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Evaluation Report
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Fox Blocks Insulating Concrete Form Wall System

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that "Fox Blocks Insulating Concrete Form Wall System" when used as an insulated concrete form in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 2005:

- Clause 1.2.1.1.(1)(a), Division A, using the following acceptable solutions from Division B:
  - Article 4.1.1.3. Design Requirements (structural loads and procedures)
  - Article 4.3.3.1. Design Basis for Plain, Reinforced and Pre-stressed Concrete
  - Subsection 9.3.1. Concrete
  - Section 9.4. Structural Requirements
  - Clause 9.15.1.1.(1)(c) General (footings and foundations)
  - Article 9.15.3.3. Application of Footing Width and Area Requirements
  - Clause 9.15.3.5.(1)(c) Adjustment of Footing Widths for Exterior Walls
  - Clause 9.20.1.1.(1)(b) General (masonry and insulating concrete form walls not in contact with the ground)
  - Sentence 9.20.1.1.(2) General (masonry and insulating concrete form walls not in contact with the ground)
  - Subsection 9.20.17. Above-Ground Flat Insulating Concrete Form Walls
- Clause 1.2.1.1.(1)(b), Division A, as an alternative solution that achieves at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the following applicable acceptable solutions:
  - Subsection 9.15.4. Foundation Walls
  - Article 9.20.1.2. Earthquake Reinforcement

This opinion is based on CCMC's evaluation of the technical evidence in Section 4.1 provided by the Report Holder.

2. Description

The products are modular, interlocking concrete forms consisting of two expanded polystyrene (EPS) Type 2 panels. The two polystyrene panels are connected by polypropylene webs which are molded into the polystyrene panels and equally spaced at 203 mm. The webs lock the two EPS panes together. The extremities of the webs are embedded 10 to 16 mm from the exterior surface of the EPS panels.

The forms have a preformed interlocking design along their top, bottom and side edges, which facilitates stacking and alignment. The interlocking design also helps prevent leakage of freshly poured concrete.

The forms are dry-laid and stacked in a running (staggered) configuration. The stacked forms create a rectangular space that, after being filled with concrete, form an insulated, monolithic concrete wall of uniform thickness.

Reinforcement is placed as required to satisfy strength requirements for above- or below-grade loadbearing walls, beams, lintels and shear walls.

The straight forms have external dimensions of 1219 mm in length and 406 mm in height. The polystyrene panels are 67 mm thick and the concrete walls are either 100 mm, 152 mm, 203 mm, or 304 mm thick, resulting in an overall wall thickness of 234 mm, 286 mm, 337 mm, or 438 mm. A standard unit is illustrated in Figure 1.

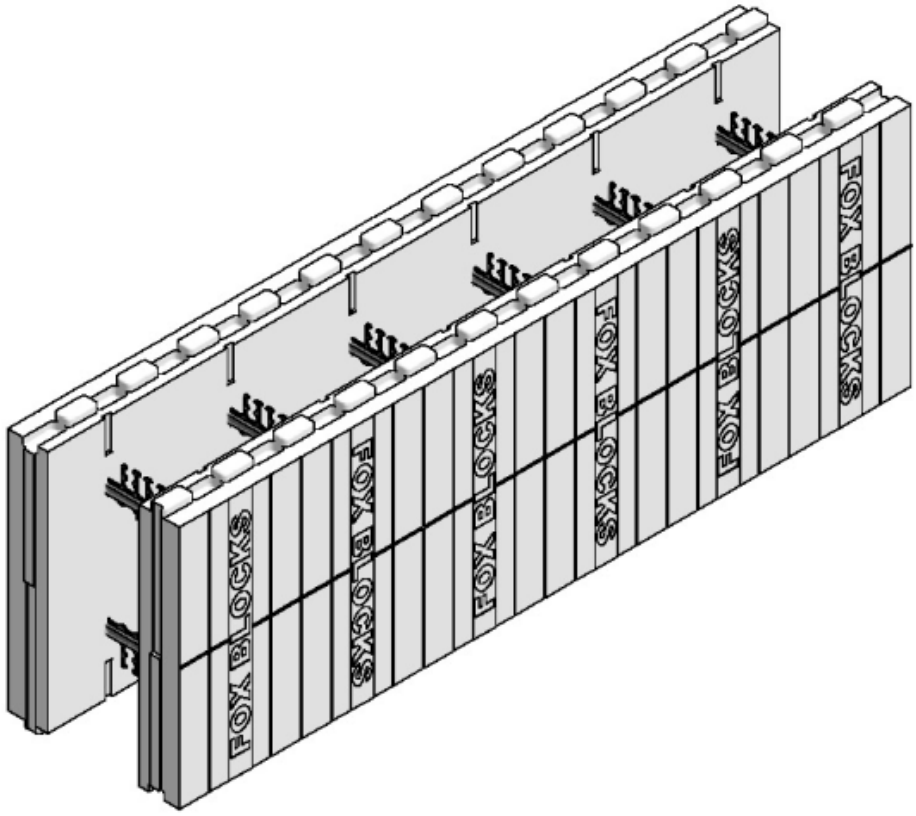

Figure 1. "Fox Blocks Insulating Concrete Form Wall System" standard unit

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the "Fox Blocks Insulating Concrete Form Wall System" being used in accordance with the conditions and limitations set out below.

- The use of the product is permitted in the construction of houses and small buildings up to two storeys above grade and one storey below grade that fall under the provisions of Part 9 of Division B of the NBC 2005, subject to all of the conditions listed below.

- The structural applications of this product must be in strict accordance with the design analysis as prepared for Airlite Plastic Co. by Barry-Bryan Associates, and included in the Engineering Analysis Report (BBA Project No. 10039), dated June 22, 2010, from which Tables 4.1.2.1.1 to 4.1.2.1.6 have been reproduced. When the product is used in structural applications outside the scope of the referenced design analysis, the engineering design analysis, related documents and drawings must bear the authorized seal of a registered professional engineer skilled in concrete design and licensed to practice under the appropriate provincial or territorial legislation. The engineer must certify that the construction provides a level of performance equivalent to that required by Part 4 and/or Part 9 of the NBC 2005.

- The maximum permitted building length is 24.4 m and the maximum permitted building width is 12.0 m. For buildings that exceed any of the above dimensions engineering is required on a case-by-case basis.

- For load-bearing walls and shear wall applications, the minimum core thickness of the product must be 150 mm.

- For non-load-bearing wall applications, the minimum core thickness of the product must be 100 mm.
- Concrete used with this system must comply with Subsection 9.3.1. of Division B of the NBC 2005. It must be Type 10 or Type 30 with a minimum compressive strength of 20 MPa and a maximum slump of 150 ± 12 mm.
- The maximum aggregate size to be used in conjunction with this product must be no greater than 14 mm.
- For the wall heights indicated in Tables 4.1.2.1.1 and 4.1.2.1.2, the pouring of concrete must be made at a rate of 1.3 m per hour in consecutive lifts; each lift is limited to a maximum height of 1.3 m.
- All point loads, such as concentrated loads created by girder trusses, columns and beams, must bear directly on top of the concrete wall and must not be supported in any manner to create an eccentric loading on the concrete wall.
- The concrete must be cured a minimum of seven days before backfilling. The wall must be laterally supported at the top and bottom prior to backfilling.
- The EPS insulation used in this system must comply with CAN/ULC-S701-05, “Standard For Thermal Insulation, Polystyrene, Boards and Pipe Covering,” Type 2 as a minimum.
- The EPS insulation panels must be aged for at least three weeks from their date of manufacturing.
- The concrete wall must be constructed on a footing designed as per Article 9.15.3.4., Basic Footing Widths and Areas, of Division B of the NBC 2005.
- The attachment of exterior cladding and interior finishing materials has not been assessed by the present evaluation. The exterior cladding attachment must be as per Part 5 of Division B of the NBC 2005 as stated in Sentence 9.27.1.1.(5), General (cladding), of Division B of the NBC 2005.
- The interior face of the panels must be protected from the inside of the building in accordance with Sentence 9.10.17.10.(1), Protection of Foamed Plastics, of Division B of the NBC 2005.
- For above-grade installations, the exterior face of the product must be protected with materials conforming to Article 9.20.6.4., Masonry Veneer, and Sections 9.27., Cladding, and/or 9.28., Stucco, of Division B of the NBC 2005.
- For below-grade installations, dampproofing must be provided in accordance with Article 9.13.2., Dampproofing, of Division B of the NBC 2005.
- Where hydrostatic pressure exists, waterproofing must be provided in accordance with Article 9.13.3., Waterproofing, of Division B of the NBC 2005.
- For foundation-wall installations, the backfill must be placed in such a way as to avoid damaging the wall, the exterior insulation panel and the waterproofing and dampproofing protection. The backfill material must be well drained and a drainage system must be installed around the footing in accordance with the requirements of the NBC 2005.
- The installation of the product must be in strict compliance with Airlite Plastic Co installation instructions without conflicting with the requirements stated in the NBC 2005 or in this report. Only installers authorized by Airlite Plastic Co. shall be contracted to set up the wall system.

4. Technical Evidence

CCMC's Technical Guide for “Fox Blocks Insulating Concrete Form Wall System” sets out the nature of the technical evidence required by CCMC to enable it to evaluate a product as an acceptable or alternative solution in compliance with the NBC 2005. The Report Holder has submitted test results and documentation for CCMC's evaluation. Testing was conducted at independent laboratories recognized by CCMC. The corresponding test results for “Fox Blocks Insulating Concrete Form Wall System” are summarized below.

4.1 NBC 2005 Compliance Data for "Fox Blocks Insulating Concrete Form Wall System" on which CCMC Based its Opinion in Section 1

4.1.1 Material Requirements

4.1.1.1 Conformance of the EPS

Compliance of the expanded polystyrene thermal insulation with the requirements of CAN/ULC-S701-05 is covered under Intertek Testing Services NA LTD. certification program for the Omaha Plant, and through testing and quality control at the Northbridge Plant.

4.1.2 Design Requirements

4.1.2.1 Conformance of Structural Capacity (Steel Reinforcement Designs)

The design analysis in the Engineering Analysis Report provided to CCMC of walls using "Fox Blocks Insulating Concrete Form Wall System" provides a level of performance equivalent to that required by applicable provisions in Part 4 and/or Part 9 of Division B of the NBC 2005. The corresponding design analysis is summarized in Tables 4.1.2.1.1 to 4.1.2.1.6. The tables provide steel reinforcement specifications for a number of different wall and lintel applications based on specific structural loads. The design assumptions are indicated below each table.

Table 4.1.2.1.1 Vertical and horizontal steel reinforcement for below-grade walls[1]

Wall Height (m)	Backfill Height (m)	Max. Spacing for Vertical Reinforcement (mm)		Max. Spacing for Horizontal Reinforcement (mm)	
		152-mm Wall	203-mm Wall	152-mm Wall	203-mm Wall
2.44	1.22	10M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.52	10M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.82	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.12	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.05	1.22	10M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.52	10M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.82	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.12	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.42	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.74	15M @200	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.66	1.22	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.52	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	1.82	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.12	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.52	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	2.82	15M @ 200	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	3.12	-	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400
	3.35	-	15M @ 200	10M @ 200/15M @ 400	10M @ 200/15M @ 400

Notes to Table 4.1.2.1.1:

- Table cells without a value indicate that the spacing is not feasible with respect to the proposed backfill height.
- Where minimum reinforcement is shown as 10M @ 200/15M @ 400, there is the option of reinforcing with either 10M or 15M bar designations at the respective on-centre spacing indicated.

(1) Table 4.1.2.1.1 is based on the following assumptions:

- The design is applicable to all seismic zones.
- The design is applicable to structures that are to be constructed on soil Types A, B, C and D.
- Wall height is the distance from the top of the basement floor slab to the point of bearing for the floor system.
- Backfill height is the distance from the top of the basement floor slab to the finished exterior grade level.
- Maximum building width is 18.0 m.
- Maximum building length is 24.4 m.
- Maximum clear floor span is 6.0 m.
- Maximum clear roof span is 12.0 m.
- Minimum roof slope is 14 degrees from horizontal.
- Maximum factored wall pressure is 3.15 kPa (designed as component or cladding), used on above-grade portion of the wall.
- Loads from walls above are considered concentric and loads from the floors are considered eccentric.
- Roof unfactored dead load is 0.60 kPa.
- Floor unfactored dead load is 0.70 kPa.
- Roof unfactored live load is 0.5 kPa.
- Floor unfactored live load is 1.9 kPa.
- Roof unfactored snow load is 2.0 kPa.
- Unfactored soil surcharge live load is 2.4 kPa.
- Drained earth density is 1800 kg/m^3.
- Below-grade walls are to have an approved drainage system.
- The exterior walls are assumed to be clad with clay bricks of a density of 7.25 kN/m^3.
- Reinforcing bars shall be hard-grade deformed bars conforming to CAN/CSA G30.18, “Carbon Steel Bars for Concrete Reinforcement,” Grade 400. Specified yield strength of reinforcement, f'_y, is 400 MPa.
- Wall design detailing bends, placement, spacing, splicing and protection of reinforcement shall be in accordance with CAN/CSA A23.3 (R2004), “Design of Concrete Structures.”
- Reinforcement is assumed to be located in the middle of the wall thickness.
- Specified 28-day compressive strength of concrete, f'_c at 28 days, is 20 MPa.
- Concrete shall be allowed to cure for a minimum of seven days prior to backfilling.
- Basement walls are considered to be supported by an adequately designed floor system at the top.
- All materials and workmanship shall conform to the requirements of the NBC 2005 including any Revisions and Errata that have been released as of the issue date of this table.

Table 4.1.2.1.2 Vertical and horizontal steel reinforcement for above-grade walls(1)

Wall Height (m)	Max. Spacing for Vertical Reinforcement (mm)		Max. Spacing for Horizontal Reinforcement (mm)	
	152-mm Wall	203-mm Wall	152-mm Wall	203-mm Wall
Single-storey concrete construction supporting a wood-frame roof structure				
2.44	10M @ 400/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.05	10M @ 400/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.66	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
Ground floor concrete construction supporting a second storey wood-frame construction and wood-frame roof structure				
2.44	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.05	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.66	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
Ground floor concrete construction supporting a second storey concrete construction and a wood-frame roof structure				
2.44	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.05	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400
3.66	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400	10M @ 200/15M @ 400

Notes to Table 4.1.2.1.2:

- Where minimum reinforcement is shown as 10M @ 200/15M @ 400, there is the option of reinforcing with either 10M or 15M bar designations at the respective on-centre spacing indicated.

1. Table 4.1.2.1.2 is based on the following assumptions:

- The design is applicable to all seismic zones.
- The design is applicable for soil Types A, B, C and D.
- The design is applicable to a maximum factored wind wall pressure of 3.15 kPa (designed as component or cladding).
- Loads from the roof are considered concentric and loads from the floor are considered eccentric when applied at the face of the ICF unit.
- Floor framing and roof framing supported by the ICF wall system shall consist of either light gauge steel frame or wood frame construction.
- For allowable building dimensions, see Note (1) to Table 4.1.2.1.1.
- For assumed loads and densities of materials, see Note (1) to Table 4.1.2.1.1.
- For concrete and steel material properties, see Note (1) to Table 4.1.2.1.1.
- The vertical reinforcement shall be placed at the center of the wall.
- All materials and workmanship shall conform to the requirements of the NBC 2005 including any Revisions and Errata that have been released as of the issue date of this table.

Table 4.1.2.1.3(a) Minimum steel reinforcement of 400-mm deep lintels with a 152-mm concrete core[1]

Opening Width (mm)	Uniformly Distributed Load (kN/m)							
	2.0		5.0		10.0		15.0	
	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)
1000	1-15M	0	1-15M	0	1-15M	0	1-15M	0
1500	1-15M	750	1-15M	750	1-15M	750	1-15M	750
2000	1-15M	1000	1-15M	1000	1-15M	1000	1-15M	1000
2500	1-15M	1250	1-15M	1250	1-15M	1250	1-15M	1250
3000	1-15M	1500	1-15M	1500	1-15M	1500	1-15M	1500
3500	1-15M	1750	1-15M	1750	1-15M	1750	2-15M/1-20M	1750
4000	1-15M	2000	1-15M	2000	2-15M/1-20M	2000	2-20M/1-25M	2000
4500	1-15M	2250	1-15M	2250	2-20M/1-25M	2250	2-20M/1-25M	2250
5000	1-15M	2500	1-15M	2500	2-20M/1-25M	2500	–	–

Table 4.1.2.1.3(b) Minimum steel reinforcement of 400-mm deep lintels with a 152-mm concrete core (continued)[1]

Opening Width (mm)	Uniformly Distributed Load (kN/m)					
	20.0		25.0		30.0	
	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)
1000	1-15M	0	1-15M	0	1-15M	0
1500	1-15M	750	1-15M	750	1-15M	750
2000	1-15M	1000	1-15M	1000	1-15M	1000
2500	1-15M	1250	2-15M/1-20M	1250	2-15M/1-20M	1250
3000	2-15M/1-20M	1500	2-20M/1-25M	1500	2-20M/1-25M	1500
3500	2-20M/1-25M	1750	–	–	–	–
4000	–	–	–	–	–	–
4500	–	–	–	–	–	–
5000	–	–	–	–	–	–

Table 4.1.2.1.4(a) Minimum steel reinforcement of 400-mm deep lintels with a 203-mm concrete core[(1)]

Opening Width (mm)	Uniformly Distributed Load (kN/m)							
	2.0		5.0		10.0		15.0	
	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)
1000	1-15M	0	1-15M	0	1-15M	0	1-15M	0
1500	1-15M	750	1-15M	750	1-15M	750	1-15M	750
2000	1-15M	1000	1-15M	1000	1-15M	1000	1-15M	1000
2500	1-15M	1250	1-15M	1250	1-15M	1250	1-15M	1250
3000	1-15M	1500	1-15M	1500	1-15M	1500	1-15M	1500
3500	1-15M	1750	1-15M	1750	1-15M	1750	2-15M/1-20M	1750
4000	1-15M	2000	1-15M	2000	2-15M/1-20M	2000	2-15M/1-25M	2000
4500	1-15M	2250	1-15M	2250	2-15M/1-25M	2250	2-20M/1-25M	2250
5000	1-15M	2500	1-15M	2500	2-15M/1-25M	2500	1-30M	2500

Table 4.1.2.1.4(b) Minimum steel reinforcement of 400-mm deep lintels with a 203-mm concrete core (continued)[(1)]

Opening Width (mm)	Uniformly Distributed Load (kN/m)					
	20.0		25.0		30.0	
	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)	Bottom Steel	Stirrup End Dist. (mm)
1000	1-15M	0	1-15M	0	1-15M	0
1500	1-15M	750	1-15M	750	1-15M	750
2000	1-15M	1000	1-15M	1000	1-15M	1000
2500	1-15M	1250	2-15M/1-20M	1250	2-15M/1-20M	1250
3000	2-15M/1-20M	1500	2-15M/1-25M	1500	2-20M/1-25M	1500
3500	2-15M/1-25M	1750	2-20M/1-25M	1750	1-30M	1750
4000	2-20M/1-30M	2000	1-30M	2000	–	–
4500	1-30M	2250	–	–	–	–
5000	–	–	–	–	–	–

Notes to Tables 4.1.2.1.3(a) to 4.1.2.1.4(b): Table cells without a value indicate that the load is not feasible with respect to the proposed core thickness.

1. Tables 4.1.2.1.3(a) to 4.1.2.1.4(b) are based on the following assumptions:

- Stirrups are fabricated from 10M bars spaced at 175 mm on-centre for the full length of the lintel (except where the Stirrup End Distance is shown as “0” in the tables).
- Stirrups are to be tied to both the lintel reinforcement and a minimum 10M continuous bar at the top of the lintel.
- Load is factored and does not include weight of the wall above or self-weight of the lintel, which is to be calculated by the designer.
- One 10M continuous reinforcing bar is required at the top of the lintel.
- The lintel reinforcement must continue past the opening by a minimum of 600 mm or be lapped with standard hooked bars to the vertical reinforcing.
- For allowable building dimensions, see Note (1) to Table 4.1.2.1.1.
- For assumed loads and densities of materials, see Note (1) to Table 4.1.2.1.1.
- For concrete and steel material properties, see Note (1) to Table 4.1.2.1.1.
- Lintels are designed for uniformly distributed gravity line loads only. When the lintels must support point loads or none-uniform lateral loads, the design of the lintels shall be prepared by a registered professional engineer.
- Where two bars are called for in the table for lintels with a 152-mm core thickness, they shall be placed in two vertical layers with the second layer 100 mm above the bottom layer.
- For lintels with a 203-mm core thickness, the bottom steel is placed in one layer and where two bars are called for in the table, they shall be placed side by side spaced a minimum of 50 mm apart.
- Two 15M bars shall be placed vertically along the full length of the wall at each side of the opening as per CAN/CSA-A23.3 - Section 14.1.8.8.1.
- Minimum reinforcing at the bottom of the lintels must be one 15M bar per layer of steel as per CAN/CSA-A23.3 - Section 14.1.8.9.
- Maximum bar size for lintels with a 152-mm core thickness is 25M, and for lintels with a 203-mm core thickness is 30M.

Table 4.1.2.1.5 Minimum solid shear wall length perpendicular to building dimensions to resist lateral wind loads(1)

Wind Pressure (kPa)	Building Dimension (m)	Wall Thickness (mm)			
		152		203	
		2nd Floor	1st Floor	2nd Floor	1st Floor
0.35	6	1.2	1.2	1.2	1.2
	12	1.2	1.2	1.2	1.2
	15	1.2	1.2	1.2	1.2
	18	1.2	1.3	1.2	1.2
	21	1.2	1.4	1.2	1.4
	24	1.2	1.4	1.2	1.4
0.45	6	1.2	1.2	1.2	1.2
	12	1.2	1.2	1.2	1.2
	15	1.2	1.4	1.2	1.3
	18	1.2	1.4	1.2	1.4
	21	1.2	1.6	1.2	1.5
	24	1.2	1.8	1.2	1.7
0.55	6	1.2	1.2	1.2	1.2
	12	1.2	1.4	1.2	1.3
	15	1.2	1.4	1.2	1.4
	18	1.2	1.6	1.2	1.6
	21	1.2	1.8	1.2	1.8
	24	1.2	1.8	1.2	1.8
0.65	6	1.2	1.2	1.2	1.2
	12	1.2	1.4	1.2	1.4
	15	1.2	1.6	1.2	1.5
	18	1.2	1.8	1.2	1.8
	21	1.2	1.9	1.2	1.8
	24	1.2	2.1	1.2	2.0
0.85	6	1.2	1.2	1.2	1.2
	12	1.2	1.7	1.2	1.6
	15	1.2	1.8	1.2	1.8
	18	1.2	2.1	1.2	2.0
	21	1.3	2.2	1.3	2.2
	24	1.4	2.4	1.4	2.2

Table 4.1.2.1.5 Minimum solid shear wall length perpendicular to building dimensions to resist lateral wind loads (Cont'd)(1)

Wind Pressure (kPa)	Building Dimension (m)	Wall Thickness (mm)			
		152		203	
		2nd Floor	1st Floor	2nd Floor	1st Floor
1.05	6	1.2	1.3	1.2	1.2
	12	1.2	1.8	1.2	1.8
	15	1.2	2.1	1.2	2.0
	18	1.4	2.2	1.3	2.2
	21	1.4	2.5	1.4	2.4
	24	1.5	2.6	1.4	2.6

Notes to Table 4.1.2.1.5:

1. Table 4.1.2.1.5 is based on the following assumptions:

- Building dimension is for the face of the building being considered for wind loading and the required solid shear wall length listed is for the walls on both sides of the building perpendicular to that face. The designer is required to examine the building in both directions.
- Shear walls are required on each side of the building and acting in both directions. Intermediate bearing walls intersecting a building width must be designed as shear walls.
- Shear wall lengths are to be the more stringent of the seismic and wind requirements.
- Linear interpolation is permitted between hourly wind pressures and building lengths.
- Minimum horizontal and vertical reinforcing of 15M @ 400 mm on centre is required.
- For concrete and steel material properties, see Note (1) to Table 4.1.2.1.1.
- Maximum roof ridge height is 3.5 m above the top of the wall.
- Wind pressures listed in the table are factored and are for primary structural actions.
- Minimum shear wall lengths on building faces are to be 1.2 m.
- Shear walls shall have a maximum height of 3.66 m between diaphragm levels.
- Wind loads shown are considered to be an average pressure between windward and leeward faces of the building as well as between end zones and interior zones.
- Wall design detailing bends, placement, spacing, splicing and protection of reinforcement shall be in accordance with CAN/CSA-A23.3 (R2004).
- All materials and workmanship shall conform to the requirements of the NBC 2005 including any Revisions and Errata that have been released as of the issue date of this table.

Table 4.1.2.1.6 Minimum solid shear wall length for seismic loads(1)

$S_a(0.2)$	Building Length (m)	Building Width (m)	Wall Thickness (mm)			
			152		203	
			2nd Floor	1st Floor	2nd Floor	1st Floor
≤ 0.25	6	6	1.2	1.2	1.2	1.2
		12	1.2	1.4	1.2	1.4
		15	1.2	1.5	1.2	1.5
		18	1.2	1.7	1.2	1.7
		21	1.2	1.8	1.2	1.8
		24	1.2	1.8	1.2	1.8
	12	6	1.2	1.4	1.2	1.4
		12	1.2	1.7	1.2	1.7
		15	1.2	1.8	1.2	1.8
		18	1.2	1.9	1.2	1.9
		21	1.3	2.1	1.3	2.1
		24	1.4	2.2	1.4	2.2
	18	6	1.2	1.7	1.2	1.7
		12	1.2	1.9	1.2	1.9
		15	1.3	2.1	1.3	2.1
		18	1.4	2.2	1.4	2.2
		21	1.5	2.3	1.5	2.3
		24	1.5	2.4	1.5	2.4
0.35	6	6	1.2	1.3	1.2	1.3
		12	1.2	1.7	1.2	1.7
		15	1.2	1.8	1.2	1.8
		18	1.2	1.9	1.2	1.9
		21	1.3	2.1	1.3	2.1
		24	1.4	2.2	1.4	2.2
	12	6	1.2	1.7	1.2	1.7
		12	1.2	2.0	1.2	2.0
		15	1.4	2.2	1.4	2.2
		18	1.4	2.3	1.4	2.3
		21	1.5	2.4	1.5	2.4
		24	1.5	2.6	1.5	2.6

Table 4.1.2.1.6 Minimum solid shear wall length for seismic loads (cont'd)(1)

$S_a(0.2)$	Building Length (m)	Building Width (m)	Wall Thickness (mm)			
			152		203	
			2nd Floor	1st Floor	2nd Floor	1st Floor
0.35	18	6	1.2	1.9	1.2	1.9
		12	1.4	2.2	1.4	2.2
		15	1.4	2.4	1.4	2.4
		18	1.6	2.6	1.6	2.6
		21	1.7	2.6	1.7	2.6
		24	1.8	2.8	1.8	2.8
0.5	6	6	1.2	1.5	1.2	1.5
		12	1.2	1.9	1.2	1.9
		15	1.3	2.2	1.3	2.2
		18	1.4	2.3	1.4	2.3
		21	1.5	2.4	1.5	2.4
		24	1.5	2.6	1.5	2.6
	12	6	1.2	1.9	1.2	1.9
		12	1.4	2.3	1.4	2.3
		15	1.5	2.5	1.5	2.5
		18	1.7	2.6	1.7	2.6
		21	1.8	2.8	1.8	2.8
		24	1.9	3.0	1.9	3.0
	18	6	1.4	2.3	1.4	2.3
		12	1.7	2.6	1.7	2.6
		15	1.8	2.9	1.8	2.9
		18	1.8	3.0	1.8	3.0
		21	2.0	3.1	2.0	3.1
		24	2.1	3.4	2.1	3.4

Table 4.1.2.1.6 Minimum solid shear wall length for seismic loads (cont'd)(1)

$S_a(0.2)$	Building Length (m)	Building Width (m)	Wall Thickness (mm)			
			152		203	
			2nd Floor	1st Floor	2nd Floor	1st Floor
0.75	6	6	1.2	1.8	1.2	1.8
		12	1.4	2.2	1.4	2.2
		15	1.5	2.5	1.5	2.5
		18	1.6	2.6	1.6	2.6
		21	1.8	2.9	1.8	2.9
		24	1.9	3.0	1.9	3.0
	12	6	1.4	2.2	1.4	2.2
		12	1.7	2.7	1.7	2.7
		15	1.8	3.0	1.8	3.0
		18	1.9	3.1	1.9	3.1
		21	2.1	3.4	2.1	3.4
		24	2.2	3.5	2.2	3.5
	18	6	1.6	2.6	1.6	2.6
		12	1.9	3.1	1.9	3.1
		15	2.1	3.4	2.1	3.4
		18	2.2	3.5	2.2	3.5
		21	2.3	3.8	2.3	3.8
		24	2.5	3.9	2.5	3.9
1.0	6	6	1.3	2.2	1.3	2.2
		12	1.6	2.6	1.6	2.6
		15	1.8	2.9	1.8	2.9
		18	1.9	3.0	1.9	3.0
		21	2.0	3.4	2.0	3.4
		24	2.2	3.5	2.2	3.5
	12	6	1.6	2.6	1.6	2.6
		12	1.9	3.2	1.9	3.2
		15	2.2	3.4	2.2	3.4
		18	2.3	3.7	2.3	3.7
		21	2.4	3.8	2.4	3.8
		24	2.6	4.1	2.6	4.1

Table 4.1.2.1.6 Minimum solid shear wall length for seismic loads (cont'd)(1)

$S_a(0.2)$	Building Length (m)	Building Width (m)	Wall Thickness (mm)			
			152		203	
			2nd Floor	1st Floor	2nd Floor	1st Floor
1.0	18	6	1.9	3.0	1.9	3.0
		12	2.3	3.7	2.3	3.7
		15	2.4	3.8	2.4	3.8
		18	2.6	4.2	2.6	4.2
		21	2.8	4.3	2.8	4.3
		24	2.9	4.6	2.9	4.6
≥ 1.25	6	6	1.4	2.2	1.4	2.2
		12	1.8	2.9	1.8	2.9
		15	1.9	3.1	1.9	3.1
		18	2.1	3.4	2.1	3.4
		21	2.2	3.5	2.2	3.5
		24	2.3	3.8	2.3	3.8
	12	6	1.8	2.9	1.8	2.9
		12	2.2	3.4	2.2	3.4
		15	2.3	3.7	2.3	3.7
		18	2.6	3.9	2.6	3.9
		21	2.7	4.2	2.7	4.2
		24	2.8	4.4	2.8	4.4
	18	6	2.1	3.4	2.1	3.4
		12	2.6	3.9	2.6	3.9
		15	2.7	4.2	2.7	4.2
		18	2.9	4.5	2.9	4.5
		21	3.0	4.6	3.0	4.6
		24	3.2	5.0	3.2	5.0

Notes to Table 4.1.2.1.6:

1. Table 4.1.2.1.6 is based on the following assumptions:

- Design applicable to soil Type A through D as defined in Table 4.1.8.4.A of Division B of the NBC 2005.
- Shear wall lengths are to be the more stringent of the seismic and wind requirements.
- Linear interpolation is not permitted.
- Minimum horizontal and vertical reinforcing of 15M @ 400 mm on centre is required.
- For concrete and steel material properties, see Note (1) to Table 4.1.2.1.1.
- Applicable to light gauge steel frame or wood frame roofing and floor systems.
- Shear walls are required on each side of the building and acting in both directions. Intermediate bearing walls intersecting a building width must be designed as shear walls.
- Minimum shear wall lengths on building faces are to be 1.2 m.
- Shear walls to have a maximum height of 3.66 m.
- Wall design detailing bends, placement, spacing, splicing and protection of reinforcement shall be in

accordance with CAN/CSA-A23.3 (R2004).

- All materials and workmanship shall conform to the requirements of the NBC 2005 including any Revisions and Errata that have been released as of the issue date of this table.

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