



**TYLER**  
**Research Corporation**  
Biomedical Engineering



**Product:** CHEM-500SW and CHEM-500DW

**Materials:** Glass, Polysulfone and Teflon with Silicone Seals

The CHEM-500 chemostat consists of a borosilicate glass vessel, a glass and Teflon rotor assembly, and a ported cover manufactured from polysulfone, an advanced engineered thermoplastic polymer capable of withstanding a temperature range of -100°C to 150°C. The CHEM-500 chemostat may be safely sterilized using an autoclave.

**IMPORTANT:**

Polysulfone is **NOT COMPATIBLE** with the following:

- Acetone
- Acetonitrile
- Benzene
- Chloroform
- Dimethylformamide (DMF)
- Dimethylsulfoxide (DMSO)
- Ethyl acetate
- Methyl ethyl ketone
- Methylene chloride
- Perchloroethylene
- Phenol
- Pyridine
- Sulfuric acid
- Toluene
- Trichloroethylene
- Xylene

Polysulfone has **LIMITED RESISTANCE** to the following:

- Acetate
- Ammonia
- Butyl acetate
- Carbontetrachloride
- Isopropanol

*\*Please note that the chemical lists are not exhaustive, but refer to the most commonly encountered laboratory chemicals*

**Even a single brief exposure to any of the proscribed solvents listed can have deleterious effects resulting in irreversible damage to the chemostat cover and premature failure.**

**Sterilizing CHEM-500 devices:**

1. The CHEM-500 may be autoclaved fully assembled or as separate components.
2. If using a double wall liquid-regulated CHEM-500, attach silicone or vinyl tubing (1/2" or 12mm ID) to the glass inlet/outlet ports, fold and tape the ends of the tubing closed. Place the rotor assembly on the axle point in the bottom of the vessel and carefully lower the Teflon hub of the ported cover onto the glass spindle. Seat the cover fully on the glass vessel. Place the entire device in an autoclave bag or wrap in surgical towels and tape the package closed with an indicating tape. Keep vertical to prevent the rotor assembly from detaching from the axle point.
3. Refer to the manual of the autoclave in use for proper loading techniques and correct positioning of the items to be sterilized. Sterilize at 121°C for 15 minutes.

## **CHEM-500 Assembly/Disassembly Instructions:**

The CHEM-500 series chemostats are precision devices consisting of a borosilicate glass vessel (single wall or double wall), a glass and Teflon rotor assembly, and a polysulfone ported cover with silicone seals.

Assembly or disassembly of the CHEM-500 device for cleaning requires no tools.

## **Culturing Bacteria in the CHEM-500:**

1. Fully assemble the CHEM-500 prior to autoclaving, or assemble the sterile components in a suitable environment such as a laminar flow hood. The upper Teflon rotor can be positioned higher or lower in the vessel as required by sliding it along the vertical glass axle.
2. The vessel may be filled with medium before installing the cover assembly, or medium may be pumped through a cover port with the CHEM-500 fully assembled.
3. Place the rotor assembly so that the dimple in the Teflon base of the lower rotor sits balanced atop the glass point protruding from the base of the vessel. Carefully guide the Teflon hub in the polysulfone cover assembly over the top of the glass axle, and lower the cover into place on the vessel until the upper O-ring seats against the vessel lip.
4. Install the stainless steel vent tube through the small hole in the cover and seat the silicone sleeve in the recess to position the lower end of the vent tube well above the liquid level in the vessel.
5. The CHEM-500 cover contains 5 ports, each capable of accepting and sealing 6mm or ¼" diameter cylindrical objects (probe, tube, plug, or thermometer, for example). Install the desired probe into a port by first turning the port insert counter clockwise one complete turn. Gently push the probe through the central bore in the port insert and allow it to extend the desired distance from the bottom of the cover. Gently turn the insert clockwise until it grips the probe at this position and maintains an airtight seal.
6. Populate all ports as desired, and block any unused ports with a sterile foam plug or a solid glass bar.
7. Position the CHEM-500 in the lab as close to the biofilm device(s) as possible:
  - a. If using a double wall vessel, place the assembly on a magnetic stirrer and connect the ports in the outer jacket to a recirculating water bath with silicone or vinyl tubing (12mm or ½" ID) and adjust the temperature as desired. Allow the CHEM-500DW to equilibrate at this temperature before inoculating.
  - b. If using a single wall vessel with solid state thermal manifold, place the assembly on a magnetic stirrer and enter the desired temperature in the LCD display. Allow the CHEM-500SW to equilibrate at this temperature before inoculating.
8. Adjust the speed of the magnetic stirrer to provide gentle mixing (approximately 30 to 90 rpm). Note that the viscosity of the medium may cause the rotor assembly to decouple from the magnetic stirrer if excessive spin rates are used. If this occurs, simply turn the magnetic stirrer off and wait until the motor completely stops. Turn on the stirrer and confirm that the rotor is coupled; then slowly increase speed to the desired level.
9. Medium may be pumped through the biofilm device with a peristaltic pump, or by siphoning with the elution rate controlled by a pinch clamp. In either case, it is important to match the inflow of sterile replacement medium to the chemostat with the outflow of cultured medium from the chemostat to the biofilm device.
10. Following use, clean all chemostat components with mild detergent and water, rinse in deionized water and allow them to dry before assembling and autoclaving.