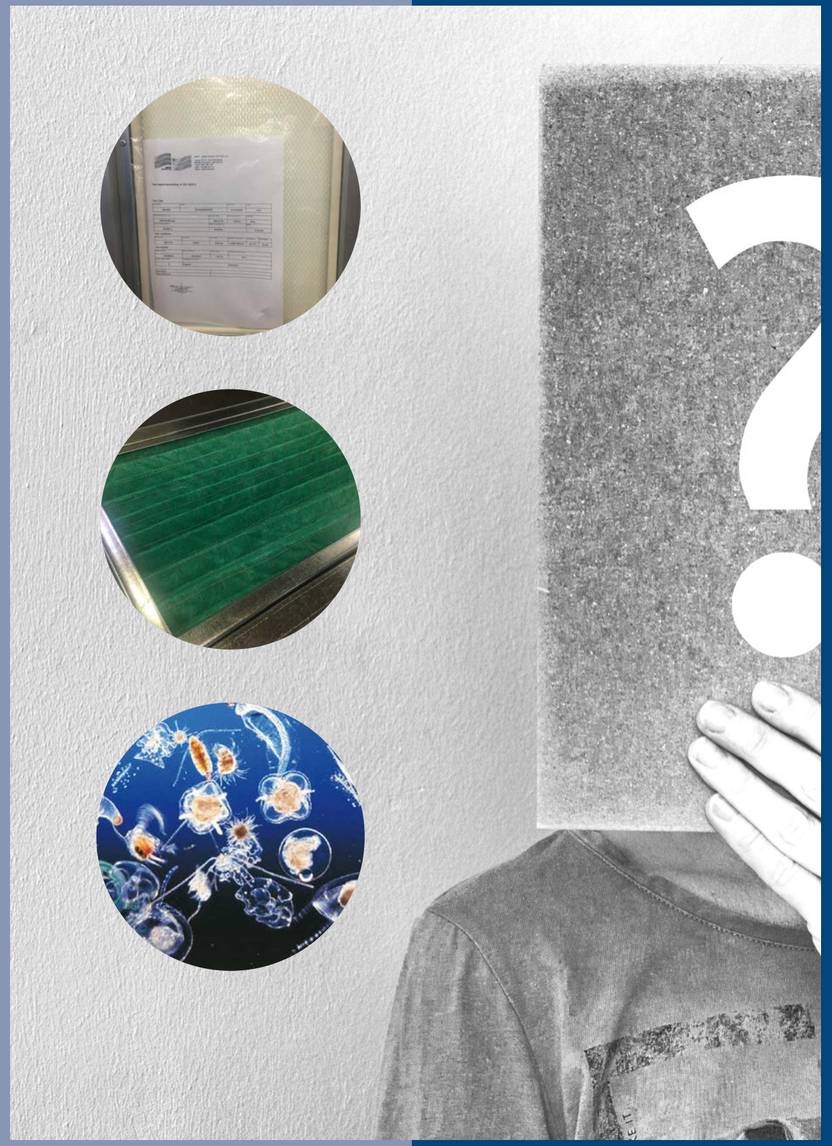
CASALS VENTILACIÓN



WHAT WE SHOULD KNOW BEFORE CHOOSING A HEPA PURIFIER

The keys to not let you cheat

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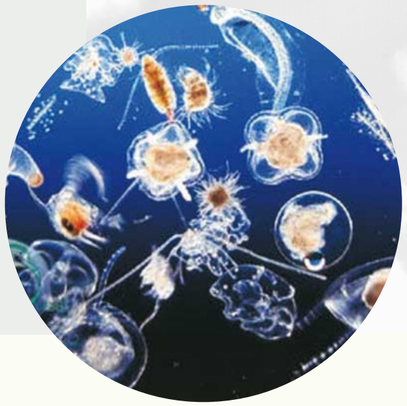
THE AIR AS A FLUID

First of all, we must become aware that we are immersed in a **fluid**, the air.
It has a **low density** compared to the best known fluid, water, but its behavior follows the same rules.
The fact of being submerged from birth in this environment makes us not aware that there is something around us, something that, like water, has **multiple particles in suspension**. It is easy for us to imagine **plankton** traveling through the sea, but instead we do not usually extrapolate it to the air when its behavior is governed by the same physics.



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INVISIBLE AND UNDETECTABLE

8,000 LITERS OF AIR PER DAY

Indeed, the enemy walks, invisible and undetectable, through the air at the mercy of currents and changes in temperature. If besides, we add that during a single day we **breathe in and breathe out 8,000 liters of air**, the situation is already beginning to seem complex and it explains why it is so difficult to control the pandemic.

For this reason, a mask, hand hygiene, social distance, disinfection of surfaces, etc. are not enough. **Closed spaces must be ventilated** and we can **rely on air purifiers**.

It's about putting the maximum number of **layers of security** between the virus and us.

SANITATION PROCESSES

Highly diverse but not as effective or recognized

CHECK IT ONLINE

SANITATION PROCESSES

We compare the different air purification systems prioritizing their toxicity to humans and the environment, in addition to their authorized use for COVID-19.

COMPARATIVE

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DYNAMIC PROCESS	TOXICITY	USE IN THE PRESENCE OF PEOPLE	COST / SPEED OF EFFECTIVENESS	AUTHORIZES USE FOR COVID-19
MECHANICAL FILTRATION	It is not toxic	YES	MEDIUM / HIGH	**Advisable**, standard product EN1822
ELECTROSTATIC FILTRATION	It is not toxic	YES	MEDIUM / MEDIUM-HIGH	**Not explicitly**, pending evaluation by the authorities.
PHOTOCATALYSIS	It is not toxic	YES	LOW / MEDIUM-HIGH	Not explicitly. With **restrictions** and pending evaluation by the authorities.
UV FILTRATION	Toxic with human presence	YES, WITH CAUTION	LOW / MEDIUM-HIGH	**Not explicitly**, pending evaluation by the authorities.
STATIC PROCESS	**TOXICITY**	**USE IN THE PRESENCE OF PEOPLE**	**COST / SPEED OF EFFECTIVENESS**	**AUTHORIZES USE FOR COVID-19**
OZONE	**Harmful** to human health (> 0.5ppm) and the environment	NO	MEDIUM / HIGH	Not explicitly. With **restrictions** and pending evaluation by the authorities.
FUMIGATION / CHEMICAL NEBULIZATION	**Risk** of chemical reactions and inflammations depending on the compound	NO	LOW / HIGH	

SANITATION PROCESSES

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HOW TO NEUTRALIZE THE ENVIRONMENTAL VIRUS

Get an overview of our document "Sanitation processes" to remind you the systems currently offered to neutralize viruses from the environment.

None of the processes that appear in the guide have any certification against the virus. In addition, many of them are **invasive**, because they generate toxic compounds or use chemical disinfectants.

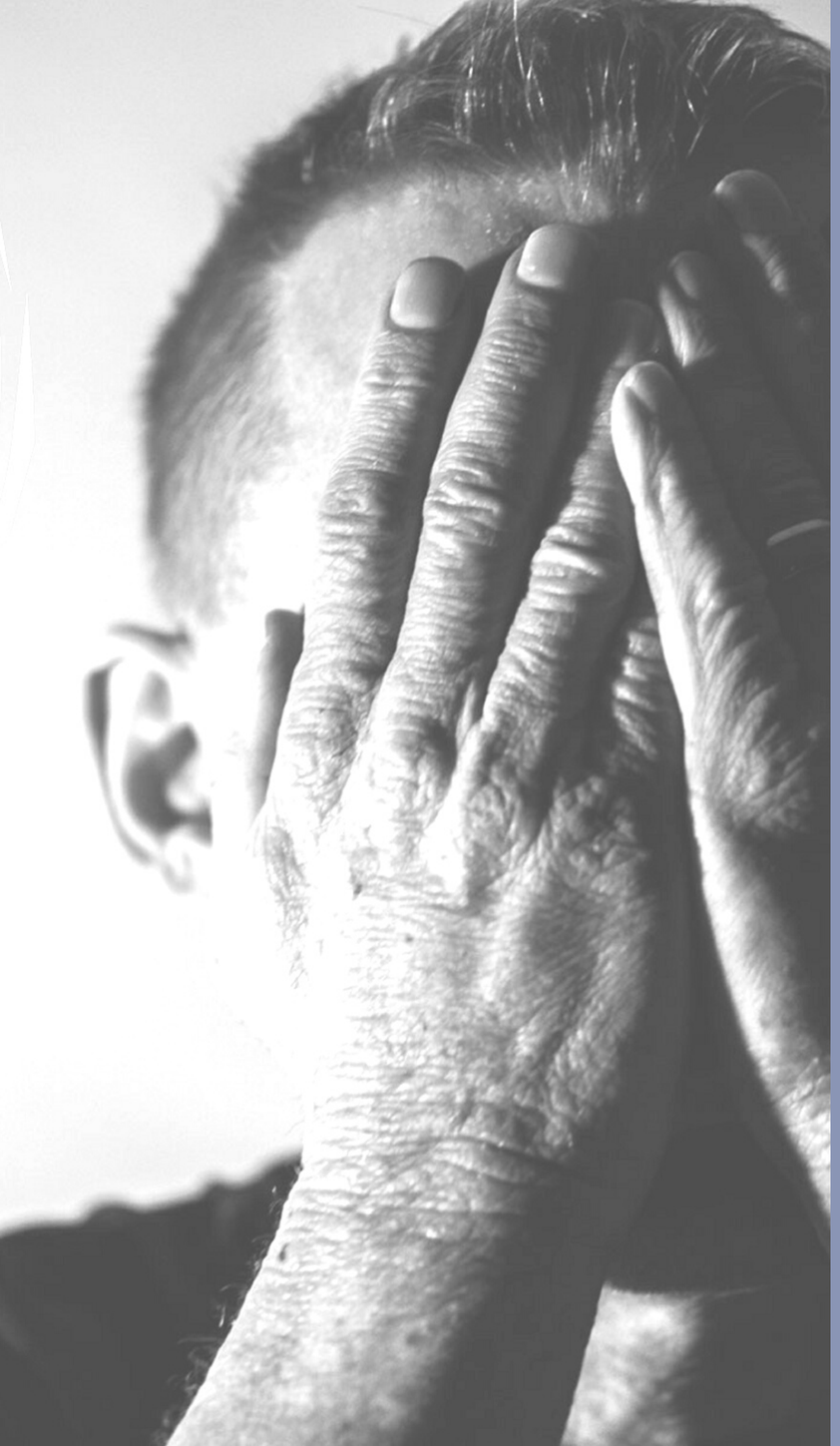
These statements are reflected in the latest scientific report for the **Spanish Ministry of Science and Technology** of October 29, 2020.

SANITATION PROCESSES

ABSENCE OF CERTIFICATIONS

- There is no fully certified system.
- There is no machine validated under official regulations.
- All are private tests, most of them very deficient.
- The most appropriate thing is to act as is done in operating rooms, with filtration approved by **EN1822**.

Even as an example, a room could be validated like an **operating room** is validated before its start-up. The air quality in operating rooms and clean rooms is the only system that uses regulations for this use where efficiency and filter tightness.



INFÓRMATE ANTES DE COMPRAR

MISINFORMATION CAUSES PROBLEMS

At this point, where the only approved certification is the one that **HEPA** filters may have, **misinformation** has been generated about the reality of the HEPA word in order to **confuse the market**.

HEPA means **High Efficiency Particulate Arresting**.

95% of the equipment showing that they have HEPA filters are **NOT APPROVED** filters and therefore without **any credibility**.

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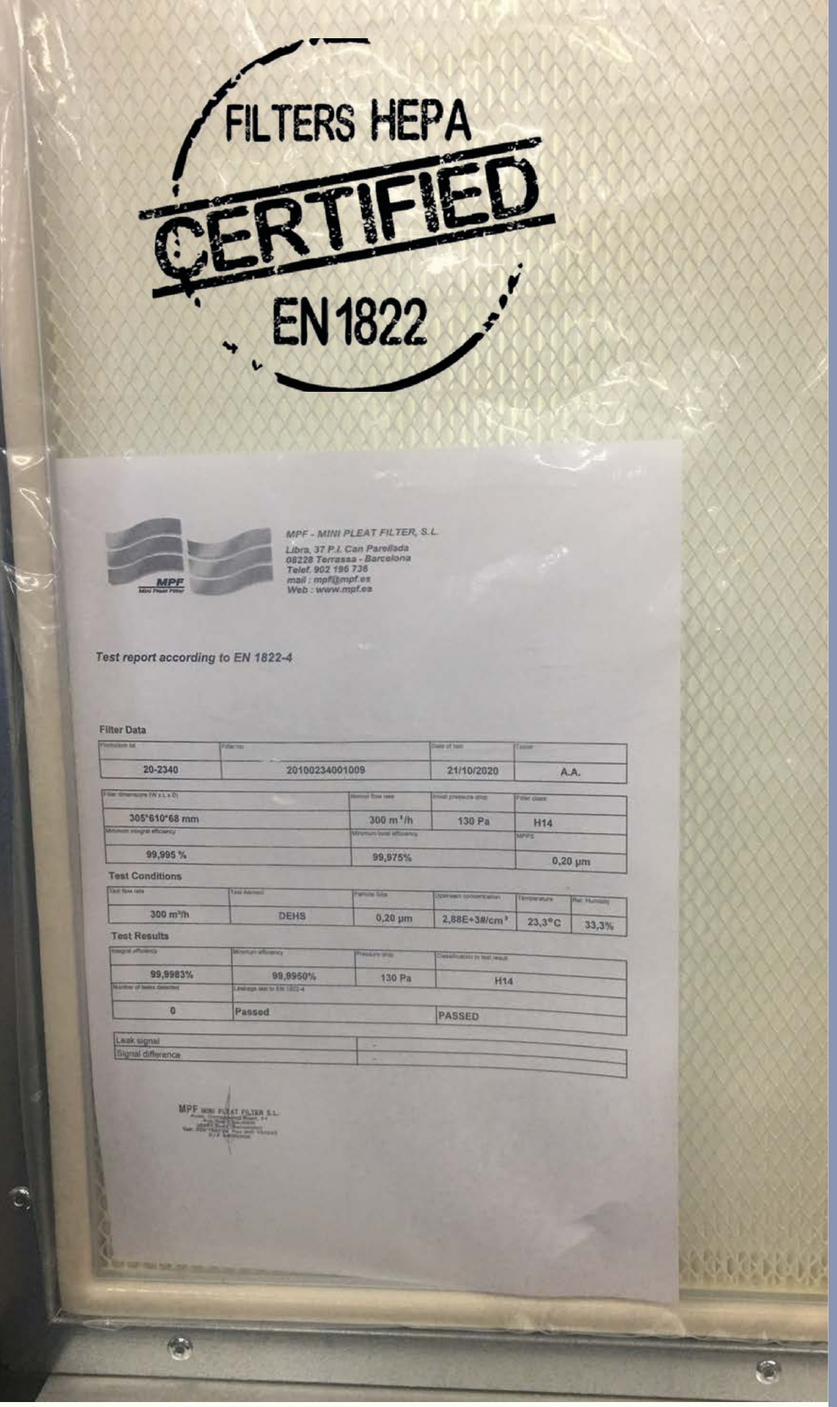

KNOW IN ADVANCE BEFORE YOU BUY

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APPROVED FILTERS

To be considered an approved filter with guarantees, it must **have been tested under the EN1822 standard**. This requires supplying the filter enclosed in a sealed bag with its unique and numbered certificate inside. That is the key to differentiate **equipment with guarantees**.

All Casals HEPA H14 filters come plasticized and with the unique certificate since they have been individually tested.

CASALS PURIFIERS WITH APPROVED FILTERS

FILTERS HEPA CERTIFIED EN 1822

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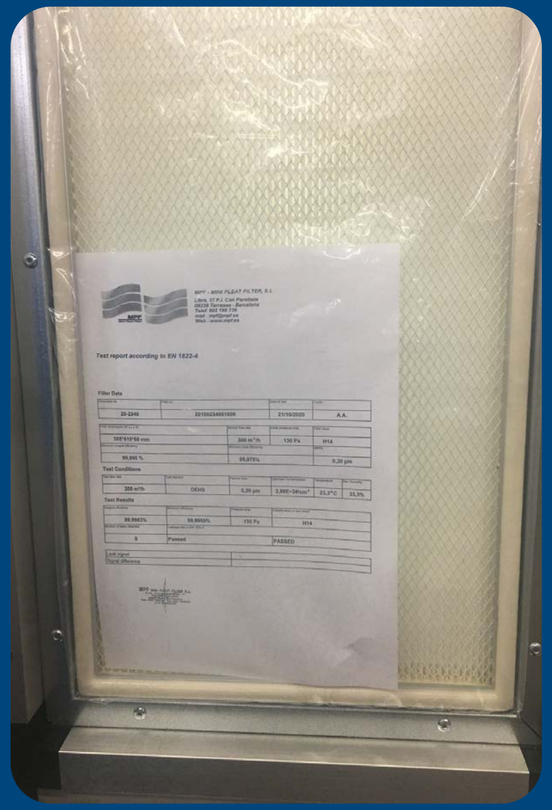


HEPA H-14 IN A REINTAIR

PRE-FILTER IN A REINTAIR

HEPA H-14 SEALING

UNDERPRESSURE WORK

AVOID LEAKS AND MAINTAIN TIGHTNESS

The adventure does not end here ...
The **tightness** of the equipment is essential to prevent air leaks without passing through the filters.
For this function it is desirable that the purifier works in underpressure instead of overpressure.
In addition to a correct recirculation rate per hour not less than 5.

UNDERPRESSURE VS OVERPRESSURE

THE PURIFIER IN UNDERPRESSURE PREVENTS THE SPREAD OF DISEASES

To understand the operation of underpressure applied to a purifier, we must imagine a room where we have isolated an **infectious and contagious** patient, that is, a person with an infectious and contagious disease.

Given that a quarter of infections in hospitals have a respiratory origin, it will be necessary to take great care of the **breathed air quality** not only by the sick people (isolated and not isolated), but also by all hospital workers and visitors.

UNDERPRESSURE VS OVERPRESSURE

THE PURIFIER IN UNDERPRESSURE PREVENTS THE SPREAD OF DISEASES

To prevent the spreading infectious disease that our isolated patient suffers, he or she will be in a room with depression or a negative room.

The sense of the air flow will be towards the interior of the room, achieving its underpressure to prevent the infection from moving and producing an airborne contagion. It will also have 100% extraction of the supplied air, with a HEPA filter in the final stage of the air extraction.

negative or underpressure room

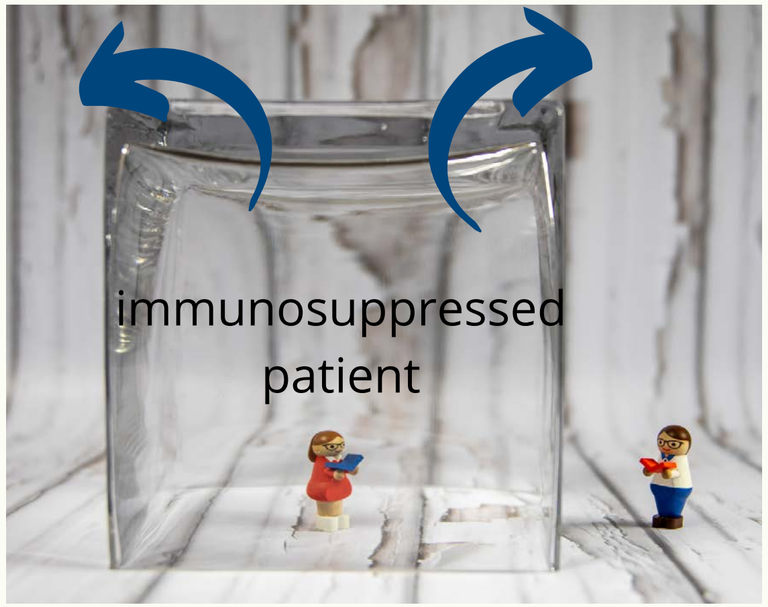
UNDERPRESSURE VS OVERPRESSURE

OVERPRESSURE ASSUMES THE DIRECTION OF THE AIR TOWARDS OUTSIDE

When the patient is **immunosuppressed**, the sense of air will be towards the outside, in addition to providing the air previously passed through a HEPA filter stage.

In these cases the important thing is no longer the retention of the bacteria and viruses inside, but the supply of clean air from these harmful particles.

positive or overpressure room

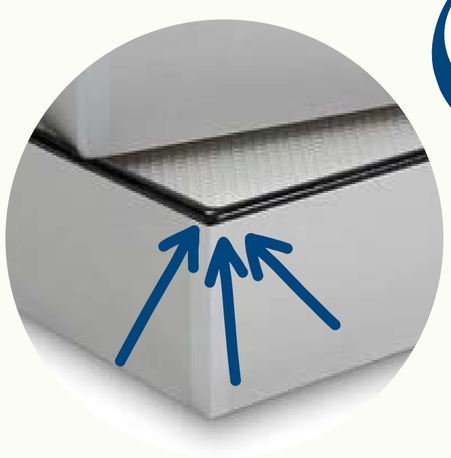


UNDERPRESSURE VS OVERPRESSURE

REINTAIR®: AN UNDERPRESSURE AIR PURIFIER

As we are interested in capturing harmful particles in suspension such as viruses, bacteria and aerosols, the Casals REINTAIR® purifier works in **underpressure**. Thus its tightness is guaranteed.

In addition, the 2 HEPA filters installed have a polyurethane gasket and sealant that prevents leaks.



underpressure purifier

STANDARD EN1822

European filter testing standard that establishes the procedures to follow to determine their efficiency

HEPA

[High Efficiency Particulate Arresting]

Removes up to 99.99% of airborne particles up to 0.3 microns in diameter

ULPA

[Ultra Low Penetration Air]

Requires removal of 99.9995% of particles up to 0.12 microns

GOOD INTERPRETATION OF FILTERS

STANDARD EN1822

Filters installed in the REINTAIR® air purifier are HEPA H-14, individually certified according to EN1822.

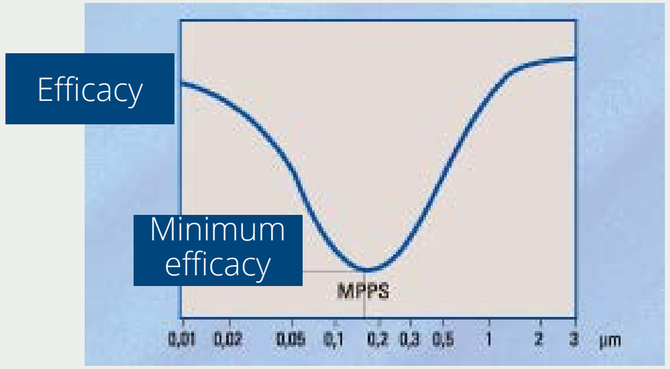
Efficiency degrees

HEPA

- H13 99.995%
- H14 99.995%

ULPA

- U15 99.9995%
- U16 99.99995%



This percentage refers to the filter degree of retention against the **most penetrating particle size** (MPPS).

This size is usually **between 0.3 microns and 0.15 microns** depending on the filter.

Once the most penetrating particle has been determined, we proceed to find out the filtration **percentage of the worst possible particle**, that is, the MPPS.

Therefore, the H14, as an example, filters a 99.995% of the particles of that diameter. That is the worst result that is achieved on THE TOTAL of particles, either larger or smaller than that diameter.

GOOD INTERPRETATION OF FILTERS

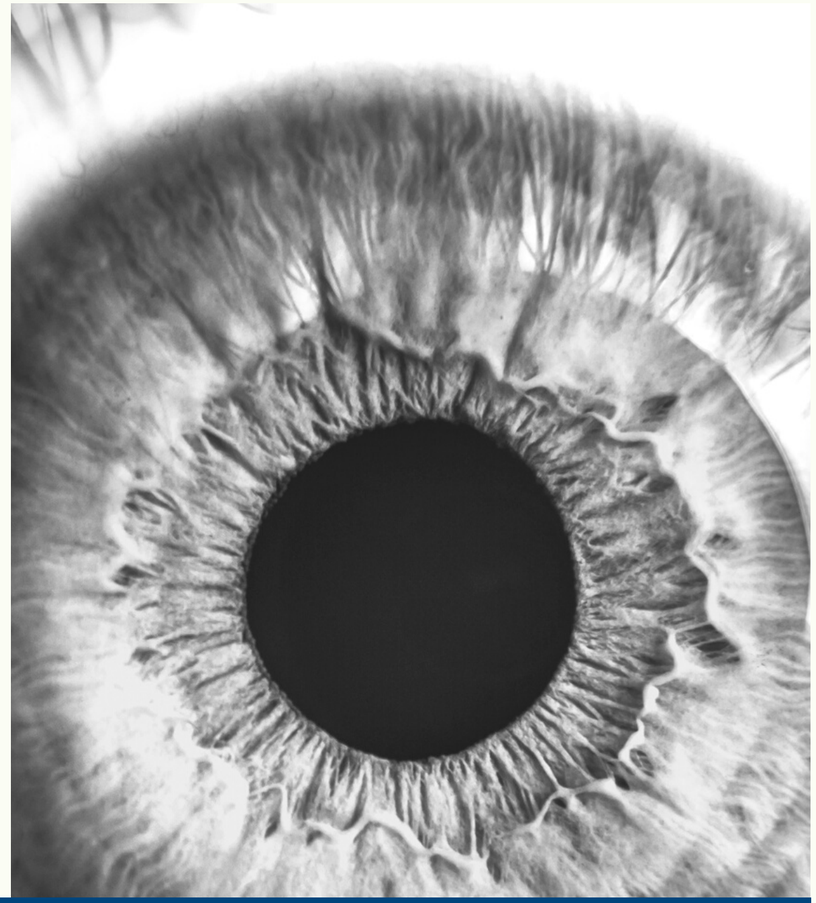
WHY HEPA AND NOT ULPA?

Each filter has its application

If ULPAs are better than HEPAs at capturing more and smaller particles, why do we keep using HEPA?

While **ULPA** filters collect more difficult-to-trap particles (0.12-0.4 microns), they are only required for **specialized applications** such as microelectronics or medical laboratory manufacturing, cleanroom particle removal, or filtering toxic surgical plumes emitted during electrosurgical operations.

On the other hand, **HEPA** filters are used in more situations because they are considered optimal for most **biological applications**, including healthcare. In hospitals they work very well since viruses, which are smaller than 0.3 micrometers and could theoretically pass through a HEPA filter, more often **travel in larger particles like saliva or sweat, so they get trapped** .



THE VIRUS AS SEEN BY THE HUMAN EYE

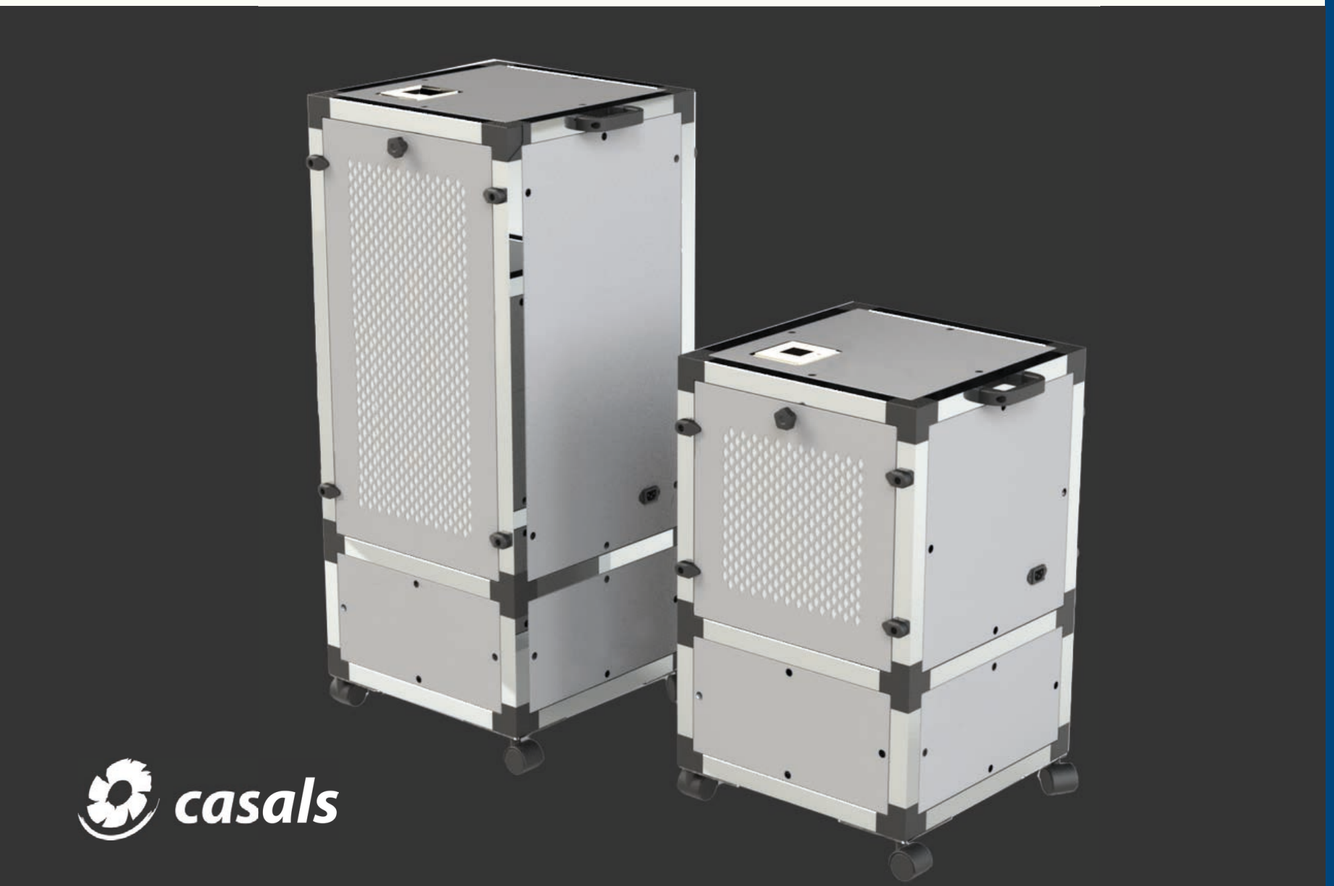
VISIBLE EXAMPLES

A medium-sized human hair has a diameter of 50 microns, or 0.050 mm. The virus is estimated to be between 0.05 and 0.2 microns in diameter. So **within the section of a medium-sized human hair, 250 to 1,000 viruses** can fit side by side.

With this size already displayed, it is clear that the virus floats in the environment without any problem for hours.

In a room without ventilation where there is a person **smoking** at one end. Someone else 10 meters away at the other end. Will you ever **smell tobacco**? Without a doubt: yes.
Well, if the smoker is infected, whoever shares the same room can also become **infected**.

REINTAIR®
THE TRUST PURIFIER



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REINTAIR® portable air purifiers, with double filtration stage that includes 2 absolute HEPA H-14 filters and 2 ISO COARSE 65% pre-filters.

Versions: standard or with photocatalysis system and UV-C light.

Available in 2 sizes, for surfaces up to 45 or 100m2.

In 20 minutes you can have a room with the purified environment.

SEE ONLINE