LAB Online Exhibition

Operation Manual

knowledge

Action movie

www.1788lab.com E-mail:info@1788lab.com

Table of Contents

Read this Operation Manual through carefully before starting to use the **BÜCHI** Syncore Product Line. Always keep these instructions ready at hand close to the equipment so that they may be consulted quickly at all times. Chapter 2 provides important safety instructions that must be followed to ensure safe operation of the unit.

en, Version A (66 pages)	Order code
Syncore Instrucctions	**96897**

1 Scope of delivery

1.1 Racks

Figure 1: Summary of the different racks

Rack R-4 complete

1	Rack R-4 complete for 500 ml sample volume, incl. 4 glasses R-4	**38183**

Rack R-6 complete

1	Rack R-6 complete for 250 ml sample volume, incl. 6 glasses R-6	**38439**

Rack R-6 cpl. with cooling of the residual volume

1	Rack R-6 complete for 250 ml sample volume with cooling of the residual incl. 6 glassel R-6 (0.3 ml residual volume) 2 cooling hoses, 1 m	**38184**

Rack R-12 complete

1	Rack R-12 complete for 120 ml sample volume, incl. 12 glasses R-12	**40900**

Rack R-24 complete, for round glasses

1	Rack R-24 complete for 30 ml sample volume, incl. 50 glasses without cover	**38188**

Rack R-24 complete, for Falcon tubes

1	Rack R-24 complete for 30 ml sample volume, ohne glasses	**38440**

Rack R-96 complete

1	Rack R-96 complete for 10 ml sample volume, incl. 100 glasses R-96	**38277**

Rack Calypso complete

1	Rack Calypso complete, for 4 reaction blocks from the Calypso® system	**38484**

1.2 Glasses and Holders

Glasses R-4

1	Set of glasses to Rack R-4 (4 units) (Ø: 85 mm / h: 185 mm / vol: 500 ml)	**38487**

Glasses R-6 without appendage

1	Set of glasses to Rack R-6 (6 units) without cooling of the residual volume (Ø: 75 mm / h: 185 mm / vol: 250 ml)	**38486**

Glasses R-6 with appendage 0.3 ml

1	Set of glasses to Rack R-6 (6 units) with cooling of the residual volume (Ø: 75 mm / h: 175 mm / vol: 250 ml)	**38485**

Glasses R-6 with appendage 2.5 ml

1	Glass to Rack R-6 with cooling of the residual volume (1 unit) (Ø: 75 mm / h: 175 mm / vol: 250 ml)	**38545**

Glasses R-12

1	Set of glasses to Rack R-12 (12 units) (Ø: 48 mm / h: 174 mm / vol: 120 ml)	**40907**

Test tubes R-24

1	Set of test tubes to Rack R-24 (50 units), without cover (Ø: 25 mm / h: 150 mm / vol: 30 ml)	**38469**

Test tubes R-24 with cover

1	Set of test tubes to Rack R-24, with round bottom, with cover (50 units) (Ø: 25 mm / h: 150 mm / vol: 30 ml)	**38468**

Glasses R-96

1	Set of test tubes to Rack R-96 (100 units) (Ø: 16 mm / h: 130 mm / vol: 10 ml)	**38543**

Figure 2: Holder for glasses R-6

Holder for glasses R-4

1	Holder for 4 glasses R-4	**38482**

Holder for glasses R-6, glasses with or without an appendage

1	Holder for 6 glasses R-6	**38483**

1.3 Low temperature insulation

Figure 3: Low temperature insulation

Insulation to Rack R-24 and Rack R-96, cpl.

1	Insulation complete to Rack R-24 and Rack R-96	**38144**

1.4 Vacuum covers

Figure 4: Vacuum covers

Vacuum cover R-4, complete

1	Vacuum cover to Rack R-4	**38245**

Vacuum cover R-6, complete

1	Vacuum cover to Rack R-6 and R-6 with cooling of the residual volume	**38246**

Vacuum cover R-12, complete

1	Vacuum cover to Rack R-12	**40910**

Vacuum cover R-24, complete

1	Vacuum cover to Rack R-24	**38150**

Vacuum cover R-96, complete

1	Vacuum cover to Rack R-96	**38425**

1.5 Condenser units

Figure 5: Condenser unit S

Condenser unit S complete (PLASTIC + GLAS)

1	Condenser unit S complete, 1000 ml Plastic + Glass coated	**37690**
1	Condenser unit S complete, 2000 ml Plastic + Glass coated	**40146**

Figure 6: Condenser unit C

Condenser unit C complete (PLASTIC + GLAS)

1	Condenser unit C complete, 1000 ml Plastic + Glass coated	**38371**
1	Condenser unit S complete, 2000 ml Plastic + Glass coated	**40147**

1.6 Insulation for high boiler

Figure 7: Insulation for high boiler

Insulation for high boiler to Rack R-24		**41922**
Consisting of:		
1	Insulation plate, upper, R-24	**41885**
1	Glass insulation, R-24	**41887**
1	Vacuum hose made of PFA ribbed, 0.6 mm complete	**37695**
1	Woulf Flask Syncore	**41875**

Insulation for high boiler to Rack R-96		**41923**
Bestehend aus:		
1	Insulation plate, upper, R-96	**41886**
1	Glass insulation, R-96	**41888**
1	Vacuum hose made of PFA ribbed, 0.6 mm complete	**37695**
1	Woulf Flask Syncore	**41875**

1.7 Cooling plate

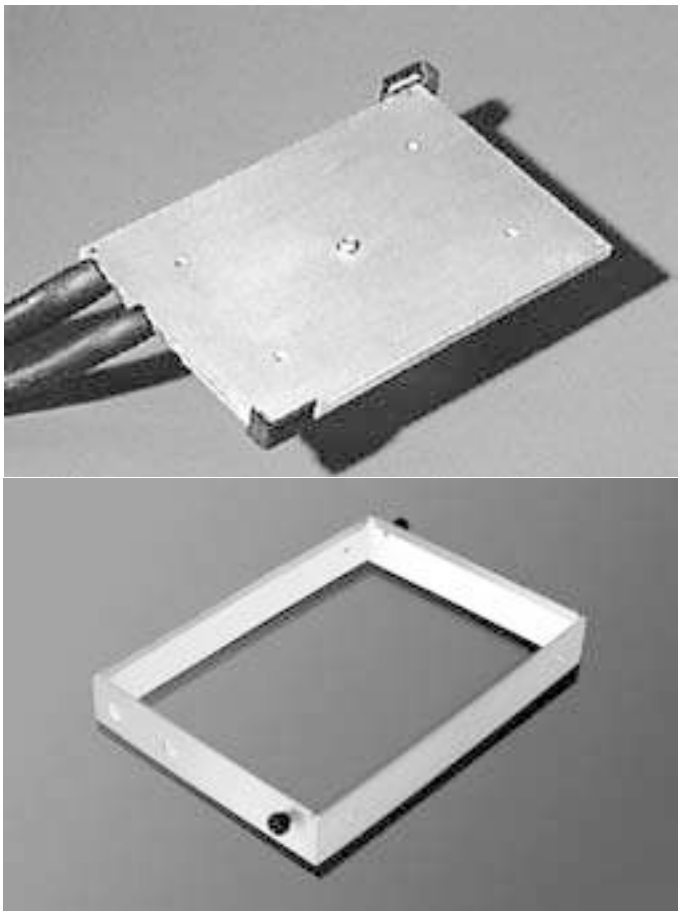


Figure 8: Cooling plate (upper), Insulation (lower)

1	Cooling plate, complete	**38481**
1	Valve, 24V DC, to -20°C, with hose nipples	**38496**

1	Insulation cooling plate	**41894**

1.8 Reaction kit, Inert gas- and reflux module

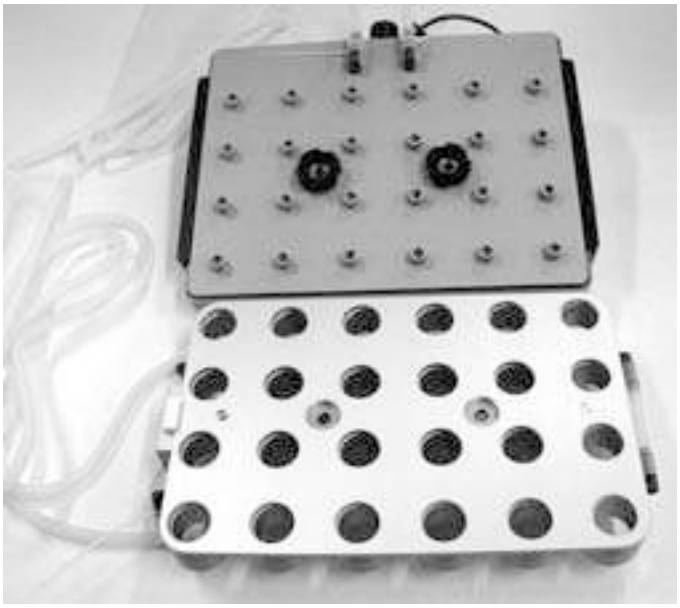


Figure 9: Reaction kit complete

Reaction kit complete		**41917**
Consisting of:		
1	Inert gas cover complete R-24 cpl.	**41918**
1	Reflux module R-24 cpl.	**41901**

Inert gas cover complete R-24 cpl.		**41918**
Consisting of:		
1	Vacuum cover base plate to Rack R-24	
1	Inert gas module R-24 complete	**41909**

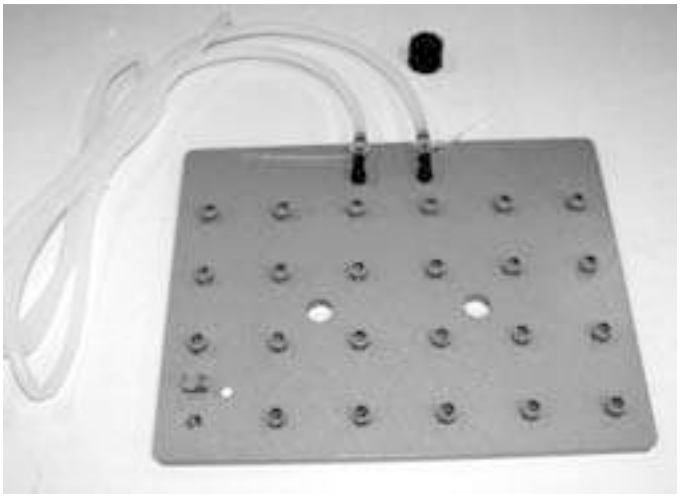


Figure 10: Inert gas module complete

Inert gas module R-24 complete		**41909**
Consisting of:		
1	Inert gas module incl. separating walls	
1	Cap SVL 22	**05222**
2	Silicon tube , 1m	**04133**
1	Set of septa silicone PTFE (25 units)	**41913**
4	Cable binders	

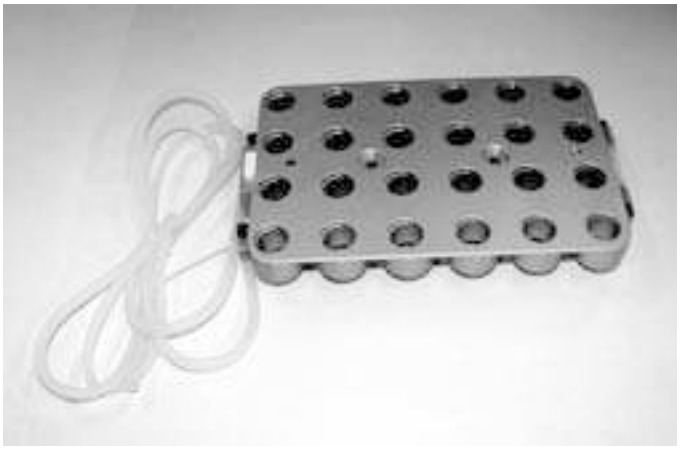


Figure 11: Reflux module complete

Reflux module complete		**41901**
Consisting of:		
1	Reflux module to Rack R-24	
2	Silicon tube , 1m	**04133**
4	Cable binders	

1.9 Filtration unit and collection unit

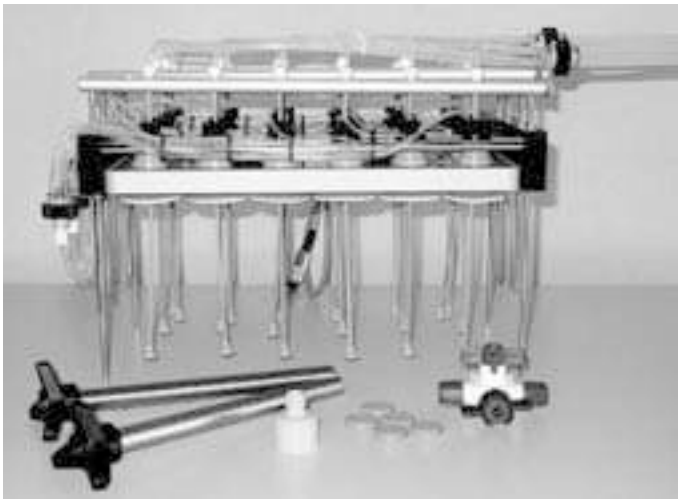


Figure 12: Filtration unit

Filtration unit, complete		**42900**
Consisting of:		
1	Filtration unit	
4	Set frit holders PFA (6 units)	**40993**
25	Filter frits PE 20 micron	**40966**
4	Sets six-fold hose couplings receiving flask (1 piece incl. tubes)	**42949**
	Cover lids (4 pieces)	
1	Three-way cock PFA	**42943**
1	Adapter SVL 22	**37784**
2	Clamping nuts long (for the attachment of the filtration unit on the rack)	**42989**
4	Sets FEP hoses with nozzle (6 pieces)	**40959**
1	Set silicon discs (5 pieces)	**40948**
1	Torx allen wrench (x8)	
1	Torx allen wrench (x 10)	
	FEP hose D 8/6 (80 cm)	
1	Tool for opening and closing the gasket mounts	**40939**

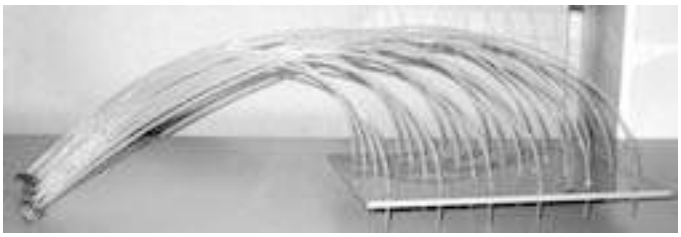


Figure 13: Collection unit

Seals filtration pipe, seals additons: Perfluoro Seal 6 x 3.2:Perfluoro

Collection unit, complete		**42940**
Consisting of:		
1	Hose guidance panel	
4	Sets six-fold hose coupling collection unit (1 piece incl. tube)	**42942**

1.10 Instrucctions

1	Operation Manual	
	German	**96896**
	English	**96897**
	French	**96898**
	Italian	**96899**
	Spanish	**96900**

2 Safety

This unit and all its components have been built in accordance with the state of the art and recognized safety rules.

Nevertheless, certain risks and dangers may be involved when working with the unit or its individual components:

- Whenever the unit is not being used in accordance with its intended purpose, or
- Whenever the staff operating the unit have not lack sufficient training and know-how.

2.1 Symbols

Stop
Information on hazards that can result in severe material damage or serious to fatal injuries.

Warning
Information on hazards that can result in injury to one's health or material damage.

Caution
Information pointing out technical requirements. A failure to follow these instructions can cause malfunctions, uneconomical operation, and production losses.

2.2 Requirements for the User

This unit and all accessories for the Syncore line of equipment may be used only by laboratory staff and other individuals who, based on their education, training, or professional experience, are fully aware of the risks involved in their use. Staff lacking this training or staff currently being trained need careful instruction. These Operating Instructions are valid as a basic requirement.

2.3 Authorized Use

This unit has been designed and built as a laboratory instrument. The authorized application for the Syncore single platform inconjunction with accessories from the Syncore product line is as follows:

Syncore Reactor/Syncore single platform with accessories:

- Chemical synthesis in various formats and reaction vessels over a range of temperature from -20 up to + 150 °C, max. (Syncore single platform and Syncore racks)

Syncore Polyvap/Syncore single platform with accessories:

- Parallel evaporation of solvents in various formats and containers across a range of temperatures from room temperature up to + 150 °C and within a range of pressures from 1 mbar up to ambient pressure.

Syncore Analyst:

- Parallel evaporation of solvents from 6 different samples across a range of temperatures from room temperatures up to + 100 ° (or bypassing pre-set safety settings, up to 150 °C), within a range of pressures from 1 mbar up to ambient pressure.

Applications for the Syncore line of equipment include:

- Parallel organic - inorganic chemical synthesis in theliquidor in the solid phase.
- Parallel material investigations, digestions, preparation of samples of from 4 to 96 samples, with sample volumes ranging from 500 down to 1 ml.
- Parallel evaporation of from 4 to 96 samples with sample volumes from 1 ml up to 500 ml after chemical synthesis, after chromatography, after extraction, etc.
- Parallel evaporation in chemical analysis, guaranteeing a residual volume after the evaporation.

2.4 Unauthorized Use

Any use other than those indicated above and any application that does not correspond to the Technical Data is considered to be improper use. The operator himself bears sole responsibility for any risks arising from such use.

The following in particular are explicitly forbidden:

- The processing of samples that can explode or ignite explosively as the result of impact, friction, heat, or sparking (e.g., explosives, etc.).
- The carrying out of chemical reactions that can produce substances that can explode or ignite explosively as the resultof impact, friction, heat, or sparking (e.g., explosives, etc.);
- Use of the unit in rooms that require explosion-proof equipment;
- Use of the single platform with sample holders or sample containers that have not been developed for use on the Syncore single platform.
- Working at above atmospheric pressure

2.5 Basic Hazards

The basic hazards arise from:

- Chemicals that are toxic or cause allergic reactions, or can, in a chemical reaction, produce compounds that are toxic or cause allergic reactions.
- Solvent materials which can form peroxides.
- Very hot or very cold parts made of plastics and metals (Burn injuries).
- Kinked hoses or the dissolving of hose materials used to introduce liquids, compressed gases under pressure.
- Moving parts which rotate at high speed about an axis and which if used in animproper way can lead to injury or the destruction of laboratory equipment.
- Glass vessels under vacuum which can implode.
- Electric cables which can be damaged or incorrectly connected.
- Combustible gases or solvent vapors in the area immediately adjacent to the Syncore.

2.6 Safety procedures

The regional and local laws and regulations must be observed. It is necessary to wear personal protective equipment such as **protective goggles** and **a laboratory coat**.

It is only permissible to assemble and dismantle certain parts of the Syncore when such action is necessary to carry out the functional requirements.

This activity can be performed manually or by use of the tool which is supplied. Except for authorized maintenance personnel, the removal of protective devices and cover plates/ shrouding with the aid of a conventional tool is forbidden.

The owner of the company is responsible for the instruction of his personnel. To assist in this context, it is possible to order these Operating Instructions in other languages. At all times, these Operating Instructions must be available - as a component part of Syncore - to the operating personnel at the point where the equipment is employed.

The owner of the company will inform the Manufacturer immediately regarding all events having a bearing on safety which take place while the equipment is in use.

2.7 Modifications

No modifications may be made on this unit or on spare and accessory parts, nor is use of spare or accessory parts other than those indicated in this Operation Manual permissible, without the prior written approval of BÜCHI Labortechnik AG.

2.8 Safety Instructions

Chemicals and Solvents

The unit must be clean before being operated. Residues of chemicals are to be removed following the general rules for working with chemicals.

The unit must not be put into operation if solvents could penetrate into it. If that could happen, place the unit in a well-ventilated fume cupboard and wait until the fumes have been drawn off completely before operating it.

Whenever the unit is being operated with chemicals that are aggressive, toxic, or likely to cause allergic reactions, it should always be located in an fume cupboard.

Indicators, Hoses and Cables

The Syncore single platform must not be operated if individual indicators are not functioning properly and data on parameters such as time, temperature, or speed are missing. Live electrical cables and the hoses for the heating and cooling media must not come into contact with the heated base plate: They could melt.

Hot and Cold Parts

Various parts of the unit can be heated or cooled to from -20 °C to +150 °C. **Never** touch hot or cold parts with your hand. No containers used may become either brittle or soft within the range of temperatures selected.

Exceeding the Maximum Temperature

Do not under any circumstances continue using the unit when the temperature displayed is above 155 °C. Contact a BÜCHI service agent immediately in such a case.

3 Function, Putting into Operation Operation and Maintenance

3.1 Syncore Product Line Accessories

The Syncore product line is modular throughout. Every accessory is usable at any time with a Syncore single platform and with all standard configurations.

3.2 The Condenser Unit

Introduction

The condenser unit is used to condense out solvent vapors under a reduced pressure and to collect them in a receiving flask. Cooling liquids may, for example, be water at room temperature or liquids actively cooled in a cooling aggregate.

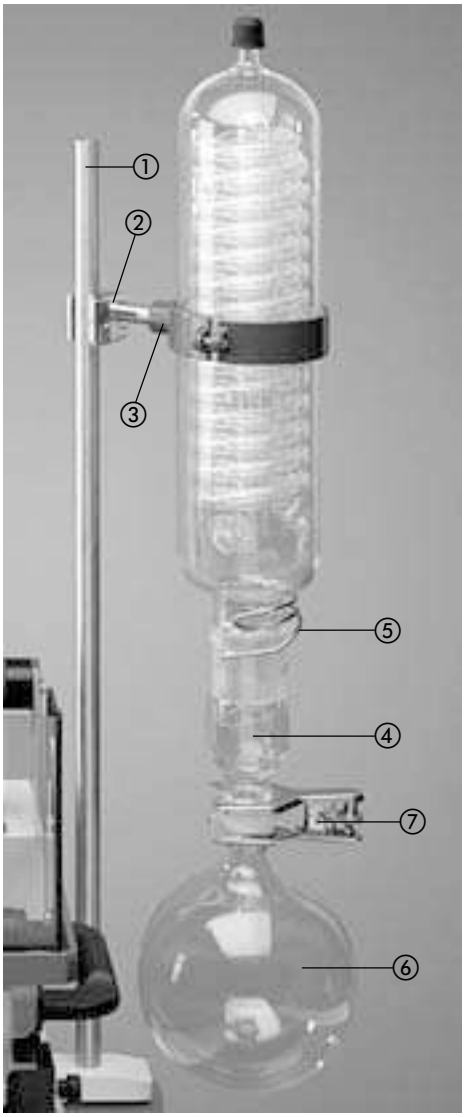


Figure 14: Attachment of the Condenser Unit

During operation, the condenser unit is connected to a vacuum source. Never use glassware if it is found to be cracked. No manipulations may be made on either the condenser unit or the receiving flask during operation. Glass parts subjected to a vacuum may implode and cause material damage and personal injuries. Ground glass joints may be turned and the unit as a whole moved only has been fully vented.

Attachment of the Condenser Unit S and C

- Screw the support rail ① into the hole provided either on the right or on the left of the back legs (depending on the workplace and on the working procedure involved).
- Fasten the the pivoting clamp ③ with the cross-shaped sleeve ② to the stand.
- Fasten the cooler to the pivoting clamp.
- Using a clamp ⑤, fasten the adapter ④ to the cooler.
- Likewise fasten the receiving flask ⑥ to the adapter with a clamp ⑦.

The firmly-secured hoses must not come into contact with the heating plate or the heated and cooled racks or vacuum connections and must be held in place by a clip.

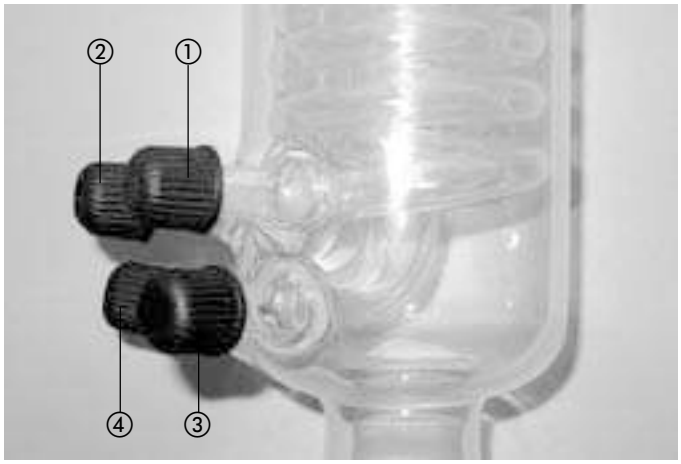


Figure 15: Cooler connections

- Fasten the cold water supply to the connection units ① and ② using GL14 screwed fittings
- Join the connection element ③ to the valve unit by means of a GL 14 sealing cap ④.

Temperature of the Cooling Medium

The temperature of the cooling medium significantly affects the condensation of the solvent vapors. Select a cooling medium temperature that lies at least 15 to 20 °C below the vapor pressure of the sample. Efficient cooling in condensation is ensured whenever the solvent condenses out completely in the first third of the cooling coil.

In addition to the condensation done under a vacuum, we recommend also carrying out a second condensation downstream from the vacuum pump. Re-condensation under atmospheric pressure downstream from the vacuum pump (e.g., using the BÜCHI VAC V-503 diaphragm pump) makes it possible to condense any fumes of solvents and chemicals that may still be present efficiently and safely.

3.3 Racks

Introduction

The Syncore product line allows various racks to be used on a given platform. These permit the parallel processing of...

- in synthesis: 24 and 96 samples with working volumes ranging from 1 to 40 ml
- in evaporation: 4 to 96 samples with working volumes ranging from 1 to 500 ml

In addition, within any given format (4, 6, 12, 24, or 96), racks can be adapted to accommodate customer vessels.

There is a special rack available for using the reaction blocks of the Calypso System from Charybdis Technologies. This allows parallel processing of up to 4 x 96 samples in chemical synthesis.

All racks are heated by a heating system built into the base plate of the unit. The heat is transferred into the samples by means of:

- Direct transfer between the sample glass and the metal of the rack (Racks R-12, R-24 and R-96)
- Indirect transfer between the sample glass and the metal shell of the rack (Racks R-6 and R-4, using a layer of water): Hybrid heating.

Installation of a Rack

The base plate and the floor of the rack must be clean before installing a rack on the Syncore single platform. Switch the vortex drive OFF and flip up the protective shield.

The base plate and the floor of the rack must not be fouled with hard particles. Particles of glass, metal, plastic, ceramics, or similar materials can cause scratches on the base plate or the floor of the rack. A poor contact between the base plate and the floor of the rack detracts from the heat transfer.

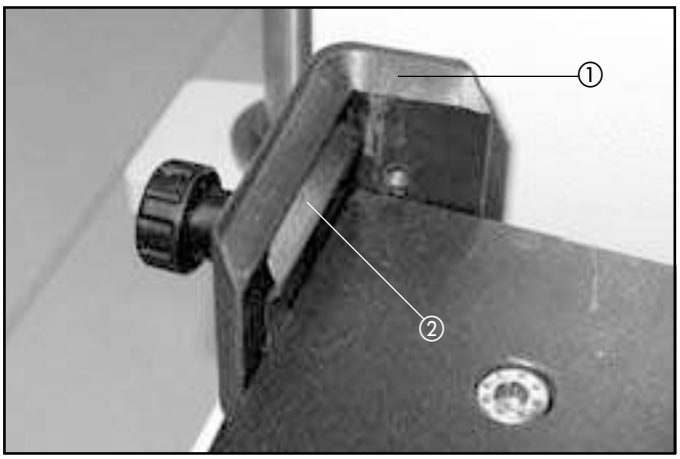


Figure 16: Corner frames and spring-loaded clamps on the base plate.

The racks are held and positioned by two corner brackets ① (with spring-loaded clamps ②). Warning: Never use a rack on the base plate if the corner brackets or the clamping springs are missing or have become damaged.

To put a rack in place, hold it by the handles with both your hands. Place the rack on the base plate so that the corners of the rack floor lie on the corresponding corners of the base plate.

Check that the floor of the rack lies in full contact on the base plate and that the spring-loaded brackets hold the rack fast from two sides. Finally, tighten the two screws by hand.

Sample Volume (SV)

Rack	Minimum SV	Optimum SV
R-4	50 ml	500 ml
R-6	25 ml	250 ml
R-6 with residual volume	25 ml	250 ml
R-12	10 ml	120 ml
R-24	5 ml	30 ml
R-96	0.5 ml	10 ml

Table 1: Sample volume

Rack R-4, R-6

Rack R-4 or Rack R-6, respectively, allows for the heating or cooling of 4 or 6 test vessels respectively. Only the glass vessels described in these Operating Instructions should be used.

In Rack R-4 and Rack-R6, water is used as the heating transfer medium between the metal sheath and the test vessel. The water layer between the sheath and the glass should surround at least $^2/_3$ of the glass surface. For this reason, water is added to reach the marks in the sheath equivalent to 125 ml for R-4 respectively 85 ml for R-6.

Only distilled, clean water should be used. If the racks are not used for a long period, they should be emptied in order to prevent deposits forming in the metal caps.

Rack R-6 with residual Volume

The Rack R-6 with cooling of the residual volume lets you cool a glass appendage actively without changing the heat exchange into the glass outside the appendage.

Thus it becomes possible to evaporate solvents from the appendage glass until the final volume has been reached within the glass appendage. Due to the active cooling, any solvents remaining in the appendage along with the products being investigated in the analysis will no longer evaporate out. The cooling temperature selected for the glass appendage and the vacuum applied must be coordinated so that the temperature will not drop below the boiling point of the solvent.

Example: Using hexane as the solvent

Cooling of the appendage with water, 15 °C.,
pressure = 335 mbar / Boiling point of the hexane = 40°C.

Too low a vacuum or too high a temperature of the cooling medium may result in a complete evaporation of the residual volume.

For a rough guide for the pressure to be selected to reduce the boiling point to 40 °C, refer to the Table of Solvents in the Appendix.

Filling with Water

Figure 17: Water in the Rack R-6 with cooling of the residual volume

In the Rack R-6 with cooling of the residual volume, water is used as the medium of heat transfer between the metal shell and the sample tube.

The layer of water between the shell and the glass should surround at least $^{2}/_{3}$ of the glass in the shell. To ensure this, fill 40 ml of water into the shell up to the marking ①.

Use only clean distilled water.
Whenever the racks are not going to be used for a prolonged time, empty them so as to keep deposits from forming on the metal shell.

Connections for Cooling Media

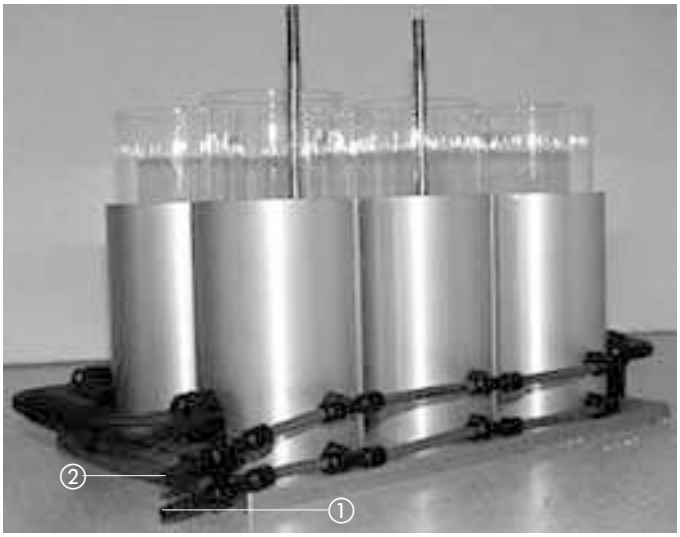


Figure 18: Cooling fluid liquid and outlet

The cooling media used may be either tap water or some other liquid cooled using an external cooling aggregate.

The temperature of the cooling medium may range between 0 °C and 40 °C. The flow of cooling medium should be regulated at between 100 and 200 ml / min.

The cooling of the residual volume has not been designed for less than 0 °C. Cooling to below 0 °C should be avoided.

The 6 positions in the Rack R-6 with cooling of the residual volume are connected in series. They are connected to the cooling medium across two hose connections. Hoses at the inlet ① for the cooling liquid a and at the outlet ② for the liquid b must always be secured.

The vortex movement of the rack also moves the hoses for the liquid. The hoses must not be laid across the rack or the unit. Any contact of the hoses with sharp edges or corners must absolutely be avoided.

Empty Positions

Due to active cooling of the residual volume appendages on the glasses in the Rack R-6 with cooling of the residual volume, the rack should never be operated with some of the glasses empty without first sealing off the empty positions in the vacuum connection with plastic plugs. The cooling produces a cool condensation zone for solvents that evaporate out of glasses that are filled. Plugging the vacuum inlets for empty glasses in the vacuum connection renders such condensation impossible and results in a quicker evaporation across the positions that are filled.

Glassware

Only the glassware described in this Operation Manual may be used with the Rack R-6 with cooling of the residual volume.

Residual Volume

The residual volume in the cooled appendix of the glass vessel amounts to between 0.3 and 0.4 ml respectively between 2.5 and 3.0 ml (see also the Section on Spare Parts). Under suitable conditions, the residual volume remains stable for hours.

Example: Glasses with 0.3 - 0.4 ml residual volume
Evaporation of hexane, 200 ml, heating of the rack at 60 °C, Vacuum 335 mbar (Boiling Pt. = 40 °C). Cooling of the residual volume at 15 °C. The residual volume within the appendage remains at a minimum of 0.3 - 0.4 ml.

Rack R-12

Rack R-12 provides for the heating or cooling of test vessels with rounded bases. Only those glass vessels described in these Operating Instructions should be used.

Retaining clamps

In all the positions within the racks, the glass vessels are secured by retaining clamps in the wall of the rack and - in order to obtain an optimal transfer of heat - are pressed against the metal surface.

Do not use positions that do not have retaining clamps. The sample glass will not be held firmly and no optimum heat exchange can take place.

Rack R-24 for Round Glasses

Glasses

The Rack R-24 for round glasses permits the heating or cooling of test tubes with a round bottom.

Retaining clamps

In all the positions within the racks, the glass vessels are secured by retaining clamps ① in the wall of the rack and - in order to obtain an optimal transfer of heat - are pressed against the metal surface.

Do not use positions that do not have retaining clamps. The sample glass will not be held firmly and no optimum heat exchange can take place.

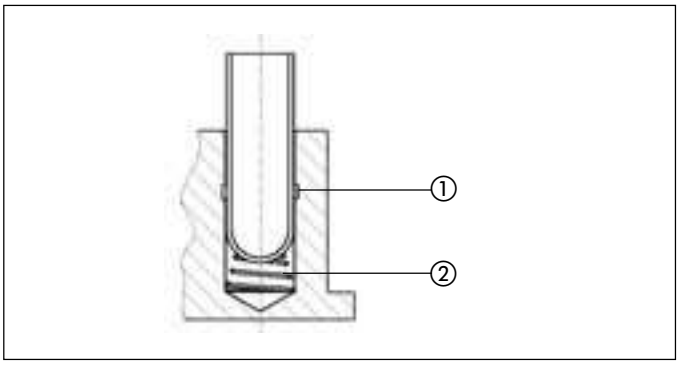


Figure 19: Springs for Rack R-24

A spring ② can be inserted in each hole to press the glass vessels against the vacuum connection.

Rack R-24 for Falcon Glasses

The Rack-R-24 for Falcon glasses permits the heating or cooling of Falcon 50 ml glasses. The hole in the rack for each sample glass runs to a point.

Rack R-96

The Rack R-96 permits the heating or cooling of test tubes with a round base. The glasses described in this Operation Manual should be used.

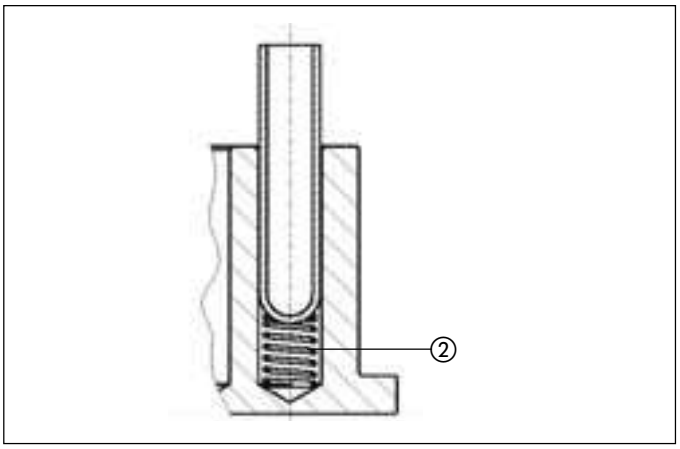


Figure 20: Springs for Rack R-96

A spring ② can be inserted in each hole to press the glass vessels against the vacuum connection.

Customer-Specific Racks

It is possible to build a customer-specific rack with various glass geometries and sizes. Under some circumstances, customer-specific racks can be built for sample glasses with the following diameters:

Rack 96:
Minimum outside diameter = 8 mm
Maximum outside diameter = 20 mm

Rack 24:
Minimum outside diameter = 10 mm
Maximum outside diameter = 44 mm

Possible glass geometries include: Glass with a round bottom, glass with a square bottom, or a bottom that runs to a point. Please contact your BÜCHI representative or BÜCHI Labortechnik AG directly for your specific racks and requirements.

3.4 Vacuum covers

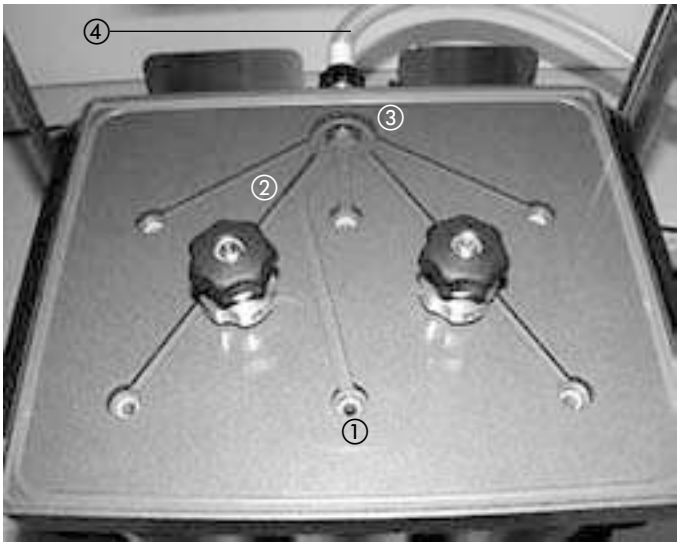


Figure 21: Vacuum Cover

Introduction

The vacuum connection is used in conjunction with a suitable vacuum source in order to place the sample tubes in a rack under a vacuum. For this reason, the vacuum connection is connected to the vacuum source by a cooling unit, then positioned against the test vessels in the rack and, finally, screwed down.

Each sample tube is sealed off across its own individual connection ①. The seal is made with plastic sealing discs with a PTFE-coating.

Solvent vapors are directed into the vacuum connection separately from each glass and sent from that point via collection channels ② to a central steam duct ③. This duct is connected to an inert, pressure-resistant hose made of PFA ④ which directs the solvent vapors on to a cooler. To prevent condensation of the solvents within the vacuum connection, the vacuum connection is heated. The maximum temperature that the vacuum connection can reach is 70 °C.

The settings in the single platform must make provision for the vacuum connection. The eccentricity of the shaking movement and the unbalance compensation must be adjusted to the rack being used and the vacuum connection. An incorrect eccentricity or unbalance compensation can result in damage to the single platform or laboratory equipment, or may cause personal injuries (refer also to the Operating Instructions relating to the Syncore Platform).

Connections

Vacuum connection

Connect the vacuum hose to the vacuum connection.
The vacuum hose itself is joined directly to the adapter on the condenser unit.

The vortex shaking movement of the rack sets the vacuum hose into a rotating movement along with the vacuum connection. The vacuum hose must not come into contact with or rub against other parts of the unit. There should be a slight fall between the vacuum connection and the adapter on the condenser unit.

Electrical Connection

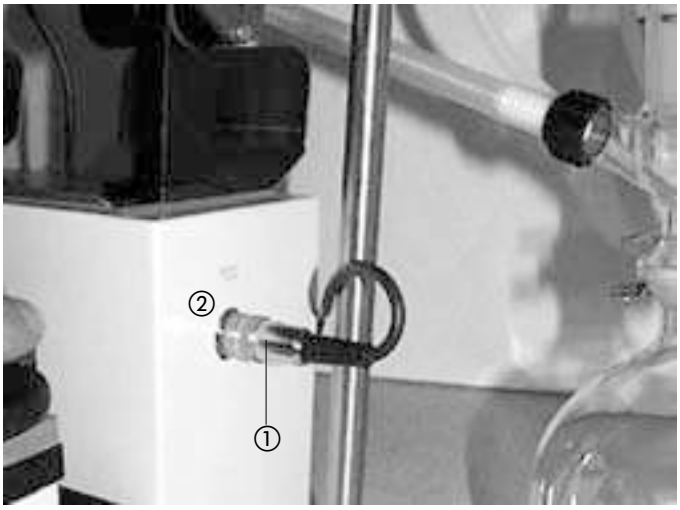


Figure 22: 24 V connection on the vacuum connection

Connect the plug ① on the electrical cable of the vacuum connection to the 24 V connection socket ② on the right side of the single platform.

Warning:
Under no conditions is it permissible to plug the plug into the socket if solvents or chemicals have flowed into the socket.

If the plug on the vacuum connection or the socket has become fouled, switch the unit OFF immediately and pull the power system cable from the plug.

Selection of the Temperature

Maximum temperatures:
The vacuum connection must not be heated to more than 70 °C.Depending on the temperature, contact with the vacuum connection may cause slight burns. Handle the vacuum connection only by the handles on its sides.

Once it has been connected to power, the vacuum connection is heated constantly. The operator can set the maximum temperature of the vacuum connection. In this context, refer also to the Section “Vacuum-connection heating” in the Operating Instructions relating to the Syncore Platform.

Select the maximum temperature so that the temperature of the vacuum connection is at all times 5 °C higher than the temperature of the solvent vapors. A temperature of the vacuum connection lower than that of the solvent fumes causes the fumes to condense out in the vacuum connection. As a rule, all work with pure solvents should be done at a solvent vapor temperature of 40 °C and a vacuum connection temperature of 50 °C.

The „Table of Solvents: Pressure for a boiling point of 40 °C“ in the Appendix shows the optimum pressure conditions for various solvents.

To ensure a quick warming of the vacuum connection, the vortex drive should not be switched ON. A flashing in the display „Actual“ indicates that the heater for the vacuum connection is ON. This display keeps flashing until the set-point temperature for the vacuum connection has been reached. As soon as the „Start“ button is activated, the display stays lit with a constant light.

Handling (General)
The vacuum connection consists of one basic part made of coated aluminum, plus sealing discs, sealing rings, sealing nipples, and a glass plate.

Aluminum Plate
The aluminum plate has a coating of PFA. that is absolutely resistant to chemicals.

This chemically resistant coating must not become damaged due to the contact with hard or pointed objects. If this protective coating becomes damaged, the aluminum will be attacked by solvents and chemicals. All vacuum connections must always be stored on a soft base.

Sealing Discs
The sealing discs seal the individual sample tubes off vacuum-tight. Damaged or fouled sealing discs can be replaced easily. Before putting the vacuum connection into use, check that the sealing discs are clean and intact.

The sealing discs must not be handled with sharp or pointed objects. It is not permissible to use any sample tubes that have sharp edges that could cause damage to the sealing discs.

Replacement of Sealing Discs (R-4, R-6, R-12, R-24, R-96)

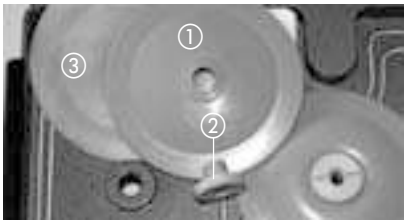


Figure 23: Sealing discs: Fastening to the vacuum connection

The sealing discs ① can easily be replaced using a broad screwdriver.

To do this, carefully unscrew the screw caps ② made of PEEK from the vacuum plate. The sealing discs ③ can now be removed. If necessary, the silicone shims under the vacuum connections can likewise be replaced after the new sealing discs have been put in place, carefully screw the screw caps of PEEK back in. Screw the screw caps in carefully.

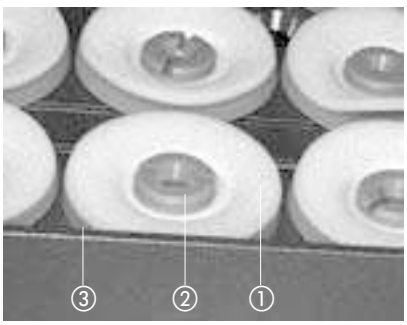


Figure 24: Sealing discs: Fastening to the vacuum connection

To avoid damaging the screw caps and the threads for them in the vacuum connection, the screw caps must be set down straight on the thread when screwing them in.

The force required to screw the screw caps in is approximately the same for all caps.

Whenever the screw clamps jam while being screwed in, stop.

Screw the screw caps back out and screw them in again. Whenever the sealing discs have been replaced, recheck the vacuum connection for leaks.

Glass Plate

The glass plate lets the operator observe the vacuum zone inside the vacuum connection. The operator can at all times see any spraying in one of the positions or any condensation that is occurring.

A vacuum connection must never be used if the glass has been damaged. Glass plates that are cracked or whose edges have splintered off could shatter under the vacuum and cause material damage and personal injuries.

Empty Positions in the Rack

Whenever you do not need all of the positions in the rack, you can proceed as follows:

- Fill all the positions in the rack with sample tubes. The empty sample tubes do not affect the evaporation of the other positions;

or

- Use only those sample tubes that contain samples. Seal off the individual empty connections in the vacuum connection that do not have a sample tube with plastic plugs (refer also to Chapter „Replacement Parts“).

There must always be sample tubes in the corner positions of the rack. A symmetrical arrangement of the tubes is necessary in order to ensure an even distribution of the contact pressure in the vacuum connection.

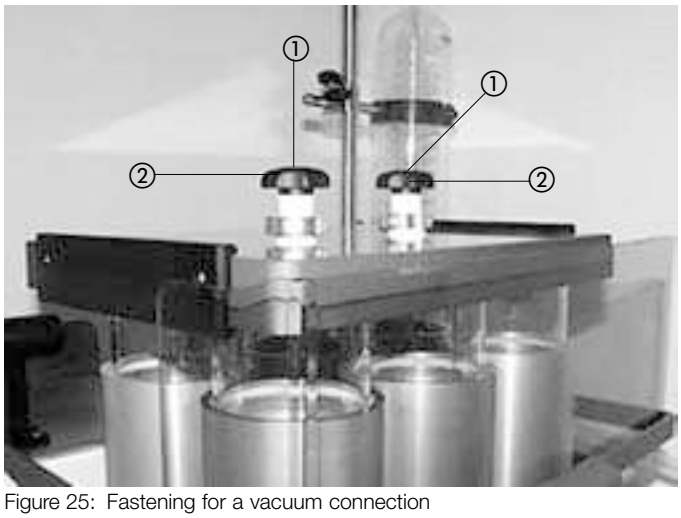


Figure 25: Fastening for a vacuum connection

Setting Up the Vacuum Connection

Mount the rack containing the sample tubes on the Syncore single platform. Flip down the protective shield. Hold the vacuum connection in both hands. Introduce it into the two rack bars ① and lay it on the sample tubes.

The sealing discs must lie flat on all sample tubes. Tighten the two locking screws ② down, both at the same time, so as to press the sealing discs against the sample tubes.

The locking screws must be tightened by hand, **both at the same time,** down to the stop. Screwing them down too hard may damage to the screw thread.
The glass plate cannot be destroyed by screwing them down too strongly.

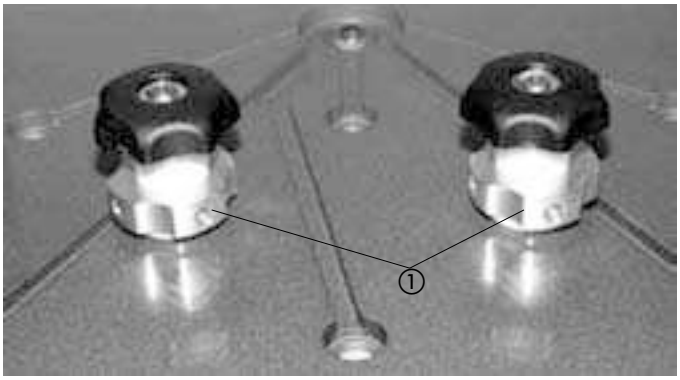


Figure 26: Releasing the screws of the vacuum connection

Maintenance of the Vacuum Connection

The gas plates of the vacuum connections can be removed by releasing the two clamping screws ①. For this reason, the "PEEK"-screws for the glass vessel seals must be tightened with the Syncore Universal Key (see Section "Spare Parts").

Use a sponge dampened in alcohol to clean the coated plate of the vacuum connections. Caution: The PFA coating must never be damaged with hard brushes or other hard parts.

The sealing discs can be cleaned with a mild detergent in water or in alcohol. If they are severely fouled, we recommend replacing the sealing discs with new ones.

3.5 Cooling Plate

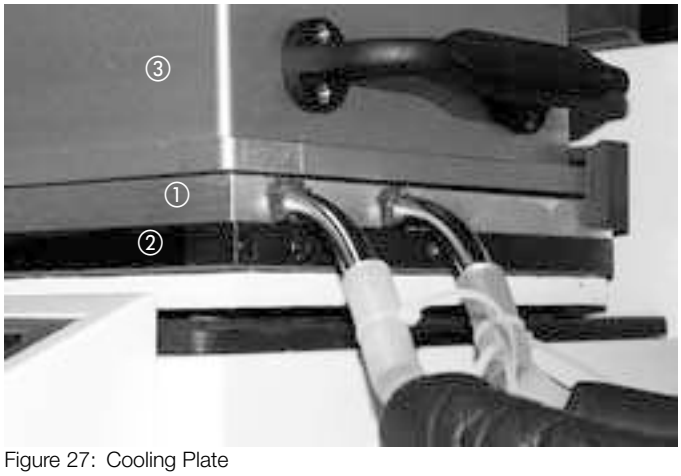


Figure 27: Cooling Plate

Introduction

The cooling plate ① is installed between the base plate ② of the unit and a rack ③. When used with a cooling aggregate and a valve, the cooling plate allows controlled cooling of a rack within a range from room temperature down to -20 °C.

When a valve is used, a rack can also be through the cooling plate, enabling operation with complex time / temperature profiles.

Figure 28: Fastening of the hoses

Connections

The cooling plate has an inlet ① and an outlet ② for cooling media. The hoses ③ for the cooling medium are connected to the inlet and outlet on the cooling plate. The hoses must be secured.

Hoses that are not secured can work themselves loose from the cooling plate and lead to material damage and personal injuries.

The vortex movement of the single platform brings the cooling hoses into a rotational movement. The hoses must not come into contact with sharp edges or corners.

Figure 29: Fastening the cooling plate in position (1)

Fastening to the Base Plate

To fasten the cooling plate in position, use a screwdriver to remove the holding clamps ① from the base plate. Lay the cooling plate on the base plate, and screw it on tightly with four screws.

The cooling plate and the base plate must both be clean and must not be fouled with hard particles. Otherwise, no good heat exchange between the base plate and the cooling plate can be guaranteed any longer. Furthermore, the plates can be scratched by hard particles and this has an adverse effect upon heat transfer.

Figure 30: Fastening the cooling plate in position (2)

Then screw the holding clamps onto the cooling plate. A Rack can now be put on, just as on the base plate.

It is important that the holding clamps be screwed on tightly. If not fastened adequately, the holding clamps do not hold the racks tightly enough to the cooling plate, which can lead to material damage and personal injuries.

3.6 Valves

For both types of valves: Always secure the connections!

Poorly secured hose connections can resullt in material damage and personal injuries.

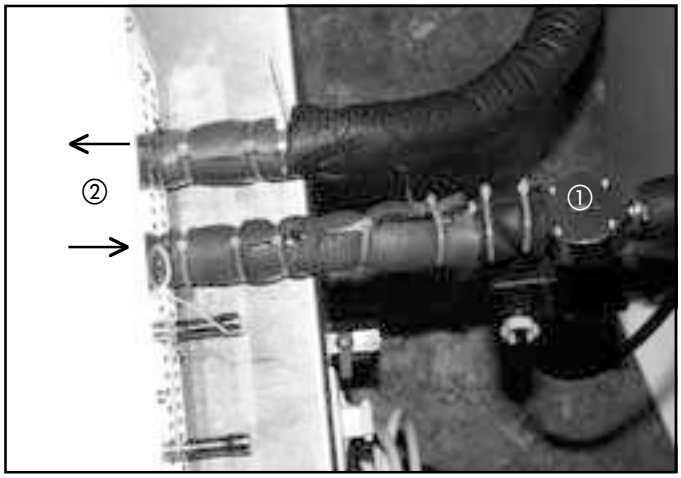


Figure 31: Fastening of the cooling hoses on the valve

Valve, 24 V DC to - 20°C, with hose nipples

The temperature-controlled valve ① is located between the cooling aggregate and the cooling plate. It controls the (temperature-dependent) flow of coolant into the cooling plate. To accomplish this, connect the cooling fluid inlet a and the cooling fluid outlet b on the cooling plate to the cooling hoses.

Secure all hose connections.

The valve is placed in the circuit between the cooling aggregate ② and the cooling plate inlet.

The valve is plugged into the Syncore Platform at Connection TC.

Cooling water valve with a ½" GR thread

The valve is located in the cold water supply for the rack R-6 with residual volume cooling or for the condensor unit. It controls the (programme-dependent) flow of cooling liquid into the cooling zone of the racks or into the condensor unit. The valve makes it possible at the end of a programme to terminate the flow of cooling water through the rack or through the condensor unit after a given time.

To this purpose, the cooling water exit from the valve is connected to the cooling water hose to the rack or to the condensor unit.

The valve is plugged into the Syncore Platform at Connection EC.

3.7 Inert gas cover / Inert gas module

Figure 32: Inert gas connection on rack R-24 with test tubes

Using the inert gas cover, 24 reaction glass vessels can be simultaneously sealed against the environmental temperature and they can be gassed with an inert gas. As a result, 24 chemical reactions can be carried out at the same time under inert gas (for example water exclusion via Argon). Reagents can be added through individual septas in the inert gas cover or samples can be removed from the test tubes.

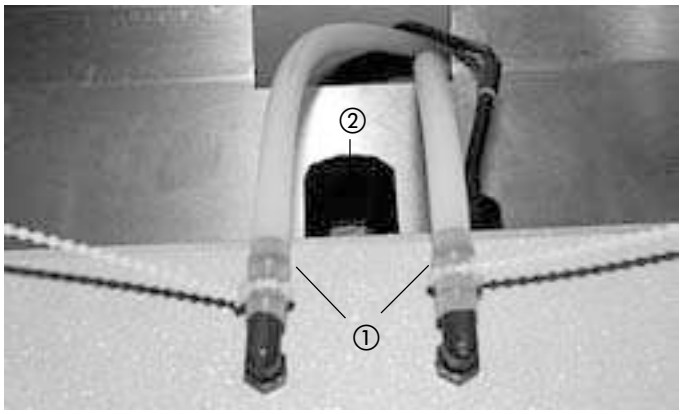


Figure 33: Tubes on inert gas cover

The tubes for adding and removing inert gas are secured by means of tube safeties as illustrated ①.

It is not important which connection on inert gas connection or inert gas module is used for adding or removing inert gas.

The vacuum connection can be sealed with the SVL22 screw cap ②.

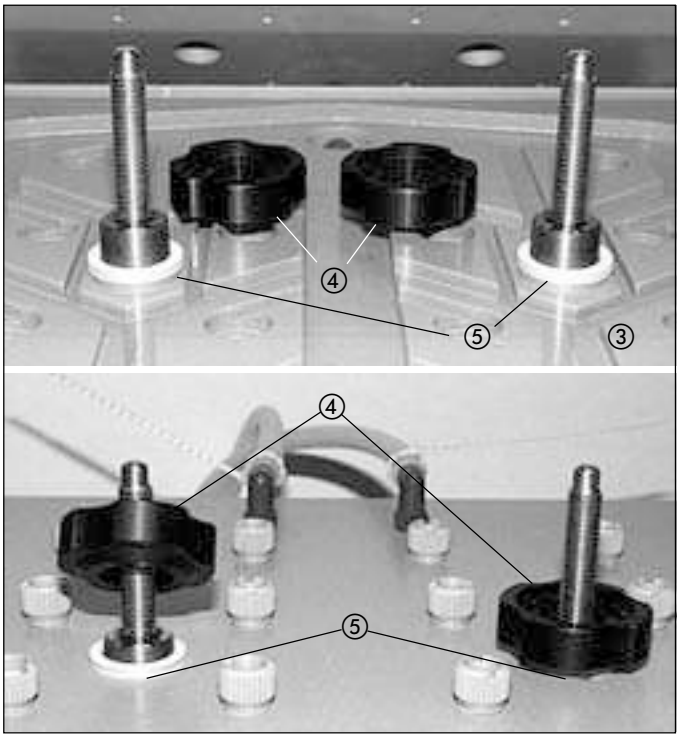


Figure 34: Putting an inert gas module into operation together with a vacuum R-24

An inert gas module is used together with a vacuum cover. For this purpose, the glass plate ③ of a vacuum cover in format 24 is removed by loosening the two screws ④ and the two seals ⑤.

The inert gas module is placed on the bottom of the vacuum cover in place of the glass plate. The two seals ⑤ are inserted as illustrated and the inert gas module is fixed with the two screws ④. The PEEK septa screw joints are to point upward as represented.

The component cannot be used without secured tube connection. All tube connections must be oriented away from users.

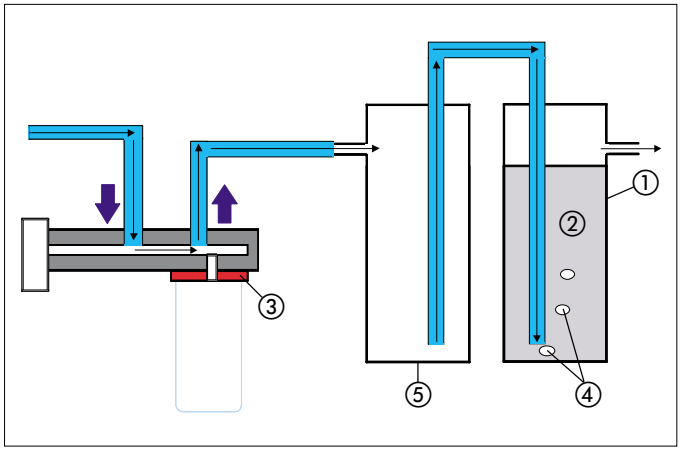


Figure 35: Gas flow and bubble counter

Function test

Tightness

Tightness is tested at slight gas excess pressure.

For this the vacuum connection must be sealed with the SVL22 lid.

The inert gas cover (or the inert gas module in connection with a vacuum cover) is placed onto the 24 test tubes in rack R-24. The inert gas cover is fastened to the test tubes using the two tightening nuts (safety screws). Gas is supplied via a valve in a controlled manner.

The gas discharge takes place via a tube, connected with a gas wash bottle ① or a bubble counter. A slight counter pressure forms in the gas wash bottle or bubble counter via water ② or an other liquid. The inert gas connection is to be completely sealed by tightening the tightening screws via the individual sealing discs ③ of the test tubes, visible via gas bubble formation ④ at the exit in bubble counter or gas wash bottle.

So that the sealing liquid cannot be drawn back into the reaction containers, connect a second gas scrubbing bottle ⑤ as described in the picture.

If no tightness is achieved when the tightening nuts are moderately tightened, the test tubes used are to be checked for unevenness, if necessary, individual test tubes, sealing rings or sealing washers are to be replaced and the function test repeated.

If the problem still persists, you should notify the supplier.

Working with inert gas

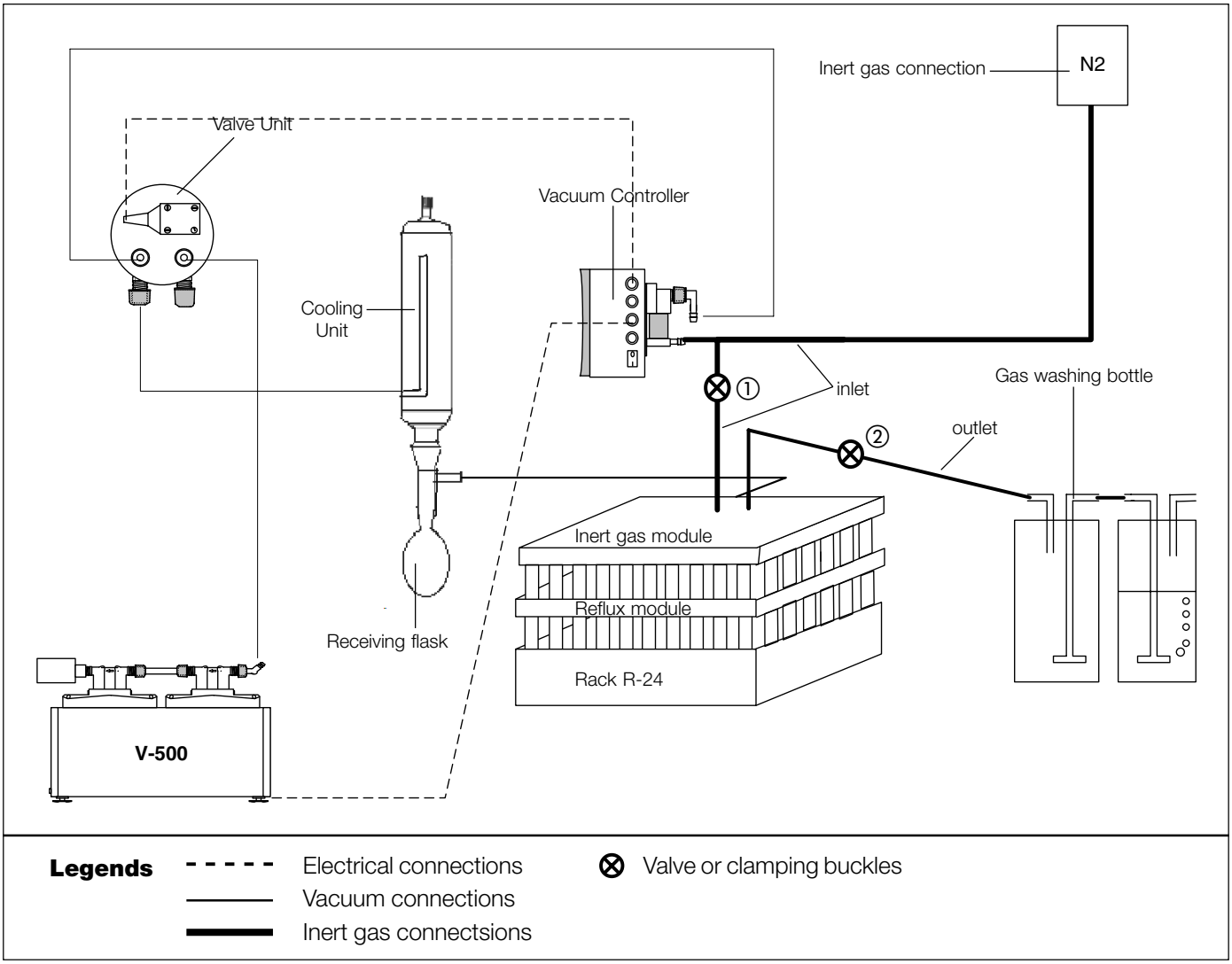


Figure 36: Hose coupling diagram

For sensitive reactions where traces of steam or other gases can cause disturbances, we recommend the following procedure to completely expel the water or gas:

1. Lock the inert gas inlet ① and outlet ② on the inert gas module using a clamp bride or a 3-way faucet.
2. Evacuate the Syncore at 500 mbar.
3. Ventilate the system with inert gas via the Vacuum Controller (connect the ventilation valve to the inert gas main).
4. Repeat steps 2 and 3 twice
5. Open the inert gas inlet ① and outlet ② at the inert gas module.
6. Set the light inert gas flow to c. 1 to 2 bubbles/second.

Direct concentration

We recommend direct concentration of reaction mixtures for sensitive reaction products, which are further processed directly in the same size (without transfer into another vessel).

If you directly evaporate after a parallel reaction, the following procedure is used after the reaction:

- Inert gas supply and discharge is interrupted (for example via hose clamps or by using a three-way cock).
- The suitable vacuum is applied, vibrating motion and heating of rack are started according to the Operating Instructions of the Syncore Apparatus Line.

If the shaking movement is concluded before the sample temperature is below the lowest boiling point, the mixture can start to intensely boil in a boiling delay, which can lead to a loss of the reaction mixture.

The vacuum conditions are to be adapted to the sample temperature. Make sure that the samples in the rack cool slowly after the reaction and that too low vacuum can lead to boiling delay.

Maintenance of the intert gas module

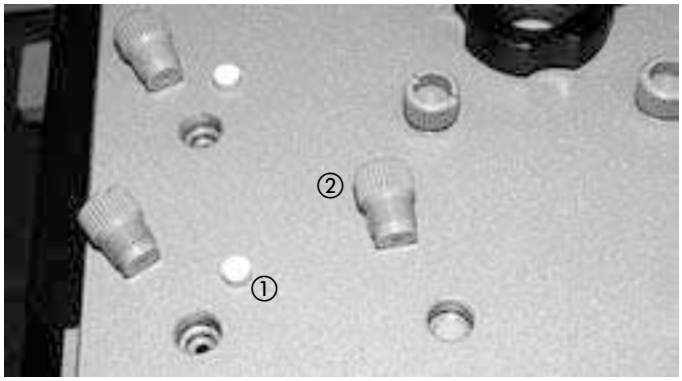


Figure 37: Replacing septa

You can use organic solvents like ethanol or acetone to remove organic residues. You can use mild detergents and a soft (plastic) brush to clean the module.

Punctured septa ① can be removed by loosening the PEEK screws ②, and individually replaced by new septa. You should visually inspect the septa after every reaction for damages and contamination.

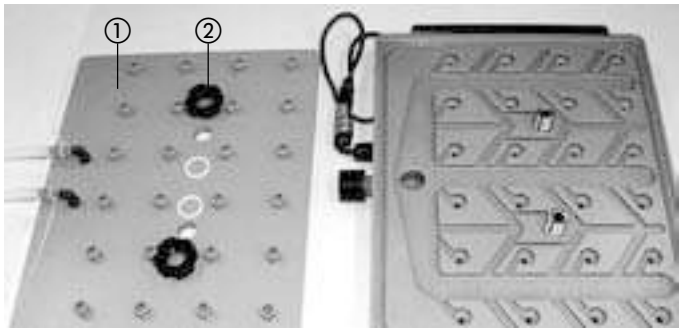


Figure 38: Taking apart an inert gas cover

The inert gas module ① can be removed by loosening the two screws ② and the you can then clean the inside of the vacuum tube with an organic solvent such as ethanol or acetone or a mild detergent in water. Use a soft (plastic) brush.

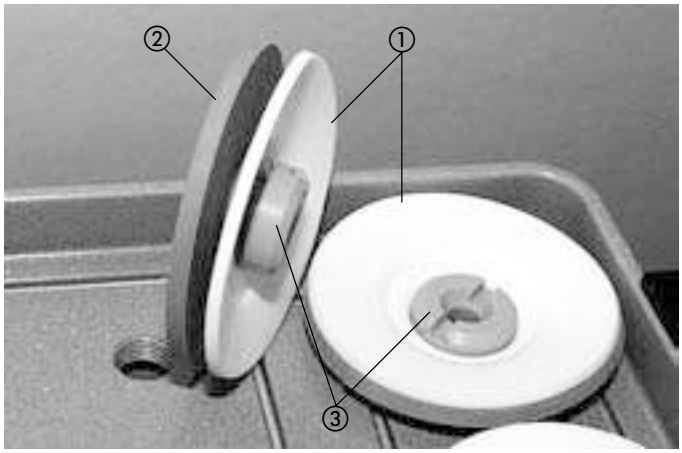


Figure 39: Sealing system of the inert gas cover

You should visually examine the poly ethylene sealing discs ① after every reaction for contamination and wear. The polyethylene sealing discs and the supporting rings ② can be simply replaced by loosening the PEEK screws ③.

Cleaning is done by washing with alcohol or water.

3.8 Reflux module

Figure 40: Reflux modules on rack R-24 with test tubes

The reflux module ① enables simultaneous condensation of solvent vapor in 24 reaction glass vessels ② (=reflux) via contact of the glass vessels with actively cooled metal ring, which surrounds each glass vessel.

Because of this cooling of solvent vapor in a defined zone with simultaneous heat supply via the rack ③, chemical reactions can be carried out at the boiling point of the solvent without loss.


Figure 41: Tubes on reflux module

The tubes for the cooling medium must be secured with tube safeties as illustrated. It is insignificant what connection is used for adding or removing cooling media.

The cooling medium flow (tap water or actively cooled water) must be controlled. The cooling medium flow should not be greater than 2 liters/min. An excessive pressure on the silicone tubes must be prevented, because the tubes can burst and cause material and personal damage.

The reflux module cannot be used without secured tube connections.

Figure 42: Setting up the reflux module

Setting up

Among others, the reflux module consists of two metal plates with recesses for the individual test tubes.

The two metal plates can be pushed against one another. They hold the test tubes via horizontal shear action and cool the test tubes in a defined zone through contact with an actively cooled metallic surface. The reflux module is held with both hands as illustrated and led over the reaction vessels from the top. The slide handle is pressed downward, so that the two metal plates of the module, release the opening for the reaction vessel.

You should check visually to make sure that all reaction vessels are in the opening and that they are cooled.

Cooling medium

Only water or water-containing cooling media should be used (example: alcohol – water mixtures). All tubes are to be secured with tube safeties.

Depending on the solvent used or volatile reagents, the temperature of the cooling medium must be adjusted. The reflux module is specified for a temperature range between 0°C and room temperature (30°C). You should not cool to below 0°C because water condenses.

Set the cooling medium flow to approximately 1 liter/minute (maximum 2 liters/min.).

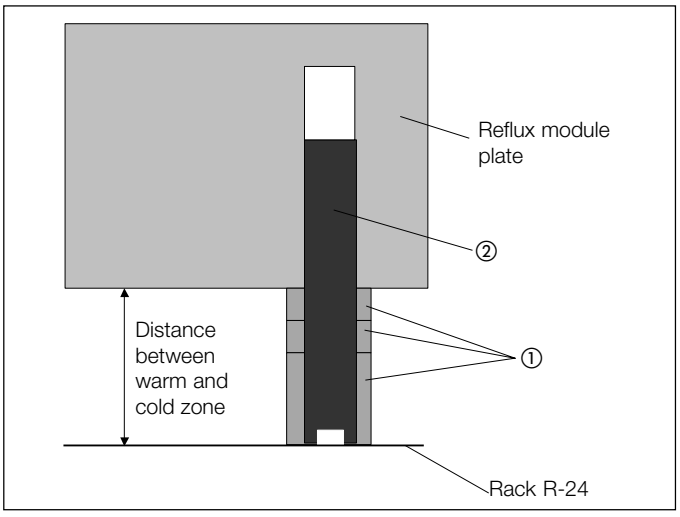


Figure 43: PEEK distancing sheaths

The distance between the reflux module and the rack can be varied while the distancing sheaths ① can be removed by slackening the screw ②.

The PEEK distancing sheaths also provide insulation between the rack and the reflux module. A more direct contact by means of the screw would reduce the efficiency of the system

Temperature of the cooling medium

The optimum temperature of the cooling medium depends on the boiling points of the volatile solvents or reagents and the selected temperature of the rack heating.

Wrong (too high) temperature of the reflux module or the cooling medium can led to lost of solvent or volatile reagents through the inert gas flow. Flow of cooling medium through the reflux module and the temperature of the cooling medium are to be controlled before reactions are carried out.

Solvents or reagents, heated above the boiling point, must be kept in constant motion. Stopping the shaking motion can lead to boiling delay and loss of reaction mixture.

Guidelines for the operation of the reflux module are contained in the following table:

Boiling point range of the solvent at normal pressure	**Rack heating**	**Temperature of the cooling medium of the reflux module**
35 - 60°C	Maximal 5°C above the boiling point of the lowest boiling point solvent / reagent	0°C
60 - 100°C	Maximal 10°C above the boiling point of the lowest boiling point solvent / reagent	10°C
100 - 150°C	Maximal 20°C above the boiling point of the lowest boiling point solvent / reagent	15°C
Less than 35°C	-	No efficient return flow
35 - 60°C	> 5 °C above the lowest boiling point of solvent / reagent	No efficient return flow
60 - 100°C	> 10 °C above the lowest boiling point of solvent / reagent	No efficient return flow

Table 2: Selection of the cooling medium temperature

Removing the reflux module

You can only remove the reflux module from the rack, after you have turned off the shaking motion. Before shaking motion of the Syncore basic unit stops, you must make sure that the temperature of the samples is clearly below the lowest boiling point of the solvents/reagents used.

If a lower cooling medium temperature was used, you can expect condensation water to be on the reflux module. In this case, you should carefully move the reflux module upward over the sides of the vessels, because otherwise water drops will fall into the reaction vessels. If necessary, you can also remove the vessels from the rack first, making it impossible for water drops to get into them.

Maintenance of the reflux module

The cooling medium tubes to and from the reflux modules should be examined once a month for abrade, leaks and porous sites.

If non – deionized water is used to cooling the reflux module, you should periodically decalcify the cooling medium path in the module (1 x year, in case of daily use every 6 months, if water contains lots of lime, every three months):

- Using a syringe, inject diluted acetic acid, formic acid or citric acid solution (10%) into the reflux module via the cooling medium tube.
- Allow to act for 1 hour.
- Rinse thoroughly with water.

The reflux module cannot be taken apart.

3.9 Filtration unit and collection unit

Up to 24 filtrations can be conducted simultaneously with the filtration unit. The filtrate can be filtered here into a large collection container or with the help of the collection unit into individual reaction vials.

After filtration the sample vials can simultaneously be loaded with washing solutions, without the system having to be opened. All work processes are possible with a continual shaking movement and a hot sample rack (with PE frits max. 80°C). During synthesis the filters can be lifted. The used frits are simply exchangeable.

Hook-up of the filtration unit

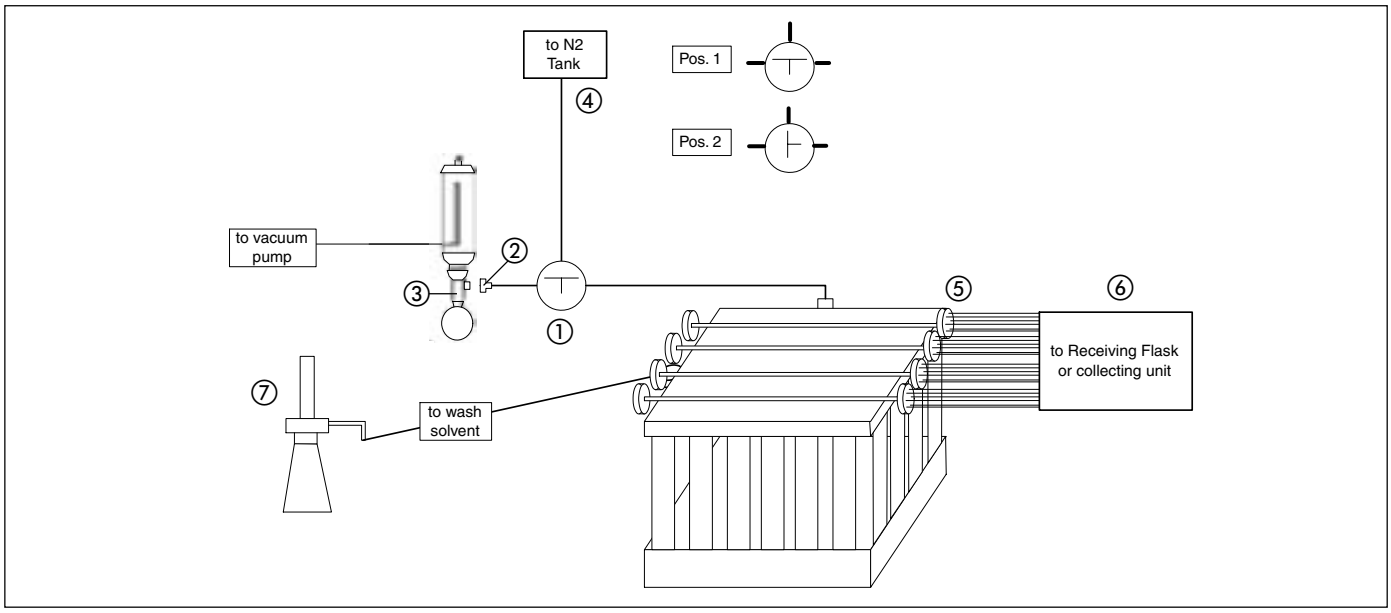


Figure 44: Hose coupling diagram filtration unit

1. The filtration unit is to be attached via the three-way cock ① with the help of the adapter SVL 22 ② to the vacuum coupling ③ of the cooler. In doing this, the tube must be fed through the adapter into the vacuum coupling (3) (glass section). The second coupling of the three-way cock is to be connected to the compressed air connection or inert gas connection ④. The compressed air connection or inert gas connection must be reduced to 0.5bar.
2. If necessary the electric cable of the filtration unit is to be plugged into the provided outlet on the right side of the Syncore. The filtration unit can thus be heated to max. 70°C.
3. Next the filtration unit is to be connected with the six-fold hose coupling ⑤ to the receiving flask or collection unit ⑥.
4. The dispenser ⑦ is to be connected via the single hose coupling to the filtration unit. For this we recommend straight tapered screw joints ¼ to $^1/_8$ inch from the company Swagelok (www.swagelok.com)

Connecting the collection unit to the filtration unit

The six-fold hose coupling is connected to the filtration unit. The 6 tubes are fed through the holes of the collection unit. In doing this, the shortest hose must be connected with slot 1 of the collection unit.

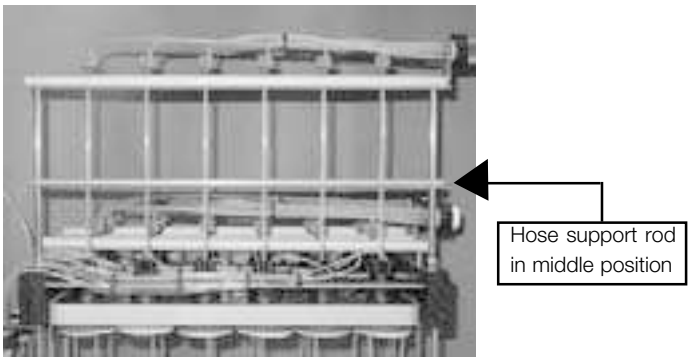


Figure 45:

Parallel filtration

1. Filtration unit is installed as described above, then placed on the reaction vials and screwed onto the rack with the long clamping nuts (analogue to the vacuum couplings).
2. For filtration the filters are immersed in the reaction solution.

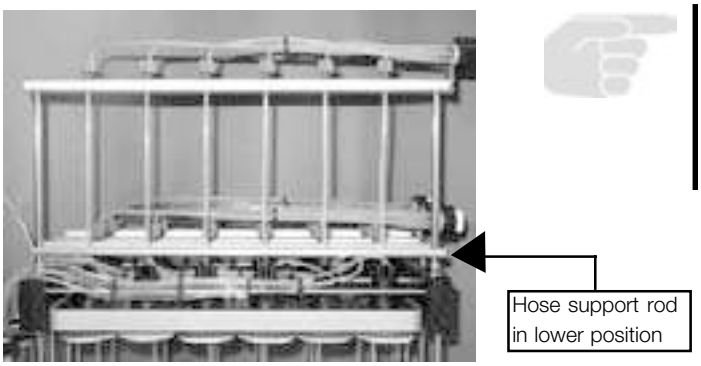


Figure 46:

If the support rod is placed in the middle position (Picture 45), it guides the hoses while immersing the filters to the bottom of the glasses without the danger of bending. If the support rod is placed in the lower position (Picture 46) it fixes the hoses and the filters will not be immersed while shaking or during the evaporation process.

3. The three-way cock is opened to the compressed air connection (Pos. 2) and the liquid squeezed out with a maximum excess pressure of 0.5 bar.
4. The end of the filtration can be recognised when all of the hoses on top of the sliding unit have been blown empty.
5. Next the three-way cock is turned back to the cooler (Pos.1).

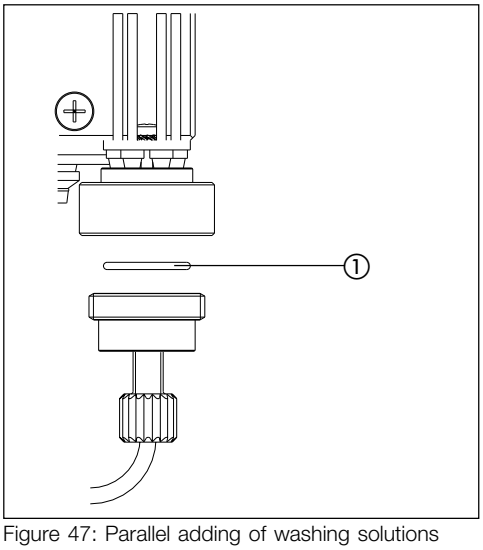


Figure 47: Parallel adding of washing solutions

The filtration process can still also take place with continual shaking movement of the Syncore.

Parallel adding of washing solutions

1. The three-way cock is opened to the cooler (Pos. 1).
2. With the dispenser washing solution is pumped into the reaction vials.

Rows that are not being used can be shut through insertion of a silicon disc ① into the corresponding hose manifold.

The addition of solutions can also take place with continual shaking movement of the Syncore and with immersed or lifted filters.

During the addition the three-way cock must be opened to the cooler (Pos. 1).

Evaporating with the filtration unit

1. 1. The three-way cock is opened to the cooler (Pos. 1).
2. Close the „six-fold hose coupling“ ⑤ with the closure lids
3. Close the „ single hose coupling“ (connection with the dispenser) with a closure lid.
4. Then the system can be evacuated and the solutions distilled off from the reaction vials.

Increasing of the mixing efficiency by means of fumigation through the filter frits

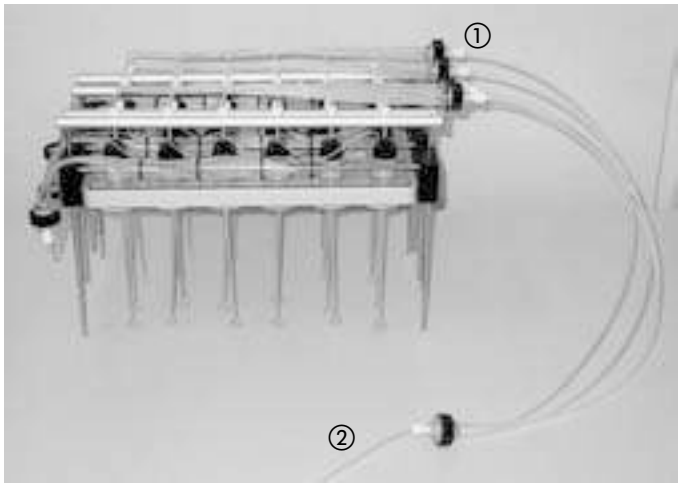


Figure 48: Fumigation

In the case of hard-to-mix solutions such as for example with multiphase systems, the vortex mixture can be additionally supported by means of fumigation through the filter frits.

1. Connect set „hose distribution (3.2 mm) 1-4“ ① with the filtration unit.
2. Connect the other end of the set with the inert gas connection ②.
3. Open the valve of the inert gas connection. The inert gas now flows through the filter and supports the mixing process. In doing this too high a flow volume must not be selected, as otherwise the solution will be blown out of the reaction vials.

The development of low pressure situations is to be avoided through suitable measures.

Cleaning

If the filtration unit is soiled between the glass panel and the PFA-coated panel, it is recommended to inject an appropriate solution with a water bottle through the pressure/vacuum coupling.

In addition, solution can be injected from below via the steam feed-through. In the case of heavy soiling the filtration unit must however be disassembled.

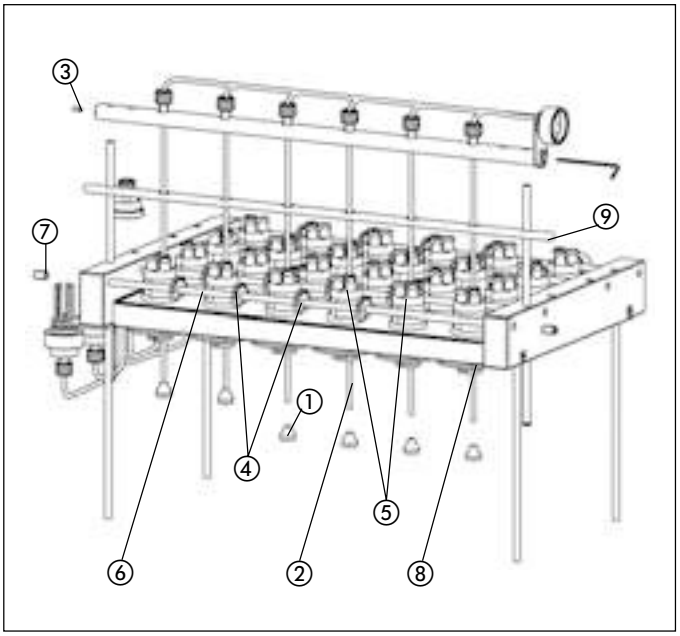


Figure 49: Disassembly of the filtration unit

Disassembly of the filtration unit

1. Remove frit holder ① through slight turning of the FEP hoses ②.
2. Loosen the screws ③ of the sliding unit.
3. Pull the sliding unit of the filtration unit out in an upward direction. Remove sliding unit and support rod ⑨.
4. Remove feed hoses from the clips ④ and the gasket heads ⑤.
5. Remove the clips ④ from their shaft ⑥.
6. Loosen the screws ⑦ of the shaft.
7. Slide the shaft to the left and remove it from the filtration unit.
8. The gasket head ⑤ can now be unscrewed. In doing this, the steam feed-through ⑧ must be held tight with the Syncore monkey wrench.
9. After removal of all gasket heads, now the nut for the fixation of the glass panel can be unscrewed and the glass panel removed.

The coated panel is to be cleaned with a sponge dampened with alcohol.

The PFA coating must never be damaged with hard brushes or other hard implements.

The gaskets can be cleaned with a mild detergent in water or alcohol. In the case of heavy soiling we recommend replacement of the gaskets.

The assembly of the filtration unit takes place in reverse order (points 9 to 1).

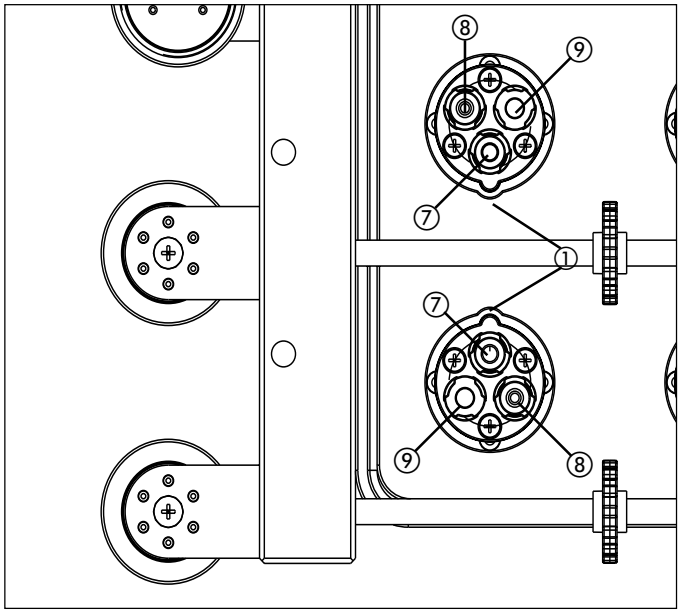


Figure 50: Assembly of the gasket heads 1

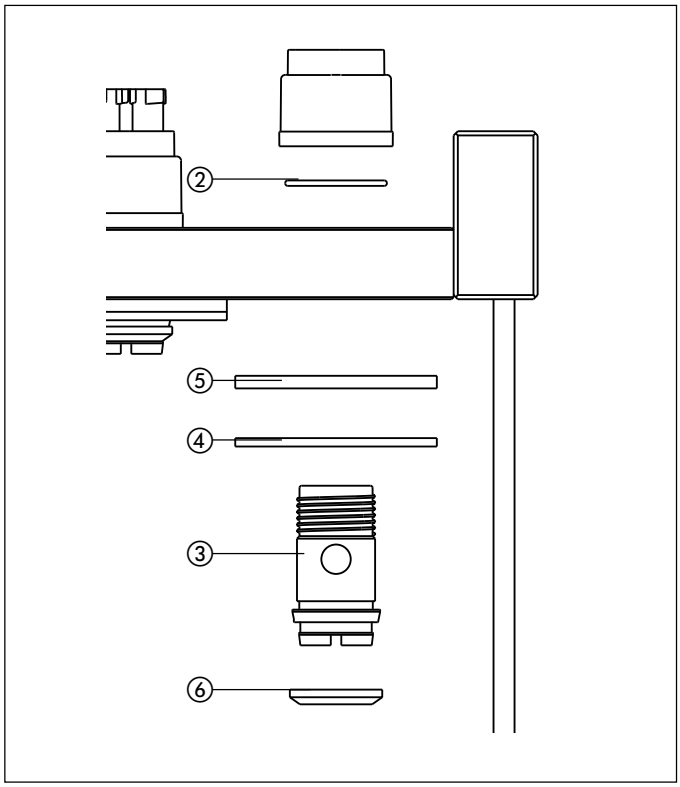


Figure 51: Assembly of the gasket heads 2

Assembly of the gasket heads

1. The gasket heads are to be mounted on the glass panel of the filtration unit in a way that the cams ① of the gasket heads in rows 1 and 2 are facing one another. The same applies to rows 3 and 4. Here one must ensure that an o-ring 22 x 1.5 ② is inserted under every gasket head.

2. Slide gaskets PE or EPDM/chemraz ④ from the thread side over the steam feed-through ③.

3. Also slide support plates silicon ⑤ over the steam feed-through ③.

4. If vials with screw-on lids are used, then special seals ⑥ must be placed on the steam feed-through ③ from below.

5. Feed steam feed-through ③ through the borehole of the filtration unit and with the help of the Syncore monkey wrench screw it together with the gasket head.

6. In position ⑦ of the gasket head (at the cam!) each one seal filtration pipe Ø 3.2mm is to be used and closed with the gasket mount.

7. The seal addition Ø 2.0mm is to be inserted in the bordering position clockwise ⑧ and closed with the gasket mount.

8. The septum is to be inserted in the bordering position clockwise ⑨ and closed with the gasket mount.

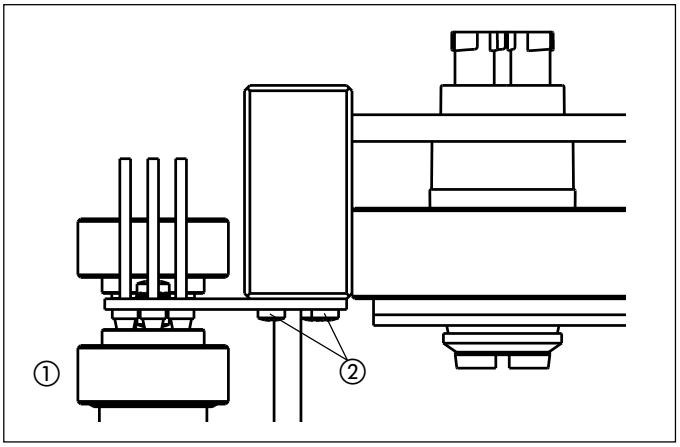


Figure 52: Assembly clips

Assembly of the hoses for the adding of solutions

The hoses ∅ 2.0mm for the parallel adding of solutions must all be selected with the same length of 450 mm, as otherwise differences in the quantities will result in the adding of solutions.

1. The FEP hoses are to be connected with the hose manifold ① (see description below). For this the cones 2.0 mm (grey) must be used.

2. The hose manifold ① is to be mounted on the left of the filtration unit ②.

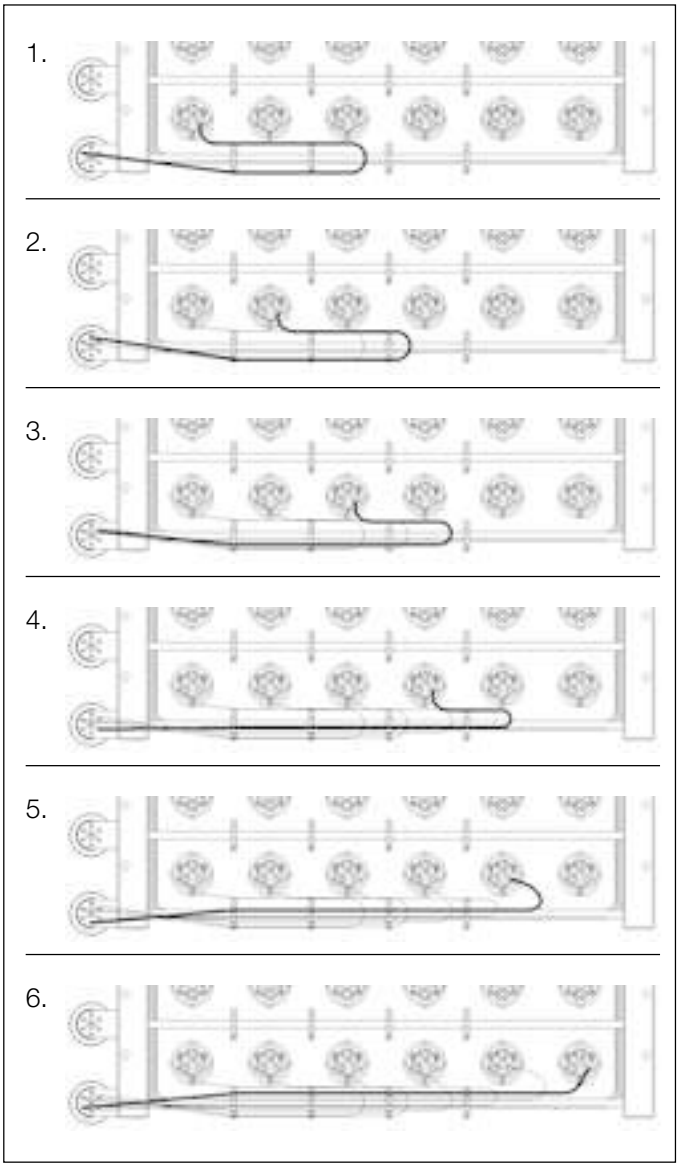


Figure 53: Assembly of the hoses for the adding of solutions

Next the hoses are to be hung in the clips analogue to the hose coupling diagram and fed though the seal for the addition. It is to be recommended that position 1 be started with the hose. Please take note of its position on the hose manifold ①.

The remaining hoses are then to be fed in clockwise on the hose manifold at positions 2, 3, 4, 5, and 6.

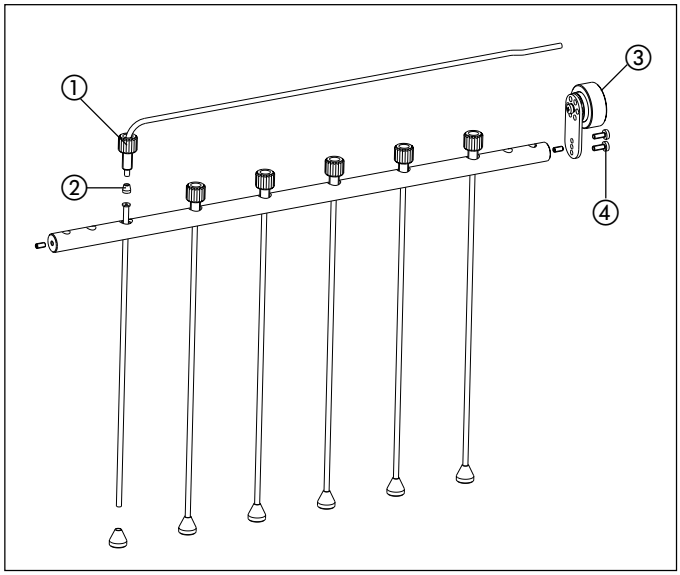


Figure 54: Loosening the hoses of the sliding unit

Loosening the hoses of the sliding unit

1. Loosen the fitting ① of the sliding unit.
2. Remove the cone ② from the FEP hose. When mounting a new come ②, one must pay attention that the side with the large diameter is flush with the end of the hose.
3. The complete hose manifold ③ can be separated from the sliding unit through loosening the two screws ④.

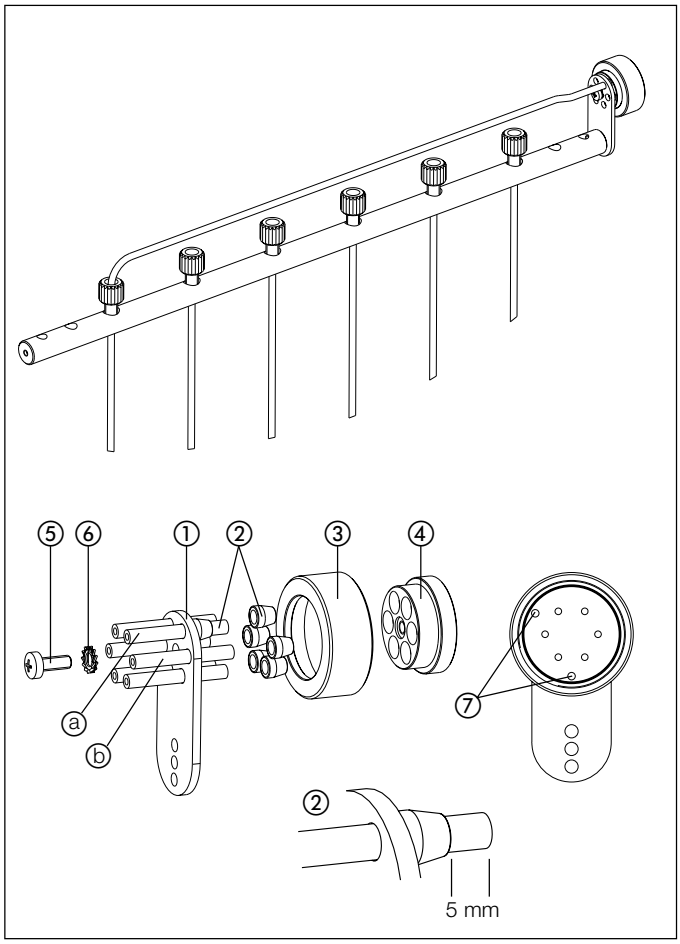


Figure 55: Assembly of the hoses to the hose manifolds

Assembly of the hoses to the hose manifolds

1. Feed FEP hoses through the clamping sleeve ①. In doing this, the longest hose must be fed through position (a), the second-longest clockwise through position (b), etc.
2. A cone ② is placed over the end of every hose in accordance with the illustration.
3. The separator unit ④ with coupling nut ③ is slid over the hoses and screwed on to the clamping sleeve with the fixing screw ⑤ and lock washer ⑥. Here one must ensure that the two holes ⑦ of the separator unit come to fit in accordance with the illustration.

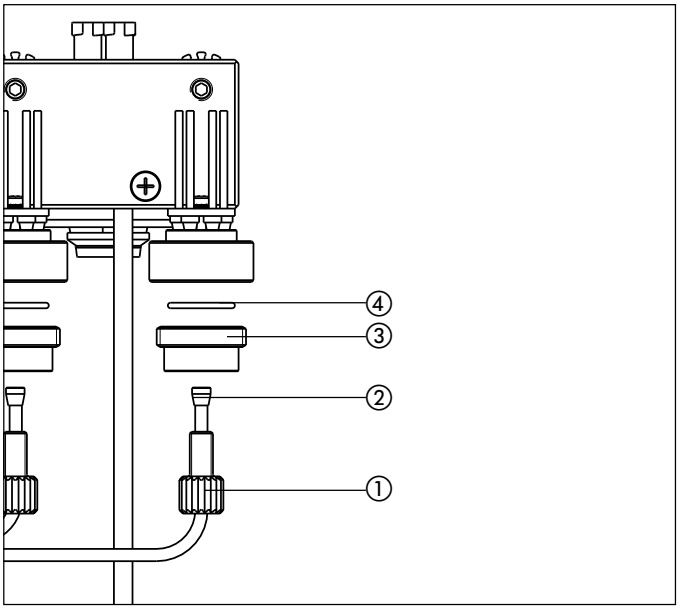


Figure 56: Assembly of the hoses to the „single hose coupling“

Assembly of the hoses to the „single hose coupling“

1. Slide fitting ① over FEP hose.
2. Place cone ② on the hose so that the larger diameter is flush with the end of the hose.
3. Screw fitting ① on the „single hose coupling“ ③.
4. Insert o-ring 15 x 1.5 ④ into the „single hose coupling“.

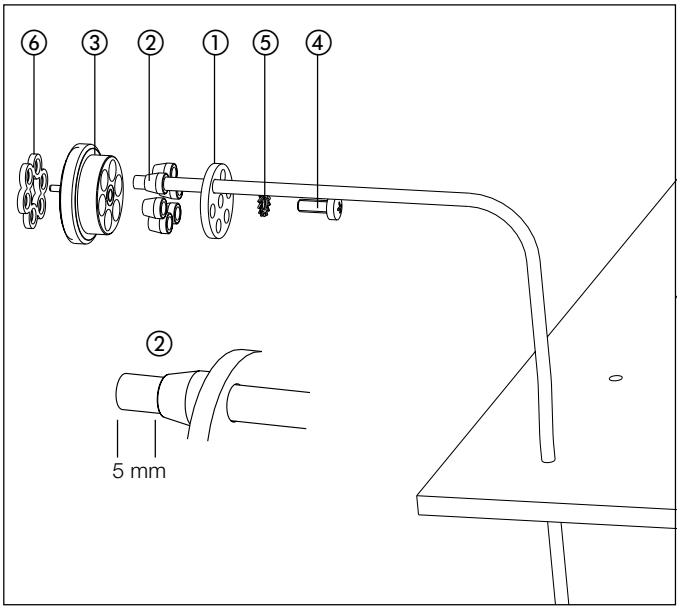


Figure 57: Assembly of the hoses to the „six-fold hose coupling“

Assembly of the hoses to the „six-fold hose coupling“

1. FEP hoses through the clamping sleeve ①.
2. A cone ② is to be placed over the end of every hose in accordance with the illustration.
3. The „six-fold hose coupling“ ③ is to be slid over the hoses.
4. The „seal 6 x 3.2 mm“ ⑥ is to be placed over the raised hoses. The hoses are now to be positioned so that with the seal they result in a flat surface.
5. With the screw ④ and lock washer ⑤ screw the coupling ③ to the clamping sleeve.

4 Replacement Parts

Only original accessory and spare parts ensure operating safety and the proper functioning of this unit and its accessories in the Syncore line of equipment. The use of spare parts and accessories other than those from BÜCHI is permissible only with prior approval from BÜCHI AG.

4.1 Racks

Figure 58: Replacement parts, Rack (1)

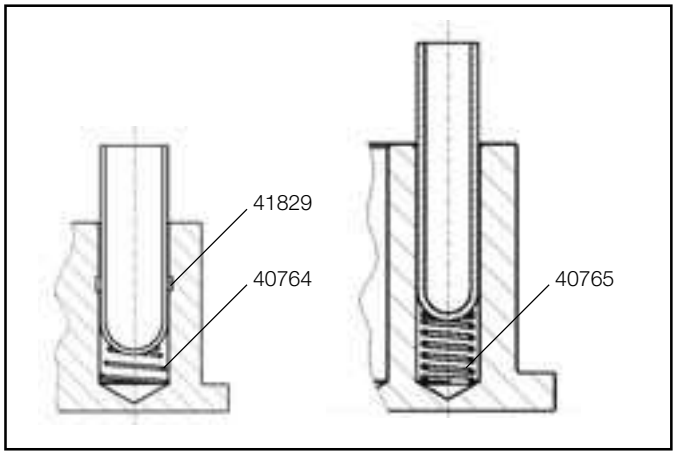


Figure 59: Replacement parts, Rack (2)

Rack R-4, R-6		**Order code**
1	Set of glass bases to fit Rack R-4 and Rack R-6 (6 units)	**38546**
Rack R-12		
1	Set of retaining springs (12 units)	**40903**
Rack R-24		
1	Set of retaining springs (24 units)	**41829**
1	Set of balancing springs (25 units)	**40764**
Rack R-96		
1	balancing springs (100 units)	**40765**

4.2 Glasses and Holders

Glasses R-4

1	Set of glasses to Rack R-4 (4 units) (Ø: 85 mm / h: 185 mm / vol: 500 ml)	**38487**

Glasses R-6 without appendage

1	Set of glasses to Rack R-6 (6 units) without cooling of the residual volume (Ø: 75 mm / h: 185 mm / vol: 250 ml)	**38486**

Glasses R-6 with appendage 0.3 ml

1	Set of glasses to Rack R-6 (6 units) with cooling of the residual volume (Ø: 75 mm / h: 175 mm / vol: 250 ml)	**38485**

Glasses R-6 with appendage 2.5 ml

1	Glass to Rack R-6 with cooling of the residual volume (1 unit) (Ø: 75 mm / h: 175 mm / vol: 250 ml)	**38545**

Glasses R-12

1	Set of glasses to Rack R-12 (12 units) (Ø: 48 mm / h: 174 mm / vol: 120 ml)	**40907**

Test tubes R-24

1	Set of test tubes to Rack R-24 (50 units), without cover (Ø: 25 mm / h: 150 mm / vol: 30 ml)	**38469**

Test tubes R-24 with cover

1	Set of test tubes to Rack R-24, with round bottom, with cover (50 units) (Ø: 25 mm / h: 150 mm / vol: 30 ml)	**38468**

Glasses R-96

1	Set of test tubes to Rack R-96 (100 units) (Ø: 16 mm / h: 130 mm / vol: 10 ml)	**38543**

Holder for glasses R-4

1	Holder for 4 glasses R-4	**38482**

Holder for glasses R-6, glasses with or without an appendage

1	Holder for 6 glasses R-6	**38483**

4.3 Vacuum covers

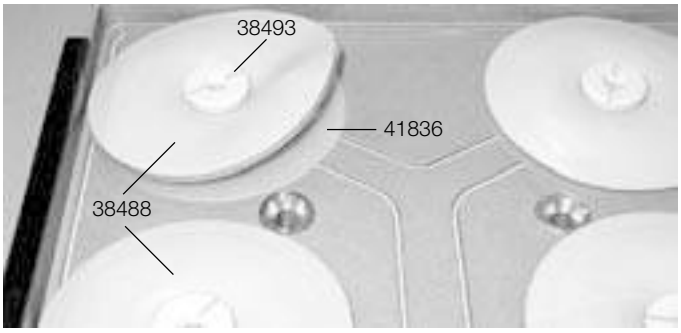


Figure 60: Replacement parts, vacuum cover R-4

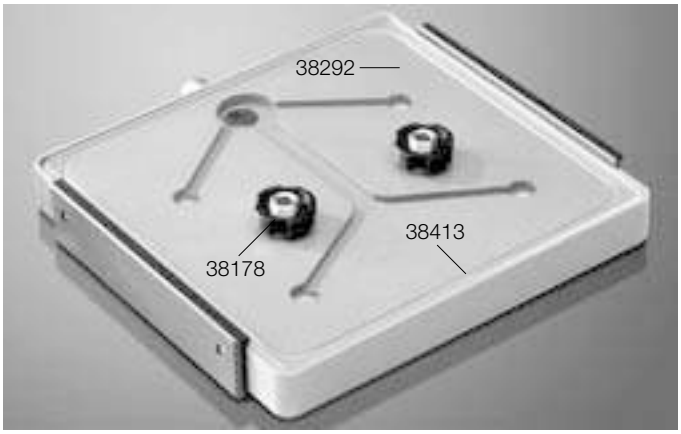


Figure 61: Replacement parts, vacuum cover R-4

	Vacuum cover R-4	Order code
1	Nut (for securing the glass plate to the vacuum cover), 1 unit	**38178**
1	Set of sealing washers, PTFE-coated 6 units	**38488**
1	Set of silicone underlays for the sealing washers, 6 units	**41836**
1	Set of PEEK bolt caps, 2 units	**38493**
1	Glass plate for vacuum cover R-4	**38292**
1	Sealing ring for the glass plate	**38413**
1	Set of seals for the vacuum cover 2 x O-rings, 2 x Silicone seals, 2 x Crastin discs	**41839**

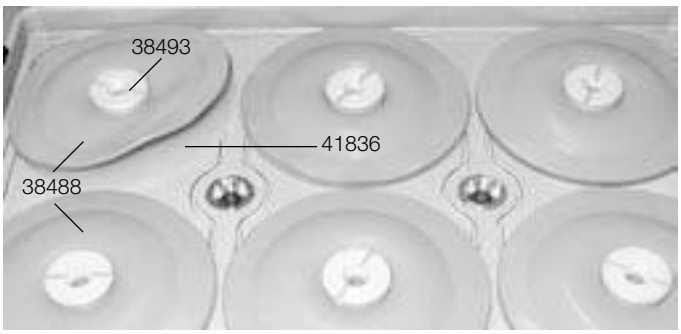


Figure 62: Replacement parts, vacuum cover R-6

Figure 63: Replacement parts, vacuum cover R-6

	Vacuum cover R-6	Order code
1	Nut (for securing the glass plate to the vacuum cover), 1 unit	**38178**
1	Set of sealing washers, PTFE-coated 6 units	**38488**
1	Set of silicone underlays for the sealing washers, 6 units	**41836**
1	Set of PEEK bolt caps, 2 units	**38493**
1	Glass plate for vacuum cover R-6, R-24	**38134**
1	Sealing ring for glass plate R-6, R-12, R-24, R-96	**38272**
1	Set of seals for the vacuum cover 2 x O-rings, 2 x Silicone seals, 2 x Crastin discs	**41839**
1	Set of plastic stoppers, 6 units	**38542**

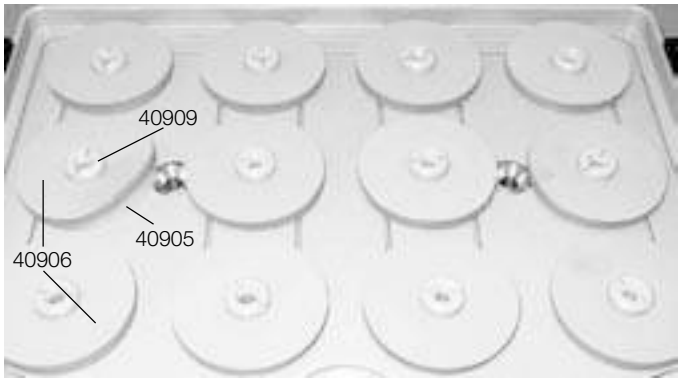


Figure 64: Replacement parts, vacuum cover R-12

Vacuum cover R-12		Order code
1	Nut (for securing the glass plate to the vacuum cover), 1 unit	**38178**
1	Set of sealing washers, PTFE-coated 12 units	**40906**
1	Set of support discs for the vacuum cover R-12, 12 units	**40905**
1	Set of PEEK bolt caps, 2 Stk.	**40909**
1	Glass plate for vacuum cover R-12	**40915**
1	Sealing ring for glass plate R-6, R-12, R-24, R-96	**38272**
1	Set of seals for the vacuum cover 2 x O-rings, 2 x Silicone seals, 2 x Crastin discs	**41839**
1	Set of plastic stoppers R-12, R-24, R-96 / 25 units	**38704**

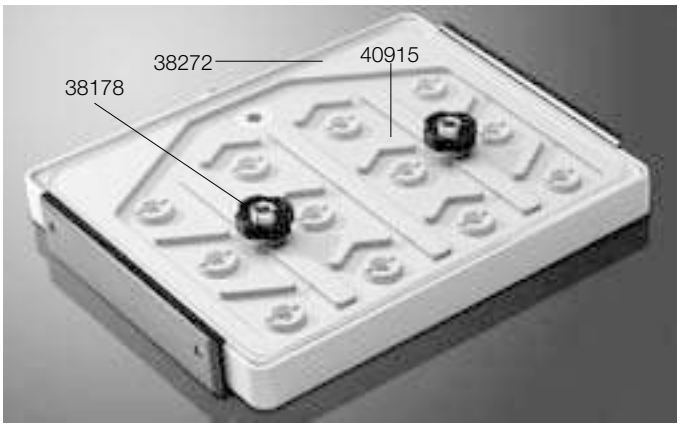


Figure 65: Replacement parts, vacuum cover R-12

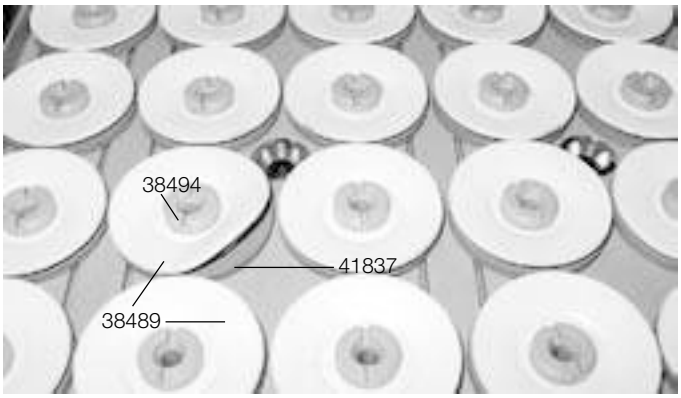


Figure 66: Replacement parts, vacuum cover R-24

Vacuum cover R-24		Order code
1	Nut (for securing the glass plate to the vacuum cover), 1 unit	**38178**
1	Set of sealing washers PE, 25 units	**38489**
1	Set of support discs for the vacuum cover R-24, 25 units	**41837**
1	Set of PEEK bolt caps, 6 Stk.	**38494**
1	Glass plate for vacuum cover R-6, R-24	**38134**
1	Sealing ring for glass plate R-6, R-12, R-24, R-96	**38272**
1	Set of seals for the vacuum cover 2 x O-rings, 2 x Silicone seals, 2 x Crastin discs	**41839**
1	Inert sealing discs for the vacuum cover R-24, with EPDM/Chemraz coating, 24 units	**38491**
1	Set of plastic stoppers R-12, R-24, R-96 / 25 units	**38704**

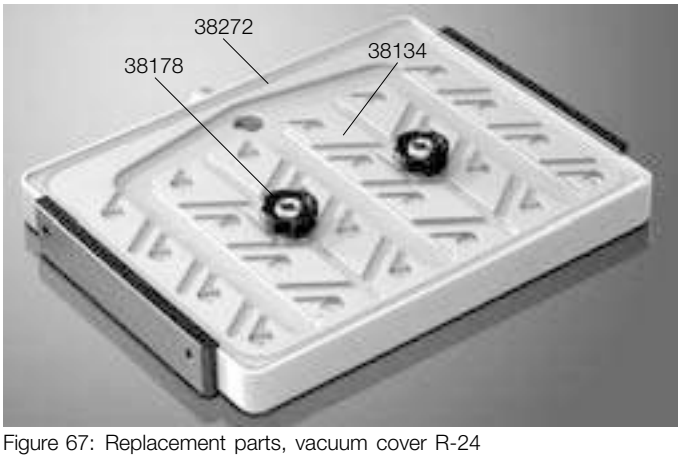


Figure 67: Replacement parts, vacuum cover R-24

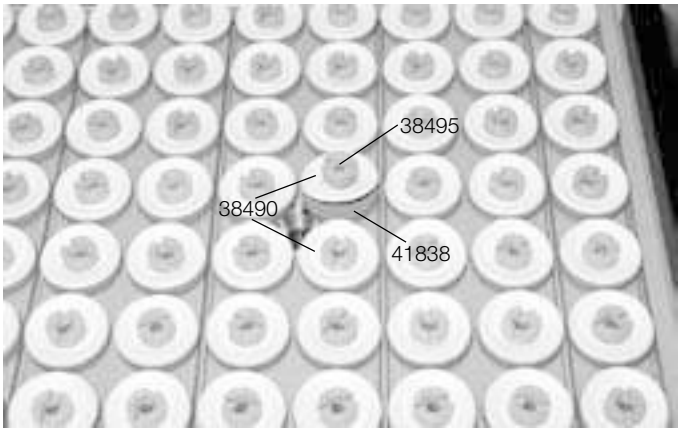


Figure 68: Replacement parts, vacuum cover R-96

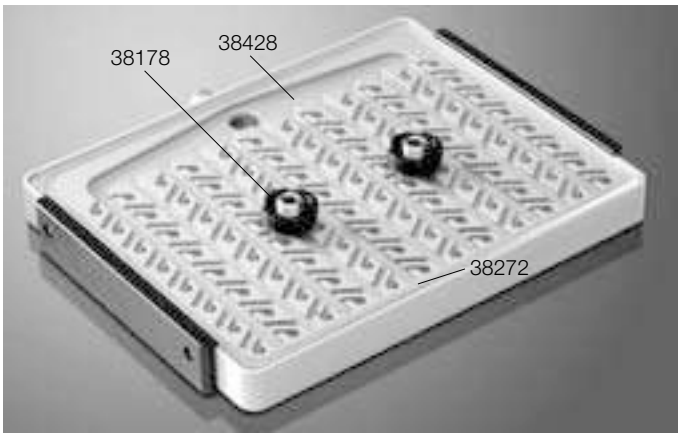


Figure 69: Replacement parts, vacuum cover R-96

	Vacuum cover R-96	**Order code**
1	Nut (for securing the glass plate to the vacuum cover), 1 unit	**38178**
1	Set of sealing washers PE, 100 units	**38490**
1	Set of support discs for the vacuum cover R-96, 96 units	**41838**
1	Set of PEEK bolt caps, 12 units	**38495**
1	Glass plate for the vacuum cover R-96	**38428**
1	Sealing ring for glass plate R-6, R-12, R-24, R-96	**38272**
1	Set of seals for the vacuum cover 2 x O-rings, 2 x Silicone seals, 2 x Crastin discs	**41839**
1	Inert sealing discs for the vacuum cover R-96, with EPDM/Chemraz coating, 96 units	**38492**
1	Set of plastic stoppers R-12, R-24, R-96 / 25 units	**38704**

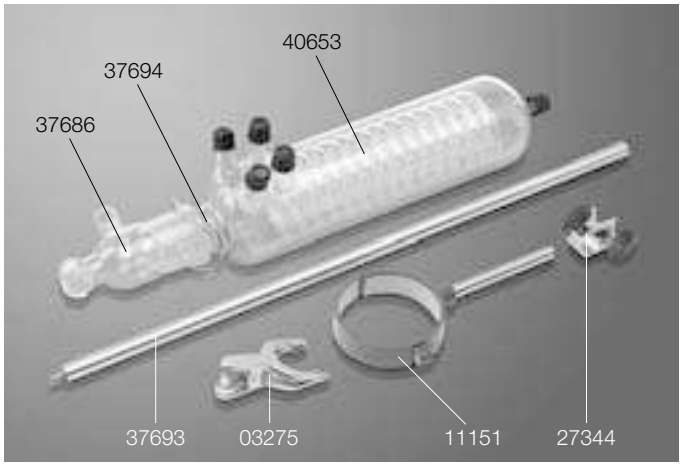


Figure 70: Condenser unit S

4.4 Condenser units

	Condenser unit S complete (PLASTIC + GLAS)	**Order code**
1	Condenser unit S complete, 1000 ml, (PLASTIC+GLAS coated)	**37690**
consisting of		
1	Support rail for attaching the condenser unit	**37693**
1	Cooler S	**40653**
1	Vacuum stopping device	**37686**
1	Cross-shaped sleeve, complete	**27344**
1	“KS” clamp for the receiving flask	**03275**
1	“NS” clamp for the vacuum adaptor/ cooling unit	**37694**
1	Pivoting clamp	**11151**
2	Screw cap GL 14	
1	Hose nipples GL-14, bent, 3 units	**41987**
1	Vacuum hose, PFA, ribbed, 0.6 m cpl.	**37695**
1	Sealing ring for vacuum hose PFA rib.	**05155**
2	Cooling hoses, silicone, 1m	**04133**
1	Receiving flask, 1000 ml (PLASTIC+GLAS coated)	**20728**

1	Condenser unit S complete, 2000 ml, (PLASTIC+GLAS coated)	**40146**
consisting of		
1	Support rail for attaching the condenser unit	**37693**
1	Cooler S	**40653**
1	Vacuum stopping device	**37686**
1	Cross-shaped sleeve, complete	**27344**
1	“KS” clamp for the receiving flask	**03275**
1	“NS” clamp for the vacuum adaptor/ cooling unit	**37694**
1	Pivoting clamp	**11151**
2	Screw cap GL 14	
1	Hose nipples GL-14, bent, 3 units	**41987**
1	Vacuum hose, PFA, ribbed, 0.6 m cpl.	**37695**
2	Cooling hoses, silicone, 1m	**04133**
1	Receiving flask, 2000 ml (PLASTIC+GLAS coated)	**25265**
1	Sealing ring for vacuum hose PFA rib.	**05155**

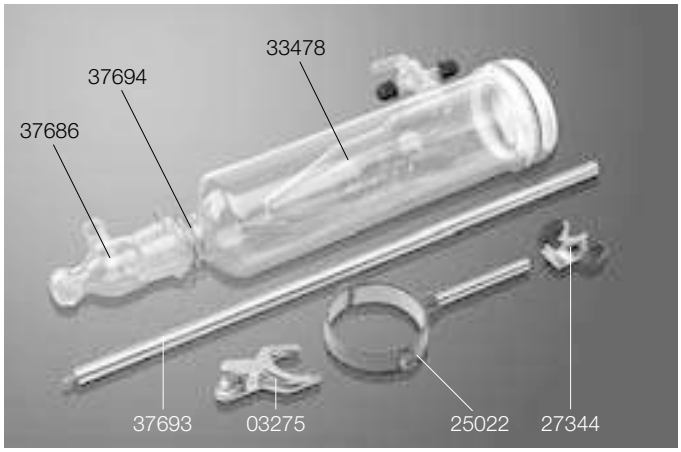


Figure 71: Condenser unit C

Condenser unit C complete (PLASTIC + GLAS)		**Order code**
1	Condenser unit C complete, 1000 ml, (PLASTIC+GLAS coated)	**38371**
consisting of		
1	Support rail for attaching the condenser unit	**37693**
1	Cold trap, complete (25614 + 00672 + 40628 + 27462 + 27479 + screw cap GL-14 cpl.)	**33478**
1	Vacuum stopping device	**37686**
1	Cross-shaped sleeve, complete	**27344**
1	“KS” clamp for the receiving flask	**03275**
1	“NS” clamp for the vacuum adaptor/ cooling unit	**37694**
1	Pivoting clamp	**25022**
1	Vacuum hose, PFA, ribbed, 0.6 m cpl.	**37695**
1	Sealing ring for vacuum hose PFA rib.	**05155**
1	Receiving flask, 1000 ml (PLASTIC+GLAS coated)	**20728**

1	Condenser unit C complete, 2000 ml, (PLASTIC+GLAS coated)	**40147**
consisting of		
1	Support rail for attaching the condenser unit	**37693**
1	Cold trap, complete (25614 + 00672 + 40628 + 27462 + 27479 + screw cap GL-14 cpl.)	**33478**
1	Vacuum stopping device	**37686**
1	Cross-shaped sleeve, complete	**27344**
1	“KS” clamp for the receiving flask	**03275**
1	“NS” clamp for the vacuum adaptor/ cooling unit	**37694**
1	Pivoting clamp	**25022**
1	Vacuum hose, PFA, ribbed, 0.6 m cpl.	**37695**
1	Sealing ring for vacuum hose PFA rib.	**05155**
1	Receiving flask, 2000 ml (PLASTIC+GLAS coated)	**25265**

4.5 Inert gas module

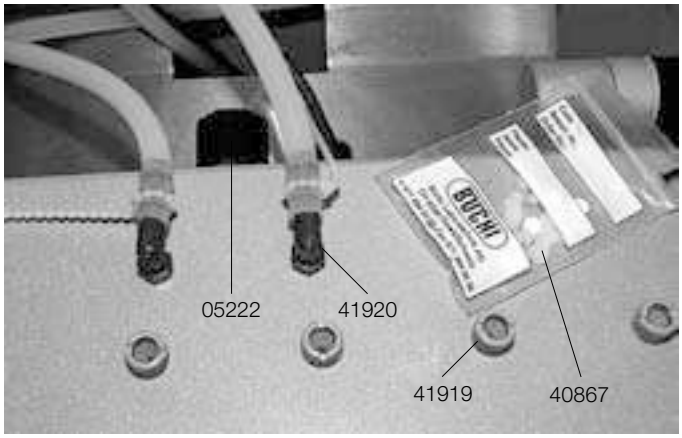


Figure 72: Replacement parts inert gas module

Components		Order code
1	Set of septa (24 units), butyl with PTFE coating	**40867**
1	Set of PEEK septa screw joints (6 units)	**41919**
1	Set of angle screwed sockets (gas inlet and gas outlet), 2 units	**41920**
1	Cap SVL 22	**05222**
1	Silicone tube, 1m	**04133**

4.6 Filtration unit

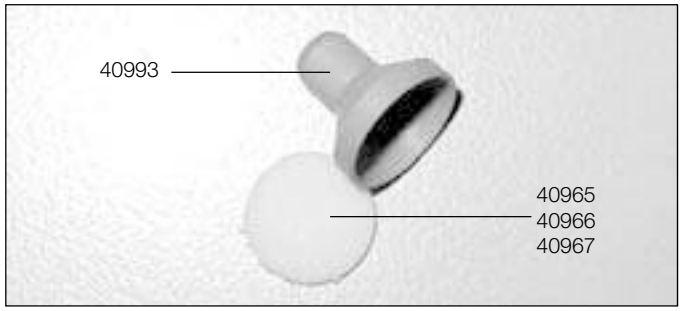


Figure 73: Fit holder and filter frits

Components		Order code
1	Set frit holders (6 units) Ø 8.9 PFA	**40993**
1	Set filter frits PE 90 micron (25 units)	**40965**
1	Set filter frits PE 20 micron (25 units)	**40966**
1	Set filter frits PE 10 micr. (25 units)	**40967**

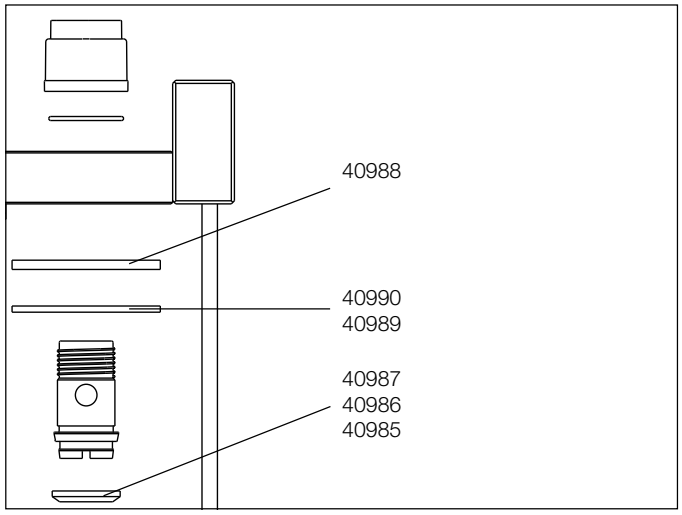


Figure 74: Seals and gaskets

1	Glass panel for the filtration unit	**42903**
1	Sealing ring for glass panel R-6, R-12, R-24, R-96, filtration unit	**38272**
1	Set Clips (8x2mm 8 units, 4x3.2mm 2 units, 6x3.2mm 4 units)	**40991**
1	Set gaskets PE (25 units)	**40990**
1	Set gaskets EPDM/chemraz-coated (24 units)	**40989**
1	Set support plates silicon (25 units)	**40988**
1	Set seals for glass vials with screw-on caps, EPDM (grey, 25 units)	**40987**
1	Set seals for glass vials with screw-on caps, FPM (white, (25 units)	**40986**
1	Set seals for glass vials with screw-on caps, (perfluor, 25 units)	**40985**

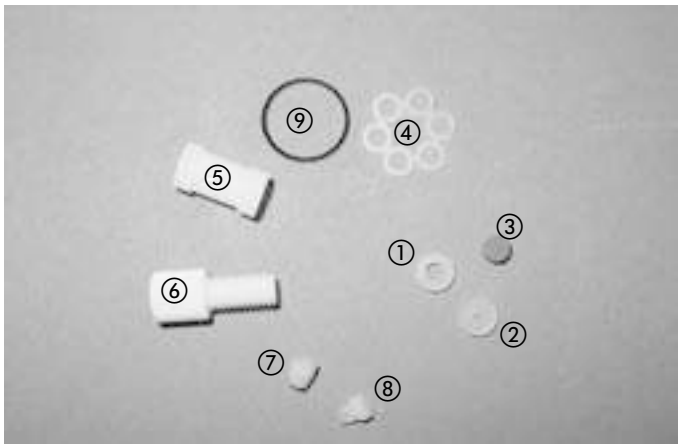


Figure 75: Seals

Components	Order code
① 1 Set seals filtration pipe Perfluor (black, 25 units)	**40982**
② 1 Set seals additions, Perfluor (black, 25 units)	**40979**
③ 1 Set septa butyl / PTFE coated (25 units)	**40867**
④ 1 Set seals 6 x 3.2mm (4 units) Perfluoro	**40957**
⑤ 1 Set gasket mounts (20 units)	**40976**
⑥ 1 Set fittings ∅ 3.2 (25 units)	**40956**
⑦ 1 Set seal cones ∅ 3.2 (green, 25 units)	**40961**
⑧ 1 Set seal cones ∅ 2.0 (grey, 25 units)	**40960**
⑨ Set o-rings FPM for single hose coupling (15 x 1.5), 5 units	**40955**

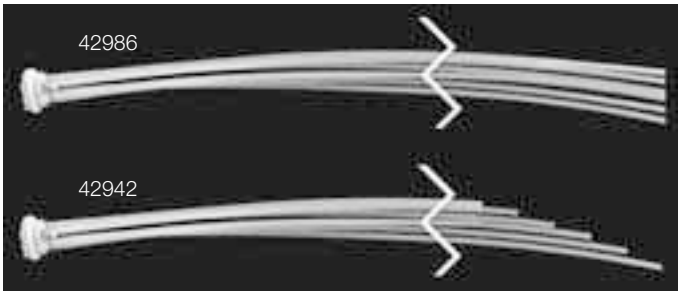


Figure 76: Hose coupling

1	Set six-fold hose coupling receiving flask (1 piece incl. hoses)	**42986**
1	Set six-fold hose coupling collection unit (1 piece incl. hoses)	**42942**
1	One hoes coupling (1 piece incl. hoses)	**42907**

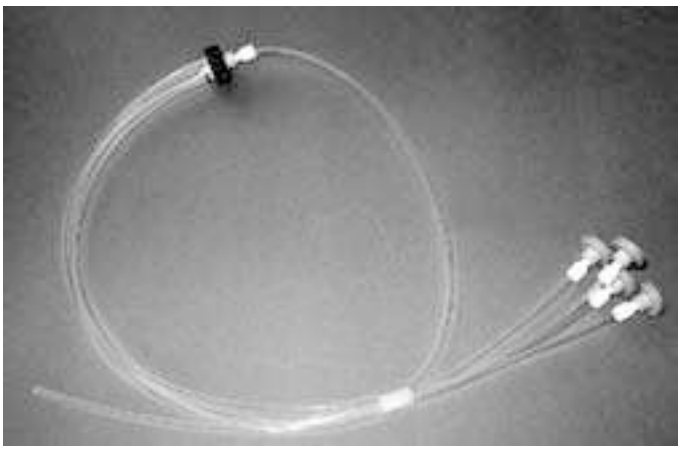


Figure 77: Set hose distribution

1	Set hose distribution (3.2 mm) 1 – 4	**40975**

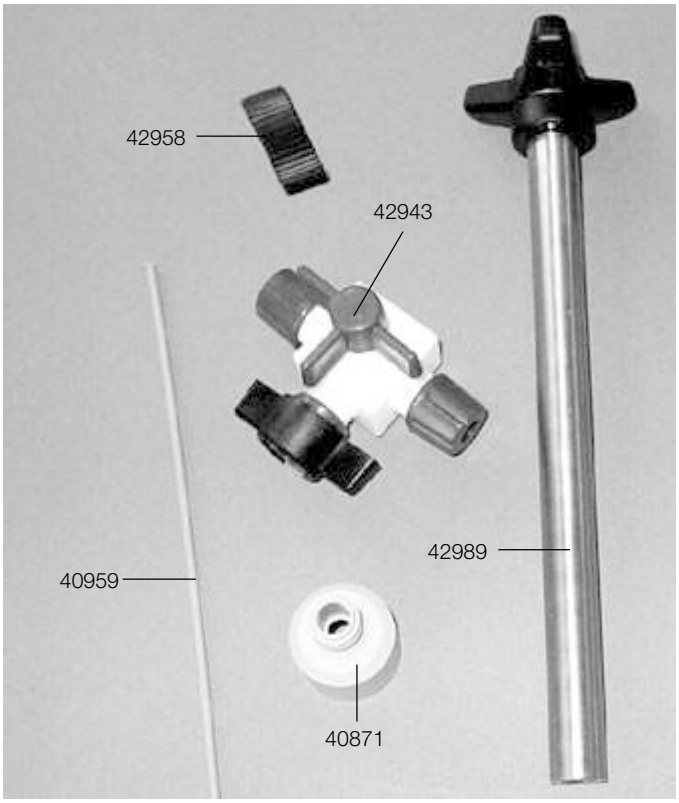


Figure 78: PEEK hose, 3-way cock, adapter, clamping nut long and screw Cap

	Components	Order code
1	Set FEP hose with nozzle (6 units)	**40959**
1	Three-way cock PTFE	**42943**
1	Adapter SVL 22 / GL14	**40871**
1	Clamping nut long (for the attachment of the filtration unit on the rack)	**42989**
1	Screw cap	**42958**

Figure 79: Differenz hoses

1	Set FEP hose sliding unit (6 units)	**40958**

1	Set cover lids (5 units)	**40974**
1	Set silicone discs (10 units)	**40948**
1	Set o-rings FPM for gasket heads (22 x 1.5), 6 units	**40954**
1	Tool for opening and closing the gasket mounts	**40939**

1	FEP hose 2.0mm (10m)	**40952**
1	FEP hose 3.2mm (10m)	**40953**

4.7 Hoses

	Components	Order code
1	Vacuum hose to vacuum cover Length: 1m	**26096**
1	Water hose, Length: 1m (Cooling of the condenser unit or the residual volume Rack R-6)	**04133**

4.8 Various spare parts

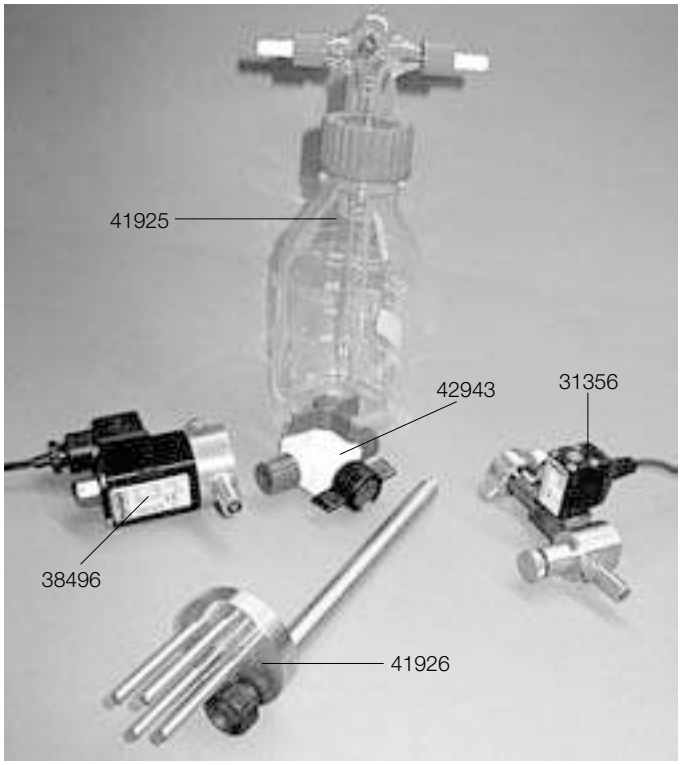


Figure 80: Various spare parts 1

	Components	Order code
1	Bubble counter for checking the tightness of the inert gas cover with the reaction vessels	**41925**
1	Spiked hose feeder for guiding several silicone hoses	**41926**
1	3-way cock, PTFE with hose nipple	**41924**
1	3-way cock, PTFE with screwed cover	**42943**
1	Valve, 24 V DC to -20 °C, with hose nipple	**38496**
1	Cooling water valve with GR ½“ thread 24 V DC	**31356**

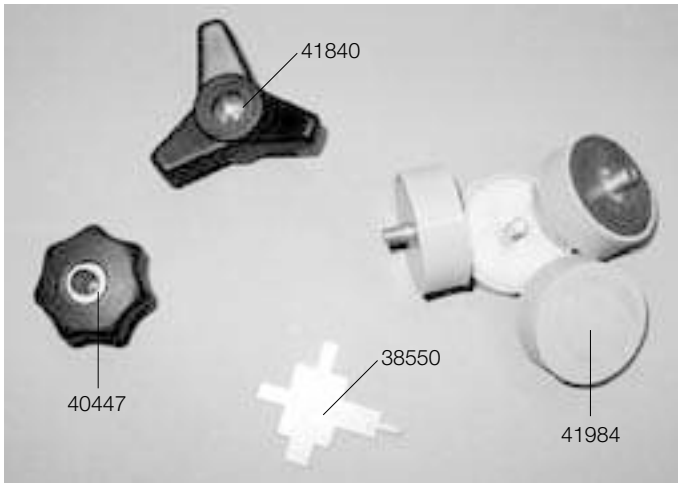


Figure 81: Various spare parts 2

	Components	Order code
1	Set of equipment feet (4 units)	**41984**
1	Syncore Universal Key	**38550**
1	Lock nut (for securing the vacuum cover to the rack) 1 unit	**41840**
1	Lock nut (for securing the vacuum cover to the rack) 1 unit	**40447**

5 Appendix

5.1 Technical Data

Connection to inert gas module cpl., vacuum connection, filtration unit	24 V
Power take-up for the vacuum connection	120 W max
Ambient temperature	5°C-40°C
Maximal gas overpressure	10 mbar
Temperature range, vacuum connection, filtration unit	Room temperature up to +70°C

Table 3: Technical data

5.2 Materials Used

Description	Materials	Material Code
Rack	Aluminum, anodized	AL
Vacuum connection, filtration unit	Aluminum with PFA coating	AL
Glass in vacuum connection, filtration unit	Borosilicate glass, hardened	3.3
Vacuum hose	Ribbed PFA	PFA
Condenser unit R-4	Borosilicate glass	3.3
Sealing discs Rack R-6, R-12	PTFE coating	PTFE/rubber
Glass with residual volume appendage Glass R-4 and Glass R-6, R-12	Borosilicate glass	3.3
Support discs R-24	Silicone	
Sealing discs, Rack R-24 and R-96	Polyethylene	PE
Cooling plate	Aluminum, anodized	AL
Inert gas module base plate	Aluminum, PFA coated	AL
Inert gas module gas tube	Silicone	
Inert gas module septa	Silicone, PTFE coated	
Inert gas module screwed joints	Polyethylether ketone	PEEK
Inert gas cover sealing discs screw cap	Polyethylether ketone	PEEK
Reflux module	Aluminium	AL
Reflux module, cooling medium tube	Silicone	
Reflux module, base	Polyethylether ketone	PEEK

Table 4: Materials used

5.3 Table of Solvents

Pressure for reducing the boiling point to 40 °C

Solvent	Formula	Molary weight in g/mol	Energie of evaporation in J/g	Boiling point in °C at 1013 mbar	Tightness in g/cm³	Vacuum in mbar for boiling at 40 °C
Acetic acid	$C_2H_4O_2$	60.0	695	118	1.049	44
Aceton	C_3H_6O	58.1	553	56	0.790	556
N-Amylalcohol, n-Pentanol	$C_5H_{12}O$	88.1	595	37	0.814	11
Benzene	C_6H_6	78.1	548	80	0.877	236
n-Butanol, tert. Butanol	$C_4H_{10}O$	74.1	620	118	0.810	25
2-Methyl-2-Propanol	$C_4H_{10}O$	74.1	590	82	0.789	130
Carbontetrachloride, tetra Chloromethane	CCl_4	153.8	226	77	1.594	271
Chlorobenzene	C_6H_5Cl	112.6	377	132	1.106	36
Chloroform	$CHCl_3$	119.4	264	62	1.483	474
Cyclohexane	C_6H_{12}	84.0	389	81	0.779	235
Diethyl ether	$C_4H_{10}O$	74.0	389	35	0.714	850*
1,2,-Dichloroethane	$C_2H_4Cl_2$	99.0	335	84	1.235	210
1,2,-Dichloroethylene (cis)	$C_2H_2Cl_2$	97.0	322	60	1.284	479
1,2,-Dichloroethylene (trans)	$C_2H_2Cl_2$	97.0	314	48	1.257	751
Di isopropyl ether	$C_6H_{14}O$	102.0	318	68	0.724	375
Dioxane	$C_4H_8O_2$	88.1	406	101	1.034	107
DMF (Dimethylformamide)	C_3H_7NO	73.1		153	0.949	11
Ethanol	C_2H_6O	46.0	879	79	0.789	175
Ethyl acetat	$C_4H_8O_2$	88.1	394	77	0.900	240
Heptane	C_7H_{16}	100.2	373	98	0.684	120
Hexane	C_6H_{14}	86.2	368	69	0.660	335
Isopropyl alcohol	C_3H_8O	60.1	699	82	0.786	137
Isoamyl alcohol, 3-Methyl-1-Butanol	$C_5H_{12}O$	88.1	595	129	0.809	14
Methyl ethyl ketone	C_4H_8O	72.1	473	80	0.805	243
Methanol	CH_4O	32.0	1227	65	0.791	337
Methylenechloride, Dichloromethane	CH_2Cl_2	84.9	373	40	1.327	850*
Pentane	C_5H_{12}	72.1	381	36	0.626	850*
n-Propyl alcohol	C_3H_8O	60.1	787	97	0.804	67
Pentachlorethane	C_2HCl_5	202.3	201	162	1.680	13
1,1,2,2,-Tetrachloroethane	$C_2H_2Cl_4$	167.9	247	146	1.595	35
1,1,1,-Trichloroethane	$C_2H_3Cl_3$	133.4	251	74	1.339	300
Tetrachloroethylene	C_2Cl_4	165.8	234	121	1.623	53
THF (Tetrahydrofurane)	C_4H_8O	72.1		67	0.889	357
Toluene	C_7H_8	92.2	427	111	0.867	77
Trichloroethylene	C_2HCl_3	131.3	264	87	1.464	183
Water	H_2O	18.0	2261	100	1.000	72
Xylene (Isomers mixture)	C_8H_{10}	106.2	389			25
(o)				144	0.880	
(m)				139	0.864	
(p)				138	0.861	

Table 5: Table of Solvents (CRC Handbook, 65th Ed)

Resistance of Polyethylene sealing discs

A: Very good resistance: Sealing discs of PE (polyethylene) may be used without restrictions

B: Good resistance: Sealing discs of polyethylene may be used without restrictions

C: Moderate resistance: Sealing discs made of PE may swell. Sealing discs may generally be used, but may under some circumstances have to be replaced after being used several times.

D: Poor resistance: Sealing discs deform. The sealing discs of PE should be used only to a limited extent. We recommend that the sealing discs be tested beforehand (softening or wetting the sealing discs).

Solvent	Resistance
Acetaldehyd	A
Acetaldehyde	A
Acetone	A
Benzene	B
Butanol	A
Chloroform	C
Diethyl ether	B
Dimethylformamide	A
Dimethylbenzene (Xylol)	B
Dioxane	A
Acetic acid	A
Acetic acid anhydride	A
Ethanol	A
Ethyl acetate	A
Hexane	A
Iso-Butanol	A
Iso-Propanol	A
Methanol	A
Methylene chloride	B
Nitrobenzene	A
Phenol	A
Propanol	A
Sulphuric acid, smoking	C
Carbon tetrachloride	C
Tetrahydrofurane	B
Toluol	B
Triethylamine	A
Trichloroacetic acid	A
Trichloroethane	C
Trifluoroacetic acid	A
Vinylidene chloride (Dichloroethylene)	D
Aqueous hydrogen bromide, saturated	C
Aqueous hydrogen chloride, saturated	A
Aqueous ammonia solution	A
Aqueous caustic soda	A
Aqueous nitric acid	B

Table 6: Resistance of the Polyethylene Sealing Discs

Resistance of FPM

A: Very good resistance: FPM may be used without restrictions

B: Moderate resistance: Sealing made of FPM may swell. Sealings may generally be used, but may under some circumstances have to be replaced after being used several times.

C: Poor resistance: Sealing deform. The sealings of FPM should be used only to a limited extent. We recommend that the sealings be tested beforehand (softening or wetting the sealing discs).

D: Very poor resistance: Sealing deform. The sealing of FPM should not be used.

Solvent	Resistance
Acetaldehyde	D
Acetone	D
Benzene	B
Butanol	A
Chloroform	B
Diethyl ether	D
Dimethylformamide	C
Dimethylbenzene (Xylol)	A
Dioxane	C
Acetic acid	D
Acetic acid anhydride	D
Ethanol	B
Ethyl acetate	D
Hexane	A
Iso-Butanol	A
Iso-Propanol	A
Methanol	A
Methylene chloride	C
Nitrobenzene	B
Phenol	A
Propanol	A
Sulphuric acid, smoking	A
Carbon tetrachloride	A
Tetrahydrofurane	D
Toluol	A
Triethylamine	B
Trichloroacetic acid	C
Trichloroethane	A
Trifluoroacetic acid	D
Vinylidene chloride (Dichloroethylene)	B
Aqueous hydrogen bromide, saturated	A
Aqueous hydrogen chloride, saturated	B
Aqueous ammonia solution	C
Aqueous caustic soda	B
Aqueous nitric acid	B

Table 6: Resistance of the FPM sealings

Resistance of EPDM

A: Very good resistance:EPDM may be used without restrictions

B: Moderate resistance: Sealing made of EPDM may swell. Sealings may generally be used, but may under some circumstances have to be replaced after being used several times.

C: Poor resistance: Sealing deform. The sealings of EPDM should be used only to a limited extent. We recommend that the sealings be tested beforehand (softening or wetting the sealing discs).

D: Very poor resistance: Sealing deform. The sealing of EPDM should not be used.

Solvent	Resistance
Acetaldehyde	B
Acetone	A
Benzene	D
Butanol	B
Chloroform	D
Diethyl ether	C
Dimethylformamide	A
Dimethylbenzene (Xylol)	D
Dioxane	B
Acetic acid	A
Acetic acid anhydride	B
Ethanol	A
Ethyl acetate	B
Hexane	C
Iso-Butanol	A
Iso-Propanol	A
Methanol	A
Methylene chloride	D
Nitrobenzene	C
Phenol	B
Propanol	A
Sulphuric acid, smoking	C
Carbon tetrachloride	D
Tetrahydrofurane	B
Toluol	D
Triethylamine	C
Trichloroacetic acid	B
Trichloroethane	D
Trifluoroacetic acid	C
Vinylidene chloride (Dichloroethylene)	D
Aqueous hydrogen bromide, saturated	B
Aqueous hydrogen chloride, saturated	A
Aqueous ammonia solution	A
Aqueous caustic soda	A
Aqueous nitric acid	B

Table 6: Resistance of the Sealing of EPDM

Resistance of Perfluorelastomer

A: Very good resistance: Perfluorelastomer may be used without restrictions

B: Moderate resistance: Sealing made of Perfluorelastomer may swell. Sealings may generally be used, but may under some circumstances have to be replaced after being used several times.

C: Poor resistance: Sealing deform. The sealings of Perfluorelastomer should be used only to a limited extent. We recommend that the sealings be tested beforehand (softening or wetting the sealing discs).

D: Very poor resistance: Sealing deform. The sealing of Perfluorelastomer should not be used.

Solvent	Resistance
Acetaldehyde	B
Acetone	A
Benzene	A
Butanol	A
Chloroform	A
Diethyl ether	A
Dimethylformamide	A
Dimethylbenzene (Xylol)	A
Dioxane	A
Acetic acid	A
Acetic acid anhydride	A
Ethanol	A
Ethyl acetate	A
Hexane	A
Iso-Butanol	A
Iso-Propanol	A
Methanol	A
Methylene chloride	A
Nitrobenzene	A
Phenol	A
Propanol	A
Sulphuric acid, smoking	A
Carbon tetrachloride	B
Tetrahydrofurane	A
Toluol	A
Triethylamine	A
Trichloroacetic acid	A
Trichloroethane	A
Trifluoroacetic acid	A
Vinylidene chloride (Dichloroethylene)	A
Aqueous hydrogen bromide, saturated	A
Aqueous hydrogen chloride, saturated	A
Aqueous ammonia solution	A
Aqueous caustic soda	A
Aqueous nitric acid	A

Table 6: Resistance of the Perfluorelastomer Sealings

Resistance of PEEK

A: Very good resistance: PEEK may be used without restrictions

B: Moderate resistance: PEEK may swell. PEEK may generally be used, but may under some circumstances have to be replaced after being used several times.

C: Poor resistance: PEEK deform. PEEK should be used only to a limited extent. We recommend that the PEEK be tested beforehand (softening or wetting the PEEK).

Solvent	Resistance
Acetaldehyde	A
Acetone	A
Benzene	A
Butanol	A
Chloroform	A
Diethyl ether	A
Dimethylformamide	A
Dimethylbenzene (Xylol)	A
Acetic acid	A
Acetic acid anhydride	A
Ethanol	A
Ethyl acetate	A
Hexane	A
Iso-Butanol	A
Iso-Propanol	A
Methanol	A
Methylene chloride	A
Nitrobenzene	B
Phenol	B
Propanol	A
Sulphuric acid, smoking	C
Carbon tetrachloride	A
Tetrahydrofurane	A
Toluol	A
Trichloroacetic acid	A
Trichloroethane	A
Trifluoroacetic acid	A-B
Vinylidene chloride (Dichloroethylene)	A
Aqueous hydrogen bromide, saturated	C
Aqueous hydrogen chloride, saturated	B
Aqueous ammonia solution	A
Aqueous caustic soda	A
Aqueous nitric acid	B

Table 6: Resistance of the PFEK Sealings

5.4 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, pusuant 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 like 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 règlementation FCC à la règlementation des radio-interférences du Canadian Department of communications. Ces limites sont destinées à fournir une protection odéquate contre les interférences nétastes lorsque l'appareil est utilisé dans un environnement commercial.

Cet appareil génère, utilise et peut radier une énergie à fréquence radioélectrique, il est en outre susceprible d'engendrer des interferences 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 nèfastes, auquel cas l'exploitant sera amené à prendre les dispositions utiles pour polier aux interférences à ses propres frais.

5.5 Declaration of Conformity

We, **Büchi** Labortechnik AG
P.O.Box, CH-9230 Flawil
Switzerland

declare on our sole responsibility that the product:
BÜCHI Syncore Product Line,

to which this declaration pertains, conforms to the following standards:

EN 61010-1:1993 (~ IEC 1010-1, VDE 0411-1)
Safety Rules for Electrical Measurement, Control, and Laboratory Units: General Requirements

EN 55011:1991/B (~ VDE 0875/B, VDE 0871/B)
Limit Values and Measurement Procedures for Radio Interference from High-Frequency Industrial, Scientific, and Medicinal Equipment

EN 50081-1:1992
Electromagnetic compatibility - Generic immunity standard: Residential, commercial, light industry.

In accordance with the provisions of EU-Guidelines:

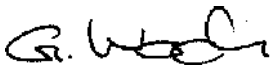
73/23/EWG (Electrical Operating Equipment / Low Voltage Guidelines)
89/336/EWG (Electromagnetic Compatibility)

Flawil, 04.06.2002

BÜCHI Labortechnik AG
Meierseggstrasse 40
CH-9230 Flawil
Switzerland

Tel. +41 (0)71 394 63 63
Fax +41 (0)71 394 65 65

buchi@buchi.com
www.buchi.com



Guido Worch
Qualitymanager