

ASHRAE 90.1-2022 Standard and 2024 International Fire Code Review

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Technical Advisory Group Review of ASHRAE 90.1-2022 and the 2024 International Fire Code

Introduction

The Minnesota Legislature requires the Commissioner of the Department of Labor and Industry to review the ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings (“ASHRAE 90.1”) every three years for its potential adoption as amended for use in Minnesota and to adopt the State Fire Code consistent with the recommendations of the State Fire Marshal.¹ The Commissioner must consult with the Construction Codes Advisory Council (“CCAC”).² The CCAC is to review the new model codes in order to provide recommendations to the Commissioner for their adoption and recommendations for revisions to current Minnesota Rules.³ To facilitate their review, the CCAC appointed Technical Advisory Groups (“TAGs”) and their members to review the 2022 edition of ASHRAE 90.1 and the 2024 edition of the International Fire Code (“IFC”), and compare them to current Minnesota rules that adopt the 2019 edition of ASHRAE 90.1 and the 2018 edition of the IFC as amended for use in Minnesota, and report their findings.

The TAGs held open meetings that allowed the public to attend and participate in the review and discussion of changes in each model code. As a result, TAG members and the public identified concerns and drafted code change proposals to address those concerns. The TAG members and the public also discussed and identified any significant issues raised by those proposals.

Many of these code change proposals were editorial, such as renumbering Minnesota rule parts to align with the model code or deleting code sections from Minnesota rules that are no longer necessary because the latest edition of the model code has adopted similar language. These types of changes recommended by TAG members do not require CCAC review because they do not present meaningful or substantive changes to the provisions of ASHRAE 90.1, the IFC, or current Minnesota rules. This report highlights some of the more significant changes in ASHRAE 90.1 and the IFC and those code change proposals that TAG members recommend to the CCAC.

The appendixes also discuss code change proposals that TAG members could not agree to recommend to the CCAC and the membership roster for each of the TAGs.

- Appendix A summarizes code change proposals TAG members did not agree to recommend to the CCAC but identified as areas of concern with the provisions of the model code or current Minnesota code provisions, and suggest modifications.
- Appendix B lists the TAGs, their members, and the organizations they represent.

¹ See [Minnesota Statutes, section 326B.106, subdivision 1\(e\)](#) and [section 326B.02, subdivision 6](#).

² See [Minnesota Statutes section 326B.106, subdivision 1](#).

³ See [Minnesota Statutes section 326B.07](#).

TAG Recommendations

Commercial Energy Code TAG (Chapter 1323)

The Commercial Energy Code TAG members met thirteen times to review the 2022 edition of ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings (“ASHRAE 90.1”) and Minnesota Rules, chapter 1323, which adopts the 2019 edition of ASHRAE 90.1, with amendments. TAG members received 37 code change proposals. The Commercial Energy Code TAG members recommend adopting ASHRAE 90.1-2022 with the following significant proposed code changes.

Recommended Code Changes

- Amend current Minnesota Rules, part 1323.0210, to require Group R-2, R-3, and R-4 occupancies that are three stories or less above grade to comply with the Minnesota Commercial Energy Code.
- Adopt the following addendums to ASHRAE 90.1-2022: a, b, c, d, f, h, i, j, l, m, n, o, p, q, r, s, t, u, v, w, x, z, ab, ad, af, ag, ah, aj, ak, am, an, ar, as, at, au, av, aw, ay, bb, bd, be, bf, bg, bh, bl, bo, bp, br, bv, bw, by, ca, cb, cd, ce, cf, cg, ch, cv, and cw.⁴
 - Addendum AK modifies section 6.3.2(c) and adds new section 6.5.12 that does not permit the use of electric resistance heating in single-zone systems using direct expansion (“DX”) cooling. Supplemental electric resistance heating is permitted where a heat pump is installed.
 - Addendum BF modifies tables 5.5-6 and 5.5-7 to increase the above-grade wall insulation R-value.
- Modify section 5.4.3.1.4 of ASHRAE 90.1-2022 to reduce the air leakage rate from 0.35 cfm/ft² to 0.30 cfm/ft². As an alternative to that requirement, individual dwelling units and sleeping units in multifamily buildings are permitted to comply with weighted average air leakage rate of 0.23 cfm/ft².
- Modify section 5.1.4 of ASHRAE 90.1-2022 to not require the insulation of the interior side of existing below-grade walls undergoing alternation if insulation was not required by the code in effect at the time of original construction.
- Modify Tables 5.5-6 and 5.5-7 of ASHRAE 90.1-2022 to reduce the U value for dwelling fenestration to 0.27.
- Modify sections 4.2.2.1, 5.7.2, 12.7.2, and G1.3.2 of ASHRAE 90.1-2022 to require additional energy compliance information be provided on construction documents and the permit application.
- Modify section 6.4.4.1.2 of ASHRAE 90.1-2022 to require exhaust ducts and plenums to be thermally insulated unless they are outside air ducts that are continuously insulated to R-6 and have a vapor retarder with a maximum perm rating of 0.05.

⁴ Addendums to ASHRAE 90.1 are available here: <https://www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda>.

- Amend current Minnesota Rules, part 1323.0680, subpart 1, to require the following dwelling unit ducts to be provided with R-6 insulation: exhaust ducts in attics, garages, and ventilated crawl spaces; outdoor air intakes within conditioned spaces; and exhaust ducts within conditioned spaces of dwelling units.
- Modify section 6.5 of ASHRAE 90.1-2022 to require gas-fired warm air furnaces installed in non-transient dwelling units to have a minimum efficiency of 93 AFUE unless the unit is provided with more efficient energy recovery ventilation (“ERV”), fenestration that complies with a lower U-factor, and a lower maximum air leakage rate. The proposal will be updated to address all-electric buildings.
- Modify sections 6.5.6.1.1 and 6.5.6.1.2.1 of ASHRAE 90.1-2022 to require energy recovery ventilation serving non-transient dwelling units and spaces other than non-transient dwelling units to have a heating sensible recovery ratio of 70 percent. ERVs serving spaces other than non-transient dwelling units must have an enthalpy recovery ratio of 60 percent at cooling design conditions.
- Modify table 6.5.6.1.2-1 of ASHRAE 90.1-2022 to require single-zone system ventilation systems that operate less than 8,000 hours per year in climate zone 6A to comply with the exhaust air energy recovery requirements for climate zone 7.
- Repeal current Minnesota Rules, part 1323.0842, that deletes the requirements for automatic receptacle control.
- Modify section 9.4.4 of ASHRAE 90.1-2022 to require horticultural lighting in greenhouse spaces or indoor grow spaces to have a minimum photosynthetic photo efficacy (“PPE”) of at least 2.5 $\mu\text{mol/J}$ and to permit lighting with a PPE of at least 1.7 $\mu\text{mol/J}$ where the lighting load is less than 40 kW.
- Modify section 10.4.3 of ASHRAE 90.1-2022 to require a regenerative drive in traction elevators with a rated capacity of 2,000 pounds or greater, a rated speed of 150 feet per minute or greater, and a total rise of 20 feet or greater.
- Delete section 10.5.1 of ASHRAE 90.1-2022 so on-site renewable energy equipment is not required on building sites.
- Modify sections 12.2 and G1.2.1 of ASHRAE 90.1-2022 to provide a thermal envelope trade-off backstop for the performance path by not permitting the proposed envelope performance factor to exceed the base envelope performance factor.
- Modify table 12.5.1 of ASHRAE 90.1-2022 to lower the lighting power density from 0.60 W/ft² to 0.35 W/ft² in dwelling units designed in accordance with the Energy Cost Budget Method.

Fire Code TAG (Chapter 7511)

The Fire Code TAG members met three times to review the 2024 International Fire Code and Minnesota Rules, chapter 7511, which adopts the 2018 IFC with amendments. TAG members reviewed thirty code change proposals that were previously reviewed and recommended by the Minnesota State Fire Chiefs Association (“MSFCA”) Code Committee. The Fire Code TAG members recommend adopting the 2024 IFC with the following significant proposed code changes.

Recommended Code Changes

- Amend current Minnesota Rules, part 7511.0901, to require the annual inspection of NFPA 13D automatic sprinkler systems in licensed care facilities.
- Amend current Minnesota Rules, part 7511.0906, subpart 1, to permit portable fire extinguishers to be mounted in locations that are obstructed from view in Group R-3 and R-4 licensed care facilities with the approval of the fire code official.
- Modify section 1103.9 of the 2024 IFC to not require interconnected carbon monoxide alarms when the code in effect at the time of construction did not require carbon monoxide detectors to be provided and to not require interconnected carbon monoxide alarms in dwelling units that are not served from a commercial power source. The 2024 IFC allows most existing buildings to be equipped with battery-operated carbon monoxide alarms that are interconnected instead of a carbon monoxide detection system. However, only a limited number of battery-operated alarms can be wirelessly interconnected so commercial occupancies would have to install a more costly carbon monoxide detection system. The proposed change will alleviate the cost burden of providing a full carbon monoxide detection system.
- Amend current Minnesota Rules, part 7511.1103, subpart 8, to add an exception that requires the installation of interconnected smoke alarms that are battery-powered in state licensed Group I-1 and R occupancies.
- Amend current Minnesota Rules, part 7511.1104, subpart 15, to require aisle accessway widths in areas of existing buildings without seating to comply with the aisle accessway widths required by chapter 1305.

Conclusion

1. TAG members reviewed the 2022 edition of ASHRAE 90.1 and the 2024 IFC and recommend their adoption. TAG members also reviewed and recommended adoption of code change proposals that modify ASHRAE 90.1 and the 2024 IFC or amend an existing Minnesota code provision as described in this report to promote consistency among the building codes, to ensure uniform safety standards, and to accommodate Minnesota's climatic conditions.
2. The MFCA and the 7511 TAG reviewed the 2024 IFC and Minnesota Rules, chapter 7511, which adopts the 2018 IFC with amendments, and recommended their adoption with amendments as described in this report to promote consistency among the building codes and ensure uniform fire safety standards.

Appendix A

TAG members did not agree to recommend all code change proposals they reviewed. Although TAG members did not agree to recommend the following code change proposals, the CCAC should be aware of the concerns they identify.

Commercial Energy Code TAG (Chapter 1323)

Other Code Change Proposals

TAG members did not agree to recommend the following code change proposals:

- Delete section 12 of ASHRAE 90.1-2022 to eliminate the Energy Cost Budget Method as a compliance option.
- Modify table 11.5.1-1 of ASHRAE 90.1-2022 to increase the amount of energy credits required for buildings that comply with prescriptive requirements.
- Modify section 8.4.2 of ASHRAE 90.1-2022 to exempt spaces and individual cubicles spaces from automatic receptacle control requirements where the unoccupied combined input power for all plug loads does not exceed 90 W.

Fire Code TAG (Chapter 7511)

Other Code Change Proposals

TAG members did not agree to recommend the following code change proposal:

- Amend current Minnesota Rules, part 7511.1103, subpart 8, to require battery-powered smoke alarms in existing buildings to have a nonreplaceable, nonremovable battery that can power the alarm for a minimum of 10 years. TAG members believe the proposal is better addressed through the national model code development process.

Appendix B

The CCAC appointed TAGs and their members to review the 2022 edition of ASHRAE 90.1 and the 2024 edition of the IFC and compare it to the current Minnesota rules. The members of the TAG were appointed to represent associations with experience with the standard and model code. Below is a list of TAG members and the organizations they represent.

Commercial Energy Code TAG

TAG representation	Member	Employer	Association
DLI staff	Steve Shold	DLI	CCLD
	Chris Rosival	DLI	CCLD
Municipal building official	Dennis Schilling	City of West St. Paul	AMBO
Licensed architects	Rachael Spires	BWBR Architects	MN AIA
Engineering	John Smith	Consultant	Mechanical Engineering
	Russ Landry	Center for Energy and Environment	Energy Conservation Engineer
	Eric Johansen	CenterPoint Energy	Energy Efficiency Engineer
	Richard Hermans	Mechanical Engineering	MN Chapter of ASHRAE
Energy advocacy	Michael Waite	American Council for an Energy-Efficient Economy	Energy conservation advocate
	Sam Friesen	Fresh Energy	Building energy efficiency
	Chris Burgess	Midwest Energy Efficiency Alliance	Energy advocacy

Fire Code TAG

TAG representation	Member	Employer	Association
State Fire Marshal	Forrest Williams	DPS	SFMD
	Thomas Jenson	DPS	SFMD
Fire code compliance	Dean Mau	DLI	CCLD
Fire service official	Lisa Consie	Duluth Fire	MSFCA
Fire service/code official	Alisa Schuster	Golden Valley Fire	MSFCA/FMAM
Fire marshal/Building official	Mark Lucht	City of Becker	FMAM
Building official	Jerry Norman	City of Rochester	
Architect	Roger “Lars” Larson	BWBR	MN AIA
Designated managing employee – fire protection	David McNiesh	Viking	Fire Protection Industry
Fire alarm system designer	Dan Morehead	Master Technology Group	MNAFAA
Fire Protection Engineer	Scott Futrell	SFPE MN	OnSite Engineer