

*Vita*



ENTROPIC

ECOLOGY INDOORS

Operating Room  
Solutions

# Operating Room Solutions

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Hygienic and comfortable environments for patients, doctors and nurses.

Entropic's Vita solutions offer a full range of airflow systems for operating room air cleanliness and thermal environment management, all meeting the highest standards.

The safe and energy efficient system consists of all necessary elements for guaranteed performance: HEPA filtrated supply air terminals, exhaust air units, recirculation air handling units, an operating room control system and supporting services for performance validation.

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## Entropic – at the forefront of innovation.

**Operating rooms are the most demanding spaces in the hospital environment. Our world-leading laboratories and co-creation with our customers help us design solutions that meet your requirements today and in the future.**

- Ultraclean operational conditions lower infection risk
- Operational efficiency allows quick changes in the operating room setup, type of operation or medical team of personnel
- Flexible use of the space in operating room allows full use of floor area
- Comfortable conditions in the operating room increase wellbeing and comfort of the patient and the medical team
- Energy efficiency brings savings in operational costs
- The offering is compliant with various national and international standards

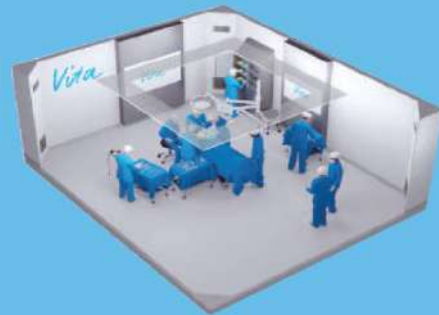


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# The Entropic Vita OR solution family offers a full range of high-quality airflow solutions.

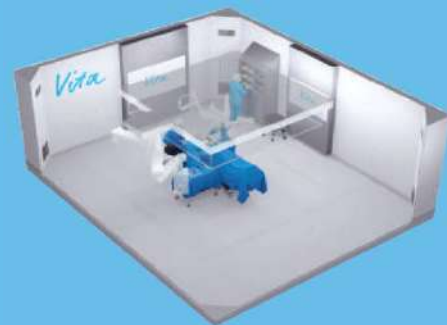
## Entropic Vita OR Space

Entropic Vita OR Space is an airflow solution which provides the highest required air cleanliness for the ultraclean operations in the entire operating space. This unique controlled-dilution innovation provides hygienic conditions and safety without compromising on comfort and freedom to use the whole room.



## Entropic Vita OR Zone

Entropic Vita OR Zone is a high-class low-turbulent-flow solution for ultraclean operating environments. It provides a constant stream of ultraclean air to a defined zone with a traditional laminar flow principle.



## Entropic Vita OR Cell

Entropic Vita OR Cell is a mobile airflow solution providing clean air where needed. Mobile HEPA filtering units deliver ultraclean air to the patient's wound area or the instrument table.



# Entropic Vita OR Space



New, unique ventilation  
solution for modern hospital  
operating rooms.



#### Validation for Nya Karolinska Hospital

Entropic unique simulated operation is a validation service that defines the room hygiene cleanliness level. In this test, Entropic Vita OR Space reached the highest hygiene level with less than 5 CFU / m<sup>3</sup>.



**As the requirements for operating rooms increase, Entropic Vita OR Space brings together ultraclean (ISO 5) environments with comfortable conditions and high energy efficiency for the entire operating room.**

#### **Highest level of cleanliness**

Designed for high-risk operations (<5CFU). Provides the required cleanliness level for the entire operating space. The airflow is provided on the basis of the microbial load in the operating room.

#### **Comfortable conditions**

Enables an ideal and adjustable work environment for the medical team. The system allows for modifications in airflow patterns and thermal conditions according to individual needs.

#### **Flexible use of space safely**

Operational flexibility for the surgical staff and the medical equipment. The unique controlled-dilution innovation provides hygienic conditions and safety with freedom to use the entire space.

#### **Energy efficient**

The demand-based and highly automated control system makes Entropic Vita OR Space exceptionally energy efficient. The system adjusts the airflow to actual usage and the microbial load. Short recovery time of the room conditions creates substantial energy savings.

#### **Silent operational environment**

The well-designed system enables low noise levels in the operating area.

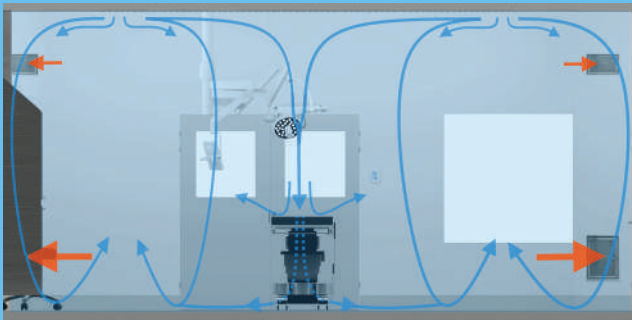
\*The ISO 14644 standard is a classification system for air cleanliness in cleanrooms and associated controlled environments such as healthcare, pharmaceuticals or food industry.

## Design and operation based on microbial cleanliness and system recovery time

- Microbial load from operating personnel is the principal source of contamination
- System recovery time emphasises the system's ability to maintain cleanliness in various operating situations and between individual operations
- The unique control system saves energy while maintaining the cleanliness levels

## A complete operating room ventilation solution

- The Vita OR Space total solution includes a fully functional system consisting of supply and exhaust air units, an intelligent ventilation control system, recirculation units and verification services.
- Continuously updated to meet the pan-European CEN TC 156 WG18 -standard development



### Innovative controlled-dilution principle

HEPA-filtered air is introduced into the room in a carefully controlled manner, effectively displacing and diluting air impurities, and preventing them from re-entering into the operating area. With this method, the highest required air cleanliness level is achieved for the entire operating space, without compromising the safety and comfort of the patient and medical team.

# Entropic Vita OR Space 5

## Performance criteria for ultraclean air ventilation

- Microbial cleanliness in *operational* occupancy state < 5 CFU/m<sup>3</sup> (SIS-TS 39:2012) / < 10 CFU/m<sup>3</sup> (CENTC 156 WG 18)
- Particle counts in *at rest* occupancy state should be within ISO 5 (CENTC156 WG18)
- Recovery time (100:1) < 15 min (CENTC156 WG18)

## Dimensioning of required minimum airflow rate and suggested unit size

### Based on:

- Maximum number of operation personnel
- Quality of clothing system - Microbial source strength 1.5 CFU/person\*\*
- Microbial cleanliness requirement 5 CFU/m<sup>3</sup>, Ultraclean air\*
- Recovery time (100:1) < 15 minutes

Maximum number of personnel in OR	Minimum supply airflow rate (l/s / m <sup>3</sup> /h)	Supply unit dimensions (mm x mm)
4	1200 / 4320	3000 x 3000
6	1800 / 6480	3600 x 3600
8	2400 / 8640	4200 x 4200

\* CFU = Colony forming unit, bacteria carrying particle which gives rise to a colony on a culture plate

\*\* Source strength < 1.5 CFU - requires the use of operating suits of clean air quality

**The unit dimensions may be adjusted according to airflow rate and room dimensions.**



# Entropic Vita OR Space 7

## Performance criteria for clean air ventilation

- Microbial cleanliness in *operational* occupancy state < 50 CFU/m<sup>3</sup> / < 100 CFU/m<sup>3</sup> (CEN TC156 WG18)
- Particle counts in *at rest* occupancy state should be within ISO 7 (CEN TC156 WG18)
- Recovery time (100:1) < 20 min (CEN TC156 WG18)

## Dimensioning of required minimum airflow rate and suggested unit size

### Based on:

- Operation personnel, up to 8 persons
- Quality of clothing system - Microbial source strength 3 CFU/person\*\*
- Microbial cleanliness requirement 50 CFU/m<sup>3</sup>, Clean air\*
- Recovery time (100:1) < 20 minutes

Room size [m <sup>2</sup> ]	Minimum supply airflow rate (l/s / m <sup>3</sup> /h)	Supply unit dimensions, 2x Units (mm x mm)
40	525 / 1890	2400 x 600
50	650 / 2340	2400 x 600
60	775 / 2790	3000 x 600

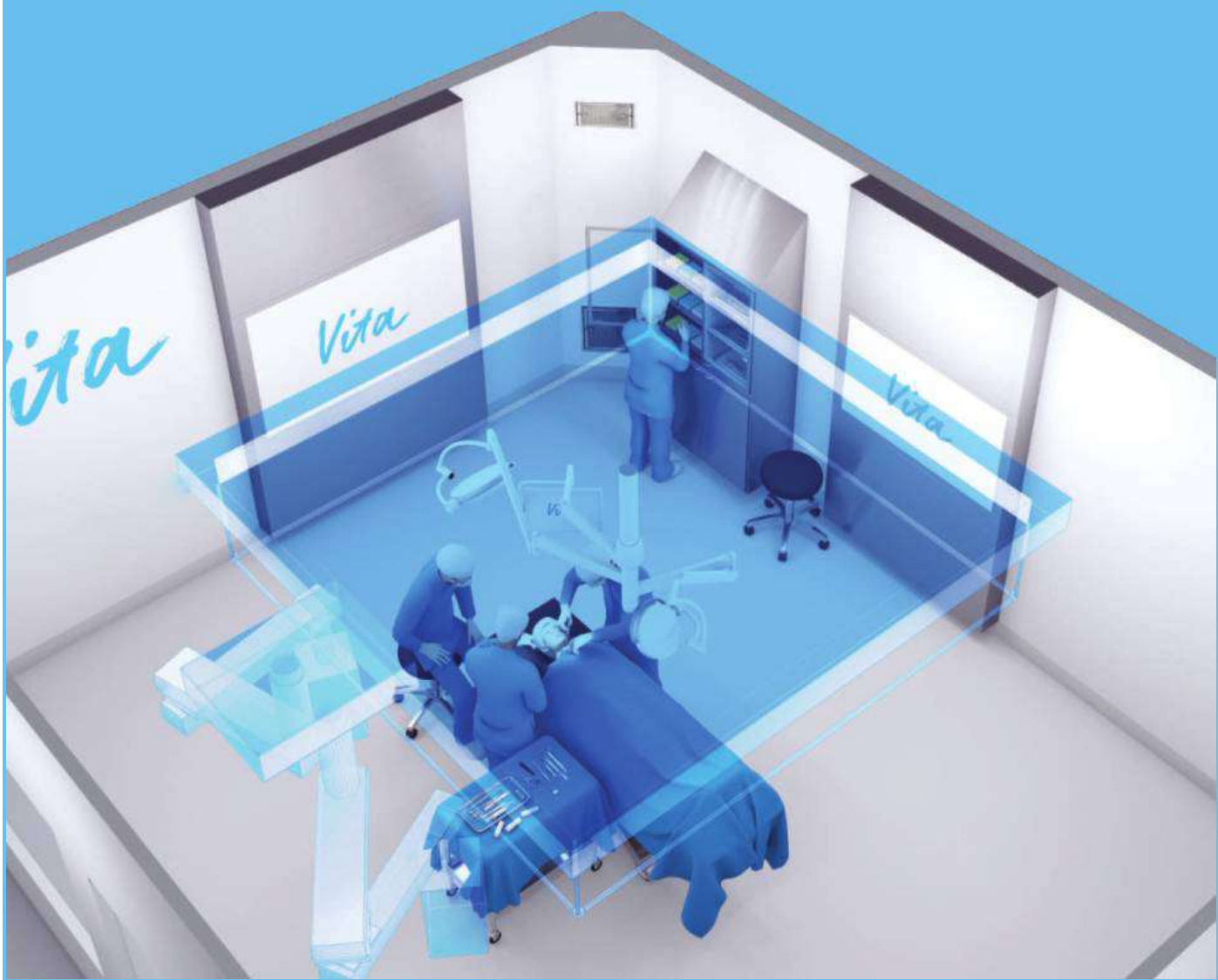
\* CFU = Colony forming unit, bacteria carrying particle which gives rise to a colony on a culture plate

\*\* Source strength < 3.0 CFU - corresponds to the use of good quality operating suits

**The unit dimensions may be adjusted according to airflow rate and room dimensions.**

# Entropic Vita OR Zone

Low-turbulent-flow ventilation  
solution for operating rooms.





## A complete operating room ventilation solution for ultraclean operating environments

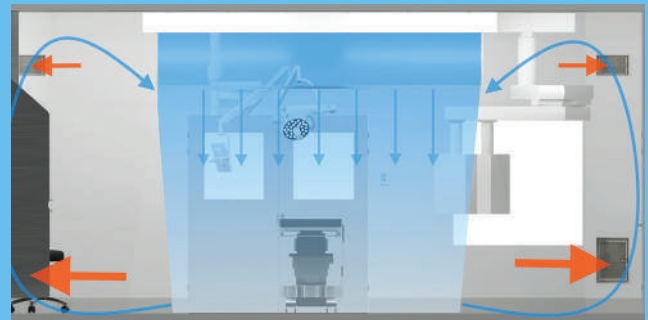
- Complies with the ISO class 5 cleanliness requirements
- Compliant with many national hospital ventilation standards
- The total solution includes a fully functional system consisting of supply and exhaust air units, an intelligent ventilation control system, recirculation units and verification services. Entropic Vita OR Zone is available with a recirculation unit or with ceiling-integrated circulation. Integrated general lighting is available as an option.

## Smart design and high-quality materials

- Filter sizes are optimised so that the filtered surface area is maximised
- Easy-to-clean single-layer membrane guarantees an even airflow throughout the unit
- An air-guiding skirt ensures a maximum amount of ultraclean air to the targeted area
- An advanced filter-leakage detection system prevents contamination of the ultraclean air zone

## Ultraclean air created with the low-turbulent-flow principle

An ultraclean air zone is created around the surgical field. The risk of surgical site infections is decreased as the ultraclean airflow prevents air impurities from entering the operating area from the periphery.



# Entropic Vita OR Zone

Size of supply air outlet (mm x mm)	Size of protected zone (m x m)	ACCORDING TO DIN 1946-4: 2008			ACCORDING TO HTM-03-01: 2008			Minimum OR size (m x m)
		Supply air velocity (m/s)	Airflow rate (l/s)	Airflow rate (m <sup>3</sup> /h)	Supply air velocity (m/s)	Airflow rate (l/s)	Airflow rate (m <sup>3</sup> /h)	
2400 x 1800 *	2.0 x 1.4	0.24	950	3420	0.38	-	-	5.4 x 4.8
2400 x 2400	2.0 x 2.0	0.24	1300	4680	0.38	-	-	5.4 x 5.4
2800 x 2800	2.4 x 2.4	0.24	1900	6840	0.38	3000	10800	5.8 x 5.8
3200 x 3200	2.8 x 2.8	0.24	2350	8460	0.38	3700	13320	6.4 x 6.4
3500 x 3500	3.1 x 3.1	0.24	2800	10080	0.38	4450	16020	7.0 x 7.0

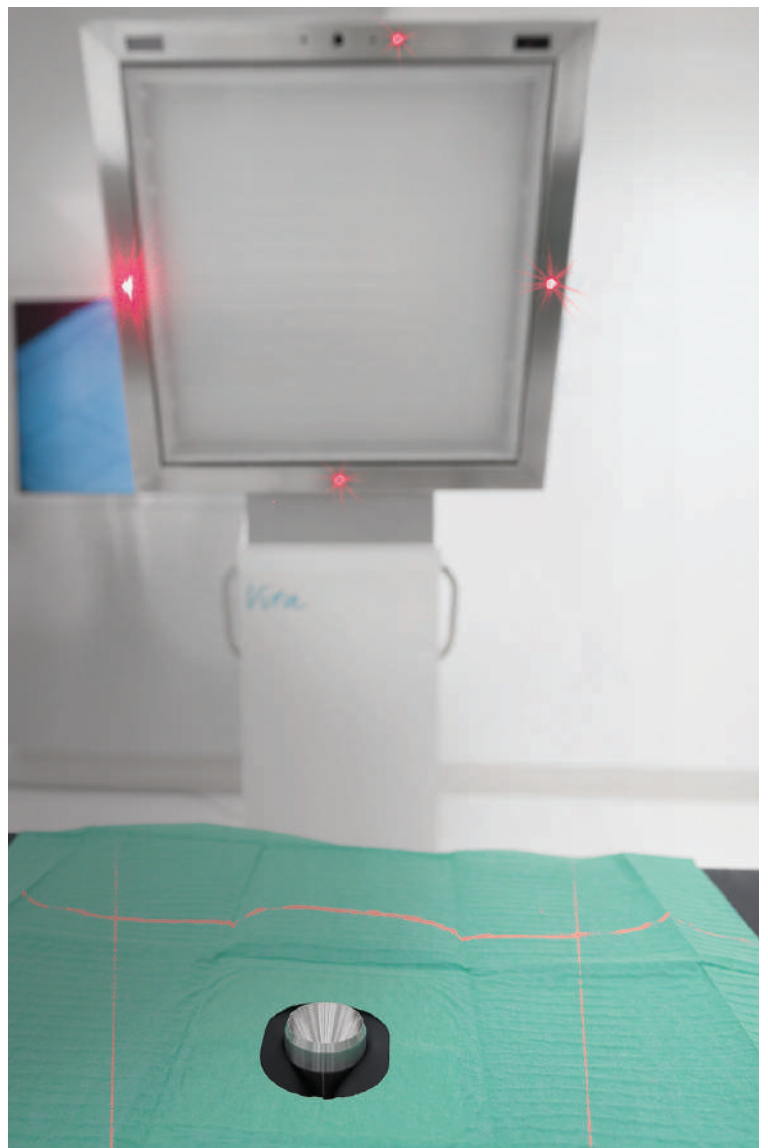
\* Unit size not available with ceiling integrated circulation



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# Entropic Vita OR Cell Solution

An easy and cost-effective way to upgrade the safety of the operating environment.



## Entropic Vita OR Cell Patient and Entropic Vita OR Cell Instrument – clean air where needed

- Complements existing ventilation system in spaces where improved clean air conditions for surgical procedures are required
- Primary provider of clean air conditions in smaller outpatient and ambulatory treatment facilities



Entropic Vita OR Cell Patient

## Easy-to-use, innovative flexibility

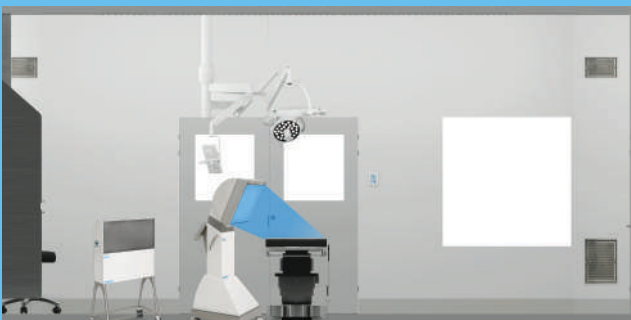
- Simple user interface
- Easy to set up and re-adjust
- Wheels for easy repositioning
- Startup and qualification services

All materials and the construction design of the products enable easy cleaning of both unit and space. Financing models include

- purchase
- lease with a maintenance plan



Entropic Vita OR Cell Instrument



## Ultraclean air with mobile HEPA air filtering units

Entropic Vita OR Cell products extract air from the space and treat it with a pre-filter followed by a H14 HEPA-filter. The air is delivered as a constant and stable laminar airflow directly to the wound area or the instrument table. This lowers the risk of airborne contamination of the wound area and the instruments.

# Entropic Vita OR Services

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Entropic Vita OR solutions are delivered as turnkey solutions. Entropic's expertise ensures the best outcome - all the way from early design to validation and support throughout the building lifecycle.



Entropic helps you find the optimal solution for operating environments at the design phase and verifies excellent system performance at the handover. During building use, our services offer a proactive and user-centric tool for managing the safety and comfort of your indoor environment.



### Entropic Design Studio services

- Co-designing with the customer, defining the requirements and performance targets, matching targets to optimal OR solutions
- Entropic CFD simulations for thermal comfort, air quality and system performance analysis
- Entropic Mock-up for system performance and full-scale indoor environment testing conducted.



### Entropic Tune services

- Securing the safety and functionality of spaces with smooth commissioning and optimal system performance validation services
- Ensuring safe and comfortable working conditions with space cleanliness and indoor climate validation services
- End-user training for all solutions



### Entropic Life Cycle services

- Continuous validation and fine-tuning services for guaranteeing the safety, hygiene and comfort of spaces
- Regular maintenance services for all Entropic Solutions
- System performance evaluation and optimization



*Vita*

**Wherever air quality  
we take care of everything**

## Your partner in indoor air quality

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Entropic is your lifetime partner from the design of the systems, through construction process to annual maintenance. Our services cover your project from end to end, ensuring the best solution for all your needs.

- Project design and support
- Pre-validation with mock-up or CFD modelling
- Commissioning and performance validation
- Annual maintenance
- Entropic HIT Design tool and solution documentation

# Quality is critical, every breath you take.

## Entropic Vita Solutions

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### **Demanding spaces**

- Operating rooms
- Laboratories
- Patient environments
- Isolation rooms
- Hospital pharmacies

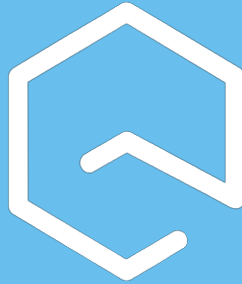
### **Specialised needs**

- Outdoor air intake hygiene
- Fire and smoke safety
- Air diffusion and thermal comfort
- Solutions for hospital kitchens

### **Entropic Vita solutions are designed for**

- Maximum safety, reliability and comfort for professionals and patients
- Easy and intuitive system use and monitoring with smart controls and interfaces
- Optimised energy efficiency with demand-based system operation

# Vita



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## Entropic Vita Values

### Putting people first

Entropic Vita solutions are made for people who depend on them. From laboratory and pharmaceutical professionals to doctors, nurses and their patients, our first responsibility is the safety, comfort and wellbeing of these people and their environment.

### Passion for better solutions

We are driven by our customers' needs, and demanding spaces demand better solutions. Entropic Vita solutions are designed, produced and delivered to the highest standards of safety, quality and efficiency.

### Solving each challenge together

Delivering the best solutions for demanding spaces requires great flexibility, a commitment to continuous development, and close cooperation with our customers. Together, we can ensure that every Entropic Vita solution meets the unique demands of your project and the people it serves.

[www.entropic.ie](http://www.entropic.ie)