Advantage ICF PIB 207

Canadian Building Code Requirements for ICF Construction

Advantage ICF System®
Product Information Bulletin

Plasti-Fab EPS PRODUCT SOLUTIONS
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BULLETIN NO.	207
ISSUED:	August 10, 2016
REPLACES:	January 8, 2014

Canadian Building Code Prescriptive Requirements for ICF Construction

(see also attached Detail Dwgs. D.0.1, D.0.2 & D.0.3)

The National Building Code of Canada 2010 (NBC 2010), 2014 Alberta Building Code (2014 ABC) and 2012 British Columbia Building Code (2012 BCBC) provide *prescriptive* requirements for construction of concrete walls using insulating concrete forming (ICF) systems to form solid concrete walls of uniform thickness over their height and width. NBC 2010, 2014 ABC and 2012 BCBC, Division B, Sentence 9.3.1.1.(4) provides general requirements for concrete and reinforcing materials used for flat insulating concrete form (ICF) walls not exceeding 2 storeys in building height and having a maximum floor to floor height of 3 m.

The Advantage ICF System® combines rigid expanded polystyrene (EPS) insulation panels with a web and interlock connector system that results in a concrete wall of uniform thickness. The EPS insulation panels in the Advantage ICF System stay in place permanently to provide an insulated cast-in-place concrete wall resulting in a superior, energy efficient building envelope.

The table below summarizes requirements related to ICF foundation wall applications.

Foundation ICF Wall Applications
Sentences 9.13.2.4.(3) (***dampproofing***) and 9.13.3.4.(3) (***waterproofing***) – ICF surface preparation prior to application.
Clause 9.15.1.1.(1)(c) – General requirements for ***footings*** and ***foundations*** related to ICF foundation walls
Article 9.15.3.3. – Application of ***footing width or area*** requirements provided in Articles 9.15.3.4. to 9.15.3.7.
Article 9.15.3.4. – Calculation of basic ***footing width and area***
Article 9.15.3.5. – Adjustments to ***footing width and area*** for exterior walls
Sentence 9.15.3.8.(1) – ***Footing*** thickness
Sentence 9.15.3.9.(1) – ***Step footing*** minimum vertical rise and spacing requirements
Sentence 9.15.4.1.(1) – Reference to ***CAN/ULC-S701*** for EPS insulation used in ICF systems
Sentence 9.15.4.2.(2) – Minimum ***foundation*** wall thickness for ICF wall
Sentence 9.15.4.2.(3) – Required ***lateral support*** at top & bottom for ICF foundation wall
Sentence 9.15.4.3.(5) – ***Lateral support*** at the ***top of foundation*** wall using floor joists or floor system installed according to Article 9.20.17.5.
Sentence 9.15.4.4.(1) – ***Lateral support*** at ***bottom of foundation*** wall using shear key in footing & floor framing at the top of wall ***or*** 15M dowels extending out of the footing @ 1.2 m.
Article 9.15.4.5. and Tables 9.15.4.5.A. to 9.15.4.5.C. – ***Reinforcement*** for ICF walls
Article 9.20.17.5. – ***Framing*** supported on ledger boards ***on the side*** of ICF walls per Sentences 9.20.17.5.(1) to (3) or ***on top*** of ICF walls per Sentence 9.20.17.5.(4) anchored in accordance with Article 9.23.6.1.

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The table below summarizes requirements related to ICF walls not in contact with the ground (above-grade) to a maximum of two storeys in ***building height***. The code defines ***building height*** (in storeys) as the number of ***storeys*** contained ***between the roof and the floor of the first storey***. The ***first storey*** is defined as the uppermost storey having its ***floor level*** not more than 2 m above grade.

Above Grade ICF Wall Construction:
Clause 9.20.1.1.(1)(b) – ***General requirements*** for ICF above-grade walls
Article 9.20.17.1. – ***Thickness*** of flat ICF walls
Article 9.20.17.2. – ***Reinforcement*** for ICF walls
Article 9.20.17.3. – ***Openings in non-loadbearing*** ICF walls (drawing D.0.3, figure 1)
Article 9.20.17.4. – ***Openings in loadbearing*** ICF walls (drawing D.0.3, figure 2)
Article 9.20.17.5. – ***Framing*** supported on ledger boards ***on the side*** of ICF walls per Sentences 9.20.17.5.(1) to (3) or ***on top*** of ICF walls per Sentence 9.20.17.5.(4) anchored in accordance with Article 9.23.6.1.
Article 9.20.17.6. – ***Anchoring of roof framing*** to the top of ICF walls and attachment of ***roof framing to top plates*** in accordance with Table 9.23.3.4
Article 9.20.17.7. – ***Protection from Precipitation and Damage*** for above-grade walls in conformance with Section 9.27.

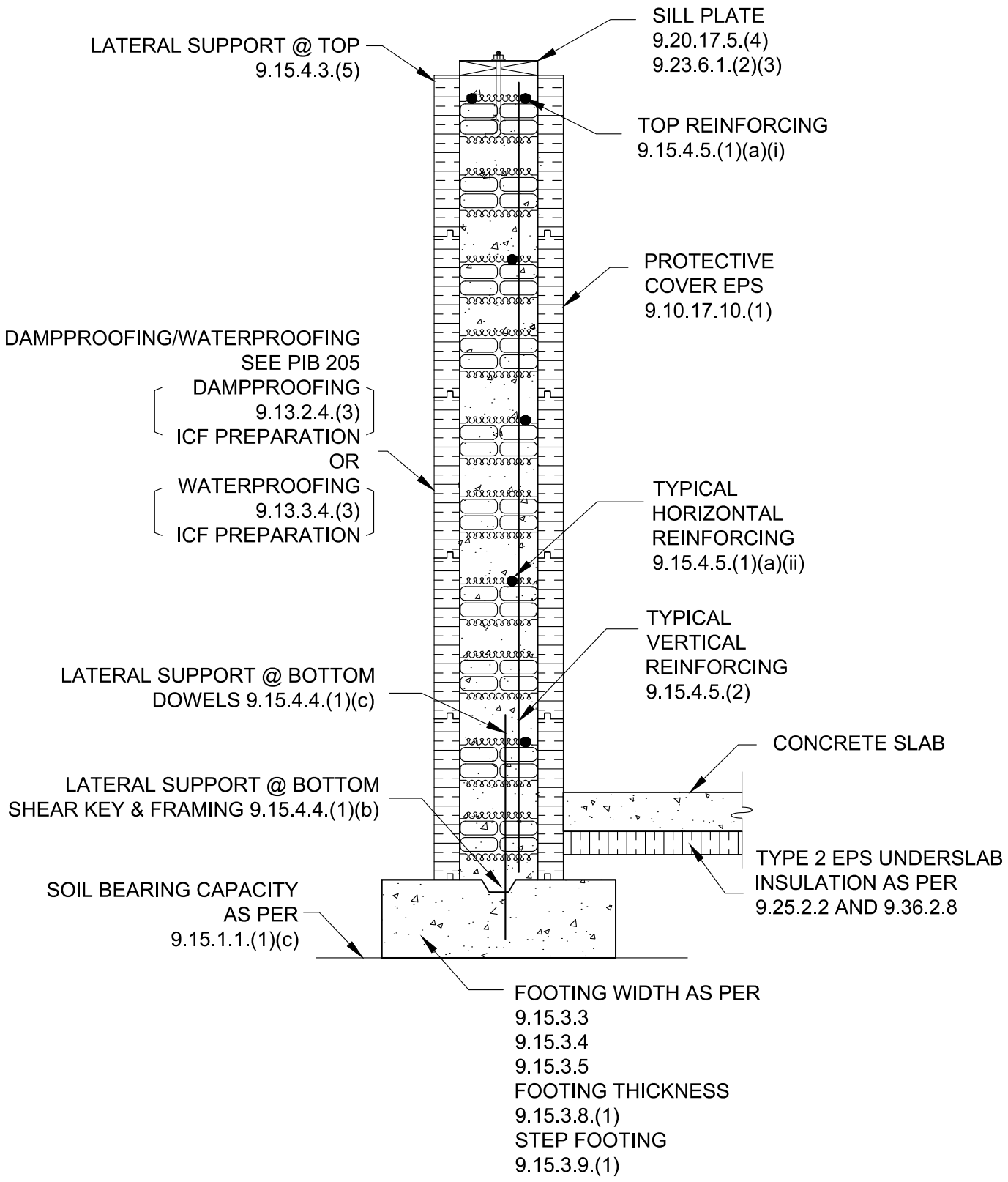
The following notes provide additional information related to wall construction using the Advantage ICF System:

1. For design conditions beyond the scope of the referenced building code provisions refer to the ***Advantage ICF System Design Manual***.
2. Refer to the ***Advantage ICF System Installation Manual*** for additional information on the construction of ICF walls using the Advantage ICF System.
3. NBC 2010, 2014 ABC and 2012 BCBC, Division B, Article 9.25.3.2. (**Air Barrier System Properties**) includes a reference to A-9.25.5.1.(1) in Appendix A. Table A-9.25.5.1.(1) indicates the air leakage characteristic is negligible and water vapour permeance is 23 ng/(Pa·s·m^2) for 50-mm reinforced concrete.
4. NBC 2010, 2014 ABC and 2012 BCBC, Division B, Article 9.25.4.2. (***Vapour Barrier Materials***) has been revised to add a new Sentence 9.25.4.2.(6) indicating that where insulation functions as the vapour barrier, it shall be sufficiently thick to meet the vapour material requirements.
   NOTE: Refer to Advantage ICF System Product Information Bulletin 209 for additional information on air barrier and vapour barrier system requirements.

The following detail drawings attached with this bulletin provide additional assistance to identify code requirements for ICF construction:

- **D.0.1 – *RESIDENTIAL FOUNDATION WALL PRESCRIPTIVE REQUIREMENTS PER NBC 2005 AND NBC 2010***.
- **D.0.2 – *RESIDENTIAL ABOVE-GROUND PRESCRIPTIVE REQUIREMENT PER NBC 2005 AND NBC 2010.***
- **D.0.3 – *RESIDENTIAL OPENINGS REINFORCING REQUIREMENT PER NBC 2005 AND NBC 2010.***

ICF FOUNDATION WALLS



NOTE: SEE D.0.3 FOR REINFORCING REQUIREMENT FOR OPENINGS

No.	REVISION DESCRIPTION	DATE	BY	CHKD	APPD

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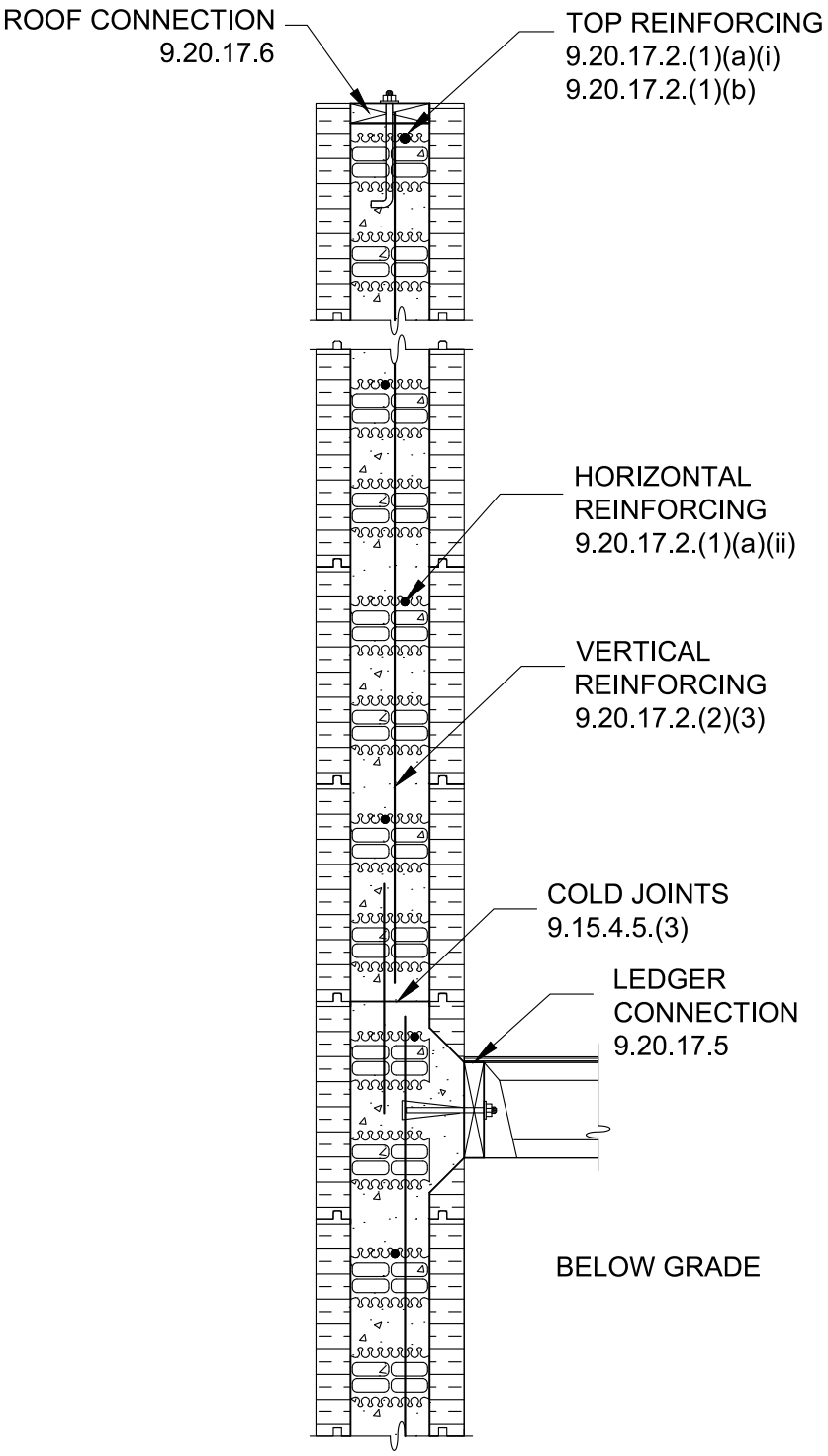
RESIDENTIAL FOUNDATION WALL
PRESCRIPTIVE REQUIREMENT
PER NBC 2005 AND NBC 2010

SCALE	NTS		
DESIGN	J WHALEN	DATE	DEC, 2013
DRAWN	L XIE	DATE	DEC, 2013
CHECKED	J WHALEN	DATE	DEC, 2013
DRAWING No.	D.0.1	REV.	

ABOVE-GROUND ICF WALLS



NOTE: SEE D.0.3 FOR REINFORCING REQUIREMENT FOR OPENINGS

No.	REVISION DESCRIPTION	DATE	BY	CHKD	APPD

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PLANT OR PROJECT: PLASTI-FAB LTD

RESIDENTIAL ABOVE-GROUND PRESCRIPTIVE REQUIREMENT PER NBC 2005 AND NBC 2010

SCALE: NTS

DESIGN	J WHALEN	DATE	DEC, 2013
DRAWN	L XIE	DATE	DEC, 2013
CHECKED	J WHALEN	DATE	DEC, 2013
DRAWING No.	D.0.2	REV.	

BELOW GRADE OPENING REINFORCING - SEE 9.15.4.5.(4)

ABOVE GRADE OPENING REINFORCING - SEE 9.20.17.3 AND 9.20.17.4

FIGURE 1 - OPENINGS IN NON-LOADBEARING WALLS

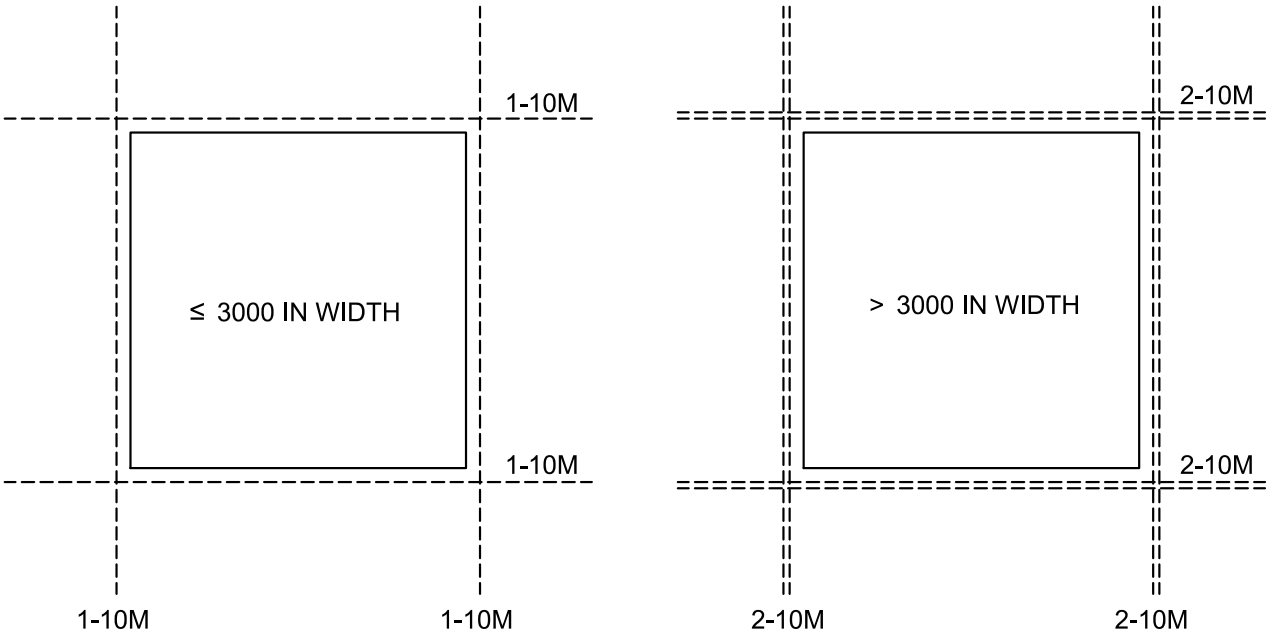
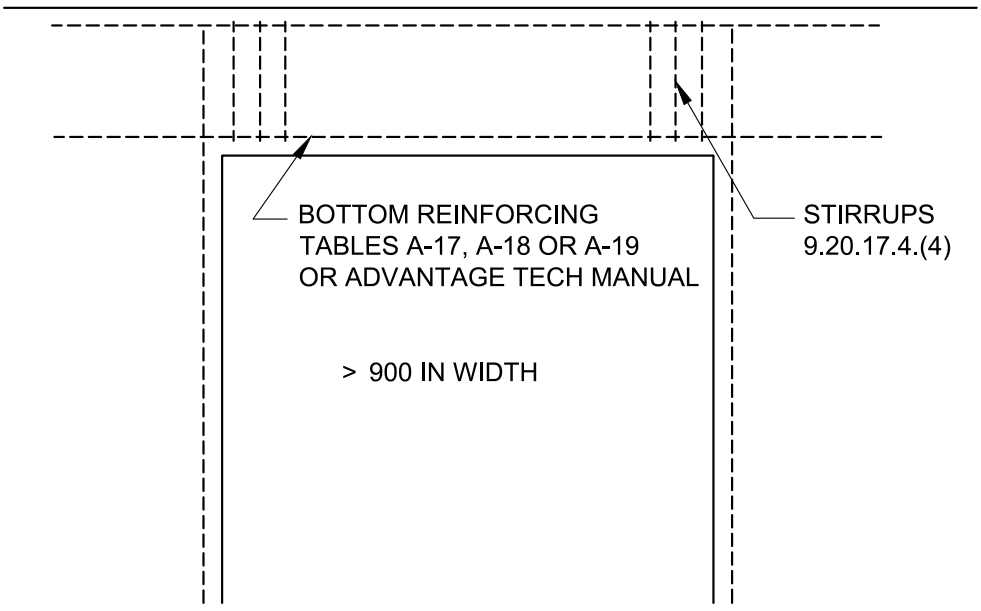


FIGURE 2 - OPENINGS IN LOADBEARING WALLS



No.	REVISION DESCRIPTION	DATE	BY	CHKD	APPD

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PLANT OR PROJECT: PLASTI-FAB LTD

RESIDENTIAL OPENINGS REINFORCING REQUIREMENT PER NBC 2005 AND NBC 2010

SCALE: NTS

DESIGN	J WHALEN	DATE DEC, 2013
DRAWN	L XIE	DATE DEC, 2013
CHECKED	J WHALEN	DATE DEC, 2013
DRAWING No.	D.0.3	REV.