



SURFACE VEHICLE RECOMMENDED PRACTICE

J3290™

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Selection and Use of Technologies and Methods for Vehicle Cabin Air Disinfection

RATIONALE

Due to the variety of information and misinformation available with regard to vehicle cabin air disinfection, this recommended practice has been created to provide guidance on acceptable technologies and methods for use when air disinfection is desired in a vehicle cabin - both in terms of effectiveness and in terms of user health and safety.

FOREWORD

The onset of the COVID-19 pandemic during March 2020 led many people to be concerned about cleaning and disinfecting surfaces to prevent the spread of disease. In April of that year, a group of automotive professionals began looking into cleaning products, cleaning methods, and disinfectants that could be used before, during, and after servicing a vehicle in a repair shop. At the same time, the U.S. Environmental Protection Agency (EPA) was investigating disinfectants that could be used to kill the SARS-CoV-2 virus.

In June 2020, MACS (the Mobile Air Conditioning Society, now known as the Mobile Air Climate Systems Association), published a MACS Service Report (MSR) detailing what was known at the time, both the concerns of those involved in the industry and the potential solutions for cleaning and disinfecting vehicles.

In the following months, many organizations (including most vehicle OEMs and Tier 1 suppliers) began publishing documents related to proper cleaning and disinfecting methods and products that could be used. Product experts within these companies carefully studied the various products and methods available and made recommendations based on what could safely and successfully be used on their products (their vehicles). It was proposed that SAE form a group to consolidate and generalize the available information for use by the industry as a whole, which led to the formation of the Cabin Disinfection Practices Committee (TEVCDPC) in May 2021 and the work that produced SAE J3260 (the committee's first recommended practice) titled, "Selection and Use of Cleaners and Disinfectants for Vehicle Interior Surfaces and Exterior Touch Points."

Meanwhile, studies by the U.S. Centers for Disease Control and Prevention (CDC) found that the principal mode by which people are infected with SARS-CoV-2 (the virus that causes COVID-19) is through exposure to respiratory droplets carrying infectious aerosols (such as allergens, bacteria, microbes, and virus). While it is possible for people to be infected through contact with contaminated surfaces or objects, the risk is generally considered to be low when compared to airborne transmission. However, other forms of infection are spread through contact with surfaces, and SAE J3260 can help to minimize that risk.

Following publication of SAE J3260 in late 2022, the CDPC committee began working on this, SAE J3290 (the committee's second recommended practice), with the goal of identifying technologies and methods that can be used to prevent the transmission of infectious disease from contact with airborne pathogens during vehicle operation and service procedures, for both privately owned and shared mobility vehicles.

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1. SCOPE

1.1 This recommended practice is intended to provide general guidelines for the selection and proper use of technologies and methods intended to minimize the risk of exposure to infection through light-duty vehicle cabin air. It is not intended to include all aspects of cabin air quality, including odor, inorganic particulates, volatile organic compounds (VOCs), etc.

1.2 Sources of Contamination

1.2.1 Pathogens from outside air

1.2.2 Pathogens from inside air

1.2.2.1 Trapped in cabin air filter, released into cabin

1.2.3 Allergens (pollen), microbes (bacteria, virus, fungi)

1.3 Point of Generation

1.3.1 Vehicle occupant(s)

1.3.2 Entry from outside the vehicle

1.4 Source Control

1.4.1 Outside air and recirculation mode

1.4.2 Cabin leaks

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J3260 Selection and Use of Cleaners and Disinfectants for Vehicle Interior Surfaces and Exterior Touch Points

Mathur, G.D. (2023, October 3-4). *Risk of infection and control of airborne pathogens in automobile cabins* [Conference session]. SAE Thermal Management Systems Symposium, Plymouth, MI, USA.

2.1.2 ASHRAE Publications

Available from ASHRAE Headquarters, 1791 Tullie Circle, NE, Atlanta, GA 30329, Tel: 800-527-4723 (U.S. and Canada only) or 404-636-8400, www.ashrae.org.

ASHRAE 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

2.1.3 Code of Federal Regulations (CFR) Publications

Copies of these documents are available online at <https://www.ecfr.gov>.

40 CFR Part 156 Labeling Requirements for Pesticides and Devices

2.1.4 DIN Publications

Copies of these documents are available online at <https://www.din.de/en/>.

DIN 71460-1 Road vehicles - Air filters for motor passenger compartments - Part 1: Test for particulate filtration, Edition 2006-04

DIN 71460-2 Road vehicles - Air filters for passenger compartments - Part 2: Test for gaseous filtration, Edition 2020-10

2.1.5 ISO Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ISO/TS 11155-1:2001 Road vehicles - Air filters for passenger compartments - Part 1: Test for particulate filtration

ISO 11155-2:2009 Road vehicles - Air filters for passenger compartments - Part 2: Test for gaseous filtration

ISO 29463-1:2017 High efficiency filters and filter media for removing particles from air - Part 1: Classification, performance, testing and marking

2.1.6 REHVA Publications

Available from Federation of European Heating, Ventilation and Air Conditioning Associations, 40 Rue Washington 1050 Brussels, Belgium, Tel: +32-2-5141171, <https://www.rehva.eu/>.

Loomans, M., Boerstra, A., Franchimon, F., and Wisse, C. (2020). Calculating the risk of infection. *The REHVA European HVAC Journal*, 57(5), 19-24, <https://www.rehva.eu/rehva-journal/chapter/calculating-the-risk-of-infection>.

2.1.7 UL Publications

Available from UL, 333 Pfingsten Road, Northbrook, IL 60062-2096, Tel: 847-272-8800, www.ul.com.

UL 867 Electrostatic Air Cleaners

UL 2998 Environmental Claim Validation Procedure for Zero Ozone Emissions from Air Cleaners

2.1.8 U.S. EPA Publications

Available from United States Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, Tel: 202-564-4700, <https://www.epa.gov/>.

U.S. EPA. (2023). *Pesticide Registration Manual: Chapter 13 - Devices*. <https://www.epa.gov/pesticide-registration/pesticide-registration-manual-chapter-13-devices>.

U.S. EPA. (2024). *What is a MERV rating?* <https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating>.

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 ASHRAE Publications

Available from ASHRAE Headquarters, 1791 Tullie Circle, NE, Atlanta, GA 30329, Tel: 800-527-4723 (U.S. and Canada only) or 404-636-8400, www.ashrae.org.

2020 ASHRAE Handbook, HVAC Systems and Equipment, Chapter 17.

ASHRAE Positions on Infectious Aerosols. https://www.ashrae.org/File%20Library/About/Position%20Documents/PD_-_Infectious-Aerosols-2022_edited-January-2023.pdf.

2.2.2 CIE Publications

Available from CIE Central Bureau, Babenbergerstrasse 9/9A, 1010 Vienna, Austria, Tel: +43 1 714 31 87, www.cie.co.at.

CIE 155:2003 Ultraviolet Air Disinfection

2.2.3 DIN Publications

Copies of these documents are available online at <https://www.din.de/en/>.

DIN 71460-3 Road vehicles - Air filters for passenger compartments - Part 3: PMx based filter efficiency eff (PMx), Edition 2020-10

2.2.4 FDA Publications

Available from Food and Drug Administration, 10903 New Hampshire Avenue, Silver Spring, MD 20993, Tel: 1-888-463-6332, <https://www.fda.gov/>.

FDA. (2020). *Enforcement Policy for Sterilizers, Disinfectant Devices, and Air Purifiers During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency Guidance for Industry and Food and Drug Administration Staff*. <https://www.regulations.gov/document/FDA-2020-D-1138-0022>.

2.2.5 UL Publications

Available from UL, 333 Pfingsten Road, Northbrook, IL 60062-2096, Tel: 847-272-8800, www.ul.com.

Zero Ozone Emissions Validation. <https://www.ul.com/services/zero-ozone-emissions-validation>.

2.2.6 U.S. EPA Publications

Available from United States Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, Tel: 202-564-4700, <https://www.epa.gov/>.

U.S. EPA. (2023). *Pesticide Devices: A Guide for Consumers*. <https://www.epa.gov/pesticides/pesticide-devices-guide-consumers>.

U.S. EPA. (2020). *Compliance Advisory: EPA Regulations About UV Lights that Claim to Kill or Be Effective Against Viruses and Bacteria*. <https://www.epa.gov/sites/default/files/2020-10/documents/uvlight-complianceadvisory.pdf>.

U.S. EPA. (2024). *Can air cleaning devices that use bipolar ionization, including portable air cleaners and in-duct air cleaners used in HVAC systems, protect me from COVID-19?* <https://www.epa.gov/indoor-air-quality-iaq/can-air-cleaning-devices-use-bipolar-ionization-including-portable-air>.

U.S. EPA. (2024). *Summary of the Federal Insecticide, Fungicide, and Rodenticide Act*. <https://www.epa.gov/laws-regulations/summary-federal-insecticide-fungicide-and-rodenticide-act>.

2.2.7 Other Publications

Kowalski, W. (2009). *Ultraviolet germicidal irradiation handbook: UVGI for air and surface disinfection*. Springer. https://www.researchgate.net/publication/278717381_Ultraviolet_Germicidal_Irradiation_Handbook.

3. ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
CAF	cabin air filter
CARB	California Air Resources Board
CATARC	China Automotive Technology and Research Center
CDC	United States Centers for Disease Control and Prevention
CIE	Commission Internationale de l'Eclairage (International Commission on Illumination)
COVID	coronavirus disease
DIN	Deutsches Institut für Normung
EC	European Commission
EPA	United States Environmental Protection Agency
EU	European Union
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FPR	filter performance rating
HEPA	high efficiency particulate (air) filter
HVAC	heating, ventilation, and air conditioning
ISO	International Organization for Standardization
LED	light emitting diode

MERV	minimum efficiency reporting value
mL	milliliter
MPPS	most penetrating particle size
MPR	micro-particle performance rating
oz	ounce
OSHA	United States Occupational Safety and Health Administration
PM	particulate matter
PPE	personal protective equipment
ppm	parts per million
UFP	ultra fine particles
UV	ultraviolet
VOC	volatile organic compound
°F	degrees Fahrenheit
°C	degrees Celsius

4. GENERAL DESCRIPTIONS AND DEFINITIONS

4.1 UV Light Devices

4.1.1 Inside an HVAC Unit

- 4.1.1.1 The system is designed such that UV light is contained with the HVAC unit and no UV light leakage is allowed from any opening.
- 4.1.1.2 Some UV light devices are located inside the HVAC unit, while others are located inside the duct. Duct is not generally considered “part of the HVAC.”
- 4.1.1.3 In any case, care should be taken so that occupants are not exposed to the UV light source.

4.1.2 Outside of an HVAC Unit

- 4.1.2.1 For UV light devices that are installed outside of an HVAC unit, the device shall not be turned on while the vehicle is occupied to prevent exposure.
- 4.1.2.2 Handheld device