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# 2015 Michigan Residential Code
# Energy Worksheet for
# Single-Family Residential Construction

To facilitate permit issuance and enable the plan reviewer to verify compliance with the applicable energy efficiency provisions of the 2015 Michigan Residential Code, please **complete this form (Parts I, II, and III) and submit it along with your application for all new construction, alterations, renovations, and additions. (N1101.3.1)**

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| **Project Address** | |

## Part I – Mandatory Provisions

The following requirements (see code for full text) apply to all new single-family residential buildings.
**Indicate that you understand and will comply with the following provisions by checking each box.**

| MRC Sec. # | Description | ☒ |
|---|---|---|
| N1101.12.1 and 1.1 | For insulation products that do not have an identification mark from the manufacturer, the insulation installer shall provide a certification listing the type, manufacturer and R-value of insulation in each element of the building thermal envelope.<br><br>For blown or sprayed insulation, the initial thickness, settled thickness, settled R-value, installed density, coverage area and number of bags shall be listed on the certification. In addition, markers shall be installed throughout attic spaces in accordance with N1101.12.1.1.<br><br>For sprayed polyurethane foam insulation, the installed thickness of the areas covered and the R-value of the installed thickness shall be listed on the certification.<br><br>**Insulation certificates shall be submitted and approved by the Building Department prior to issuance of a Certificate of Occupancy.** | ☐ |
| N1101.16 | Prior to final inspection, a permanent energy code certificate shall be posted on or in the electrical distribution panel. Such certificate shall be on a label approved by the Building Department and include all information required by Section N1101.16. | ☐ |
| N1102.4.1.2, N1105, or N1106 | **Air leakage Test (Blower Door Test)**<br><br>The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 4 air changes per hour. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 pascals). Where required by the code official, testing shall be conducted by a certified independent third party. Certification programs shall be approved by the state construction code commission. **A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.** Testing shall be performed at any time after creation of all penetrations of the building thermal envelope. | ☐ |

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| N1102.4.1.1 | **Air Leakage –** The components of the building thermal envelope as listed in Table N1102.4.1.1 shall be installed in accordance with manufacturer's installation instructions and the following criteria: | ☐ |

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

| COMPONENT | CRITERIA |
|---|---|
| Air barrier and thermal barrier | A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope shall contain a continuous air barrier. Breaks or joints in the air barrier shall be sealed.<br>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.<br>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.<br>The junction of the top plate and top of exterior walls shall be sealed.<br>Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.<br>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.<br>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.<br>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 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 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 ext. 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. |

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| N1102.4.2 | **Fireplaces –** New wood-burning masonry fireplaces shall have tight-fitting flue dampers and 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.<br><br>**Exceptions:** Site built windows, skylights and doors<br><br>**Labels shall remain on windows until after insulation inspection** | ☐ |
| N1102.4.4 | **Recessed Lighting –** Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires 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.<br><br>**All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering** | ☐ |
| N1103.1 | **Controls –** At least one thermostat shall be provided for each separate heating and cooling system. | ☐ |
| N1103.1.1 | **Programmable thermostat –** Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day.<br><br>This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55 degrees F or up to 85 degrees F. The thermostat shall initially be programmed with a heating temperature set point no higher than 70 degrees F and a cooling temperature set point no lower than 78 degrees F. | ☐ |
| N1103.1.2 | **Heat pump supplementary heat –** Heat pumps having supplementary electric resistance heat shall have controls that, except during defrost, 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 with approved sealants, including joints and seams.<br><br>**Exceptions:**<br>1.Air-impermeable spray foam products may be applied without additional joint seals<br>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.<br>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 of water column pressure classification shall not require additional closure systems. | ☐ |

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| N1103.2.2 | **Ducts and air handlers located outside the building thermal envelope or located within the building envelope assembly –** Duct tightness shall be verified by either a Rough-in or Post Construction pressure test in accordance with Section N1103.2.2. **A written report of the test results, signed by the party conducting the test, shall be provided to the code official prior to the issuance of a certificate of occupancy** | ☐ ☐ NA |
| N1103.2.3 | **Building Cavities –** Building framing cavities shall not be used as supply ducts or plenums. | ☐ |
| N1103.3 | **Mechanical system piping insulation –** Mechanical system piping capable of carrying fluids above 103 degrees F or below 55 degrees F shall be insulated to a minimum or R-3 | ☐ ☐ NA |
| N1103.3.1 | **Protection of piping insulation –** Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance, and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be permitted as a protection method. | ☐ |
| 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. | ☐ ☐ NA |
| 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 Cooing 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 other approved heating and cooling calculation methodologies. **A heating/cooling plan, Manual J calculations, equipment sizes and efficiencies, duct R values, and supporting documentation shall be submitted to the Inspector at the rough mechanical inspection. All information shall be kept with the furnace and available for 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 degrees F, and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40 degrees F | ☐ ☐ NA |
| 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 | ☐ ☐ NA |
| N1104.1 | **Lighting equipment –** A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficiency lamps or a minimum of 75 percent of the permanently installed lighting fixtures shall contain only high-efficiency lamps.<br><br>**Exception:** Low-voltage lighting | ☐ |
| N1104.1.1 | **Gas lighting equipment –** Fuel gas lighting systems shall not have continuously burning pilot lights. | ☐ ☐ NA |

## Part II – Compliance Paths

In addition to the mandatory requirements previously noted, energy code provisions require you to choose one of four alternative compliance paths to demonstrate code compliance. Indicate the path you choose below **by checking one** of the following boxes and completing the instructions.

☐ **Prescriptive (as prescribed by the code)**

If you choose to use the prescriptive method of compliance, you may demonstrate compliance by completing the attached **Prescriptive Compliance Report Form**. **Sign the compliance statement below and the completed Prescriptive Compliance Report Form when submitting for a building permit.** Please note that the prescriptive insulation materials and methods shown on the building plans shall match what is indicated on the compliance report.

☐**Total UA Alternative (prescriptive trade-off method)**
Compliance with the Total UA Alternative method may be demonstrated by completing a compliance report using **REScheck** software provided free of charge at energycodes.gov. At present, **REScheck** does not offer a code edition incorporating State of Michigan amendments. However, you may use the **2015 International Energy Conservation Code (2015 IECC)** since it meets or exceeds Michigan requirements. Please use "Kalamazoo, Michigan" for location criteria. **Sign the compliance statement below and attach a copy of a signed compliance report, including the inspection checklist, with this form when submitting for a building permit.**

Please note that the building plans shall show the same materials and methods you use to complete the **REScheck** form. For example, if you use basement wall insulation in **REScheck**, such insulation should be clearly indicated on the building plans too.

☐**Simulated Performance Alternative (performance analysis)**
Certain commercially available compliance software (e.g. REM/RATE, etc.) may be used to demonstrate that the proposed construction will have an annual energy cost that is less than or equal to the energy cost of the standard reference design. Please see Section N1105 of the code for specific criteria.

Such software shall generate a compliance report that documents that the proposed design complies and shall include information outlined in Section N1105. **Sign the compliance statement below and attach a copy of the completed compliance report with this form when submitting for a building permit.**

☐**Above Code Programs**
Compliance with certain energy efficiency programs such as Energy Star Version 3 and ICC 700-2012 "silver" are acceptable. See Section N1101.7 and N1106 for specific provisions. Provide a compliance report that documents that the proposed design meets program requirements. **Sign the compliance statement below and attach a copy of the completed compliance report with this form when submitting for a building permit.**

## Prescriptive Compliance Report Form

(Please note that this form is **only** required if you have chosen 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* | Prescribed Value | Proposed Value | Comment |
|---|---|---|---|
| Fenestration U-Factor | 0.32 | | |
| Skylight U-Factor (b) | 0.55 | | |
| Ceiling R-Value | 38 | | |
| Wood Frame R-Value | 20 or 13+5g | | |
| Mass Wall R-Value(h) | 13/17 | | |
| Floor R-Value | 30f | | |

| | | | |
|---|---|---|---|
| Basement Wall R-Value (c) | 10/13 | | |
| Slab R-Value/Depth (e) | 10/2 feet | | |
| Crawl Space Wall R-Value (d) | 15/19 | | |
| Ducts outside building thermal envelope (i.e. attic spaces) R-Value | 8 | | |
| Ducts within building but outside conditioned space (i.e. crawl spaces) R- Value | 6 | | |
| Ducts within building envelope assembly, insulation placed between duct and unconditioned space R-Value | 8 | | |
| High-efficiency lamps in permanently installed light fixtures - Percentage | 75% | | |
| Attic access doors – Doors shall be weather-stripped and insulated to 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.
b. The fenestration U-factor excludes skylights.
c. "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. "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 crawlspace wall. "15/19" may be met with R-13 cavity insulation on the interior of the crawlspace wall plus R-5 continuous insulation on the interior or exterior of the home.
e. R-5 shall be added to the required slab edge R-values for heated slabs.
f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
g. 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.
h. The second R-value applies when more than half the insulation is on the interior of the mass wall.

**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.**

## Part III - Compliance Statement

I have read and completed the above form and will insure that the actual construction complies with Chapter 11 of the 2015 Michigan Residential Code.

**Project Applicant: _____ Date:_____**

**Signature**

**Printed Name: _____**

**Printed Name**