KjelROC Scrubber
Operation Manual

Version E

1. Contents

2. Introduction

The KjelROC Scrubber is designed to facilitate a safe working environment in the lab. By efficient removal of fumes from a digestion process it is possible to maintain a healthy and safe environment for operators. As an additional benefit the KjelROC Scrubber makes it possible to increase the efficiency of a digestion process.

However, as the use of the KjelROC Scrubber includes handling of hazardous chemicals it is important that the operator reads what is written in chapter 3, Safety.

To get a brief understanding of how he KjelROC Scrubber is working please refer to chapter 4, Function. How to remove transport package and correctly install your instrument is described in chapter 5, Installation.

To get the best from your instrument it is important to operate, maintain and service it correctly. This is described in chapter 6.

3. Safety

Since the KjelROC Scrubber use hazardous chemicals it is important that every user read these safety instructions or be instructed by the laboratory manager.

3.1. User Safety

The instrument may only be used by laboratory personnel and other persons who have knowledge and/or experience of doing chemical analysis and dealing with hazardous chemicals.

Applications not mentioned in this document are improper. In particular, it is forbidden to use the instrument in the following instances:

- use of the instrument that require ex-protected instruments
- use of Chemicals or Reagents which can explode or inflame

It shall be noted that:

- modifications or upgrades to the instrument shall only be carried out by authorized service personnel

3.2. Safety Symbols


General Hazard


Corrosive acid


Crushing hazard


Electrical shock hazard


Hot Surface

Explanations used in this manual

 Important, Please Note

 Please Note, Protection Glasses is recommended

 Please Note, Gloves should be used

3.3. Product Safety Systems

The instrument is designed and built in accordance with state-of-the-art technology. Nevertheless, risks to users, property, and environment can arise when the instrument is used carelessly or improperly. If the equipment is not used in a manner specified by this document, the protection provided by the equipment may be impaired.

3.3.1. Handling of Chemicals

When using the KjelROC Scrubber it will be necessary to exchange the solutions in the large containers. Since these contain hazardous chemicals it is important that proper care is taken. Only operators that fully understand the used chemicals should do this task.

3.3.2. Maintenance and Service

The operator is responsible for ensuring that recommended daily and monthly user maintenance are performed on the Instrument. Failure to do so might impair the functionality and/or shorten the lifespan of the instrument.

The operator is responsible to schedule regular maintenance with authorized service personnel only. Only OPSIS LiquidLINE Spare parts should be used in the instrument.

4. Function

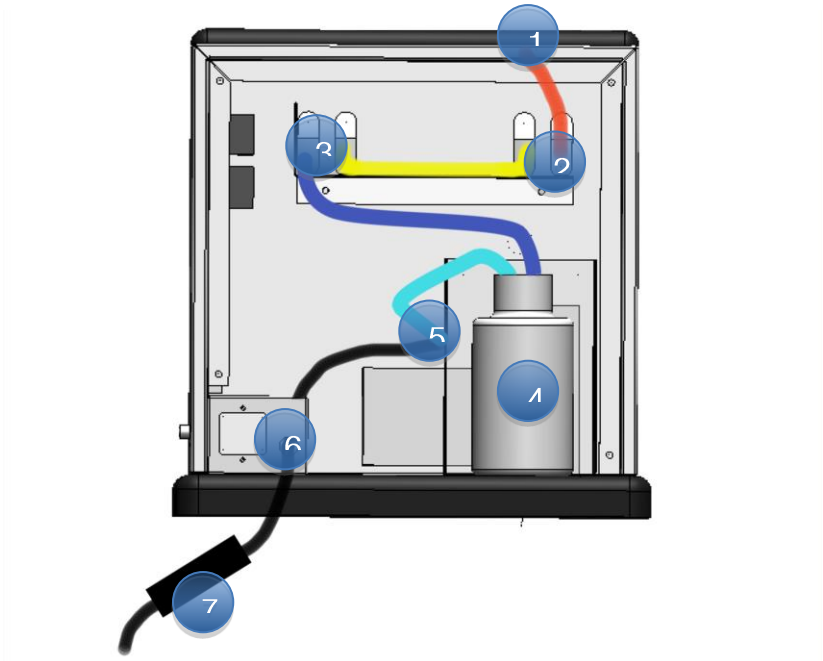
The gases and vapors from the digestion are all collected, via an exhaust, into the KjelROC Scrubber. The stable flow of gas to the KjelROC is achieved by the combination of a powerful air pump and a completelty sealed system.

The gases first passes through the inlet. An optional cooler can also be mounted for added efficiency of the following neutralization stages.

The resulting vapors are thereafter pumped through a first washing container containing water (2).

The gases and acidic vapors are therafter neutralized in the second container with the help of a soda solution (3).

The collector bottle (4) acts as a final filter stage and traps undesired particles and residual gases. Final waste and waste air passes through an air pump (5), outlet connector (6) and a silencer (7).



5. Installation

Your KjelROC Scrubber is delivered with some parts dismounted, to avoid damages. Please follow these advices to mount final parts and install your KjelROC Scrubber.

5.1. Checking the Package

The package should contain the following items:

- 1 pce KjelROC Scrubber with one Collector Bottle
- 1 pce KjelROC Scrubber container, 2 litres, for water
- 1 pce kjelROC Scrubber container with a warning sign, 2 liters
- 1 pce power cable
- 1 pce Silencer
- 2 pcs of 1 m Viton tube to connect to Exhaust
- 1 pce KjelROC Scrubber Operation Manual (this document)

5.2. Removing transport Packaging

Follow these instructions to prepare your instrument:

1. Please un-mount the protective cover on the backside of the instrument and remove the protective foam around the collector bottle. Ensure that the bottle is standing correctly inside the KjelROC Scrubber. Re-mount the protective cover.

2. Place the two glass containers at the designated location. Neutralization container (with warning sign) to the right and water container to the left. Please ensure that the top covers are sealing correctly towards the containers by pressing gently downwards. Please check that no tube connections are loose after the transportation.

5.3. Installing the Instrument

3. Connect tube for incoming gases: connect one end of the black viton tube to the fume inlet of the Scrubber. Connect the other end to the KjelROC Exhaust. Adjust the length of the tube.
4. Connect tube for outgoing air waste: connect one end of the black viton tube to the outlet on the backside of the instrument. Let the other end of the tube go to the waste. Please ensure that this tube goes downwards from the instrument to ensure a good outward flow of water.
5. If you want to use the optional silencer then please mount it at the end of the outgoing tube, from the outlet of the instrument.
6. Insert the power cable at the backside of the instrument and thereafter in the wall outlet.

Ensure that the length of the tube between the exhaust and the Scrubber is properly adjusted. Too long tube might result in a trap and prevent the KjelROC Scrubber to operate properly.

Please allow for exit of small amounts of liquid from the instrument. Please ensure that the black outgoing viton tube is going to the waste and that liquid can flow freely.

5.4. Optional Cooler

An optional Scrubber might be delivered together with your instrument. If that is the case then please connect the supplied PVC tubes to cooling water and drain respectively.

6. Operation

The KjelROC Scrubber is designed to be easy to use in the daily laboratory work. In normal operation there are only four steps – switch-on, adjust to high power, adjust to lower power and switch-off.

6.1. Adding or Changing Chemicals

The first container (the container to the left and with no warning sign) should hold approximately 800 ml of tap water.

The second container (to the right) should contain a saturated soda solution as the neutralizing solution, typically 400 ml of water plus 400 ml alkali (30-40%) plus 5 ml of BTB (bromothymol blue) indicator (100 mg in 100 ml methanol). As long as the liquid in flask no 2 is alkaline the air coming out from the Scrubber will be odourless. The number of batches that can be analysed before changing the liquids depends on the suction effect applied as well as the volume added acid. During “normal” conditions the contents in the flasks should be replaced after digestion of 60-80 tubes. The colour of the solution in flask no 2 will turn from blue to yellow when it is time to change.

6.1.1. Exchange Water in the First Container

1. Open the top cover and carefully remove the first container (to the left with no sign) to prevent spill on the instrument.
2. Dispose of the water
3. Refill the container with new water. Please take care to ensure that cover is sealing the container completely.

6.1.2. Exchange Sodium Hydroxide solution in the Second Container

4. Open the top cover and carefully remove the second container (warning sign, to the right) to prevent spill on the instrument.
5. Dispose the solution in the container according to the relevant waste disposal regulations.
6. Refill the container with a new sodium hydroxide solution and colour indicator. Place the container in the instrument and seal with the top cover. Please take care to ensure that cover is sealing the container completely.

Please take care when handling hazardous chemicals.

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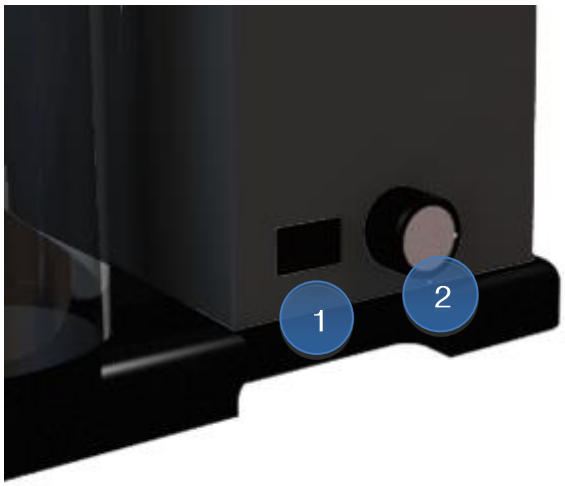
6.1.3. Exchange solution in the Collector Bottle

1. Remove the protective cover on the back side of the instrument.
2. Carefully remove the top cover of the bottle by unscrewing the cap. Leave the cap inside the instrument while you dispose of the contents in the collector bottle.
3. Dispose of the solution in the collector bottle according to relevant waste disposal regulations.
4. Place the collector bottle inside the instrument and seal again with the cap

Please take care when handling hazardous chemicals.

6.2. Using the Instrument

Switch on power by pressing the on/off button (1) at the right side of the instrument. The KjelROC Scrubber will start immediately. If you use the optional cooling function then please open the water tap to allow full cooling of the system.



Adjust the power by adjusting the Power nob (2) to the right of the instrument. There are six steps – from 0% to 100% power. Normally it is recommended to use maximal suction power in the beginning of the digestion, to ensure complete fume removal, and thereafter a lower level for the duration of the digestion. Please read the respective application note for further advice.

Switch-off the Instrument by pressing the on/off button at the end of the digestion. If you have used the optional cooling function then it is advised to close the water tap to avoid wasting of water.

6.3. Daily Maintenance

It is important to take care of the instrument by daily care and maintenance. Please follow these easy steps;

1. Use a wipe to clean and remove any residuals in the area below and around the containers
2. Check the top cover seals regularly and clean them with warm water

6.4. Closing down for Longer Periods

If the instrument is not used for a period longer than two weeks then it is advisable to remove all chemicals from the instrument. Please remove the water and solutions in the containers and remove any solution from the collector bottle. It´s advised to run the system for a short period with water in the two containers, to ensure that unwanted chemicals are removed from tubes and pump.

Please also check that there are no residuals left in the silencer.

7. Troubleshooting

Every consideration has been taken into account to ensure an easy and robust instrument. However, if something goes wrong it is recommended to following these advices before calling your authorized service engineer.

Problem	Possible Cause	Solution
The KjelROC Scrubber does not start	Power cable not connected or no power from the outlet.	Ensure that you have power correctly connected.
	The KjelROC Scrubber is on but power is set to 0%	Please turn the power nob to a higher value.
The KjelROC Scrubber seems to be on but there is no or very little suction	There might be a leakage between the glass container and the cover.	Please ensure that both top covers are sealing correctly and that no air can escape. Press gently at the top covers to ensure proper sealing.
	There might be leakage in one of the tube connections.	Check that there is no trap in the tube between the exhaust and the Scrubber. Please check tube connections. Check that the top to two containers are correctly sealed. Check that the cap on the bottle (inside the instrument) is correctly closed. If still no problem can be found there might be an internal leakage. Please contact your service engineer.

There is unusual high noise from the KjelROC Scrubber	There might be a leakage from the Silencer	Please check that the external Silencer has been mounted. Please ensure that no water has been left in the Silencer by lifting it carefully, having the exit tube into the waste.
The KjelROC Scrubber does not seem to clean the fumes, there is smell	There might be time to exchange the chemicals	Please exchange the solutions in the containers. Please ensure to add a colour indicator into the new solution.

8. Technical Data

Operating Temperature	5°C - 40°C
Relative humidity	max 80 %
Power Supply	190-240 VAC, 50-60 Hz, 10A
Power consumption	75 W
Dimensions (WxHxD)	330 x 470 x 335 mm
Weight	14 kg

9. Declarations and Requirements

9.1. Declaration of conformity

OPSIS

CE

Declaration of Conformity

Identification of apparatus:	KjelROC Scrubber DI-110
Model/type:	Scrubber
Manufacturer:	OPSIS AB Box 244, SE–244 02 Furulund, Sweden Phone: +46 46 72 25 00

The undersigned hereby declares that the above-referenced product, to which this declaration relates, is in conformity with the provisions of:

- Council Directive 2014/30/EU (February 26, 2014) on Electromagnetic compatibility (EMC),
- Council Directive 2014/35/EU (February 26, 2014) on Electrical Safety: low-voltage electrical equipment,
- Council Directive 2006/42/EC (June 9, 2006) on Safety of Machinery,
- Council Directive 2011/65/EU (June 8, 2011) on Restriction of the use of hazardous substances (RoHS 2).

The below harmonised standard specifications have been applied:

Safety:

ANSI/ISA-61010-1 (November 5, 2012) Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

Electromagnetic Compatibility:

Emission: EN 61000-6-3 (2007)

Immunity: EN 61000-6-2 (2005)

October 8, 2018

Svante Wallin
President OPSIS AB

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9.2. FCC REQUIREMENTS (FOR USA AND CANADA)

English:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to both Part 15 of the FCC Rules and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Français:

Cet appareil a été testé et s'est avéré conforme aux limites prévues pour les appareils numériques de classe A et à la partie 15 des réglementations FCC ainsi qu'à la réglementation des interférences radio du Canadian Département of Communications. Ces limites sont destinées à fournir une protection adéquate contre les interférences néfastes lorsque l'appareil est utilisé dans un environnement commercial.

Cet appareil génère, utilise et peut irradier une énergie à fréquence radioélectrique, il est en outre susceptible d'engendrer des interférences avec les communications radio, s'il n'est pas installé et utilisé conformément aux instructions du mode d'emploi. L'utilisation de cet appareil dans les zones résidentielles peut causer des interférences néfastes, auquel cas l'exploitant sera amené à prendre les dispositions utiles pour pallier aux interférences à ses propres frais.