Creating a new sky

ZONAIR3D®
PURE AIR, JUST BREATHE

ZONAIR3D CERTIFICATES

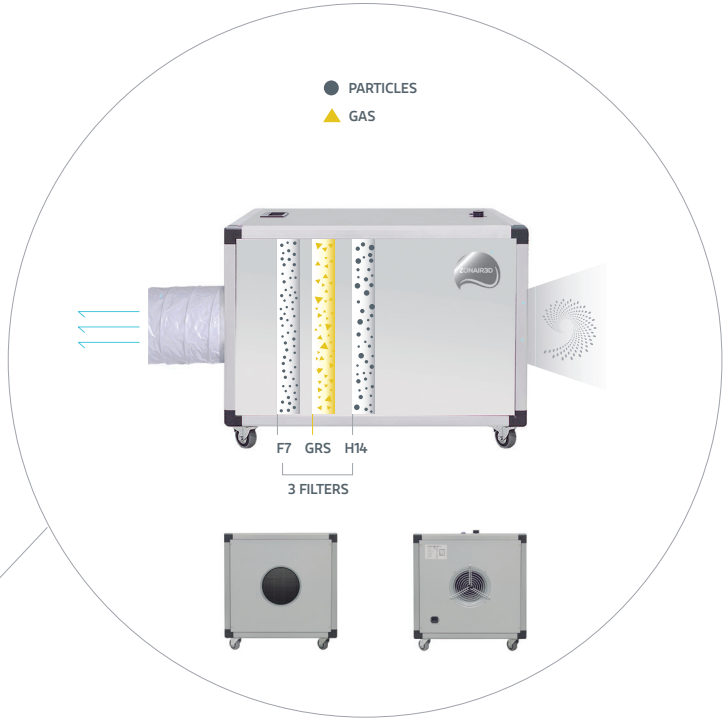
ZONAIR3D | PURE AIR BY ZONAIR3D

4 **Purified Air** Outlet

3 Continuous **Air Regeneration**
40 Renewals/h
IDA 1*
ISO 5 Clean Room certificate**
Purified Air

2 Particles and Gaseous Pollutants **Filtration**

1 **Polluted Air** Input



ISO 14001

ISO 9001

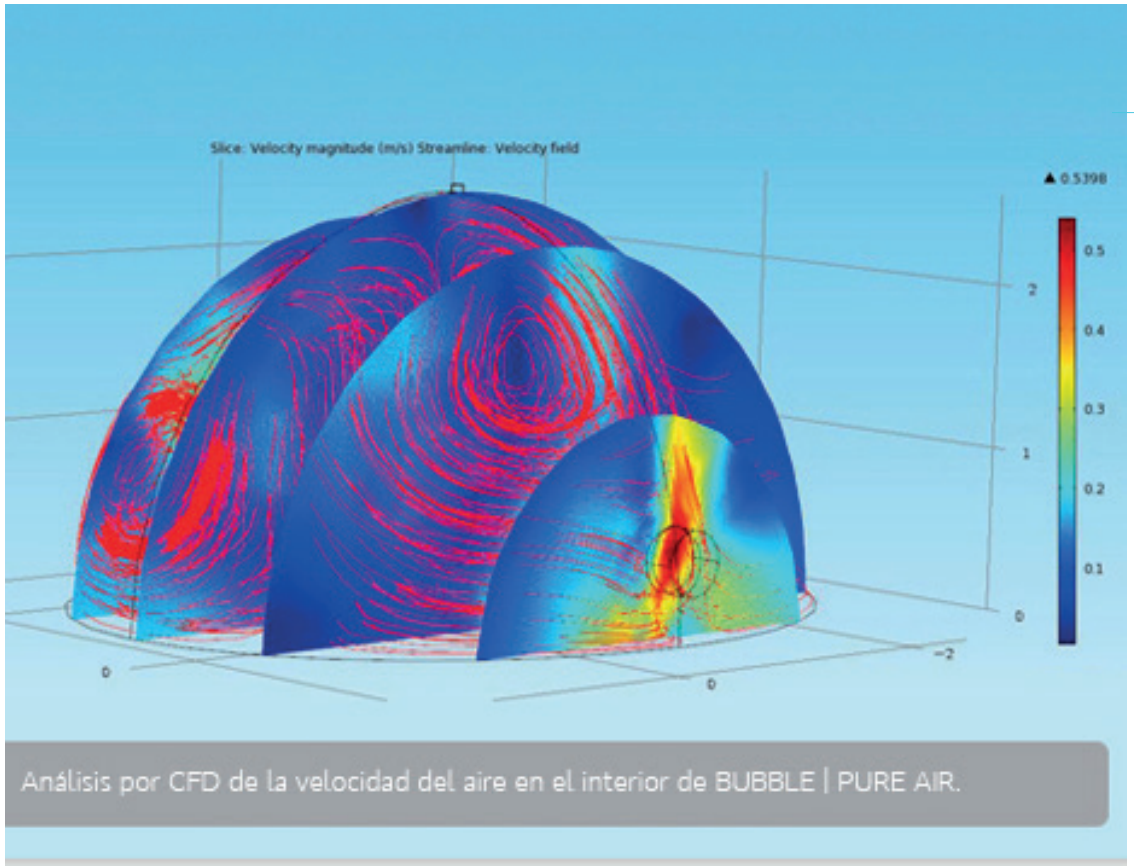
ErP Eco-design
2009/125/EC (EC) No. 1275/2008

CE

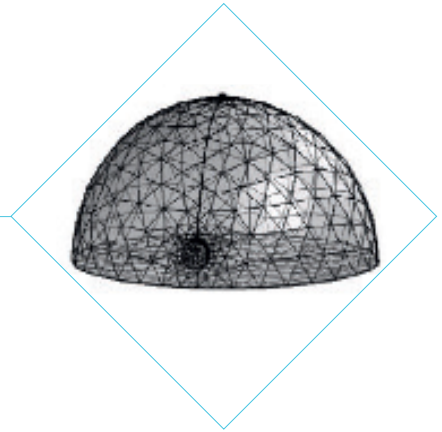
* *Environment Centre Laboratory, LCMA, UPC*
** *Operational Qualification (OQ) Rapport by CVTEC*

PURE AIR, JUST BREATHE

AIR FLOW SIMULATION INSIDE BUBBLE | PURE AIR

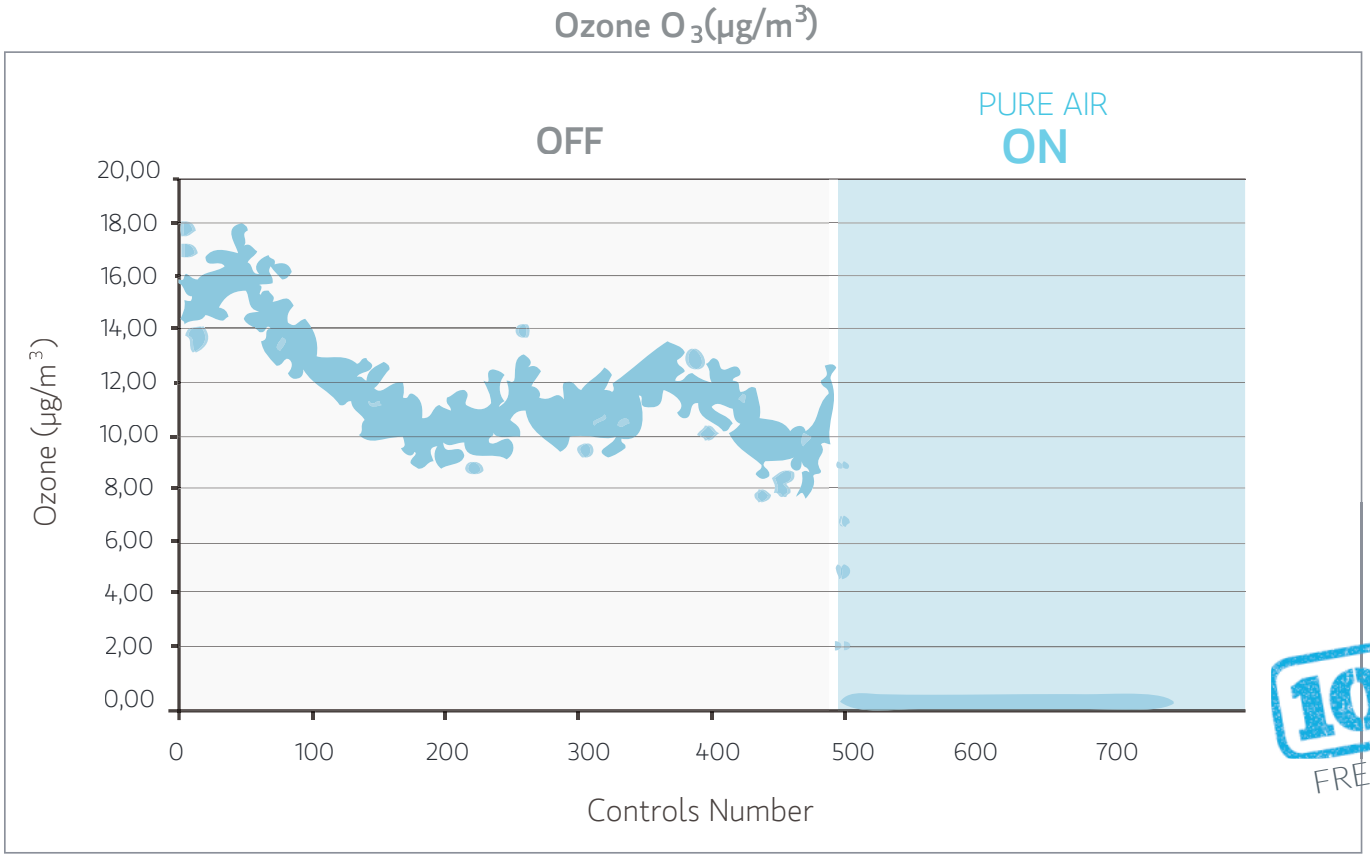


Análisis por CFD de la velocidad del aire en el interior de BUBBLE | PURE AIR.



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Laboratori del Centre de Medi Ambient

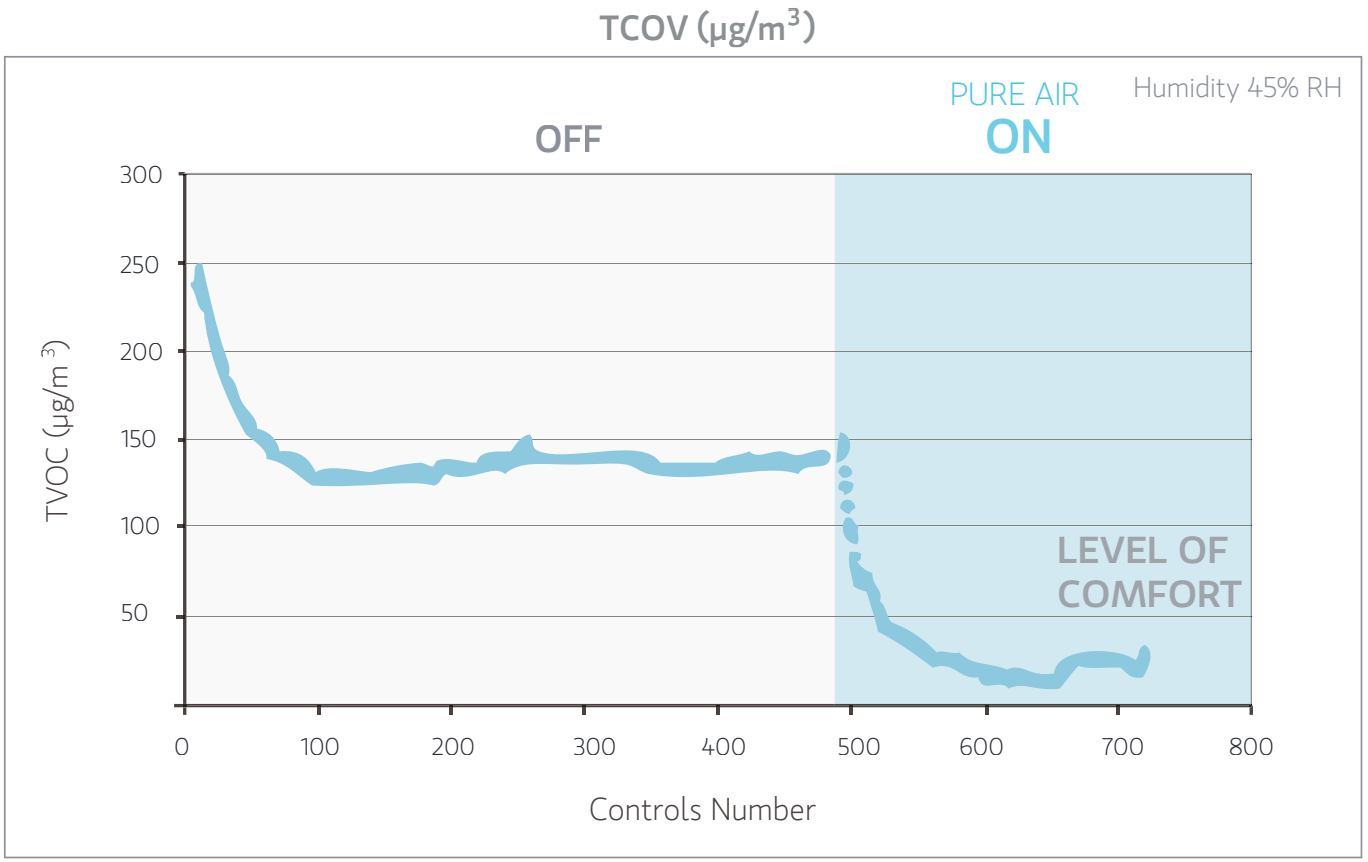
ZONAIR3D | OZONE FREE CERTIFICATE



RESULTS BY INTERNATIONALLY RECOGNIZED ENVIRONMENT CENTER LABORATORY OF THE EUROPEAN UPC UNIVERSITY

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Laboratori del Centre de Medi Ambient

PURE AIR, JUST BREATHE



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INTERNATIONAL HEPA CERTIFICATE
EN 1822 - 4 STANDARDS

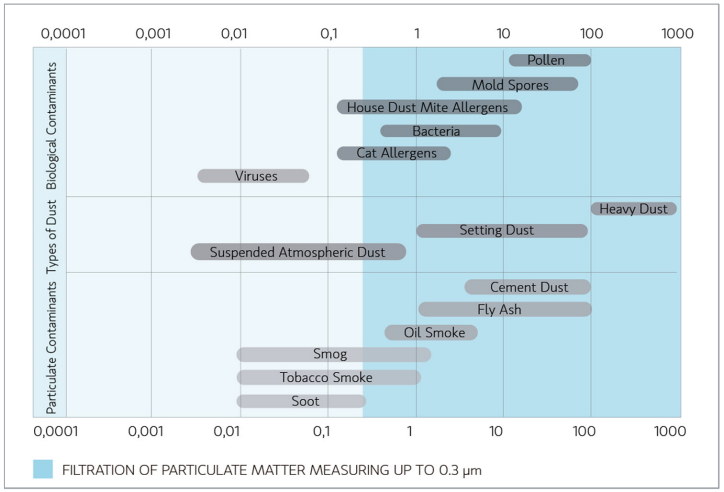

FIGURE 1: SIZE OF PARTICULATE CARRIED BY THE AIR

99.995% FREE OF:

- √ DUST
- √ ALLERGENS
- √ POLLEN
- √ MITES
- √ BACTERIA

Certificado de ensayo conforme la norma EN 1822-4
Test report according to EN 1822-4
Rapport de test salon EN1822-4

Datos del filtro / Filter data / Filtre techniques

Lista de producción / Production lot / Numéro de production	Número de filtro / Filter no. / Numéro de filtre	Nº de orden / Order no / Numéro de ordor	Fecha del test / Date of test / Date du test	Test realizador / Tester / Identifiant du test
112402-421-20 -11	AVGVPP121206H14	2/138	24/02/2011	A. A

Dimensiones del filtro (A x H x P) / Filter dimensions (W x L x D) / Dimensions du filtre (l x L x P)	Caudal nominal / Nominal flow rate / Débit d'air nominal	Pérdida de carga inicial / Initial pressure drop / Perte de charge initiale	Clase filtro / Filter class / Classe de filtration
305x305x150mm	400m3/h	270Pa	HEPA H14
Mínima eficacia integral / Minimum integral efficiency / Minimum efficacité intégrale	Mínima eficacia local / Minimum local efficiency / Minimum efficacité locale		MPPS
99,99500%	99,97500%		0,20µm

Condiciones del test / Test conditions / Conditions de test

Caudal test / Test flow rate / Débit de test	Aerosol del test / Test aerosol / Aérosols de test	Dimensión de las partículas / Particle size / Taille de particule	Concentración total / Upstream concentration / Concentration amont	Temperatura / Temperature / Température	Humedad relativa / Rel. Humidity / Humidité rel.
408m3/h	DEHS	0,20µm	3,25E+3#/cm3	19,3°C	31,3%

Resultados del test / Test results / Résultats de test

Eficacia integral / Integral efficiency / Valeur intégrale d'efficacité	Valor mínimo de eficacia / Minimum efficiency / Minimum valeur d'efficacité	Pérdida de carga / Pressure drop / Perte de charge	Clasificación según el resultado del test / Classification to test result / Classification selon résultat de test
99,99843%	99,99566%	265Pa	HEPA H14
Número de fugas detectadas / Number of leaks detected / Nombré de fuites détectées	Test de fugas según EN 1822-4 / Leakage test to EN 1822-4 / Test de fuite selon EN 1822-4		
0	aceptado / passed / accepté		OK

CLEAN ROOM INTERNATIONAL CERTIFICATE

PARTICLE COUNTING (particles /m³)		
Result (particles /m³)		Veredict
0,5µm	5,0µm	
3,520	20	Accordant
ISO 5		

ZONAIR3D

Unidad: ZONAIR 3D
Código: E_19.236_Inf
Sistema: HVAC

3.2.2 Contaje de partículas

- Procedimiento:

Se utilizará la Norma UNE EN ISO 14644-1 como norma técnica y para definir los resultados obtenidos en cuanto a Criterios de aceptación.
Los puntos de muestreo vienen definidos en la Tabla A.1 de dicha norma.

Se efectuará 1 lectura por punto (el volumen de muestreo de 1m³ por punto).
Los resultados se darán en partículas/ m³.

Tablas de límites:

Internacional: Norma UNE EN ISO 14644-1:2015 - Clasificación ambiental según el número de partículas en el aire			
CLASE "N" de ISO	***Valor máximo de la concentración de partículas (partículas/m³ de aire) igual o mayor a: [Nota: Se tienen en cuenta únicamente los dos tamaños de partículas especificados en las GMP]***		
	de 0,5 µm de Ø	*de 1,0 µm de Ø*	*de 5 µm de Ø*
ISO 1	---	---	---
ISO 2	4	---	---
ISO 3	35	---	---
ISO 4	352	83	---
ISO 5	3.520	832	Factor (ISO M (20;≥5 µm))
ISO 6	35.200	8.320	293
ISO 7	352.000	83.200	2.930
ISO 8	3.520.000	832.000	29.300
ISO 9	35.200.000	8.320.000	293.000

- Criterio de aceptación:

La concentración de partículas es la correspondiente a la clasificación especificada (ISO 5).

Tabla 2. - Sistema HVAC – ZONAIR 3D
Contaje de partículas *(Cumplimiento de especificaciones)*

Anexo	Referencia	Teórico	C.A. Concentración máxima de partículas/m³ por punto		Obtenido	Veredicto
1	ZONAIR 3D	*ISO 5*	0,5 µm	3.520	***ISO 5***	**CONFORME**
			5,0 µm	20		

C.A.: Criterio de aceptación

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

75 AÑOS CSIC

To whom it may concern:

Under ZONAIR3D's request, and its General Manager, Mr Xavier Trillo Roca, we hereby confirm the collaboration of our institution with the company Zonair3D (TRILANZ, SL) and offer our availability to collaborate with the Chinese institutions in the application of Zonair3d's air purification technology.

ZONAIR3D is a Spanish company, aimed at the research and production of indoor air purification systems.

ZONAIR3D's leading systems are applied in the architecture field for any public and private facilities and, among others, for commercial, industrial and food applications. They are mainly aimed at their users' health.

Our Institution, the Institute of Environmental Assessment and Water Research, IDAEA, from the National Research Council CSIC, collaborates with Zonair3d in the research of air purification systems which help improve the existing air quality taking the International guidelines as starting point and using the before mentioned technology developed by Zonair3d.

This collaboration is based on a series of actions, among which a project led by IDAEA-CSIC, in which by reducing pollutants by means of the installation of Pure Air Control by Zonair3D and performing measurements at several schools, we are assessing the environmental impact on children in the city of Barcelona.

In witness where of and for all pertinent purposes I issue and sign this document.

Barcelona, Spain, 16th June 2016

Yours sincerely,

Xavier Querol
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Consejo Superior de Investigaciones Científicas (CSIC)
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Profile URL : http://www.researcherid.com/rid/E-2800-2014

MINISTRY OF DEFENCE
SUB-SECRETARIAT OF DEFENCE
GENERAL INSPECTORATE OF HEALTH

DEPARTMENT INSTITUTE FOR PREVENTIVE MEDICINE
"Capitán Médico Ramón y Cajal"
ENVIRONMENTAL AND NBC HEALTH SERVICE

REPORT ON THE PRESENTATION OF THE BUBBLE | PURE AIR SYSTEM BY ZONAIR3D

On 13 October, a presentation was given at the *Instituto de Medicina Preventiva de la Defensa* [Department of Defence Institute for Preventive Medicine] on the BUBBLE | PURE AIR system by representatives from the company that manufactures the product, ZONAIR3D. The product in question is a mobile space made from PVC (medically treated and phthalate-free) in the shape of a bubble. The filtering system (pre-filter and absolute HEPA filter), architecture, positive pressure and air input flow control, enables people inside the bubble to breathe 99.995% pure air – free from contaminating particles and viral, bacteriological and allergenic agents.

The HEPA filter was originally developed for the Atomic Energy Commission during the Second World War and the name stands for High-Efficiency Particulate Air. This type of filter is made from tiny glass fibres that are matted together to form a highly dense membrane. This creates a high-density filter that is capable of trapping tiny particles.

Once the contaminating particles have passed through the filter, they are blocked from returning to the air by the filter's highly absorbent pores.

The size of the particles trapped by the air purifier are measured in microns. One micron is 1/1000 of a millimetre. Particles that measure 10 microns or less are invisible to the naked eye.

The size of objects:
100 microns: the diameter of a human hair
25 microns: waste or other particles
10 microns: thick dust, plant spores and pollen
5-10 microns: flakes of skin, mould, pollen, normal dust, flakes of skin from pet animals
1-5 microns: fine atmospheric dust, dust mite waste
0.3 to 1 micron: tobacco smoke, metallic gases

The traditional HEPA classification scale consists of various HEPA filter quality levels on a scale from 10 to 14. Level 10 filters provide 99% filtration and trap particles measuring up to 2 microns or more from the air that passes through the filter. Filters that provide up to 99.97% filtration and trap particles that measure only 0.3 microns from the air that passes through the filter are level 14 filters. Such filters are used for laboratory clean rooms and are referred to as absolute filters. It should be pointed out that bacteria have an average size of 0.5 to 5 microns (and would therefore be removed from the air by the filter) and viruses measure between 10 and 300 nanometres (millionths of a millimetre), i.e. 100 times smaller than bacteria and not removed from the air by these filters.

Most germs, and viruses in particular, are carried on particles of a larger size (flakes of skin, dust, fabric particles, breath droplets, etc.), which are much larger.

The HEPA filter fitted to the BUBBLE | PURE AIR system is a level 14 filter and is therefore considered to be an absolute filter.

These filters are currently classified as follows in Europe, according to most penetrating particle size:

HEPA/ULPA Filter Classification (EN 1822 standards)

HEPA Filter Group	Global MPPS % of MPPS eliminated
H10	up to 85 %
H11	" 95 %
H12	" 99.5 %
H13	between 99.95 - 99.75%
H14	between 99.995 - 99.975%

MPPS: Most Penetrating Particle Size.

According to this standard, the HEPA filter fitted to the BUBBLE | PURE AIR system can also be considered as an absolute filter given that it achieves a global 99.995 % of MPPS eliminated.

The certificate from the Environment Centre Department of the Polytechnic University of Catalonia reads as follows:

La calidad del aire en el interior es alta: IDA 1 (norma UNE-EN 13779). Los incrementos en la concentración de dióxido de carbono (CO2) no superan los 350 ppmv sobre el contenido del aire exterior. El incremento máximo obtenido con una persona en el interior y la posición del regulador al mínimo son del orden de 140 ppmv.

The interior air quality is high: IDA 1 (UNE-EN 13779 standard). Increases to the carbon dioxide concentration (CO_2) do not exceed 350 ppmv above the content of the exterior air. The maximum increase obtained with someone inside and the regulator set to minimum is approximately 140 ppmv.

In light of the above, it can be said that the type of filter fitted to the system provides air that is more than 99.996% particle-free and similar to that of a "White Room". Furthermore, the positive pressure generated inside the system means that the outside air and the particles contained therein cannot enter the bubble.

The filter does not contain active carbon and cannot therefore be used in an NBC environment.

In principle, the structure is not made to withstand corrosive chemical agents, such as Yperite. This extreme could be assessed at the materials laboratory of the *Instituto Tecnológico de la Marañosa* [Marañosa Technology Institute]. The interior air quality could be checked by carrying out studies on the level of particles, CO_2, CO and microbiology.

CONCLUSIONS:

It could be suitable for surgical healthcare facilities (such as ROLE 2 installations) by installing it inside the tent-type surgery module, which has no pressurisation or specific air filtering system. It would eliminate dust, germs and insects from the operating area in dusty field environments.

This extreme should be assessed in terms of size and functionality for surgical services. Personnel, equipment, gases and lighting requirements generate certain space requirements that could be greater than the model currently available is able to meet. In any case, the manufacturing company can also produce the BUBBLE | PURE AIR system to any size measurements required. It is also possible to manufacture the system with an intermediary chamber that enables the entry and exit of personnel without modifying the positive pressure.

The system also shows itself to be suitable for creating a clean room for the treatment of burns and immunodepressed patients (for example, in the case of radiation injuries). It would also help reduce the chances of infection during the application or replacement of treatments and bandages.

It could also be useful for treating patients with asthmatiform respiratory pathology. Such cases are frequent in such environments as Afghanistan, which are rich in breathable particles. Besides the corresponding medical treatment, isolation from allergens could avoid the need for a MEDEVAC in serious cases.

It is possible to carry out a study on and place a custom order for fitting the system with an NBC filter containing active carbon and using a non-corrodible material for use as a COLPRO shelter or group NBC shelter.

References:

1. TSI Application Note ITI-041: Mechanisms of Filtration for High Efficiency Fibrous Filters
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3. ASHRAE Transactions 3: 523-534.
4. Air Purifier Buying Guide, AchooAllergy
5. www.alcion.es/Download/ArticulosPDF/if/05articulos.pdf