



**Standard of the Architectural Society of China**

**T/ASC 08-2020**

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**Guidelines for emergency operation  
and management of office buildings for  
dealing with “novel coronavirus”**

办公建筑应对“新型冠状病毒”运行管理应急措施指南

(English Translation)

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**Guidelines for emergency operation and  
management of office buildings for dealing with  
“novel coronavirus”**

**T/ASC 08-2020**

**Developed by:**

China Construction Technology Group Corporation Limited

**Approved by:**

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# **Notification on Publishing T/ASC Standard *Guidelines for emergency operation and management of office buildings for dealing with “novel coronavirus”***

*Guidelines for emergency operation and management of office buildings for dealing with “novel coronavirus”* has been approved as a standard of the Architectural Society of China with a serial number of T/ASC 08-2020, and shall be implemented as of February 5, 2020.

**Architectural Society of China**

**February 04, 2020**

# Foreword

The Architectural Society of China is in charge of this English translation. In case of any doubt about the English translation, the Chinese original shall be considered authoritative.

The present stage is critical for the prevention and control of the "novel coronavirus" epidemic. In order to implement the decisions and arrangements of the Central Government, the epidemic prevention and control shall be taken as the top priority at the moment. Under the circumstances that the epidemic situation has not been fully and effectively controlled and that the Chinese New Year holidays are coming to the end, the drafting group has developed the Guidelines through careful summarization of practical experiences from SARS prevention and control and on the basis of widely soliciting for opinions, with aims to ensuring the scientific and normal use of people-intensive office buildings after the holidays, preventing further spread of "novel coronavirus" due to the concentration of people and improper use of electric and mechanical systems in the buildings, and protecting the health of office building users.

The Guidelines consists of 5 clauses: 1. General provisions; 2. Ventilation and air conditioning; 3. Water supply and drainage system; 4. System cleaning and cleaning disinfection; and 5. Garbage collection and temporary storage.

China Construction Technology Group Corporation Limited (CCTC) is responsible for the explanation of specific technical contents of the Guidelines. In case of any comment or suggestion during the implementation of the Guidelines, please contact CCTC (Address: No.36, Deshengmenwai Street, Xicheng District, Beijing, 100210, China; Contact: Zhao Li, Tel.: +86-10-88328008, Email: zhaol@cadg.cn).

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## **1 General provisions**

**1.0.1** The Guidelines are developed to guiding the emergency operation and management of office buildings for dealing with the prevention and control of “novel coronavirus” epidemic.

**1.0.2** During the epidemic prevention and control period, in order to prevent further spread of "novel coronavirus" caused by the concentration of people and the improper use of electric and mechanical systems in the buildings, the operation of electric and mechanical systems shall place top priority to ensure the health and safety of occupants, and the energy-efficient and environmentally-friendly requirements should be taken into consideration.

**1.0.3** The Guidelines is applicable to the emergency measures taken by facility operators of office buildings to deal with the “novel coronavirus”, including covering air-conditioned areas (adopting " fan-coil units, independent air-conditioning units, etc. + fresh air" system or VAV/CAV system), dining room and kitchen ventilation system, and air treatment and chilled/hot water and condensing water system of air-conditioning system; building water supply and drainage system; system cleaning and cleaning disinfection; and domestic garbage collection and temporary storage.

**1.0.4** The emergency operation and management of the office buildings in “novel coronavirus” prevention and control period shall meet the requirements specified in both the Guidelines and the current relevant standards of the nation.

## **2 Ventilation and air conditioning**

### **2.1 Ventilation and air conditioning system**

**2.1.1** The office building should give priority to increasing the ventilation volume of fresh air as one of the most effective prevention measures. Various measures should be taken according to the forms of air conditioning systems in the office buildings.

**2.1.2** The following measures are recommended for the air-conditioned areas adopting "fan-coil units, independent air-conditioning units, etc. + fresh air" system:

**1** The air conditioning system may be operated normally as usual, and all the fresh air systems shall be operated with the maximum fresh air volume;

**2** In order to ensure that fresh air can be effectively delivered to each air-conditioned room and make the fresh air volume for the occupants meet the requirements specified in the current national standard GB 50736 *Design code for heating ventilation and air conditioning of civil buildings*, the following measures shall be taken depending on different air-conditioned rooms, respectively:

**(1)** For air-conditioned rooms with openable exterior windows, the exterior window shall be opened at a certain degree when using the air conditioning system; for buildings adopting control sequence that when exterior windows opens the corresponding air-conditioning terminals will be shut off automatically for energy conservation or other purposes, it is recommended to disable this control sequence until the end of this epidemic;

**(2)** For air-conditioned rooms without exterior windows and exhaust systems , the following provisions shall be followed:

**1)** Ventilator with heat recovery may be adopted to meet the ventilation requirements of the room; ventilator with such heat recovery device that fresh air and exhaust air is isolated should be adopted, e.g., heat pipe or plate heat exchanger, etc.; rotary heat recovery equipment shall not be used at present; "mass transfer" heat recovery equipment (e.g., patent heat recovery device) is not recommended for use either, since the protection capability of these kinds of equipment against the virus cannot be confirmed at present;

**2)** For buildings with each office room equipped with centralized fresh air system and each floor's toilets and walkways equipped with centralized mechanical exhaust system, the exhaust system shall be put into operation, and two of the following ventilation modes may be adopted for each room:

① Unless for special reasons, it is recommended that during occupancy, the room door be kept opening at a certain degree or a certain area of louvers be set on the room door so that the air of air-conditioned room can be exhausted through the walkway;

② For air-conditioned rooms that need to be relatively closed while in use (such as some important meeting rooms and confidential rooms), it is recommended to set mechanical exhaust fans, with the exhaust air volume less than the fresh air volume of the room, on the partition wall between the room and the walkway, or to set exhaust ducts, with the cross-sectional area better greater than that of the fresh air duct of the room, directly leading to outdoors;

③ The total exhaust air volume of the centralized exhaust system on a floor shall not be less than 70% of the designed total fresh air supply volume of the floor, otherwise, the exhaust air system should be appropriately reformed (by replacing exhaust fan, etc.).

**(3)** If each office room is equipped with a centralized fresh air system but the walkway is not equipped with a centralized exhaust system, refer to Item (2) above to reasonably install new exhaust systems and put them into operation; on the premise of taking effective measures to assure the safeness of smoke exhaust system and obtaining the consent of the competent fire-fighting administrative department, it may also be considered to exhaust air in a centralized way by virtue of the fire-fighting smoke exhaust system.

**3** If a fan-coil unit serves more than one room (this kind of situation may occur in part area of a building), the operation of such fan-coil unit shall be suspended (or the unit shall be appropriately reformed so that it only serves a main room);

**4** Once a “suspected case of novel coronavirus infection” is found in the building, all the on-site convective cooling/heating terminal (such as fan-coil unit and indoor unit of independent air-conditioning unit) should be shut down;

**5** For severe cold and cold zones (and some of the hot-summer and cold-winter zones) where heating supply is still required for a period of time after the Chinese New Year holidays, the set point of the outlet air temperature of the fresh air handling unit shall be increased as much as possible (for buildings in which the automatic air-conditioning system operates effectively), or the hot water valve of the fresh air handling unit shall be manually opened fully (for buildings without an effective air-conditioning system), so that the fresh air can undertake the heating load of the building as much as possible. If cooling is required for the buildings (for example, in Hainan Province, etc.), the set point of the outlet air temperature of the fresh air handling unit shall be as lower as possible (or the cold water valve of the fresh air handling unit shall be manually opened fully), so that the fresh air can undertake the cooling load of the building as much as possible.



**2.1.3** The following measures are recommended for air conditioned areas serving by VAV/CAV systems:

**1** If the air-conditioning system only serves one room, it can be operated as usual; under the premise that indoor temperature could be controlled not lower than 16℃~18℃ (an on-site test can be conducted to determine whether the indoor temperature variation is acceptable or not), following measures to increase fresh air volume are recommended:

**(1)** For single-fan system: make sure that the fresh air valve is fully opened, and reduce the return-air valve opening or shut off the return-air valve;

**(2)** For system with supply fan and return or exhaust fan: open (or fully open) the fresh air valve and exhaust valve while reducing the return-air valve opening or shutting off the return-air valve;

**(3)** In hot summer and warm winter zones, air-conditioning system may operate in whole fresh air mode by fully closing return-air valve during the period from the end of the holidays to the day cooling is needed; if possible, the exterior window shall be opened at the same time.

**2** For areas seriously affected by the epidemic, or where the air-conditioning systems serve more than one room, the return-air valve of the air-conditioning system shall be fully closed, and the fresh air valve and exhaust valve shall be fully opened during the epidemic period;

**3** The requirements for the set point of room temperature or the control method of the hot/chilled water valve are the same as those for the fresh air handling units, see 2.1.2, Item 5.

**2.1.4** The following measures are recommended for canteen and kitchen areas:

**1** For canteen, food delivering area and dining area shall be partitioned (for example, using transparent plates) to properly separate the diners in the dining area from the staffs in the kitchen (and in the food delivering area). The isolation height shall be 1.3m~2.0m (the respiratory affected space of human being);

**2** For zones seriously affected by the epidemic, the canteen shall be completely isolated from the kitchen, and measures shall be taken to prevent the air in the canteen from flowing into the kitchen. At this time, when vent hood exhaust fan of the kitchen is in operation, other measures shall be taken to supplement the air, such as using mechanical makeup air or opening windows (or arranging air ducts) to introduce natural air make-up from outdoor air;

**3** For canteens without mechanical ventilation measures or private rooms without openable windows, it is recommended to temporarily stop using them if they cannot be renovated;

**4** The operations in the kitchen shall comply with the corresponding occupational management regulations; during the epidemic period, it is recommended that employees eat packed meal instead of eat in canteen.

**2.1.5** The following measures are recommended for ventilating area:

**1** In order to improve the indoor air quality of the building, VAV/CAV system, all-air system and exhaust system with their return-air valve closed (including the systems where fire-fighting smoke exhaust is temporarily converted into air exhaust) can be properly put into operation 1d~3d before the building running for early ventilation; however, for severe cold and cold zone, it is necessary to pay attention to the operation time to ensure that the room temperature is not lower than 5°C~8°C when the building is unoccupied;

**2** The ventilation and air-conditioning systems in the building (including heating coils and centralized air conditioning and hot water systems) shall be started 1h before the working hours; after work, the operation of the ventilation and air-conditioning systems shall be continued for 1h to 2h, and it shall be ensured that the room temperature is not lower than 5°C~8°C;

**3** All exhaust systems for toilets and soiled articles disposal rooms shall be put into operation all the time to ensure that the air pressure difference between these rooms and the area beyond these areas is negative;

**4** The ventilation system of the underground garage shall be put into normal operation according to the design requirements; in areas seriously affected by the epidemic, the daily operation time shall be extended;

5 Ventilation shall be enhanced in the drinking water tank room and the direct drinking water treatment room.

## **2.2 Air treatment and hot/chilled and condensing water system**

**2.2.1** The fresh air and all makeup air of the building shall be taken directly from the a clean place ,outside air shall be introduced from outside air inlets to air handling units or fans by duct other than air handling units or fans take fresh air indirectly (e.g. from mechanical room).

**2.2.2** “Disinfection via chemical disinfectant” shall not be adopted for air conditioned rooms, air conditioning duct systems and air conditioning mechanical rooms; without exact evidence or the opinions from the medical experts, it is currently not appropriate to install ultraviolet lamps in air-conditioning system and ventilation system.

**2.2.3** If possible, for buildings with heating requirements, the hot water temperature of the air handling unit and air conditioning units shall be increased as much as possible to reduce the impact on room temperature caused by the increased fresh air volume; for buildings with cooling requirements, the chilled water temperature set point shall be reduced to 5℃~6℃.

**2.2.4** During working hours, the indoor air-cleaning devices shall be put into operation.

### **3 Water supply and drainage system**

#### **3.1 Water sealing, water trap, and floor drain in drainage system**

**3.1.1** For the connection of water apparatus and the drainage system, the pollutant gas in the sewer pipes must be blocked from entering the room by using water sealing.

**3.1.2** The property management staff shall organize the investigation and improvement of all the water sealing devices connected between the pipeline system and the drain points of drainage systems, sewage systems, wastewater systems, building reclaimed water collection systems, and air conditioning condensate collection systems.

**3.1.3** The property management staff shall inspect the drainage appliances one by one to see if they have water sealing, and for those without water sealing or with incomplete water sealing or subject to water leakage, they shall be recorded and replaced (with drainage pipes with complete water sealing) or closed, and for those leaking ones, they shall be repaired in time. In case of sealing the drainage appliances, plastic clothes, wet towels and tapes shall be used to cover and seal them completely. Positions to be inspected shall include the following ones:

- 1** drainage pipe at lower part of hand basin (table top);
- 2** drainage pipe at lower part of hanging urinal;
- 3** drainage pipe of squatting pan of toilet in the upper floor (usually in the suspended ceiling);
- 4** drainage pipe of pedestal urinal in the upper floor;
- 5** drainage pipe of mop sink;
- 6** floor drain must be equipped with water sealing, those without water sealing shall be closed;
- 7** drainage pipe for air conditioning condensate;
- 8** for toilets with bathtubs, the bathtubs shall be checked to confirm that they are equipped with drainage water sealing, and those for which confirmation cannot be made should be closed and blocked;
- 9** check the water sealing unit connected to the oil trap in the canteen kitchen;

**10** drainage pipes at other drainage points.

**3.1.4** In case the drainage system subject to smell backing up, the causes shall be investigated immediately.

**3.1.5** The water sealing shall be in favorable condition and meet the following requirements:

**1** Inject water every day and after water injection, the water sealing of floor drain shall be in sound condition;

**2** For floor drains with a water sealing depth of 50mm, water shall be filled no less than 2 times a day, with an amount of no less than 350ml each time;

**3** For floor drains with a water sealing depth less than 50mm or for those do not meet the requirements of the standard, the number of water injection shall be increased as appropriate to ensure that the floor drains do not dry up;

**4** For floor drains used for shower drainage, hairs shall be cleaned timely to reduce water sealing loss;

**5** For pedestal pans, if after each flush, there is no wake flow to fill the water sealing in the chassis, the fittings in the cistern shall be replaced to increase this function, or manually add water after each flush;

**6** Not commonly used pedestal pans shall be checked and filled with water every day to ensure that the water sealing is in sound condition;

**7** Basin plugs should not be used for hand basins to prevent water sealing loss caused by siphon the time the basin plug is pulled out for water drainage. Where a basin plug must be used for clean purpose, the water sealing shall be filled with thin stream of water after the basin plug is pulled out;

**8** For toilets that are not used for the time being, the water sealing of the appliances shall be filled with water every day;

**9** For single riser systems, especially plastic single riser systems, close observation is required to see if there is any air bubble coming from the water sealing of the pedestal pan chassis. If so, appropriate amount of disinfectant shall be added into the water sealing of the pedestal pans of this floor, and this shall be performed after each flush;

**10** After cleaning and disinfection, the pedestal pans should be covered with a lid to reduce water evaporation.

**3.1.6** Unused drainage points shall be closed and the following requirements shall be met:

**1** Floor drains in equipment room with drainage points, such as water supply pump rooms, water tank rooms, heat exchange stations, refrigeration rooms and air-conditioned rooms, shall be checked, and those not often used are recommended to be closed temporarily and open when necessary;

**2** Access holes on the cover plate of the underground non-closed sewage pump well shall be closed and blocked.

### **3.2 Water quality assurance**

**3.2.1** System for regular testing of water quality shall be established and implemented.

**3.2.2** Under normal circumstances, drinking water, fine drinking water from pipes and centralized domestic hot water shall be tested for water quality in strict accordance with relevant standards of the nation. During epidemic prevention period, all water supplies shall be tested once.

**3.2.3** Water quality testing shall be entrusted to a qualified third-party testing organization, those not tested in time shall be tested subsequently.

**3.2.4** For water systems with unqualified water quality, the pipeline system shall be flushed and disinfected, and the cause for pollution shall be checked immediately.

**3.2.5** The disinfection equipment of water supply system shall be checked to ensure that it works normally.

**3.2.6** The following key parts shall be checked or cleaned:

**1** Open domestic water tanks and open expansion water tanks of air-conditioning systems shall be cleaned;

**2** Water quality of the cooling tower shall be checked and water replenishing amount and sewage discharge amount of the cooling tower shall be increased as appropriate.

### **3.3 Centralized hot water supply system**

**3.3.1** For centralized hot water supply systems, especially those using solar energy and heat pumps as heat sources (like canteens, etc.), high temperature disinfection and other measures shall be adopted to eliminate the legionella in the pipeline system.

**3.3.2** In case of high temperature disinfection, it shall be ensured that the temperature at the most unfavorable point is not lower than 60 °C, and the disinfection shall be done no less than 1h.

**3.3.3** Silver ion and photocatalytic oxidation sterilizers should be installed on the pipeline system.

### **3.4 Reclaimed water treatment station**

**3.4.1** For buildings using municipal reclaimed water as reclaimed water source, the municipal reclaimed water shall be closed during the epidemic period and replaced with tap water.

**3.4.2** For reclaimed water treatment stations adopting biochemical treatment process, the openings of facilities shall be disinfected. In case of wiping, 250mg/L chlorine-containing or bromine-containing disinfectant with available chlorine may be used, and in case of spraying, peracetic acid or hydrogen peroxide may be used, and if conditions permit, an ultraviolet lamp shall be used for irradiation.

**3.4.3** Raw-water of reclaimed water regulating tank shall be inspected for coronavirus according to the epidemic situation. Where necessary, the reclaimed water treatment system shall be shut down, with the reclaimed water replaced with tap water.

### **3.5 System maintenance**

**3.5.1** The stack vent of sewage system shall be kept unblocked to facilitate discharging foul gas to the air.

**3.5.2** Pedestal pan seat shall be equipped with disposable pad paper.

**3.5.3** Peracetic acid or hydrogen peroxide shall be sprayed regularly around non-closed sewage pump wells for disinfection, and where conditions permit, ultraviolet lamps shall be used for irradiation.

**3.5.4** Wet spaces such as car washing stations shall be well ventilated and disinfected regularly.

**3.5.5** The sanitary administrator in the building shall check the toilets and their sanitary wares (including the residue of excrement) for cleanliness and handle it timely. Cleaning and inspection should be done no less than 1 time/2h, and shall not be less than 2~4 times/d.

## **4 System cleaning and cleaning disinfection**

### **4.1 System cleaning**

**4.1.1** During the epidemic prevention and control period, the following space or air-conditioning system parts shall be inspected and cleaned in time:

**1** Check the location, form, area and installation height of the fresh air intake of the air conditioner and see if they meet the requirements of the original design, for those items that do not meet the requirements, rectification shall be made; check the air intake regularly for debris and dirt and clean them in time;

**2** Where there is a possibility of short circuit due to the short distance between the fresh air intake and the exhaust vent and the drainage vent pipe, rectification shall be made as appropriate;

**3** Regular inspections shall be carried out in all areas of the building (especially in areas where people do not often stay) so as to timely deal with abnormal situations such as enclosure structure leakage, indoor water accumulation, dirt accumulation and building or component mildew.

**4.1.2** For air conditioning units using wet films for humidification, whether impurities are accumulated on wet film materials shall be regularly inspected, and if necessary, such films shall be washed or replaced.

**4.1.3** Air filters (nets) of fan-coil units and indoor split type air conditioners shall be cleaned every (1~2) months. Air filters of air conditioning units (including fresh air handling units) installed in the air conditioning room shall be inspected for tightness once a month and cleaned at least once a month. For those cannot be cleaned, they shall be replaced in time. For areas seriously affected by epidemic, the frequency of inspections, cleaning (or replacement) shall be increased.

**4.1.4** The filter shall be cleaned (washed) or replaced in the air conditioning room where it is located. If the filter needs to be taken out of the air conditioning room for washing (or replacement, destruction, etc.), it shall be packaged in a sealed plastic bag before being taken out. It is strictly prohibited to washing the filter in the occupied zones (including public toilets) in the building. It shall be ensured that the sealing requirements are met when the filter is reinstalled after washing and replacement.

**4.1.5** The condensate drain pan of the air conditioning unit shall be inspected and washed according to the requirements of the specification for operational management.

**4.1.6** The condensation (severe cold and cold zones) and dirt accumulation of the



two-way heat recovery unit shall be inspected regularly, and if necessary, anti-condensation measures such as preheating on the fresh air side shall be taken or the heat recovery equipment shall be replaced.

## **4.2 Cleaning disinfection**

**4.2.1** The property management staff shall determine the disinfection method, namely, the preventive disinfection or disinfection for infectious focus according to the requirements of the national and governmental epidemic prevention guidance departments and changes in the local epidemic situation, and shall keep abreast of the latest special disinfection methods.

**4.2.2** Disinfection methods and disinfectants shall be selected according to objects and shall meet the following requirements:

**1** For air disinfection, peracetic acid, hydrogen peroxide and chlorine dioxide should be used;

**2** For object surface disinfection, chlorine-containing or bromine-containing disinfectants should be used;

**3** For skin disinfection, alcohol, isopropanol, chlorhexidine alcohol, iodophor, etc. should be used;

**4** The concentration ratio of disinfectants and the effective contact time of different disinfectants shall meet the requirements of the product specification.

**4.2.3** For places where people do not stay frequently and ventilation is poor (such as air conditioning room, clean and storage room, water treatment room, etc.), ultraviolet lamps may be arranged for disinfection.

**4.2.4** Cleaning people shall wear gloves and mouth masks during working. Cleaning tools such as mops, rags and cleaning gloves used in different areas (such as toilets, corridors and boiling water rooms) shall not be mixed.

**4.2.5** Cleaning and disinfection shall be strengthened for the following spaces. 250mg/L chlorine-containing disinfectant with available chlorine (such as 84 disinfectants) or bromine-containing disinfectant may be used for wiping disinfection. The cleaning and inspection should be performed no less than 1 time/2h, and shall not be less than (2~4) times/d.

**1** Parts in public space that may be frequently touched by human hands:

**(1)** revolving doors, straight sliding doors, automatic doors, door frames, door

handles, windows, window frames, windowsill surfaces, stairs or platform handrails;

**(2)** surfaces of pedestal pans and urinals in toilets, washbasins and cosmetic mirrors of the dresser;

**(3)** elevator buttons;

**(4)** light switches, air conditioning switches, hand basins, buttons on cistern of pedestal pan, non-automatic faucets, etc.

**2** Disinfection shall be added to the cleaning operation procedures for parts daily cleaned and maintained in public buildings, such as marble and glazed floor tiles, terrazzo and cement floors, carpets (dry, wet and steam cleaning), glass, mirrors, metal surfaces, wooden dados, wooden wall surfaces, wall surfaces with metal decorative plates, wallpapering inner walls, air vents, decorative lighting, etc.;

**3** Cleaning product disinfection shall meet the following requirements:

**(1)** Soak the rag in 250mg/L chlorine-containing disinfectant with available chlorine for 30min after it is cleaned, rinse the disinfectant on it, and dry it for standby;

**(2)** Soak the mop in 500mg/L chlorine-containing disinfectant with available chlorine for 30min after it is cleaned, rinse the disinfectant on it, and dry it for standby;

**4** Cross operation and disinfection (elevators are not in operation) may be adopted when multiple elevators are equipped in the building.

## **5 Garbage collection and temporary storage**

**5.0.1** Documents on pollutant emission management system and garbage management system as well as garbage classification and collection management system shall be formulated and implemented, and managed by specialized people. During the epidemic, special attention shall be paid to the transport management, and records for various works shall be established and improved in a timely manner. Kitchen waste, office building solid waste, clinic waste, etc. shall be collected and temporarily stored according to the garbage classification standard.

**5.0.2** Management plans shall be formulated at different levels according to the epidemic development locally.

**5.0.3** Garbage collection and temporary storage operation procedures shall be formulated, including the protection requirements for operators.

**5.0.4** Temporary storage places such as garbage stations (rooms) shall be provided with washing and drainage facilities, and special people shall be designated to carry out regular washing, disinfection and sterilization. The records on regular cleaning, disinfection and garbage removal of garbage stations (rooms) shall be improved and perfected.

**5.0.5** The quantity and quality of collection containers shall meet the requirements of relevant standards, and containers for classification shall be provided with easily identifiable marks.

**5.0.6** Garbage temporarily stored shall be cleared and transported in a timely manner to avoid bad smell. During transportation, garbage shall not be scattered or cause pollution to the environment.

**5.0.7** A special mask recycling box shall be placed at a conspicuous position in the office building, and disinfected and cleaned regularly.

# Explanation of wording in the Guidelines

**1** Words used for different degrees of strictness are explained as follows in order to mark the differences in implementing the requirements of the Guidelines:

**1)** Words denoting a very strict or mandatory requirement: "Must" is used for affirmation; "must not" for negation.

**2)** Words denoting a strict requirement under normal conditions: "Shall" is used for affirmation; "shall not" for negation.

**3)** Words denoting a permission of a slight choice or an indication of the most suitable choice when conditions permit: "Should" is used for affirmation; "should not" for negation.

**4)** "May" is used to express the option available, sometimes with the conditional permit.

**2** "Shall meet the requirements of..." or "shall comply with..." is used in the Guidelines to indicate that it is necessary to comply with the requirements stipulated in other relative standards and codes.

## List of quoted standard

*Design code for heating ventilation and air conditioning of civil buildings* GB50736

**Standard of the Architectural Society of China**

**Guidelines for emergency operation and  
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**T/ASC 08-2020**

**Explanation of provisions**

# Explanation for preparation

T/ASC 08-2020 *Guidelines for emergency operation and management of office buildings for dealing with “novel coronavirus”* was approved and issued by the Architectural Society of China through No.01 Notification on February 4, 2020.

The drafting group has developed the Guidelines through careful summarization of practical experiences from SARS prevention and control of China in 2003 and on the basis of widely soliciting for opinions, with aims to ensuring the scientific and normal use of people-intensive office buildings after the Chinese New Year holidays, preventing further spread of "novel coronavirus" due to the concentration of people and improper use of electric and mechanical systems in the buildings, and protecting the health of office building users.

The drafting group of *Guidelines for emergency operation and management of office buildings for dealing with “novel coronavirus”* has compiled this Explanation of provisions for the Guidelines in sequence of chapter, section and article to explain the purpose, basis and matters to be concerned in implementation of the provisions so that the relevant people from the property unit, the use unit and the property management unit of the office buildings are able to correctly understand and implement its provisions when using the Guidelines. However, instead of sharing equivalent legal effects with the main text of the Guidelines, this Explanation of provisions only serves as the reference for the users to understand and grasp those specified in the Guidelines.

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## **1 General provisions**

**1.0.1** In addition to the emergency measures specified in the Guidelines, each building shall also establish corresponding daily management and prevention & control measures and mechanisms, including but not limited to management of people entering the building and body temperature monitoring management in areas seriously affected by the epidemic, so that the people with a fever, once found, are immediately reported and urged to leave the office building; responsibilities of relevant management personnel; operation and management records; emergency report; emergency treatment process and other related systems.

**1.0.3** The Guidelines focus mainly on the measures ought to be taken by the operation and management department of the office buildings required to be normally used during “novel coronavirus” prevention and control period. It may be referred for implementation for other public buildings based on their characteristics, such as hotels, apartments and residential buildings.

## **2 Ventilation and air conditioning**

### **2.1 Ventilation and air conditioning system**

**2.1.1** The outdoor fresh air is clean. Strengthening fresh air ventilation may therefore not only improve the daily indoor air quality, but also, in case certain health emergencies occur indoors, reduce the concentration of pollutants in the air through dilution.

**2.1.2** The "fan-coil units, independent air-conditioning units, etc." mentioned here refers to equipment or device for heating or cooling a room or area. It mainly includes fan-coil units, independent air-conditioning units, indoor unit of multi air conditioning system, radiators, radiant cooling and heating devices, etc. Fresh air refers to the centralized (or decentralized) fresh air system set up for these rooms. Since the fan-coil units, independent air-conditioning units, etc. usually serve a certain room, even if convective terminal such as air supply unit is adopted, there is no air-cross problem between rooms. Therefore, such system may be used normally at present.

Although many buildings are equipped with fresh air systems, it is found in the actual use process that even if the fresh air systems are normally opened, some rooms still cannot meet the requirements for design fresh air volume. One of the main reasons is that the ventilation of these rooms is not smooth and the air volume is not well balanced. Keeping the exterior windows, if any, of a room open at a certain degree when using the fresh air system may make the air exhaust of the rooms meet the requirements and allow the fresh air to be blown in normally.

However, air exhaust-targeted measures shall be taken according to different situations for some rooms existing in "inner areas" which are without exterior windows:

Using two-way heat recovery equipment is a good method, which can provide fresh air to the rooms in question and, at the same time, exhaust air therefrom. Some data show that, it is found in the research using tracer gas that the "pollution rate" of fresh air due to exhaust air is about 10% to 30% in the case of rotary equipment and is about 6% to 9% in the case of polymer-type total heat recovery equipment ("paper" heat exchange). The results of this research show that for the heat recovery device with the characteristics of "mass transfer", the exhaust air pollutes the fresh air to certain extent in actual use. Because the reliability of virus protection is not completely clear, it is not recommended to use heat exchangers with "mass transfer" characteristics. If such equipment has been installed, it is recommended to install bypass air ducts on the fresh air side or the exhaust air side to completely isolate the fresh air from the exhaust air before use.

If the room in the inner area is equipped with a fresh air system, and instead of arranging an air vent in each room, the centralized exhaust system is only arranged in the public

parts of each floor, the exhaust outlet of each room shall be taken into account during use. To this end, one of the simplest and most effective methods is to keep the room doors open or install a louver on the room door. If the room door must be closed for the purpose of work, an air duct may be arranged to connect the rooms with other public parts like corridors, or the problem can be solved by directly installing an exhaust fan (of which the wind volume shall not be greater than the fresh air volume of the room so as to prevent the air pressure in the room from becoming negative). If there is no centralized exhaust system arranged for the public zones on each floor, or the total exhaust air volume is less than 70% of the volume of the fresh air supplied to the room, appropriate reforms (such as installing additional ventilators or public walkway mechanical exhaust systems) are required, or the fire-fighting smoke exhaust system can be used for mechanical ventilation in normal times (in such cases, measures shall be taken to ensure that the exhaust system can be timely put into operation in case of fire, and the consent of the relevant fire department shall be obtained).

For some buildings in which a fan-coil unit serves two zones, the fan-coil unit should be put into operation only after appropriate "rectifications" (for example, closing the air vent in one of the rooms) are made.

Although the terminal equipment will not cause the air in the room to be connected, the convective terminals will play a greater role in the mixing and agitation of indoor air, and there is no accurate quantitative analysis as to the influence of such effect on indoor pollutants at present. Therefore, once a "suspected case of novel coronavirus infection" is found in the building, it is recommended to shut down the air supply type convective terminals for safety reasons. However, radiators and radiation terminal and the like can still be used.

In most parts of China, heating supply may still be required for a certain period after the holidays. Although it is encouraged to increase the volume of fresh air, questions may be raised as to whether the capacity of hot coil unit is sufficient (especially in severe cold zones and some of the cold zones where cooling and heating coils are installed separately). Therefore, it is recommended to increase the supply water temperature and flow of the hot water system as well as the supply air temperature of the fresh air handling unit as much as possible so that the fresh air can undertake the thermal load as much as possible, and that a certain amount of heat may be ensured in case the convective terminals is shut down.

**2.1.3** The VAV/CAV system in the building may be divided into systems for "single-space applications" and those for "multi-space applications" in terms of the use mode, or "single-fan system" and "system with supply fan and return or exhaust fan" (including variable air conditioning system, which is referred to as "VAV system") in terms of system

type.

When the VAV/CAV system is applied to a 'single space', the cross contamination of room air can be avoided; and with the characteristics similar to those of fan-coil unit, such system can be used normally. Although the volume of fresh air is likely to be increased by using the VAV/CAV system, the effect of such an increase on room temperature shall also be considered. Therefore, during the epidemic period, the room temperature (during heating) can be appropriately reduced to obtain a larger fresh air volume for ventilation. And the fresh air volume that can be increased may be determined by adjusting the proportion of the fresh/return air valves and measuring the indoor temperature.

Although the air-conditioning system may operate in whole fresh air mode by using the VAV/CAV system, the fresh air volume that can be increased with a single-fan system is relatively small due to the lack of mechanical exhaust; therefore, in addition to taking adjustment measures such as using system valves, the measures such as opening the windows of the rooms may be adopted if possible. The configuration of system with supply fan and return or exhaust fan or "single fan + exhaust fan" system can provide better conditions for increasing the fresh air rate of the system.

For an VAV/CAV system serving multiple spaces, in order to prevent cross infection of room air, it is recommended to shut down the return air system and fully open the fresh air valve (and the exhaust valve, for system with supply fan and return or exhaust fan) (for single-fan system, a part of the exterior windows may be opened). At the same time, the set point of the room temperature control, together with the temperature of hot water supply and the water flow quantity shall be increased as much as possible, the same as those specified in 2.1.2, Item 5.

**2.1.4** (1) Appropriate separation of diners (food buyers) from food delivering (or processing) staffs is one of the simple and easy measures to prevent the "droplet transmission" that may be caused during food delivery. Because of the diversity of food preparation methods, this measure is necessary even when the packed meal method recommended in Item 4 of this article is implemented. (2) In conventional design and construction, the air pressure in the kitchen is "relatively negative" to that in the canteen, so as to prevent the dirty air in the kitchen from flowing into the canteen, and to mechanically make up part of the air in the kitchen through the canteen. However, under the present circumstances, it is more important to prevent possible pollution sources from entering the kitchen due to the diversity of diners.

**2.1.5** This article places requirements on the operation of some non-air-conditioning (hot and cold) supply systems.

Turning on the ventilation systems in advance before work (and keeping them running for a certain period after work) helps to ventilate buildings. However, for severe cold and cold zones, room temperature shall be monitored closely. Especially when systems are running at night, the room temperature must be above the anti-freezing temperature.

All operational mechanical ventilation systems (especially those in the spaces directly used by personnel: toilets, garages, etc.) shall be put into operation.

## **2.2 Air treatment and hot/chilled and condensing water system**

**2.2.1** This is a basic requirement. During the epidemic period, more attention and special inspection are required.

**2.2.2** Chemicals, when used for disinfecting air-conditioning ventilation systems or their air treatment equipment and components, will be taken to personnel occupied spaces by air, thus increasing risks to human health, which was not supported by WHO either during the SARS period. Ultraviolet lamps, when mounted in the air duct, almost contribute nothing to disinfection.

**2.2.3** For the purpose of this article, this is to provide a higher quality cold and heat source to the unit for its air cooling and heating treatment under "emergency" cases.

**2.2.4** At present, many offices are equipped with circulating air purifiers, which, during operation, can reduce the particle concentration of indoor air, and filter out some of the viruses attached to the particles, which to some extent, helps to purify the air.

### **3 Water supply and drainage system**

#### **3.1 Water sealing, water trap and floor drain in drainage system**

**3.1.1** By analyzing the causes of SARS outbreak in a high-rise residential area in Hong Kong in 2003, it can be seen that the SARS virus mainly pollutes the environment through the sewage drainage system, and then outbreaked among residents through human-to-human contact and through the use of public utilities in the building (such as lifts and stairs). ("Epidemiological Investigation and Prevention of SARS in Hong Kong" by Liang Tingxiong, excerpt from *National Medical Journal of China*, No.11, Volume 83, June 10, 2003) after the epidemic, national construction water supply and drainage professionals, government agencies and WHO made a summarization from multiple perspectives, and found that water sealing, water trap and floor drain failure in drainage system is the main reason for virus transmission through the sewage drainage system.

To prevent polluted gas in the sewer pipe from entering the room, each water appliance in the drainage system is separated from the sewer pipe by a water sealing device. If the water sealing fails, the indoor air will exchange with the contaminated gas in the sewer pipe, and then the polluted gas will enter the room through the chimney of building and the exhaust system in the toilet, and the pathogenic microorganisms carried by it will then spread on the surface of indoor objects, and residents will be infected through skin contact. The pipes and most fittings of the drainage system of office buildings are no different from those of residential buildings. The pollution source can be cut off by using a water sealing between the sewer pipe and the pipe indoors. Therefore, water sealing plays an important role in building drainage system.

**3.1.2** This article mainly aims to emphasize that the water appliances in each drainage system must be separated from the sewer pipe by a water sealing device. These systems are not just sewage drainage systems.

**3.1.3** This article mainly aims to emphasize that during the epidemic prevention period, each drainage appliance of the drainage systems in the office building, whether it is surface-mounted or concealed, must be equipped with a water sealing, this shall be confirmed one by one, and no appliance shall be missed. Where a drainage hose is used, a water sealing can be made by coiling the hose, but it must be ensured that the height of the water sealing is not less than 50mm, and the system shall be sealed; where metal or other hard material pipes without water traps are used, they shall be replaced with connecting pipes with water traps.

Special attention shall be given to the floor drains, whose water sealing shall be deep enough. If bell-type floor drains are used, all covers must be fitted.

**3.1.4** Drainage system smell backing up is quite common in buildings. Smell backing up

means that there is connection between the sewer system and the indoor space of buildings, which means that the building space is polluted by sewer gas. Therefore, the causes for smell backing up shall be investigated once it is found and the relevant items shall be repaired immediately.

**3.1.5** This article mainly aims to emphasize that not only the water appliance shall have a water sealing device, but the water sealing device shall work normally and can isolate gas effectively. For toilets or appliances that are not used for the time being, their water sealing shall be maintained during the epidemic period, and sanitary wares cannot be only covered simply with plastic bags. Once the water sealing dries up, the indoor environment will be polluted.

### **3.3 Centralized hot water supply system**

**3.3.1** Due to improper maintenance of the centralized domestic hot water supply system, the hot water output is low, providing possibilities for the spread of various diseases. The results of sample collection and detection conducted by relevant domestic scientific research and design units on 14 sampling points including residential quarters, high standard hotels, hospitals, and colleges and universities show that the temperatures of the output water at the end of 85.71% of hot water systems were below 45 °C. The World Health Organization (WHO) suggests that the water temperature shall be kept beyond 25°C ~45°C to prevent the reproduction of Legionella; ideally, the temperature of cold and hot water shall be lower than 20°C and higher than 50°C, respectively. It is believed in most literatures that the minimum temperature for preventing Legionella is 46°C, and the current professional standard CJ/T 521 *Water quality standards for domestic hot water* specifies that the water temperature shall not be lower than 46°C. As a water temperature of 55°C can effectively prevent the breeding of Legionella, and a water temperature of 60°C can effectively kill the Legionella, the water temperature of the centralized hot water supply system shall not be lower than 60°C. It is difficult to reach a water temperature of 60°C for the heat pump hot water system and solar energy (directly utilized) hot water system. To reach a reasonable hot water supply temperature will aggravate the scaling and corrosion of pipelines and equipment and greatly increase energy consumption. Two technologies for killing Legionella in hot water systems may be adopted: silver ion sterilizer or UV-Catalyzed titanium dioxide sterilization.

**3.3.2** Heating water to above 60°C can kill protozoa, pathogens or bacteria (including Legionella). The disadvantages are: they cannot be completely killed, and a small amount of residual microorganisms may resurrect, and there is also risk of serious burns; high temperature sterilization may affect the use of the system. For systems provided with thermostatic mixing valves, the pipes behind the valves cannot be flushed, thus this method is not applicable to such systems. For hot water systems using municipal heat and other heat sources, the water temperature of heat medium water should be verified. At present, the temperature of water supply and return of municipal heat sources in some cities in China are low and cannot meet the requirements of high temperature sterilization.

**3.3.3 UV-Catalyzed titanium dioxide:** the device is the one that fixes the photocatalytic film ( $\text{TiO}_2/\text{Ti}$ ) composed by attaching  $\text{TiO}_2$  photocatalyst to the surface of metal Ti around the UV light source. Photocatalytic film ( $\text{TiO}_2/\text{Ti}$ ) generates hydroxyl radical ( $\bullet\text{OH}$ ) under the irradiation of ultraviolet lamp. The generated hydroxyl radical ( $\bullet\text{OH}$ ) collides with the surface of microorganism to seize a hydrogen atom on the surface of microorganism. The microorganism that has been taken hydrogen atom is decomposed to death after its structure is destroyed, and the hydroxyl radical becomes water molecule after its hydrogen atom is seized.

Silver ions combine with substances in bacterial cells to destroy some of their physiological functions, causing bacteria and other microorganisms to lose activity and die. While some silver ions separate out of the inactivated bacteria and then contact with other bacteria to repeatedly inactivate such bacteria, thus having a lasting sterilization effect. Where the average concentration of silver ions is 0.05mg/L, the inactivation rate of *Legionella* is > 99.92% after it is sterilized for 180 min under the condition that the average concentration of *Legionella* in the test system is  $1.2 \times 10^3 \text{cfu/ml}$ . The *Guidelines for drinking water quality* (Fourth edition) (2011) of the World Health Organization (WHO) points out that drinking water with silver ion concentration lower than 0.1mg/L will not impose adverse effects on human body.

### **3.4 Reclaimed water treatment station**

**3.4.1** Different regions have different levels of epidemic. Whether preventive disinfection or disinfection of epidemic focus shall be adopted for office building disinfection shall theoretically be determined according to the severity level of the epidemic in specific regions, even in specific buildings. As the water quality of municipal reclaimed water meets the Grade I A or Grade I B standard, using such water as the water source of reclaimed water system for buildings cannot meet the flushing water quality standard in the national standard GB/T 18920-2002 *The reuse of urban recycling water - Water quality standard for urban miscellaneous water consumption*, the following requirements are absent: smell: no nasty feeling; turbidity (NTU):  $\leq 5$ ; total dissolved solid (mg/L):  $\leq 1,500$ ; dissolved oxygen (mg/L):  $\geq 1.0$ ; iron (mg/L):  $\leq 0.3$ ; manganese (mg/L):  $\leq 0.1$ ; total residual chlorine (mg/L):  $\geq 1.0$  for 30min, and total residual chlorine at pipe network end (mg/L):  $\geq 0.2$ . The Architectural Design Institute usually does not further process the water quality of municipal reclaimed water. Therefore, for those who use municipal reclaimed water sources to flush toilets at home, it is recommended to replace the water sources to eliminate hidden danger.

**3.4.3** As relevant researches have shown that novel coronavirus may exist in fecal sewage, close attention shall be paid to the raw-water of reclaimed water for buildings mainly based on high grade gray water (non-fecal sewage), and disinfection and coronavirus detection shall be carried out to ensure safe and reliable water quality. It is recommended to contact the local hygiene and epidemic prevention department for coronavirus detection.



## **4 System cleaning and cleaning disinfection**

### **4.2 Cleaning disinfection**

**4.2.5** This article is formulated based on expert opinions, with reference to professional standards and documents such as “Disinfection of cleaning products” in *Regulation of disinfection technique in healthcare settings* (Edition 2015), and “Material disinfection” in *Guidelines for commonly used disinfection methods in wards and outpatient clinics*. Attention shall be paid that disinfection shall be strengthened for the parts in office buildings that are easy to be touched by hands, and disinfection procedures, together with disinfection of cleaning products shall be considered in daily cleaning and maintenance. In practice, new disinfection methods put forward by relevant department and the changes in epidemic prevention shall also be taken into consideration.