



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

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**Technical standard for smoke management systems in
buildings
(English Translation)**

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Table of Contents

- 1 General
- 2 Terminology and symbols
 - 2.1 Terminology
 - 2.2 Symbols

1 General

1.0.1

This standard is formulated for the purpose of rationally designing building smoke prevention and exhaust systems, ensuring construction quality, standardizing acceptance and maintenance management, reducing fire hazards, and protecting personal and property safety.

1.0.2

This standard applies to the design, construction, acceptance and maintenance management of smoke prevention and exhaust systems for new, expanded and rebuilt industrial and civil buildings. For industrial and civil buildings with special purposes or special requirements, if there are special provisions in professional standards, those provisions can be followed.

1.0.3

The design of building smoke prevention and smoke exhaust system should take effective technical measures in consideration of the characteristics of the building and the development law of fire smoke, so as to achieve safety, reliability, advanced technology and reasonable economy.

1.0.4

The equipment of the building's smoke prevention and smoke exhaust system should be selected in accordance with the current relevant national standards and relevant access systems.

1.0.5

In addition to implementing this standard, the design, construction, acceptance and maintenance management of the building's smoke prevention and smoke exhaust system should also meet the requirements of the current relevant national standards.

2.1.1 Smoke protection system

Prevent fire smoke from accumulating in stairwells, front rooms, and refuge floors (rooms) by adopting natural ventilation, or prevent fire smoke from invading stairwells, front rooms, and refuge floors (rooms) by using mechanical pressurized air supply. Room) and other space systems, the smoke prevention system is divided into natural ventilation system and mechanical pressurized air supply system.

2.1.2 Smoke exhaust system

A system that uses natural smoke exhaust or mechanical smoke exhaust to exhaust fire smoke from rooms, aisles and other spaces to the outside of the building, and is divided into natural smoke exhaust systems and mechanical smoke exhaust systems.

2.1.3 Direct irrigation mechanical pressurization without air shaft

There is no air supply shaft, and the air supply mode is directly mechanically pressurized by the fan to the stairwell.

2.1.4 Natural smoke exhaust

Utilize the buoyancy of the fire hot smoke flow and the external wind pressure to directly discharge the smoke in the building to the outside through the opening of the building.

2.1.5 Natural smoke exhaust window (mouth) natural smoke vent

The openable outer window or opening with smoke exhaust function can be opened by automatic, manual, temperature-controlled release, etc.

2.1.6 Smoke plume

The mixed smoke flow formed by the smoke entraining the surrounding air during a fire. According to the flow of flame and smoke, the smoke plume can be divided into axisymmetric smoke plume, balcony overflow smoke plume, window type smoke plume, etc.

2.1.7 Axisymmetric smoke plume axisymmetric plume

A smoke plume that does not come into contact with surrounding walls or obstacles during its ascent, and is not disturbed by airflow.

2.1.8 Balcony spill plume

The smoke plume overflows from the door (window) beam of the fire room, flows along the balcony or horizontal protrusion outside the fire room, and overflows to the edge of the

balcony or horizontal protrusion to the adjacent tall space.

2.1.9 Window plume

The smoke plume that overflows from openings such as doors, windows, etc. of a room or compartment where a fire with restricted ventilation occurs, into an adjacent tall space.

2.1.10 Draft curtain

Made of non-combustible materials, it is vertically installed under the roof, beam or ceiling of the building, and can form a certain smoke storage space in the event of a fire.

2.1.11 Smoke reservoir

Located on the top of the building space, it is a space for accumulating fire smoke formed by smoke-retaining vertical walls, beams or partition walls. The height of the smoke storage bin is the design smoke layer thickness.

2.1.12 Clear height

The height from the lower edge of the smoke layer to the indoor ground.

2.1.13 Mass flow rate of plume

The mass of the plume passing through a horizontal section at a certain height per unit time, in kg/s.

2.1.14 Combination fire and smoke damper

Installed on the pipe of the mechanical smoke exhaust system, it is usually open, and it will be closed when the temperature of the smoke in the smoke exhaust pipe reaches 280°C during a fire, and it can meet the requirements of smoke leakage and fire resistance integrity within a certain period of time Fire-stop valve. It is generally composed of valve body, vane, actuator and temperature sensor.

2.1.15 Smoke damper

Installed at the end of each branch pipe (smoke inlet) of the mechanical smoke exhaust system, it is usually closed and meets the air leakage requirements. It can be opened and closed manually or electrically in case of fire, and it plays the role of smoke exhaust. It is generally composed of valve body, vane, actuator and other components.

2.1.16 Smoke exhaust inlet

Inlet for flue gases in a mechanical fume extraction system.

2.1.17 Fixed window fixed window for fire forcible entry

Installed in a place with a mechanical smoke prevention and exhaust system, the window sash is fixed and cannot be opened at ordinary times. It is only convenient for manual demolition in the event of a fire to exhaust the smoke and heat in the fire.

2.1.18 Fusible daylighting band (window) fusible daylighting band

It is made of materials that can melt by itself at 120°C to 150°C without producing molten droplets. It is installed in the upper part of the building space and is used to discharge smoke and heat in the fire site.

2.1.19 Independent anteroom

Antechamber connected only by an escape staircase.

2.1.20 Shared front room shared anteroom

(residential building) scissor stairwell The front room when two stairwells share the same front room.

2.1.21 Combined anteroom

The front room when the front room of the smoke-proof stairwell is shared with the front room of the fire elevator.

2.2.1 Calculation of geometric parameters

A - the effective air leakage area of each evacuation door;

A_k - cross-sectional area of the door to open;

A_o - total area of all air inlets;

A_m - the area of the door;

A_f - the area of a single air supply valve;

A_g - the total area of the evacuation door in the front room;

A_l - the total area of the evacuation door in the stairwell;

A_v - cross-sectional area of natural smoke exhaust window (port);

A_W--window opening area;

B--The dimension of the long side of the air duct;

b--the distance from the opening to the edge of the balcony;