City of Mt. Pleasant, Department of Building Safety
320 W Broadway Street
Mt. Pleasant, MI 48858
Phone (989) 779-5301

MICHIGAN ENERGY CODE WORKSHEET

Effective October 9, 2015, all NEW HOMES and ADDITIONS thereto are required to comply with the Michigan Energy Code (MEC). Additions need only to demonstrate compliance with the provisions without requiring updates to the existing home as permitted under section N1101.1.3.1 of the 2015 Michigan Residential Code (MRC).

The code regulates the design and construction of buildings for the effective use and conservation of energy over the useful life of the building. The MEC provides flexibility to permit the use of innovative approaches and techniques to achieve this objective. Applicants may choose from one of the four compliance paths as part of the submittals for a building permit, *i.e., Building Thermal Envelope (prescriptive), the trade-off method (*Total UA Alternative), Simulated Performance Method or Energy Rating Index (ERI) administered by a third party testing agency,* in addition to meeting mandatory provisions outlined in the code.

Applicants choosing to use *REScheck* software for demonstrating compliance under the *Total UA Alternative/ trade-off method* may use the 2015 edition of the International Energy Conservation Code (2015 IECC) in the model that will meet and/or exceed the provisions of the MEC. Please note, that REScheck does not currently offer a 2015 Michigan specific version of the code at this time.

OWNER INFORMATION		
Owner Name:	Phone:	Mobile:
Owner Address:	City/State/Zip:	
E-mail Address:		

PROJECT DESCRIPTION		
Address of Project:	County: *Isabella / Zone 6A*	
Project Type:	☐ *New Home* ☐ *Addition* ☐ *Alteration (Describe)*	
Compliance method:	☐ *Prescriptive*	☐ *Total UA Alternative (Rescheck)*
	☐ *Simulated Performance Method*	☐ *Energy Rating Index (ERI)*

A signed copy of the compliance report shall be provided with the building permit application.

I. CONSTRUCTION PLANS

N1101.8 (R103.2) Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed.

Details shall include, but are not limited to, as applicable, insulation materials and their R-values; fenestration U-factors and s; area-weighted U-factor and SHGC calculations; mechanical system design criteria; mechanical and service water heating system and equipment types, sizes and efficiencies; economizer description; equipment and systems controls; fan motor horsepower (hp) and controls; duct sealing, duct and pipe insulation and location; lighting fixture schedule with wattage and control narrative; and air sealing details.

II. MANDATORY REQUIREMENTS (MEC)

The following requirements shall apply to all NEW HOMES and residential ADDITIONS.

CODE	DESCRIPTION
N1101.12.1	**Building thermal envelope insulation.** An *R*-value identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation 12 inches or greater in width. The insulation installer shall provide a certification that lists the type, manufacturer and *R*-value of insulation installed in each element of the *building thermal envelope*. For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled *R*-value, installed density, coverage area and number of bags installed shall be *listed* on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and *R*-value of installed thickness shall be *listed* on the certification. ***The insulation installer shall sign, date and post the certification and place it near the electrical service panel with the compliance decal required under N1101.16 prior to scheduling the final building inspection.***
N1101.12.1.1	**Blown or sprayed roof/ ceiling insulation.** The thickness of blown-in or sprayed roof/ceiling insulation (fiberglass or cellulose) shall be written in inches on markers that are installed at least one for every 300 square feet throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers a minimum of 1 inch in height. Each marker shall face the attic access opening. Spray polyurethane foam thickness and installed *R*-value shall be *listed* on certification provided by the insulation installer.
N1101.16	Prior to the building final inspection, a permanent energy code compliance decal, approved by the Department of Building Safety, shall be affixed to the electrical distribution panel in accordance with the compliance path.
N1102.2.4	**Access hatches and doors.** Access doors from conditioned spaces to unconditioned spaces (attics and crawl spaces) shall be weather stripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment that prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required when loose fill insulation is installed.
N1102.4.1.2, N1105, & N1106	**Air Leakage Testing** - The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding the limits of the compliance path chosen. ***Testing shall be conducted by an independent third party certified by the "State of Michigan". A Licensed Residential Builder, who has proper training in the use of the testing equipment, may file the report to the Department of Building Safety. The testing may be completed any time after the creation of all penetrations of the building thermal envelope and such testing shall be completed in accordance with Section N1102.4.1.2. A copy of the test report shall be filed with the Department of***

	Building safety prior to scheduling a final building inspection. In addition, a copy of the report shall be placed near the electrical service panel with the installers certification.

EXCERPT FROM THE 2015 MICHIGAN RESIDENTIAL CODE

TABLE N1102.4.1.1 (R402.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair, or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing, and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the drywall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	Exterior walls adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls.

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

R 408.30547d

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N1102.4.2	**Fireplaces** – New wood-burning masonry fireplaces shall have tight-fitting flue dampers and be provided with outdoor combustion air.
N1102.4.3	**Fenestration Air Leakage** – Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot, and swinging doors on more than 0.5 cfm per square foot, when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

N1102.4.4	Recessed Lighting – Recessed luminaries installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaries shall be IC-rated and labeled as having an air leakage rate not more than 2.0 cfm when tested in accordance with ASTM E283 at a 1.57 psf pressure differential.
N1103.1 &N1103.1.1	**Thermostat.** At least one programmable thermostat shall be provided for each separate heating and cooling system.
N1103.1.2	**Heat pump supplementary heat** - Heat pumps having supplementary electric resistance heat shall have controls that prevent supplemental heat operation when the heat pump compressor can meet the heating load.
N1103.2.2	**Sealing** - Ducts, air handlers, and filter boxes shall be sealed, including joints and seams with exception to the following: 1. *Air-impermeable spray foam products may be applied without additional joint seals.* 2. *Where a duct connection is made that is partially inaccessible, 3 screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.* 3. *Continuously welded and locking-type longitudinal joints and seams, of other than snap- lock and button-type per Section M1601.4.1, in ducts operating at static pressures less than 2 inches (51 mm) of water column (500 Pa) pressure classification*
N1103.2.2	Ducts and air handlers located inside and/or outside the building thermal envelope shall be tested to verify duct tightness in accordance with Section N1103.2.2 at the mechanical rough-in. A copy of the test report shall be submitted to the Department of Building Safety upon completion.
N1103.2.3	**Building Cavities** – Building framing cavities shall not be used as ducts or plenums.
N1103.3	**Mechanical system piping insulation** - Mechanical system piping capable of carrying fluids above 105°F or below 55°F shall be insulated to a minimum of R-3.
N1103.3.1	**Protection of piping insulation.** Pipe insulation exposed to weather shall be protected from damage by moisture, building maintenance, wind and shall provide shielding from solar radiation that could cause degradation of the material.
N1103.4.1	**Circulating hot water systems** - Circulating hot water systems shall be provided with an automatic or readily *accessible* manual switch that can turn off the hot-water circulating pump when the system is not in use.
N1103.5	**Mechanical ventilation** - The building shall be provided with ventilation that meets the requirements of Section M1507 or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.
N1103.6	**Heating and Cooling Equipment Sizing** – Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or approved alternative. ***Information shall be submitted along with the MEC compliance report and placed with the service documents for the HVAC system at the time of the final inspection.***

N1103.8	**Snow melt system controls** - Snow and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F (10°C), and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F (4.8°C).
N1103.9	**Pools and in ground permanently installed spas** - Pools and in ground permanently installed spas shall comply with Sections N1103.9.1 through N1103.9.3.
N1104.1	**Lighting equipment** - A minimum of 75 percent of all lamps permanently installed in lighting fixtures shall be high-efficiency lamps.

Prescriptive Compliance Report Form

This form is required "ONLY" when choosing the Prescriptive Compliance path

In the table below, **indicate the proposed values** of insulation, fenestration and other components in your proposed home. Please note that such components shall meet or exceed the performance of the prescribed values. If you have any clarifications, please note them in the comment section. Finally, insure that the building plans submitted show the same materials and methods you use to complete this form.

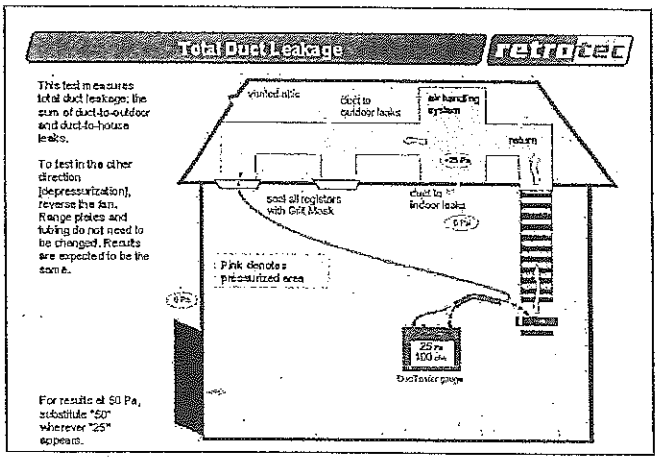
Component Description[a]	Prescribed Value	Proposed Value	Comment
Fenestration U-Factor	0.32		
Skylight U-Factor[b]	0.55		
Ceiling R-Value	49		
Wood Frame R-Value	20 or 13+5[f]		
Mass Wall R-Value[g]	15/20		
Floor R-Value	30[e]		
Basement Wall R-Value[c]	15/19		
Slab R-Value/Depth[d]	R 10 / 4 feet		
Crawl Space Wall R-Value[c]	15/19		
Ducts outside building thermal envelope (i.e. attic spaces) R-Value	8		
Ducts within building but outside conditioned space (i.e. crawls spaces) R-Value	6		
Ducts within building envelope assembly, insulation placed between duct and unconditioned space R-value	8		
High-efficacy lamps in permanently installed light fixtures - Percentage	75%		
Attic access doors shall be weather-stripped and insulated the same level of ceiling insulation. A wood frame or equivalent retainer is required around the access when loose fill insulation is used.			

a. *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.
b. The fenestration *U*-factor column excludes skylights.
c. "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.
d. R-5 shall be added to the required slab edge R-values for heated slabs.
e. Or insulation sufficient to fill the framing cavity, R-19 minimum.
f. 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.
g. The second *R*-value applies when more than half the insulation is on the interior of the mass wall. R 408.30547d

This form is intended to provide a simplified method of documenting prescriptive code compliance. Please see the full code context for exceptions, alternatives and other requirements that may apply.

Duct Tightness Verification

- Verify that the required safety provisions have been made: i. e. combustion appliances and other potentially hazardous conditions.
- Verify the qualifications of the tester.
- Verify the *conditioned floor area**.
- Verify the type of test: NOTE: Leakage to outdoors testing was acceptable in the 2009 IECC; it is **NOT** acceptable in the 2012 version.
    - **Postconstruction test** @ 0.1 inches w.g. (25 Pa)
        1. Total leakage ≤ 4cfm per100 ft^2 of *conditioned floor area*
    - **Rough-in test** @ 0.1 inches w.g. (25 Pa)
        1. Total leakage- including air handler ≤ 4 cfm per100 ft^2 of *conditioned floor area*
        2. Total leakage- without air handler ≤ 3 cfm per 100 ft^2 of *conditioned floor area*
- Verify the apparatus setup:
    - All register boots are taped or otherwise sealed for the test.
    - Placement of hoses and tubing connections.
    - Settings on the pressure gauges
        1. 25Pa
        2. Proper ring configuration
- Verify the readings on the pressure gauges.
- Check the math: acceptable/actual cfm per100 ft^2
- Accept or reject



ONE BLOWER & ONE GAUGE

2012 IECC Definitions:

***CONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the *conditioned space*.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent *conditioned space*.

NOTE: *Conditioned floor space* is <u>not</u> cumulative for buildings that have multiple systems.

Building Envelope Testing

- Verify that the required safety provisions have been made: i. e. combustion appliances and other potentially hazardous conditions.
- Verify the **qualifications** of the tester.
- Verify the volume of the ***conditioned space****.
- Verify the apparatus setup:
  - The building is prepared per IECC Section R402.4.1.2
    1. Exterior windows and doors, fireplaces and stove doors closed, but not sealed beyond the intended weatherstripping or other infiltration control measures.
    2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed but not sealed beyond the intended infiltration control measures.
    3. Interior doors, if installed at the time of the test, open;
    4. Exterior openings for continuous ventilation and heat recovery ventilators shall be closed and sealed;
    5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
    6. Supply and return registers, if installed at the time of the test, shall not be fully open.
  - Placement of hoses and tubing connections.
  - Settings on the pressure gauges
    1. 50Pa
    2. Proper ring configuration
- Verify the readings on the pressure gauges.
- Check the math: acceptable/actual ACH
- Accept or reject