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Code for Installation of Intelligent Building Systems

智能建筑工程施工规范

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Code for Installation of Intelligent Building Systems

1 General Provisions

1.0.1 This code is formulated with a view to strengthening the management of the installation of intelligent building systems, guaranteeing the installation quality of intelligent building systems, and achieving advanced technology, reliable process, economy and rationality and efficient management.

1.0.2 This code is applicable to the installation of intelligent building systems in construction, renovation and extension engineering.

1.0.3 This code shall be used in supporting with the current national standards "Standard for Design of Intelligent Building" (GB/T 50314), "Unified Standard for Constructional Quality Acceptance of Building Engineering" (GB 50300), "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339), "The code of Construction Project Management " (GB/T 50326), "Evaluating standard for excellent quality of building engineering" (GB/T 50375), "Code of Acceptance of Construction Quality of Electrical Installation in Building" (GB 50303) and "Technical Code for Safety of Temporary Electrification on Construction Site" (JGJ 46).

1.0.4 The installation of intelligent building systems shall not only comply with the requirements stipulated in this code, but also comply with those in the current relevant ones of China.

3 Basic Requirements

3.1 General Requirements

3.1.1 Before installation of intelligent building systems, deepening design shall be carried out on the basis of schematic design and technical design, and the construction drawing shall be plotted.

3.1.2 The installation of intelligent building systems must be undertook by the construction organization having the corresponding qualification grade and safety production license.

3.2 Construction Management

3.2.1 The construction site management shall meet the following requirements:

1 Coordination shall be carried out between subsystems of building intelligent system and between the building intelligent system specialty and the specialties of building engineering, and the construction progress and quality shall be guaranteed;

2 The implementation of intelligent building systems shall accept supervision of the supervision engineer over the whole process;

3 Without the confirmation of supervision engineer, the operation of concealed work shall not be implemented. The process examination record of concealed work shall be signed and confirmed by supervision engineer, and the concealed work acceptance table shall be filled in.

3.2.2 Construction technology management shall meet the following requirements:

1 Under the presiding of technical director, the project department shall establish construction technical disclosure system that is adaptable to this project;

2 The technical disclosure materials and records shall be collected, sorted and preserved by documenter.

3 In case of design change, it shall be consulted jointly by development organization, design organization, supervision engineer and construction organization and shall not be implemented until the Design Change List is filled in, and it shall be checked and confirmed according to the requirements.

3.2.3 The construction quality management shall meet the following requirements:

1 Shall determine the quality objective;

2 Shall establish quality assurance system and quality control procedure.

3.2.4 The construction safety management shall meet the following requirements:

1 Shall establish safety management organization;

2 Shall meet the requirements safety production of the State and relevant industries;

3 Shall establish safety production system and formulate safety operation specification;

4 Shall conduct safety production technical disclosure to the working team and group prior to operation.

3.3 Construction Preparation

3.3.1 Technical preparation shall meet the following requirements:

1 Prior to construction, the deepening design shall be carried out and the plotting work of construction drawing shall be finished;

2 Construction drawing shall be reviewed and signed jointly by the development organization, design organization and construction organization;

3 The installation of intelligent building systems shall be implemented according to the examined and approved design documents, like construction drawing;

4 The construction organization shall compile the construction organization design and special construction scheme and submit them to supervision engineer for approval;

5 Safety education and technical disclosure work (including being familiar with the construction drawing, construction scheme and relevant materials, etc.) shall be conducted for construction personnel.

3.3.2 In addition to those specified in Section 3.2, Article 3.3.4 and Article 3.3.5 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003), the preparation of materials and equipment shall also meet the following requirements:

1 The materials and equipment shall be accompanied with product qualification certificate and quality inspection report, the equipment shall have product qualification certificate, quality inspection report and instruction book, etc.; the imported products shall be provided with the certificate of origin and commodity inspection certificate, certification of fitness, test report and installation, application and maintenance manual (in Chinese);

2 The brand, origin, model, specification, quantity and appearance of wire cables and equipment shall be checked, the main technical parameters, performances etc. shall meet the design requirements, the appearance shall be free from damage, the site-approaching inspection record shall be filled in, the wire cable and devices shall be sealed up for safekeeping;

3 The active equipment shall be inspected by power on to confirm the equipment being normal.

3.3.3 The preparation of machines and tools, apparatus and manpower shall meet the following requirements:

1 The erecting tools shall be complete and in good condition, and the electric tools shall be carried with insulation inspection;

2 The measuring instruments and tools used during the process of construction shall be calibrated according to the relevant laws and regulations of China;

3 The construction personnel shall take the post with a certificate.

3.3.4 The construction environment shall meet the following requirements:

1 The procedure handover and interface confirmation of the intelligent building systems with such specialties as building structure, building decoration, building water supply and drainage, heating, ventilation and air conditioning, building electricity and lift shall be well done;

2 The construction site shall have such conditions as water and electricity meeting the demand of normal construction;

3 The electricity for construction shall have safety protection devices, be connected to

1 The installation and debugging personnel shall have the corresponding professional qualification or special qualification;

2 The operation personnel shall be qualified through on-the-job training and shall hold the work license;

3 The instruments, meters and measuring devices shall be provided with the examination and calibration certificates within validity period.

3.5.3 The installation quality test of the subsystems shall meet the following requirements:

1 The installation quality test of the subsystems shall comply with the current national or professional standards;

2 After completing the equipment installation, the construction organization shall conduct self-examination over the system. During the self-examination, the test items shall be tested item by item and the relevant records shall be well done.

3.5.4 The test of intelligent building systems shall meet the following requirements:

1 The quality of the subsystem interfaces shall be inspected according to the following requirements:

1) As for all the interfaces, the interface suppliers shall submit the interface specification and interface test outline;

2) The interface specification and interface test outline should be examined and approved with the participation of construction organization of intelligent building systems when signing the contract;

3) The construction organization shall implement inspection in accordance with the test outline and shall ensure the installation quality of system interfaces.

2 The construction organization shall organize the personnel concerned to formulate the system test scheme in accordance with the corresponding requirements of contract technical documents, design documents and this code.

3 The conclusion and treatment method of system test shall meet those specified in Article 3.4.4 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

4 The test record shall be filled in according to Appendix B of this code.

3.5.5 The quality inspection on software products shall meet the following requirements:

1 The occupancy permit and application scope shall be checked;

2 The user application software, designed software configuration, interface software etc. shall be carried out with functional test and system test and be provided with complete documents (including program structure instruction, installation and debugging instruction and operation and maintenance instructions, etc.).

3.6 Finished Product Protection

3.6.1 Aiming at the characteristics of equipment in different subsystems, finished product protection measures shall be formulated.

3.6.2 The equipment having been installed on site shall be taken with such necessary protective measures as packing, covering and separating and also shall be kept avoiding impact and damage.

3.6.3 The equipment stored at the construction site shall be taken with such protective measures against dust, moisture, impact, smash, pressure and theft.

3.6.4 During construction, the main switch of the equipment power supply shall be turned off on meeting lightning, overcast and rainy and wet weather or a long time of out of service.

3.6.5 The protection for the software and system configuration shall meet the following requirements:

1 The alteration of software and system configuration shall be well done with records;

2 During the process of debugging, the software shall be backed up every day, the backup contents shall include system software, database, configuration parameters and system images;

3 The backup files shall be saved in independent storage devices;

4 The login password of the system equipment shall be managed by specific personnel and shall not be disclosed;

5 The computer shall be locked in case of no operator.

3.7 Quality Record

3.7.1 The inspection records of construction site quality management shall be filled in in accordance with Table A.0.1 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.2 The site-approaching inspection records of equipment and materials shall be filled in Table B.0.1 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.3 The concealed work inspection records shall be filled in Table B.0.2 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.4 In case of the alteration of examination and verification records, Table B.0.3 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003) shall be filled in.

3.7.5 The installation quality and appearance quality acceptance records of the engineering shall be filled in Table B.0.4 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.6 The equipment unpacking inspection records shall be filled in Table A.0.1 of this code.

3.7.7 The design change records shall be filled in Table A.0.2 of this code.

3.7.8 The engineering negotiation records shall be filled in Table A.0.3 of this code.

3.7.9 The joint review records of drawings shall be filled in Table A.0.4 of this code.

3.7.10 The subitem project quality test records of intelligent building systems shall be filled in Table C.0.1 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.11 The subsystem test records shall be filled in Table C.0.2 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems" (GB 50339-2003).

3.7.12 The enforcement measure provisions test records shall be filled in Table C.0.4 of the current national standard "Code for Acceptance of Quality of Intelligent Building Systems"

4 Comprehensive Pipeline

4.1 General Requirements

4.1.1 The power wire cable and signal wire cable must not be laid in one wire pipe.

4.1.2 The construction of the wire cables of generic cabling system shall meet those specified in Chapter 5 of this code.

4.2 Construction Preparation

4.2.1 Before construction, the bridges and wire pipes of all systems shall be carried out with integrated layout and arrangement, and the construction drawing of intelligent system shall be plotted after deepening design and shall be approved through joint review.

4.2.2 The construction organization shall cooperate with the engineering general contractor and design organization to complete the comprehensive pipeline layout and arrangement design of various professions.

4.2.3 The material preparation shall meet the following requirements:

1 The specification and type of bridge, wire pipe and wire cable shall meet the design requirements and shall be provided with the product qualification certificates and test reports.

2 Parts of bridge and wire pipe shall be complete, with smooth surface and complete coating and be rustless.

3 The metal conduit shall be free from such defects crack, burr, fin, pin hole and bubble, be of uniform wall thickness and even conduit orifice; the insulating conduit and fittings shall be in good condition and be with anti-flaming marks on surface.

4 The wire cables shall be carried out with the inspection on connecting, disconnecting and insulation between cables.

4.3 Pipeline Installation

4.3.1 Bridge installation shall meet the following requirements:

1 Anti-corrosive measures shall be taken at the cutting and drilling sections of bridge;

2 Bridge shall be even without distortion, and its inner wall shall be burr free, all the accessories shall be installed ready, the nut of fastener shall be set at the outer side of bridge, the bridge interface shall be straight, even and tight, the cover plates shall be complete, flat and smooth;

3 The bridge shall be set with compensation devices at the place passing through the deformation joints (including settlement joint, expansion joint and seismic joint, etc.) of building, the protective ground wire and the wire cables in bridge shall be reserved with compensating surplus;

4 The joint of bridge with box, case, cabinet and the like shall adopt the feet fitted connection or flanged edge connection and shall be fixed by screw, the terminals shall be

plugged up;

5 The distance from the bottom of horizontal bridge to the ground should not be less than 2.2 m, the distance from its top to the floor slab should not be less than 0.3 m, the distance from bridge to beam should not be less than 0.05 m, and the spacing between bridge and power cable should not be less than 0.5 m;

6 Where the bridge is parallel to or cross with various pipelines, their minimum clearance shall meet those specified in Table 12.2.1-2 in Article 12.2.1 of the current national standard "Code of Acceptance of Construction Quality of Electrical Installation in Building" (GB 50303-2002);

7 Bridges and pipeline holes laid in vertical shaft or passing through different fire compartments shall be provided with firestops

8 Fittings, like elbows and tees, should adopt the finished products manufactured by bridge manufacturer and should not be processed or fabricated on site.

4.3.2 Installation of supports and hangers shall meet the following requirements:

1 The spacing between the installed supports and hangers in the straight section should be 1.5m~2.0m, and the spacing between supports and hangers in one straight section shall be uniform.

2 Supports and hangers shall be installed within a scope of no larger than 0.5 m at the port, branch or turn of bridge;

3 Supports and hangers shall be straight and even without obvious distortion, their welding shall be firm without significant deformation, the welds shall be uniform, flat and smooth, and cut place shall be free from flanged edge and burr;

4 Supports and hangers shall be securely connected and fixed by adopting expansion bolts and shall also be assembled with spring washers;

5 Supports and hangers shall be conducted with anticorrosive treatment;

6 Where round steel is adopted as the hanger, the anti-sway supports shall be installed at the turns of bridge and also every other 30 m in the straight section of bridge.

4.3.3 Wire pipe installation shall meet the following requirements:

1 Conduit laying shall be keep the conduit inside clean and dry, the conduit orifice shall be taken with protective measures and be carried out with plugging treatment;

2 The exposed wire pipes shall be straight and even and also be lined neatly;

3 The exposed wire pipes shall be fixed by pipe clips, the pipe clips shall be installed firmly and their arrangement shall meet the following requirements:

1) Installing pipe clips within the scope of 150 mm~500 mm at the terminal and the midpoint of elbow;

2) Pipe clips shall be installed within the scope of 150 mm~500 mm away from the edges of box, case and cabinet, etc.;

3) Pipe clips shall be installed uniformly in the middle straight section. The maximum distance between pipe clips shall meet those specified in Table 14.2.6 of the current national standard "Code of Acceptance of Construction Quality of Electrical Installation in Building" (GB 50303-2002);

4 The bending radius at the turn of wire pipe shall not be less than the minimum allowable bending radius of the wire cable that is put into the wire pipe and shall not be less than 6 times of the outside diameter of this pipe; where the outside diameter of concealed pipe

4) Where the wire pipe enters into underground building, it shall be adopted with waterproofing sleeve and shall be done with sealing and waterproofing treatment.

4.3.4 Installation of wire boxes shall meet the following requirements:

1 Where the steel conduit enters into box (case), one conduit shall pass through a hole, and the connection between conduit and box (case) shall adopt the claw-type screwed joint pipe connection, and the conduit shall be tightly locked, the inner wall of conduit shall be smooth and clean for the convenience of guiding wire.

2 If the wire pipeline has any one of the following conditions, pull box or junction box shall be added at middle and its position shall be convenient for guiding wire:

1) The pipeline has no bend in per length exceeding 30 m;

2) The pipeline has only one bend in per length exceeding 20 m;

3) The pipeline has only two bends in per length exceeding 15 m;

4) The pipeline has only three bends in per length exceeding 8 m;

5) Where the wire cable pipeline is laid vertically, the cross section of the insulated wire cable in pipe should be less than 150 mm^2; where the pipeline length is larger than 30 m, the pull boxes for purpose of fixing shall be added;

6) Embedded box at information point should not be used as line passing box at the same time.

4.4 Wire Cable Laying

4.4.1 The wire cable shall be provided with permanent labels for waterproofing and friction resistance at both ends, and the characters on the labels shall be distinct and accurate.

4.4.2 Wire cables in a pipe shall not be twisted or buckled and shall be without joints.

4.4.3 The minimum allowable bending radius of wire cable shall meet those specified in Table 12.2.1-1 of the current national standard "Code of Acceptance of Construction Quality of Electrical Installation in Building" (GB 50303-2002).

4.4.4 Connection between outlet of wire pipe and connecting terminal of equipment shall adopt metal hose, the length of metal hose should not exceed 2 m, and the wire cable shall not be exposed.

4.4.5 Wire cables in bridge shall be arranged neatly and not be twisted or buckled; the wire cables shall be fixed by banding at the positions in and out of the bridge and at their turns; the spacing between the banding and fixing points of wire cable in vertical bridge should not be larger than 1.5 m.

4.4.6 Where the wire cable passes through the deformation joints of building, it shall be retained with appropriate compensating surplus.

4.4.7 In addition to complying with those specified in this code, the laying of wire cables the relevant requirements of the current national standards "Technical code for Regulation of CATV system" (GB 50200), "Code of Acceptance of Construction Quality of Electrical Installation in Building" (GB 50303) and "Technical Code for Engineering of Security and Protection System" (GB 50348).

4.5 Quality Control

4.5.1 The dominant items shall meet the following requirements:

1 The bridges laid in vertical shaft or passing through different fire compartments as well as the holes of wire pipes shall be provided with firestops;

2 The place where the bridge or wire pipe passes through the deformation joints of building shall be equipped with compensation device, and the wire cable shall be retained with surplus;

3 The wire cable shall be provided with permanent labels for waterproofing and friction resistance at both ends, and the characters on the labels shall be distinct and accurate;

4 The bridge, wire pipe and junction box shall be grounded reliably; where integrated grounding is adopted, the ground resistance shall not be larger than 1 Ω.

4.5.2 General items shall meet the following requirements:

1 The bridge shall be taken with anticorrosive measures after being cut and drilled with holes, and the supports and hangers shall be carried out with anticorrosive treatment.

2 The wire pipe shall be equipped with marks at both ends and shall be threaded with strip line;

3 Where the wire pipe is connected to control case, wiring case, pull box or the like, locknut shall be adopted, and the wire pipe, case and box shall be firmly fixed;

4 The attached pipe in suspended ceiling should be fixed by using separate support and hanger, and the support and hanger shall not be erected on the keel or other pipelines;

5 Sealing measures shall be taken at the joint of steel pipe with tapered adapter;

6 Bridge shall be firmly installed, straight and even, without distortion;

7 Wire cables in bridge or wire pipe shall not be twisted or buckled and shall be without joints.

4.6 Self-examination and Test

4.6.1 The bridge and wire pipe shall be inspected for their specification, position, bending and flattening degree, bending radius, connection, bridge ground wire, corrosion protection, pipe box fixation, pipe orifice treatment, protective layer and welding quality, etc. The bent pipe and connection accessories shall be of uniform radian and shall be free from such defects as folding, depression, crack, bending or flattening and dead turn, and the welds of pipe shall be at the outer side.

4.6.2 According to the requirements of deepening design documents, the specification, type, labeling and laying quality of wire cable shall be inspected.

4.6.3 After the construction of concealed work is completed, the concealed work record sheet shall be filled in.

4.6.4 After the concealed work is qualified in acceptance of concealed check, Table B.0.2 of this code shall be filled in.

4.6.5 As for the ground resistance test of bridge and wire pipe, Table B.0.27 of this code shall be filled in.

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