2015 Michigan Energy Code for Residential
Michigan Energy Code Training and Implementation Program

3.0 Hour Residential Program Course Number  PENDING
Michigan Residential Energy Code Training and Implementation Program:

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Instructor # 1540

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Instructor # 1616

**Course Number:** (Pending)

**3 Hours Technical:**
- All Categories
  - BI, BO, PR, MI, EI, PI
Project Support

Prepared by: The School of Planning, Design and Construction at Michigan State University.

Project funding provided by: DTE Energy

Additional support provided by:
• Navigant
• Midwest Energy Efficiency Alliance (MEEA)
Project Objectives

To train building officials, inspectors, home builders, subcontractors, suppliers, engineers and architects in the revised Michigan energy code for the purpose of:

1. Increasing understanding
2. Improving compliance
3. Reducing administrative time
4. Improving customer relationships
Presentation Overview

• Background on new code
• Michigan code status
• When does it apply?
• What’s new overview?
• Code requirements
• Will REScheck™ apply?
• Will “above code” programs comply?
• Additional Resources
Disclaimer

This presentation presents an educational overview of the significant changes in the Michigan Energy Code for Residential Buildings effective February 8, 2016.

While it is believed to be accurate it is not intended to substitute for actual code language. Code language is addressed only generally and is not verbatim, language is paraphrased and not all code sections are addressed in this presentation. Designers, contractors, code officials etc, should always use the actual code in projects.
Status of Residential Energy Codes

Michigan will change to an amended color February 8, 2016

Michigan Energy Code Adoption

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

DIRECTOR’S OFFICE

CONSTRUCTION CODE

Filed with the Secretary of State on October 9, 2015

Effective Feb 8, 2016

These rules take effect February 8, 2016.


R 408.30501, R 408.30505, R 408.30506, R 408.30507, R 408.30510, R 408.30512, R 408.30513, R 408.30514, R 408.30518, R 408.30520, R 408.30522, R 408.30522a, R 408.30527, R 408.30528a, R 408.30529, R 408.30536, R 408.30536a, R 408.30537, R 408.30537a, R 408.30537b, R 408.30537c, R 408.30541, R 408.30542, R 408.30544, R 408.30545, R 408.30545a, and R 408.30546 of the Michigan Administrative Code are amended and R 408.30500, R 408.30501a, R 408.30509a, R 408.30510a, R 408.30521a, R 408.30523, R 408.30523a, R 408.30525a, R 408.30533a, R 408.30533b, R 408.30537d, R 408.30541a, R 408.30544b, R 408.30544c, R 408.30547a, R 408.30547b, R 408.30547c, R 408.30547d, R 408.30547e, R 408.30547f and R 408.30547g are added and, R 408.30526, R 408.30531, R 408.30543, and R 408.30547 are rescinded as follows:
Michigan Energy Code Adoption


- Changes the order and section numbers within the code to reflect the new placement in Chapter 11
Obtaining Copies of the Code

• No longer available for purchase as Michigan Uniform Energy Code (MUEC) from Bureau of Construction Codes (BCC)

• Available from IECC in printed or downloadable form as part of MRC (2015)

Obtaining Copies of the Code


Visited Jan 18, 2016
Overview of Residential Code Requirements

- Focus is on building envelope
  - Ceilings, walls, windows, floors, foundations
  - Sets insulation and fenestration levels, and solar heat gain coefficients
  - Infiltration control - caulk and seal to prevent air leaks, and test
- Ducts, air handlers, filter boxes – seal, insulate, and test
- Limited space heating, air conditioning, and water heating requirements
  - Federal law sets most equipment efficiency requirements, not the I-codes
- No appliance requirements
- Lighting equipment – 75% of lamps to be high-efficacy lamps or 75% of lighting fixtures to have only high-efficacy lamps

Codes Baseline Study

2014-2015 study by DTE Energy and partners to determine opportunities to help construction community and code officials meet code requirements:

- **Goal 1**: understand performance of 2009 energy code
- **Goal 2**: identify opportunities to support code officials and construction community
- Interviews with 20+ building departments
- Invited to visit 124 residential new construction sites across the state

Thank you to everyone who participated!
Codes Baseline Study

Thanks to the support of the community, we were able to conduct visits in over 30 counties across Michigan.

- Took care to ensure data collected were representative of activity across the state based on:
  - Enforcement Jurisdiction
  - Climate Zone
  - Urban/Rural Construction
Building Departments Interviewed

• All departments interviewed were located in either DTE or CE territories, additional characteristics of the distribution of building departments interviewed are as follows:

Department Types

<table>
<thead>
<tr>
<th></th>
<th>State</th>
<th>County</th>
<th>City</th>
<th>Township</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Geographical Distribution

<table>
<thead>
<tr>
<th></th>
<th>Lower Peninsula</th>
<th>Upper Peninsula</th>
<th>Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Climate Zone Distribution

<table>
<thead>
<tr>
<th></th>
<th>5A</th>
<th>6A</th>
<th>All Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>
Codes Baseline Study

• 124 under-construction homes visited

• Compliance of any given home was not measured. Instead, individual measure observations were taken

<table>
<thead>
<tr>
<th>Item</th>
<th>Climate Zone</th>
<th>Achieved Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>ACH50</td>
<td>49</td>
<td>9</td>
</tr>
<tr>
<td>Ceiling R</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>Foundation (Floor/Basement/Glab R)</td>
<td>69</td>
<td>16</td>
</tr>
<tr>
<td>Target</td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>Duct Leakage</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>Window SHGC</td>
<td>57</td>
<td>12</td>
</tr>
<tr>
<td>Window U-Factor</td>
<td>62</td>
<td>12</td>
</tr>
<tr>
<td>Wall R</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>High Efficiency Lighting</td>
<td>66</td>
<td>12</td>
</tr>
</tbody>
</table>
Homes being built in Michigan are, on average, **significantly** more energy efficient than what was required by the 2009 code.
Identified four opportunities where DTE Energy can provide additional technical and other support:

- Exterior Wall Insulation
- Air Sealing
- Duct Sealing
- High Efficacy Lighting

Presentation addresses additional information around these areas
When Does it Apply?

- Applies to one and two family dwellings and townhouses
- Will be applied to buildings classified as R2, R3, R4 not more than three stories above grade
When Does it Apply?

Does not apply to buildings with:

Low energy usage
< 3.4 Btu/h/sq.ft. OR 1 watt/sq.ft. of floor area

OR unconditioned spaces
When Does it Apply?

- Other building types are under the Michigan commercial energy code provisions based on ASHRAE 90.1 (2007) as amended. This has not been changed at this time.

- The MI BCC Commercial Energy Code Revision Committee met during summer 2015 to consider the next commercial energy code, but it has not yet been adopted.
Application to additions and renovations

Additions, alteration, renovations and repairs to conform as relates to new construction

• Unaltered portions do not need to comply

• Additions can comply alone or in combination with existing building

• Window replacements are required to comply

• No exception to blower door testing for additions

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE
CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Exceptions for certain alterations, renovations and repairs:

• Storm windows over existing fenestration
• Glass only replacements
• Exposed, existing ceiling, wall or floor cavities if already filled with insulation
• Where existing roof, wall or floor cavity isn’t exposed

• Reroofing for roofs where neither sheathing nor insulation exposed
• Reroofing where roof is not part of thermal envelope (New exception added by Michigan)

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Compliance Terminology

Terminology

• **Prescriptive**
  - Required but can be lessened or eliminated in trade for compensating improvements elsewhere

• **Mandatory**
  - Required and cannot be traded down, even in the simulated performance path

• Some elements have “hard limits”
  - aka, “trade-off limits”
  - a prescriptive requirement that can only be traded so far
  - components can only be traded so far when complying with the performance requirements
Structure of MRC (2015) Chapter 11

Based on IECC 2015 with Michigan Amendments

Section N1101: General
Section N1102: Building Thermal Envelope **
Section N1103: Systems **
Section N1104: Electrical Power and Lighting Systems *
Section N1105: Simulated Performance Alternative (Performance)
Section N1106: Energy Rating Index Compliance Alternative **

Based on and modified from Index, Michigan Residential Code (2015)
Compliance - Four Approaches

- **Prescriptive**
  - “Prescriptive Packages Approach”

- **Trade-off**
  - “Trade-off Approach” (UA)

- **Performance**
  - “Performance Approach”

No Michigan specific version

*Residential Requirements of the 2009 IECC. U.S. DOE Building Energy Codes Program. (2010)*
Climate Zones are unchanged from former MUEC
The code is not intended to prevent installation of any material or prohibit design or method of construction that is not specifically prescribed in this code.

Such material, equipment, or design shall be approved by the code official.
Scope/Construction Documents

Information required:

- Insulation materials and R-values
- Fenestration U-Factors
- Area-weighted U-Factor calculations
- Mechanical, SWH, equipment types, sizes, and efficiencies
- Equipment and system controls
- Duct sealing, duct and pipe insulation and location
- Air sealing details

See code for complete list

Certificate

- Permanently posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building.
- Don't cover or obstruct the visibility of other required labels.
- Includes the following:
  - R-values of insulation installed for the thermal building envelope, including ducts outside conditioned spaces.
  - U-actors and SHGC for fenestration.
  - Area-weighted U-Factor and SHGC calculations.
  - Results from any required duct system and building envelope air leakage testing.
  - HVAC efficiencies and types.
  - SWH equipment.
  - Duct sealing, duct and pipe insulation and location.
  - Air sealing details.

Certificate (cont’d)

Certificate lists “gas-fired unvented room heater”, “electric furnace”, or “baseboard electric heater”, rather than listing an efficiency for those heating types.
Insulation Identification

- R-value labeled on product package
Chapter 3: Climate Zones

• Labeling requirements for fixed wall insulation
  – Compressing cotton, polyester, fiberglass, or mineral wool batts
    • Must have labeling on batt for compressed R-value

• Currently information is on packaging material per FTC requirements

Insulation Identification

- R-value listed on certification
- Installer signature and date
- Posted on site in conspicuous location
- Thermal resistance (R-value) determined in accordance with ASTM C 1363
R-values are to be printed on batt insulation or rigid foam board.

Blown-in insulation must have an insulation certificate at or near the opening of the attic.

The certificate should include:
- R-value of installed thickness
- Initial installed thickness
- Installed density
- Settled thickness/settled R-value
- Coverage area
- Number of bags installed

Insulation markers must be installed every 300 square feet and be marked with the minimum installed thickness and affixed to the trusses or joists.

Building Thermal Envelope consists of:

- Fenestration
- Ceilings
- Walls
  - Above grade
  - Below grade
  - Mass walls
- Floors
- Slabs
- Crawlspace
### Building Thermal Envelope - Changes

- Prescriptive R Values and U-Factors have some changes **

**Table 1102.1.1 (R402.1.1)**

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Fenestration U-Factor</th>
<th>Skylight U-Factor</th>
<th>Ceiling R-Value</th>
<th>Wood Frame Wall R-Value</th>
<th>Mass Wall R-Value</th>
<th>Floor R-Value</th>
<th>Basement Wall R-Value</th>
<th>Slab R-Value &amp; Depth</th>
<th>Crawl Space Wall R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A</td>
<td>0.32</td>
<td>0.55</td>
<td>38</td>
<td>20 or 13 + 5f</td>
<td>13/12</td>
<td>30e</td>
<td>10/13</td>
<td>10, 2 ft</td>
<td>15/19</td>
</tr>
<tr>
<td>6A</td>
<td>0.32</td>
<td>0.55</td>
<td>49</td>
<td>20 or 13 + 5f</td>
<td>15/19</td>
<td>30e</td>
<td>15/19</td>
<td>10, 4 ft</td>
<td>15/19</td>
</tr>
<tr>
<td>7</td>
<td>0.32</td>
<td>0.55</td>
<td>49</td>
<td>20 or 13 + 5f</td>
<td>19/21</td>
<td>38e</td>
<td>15/19</td>
<td>10, 4 ft</td>
<td>15/19</td>
</tr>
</tbody>
</table>

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**Notes:**
- R-values are minimums. U-factors are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-values specified in the table.
- The fenestration U-factor column excludes skylights.
- “15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” may be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. “10/13” means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- R-5 shall be added to the required slab edge R-values for heated slabs.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- First value is cavity insulation, second is continuous insulation or insulated siding, so “13 + 5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40% or less of the exterior, continuous insulation R-value may be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.
- The second R-value applies when more than 1/2 the insulation is on the interior of the mass wall.

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**Source:** DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
## Insulation Requirements

<table>
<thead>
<tr>
<th>Zone</th>
<th>New Code 2015 MRC Chapter 11</th>
<th>Old MUEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wood Frame Wall R-Value</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>20 or 13 +5</td>
<td>20 or 13 +5</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>20 or 13 +5</td>
<td>20 or 13 +5</td>
</tr>
<tr>
<td>Zone 7</td>
<td>20 or 13 +5</td>
<td>21</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td></td>
<td>Ceiling R-Value</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Zone 7</td>
<td>49</td>
<td>49</td>
</tr>
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<th>Old MUEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Floor R-Value</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Zone 7</td>
<td>38</td>
<td>38</td>
</tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basement Wall R-Value</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>10/13</td>
<td>10/13</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>15/19</td>
<td>15/19</td>
</tr>
<tr>
<td>Zone 7</td>
<td>15/19</td>
<td>15/19</td>
</tr>
</tbody>
</table>

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<th>Zone</th>
<th>New Code 2015 MRC Chapter 11</th>
<th>Old MUEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slab R-Value and Depth</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>10, 2ft</td>
<td>10, 2ft</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>10, 4ft</td>
<td>10, 4ft</td>
</tr>
<tr>
<td>Zone 7</td>
<td>10, 4ft</td>
<td>10, 4ft</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Zone</th>
<th>New Code 2015 MRC Chapter 11</th>
<th>Old MUEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crawl Space Wall R-Value</td>
<td></td>
</tr>
<tr>
<td>Zone 5A</td>
<td>15/19</td>
<td>10/13</td>
</tr>
<tr>
<td>Zone 6A</td>
<td>15/19</td>
<td>10/13</td>
</tr>
<tr>
<td>Zone 7</td>
<td>15/19</td>
<td>10/13</td>
</tr>
</tbody>
</table>

*Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015*
Prescriptive R Values and U-Factors have some changes

- Window U-Factors lowered from .35 to .32 (more energy efficient)
- Skylight U-Factors lowered from .6 to .55 (more energy efficient)
- Wood framed walls in Zone 7: lowered from R-21 to R-20 (less energy efficient)
- Mass walls: raised R value from R-19 to R-20 when insulation on interior (more energy efficient)
- Crawl space walls R values increased to R-15/19 from R-10/13 (more energy efficient)

U-Factor change for windows may be the most significant

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Various Michigan amended values are less than IECC 2015

- **Zone 5A Ceilings**
  - R-49 (IECC 2015)
  - R-38 (Michigan)

- **Zone 5A Basement walls**
  - R-15/19 (IECC 2015)
  - R-10/13 (Michigan)

- **Wood Framed Walls in Zone 6A**
  - R-20+5 or R-13 +10 (IECC 2015)
  - R-20 or R-13 +5 (Michigan)

- **Wood Framed Walls in Zone 7**
  - R20+5 or R13 +10 (IECC 2015)
  - R-20 or R-13 +5 (Michigan)
Exterior Wall Insulation in Michigan

Homes in Michigan are either meeting this requirement, or are very close

![Bar chart showing R-values for different climate zones in Michigan. The chart indicates that most observations fall within the R-value range of 20, with climate zones 5 and 7 having the highest number of observations. The code R-20 is highlighted, suggesting that it is the requirement for exterior wall insulation.]
Codes Baseline Study

HOW TO IMPROVE:

• Insulation R-value

• Insulation installation quality

• Framing/other strategies to improve insulation performance
Codes Baseline Study

Thermal Images-Corners

![Thermal Image](image)
Opportunity to reduce bridging due to framing
Codes Baseline Study

Opportunities to eliminate bridging due to framing
Codes Baseline Study

Opportunities to eliminate the Gaps
Codes Baseline Study

Opportunities to fill the gaps
Codes Baseline Study

Compressed versus Packaging vs installed R value

For projects requiring moisture management.
(Compressed in 5.5” cavity provides R-value of R-18)
Promoting Efficiency

Advanced Framing

• Promotes Energy Efficiency

• Promotes Structural Efficiency
Promoting Efficiency

Advanced Framing Examples-reducing thermal bridging

- 24” O.C. framing
- Inline Framing
- Single ply headers
- Two stud exterior corners
Insulation Inspections

When to Call for an Inspections

Please call the building inspector’s telephone number listed on your building permit at least two (2) days prior to the time you need an inspection. A minimum of five (5) inspections are required on most structures. It is the permit holder’s responsibility to call for inspections, prior to the construction being covered.

Foundation Inspection
Prior to placing concrete in piers, trenches and formwork.

Backfill Inspection
Prior to backfill and after the footings, walls, waterproofing, and drain tile are installed.

Rough Inspection
The rough inspection is to be made after the roof, all framing, firestopping, bracing, and the electrical rough, mechanical rough, and the plumbing rough installations have been approved and before the insulation is installed.

Insulation Inspection
The insulation inspection is conducted after all insulation has been installed and before any finish work is installed.

Final Inspection
The final inspection is to be made upon completion of the building or structure, and before occupancy occurs.

Insulation Inspections

• Building Department
  Interviews showed all but two departments conduct separate insulation inspections
• Other departments inspected insulation during other standard inspections
Fenestration

Look for labels

• Area-weighted average U-Factor must not exceed = .32

• Must be certified and labeled in accordance with NFRC 100 by an “accredited, independent laboratory”

• Non-labeled windows must still use the default tables

• SHGC does not apply to residential in Michigan

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Fenestration Requirement Changes

Windows

• Some typical windows from manufacturers for certain shapes and types will be above $U=.32$ and some below.

• Will need to know the area and U-Factor for each window type and size to compute a weighted average.

• 15 SF of window area continues to be exempt from requirement

• One door 24 ft$^2$ continues to be exempt
# Area Weighted Average Example

<table>
<thead>
<tr>
<th>Opening Type</th>
<th>Area</th>
<th>Opening</th>
<th>Quantity</th>
<th>Total Area by Type</th>
<th>U values</th>
<th>U X Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Operable</td>
<td>16</td>
<td>11.16</td>
<td>9</td>
<td>144</td>
<td>0.34</td>
<td>48.96</td>
</tr>
<tr>
<td>B Fixed</td>
<td>1.75</td>
<td>0</td>
<td>34</td>
<td>59.5</td>
<td>0.28</td>
<td>16.66</td>
</tr>
<tr>
<td>C Operable</td>
<td>9</td>
<td>5.36</td>
<td>1</td>
<td>9</td>
<td>0.35</td>
<td>3.15</td>
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<tr>
<td>D Upper Fixed</td>
<td>9.32</td>
<td>0</td>
<td>13</td>
<td>121.16</td>
<td>0.29</td>
<td>35.1364</td>
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<tr>
<td>D lower Venting</td>
<td>3.5</td>
<td>1.33</td>
<td>13</td>
<td>45.5</td>
<td>0.35</td>
<td>15.925</td>
</tr>
<tr>
<td>E Diamond Fixed</td>
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<td></td>
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<tr>
<td>Avg U</td>
<td></td>
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<td></td>
<td></td>
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<td>140.9634</td>
</tr>
</tbody>
</table>

Example weighted average calculation table
Building Thermal Envelope - Changes

- Prescriptive U values have some changes

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Fenestration U-Factor</th>
<th>Skylight U-Factor</th>
<th>Ceiling U-Factor</th>
<th>Frame Wall U-Factor</th>
<th>Mass Wall U-Factor</th>
<th>Floor U-Factor</th>
<th>Basement Wall U-Factor</th>
<th>Crawl Space Wall U-Factor</th>
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<tbody>
<tr>
<td>5A</td>
<td>0.32</td>
<td>0.55</td>
<td>0.030</td>
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<td>0.055</td>
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<td>0.057</td>
<td>0.028</td>
<td>0.050</td>
<td>0.055</td>
</tr>
</tbody>
</table>

a. Nonfenestration U-factors shall be obtained from measurement, calculation, or an approved source.

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
U-Factor and Total UA Alternatives

U-Factor Alternative

• Similar to Prescriptive R-Value but uses U-factors instead
  • Allows for innovative or less common construction techniques such as structural insulated panels or advanced framing
  • Allows no trade-offs between building components

Total UA Alternative

• Same as U-factor alternative but allows trade-offs across all envelope components
  • Primary approach used in REScheck software
    UA – U-factor x area of assembly
Fenestration Trade-off Limits

Hard limits on U-Factor in northern U.S. (cannot be exceeded, even in trade-offs)

- U=.40 area weighted average for windows
- U-0.75 area weighted average for skylights
- U-Factors of individual windows or skylights can be higher if maximum area-weighted average is below these limits.

Building Thermal Envelope - Changes

• New language that allows for R-30 to substitute for R-38 and R-38 to substitute for R-49 when full depth of insulation extends over the wall plate. Previously this substitution was only allowed for R-49. This impacts Zone 5A and can be achieved with raised heel trusses.

• New Language requires Eave Baffles and governs their installation in attics with air permeable insulation
Building Thermal Envelope - Changes

Raised Heel/Energy Truss credit if insulation is full height over exterior wall (Prescriptive)
R-30 instead of R-38
R-38 instead of R-49

Eave Baffle

For air permeable insulations in vented attics, a baffle shall be installed

• Adjacent to soffit and eave vents
• To maintain an opening ≥ size of vent
• To extend over top of attic insulation
• May be of any solid material
Ceilings without Attic Spaces

R-30 allowed for up to 500 ft\(^2\) or 20\% total insulated ceiling area, whichever is less, where

- Required insulation levels exceed R-30
- Design of roof/ceiling assembly does not provide sufficient amount of space to meet higher levels

Note: This reduction ONLY applies to the R-value prescriptive path, not the U-factor or Total UA alternatives
Access Hatches and Doors

Unconditioned space includes unheated basement, vented crawlspace, or outdoor air

Insulation must maintain permanent contact with underside of subfloor

* **Exception**

*Climate Zones 4c-8*
*R-19 permitted if cavity completely filled*
Crawlspace Wall Insulation

- Implies an unvented crawlspace (aka, conditioned crawlspace)
  - Space must be mechanically vented or receive minimal supply air *(Refer to IRC)*
  - Exposed earth must be covered with a continuous Class I vapor retarder
Defining Below-Grade Walls

- **Basement Wall** – >50% below grade
- **Below grade**
  - **Basement wall**
- **Exterior Wall** – <50% below grade

Slab Edge Insulation

Applies to slabs with a floor surface < 12 inches below grade

- R-10 (typically 2 inches) insulation in Zones 4 and above
- Must extend downward from top of slab a minimum of 24” (Zones 4 and 5) or 48” (Zones 6, 7, and 8)
- Insulation can be vertical or extend horizontally under the slab or out from the building
- Insulation extending outward must be under 10 inches of soil or pavement
  - An additional R-5 is required for heated slabs
  - Insulation to depth of the footing or 2 feet, whichever is less in Zones 1-3 for heated slabs

Section 402: Building Thermal Envelope

Typical air infiltration locations:

- Windows and doors
- Between sole plates
- Floors and exterior wall panels
- Plumbing
- Electrical
- Service access doors or hatches
- Recessed light fixtures
- Rim joist junction

Building Thermal Envelope - Changes

Air Barriers
Air Leakage Control

Building thermal envelope

Building Thermal Envelope - Changes

- New language requires a complete air barrier system be installed and identifies particular locations

### AIR BARRIER AND INSULATION INSTALLATION

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air barrier and thermal barrier</td>
<td>A continuous air barrier shall be installed in the building envelope.</td>
</tr>
<tr>
<td></td>
<td>Exterior thermal envelope contains a continuous air barrier.</td>
</tr>
<tr>
<td></td>
<td>Breaks or joints in the air barrier shall be sealed.</td>
</tr>
<tr>
<td></td>
<td>Air-permeable insulation shall not be used as a sealing material.</td>
</tr>
<tr>
<td>Ceiling/attic</td>
<td>The air barrier in any dropped ceiling/sofit shall be aligned with the insulation and any gaps in the air barrier sealed.</td>
</tr>
<tr>
<td></td>
<td>Access openings, drop down stair, or knee wall doors to unconditioned attic spaces shall be sealed.</td>
</tr>
<tr>
<td>Walls</td>
<td>Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed.</td>
</tr>
<tr>
<td></td>
<td>The junction of the top plate and top of exterior walls shall be sealed.</td>
</tr>
<tr>
<td></td>
<td>Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.</td>
</tr>
<tr>
<td></td>
<td>Knee walls shall be sealed.</td>
</tr>
<tr>
<td>Windows, skylights, and doors</td>
<td>The space between window/door jambs and framing, and skylights and framing shall be sealed.</td>
</tr>
<tr>
<td>Rim joists</td>
<td>Rim joists shall be insulated and include the air barrier.</td>
</tr>
<tr>
<td>Floors (including above-garage and cantilevered floors)</td>
<td>Insulation shall be installed to maintain permanent contact with underside of subfloor decking.</td>
</tr>
<tr>
<td></td>
<td>The air barrier shall be installed at any exposed edge of insulation.</td>
</tr>
<tr>
<td>Crawl space walls</td>
<td>Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls.</td>
</tr>
<tr>
<td></td>
<td>Exposed earth in unvented crawl spaces shall be covered with a class I vapor retarder with overlapping joints taped.</td>
</tr>
</tbody>
</table>

See code for full list
Mandatory Requirements - Air Leakage

- Building thermal envelope
- Recessed lighting
- Fenestration
- Fireplaces
- Rooms with fuel burning
- appliances

Building Thermal Envelope - Changes

Air Barriers – good information sources Building Science Corp

Building Thermal Envelope - Changes

• New language requires blower door testing
• The former visual check has been eliminated.
• All new buildings and additions will require blower testing.
Building Thermal Envelope - Changes

Blower Door Testing

• Must achieve maximum of 4 air changes per hour when tested at 50pa (Amended from 3 ACH in IECC 2015)
• Building official can require testing by a third party who is certified and independent.
• Submit written report
• Construction Code Commission can approve certification programs
• Specific conditions for running the tests are laid out (Refer to code for details)
Building Thermal Envelope - Changes

http://www.michigan.gov/lara/0,4601,7-154-10575-376044--,00.html  date visited March, 16 2016
Air Sealing in Michigan

Homes in Michigan are, in almost all cases observed, met the air sealing requirements of 2009 code, however the code has changed the requirement to 4 ACH50.

Number of Observations

2015 Code = 4 ACH50

2009 Code = 7 ACH50

ACH50

Climate Zone 5  Climate Zone 6  Climate Zone 7
What’s New for Residential Buildings?

• Recessed light fixtures that penetrate into the building thermal envelope must be IC rated and labeled
• Must not have more air leakage than 2.0 CFM
• Sealed with gaskets or caulk between the fixture and finished surfaces
• The exception from the 2009 MUEC for non IC rated fixtures to be installed in site-built sealed enclosures of drywall and other materials was eliminated

What’s New for Residential Buildings?

Fireplaces

• Required to have outdoor combustion air
• Required to have flue dampers (new)
• Dropped language requiring gasketed doors

(There may be a typo here in omitting the tight fitting language for doors)

Steel-frame

• Changes to insulation levels
• List equivalence in comparison to required wood framed values
Mass Walls

- Concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth, and solid timber/logs
- Any other walls having a heat capacity $\geq 6 \text{ Btu/ft.}^2/\text{°F}$
Section 402: Building Thermal Envelope

Masonry Veneer

- Insulation not required on the brick ledge

Sunrooms

Less stringent insulation R-value and glazing U-factor requirements

Sunroom definition:

- One story structure
- Glazing area >40% glazing of gross exterior wall and roof area
- Separate heating or cooling system or zone
- Must be thermally isolated (both HVAC and physical separation—closeable doors or windows between sunroom and rest of the house)
- Can use unlimited glass
Sunroom Requirements

- Ceiling Insulation = R-24
- Wall Insulation = R-13
- Fenestration U-Factor
  \[ U = 0.45 \]
- Skylight U-Factor \( U = 0.70 \)
Mechanical Systems

Expanded Mechanical Systems requirements

Equipment efficiency set by Federal law, not the energy code

Officials should still check and verify that proper equipment is installed and that documentation is present such as yellow FTC Energy Guide Labels

Mandatory Requirements Systems

- Controls
- Heat pump supplementary heat
- Hot water boiler outdoor temperature setback
- Ducts
  - Sealing (Mandatory)
  - Insulation (Prescriptive)
- HVAC piping insulation
- Hot water systems
- Ventilation
  - Dampers
- Equipment sizing
- Systems serving multiple dwelling units
- Snow melt controls
- Pools and inground permanently installed spas
Equipment Sizing and Efficiency Rating

• Equipment Sizing
  • Load calculations determine the proper capacity (size) of equipment
    • Goal is big enough to ensure comfort but no bigger
    • Sizing shall be performed in accordance with ACCA Manual S based on loads calculated in accordance with ACCA Manual J (other approved methods)

• Efficiency Rating
  • New or replacement heating/cooling equipment shall have an efficacy rating equal to or greater than minimum required by federal law for geographic location of installation
Mechanical Systems

Dampers required
On outside air intakes
And exhaust

No change from
previous
MUEC
New requirements for Ventilation Fan Efficiency in Table N1103.5.1

Range hoods, In-line fans, bathroom and utility room fans etc.
Programmable Thermostat

- At least one programmable thermostat controlling the primary heating/cooling per dwelling unit
- Capability to set back or temporarily operate the system to maintain zone temperatures
  - down to 55°F (13°C) or
  - up to 85°F (29°C)
- Initially programmed by manufacturer with:
  - heating temperature set point no higher than 70°F (21°C) and
  - cooling temperature set point no lower than 78°F (26°C)
Heat Pump Supplementary Heat

Prevent supplementary electric-resistance heat when heat pump can meet the heating load
Mechanical Systems

Ductwork Insulation

R-6 within the building but outside conditioned space

R-8 when outside the building

R-8 min. between duct and outside surface when duct located in a cavity

Watch installation quality


Duct Sealing - Mandatory

• Sealing (Mandatory)
  • Joints and seams to comply with IMC or IRC
  • All ducts, air handlers, and filter boxes to be sealed

• Exceptions
  – No additional joint seals required for air-impermeable spray foam products
  – Continuously welded and locking-type joints and seams other than snap-lock and button-lock types and ducts having static pressures < 2 in. w.c. pressure classification don’t require additional closure systems

Mechanical Systems

Ductwork sealing as required by mechanical provisions

Check installation quality

Duct Leakage in Michigan

Even homes in Michigan with “all interior ductwork” are, to a large degree, being built with high performing systems even though they are not required to be tested.

- **2009 Code** = 12 CFM/100ft²
- **2015 Code** = 4 CFM/100ft²

The chart shows the number of observations for different Climate Zones and Duct Leakage rates.
Benefits of Reducing Duct Sealing

A duct system that is well-designed and properly sealed can make your home more comfortable, energy efficient, and safer.

**Comfort**
Sealing and insulating ducts can help with common comfort problems, such as rooms that are too hot in the summer or too cold in the winter.

**Indoor Air Quality**
Fumes from household and garden chemicals, insulation particles, and dust can enter your duct system, aggravating asthma and allergy problems. Sealing ducts can help improve indoor air quality by reducing the risk of pollutants entering ducts and circulating through your home.

**Safety**
During normal operation, gas appliances such as water heaters, clothes dryers, and furnaces release combustion gases (like carbon monoxide) through their ventilation systems. Leaky ductwork in your heating and cooling system may cause “backdrafting,” where these gases are drawn back into the living space, rather than expelled to the outdoors. Sealing leaks can minimize this risk.

**Save Money**
Leaky ducts can reduce heating and cooling system efficiency by as much as 20 percent. Sealing and insulating ducts increases efficiency, lowers your energy bills, and can often pay for itself in energy savings. Plus, if you're planning to install new heating and cooling equipment, a well-designed and sealed duct system may allow you to downsize to a smaller, less costly heating and cooling system that will provide better dehumidification.

**Protect the Environment**
Energy used in our homes often comes from the burning of fossil fuels at power plants, which contributes to smog, acid rain, and climate change. Simply put, the less energy we use in our homes, the less air pollution we generate. By sealing your ducts and reducing the amount of energy necessary to

Codes Baseline Study

COMMON DUCT PROBLEMS AND SOLUTIONS

PROBLEMS:
A. Leaky, torn, and disconnected ducts
B. Poorly sealed registers and grills
C. Leaks at furnace and filter slot
D. Kinks in flexible ductwork restricting airflow

https://www.energystar.gov/ia/products/heat_cool/ducts/DuctSealingBrochure04.pdf?d2fb-a7f0
Codes Baseline Study

SOLUTIONS:

E. Properly sealed ducts
F. Registers and grills tightly sealed to ducts
G. Sealed furnace and filter slot
H. Well-insulated ducts in unfinished areas
I. Straightened flexible ducts with improved airflow

https://www.energystar.gov/ia/products/heat_cool/ducts/DuctSealingBrochure04.pdf?d2fb-a7f0
Duct Testing - *Mandatory*

Ducts shall be pressure tested to determine air leakage by either of the following:

- **Rough-in test**
  - Total leakage measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system including manufacturer’s air handler enclosure

- **Postconstruction test**
  - Total leakage measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system including manufacturer’s air handler enclosure

- **Exception**
  - Duct air leakage test not required where ducts and air handlers are entirely within the building thermal envelope

A written report of results of test signed by the party conducting test and provided to code official
Duct Tightness Tests

Sealed Air Handler - *Mandatory*

Air handlers to have a manufacturer’s designation for an air leakage of ≤ 2% of design air flow rate per ASHRAE 193

Building Cavities

Framing cavities cannot be used as ducts or plenums.
Building Cavities

The Michigan Residential Code (MRC) Sections N1103.2.3 and M1601.1.1 conflict regarding the use of building framing cavities for plenums. The conflict is resolved in favor of M1601.1.1 as MRC Section M1601 is the definitive section on duct construction. This decision is based on MRC Section R102.1 (Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.) and that Section N1103.2.3 has not been shown to meet the definition of cost effective.

http://www.michigan.gov/lara/0,4601,7-154-10575-378767--,00.html date visited March 16 2016
Mechanical System Piping Insulation - Mandatory

- R-3 required on
  - HVAC systems
    - Exception: Piping that conveys fluids between 55 and 105°F
- If exposed to weather,
  - protect from damage, including
    - Sunlight
    - Moisture
    - Equipment maintenance
    - Wind
  - Provide shielding from solar radiation that can cause degradation of material
- Adhesive tape is not allowed
Mechanical Systems

Service Water

• Circulating hot water systems
  Requires Automatic shutoff or manual switch

• Hot water piping Insulation R3 for pipes larger than ¾” and other specified locations such as serving multiple units, outside condition space etc.
Snow Melt System Controls

• Snow- and ice-melting system controls
  • Automatic shutoff when pavement temperature is > 50°F and no precipitation is falling
  • Automatic or manual shutoff when outdoor temperature is > 40°F
Mechanical Systems

Heated Pools

- Heater switch location changed
- Covers required
- Deleted R-12 insulation requirement for covers

Exception:
covers not required if at least 70% of energy from sources such as solar
(Previously 60%)

Portable Spas - Mandatory

- Energy consumption of electric-powered portable spas shall be controlled by the requirements of APSP-14

Systems serving multiple dwelling units shall comply with Sections C403 and C404 in lieu of Section R403.
Mechanical Systems

Lighting and Power

- 75% high efficacy lamps (changed from 50%)
- Low voltage system do not have to use high efficacy lamps
- No continuous pilot lights on fuel gas lighting systems

Lighting in Michigan

Few homes visited had high efficacy lamps in permanent fixtures, and instead had construction bulbs however visits were mostly conducted before final inspections and may have been changed.

2009 Code = 50%

2015 Code = 75%
Codes Baseline Study

Check list of points

• Need to include all fixtures in the count for high efficacy lamps (except low voltage)

• Create changing lamps to low efficacy lamps in project closeout checklists

• Check with utilities for any available bulb purchasing programs

• Inform homebuyer of merits high efficacy lamps
## Lamp Comparisons

### LED Efficacy Compared to Conventional Lighting Technologies

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Luminous Efficacy (in lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED A19 lamp (warm white)</td>
<td>78</td>
</tr>
<tr>
<td>LED PAR38 lamp (warm white)</td>
<td>67</td>
</tr>
<tr>
<td>LED troffer 2’x4’ (warm white)</td>
<td>93</td>
</tr>
<tr>
<td>LED high/low-bay fixture (warm white)</td>
<td>90</td>
</tr>
<tr>
<td>High intensity discharge system (high watt)</td>
<td>115</td>
</tr>
<tr>
<td>Linear fluorescent system</td>
<td>108</td>
</tr>
<tr>
<td>High intensity discharge system (low watt)</td>
<td>104</td>
</tr>
<tr>
<td>Compact fluorescent lamp</td>
<td>70</td>
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<tr>
<td>Halogen</td>
<td>20</td>
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<tr>
<td>Incandescent</td>
<td>15</td>
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</tbody>
</table>

Performance Approaches

Two approaches:

- Simulated Performance Alternative
- Energy Rating Index Alternative
Performance Approaches

Simulated Performance Alternative

- Software based
- Computer simulation
- Minimum software requirements
- New requirement for documentation of software capabilities (This is not REScheck™)
- Largely unchanged from former MUEC)
Performance Approaches

Energy Rating Index Alternative

• Does not specifically mention HERS but it is likely implied
• Software based
• Compliance Report required
• Proposed design is simulated against a reference design based on IECC 2006
• Must meet thermal envelope insulation requirements of IECC 2009
• Must meet the maximum index of Table 1106.4
• Must still meet mandatory requirements
Energy Rating Index

• ERI is defined much like the RESNET HERS Index:
  - Integer value
  - 100 corresponds to an “ERI reference design”
  - 0 corresponds to a net zero energy home
  - Each integer value represents a one percent change in the total energy use of the rated design relative to the reference design
  - ERI considers all energy used in the residence

• ERI differs from traditional performance path
  - ERI considers all energy used in the residence, whereas the performance path includes only heating, cooling, lighting, and water heating (excludes appliances and other uses)
  - Equipment and appliance efficiencies can be involved in trade-offs
  - Credit toward compliance may be available for renewable energy
## Energy Rating Index Alternative

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Energy Rating Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>7</td>
<td>53</td>
</tr>
<tr>
<td>8</td>
<td>53</td>
</tr>
</tbody>
</table>

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Will REScheck™ apply?

As of February 8, 2016 there will be no specific tab in REScheck™ that will apply to Michigan.
Results indicated that a majority of new construction homes in Michigan are using REScheck.

- **REScheck (52%)**
  - Homes using REScheck

- **Performance (13%)**
  - Homes using performance path (no REScheck)

- **Prescriptive (35%)**
  - Homes using prescriptive path

124

*Number of homes observed*
Will REScheck™ apply?

A study conducted in Fall 2014 showed a high number of projects in Michigan were submitted using REScheck™

Since Michigan has various insulation values that are less than both the IECC (2012) and (IECC 2015) values there will no longer be a version of REScheck™ that will directly apply for Michigan.

Amendments where insulation values are less than IECC 2015 are not incorporated into REScheck™ 4.6.2.1

Buildings permits issued after Feb 8, 2016 should not be based on IECC 2009 in REScheck™
Will REScheck™ apply?

• DOE has no plans to develop state specific versions of amended state versions of IECC as they have in the past

Reasonable Approach:
• Use the IECC 2015 Tab. This would meet and exceed Michigan requirements for R values and U-Factors
Will REScheck™ apply?

Select IECC 2015
Will REScheck™ apply?

**REScheck Software Version 4.6.2**

**Inspection Checklist**

Energy Code: 2015 IECC

Requirements: 0.0% were addressed directly in the REScheck software

Text in the “Comments/Assumptions” column is provided by the user in the REScheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

<table>
<thead>
<tr>
<th>Section # &amp; Req.ID</th>
<th>Pre-Inspection/Plan Review</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.1, 103.2 PR3</td>
<td>Construction drawings and documentation demonstrate energy code compliance for the building envelope. Thermal envelope represented on construction documents.</td>
<td></td>
<td></td>
<td>[ ] Complies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[ ] Does Not</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[ ] Not Observable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[ ] Not Applicable</td>
<td></td>
</tr>
<tr>
<td>103.1, 103.2, 403.7 PR3</td>
<td>Construction drawings and documentation demonstrate energy code compliance for lighting and mechanical systems. Systems serving multiple dwelling units must demonstrate compliance with the IECC Commercial Provisions.</td>
<td></td>
<td></td>
<td>[ ] Complies</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>[ ] Does Not</td>
<td></td>
</tr>
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<td></td>
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<td>[ ] Not Observable</td>
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<td></td>
<td></td>
<td>[ ] Not Applicable</td>
<td></td>
</tr>
<tr>
<td>302.1, 403.7 PR2</td>
<td>Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official.</td>
<td>Heating: Btu/hr_____</td>
<td>Heating: Btu/hr_____</td>
<td>[ ] Complies</td>
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<td></td>
<td></td>
<td>Cooling: Btu/hr_____</td>
<td>Cooling: Btu/hr_____</td>
<td>[ ] Does Not</td>
<td></td>
</tr>
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<td>[ ] Not Observable</td>
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<td>[ ] Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
Will REScheck™ apply?

REScheck Software Version 4.6.2

Compliance Certificate

Project

Energy Code: 2015 IECC
Location: Lansing, Michigan
Construction Type: Single-family
Project Type: New Construction
Conditioned Floor Area: 3,200 ft²
Glazing Area: 11%
Climate Zone: 5 (7101 HDD)
Permit Date: 
Permit Number: 

Construction Site: 
Owner/Agent: 
Designer/Contractor: 

Compliance: Passes using UA trade-off

Compliance: 1.6% Better Than Code  Maximum UA: 247  Your UA: 243

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules. It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.
**Will REScheck™ apply?**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>R-</th>
<th>R-</th>
<th>Complies</th>
<th>Does Not</th>
<th>Not Observable</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.2.4</td>
<td>Attic access hatch and door insulation ≥ R-value of the adjacent assembly.</td>
<td>R-</td>
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<tr>
<td>402.4.1.2</td>
<td>Blower door test @ 50 Pa. &lt;= 5 ach in Climate Zones 1-2, and &lt;= 3 ach in Climate Zones 3-8.</td>
<td>ACH 50 =</td>
<td>ACH 50 =</td>
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<tr>
<td>403.2.3</td>
<td>Duct tightness test result of &lt;= 4 cfm/100 ft² across the system or &lt;= 3 cfm/100 ft² without air handler @ 25 Pa. For rough-in tests, verification may need to occur during Framing Inspection.</td>
<td>___ cfm/100 ft²</td>
<td>___ cfm/100 ft²</td>
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</tbody>
</table>

**IECC 2015** Based on 3 air changes per hour. Michigan has amended this to 4 air changes per hour (ach).

Could accept 4 ach as test result, since UA alternative approach in REScheck™ is not influenced by air changes (It is based solely on R and U factors).
Will “above code” programs comply?

The state construction code commission can evaluate and approve above code programs as meeting or exceeding code requirements.

Two named above code programs:

- ICC-700 (2012) Silver rating
- Energy Star Version 3

(Note: while Michigan code states Energy Star v3.0, the newer v3.1 may be more appropriate as Energy Star does may not recognize v3.0 in states that have adopted IECC 2012 or 2015)
Will “above code” programs comply?

- Must be approved in writing
- Must still meet mandatory provisions marked as “Mandatory” in the code.
- State Construction Code Commission may approve other above code programs

Source: DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR’S OFFICE
CONSTRUCTION CODE Filed with the Secretary of State on October 9, 2015
Codes Baseline Study

How DTE can Help

• Energy-saving resources for contractors/building professionals

• Technical resources for code officials

• Other resources
Visit MSU’s Energy Codes Website

http://www.spdc.msu.edu/training_workshops/michigan_uniform_energy_code_training_and_implementation_program

Michigan Uniform Energy Code Training and Implementation Program

Did you know 39% of the nation’s energy is used to power the buildings in which we live and work?

The Michigan Uniform Energy Code Training and Implementation Program was created by the School of Planning, Design & Construction at Michigan State University. The curriculum is designed to assist home builders, architects, engineers, subcontractors, suppliers, and government officials in implementing and enforcing the energy code in the state of Michigan. The purpose of this program is to increase understanding, improve compliance, reduce administrative time and costs, and to improve customer relationships among these groups.

The training programs are approved for Public Act 54 continuing education credits for building officials by the Michigan Department of Licensing and Regulatory Affairs through the Michigan Bureau of Construction Codes. Over 5,000 attendees and almost all State of Michigan Building Officials have received training through this program.

Project funded by the Michigan Bureau of Energy Systems, the Michigan State Housing Development Authority, the Midwest Energy Efficiency Alliance, the Pacific Northwest National Laboratory, and the U.S. Department of Energy. Technical support provided by the Michigan Bureau of Construction Codes. The project was conducted under the direction of faculty from the School of Planning, Design & Construction and the Construction Industry Research and Education Center (CIREC) at Michigan State University.

Featured Website
Code Officials Companion Guide

Building Energy Codes Resource Guide:

**Code Officials Edition** *(Still based on older versions of IECC)*

View or download:

- Plan review and inspection resources
- REScheck and COMcheck reference guides
- Case studies
- Sample checklists


date visited Jan 18, 2016
Explore www.energycodes.gov
State of Michigan Resources

Michigan Bureau of Construction Codes (BCC):
http://www.michigan.gov/lara/0,4601,7-154-10575-92379--,00.html

Michigan Energy Office, Michigan Agency for Energy
http://michigan.gov/energy/0,4580,7-230-72052_72054---,00.html
Energy Star Program

https://www.energystar.gov/
date visited Jan 18, 2016
Q and A