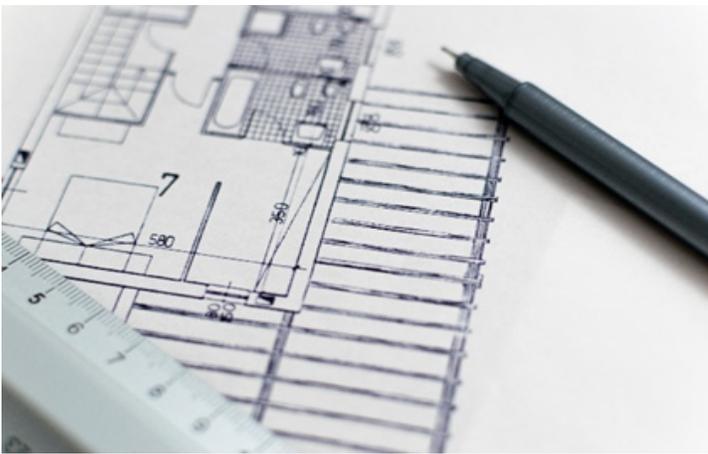


Michigan Energy Code Compliance Aid: COMPARATIVE COMMERCIAL PROVISIONS HIGHLIGHTS for ASHRAE 90.1-2013, ASHRAE 90.1-2019, and the 2021 IECC



Michigan’s Bureau of Construction Codes (BCC) administers the Stille-DeRossett-Hale Single State Construction Code Act 230 of 1972, commonly known as Act 230. One of the many provisions in this Act is the requirement to regularly update Michigan’s building codes, including its building energy code. By law, the commercial building energy provisions are updated every three years and the residential building energy provisions are updated every three to six years.

Similar to Michigan’s other construction codes, its energy code is based on the code established by the International Code Council (ICC). Michigan’s energy code may include the ICC’s International Energy Conservation Code (IECC) in whole or in part, including any or all of the standards referenced therein. One of the standards referenced in the IECC is ASHRAE Standard 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*. Currently, the technical basis for Michigan’s energy code is the 2015 IECC for residential buildings and ASHRAE 90.1-2013 for commercial buildings, including multi-family buildings with more than 3 stories above grade.

The current 2015 Michigan Energy Code (MEC), is presently under review. Updates to the MEC mean that Michigan’s building stock will become progressively more energy efficient, creating savings for families and businesses. According to the draft proposals issued by the BCC, the next iteration of the MEC will likely be based on the 2021 IECC for residential structures and the designers’ choice of the 2021 IECC or ASHRAE 90.1-2019 for commercial buildings.

In anticipation of code updates, this commercial energy code comparison has been developed to highlight significant differences between the commercial provisions of ASHRAE 90.1-2013, ASHRAE 90.1-2019, and the 2021 IECC for new construction projects using a prescriptive approach to energy efficiency. It includes the four major building systems as well as quality assurance and documentation requirements.

This comparison is intended to help building officials, architects, engineers, constructors, building owners, facility managers, and other building arts practitioners comply with existing code provisions and understand how provisions may be changing in the near future. Code officials may use this document to understand how new codes will impact submittal reviews and site inspections. Forward-thinking readers may use this summary comparison to help identify deeper energy savings opportunities.

While intended to be a compliance aid, this summary comparison is not meant to be comprehensive. It merely highlights some of the more significant differences between the source documents on which the future Michigan Energy Code may be based. Readers are referred to the source documents for a fuller understanding and complete details, including applicability and exceptions.

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Table A. Updates to Michigan Climate Zones

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to Climate Zones for construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §5.9.1, also includes §5.9.1.1, 5.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements which may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| County | Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|-----------|--|--|--|
| | Pertinent Climate Zone information is found in Provision 5.1.4.1 and Appendix B. | Ten (10) counties in MI have reassigned Climate Zones. Readers are also referred to ASHRAE Standard 169-2013, extracts of which are included in Annex 1 - 3. | Climate Zones are based on ASHRAE Standard 169-2013, excerpts of which are provided in Table C301.1. |
| Baraga | 7 | 6A | 6A |
| Chippewa | 7 | 6A | 6A |
| Gogebic | 7 | 6A | 6A |
| Houghton | 7 | 6A | 6A |
| Huron | 6A | 5A | 5A |
| Iron | 7 | 6A | 6A |
| Luce | 7 | 6A | 6A |
| Mackinac | 7 | 6A | 6A |
| Marquette | 6A | 7 | 7 |
| Ontonagon | 7 | 6A | 6A |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table B. Updates to Provisions for Verification, Function Testing & Commissioning

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to energy performance quality assurance for projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §4.2.5.2, also includes §4.2.5.2.1, 4.2.5.2.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

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| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>4.2.4</p> <p>In general, verification is provided by the code official’s inspection of all building construction, alterations, and additions subject to code provisions.</p> | <p>4.2.4 thru 4.2.5.3; 5.9; 6.9; 7.9; 8.9; 10.9</p> <p>Functional performance testing and commissioning of all systems are added as general components of verification.</p> <p>Criteria are summarized in §4.2.5 with details in enumerated building sections, for example §5.9.</p> <p>Commissioning must use ASHRAE Standard 202: <i>Commissioning Process for Buildings and Systems, or equal acceptable to the authority having jurisdiction (AHJ)</i>.</p> | <p>C105.2 - C105.2.6; and C408</p> <p>Functional performance testing and commissioning (as defined by the IECC) of all systems are added as general components of verification.</p> <p>Commissioning must be in compliance with 2021 IECC functional test criteria.</p> |
| <p>4.2.4</p> <p>Equipment & components to be inspected include, but are not limited to:</p> <ul style="list-style-type: none"> • Wall insulation & vapor retarders • Roof & ceiling insulation • Slab or foundation-wall intersection • Fenestration • Continuous air barrier | <p>4.2.5.2; 5.4.3.1.1; and 5.9</p> <p>In addition to envelope inspection by the code official, verification must include either a detailed, documented verification program with periodic site inspections or air leakage testing.</p> <p>With certain exceptions, commissioning is required.</p> | <p>C406.9</p> <p>In addition to envelope inspection by the code official, verification must include either a detailed, documented verification program with periodic site inspections or air leakage testing.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table B continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.7.2.3.1</p> <p>Air and water-balancing is required for all HVAC systems.</p> <p>For systems serving more than 5,000 ft², the balance report(s) must be provided to the owner.</p> | <p>6.7.3.3</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>C408.2.2 and C408.2.5.1</p> <p>Air and water-balancing is required for all HVAC systems.</p> <p>Balance reports must be provided to the owner.</p> |
| <p>6.7.2.4</p> <p>All HVAC control systems are to be function tested.</p> <p>Certain projects over 10,000 ft² must have commissioning instructions in the project plans & specifications.</p> | <p>4.2.5.1; 6.9.1 and 6.9.2</p> <p>All HVAC control systems are to be function tested.</p> <p>Commissioning is not required for systems serving ≤ 10,000 ft² with a combined space cooling, space heating, and service water heating capacity of less than 960 MBH.</p> <p>Where commissioning is required, it must use ASHRAE Standard 202 or a generally accepted engineering standard, and instructions must be provided in the project plans & specifications.</p> | <p>C408.1.1 and C408.2 thru C408.2.5.2</p> <p>All HVAC control systems are to be function tested.</p> <p>Commissioning is not required for systems with a total cooling capacity of less than 480 MBH and a combined space and service water heating capacity of less than 600 MBH.</p> <p>Where commissioning is required, it must comply with the IECC and instructions must be provided in the project plans, which may refer to project specifications.</p> |
| <p>7.7.1 and C104.2.3</p> <p>The authority having jurisdiction must verify compliance by inspection and may also require compliance documentation to be submitted.</p> | <p>7.9</p> <p>In addition to inspection by the code official, function testing is explicitly required for controls of:</p> <ul style="list-style-type: none"> • Service Hot Water Systems • Recirculating Pump Systems • Heat Trace Systems • Pool & Spa Heaters <p>With certain exceptions, commissioning is required for service water heating systems.</p> | <p>C408.2 and C408.2.3.2</p> <p>This section requires function testing for service water heating controls systems.</p> <p>Systems with a combined service and space heating hot water of less than 600 MBH are exempted.</p> |
| <p>9.4.3</p> <p>Functional testing is required for lighting controls including occupancy sensors, time switches and daylight responsive controls.</p> | <p>9.9 - 9.9.1</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013, but moved to a new section.</p> | <p>C408.3.1 - C408.3.1.3</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table B continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>4.2.4</p> <p>Equipment & components to be inspected include, but are not limited to:</p> <ul style="list-style-type: none"> • Mechanical systems & controls • Electrical systems & controls | <p>10.9</p> <p>In addition to inspection by code official, function testing is explicitly required for controls of:</p> <ul style="list-style-type: none"> • Whole-Building Energy Monitoring Systems • Elevator Stand-by Controls • Service Water Pressure Booster Systems <p>With certain exceptions, commissioning is required for other building equipment systems.</p> | <p>No comparable provisions.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table C. Updates to Provisions for Submittals and Record Documents

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to documentation requirements for new construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §5.9.1, also includes §5.9.1.1, 5.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|---|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>4.2.2 thru 4.2.2.3</p> <p>O&M Manuals must be provided to the owner for:</p> <ul style="list-style-type: none"> • HVAC systems • Electrical & Power system • Lighting systems | <p>4.2.2 thru 4.2.2.3</p> <p>O&M Manuals must be provided to the owner for:</p> <ul style="list-style-type: none"> • Building envelope • HVAC systems • SWH systems • Electrical & Power system • Lighting systems • Other systems (i.e., elevators) | <p>C408</p> <p>O&M Manuals must be provided for the building, systems, and equipment. Equipment must include a label with the regularly required maintenance tasks as well as the identifying information for the model-specific O&M Manual.</p> |
| <p>5.7 thru 5.8.1.1</p> <p>Building envelope submittals to include:</p> <ul style="list-style-type: none"> • Space conditioning categories • Fenestration VT, SHGC, U-factor, and leakage rate • Daylit floor areas • Insulation R-values • Air barrier materials and installation details | <p>5.7.3.1 and 5.8.1.11</p> <p>Building envelope submittals & record documents requirements are expanded to also include:</p> <ul style="list-style-type: none"> • Verified air leakage test results • Signed, dated insulation certificate with <ul style="list-style-type: none"> - Type - Manufacturer - Rated R-value - Initial and settled thicknesses - Coverage area | <p>C103.2</p> <p>Information required matches ASHRAE 90.1-2019.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table C continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.7.2.1 - 6.7.2.2</p> <p>Construction documents must indicate that within 90 days of acceptance, record documents and O&M manuals for each HVAC system or piece of equipment requiring maintenance in the HVAC system be provided to the owner.</p> | <p>6.7.3.1</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>C408.3.2</p> <p>Construction documents must indicate that within 90 days of receipt of certificate of occupancy, record documents be provided to the owner.</p> |
| <p>7.7</p> <p>AHJ may require documentation to substantiate compliance for service water heating systems.</p> | <p>7.7 - 7.1.3.2</p> <p>Construction documents must indicate that within 90 days of acceptance, record documents and O&M manuals for SWH systems be provided to the owner.</p> | <p>C408.3.2</p> <p>Construction documents must indicate that within 90 days of receipt of certificate of occupancy, record documents be provided to the owner.</p> |
| <p>8.7 - 8.7.2</p> <p>Construction documents must indicate that within 30 days of acceptance, record documents and O&M manuals for each power system or piece of equipment requiring maintenance in the power system be provided to the owner.</p> | <p>8.7 - 8.7.3.2</p> <p>Deadline for document submission extended to 90 days.</p> | <p>No comparable provision.</p> |
| <p>9.7 - 9.7.2.3</p> <p>Construction documents must indicate that within 90 days of acceptance, record documents and O&M manuals for each lighting system or piece of equipment requiring maintenance in the lighting and lighting control system be provided to the owner.</p> | <p>9.7 - 9.7.3.3</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>C408.3.2</p> <p>Construction documents must indicate that within 90 days of receipt of certificate of occupancy, record documents be provided to the owner.</p> |
| <p>No comparable provision.</p> | <p>10.7 - 10.7.2.3</p> <p>Construction documents must indicate that within 90 days of acceptance, record documents be provided to the owner for other equipment & systems included in the project, such as water pressure booster pumps.</p> | <p>No comparable provision.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D1. Updated Conditioned Space Definitions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between definitions of conditioned spaces in the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to new construction projects located in Michigan.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements which may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| | | 2015 MEC/ASHRAE 90.1-2013 | | ASHRAE 90.1-2019 | |
|------------------------|--------|---------------------------|---|---|---|
| Space Type | | Climate Zone | Thermal Control Range | Thermal Control Range | |
| Conditioned | Cooled | All | $> 5 \text{ Btu/h-ft}^2$ | $> 3.4 \text{ Btu/h-ft}^2$ | |
| | Heated | 5A | $> 15 \text{ Btu/h-ft}^2$ | $> 12 \text{ Btu/h-ft}^2$ | |
| | | 6A | $> 20 \text{ Btu/h-ft}^2$ | $> 14 \text{ Btu/h-ft}^2$ | |
| | | 7 | $> 20 \text{ Btu/h-ft}^2$ | $> 16 \text{ Btu/h-ft}^2$ | |
| Indirectly conditioned | | All | Conditioned with air intentionally transferred from an adjacent conditioned space | Matches ASHRAE 90.1-2013 | |
| Semi-Heated | | | 5A | $3.4 \text{ Btu/h-ft}^2 \leq X < 15 \text{ Btu/h-ft}^2$ | $3.4 \text{ Btu/h-ft}^2 \leq X < 12 \text{ Btu/h-ft}^2$ |
| | | | 6A | $3.4 \text{ Btu/h-ft}^2 \leq X < 20 \text{ Btu/h-ft}^2$ | $3.4 \text{ Btu/h-ft}^2 \leq X < 14 \text{ Btu/h-ft}^2$ |
| | | | 7 | $3.4 \text{ Btu/h-ft}^2 \leq X < 20 \text{ Btu/h-ft}^2$ | $3.4 \text{ Btu/h-ft}^2 \leq X < 16 \text{ Btu/h-ft}^2$ |
| Unconditioned | | All | Not conditioned, indirectly conditioned, or semi-heated | Not conditioned, indirectly conditioned, or semi-heated | |

X = Building heating load

2021 IECC

| Space Type | | Climate Zone | Thermal Control Range |
|------------------------|--------|--------------|--|
| Conditioned | Cooled | All | Any space directly cooled |
| | Heated | | Any space directly heated |
| Indirectly conditioned | | All | Conditioned with air intentionally transferred from a conditioned space |
| Equipment Buildings | | All | <ul style="list-style-type: none"> Physical size of $< 1200 \text{ ft}^2$ Not intended for people Intended to house electric equipment of power $\geq 7\text{W/ft}^2$ Heating load of $\leq 17 \text{ Btu/h-ft}^2$ |
| Low energy | | All | Peak energy rate of $< 3.4 \text{ Btu/h-ft}^2$ |
| Greenhouse | | All | Greenhouse meeting the criteria of § C402.1.1.1 |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D2. Updated Building Envelope Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to building envelope energy performance criteria for new construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §5.9.1, also includes §5.9.1.1, 5.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements which may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|--|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| 5.1.2.3 - 5.1.2.4 Requires building official's approval for a space to be considered as semi-heated or unconditioned space. | 5.1.2.3 - 5.1.2.4 Matches 2015 MEC/ASHRAE 90.1-2013. | No comparable criteria. Note: The 2021 IECC does not have a semi-heated conditioned space category. |
| C506.1: 5.1.3 Item 7 Alterations to roof membranes with insulation entirely above deck that would generally require new code compliant insulation are allowed to use insulation with an R-value as low as R-20 when the thickness of insulation with a higher R-value would raise the height of roof elements or equipment such as parapets, sweep systems, equipment curbs, piping, door thresholds, etc. (Michigan amendment) | No comparable provision. This exception is not a component of ASHRAE 90.1-2019 but may be retained as a Michigan Amendment to the next iteration of the MEC. | No comparable provision. This exception is not a component of the 2021 IECC but may be retained as a Michigan Amendment to the next iteration of the MEC. |
| 5.1.4.1 Defines Climate Zones. | 5.1.4.1 Updated per ASHRAE 169-2013. See source document and Table D1 of this document. | C301 Matches ASHRAE 90.1-2019. |
| 5.2.1 Compliance paths are defined. | 5.2.1 Requirements for verification, testing, commissioning and inspection of certain envelope elements have been added. | C402 Also requires verification, testing, and commissioning of certain envelope elements. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D2 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>Tables 5.5.5, 5.5.6 and 5.5.7</p> <p>Criteria of maximum and minimum values for certain performance and dimensional characteristics for certain envelope elements by climate zone.</p> | <p>Tables 5.5.5, 5.5.6 and Table 5.5.7</p> <p>Performance and physical characteristics are updated to provide improved efficiency.</p> | <p>C402.4.1</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>5.4.3.1 - 5.4.3.1.3</p> <p>Criteria for continuous air barrier materials, design, and installation with an exception for semi-heated spaces in Climate Zones 5A and 6A.</p> | <p>5.4.3.1</p> <p>Requirements expanded to include quality assurance which may be either an air leakage verification program or air leakage testing.</p> | <p>C402.5.1 - C402.5.1.3</p> <p>Requires air leakage testing or a verification program for the continuous air barrier. However, semi-heated spaces are not defined in the IECC. Therefore they are not exempt from the requirement.</p> |
| <p>5.4.3.4</p> <p>With certain exceptions, entrances separating conditioned spaces from the outdoors must have vestibules with self-closing doors. This does not apply to entrances such as overhead or revolving doors, doors opening only to outdoor eating areas, doors with no exterior hardware, and doors for material handling only.</p> | <p>5.4.3.3</p> <p>Exceptions expanded to also apply to certain vestibules in buildings ≤ 15 stories high with self-closing doors and air curtains.</p> <p>The exception for entrances with revolving doors has been removed.</p> | <p>C402.5.9</p> <p>Exceptions expanded to also apply to certain vestibules in building with air curtains that achieve a velocity of at least 6.56 fps at the floor.</p> |
| <p>5.5.2</p> <p>Exterior building envelope of semi-heated or unconditioned spaces must meet the requirements for semi-heated spaces.</p> | <p>5.5.2</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>No comparable criteria.</p> <p>Note: 2021 IECC does not have a semi-heated space conditioning category.</p> |
| <p>5.5.4.1</p> <p>Criteria for fenestration performance characteristics.</p> <p>Area-weighting of U-factor, SHGC, VT/SHGC, or LSG for multiple assemblies within a single construction class and space conditioning category are allowed. Area-weighting of values is NOT allowed across construction classes or space conditioning categories.</p> | <p>5.5.4.1</p> <p>For vertical fenestration only, area-weighting of U-factor, SHGC, VT/SHGC, or LSG across construction classes is allowed, but remains NOT allowed across space conditioning categories.</p> | <p>C402.4.3.4</p> <p>Area-weighted U-factor is allowed within fenestration categories but is NOT allowed across fenestration product categories.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D2 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>5.5.4.2.3</p> <p>Criteria for minimum skylight areas and exceptions for spaces that do NOT require skylights, such as those for which at least 90% of the skylight would be shaded by permanent building features at noon on June 21st.</p> | <p>5.5.4.2.3</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>C402.4.2</p> <p>Does not exempt skylights from spaces for which at least 90% of the skylight area would be shaded by permanent building features at noon on June 21st.</p> |
| <p>5.4.3.2</p> <p>Air leakage for fenestration and doors must not exceed the maximum values listed.</p> | <p>5.5.4.5</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013 but values are tabulated in new Table 5.8.3.2.</p> | <p>C402.5.4 and C402.5.6</p> <p>Additionally, access openings and doors that are in certain vertical elements, such as stairwells and elevator shafts, must be either sealed or isolated from the thermal envelope to reduce air leakage, except when seals are already required because they are fire protective openings.</p> <p>Also, all outdoor air intake and exhaust openings must be dampered.</p> |
| <p>5.5.4.4.2</p> <p>Limitations on solar heat gain through east (E) and west (W) facing vertical fenestration is accomplished by either limiting the fenestration area or by limiting the area-weighted SHGC for the Climate Zone (CZ).</p> <p>Option 1: $A_W & A_E \leq (A_T/4)$</p> <p>Option 2: $A_W \times SHGC_W \leq (A_T \times SHGC_{CZ})/4$ and $A_E \times SHGC_E \leq (A_T \times SHGC_{CZ})/4$</p> | <p>5.5.4.5</p> <p>Formula for limitation Option 2 is updated.</p> <p>Option 2: $A_W \times SHGC_W \leq (A_T \times SHGC_{CZ})/5$ and $A_E \times SHGC_E \leq (A_T \times SHGC_{CZ})/5$</p> | <p>No comparable provisions.</p> |
| <p>5.7 - 5.7.4</p> <p>Criteria for submittals.</p> | <p>5.7 - 5.7.3.2</p> <p>Sections subdivided to differentiate criteria for permits from criteria for completion.</p> <p>O&M manuals also required for building envelope. See source documents and Table C of this document for additional details.</p> | <p>C103.2</p> <p>Criteria for permits is differentiated from criteria for completion.</p> <p>O&M manuals also required for building envelope. See source documents and Table C of this document for additional details.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D3. Comparison of New Building Envelope Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major new envelope related provisions of the 2021 IECC and/or ASHRAE 90.1-2019 with no precedent in the 2015 MEC. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §5.9.1, also includes §5.9.1.1, 5.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements which may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| ASHRAE 90.1-2019 |
|--|
| Within the framework of this document, there are no new building envelope provisions in ASHRAE 90.1-2019 that do not have a pre-existing precedent in ASHRAE 90.1-2013. Envelope performance and verification of air leakage have been expanded and are included in Table D-2 of this document. |
| IECC-2021 |
| Description |
| C402.1.5 This new provision allows for calculated U-factor as well as F-factor and C-factor to replace the tabulated values based on climate zone. Provides calculation methods for determining envelope compliance based on the combined UA values or the various assemblies. This section forms the basis for COMCheck software available from the U.S. DOE that allows for trading off building envelope components to show compliance. |
| C402.5.5 This new provision requires rooms with fuel-burning appliances to either be located outside the thermal envelope or thermally isolated from the conditioned space. |
| C302.1 This new provision establishes interior design temperatures for both heating and cooling calculations. |
| C303.1.1 This new provision requires the use of depth markers when using blown-in or sprayed-on ceiling/roof insulation. |
| C401.3 This new provision requires that a certificate of building envelope performance characteristics, including energy performance, be posted in the space where the conditioning equipment is located. |
| C402.1.1.1 This new provision establishes criteria for greenhouse structures that, if met, exempt greenhouses from complying with general building envelope criteria. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table D3 continued

| IECC-2021 |
|--|
| Description |
| C402.1.4.1.1 and C402.2.1.1 |
| This new provision allows the average insulation thickness to be used to establish the roof assembly U-factor when applying tapered insulation to a roof assembly. |
| C402.2.1.2 |
| This new provision requires a minimum of 1" thickness of roof insulation at the lowest point of roof drainage system components such as the gutter edge, roof drain, and scuppers. |

Table E1. Comparison of Updated HVAC System Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to HVAC system energy performance criteria for new construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §6.9.1, also includes §6.9.1.1, 6.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.1.1.3</p> <p>In HVAC&R system alterations, equipment replacements must comply with the minimum efficiency requirements for new equipment.</p> | <p>6.1.1.3</p> <p>This provision is updated to also include requirements for control & energy management capabilities.</p> | <p>C503</p> <p>HVAC&R system alterations must comply with the Sections C403-Mechanical Systems and C408-Maintenance Information & Commissioning, including any requirements for controls and energy management.</p> |
| <p>6.2</p> <p>Compliance paths are listed and include:</p> <ul style="list-style-type: none"> • ASHRAE 90.1 Simplified Approach for Small Buildings • ASHRAE 90.1 Prescriptive • ASHRAE 90.1 Energy Cost Budget • ASHRAE 90.1/90.4-Computer Room Alternate. | <p>6.2</p> <p>The Performance Rating Method of Appendix G, previously used only to quantify performance that exceeded the standard, is now one of the approved compliance paths.</p> | <p>C401</p> <p>Compliance paths include:</p> <ul style="list-style-type: none"> • IECC Prescriptive • IECC Total Building Performance • ASHRAE 90.1 Simplified Approach for Small Buildings • ASHRAE 90.1 Prescriptive • ASHRAE 90.1 Energy Cost Budget • ASHRAE 90.1-Performance Rating (Appendix G) • ASHRAE 90.1/90.4-Computer Room Alternate. |
| <p>6.3</p> <p>Scope and requirements for the Simplified Path for HVAC Systems are defined.</p> | <p>6.3</p> <p>Requirements have been added for systems serving hotel & motel guest rooms; and requirements for the newly defined status of occupied standby have been added.</p> | <p>The IECC exempts certain provisions for buildings based on size, however, it does not have a consolidated pathway dedicated to small buildings.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.4.1.1</p> <p>List of minimum efficiency tables for equipment standard operating conditions.</p> | <p>6.4.1.1</p> <p>Equipment minimum efficiency values are updated to reflect improved efficiencies.</p> <p>Some new equipment, such as indoor pool humidifiers and DX-DOAS systems, has been added to the list.</p> <p>Some equipment tables have been subdivided for better clarity. For example, ceiling-mounted and floor-mounted CRACs are now tabulated separately.</p> | <p>C403.3.2</p> <p>Minimum efficiencies for all listed equipment are the same as in ASHRAE 90.1-2019. However, some HVAC&R equipment listed in ASHRAE 90.1-2019 are not listed in the 2021 IECC.</p> |
| <p>6.4.1.2.1</p> <p>Formulae to calculate allowable FL and IPLV for non-standard operating conditions.</p> | <p>6.4.1.2</p> <p>Updates were made to the formula for lift factor, A; and a maximum value was established for the evaporator leaving water temperature.</p> | <p>C403.3.2.1</p> <p>Updates were made to the formula for lift factor, A; and a maximum value was established for the evaporator leaving water temperature.</p> |
| <p>6.4.3.3</p> <p>HVAC control requirements for off-hours.</p> | <p>6.4.3.3 and 6.4.3.3.5 - 6.4.3.3.5.3</p> <p>Requirements for hotel & motel guest rooms are now included.</p> | <p>C403.7.6.2</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.4.3.4</p> <p>HVAC control requirements for ventilation.</p> | <p>6.4.3.4.2</p> <p>Allows the use of non-motorized dampers when the exhaust or outdoor air intake airflow rate is ≤ 300 cfm. Clarifies that automatic shut-off dampers are not required in systems that operate 24/7.</p> | <p>C403.7.7</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.4.3.4.3; 6.5.1.1.4</p> <p>HVAC damper leakage rates, including those for economizer dampers, are established.</p> | <p>6.4.3.4.3; 6.5.1.1.4</p> <p>Maximum leakage requirements have been added for non-motorized exhaust dampers in buildings over 3 stories and for non-motorized intake dampers on buildings of any size.</p> | <p>C403.7.7</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.4.3.9</p> <p>Heating thermal setpoint in vestibules is established.</p> | <p>6.4.3.9</p> <p>A cooling setpoint limit has been added with exceptions for site-recovered energy applying to both heating & cooling modes.</p> | <p>C403.4.1.4</p> <p>Matches ASHRAE 90.1-2019.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.5.1</p> <p>Lists applications in which economizers are required.</p> | <p>6.5.1</p> <p>The minimum CRAC fan-cooling unit size for which economizers are required is reduced from 11.25 tons to 4.5 tons.</p> <p>Certain chilled water cooling systems less than 1,400 MBH in capacity have been added to the list of exclusions.</p> | <p>C403.5</p> <p>Chilled water systems less than 1320 MBH water-cooled or 1720 MBH air-cooled or district water-cooled are added to the list of exemptions. Other exemptions, that differ from ASHRAE 90.1-2019, also apply.</p> |
| <p>6.5.2.1</p> <p>Zone controls to prevent simultaneous heating and cooling.</p> | <p>6.5.2.1</p> <p>The deadband airflow rate that exempts zone thermostatic controls from the requirement to prevent simultaneous heating & cooling has been changed from 20% of the peak airflow rate to the minimum rate of primary airflow required to meet ASHRAE 62.1.</p> | <p>C403.6.1</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> |
| <p>6.5.3.1</p> <p>Fan system power limitations.</p> | <p>6.5.3.1</p> <p>Limitations now only apply to fan systems with combined nameplate inputs greater than 5 hp.</p> | <p>C403.8.1</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.3.1-2</p> <p>Pressure drop adjustments for fan power limitations.</p> | <p>6.5.3.1-2</p> <p>Clarification that the adjustment for fully ducted return & exhaust systems only applies when the system is required by code to be fully ducted. It also applies to systems required to maintain pressure differentials between adjacent spaces.</p> | <p>C403.8.1</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.3.1.3</p> <p>Fan efficiency provisions are defined using the Fan Efficiency Grade (FEG) rating system.</p> | <p>6.5.3.1.3</p> <p>The new AMCA rating system for fans replaces the FEG with a Fan Efficiency Index (FEI). This section reflects the new rating system, establishes a minimum FEI and provides a list of exceptions under which the provision does not apply.</p> | <p>C403.8.3</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.3.2.3</p> <p>Setpoint reset criteria for VAV systems.</p> | <p>6.5.3.2.3</p> <p>This provision is now restricted to VAV systems with a combined motor nameplate power of ≥ 5 hp.</p> | <p>C403.6.8</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.5.3.3 Optimization control for ventilation in multi-zone VAV systems.</p> | <p>6.5.3.3 The exemption for systems required to have exhaust air energy recovery has been removed.</p> | <p>C403.6.6 Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.4.2 Pumping/Power criteria for variable flow systems.</p> | <p>6.5.4.2 This provision now includes hot water distribution pumps. The required minimum pump flowrate has been reduced from 50% to 25% of full flow and exceptions for certain equipment types are delineated.</p> | <p>C403.4.4 Matches 2015 MEC/ASHRAE 90.1-2013.</p> |
| <p>6.5.4.4 Water temperature reset control requirements.</p> | <p>6.5.4.4 A basis for reset when control valves are controlled by DDC systems has been added to the provision and exceptions have been updated to address applications such as district cooling variable flow, manufacturing, and industrial processes.</p> | <p>C403.4.4 Matches 2015 MEC/ASHRAE 90.1-2013.</p> |
| <p>6.5.5.2 Speed control requirements for fans.</p> | <p>6.5.5.2 This provision has been updated to include motor arrays and the threshold horsepower has been lowered. Additionally, a specific air flowrate/power consumption relationship has been established so that a VFD or comparable means of speed modulation is required.</p> | <p>C403.10.1 Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.6.1 Establishes exhaust air energy recovery requirements.</p> | <p>6.5.6.1 - 6.6.6.1.2 This provision has been updated to include certain dwelling units in heating mode. The energy recovery effectiveness is replaced with enthalpy recovery ratio metric. Exceptions have been updated to include indoor pool dehumidifiers and multiple points of exhaust within 20 ft of each other.</p> | <p>C403.7.4.1 and C403.7.4.2 Matches ASHRAE 90.1-2019.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.5.8 Heating for unenclosed spaces must be radiant.</p> | <p>6.5.8 Matches 2015 MEC/ASHRAE 90.1-2013.</p> | <p>C403.13.1 Systems heating unenclosed spaces outside a building must be radiant with automatic occupancy-based control or a timer switch.</p> |
| <p>6.6 Power Usage Effectiveness (PUE) established as the performance metric for computer rooms.</p> | <p>6.6 The Alternate Compliance Path using PUE metrics is no longer provided within 90.1. Computer rooms with an IT equipment load in excess of 10kW are required to meet ASHRAE 90.4, which uses mechanical and electrical load components (MLC and ELC) rather than PUE to measure system performance.</p> | <p>C403.1.2 Requires data centers to meet ASHRAE 90.4, with adjustments to the mechanical and electrical load components (MLC and ELC) listed therein. The MLC and ELCs required in the IECC are lower than those of 90.4-2019.</p> |
| <p>6.7 Defines requirements for submittals.</p> | <p>6.7 Matches 2015 MEC/ASHRAE 90.1-2013. While all systems must be air- and water-balanced, balance reports are only required to be provided to the owner or owner’s representative for systems serving > 5,000 ft².</p> | <p>C408.1.1 Rather than within 90 days of equipment of system acceptance, required documentation must be submitted within 90 days of the receipt of the certificate of occupancy. All systems must be air- and water-balanced, and balance reports must be provided to the owner or owner’s representative.</p> |
| <p>6.7.2.3.4 Defines hydronic system balancing criteria.</p> | <p>6.7.3.3.3 Matches 2015 MEC/ASHRAE 90.1-2013. Pumps < 10 hp do not need to have their speed adjusted nor their impellers trimmed.</p> | <p>C408.2.2.2 Pumps < 5 hp do not need to have their speed adjusted nor their impellers trimmed.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>6.7.2.4 All HVAC control systems are to be function tested.</p> <p>Certain new construction projects over 10,000 ft² must have commissioning instructions in the project plans & specifications.</p> <p>This Michigan Amendment may be retained in the next iteration of the MEC.</p> | <p>6.9.1 and 6.9.2 All HVAC control systems are to be function tested.</p> <p>Commissioning is not required for systems serving ≤ 10,000 ft² with a combined space cooling, space heating and service water heating capacity of less than 960 MBH.</p> <p>Where commissioning is required, it must use ASHRAE Standard 202 or a generally accepted engineering standard, and instructions must be provided in the project plans & specifications.</p> | <p>C408.1.1 and C408.2 All HVAC control systems are to be function tested.</p> <p>Commissioning is not required for systems with a total cooling capacity of less than 480 MBH and a combined space and service water heating capacity of less than 600 MBH.</p> <p>Where commissioning is required, it must comply with the IECC and instructions must be provided in the project plans, which may refer to project specifications.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E2. Comparison of New HVAC System Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major new HVAC related provisions of ASHRAE 90.1-2019 and the 2021 IECC with no precedent in the 2015 MEC. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §6.9.1, also includes §6.9.1.1, 6.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| ASHRAE 90.1-2019 | IECC-2021 |
|--|--|
| Description | Description |
| ASHRAE has no comparable provision. Because space design conditions, including temperature, may be unique to the application (such as for hospital patient areas, senior facilities, or other special purpose facilities), ASHRAE leaves the interior design conditions to the discretion of the system design engineer. Load calculations use proposed operating points. | C302.1 This provision establishes maximum and minimum design temperatures for heating and cooling load calculations, respectively. |
| 6.4.1.3 This new provision establishes performance rating requirements for large diameter ceiling fans. Efficiency thresholds are not yet required. | C403.9 Matches ASHRAE 90.1-2019. |
| 6.4.3.11 This new provision provides requirements to submeter, trend, and retain energy use for chilled water plants. It applies to air-cooled plants over 860 tons and water-cooled plants over 1500 tons. | No comparable provision. |
| 6.4.3.12 This new provision provides fault detection requirements for air-cooled DX systems with economizers. | C403.5.5 Matches ASHRAE 90.1-2019. |
| 6.5.2.6 This new provision provides supply air temperature limits for multiple-zoned ventilation systems when the majority of the zones require cooling. | C403.7.3 Matches ASHRAE 90.1-2019. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table E2 continued

| ASHRAE 90.1-2019 | IECC-2021 |
|---|---|
| Description | Description |
| <p>6.5.3.2.4</p> <p>This new provision provides control requirements for relief and return fans, including airflow tracking.</p> | No comparable provision. |
| <p>6.5.3.4</p> <p>This new provision provides requirements for automatic control on parallel-flow, fan powered VAV boxes.</p> | <p>C403.6.7</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>6.5.3.7</p> <p>This new provision clarifies that minimum outdoor airflow rates are those required to meet ASHRAE Standard 62.1 (general ventilation), Standard 170 (ventilation in healthcare environments), or what is required by the local code.</p> | The IECC has no comparable provision. However in Michigan, minimum outdoor airflow rates are established in the Michigan Mechanical Code. They are derived from ASHRAE Standard 62.1. |
| <p>6.5.3.8</p> <p>This new provision establishes temperature setback and setup criteria and allows for zero airflow in certain spaces when operating in the newly defined state of occupied stand-by.</p> | No comparable provision. |
| <p>6.5.4.7</p> <p>This new provision establishes a temperature rise minimum of 15°F and minimum leaving fluid temperature of 57°F for chilled water coils.</p> | No comparable provision. |
| <p>6.5.4.8 - 6.5.4.8.2</p> <p>For high capacity gas-fired boiler systems, this new section establishes a minimum threshold of 90% for efficiency as well as criteria for maximum boiler return temperature, and the percent of supply water that can be bypassed.</p> | <p>C403.2.1</p> <p>Establishes a minimum threshold of 92% for high capacity gas-fired boiler systems.</p> |
| <p>6.5.6.3</p> <p>For systems in Climate Zones 5A and 6 with simultaneous heating and cooling occurring above outdoor temperatures of 60°F, this new provision establishes criteria for condenser heat recovery when hot water is used for space heating.</p> | No comparable provision. |
| <p>6.5.6.4</p> <p>This new provision establishes energy recovery equipment requirements for dehumidifiers serving indoor pools larger than 500 ft².</p> | No comparable provision. |
| <p>6.5.7.1</p> <p>This new provision places limitations on the amount of air that can be supplied to spaces and strongly encourages the use of transfer air, where it is available.</p> | No comparable provision. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table F1. Comparison of Updated Service Water Heating Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to service water heating energy performance criteria for new construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §7.9.1, also includes §7.9.1.1, 7.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|--|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| 7.4.3 Listing of what piping must be insulated. | 7.4.3.c This new provision also requires the first 8 ft of certain branch piping to be insulated. | C404.4 For hot water storage systems with heat traps, insulation must be on the first 8 ft or to the heat trap, whichever is less. |
| 7.4.6 Water heaters with integral or separate storage must have a heat trap, which can be either factory or field provided. | 7.4.6 Matches 2015 MEC/ASHRAE 90.1-2013. | C404.3 With the exception of solar water heating systems, water heaters with integral or separate storage must have a heat trap, which can be either factory or field provided. |
| 7.4.5.2 Except for pool (and spa) heaters powered by at least 60% solar or site-recovered energy, heated pools (and spas) require vapor retardant covers. | 7.4.5.2 Matches 2015 MEC/ASHRAE 90.1-2013. | C404.8.3 Except for outdoor pool (and spa) heaters powered by at least 75% solar or site-recovered energy, outdoor heated pools (and spas) require vapor retardant covers. |
| 7.5.3 Systems equal to or greater than 1,000 MBH must have a thermal efficiency no less than 90%. | 7.5.3 Matches 2015 MEC/ASHRAE 90.1-2013. | C404.2.1 Multiple unit systems equal to or greater than 1,000 MBH must have a thermal efficiency no less than 90%. Single boilers equal to or greater than 1,000 MBH must have a thermal efficiency no less than 92%. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table F1 continued

| Current MEC-2015 (ASHRAE 90.1-2013) | ASHRAE 90.1-2019 | IECC-2021 |
|--|--|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>7.7 Providing record construction documents to the owner is implicit. The AHJ may require them also.</p> | <p>7.7 - 7.7.3.2 New provisions explicitly require that record construction documents and operating & maintenance manuals with routine maintenance clearly marked, be provided to the owner within 90 days of system acceptance.</p> | <p>C408.2.2 Requirement for record construction documents and operating & maintenance manuals with routine maintenance clearly marked to be provided to the owner within 90 days of receipt of the certificate of occupancy.</p> |
| <p>7.8 Performance criteria for water heaters for potable, domestic, and pool purposes is defined using the energy factor (EF).</p> | <p>7.8, F-2 Energy performance reporting metric changed from EF to uniform energy factor (UEF) to be consistent with the current NAECA and U.S. DOE test method and reporting metric. The new UEF metric accounts for draw patterns and first-hour delivery. Performance criteria for residential-sized equipment used in commercial applications are moved to Appendix F. Coefficients in standby losses formulae have been updated for improved efficiency.</p> | <p>Reporting metric for energy performance is the EF. Some formulae for EFs have been updated.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table F2. Comparison of New Service Water Heating Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major new service water heating provisions of ASHRAE 90.1-2019 and the 2021 IECC with no precedent in the 2015 MEC. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §7.9.1, also includes §7.9.1.1, 7.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| ASHRAE 90.1-2019 | IECC-2021 |
|--|---|
| Description | Description |
| No comparable provision. | C404.5 - C404.5.2.1 Establishes that the volume of water in pipes is limited by restricting either the pipe diameter or the length of pipe between the heating source and the outlet device. Limitations are also placed on fluid flowrates. |
| No comparable provision. | C404.7 This provision establishes criteria for drain water heat recovery systems, but does not require that such systems be used. |
| 7.9.1 This new provision establishes function testing criteria for water heater system controls for temperature, recirculating pumps, heat traces, and pool heater time switches. | C408.2 and C408.2.3.2 This provision requires function testing for service water heating controls systems. Systems with a combined service and space heating hot water of less than 600 MBH are exempted. |
| 7.9.2 This new provision establishes commissioning criteria for the energy performance of water heating systems. Commissioning is not required for systems serving $\leq 10,000$ ft ² with a combined space cooling, space heating, and service water heating capacity of less than 960 MBH. Commissioning must use ASHRAE Standard 202 or a generally accepted engineering standard, and instructions must be provided in the project plans & specifications. | C408.1.1 C408.2 Commissioning is not required for systems with a total cooling capacity of less than 480 MBH and a combined space and service water heating capacity of less than 600 MBH. Where commissioning is required, it must comply with the IECC and instructions must be provided in the project plans, which may refer to project specifications. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table G1. Comparison of Updated Lighting System Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major differences between existing prescriptive provisions of the 2015 MEC, the 2021 IECC, and ASHRAE 90.1-2019 that pertain to lighting system energy performance criteria for new construction projects located in Michigan. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §9.9.1, also includes §9.9.1.1, 9.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-by-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| Current MEC-2015 | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>9.1.1</p> <p>Describes spaces and areas to which the code applies.</p> | <p>9.1.1</p> <p>Dwelling units are removed from the list of exempted spaces. The standard now applies to them as well.</p> | <p>C405.2.5</p> <p>This provision also applies to dwelling units.</p> |
| <p>9.1.2</p> <p>Alteration projects involving less than 50% of the connected lighting load of a space or area must comply with LPD requirement but are only required to include shut-off controls.</p> <p>This Michigan Amendment may be retained in the next iteration of the MEC.</p> | <p>9.1.2</p> <p>Projects affecting less than 20% of the connected lighting load are exempt.</p> <p>The Michigan amendment of a 50% threshold may be retained in the next iteration of the MEC.</p> | <p>C508.5</p> <p>Projects affecting less than 10% of the existing luminaires are exempt.</p> <p>The Michigan amendment of a 50% threshold may be retained in the next iteration of the MEC.</p> |
| <p>9.4.1.1.c</p> <p>When Automatic Partial ON lighting control is used, the maximum percent of lighting power allowed to automatically turn ON is limited to 50%, and no lighting outside the control zone is allowed to automatically turn on.</p> | <p>9.4.1.1.c</p> <p>A new exemption is included allowing lighting to turn ON to more than 50% for control zones of 600 ft² or less in open-plan office spaces.</p> | <p>C405.2.1.1 & C495.2.1.3</p> <p>The 50% limitation applies to open-plan office spaces 300 ft² or less. For offices with control zones between 301 and 600 ft², lighting outside the control zone can be automatically turned on up to 20% full power.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table G1 continued

| Current MEC-2015 | ASHRAE 90.1-2019 | IECC-2021 |
|--|---|---|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| <p>9.4.1.1.e and 9.4.1.1.f</p> <p>For systems using daylight responsive lighting control for lighting, stepped control is allowed with intermediate steps at least at 70% - 50% and 40% - 20% of full power.</p> | <p>9.4.1.1.e and 9.4.1.1.f</p> <p>Stepped dimming is no longer allowed. All dimming must now be continuous down to 20% or less of full power.</p> | <p>C405.2.3</p> <p>Dimming must be continuous down to 15% or less of full power.</p> |
| <p>9.4.1.1.f</p> <p>Description of daylight responsive control (DRC) schemes for systems using daylighting.</p> | <p>9.4.1.1.f</p> <p>Setpoint coordination is now required when occupancy-based and daylight responsive controls operate in the same space so that if occupancy-based Partial Automatic OFF is in effect, DRC cannot raise the electric light level above the unoccupied setpoint.</p> | <p>Matches ASHRAE 90.1-2019.</p> |
| <p>9.4.1.1.g, 9.4.1.1.h & 9.4.1.1.i</p> <p>Description of control scheme for Partial Automatic OFF lighting control.</p> | <p>9.4.1.1.g</p> <p>A new exemption applies when the space lighting load is less than 0.02 W/ft² multiplied by the building gross lighted floor area.</p> | <p>No comparable provision.</p> |
| <p>9.4.1.2.b</p> <p>For parking garages, lighting power is reduced by at least 30% when no activity is sensed for 20 minutes.</p> | <p>9.4.1.2.b</p> <p>Lighting power is now reduced by at least 50% when no activity is sensed for 10 minutes.</p> | <p>C405.2.8.1</p> <p>Matches 2015 MEC/ASHRAE 90.1-2013.</p> |
| <p>9.4.1.2.d</p> <p>For parking garages, the threshold of perimeter opening-to-wall ratio at which daylighting responsive controls are required is 40%.</p> <p>The perimeter daylight responsive controls must reduce lighting power by at least 30% within 20 minutes of no activity.</p> | <p>9.4.1.2.d</p> <p>The threshold of perimeter opening at which daylighting responsive controls are required is fixed at 24 ft².</p> <p>The perimeter daylight responsive controls must reduce lighting power by at least 50% within 20 minutes of no activity.</p> | <p>C405.2.8.3</p> <p>The perimeter daylight responsive controls must reduce lighting power by at least 50% within 20 minutes of no activity.</p> |
| <p>9.4.1.3</p> <p>Exemptions from general lighting control requirements are provided for special purpose lighting such as plant growth, food warming, and theaters.</p> | <p>9.4.1.3</p> <p>The list of exempted applications is reorganized and specific control requirements for each application have been added.</p> | <p>C405.3.1</p> <p>Closely matches 2015 MEC/ASHRAE 90.1-2013.</p> <p>Some applications that are subcategories in the 2015 MEC are promoted to category in the IECC.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table G1 continued

| Current MEC-2015 | ASHRAE 90.1-2019 | IECC-2021 |
|---|--|--|
| Provision Content of Concern | Significant Changes From Current MEC | Significant Changes From Current MEC |
| 9.4.2 LPD allowances for exterior areas. | 9.4.2 LPD allowances have been reduced. | C405.2 Closely matches 2015 MEC/ASHRAE 90.1-2013. LPDs for canopies, open areas, and building façades differ from 90.1-2019. |
| 9.4.3 Functional testing is required for lighting controls including occupancy sensors, time switches, and daylight responsive controls. | 9.9 - 9.9.1 Matches 2015 MEC/ASHRAE 90.1-2013, but moved to a new section. | C408.3.1 - C408.3.1.3 Matches 2015 MEC/ASHRAE 90.1-2013. |
| 9.5 Building Area Method, Table 9.5.1. Tabulated LPD allowances required for various building types. | 9.5 LPD allowances have been reduced approximately 25%. | C405.3.2.1 Matches ASHRAE 90.1-2019. |
| 9.6.1 Space-by-Space Method, Table 9.6.1. Tabulated LPD allowances and control schemes required for various space types. | 9.6.1 Updates have been made to lighting power density allowances and room cavity ratio thresholds. | C405.2.1.1 - C405.2.1.4 Control of lighting systems is required, but schemes differ from ASHRAE schemes. |
| 9.6.2 Formula for additional lighting power allowances for retail areas. | 9.6.2 Coefficients for the retail lighting power allowance formula have been reduced, thus lowering the overall retail allowance. | C405.3.2.2.1 Matches ASHRAE 90.1-2019. |
| 9.6.3 Additional lighting power allowances for spaces using non-mandatory controls in addition to mandatory controls. | 9.6.3 Additional allowances are no longer made for sidelighted spaces with continuous daylight dimming. | None No comparable provision. |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table G2. Comparison of New Lighting System Provisions

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the major new lighting system provisions of ASHRAE 90.1-2019 and the 2021 IECC with no precedent in the 2015 MEC. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §9.9.1, also includes §9.9.1.1, 9.9.1.2, and any exceptions thereto.

Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013.

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| ASHRAE 90.1-2019 | IECC-2021 |
|---|---|
| Description | Description |
| <p>9.1.4</p> <p>This new provision establishes the wattage used for DC low-voltage systems and systems that power lighting plus other equipment.</p> | <p>No comparable provision.</p> |
| <p>9.3</p> <p>A new compliance path, the Simplified Building Method, is presented. It includes detailed automatic control schemes for spaces that are designed predominantly for office, school, or retail uses.</p> | <p>C405.2.1.1</p> <p>Detailed control schemes for occupancy sensors used in warehouses, open plan offices, and corridors are provided.</p> |
| <p>9.4.1.1.j</p> <p>This new provision establishes criteria for lighting control during scheduled non-business hours, independent of scheduled unoccupied hours.</p> | <p>C405.2.1.1</p> <p>This provision requires time switch controls for certain periods, including holidays.</p> |
| <p>9.4.1.4.d</p> <p>This new provision establishes criteria for outdoor parking area lighting. Lighting > 78 Watts mounted at 24 ft or lower must be reduced by 50% within 15 minutes of no activity.</p> | <p>C405.2.7.3</p> <p>Matches ASHRAE 90.1-2019.</p> |
| <p>9.4.3</p> <p>This new provision requires 75% of permanent fixtures in dwelling units to either have lamps with an efficacy of 55 lm/W or have a fixture efficacy of 45 lm/W.</p> | <p>C405.1.1</p> <p>This provision requires 90% of permanent fixtures in dwelling units to either have lamps with an efficacy of 65 lm/W or have a fixture efficacy of 45 lm/W.</p> |
| <p>9.9.2</p> <p>This new provision establishes energy performance commissioning criteria for lighting systems.</p> <p>Commissioning must use ASHRAE Standard 202 or a generally accepted engineering standard, and instructions must be provided in the project plans & specifications.</p> | <p>C408.3.1 - C408.3.1.3</p> <p>Commissioning (function testing) is required and must comply with the IECC and instructions must be provided in the project plans, which may refer to project specifications.</p> |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.

Table H. Additional Energy Efficiency Credits

The current Michigan Energy Code (2015 MEC) is based on ASHRAE Standard 90.1-2013. The 2015 MEC is currently under review for updating and the next iteration of the MEC will likely have compliance paths that follow the 2021 IECC and ASHRAE 90.1-2019.

The table below summarizes the new provision for additional energy efficiency beyond the literal prescriptive criteria. These provisions are only found in the 2021 IECC. Where provision numbers are included, the inclusion of all subsequent numbers and exceptions is implied. For example, mention of §C406.2, also includes §C406.2.1 through C406.2.5 and any exceptions thereto.

This document does not replicate code or standard language verbatim and is neither a point-by-point nor a provision-provision comparison. This list is not exhaustive, and each provision may have nuances, exemptions, or additional requirements that may not be addressed in this document. The reader is referred to the source documents for complete details on the criteria, requirements, and exceptions.

| IECC-2021 |
|--|
| Description |
| <p>C406</p> <p>This is an extensive new set of provisions that apply to the prescriptive approach. All new buildings must achieve a minimum of 10 additional energy credits which may come from the designer’s choice of 11 prescribed strategies. The points value of each strategy is defined by building occupancy class, climate zone, and in some cases, by the degree of efficiency improvement. For example, one strategy is to improve the HVAC system performance. Improvements may be to the heating system by 5% or 10%. They may also be to the cooling system by 5%, 10%, or more than 10%. Or, they may be to both the heating and cooling systems. As the energy performance improves, the points value increases.</p> <p>In general, the 11 strategies are:</p> <ul style="list-style-type: none"> • HVAC system efficiency improvement • Lighting system power reduction • Lighting controls enhancement • On-site renewables • Dedicated outdoor air systems (DOAS) • Service water heating system efficiency improvement • Reduced building UA • Reduced building air leakage • Enhanced on-site energy monitoring • Fault detection and diagnostics (FDD) • Kitchen equipment efficiency improvement (available for Group A2 occupancies or buildings with commercial kitchens with at least one fryer) |

Data adapted from 2015 MEC/ASHRAE 90.1-2013, ASHRAE 90.1 -2019, and the 2021 IECC. Exceptions apply. Commercial provisions for the 2015 MEC are based on ASHRAE 90.1-2013, however, in some instances, there are Michigan amendments to the standard. Where a Michigan amendment exists, that data is presented in lieu of the information contained in ASHRAE 90.1-2013. See source documents, including the 2015 MEC, for complete details.



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