PERFORMANCE REPORT

SARS-CoV-2
In-Air and Surface Testing

April 2021

*DISCLAIMER: Global Plasma Solutions (GPS) uses multiple data points to formulate performance validation statements. GPS technology is used in a wide range of applications across diverse environmental conditions. Since locations will vary, clients should evaluate their individual application and environmental conditions when making an assessment regarding the technology’s potential benefits. The GPS products have not been evaluated by the FDA as medical devices and, therefore, are not intended to treat, cure, or prevent infections or diseases caused by certain viruses or bacteria.

The use of this technology is not intended to take the place of reasonable precautions to prevent the transmission of disease. It is important to comply with all applicable public health laws and guidelines issued by federal, state, and local governments and health authorities as well as official guidance published by the Centers for Disease Control and Prevention (CDC), including but not limited to social distancing, hand hygiene, cough etiquette, and the use of face masks.

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The Case for NPBI™

With the emergence of COVID-19, the role of Global Plasma Solutions’ patented needlepoint bipolar ionization (NPBI™) technology has never been more important. The data in this report illustrate the latest testing we have commissioned on the efficacy of NPBI technology in reducing the original strain of SARS-CoV-2, the virus that causes COVID-19.

SARS-CoV-2 is most frequently transmitted by air. However, the potential for surface transmission also exists. For this reason, GPS secured both in-air and surface testing from Innovative Bioanalysis for this report. In addition, testing was conducted at different ion levels to understand results in a range of settings. Furthermore, tests were conducted with different levels of ionization over time. Assuming that higher ionization levels and longer time intervals would, in all likelihood, result in greater reduction of the virus, we sought to determine effective, realistic measures for ionization and duration.

Of special importance is the fact that GPS reports percent net reduction. Whereas percent gross reduction would appear more effective, percent net reduction is more meaningful, showing effectiveness when compared with a control.

The scientific validity of data we report is fundamental to our mission at GPS. Be assured, we are committed to continuously striving for best-in-class, independent performance validation and technology research. Because of the risks inherent in testing SARS-CoV-2, all tests in this report were conducted in Innovative Bioanalysis’s BSL-3 lab.

We are also committed to ensuring our testing methodology is relevant to real-world environments. In the current case, a large chamber was used to approximate an office space. Ionized air was introduced in a similar way to how a typical HVAC system would deliver ions in an actual room. This conservative approach is more representative of actual use conditions for ionization, relative to introducing high concentrations of ions directly onto virus samples.

The use of a control environment in this research was crucial to assessing virus reduction using NPBI technology. As the world endeavors to mitigate risks for building occupants due to COVID-19, the disparity between utilizing NPBI technology and taking no measures in managing SARS-CoV-2 is noteworthy.

As you will see in the studies’ conclusions, NPBI is highly effective in reducing SARS-CoV-2. We welcome your interest in utilizing NPBI technology for reduction of certain viruses and bacteria.

For additional information, please contact your GPS representative.

Sincerely,

Edward A. Sobek, Ph.D.
Chief Science Officer
Research Summary

CONCLUSION
In an environment employing GPS® NPBI™ technology, active virus in the air was reduced after 15 minutes of exposure in aerosol form, and collectable virus in the air was substantially reduced over the course of 60 minutes. By contrast, the control test, which lacked ionization technology, resulted in much higher measurements of the virus. NPBI reduction results were achieved without reliance on or production of potentially harmful ozone.

TESTING OBJECTIVE
To determine the efficacy of NPBI technology on airborne SARS-CoV-2 virus, this testing measured what reductions in virus level were possible under controlled conditions after the virus was introduced into a testing chamber via aerosolization. The testing measured relative percent reduction as exposure to ions increased and as time elapsed.

METHODOLOGY
A BSL-3-rated bio safety testing chamber with a controlled air source closely replicated real-life applications while controlling for variables such as air velocity, temperature and humidity. A single, centrally positioned bioaerosol nebulizing port dispersed SARS-CoV-2 into the air. Positive and negative ions were introduced via a custom HVAC unit designed to mimic units typically used in commercial applications, upfitted with GPS FC48 NPBI technology. Fans in each corner of the chamber for airflow ensured that ions mixed with the airborne virus. Four air sample ports throughout the room were connected to programmable vacuum devices and contained internal filtration discs to collect viral samples and measure the virus in the air. Effects were measured for varying durations. For control purposes, the same tests were conducted without the utilization of GPS NPBI technology.
The test stage can be seen in the design diagram and consisted of a metal and laminate test chamber measuring 20’ w x 8’ h x 8’ d with sealed seams.

Temperature during all test runs was approximately 72 +/- 2f with a relative humidity of 47%.

The aerosol particles containing the virus that was nebulized into the air averaged 0.8 micrometers in diameter.

*Represents percent net reduction. At the same concentration of negative ions, the percent gross reduction was 99.70% in 60 minutes.
The graphs below illustrate the percent net reduction across various ion densities.

Remaining active airborne SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.

Remaining active airborne SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.
Research Summary

CONCLUSION

Virus samples tested in an environment employing GPS® NPBI™ technology were reduced much more rapidly when compared with the control, which lacked ionization technology. As exposure time to ionization increased, virus reduction also increased for both ion concentration target levels tested.

TESTING OBJECTIVE

To ascertain the efficacy of GPS NPBI technology for reducing SARS-CoV-2 on surfaces, this testing measured relative levels of virus reduction as exposure to ions increased and as time elapsed.

METHODOLOGY

A BSL-3-rated bio safety testing chamber with a controlled air source closely replicated real-life applications while controlling for variables such as air velocity, temperature and humidity. Known quantities of SARS-CoV-2 on glass slides were exposed to both positive and negative ions, with targeted levels of negative ions at 10,000 ions/cc and 20,000 ions/cc. Ions were introduced to the chamber via a custom HVAC unit designed to mimic units typically used in commercial applications, upfitted with GPS NPBI technology. Effects were measured for varying durations. For control purposes, the same tests were conducted without the utilization of GPS NPBI technology.
The test stage can be seen in the design diagram and consisted of a metal and laminate test chamber measuring 20' w x 8' h x 8' d with sealed seams.

Temperature during all test runs was approximately 71 +/- 2f with a relative humidity of 52%

*Represents percent net reduction. At the same concentration of negative ions, the percent gross reduction was 99.99% in 60 minutes.
The graphs below illustrate the percent net reduction across various ion densities.

Remaining active surface SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.

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Remaining active surface SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.

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All data points are results of tests conducted by Innovative Bioanalysis
The graphs below illustrate the percent net reduction across various ion densities.

Remaining active surface SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.

Remaining active surface SARS-CoV-2 virus in BSL3 room after 60 minutes with ionizer off versus on.
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