

Minnesota Department of Labor and Industry

STATEMENT OF NEED AND REASONABLENESS

Proposed Amendment to Rules Governing Minnesota Provisions, *Minnesota Rules*, Part 1303.2200, Simplified Wind Loads; Revisor's ID Number R-04521

INTRODUCTION

The Commissioner ("Commissioner") of the Department of Labor and Industry ("Department") has the authority to amend the State Building Code, which governs the construction, reconstruction, alteration, repair and use of buildings and other structures. The State Building Code provides basic and uniform performance standards along with reasonable safeguards for health, safety, welfare, comfort, and security of Minnesota residents. The State Building Code is comprised of twenty-one rule chapters.¹ The Minnesota State Legislature has directed the Department to establish a code of standards for the construction, reconstruction, alteration, and repair of buildings and to adopt model building codes generally accepted and in use throughout the United States when practicable.² The Department has also adopted rules that serve as the Minnesota Provisions to the State Building Code, Minnesota Rules, chapter 1303. The Minnesota Provisions address requirements that are mandated by Minnesota Statutes, are needed due to Minnesota's climatic conditions, or are other provisions not appropriately regulated by the model codes.³

The Commissioner proposes amending *Minnesota Rules*, part 1303.2200, Simplified Wind Loads. In 2007, the Department adopted this as a new rule part in compliance with the Minnesota Administrative Procedure Act.⁴ The new rule part added an equation and tables to determine the net pressures of wind loads on buildings meeting the requirements described in Minn. R. part 1303.2200, subp. 1 (hereafter referred to as "simple buildings"). Wind loads are a type of force that applies pressure (net pressure) to the projections of a building surface. The projections of a building surface is the area of the building's surface that is expected to be impacted by the effects of wind. The net pressures must be accurately calculated to ensure that the building can withstand pressures caused by the force of wind. In 2014, the Department adopted amendments to this rule part that were intended to make the equation and tables consistent with procedural changes that occurred in the *International Building Code*. However, the equation as written is mathematically erroneous and provides no design value. The formatting of the variables is inconsistent with standard mathematical practice. The proposed amendments correct formatting and content errors in the current equation. The result will be a correct, usable equation that provides a simple, uniform method for the building industry to correctly and efficiently determine net pressures of wind loads applied to the projections of building surfaces. Some additional proposed amendments clarify the equation and add an alternate calculation method.

¹ See [Minn. R. part 1300.0050](#).

² See [Minn. Stat. § 326B.106](#).

³ See [Minn. R. part 1303.1100](#).

⁴ See *State Register*, Volume 32, Number 1, pages 1-36, July 2, 2007 (32 SR 10) at https://www.revisor.mn.gov/state_register/?vol=32&num=1#page=10

The Department published a Request for Comments on January 2, 2018, and received one comment regarding the tables corresponding with the equation. The comment requested that an additional method be provided to convert the values in the tables from ultimate wind design, as expressed by the equation variable V_{ult} , to allowable stress design (“ASD”). Both ultimate wind design and ASD are calculation methods accepted by the building industry for determining net pressures of wind loads applied to the projections of building surfaces. In response to the comment, the proposed rule amendment includes the method to convert values from ultimate wind design to ASD.

ALTERNATIVE FORMAT

Upon request, this information can be made available in an alternative format, such as large print, braille, or audio. To make a request, contact Amanda Spuckler at the Department of Labor and Industry, 443 Lafayette Road N., St. Paul, MN 55155, phone: 651-284-5006, and fax: 651-284-5749.

STATUTORY AUTHORITY

The Department’s statutory authority to adopt the rules is stated in the following Minnesota Statutes:

326B.02, Subdivision 5. General rulemaking authority. The commissioner may, under the rulemaking provisions of chapter 14 and as otherwise provided by this chapter, adopt, amend, suspend, and repeal rules relating to the commissioner's responsibilities under this chapter, except for rules for which the rulemaking authority is expressly transferred to the Plumbing Board, the Board of Electricity, or the Board of High Pressure Piping Systems.

326B.101 Policy and purpose. The State Building Code governs the construction, reconstruction, alteration, repair, and use of buildings and other structures to which the code is applicable. The commissioner shall administer and amend a state code of building construction which will provide basic and uniform performance standards, establish reasonable safeguards for health, safety, welfare, comfort, and security of the residents of this state and provide for the use of modern methods, devices, materials, and techniques which will in part tend to lower construction costs. The construction of buildings should be permitted at the least possible cost consistent with recognized standards of health and safety.

326B.106, Subdivision 1. Adoption of code. Subject to sections 326B.101 to 326B.194, the commissioner shall by rule and in consultation with the Construction Codes Advisory Council (“CCAC”) establish a code of standards for the construction, reconstruction, alteration, and repair of buildings, governing matters of structural materials, design and construction, fire protection, health, sanitation, and safety, including design and construction standards regarding heat loss control, illumination, and climate control. The code must also include duties and responsibilities for code administration, including procedures for administrative action, penalties, and suspension and revocation of certification. The code must conform insofar as practicable to model building codes generally accepted and in use throughout the United States, including a code for building conservation. In the preparation of the code, consideration must be given to the existing statewide specialty codes presently

in use in the state. Model codes with necessary modifications and statewide specialty codes may be adopted by reference. The code must be based on the application of scientific principles, approved tests, and professional judgment. To the extent possible, the code must be adopted in terms of desired results instead of the means of achieving those results, avoiding wherever possible the incorporation of specifications of particular methods or materials. To that end, the code must encourage the use of new methods and new materials. Except as otherwise provided in sections 326B.101 to 326B.194, the commissioner shall administer and enforce the provisions of those sections.

Under these statutes, the Department has the necessary statutory authority to adopt the proposed rules.

Pursuant to Minnesota Statutes, section 326B.106, subdivision 1, the Commissioner consulted with the CCAC in establishing the proposed adoption of, and amendments to, this proposed rule on May 30, 2019.

Minnesota Statutes, section 14.131, sets out eight factors for a regulatory analysis that must be included in the SONAR. Paragraphs (1) through (8) below quote these factors and then give the agency's response.

(1) a description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule

The classes of persons who probably will be affected by the proposed rule include municipal building officials, building inspectors, building contractors, architects, engineers, material suppliers, installers, and building owners and managers.

It is unlikely there will be any costs as a result of the proposed rule. However, if there are any costs, building owners will probably bear any costs. The proposed rule corrects errors of an equation that is currently in rule and provides a standardized, cost-effective method to determine net pressures applied to the projections of building surfaces. Therefore, a cost savings is anticipated because the required calculation can be performed more quickly and accurately than the more complex calculations in *ASCE 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures* ("ASCE 7"). ASCE 7 is a referenced standard for the calculation of wind loads in the *International Building Code*, *International Existing Building Code*, and *International Residential Code*.

Those that will likely benefit from the proposed rule include building contractors, designers, certified building officials, designers, engineers, material manufacturers, building owners and the general public.

(2) the probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues

The probable costs to the agency for the implementation and enforcement of the proposed rule might include costs to copy and distribute the rule to agency staff. However, the rule is available for free online on the Revisor's web site.⁵

The probable costs to any other agency for the implementation and enforcement of the proposed rule might include costs to copy and distribute the rule to municipal building officials and other entities involved with enforcement of the code. A code book published by the Minnesota Bookstore that has 17 rule chapters, including chapter 1303, is \$35.95. Presumably the updated version will be similar in cost.⁶ Again, the rule is available for free online on the Revisor's web site.

There is no anticipated effect on state revenues as a result of the implementation and enforcement of the proposed rule.

(3) a determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule

There are no less costly or less intrusive methods for achieving the purpose of the proposed rule. The current rule contains an incorrect equation intended to calculate the net pressures of wind loads applied to the projections of building surfaces and the corresponding tables. The proposed amendments correct errors in that equation and provide information to convert table values from ultimate wind design, as expressed by equation variable " V_{ult} ," to ASD. ASD and ultimate wind design are both acceptable methods for calculating the net pressures applied to the projections of building surfaces. The adoption of the proposed rule will provide uniform administration and enforcement of construction standards. The uniform administration and enforcement of this code will result in more predictable code application and enforcement, which will tend to lower costs by reducing the need for review by local and state review boards and other entities responsible for code interpretation and review. Having the correct equation in the rule will also reduce costs because design engineers do not have to spend time using more complex calculations that increase the risk of errors in calculating the net pressures of wind loads when applied to the projections of building surfaces.

(4) a description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the agency and the reasons why they were rejected in favor of the proposed rule

No alternative methods for achieving the purpose of the proposed rule were seriously considered because it is a correction and clarification. Chapter 1303 contains the Minnesota Provisions of the State Building Code that address requirements that are mandated by Minnesota Statutes, are needed due to Minnesota's climatic conditions, or are other provisions not

⁵ <https://www.revisor.mn.gov/rules/1303.2200/>

⁶ See <https://www.mnbookstore.com/minnesota-state-building-code-184.html>. Note that there are 17 rule chapters in the book, of which 1303 is one of them.

appropriately regulated by the model codes.⁷ The proposed rule corrects content and formatting errors in the equation in the current rule. The correct equation is necessary because the model codes do not include a simple, cost-effective method to calculate the effect of the net pressures of wind loads for simple buildings.

(5) the probable costs of complying with the proposed rule, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals

There might be negligible costs to regulated parties and municipal building departments to purchase new copies of the rule book for reference and training on the updated rule. There are no other costs to comply with the proposed rule because the proposed rule corrects an equation in the current rule. The additional information about how to convert information in the tables from ultimate wind design to ASD are anticipated to be neutral or save money because it offers an alternative method to calculate the same information.

(6) the probable costs or consequences of not adopting the proposed rule, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals

The probable costs of not adopting the proposed rule are structural engineers and other building professionals spending time trying to work with the incorrect, nonsensical equation in the current rule due to the content and formatting errors and ending up with no calculated answer. This costs time and therefore money in the planning stages. The current equation cannot be used to determine if buildings can safely withstand wind conditions so the structural engineer must use a more complex method. The probable consequences of not adopting the proposed rule include the need for alternative methods to be used, which are more time consuming and subject to error.

Not adopting the proposed rule could result in a structural engineer attempting to use the incorrect formula, which would pose a risk to life safety or great expense to correct later.

(7) an assessment of any differences between the proposed rule and existing federal regulations and a specific analysis of the need for and reasonableness of each difference

There are no applicable federal regulations that regulate the state building codes.

(8) an assessment of the cumulative effect of the rule with other federal and state regulations related to the specific purpose of the rule. . . . '[C]umulative effect' means the impact that result from incremental impact of the proposed rule in addition to other rules, regardless of what state or federal agency has adopted the other rules. Cumulative effects can result from individually minor but collectively significant rules adopted over a period of time.

The Minnesota State Building Code is a single set of coordinated building construction regulations that apply throughout the state of Minnesota. There are no other building codes that

⁷ See [Minn. R. part 1303.1100](#).

can be used or enforced in this state. When the Department adopts the individual rule chapters that make up the Minnesota State Building Code, it works with other state agencies that have complementary jurisdiction of certain buildings or building types to ensure that the requirements coordinate and are not cumulative or conflicting. Because Chapter 1303 is the Minnesota Provisions chapter, there are no other building regulations that apply to these specific provisions. There are no other federal or state regulations that must be coordinated with the proposed rule.

PERFORMANCE-BASED RULES

Minnesota Statutes, section 326B.106, subdivision 1, authorizes the Department to establish by rule a code of standards for construction. This statute requires the code to “conform insofar as practicable to model building codes generally accepted and in use throughout the United States.” At the same time, this statute mandates that, “to the extent possible, the code must be adopted in terms of desired results instead of the means of achieving those results, avoiding wherever possible the incorporation of specifications of particular methods or materials.”

The proposed rule corrects a specific equation that calculates the net pressures of wind loads that the projections of building surfaces must withstand and also allows ASD as an alternative method to calculate wind net pressures. The equation and corresponding tables are an alternative to the more costly and extensive methods in the model codes meant to determine a more complex structure’s ability to withstand wind loads.

The rule does not mandate the use of this specific equation or the ASD method to calculate the net pressure wind loads of a building. Wind load calculations are required in other parts of the Minnesota State Building Code and this rule part offers two simple formulas to use to make that calculation.

ADDITIONAL NOTICE

This Additional Notice Plan was reviewed by the Office of Administrative Hearings and approved in a June 28, 2019, Order on Review of Additional Notice Plan by Administrative Law Judge Middendorf.

Our Notice Plan also includes giving notice required by statute. We will mail or email the Notice of Intent, which will contain an easily readable and understandable description of the nature and effect of the proposed rule, to everyone who has registered to be on the Department’s rulemaking mailing list under Minnesota Statutes, section 14.14, subdivision 1a. We will also give notice to the Legislature per Minnesota Statutes, section 14.116.

The Department will mail the Notice of Intent to the following interested parties:

1. Builders Association of Minnesota (BAM)
2. Association of Builders and Contractors (ABC)
3. Builders Association of the Twin Cities (BATC-Housing First Minnesota)
4. Association of Minnesota Building Officials (AMBO)
5. Fire Marshals Association of Minnesota

6. League of Minnesota Cities
7. American Institute of Architects Minnesota
8. Association of Minnesota Counties
9. Building Owners and Managers Association, Greater Minneapolis and Greater St. Paul chapters (BOMA)
10. American Council of Engineering Companies of Minnesota (ACEC/MN)
11. Minnesota Structural Engineers Association (MNSEA)
12. Minnesota Society of Professional Engineers (MNSPE)

Our Notice Plan did not include notifying the Commissioner of Agriculture because the rules do not affect farming operations per Minnesota Statutes, section 14.111.

CONSULTATION WITH MMB ON LOCAL GOVERNMENT IMPACT

As required by Minnesota Statutes, section 14.131, the Department consulted with the Commissioner of Minnesota Management and Budget (MMB). The Department did this by sending to the Commissioner of MMB copies of the documents sent to the Governor's Office for review and approval by the Governor's Office prior to the Board's publishing the Dual Notice. Copies were sent on September 19, 2018. The documents included: the Governor's Office Proposed Rule and SONAR form; draft rules; and almost final SONAR. MMB Executive Budget Officer Laurena Schlottach-Ratcliff responded, in part, as follows in a memorandum dated June 7, 2019: "Under this rule change a cost savings is expected for designers calculating wind loads because the calculation can be performed more quickly." And, "In summary, these proposed changes will have a fiscal impact on local government."

DETERMINATION ABOUT RULES REQUIRING LOCAL IMPLEMENTATION

As required by Minnesota Statutes, section 14.128, subdivision 1, the agency has considered whether these proposed rules require a local government to adopt or amend any ordinance or other regulation in order to comply with these rules. Pursuant to Minnesota Statutes, section 14.128, the Department has determined that a local government will not be required to adopt or amend an ordinance or other regulation to comply with these proposed rules. The State Building Code is the standard that applies statewide. Minnesota Statutes, section 326B.121, subdivision 1, mandates compliance with the State Building Code whether or not a local government adopts or amends an ordinance. As a result, an ordinance or other regulation is not required for compliance. If a city wants its ordinances to accurately reflect legal requirements in a situation in which the State Building Code has superseded the ordinances, then the city may want to amend or update its ordinances.

COST OF COMPLYING FOR SMALL BUSINESS OR CITY

Agency Determination of Cost

As required by Minnesota Statutes, section 14.127, the Department has considered whether the cost of complying with the proposed rules in the first year after the rules take effect will exceed \$25,000 for any small business or small city. The Department has determined that the cost of complying with the proposed rules in the first year after the rules take effect will not exceed \$25,000 for any small business or small city, and the proposed rules will have no impact

on the cost of construction of a simple building. The proposed rules correct an equation that design professionals use to determine a building's ability to withstand wind loads. The equation itself has no costs associated with it. If a small business or small city intends to have a simple building built, design professionals are required by the State Building Code to determine the planned structure's ability to withstand the pressures caused by wind loads. Currently, design professionals use the more extensive methods prescribed by ASCE 7 to determine a building's capacity to withstand the net pressures caused by wind loads. Both the equation in this proposed rule and the methods prescribed by ASCE 7 would produce similar results. Those results determine to what wind capacity a designer must design a building, which could result in specific materials or methods to be used. Both calculation methods would produce similar wind capacity determinations. The cost to build to the specifications determined by the equation or ASCE 7 would be similar because the results of both methods would be similar. The proposed amendment provides an accurate equation and simplifies the calculation that designers must currently do.

The cost of constructing a building under the current rule compared to the same building constructed under the proposed rule is anticipated to be similar or slightly more because of additional time required to calculate wind loads under the current rule. The equation in the proposed rule is a less-costly alternative to other methods that may be used to calculate net pressures applied to the projections of building surfaces because designers can calculate the wind loads more quickly. Saving designer time saves the building owner money.

LIST OF WITNESSES

If these rules go to a public hearing, the Department anticipates having the following witnesses testify in support of the need for and reasonableness of the rules:

1. Dan Kelsey, Administrative Structural Engineer, Construction Codes and Licensing, Department of Labor and Industry,
2. Other staff from the Construction Codes and Licensing Division, if necessary

RULE-BY-RULE ANALYSIS

MINNESOTA RULES, CHAPTER 1303 Minnesota Provisions of the State Building Code

1303.2200 SIMPLIFIED WIND LOADS.

Subp. 2. Simplified design wind pressures. The proposed amendment corrects the equation and reformats the variables. The proposed amendment italicizes the variables to be consistent with standard mathematical equation formatting. The proposed amendment corrects the placement of the square function (" x^2 ") and therefore corrects the order in which the mathematical operations are performed. That is, the proposed amendment directs the user to square the " V_{ult} " variable, square "115," and then divide the answers to determine the net pressures caused by the wind load, or force, that is applied to projections of building surfaces, or the area of the building's surface that is expected to be impacted by the effects of wind. The " V_{ult} " value is based on geographic location and the intended use of the building. For example,

buildings such as schools, nursing homes, and those providing emergency services are designed to withstand greater ultimate design wind speeds. The “ V_{ult} ” value is based on the geographic location and use of the building as determined in the ASCE 7 and *International Building Code*.⁸ Once the “ V_{ult} ” value is determined, the designer uses the “ V_{ult} ” value in the equation of this rule part. Without these modifications, the equation is meaningless when structural engineers and other building professionals attempt to use it. Instead, structural engineers and other building professionals must use a longer, more complex calculation in ASCE 7 that takes more time to calculate than the intended equation. As written, any results calculated from the current equation would result in an unnecessarily high calculation that would not be consistent with the longer calculation method provided in ASCE 7. The proposed amendments correct the equation so a designer can accurately and more quickly determine what pressures caused by wind conditions a building must be able to withstand. The proposed equation and the longer calculation method in ASCE 7 produce similar results.

Table *P_{alt}*. Reformatting “ P_{alt} ” to italics is a correction that is consistent with standard mathematical equation formatting. Footnote “a” clarifies that table values are for ultimate wind design (“ V_{ult} ”) and directs the user to multiply the table values by 0.6 to convert them from ultimate wind design to ASD. ASD and ultimate wind design are two methods commonly used by designers and engineers to determine a structure’s ability to withstand wind. The proposed amendments allow easy conversion of the ultimate wind design table values to ASD, which will be beneficial to structural engineers and designers who must make the calculation. The proposed amendments delete the existing notations that are indicated by asterisks and replace them with footnotes “b” and “c” to clarify the current rule. The footnotes provide specific instead of general information and clarify the meaning of the negative numbers.

There are no substantive changes insofar as the proposed amendments correct the existing equation to express what was intended and adds an additional calculation method.

CONCLUSION

Based on the foregoing, the proposed rules are both needed and reasonable.

7/3/2019
Date



Nancy J. Leppink, Commissioner
Department of Labor and Industry

This Statement of Need and Reasonableness was made available for public review on 7/3, 2019.

⁸ The designer can use either of these sources listed to determine the “ V_{ult} ” value. The *International Residential Code* refers code users to the *International Building Code* for the calculation of wind loads.