



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



**Product:** MPMR-10PMMA

**Material:** Poly(methyl) methacrylate with silicone seals and stainless steel screws

The MPMR-10PMMA is manufactured from poly(methyl) methacrylate (acrylic), a noncrystalline transparent thermoplastic. The MPMR-10PMMA series is **NOT** an autoclavable product.

**Chemical compatibility:**

Refer to the table at the end of this document for a partial list of chemicals and their effects on acrylic.

**Sterilizing MPMR-PMMA series devices:**

Clean the MPMR-10PMMA with mild detergents and warm water followed by thorough rinsing in deionized water, and treatment using one or more of the following procedures:

1. Exposure to ethylene oxide gas (available in many hospitals)
2. Exposure to ionizing radiation (Cobalt 60 gamma or X-rays)
3. Treatment with agents containing 2% glutaraldehyde (e.g. Cidex)
4. Soaking overnight in sodium hypochlorite solution (5%)
5. Prolonged exposure to sodium metabisulfite solution (15 g/liter)

**IMPORTANT:**

Ionizing radiation may cause surface crazing of some materials (such as acrylic) and may lead to color changes over time. In the event that procedures 3, 4, or 5 are used, it is important to soak and rinse the devices in sterile deionized water thoroughly before placing them back in service.

## **MPMR-10PMMA Assembly/Disassembly Instructions:**

The MPMR-10PMMA series biofilm systems are precision devices consisting of two acrylic manifold halves, two acrylic inlet/outlet nipples, stainless steel socket head cap screws connecting the manifold halves, silicone O-rings, and ten acrylic biostud holders with silicone seals and nylon ejection screws.

Assembly or disassembly of the MPMR-10PMMA device for cleaning requires a 5/32" hex drive wrench.

### **Disassembly of the MPMR-10PMMA**

1. Turn the biostud holders counterclockwise to remove them from their ports. If the holders are populated with biostuds, remove the biostuds from the holders by turning the nylon thumbscrews clockwise to partially eject the biostuds. Grasp the stems of the partially ejected biostuds with sterile forceps to remove them for analysis.
2. If desired, remove the inlet/outlet nipples from the lower manifold by turning counterclockwise with a wrench (for routine cleaning and sterilization this step is not required).
3. Place the MPMR-device face down and use a 5/32" hex-drive wrench to remove the socket head cap screws connecting the two manifold halves.
4. Carefully separate the two acrylic halves and remove the silicone O-ring.
5. Wash all components using only mild detergent and water, and thoroughly rinse with deionized water. Allow to dry before reassembly. Lubricate all O-rings with food-grade O-ring lube to promote sealing and prolong O-ring life.

### **Assembly of the MPMR-10PSF**

1. With the MPMR base upright on a bench, place the large silicone O-ring in the groove surrounding the central channel. Align the top manifold and place it gently onto the base, being careful not to dislodge the O-ring. While holding the halves firmly together, turn the manifold over on the bench to expose the holes for the socket head cap screws. Using a 5/32" hex drive wrench, install and partially tighten the cap screws, leaving a 1mm gap between the top and base of the manifold. Then tighten the screws uniformly, still leaving a tiny gap (approximately 0.1mm) between the manifold halves. Finally, tighten them sequentially just to bring about surface-to-surface contact between the manifold halves. **DO NOT OVERTIGHTEN!** The O-ring is fully compressed and any tightening beyond surface-to-surface contact will simply stress the threads in the upper manifold, leading to cracking and structural failure.
2. If the inlet/outlet nipples were removed during cleaning, replace the O-rings in the grooves surrounding the thread and carefully screw them into the endport sockets only until surface-to-surface contact has been made to gently compress the retained O-ring. Again, **DO NOT OVERTIGHTEN** as this will simply lead to structural failure of the insert or manifold.
3. Back the nylon thumbscrews off of the surface of the holder approximately 1/4". Populate the holders with biostuds of the appropriate material by pushing the stem into the holder until the shoulder of the biostud seats fully against the end of the holder.
4. **NOTE:** The flat recessed ring in the bottom of each manifold port is a precision sealing surface against which the O-ring in the face of the biostud holder seats. This must be kept free of foreign matter and scratches. Return the populated biostud holders to their respective ports, tightening firmly *by hand only* to affect a seal.

**Table 1**

This chemical compatibility table should be used only as a general guide and, in case of doubt, should be supplemented by tests made under actual working conditions.

**R = Resistant** (withstands this substance for long periods and at temperatures to 120°C (49°C))

**LR = Limited Resistance** (resists action for short periods of time at room temperature only)

**NR = Not Resistant** (acrylic is irreversibly damaged by exposure to these substances)

<u>Chemical</u>	<u>Code</u>	<u>Chemical</u>	<u>Code</u>
Acetic Acid (5%)	LR	Hydrogen Peroxide (3%)	R
Acetic Acid (Glacial)	NR	Hydrogen Peroxide (28%)	LR
Acetone	NR	Isopropyl Alcohol (30%)	LR
Ammonium Chloride	R	Kerosene	R
Ammonium Hydroxide (10%)	R	Lacquer Thinner	NR
Ammonium Hydroxide (Conc.)	R	Methyl Alcohol (30%)	LR
Aniline	NR	Methyl Alcohol (100%)	NR
Battery Acid	R	Methyl Ethyl Ketone (MEK)	NR
Benzene	NR	Methylene Chloride	NR
Butyl Acetate	NR	Mineral Oil	R
Calcium Chloride (Sat.)	R	Nitric Acid (10%)	R
Calcium Hypochlorite	R	Nitric Acid (40%)	LR
Carbon Tetrachloride	LR	Nitric Acid (Conc.)	NR
Chloroform	NR	Oleic Acid	R
Chromic Acid	LR	Olive Oil	R
Citric Acid (10%)	R	Phenol Solution (5%)	NR
Cottonseed Oil (Edible)	R	Soap Solution (Mild dish soap)	R
Detergent Solution (Heavy Duty)	R	Sodium Carbonate (2%)	R
Diesel Oil	R	Sodium Carbonate (20%)	R
Diethyl Ether	NR	Sodium Chloride (10%)	R
Dimethyl Formamide	NR	Sodium Hydroxide (1%)	R
Diocetyl Phthalate	NR	Sodium Hydroxide (10%)	R
Ethyl Acetate	NR	Sodium Hydroxide (60%)	R
Ethyl Alcohol (30%)	LR	Sodium Hypochlorite (5%)	R
Ethyl Alcohol (95%)	NR	Sulfuric Acid (3%)	R
Ethylene Dichloride	NR	Sulfuric Acid (30%)	R
Ethylene Glycol	R	Sulfuric Acid (Conc.)	NR
Gasoline	LR	Toluene	NR
Glycerine	R	Transformer Oil	R
Heptane	R	Trichloroethylene	NR
Hexane	R	Turpentine	R
Hydrochloric Acid	R	Water	R
Hydrofluoric Acid (25%)	NR	Xylene	NR