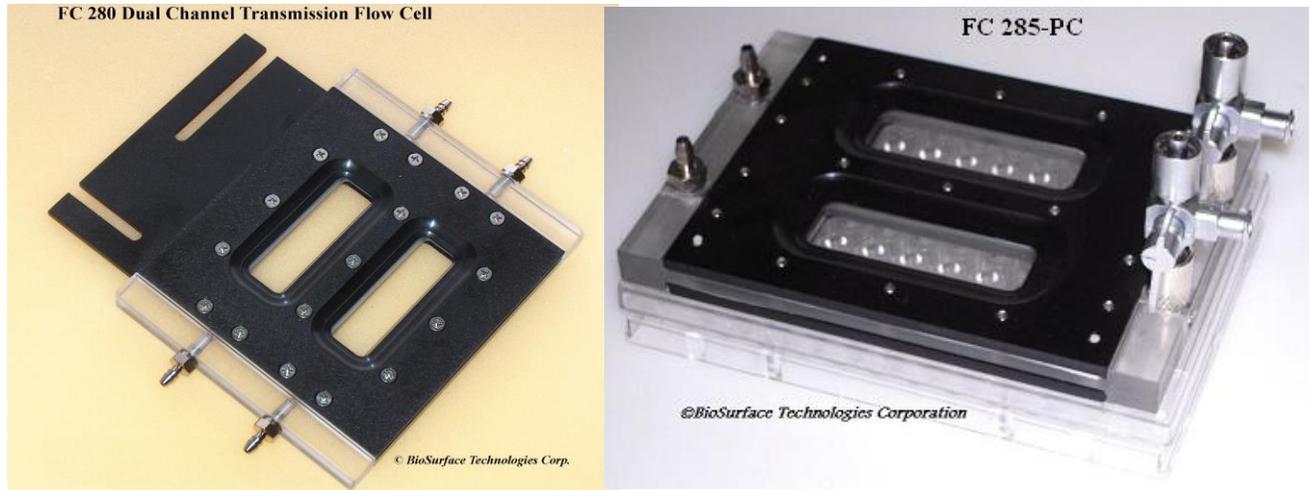


BioSurface Technologies, Corp.

BST FC 280/281/284/285 Flow Cell Operations

The model FC 280 series flow cells consist of a polycarbonate or anodized aluminum flow channel. Glass viewing ports allow transmission microscopy of biofilm growth in the flow channel.



Viewing Windows:

The viewing window on one side of the flow cell consists of a glass microscope slide, and on the other of a no. 2, 24x60 mm cover slip. The flow cell may be operated in any orientation. The middle flow channel component is reversible to allow installation on inverted and upright microscopes. Milled recesses on the polycarbonate flow channel accept the glass slide or glass cover slip. The recess for the glass slide is deeper than the recess for the cover slip.

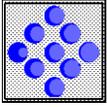
The glass viewing windows are held in place by a pair of aluminum cover plates. The cover plates also compress the silicone rubber gasket material to provide a leak-proof flow cell.

FLOW CELL ASSEMBLY AND OPERATION

It is very important the flow cells be assembly properly to provide a leak-proof seal.

Disassembly:

1. Remove the screws holding the cover plate in place.



BioSurface Technologies, Corp.

2. Remove the cover plate. (Most likely the gaskets and glass viewing ports will remain with the cover plate).
3. Carefully remove the glass slide and glass cover slip from the gasket material. Removal of the gasket from the cover plate may aid cover slip removal from the gasket. If the slide or cover slip is broken, remove and discard these items.
4. Carefully clean the gasket surface, removing all glass and other debris. **It is very important no residual material be left on the gasket or cover plate surface.**
5. Clean the polycarbonate or anodized aluminum flow channel. **Do not scrub or mar the glass/flow channel mating surfaces.**

Assembly:

1. Carefully position the glass slide in the recessed slot on the flow channel (the deeper and longer of the recessed slots; see glass slide dimensions and tolerances below).
2. Carefully position the silicone gasket on the inside surface of the cover plate with threaded screw holes (no recessed beveling of the screw holes; alignment and positioning is aided by wetting the gasket). Align the holes in the gasket to the threaded holes on the cover plate.
3. Carefully position the cover plate/gasket onto the flow channel. Make sure the glass slide stays in the recessed slot and the screw holes in the gasket still line up with the holes in the cover plate. Insert short screws into the corner beveled recess and tighten the screws to seal the flow channel component to the base mount plate (if using an inverted microscope, the cover slip side of the flow channel will be used and the cover slip substituted for the microscope slide).
4. With the stage mount plate mounted on the flow channel, invert the flow channel and set it down on a clean, flat, stable surface.
5. Carefully position a clean, unbroken cover slip in the shallow recessed slot on the flow channel. It is very important the cover slip be properly positioned in the recessed slot. **Improper placement will result in cover slip breakage upon tightening the cover plates.**
6. Carefully position the other clean gasket on the other cover plate (plate with recessed beveled screw holes; positioning is aided by wetting the gasket). Align the screw holes in the gasket and the cover plate.

7. Put several screws through the beveled holes on the cover plate (center) and through the holes on the gasket. These screws will help hold the gasket in place as it is placed onto the flow channel, and align the cover plate onto the flow channel.
8. Carefully place the cover plate with gasket onto the flow channel. **It is very important the cover slip remain properly positioned in the recessed slot (improper placement will result in cover slip breakage and or leaking).** [Screws inserted into the cover plate while installing the cover plate will help align the plate as it is lowered onto the cover slip and flow channel. Do not move the cover plate once it has contacted the cover slip, as the cover slip will move out of the channel, resulting in breakage upon tightening the screws.]
9. Place the screws into the beveled screw holes and tighten evenly around the perimeter, alternating sides as the screws are tightened. **It is important the screw holes in the cover plate align with the holes in the gasket material.** Improper alignment may result in leakage.
10. Install tubing on the tube ports and pump liquid through the flow cell to confirm a liquid tight seal.

AUTOCLAVING INSTRUCTION:

The FC 280 series Flow Cells are completely autoclavable.

BioSurface Technologies recommends always using the slow (liquid) exhaust option. The screws holding the cover plates on the flow cell should be loosened to allow for material expansion. Tubing connected to the flow cell should allow free exchange of steam with the surrounding environment. BST recommends using a gas permeable material to cover the tubing ends such as autoclave paper instead of a gas impermeable material, such as tin/aluminum foil.

Slowly tighten the screws as the flow cell cools or wait until the flow cell is completely cooled before tightening the screws.

SPARE PARTS

Spare screws

Gasket

Cover slips

With proper care, the gaskets should be re-useable for numerous experimental evaluations. The spare gaskets provided require removal of the clear protective polymer sheeting from both sides of the gasket prior to installation.

The Model FC 280 series Flow Cells use standard microscope slides (1mm thick x 25mm x 75mm) and no. 2, 24x60 mm cover slips as viewing ports (VWR P/N 48382-139).

The gasket material is 0.020 inches thick silicone rubber. Other materials may be used.

The flow channel is manufactured from polycarbonate or anodized aluminum. The flow cell is completely autoclavable. Rinse cell with water to remove used media/bioproducts prior to post-experiment sterilization to minimize detrimental effects.

TROUBLE SHOOTING

Problem: Glass viewing ports keep breaking:

Solution:

- Check to ensure the glass is properly positioned in the recessed slot.
- Ensure the gasket surfaces and flow channel mating surfaces are total free of debris.

Problem: Flow cell leaks.

Solution:

- Tighten screws further to compress gasket.
- Make sure flow channel and hose barbs are free and clear of obstructions.
- Make sure glass viewing ports are not cracked or broken.
- Check gasket for rips or tears. Clear of all debris. Replace as necessary.
- High flow rates may create too much back pressure to contain leakage. Reduce flow rate (**maximum operational flow rate is 3.5 ml/min**).

If you have any questions concerning the Model FC 280 series Flow Cell, please contact BioSurface Technologies Corporation at (406) 585-2812.