PRÜFUNG DER WIRKSAMKEIT DER ACTIVEPURE® TECHNOLOGIE BEI DER DEKONTAMINATION VON SARS-COV-2 AUF OBERFLÄCHEN



Einleitung

Dieser Abschlussbericht wurde bei MRIGlobal (MRIGlobal) für die Untersuchungen erstellt, die unter der MRIGlobal Task Nr. 311624.01.001 "Überprüfung der Wirksamkeit der AktivePure Technologie bei der Dekontamination von SARS-CoV-2" durchgeführt wurden.

Für die Durchführung des Programms wurden von Aerus LLC Testgeräte an MRIGlobal geliefert. Die Testphase dieser Aufgabe wurde von MRIGlobal am 18. Mai 2020 begonnen und endete am 19. Juni 2020.

Der Untersuchungsleiter des Programms war Rick Tuttle. Die Durchführung der Untersuchung wurde von Dr. Carl Gelhaus, Dr. Luca Popescu, Dr. Kristen Solocinski und Sam Humphries begleitet und von William Sosna geleitet.

Die Untersuchungen sind in Übereinstimmung mit den MRIGlobal Qualitätssicherungsverfahren durchgeführt worden. Alle Abläufe im Zusammenhang mit dieser Untersuchung wurden, sofern nicht ausdrücklich in diesem Protokoll definiert, gemäß der Standardvorgehensweise von MRIGlobal oder zugelassenen Laborverfahren durchgeführt, und etwaige Abweichungen sind dokumentiert worden.

Genehmiat von:

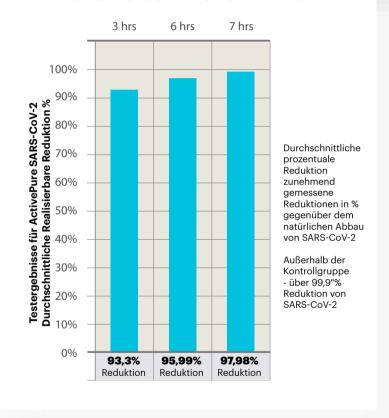
Ed Sistrunk Abteilungsleiter Medizinische Gegenmaßnahmen MRIGlobal

Rick Tuttle Untersuchungsleiter

Richard Suttle

15. Juli 2020

PRÜFUNG DER WIRKSAMKEIT DER ACTIVEPURE® TECHNOLOGIE BEI DER DEKONTAMINATION VON SARS-COV-2 AUF OBERFLÄCHEN









of Fame Inductee





Testeinheit Aerus Pure & Clean[®] Sars- Cov-2 Virenreduktion in der Luft

Zusammenfassung

Die Aerus® Active Pure® Technologie deaktivierte das Sars-Cov-2 Virus in der Luft bis zu unmessbar niedrigen Werten.

Die Ergebnisse offenbaren, dass der Reduktions- Prozentsatz zwischen >99,87 und >99,96% liegt. Da jedoch kein messbarer Prozentsatz nach dem Einsatz der Testeinheit festgestellt werden konnte, ist davon auszugehen, dass der tatsächliche Reduktions-Prozentsatz des Virus über 99,9% hinausgeht. Der tatsächliche Prozentsatz konnte auf Grund der niedrigen Werte nicht gemessen werden. Weshalb zu dem Ergebnis gekommen wird, dass die reelle Reduktion bei über 99,9 % liegt.

Dieser Laborbericht wurde erstellt und angefertigt von:

William S. Lawrence,

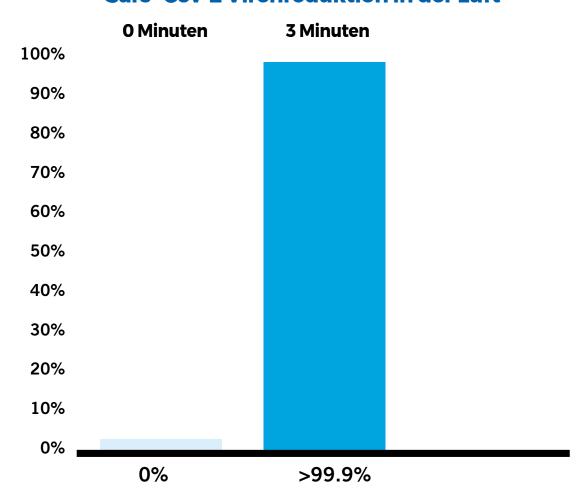
Ph. D. Assistant Professor, Microbiology & Immunology University of Texas Medical Branch (UTMB)

Jennifer E. Peel,

B.S. Senior Research Associate, Microbiology & Immunology University of Texas Medical Branch (UTMB)

Testeinheit Aerus Pure & Clean® Sars- Cov-2 Virenreduktion in der Luft

Sars-Cov-2 Virenreduktion in der Luft



TESTEINHEIT PURE & CLEAN®

Die medizinische Abteilung der Texas University (UTMB) hat SARS-Cov-2-Viren in der Luft getestet und 99,9% weniger Viruspräsenz in nur 3 Minuten festgestellt. Diese Tests, wurden in den Biosicherheitsstufen 3 und 4 dreifach durchgeführt, gemäß der dafür vorgesehenen FDA-Protokolle.



Prüfungen/Tests

- University of Texas Medical Branch (UTMB)
- UNE Spanish Association for Standardization and Certification (AENOR)
- DMT GmbH (TÜV NORD GRUPPE)
- MRI Global, Kansas City
- Danish Technological Institute

Aerus Pure & Clean Unit with ActivePure® Technology Testing Airborne SARS-CoV-2 Virus Reduction

Executive Summary

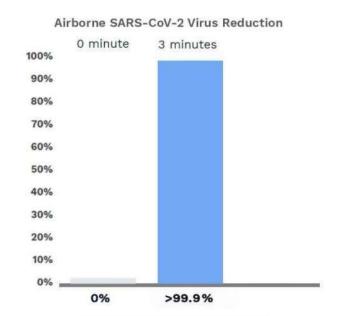
The Aerus technology inactivated airborne SARS-CoV-2 to undetectable levels. The results show that, when accounting for the LLD, the percent reduction in virus was ≥ 99.87 to $\geq 99.96\%$; however, since no virus was detected after using the experimental device, the true percent reduction was likely greater than 99.99% in every case.

The true net reduction could not be determined due to the LLD of the quantitation assay, but this too was likely greater than 99.99%.

Report Prepared and Submitted by:

William S. Lawrence, Ph.D. Assistant Professor, Microbiology & Immunology University of Texas Medical Branch(UTMB)

Jennifer E. Peel, B.S. Senior Research Associate, Microbiology & Immunology University of Texas Medical Branch(UTMB)



NEW PURE & CLEAN UNIT TESTING

Testing done at UTMB BSL Level 3 Lab with assistance from BSL Level 4 Lab, complying with FDA protocols in a FDA Certified Compliant Laboratory.











Beyond Guardian Air and Pure & Clean Units with ActivePure® Technology Tested – No Ozone



Executive Summary

Danish Technological Institute assess that neither of the tested Air Purification Systems give rise to ozone accumulation.

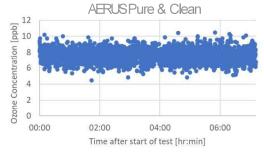
The background ozone concentration in the test chamber was measured to 7±2 ppb prior to the tests.

The ozone concentration was continuously measured with a Teledyne API Ozone Analyzer model 430. The instrument can measure ozone concentration in the range from 0 - 20 000 ppb (20 ppm) with a precision of 0.5 ppb and a lower detection limit of 2 ppb. The measurement was performed with time resolution of 10 seconds.

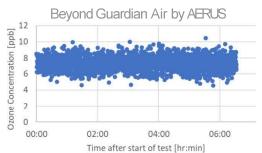
Report Prepared and Submitted by: Teknologist Institut Bioengineering and Environmental Technology

Author: Stig Koust Hansen, Ph.D., Consultant Quality Assurance:

Thomas Nørregaard Jensen Consultant



Ozone concentration measured in test chamber during test of AERUS PURE & CLEAN with ActivePure



Ozone concentration measured in test chamber during test of BEYOND GUARDIAN AIR BY AERUS with ActivePure

The full testing procedures and results are presented in Reportno. 946792











Verification of the Effectiveness of ActivePure® Technology in Decontamination of Sars-CoV-2 on Surfaces



This final report was prepared at MRIGlobal (MRIGlobal) for the work performed under MRIGlobal Task No. 311624.01.001, "Verification of the Effectiveness of ActivePure® Technology in Decontamination of SARS-CoV-2"

Test devices were supplied to MRIGIobal by Aerus, LLC for the conduct of the program. The experimental phase of this task was initiated by MRIGIobal on May 18, 2020 and ended on June 19, 2020.

The Study Director of the program was Rick Tuttle. Execution of the study was assisted by Carl Gelhaus, Ph.D., Luca Popescu, Ph.D., Kristen Solocinski, Ph.D., Sam Humphries, and managed by William Sosna.

The studies were performed in compliance with MRIGIobal QA procedures. All operations pertaining to this study, unless specifically defined in this protocol, were performed according to the Standard Operating Procedures of MRIGIobal or approved laboratory procedures, and any deviations were documented.

Approved by:

Ed Sistrum

Ed Sistrunk

Division Director

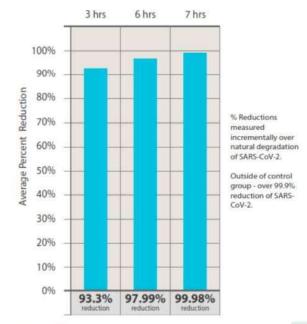
Medical Countermeasures

MRIGlobal

Rick Tuttle Study Director

Richard Sittle

Test Results for ActivePure® SARS-CoV-2 Averaged Viable Reduction %













The Spanish Association for Standardization and Certification (UNE) has tested the air purifier Beyond Guardian Air by Aerus with ActivePure® Technology, for its efficiency to reduce the concentration of bacteria on surfaces.



Declaration of tests and assessments

The Spanish Association for Standardization and Certification has tested the air purifier Beyond Guardian Air by Aerus for both its capacity of distribution and the efficiency to reduce the concentration of bacteria, using the Euro Norm 17272-2020.

The test was conducted with the air purifier unit installed in a $4.55 \,\mathrm{m} \times 5.61 \,\mathrm{m}$ room. The efficiency of the air purifier was tested by a method where several petri dishes were placed around the room. The Beyond Guardian Air is turned on and the testing on the petri dish samples takes place for a period of $24 \,\mathrm{hours}$

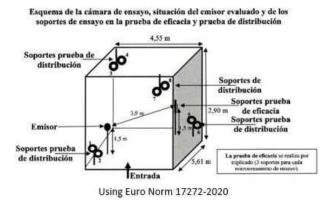
The efficiency and distribution of the Beyond Guardian Air, according to both tests was declared as more than 5log.

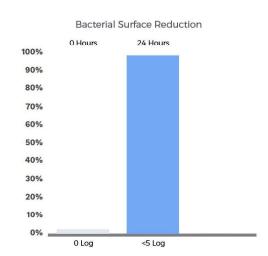
Prepared by:

The Spanish Association for Standardization and Certification

AENOR UNE

Author: Miguel Yuste















The Spanish Association for Standardization and Certification (UNE) has tested the air purifier Beyond Guardian Air by Aerus with ActivePure® Technology, for its efficiency to reduce the concentration of fungi on surfaces.



Declaration of tests and assessments

The Spanish Association for Standardization and Certification has tested the air purifier Beyond Guardian Air by Aerus for both its capacity of distribution and the efficiency to reduce the concentration of fungi, using the Euro Norm 17272-2020.

The test was conducted with the air purifier unit installed in a $4.55 \,\mathrm{m} \times 5.61 \,\mathrm{m}$ room. The efficiency of the air purifier was tested by a method where several petri dishes were placed around the room. The Beyond Guardian Air is turned on and the testing on the petri dish samples takes place for a period of $24 \,\mathrm{hours}$

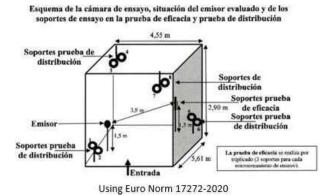
The efficiency and distribution of the Beyond Guardian Air, according to both tests was declared as more than 5log.

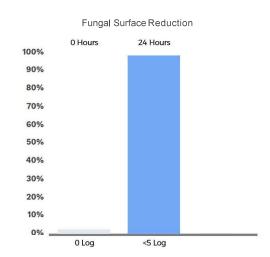
Prepared by:

The Spanish Association for Standardization and Certification

AENOR UNE

Author: Miguel Yuste















Test Certificate for MPPS and Filter grade model "HEPA Guardian Air Filter – Part No. 49457"



Executive Summary

The tested filter model "HEPA Guardian Air Filter - Part No. 49457" has to be classified according ISO 16890-1 on base of the average fractional efficiency determined in new and in discharged condition as

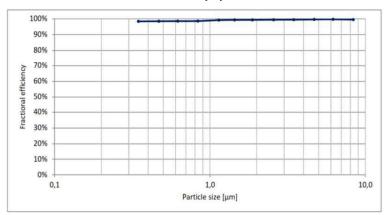
"ISO ePM10 85%"

Obviously, the filter medium is strongly electrically charged. Separation performance decreases significantly after discharging procedure of the filter element in isopropanol vapor. Without this requirement to discharge synthetic filter media the filter element would be filter class E11 according EN 1822-1 or ISO 15E acc. ISO 29463-1:2017.

Prepared by: DMT GmbH & Co.KG

Author:
Dr. Dirk Renschen
Johannes Schamberg

Fractional Efficiency by Particle size



NOTE: The results of this test relate only to the test devise in the conditions stated herein. The performance results cannot by themselves be quantitatively applied to predict filtration performance in all "real life" environments.

classified according ISO16890-1
DIN ENISO9001 ZERTIFIZIERT

9001 gertifiziert











Danish Technological Institute has tested the viral inactivation efficiency of Beyond Guardian Air by Aerus with ActivePure® Technology on aerosolized MS2 bacteriophage, a positive-stranded RNA virus



Declaration oftest and assessment

The purpose of the test is to determine the efficiency of the air purifier to reduce the concentration active of aerosolized MS2 bacteriophages using a modifies ISO 1600-36-2018 method. The tested air purifier is a Beyond Guardian Air by Aerus.

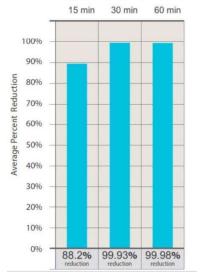
The significant and consistent difference between the Natural decay test and the Product test clearly shows a reduction of the concentration of active and airborne MS2 caused by the air purifier.

The measured decay of the concentration of active MS2 during the tests is attributed to a natural decay of the aerosol and an attribution of the air purifier. The determine attribution of the air purifier is >99.99% reduction in the 20 m3 room withing 30 minutes. In addition, the calculated half time for active MS2 is determined to be 2.8 minutes.

Report Prepared and Submitted by: Teknologist Institut Bioengineering and Environmental Technology

Author: Stig Koust Hansen, Ph.D., Consultant Quality Assurance: Caster Laur Byg, Specialist

Test Results for Beyond Guardian Air® on MS2 bacteriophages Averaged Viable Reduction %



The full testing procedures and results are presented in report no. 956985
Using ISO 16000-36:2018 method











Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus with ActivePure® Technology, for its efficiency to reduce the concentration of particles and volatile organic compounds from cigarette smoke



Declaration oftest and assessment

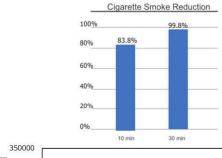
Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus, for its efficiency to reduce the concentration of particles and volatile organic compounds (VOC) from cigarette smoke using a modified ANSI/AHAM AC-1-2015 method.

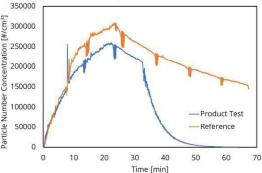
The test was conducted with the air purifier unit installed in a 20 m3 sealed room. The efficiency of the air purifier was tested by a method, where particles and VOC were generated through a smoking phase consisting of sequential smoking of three cigarettes using a smoking robot over a period of 20-25 minutes. The smoking phase is immediately followed by a 10-minute period where the cigarette smoke is mixed, before the air purifier is turned on. This marks the beginning of the 30-minutes Product Test period.

The rate of reduction of the particles and VOC was determined as the difference between a reference experiment designed to measure the natural decay rate and reduction rate measure during the use of the Beyond Guardian Air.

Report Prepared and Submitted by: Teknologist Institut Bioengineering and Environmental Technology

Author: Stig Koust Hansen, Ph.D., Consultant Quality Assurance: Caster Laur Byg, Specialist





Particle Number concentration measured over time. The smoke phase occurs during the initial 25 minutes, which is followed by a 10-minute mixing period. Hereafter the air purifier is turned on (only for product test) for 30 minutes











Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus with ActivePure® Technology, for its efficiency to reduce the concentration of particles and volatile organic compounds from cigarette smoke



Declaration oftest and assessment

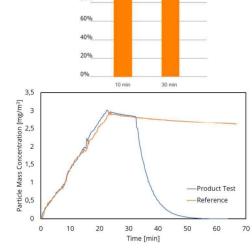
Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus, for its efficiency to reduce the concentration of particles and volatile organic compounds (VOC) from cigarette smoke using a modified ANSI/AHAM AC-1-2015 method.

The test was conducted with the air purifier unit installed in a 20 m3 sealed room. The efficiency of the air purifier was tested by a method, where particles and VOC were generated through a smoking phase consisting of sequential smoking of three cigarettes using a smoking robot over a period of 20-25 minutes. The smoking phase is immediately followed by a 10-minute period where the cigarette smoke is mixed,

before the air purifier is turned on. This marks the beginning of the 30-minutes Product Test period.

Report Prepared and Submitted by: Teknologist Institut Bioengineering and Environmental Technology

Author: Stig Koust Hansen, Ph.D., Consultant Quality Assurance: Caster Laur Byg, Specialist



Particle Mass concentration measured over time. The smoke phase occurs during the initial 25 minutes, which is followed by a 10-minute mixing period, Hereafter the air purifier is turned on (only for product test) for 30 minutes.

using ANSI/AHAM AC-1-2015 method
The full testing procedures and results are presented in report no. 956985











Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus with ActivePure® Technology, for its efficiency to reduce the concentration of particles and volatile organic compounds from cigarette smoke



Declaration oftest and assessment

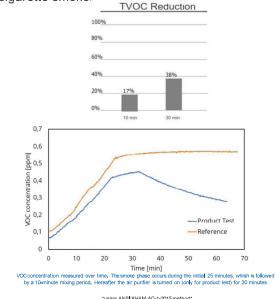
Danish Technological Institute has tested the air purifier Beyond Guardian Air by Aerus, for its efficiency to reduce the concentration of particles and volatile organic compounds (VOC) from cigarette smoke using a modified ANSI/AHAM AC-1-2015 method.

The test was conducted with the air purifier unit installed in a 20 m3 sealed room. The efficiency of the air purifier was tested by a method, where particles and VOC were generated through a smoking phase consisting of sequential smoking of three cigarettes using a smoking robot over a period of 20-25 minutes. The smoking phase is immediately followed by a 10-minute period where the cigarette smoke is mixed, before the air purifier is turned on. This marks the beginning of the 30-minutes Product Test period.

The rate of reduction of the particles and VOC was determined as the difference between a reference experiment designed to measure the natural decay rate and reduction rate measure during the use of the Beyond Guardian Air. The concentrations of particles and VOC were measured continuously with a time resolution of 10 seconds. We have previously preformed proton transfer reaction mass spectrometry on cigarette smoke and found high concentrations of acetaldehyde, formaldehyde and various fragments of acetic acid the FDA list 33 different VOCs in mainstream cigarette smoke.

Report Prepared and Submittedby: Teknologist Institut Bioengineering and Environmental Technology

Author: Stig Koust Hansen, Ph.D., Consultant Quality Assurance: Caster Laur Byg, Specialist



using ANSI/AHAM AC-1-2015 method
*The full testing procedures and results are presented in report no. 95698











Zertifikate

ActivePure[®] TECHNOLOGY

CE Declaration of Conformity

Aerus LLC. 14841 Dallas Parkvay The Aberdeen Bldg, Suite 500 Dallas, Texas 75254 USA

BMC Directive 88036EEC assmended by Council Directive 93/66/EEC WHEEDirective 200266EC

Product Name Aerus Mobile Model Number: A1018D

is in conformity with the applicable requirements of the following standards:

Bectronagnete compatibility
Electronagnete compatibility
Electronagnete compatibility
Electronagnete compatibility
Electronagnete compatibility
Electronagnete compatibility
Electrolaf electronagnete compatibility
Conducted immunity
Conducted immunity
Electronagnete conducted immunity
Electronagnete conducted Emissione
Conducted Emissione
Reduced Emissione B161000-5-2:2004 B1610003-3:2002 B1610004-2:2001 B1610004-3:2002 B1610004-4:2004 B1610004-6:2001 B1610004-6:2004 B1610004-11:2003 FCOPert 18

I hereby declare that the product named above has been designed and manufactured to comply with the relevant sections of the above referenced standards. The product complies with applicable requirements of the Directives.

Lab Technician: Jamie Davis _____ Jamie Davis

Signature:
Title:
Voo President, Product Development and Manufacturing
Company:
Title:
14841 Dallas-Parkowy
The Abendeen Bigs, Joals 500
Dallas, Teors 75544 USA
Dale: 01 Merch 2021



RoHS(2) Certificate of Compliance Restriction of the use of certain Hazardous Substances

European Union Directives 2002/95/EC and 2011/65/EU, restricts the use of the hazardous substances listed below in electrical and electronic equipment

For these purposes, the maximum concentration values of the restricted by weight are:

Maximum Limit (ppm)

*Maximum limit (ppm) on Lead (Pb) does not apply to applications for which exemptions have been granted by the RoHSDirective

Based on the information provided by our suppliers, and to the best of our knowledge, Aerus designates that the following products, are Ro-IS Compliant and conform to the stated EU Restrictions of the use of Hazardous Su

Lux Guardian Air Platinum
 Beyond Guardian Air
 (Models F159B, D.E.F.G)

Confirmation of compliance status by our suppliers is either because the products do not contain any of the restricted substances referred to in Article 4(1) of the RAFS Directive at concentrations in secses of those permitted under the RAFS Directive or because removed of the restricted substances innot technically possible and their existence in the products at levels in secses of these concentrations is allowed some of the particular applications listed in the Area to the RAFS Directive to the RAFS Directive to the RAFS Directive to the RAFS Directive.

To the best of our knowledge, none of our suppliers use these banned substances to manufacture their products. Our statements in this letter regarding RNS compliance and lead content do not extend to, or apply to any product subjected to unintended contamination, misuse, neglect, accident, or improper installation.

4.300

Andrew Eide
VP, Product Development & Manufacturing



CE Declaration of Conformity

Aerus LLC 300 East Valley Drive cast Valley D Bristol, VA 24201 USA

And in accordance with the following Directi

hereby declare that the Air Purification System

 Product Name
 Aerus Pure and Clisan

 Model(s):
 A1040A

 Rating:
 100-240 VAC50/60 Hz

is in conformity with the applicable requirements of the following standards:

28.0501.4: 2077. Electromagnetic compatibility required for household appliances, electric tools and entitle agenature. 1914 Emigracie. 1815;201.4: 20.05. Electromagnetic compatibility required for household appliances, electric tools and 1815;201.4: 2.2015. Electromagnetic compatibility required for household appliances, electric tools and similar agenature. 1914 International Control of the Control of the Control of Cont

I hereby declare that the product named above has been designed and manufactured to comply with the relevant sections of the above referenced standards. The product complies with applicable requirements of the Directives

Lab Manager: Jamie Davis

Reviewed and Anarovad: AndrowEldo

4.3 00

Tilb: Vice President, Product Development and Manufacturing
Company: 4
Agents LIC
The Abordine Bldg, Suite 500
Dallas, Tools 75254 USA
Date: 4 February 2021



14841 Dallas Parkway Suite 500, The Aberdeen Bldg. Dallas, Texas 75254 USA

RoHS Certificate of Compliance

Restriction of the use of certain Hazardous Substances

European Union Directives 2002/95/EC and 2011/65/EU, restricts the use of the hazardous substituted below in electrical and electronic equipment

Substance Maxim
Cadmism(Cid)
Lead (Ph)
Mercury (Hg)
Hexnaderif Chromism (Ci6+)
Poly Brominated Biphenyls (PBB)
Poly Brominated Diphenyl Ethers (PBDE) Maximum Limit (ppm) 100

*Maximum limit (ppm) on Lead (Pb) does not apply to applications for which exemptions have been granted by the RoHSDirective

Confirmation of compliance status by our supplier is either because the product does not contain any of the restricted substances referred to in Article 4(1) of the RAFSD incefine all concentrations in excess of those permitted under the RAFSD product or because removed of the restricted substances innot technically possible and their existence in the products all levels in excess of these concentrations is allowed across of the particular applications listed in the Arms to the RAFSD Excellent to the RAFSD Excellent allowed across of the surface and products allowed the RAFSD Excellent and the RAFSD Excellent and the RAFSD Excellent surface and the RAFSD Excellent surface the RAFSD Excellent surface and the RAFSD Excellent surface the RAFSD Excellent surface and the RAFSD Excellent surface the RAFSD Excellen

To the best of our knowledge, our supplier does not use these banned substances to manufacture their products. Our statements in this letter regarding Rd+Scompliance and lead content do not extend to, or apply to any product subjected to unintended contamination, misuse, neglect, accident, or improper installation.

4.300

Andrew Eide VP, Product Development & Manufacturing



CE Declaration of Conformity

Aerus LLC 300 East Valley Drive Bristol, VA 24201 USA

And in accordance with the following Directive(s).

Low Voltage Directive 2014/35/EU BMC Directive 2014/30/EU

Product Name Beyond Guardian Air McGel(s): F159F Rating: 220/240 VAC50/60 Hz, 70 watts

BN03351-1.20 A-13.2017 Household and similar electrical appliances – Safety, Part 1: General requirements
BN03351-1.2015. BN0354-0.2015 A-13.2017 Household and similar electrical appliances—Safety, Part 2-65. Particular requirements for air denning appliances
BN03354-2-6.05 Flactomagnetic compatibility required for household appliances, electric tools and similar apparatus.—Part 1 Emissions
BND5014-2-2.0515. Electromagnetic compatibility required for household appliances, electric tools and similar apparatus.—Part 1 Emissions

Lab Manager: Jamie Davis

Signature:

Title: Vice President, Product Development and Manufacturing
Company: Aerus LIC
M441 Datas Partoray
The Abarcheon BHg, Suite 500
Datas, Toes 75254 USA
Date: 4 June 2020

CE Declaration of Conformity

Low Voltage Directive 2014/35/EU BMC Directive 2014/30/EU

hereby declare that the Air Purification System

operandy van the application registeration of the placeting assessment of the placeting placeting assessment of the placeting assessment of th

I hereby declare that the product named above has been designed and manufactured to comply with the relevant sections of the above referenced standards. The product complies with applicable requirements of the Directives.

Lab Manager: Jamie Davis Jamie Davis

Reviewed and Approved: Andrew Eide

Signature De E. L

Tale: Vice President, Product Development and Manufacturing
Company: Across LIC
14941 Dalles Parlowy
The Abendoor Blag, Suite 500
Dalles, Teora 57254 USA
June 2020

