User Guide

Milliflex Oasis® VHP Resistant Vacuum Pump

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1. Introduction

The Milliflex Oasis® VHP Pump

This user guide is intended to assist lab personnel in using the Milliflex Oasis® VHP resistant Pump, an instrument for membrane filtration of microbiological samples, equipped with pump heads that withstand vaporous hydrogen peroxide (VHP). A proven solution for efficient membrane filtration in isolators, the Milliflex Oasis® VHP Pump is the ideal match for the Milliflex® Rapid System 2.0 as the two are finely tuned to each other, ensuring an optimal workflow and fastest results.

The Milliflex® Rapid System 2.0

The Milliflex® Rapid System 2.0 is a solution for the rapid detection and quantification of viable contaminants (e.g., bacteria, yeasts, molds) in filterable samples, allowing an earlier response to an arising contamination issue. Based on highly sensitive adenosine triphosphate (ATP) bioluminescence technology, it delivers faster total viable count results than traditional methods such as membrane filtration and pour plates. The Milliflex® Rapid System 2.0 is suitable for both rapid sterility and rapid bioburden testing.

The central hardware components of the Milliflex® Rapid System 2.0 are the Milliflex® Rapid 2.0 AutoSpray Station (Cat. No. MXRP2SPRKT), which automatically applies the reagents for the enzymatic reaction onto the filter membrane, and the Milliflex® Rapid 2.0 Detection Tower (Cat. No. MXRDP2DT00), which automatically detects and enumerates the luminescent microcolonies.

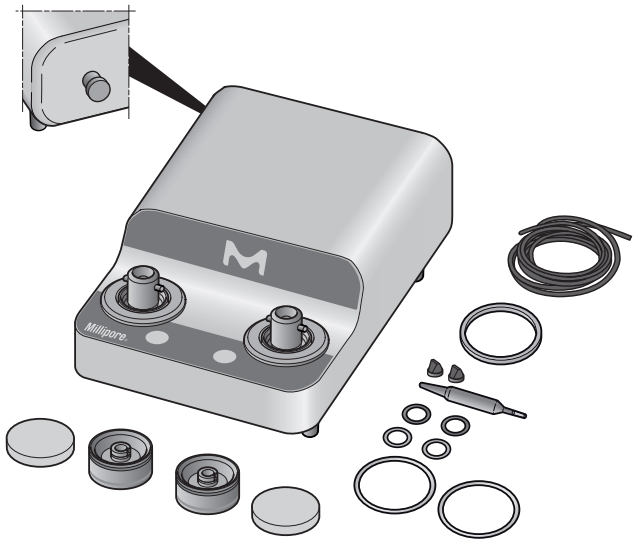
The Milliflex® Rapid System 2.0 workflow is performed in three steps:

1. Any microorganisms contained in a liquid sample are captured on a filter membrane, which is then transferred onto a media plate and incubated for growth.
2. After incubation, reagents are evenly distributed onto the membrane by the Milliflex® Rapid 2.0 AutoSpray Station to perform an enzymatic reaction that leads to bioluminescence where microcolonies are present.
3. The emitted light allows any microcolonies on the membrane to be automatically detected and counted by the Milliflex® Rapid 2.0 Detection Tower and its software.

For details on using the Milliflex® Rapid 2.0 AutoSpray Station and the Milliflex® Rapid 2.0 Detection Tower, please consult the respective user guides.

2. Components

Millflex Oasis® VHP Pump (MMPPLUVHP)



The Milliflex Oasis® VHP Pump package contains:

- Pump body with one protective cap to protect an unused power port
- Two filtration heads with their covers and colored ring
- Tubing for discarding the liquids
- Accessory spare parts kit
- Two large external head gaskets (translucid)
- Two small external head gaskets (translucid)
- Two small internal head gaskets (red)
- Two duck valves
- One gasket removal tool

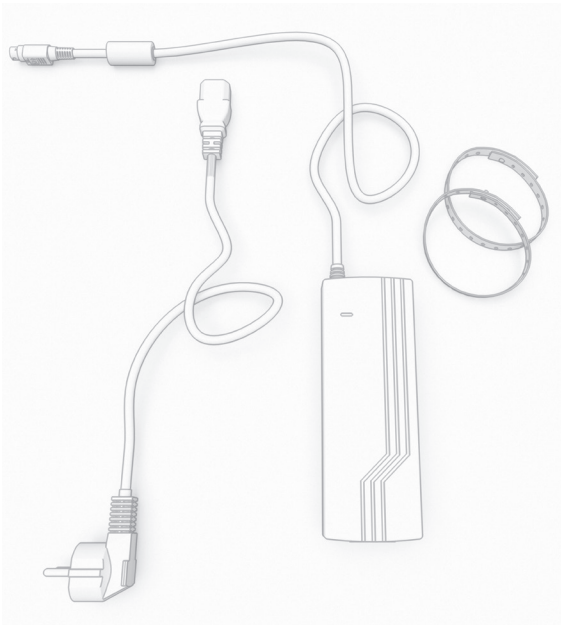
Milliflex Oasis® power supply for one or two filtration pumps

The following items are also necessary to run the pump system (see Ordering Information for details):

Milliflex Oasis® power supply (VHPPWRSP--)

The power supply consists of the DC power unit, a power cable, and two rubber fasteners (see image below). The power cable is specific to defined regions:

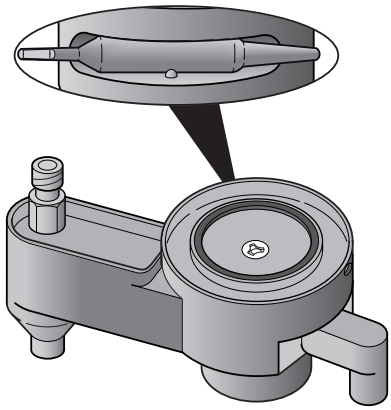
- Australia
- Brazil
- China
- Denmark
- Europe (except Denmark, Switzerland & UK)
- Switzerland
- India
- UK
- Japan
- USA
- South Africa



A single power supply can supply the power needed to run either one or two filtration pumps. In the latter case, the Milliflex Oasis® electrical cable for connecting two pumps is required for the additional pump (Cat. No. MMCABLEVHP).

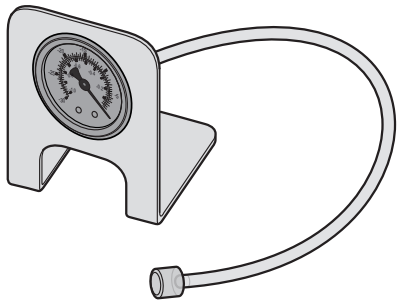
Milliflex Oasis® internal flow sanitization kit (MMSANKITVHP)

The Milliflex Oasis® internal flow sanitization kit package contains a stainless-steel sanitization kit with plug and gasket removal tool.

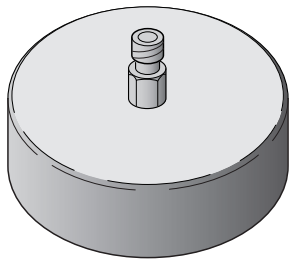


Milliflex Oasis® performance verification tool

Vacuum gauge (MMGAUGEMM).



Vacuum Cover for Milliflex Oasis® VHP Pump (MMSANKITCVR)



Consumables

Please consult the Ordering Information section for details on filtration units, culture media, and consumables for the Milliflex Oasis® internal flow sanitization kit. The Milliflex Oasis® consumables kit package for internal flow sanitization contains 24 plastic syringes for dispensing the sanitizer and 24 funnel assemblies for rinsing with purified water.

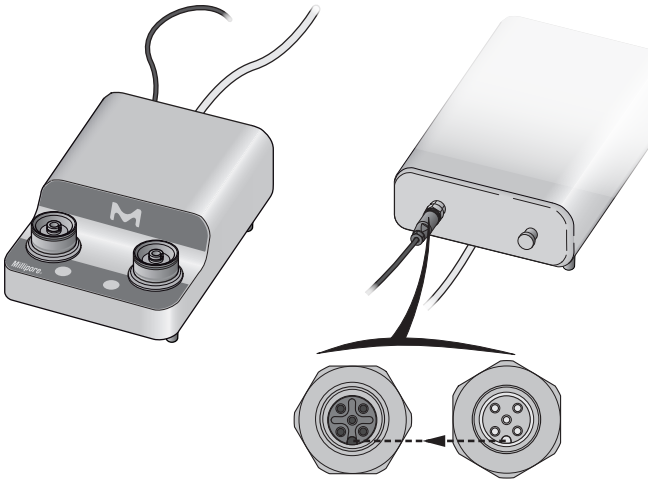
3. Hardware Installation

The pump must be installed on a horizontal surface. Please make sure that your working area is level to ensure reliable sample volume readings.

Clean the exterior of all components by using a wipe moistened with a surface sanitizer listed in the Cleaning & Maintenance section.

Single pump system

Place the system in the VHP isolator.



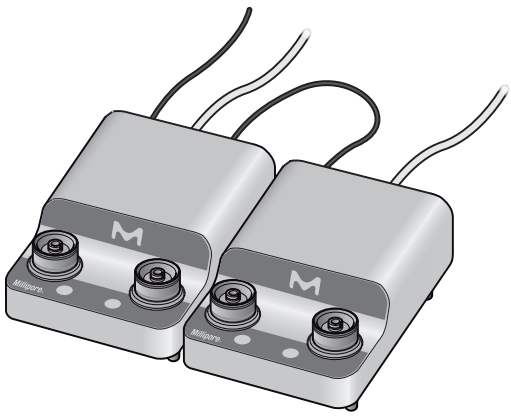
Plug the DC power unit to one of the power ports situated at the back of the pump.

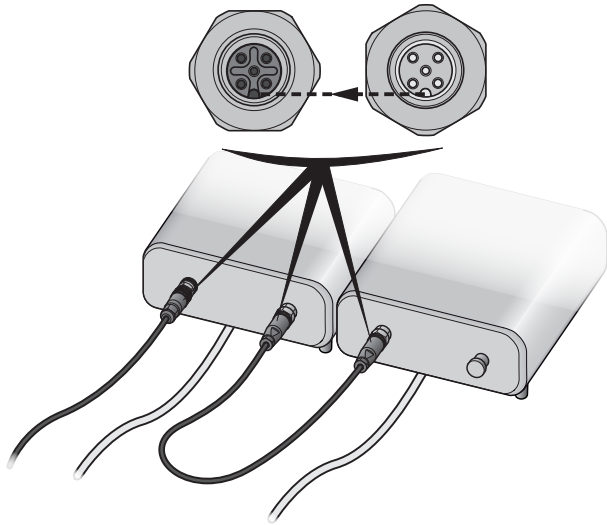
Note: To insert, align the connecter plug with the power port as shown above.

Note: Ensure that the protective cap is screwed on the unused power port.

Two-pump system

Place the 2 pumps into the VHP isolator.





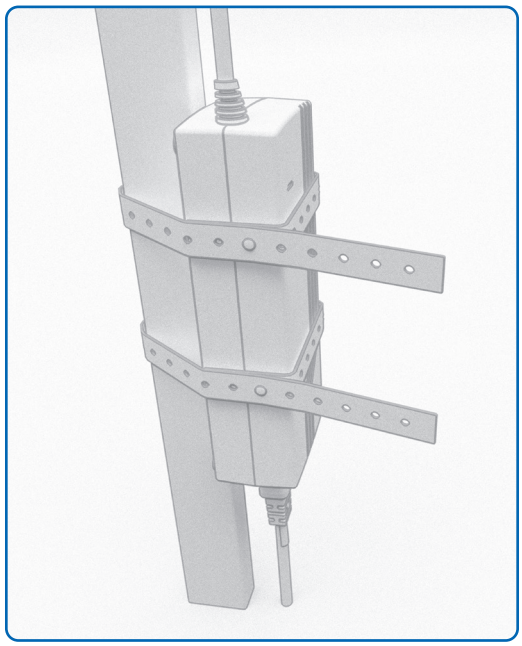
Plug the DC power unit to one of the power ports at the back of the pump.

Connect both pumps by using the interconnection cable MMCABLEVHP.

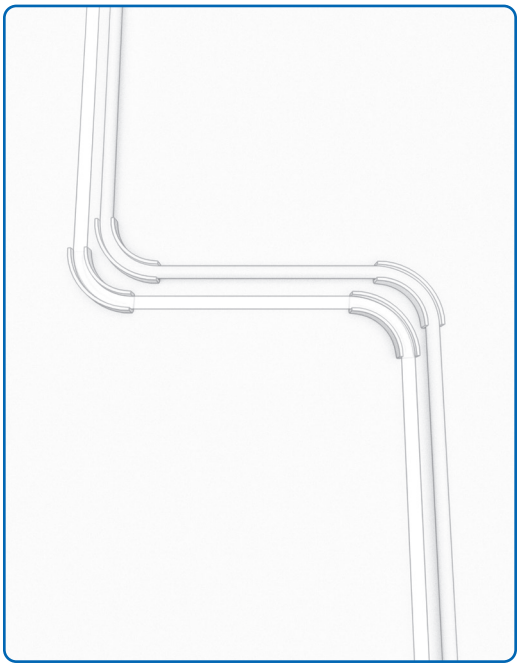
Note: To insert, align the connecter plug with the power port as shown above.

Note: Ensure that the protective cap is screwed on the unused power port.

Optional: Attach the power supply outside the working area with the two rubber fasteners.



Optional: To arrange the tubing and electrical cable in your working area, use the Milliflex Oasis® routing guides for the electrical cable and tubing (see image below).



4. Basic Operation

The Milliflex Oasis® VHP Pump has six LED indicator lights integrated into each of the two switches.

Color	Meaning
White	Steady: pump is ready for next handling step
White	Blinking: membrane dry out is ongoing
Blue	Vacuum on
Green	The sanitization kit is ready to use
Red	No filtration head or filtration head is not locked
Off	No power or standby

- The switches are touch-sensitive. Use your fingertip to activate them.
- Touch the center of the switch without touching the outer ring.
- When the Milliflex Oasis® pump is in standby mode, it can be reactivated by touching the space between the two switches.

Note: If unused for thirty minutes, the pump switches off. Touch the switch once to power up.

Note: Touch the switch three times within one second to launch filtration on two filtration heads simultaneously.

5. Testing

The following components are needed before starting your sample processing:

- Milliflex Oasis® pump installed following the Hardware Installation section
- Milliflex Oasis® filtration units
- Milliflex Oasis® media plates
- Samples to test

Ensure that the internal pump flow has been sanitized according to the Cleaning & Maintenance section.

- Clean the exterior of the pump using a wipe moistened with a surface sanitizer listed in the Cleaning & Maintenance section.

Filtration units

Different types of filtration units are available (see Ordering Information section).

Note: To test samples with antimicrobial activity, select filtration units with a low-binding Durapore® membrane (Cat. No. MMHVWP124 or Cat. No. MMHVWP224).

Note: Isopropyl myristate (IPM) is not chemically compatible, therefore samples containing IPM should not be used.

- Open a box of filtration units and take out the needed number of trays or individually packed funnels.

Note for units on trays: Grasp one end of the tape and pull to open the box of filtration units (no tool needed).

- Repeat the operation if more than one box of filtration units is needed.
- Clean each bag or individual package using a wipe moistened with one of the surface sanitizers listed in the Cleaning & Maintenance section.

Optional for units on trays: If four filtration units or fewer are needed for testing, open the bag at the front of the safety cabinet, then pull out only half of the tray, separate the tray in two and place the pulled-out half of the tray in the working area. Fold the bag to close it and use the longer part of the sticker situated on the bag to secure its closure. The four filtration units remaining in the bag can be put aside for later usage. In this case the bag can be opened at the sealed end, which is achieved by pulling on each side of the bag.

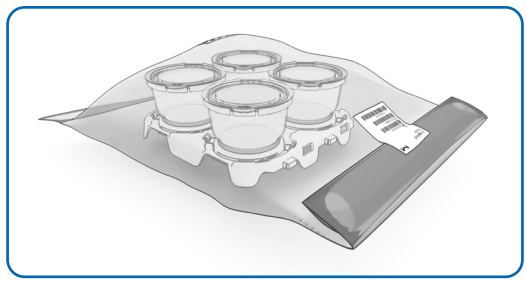


Figure 1: Unused filtration unit storage.

- Open a bag and remove the tray, then place the tray near the pump. If using individually packed units, open each package and place each filtration unit near the pump.
- Repeat the operation if more filtration units are needed

Optional for units on tray: To save space, trays can be separated in two parts and stacked.

Figure 2: Tray separated and stacked for space saving.

Note: Four stickers with traceability information and 2D barcodes are present on each bag. It is possible to detach the stickers and stick them into a log book.

Media plates

- Open a box of media plates and remove the needed number of bags, each containing eight media plates
- Repeat the operation if more than one box of media plates is needed
- Clean each bag using a wipe moistened with one of the surface sanitizers listed in the Cleaning & Maintenance section
- Open the bag and place the media plates on the working area
- Repeat the operation if more media plates are needed

Note: The media plates must be at ambient temperature for optimal growth performance.

Optional: Four stickers, each with traceability information and a 2D code, are present on each bag. It is possible to detach the stickers and stick them into a log book.

Testing

When the pump is in standby mode, the switch is not lit up. To power up the Milliflex Oasis® pump, touch the front of the pump between the two switches with your fingertip.

Note: If starting a filtration without a filtration unit placed on the filtration head, you will hear a whistle noise. This is due to a check valve found in each pump head and is perfectly normal. If the pump is started after having placed a filtration unit on the pump head, this noise will not be heard.

- Place the Milliflex Oasis® filtration unit on the pump head, lining up one of the unit's frosted strips with the pump's colored background

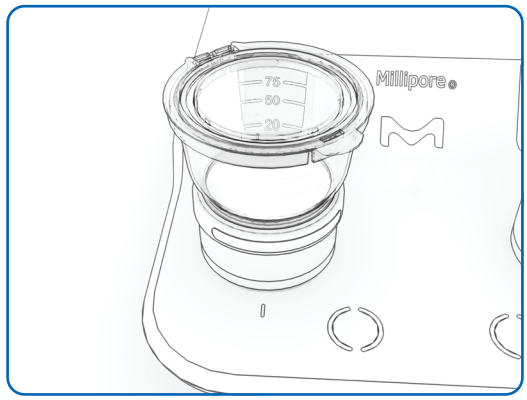


Figure 3: Filtration unit placement

- Open the filtration unit lid
- Pour the sample into the Milliflex Oasis® filtration unit and flip down the lid without locking it

IMPORTANT NOTE: When filtering a volume larger than the capacity of the filtration unit, the user should complete a proper filtration cycle including the dry out step, then continue with the remaining volume(s). Alternatively, the user must ensure that the filter is always covered by 25 mL to 50 mL of liquid while filtering.

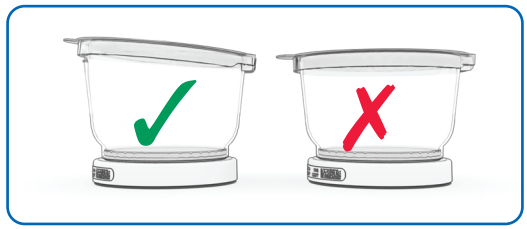


Figure 4: CORRECT lid position on the LEFT SIDE (unlocked lid).

- Touch the switch to start the filtration

Note: Touch the switch three times within one second to launch filtration on two filtration heads simultaneously.

- For easier subsequent handling, open a media plate using both hands and rest its lid back on the plate until use
- After all the liquid has been filtered, touch the switch once more to stop the filtration, and membrane dry-out will automatically start
- When the dry-out cycle is finished, the pump stops, and the switch light stops blinking; firmly press the filtration unit lid down to lock it

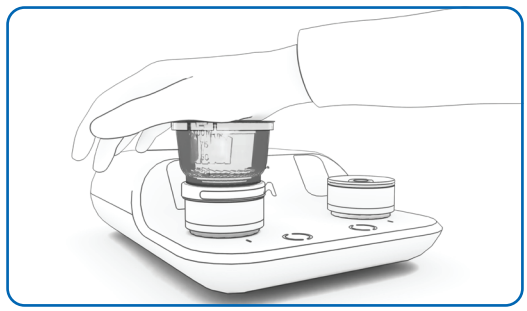


Figure 5: Filtration unit lid firmly pressed down with the palm to lock.

- Tilt the filtration unit first, then remove it from the pump head

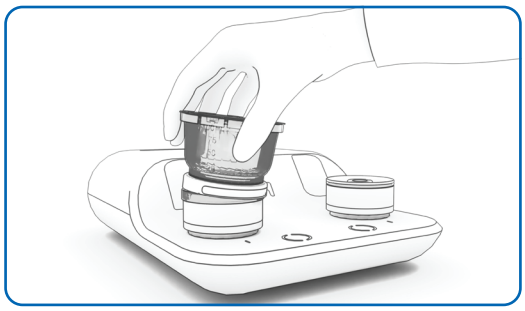


Figure 6: Filtration unit tilted for removal.

- Optional: Inspect the underside of the membrane to verify that it has a convex shape

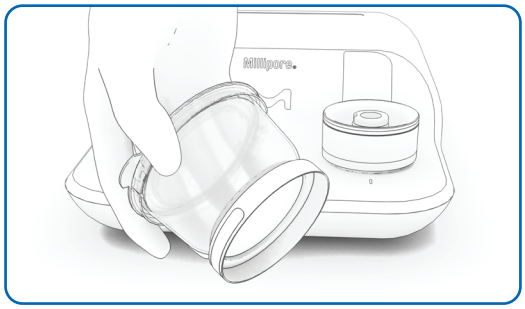


Figure 7: Checking the membrane's shape.

Note: A convex membrane shape shows that there is no leakage or pass-through (membrane and seal integrity). In addition, it helps in removing bubbles or folds between the membrane and the agar after membrane transfer.

- Lift the lid off the media plate with one hand

Note: Be careful not to touch the agar while removing the media plate lid.

- Place the filtration unit on the media plate
- Using the thumb and index finger of each hand, push down the funnel lid's edges vertically ensuring a central contact between the membrane and the agar. Make sure the filtration unit is firmly pressed down against the media plate.

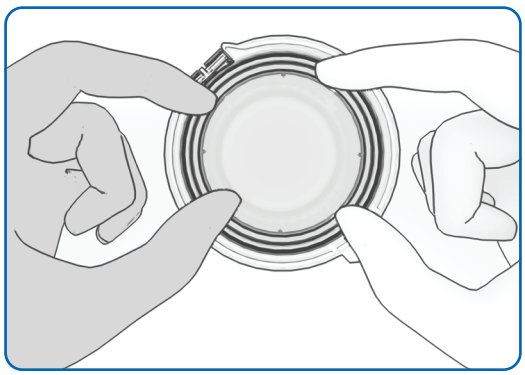


Figure 8: Optimal handling for pushing down the filtration unit to the media plate.

Note: Pushing down the filtration unit vertically with four fingers ensures that the membrane comes into full contact with the agar without forming folds or bubbles.

- Open the filtration unit lid while holding the base with the other hand
- With the same hand, now pinch the funnel to separate it from the membrane assembly

Note: For 250 mL units, it is necessary to hold the membrane assembly (filtration unit base) with one hand while pinching the funnel with the other hand.

- Tilt the lid sideways to remove it

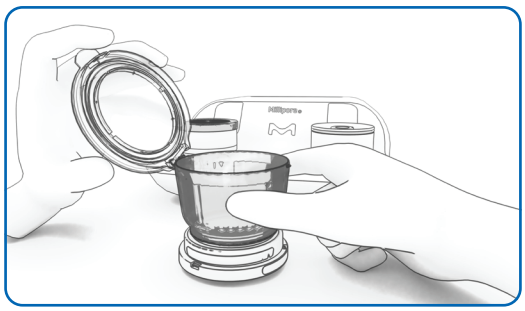


Figure 9: CORRECT filtration unit lid removal.

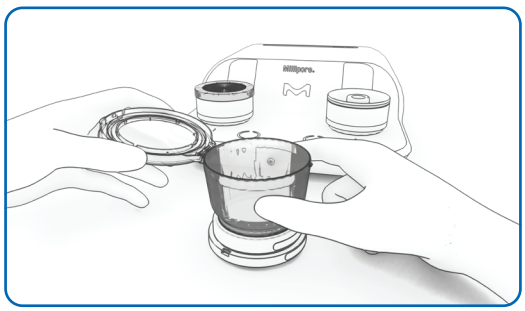


Figure 10: INCORRECT filtration unit lid removal.

- Place the lid onto the media plate/membrane assembly and lock it
- Place the media plate upside down. It is ready for incubation

Optional: Empty filtration unit trays can be used to transport and to incubate the media plates/membrane assemblies. When placing media plates/membrane assemblies on the trays, the lid tab must be positioned pointing out of the tray.

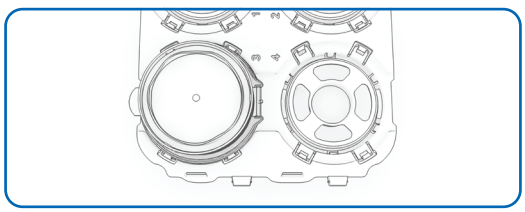


Figure 11: CORRECT media plate/membrane assembly placement (lid tab pointing outside the tray).

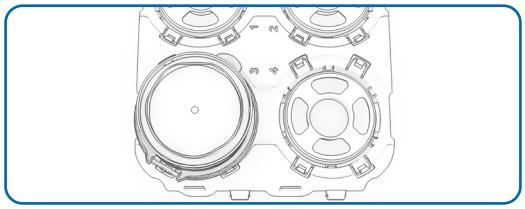


Figure 12: INCORRECT media plate/membrane assembly placement (lid tab pointing inwards).

Optional: Up to six media plates/membrane assemblies can be stacked and locked.

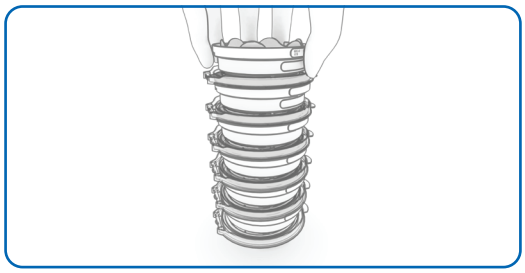


Figure 13: Up to six media plate assemblies can be stacked together.

- Remove the membrane support that remains on the pump by twisting it

Figure 14: Membrane support removal by twisting it.

Optional: It is possible to use an accessory to remove the support, the Milliflex Oasis® membrane support removal tool (Cat. No. MMSUPREMV).

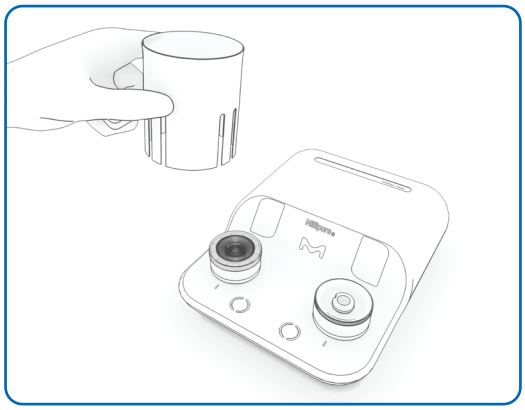


Figure 15a: Membrane support removal tool to be placed on pump head for removal of membrane support by twisting.

Figure 15b: Membrane support tool with attached membrane support after removal from pump head.

Note: If some filtered liquid remains in the pump head, it is possible to remove it with a dry, sterile wipe. Regardless of the amount of liquid, this does not impact the test results.

Waste

After use, the filtration units and membrane supports can be stacked to save space. Place one support into a filtration unit and stack the second filtration unit, then repeat the operation.

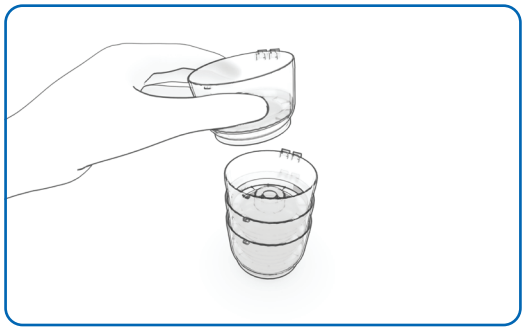


Figure 16: Stacking of filtration units and membrane supports for waste.

Please refer to the waste management document available on our website to recycle the filtration unit material.

6. Cleaning & Maintenance

Cleaning table

Component	Action	First installation	BEFORE each testing shift	AFTER each workday	MONTHLY	YEARLY
Pump heads	Cleaning	X		X		
Pump exterior and pump heads	Surface cleaning	X	X	X		
Pump	Internal flow sanitization	X		X		
Pump	Rinsing			X		
Pump heads	Complete cleaning				X	
Pump heads	Autoclaving*	X		X		
Pump heads	Spare parts replacement					X
Sanitization kit	Surface cleaning			X		
Sanitization kit	Spare parts replacement					X

*** The pump heads are compatible with the following autoclave cycles:**
- 121 °C up to 30 minutes,
- 134 °C up to 15 minutes.

Surface sanitizer table

Surface sanitizer tested: Active ingredients	Suppliers	Dilution
Ethanol (N°CAS 64-17-5 : 226 mg/g), Chlorhexidine digluconate (N°CAS 18472-51-0 : 0.64 mg/g), Didecyldimethylammonium chloride (N°CAS 7173-51-5 : 0.53 mg/g), excipients*	Consult our local technical support	Ready to use
Propan-2-ol (70%), deionized water solution (30%)*	Consult our local technical support	Ready to use
Ethanol (70%)*	N/A	Ready to use
Quaternary ammonium: benzalkonium chloride (0.25–0.5%) Poly(hexamethylene biguanide) hydrochloride (0.1–0.25%)	Consult our local technical support	Ready to use
Sodium hypochlorite (2.6% active chloride)	Consult our local technical support	250 ppm
Hydrogen peroxide (6%)	Consult our local technical support	Ready to use
Isopropyl alcohol (N°CAS 67-63-0 10%) Didecyldimethylammonium chloride (N°CAS 7173-51-5: 0.15936%)	Consult our local technical support	Ready to use
Hydrogen peroxide (1%) and acetic acid (5.2%)	Consult our local technical support	Ready to use
Peracetic acid (0.08%), hydrogen peroxide (1%), and acetic acid (<10%)	Consult our local technical support	Ready to use
Quaternary ammonium: ethanol <25%, didecyldimethylammonium chloride <0.5% N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine <0.5%	Consult our local technical support	Ready to use
Phenolic disinfectant: biphenyl-2-ol (CAS No 90-43-7: 7.7%) clorophene (CAS No 120-32-1: 7.7%)	Consult our local technical support	8 mL/L
Alkaline disinfectant: potassium hydroxide (CAS 1310-58-3) Tetrasodium ethylenediaminetetraacetate (CAS 64-02-8)	Consult our local technical support	47 mL/L

*** Sanitizers compatible with the manometer and its support—see section 7, Calibration Performance Verification.**

Internal flow sanitizer table

Surface sanitizer tested: Active ingredients	Suppliers	Dilution
Quaternary ammonium: benzalkonium chloride (0.25–0.5%) Poly(hexamethylene biguanide) hydrochloride (0.1–0.25%)	Consult our local technical support	Ready to use
Sodium hypochlorite (2.6% active chloride)	Consult our local technical support	250 ppm
Hydrogen peroxide (6%)	Consult our local technical support	Ready to use
Isopropyl alcohol (N°CAS 67-63-0 10%) Didecyldimethylammonium chloride (N°CAS 7173-51-5: 0.15936%)	Consult our local technical support	Ready to use
Hydrogen peroxide (1%) and acetic acid (5.2%)	Consult our local technical support	Ready to use
Peracetic acid (0.08%), hydrogen peroxide (1%), and acetic acid (<10%)	Consult our local technical support	Ready to use

Filtration head cleaning

- Remove the filtration heads from the pump, then remove the external gaskets.

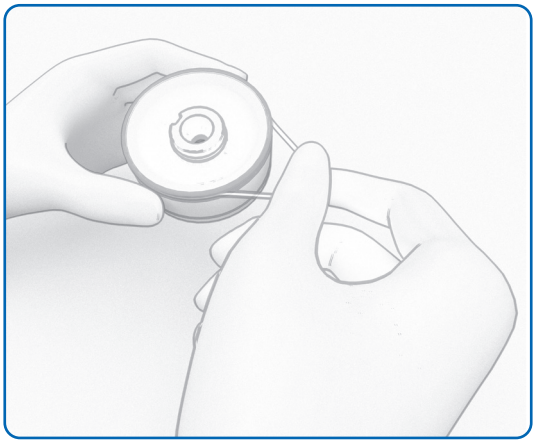


Figure 17a: External gasket removal.

- Clean the external gasket's groove using a wipe moistened with a surface sanitizer listed in the Cleaning & Maintenance section.
- Spray the upper side of the filtration head, in particular its central part, and also spray the external gasket with the sanitizer.

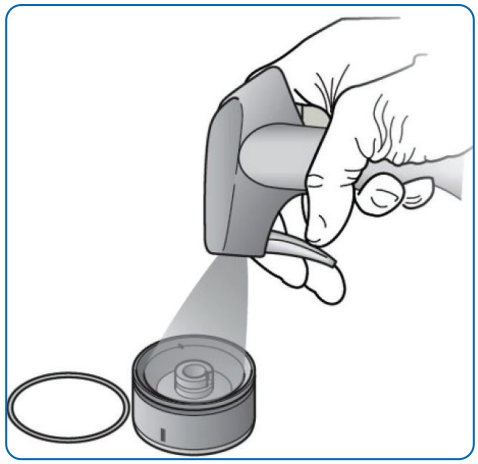


Figure 17b: Filtration head decontamination: upper side.

- Turn the filtration head over and spray the underside, in particular its inner part, ensuring that the orange gasket and the check valve are covered with liquid.

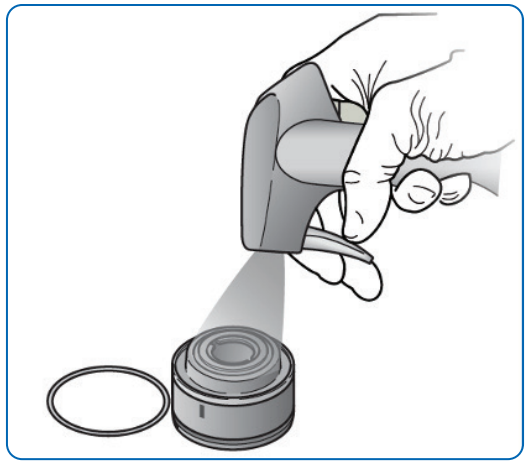


Figure 17c: Filtration head decontamination: under side.

- Wait for the sanitizer to operate for the time specified by the supplier.

NOTE: Ensure that no sanitizer residues remain anywhere on the head, on the gaskets and on the check valve. We recommend the use of a 70% alcoholic solution which evaporates without leaving residues.

- Put the external gasket back in place.

Pump and filtration head surface cleaning

Clean the exterior of the pump, the filtration heads, the tubing and the cable, using a wipe moistened a surface sanitizer listed in the Cleaning & Maintenance section.

Pump rinsing

Filter 300 mL of sterile water at the end of each day. This is recommended to ensure the functionality of the internal parts.

Use either a Milliflex Oasis® filtration unit or the internal flow sanitization kit with a sanitization funnel assembly to perform the rinsing.

Filtration head autoclaving

The filtration head including its components can be autoclaved at 121 °C up to 30 minutes or at 134 °C up to 15 minutes.

Pump head dimensions and weight:

Height: 31 mm (1.2 in)

Diameter: 57 mm (2.2 in)

Weight: 350 g

Note: For an alternative to autoclaving, please contact your local technical support team.

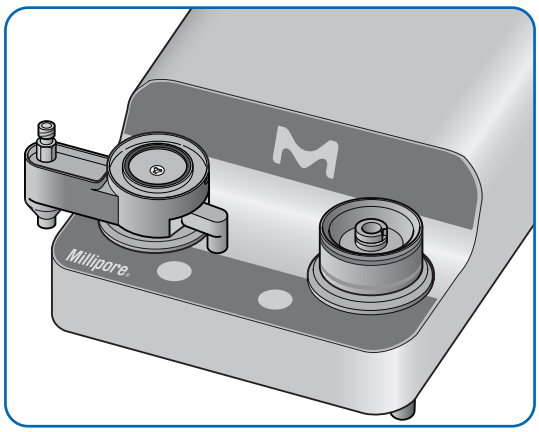
Pump internal flow sanitization

Materials:

1. Sanitization kit (Cat. No. MMSANKITVHP)
2. Consumables for sanitization kit (Cat. No. MMSANSYFU)
3. Sanitizer (see table)
4. Sterile water

- Remove the pump head where sanitization is to take place
- Place a sanitization head on the corresponding pump head support and lock it
- The switch turns green
- Keep the pump head on the other support

Optional: For faster sanitization, it is possible to place a second sanitization head and sanitize the complete pump at once



- Take one sanitization funnel assembly (sanitization kit consumable) and remove its support, then place the funnel on the sanitization head
- Take a syringe (sanitization kit consumable) and remove its plunger
- Place and lock the syringe on the outward pointing extension of the sanitization head
- Pour 60 mL of sanitizer into the syringe
- Introduce the plunger into the syringe

Note: An air pocket is visible over the liquid.

- Push the plunger to bring the liquid level to the 50 mL level indicator

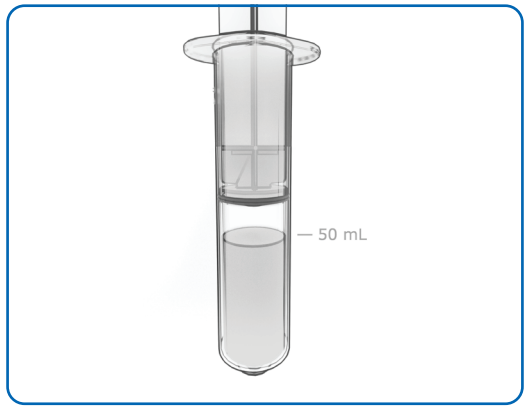


Figure 18: Plunger pushed to bring the liquid to the 50 mL level indication of the sanitization syringe.

- Open the funnel lid
- Pour sterile water up to the 250 mL indication level
- Place back (but don't fully close) the funnel lid
- Touch the corresponding switch to start the pump

Note: The switch blinks for 15 minutes while the following operations are automatically performed:

1. The plunger is partially pulled down and the sanitizer fills the pump's internal flow path.
2. About 10 mL of sanitizer remains in the syringe.
3. The sanitizer remains in contact with the internal flow path for 15 minutes.
4. The plunger is pulled down completely.
5. The water in the funnel is pulled to rinse the pump.
6. The switch stops blinking and sanitization is completed.
7. The pump switches off if not in use for thirty minutes.

- When the light is steady or if the pump is switched off, repeat the operation for the second flow path
- Discard the sanitization kit consumables
- Remove the sanitization head and clean it using a wipe moistened with one of the surface sanitizers listed in the Cleaning & Maintenance section

Filtration head complete cleaning

Materials:

1. Pump head
2. Gasket removal tool (to be found in the pump spare parts kit or together with the sanitization kit)
3. Sanitizer (see table)

- Remove the filtration head from the pump
- Remove the clear external silicone gasket at the exterior of the head

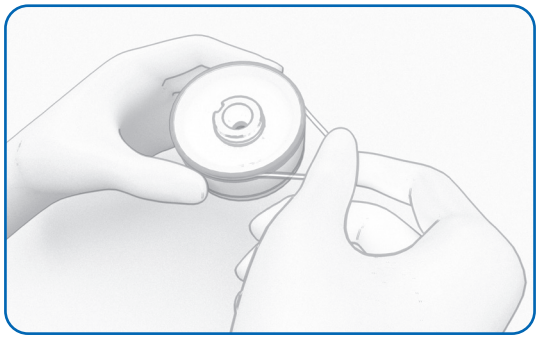


Figure 19: External gasket removal.

Optional: Do the same with the external colored ring (if used)

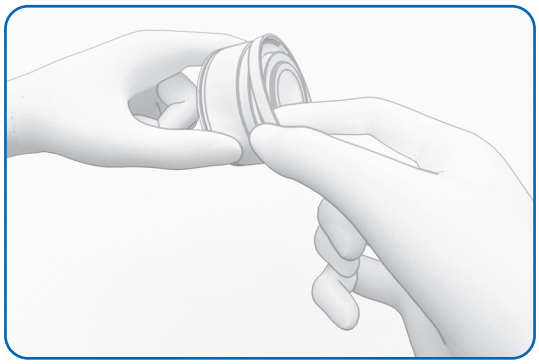


Figure 20: Colored ring removal.

Remove the black check valve with the metal tool provided in the gasket kit

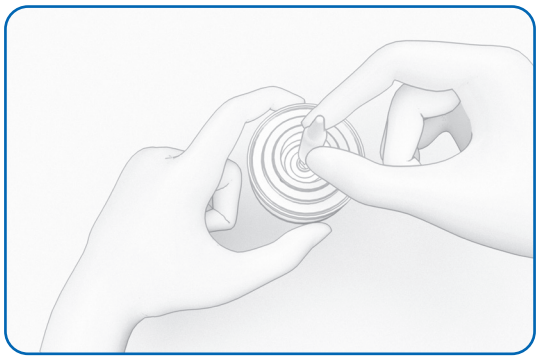


Figure 21a: Check valve removal with tool—part 1.

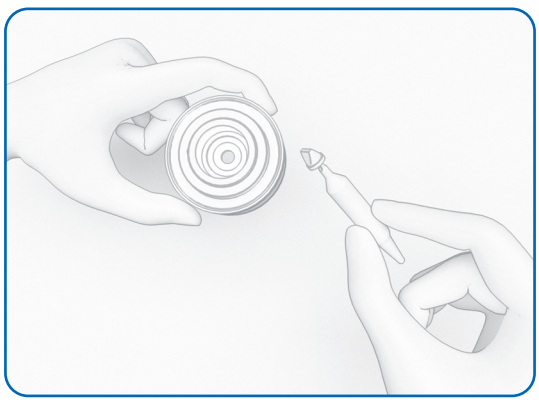


Figure 21b: Check valve removal with tool—part 2.

Remove the two internal gaskets using the gasket removal tool

- Clean the stainless-steel pump head carefully, including the grooves, using a wipe moistened with one of the surface sanitizers listed in the Cleaning & Maintenance section
- Clean the gaskets and the check valve carefully using a wipe moistened with the sanitizer
- Put the gaskets and check valve back in place using the gasket removal tool

IMPORTANT NOTE: If the check valve remains on the tool, ensure that the check valve is dry inside.

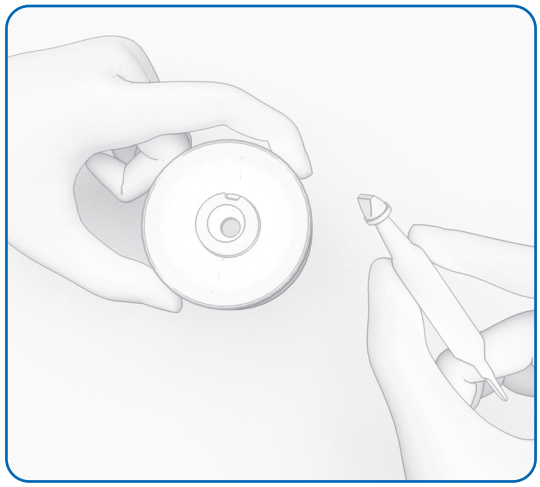


Figure 22a: Check valve installation with tool—part 1.

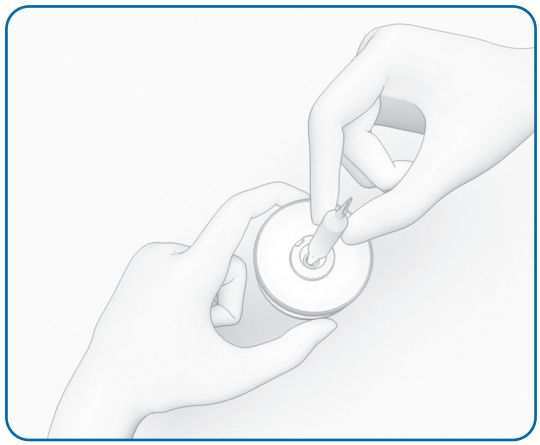


Figure 22b: Check valve installation with tool—part 2.

Filtration head gasket and check valve replacement

Materials:

1. Pump head
2. Spare parts kit to be found in the pump package or filtration head gasket kit Cat. No. MMGASKTMM

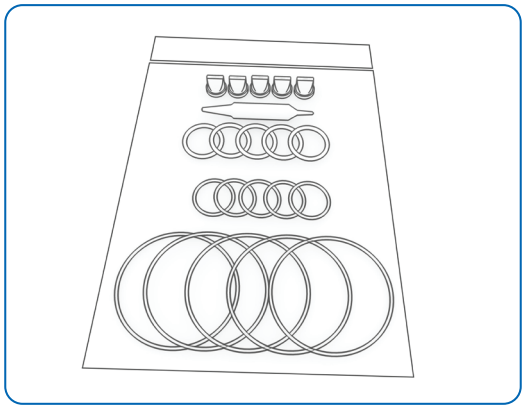


Figure 23: Filtration head gasket kit (MMGASKTMM) components.

- Remove the filtration head
- Remove the gaskets and the check valve and discard them (see how in previous chapter)
- Take a set of gaskets and one (black) check valve out of the gasket kit bag and clean them using a wipe moistened with sanitizer
- Put the new gaskets and the check valve in place using the gasket removal tool (see how in previous chapter)

Note: The removal tool can be autoclaved at 121 °C up to 30 mins or at 134 °C up to 15 mins.

Removal tool dimensions and weight:
Height: 70 mm (2.7 in)
Diameter: 10 mm (0.4 in)
Weight: 26 g

Sanitization kit gaskets replacement

Materials:

1. Sanitization kit (Cat. No. MMSANKIT1)
2. Sanitization kit gasket kit (Cat. No. MMGASKTSK) containing:
   - Five U-rings for funnel-to-kit tightness
   - Five O-rings for kit-to-pump tightness

- Remove the gaskets (using the metal tool provided with the gasket kit) from the sanitization kit and discard them
- Take a set of gaskets out of the gasket kit bag and clean them using a wipe moistened with one of the surface sanitizers listed in the Cleaning & Maintenance section
- Put the new gaskets in place

7. Calibration Performance Verification

The accuracy of the vacuum level and the flow rate provided by the pump can be easily checked at any time, however this verification is not mandatory.

Materials:

- Milliflex Oasis® rapid 100 mL funnel, 0.45 µm white plain, PVDF Durapore® membrane Cat. No. MMHVMFX24
- or Milliflex Oasis® 100 mL funnel, 0.45 µm white gridded, mixed cellulose esters (MCE) membrane MMHAWG124
- Milliflex Oasis® vacuum cover Cat. No. MMSANKITCVR
- Sterile water
- Stopwatch
- Calibrated flask

Verification of the flow rate

1. Place the Milliflex Oasis® filtration unit on the pump head
2. Open the lid
3. Fill the unit with 100 mL of sterile water by using the calibrated flask
4. Start the filtration and simultaneously start the stopwatch
5. Stop the stopwatch when there is no more water inside the unit
6. Record the time and check that it is no more than the specified 16 seconds

Verification of the vacuum

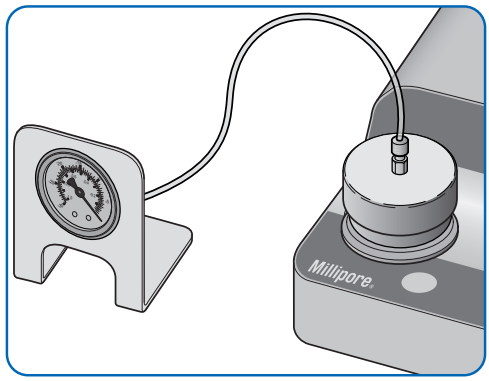


Figure 24: Set up for performance verification.

1. Place the vacuum cover on the Milliflex Oasis® filtration head
2. Connect the vacuum gauge and the vacuum cover
3. Start the pump
4. Record the vacuum
5. Stop the pump and disconnect the gauge
6. Repeat the measure two times
7. Check that the average values are within the following specification: vacuum ≤ −0.4 bar
8. Remove and clean the vacuum cover

8. Troubleshooting

This section offers solutions to some issues that might arise when operating the Milliflex Oasis® VHP Pump. If any of these problems persist, contact Technical Assistance.

Issue	Solution
Condensation on media plates	The media plates must be at ambient temperature for optimal growth performance. If plates have been stored in a fridge, warming them up for up to 2 hours is recommended.
The pump switch is not active	Check that there is no liquid on the switch.
Small amount of liquid in the pump head after filtration	It is normal that a small amount of liquid remains in the pump head after filtration. This does not impact the testing results.
Large amount of liquid in the pump head after filtration	When filtering a volume larger than the capacity of the filtration unit, complete a proper filtration cycle including the dry out step and continue with the remaining volume(s).
Filtration unit leakage	The maximal sample temperature is 60 °C (140 °F).
Sample is foaming out of the filtration unit	Use a 250 mL filtration unit.
Membrane is broken after filtration	Check the lid's position before starting filtration. If the lid is closed while filtering, the membrane might break due to the pressure.
Long filtration time	Check and, if necessary, change the filtration head gaskets. If issue remains, test pump performance —see Cleaning and Maintenance.
Sanitization	
Impossible to install the sanitization kit	Remove the kit, place it back and turn clockwise—see Cleaning and Maintenance, subsection Sanitizing.
Leakage when pouring the purified water	Remove the sanitization funnel and check the position of the funnel gasket.
Remaining liquid in the funnel or in the syringe	The test was uncomplete, e.g. due to a power issue during the process. Restart the sanitization from the start.

9. System Specifications

Milliflex Oasis® VHP Pump	
Frame	Stainless steel 316L
Filtration heads	Two per pump, stainless steel, silicone, rubber gaskets Note: The pump head including all its components can be autoclaved at 121 °C up to 30 minutes OR at 134 °C up to 15 minutes.
Pump dimensions	
Height	120 mm (4.9 in.)
Width	230 mm (9.0 in.)
Depth	310 mm (12.2 in.)
Filtration support height	70 mm (2.8 in.)
Weight with filtration heads	7 kg (8.8 lb)
Power supply	100–240 V ±10%; 50/60 Hz ±2 Hz—one set can be used for up to two pumps

Milliflex Oasis® filtration units	
Filtration unit	
Funnel, support & lid material	Styrene butadiene copolymer (SBC)
Membrane ring material	Polyethylene (PE)
Height 100 mL funnel	57 mm (2.2 in.)
Height 250 mL funnel	113 mm (5.5 in.)
Maximal diameter	82 mm (3.2 in.)
2D code identification	Data matrix can be read with standard 2D reader
Sterilization	E-beam irradiation
Membrane	
Material	Mixed Cellulose Esters (MCE) or low binding PVDF Durapore®
Color	White or black
Pore size	0.45 µm or 0.22 µm
Diameter	49 mm (1.9 in.)

Materials that contact the liquid to be filtered	
Part	**Material**
Filtration head	Stainless steel AISI 316 L Silicone (gaskets & check valve)
Inner tubing	Low-density polyethylene (LDPE) Silicone
Tubing fittings	Polyphenylsulfone (PPSU) Polypropylene (PP) Acetal Buna N rubber
Core pump module	Polypropylene (PP) FFKM (perfluoroelastomer) PTFE (Teflon®)
Drain tubing	Silicone

10. Ordering Information

Description	Qty/pack	Cat. No.
Filtration units		
Milliflex Oasis® rapid 100 mL funnel, 0.45 µm white plain, PVDF Durapore® membrane	24	MMHVMFX24
Milliflex Oasis® funnel without membrane, growth promotion accessory	24	MMRECVERY
Culture media		
Rapid Sterility Test Medium Cassettes, triple-bagged and gamma-irradiated	20	1460530020
Hardware		
Milliflex Oasis® VHP pump with filtration head without power supply	1	MMPPLUVHP
Accessories		
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Australia	1	VHPPWRSPAU
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Brazil	1	VHPPWRSPBR
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—China	1	VHPPWRSPCN
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Denmark	1	VHPPWRSPDK
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Europe	1	VHPPWRSPEU
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—India	1	VHPPWRSPIN
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Japan	1	VHPPWRSPJP
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—Switzerland	1	VHPPWRSPSZ
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—United Kingdom	1	VHPPWRSPUK
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—United States	1	VHPPWRSPUS
Milliflex Oasis® VHP Pump power supply for one to two filtration pumps—South Africa	1	VHPPWRSPZA
Milliflex Oasis® VHP resistant Pump filtration head	1	MMHEADMM2
Milliflex Oasis® filtration head gaskets replacement kit, including gaskets removal tool	1	MMGASKTMM
Milliflex Oasis® filtration head cover set	1	MMHEADCV1
Milliflex Oasis® drain tubing	1	MMDRNTUBE
Milliflex Oasis® for Milliflex Oasis® VHP resistant pump	1	MMSANKITVHP
Stainless steel cover for Sanitization kit of Milliflex Oasis® VHP pump	1	MMSANKITCVR
Milliflex Oasis® internal flow sanitization gasket kit	5	MMGASKTSK
Milliflex Oasis® consumables for internal flow sanitization kit	24	MMSANSYFU
Milliflex Oasis® vacuum gauge for pump performance testing	1	MMGAUGEMM
Plug for Milliflex Oasis® pump for connecting vacuum gauge on the filtration head	1	MMVHPPLUG
Electrical cable to connect two Milliflex Oasis® VHP pumps	1	MMCABLEVHP
Milliflex Oasis® guides for electrical cable and tubing	20	MMTUGUIDE
Milliflex Oasis® membrane support removal tool	1	MMSUPREMV
Milliflex Oasis membrane removal tool	1	REMRACKMM
Services		
Customer validation protocol format A4	1	MM2PA4VP1
Customer validation protocol format letter	1	MM2PLTVP1

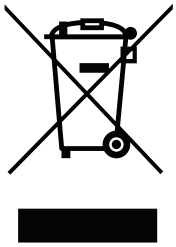
11. Symbols Referenced

The presence of this logo on the product testifies the compliance of the Milliflex Oasis® VHP resistant Vacuum Pump with the following European Union directives:

- Electromagnetic Compatibility Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- Restriction of the Use of Certain Hazardous Substances in Electrical Equipment (RoHS) 2011/65/EU

UK Statutory Instruments and their amendments:

- 2016 No 1101 The Electrical Equipment Safety Regulations 2016
- 2016 No 1091 The Electromagnetic Compatibility Regulations 2016
- 2012 no 3032 The Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment Regulations 2012



- In accordance to the European Union Directive 2012/19/EC on Waste Electric and Electronic Equipment (WEEE), the presence of this logo on the product indicates that it should not be disposed of in the normal waste stream but collected separately.

Go to **www.sigmaaldrich.com/weee** for details on how to ensure proper treatment of the product in different countries.

Direct Current (DC)

12. Operator & Equipment Safety Instructions

Please refer to the Operator & Equipment instructions addendum on **SigmaAldrich.com/Milliflex-Oasis**

13. Technical Assistance

For more information visit **SigmaAldrich.com/techservice**

14. Manufacturer

Millipore SAS
39 Route Industrielle de la Hardt
67120 Molsheim, France

Standard Product Warranty

The applicable warranty for the products listed in this publication may be found at: **SigmaAldrich.com/terms** (within the “Terms and Conditions of Sale” applicable to your purchase transaction).

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SigmaAldrich.com

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