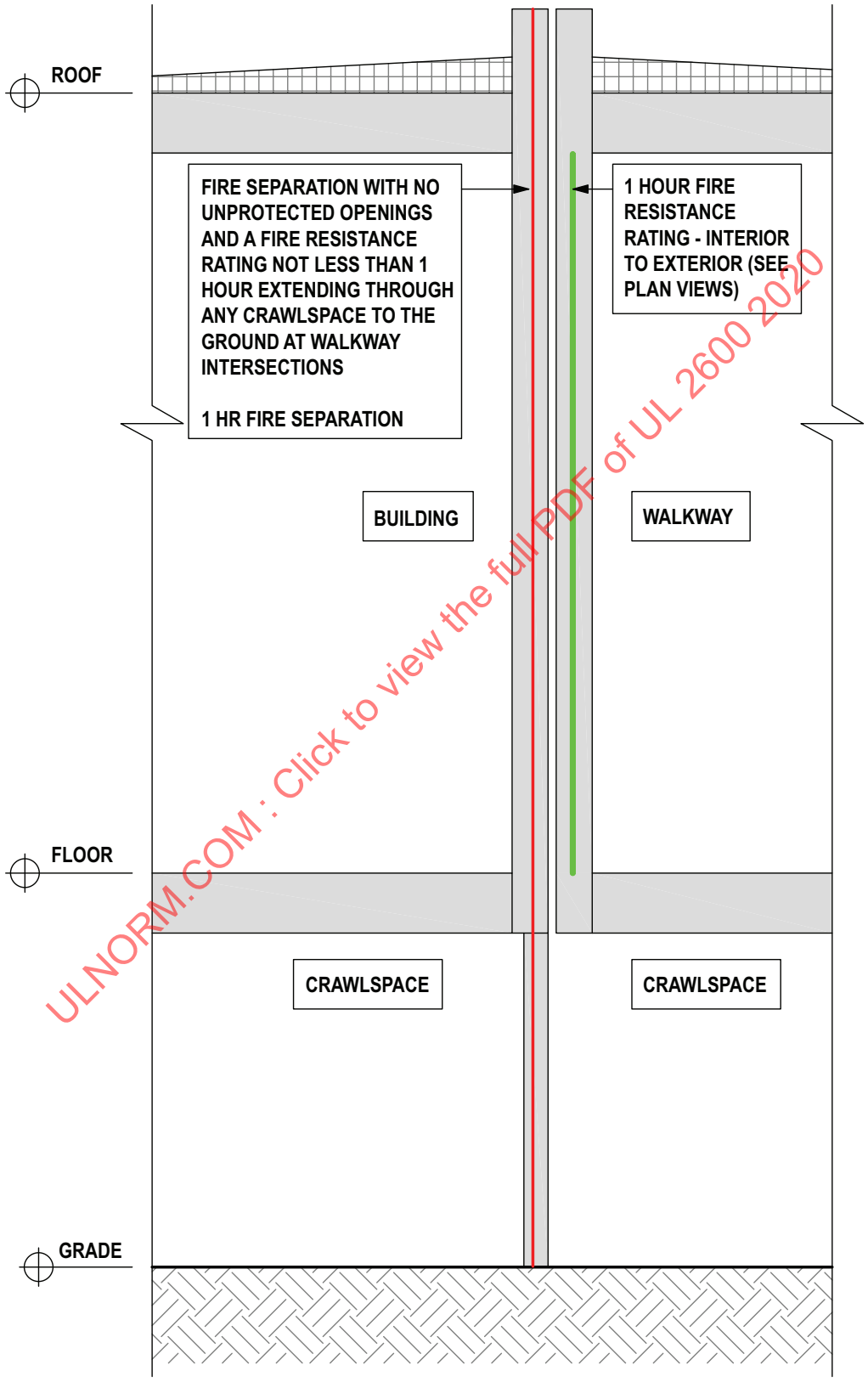


Figure C13.4.3-A(c)

Figure C13.4.3-B

Fire-rated walls where relocatable building abuts a walkway.



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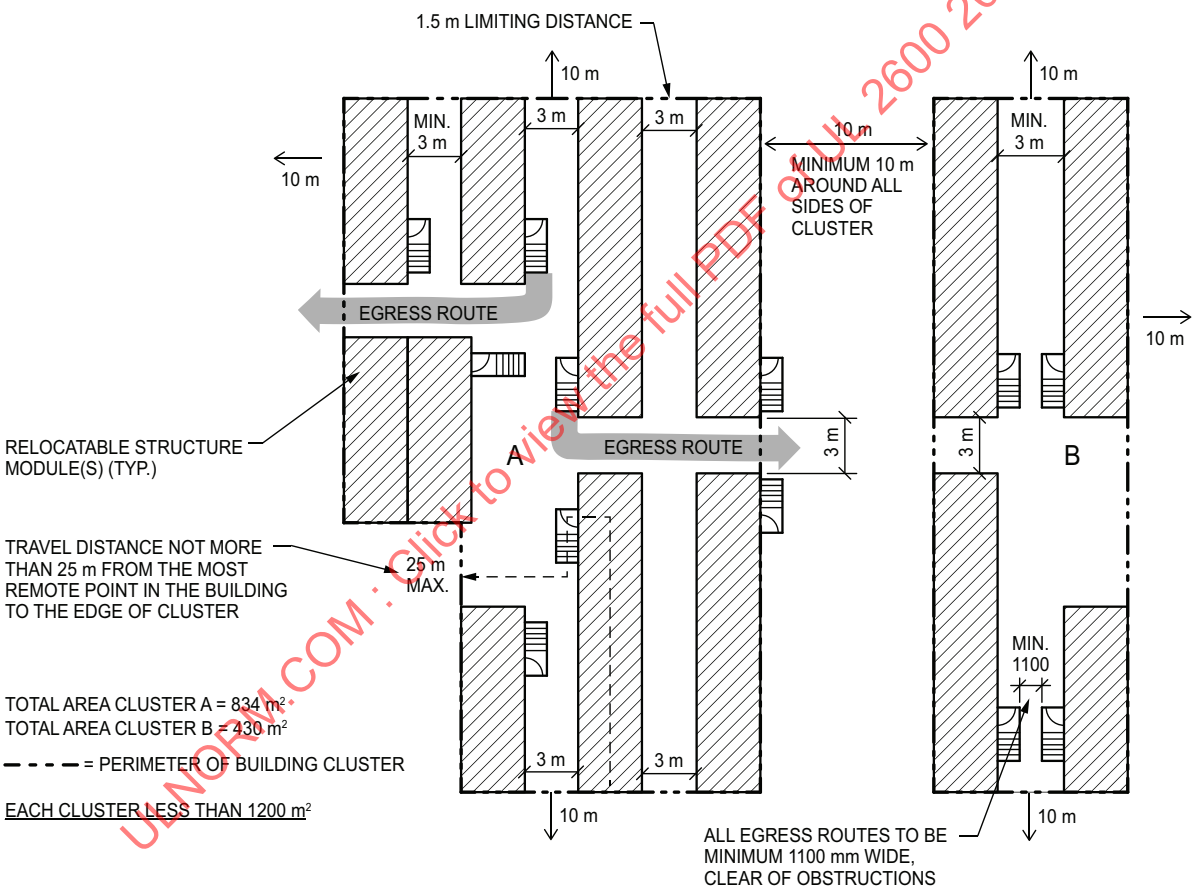
C13.5 Spatial Separation within Building Clusters

Clusters of relocatable structures should be located within a single property. The total area of a cluster of buildings is the area measured at the perimeter of all of the buildings in the cluster and includes the area between the buildings. See Figure C13.5.

A 3-metre wide egress space between buildings is to be kept clear and unobstructed for the use of occupants. A 10 metre space should be maintained around each cluster of buildings that is free of combustible materials. For locating buildings not regulated by this standard, the spatial separation requirements of NBC Subsections 3.2.3, 9.10.14 or 9.10.15 apply.

Figure C13.5

Examples of Building Clusters



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C14 Fire Suppression

Requirements in addition to those in this standard and the NBC are provided in the fire codes that apply in the various jurisdictions. These requirements address issues such as safety plans and the need for training.

C14.1.1.2 Required Hose Stations

The requirement for hose stations where a building or aggregate of building contains sleeping rooms for 30 or more persons was derived from the 2015 NBC Section 9.10.21, construction camps and accepted practice for rig camps.

C15 Alarm and Detection Systems

C15.1.1 Fire Alarm Systems

Fire alarm systems must comply with the NBC, including with respect to fire station notification and annunciators, noting that the fire station may be on site.

C15.5 Smoke Alarms

The NBC requirements for fire alarms apply only where sleeping rooms are provided for more than 10 persons. Requirements for smoke alarms in NBC Part 9 apply only to dwelling units, not to all sleeping rooms. 15.5.1 ensures that advance warning will be provided in relocatable buildings where there is sleeping accommodation for not more than 10 persons.

C17 Heating and Ventilation

C17.2 Ducts for Space Heating and Building Ventilation Systems

The requirement for galvanized ducting follows from Part 10 of the Alberta Building Code, 1981 to 2014 editions, to address health.

Ducting is often installed under floors. While branch ducts are typically installed on the warm side of the insulation, the larger trunk ducts may be within the plane of insulation where they may be more susceptible to condensation, which can lead to corrosion or growth of mold or mildew. Modules for multi-module buildings are often stored outside unheated and sometimes with temporary cladding for long periods of time. Galvanized ducting is resistant to corrosion, does not provide a food source for mold and can be easily cleaned if mold growth should occur.

C17.4 Circulation of Heating and Ventilation Air for Sleeping Rooms

Heating, cooling and ventilation air is permitted to be distributed to all sleeping rooms in a single module where the entire HVAC system is located within the module. This is permitted because the sleeping rooms are not classified as individual suites for purpose of NBC 6.3.2.7, Interconnection of Systems, Sentence (1). The approach is comparable to an HVAC system in a single dwelling unit.

C17.5.3 Screens

NBC Part 6 and Part 9 require screens on outdoor intake and exhaust openings. Screens should be cleaned annually and removed for the winter.

C18 Plumbing Facilities

C18.1 Sewage Disposal

Depending on the installation, sewage may be disposed of to a public system, private system or private holding tank, or may be retained on-board and drained to a public system at a later time. Private systems and holding tanks must comply with local regulations.

C19 Building Envelope

C19.3.2 Insulation Continuity at Connections between Rapid Deployment Modules

See Figure C19.3.2.

Figure C19.3.2

Insulation block and airtight insulated blanket at connection

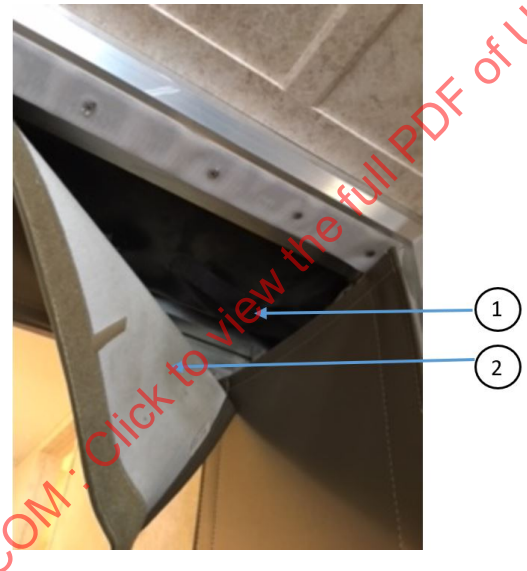


Photo courtesy of Alta-Fab Remote Modular Solutions.

1 – Flexible insulation block

2 – Insulated blanket with continuous perimeter hook-and-loop fastening

C19.4.1 Air Barrier Continuity at Connections between Rapid Deployment Modules

The connections between modules in multi-module rapid deployment buildings are soft connections to allow for differential movement. For this reason and because it must be possible to assemble and disassemble these buildings very quickly, continuity of airtightness at these connections using standard materials is not practical. Airtight insulated blankets connected with continuous hook and loop fasteners (e.g., Velcro) are deemed to provide an acceptable level of performance for these buildings. See Figure C19.3.2.

C20 Energy Efficiency

Context

The requirements for energy efficiency reflect not only the evolution of the industry and energy efficiency regulations in Canada but also the broader context of Canada's position on climate change and the CCBFC's policy on the development of energy codes.

Pan Canadian Framework in Clean Growth and Climate Change

In 2016, the federal government, all the territories and all provinces except Saskatchewan signed on to the Pan Canadian Framework in Clean Growth and Climate Change. The document describes the "collective plan to grow our economy while reducing emissions and building resilience to adapt to a changing climate." The document addresses a number of issues that relate to building construction and energy use, and states that:

- buildings are the third-highest emitters of greenhouse gasses
- construction of buildings is included in "industry" which is the highest emitter
- model codes with requirements for buildings to be net-zero ready are to be ready for adoption by 2030

That is, increasing the energy efficiency of buildings is one of the approaches toward the goal of reducing greenhouse gas (GHG) emissions.

Environment Objective of the National Model Codes

At the time of publication of this standard, the "Environment" objective in the NBC and the NECB did not address greenhouse gas emissions or sustainability directly. Before energy efficiency requirements were introduced into the national model codes, the Canadian Commission on Building and Fire Codes (CCBFC), commissioned an analysis which compared the effectiveness of regulatory and non-regulatory approaches to address four policy objectives including the reduction of greenhouse gas (GHG) emissions. In September 2016, the CCBFC prepared a policy paper – *Position Paper on a Long-Term Strategy for Developing and Implementing More Ambitious Energy Codes*. While the focus of the paper is energy codes, there are numerous references to the ultimate goal of reducing GHG emissions.

Relocatable Buildings in the Context of the Framework and CCBFC Position

The relocatable buildings industry is a leader in sustainability. This is rarely recognized.

Construction

Factory-constructed buildings have been shown to be significantly more sustainable than site-constructed buildings. Research conducted by the University of Alberta on a multi-unit residential building showed a 43% reduction in CO^2 emissions for all construction work including

- material deliveries
- crew travel
- equipment usage, and
- winter heating.

(Ref: Al-Hussein, Mohamed, Juan D. Manrique, Don Mah. North Ridge CO^2 Analysis Report – Comparison between Modular and On-Site Construction. Department of Civil & Environmental Engineering, University of Alberta, September 2009)

Recycling versus Disposal

Relocatable buildings are recycled many times over their service lives. Construction, installation and relocation of these buildings avoid the construction of "permanent" buildings that are used for short periods

and then demolished, with tonnes of material ending up in landfills. Aside from the cost of wasted time and materials, the embodied energy that is wasted in disposing of “permanent” buildings is enormous.

Energy Performance

This standard references NBC 2015 Section 9.36, as the baseline for energy efficiency and recognizes the NECB 2017 as an acceptable option. This is to ensure that simple prescriptive solutions are available as the national codes transition to tiered energy efficiency requirements leading to net-zero ready. This is also to provide the industry time to determine how the tiered requirements might or might not be applied to relocatable buildings.

A number of exceptions to NBC Section 9.36, and the NECB are provided. These exceptions are for practical reasons that are specific to relocatable buildings. A few requirements are more stringent. Information on specific exceptions and additional requirements is provided below.

The industry contends that the reduction in GHG emissions that is achieved by using relocatable buildings along with the prescriptive requirements in the standard, provides a level of performance that exceeds NBC 2015 Section 9.36, and the NECB 2017 considering the broader environmental context.

C20.2 Building Envelope

Design for Climate Zones

The requirements in NBC Section 9.36, and NECB for the thermal performance of the building envelope depend on the climate zone where the building is located (see Figure B20.2). Climate zones are defined by heating degree days which are provided in Appendix C of the NBC for 679 locations in Canada.

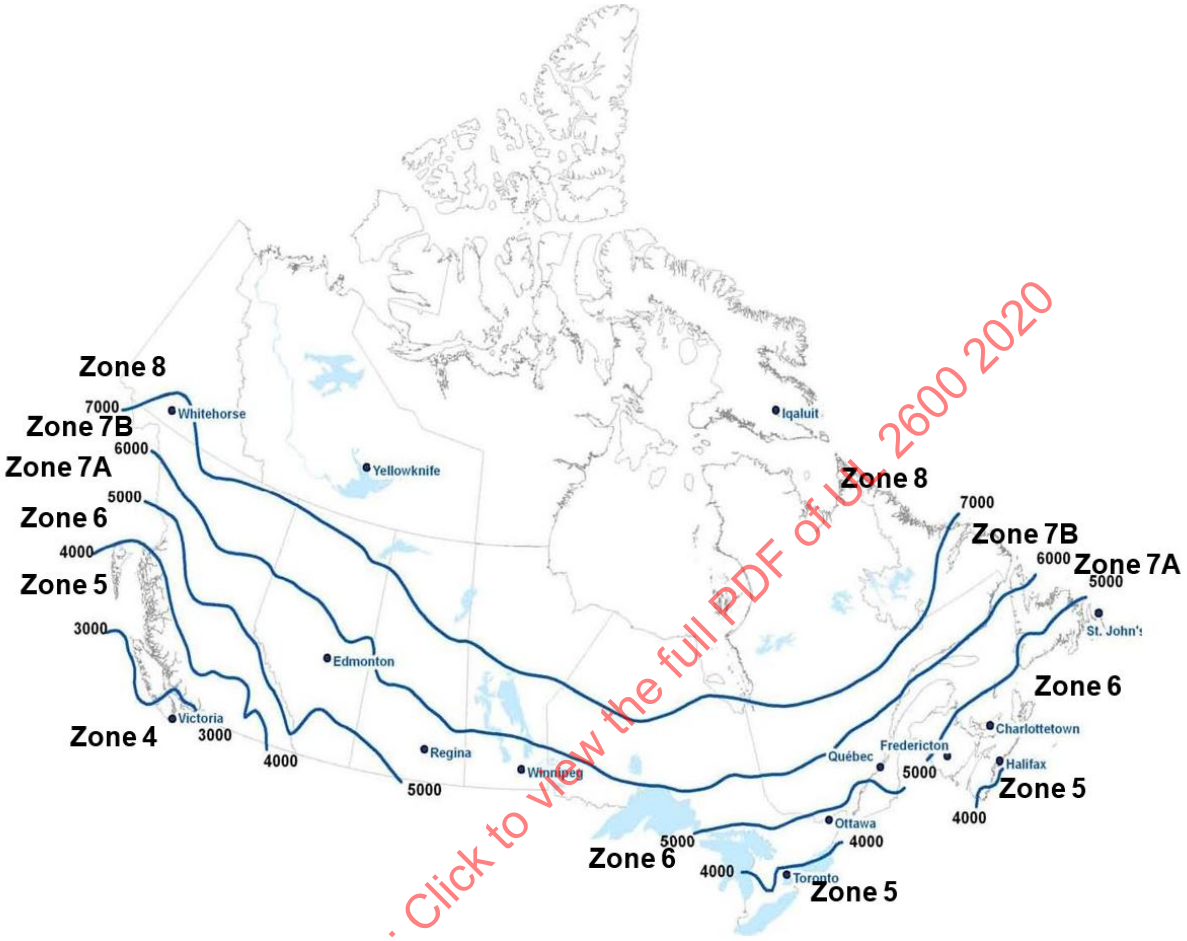
The same approach is taken for relocatable buildings except for WSRBs. As with snow and wind loads and seismic forces, it is expected that manufacturers will design and construct relocatable buildings to comply with requirements for all or portions of their principle market area.

Because WSRBs are so readily moveable, the standard specifies only two sets of criteria – one for buildings without an HRV and one for buildings with an HRV. The criteria are the same as those for Zones 7A to 8 for all other relocatable buildings. This simplifies application of the requirements and also results in performance that exceeds NBC Section 9.36, in the warmer climate zones, more than compensating for roof and wall levels that fall below code-minimum in the colder climate zones. (See below re. Table 20.2.1.1-A and Table 20.2.1.1-B.) The average thermal performance of the building envelope of an archetype single-module WSRB is 4.26% better than the equivalent Code-compliant building assuming:

- 17.1% fenestration and door to wall area ratio (FDWR) (based on the 15% maximum unprotected glazed area permitted for the simplified approach for spatial separation)

- an equal number of buildings, with and without heat recovery, in all climate zones.

Figure C20.2
Climate Zones



Building Envelope Trade-Offs

Because the NBC and NECB are referenced at the outset of the standard and there are no provisions in the standard addressing building envelope trade-offs, the trade-offs described in the Codes can be used.

C20.2.1 Minimum Effective Thermal Resistance of Opaque Elements

Thermal performance of relocatable buildings has lagged behind site-constructed buildings. The 2014 Alberta Building Code (ABC), for example, provides requirements specific to relocatable buildings but requires a minimum nominal thermal resistance of only RSI 2.1 for opaque elements of the building envelope assembly. Other provinces exempt relocatable buildings from their energy efficiency requirements. The requirements of this Standard reflect significant increases in thermal performance.

Table 20.2.1.1-A and Table 20.2.1.1-B

Table 20.2.1.1-A and Table 20.2.1.1-B apply to all relocatable buildings except WSRBs. They are based on NBC Tables 9.36.2.6-A and 9.36.2.6-B and provide minimum effective thermal resistances for above-ground opaque assemblies in buildings without and with a heat-recovery ventilator (HRV) respectively. The values in the Standard have been maximized as far as possible at this time considering:

- current construction practices;
- cost and availability of lumber in larger dimensions, and greater depth of wood I-joists and trusses;
- dimensional limitations imposed by transport regulations, infrastructure and geography in some regions of the country.

Compared to the 2015 NBC, the minimum effective thermal resistances specified in the standard are:

- the same for cathedral ceilings, flat roofs and nominally flat roofs for climate zones 4 to 6 and lower for zones 7A to 8.
- the same for roof-ceiling assemblies with attics
- the same for walls except lower in zones 7B and 8 where an HRV is not installed
- the same for floors except higher where an HRV is not installed to compensate to some degree for the lower wall values.

Thermal transmission calculations have been carried out for two multi-module archetype relocatable buildings that are not on wheels or skids. One is an 8-module building with four modules end-to end and a central corridor. The other is a 6-module building with the modules side-by-side. Assuming 17.1% fenestration and door to wall area ratio (FDWR) (based on the 15% maximum unprotected glazed area permitted for the simplified approach for spatial separation), performance of corridor, roof, exterior wall, and floor equivalent to the modules and the same number of buildings with and without heat recovery in all climate zones, the average thermal performance of the building envelope is 0.55% to 0.60% poorer than the equivalent Code compliant buildings. With WSRBs included, average thermal performance is 1.04% better than the equivalent Code complaint buildings.

Table C20.2.1.1-A and Table C20.2.1.1-B provide equivalent nominal imperial thermal resistance values for the insulation to achieve the required effective thermal resistances without and with an HRV. Values for roof-ceiling assemblies with attics are based on wood roof trusses spaced not less than 600 mm (24”) o.c. All other values assume standard lumber framing not less 400 mm (16”) o.c. as follows:

- roof joists – 38 mm x 235 mm (2”x10”) tapered to 38 mm x 184 mm (2”x8”)
- wall framing – 38 mm x 140 mm (2”x6”)

• floor joists – 38 mm x 184 mm (2'x8") or 38 mm x 235 mm (2"x10").

Table C20.2.1.1-A
Equivalent Nominal Thermal Resistances for Insulation in Above-Ground Opaque Assemblies, without HRV, except WSRBs

	Heating Degree Days at Building Installation location					
	Zone 4 < 3000	**Zone 5 3000 to 3999**	**Zone 6 4000 to 4999**	**Zone 7A 5000 to 5999**	**Zone 7B 6000 to 6999**	**Zone 8 > 7000**
	Minimum Nominal Thermal Resistance, m^2C/W ($(h*ft^2*F)/BTU$)					
Cathedral ceilings, and flat and nominally flat roofs	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28
Roof-ceiling assemblies with attics	R40	R50	R50	R60	R60	R60
Walls	R24	R24	R24	R24	R24	R24
Floors over unheated space	R28	R28	R28	R35	R35	R35
Colour Key:						
Black = same level of performance compared to NBC Section 9.36.						
Red = lower level of performance compared to NBC Section 9.36.						
Green = higher level of performance compared to NBC Section 9.36.						

Table C20.2.1.1-B
Equivalent Nominal Thermal Resistances for Insulation in Above-Ground Opaque Assemblies, with HRV, except WSRBs

	Heating Degree Days at Building Installation location					
	Zone 4 < 3000	**Zone 5 3000 to 3999**	**Zone 6 4000 to 4999**	**Zone 7A 5000 to 5999**	**Zone 7B 6000 to 6999**	**Zone 8 > 7000**
	Minimum Nominal Thermal Resistance, m^2C/W ($(h*ft^2*F)/BTU$)					
Cathedral ceilings, and flat and nominally flat roofs	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28	R31 compressed to avg. R28
Roof-ceiling assemblies with attics	R40	R40	R50	R50	R60	R60
Walls	R22	R22	R22	R22	R24	R24
Floors over unheated space	R28	R28	R28	R31	R31	R31
Colour Key:						
Black = same level of performance compared to NBC Section 9.36.						
Red = lower level of performance compared to NBC Section 9.36.						
Green = higher level of performance compared to NBC Section 9.36.						

Table 20.2.1.2

Table 20.2.1.2 applies to WSRBs and specifies a single set of minimum effective thermal resistances for above-ground opaque assemblies for each of the two cases of buildings without and HRV and with a HRV. The values are the same as those for other relocatable buildings designed for installation in zones 7A to 8. This simplifies fleet construction and allows the buildings to be installed in any climate zone.

C20.2.1.4 Exceptions to Roof-Ceiling Thermal Resistance

For the two coldest climate zones, the standard provides for further lenience relative to NBC Section 9.36, for insulation at the perimeter of ceilings under roofs with shallower slopes where this is necessary due to dimensional limitations imposed by transport regulations, infrastructure and geography in some regions of the country. As most relocatable buildings are not constructed with attics, this exception will rarely be invoked.

C20.2.2.1 Skylights

Skylights are not common in relocatable buildings. Prohibiting their installation increases overall energy performance.

C20.2.3 Airtightness

Factory constructed buildings have traditionally been more airtight than site-constructed buildings. The cost of testing of multi-module buildings on-site can be very high when the buildings are in remote locations. The standard relies on the airtightness of individual modules and the application of the prescriptive requirements from NBC Section 9.36, for continuity at connections between modules in multi-module buildings.

C20.3 Lighting

Further review is needed to determine if and how additional interior lighting power requirements and interior lighting control requirements might be applied to relocatable buildings considering that the use of the buildings and individual spaces can change over time. Similarly, further review is needed to determine if and how requirements for basic exterior lighting allowances, exterior lighting power and exterior lighting control might be included considering that buildings can be reconfigured over time.

C20.4 Electrical Power Systems and Motors

Further review is needed to determine if and how requirements for electrical power might be included considering that entire sites of relocatable buildings are often powered by generators and the buildings can be reconfigured over time.

Examples

1. At one site, a building or building complex may have an electrical distribution system with a load-carrying capacity greater than 250 kVA. When the modules are moved to another site, there may be no electrical distribution system that has a load-carrying capacity greater than 250 kVA. In the first case, the NECB would require the system to be designed to allow individual monitoring of the electrical energy consumption of HVAC systems, interior lighting and exterior lighting. In the second case, this would not be needed or warranted. To provide for separate monitoring in all cases to allow this in some adds unnecessary complexity and is not cost effective.

2. At one site, the feeder and branch circuit conductors may comply with the NECB limit on voltage drop. When the modules are reconfigured to create a different building at another site, the conductors may not comply. Again, to regulate voltage drop in all cases is unnecessary and not cost effective.

C20.5 Heating Ventilation and Air-Conditioning

C20.5.1 Appliance Efficiencies

Due to the nature and temporary use of relocatable buildings, condensing furnaces may not be suitable. High efficiency space heating appliances in some relocatable buildings have resulted in on-going cost, health and safety, and environmental concerns.

Cost

Some high efficiency furnaces have proved to be less rugged than mid-efficiency furnaces and are prone to damage during transport.

Health and Safety

Relocatable buildings may be subject to furnace shutdown when the building is not occupied or is transported to a new location. This can lead to freezing of the condensate in the furnace drain which would adversely affect the condensing tank and pump and may prevent the furnace from operating properly. Limited access to service repairs in remote locations should be taken into consideration.

Environment

Relocatable buildings may be constructed without plumbing systems. Even where they have plumbing systems, they may be installed in locations without municipal services. Safe disposal of condensate may not be practical. Requiring high efficiency furnaces in these cases is counter to the National Plumbing Code objective OH5 Hazardous Substances Containment.

The intent of the exception to NBC and NECB requirements for high efficiency space heating appliances is to allow the use of non-condensing (mid-efficiency) fuel-fired appliances in relocatable structures.

C20.6 Service Water Heating

Fuel-fired service water heater efficiencies specified in NBC 2015 Section 9.36, can be met with non-condensing units. The rationale for permitting these is the same as for fuel-fired forced air furnaces. See C20.5.1 above.

C21 Connection of Modules in Multiple-Module Buildings

C21.1 Compliance

With some exceptions, continuity of building assemblies and services must comply with the NBC. CSA Z240.10.1, “Site Preparation, Foundation and Installation of Buildings” identifies elements of the building structure, building envelope, fire protection, and building services that must be addressed.

Multi-module buildings designed for rapid deployment are often designed to be installed directly on the ground. These buildings must be able to accommodate differential movement at the module connections. Discontinuities in fire protection and airtightness are permitted.

C21.1.2 Where multi-module buildings, other than rapid-deployment buildings, are installed on surface foundations on moisture-susceptible soil, continuity must be maintained while the junctions between modules allow for differential movement. Differential movement may be reduced by the installation of piers that support adjoining modules. Weather protection can be provided by metal capping capable of expansion if modules move apart. Required building envelope elements and fire protection materials must be detailed to allow for anticipated movement.

C22 Instructions and Marking

Requirements for provision of instructions and marking of products are administrative. While the requirements in this standard are more detailed than for most products, they are comparable to requirements in other product standards referenced in the NBC. The level of detail reflects the complexity of the products.

C22.1 Instructions

C22.1.2 Site-Specific Instructions

CSA A277 assumes that there is one installation site for the building so a single set of instructions for tie-downs, anchorage and other site-specific instructions can be provided. This is not the case for relocatable buildings. Site-specific information should be included in the engineering documents that are submitted at the time of permitting.

C22.2 Marking

C22.2.1 Certification Labels

While the Standard does not provide vehicular requirements, vehicular elements of single-module relocatable buildings constructed with running gear must comply with the applicable provincial-territorial transportation regulations in order to be certified.

C22.2.1.2 Certification Label Location

Certification labels are to be visible when modules are delivered to the installation site. If an interior module is installed before the certification label can be checked, the information can be reviewed on the specification sheet.

C22.2.2 Nameplates

C22.2.2.3 Nameplates for Modified Modules

Repairs and replacements that occur as normal maintenance, such as replacement of light fixtures or heating equipment with the same capacity, do not trigger the requirement for a nameplate indicating modification. See also Section A3.

C22.2.2.6 Nameplate Location

Nameplates are to be visible when modules are delivered to the installation site. If an interior module is installed before the nameplate can be checked, the information can be reviewed on the specification sheet.

C22.2.3 Specification Sheets

C22.2.3.5 Specification Sheet Location

Specification sheets must be located where they are accessible for review at all times. Areas above suspended ceiling tiles are considered to be accessible where the tile that would need to be removed is marked.

A copy of the specification sheet should be included in the documents submitted for permitting.

Annex D
Administrative Considerations

(Informative)

D1 Purpose

Annex D provides information for regulators, owners, operators and the local authority having jurisdiction on administrative issues specific to relocatable buildings.

Note: See also Annex A for certification.

D2 Glossary

D2.1 Authority having jurisdiction (AHJ) – the government body responsible for enforcement of building regulations or the official or agency designated by that body to exercise such a function.

D2.2 Manufacturer – A manufacturer of relocatable buildings

D2.3 Installer – a person who undertakes some or all of the work involved in on-site installation of relocatable buildings.

D2.4 Operator – the person responsible for the operation of a relocatable buildings site. This includes agents of the owner and lessors.

D2.5 Owner – a person who has legal ownership of a relocatable building or building site as applicable.

D3 Duration of Use

D3.1 This standard is intended to be applied to buildings that remain in one location for not more than five years. The actual duration of use in any one location is an administrative issue that is subject to regulation by the authority having jurisdiction (AHJ). The AHJ may limit duration to less than five years or permit longer periods. The agreed duration should be documented and understood by the owner and operator.

D4 Responsibilities

D4.1 Design and In-Factory Construction

D4.1.1 The owner of a relocatable building is responsible for the building's compliance with this standard at the time of design, construction and modification.

D4.1.2 The manufacturer of a relocatable building is responsible for manufacturing buildings in compliance with this standard and maintaining certification by an accredited certification body in accordance with CSA A277, "Procedure for Certification of Prefabricated Buildings Modules and Panels".

Note: Certification applies to individual factories rather than companies. Canadian certification bodies are accredited by the Standards Council of Canada.

D4.2 Modification

D4.2.1 The modifier of a relocatable building is responsible for modifications in compliance with this standard.

Note: See also A3.1.

D4.3 Permitting

D4.3.1 Because of the time needed for permitting, some jurisdictions allow some relocatable buildings to be installed for short periods without building permits. The duration is typically limited to 28 days. It is the owner's and operator's responsibility to check with the local AHJ for permitting requirements prior to installation.

D4.3.2 In addition to reviews that are normally carried out as part of the permitting process, the local AHJ is expected to check that relocatable buildings have been certified and comply with requirements specific to the installation site such as snow, wind and earthquake loads, and climate zone.

D4.4 Installation and Site Construction

D4.4.1 The owner of a relocatable building is jointly responsible with any operator for the building's compliance with this Standard at the time of installation including compliance with requirements that address conditions specific to the installation site such as snow, wind and earthquake loads and climate zone.

D4.5 Markings Review and Inspection

D4.5.1 The local AHJ is expected to confirm that relocatable modules have certification labels and nameplates.

D4.5.2 If a module with no exterior walls is installed before the local AHJ can review the certification label and nameplate, the local AHJ is expected to review the specification sheet for the relocatable building.

D4.5.3 The local AHJ is expected to review the specification sheet for the relocatable building and confirm that the building has been constructed in compliance with the location-specific requirements.

D4.6 Operation and Maintenance

D4.6.1 The owner of a relocatable building is jointly responsible with any operator for:

a) the safe operation and maintenance of buildings, walkways and site services as applicable;

b) activities within the building and building site; and

c) maintenance of the building site.

D4.6.2 Operation, activities and maintenance described in D4.6.1 must be in accordance with the Fire Codes applicable at the installation site.

D4.6.3 It is the owner's responsibility to appoint and train a fire crew, to appoint a person to be responsible for fire prevention, and to ensure site occupants are familiar with fire hazards.

ANNEX E
Stringency of CAN/UL 2600 Requirements Compared to NBC Parts 3, 4, 6, 7 and 9, and the NECB

(Informative)

Purpose

This Annex describes how the requirements in CAN/UL 2600 vary from those in NBC and NECB 2015 while providing a minimum acceptable level of performance. Each section in the Annex provides a general overview of the requirements in the related section of the Standard, identifies the requirements that are more or less stringent than the related NBC requirements, and provides reasons for the differences. Where demonstrated acceptable performance is cited in the rationale for less stringent requirements, this is based on performance that has been demonstrated in the field over more than 40 years.

E1 Scope

The application statement in 1.3 specifies limits on building height and building area depending on whether sleeping accommodation is provided and whether sprinklers are installed. These criteria in conjunction with the minimum fire resistance ratings provided in Table 12.1.2 can be compared with the requirements in NBC Subsection 3.2.2. Building Size and Occupancy. This comparison is provided under C12 Fire Protection below.

E6 Structural Design

With two exceptions, relocatable buildings must be constructed in accordance with NBC Part 4 Structural design regardless of building size or occupancy. Only single-module buildings within the application of Part 9 are permitted to be constructed in accordance with Part 9.

Table E6
More or Less Stringent Requirements in Section 6 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
6.1 Compliance					
6.1.1 Requires compliance with Part 4 for all buildings	**Part 4** Applies to non-Part 9 buildings and structures for Part 9 buildings not described in Part 9 9.04. Applies to Part 9 buildings	To address 6.1.2.			
6.1.2 Requires consideration of effects of forces due to transportation and installation	none	To reduce the probability of damage due to transport and installation loads.			
6.2 Design Loads					
6.2.1 Snow Specifies minimum design wind load that is higher than at most locations.	**4.1.6 Snow** Require design to the design loads at the building site	To simplify design and construction of buildings that are moved to various locations.			

Table E6 Continued on Next Page

Table E6 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
		Any module may be installed in 533 of the 679 locations listed in Appendix C of the 2015 NBC			
6.2.2 **Wind** Specifies a minimum specified wind load that is higher than at most locations.	**4.1.7 Wind** Require design to the design loads at the building site	To simplify design and construction of buildings that are moved. Any module may be installed in 659 of the 679 locations listed in Appendix C of the 2015 NBC			
6.2.3 **Earthquake** Permits any single-module building to be designed in accordance with Part 9 for "high seismic forces"	**4.8 and 9.23.13** Requires design for seismic forces at the building site	To simplify design of single-module buildings that are moved Any module may be installed in any of the locations listed in Appendix C of the 2015 NBC	6.2.3 **Earthquake** Permits any single-module building to be designed in accordance with Part 9 for "high seismic forces"	**4.8** Part 4 requirements may be more stringent depending on soil properties	To simplify design of single-module buildings that are moved Any module may be installed in any of the locations listed in Appendix C of the 2015 NBC
			6.2.4 **Floor Loads** Permits very small frequently-relocated office buildings to be designed to 2.4 kPa uniformly distributed live floor load	**Table 4.1.5.3** Minimum 4.8 kPa for: • first-storey offices; 2.4 for offices above the first storey	Demonstrated acceptable performance recognizing normal use of small frequently-relocated office buildings

E7 Site Preparation, Foundations and Anchorage

With two exceptions in this Section, relocatable buildings must be constructed in accordance with NBC Part 4 Structural design regardless of building size or occupancy. Only single-module buildings within the application of Part 9 are permitted to be constructed in accordance with Part 9; in that case, they must be comply with the most stringent requirements of the 2015 NBC.

Table E7
More or Less Stringent Requirements in Section 7 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
7.1 **Site Preparation**					
7.1.1 Accepted good practice	**Part 4** No requirements	To specify the minimum acceptable solution.	7.1.1 Accepted good practice	**9.12.1.1** Requires removal of topsoil and organic matter under the building	To recognize that minimum acceptable performance can be achieved by other means; see exceptions to

Table E7 Continued on Next Page

Table E7 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
					foundation requirements
7.2 Foundations			**7.2 Foundations**		
7.2.1 Prohibits pier foundations complying with NBC 9.15.2.3 and footings for piers with dimensions described in NBC	**9.15.2.3** Applies to pier foundations on non-moisture-susceptible soil **9.15.3** Specifies minimum dimensions based only on spacing of piers, supported length and number of storeys supported. See Rationale re. criteria.	**NBC 9.15.2.3** Prescriptive requirements • permit excessive height to width ratio • do not specify minimum dimensions of pier components **NBC 9.15.3** • Requirements do not recognize variations in building weight or snow load • minimum footing area is – excessive except where the maximum specified snow load exceeds 5.0 kPa – inadequate where the snow load is 6.5 kPa or more and the allowable soil bearing pressure is 75 kPa	7.2.2 With some limitations but regardless of building area, provides exceptions to code-compliant foundations • permits foundations complying with CSA Z240.10.1; • exempts single modules with running gear and rapid deployment buildings on skids or rig mats	**4.2** • engineered foundations **9.15** • compliance with CSA Z240.10.1	Demonstrated acceptable performance

E8 Crawl Spaces

In providing a general reference to NBC Part 9, the standard addresses the separation of crawl spaces from the ground in non-Part 9 buildings, a subject that is not addressed in NBC Part 5, and provides simple prescriptive requirements for work that will be done on site.

Table E8
More or Less Stringent Requirements in Section 8 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
Compliance			**Ground Cover**		
8.1 Requires compliance with NBC Section 9.18 for all buildings.	**5.7** Part 5 does not address separation of unheated crawl spaces from the ground	• Demonstrated acceptable performance • guidance needed for non-Part 9 buildings	8.3.1 ground cover not required under rapid deployment building constructed with skids or placed on a rig mat	**9.18.6** ground cover required in all crawl spaces	Demonstrated acceptable performance for these rapid-deployment relocatable buildings Annex information also provided re. regular inspection
			8.3.2 Permits ground cover to be omitted where net free ventilation area is doubled.	**9.18.6** Requires ground cover in all situations	Trade-off Demonstrated acceptable performance

E9 Barrier-Free Design and Ceiling Height

The standard provides an exception to the barrier-free design requirements for buildings that are not for public use and specifies minimum ceiling height for all buildings.

Table E9
More or Less Stringent Requirements in Section 9 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
			Application		
			9.1.1 Provides an exemption from barrier-free requirements where the building is not for public use	**3.8** For relocatable buildings, would apply barrier-free requirements except for Group F1.	Newer relocatable buildings are becoming more accessible. The issue needs further review to determine what is practical for various building uses and sites before requirements are made mandatory. The limited exception applies to buildings that: • are essentially industrial, • are often in remote locations, and • provide spaces for site offices, equipment storage, sleeping, personal hygiene and meals.

Table E9 Continued on Next Page

Table E9 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
Ceiling height			**Ceiling height**		
9.2.1 With one exception, requires minimum 2.1 m clear ceiling height in all spaces in all buildings.	**3.7.1.1** No prescriptive criteria for other than dwelling units. **9.5.3.1** Ceiling height criteria apply only to residential occupancies.	Guidance needed	9.2.2 Permits ceiling heights less than 2.1 m where modules are transported by airplane	**3.7.1.1** Not prohibited by Part 3. **9.5.3.1** 2.1 m minimum in residential occupancies.	Recognizes practical transportation limitations.

E10 Stairs, Ramps, Handrails and Guards

The provisions in the Standard apply only to buildings that are not for public use.

Table E10
More or Less Stringent Requirements in Section 10 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
			Application		
			10.1 Provides exemptions to Code requirements where the building is not for public use	**Part 3 – numerous 9.8**	The exceptions recognize that relocatable buildings that are not for public use are essentially industrial buildings.
			Minimum Number of Risers		
			10.2 Permits single riser at raised floors constructed for installation of building services in laundry rooms and washrooms	**3.3.1.14, 3.4.6.2** Minimum 3 risers required except in assembly occupancy where food and beverages are served. **9.8.3.2** Minimum 3 risers required except in dwelling units.	Demonstrated acceptable performance where the building is not for public use Recognizes practical construction limitations for buildings that are not on heated crawl spaces or basements.
			Step Dimensions		
			10.3 Maximum rise and minimum run of 200 mm where the stairs • are exterior stairs and serve a rapid deployment building or a single-module building constructed on a	**3.4.6.8, 9.8.4.2** • 180 mm maximum rise • 280 mm minimum run	DAP where the building is not for public use • recognizes practicalities of accommodating fold-down stairs used for rapid deployment and recovery • recognizes limitations on

Table E10 Continued on Next Page

Table E10 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
			chassis with running gear • are interior stairs serving raised floors constructed to allow for the installation of building services in laundry rooms and washrooms		space available in modules with laundry or washroom spaces
Ramp Marking			**Ramp Slope**		
10.4.3 Requires marking for ramps for buildings not accessible to the public	**3.4.6.1** Requires marking only on ramps accessible to the public	• low cost • industry standard practice • occupants of non-public buildings may be transient	10.4.1 1 in 6 maximum slope for interior ramps	**3.4.6.7, 9.8.5.4** Maximum slopes: • 1 in 6 for industrial occupancies • 1 in 10 for assembly, care, treatment, detention or residential • 1 in 8 for everything else.	Demonstrated acceptable performance where the building is not for public use.
			Guards		
			10.6.1 All guards permitted to comply with opening requirements for industrial occupancies	**3.3.1.18, 9.8.8.5** Except in industrial occupancies, openings must prevent passage of a 100 mm diameter sphere	Demonstrated acceptable performance where the building is not for public use.

E11 Means of Egress

Table E11
More or Less Stringent Requirements in Section 11 Compared to NBC

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
11.1 Walkways as Means of Egress					
11.1.3 Use of Walkways Except for access to certain service rooms [11.1.5], walkways are to be used only for movement of persons to and from adjoining buildings	**3.3.1.9 Corridors, 3.3.1.23 Obstructions,** No requirements specific to walkways. Only occupancies in corridors and obstructions in means of egress are addressed. **3.4.4.4(8)** Limits on access to service rooms applies only to	To reduce the likelihood of congestion and possible increases in fire load in a means of egress recognizing that relocatable buildings connected by walkways are likely to be in remote locations without municipal fire service			

Table E11 Continued on Next Page

Table E11 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
	exits, not means of egress.				
11.1.4 Storage rooms, washrooms, toilet rooms, laundry rooms and similar ancillary rooms not permitted to open directly into a walkway	**3.4.4.4(7)** Applies only to exits, not means of egress.	To avoid increases in traffic and fire loads in a means of egress recognizing that relocatable buildings connected by walkways are likely to be in remote locations without municipal fire service			
Travel Distance to Exit					
11.2.1 • 15 m if the building is not sprinklered and is a multi-module rapid deployment building constructed according to exceptions for fire resistance • 25 m if the building is not sprinklered and is not a multi-module rapid deployment building constructed according to exceptions for fire resistance • 40 m if the building is sprinklered.	**3.4.2.5(1), 9.9.8.2 (1)** • 40 m for business and personal services • 45 m where the floor area is sprinklered • 30 m for all other occupancies.	To recognize that • modules may serve different occupancies over their service lives • multi-module rapid deployment buildings are constructed with limited fire resistance at the connections			
11.3 Number of Exits			**11.3 Number of Exits**		
11.3.2 single exit permitted where occupant load is not greater than 60 and • for unsprinklered building not more than 80 m^2 in building area – travel distance is not more than 15 m where there are no sleeping rooms, or – travel distance is not more than 10 m where there are sleeping rooms • for sprinklered buildings with a travel distance is	**3.4.2.1, 9.9.8.2 (ref. to 9.9.7.4)** single exit permitted where total occupant load is not more than 60 and a) for non-sprinklered buildings, max building/floor area and travel distance are: • Group A 150 m^2 and 15 m • Group C 100 m^2 and 15 m • Group D 200 m^2 and 25 m • Group F3 200 m^2 and 15 m	• for other than Group C, occupancy-neutral application recognizes that modules may serve different occupancies over their service lives • 80 m^2 building area limits occupant load to maximum – 43 persons for Group A (classrooms) (60 person limit applies to cafeterias) – 17 persons for Group C (dormitories)			

Table E11 Continued on Next Page

Table E11 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
not more than 25 m – the building area is not more than 200 m^2 without sleeping rooms.	b) for sprinklered buildings with max. 25 m travel distance, max. floor area is: • Group A – 200 m^2 • Group C – 150 m^2 • Group D – 300 m^2 • Group F3 – 300 m^2	– 17 and 8 for Group D (personal services and offices) – 17 for Group F, Div. 3 (manufacturing/ process spaces) • 150 m^2 building area for Group C limits occupant load to maximum 32 (dormitories) • 200 m^2 building area limits occupant load to maximum – (60 person limit applies to Group A) – 43 and 21 for Group D (personal services and offices) – 43 for Group F, Div. 3 (manufacturing/ process spaces)			
			Service and Janitor Room Doors		
			11.4.1 • service and janitor room doors permitted to open into corridors and rooms or spaces of assembly occupancy	**3.6.2.6** • doors of service rooms with boilers or incinerators not permitted to open into corridors, or into rooms or spaces of assembly occupancy **9.10.13.12** • doors of service rooms with fuel-fired equipment not permitted to open into corridors, or rooms or into spaces of assembly occupancy	• Demonstrated acceptable performance • reflects practical limitations of buildings with very small service rooms
11.4.2.2 **Door Hardware** for relocatable buildings with sleeping rooms: • maximum 90 N force in direction of exit travel to release where the door serves more than 20 persons	**3.4.6.16(2)** specifies a force not more than 90 N for • every door leading to an exit lobby from an exit stair shaft • every exterior door leading from an exit stair shaft in a building having an occupant load more than 100	• to permit more rapid exit where occupants may also serve as fire fighting personnel	11.4.2.1 **Door Hardware** permitted to comply with requirements for dwellings or residential suites where: • the building is a single module with an occupant load not more than 20 • the door serves a sleeping room and opens directly to a	**3.3.1.13(3) Door Release Hardware within Floor Areas** • single action to open • ref. to Clause 3.8.3.8(1)(b)] **3.3.2.7 ref. to 3.8.3.6(8) Assembly Occupancy**	See CAN/UL 2600 clause 9.1.1 re. exceptions to barrier-free requirements. Demonstrated acceptable performance • relocatable buildings not for public use are essentially industrial buildings where occupants

Table E11 Continued on Next Page

Table E11 Continued

More Stringent			Less Stringent		
CAN/UL 2600 Ref. & Criteria	**NBC Ref & Criteria**	**Rationale**	**CAN/UL 2600 Ref. & Criteria**	**NBC Ref & Criteria**	**Rationale**
			corridor or the exterior	maximum operating force to open door • 22 N for interior doors • 38 N for exterior doors **3.4.6.16(2) Exit Door Release Hardware** maximum operating force of 90 N to release latch and open door for exterior doors from exit stairs in buildings with occupant load greater than 100 **9.9.6.7(2) Door Release Hardware** single action to open applies to all doors in means of egress except those serving accessory buildings, a single dwelling unit or a house with a secondary suite or garages for these	are able-bodied adults • the single-module buildings are typically no larger than 80 m^2 in building area with low occupant loads • doors from sleeping rooms opening directly to a corridor or the exterior are comparable to exit doors from single dwelling units.
11.4.2.3 **Door Hardware** for egress and exit doors serving an assembly use with occupant load more than 60: • maximum 90 N force in direction of exit travel to release	**3.4.6.16(2)** Maximum operating force to unlatch and open exit doors serving assembly occupancy with occupant load greater than 100	• to permit more rapid exit where occupants may also serve as fire fighting personnel			
Lighting					
11.5.1 **Exit Signs** Signs required for • buildings with sleeping accommodation for more than 10 persons • buildings with occupant load more than 50	**3.4.5.1** Signs required for • buildings more than 2 storeys • buildings with occupant load more than 150	To increase likelihood of awareness of exit locations where occupants are transient in a remote and industrial location.			
11.5.2 **Exterior Lighting for Building Clusters** • normal lighting – 50 lx minimum average at all points • emergency lighting – 10 lx minimum average in open areas between modules and in egress passageways	none	To provide a minimum level of performance for egress routes equivalent to that for means of egress.			

E12 Fire Protection in Buildings

Because of the limits on building size and required protection of sleeping rooms, the fire protection requirements in the Standard are generally more stringent than those in the NBC.

Table 12.1.2. Fire Separations and Fire Resistance Ratings identifies assemblies that must be constructed as fire separations and specifies minimum fire resistance ratings. The first three rows of Table apply to

- floor-ceiling assemblies between storeys
- loadbearing walls supporting the floor of a second storey, and
- loadbearing columns and arches supporting the floor of a second storey.

Table E12.1 below summarizes the first three rows of Table 12.1.2, considering the application of CAN/UL 2600 as stated in 1.2, and the parallel requirements in NBC Subsection 3.2.2, Building Size and Construction Relative to Occupancy. Observations on stringency with respect to NBC Part 3 are provided in Table E12.2. For relocatable buildings within the application of Part 9, the minimum fire-resistance ratings are the same.