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A Guide to the Limited Quantity in Indoor Loading for Wood-Based Panel Based on its Ultimate Formaldehyde Emission

基于极限甲醛释放量的人造板室内承载限量指南

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1 Scope

This Standard provides information such as the terms and definitions, basic principles of the limited quantity in indoor loading for wood-based panel based on its ultimate formaldehyde emission, as well as the calculation methods and key points to be considered of the limited quantity in indoor loading for wood-based panel.

This Standard is applicable to the limited quantity of loading for wood-based panels that are used in wood products such as indoor furniture, cabinets, wooden doors, wooden wall panels, and wooden floors, etc.

2 Normative References

The following documents are essential to the application of this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 17657-2013 Test Methods of Evaluating the Properties of Wood-based Panels and Surface Decorated Wood-based Panels

GB/T 18204.1 Examination Methods for Public Places - Part 1: Physical Parameters

GB/T 18259-2018 Terminology for Wood-Based Panels and their Surface Decoration

GB 18580-2017 Indoor Decorating and Refurbishing Materials - Limit of Formaldehyde Emission of Wood-Based Panels and Finishing Products

GB/T 18883 Indoor Air Quality Standard

complies with the provisions of GB 18580-2017, and that the concentration of formaldehyde in the indoor air after the decoration by wood-based panels complies with the provisions of GB/T 18883.

According to the indoor air formaldehyde concentration requirements and the ultimate formaldehyde emission of wood-based panel, calculate the limited quantity in indoor loading for wood-based panel. The usage of wood-based panels per unit volume of indoor space shall not exceed the limited quantity of loading.

5 Calculation Method of the Limited Quantity in Indoor Loading for Wood-Based Panel

5.1 Determination of the number of indoor air changes

The number of indoor air changes shall be implemented in accordance with the provisions of GB/T 18204.1. When estimating, refer to the data on the number of indoor air changes in Appendix A.

5.2 Determination of the ultimate formaldehyde emission of wood-based panel

5.2.1 Method-A

Set the test parameters of the 1m^3 climate chamber according to the hottest monthly average temperature and the highest monthly average humidity in the area of use (see Appendix B), as well as the number of indoor air changes measured or estimated according to Appendix A; and refer to the detection method in 4.60 of GB/T 17657-2013 to determine the ultimate formaldehyde emission of wood-based panel, and the result is accurate to 0.001mg/m^3.

5.2.2 Method-B

Set the number of air changes of the 1m^3 climate chamber according to the number of indoor air changes measured or estimated according to Appendix A; and determine the formaldehyde emission of the wood-based panel according to the detection method in 4.60 of GB/T 17657-2013, and the result is accurate to 0.001mg /m^3. Then calculate the correction coefficients of the hottest monthly average temperature and the highest monthly average humidity respectively according to Formulas (1) and (2). The ultimate formaldehyde emission of wood-based panel is the correction coefficient of the hottest monthly average temperature and the highest monthly average humidity multiplied by the formaldehyde emission of the measured wood-based panel.

$$\alpha = e^{-9\,799\times\left(\frac{1}{t+273.15}-\frac{1}{296.15}\right)} \qquad \cdots\cdots(1)$$

6 Key Points Need to be Considered

6.1 Before interior decoration, the local hottest monthly average temperature, the highest monthly average humidity and the number of indoor air changes shall be determined.

6.2 Determination of ultimate formaldehyde background concentration in indoor air: Determine the formaldehyde concentration in indoor air before decoration in accordance with the requirements of GB/T 18883. According to local hottest monthly average temperature, the highest monthly average humidity, calculate the correction coefficients of the hottest monthly average temperature, the highest monthly average humidity according to Formulas (1) and (2). The ultimate formaldehyde background concentration in indoor air is correction coefficient of the hottest monthly average temperature and the highest monthly average humidity multiplied by the formaldehyde concentration in indoor air before decoration.

6.3 Determine the ultimate formaldehyde emission of wood-based panels according to the hottest monthly average temperature, the highest monthly average humidity and the number of indoor air changes in the area where the room is decorated. According to Formula (3), calculate the limited quantity in indoor loading for wood-based panel.

6.4 The maximum release surface area of indoor wood-based panel shall not exceed the limited quantity in indoor loading for wood-based panel multiplied by the volume of the indoor space.

6.5 When a variety of wood-based panels are used at the same time, the limited quantity in indoor loading is calculated based on the ultimate formaldehyde emission of the most used panel. The ultimate formaldehyde emission of other wood-based panels cannot exceed that of this panel.

6.6 When the ultimate formaldehyde emission of wood-based panel is not detected, the indoor usage of such wood-based panel is not restricted.

6.7 Under the same indoor temperature, humidity and the number of air changes, the concentration of formaldehyde in the indoor air after decoration shall decrease over time.

6.8 The concentration of formaldehyde in the indoor air after decoration can be measured in accordance with the requirements of GB/T 18883, and the calculation results of the limited quantity in loading shall be verified.

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