Niagara Regional Group, Ltd.

Engineer Technical Information Package
INDEX

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Composite Masonry Wall

<table>
<thead>
<tr>
<th>Insulation</th>
<th>Material</th>
<th>Labor</th>
<th>Total</th>
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<tbody>
<tr>
<td>2&quot; Thick EPS</td>
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<td>$.34</td>
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<td></td>
<td>$6.50 (CMU, Brick &amp; Mat.)</td>
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<td>$27.00 Labor</td>
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<td>$34.82/ Sq. Ft.</td>
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Effective R-Value 18.50

NRG Insulated Wall System

<table>
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<th>Labor</th>
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<tr>
<td>10&quot;</td>
<td>Half High NRG ICMU Split Face (Earth tone)</td>
<td>$1.70 (w/Mat.)</td>
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<td>10&quot;</td>
<td>Half high NRG Wall Cost</td>
<td>$17.20 / Sq. ft.</td>
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Effective R-Value 19.80

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Effective R-Value 23.80

Mason: $34.85 / hr.
Laborer: $27.50 / hr.
Material: Rebar / CMU / Grout

Note: Estimates based on averaged labor & material cost in USA

Disclaimer Notice

This cost guide should never be used as the sole measurement, guide or considered mandatory. The final determination in cost must always be made in light of relevant market considerations such as availability of supplies, labor, inflation and competitive pressures.

Moreover, these cost are merely guides and should not be construed as correct or accurate estimating cost for any particular project. Because each project is unique and market considerations so relevant, each user of this guide is advised to consult a qualified mason contractor and not rely on cost herein contained.

As such, Niagara Regional Group, Ltd., and those cooperating with (NRG) assumes no liability for any consequences, which may follow the use of this cost guide and expressly disclaim any implied or impressed warranties with regard to such use and the cost herein contained.
Instructions for Installing NRG™ Wall Systems

STANDARD CONFIGURATION
* Blocks are placed in a wall with the "dog bone" side out.
* Use thumbholes for ease of installation.
* Align units so that all "dog bones" are facing the same way.
* Mortar face-shells only, keeping excess mortar off of the insulation.
* Mortar head joints keeping excess mortar off of the insulation. Insulation should be touching at all head joints.
* Block tender should align blocks in the same fashion according to mason's instructions.

VERTICAL REINFORCING
* Using the inner cores vertically reinforce this wall system the same as a regular or standard concrete masonry wall.

HORIZONTAL REINFORCING
* Truss-Type reinforcing must maintain 16-inch centers.
* Align units so that all "dog bones" are facing away from you.

NOTE: These illustrations are merely suggestions on how to install NRG blocks. Check with your architect or design engineer for specific details.
Specifications: NRG Insulated Wall System

**Specification:** Add, delete, or change any of the following, where local codes, standards, or practices require amendment.

**General Conditions Part I:** It is important to note that the NRGtm ICMU (Insulated Concrete Masonry Unit) is designed with an off-centered core configuration. Therefore, the vertical rebar (positioned and set in the poured foundation) must be matched to the same off-centered designation. (According to specific size units the position of the vertical rebar will vary.) i.e.: 12” ICMU offset is 2.5”

**General Conditions Part II:** List the requirements for mortar, reinforcing, concrete block work and other associated work and details that relate to this product. If this information is detailed in another section, it should be cross-referenced under this heading. The NRGtm Insulated Wall System is laid similar to any other block, either in a running bond or stacked bond. Units shall be presented to the mason, and the mason shall lay each ICMU with each “cap” on top of the block and facing the same direction. (To insure that the thermal mass of the unit is on the inside, face shell and thumb holes toward the outside exterior of the wall.) Note: This will also insure that the wall is laid with the tightest thermal barrier.

**Scope:** Interior and exterior walls shall be insulated, web-less, concrete masonry units as shown on the plans/ or indicated on the finish schedule.

**Material:** All insulated, web-less, concrete masonry units shall be NRGtm ICMU’s, except corner, half, solid bottom bond beam and sash units. These “special” units shall be conventional units and shall interspersed into the NRGtm wall construction where needed. Incorporation of conventional CMU’s into the NRGtm wall system will have no adverse effect upon thermal performance of the overall system. NRGtm ICMU’s are available from manufacturers licensed by *Niagara Regional Group, Ltd.* ICMU’s shall be specified as lightweight, medium weight, or normal weight NRGtm design units. All ICMU’s shall conform to ASTM C90 Standard Specification for load-bearing Type 1 moisture control units. Additives such as Dry-Blocktm or equivalent shall be specified into the mix design for the ICMU if the units are exposed to exterior environmental conditions. The NRGtm ICMU’s are available in a large variety of Face textures and colors. However, (Similar to any architectural block) not all manufacturers make all varieties. Therefore, check with local suppliers for availability.

**Submittal:** Submit color samples for selection from manufactures standard or custom series. Submit product literature, certificates, test reports, full size sample(s) of each color specified or selected and test reports for color stability performed under similar conditions of use to ensure against fading. A sample panel of no less than 4’x4’ may be constructed of units of each color and size to be used in the project (these units need not be NRGtm ICMU’s).
**Project Site Delivery:** NRGtm ICMU’s shall be wrapped and delivered on wooden pallets. Delivered pallets shall be set on level ground and single stacked. Glazed units shall be kept dry while stored by means of a waterproof covering, e.g. tarpaulin or plastic wrap.

**Face Sizes:** Modular 8”x 16”

**Face Mortar Joints:** 3/8” exposed.

**Hourly Fire Rating:** Define fire rating required as 1, 2, 3 or 4 hours (Depth of wall specified must increase as hour ratings increase).

**Shapes:** Shapes not available in the NRGtm design shall be substituted for using conventional hollow core CMU’s matching the same finish and color of the NRG tm units.

**Scoring:** Scoring of the face shall be accomplished through the molding process, or by cutting 3/8” wide x 1/4” deep grooves into the face of the ICMU’s or CMU’s. These grooves shall be pointed and tooled using the same mortar as used to lay the units. Face joints shall be 3/8” wide and the block joints on the sides, top and bottom shall be 3/8” wide, (thereby giving the visual effect of 8” x 8” squares)

**Miscellaneous Tools and Products Required by Masons:** Contractor shall include products such as mortar, reinforcing, ties, anchors, and other masonry attachments as may be required to properly finish the project. Striking or jointing tools, rags, and masonry cleaners shall also be required.

**Lighting:** Adequate lighting shall be provided for mason contractor’s work.

**Base Course:** Base course shall be properly aligned on the floor slab, or footer.

**Cove Base:** Cove base shall be tight to the slab if thin floor tiles (vinyl) is to be installed. For thicker flooring material cove base course shall be raised to desired height.

**Cutting:** All cuts for bonding, boxes, holes, etc. shall be made using a motor driven masonry saw using either an abrasive or diamond blade.

Note: the NRG unit should not be cut in half.

**Workmanship:** ICMU’s shall be laid with the faces level, plumb, and true to a line strung horizontally at the face. Units shall have uniform joint dimensions 1/4” both horizontal and vertical. Joints shall be tooled, straight and inform neatly after they are finger hard. Cut pieces shall be sized and placed appropriately to maintain consistency and bond. Masonry construction shall be completed using procedures and workmanship consistent with the best masonry practices.

**Scored Face Glazed Units:** Head and bed joints shall be raked back 1/4” after they have hardened, the scored unit shall be tuck pointed and joints raked out.
Reinforcing: Horizontal and other reinforcing shall be installed in locations designated.

Control Joints: Control joints shall be installed in the locations designated in design plans.

Weeps and Vents: The bottom 2” of the vertical joints shall be left open in every other block unit in the first course above grade. Such open joints shall also be left open above flashing, beam units, and filled block areas that act as water stops.

Coping: As shown in details/ Or specified.

Cleaning: Walls shall be kept clean during installation using brush or rags, and a clean damp cloth. Excess mortar clumps or smears shall not be allowed to harden onto surfaces. Green mortar to be removed with a dry cloth.

Final Clean down: The complete wall shall be cleaned with a detergent cleaner strictly following the cleaner manufacturers instructions including thorough rinsing. No acids or abrasives shall be used on the glazed surface. (Masonry cleaners such as VANATROL and DEOX have been used successfully).

Other Recommendations:

*All lighting should be placed a reasonable distance from wall for even illumination.

*When center scored units are used, the finished wall will be much neater to lay if stack bond is used. The use of scored units which have bonding patterns that do not require continuous vertical joints can be installed faster and more economically.

*Exterior mortar joints should be raked back a minimum of ¼” and tuck pointed with an approved water resistant grout. A typical exterior tuck pointing grout is “LATICRETE 1776 Grout Admix Plus” used full strength instead of mixing water. (“LATAPOXY SP 100” may be used for interior chemical resistant installation).
Door Frame Details

Wood door frame with and without plaster.

Flashing Details

NOTE: The outer concrete wall of an NRG unit has been intentionally designed thicker than conventional CMU's specifically to accommodate for free access of weepholes.

Metal door frames with and without plaster.
ALTERNATE COURSES

10X8X16 UNITS

FULL BLOCK

VERTICAL REBAR SUPPORT WITH GROUT

HALF BLOCK

(WINDOW OR DOOR WIDTH)
CORNER DETAIL FOR 10" BLOCK

10"x8"x16" BLOCK

1 5/8" x 5 5/8" x 7 5/8"

VERTICAL REBAR

8"x8"x16" CORNER

TURNING CORNER WITH 2" SOLID SECTION AND 8"x8"x16" CORNER BLOCK

CORNER DETAIL FOR 12" BLOCK

VERTICAL REBAR

2 1/2" x 3 5/8" x 7 5/8"

8"x8"x16"

12"x8"x16"

TURNING CORNER WITH BRICK AND 8"x8"x16" CORNER BLOCK
ALTERNATE COURSES

12X8X16 UNIT

8X8X16 UNIT

4X4X8 UNIT
ALTERNATE COURSES

10X8X16 UNIT

8X8X16 UNIT

2X6X8 UNIT
PRECAST CONC. CAP
3/8" DIA. ANCHOR BOLTS
CAULK
COUNTER FLASHING
ALL PURPOSE SEALANT
TERMINATION BAR FASTENERS
6" O.C.
BONDING ADHESIVE
60 MIL TPO ROOFING MEMBRANE
SAFETY TIE-BACK ANCHOR, REFER TO 16/A5
HOT AIR WELD
SEAM CAULK
60 MIL TPO ROOFING MEMBRANE
3" RIGID INSULATION

12" CMU
12" CMU
4" FACE BLOCK
12" CMU, GROUT CORES SOLID
STEEL ANGLE
HORIZONTAL REINFORCING
@ 16" O.C. VERTICALLY

FACE BLOCK
MORTAR NETTING
FLASHING
MORTAR NET TYPE
WEEP VENTS @ 32" O.C.
WF BEAM
GALVANIZED PLATE
BACKER ROD & CAULK
SHIM
ALUMINUM FRAME, GLAZING SYSTEM

SPRAY FIREPROOFING,
UNDERWITERS LABORATORIES
ASSEMBLY NO. UL PB14,
REFER TO TABLE 602 ON
DRG. A11-501 FOR FIRE
RATINGS.

2 1/2" MIL STUDS
@ 18" O.C.
W/ 1/2" DWB

3/4" PRESSURE TREATED PLYWOOD
NAILER
1/2" GYPSUM BOARD
"J" TRIM

1 EXTERIOR MASONRY WALL DETAIL
AS-3
SCALE 1" = 1'-0"
(MEASURE DETAIL 16/A5 FOR MORE INFO)
2 EXTERIOR MASONRY WALL DETAIL

NOTE: NRC INSULATED CONCRETE MASONRY UNITS SHALL BE IDENTIFIED AS ICWU. REMAINING MASONRY UNITS SHALL BE STANDARD CMU.
EXTERIOR MASONRY WALL DETAIL

4

A6-3 SCALE: T = 1'-0"

SEE STRUCTURAL DRAWINGS

8" C.M.U. GROUTED BLOCK

HORIZONTAL REINFORCING @ 16" O.C. VERTICALLY

2" RIGID INSULATION 2'-0" WIDE; HORIZONTAL AND VERTICAL

SEE FLOOR PLAN

MORTAR NET TYPE WEEP VENTS @ 32" O.C.

8" CHAMFERED SOLID BLOCK SEE 8/A5-3

4" GROUND FACE

RIGID INSULATION

FLASHING

MORTAR NETTING
MASONRY WALL DETAIL

SCALE 1" = 1'-0"

PRECAST CONC. CAP
3/6" DIA. ANCHOR BOLTS
CAULK
COUNTER FLASHING
ALL PURPOSE SEALANT
TERMINATION BAR FASTENERS
6" O.C.
BONDING ADHESIVE
60 MIL TPO ROOFING MEMBRANE
HOT AIR WELD
SEAM CAULK
60 MIL TPO ROOFING MEMBRANE
3" RIGID INSULATION

T.O.W.
EL. 17'-0"

1'-0"

3'-4" (GROUND FACE CAUL)

3/6" DIA. ANCHOR BOLTS

BOND BEAM (GROUT CORES SOLID)
SEE DWG. S5-2 FOR BOND BEAM CONFIG.

BOND BEAM (GROUT CORES SOLID)

SPLIT FACE CAUL

HORIZONTAL REINFORCING
16" O.C. VERTICALLY

ICMU

ICMU

ICMU

ICMU

ICMU

ICMU

ICMU

ICMU

ICMU

WF BEAM

SPRAY FIREPROOFING
UNDERWRITERS LABORATORIES
ASSEMBLY NO. UL PB14
REFER TO TABLE 602 ON DWG. A11-501 FOR FIRE RATINGS.

6 MASONRY WALL DETAIL
A5-3
MASONRY WALL DETAIL

SCALE 1' = 1'-0"

SPLASH FACE CHU

WF BEAM

SPRAY FIREPROOFING
UNDERWRITERS
LABORATORIES
ASSEMBLY NO. UL P814.
REFER TO TABLE 602 ON
DWG. A11-501 FOR FIRE
RATINGS.

ICMU

ICMU

ICMU

ICMU

ICMU

HORIZONTAL REINFORCING
○ 18" O.C. VERTICALLY

BOND BEAM (GROUT
CORES SOLID)
SEE DWG. S5-2 FOR
BOND BEAM CONFIG.

BOND BEAM (GROUT
CORES SOLID)

3/8", DIA.
ANCHOR BOLTS

COUNTER FLASHING

ALL PURPOSE SEALANT

TERMINATION BAR
FASTENERS
○ 6" O.C.

BONDING ADHESIVE
60 MIL TPO ROOFING
MEMBRANE

HOT AIR WELD
SEAM CAULK

60 MIL TPO ROOFING
MEMBRANE

3" RIGID INSULATION

PRECAST CONC.
CAP

ANCHOR BOLTS

CAULK
MASONRY WALL DETAIL

**7**

**A6-8**  SCALE 1" = 1'-0"
Horizontal Cross Area (A) = 152.86 in^2
Horizontal Net Area (An) = 97.91 in^2
Moment of Inertia (Ix) = 953.67 in^4
Section modulus (Zx) = 194.32 in^3
(Ix/An)^.5 = 3.12 in
Horizontal Cross Area \((A)\) = 183.59 in\(^2\)
Horizontal Net Area \((An)\) = 107.58 in\(^2\)
Moment of Inertia \((I_x)\) = 1613.64 in\(^4\)
Section modulus \((Z_x)\) = 265.31 in\(^3\)
\((I_x/An)^{.5}\) = 3.87 in
Flashing Details

Note: The outer concrete wall of an NRG unit has been intentionally designed thicker than conventional CMU's specifically to accommodate for free access of weepholes.

Floating Slab Foundation
NOTE: The outer concrete wall of an NRG unit has been intentionally designed thicker than conventional CMU’s specifically to accommodate for free access of weepholes.

Weephole Indications

EPS Insert

NRG ICMW Units

Full mortar bed

Standard CMU

Concrete floor

Compacted soil or fill

3/8” premolded joint

Insulation (if required)

Continuous reinforcement

Trench Type foundation
**Flashing Details**

Note: The outer concrete wall of an NRG unit has been intentionally designed thicker than conventional CMU's specifically to accommodate for free access of weepholes.

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**Spread Footing Foundation**
Flashing Single Whyth Walls at Sills

NOTE: Rake out vertical joints where masonry units butt up to window jambs and fill with sealant.

Concrete masonry sill unit or Precast concrete sill

Weepholes 24” (610mm) O.C.

1 1/2” (38mm) min.

Split faced ICMU’s

4” (10.2mm) CMU (solid or filled) To support flashing

Solid or filled ICMU to support flashing

EPS inserts
Flashing Details

Note: The outer concrete wall of an NRG unit has been intentionally designed thicker than conventional CMU's specifically to accommodate for free access of weepholes.

NRG ICMW Units

Weephole Indications

EPS Insert

12" Standard CMU

CONCRETE TOPPING

GROUT IN DOWELS

PARALLEL TO WALL

PERPENDICULAR TO WALL

Wall Details at Precast Concrete Floors
TYP. SECTION AT UNIT VENTILATOR LOCATIONS. SEE MECH.
PLANS FOR LOCATIONS. SEE ELEVATIONS FOR Louver LOCATIONS.
SEE STRUCTURAL DRAWINGS FOR HUNG LINTEL DETAIL
REFER TO STRUCTURAL DWGS
Sill (Fixed)

Scale: 3" = 1'-0"
Head (Fixed)

SCALE: 3"=1'-0"
Plan Detail

Scale: 3/4" = 1'-0"

Note:
Plan details refer to conditions on both the first and second floors.
Plan Detail

SCALE: 3/4" = 1' - 0"

NOTE:
Plan details refer to conditions on both the first and second floors.
Plan Detail

Scale: 3/4" = 1' - 0"

NOTE:
Plan details refer to conditions on both the first and second floors.
Plan Detail

Scale: 3/4"=1'-0"

Note:
Plan details refer to conditions on both the first and second floors.
Plan Detail

Scale: 3/4" = 1'-0"

Note:
Plan details refer to conditions on both the first and second floors.
Window Jamb (Project-out)

Scale: 3" = 1' - 0"
Window Jamb (Fixed)

SCALE: 3"=1'-0"
Window Head

SCALE: 3"=1'-0"