

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

HJ 949-2018

**Technical specification for investigation on infiltration factor of
ambient particulate matter (PM_{2.5}) for civil buildings**

民用建筑环境空气颗粒物 (PM_{2.5}) 渗透系数调查技术规范
(English Translation)

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7.1 Determination of permeability coefficient

Foreword

To implement the Environmental Protection Law of the People's Republic of China, promote environmental health risk management, and regulate airborne particulate matter (PM_{2.5}) for civil buildings.

The investigation of the permeability coefficient and the development of this standard.

This standard specifies the working procedures, survey contents, survey methods and techniques for the investigation of the permeability coefficient of airborne particulate matter (PM_{2.5}) in civil buildings.

Technical requirements.

Appendix A to Appendix D of this standard are informative annexes.

This standard is the first release.

This standard was formulated by the Science and Technology Standards Department of the

Ministry of Ecology and Environment.

This standard is mainly drafted by. South China Institute of Environmental Sciences, Fudan University, Dalian University of Technology.

This standard was approved by the Ministry of Ecology and Environment on July 12, 2018.

This standard is implemented as of the date of promulgation.

This standard is explained by the Ministry of Ecology and Environment.

Technical Specifications for Investigation of Permeability Coefficient of Airborne Particulate Matter (PM2.5) in Civil Buildings

1 Scope of application

This standard specifies the working procedures, survey contents, and survey methods for the investigation of the permeability coefficient of airborne particulate matter (PM2.5) in civil buildings.

And technical requirements.

This standard is applicable to the use of particulate matter (PM2.5) concentration measurement method to carry out the permeability coefficient of airborne particulate matter (PM2.5) in civil construction environment.

survey.

The investigation of the permeability coefficient of airborne particulate matter (PM10) in civil buildings can be carried out with reference to this standard.

2 Normative references

This standard refers to the terms of the following documents. For undated references, valid versions (including amendments) apply.

In this standard.

GB 50178 Building climate zoning standards
Statistical processing of GB/T 4883 data and interpretation and interpretation of outliers of normal samples
GB/T 8170 Numerical Rounding Rules and Representation and Determination of Limit Values
HJ 93 ambient air particulate matter (PM10 and PM2.5) sampler technical requirements and test methods
HJ/T 167 Indoor Environmental Air Quality Monitoring Technical Specification
QX/T 152 climate season division

3 Terms and definitions

The following terms and definitions apply to this standard.

Civil building

A general term for buildings where people live and perform public activities.

[GB 50352-2005, definition 2.0.1] 3.2 Particulate matter (particle size less than or equal to 2.5 μm) particulate matter (PM_{2.5}) Particulate matter, also known as fine particles, with aerodynamic equivalent diameter of 2.5 μm in ambient air.

[GB 3095-2012, definition 3.4] 3.3 PM_{2.5} permeability coefficient PM_{2.5} infiltration factor the slope obtained by linear regression using the ambient air PM_{2.5} concentration as the independent variable and the indoor air PM_{2.5} concentration as the dependent variable.

Indoor environment

A relatively closed space in which people work, live, socialize, and other activities.

[HJ/T 167-2004, definition 3.1] 3.5 Outdoor environment A space outside the relatively closed space in which people work, live, socialize, and otherwise.

4 Working procedures

Civil construction environment air PM_{2.5} permeability coefficient survey work procedures including program development, site survey, permeability coefficient determination and results table 4, quality control and quality evaluation, see Figure 1.

Figure 1 Working procedure

5.1 Data collection

a) Information on the geographical distribution and climate of the survey area should be collected according to GB 50178, and the architectural climate division of the survey area should be clearly defined.

Record A of Table A.1.

b) The information, quantity and distribution of civil building function types in the survey area should be collected, and the types of building functions that are of primary concern should be clearly identified.

See Table B.1 of Appendix B.

c) The building characteristics of the civil buildings in the survey area should be collected, and the characteristics of the buildings that are of primary concern should be clearly identified. See Table C.1 of Appendix C.

5.2.1 Stratification factors

According to the purpose of the investigation and the survey area, combined with the zoning of the building climate, the functional type of the civil building, and the characteristic factors of the building for stratification factors, see Table A.1 in Appendix A, Table B.1 in Appendix B, and Table C.1 in Appendix C.

5.2.2 Minimum sample size

Use formula (1) to estimate the minimum sample size of a civil structure under a single layer of a functional building.

Where. n_i - a type of function (i) the minimum sample size under a single layer of a civil building;

$U_{\alpha/2}$ --the corresponding standard normality difference when the significance level is 95%, take 1.96;

σ_{μ_i} --a functional type (i) the standard deviation of the PM2.5 permeability coefficient of civil buildings, which can be obtained by consulting the literature or conducting a pre-investigation;

δ --allowing error, generally 15% to 20%;

μ_i --A functional type (i) The arithmetic mean of the PM2.5 permeability coefficient of a civil building can be obtained by consulting the literature or conducting a pre-survey;

$Deff$ --design effect value, simple random sampling is taken as 1.0, and other sampling methods are taken as 1.0 to 1.5.

5.2.3 Total sample size

Use formulas (2) and (3) to estimate the total sample size of a functional building for civil buildings and all functional types of civil buildings.

Where. n_i --a type of function (i) the minimum sample size under a single layer of a civil building;

Q --the product of the stratification factor, combined with the main factors affecting the PM2.5 permeability coefficient, such as the sample according to the construction climate division 3 layers, divided into 2 layers according to the characteristics of the building, then the product of the stratification factor is $3 \times 2 = 6$;

P --The rate of loss of follow-up on-site investigation, taking 0% to 10%;

N_i --Investigate a functional type (i) the total sample size of civil buildings;

N --Investigate the total sample size of all functional types of civil buildings.