MASONRY
Institute of Michigan

12" SINGLE WYTHE CMU

- "SEMI-HEATED" BUILDINGS/SPACES
- "HEATED" BUILDINGS/SPACES

HIGH PERFORMANCE ATTRIBUTES

- ARCHITECTURAL
- STRUCTURAL
- ENERGY
- FIRE
- SOUND
- MOISTURE
- AIR

FOR ADDITIONAL INFORMATION ON HIGH PERFORMANCE ATTRIBUTES OF MASONRY WALLS, SEE "MASS BENEFITS"

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12" ARCHITECTURAL CMU WALL

12" ARCHITECTURAL CMU WALL

CONTROL JOINT

CONTROL JOINT

SHEET METAL COPING

SHEET METAL COPING

GENERIC BUILDING

NOT TO SCALE

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NOTE: TOP OF CONCRETE SLAB TO BE ABOVE PAN FLASHING, BOTH OF WHICH ARE TO BE ABOVE FINISH GRADE.
ISOMETRIC VIEW

SECTION VIEW

SHORT SPAN
MASONRY LINTEL (PREFERRED)
(PREFERRED DETAIL)

NOTES:
1) LINTEL UNITS AND OPEN BOTTOM UNITS ARE NOT AVAILABLE WITH SPLIT-FACE CMU, THEREFORE THE DETAIL SHOWS A SMOOTH FACE UNIT.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE, SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

INSULATION (FOAM, LOOSE FILL OR INSERTS)

DRAINAGE MATERIAL

NOTE: MASONRY LINTEL MAY BE PRECAST OR FIELD ASSEMBLED

12" CMU

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACED @ 16" O.C.

PAN FLASHING SYSTEM

LINTEL UNIT (W/ REINF, PER STRUCTURAL DESIGN) GROUTED SOLID (NOTE #1)

3A
A-1
NOTES:

1) CONTINUE PAN FLASHING SYSTEM A MINIMUM OF ONE CELL BEYOND BOTH JAMB EDGES OF THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.


12" CMU

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACED @ 16" O.C. AND IN 1ST AND 2ND RED JOINTS ABOVE PAN FLASHING FROM C.J. TO C.J. (SEE SHEET A-10.2)

PAN FLASHING SYSTEM

GALVANIZED DOUBLE ANGLE STEEL LINTEL

INSULATION (FOAM, LOOSE FILL OR INSERTS)

DRAINAGE MATERIAL

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

GROUT CORES AND HEAD JOINTS SOLID

SHORT SPAN DOUBLE ANGLE STEEL LINTEL

3B

A-1

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ISOMETRIC VIEW

SECTION VIEW

NOTES:
1) NOTCH ENDS OF PRECAST LINTEL AS REQUIRED FOR VERTICAL REINFORCEMENT.
2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

12" CMU

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACED @ 16" O.C.

INSULATION (FOAM, LOOSE FILL OR INSERTS)

DRAINAGE MATERIAL

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

VERTICAL REINFORCEMENT BEYOND, SEE NOTE #1

NOTE: FOR AESTHETIC REASONS, THIS DETAIL IS NORMALLY USED ONLY ON WALLS CONSTRUCTED OF STANDARD UNITS, NOT THOSE WITH ARCHITECTURAL CMU UNITS.

SHORT SPAN PRECAST CONCRETE LINTEL

3C
A-1

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ISOMETRIC VIEW

SECTION VIEW

NOTES:

1) UNTEL UNITS AND OPEN BOTTOM UNITS ARE NOT AVAILABLE WITH SPLIT-FACE CMU. THEREFORE THE DETAIL SHOWS A SMOOTH FACE UNIT.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.


PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

INSULATION (FOAM, LOOSE FILL OR INSERTS)

DRAINAGE FILL MATERIAL

DRAINED UNIT (W/ REINF. PER STRUCTURAL DESIGN)

NOTE: MASONRY LINTEL MAY BE PRECAST OR FIELD ASSEMBLED

12" CMU

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACED @ 16" O.C.

PAN FLASHING SYSTEM

GROUT SOLID (IN ONE-LIFT) TOTAL NUMBER OF COURSES REQUIRED PER STRUCTURAL DESIGN (2 COURSES DEPICTED IN THIS DETAIL) (NOTE #1)
LADDER-TYPE HORIZONTAL
J O I N T R E N C O R F E N C E
S P A C E D @ 16" O.C. AND
IN 1ST. AND 2ND. SEE JOINTS
A B O V E P A N F L A S H I N G F R O M
C.J. T O C.J. (S E E S H E E T A-10.2)

12" C M U

I N S U L A T I O N (F O A M,
L O O S E F I L L O R I N S E R T S)

P A N F L A S H I N G
S Y S T E M

G R O U T S O L I D
(I N C L U D I N G H E A D J O I N T S)

F L E X I B L E M E M B R A N E
F L A S H I N G , F U L L Y A D H E R E D

T W O - P I E C E F L A S H I N G

S E E E N L A R G E D
D E T A I L B B - A - 7

D R A I N A G E M A T E R I A L

P A I N T (C A N F U N C T I O N A S
A N A I R B A R I E R , S E E
S H E E T A-12.2, N O T E # 2)

S O A P S - N O T C H E D A R O U N D
F L A N G E (B O T H S I D E S)

T W O - P I E C E F L E X I B L E A N C H O R I N E A C H
H E A D J O I N T I N E A C H S O A P C O U R S E
R E C E I V E R C O M P O N E N T M E C H A N I C A L L Y
F A S T E N E D T H R O U G H F U L L Y
A D H E R E D M E M B R A N E F L A S H I N G
O N E X T E R I O R S I D E O F L I N T E L

S T E E L B E A M U N T E L A S S E M B L Y
(C O R R O S I O N R E S I S T A N T)

S T E E L P L A T E

T U R N U P F L E X I B L E
M E M B R A N E F L A S H I N G A S
E N D D A M S (B E Y O N D)

S E C T I O N V I E W

N O T E : W I T H T H I S D E T A I L
S O A P S R E Q U I R E N O T C H I N G.

L O N G S P A N 1 6 "
D E P T H S T E E L L I N T E L D E T A I L

T H E D E C I S I O N T O U T L I T E T H I S I N F O R M A T I O N I S N O T W I T H I N T H E P U R S E W O R D S O F T H E M I M , a n d p e r s o n s m a k i n g u s e o f t h i s i n f o r m a t i o n d o s o a t t h e i r o w n r i s k . M I M m a k e s n o r e p r e s e n t a t i o n o r w a r r a n t i e s , e x p r e s s e d o r i m p l i c t , w i t h r e s p e c t t o t h e a c c u r a c y o r s u b s t a n t i a l t y o f t h i s i n f o r m a t i o n . M I M a n d i t s m e m b e r s d i s c l a i m l i a b i l i t y f o r d a m a g e s o f a n y k i n d , i n c l u d i n g a n y s p e c i a l , i n d i r e c t , i n c i d e n t a l , o r c o n s e q u e n t i a l d a m a g e s , w h i c h m a y r e s u l t f r o m t h e u s e o f t h i s i n f o r m a t i o n . T h i s i n f o r m a t i o n i s n o t t o b e i n t e r p r e t e d a s i n d i c a t i n g c o m p l i a n c e w i t h , o r w a l k e r o f , a n y p r o v i s i o n o f a n y a p p l i c a b l e b u i l d i n g c o d e , o r d a n c e , s t a n d a r d o r l e w.
NOTES:
1) CONTINUE PAN FLASHING SYSTEM A MINIMUM OF TWO CELLS BEYOND BOTH JAMB EDGES OF THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INURE DAMAGE. SEE PCA “ALUMINUM FRAMES IN MASONRY WALLS” FOR RECOMMENDATIONS.

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT
SPACED @ 18" O.C. AND IN 1ST. AND 2ND. BED JOINTS ABOVE PAN FLASHING FROM C.J. TO C.J. (SEE SHEET A-10.2)

12" CMU

INSULATION (FOAM, LOOSE FILL OR INSERTS)

PAN FLASHING SYSTEM

GROUT SOLID (INCLUDING HEAD JOINTS)

FLEXIBLE MEMBRANE FLASHING, FULLY ADHERED

TWO-PIECE FLASHING

SEE ENLARGED DETAIL BB/A-7 (SIMILAR)

DRAINAGE MATERIAL

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

SOAPS—(BOTH SIDES)

TWO-PIECE FLEXIBLE ANCHOR IN EACH HEAD JOINT IN EACH SOAP COURSE RECEIVER COMPONENT MECHANICALLY FASTENED THROUGH FULLY ADHERED MEMBRANE FLASHING ON EXTERIOR SIDE OF LINTEL

HSS STEEL LINTEL ASSEMBLY (CORROSION RESISTANT)

STEEL PLATE

TURN UP FLEXIBLE MEMBRANE FLASHING AS END DAMS (BEYOND)

LONG SPAN HSS STEEL LINTEL DETAIL

A-1

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SEALANT FILLET BEAD AT JAMB/SILL INTERFACE

SEALANT AT JAMB/SILL INTERFACE

METAL SILL W/HEMDED DRIP (BY OTHERS)

GROUT CORES AND HEAD JOINTS SOLID

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACE @ 18" O.C.

12" CMU

WINDOW FRAME

TURN UP METAL SILL AT JAMB (CONCEALED)

SEALANT OVER BACKER ROD

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

INSULATION (FOAM, LOOSE FILL OR INSERTS)

SECTION VIEW

ISOMETRIC VIEW

METAL SILL

5B

A-1
NOTE:
TURN UP FLEXIBLE MEMBRANE
FLASHING AS END DAMS AT
BOTH ENDS OF STEEL BEAM

(CMU NOT SHOWN FOR CLARITY)

FLEXIBLE MEMBRANE
FLASHING, FULLY ADHERED

RECEIVER COMPONENT
OF TWO-PIECE FLEXIBLE
ANCHOR MECHANICALLY
FASTENED THROUGH FULLY
ADHERED MEMBRANE
FLASHING ON EXTERIOR FACE

ANCHORS (BOTH SIDES)

1-1/2" MIN. LAP

METAL DRIP
w/ HEMMED
EDGE

SEALANT

FLEXIBLE MEMBRANE
FLASHING, FULLY ADHERED

RECEIVER COMPONENT
OF TWO-PIECE FLEXIBLE
ANCHOR MECHANICALLY
FASTENED THROUGH FULLY
ADHERED MEMBRANE
FLASHING ON EXTERIOR FACE

1 1/2" MINIMUM LAP

METAL DRIP
w/ HEMMED
EDGE

SEALANT

ANCHOR (BOTH SIDES)

RECEIVER COMPONENT
ON INTERIOR FACE
MECHANICALLY FASTENED
OR WELDED

ENLARGED FLASHING DETAIL
AT 16" DEPTH STEEL BEAM LINTELS

6B
A-5

ENLARGED FLASHING DETAIL
AT 8" DEPTH STEEL BEAM LINTELS

6A
A-5

ENLARGED TWO-PIECE FLASHING DETAIL

6C
A-5
EXTEND ROOFING MEMBRANE TO EXTERIOR, UNDERSIDE OF THE SHEET METAL COPING

12" SMOOTH FACE CMU

12" CMU

12" BOND BEAM (W/ REINF.)

LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT SPACED @ 16" O.C.

INTEGRAL WATER REPELLENT (IN CMU AND MORTAR) AND A POST-CLEANING FIELD-APPLIED WATER REPELLENT

TOOL MORTAR JOINT TO A CONCAVE PROFILE

SLOPING SHEET METAL COPING CAP WITH CONT. CLEAT, EA. SIDE

WOOD NAILER WITH ANCHOR BOLTS

GROUT CORES AND HEAD JOINTS SOLID @ PARAPET

VERTICAL REINFORCEMENT

AIR BARRIER IN WALL (SEE SHEET A-12, NOTE CO.11) VIA SOLID CRATING OR BY MEANS OF THE INSULATED INTERIOR SYSTEM

AIR BARRIER IN WALL (SEE SHEET A-12, NOTE CO.11) VIA SOLID CRATING OR BY MEANS OF THE INSULATED INTERIOR SYSTEM

INSULATED INTERIOR (SEE SHEET A-13) (NOT REQUIRED FOR "SEMI-HEATED" BUILDINGS/SPACES)

ISOMETRIC VIEW

SECTION VIEW

7A SHORT PARAPET DETAIL

A-2
NOTES:
1) THIS DETAIL ONLY APPLICABLE TO A REINFORCED WALL DUE TO FLASHING/BOND BREAK CONCERNS.

ISOMETRIC VIEW

ROOFING OPTION:
EXTEND ROOFING
MEMBRANE TO
EXTERIOR, UNDERSIDE
OF THE SHEET METAL
COPING

12" SMOOTH FACE CMU

NOTE:
VERTICAL REINFORCEMENT
NOT SHOWN FOR CLARITY

12" CMU

REMOVABLE FASTENERS
BY ROOFING
CONTRACTOR

PAN FLASHING SYSTEM

DRAINAGE MATERIAL

SECTION VIEW

28 Ga. STAINLESS STEEL FLASHING
W/ 2" VERTICAL LEG, HEMMED,
NO DRIP, HORIZONTAL LAP 4" (MIN.) W/
NON-SKINNING BUTYL SEALANT
(BY MASON CONTRACTOR)

1 1/2"

2" W/ 1/2" HEM

1 1/4" x 1/8" CONTINUOUS TERMINATION
BAR W/ REMOVEABLE FASTENERS
Ø 1" O.C. (MIN.) (BY ROOFING
CONTRACTOR)

COMPATIBLE METAL COUNTER FLASHING,
HEMMED, WITH DRIP, LAP 4"
(MIN.) W/ NON-SKINNING
BUTYL SEALANT (BY ROOFING
CONTRACTOR)

12" BOND BEAM
(W/ REINF.)

LADDER-TYPE HORIZ.
JOINT REINFORCEMENT
SPACED @ 16" O.C.

INTEGRAL WATER REPELLENT
(IN CMU AND MORTAR)
AND A POST-CLEANING FIELD-
APPLIED WATER REPELLENT

TOOL MORTAR JOINT
TO A CONCAVE PROFILE

INSULATION (FOAM,
LOOSE FILL OR INSERTS)

INSULATED INTERIOR
(SEE SHEET A-13)
(NOT REQUIRED FOR
"SEMI-HEATED" BUILDINGS/SPACES)

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MASONRY CONTROL JOINT - MICHIGAN DETAIL

CONTINUOUS HORIZONTAL STEEL REINFORCEMENT

CONTROL JOINT

GROUT BOND BEAM UNITS SOLID, CONTINUOUS

BOND BEAM UNITS (OMIT C.J. AT BOND BEAM)

RAKE JOINT TO RECEIVE SEALANT, BOTH SIDES

DISCONTINUE HORIZONTAL JOINT REINFORCEMENT @ CONTROL JOINT

#15 FELT BOND BREAKER, FIT TIGHT TO CORE FACE

GROUT OR MORTAR

RAKE JOINT TO RECEIVE SEALANT, BOTH SIDES

MASONRY CONTROL JOINT @ CONTINUOUS BOND BEAM DETAIL (PER STRUCTURAL REQUIREMENTS)

8C
A-9

MASONRY CONTROL JOINT - ALTERNATE DETAIL

LEAVE JOINT OPEN TO RECEIVE BACKER ROD AND SEALANT, BOTH SIDES

DISCONTINUE HORIZONTAL JOINT REINFORCEMENT @ CONTROL JOINT

PREFORMED CONTROL JOINT

CONTROL JOINT

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NOTES:

1) TRADITIONALLY, CONTROL JOINTS HAVE TYPICALLY BEEN LOCATED AT OR VERY CLOSE TO THE SIDES OF UNREINFORCED OPENINGS. HOWEVER IT IS THE MWI’s PREFERENCE FOR CONTROL JOINTS TO BE LOCATED AWAY FROM THE EDGE OF OPENINGS AND TO ADD REINFORCEMENT AROUND THE OPENINGS.

2) FOR BEST PERFORMANCE, THE VERTICAL REINFORCEMENT SHOULD BE PREFERABLY PLACED IN THE CELL IMMEDIATELY ADJACENT TO THE OPENING. HOWEVER IF THIS CELL IS CONGESTED, THE VERTICAL REINFORCEMENT MAY BE PLACED IN THE 2nd CELL FROM THE OPENING.

3) ON LONG SPAN OPENINGS IT IS RECOMMENDED TO GROUT BOTH THE 1st AND 2nd CELLS FROM THE OPENING TO PROVIDE ADDITIONAL RESISTANCE FOR ATTACHING THE DOOR OR WINDOW FRAME.

4) FOR CONTROL JOINT DETAILS SEE SHEET A-9.

5) FOR ADDITIONAL INFORMATION ON CONTROL JOINT SPACING/Locations, SEE NCMA TEK 10-3.
1) TRADITIONALLY, CONTROL JOINTS HAVE TYPICALLY BEEN LOCATED AT OR VERY CLOSE TO THE SIDES OF UNREINFORCED OPENINGS. HOWEVER, IT IS THE MWI'S PREFERENCE FOR CONTROL JOINTS TO BE LOCATED AWAY FROM THE EDGE OF OPENINGS AND TO ADD REINFORCEMENT AROUND THE OPENINGS.

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3) ON LONG SPAN OPENINGS IT IS RECOMMENDED TO GROUT BOTH THE 1st. AND 2nd. CELLS FROM THE OPENING TO PROVIDE ADDITIONAL RESISTANCE FOR ATTACHING THE DOOR OR WINDOW FRAME.

4) FOR CONTROL JOINT DETAILS SEE SHEET A-9.

5) FOR ADDITIONAL INFORMATION ON CONTROL JOINT SPACING/LOCATIONS, SEE NCMA TEK 10-3.
PLAN OF LINTEL/BEARING PLATE

NOTE: 8" BEARING IS SHOWN AND IS TYPICAL, BUT SHOULD BE INCREASED IF NECESSARY BASED ON STRUCTURAL BEARING CALCULATIONS

BEARING PLATE
BOTTOM FLANGE (AND WEB) OF LINTEL BEAM
"J" ANCHORS W/ THREADED PROJECTIONS. DO NOT FULLY TIGHTEN NUTS TO ALLOW FOR IN-PLANE MOVEMENT
SLOTTED HOLES IN BEAM FLANGES (NO WELDS)

LINTEL PLATE

STEEL REINFORCEMENT IN SOLID GROUTED CELLS
CONTROL JOINT (BACKER ROD AND SEALANT)

NOTE:
NO REINFORCEMENT (VERTICAL OR HORIZONTAL) SHALL PASS THROUGH THE CONTROL JOINT.

ELEVATION VIEW
NCMA RECOMMENDS WIRE: 24" LONG HORIZONTAL JOINT REINFORCEMENT AT LINTEL BEARING AND TWO COURSES BELOW LINTEL BEARING

OPENING

ISOMETRIC VIEW

SLIP PLANE/CONTROL JOINT @ LONG SPAN WIDE FLANGE STEEL LINTEL

STEEL BEARING PLATE WITH "J" ANCHORS (THREADED ON PROJECTION ABOVE BEARING PLATE)
BACKER ROD AND SEALANT ON BED JOINT ON ALL THREE EXPOSED FACES
FACE SHELL AND GROUT NOT SHOWN TO REVEAL BEARING PLATE AND ANCHORS
JAMB OPENING FACE

NOTES:
1) DO NOT WELD STEEL BEAM LINTEL PLATE TO BEARING PLATE (TYPICAL BOTH SIDES).
2) STEEL BEAM TO HAVE SLOTS ON BOTTOM FLANGES TO ALLOW FOR IN-PLANE MOVEMENT.

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"CONTROL LAYER" INFORMATION

1) THERMAL CONTROL LAYER OVERVIEW:

   1) FOR "SEMI-HEATED" BUILDINGS SEE NOTE 1A BELOW AND SHEET A-12.3.  
      (CONVENTIONAL UNITS - PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).

   2) FOR "HEATED" BUILDINGS:
      A) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND FULLY INSULATED ON THE INTERIOR
         FACE, SEE NOTE 1B BELOW AND SHEET A-13.  
         (CONVENTIONAL UNITS - PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).
      B) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND PARTIALLY INSULATED ON THE INTERIOR
         FACE, SEE NOTE 1B BELOW AND SHEETS A-12.4 THRU A-12.7 (CONVENTIONAL UNITS - COMCHECK METHOD).
      C) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND EXPOSED ON THE INTERIOR
         FACE (USING SPECIAL ENERGY UNITS), SEE NOTE 1B C Below AND SHEET A-12.8
         (SPECIALITY ENERGY UNITS - PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).

1A) THERMAL CONTROL LAYER - "SEMI-HEATED" BUILDINGS/SPACES:

   A) ASHRAE 90.1-2013 PRESCRIPTIVE COMPLIANCE REQUIREMENTS FOR MASS WALLS FOR CLIMATE ZONES 5, 6, & 7; AND ALTERNATE INSULATION OPTION:

   WALLS ABOVE GRADE

<table>
<thead>
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<th>ZONE</th>
<th>CONTINUOUS INSULATION METHOD (Rci MINIMUM)</th>
<th>Umux METHOD (Umax OF ENTIRE WALL ASSEMBLY)</th>
<th>ALTERNATE INSULATION OPTION</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>Rci ≥ 5.7</td>
<td>Uassembly ≤ 0.151</td>
<td>ASTM C90 CONCRETE BLOCK WALLS, UN-GRouted OR PARtially GRouted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AT 32°F OR LESS ON CENTER VERTICALLY AND 48°F OR LESS ON CENTER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HORIZONTALLY, WITH ALL UN-GROUTED CORES FILLED WITH MATERIAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HAVING A MAXIMUM THERMAL CONDUCTIVITY OF 0.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BTU-in/ft²·°F·H     COMPLY PER SECT. 5.5.3.2 EXCEPTION</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(SEE SHEET A-12.3)</td>
</tr>
<tr>
<td>6</td>
<td>Rci ≥ 5.7</td>
<td>Uassembly ≤ 0.151</td>
<td>NOT APPLICABLE</td>
</tr>
<tr>
<td>7</td>
<td>Rci ≥ 7.6</td>
<td>Uassembly ≤ 0.123</td>
<td>NOT APPLICABLE</td>
</tr>
</tbody>
</table>

   TABLE NOTES:
   1) MICHIGAN RANGES FROM ZONE 5 IN THE SOUTH TO ZONE 7 IN THE NORTH.
   2) SEE NCMA TEK 06-02C, TABLE 5, FOR R-VALUES AND U-FACTORS OF SINGLE WYTHE CONCRETE MASONRY WALLS, AND ADDITIONAL THERMAL DATA INFORMATION.

   B) IN ORDER TO USE THE PRESCRIPTIVE PROVISIONS OF REFERENCED ENERGY CODE, WALL OPENINGS ARE LIMITED TO A MAXIMUM

   40% OF GROSS WALL AREA, AND SKYLIGHTS ARE LIMITED TO A MAXIMUM 5% OF THE GROSS ROOF AREA.

1B) THERMAL CONTROL LAYER - "HEATED" BUILDINGS/SPACES:

   A) FOR OCCUPANCIES SUCH AS OFFICE, RETAIL, ASSEMBLY, ETC.; WHERE THE EXTERIOR WALLS ARE COMMONLY FINISHED ON THE INTERIOR SIDE
      WITH FURRING AND INSULATION, SEE SHEET A-13 FOR EXAMPLES OF INSULATION OPTIONS.

   B) FOR INDUSTRIAL WAREHOUSE OCCUPANCIES, IT IS POSSIBLE TO HAVE EXPOSED CMU ON THE LOWER PART OF THE WALL (FOR SUPERIOR DURABILITY), AND
      DIRECT APPLY RIGID FOAM INSULATION ON THE UPPER PART OF THE WALL. SEE SHEETS A-12.4 THRU A-12.7 FOR
      GUIDANCE ON USING "COMCHECK" TO ACHIEVE ENERGY CODE COMPLIANCE USING THIS APPROACH.

   C) SPECIAL ENERGY UNITS (PROPRIETARY) PROVIDE ANOTHER OPTION. SEE SHEET A-12.8 FOR ADDITIONAL INFORMATION.
2) AIR CONTROL LAYER:
   A) THE AIR CONTROL LAYER IS OFTEN REFERED TO AS AN "AIR BARRIER" (SYSTEM). SEVERAL PRODUCTS AND OPTIONS (SUCH AS LIQUID OR MEMBRANE APPLIED PROPRIETARY SYSTEMS) ARE AVAILABLE, WITH DIFFERING LEVELS OF COST AND COMPLEXITY. SEE NOTE # 2 ON SHEET A–13.1 FOR MORE COMMENTS ADDRESSING AN AIR CONTROL LAYER.

   B) THIS SET OF DETAILS REFLECTS AN AIR BARRIER SYSTEM ACHIEVED WITH SPECIFIC MASONRY DETAILING/CONSTRUCTION AND NON–PROPRIETARY COATINGS DESCRIBED IN NOTE C BELOW.

   C) THE FOLLOWING NON–PROPRIETARY COATINGS ARE CONSIDERED TO MEET AN AIR LEAKAGE OF LESS THE 0.04 CFM/SQ. FT. @ 75 Pa. (SEE NCMA TEK 6–14A FOR ADDITIONAL INFORMATION).

      1) PRESCRIPTIVE COMPLIANCE:
         - FULLY GROUTED CMU
         - CMU WALL WITH ONE APPLICATION OF BLOCK FILLER AND TWO APPLICATIONS OF A PAINT OR SEALER COATING
         - CMU WALL WITH A PORTLAND CEMENT/SAND PARGE, STUCCO OR PLASTER WITH A MINIMUM THICKNESS OF 1/2”.

      2) BY LABORATORY TESTING:
         - 12” CMU SEALED WITH AT LEAST (2) COATS OF COMMERCIAL–GRADE LATEX PAINT.
         - 8” CMU COATED WITH A SINGLE COAT OF HIGH QUALITY LATEX PAINT.
         - 8” CMU COATED WITH A SINGLE COAT OF MASONRY BLOCK FILLER.

3) MOISTURE CONTROL LAYER:
   A) SINGLE MY THE WALL ASSEMBLIES DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THESE DETAILS PROVIDE PROTECTION AGAINST WATER PENETRATION, ESPECIALLY FOR LOW–RISE BUILDINGS. FOR IMPROVED PROTECTION, CONSIDER THE DRAINAGE WALL ASSEMBLIES SHOWN IN M.I.M. DETAIL SET CW.6 (8” CAVITY WALL). SEE NOTE #3 ON SHEET A–13 FOR MORE COMMENTS ADDRESSING A VAPOR CONTROL LAYER.
SEMI-HEATED BUILDING W/CONVENTIONAL UNITS
(PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED)
ALTERNATE INSULATION OPTION

Bond Beam
≥48” O.C.

≥32” O.C. Grouted Cells

Grout

Insulation: Maximum Thermal Conductivity of 0.44 Btu-in/H-Ft² °F
(See NCMA TEK 6-2C, Table 5)
HEATED BUILDING W/CONVENTIONAL UNITS
(COMCHECK METHOD)
- Exposed on the Exterior
- Partially Insulated on the Interior

**Interior Side of Wall**

<table>
<thead>
<tr>
<th>8&quot; CMU</th>
<th>polyisocyanurate, HD (interior face)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>2&quot;</td>
</tr>
<tr>
<td>---------</td>
<td>----</td>
</tr>
<tr>
<td>105</td>
<td>0.061</td>
</tr>
<tr>
<td>115</td>
<td>0.062</td>
</tr>
<tr>
<td>125</td>
<td>0.062</td>
</tr>
<tr>
<td>135</td>
<td>0.062</td>
</tr>
</tbody>
</table>

Select $U_T$

Select $U_B$

See Sheet A-12.5 for Cell Fill

**Cell Fill**
- Polyurethane
- Perlite
- Vermiculite
- Inserts

**SAMPLE WALL FOR COMCHECK EXAMPLE**

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HEATED BUILDING W/CONVENTIONAL UNITS
(COMCHECK METHOD)

• Exposed on the Exterior
• Partially Insulated on the Interior

**POLYURETHANE**

<table>
<thead>
<tr>
<th>12&quot; CMU</th>
<th>B20SPACING, polyurethane framed-in-place, R=5.9 perlin. (cell fill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENSITY</td>
<td>8&quot;</td>
</tr>
<tr>
<td>105</td>
<td>0.247</td>
</tr>
<tr>
<td>115</td>
<td>0.246</td>
</tr>
<tr>
<td>125</td>
<td>0.266</td>
</tr>
<tr>
<td>135</td>
<td>0.285</td>
</tr>
</tbody>
</table>

**PERLITE**

<table>
<thead>
<tr>
<th>12&quot; CMU</th>
<th>B20SPACING, perlite, R=3.12 perlin. (cell fill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENSITY</td>
<td>8&quot;</td>
</tr>
<tr>
<td>105</td>
<td>0.247</td>
</tr>
<tr>
<td>115</td>
<td>0.246</td>
</tr>
<tr>
<td>125</td>
<td>0.266</td>
</tr>
<tr>
<td>135</td>
<td>0.285</td>
</tr>
</tbody>
</table>

**VERMICULITE**

<table>
<thead>
<tr>
<th>12&quot; CMU</th>
<th>B20SPACING, vermiculite, R=2.27 perlin. (cell fill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENSITY</td>
<td>8&quot;</td>
</tr>
<tr>
<td>105</td>
<td>0.247</td>
</tr>
<tr>
<td>115</td>
<td>0.246</td>
</tr>
<tr>
<td>125</td>
<td>0.266</td>
</tr>
<tr>
<td>135</td>
<td>0.285</td>
</tr>
</tbody>
</table>

Conventional Unit w/Insert*
(Typical U-values range from 0.14 to 0.20)

*NOTES:
1) This is a proprietary product, consult the manufacturer for U-Values and technical information and guidance for structural design.
2) Basis of design for Conventional Units with inserts is "Korfil ICON."

CONVENTIONAL CMU'S "UB" VALUES
**STEP 1:** Select Exterior Wall  
**STEP 2:** Select Other U-Factor Option  
**STEP 3:** Select Mass Wall

COMCHECK STEPS #1—#3

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### COMCHECK STEPS #4–#6

**STEP 4:** Enter Wall Area  
**STEP 5:** Select U-Factors from Tables and enter  
**STEP 6:** Select Heat Capacity from NCMA TEK 6-16A

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HEATED BUILDING W/SPECIALTY ENERGY UNITS
(PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED)
- Exposed on the Exterior
- Exposed on the Interior

Specialty Energy Unit

Special Energy Unit #1*
(Typical U-values range from 0.033 to 0.035)

Special Energy Unit #2*
(Typical U-values range from 0.07 to 0.09)

*NOTES:
1) These are proprietary products, consult the manufacturer for U-Values and technical information and guidance for structural design.
2) Basis of design for Special Energy Unit #1 is "Omniblock." Basis of design for Special Energy Unit #2 is "Korfil HiR-H."

<table>
<thead>
<tr>
<th>U_{max}</th>
<th>Zone 5</th>
<th>Zone 6</th>
<th>Zone 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.090</td>
<td>0.080</td>
<td>0.071</td>
</tr>
</tbody>
</table>
RIGID INSULATION WITH FURRING/GYP. BOARD

RIGID FOAM WITH COMPOSITE THERMAL BARRIER

SPRAY FOAM WITH METAL STUDS/GYP. BOARD

NOTES:

THE THREE OPTIONS SHOWN ABOVE:

1) ARE JUST A FEW REPRESENTATIVE SAMPLES OF THE MULTITUDE OF AVAILABLE INTERIOR INSULATION SYSTEMS:
   A) RIGID BOARD – EXTRUDED OR EXPANDED POLYSTYRENE, OR POLYSYNYLurate
   B) CLOSED-CELL SPRAY POLYURETHANE FOAM
   C) CELLULAR GLASS
   D) FIBROUS BATT
   E) FIBROUS BLOW-IN

2) DO NOT ADDRESS A VAPOUR CONTROL LAYER, AND HAVE VARYING LEVELS OF VAPOUR PERMEABILITY. THE DEGREE OF VAPOUR PERMEABILITY AND INTERIOR SPACE HUMIDITY SHOULD BE CAREFULLY EVALUATED (DEWPOINT ANALYSIS) IN ORDER TO ACHIEVE PROPER CONDENSATION CONTROL.

3) HAVE NOT BEEN ANALYZED FOR AIR CONTROL LAYER PERFORMANCE. THE OTHER DETAILS IN THIS SET REFLECT AN AIR BARRIER SYSTEM ACHIEVED WITH SPECIFIC MAsonRY DETAILING/CONSTRUCTION AND NON-PROPRIETARY COATINGS APPLIED DIRECTLY TO THE CMU (SEE SHEET A-12, NOTE #2). IF AN INTERIOR WALL INSULATION SYSTEM IS INCLUDED IN THE DESIGN, THE USER MAY WISH TO CONSIDER OTHER AIR BARRIER SYSTEMS (PERHAPS EVEN UTILIZING COMPONENTS OF THE INTERIOR WALL INSULATION SYSTEM, IF APPLICABLE).
1) THIS DETAIL ONLY APPLICABLE TO A REINFORCED WALL DUE TO FLASHING/BOND BREAK CONCERNS.

NOTE:
VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY

12" CMU

INSULATION (FOAM, LOOSE FILL OR INSERTS)

PAINT (CAN FUNCTION AS AN AIR BARRIER, SEE SHEET A-12.2, NOTE #2)

DRAINAGE MATERIAL

REMOVABLE FASTENERS BY ROOFING CONTRACTOR

12" BOND BEAM (W/ REINF.)

LADDER-TYPE HORIZ.-JOINT REINFORCEMENT SPACED @ 16" O.C.

INTEGRAL WATER REPELLENT (IN CMU AND MORTAR) AND A POST-CLEANING FIELD-APPLIED BREATHABLE WATER REPELLENT

PAN FLASHING SYSTEM DIRECTLY OVER THE METAL FLASHING

28 GA. STAINLESS STEEL FLASHING W/ 2" VERTICAL LEG, HEMMED, NO DRIP, HORIZONTAL LAP 4" (MIN.) W/ NON-SKINNING BUTYL SEALANT (BY MASON CONTRACTOR)

1 1/2" 2" W/ 1/2" HEM

1 1/4" x 1/8" CONTINUOUS TERMINATION BAR W/ REMOVABLE FASTENERS @ 16" O.C. (MIN.) (BY ROOFING CONTRACTOR)

COMPATIBLE METAL COUNTER FLASHING, HEMMED, WITH DRIP, LAP 4" (MIN.) W/ NON-SKINNING BUTYL SEALANT (BY ROOFING CONTRACTOR)

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