VPHP GENERATOR

VAPOR PHASE HYDROGEN PEROXIDE GENERATOR

TD_VPHP-GENERATOR_R6_ENG – 17/10/17

COMECER

ISO 9001 & ISO 13485 Certified Quality System

PLEASE NOTE

PLEASE NOTE

The photos and images provided are purely informative. Consequently, they cannot represent the type of equipment specifically installed.

INDEX

1 OVERVIEW

1.1 PRODUCT OVERVIEW

Comecer VPHP GENERATOR (Vapour-Phase Hydrogen Peroxide) is a system designed to decontaminate isolators. It uses dry hydrogen peroxide as a sterilising agent. The vapour distributed in the isolator chamber is created by "flash vapourisation". The generator's standard configuration is that of a closed loop while the open loop configuration should be considered as a custom.

Being it a device integrated to the isolator to be decontaminated:

- it cannot operate alone or as an open system
- it allows to perform a 'leak test' along with the chamber to be sterilised
- it is operated via the isolator or shielded cell control panel (HMI), to which it is linked

The generator can be integrated with each shielded cell and/or isolator that are configured for dry VPHP injection. Through HMI, it is possible to select the decontamination cycles and monitor all important parameters for each phase. Executed cycles' reports can be exported to verify operational parameters.

Along with the generator, there are a range of accessories to choose. These are either integrated in the generator itself or in the isolator that needs to be decontaminated. Some of these accessories are mandatory for a perfect installation and operation of the system.

1.2 INTENDED USE

The Comecer VPHP GENERATOR must be used to sterilise only isolated and closed environments.

Features of the environments to be decontaminated:

- volume up to $10m^3$
- made with compatible VPHP materials
- no electric device inside (if not explicitly designed for decontamination cycles with VPHP)
- no open chemical product inside
- qualified as "sealed" (reference ISO 10648-2)

Features of the sterilising agent:

- hydrogen peroxide solution at 30% or 35% (stored in the fridge and protected from light)

1.3 STATE OF THE ART

In the pharmaceutical industry, many applications require aseptic processing control: this goal is achieved through a set of factors, following GMP (Good Manufacturing Practices) guidelines. Among the many aspects to consider, there are the use of isolators and, of course, the application of validated sterilisation methods. Isolators are machines with HEPA (High Efficiency Particulate Air) filters or with better efficiency, which create a controlled environment: they protect both the handled material and the operator, eliminating direct contact between the inside/outside and all the related risks.

To ensure an aseptic environment, isolators must be decontaminated through a validated method that is able to reduce the microbiological charge to the preset requirement, usually referred to as a SAL (Sterility Assurance Level) of 6log: "sterility" is indeed an absolute concept that is defined as the absence of microorganisms and for this reason one can only estimate its probability.

For the sterilisation of isolators, since the 80's onwards, the use of hydrogen peroxide has become the method of "excellence" as it has several advantages:

- it has a clear and proven sporicidal effect on a broad spectrum of microbial agents
- it is effective at a low concentration and at room temperature
- it degrades into non-toxic by-products
- it can be used in vapour phase, allowing a good diffusion even on complex surfaces

2 CONSTRUCTIONAL FEATURES

2.1 GENERAL DESCRIPTION

The Comecer VPHP GENERATOR is a system that aims at achieving proper sterilisation fast, combining 'desing' and cycling development experience. The main features are:

Integration with the isolator

The design of the system was based on an 'integration' with the environment to be decontaminated, that is, the isolator. Although these two devices (generator-isolator) can be two separate machines, Comecer does not consider them as independent entities because they share many aspects, among which:

- Ventilation circuit for VPHP distribution and leak test
- Measurement of environmental parameters such as pressure, temperature, humidity and H2O2 levels
- Management of security interlocks
- Operator interface for cycling control

Reduced volumes and increased performance

It has been developed with a compact design: it does not need an external dehumidification system and has a two-stage catalyst system inside it. It can reach a range of 65m^3/h and a dosage of 18g/min.

Easy maintenance

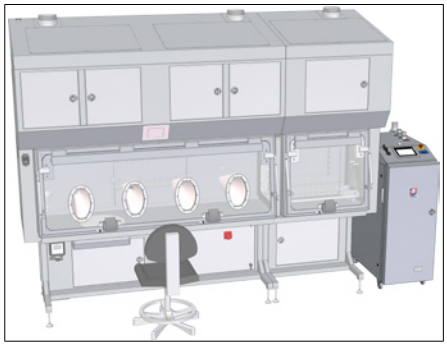
Access to the air filter is via the front door. Side access allows the inspection to the vaporizer plate and to the electric panel.

2.1.1 Isolation Technology

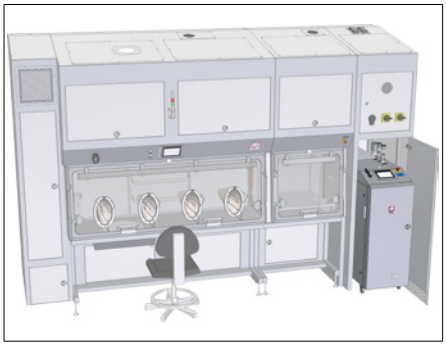
In the pharmaceutical application, the generator is usually placed alongside the isolator that needs to be decontaminated. The entire housing of the generator can be integrated into the enclosure of the isolator as a side column, listing it as an option.

2.1.2 Nuclear Medicine

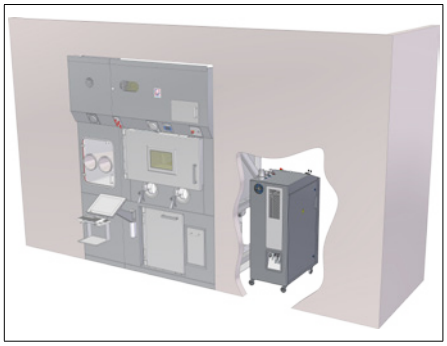
The available space in nuclear medicine laboratories usually does not allow the generator to be placed alongside the cell, so the system can be placed in the technical area at a maximum distance between the cell and the generator of 10m. A single system can cope with multiple cells through the creation of a multiple distribution system, the only limitation to be considered is 4 as the maximum number of cells to which it can be connected (a larger number of cells can be evaluated as custom during the buying phase). If the cell has a negative working pressure then the leak test is performed under negative pressure, but the decontamination cycles are always in positive pressure to allow the decontamination of each part of the glove through the appropriate extension. It must always be considered whether or not there is a technical area available, both for housing the generator and the installation of additional and mandatory accessories of the cell itself, such as AVC-LIGHT and VPHP.



Isolation Technology



Isolation Technology

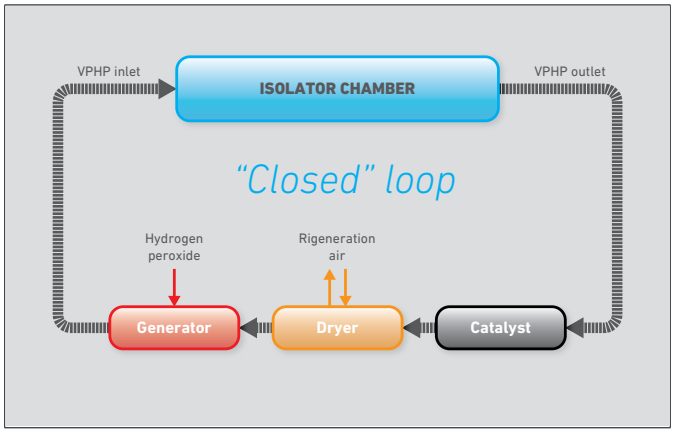


Nuclear Medicine

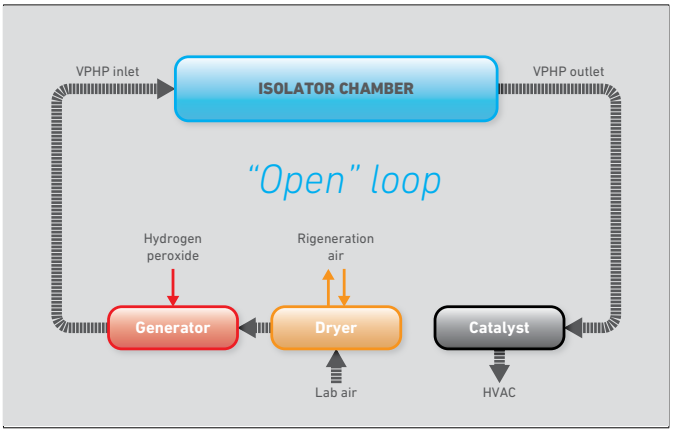
2.2 DESCRIPTION OF MAIN COMPONENTS

The Comecer VPHP GENERATOR consists of the following main components:

- Catalytic converter
- Dehumidifier
- Generator
- Ventilation system
- Command and control system

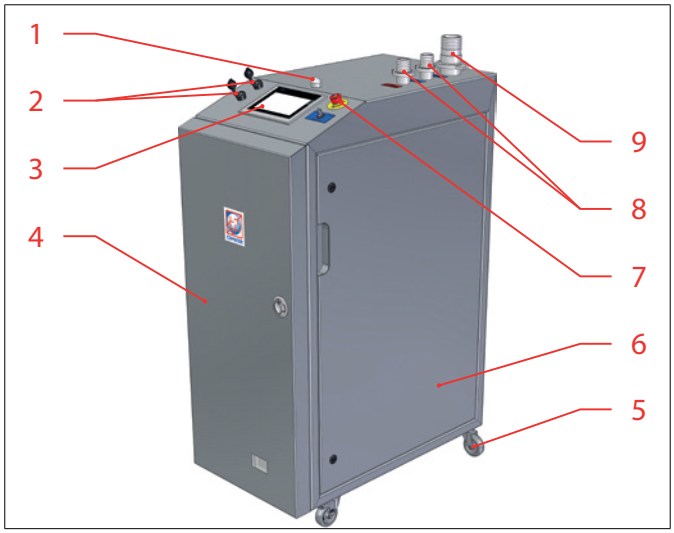


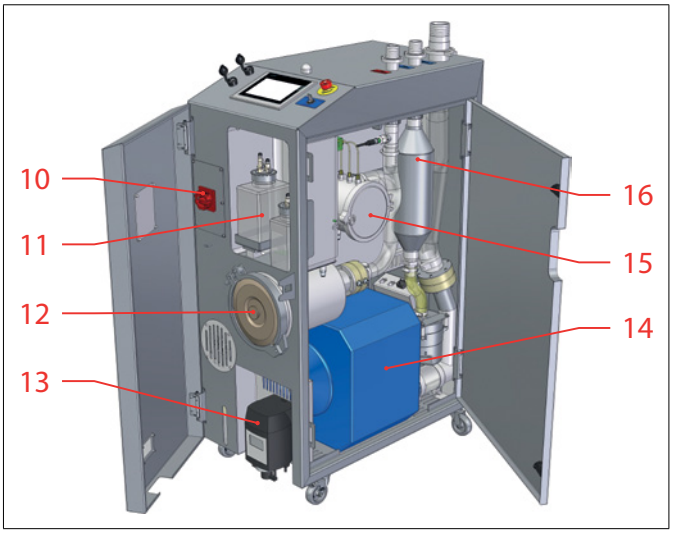
"Closed" loop



"Open" loop

The generator's internal configuration can be schematized in the two over-represented ways that the generator works in "closed" loop (standard) or "open" loop (custom).





Ref.	Description	Ref.	Description
1	Light	9	Regeneration air outlet
2	Ethernet and USB connections	10	Switch
3	Operator panel (if present)	11	Dose group area
4	Operator access front door	12	H14 absolute filter
5	Pivoting wheels	13	Environmental safety sensor
6	Side door access for operator	14	Dehumidifier
7	Emergency stop button	15	Vaporizer plate
8	VPHP Input and Output	16	Catalyst

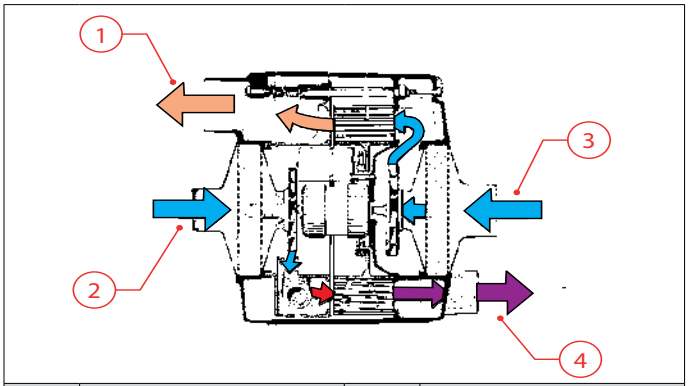
2.2.1 Catalytic converter

The catalyst is a system specially designed to reduce the concentration of hydrogen peroxide (H2O2). The airflow containing vaporized peroxide is reduced to water (H2O) and oxygen (O2) when it goes through the catalytic layer.

2.2.2 Dehumidifier

The dehumidifier has been designed for efficient air dehumidification. The unit desiccant rotor absorbs humidity and is made with high efficiency composite material to attract and retain water vapour. During the pre-conditioning phase, it is used to reach a preset HR% value, while during the conditioning/decontamination phase it is used to keep the physical parameters of the cycle, stable.

The dehumidifier requires a "regeneration airflow" to maintain the dehumidifying power over time: the unit then provides a fresh air intake (taken from the lab itself) and provides an output line (usually connected to the HVAC). The air coming from the regeneration outlet line will be hot and humid and may contain a small residue of hydrogen peroxide solution.



Ref.	Description	Ref.	Description
1	Dry air	3	Process air
2	Regeneration air	4	Humid air

2.2.3 Generator

The generator is able to quickly evaporate the liquid hydrogen peroxide during the conditioning and decontamination phase by means of a heated internal plate on which the liquid peroxide is injected. This way a "flash vapourisation" of the liquid sterilising agent is obtained. The continuous airflow generated by the generator's internal fans allows the distribution within the generated vapour chamber.

2.2.4 Dose area

Inside the bottle compartment and the pump there is a 2 litre container of sterilising agent solution placed on the loading cell that monitors the weight. At the beginning of the cycle, the system automatically checks if there is enough quantity in the bottle to successfully complete the selected cycle.

2.2.5 H2O2 environmental sensor

On the front crankcase there is a low-electrochemical sensor to detect any leakage in the outside environment that generates an alarm resulting in a shutdown of the system, if the set threshold is exceeded. Unless otherwise specified, the alarm level is set to 1ppm.

2.2.6 Ventilation system

The process air flow can be set between 30 m3/h and 70 m3/h, and the pressure of the chamber to be decontaminated is automatically adjusted by the system throughout the cycle. An internal valve allows an automatic leak test between the chamber and the generator. They are mounted and controlled by the isolator: the valves that isolate the chamber, the valves to open/close the branches of the VPHP and the distribution system with which it can be possible to choose which room to sterilise in case of multiple environments. VPHP input/output is connected to the isolator via 1 ½" tubes equipped with clamps. The regeneration air outlet can be connected to the HVAC via a 2" pipe clamp. Connection features:

- for safety reasons, they should not be exchanged
- they must be sealed
- when they are not connected to the isolator (for example if the system is not working during transport), they must be plugged in with the appropriate clamp plugs

2.2.7 Control system

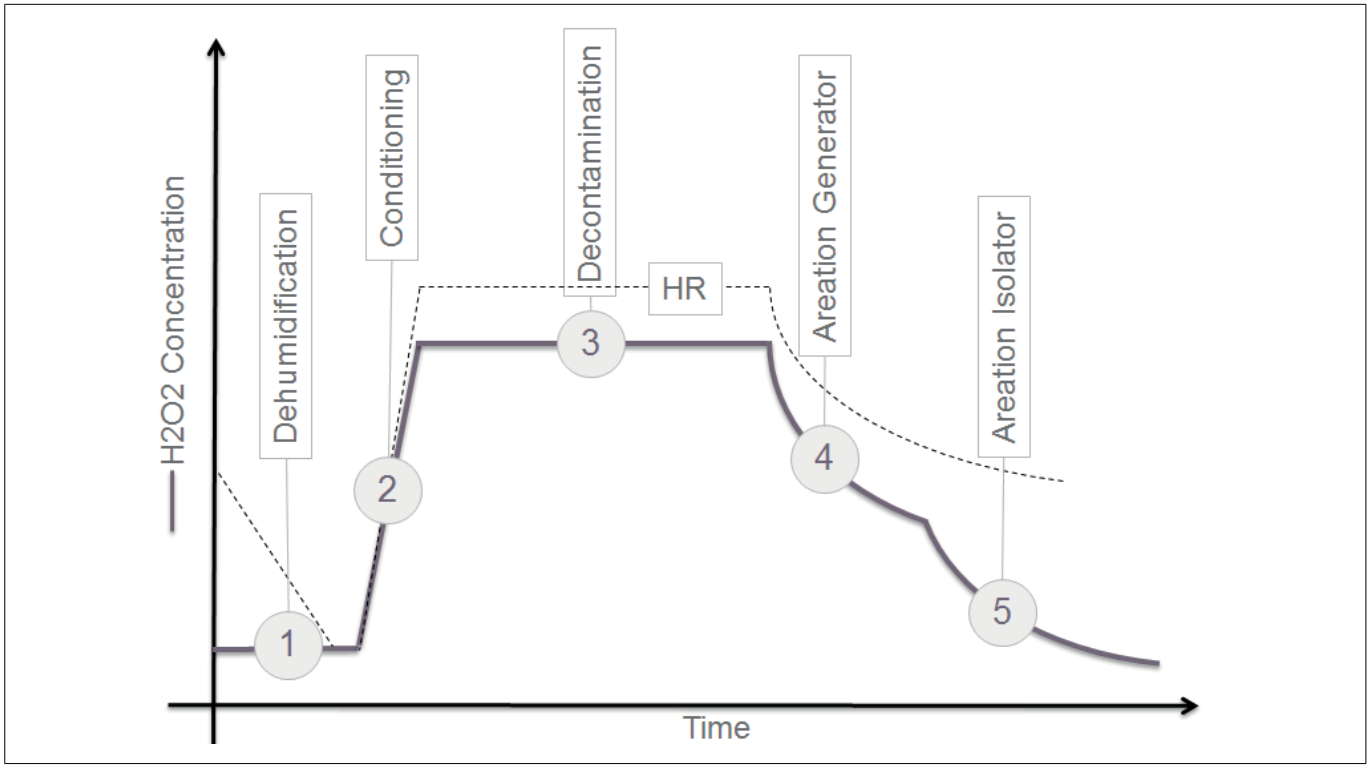
The generator is controlled by the HMI of the isolator which allows to select/modify the cycles, select the chamber to be decontaminated and monitor all parameters of the work phases. An alternative control system, via a dedicated HMI on the generator, can be listed as an option.

3 OPERATIONAL FUNCTIONING

Decontamination takes place through four distinct phases: the duration of each phase can be calculated and used as the starting point to validate the cycle. The calculated times must be used as a starting guide since some hypothesis may not be valid for all configurations.

The Comecer VPHP Generator work phases are:

- Dehumidification
- Conditioning
- Decontamination
- Ventilation



- ***. Phase 1 - Dehumidification This stage creates the initial conditions required for decontamination, adjusting the relative humidity in order to reach a value that will be the standard for injecting hydrogen peroxide safely and to ensure reproducibility of the cycle in future.***
- ***Phase 2 - Conditioning***: During this stage, the required concentration of hydrogen peroxide (H2O2) within the isolator, necessary to ensure the "killing" effect, is reached. The goal at this stage is to get the most concentration of H2O2 possible within the isolator, in the shortest time possible, rapidly reaching the level of bacterial reduction. The main parameters to consider in this stage are: dosing of liquid hydrogen peroxide (g/min), which is injected into the isolator, and the air intake speed in the isolator (m/s).
- ***Stage 3 - Decontamination in this phase, within the chamber, the concentration of H2O2 is kept stable at the value achieved during the conditioning phase for all the time necessary to reach the desired SAL value (usually SAL=10-6). Therefore, the main parameters to consider at this stage are the dosage of liquid hydrogen peroxide (g/min) and the duration of the same step (min). The effect of this stage is to maintain the stability of the bacterial reduction rate.***
- ***Stage 4 - Ventilation***: in this stage an H2O2 concentration is reached that ensures the safety of the personnel before opening the isolator (also known as the Threshold Limit Value (TLV) and generally corresponding to H2O2 =1ppm) and does not go to alter the quality of the tests and/or processes that need to be performed in the chamber. The main parameter to consider at this stage is the duration of the phase itself (min). At this stage, a further phase of ventilation (Stage 5) is usually followed by the isolator to speed up the time at which the limit is reached.

4 ACCESSORIES

4.1 FOR ISOLATION AND NUCLEAR MEDICINE

4.1.1 Integrated HMI panel in the generator

The generator is equipped with an HMI panel, allowing the operator to control it, even remotely. There is a selector switch to allow the system to operate locally or remotely. It is mandatory when the generator is placed in a separate environment from the isolator (e.g.: technical area in nuclear medicine).

4.1.2 Chemical and biological indicators

Package to validate VPHP cycles including:

- pack of 100 Biological Indicators (BI)
- pack of 100 Broth culture.
- pack of 100 Chemical Indicators (CI)

It might be required the use of multiple packs to run Cycle Development and PQ. (See Cycle and PQ Development for additional information in Chapter 8.4)

	Descrizione
Biological Indicator	Unit containing microorganisms with a concentration and resistance that are known and certified. Geobacillus Stearothermophilus (ATCC 12980 or 7953) is used for VPHP cycling validation, usually with a population greater than 106. They are placed directly inside the isolator at the most critical points to reach with the vapour and serve as proof of the efficiency of the sterilisation process.
Broth culture	Means where BI is grown after decontamination to verify its microbiological inactivation.
Chemical indicators	They are placed directly inside the isolator at the most critical points and serve as proof of a good and homogeneous vapour distribution through visual inspection.

INFORMATION

In order to be able to use an isolator in an aseptic process, all the internal surfaces, all the tools and the material brought into the chamber must be decontaminated. Verification of a correct sterilisation cycle is carried out by using a sufficient number of CI and BI, which are then used as a statistical test of the proper distribution of the vapour and its effectiveness.

4.2 FOR NUCLEAR MEDICINE

4.2.1 Remote HMI Panel

Includes operator panel and selector switch to be installed in the front cage of the cell.

4.2.2 Distribution Control Unit

It is mandatory for each cell that needs to be decontaminated.

An additional electrical charge that allows the cell to handle I/O related to the generator and the distribution of VPHP ventilation in the various work chambers. It is installed on the cell.

4.2.3 LAF chamber interconnection

It is mandatory for every LAF box that needs to be sterilised. It is installed on the cell. In this kit there are:

- Electropneumatic valves for IN/OUT VPHP (+ TEEs for branches to any subsequent boxes);
- The high concentration of H2O2;
- Flange IN/OUT if upgrading when mounting to 'direct injection'.

4.2.4 Turbulent chamber interconnection

It is mandatory for every turbulent box that needs to be sterilised. It is installed on the cell. In this kit there are:

- Electropneumatic valves for IN/OUT VPHP (+ TEEs for branches to any subsequent boxes);
- The high concentration of H2O2;
- The HR/T sensor.

4.2.5 Low-concentration sensor for chamber

It is installed in the chamber. System equipped with:

- Low concentration Draeger sensor with internal pump;
- Valves that allow to sample from the box only when a low ppm value is reached, so that the sensor is not saturated.

4.2.6 Low laboratory concentration sensor

It is installed on the cell. System equipped with a low-concentration Draeger sensor with internal pump that detects any leaks in the vicinity of the cell itself.

4.2.7 Extensions for gloves

VPHP cycle is done in positive pressure and open shielded door. The gloves extensions are mounted on the cell during the cycle with VPHP to allow the decontamination of each part of the glove.

5 INSTALLATION AND CONNECTION DIAGRAM

INFORMATION

The type of injection (directly in chamber or plenum) and the distribution system (main chamber and pre-chamber) are borne by the isolator.

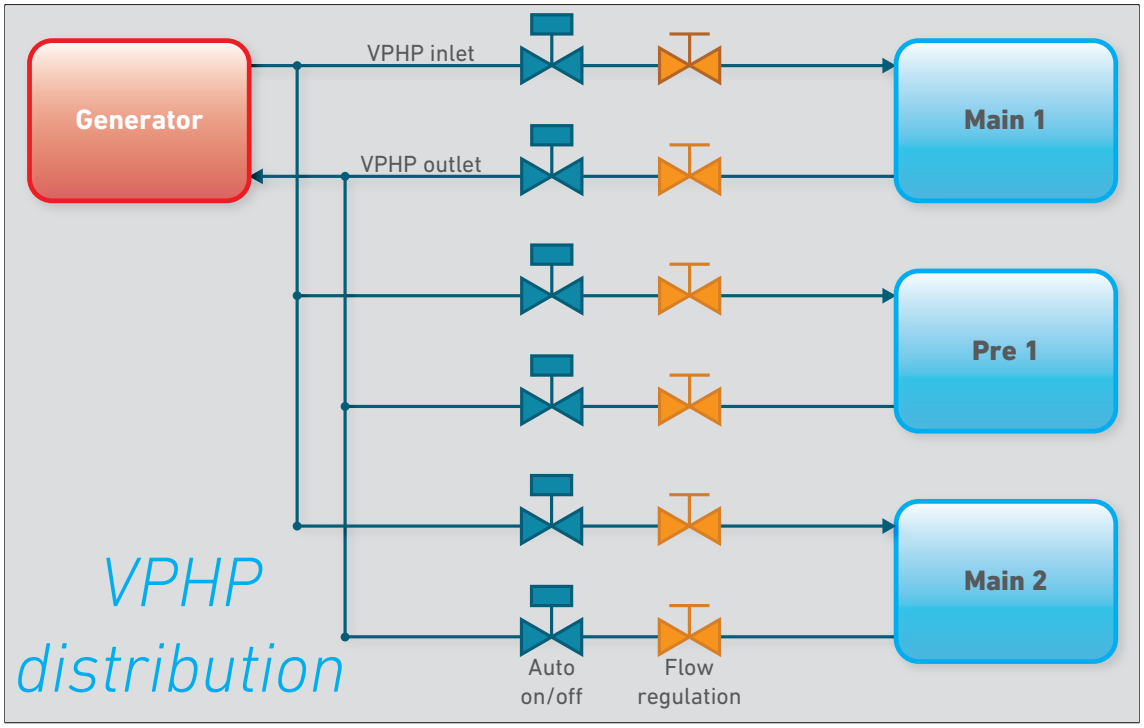
5.1 INSTALLATION

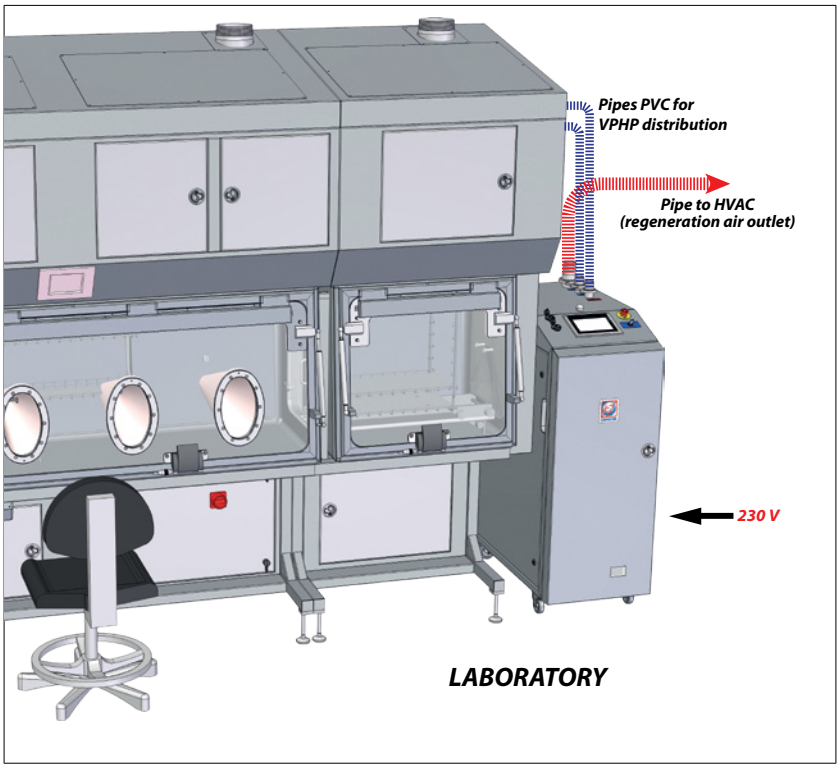
The system is placed on a fixed frame, equipped with wheels to facilitate maintenance. It can be placed in the laboratory or inside the technical cabinet.

ATTENTION

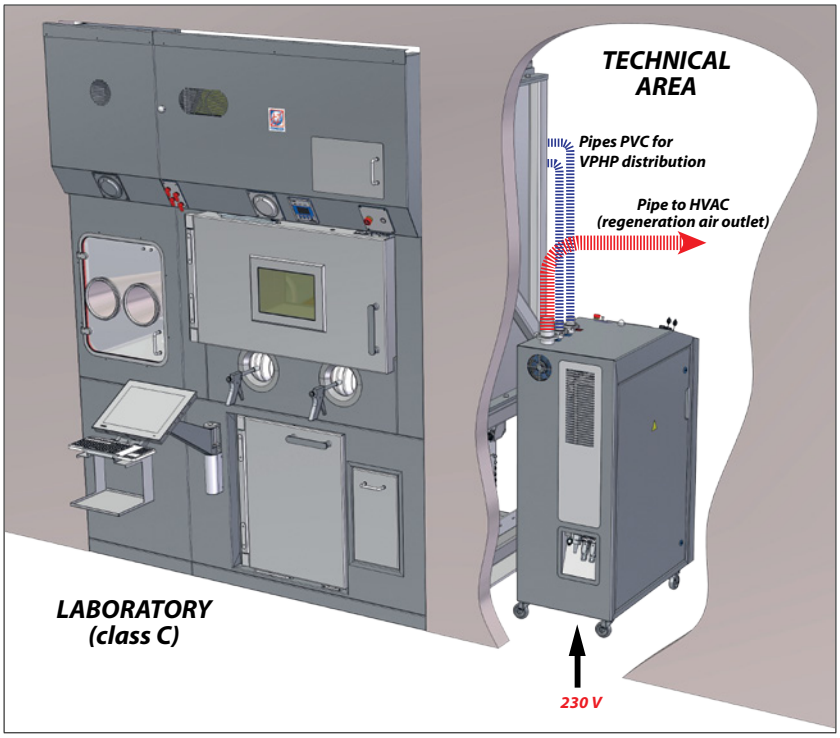
For safe decontamination, the chamber to be decontaminated and the connections between the chamber and the generator must be sealed.

A distribution system integrated in the isolator allows you to choose which chamber to decontaminate.





Isolation Technology



Nuclear Medicine

ATTENTION

Nuclear Medicine: The Comecer VPHP GENERATOR can be associated with BBST, BBST COMBO, MUSA, MUSA ^{68}Ga, PHAEDRA, TALY, THEODORIC II. In case of a retrofit, or a cell other than those listed above, a pre-sales rating is always required.

ATTENTION

All MN cells' chambers that need to be decontaminated by VPHP, must be equipped with the AVC-LIGHT ventilation closure system.

5.2 CONNECTING TO THE CHAMBER

Isolation Technology

VPHP injection points are executed inside the chamber in *'direct injection'*to bypass the LAF filters and allow a faster decontamination cycle, since the absorbing filter media is not saturated with peroxide.

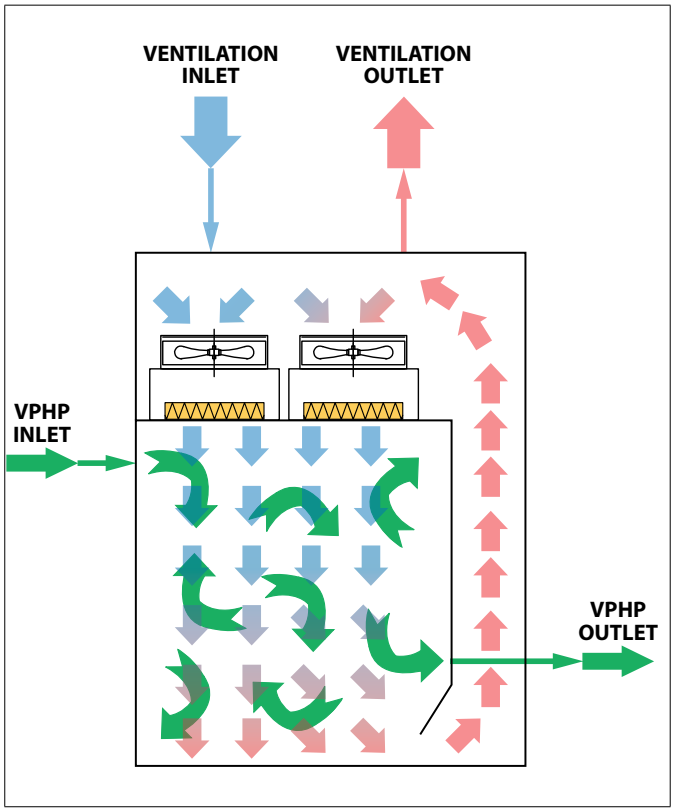
Nuclear Medicine

Depending on the type of cell there may be predisposition by injection *'LAF injection'* or *'direct injection'*.

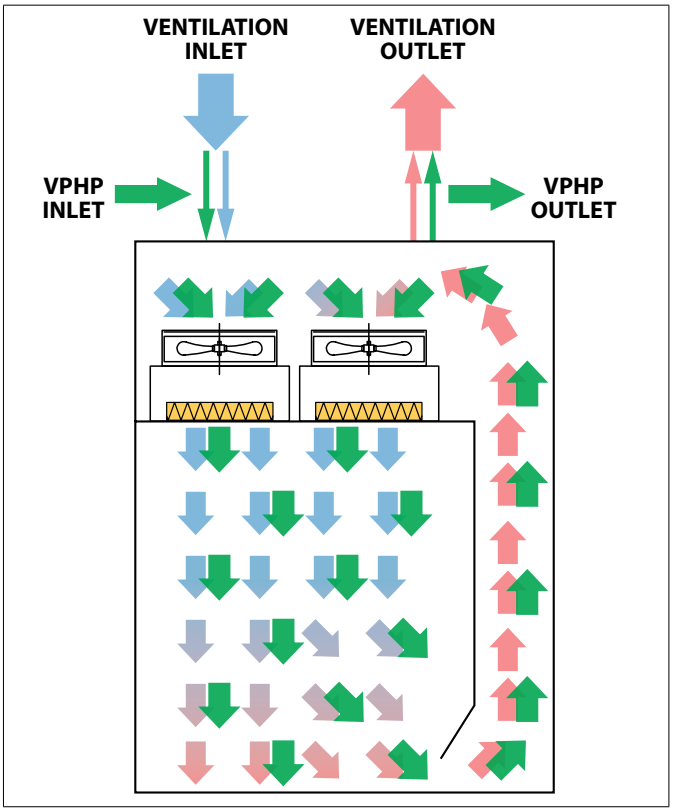
INFORMATION

LAF injection Both VPHP ducts are grafted into the core ventilation of the cell, the vapour goes through the filters, making them wet.

Direct injection: the conduits lead directly to the chamber to be decontaminated, the filters are touched only superficially and the cycle times will be reduced.



Direct injection



LAF injection

6 REFERENCE STANDARDS

This product is manufactured in compliance with the following EU Directives:

- Directive 2006/42/EC on machinery, and amending Directive 95/16/EC (Machinery Directive)
- Directive 2014/30/EU relating to electromagnetic compatibility (EMC)

And, to the extent applicable, with the harmonized standards:

- EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)
    - (following the ISO TR 14121-2:2012 - Safety of machinery - Risk assessment - Part 2: Practical guidance and examples of methods)
- EN 60204-1:2006 Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005 (PEQ))
- EN 61000-6-2:2005 - Electromagnetic compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2:2005)
- EN 61000-6-4:2007 - Electromagnetic compatibility (EMC) Part 6-4: Generic standards: Emission for industrial environments (IEC 61000-6-4:2006)

And with the following standards and technical specifications:

- ISO 10648-1:1997 Containment enclosures - Part 1: Design principles
- ISO 10648-2:1994 Containment enclosures - Part 2: Classification according to leak tightness and associated checking methods

The product was designed in compliance with the following requirements:

- Eudralex - Volume 4 Good Manufacturing Practices (GMP) Guidelines.

7 TECHNICAL DATA

Total weight	kg	180
External dimensions	mm	480 x 858 x 1322 (l x w x h)
Flow rate	m3/h	from 30 to 70
Tank capacity H2O2	l	2
Disinfectant type		H2O2 hydrogen peroxide 30-35%
Injection speed	g/min	from 1 to 18
Pre-conditioning system		absorption rotor with self-regeneration
Catalyst		Double phase (Platinum/Aluminium Oxide or Iron Oxide)
VPHP Connections	mm	Clamp 1,5"
Regeneration air connection	mm	Clamp 2,5"
Regeneration air		≥35 m 3/h hot and humid air
Nominal current	A	16
Operator Panel		Siemens HMI remote on cell/isolator (optional: installed on generator)
Main power supply	For Europe & similar	230V (1Ph+N+PE) | 50/60Hz | 16A TN-S

8 VALIDATIONS - FAT/SAT PROTOCOLS

According to the GMP requirements (Good Manufacturing Requirements), each manufacturer has the task of identifying the validation steps which are necessary in order to prove that the critical aspects of his particular operation are under control.

8.1 MAIN STEPS OF VALIDATION:

- FAT – Factory Acceptance Test
- SAT – Site Acceptance Test
- IQ – Installation Qualification (optional)
- OQ – Operational Qualification (optional)
- PQ – Performance Qualification

Comecer provides FAT validation protocol (Factory Acceptance Test) for the Comecer VPHP Generator. Comecer carries out the SAT (Site Acceptance Test) and, upon request, provides the IQ & OQ protocols (Installation Qualification & Operational Qualification).

The validation protocols are in compliance with the following Standards:

- ISO 14644 (Clean-rooms and associated controlled Environments)
- ISO 10648 (Containment enclosures)
- EEC-GMP (Good Manufacturing Practice - Annex 1 Manufacture of sterile Medicinal Products)
- PDA -TR Nr 34 (Design and Validation of Isolator Systems for the Manufacturing and Testing of Health Care Products).

8.2 FAT (FACTORY ACCEPTANCE TEST)

The functioning test for the VPHP Generator will be performed at Comecer premises.

The FAT protocol will include the following tests:

- Verification of qualification instrument calibration
- Verification of the documentation (list of qualification documentation provided)
- Verification of construction layouts (“AS BUILT” drawings and diagrams)
- Verification of the main components/instruments installed
- Verification of functionality/interlocks (mechanical & software);
- Verification of scale precision
- Verification of pump precision
- Verification of static sealing (only where applicable)

8.3 SAT (SITE ACCEPTANCE TEST)

The SAT will include the following tests:

- Control of surface finishes;
- Visual check of the main components installed;
- Verification of internal pressure;
- Functional check and regulation of the service connections (utilities);
- Verification of functionality/interlocks (mechanical & software);
- Operating functioning test of the scale and pump;
- Operating functioning test of the cycle;

- Check of the interlocks and safety devices;
- Personnel training;
- Delivery of the FAT protocol performed and collection of documentation:
  - FAT protocol carried out
  - Use and maintenance manual
  - Price list of recommended spare parts
  - Declaration of Conformity
  - "As built" technical drawings (electric, mechanical, pneumatic and process diagrams)
  - Certificates of the materials and/or data sheets
  - Main components / data sheets
  - Instrument calibration certificates
  - Qualification of the welding processes.

8.4 OPTIONAL

8.4.1 IQ & OQ (Installation Qualification & Operational Qualification)

If requested, as an optional service , Comecer can perform IQ-OQ validation at customer's site. The IQ-OQ validation will be performed by qualified technicians (Comecer Validation Dept.) using calibrated instruments and the protocol will include the complete tests list as performed during the FAT, repeated again at customer's site.

8.4.2 Thermal mapping

Upon request, Comecer can perform the thermal mapping to evaluate the temperature distribution of the surface inside the isolator during the decontamination cycle. This way, the worst possible positions can be identified to reach the microbiological reduction target required in the cycle development.

8.4.3 Cycle development

If required, Comecer can run cycle developments at the customer's premises.

The process will be carried out by qualified technicians (Comecer validation Dept.) with the aid of calibrated instruments and the protocol will include the definition of physical parameters involved in the sterilisation process via VPHP (phase time, air flow rate and dosage rate, pressure, HR/T etc.). Validation will be performed at the customer site using both Chemical Indicators (CIs) and Biological Indicators (BIs) and can be performed on a load specified by the customer and approved by the Comecer validation Dept.

Comecer provides a list of Biological and Chemical Indicators (BIs & CIs) needed to run cycle development: these products can be supplied by the customer or sold separately by Comecer.

Where not specified, it is regarded as standard an isolator with a main chamber and a pre-chamber for the development of two cycles. The two considered cycles are: 1 cycle for the main chamber plus 1 pre-cycle or 1 cycle for the whole isolator (open intermediate door) plus 1 pre-cycle.

The load change inside the isolator is considered as a further development: each load has its own dedicated cycle. Upon request, the development of more cycles can be quoted.

8.4.4 PQ (Performance Qualification)

If required, Comecer can perform PQ validation at the customer's premises, after the cycle development stage.

The FQ will be run by qualified technicians (Comecer validation Dept.) with the help of calibrated tools and the protocol will include verification for 3 times the cycle developed to validate the its success. It can be executed on a load specified by the customer and approved by the Comecer validation Dept.

Comecer provides a list of Biological and Chemical Indicators (Bis & Cis) required for FP execution: these products can be supplied by the customer or sold separately by Comecer.

Where not specified, it is considered as standard the PQ of two-cycles for an isolator with a main chamber and a pre-chamber.

9 AFTER-SALES SERVICE

9.1 MAINTENANCE SERVICES

9.1.1 Preventative Maintenance

We carry out periodical checks on the appliances to prevent failures before they occur and to preserve and improve reliability. Through measuring and diagnosis techniques of the machine, we can measure the real operating conditions of the single components and of the equipment; therefore, we can recognise the components that start to wear in advance and plan interventions according to the production requirements to guarantee maximum efficiency of the machine.

9.1.2 Corrective maintenance

Diagnosis: the corrective maintenance process starts with the diagnosis of the failure. During this phase, we will inspect the system, use diagnostic instruments and interview the user. This is important to detect the problem and solve the cause and not only "the symptoms".

Intervention: in addition to the "on site" intervention, we can carry out interventions via remote connection (for automatic systems) to minimise waiting time and machine downtime. Interventions aim at solving the problem definitively, with solutions that go from replacing the failed component to machine upgrades to removing the cause of the failure.

9.2 REMOTE ASSISTANCE / HELP DESK

This service allows you to connect to Comecer's computer to access all machine functions directly and check them for proper operation.

Standard Maintenance Contract

Offer: Preventive maintenance + corrective maintenance (defined intervention time)

Full Risk: Preventive maintenance + corrective maintenance (defined intervention time) + spare parts.

9.3 TRAINING & CONSULTING

Training sessions for users (new users and refresh training) - Training for the customer's technicians on first level maintenance.

We help our customers find the best solutions, ensuring that both the operating and financial goals are reached.

9.4 UPGRADE & RETROFIT

We propose constant updates on the equipment to increase durability and reliability both in terms of operational safety.

9.5 SPARE PARTS

Critical spare parts are always available in the dedicated Comecer warehouse.

Set of critical spare parts defined for each appliance.

9.6 SERVICE AS A CONTINUOUS SUPPORT TO CUSTOMERS

From the SAT (Site Acceptance Test), Comecer Service takes care of its customers for the entire duration life of the equipment, by supporting them either during the normal processing or maintenance operations or for extraordinary service.

9.7 IMMEDIATE RESPONSE TO THE REQUESTS OF THE CUSTOMER.

Our service engineering office handles over 1,000 worldwide technical support requests a year, either via telephone or on-line.

Presence in the field

Comecer Field Engineers and autorized local Service Providers authorized and certified, manage over 1,500 interventions a year, at the customer premises in short time, with high professionalism and expertise level in order to ensure top equipment efficiency.

9.8 PLANNING

Our planning office ensures an optimized service planning, by assigning priority levels, according to the customer's requirements.

NOTES:

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