

Superloop™ 10 mL, 50 mL

Instructions for Use

1 Introduction

The Superloop™ assembly is a sample loop intended for injecting large sample volumes into a pressurized fluid system. The Superloop assembly can also be used for multiple injections, for example in a scouting experiment when the same application conditions are required. The Superloop is available in two sizes, 10 mL or 50 mL, with either 1/16" or M6 fittings.

Size	Connection	Sample volume	Flow rate	Product code
10 mL	1/16" fittings	Up to 10 mL	0.5 to 100 mL/min	18111381
10 mL	M6 fitting	Up to 10 mL	0.5 to 100 mL/min	19758501
50 mL	1/16" fittings	Up to 50 mL	0.5 to 100 mL/min	18111382
50 mL	M6 fitting	Up to 50 mL	0.5 to 100 mL/min	19785001

The Superloop assembly can be used with all lab-scale ÄKTA™ chromatography systems from Cytiva. It is also available as a component for other chromatography systems.

The Superloop assembly can be connected to either the Injection valve (e.g. **V9-Inj**, **V9H-Inj**, **V9M-J**, or **V9-J**) or the Loop valve (e.g. **V9-L** or **V9H-L**). When using the Loop valve, up to five loops can be connected simultaneously. The Superloop assembly is connected instead of a sample loop.

Note: *The images depicted in this manual are included for general illustrative purposes and may include images of Superloop assemblies other than the Superloop 10 mL and 50 mL assembly.*

2 Safety instructions

General precautions



WARNING

Explosion risk. Always use the protective jacket and make sure that no air bubbles are present in the solution in the glass tube. Overpressure of air bubbles in the solution in the Superloop assembly can cause the glass tube to break or explode.



WARNING

Cutting risk. Always use the protective jacket and do not exceed the pressure specifications of the Superloop assembly. Overpressure can cause the glass in the Superloop assembly to break.



WARNING

Overpressure. The maximum pressure for the Superloop assembly is 4 MPa (40 bar). Set the maximum system pressure for the chromatography system to this value or lower.



WARNING

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of this product.



CAUTION

Cutting risk. Do not use the Superloop assembly when the glass tube is cracked or damaged. Glass splinters or sharp edges can cause injury.



NOTICE

Always use the Superloop assembly with sample in the sample chamber and eluent in the eluent chamber. The sample chamber is on the side closer to the O-ring of the movable seal.

Chemical resistance



NOTICE

The Superloop assembly must not be used with solvents that cause the fluorocarbon rubber O-ring to swell. Examples of such solvents are acetonitrile, dioxane, organic esters, and tetrahydrofuran.

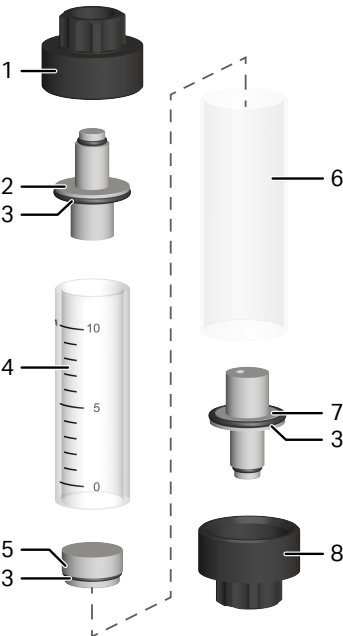
The Superloop assembly can be used with aqueous buffer solutions and alcohols. The black fluorocarbon rubber O-ring in the movable seal can swell when it comes in contact with organic solvents. The swollen O-ring blocks the bypass channel, causing the flow to stop. If the chromatography system is operating with inappropriate pressure limits, this can cause the glass tube in the Superloop assembly to shatter.

Note: *The standard fluorocarbon rubber O-ring is made of a copolymer of vinylidene fluoride and hexafluoropropylene. A solvent resistant O-ring for the Superloop assembly is available as an accessory. For ordering information, visit [cytiva.com](https://www.cytiva.com).*

3 Product description

3.1 Illustration of the product

The image below shows an overview of the components of the Superloop 10 mL assembly.



Part	Description
1	Top outer end piece
2	Top inner end piece
3	O-rings with a dimension of 11.3 × 2.4 mm
4	Glass tube with a graduated scale of 1 mL increments
5	Movable seal
6	Protective jacket
7	Bottom inner end piece
8	Bottom outer end piece

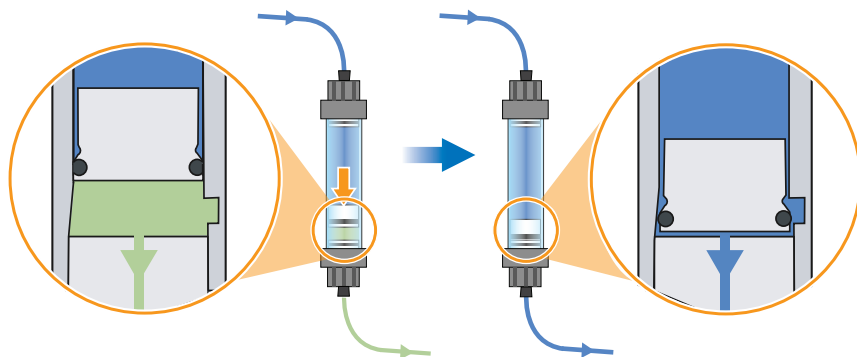
3.2 Background

The glass tube has a graduated scale of 1 mL increments and seals against the inner end pieces when assembled. The protective jacket is held in position by the outer end pieces.

The movable seal, situated between the two inner end pieces, divides the glass tube into two separate chambers. During the operation of the Superloop assembly, the sample is loaded into the lower chamber, and eluent is loaded into the upper chamber.

There is a 1 mm² countersink located on the inside of the glass tube, near the bottom end piece, that operates as a bypass channel. When the sample is injected onto the column, the movable seal moves towards the bottom of the glass tube. When the movable seal reaches the bypass channel at the bottom end piece, the eluent can flow next to the movable seal.

The image below shows the function of the bypass channel in the glass tube when the movable seal reaches the bottom of the glass tube.



4 Operation

4.1 Prime the Superloop assembly

Follow the instructions below to prime the Superloop assembly with eluent.

Tip: Wet the O-rings with distilled water to lubricate before reassembling.

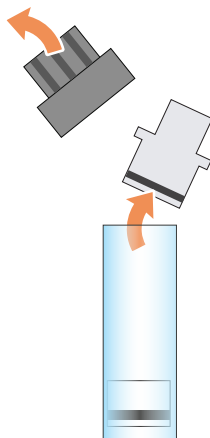
Step	Action
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1	Unscrew the top outer end piece and take out the top inner end piece.
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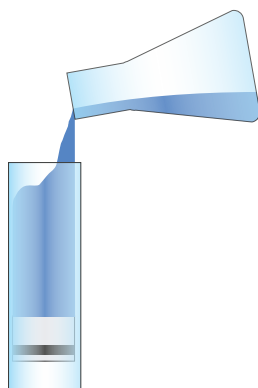
Tip:

If the end piece is difficult to remove, rock the end piece gently until it is free, or use a spatula to carefully pry the end piece out of the glass tube. Take care not to damage the glass tube or the end piece O-ring.

Step	Action
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| 2 | Fill the eluent chamber with eluent. |
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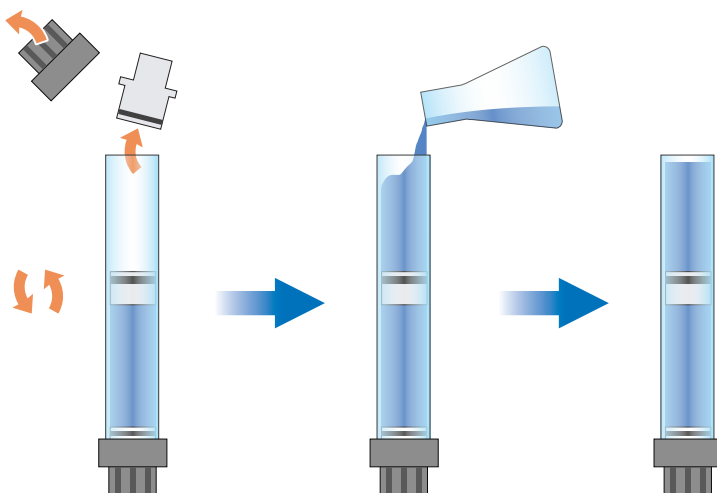


- | | |
|---|---|
| 3 | Connect the 10 cm tubing to the bottom inner end piece. |
| 4 | Connect the 40 cm or 75 cm tubing to the top inner end piece. |
| 5 | Insert the top inner end piece into the glass column. |
| 6 | Tighten the top inner end piece by screwing on the top outer end piece onto the glass tube. |

Step	Action
7	Turn the glass tube upside down and repeat the previous steps for the bottom pieces to fill the sample chamber with eluent.

Note:

When inserting the bottom inner end piece, make sure to align the slot lines with the counter sink of the glass tube.



8	Push the protective jacket into the top outer end piece.
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WARNING

Explosion risk. Always use the protective jacket and make sure that no air bubbles are present in the solution in the glass tube. Overpressure of air bubbles in the solution in the Superloop assembly can cause the glass tube to break or explode.

9	Insert the bottom inner end piece into the glass tube.
10	Screw on the bottom outer end piece.

4.2 Connect the Superloop assembly

Follow the instructions below to connect the Superloop assembly to the ÄKTA system.

Step	Action
1	Depending on the system set up, mount the Superloop assembly on a holder that is attached to the system or an external holder. Refer to user documentation for respective ÄKTA systems for information on mounting options.
2	Connect a piece of tubing from the top of the Superloop assembly to: • port LoopE on the Injection valve - or • an E port, e.g., 1E on the Loop valve.
3	Connect a piece of tubing from the bottom of the Superloop assembly to: • port LoopF on the Injection valve



or

- the **F** port corresponding to the connected **E** port, e.g., **1F** on the Loop valve.

4.3 Fill the Superloop assembly using a syringe

There are several options for loading the sample into the Superloop assembly:

- Load the sample through the sample chamber outlet using a syringe or external pump.
- Load the sample instead of eluent directly into the sample chamber as part of the priming procedure (see [Section 4.1 Prime the Superloop assembly, on page 5](#)). This approach requires that the movable seal is suitably positioned to give a sample chamber of appropriate volume.
- By using the system pump or the sample pump of the ÄKTA system. This option can only be used if it is supported by the system configuration. This method of sample loading can be integrated into a run method in the UNICORN software.

Note: Refer to the user documentation for the ÄKTA system for more details on how to operate the system pump.

Follow the instructions below to load sample into the Superloop assembly that has been primed with eluent in both chambers.



WARNING

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WARNING

Cutting risk. Always use the protective jacket and do not exceed the pressure specifications of the Superloop assembly. Overpressure can cause the glass in the Superloop assembly to break.



WARNING

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of this product.

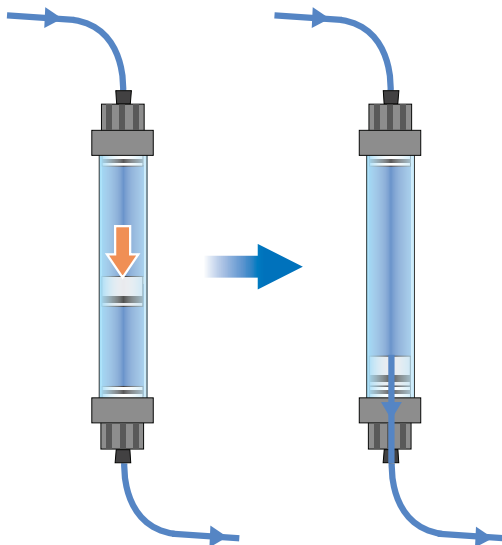


NOTICE

Always use the Superloop assembly with sample in the sample chamber and eluent in the eluent chamber. The sample chamber is on the side closer to the O-ring of the movable seal.

Step	Action
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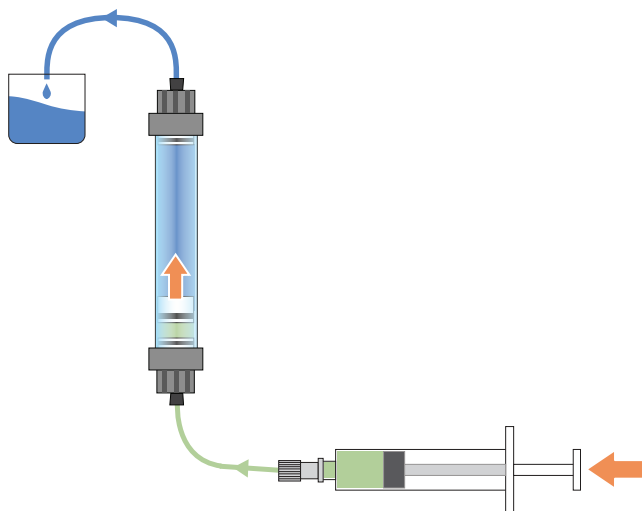
- 1 Use an external pump or the chromatography system pump to pump eluent into the eluent chamber to displace all liquid from the sample chamber. The valve in the seal will open and allow eluent flow to continue when the movable seal reaches the end of the Superloop assembly.



- 2 Stop the eluent flow and connect the eluent chamber inlet to waste. The movable seal valve closes automatically when the eluent flow stops and the pressure is released.

Step	Action
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| 3 | Fill the sample chamber with sample using a syringe or pump. |
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- | | |
|---|---|
| 4 | When sample loading is complete, connect the Superloop assembly into the chromatography system flow path. |
|---|---|

4.4 Apply the sample to the column

This procedure can be part of a method in the UNICORN software. Refer to the user documentation for the ÄKTA system for more information on how to apply the sample to the column.



WARNING

Overpressure. The maximum pressure for the Superloop assembly is 4 MPa (40 bar). Set the maximum system pressure for the chromatography system to this value or lower.



WARNING

Cutting risk. Always use the protective jacket and do not exceed the pressure specifications of the Superloop assembly. Overpressure can cause the glass in the Superloop assembly to break.

Follow the instructions below to apply the sample to the column.

Step	Action
1	Turn the valve to the inject position.
2	Pump eluent into the eluent chamber. <i>Result:</i> The movable seal moves down the glass tube, and the sample is injected onto the column.
3	• To load the entire sample, continue pumping eluent through the Superloop assembly for some time after the movable seal reached the bottom, to make sure that all sample has been injected. • To load an aliquot of the sample, switch the Superloop assembly out of the flow path when the required volume of the sample has been injected.
4	Turn the valve to the load position. <i>Result:</i> The Superloop assembly is ready for reloading, if applicable. Note: <i>If the next run uses a different eluent, make sure to first rinse the Superloop assembly to avoid contamination.</i>

5 Maintenance

5.1 Cleaning

The Superloop assembly can be cleaned using laboratory detergents. It is recommended to use enzymatic detergents to remove proteinaceous material, if necessary.

The Superloop assembly must be cleaned thoroughly and kept disassembled if it is stored for long periods of time.

Wet the inside of the glass tube, the movable seal, and the inner end pieces to lubricate before assembling the Superloop assembly.

5.2 Cleaning-In-Place

The Superloop assembly is designed to facilitate Cleaning-In-Place (CIP). CIP is achieved by pumping a cleaning or sanitizing agent through the Superloop assembly. The standard recommendation is to pump 0.5 M NaOH through the Superloop assembly for 30 minutes.

5.3 Disassembly

Follow the steps below to disassemble the Superloop assembly before cleaning.

Step	Action
1	Unscrew the top outer end piece.
2	Slide the glass tube out of the protective jacket.
3	Remove the top inner end piece from the glass tube. Tip: <i>If the end piece is difficult to remove, rock the end piece gently until it is free, or use a spatula to carefully pry the end piece out of the glass tube. Take care not to damage the glass tube or the end piece O-ring.</i>
4	Unscrew the bottom outer end piece.
5	Remove the bottom inner end piece from the glass tube.
6	Push the movable seal carefully out of the glass tube with a rod.

5.4 Reassembly

Follow the steps below to reassemble the Superloop assembly.

Note: *Wet the O-rings with distilled water to lubricate before reassembling.*

Step	Action
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| 1 | Insert the movable seal into the glass tube from the top, with the O-ring oriented towards the bottom of the glass tube. |
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**NOTICE**

Make sure to insert the movable seal from the top, with the O-ring towards the bottom of the glass tube. This way, the O-ring on the movable seal is closer to the bottom of the glass tube, that is the sample chamber. The Superloop assembly does not function correctly if the orientation of the movable seal is reversed.



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|---|---|
| 2 | Insert the bottom inner end piece into the glass tube. |
| 3 | Screw on the bottom outer end piece onto the glass tube. |
| 4 | Push the protective jacket into the bottom outer end piece. |
| 5 | Insert the top inner end piece. |
| 6 | Screw on the top outer end piece. |

Tip:

The top and bottom end pieces are identical and fit either end of the glass tube.

6 Troubleshooting

The table below describes possible causes of problems that can occur during the use of the Superloop assembly and their suggested corrective actions.

Problem	Possible cause	Action
Flow through valve does not function.	The movable seal has been inserted upside down.	Disassemble and reassemble the Superloop assembly.
	The O-ring in the movable seal is swollen.	Replace the O-ring with a solvent resistant O-ring.
Injected volume is less than expected.	Trapped air in the eluent chamber.	Disassemble and reassemble the Superloop assembly.
Inner end pieces are hard to take out. Movable seal is stuck.	If the assembled Superloop is dry for a long period of time, the O-ring adheres to the glass tube.	Inject distilled water into both chambers with a syringe. Shake the Superloop assembly, allowing the O-rings to lubricate. Carefully pry up the edge of the inner end pieces, making sure to carefully hold the Superloop assembly.

7 Specifications

The table below describes the specifications for the Superloop 10 mL assembly and the Superloop 50 mL assembly.

Parameter	Specification 10 mL	Specification 50 mL
Sample volume	Up to 10 mL	Up to 50 mL
Flow rate	0.5 to 100 mL/min	0.5 to 100 mL/min
Maximum pressure	40 bar (4 MPa, 570 psi)	40 bar (4 MPa, 570 psi)
Minimum pressure for seal movement	< 1 bar (0.1 MPa, 14 psi)	< 1 bar (0.1 MPa, 14 psi)
Size	130 × 30 mm	335 × 30 mm
Wetted materials	Fluoroplastics, fluororubber and glass.	Fluoroplastics, fluororubber and glass.

8 Ordering information

Spare parts

Product	Pkg	Product code
Inner end piece	1	19784601
Outer end piece	1	19516701
O-ring 27.1 × 1.6 mm	5	19759501
O-ring 11.3 × 2.4 mm	5	19758401
Movable seal	1	19784501
Protective jacket (50 mL)	1	19784901
Glass tube with thread and groove (10 mL)	1	19759301
Glass tube with thread and groove (50 mL)	1	19516501

Accessories

Product	Pkg	Product code
Solvent resistant O-ring	3	18630001

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