**Ionization**

Ionization in-line aircraft installation requires STC certification. Ionization also can be installed on ground air supply equipment.

In general ionization can produce ozone, the concentration and amount dependent on a number of variables. As such, ozone presence testing should be a part of the SMS process.

One ionization purification system process is currently available for use on aircraft. This device is approved by the USA FAA and EASA for installation and operation on aircraft through the Supplemental Type Certificate (STC) process. The STC approvals are NOT efficacy approvals against pathogens. Ionization devices are installed on a wide range of aircraft including many commercial air transport and business jet aircraft.

Following is general information regarding ionization.

Ionization eliminates pathogens, throughout the aircraft, by electronically creating positive (H+) and negative (OH-) ions from hydrogen and oxygen atoms in the water vapor present in the air. Pathogens infect a host by binding to sites on the cell membrane. Viruses expelled from a person through mucus or saliva are airborne aerosol form. Ionization works by leveraging an electronic charge to create a high concentration of positive and negative ions. These ions travel through the air continuously binding to particles, which sets in motion a process of particle combination. As these particles become larger, they are eliminated from the air.

Additionally, positive and negative ions have microbicidal effects on all pathogens, rendering the COVID-19 virus non-infectious, while neutralizing and removing other viruses, allergens, contaminates and even mold spores. The ions produce a natural reaction on the cell membrane of all pathogens so that they cannot reproduce and die.

Here is a listing of reference documents that should be considered as a part of the SMS process involving ionization (NPBI) processes accessible at Aviation Clean Air online, [www.aviationcleanair.com](http://www.aviationcleanair.com) .

Tests for the Component's Ability to Neutralize Bacteria

[SARS-CoV-2 Neutralization by Needlepoint Bipolar Ionization by Innovative Bioanalysis](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/phase_2_aca-iae_covid_test_official-2_final.pdf)

[Efficacy of a Bipolar Ionization System - (C. difficile) by EMSL Analytical, Inc.](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/gps_cdiff_test_results.pdf)

[Efficacy of a Bipolar Ionization System - (ECOLI) by EMSL Analytical, Inc](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/gps_ecoli_test_results.pdf)

[Efficacy of a Bipolar Ionization System - (MRSA) by EMSL Analytical, Inc](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/gps_mrsa_test_results.pdf)

[Efficacy of a Bipolar Ionization System - (TB) by EMSL Analytical, Inc](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/gps_tb_test_results.pdf)

[Efficacy of a Bipolar Ionization System - (Reduction of L. Pneumophila) by EMSL Analytical, Inc](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/pneumonia_test_emsl_labs.docx)

Ozone Emissions Testing by [Underwriter's Laboratories (UL)](https://www.aviationcleanair.com/uploads/1/3/3/2/133274601/gtr-aca-oz-0001_rev_nc-_aca_ionizer_ozone_emission_test_results_june_2019.pdf)