



BUILDINGS 2021-015 BULLETIN O T C R

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PURPOSE: This document recognizes the use of self-contained air circulating sanitization systems in elevator cars.

SUBJECT(S): Innovation Challenge, Elevator, Air circulation Sanitizing System, Ultraviolet, Electric Fan

RELATED CODE SECTIONS:

MC 403, ASME A17.1, NYCECC C403, NYCECC C405, AC 28-113.2.2

I. INNOVATION CHALLENGE COMPETITION

In 2020 the Department of Buildings launched the **Hack the Building Code Innovation Challenge** competition. The competition sought ideas for modernizing the construction process by improving buildings and keeping construction workers and the public safe. The Department's website provides a [list of the winning technologies](#).

One of the competition's winning technologies is a self-contained air circulating sanitization system used in elevator cars. This Bulletin describes how self-contained air circulating sanitization systems that comply with the description and acceptance criteria of this Bulletin may be used as an alternative to the NYC Construction Codes.

In accordance with Administrative Code §28-113, acceptable equipment and materials must be used as prescribed by the Code or approved by the Commissioner. A registered design professional must determine when a self-contained air circulating sanitization system complies with this Bulletin.

II. BACKGROUND

The NYC Building, Mechanical, and Energy Construction Codes have several provisions related to air-conditioning which are applicable in elevator cabs. Air conditioning equipment in hoistways is limited to that which is directly related to the heating, ventilation and/or air conditioning of the elevator car. Self-contained air circulating sanitizing systems, which use filters and ultraviolet (UV) exposure to minimize contaminants in the air, may be used as prescribed in accordance with these provisions. However, the Code does not address the safe usage of UV light-emitting devices. Pursuant to AC-113.2.2 this Bulletin establishes criteria for the safe usage of self-contained air circulating sanitizing systems installed in elevator cabs as an alternative to the Code.

III. DESCRIPTION

Self-contained air circulating sanitization systems used in elevators consist of an air sterilization system employing HEPA filters and UV germicidal treatment technology. The system is a self-contained, semi-closed loop, custom air circulating sanitization system housed in a sealed metal box such that there is no exposure to the UVC light and installed at the outside wall or roof of an individual elevator cab. Air within the elevator cab is forcefully drawn to the upper wall or ceiling by negative

pressure, through a duct intake and into the sanitizing system by an integral duct fan. Air entering the unit passes through a HEPA (High-Efficiency Particulate Air) filter, then through an air plenum containing a UV-C germicidal treatment lamp. Prior to exiting the plenum, the air passes through a second HEPA filter. The treated air is then forced from the unit back into the elevator cab through exhaust ducts installed along the outside of the elevator for delivery of sanitized air to strategically placed vents low in the elevator cab wall. The system shall be installed so that it does not impede the normal operation, maintenance, evacuation or repair of the elevator.

IV. USES

An air circulating sanitization system is designed to introduce a circulated flow of air within an elevator, removing air and contaminants from the car enclosure, filtering, sterilizing and then providing the cleaned and disinfected air back to the car.

Air circulating sanitization systems proposed for use in elevator cars may be retrofitted to existing passenger or freight elevators or may be part of a new elevator installation.

Restriction: Air circulating sanitization systems in elevators may not take the place of the Code requirements for exhaust air in elevators as prescribed in MC Table 403.3.

V. EVALUATION SCOPE

NYC Construction Codes

VI. ACCEPTANCE CRITERIA

Pursuant to AC 28-113.2.2, the Office of Technical Certification and Research (OTCR) recognizes self-contained air circulating sanitization systems at elevator cars when tested and designed in accordance with UL 507 **Standard for Electric Fans**.

UL 507 sections 221-224 for Air Cleaning Devices Employing UV Technology, requires a product employing lamps emitting ultraviolet light radiation generating wavelengths less than 250 nm to comply with the Ozone Test requirements of UL 867, *The Standard for Electrostatic Air Cleaners*, Section 40. A product employing ultraviolet lamps shall be subjected to the Ultraviolet Radiation Test as described in Section 223.2. Section 224 requires a product employing ultraviolet lamps to be marked in plain sight on the enclosure and in the manufacturer's instructions with the following 'WARNING- Skin or eye damage may result from directly viewing the light produced by the lamp in this apparatus. To prevent exposure to hazardous levels of UV light, always disconnect power before re-lamping or servicing. Replace lamp with lamp model no. [x], manufactured by [manufacturer's name].'

Acceptable self-contained air circulating sanitizing systems shall be listed and labeled by an approved agency in accordance with AC 28-113.2.3 and shall comply with the conditions of this Bulletin.

VII. ADDITIONAL CONDITIONS FOR PERMITTING, SIGNOFF & MAINTENANCE

Self-contained air circulating sanitization systems installed at elevator cars shall be designed, filed, installed, inspected, labeled and maintained in accordance with the NYC Construction Codes and the following applicable provisions:

- 1. Design.** Self-contained air circulating sanitization systems in elevators shall be designed in accordance with the NYC Construction Codes, manufacturer's installation instructions, the

conditions of the required listings of the components, and the conditions of this Bulletin, including the following:

a) Building Code

Section 3001.2 requires elevators to comply with ASME A17.1, as modified by Appendix K.

1. ASME A17.1, Section 2.8.1.2 as modified by Appendix K limits equipment in hoistways to that which is directly related to the heating, ventilation and/or air conditioning of the car.
2. In accordance with ASME A17.1, Section 2.14.2.3, supply and return ventilation openings in car enclosures shall be limited to less than 12 inches from the car floor with guards to prevent objects 1 inch or more in diameter from penetrating the car enclosure, or to more than 72 inches with guards to prevent objects 2 inches or more in diameter from penetrating the car enclosure. Ventilation fans/blowers must be located above the car ceiling or outside the car enclosure and must be securely fastened in place. Such air conditioning equipment must not encroach upon the minimum clearance at the bottom and top of cars, or between multiple cars in a hoistway, as required in ASME A17.1, Sections 2.4 and 2.5 for electric elevators, and Sections 3.4 and 3.5 for hydraulic elevators.
3. The air circulating sanitization system shall be mounted to the exterior of the top or wall of car such that it does not interfere with the top emergency exit hatch as required in ASME A17.1, section 2.14.1.5.1, or the refuge space at top of car enclosure as required in ASME A17.1, section 2.4.12.1.

b) Mechanical Code

1. MC 403.2.1 allows for air in excess of that required by Section 403.3 for exhaust airflow rates to be recirculated as a component of supply air to a building space. Section 403.1 requires ventilation air to be designed and installed in accordance with Chapter 6 of the Mechanical Code.

c) Electrical Code

1. The air circulating sanitization system is required to comply with the provisions in Article 620 of the New York City Electrical Code, including the requirement for a dedicated branch circuit, in accordance with 620.22(B), at the car exterior.

d) Energy Code

1. NYCECC, Section C403.8.4 (ASHRAE 90.1 6.5.3.6) requires fractional fan motors less than 1 horsepower to have a minimum motor efficiency of 70%.
2. NYCECC, Section C405.8.1 (ASHRAE 90.1, 10.4.3.3) requires ventilation fans in elevators to de-energize when elevator is stopped and its doors closed for over 15 minutes.
3. ASHRAE 90.1, referenced in Section C401.2 of the Energy Code as a compliance path option, Section 10.4.3.2, requires cab ventilation fans for elevators to not consume over 0.33 W/cfm at maximum speed.

2. Filing Requirements.

a) New Elevators (filed in DOB NOW: *Build*)

1. For air circulating sanitization systems installed on new elevators, a PW1 must be filed and the MH Mechanical work type in box 6A selected. In addition, an EL application must

be filed by a licensed elevator agency director and “contains an air-circulation sanitization system” listed under the scope of work.

b) Existing Elevators

1. For air circulating sanitization systems installed on existing elevators, a PAA must be filed by selecting MH Mechanical work type in Box 6A, and listing “Air circulating sanitization system in elevator(s)” in Box 24 Comments. In addition, an EBN-PPN must be filed by a licensed elevator agency director for self-certification.

3. **Installation Requirements.** Installation requirements shall be in accordance with the NYC Construction Codes, manufacturer’s installation instructions, the conditions of the required listings, and the conditions of this Bulletin.

4. **Inspection Requirements.** The installation of self-contained air circulating sanitization systems for elevator cars shall be subject to special inspection requirements of Chapter 17 of the Building Code and Department Rules covering special inspection. Special inspectors of self-contained air circulating sanitization systems in elevators shall:

- a) Maintain the same qualification requirements for the **Mechanical Systems** category as defined in 1 RCNY section 101-06, Appendix A. Such special inspection of mechanical equipment located in an elevator hoistway shall be conducted with a qualified elevator mechanic or facility manager present as limited by ASME A17.1.
- b) Have duties and responsibilities in accordance with, but not limited to, 1 RCNY 101-06, Section BC 1704.16.
- c) Complete the statement of special inspection by referencing this Bulletin under the Special Inspection Item for “Alternative Materials” in section 3.0 of the TR1 form.

<input type="checkbox"/>	Mastic and Intumescent Fire-resistant Coatings	BC 1704.12		
<input type="checkbox"/>	Exterior Insulation and Finish Systems (EIFS)	BC 1704.13		
<input type="checkbox"/>	Alternative Materials - OTCR Buildings Bulletin #	BC 1704.14		
<input type="checkbox"/>	Smoke Control Systems	BC 1704.15		
<input type="checkbox"/>	Mechanical Systems	BC 1704.16		

Use this line to identify **Air circulating sanitizing system**

5. **Labeling.** The air circulating sanitizing system (and its components) shall be labeled as per AC 28-113.4. All shipments and deliveries of materials shall be accompanied by a certificate or label certifying that the materials shipped or delivered are equivalent to those tested and approved.

6. **Maintenance.** Maintenance of self-contained air circulating sanitization systems in elevators shall be performed by a qualified elevator mechanic in accordance with the published manufacturer’s instructions and NYC Construction Codes.

REFERENCES: UL 507 Standard for Electric Fans - 2017