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*EVALUATION
REPORT*

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Novabrik

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1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that dry-stacking concrete brick "Novabrik" can serve as masonry cladding for exterior walls of houses and small buildings in compliance with the intent of the National Building Code of Canada (NBC) 1995.

2. Opinion

Subject to the limitations and conditions stated in this report, test results and assessments provided by the proponent show that "Novabrik" complies

with CCMC's Technical Guide for Mortarless Concrete Brick Veneer, Masterformat Number 04818, dated 97-04-03, and provides a level of performance equivalent to that required in:

- NBC 1995, Article 9.20.6.4. Masonry Veneer Walls, and
- the "Novabrik" concrete brick masonry units conform to CSA Standard A165.2-94, Type I.

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

3. Description

"Novabrik" is a dry-stacking concrete brick masonry veneer for cladding new and existing buildings.

"Novabrik" consists of concrete brick masonry units factory-moulded into the following dimensions (length x width x height):

200 mm x 65 mm x 150 mm,
230 mm x 65 mm x 150 mm,
200 mm x 65 mm x 175 mm.

There are also exterior corner units, interior corner units, wainscot units and sill block units. (See figures 1, 2, 3, 4 and 5.)

The "Novabrik" cladding system consists of concrete brick masonry units attached to wood frame buildings. The units are tied to wood furring with #10 screws 64 mm long at a predetermined spacing. The wood furring is screwed to the wood studs of a building with #10 screws 254 mm on centre.

"Novabrik" serves as a non-loadbearing masonry rainscreen cladding. A PVC starter strip is used for alignment. The masonry units in the rows above are attached to the furring strips with screws every four rows.

Figure 6 shows construction details of the "Novabrik" system.

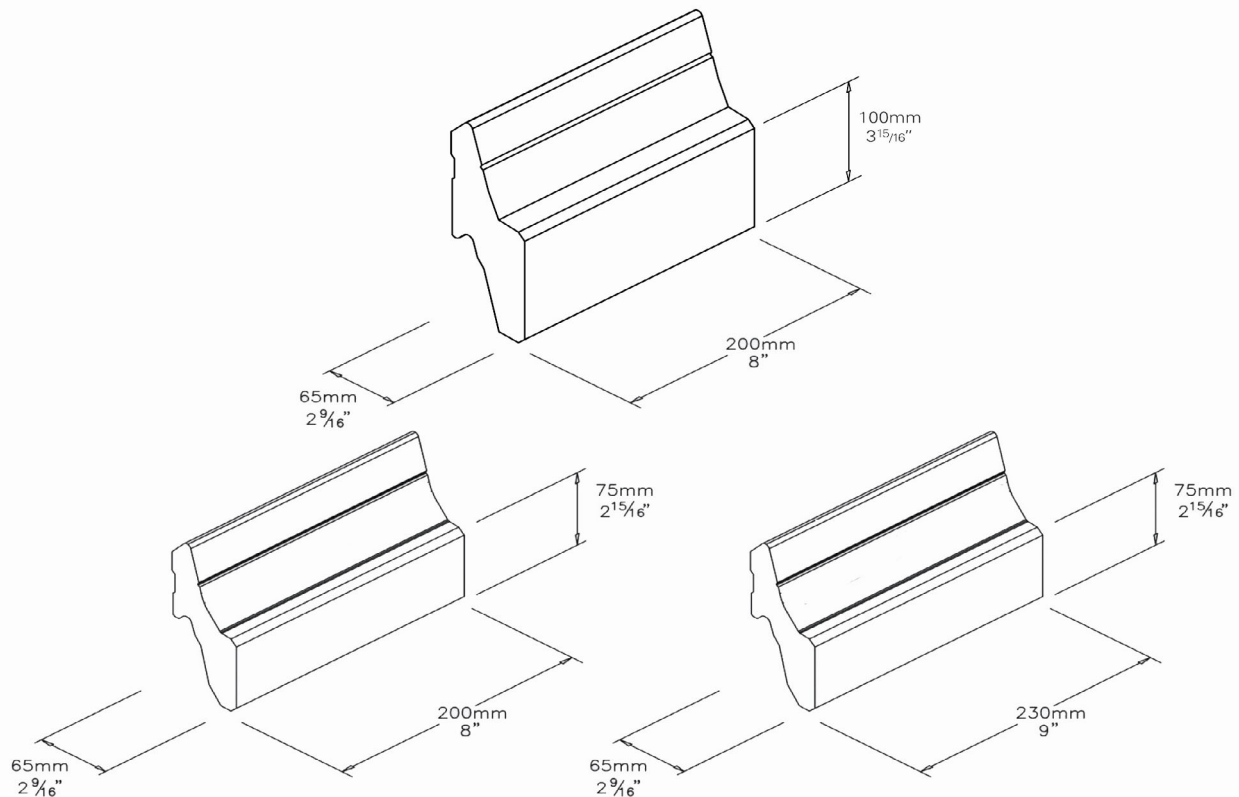


Figure 1. "Novabrik" Concrete Brick Masonry Unit

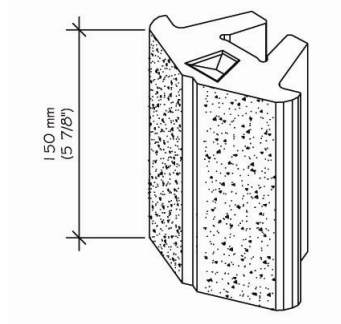
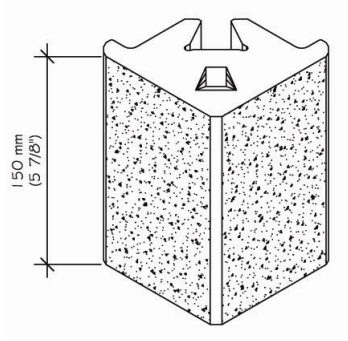


Figure 2. 90° exterior and interior corner units

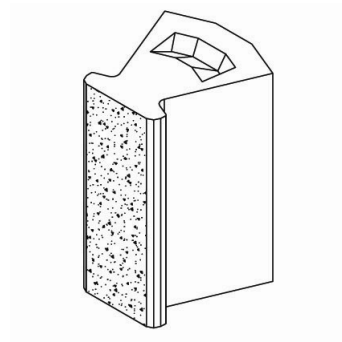
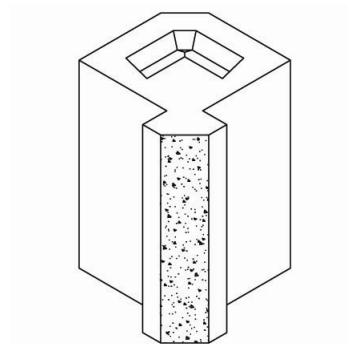


Figure 3. 45° exterior and interior corner units

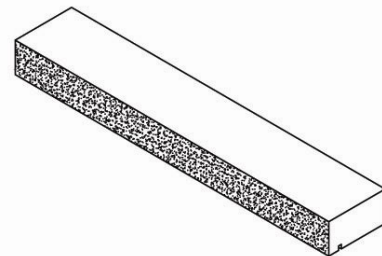
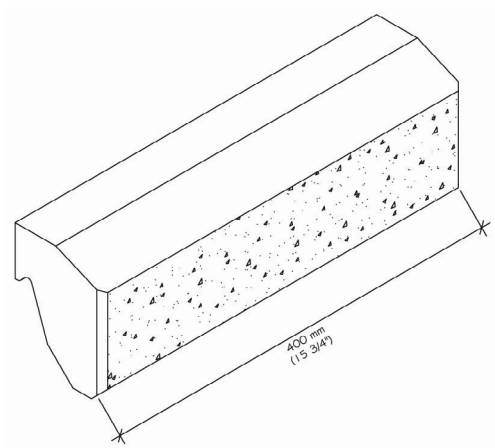


Figure 4. Wainscot and sill block units

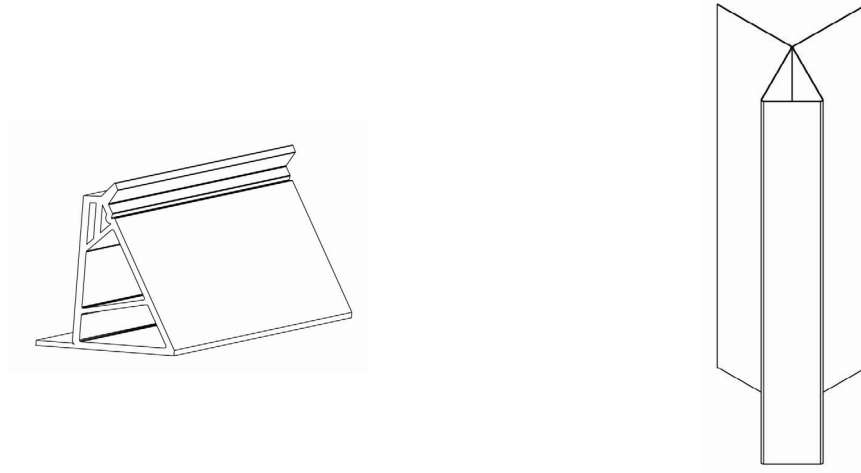


Figure 5. PVC starter strip and galvanized steel corner moulding (28 ga.)

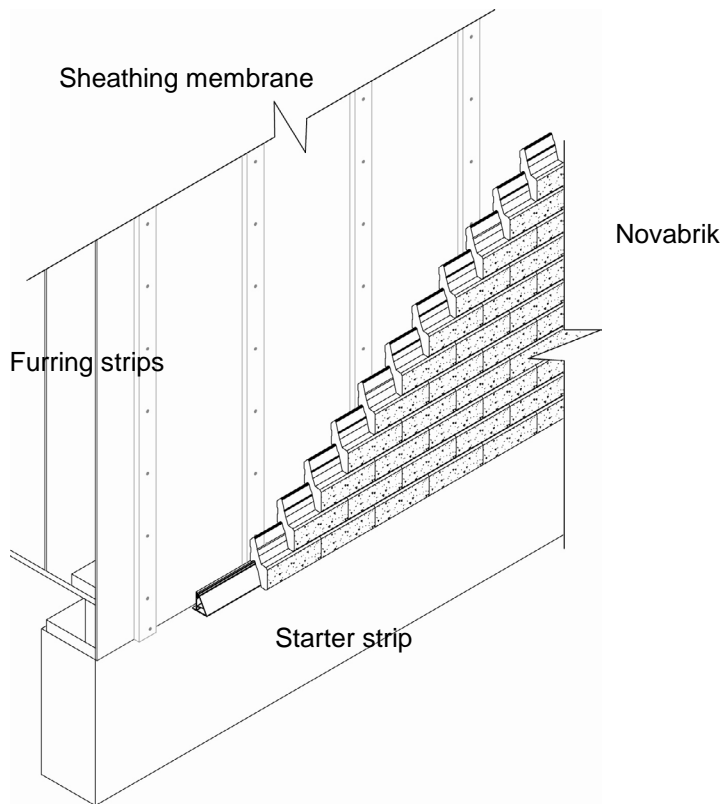


Figure 6. Typical construction details of “Novabrik” system

4. Usage and Limitations

“Novabrik” concrete brick masonry units may be used as cladding for wood frame housing and small buildings conforming to Part 9 of the NBC 1995, subject to the following conditions:

- A “Novabrik” cladded building shall conform to the requirements listed in Table 2.
- The screws attaching the “Novabrik” units to the wood furring must be:
 - (a) stainless steel in geographical areas less than 8 km from the ocean;
 - (b) in other areas, screws having corrosion protection equivalent to a coating of 305 g/m² of zinc on each exposed surface may be used. Zinc-aluminum alloy protection covered with a polytetrafluoroethylene finish (similar to teflon) would also be acceptable.
- Steel flashing and counterflashing units holding the window sill must comply with Section 3.1 of CSA-S136-94 and have a minimum protection coating of 275 g/m² (G90) or better.
- At least one layer of wall sheathing membrane conforming to NBC Subsection 9.23.17. must be installed on the wall sheathing prior to screwing the wood furring into the studs.
- An elastomeric membrane or metallic flashing must be used for flashing above window and door openings.
- The wall sheathing membrane shall overlap the elastomeric membrane by at least 100 mm.
- Wood furring must be fastened directly to the wood stud with #10 screws at 254 mm on centre.
- Only sound, undamaged components shall be used.
- Installation must follow the manufacturer’s current instructions. Detailed instructions for the installation of the concrete brick masonry units must be in accordance with the installation manual dated January 2004.
- This product must be identified with the phrase “CCMC 12833-R” on each pallet.
- Walls retrofitted with thermal insulation must meet the requirements for heat transfer, air leakage and condensation control of the NBC.
- In retrofit construction, the addition of thermal insulation into existing exterior walls may lead to the detrimental effects of moisture accumulation, as highlighted in Appendix note A 9.25.2.4.(3) of the NBC.
- All elements should have a mechanical connection to the wall either directly by screws or indirectly by interlock with elements that are directly connected (e.g. window sill). (See Figure 7.)
- Lintels above openings must be 19 mm thick plywood or 6 mm thick steel plate. The lintel must extend 300 mm on each side of the opening. Steel plate lintels must be at least 150 mm high and fastened by two rows of #10 screws at 75 mm on centre. The height and fastening of the plywood lintel is indicated in Table 3 based on the number of rows of masonry above the opening.

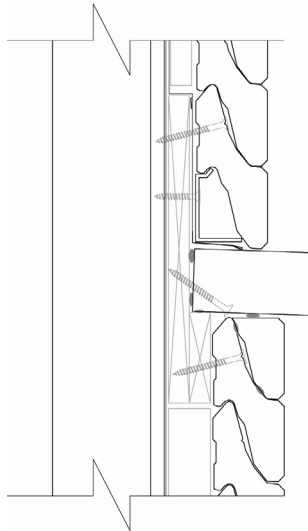


Figure 7. Detailed Mechanical Connection of the Concrete Window Sill

5. Performance

Test reports for “Novabrik” cladding system were provided by laboratories recognized by CCMC. The results are summarized as follow:

Table 1. Test Results for “Novabrik” Masonry Unit in Accordance with CSA-A165.2-94 Type I-25

Tests	Requirements	Results (Average of 5 Units)
Compressive Strength (MPa)	>25	36.2
Dry Mass Density (kg/m ³)	>2000	2300
Saturation Coefficient	<0.78	0.58
Water Absorption (% by weight)	<8	5.08

Table 2. Backup Wall Support Requirements

No. of Storeys (2.44 m high)	Wood Studs Wall Construction	Maximum Width of Building (m)
1	38 x 89 mm @ 600 mm c/c	10.67
	38 x 89 mm @ 400 mm c/c	15.25
	38 x 140 mm @ 600 mm c/c	15.25
	38 x 140 mm @ 400 mm c/c	15.25
2	38 x 89 mm @ 400 mm c/c	9.75
	38 x 140 mm @ 600 mm c/c	15.25
	38 x 140 mm @ 400 mm c/c	15.25
3	38 x 140 mm @ 400 mm c/c	15.25

Table 3. Lintels Above Openings Requirements – 75 mm (3 in.)

Height of 19 mm Thick Plywood Reinforcement Above Openings, mm								
Rows Supported	Width of opening (mm)							
	300	600	900	1200	1500	1800	2100	2400
1	130	130	130	130	130	130	130	130
2	130	130	130	130	130	130	130	150
3	130	130	130	130	130	130	150	200
4	130	130	130	130	130	150	200	200
5	130	130	130	130	150	200	200	250
6	130	130	130	130	150	200	200	250
7	130	130	130	130	200	200	250	250
8	130	130	130	150	200	200	250	300
9	130	130	130	150	200	250	250	300
10	130	130	130	150	200	250	300	300
11	130	130	130	200	200	250	300	350
12	130	130	130	200	200	250	300	350
13	130	130	130	200	250	250	300	350
14	130	130	150	200	250	300	350	350
15	130	130	150	200	250	300	350	400
20	130	130	200	250	300	350	400	450
25	130	130	200	250	300	350	450	500
30	130	150	200	300	350	400	450	560
35	130	150	250	300	350	450	500	560
40	130	150	250	300	400	450	560	610
45	130	200	250	350	400	500	560	Steel
50	130	200	250	350	450	500	610	Steel
55	130	200	300	350	450	560	610	Steel
60	130	200	300	400	450	610	Steel	Steel

Fastening of lintels:

Steel plate: Two rows of #10 screws @ 75 mm o.c.

Plywood: Up to 24 rows of bricks: two rows of #10 screws @ 250 mm on centre
 Between 25 and 39 rows of bricks: two rows of #10 screws @ 175 mm on centre
 Between 40 and 60 rows of bricks: three rows of #10 screws @ 175 mm on centre

A structural engineer shall be consulted about reinforcement dimensions.

Table 4. Lintels Above Openings Requirements – 100 mm (4 in.)

Height of 19 mm Thick Plywood Reinforcement Above Openings, mm								
Rows Supported	Width of opening (mm)							
	300	600	900	1200	1500	1800	2100	2400
1	169	169	169	169	169	169	169	169
2	169	169	169	169	169	169	203	271
3	169	169	169	169	169	203	271	271
4	169	169	169	169	203	271	271	338
5	169	169	169	169	271	271	338	338
6	169	169	169	203	271	271	338	406
7	169	169	169	203	271	338	338	406
8	169	169	169	271	271	338	406	473
9	169	169	169	271	271	338	406	473
10	169	169	169	271	338	338	406	473
11	169	169	203	271	338	406	473	541
15	169	169	271	280	406	473	541	609
19	169	169	271	280	406	473	609	
23	169	203	271	280	473	541	609	
26	169	203	338	280	473	609		
30	169	203	338	350	541	609		
34	169	271	338	473	541			
38	169	271	338	473	609			
41	169	271	406	473	609			
45	169	271	406	541	609			

Fastening of lintels:

Steel plate: Two rows of #10 screws @ 75 mm o.c.

Plywood: Up to 24 rows of bricks: two rows of #10 screws @ 250 mm on centre
 Between 25 and 39 rows of bricks: two rows of #10 screws @ 175 mm on centre
 Between 40 and 60 rows of bricks: three rows of #10 screws @ 175 mm on centre

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