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Code for Construction of Ventilation and Air Conditioning

通风与空调工程施工规范

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Code for Construction of Ventilation and Air Conditioning

1 General Provisions

1.0.1 This code is formulated with view to strengthening the technology management for the construction and installation of ventilation and air conditioning, standardizing the construction technology, intensifying the control over construction and installation processes as well as guaranteeing the engineering quality.

1.0.2 This code is applicable to the construction and installation of ventilation and air conditioning involved in the building engineering.

1.0.3 During the construction and installation of ventilation and air conditioning, the requirements for engineering quality in technical engineering documents and contracting documents shall not be lower than those specified in this code.

1.0.4 The construction of ventilation and air conditioning shall not only meet the requirements stipulated in this code, but also comply with those in the current relevant ones of the nation.

3 Basic Requirements

3.1 Construction Technology Management

3.1.1 The enterprise which undertake the construction of ventilation and air conditioning shall have appropriate construction qualification. And appropriate technical standards shall be available for the construction site.

3.1.2 Where the construction enterprise undertakes the in-depth design of construction drawings of ventilation and air conditioning, relevant in-depth design documents shall be confirmed by the original design organization.

3.1.3 Before construction of ventilation and air conditioning, the development organization shall organize the design, construction and supervision organizations to make technical disclosure and joint review on the design documents and to confirm them by signing.

3.1.4 Before construction of ventilation and air conditioning, the construction organization shall prepare the organization design (scheme) for the construction of ventilation and air conditioning which shall not be implemented until passing the review of its technical principal and obtaining the approval of the supervision (development) organization. The construction organization shall make technical disclosure and provide necessary operation instruction and training for the construction personnel of ventilation and air conditioning.

3.1.5 The change of construction drawings need be approved by the original design organization. Where the change of construction drawings involves in the using and energy-saving effects of ventilation and air conditioning, such change shall be subject to review by the censorship of the original construction drawing design documents. Before any change is made, relevant procedures shall be handled and confirmation by the supervision and development organizations is required.

3.1.6 Before system check and test as well as operation and commissioning, the construction organization shall prepare appropriate technical schemes and subject them to review and approval.

3.1.7 The new technology, process, material and equipment used for or applied to ventilation and air conditioning shall be evaluated, verified and filed according to relevant requirements. Before construction, special construction technology schemes shall be formulated for new or first-applied construction technologies.

3.2 Construction Quality Management

3.2.1 Appropriate quality management system shall be established for the construction site of ventilation and air conditioning and shall cover the following content:

1 Post responsibility system;

2 Technology management responsibility system;

3 Quality management responsibility system;

4 Regular meeting system for engineering quality analysis.

3.2.2 Construction quality control and inspection system shall be established for the construction site and shall cover the following content:

1 Implementation check system for construction organization design (scheme) and technical disclosure;

2 Material and equipment receiving inspection system;

3 Construction process control system;

4 Check system for handing-over inspection between relevant processes and intermediate delivery between professional works;

5 Construction inspection and test system.

3.2.3 Where the pipeline crosses wall and floor slab, sleeve shall be arranged according to the design requirements, and flame retardant material shall be used between sleeve and pipeline for compact filling; where the pipeline crosses fire compartment, incombustible material shall be used for fireproof plugging.

3.2.4 Before connecting pipeline and equipment, the system pipeline shall pass the hydrostatic test and flushing (purging) test.

3.2.5 Before concealed construction, it shall pass the quality inspection jointly carried out by the technical (quality) principal of construction project, professional foreman and full-time quality inspector before reporting it to the supervision engineer (representative of the development organization) for inspection and acceptance and filling the acceptance records of concealed works. If necessary, images shall be provided for important positions.

3.2.6 Manhole shall be arranged for concealed equipment and valve and shall meet the requirements of repair and maintenance.

3.2.7 The instruments for check, test and commissioning shall be calibrated and fall within their validity.

3.3 Material and Equipment Quality Management

3.3.1 The construction of ventilation and air conditioning shall be carried out according to construction drawings and relevant technical product documents. The material and equipment in use shall meet the design requirements and the requirements of relevant current national standards. Those expressly prohibited or obsoleted by the State must not be used.

3.3.2 The material and equipment used for ventilation and air conditioning shall be provided with quality certificates in Chinese and shall be complete and effective. The quality certificates shall reflect the variety, specification, quantity and performance index of material and equipment and shall comply with the received material and equipment. The type inspection report on equipment shall be applicable for such series of products and shall fall within its validity.

3.3.3 Where the material and equipment approaches the construction site, the construction organization shall inspect and test them and report it to the supervision engineer (representative of the development organization) for acceptance and filling the acceptance records of received material (equipment) as soon as such inspection and test are passed. Those that fail to pass such acceptance shall not be used.

3.3.4 The thermal insulation material and fan coil used for ventilation and air conditioning shall be inspected through evidential sampling according to the relevant requirements of the current national standard "Code for Acceptance of Energy-efficient Building Construction" GB 50411 where they approach the construction site.

3.4 Safety and Environmental Protection

3.4.1 The enterprise which undertakes the construction of ventilation and air conditioning shall have appropriate safe production license. Appropriate safety and environmental protection management system shall be established for the construction and installation site where full-time safety personnel shall be arranged.

3.4.2 Disclosure of safety technology shall be carried out before the construction of ventilation and air conditioning. The safety precautions and facilities for construction shall meet the relevant national requirements. The construction equipment shall be used according to appropriate safety regulations.

3.4.3 The temporary power utilization at the construction site shall comply with the relevant current national standards. During construction, effective measures shall be taken to guarantee the safety of power utilization and equipment operation.

3.4.4 During electric and gas welding, the operation personnel shall take their posts with certificates and a special person shall be arranged to supervise them; moreover, fire-fighting equipment shall be provided. After completion of electric and gas welding, careful inspection shall be carried out before leaving to eliminate potential hazards.

3.4.5 Where the material and equipment are handled and hoisted on site, a special person shall be arranged for command so as to avoid injuring any person or damaging any material and equipment.

3.4.6 Before hoisting and transporting large equipment, special technical scheme shall be prepared and shall not be implemented until it is approved.

3.4.7 In case of operation under relatively enclosed environment, temporary ventilation measures shall be taken.

3.4.8 Where paint and adhesive are used, protective measures shall be taken and the operation area shall keep well ventilated.

3.4.9 The inflammables, explosives and other hazardous articles shall be stored safely and separately. The volatile articles shall be preserved in sealed condition while the residues and storage vessels of hazardous articles shall be recycled properly.

3.4.10 Dust control and noise reduction measures shall be taken for construction processes where smoke, dust and noise may be generated.

6 Air Valve and Components Making

6.1 General Requirements

6.1.1 The materials for making air valve and components shall meet the requirements of design and relevant technical documents.

6.1.2 The finished air valve and components in use shall have acceptable quality certificates.

6.2 Air Valve

6.2.1 The quality of finished air valve shall meet the following requirements:

1 The specification of air valve shall meet the requirements of product technology standards and shall meet the design and service requirements;

2 The air valve shall start and stop flexibly, with sound construction, tight shell, good anti-corrosion and smooth surface and without visible scar and deformation; moreover, it shall be free from such defects as crack and rust.

3 The rotatable components in air valve shall be wear-proof and corrosion-resistant, with flexible rotating mechanism as well as reliable braking and positioning device;

4 The air valve flange shall match with the air duct flange.

6.2.2 The manual regulating valve shall close clockwise and its indicated opening shall be consistent with the vane opening. The vane overlapping shall fit closely and regularly. The gap between vane and valve body shall be less than 2mm.

6.2.3 Operation test shall be carried out on the driving device of electric and pneumatic regulating air valve. The test result shall meet the requirements of technical product documents and such valve shall operate normally under the maximum design operating pressure.

6.2.4 The fire valve and smoke discharge valve (smoke vent) shall meet the requirements of the relevant national current technical standards on fire protection products. Operation test shall be carried out on the actuating mechanism and the test result shall meet the requirements of product specifications.

6.2.5 As for check air valve, it shall inspect whether its members are complete. Strength test shall be carried out for the valve under the maximum design operating pressure and the valve leaf shall have no deformation and leakage at closed position. The horizontal check air valve shall have reliable balance regulating mechanism.

6.2.6 As for flashboard air valve, the flashboard shall be flat and smooth and have reliable positioning and fixing device. The upper and lower connection pipes of oblique flashboard air valve shall be in alignment.

6.2.7 As for tee regulating air valve, its bat-handle switch shall be indicated with the regulating angle; the valve plate shall be convenient for regulating and shall not collide with air duct.

6.3 Hood and Cowl

6.3.1 The hood and cowl shall be made according their types and service requirements. After sampling the selected materials based on the construction drawing, they may be prepared and processed by biting and welding. The making method may be in accordance with the requirements of Chapter 4 in this code.

6.3.2 The size and construction of hood made on site shall comply with the design requirements and relevant technical product documents, and shall meet the following requirements:

1 The hood shall have sound construction, regular shape and smooth surface both inside and outside, and its enclosure shall be free from sharp corner.

2 Water collecting sump shall be arranged below the exhaust hood of cooker in the kitchen. As for umbrella hood for discharging steam or other humid gas, water collecting sump for discharging condensate shall be arranged at the inside of the hood mouth. Water filling test shall be carried out for water collecting sump so as to ensure the sump is unblocked and free from leakage.

3 The suction inlet of suction hood at the sump side and slot ventilated hood shall be flat and smooth; the arc at corner shall be uniform; the spacing between reinforcing plates at the hood mouth shall be consistent;

4 The exhaust hood as for exhaust hood below the cooker in kitchen, its oil smoke filter shall be convenient for dismantling and cleaning.

6.3.3 The size and construction of cowl made on site shall comply with the design requirements and relevant technical product documents. The cowl shall have sound construction, regular shape both inside and outside as well as smooth surface, and shall meet the following requirements:

1 The edge of umbrella cowl shall be strengthened, with consistent bracing height;

2 As for the cone combination of conical cowl, its seam shall be downstream and shall guarantee the unblocked drainage of the lower part;

3 As for the outer cylinder of cylindrical cowl, its upper and lower edges shall be strengthened. The distance from the canopy edge to the outer cylinder shall be consistent. The wind-shielding ring shall be correctly positioned.

4 As for trifurcate cowl, the connection between its branch pipe and main pipe shall be tight with consistent included angle.

6.4 Air Opening

6.4.1 The finished air opening shall have sound construction and smooth outside external surface; its vane shall be distributed uniformly without consistent color and free from scratch and deformation. Moreover, it shall meet the requirements of product technology standards. Its surface shall be subject to anti-corrosive treatment and shall meet the design and service requirements. The air opening shall be able to rotate flexibly and reliably. After positioning, it shall be free from any looseness.

6.4.2 As for louver air opening, the center of axles on both ends of its vane shall in the same straight line; moreover, the vane shall be straight and even without friction with the frame.

6.4.3 The diffusion ring and regulating ring of air diffuser shall be of the same axle and the spacing between axial ring sheets shall be distributed uniformly.

6.4.4 As for the air opening of orifice plate, its orifice shall be free from burrs and of the same diameter and spacing; moreover, it shall meet the design requirements.

6.4.5 The moving parts of rotary air opening shall be portable and flexible and tightly fit with the fixing frame. The regulation range of vane angle shall meet the design requirements.

6.4.6 The internal and external spherical surfaces of spherical air opening shall fit properly with each other and rotate freely. After positioning, there shall be no looseness.

6.5 Muffler, Air Duct Muffler, Mend Muffler and Muffling Static Pressure Box

6.5.1 The making of muffler, air duct muffler, mend muffler and muffling static pressure box shall meet the design requirements. According to different forms of lofting and preparation, machining should be adopted.

6.5.2 The making of enclosure and frame structure shall meet the following requirements:

1 The frame shall be firm and the shell free from leakage. The making, riveting, biting and welding of frame, internal cover plate, clapboard and flange may refer to those specified in Chapter 4 of this code. The internal and external dimensions shall be accurate, the connection shall be firm and its shell shall be free from sharp edge.

2 The hole diameter and penetration rate of metal perforated plate shall meet the design requirements. The burrs at the orifice of perforated plate shall be flattened so as to prevent it from damaging the facing cloth.

3 During the installation of individual sound splitters, they shall be arranged regularly, and their upper and lower ends shall be installed with frame for fixing such sound splitters. The frame shall be firmly fixed without any looseness.

6.5.3 The muffling material shall have anti-corrosion and damp-proofing functions; its hygienic performance, density, heat conductivity coefficient and combustion level shall meet the requirements of relevant national technical standards. The muffling material shall be uniformly laid according to the unit density as required in the design and relevant technical documents. The part to be bonded shall be firmly bonded according to the specified thickness, with compact splicing seam and smooth surface.

6.5.4 After filling the muffling material, air-permeable facing material shall be used to cover it. The facing material shall be spliced in the downstream direction, with compact splicing seam and smooth surface and free from unevenness.

6.5.5 As for the internal and external metal members of muffler, air duct muffler, mend muffler and muffling static pressure box, their surfaces shall be subject to anti-corrosive treatment and shall be smooth.

6.5.6 After finishing the making of muffler, air duct muffler, mend muffler and muffling static pressure box, professional inspection shall be carried out on their specifications and direction signs.

6.6 Soft Coupling Duct

6.6.1 The soft coupling duct consists of flexible short duct and flexible duct. The soft coupling duct

7 Making and Installation of Trestle and Hanger

7.1 General Requirements

7.1.1 The fixing mode of trestle and hanger and the use of fittings shall meet the design requirements and shall meet the following requirements:

1 The trestle and hanger shall meet their load bearing requirements;

2 The trestle and hanger shall be fixed to reliable building structure and shall not affect the structure safety;

3 The trestle and hanger must not be welded on the steel bars of load-bearing structure and roof truss;

4 The pipeline shall not be laid until the cement mortar for embedding trestle reaches the required strength.

7.1.2 The embedded parts of trestle and hanger shall be correctly, firmly and reliably positioned. The embedded structure shall be de-rusted and degreased and shall not be painted. The exposed part shall be subject to anti-corrosive treatment.

7.1.3 As for air conditioning duct and cold and hot water pipe, thermal-insulating lining for their trestle and hanger shall be selected according to the design requirements and shall meet the following requirements:

1 The thickness of thermal-insulating lining shall not be less than the thickness of thermal insulation layer of pipeline, and its width shall be greater than the width of supporting surface for trestle and hanger. The lining shall be complete and compact with thermal insulation material without any gap;

2 Thermal-insulating lining shall meet the requirements of its bearing capacity, and shall have no deformation after installation;

3 Where wooden material is adopted as thermal-insulating lining, anticorrosion treatment shall be carried out;

4 Thermal-insulating lining shall have regular shape and smooth surface without any defect.

7.1.4 The finished product protection measures for the making and installation of trestle and hanger shall cover the following items:

1 After finishing the making of trestle and hanger, they shall be de-rusted with steel brush and abrasive cloth, and shall be painted after removing the contaminants on their surfaces;

2 Where the trestle and hanger are installed in an exposed way, they shall be painted with finishing paint;

3 The finished trestle and hanger of pipeline shall be stored separately and clearly marked.

7.1.5 The safety and environmental protection measures for the making and installation of trestle and hanger shall cover the following items:

1 Where electric hammer is adopted for the installation of trestle and hanger, no person shall

8 Air Duct and Components Installation

8.1 General Requirements

8.1.1 Before air duct and components installation, the following construction requirements shall be met:

1 The installation plan has been defined and the technical standards and documents on quality control measures are complete;

2 The air duct and accessory material has passed the receiving inspection and meet the installation requirements;

3 The environment at construction position meets the requirements of operating conditions;

4 The installation coordinates, elevation and direction of air duct has passed the technical review and meet the design requirements;

5 The installation and construction equipment has been prepared and meet the installation requirements;

6 The position of reserved hole in building structure has been checked and the hole dimension meet the continuous thermal insulation requirements of sleeve and pipeline.

8.1.2 When the air duct crosses fire-proof and explosion-proof floor slab or wall to be enclosed, steel embedded duct or protective sleeve with wall thickness not less than 1.6mm shall be arranged. Incombustible flexible material with no harm on human body shall be applied between air duct and protective sleeve for blockage.

8.1.3 The duct installation shall meet the following requirements:

1 The specification, size and installation position of air duct shall be determined according to the design requirements;

2 The distance from the connection interface of air duct and components to the wall surface and floor slab shall not affect the operation. The interface of components for connecting valve must not be installed in wall or floor slab;

3 Where the air duct is connected by flange., its nut shall be arranged at the same side; the flange gasket shall not project into the inwall of air duct or beyond the flange;

4 Where the air duct is connected with air channel, embedded flange or installed connection piece shall be adopted at the interface of air channel. The seam shall be filled with fire-proof sealing filler. The air channel interface shall be firm;

5 Pipelines must not cross the air duct or laid in it;

6 The inhaul cable for fixing outdoor vertical pipe must not be connected with lightning rod or lightning conduction;

7 As for air duct system for conveying gas containing inflammable or explosive, or installed in inflammable or explosive environment, favorable grounding measures shall be taken. Where the air

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