



SAFE SERVICE NOW

COVID-19 – Bus Airflows and Solutions

Aerosol Transmission of COVID-19 Safety and Health Briefing

The scientific evidence is clear that people are contracting COVID-19 by breathing air with tiny infectious particles. This “aerosol transmission” of SARS-CoV-2, the virus which causes COVID-19, is a particular danger for workers such as bus operators because we work for extended periods of time in enclosed spaces with other people breathing recirculated and poorly filtered air.

This risk of aerosol transmission is in addition to the risks we face from touching infected surfaces such as steering wheels and tools, and from respiratory droplets (saliva droplets) from infected people coughing, sneezing and yelling. Reducing all three types of risks—including aerosol transmission—are of vital importance to our health and that of the riding public.

Our employers and the bus manufacturers are aware of the risk of aerosol transmission, but they are largely failing to deal with the danger. Buses are made, purchased and put into service with inadequate fresh air, dangerous air flows and poor filtration. This problem was identified by research funded by the U.S. federal government well before the pandemic. The ATU demanded the problem be fixed, but the manufacturers and transit agencies turned a blind eye to the known problem. And now we’re being asked to put our lives at risk for their negligence.

Reducing the Risk of Aerosol Transmission

Our employers and bus manufacturers can reduce the risk of infection from aerosol transmission by improving air flow, filtration and sanitation to reduce the “viral load” of SARS-CoV-2 in the air we are breathing for hours every day we work.

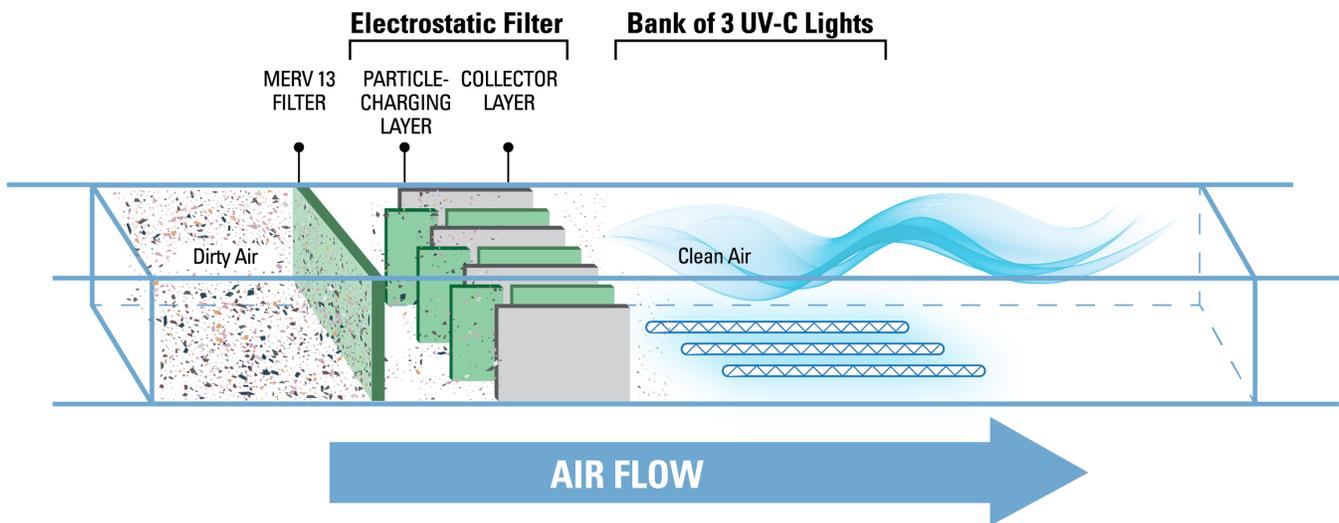
Employers and the transit industry must take measures to protect workers and passengers:

- 1 Require that masks be worn by all persons** (except for those with a disability preventing the wearing of masks). Masks greatly reduce the SARS-CoV-2 aerosols an infected person puts into the ambient air. Masks should be distributed to riders at no cost.
- 2 Do not overcrowd buses or work areas.** Reducing the number of infected passengers on a bus or people in a room reduces the viral load. Agencies should increase service to allow for social distancing on transit vehicles.
- 3 Bring in fresh air from the outside.** As much fresh air should be brought in to replace as much contaminated air as possible. On a bus, bring in fresh air as recommended by ATU’s “COVID-19 – Bus Airflows and Solutions” to ensure the airflow protects the operator.

- 4 **Air filters.** HVAC systems should be fitted or retrofitted with air filters that have a MERV 13 rating or higher. These filters significantly reduce (but do not eliminate) the viral load making buses safer for passengers and operators.
- 5 **Electrostatic filters.** MERV 13 filters should be paired with electrostatic filters which increase filter effectiveness by using static charges to attract and capture small particles.
- 6 **Sanitize the Air.** HVAC systems should be fitted or retrofitted with ultraviolet light bulbs (UV-C disinfecting light bulbs) to reduce the viral load. Due to the high speeds at which air passes by bulbs

in an HVAC system, multiple light bulbs should be used to increase sterilization effectiveness.

These steps have been taken already by a number of transit agencies. MARTA in Atlanta (<https://bit.ly/2D2Thmm>) and Tri-Met (<https://bit.ly/2X4JLG7>) are handing out free masks to passengers. Many agencies have recently added service to reduce overcrowding. DART in Dallas (<https://www.dart.org/news/news.asp?ID=1497>) has been installing UV-C bulbs in bus HVAC systems since before the pandemic. There is no excuse for a transit system to delay in developing a plan to adopt all six.



The Science of Aerosol Transmission

- SARS-CoV-2 “aerosols” are tiny infectious particles that can remain floating in the air for hours. Studies have suggested even up to 16 hours with little settling or loss of infectiousness.
- People with COVID-19 exhale SARS-CoV-2 aerosols when they cough, sneeze, talk, and breathe.
- Larger respiratory droplets from coughs and sneezes can hold more viral particles than aerosols, but they travel less distance and fall to the ground quickly.
- Aerosols and other droplets evaporate in the air and on surfaces. They leave lightweight “droplet nuclei” which can stay in the air or be kicked up from surfaces by turbulent air flows.
- Breathing in SARS-CoV-2 aerosols can infect you with COVID-19—i.e. by aerosol transmission.
- Infection by aerosol transmission is dependent on a number of factors, including these known factors:
 - The “viral load,” or how many SARS-CoV-2 aerosols are in the air someone breathes.
 - The duration that someone is breathing in air with SARS-CoV-2 aerosols.
 - The health of a person’s immune system. A compromised immune system may increase the risk of contracting COVID-19 even at relatively low levels of SARS-CoV-2 exposure.
- All individuals should wear masks in public. Individuals infected with COVID-19 may have no outward symptoms of the disease and still be infectious.