

## Type S-CUT

Spiral Wound Element  
Spiralwickelmodul  
Module à membrane spiralée



Operating Instructions

Bedienungsanleitung  
Manuel d'utilisation

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## Spiral Wound Element Type S-CUT

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# 1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the product. Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the product.

## **WARNING!**

**The operating instructions contain important safety information!**

Failure to observe these instructions may result in hazardous situations.

- ▶ The operating instructions must be read and understood.

## 1.1 Product-specific Data Sheet

With each product, a product-specific data sheet is included containing information on the product. This information must be noted in addition to the operating instructions.

Should you no longer have the data sheet at your disposal, you can find it on the internet at: [www.cut-membrane.com](http://www.cut-membrane.com).

## 1.2 Symbols

### **DANGER!**

**Warns of an immediate danger.**

- ▶ Failure to observe the warning will result in a fatal or serious injury.

### **WARNING!**

**Warns of a potentially dangerous situation.**

- ▶ Failure to observe the warning may result in serious injuries or death.

### **CAUTION!**


**Warns of a possible danger.**


- ▶ Failure to observe this warning may result in a moderate or minor injury.

### **NOTE!**

**Warns of damage to property.**

- ▶ Failure to observe this warning may result in damage to the product or the system.

 Indicates important additional information, tips and recommendations.

 Refers to information in these operating instructions or in other documentation.

- ▶ Designates instructions for risk prevention.

→ Designates a procedure which you must carry out.

## 1.3 Definitions of Terms

In these instructions, the term "product" always refers to the S-CUT spiral wound element.

## 2 AUTHORIZED USE

**Incorrect use of the S-CUT spiral wound element may be a hazard to people, nearby equipment and the environment.**

- ▶ This product is designed to filter substances out of liquid media.
- ▶ The specification data, the operating conditions and conditions of use specified in the contract documents, operating instructions and product-specific data sheet must be observed during use. The designated field of application is specified in Section ["5 Product Information"](#).
- ▶ This product may only be used following detailed consultation with a representative of Bürkert Fluid Control Systems.
- ▶ Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and problem-free operation.
- ▶ Use the product only as intended.

### 2.1 Restrictions

If exporting the product, observe any restrictions in force.

### 3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- contingencies and events which may arise during assembly, operation, and maintenance of the product.
- local safety regulations - the operator is responsible for observing these regulations, also in relation to the installation personnel.



#### **DANGER!**

##### **Risk of poisoning, chemical burns, contamination from escaping medium.**

- ▶ Check the product for leak-tightness prior to commencing use.
- ▶ When handling hazardous substances, always take appropriate precautionary measures and wear personal protective equipment in accordance with the requirements of the medium.
- ▶ Before disconnecting lines, the medium must be flushed from the entire system.

##### **Risk of injury from high pressure in the system/product.**

- ▶ Before working on the system or product, switch off the pressure and vent/drain the lines and product.

##### **General hazardous situations:**

To prevent injuries:

- ▶ Ensure that the system cannot be activated unintentionally.
- ▶ Installation and maintenance work may be carried out only by authorized technicians with the appropriate tools.
- ▶ After an interruption in the filtration process, ensure that the process is restarted in a controlled manner.
- ▶ The product may be operated only when in perfect condition and in consideration of the operating instructions and product-specific data sheet.
- ▶ The general rules of technology apply to application planning and operation of the product.

##### **To prevent damage to the product:**

- ▶ Protect the product from excessive exposure to UV radiation and from frost.
- ▶ Do not allow the product to come into contact with organic solvents. Remove contaminants with water or approved cleaning agents.
- ▶ Do not expose the product to heavy impacts.
- ▶ Do not back-flush the device.
- ▶ Always keep the interior of the product in a moist state.
- ▶ Do not exceed the maximum pressure drop.
- ▶ The pressure on the permeate side must never be higher than on the feed side.
- ▶ At the maximum permitted temperature, the module must not be operated at pressures higher than those specified in the product-specific data sheet.
- ▶ Do not make any external modifications to the product.
- ▶ Pressure surges, sudden increases in the solid content of the feed, heavy cross-flow drops and temperature shocks must absolutely be avoided.
- ▶ Only feed in the media types specified in Section [“7.2.1 Compatible Media”](#) to the media connections. The use of unnamed media is the responsibility of the user.
- ▶ Do not place a physical load on the module (e.g. by placing objects on it or standing on it).

## 4 GENERAL INFORMATION

### 4.1 Contact Address

#### Germany

Bürkert Fluid Control Systems  
CUT Membrane Technology GmbH  
Feldheider Strasse 42  
D-40699 Erkrath/Düsseldorf  
Tel: +49 (0) 2104 - 176 32 0  
Fax: +49 (0) 2104 - 176 32 22  
Email: [info@cut-membrane.com](mailto:info@cut-membrane.com)

#### International

Contact addresses can be found in the internet at: [www.burkert.com](http://www.burkert.com)

### 4.2 Warranty

The warranty is only valid if the type S-CUT spiral wound element is used correctly in accordance with the specified usage conditions.

### 4.3 Information on the Internet

The operating instructions and data sheets for the type S-CUT spiral wound element can be found on the Internet at: [www.cut-membrane.com](http://www.cut-membrane.com)



## 5 PRODUCT INFORMATION

### 5.1 Intended Use

The intended use of the S-CUT spiral wound element is to concentrate or filter medium components by separating the solvent in which they are to be found.

The S-CUT spiral wound element has been designed for media that does not attack the membrane material (refer to product-specific data sheet).



This product may only be used following detailed consultation with a representative of Bürkert Fluid Control Systems.

We recommend practical testing to support the theoretical basis for successful substance separation. Advance laboratory or pilot reference trials will provide information on the flow rates and purity of the permeate.

### 5.2 Handling of the Module

#### 5.2.1 Protection against Drying

When the module is in storage, there is the risk that the membrane may dry out. This may cause irreversible damage to the membrane and must therefore be absolutely avoided (refer to [“13 Non-use/Module Storage” on page 25](#))

#### 5.2.2 Protection against UV

Do not subject the module to long-term exposure to direct sunlight or other UV sources (e.g. UV disinfection lamps).

Store the module in a dark place.

#### 5.2.3 Protection against Frost

Store and use the module in a place protected against frost. If the module freezes, this will damage the membrane and result in brittle fractures.

#### 5.2.4 Careful Transport

If the module falls or is subjected to other collisions, this may result in fractures in and on the module and on the connectors. Therefore, the module must be transported and handled with care.

## 6 STRUCTURE AND FILTRATION

The product is designed for the cross-flow mode. If you intend to operate the module in dead-end mode, you must consult a representative from Bürkert Fluid Control Systems.

### 6.1 Design of the Spiral Wound Element

The module consists of semi-permeable, layer-reinforced flat membranes, taking the form of a pocket sealed on three sides with the open pocket side attached to the permeate pipe.

Several layers of flat membranes, spacers and permeate collection material are wrapped in a spiral-sandwich structure around the central pipe.

The process fluid enters the front of the module, flows through the chambers created by the spacers in an axial direction, and then leaves the module at the other end. The permeate penetrates the membrane, collects in the permeate collection material, flows in a spiral towards the permeate pipe and is carried away.

### 6.2 Cross-flow Filtration

In cross-flow filtration, the product to be filtered crosses the membrane installed in the filter module. The difference in pressure between the membrane pipes which the product crosses and the filtrate void causes part of the fluid to flow as a filtrate (permeate) through the membrane. The remaining part is fed into the circuit as concentrate or retentate.

Higher trans-membrane pressures will cause a thicker, dense covering layer to form, but the flow rate of the permeate will only increase slightly. Fouling of the membrane may result in a decline in the flow rate of the permeate in the long term. Therefore, while moderate trans-membrane pressures do mean that permeate flow rates are less than peak at the start of filtration, this will pay off in the form of higher and more stable permeate flow rates in the long term.

Higher cross-flow rates will limit the thickness of the developing covering layer and enable the flow rate of the permeate to be kept high.

The standard flow rate (cross-flow rate) per module can be found in the specific data sheet. The cross-flow speed is generally specified here. The optimum flow rates for membrane applications will vary and are dependent on the composition of the fluid to be filtered.

**Drop in pressure through the module:**  $\Delta p = p_{IN} - p_{OUT}$

**Trans-membrane pressure:** 
$$p_{TMP} = \frac{p_{IN} + p_{OUT}}{2} - p_{Perm}$$

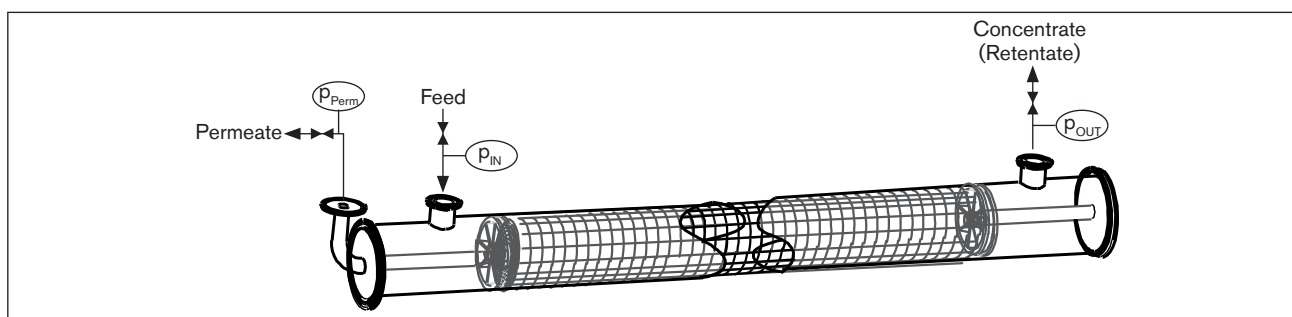


Figure 1: Representation of a spiral wound element in a pressurized pipe

## 7 TECHNICAL DATA

### 7.1 Product Data

Please refer to the product-specific data sheet for the product data.

### 7.2 Operating and Usage Conditions

In order to monitor the flow rate and pressure for the membrane application, the system must be fitted with control valves for cross-flow, pressure control etc.

#### **NOTE!**

- The operating conditions (cross-flow and trans-membrane pressure) are dependent on the specific filtration application and should be optimized by means of laboratory or pilot tests!
- The limit values for pressure and temperature must not be exceeded.
- The ambient temperature must not exceed the medium temperature and must not give rise to frost.

Please refer to the product-specific data sheet for further information on operating and usage conditions.

#### 7.2.1 Compatible Media

Aqueous media (within certain pH and temperature ranges – please refer to product-specific data sheet for precise information).

When using media not specified in the product-specific data sheets, please consult a representative of Bürkert Fluid Control Systems beforehand. The use of unnamed media without such prior consultation is the responsibility of the user.

## 8 INSTALLATION

### 8.1 Safety Instructions



#### **DANGER!**

**Risk of poisoning, chemical burns, contamination from escaping medium.**

- ▶ Check the product for leak-tightness prior to commencing use.
- ▶ When handling hazardous substances, always take appropriate precautionary measures and wear personal protective equipment in accordance with the requirements of the medium.
- ▶ Before disconnecting lines, the medium must be flushed from the entire system.

**Risk of injury from high pressure in the system/product.**

- ▶ Before working on the system or product, switch off the pressure and vent/drain the lines.



#### **WARNING!**

**Risk of injury from improper installation.**

- ▶ Installation may be carried out by authorized technicians only and with the appropriate tools.

**Risk of injury from unintentional activation of the system and uncontrolled restart.**

- ▶ Secure system against unintentional activation.
- ▶ Following installation, ensure a controlled restart.

### 8.2 Before Installation

→ Only remove the module from its plastic packaging immediately before installing it in the pressurized pipe. Once removed from the packaging, the module must be treated with particular care.

→ Examine the module for any external physical damage.

→ Clean the system and pipelines to ensure that soiling and oily substances cannot be flushed into the module from the system.

New modules are supplied dry or filled with a preservative fluid. If the module is filled with preservative fluid, please drain the module first immediately before installing it.

Dispose of the preservative fluid in accordance with the applicable waste disposal and environmental protection regulations.

## 8.3 Installation of the Modules in the Pressurized Pipe

Spiral wound elements can be installed either individually or with several in sequence in a pressurized pipe.

If several modules are installed in a pressurized pipe and the permeate flow rates are correspondingly high, the permeate will be collected at both ends of the module bundle. If permeate is collected at one end, it is generally not relevant whether the permeate is collected from the inflow or outflow end of the module.

If necessary, a very small amount of glycerine may be applied to the O-rings and lip seal as a lubricant for the installation of the module in the pressurized pipe (refer to [“12 Recommended auxiliary materials”](#)). Only use other lubricants following prior consultation with a representative of Bürkert Fluid Control Systems.

### NOTE!

#### Damage to the Membrane.

- ▶ Silicone lubricants must never be used, particularly with e-coating or clean water.
- ▶ Do not use mineral lubricants (petroleum jelly, Vaseline).

Modules should always be pushed into or pulled out of pressurized pipes **in the direction of the feed flow**. This prevents the lip seal from rolling up.

### NOTE!

- Errors in the installation of the modules may result in leaks and a deterioration in the quality of the permeate.

### 8.3.1 Installation of a Single Module

→ Push the module into the pressurized pipe in the direction of feed flow (the direction of the module itself is not relevant).

The ATD is operated with a lip seal on the feed end (inflow end).

→ Pull the lip seal into the groove of the ATD so that the U-shaped cross section of the lip seal is counter to the flow during operation. This will cause the lip seal to expand during inflow, creating a seal between the coil module and the inside surface of the pipe and thus preventing leakages.

→ Place the O-rings on the permeate adapter.

→ Place the ATD on the guide element of the permeate adapter so that the ATD with its plane surface is firmly on the cross section of the module when installed.

→ Place the sealing ring for the end cap onto the inflow end of the pressurized pipe.

→ Slide the permeate adapter with the welded-on end cap into the permeate pipe by lightly pushing and turning it.

→ Place the end cap onto the pressurized pipe, ensuring in the process that the sealing ring is correctly seated.

→ Tighten the clamping ring.

→ Proceed in the same fashion on the outflow end. However, install the ATD without the lip seal and attach the dummy adapter with the end cap instead of the permeate adapter.

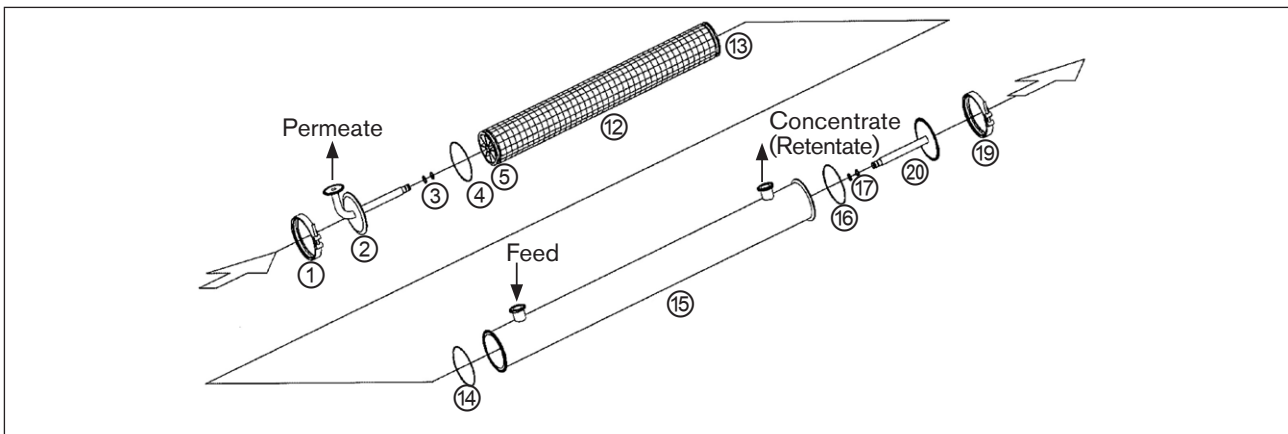


Figure 2: Installation of Individual Modules in the Pressurized Pipe

No.	Designation	Quantity
① ⑱	Clamping ring for end cap	2
②	Permeate adapter with end cap	1
⑳	Dummy adapter with end cap	1
③ ⑰	O-ring	4
④	Lip seal	1
⑤ ⑬	Anti-telescoping device (ATD)	2
⑫	Wound element	1
⑭ ⑯	Sealing ring for end cap	2
⑮	Stainless steel pressurized pipe	1

### 8.3.2 Installation of Multiple Modules

- Please note which module (serial number) is installed in which pipe.
- Push the (first) module two-thirds in the direction of feed flow into the pressurized pipe (the direction of the module itself is not relevant).
- Place the O-rings and ATDs on the inter-permeate connector. The plane surfaces of the ATDs must be firmly on the cross section of the module when installed.
- To prevent a leakage on the ATD, which is located on the inflow end of the module, apply a lip seal.
- Feed the inter-permeate connector into the permeate pipe by lightly pushing and turning it.
- Note the serial number and position of the second module.
- Push the second module onto the inter-permeate connector until both modules are flush with the ATDs.
- Carefully push the module bundle into the pressurized pipe until the second module is protruding by one third from the pipe.
- Repeat the procedure until all modules have been installed.
- Insert sealing ring for the end caps on both ends of the pressurized pipe.
- Slide both permeate adapters with the O-rings and ATDs applied (inflow-end ATD with lip seal!) into the permeate pipe by lightly pushing and turning them.
- Place the end caps onto the pressurized pipe, ensuring in the process that the sealing rings are correctly seated.
- Tighten the clamping rings.

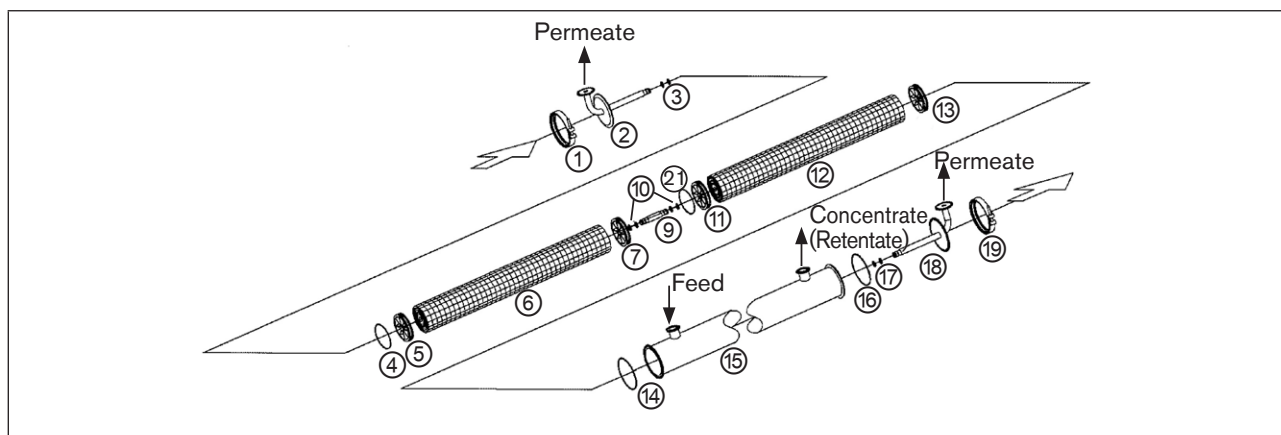


Figure 3: Installing Multiple Modules in a Pressurized Pipe

No.	Designation	Quantity
① ⑱	Clamping ring for end cap	2
② ⑱	Permeate adapter with end cap	2
③ ⑩ ⑰	O-ring	8+
④ ⑳	Lip seal	1+
⑤ ⑦ ⑪ ⑬	Anti-telescoping device (ATD)	4+
⑥ ⑫	Wound element	2+
⑨	Inter-permeate connector	1+
⑭ ⑯	Sealing ring for end cap	2
⑮	Stainless steel pressurized pipe	1

## 8.4 Installation in a Filtration System

### NOTE!

#### Risk of membrane perforations.

- ▶ Fix the pipe and connect it in such a way that vibrations from the system cannot be transferred to the module inside.

The module (element in pressurized pipe) is fixed in place by means of a bracket on the filtration system frame.

→ Check the seals to ensure that they are clean. Only use clean seals.

→ **Loosely** connect the feed inlet (connector: IN) first, then the concentrate outlet (connector: OUT), and finally the permeate outlets of the pipe.

→ Ensure that the seals are not displaced when establishing the connections.

→ Check that none of the connections is subject to mechanical stresses.

→ Check that the seals are seated correctly.

→ Alternately tighten the connections.

### NOTE!

#### Damage to the connections.

- ▶ Do not use force to tighten the connections! Use of excessive force in tightening may cause fractures in the connections.



## 9 PREPARATION FOR USE

These instructions are limited to the correct treatment of the S-CUT spiral wound element. Please refer to the operating instructions of the filtration system to prepare the filtration system for use safely and securely.

### 9.1 Safety Instructions



#### **DANGER!**

##### **Risk of poisoning, chemical burns, contamination from escaping medium.**

- ▶ When handling hazardous substances, always take appropriate precautionary measures and wear personal protective equipment in accordance with the requirements of the medium.
- ▶ Before disconnecting lines, the medium must be flushed from the entire system.

##### **Risk of injury from improper operation.**

Improper operation may result in injuries as well as damage to the product and the surrounding area.

- ▶ Before start-up, ensure that the operating personnel are familiar with and completely understand the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may start up the equipment/the product.



Compared to pumps and pipelines, the membrane in the filtration system is a relatively sensitive component. Therefore, every effort should be made when planning and operating the system to avoid pressure surges, sudden increases in the solid content of the feed, heavy cross-flow drops and temperature shocks. Pressure surges and vibrations in particular may damage the module and impair its performance.

#### **NOTE!**

##### **Damage to the Module.**

- ▶ Under no circumstances may the pressure on the permeate site exceed the pressure on the feed site of the module. Back-flushes will destroy the module.
- ▶ Media with non-permissible pH values, oxidants or other products that would attack the membrane must not be used (please refer to the data sheet for compatible media – alternatively, contact a representative of Bürkert Fluid Control Systems).
- ▶ Do not exceed the maximum pressure drop.
- ▶ Do not operate the module in dead-end mode.
- ▶ At the maximum permitted temperature, the module may only be operated at permitted pressure values (please refer to product-specific data sheet).
- ▶ We recommend keeping the pressure at the module outlet to at least 0.5 bar. The filtration system must be designed so that negative pressure cannot arise in the feed chamber.
- ▶ Quickly opening the valves may cause pressure surges, damaging the module.

## 9.2 Prior to Preparation for Use

### 9.2.1 Test Run

During the test run, the rest of the preservative fluid (often glycerine or sodium metabisulfite) is flushed out of the module.



#### **CAUTION!**

**Mildly toxic preservative fluid.**

- ▶ Avoid contact with eyes and skin.



The water used for flushing purposes must satisfy certain purity requirements. These are product-specific and must be inquired about.

→ Check connections for leakage.

#### **NOTE!**

**Damage to the connections.**

- ▶ If the surfaces of the seals on the connector and supply line are not flat on top of one another, do not use excessive force to tighten the connecting elements to ensure leak-tightness. Using excessive force may cause the connections to break.

→ Perform test run with water (approx. 10 minutes).

→ Ensure that the connections do not exhibit any leaks. If there are leaks, cease operation and take appropriate measures to eliminate them. If the seals are correctly seated, it is generally sufficient to tighten the brackets by hand.

→ Deaerate the system.

→ Determine and document the water equivalent.

In the case of applications with very strict product purity requirements, it is strongly recommended that the modules also be cleaned following flushing before beginning filtration of the feed solution.



Any concentrate or permeate generated during the test run is to be disposed of. Please observe any applicable national environmental regulations.

During the deaeration process (approx. 2 minutes), the system should be operated at very low pressure in order to prevent pressure surges.

## 9.2.2 Determining the Water Flow Rate

The water flow rate is the maximum achievable permeate flow rate for a certain trans-membrane pressure value. As no separation of substances takes place at the membrane, no covering layer will develop and the permeate flow rate is determined solely by the hydrodynamic properties of the membrane.

The effectiveness of cleaning the membrane can be defined by measuring the water flow rate before and after cleaning and then comparing both measurements.

The use of deionized water, pre-filtered to 10 µm, is recommended for determining the water flow rate.

Please consult a representative of Bürkert Fluid Control Systems if you wish to use tap water.



To avoid pressure surges, we recommend operating the module for around 2 minutes at low pressure before gradually increasing the pressure to the recommended values (refer to product-specific data sheet).

## 9.2.3 Pre-filtration

Pre-filtration is absolutely necessary with spiral wound elements.

For consistently high permeate flow rates, particular attention should be paid to the pre-filtration of the feed solution. The separation thresholds for effective pre-filtration can be found in the product-specific data sheets. Extensive pre-treatment may be necessary in specific cases.

## 9.2.4 Optimum Operating Parameters

It is only possible to determine the trans-membrane pressure and cross-flow rate that can consistently achieve optimum operating parameters such as permeate flow rate and quality by means of appropriate pre-trials.

The permeate flow rate will increase with the trans-membrane pressure. Please note that higher membrane pressure values may give rise to a thicker and in particular denser covering layer, will only generate a small increase in the permeate flow rate and that membrane fouling and scaling can result in a decline in the permeate flow rate in the long term.

Therefore, while moderate trans-membrane pressures do mean that permeate flow rates are lower at the start of filtration, this will pay off in the form of higher and more stable permeate flow rates in the long term.

Higher cross-flow rates will limit the thickness of the developing covering layer and keep the flow rate of the permeate high. However, the cross-flow rate must never be so high as to cause the maximum permissible pressure drop to be exceeded.

## 9.3 Filtration

- Ensure that the permeate can flow out without the aid of pressure (open permeate valve/s)  
The permeate pressure must not exceed 0.2 bar!  
Note the geodetic head when establishing the permeate pipes.

### When using centrifugal pumps for the feed:

- Close the feed valve
- Open the concentrate outlet valve

### When using displacement pumps for the feed:

- Leave the feed valve slightly open
- Open the concentrate outlet valve

### With either type of pump:

- Carefully and slowly open the feed valve (increase the flow on the module for around 3 minutes under low pressure to avoid pressure surges when aerating the system).



The limit values for pressure and cross-flow rate must not be exceeded.

- Ensure that the entire system (in particular the pressurized pipe permeate areas in which the modules are located) is deaerated.
- Gradually increase the cross-flow rate of the module by carefully opening the feed valve further.
- Adjust the trans-membrane pressure by carefully and gradually closing the valve on the concentrate outlet (pressure sustaining valve).
- Slowly increase the cross-flow rate. If the pressure drop has reached its limit value, the cross-flow rate must not be increased any further.



There is usually the option of measuring the pressure drop through the module and the cross-flow rate of the module from the system.

If the cross-flow rate of the module cannot be measured, the operating point is simply adjusted by slowly increasing the pressure drop to its recommended value.

In any case, the concentrate outlet valve (pressure sustaining valve) must be closed enough for the concentrate pressure on the module outlet to always be greater than 0.5 bar.

The cross-flow rate specified in the data sheets for the recommended pressure drop applies to water (temperature 25 °C, viscosity 1 mPas). Please note that the maximum permissible pressure drop with feed solutions of a higher viscosity is reached with a considerably lower cross-flow rate.



Please consult a representative of Bürkert Fluid Control Systems if you have questions surrounding the preparation of the module for use.

## 10 CLEANING AND MAINTENANCE

Fouling of the membrane surface may result in a decline in the flow rate of the permeate. In most cases, the coatings can be removed from the membrane and the permeate flow rate can be for the most part restored.

The cleaning procedure must take into consideration the type of fouling and the resilience of the module type in question.



The ideal cleaning method should be determined by means of pre-trials. As an alternative to commercial cleaning agents, the pH value can also be modified during the cleaning phase with the use of lyes or acids.

Only use the cleaning agents recommended by us in Section [“12 Recommended auxiliary materials”](#). Please contact our technical support service before using cleaning agents not listed in these operating instructions.

Cleaning is generally conducted under the stress limits of the module. Therefore, each cleaning activity reduces the life of the module.

### 10.1 Water for Flushing and Diluting/Dilution

Water used for flushing and diluting/dilution is subject to certain requirements that must be met:

- free of particles
- low hardness
- partially deionized

## 10.2 Cleaning

### NOTE!

#### Damage to the Module.

- ▶ The permeate must always be able to flow out without the aid of pressure. Always leave the permeate outlets open during cleaning.
- ▶ Back-flushes may result in the module being destroyed when using the S-CUT spiral wound element and are therefore not permitted.

#### Cleaning recommendation:

To remove deposits from the membrane surface, set a high cross-flow rate and a low trans-membrane pressure:

Feed inlet pressure: 1.5 – 2 bar

Concentrate outlet pressure: 0.7 – 0.9 bar



Please dispose of feed solutions, cleaning solutions and flushing water in accordance with the medium's characteristics and with national waste disposal regulations.

- Completely drain the system.
- Flush out the rest of the feed solution with water until the concentrate is clear.
- Flush the entire system for 20 minutes using warm water. Any concentrate or permeate generated is to be disposed of.
- Completely drain the system.
- Allow the cleaning solution to circulate throughout the system. Any concentrate or permeate generated is transported back to the cleaning tank. Warm cleaning solutions will clean faster, but the temperature must never exceed the maximum operating temperature of the module (refer to product-specific data sheet).
- Once the cleaning phase has ended, drain the system and dispose of any generated concentrate or permeate.
- Flush the entire system for 20 minutes using warm water. Any concentrate or permeate generated is to be disposed of.
- Completely drain the system.

## 10.3 Maintenance

No maintenance is necessary. The product may need to be cleaned in accordance with [“10.2 Cleaning”](#).

If the permeate flow rate and separation characteristics can no longer be restored by cleaning the module, the product has reached the end of its service life.

To order new CUT spiral wound elements, please contact a representative of Bürkert Fluid Control Systems.

## 11 DISASSEMBLY



### DANGER!

#### Risk of poisoning, chemical burns, contamination from escaping medium.

- ▶ When handling hazardous substances, always take appropriate precautionary measures and wear personal protective equipment in accordance with the requirements of the medium.
- ▶ Before disconnecting lines, the medium must be flushed from the entire system.

#### Risk of injury from high pressure in the system/product.

- ▶ Before working on the system or product, switch off the pressure and vent/drain the lines.

#### Risk of injury from improper disassembly.

Improper disassembly may result in injuries as well as damage to the product and the area around it.

- ▶ Before removal, ensure that the operating personnel are familiar with and completely understand the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may remove the product.



If the S-CUT spiral wound element is to be used further after removal, certain conditions must be adhered to regarding storage (refer to ["13 Non-use/Module Storage"](#)).

#### Procedure:

- Completely drain the system.
- Flush out the rest of the feed solution with water (normal cold tap water) until the concentrate is clear.
- Flush the entire system for 20 minutes using warm water. Any concentrate or permeate generated is to be disposed of.
- Completely drain the system.
- Disconnect the connections.
- Remove the product.



Please consult a representative of Bürkert Fluid Control Systems if you have any questions.

## 12 RECOMMENDED AUXILIARY MATERIALS

We recommend the use of the following substances for the installation, disinfection and cleaning of the S-CUT spiral wound element.

Use	Product	Manufacturer
Lubricant	Glycerin anhydrous, suitable for DI use as excipient emprove EXP PH EU	
Disinfectant	Sodium metabisulfite 1.0%	
	Formalin 0.5%	
	Propanoic acid 1.0%	
Cleaning agent	LiquiCUT	CUT Membrane Technology GmbH <a href="http://www.cut-membrane.com">www.cut-membrane.com</a>



## 13 NON-USE/MODULE STORAGE

### 13.1 Unused Products

#### NOTE!

**Incorrect storage may damage the product.**

- ▶ Store the product in a dark and dry location free of frost and dust!
- ▶ Storage temperature 5 ... 40 °C.
- ▶ Never store the module in an unpacked state – if the membrane dries out, this will cause irreversible damage to the module.

The S-CUT spiral wound element as supplied is well-packaged in a sealed plastic bag. Please store the unused module in this sealed bag, unopened.

### 13.2 Used Products

Used membranes must be kept moist at all times. To inhibit bacterial growth during periods of non-use or module storage, moist membranes should be rinsed using suitable disinfectants (refer to [“12 Recommended auxiliary materials”](#)).

We recommend storing the module inside the system.

#### 13.2.1 Short-term Storage

##### Non-use up to 24 hours

→ No measures required.

##### Non-use between 24 hours and 7 days

→ Carefully rinse the module with disinfectant (please refer to [“12 Recommended auxiliary materials”](#)).

→ Perform a filtration once a day using clean water, permeate or cleaning agent.

#### 13.2.2 Long-term Storage

##### Non-use between 7 day and 12 months

→ Clean the module prior to disinfection (refer to [“10.2 Cleaning”](#)).

→ Fill pressurized pipe with preservative solution

1.0% sodium bisulfite (NaHSO<sub>3</sub>) or

0.5% formaldehyde (CH<sub>2</sub>O).

Causing a brief and slight cross-flow through the modules will ensure that the permeate chamber is completely filled with preservative solution.

→ Leave the solution in the module and replace it every 14 days.

##### Non-use Lasting Several Months/Years

→ Clean the module prior to disinfection (refer to [“10.2 Cleaning”](#)).

→ Fill the entire system with 500 ppm benzoic acid, leave the fluid in the module.

## 14 RETURNING A MODULE

Please contact a representative of Bürkert Fluid Control Systems before sending back a module.

Prepare the module as if you were preparing it for long-term storage (“13.2.2 Long-term Storage”). Send the module well-packed to Bürkert Fluid Control Systems with an enclosed written statement of the faults identified.

## 15 PACKAGING AND TRANSPORT

### NOTE!

#### **Transport damage.**

Inadequately protected products may be damaged during transportation.

- ▶ Protect the product against light, moisture and dirt in shock-resistant packaging during transportation.
- ▶ Prevent the temperature from exceeding or dropping below the permitted storage temperature.
- ▶ Storage temperature 5 ... 40 °C.

#### **Damage to the environment caused by parts of the product contaminated with media.**

- ▶ Dispose of the product and packaging in an environmentally friendly manner.
- ▶ Observe applicable waste disposal and environmental regulations.



