

RECIRCULATOR

USER MANUAL



DOCUMENT VERSION LOG

The table below lists previous versions of this User Manual and states the major changes between versions.

This version list is introduced in September 2017.

Version #	Version date	Major changes from previous versions
1	September 2017	Complete revision and new layout.
2	April 2019	Replaces preliminary version 1 with more text, improved instructions and more pictures.
3	December 2020	Material list added to chapter 2 RECIRCULATOR DESCRIPTION.
	January 2021	Chapter 2 - number order corrected in material list

INTRODUCTION:

MANUFACTURER: Keofitt A/S
Kullinggade 31 B+E
5700 Svendborg, Denmark

TYPE: Recirculator
YEAR OF INTRODUCTION: 2017
YEAR OF REVISED DESIGN: 2019
LAST UPDATED: 2020

The English version of this Manual is the governing version and it is the only authorized version. Consequently, KEOFITT cannot be held liable for other versions including translations of this Manual

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1. PRESENTATION

This manual provides information on how to use the Keofitt Recirculator for cleaning and disinfecting a Keofitt sampling valve having hose piece connections for the inlet and outlet ports. If your Keofitt sampling valve has Mini Tri-clamp or threaded ports, use an adaptor, #900096 or #700062 respectively. The principle behind the Recirculator is based on the operator circulating a cleaning agent from the bottle through the valve chamber and back to the bottle by means of a hand operated bulb pump.



1.1 ALCOHOL AS CLEANING AGENT

By default, this manual is based on alcohol (70%) as cleaning agent, since it is widely used in breweries. For this application alcohol has the advantage that it will act both as a cleaning agent and as a disinfectant.

1.2 OTHER CLEANING AGENTS

You may also use the Recirculator with traditional CIP liquids like sodium hydroxide or nitric acid, as well as rinse water. Procedures are explained in more detail in the chapter 10.

2. RECIRCULATOR DESCRIPTION

The Recirculator consists of the following components:

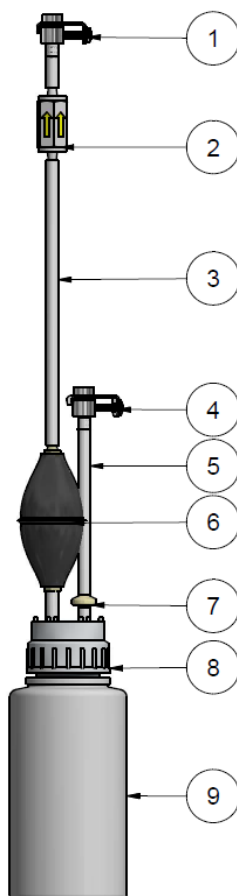
#	DESIGNATION	MATERIAL	DESCRIPTION AND USE
1	Inlet connector	316L (1.4404); silicone O-ring.	Fits hose piece connectors on Keofitt valves. To be connected to the sampling valve's inlet port (upper port).
2	Safety check valve	Nylon (PA) housing; silicone gasket and diaphragm.	Secures a uni-directional flow from the bottle through the supply hose to the valve to be cleaned. Requires a given over-pressure to open at all.
3	Supply hose	PVC plastic.	Conducts cleaning agent into the sampling valve.
4	Outlet connector	316L (1.4404); silicone O-ring.	Fits hose piece connectors on Keofitt valves. To be connected to the sampling valve's outlet port (lower port).
5	Return hose	PVC plastic.	Conducts cleaning agent from the sampling valve back to the bottle.
6	Bulb pump	Natural rubber.	Hand operated pump placed in-line with supply hose.
7	Check valve	Nylon (PA); EPDM sealing; stainless steel spring.	Prevents the content in the bottle to flow out in case the bottle is turned upside down.
8	Screw cap	Polypropylen, white; TPE gasket.	Fitted with internal and external hose unions and an air vent.
9	Bottle	PP Copolymer.	1 l bottle to be filled with detergent

ALSO INCLUDED/EXTERNAL PART:

Zip ties

Nylon (PA)

Cable ties to secure hoses on barbed fittings.



3. INITIAL CLEANING

Prior to the first use of the Recirculator it is advised to clean the bottle, the screw cap and the associated hoses and connectors with alcohol or another appropriate detergent and disinfectant.

NB! Perform these operations in a clean, controlled environment. The required hygienic level must be determined individually depending the actual application.
Once washed/disinfected keep the Recirculator in a suitable protective packaging until next use.

4. CHOOSING AND PREPARING A CLEANING SOLUTION

Prepare a solution suitable for cleaning the actual product.

By default, the descriptions to follow are based on alcohol as a cleaning agent, as it is widely used in breweries.

NB! The liquid in the Recirculator is coloured green for better visualization; real alcohol is colourless.



1. Prepare a 70% alcohol solution.
2. Take a clean Recirculator bottle and unscrew the cap.
3. Fill the bottle $\frac{3}{4}$ with the alcohol solution and refit the screw cap.
Make sure the long suction tube is inserted well below liquid level
4. Provide a small container to place the caps into and fill it with the alcohol solution

Alcohol is a good detergent for water soluble and alcohol soluble substances and at the same time the alcohol acts as a disinfectant.

Always use a 70% alcohol solution consisting of 70% ethanol or isopropanol and 30% purified water. This mixture ratio is optimal as the 70% solution is strong enough to quickly denature the cell proteins, with the water content helping to transport the solution into the bacteria cells.

Prepare the solution on a daily basis. Preparation should be done in a clean, controlled environment.

5. PRE-SAMPLING CLEANING

If the valve chamber has been filled with alcohol since the last sampling, there is usually no need for any further cleaning before taking the sample.

NB! When removing the plug from the lower port make sure alcohol drips out from the port indicating the presence of alcohol in the valve chamber.

If this is the case, you may go straight to chapter 6 SAMPLING.

If in doubt about the cleanliness of the sampling valve perform the following cleaning:

5.1 CONNECTING THE RECIRCULATOR



5. Remove both plugs on the valve (it drains any alcohol from previous sampling, if valve chamber was filled with alcohol then)
6. Place the plugs in the small container with alcohol, if they are to be reused; otherwise discard them
7. Connect Recirculator's supply hose to the valve's top port

The mentioned caps/plugs could be either the standard rubber caps usually suspended on a chain from the valve or separate rubber caps or steel plugs (see www.keofitt.dk for further information).

5.2 FLUSHING



8. Squeeze the bulb pump completely 3-4 times to rinse the valve chamber. The alcohol is flushed to drain, or any other waste collection method.

NB!

Squeeze the bulb pump hard to obtain a high flow velocity. Allow bulb to expand fully before next squeeze to get maximum flow volume.

If the sampling valve was not cleaned properly after the previous sampling, product residues may still be present in the valve chamber. If this is the case, you must clean and flush the valve chamber before starting the recirculation. In this way, the contamination of the bottle content will be minimized and not reintroduced back into the bottle.

It might be necessary to pump more times, if the product is sticky or difficult to flush out. If you flush the alcohol to the floor, you may need to provide some collection method to be placed below the valve to collect the alcohol.

5.3 CIP RECIRCULATION



9. Connect Recirculator's return hose to the lower port
10. Squeeze bulb pump with some force and as completely as possible to press alcohol through the valve chamber 5-10 times

When the Recirculator's two hoses are connected to the valve the CIP recirculation may start.

NB! It is important to squeeze the rubber bulb pump rather hard in order to obtain an adequate liquid velocity, which will mechanically improve the cleaning effect. The adequate number of pumping actions is individual from application to application and must be determined by the user.

6. SAMPLING



11. Disconnect hose from top port
12. Plug top port immediately with a clean cap
13. Disconnect hose from lower port
14. Flush the valve for 2-3 seconds with product (depending on usual practice for the specific application)
15. Take your sample (sampling procedure is not part of this user guide; see sampling valve user manual)

Disconnect the Recirculator and perform the sampling according to your SOP.

The top port should be capped quickly once flushed, in order to prevent airborne contaminants from entering the valve chamber.

Instead of using rubber caps suspended on a chain from the valve, you may use disinfected re-usable caps (rubber or steel), which are brought to the sampling point in a container filled with alcohol. This is a common practice in some industries.

It is also in some industries common practice to flush with product in order to expel any alcohol remaining in the valve chamber.

NB! If you do not flush with the product before taking the sample, you must allow some time for the alcohol to evaporate.

NB! The actual sampling operation must follow your individual standard operating procedures.

7. POST-SAMPLING CLEANING

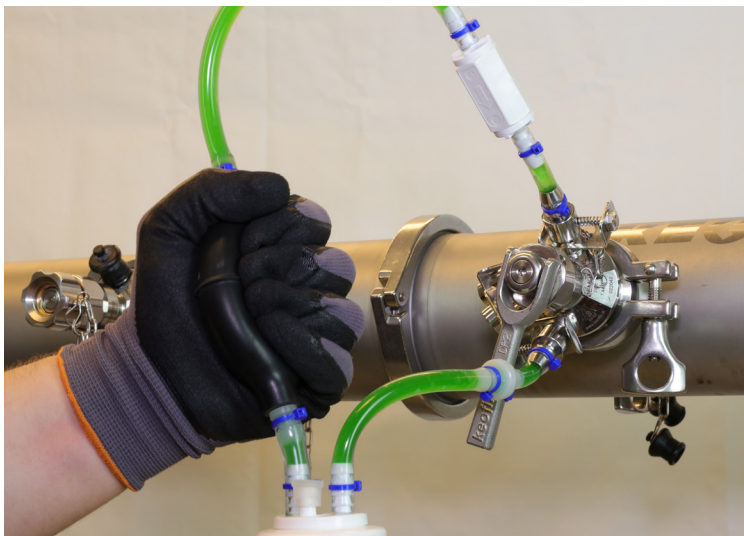
Immediately after the sample is taken the valve must be cleaned, before the product dries up inside the valve, making it much more difficult to clean at a later stage.



16. After having taken the sample remove the top cap and place it in alcohol
17. Connect the Recirculator's supply hose to the valve's top port
18. Squeeze the hand pump completely 3-4 times to flush the valve chamber

This step is similar to Step 8.

The purpose is to flush the valve chamber and remove any product residues from the sampling process. In this way you minimize the amount of product being circulated during the CIP process (steps 9-10). At the same time, you should clean and disinfect the caps and make them ready to use for plugging the ports (unless you use "new" re-useable caps, in which case you discard the used caps).



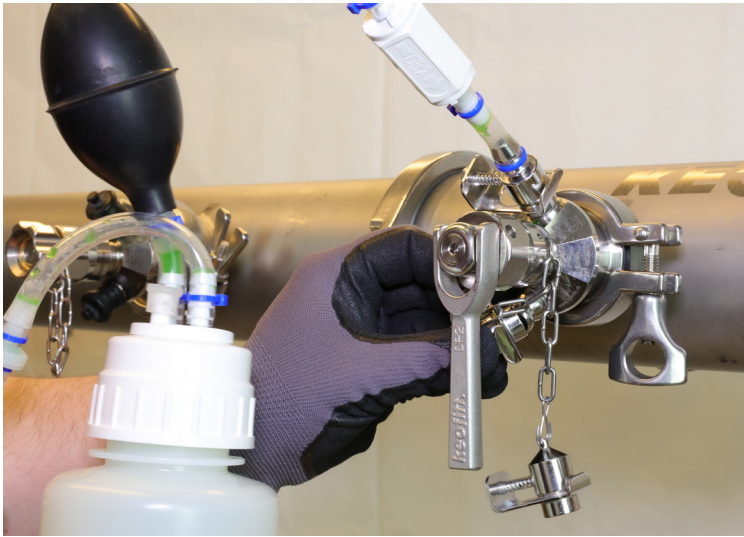
19. Connect return hose to lower port
20. Squeeze hand pump 2-3 times to circulate the cleaning agent in the sampling valve

This is a step similar to Step 9 and 10, providing a CIP after the sampling.

Depending on the level of contamination and the hygiene requirements Steps 19-20 may be skipped. The product being removed from the valve chamber and ports is suspended or dissolved in the alcohol during CIP.

Your hygienic requirements and your actual application are determining factors as to whether the alcohol may be reused for the next CIP and if so, for how many times.

8. ADDITIONAL BARRIER



21. Disconnect return hose from lower port
22. Refit cap on lower port

The purpose of the steps 21-22 is to keep the valve chamber filled with alcohol, which will act as an additional barrier between the process and the surroundings (the primary barrier being the valve's membrane).

Finally, the Recirculator must be disconnected.



23. Disconnect the supply hose and lift it a little from the top port while at the same time squeeze the bulb pump slightly to allow alcohol to flow into the valve chamber
24. For obtaining an additional barrier make sure a surface of alcohol is visible inside the top port. If not visible you may add some alcohol from a squeeze bottle with a spout.
25. Refit cap on top port

The valve chamber is now filled with alcohol.

9. RE-USE OF CLEANING SOLUTION

If pre-CIP flushing removes all visible residues the amount of product that goes into the bottle is very small, which may justify re-use of the alcohol for the subsequent cleaning processes. This must be determined by the user depending on the actual application.

10. ALTERNATIVE CLEANING AGENTS

As an alternative to alcohol you may use traditional CIP agents (alkali, acid and rinse water) and perform a small local CIP of the sampling valve.

The procedure is very much like what is described above for alcohol, except for the fact that you may need 2 or 3 bottles:

One bottle for the alkali

One bottle for the acid (only if acid cleaning is also necessary)

One bottle for rinse water (letting rinse water flow to drain)

NB! This User Manual does not recommend one or the other cleaning agent or cleaning procedure, as they may differ a lot from one industry to another, and even between companies within one given industry.

Keofitt reserves the right to change technical data without notice!

For complete set of updated data sheets and manuals for Keofitt products please refer to our web page www.keofitt.dk

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DON'T GAMBLE WITH YOUR SAMPLE