

# MJ Device Cleaning Guide

## Dispensing Environment

Particulate contamination can block the orifice of the MJ dispensing device and interfere with operation. Thus, having a clean operating environment is essential.

- Avoid handling dispensing fluids, tubing, and dispensing devices in areas susceptible to dust or static electricity that attracts dust. Static charges are more prevalent in conditions of low relative humidity (<30%). Dust is more likely to occur in areas of high traffic, near doorways and air conditioning vents.
- Store the dispensing devices, tubing, fluid containers, and swabs in an enclosed dust free area when not in use.
- Filter air incoming from the pneumatics control system and all fluids that will enter the device using a 5µm or smaller pore size filter.
- Be certain that all fluid handling materials (i.e., glassware, tubing, filters, etc) have been thoroughly cleaned and/or rinsed with filtered water or an appropriate solvent.
- Use appropriate lab apparel (lab coat, glove) to reduce contamination from your clothing or skin.

## Dispenser Handling

The orifice of a MJ device is subject to clogging and blockage by particulate material present in the jetting solution. The filtration of the jetting solution prior to use is essential. Before dispensing you should:

- Flush new syringe filters prior to use to remove particles from manufacturing.
- Confirm the tubing and reservoir will withstand the solvents you choose. Otherwise dissolved material can contaminate the dispensing device.
- Flush the tubing and reservoir with a filtered solvent before dispensing, and then dry with filtered pressurized air. Filtered isopropyl alcohol (or other solvent) has a greater wetting capacity than water and is a better choice for removing particulates.
- Always clean the dispensing device before use. Vacuum backflush the device by applying vacuum through the fluid connector and immersing the glass tip within a clean solvent. This vacuum backflush method can also be used to remove an orifice clog. Warm solvents under low power ultrasonication are useful for more resistant orifice blockages, but understand the dangers of heating and sonicating volatile solvents. Do not sonicate the immersed tip during vacuum backflushing for more than 1 minute. Never immerse more than the glass tip into the cleaning solution.

**MJ devices must be cleaned immediately after use to ensure reliable dispensing and extended operational life. Note: The inline filter must be removed from the MJ-AL style devices prior to cleaning.**

- Use a wet clean foam swab or tissue wetted with water or solvent, to clean the exterior surface of the dispensing device, including the metal body and glass tip. Inspect under a low power microscope to confirm the glass tip surface is clean.
- The filter of the **MJ-AL** style devices must first be unscrewed and removed. The device is then reattached to the female luer fitting (**Figure 1 below**), prior to performing the cleaning or clogged orifice recovery procedures outlined below. The inline filter section should be soaked in suitable cleaning fluid. The filter should then be attached to the female luer fitting and purged with cleaning fluid from the luer fitting side to remove contaminants. Use only hand tightening to attach the female luer fitting, the inline filter and the device body during reassembly to avoid over tightening and damage.

- Vacuum backflush the device with at 1.0 - 3.0mL of the solvent of the solution that was dispensed followed by a 2% water solution (80°C) of Micro-90 cleaning solution (**Cole-Parmer cat # U-18100-00**) or equivalent. Inspect the glass tip of the dispensing device using a low power microscope/stereoscope. Observe the tip after vacuum backflushing to verify all residues, particles or condensations have been removed. Repeat the procedure until the tip is clear. Lastly, vacuum backflush the tip using DI or MilliQ water for at least one minute, followed by a one-minute vacuum backflush using acetone. Apply vacuum for one-minute to dry the inside of the device and then dry the cleaned device in an oven at 70°C for 30 minutes prior to storage or use. Difficult materials, such as proteins, DNA, antibodies, etc., can be removed with a 1% sodium hypochlorite solution (10% household bleach solution) before cleaning with 2% water solution (80°C) of Micro-90 cleaning solution. Rinse and dry the device as described above.
- Recalcitrant particles can be often removed after soaking the orifice in the cleaning solution for a few minutes to overnight prior to vacuum backflushing.

### **Clogged Orifice Recovery Procedure**

An orifice blockage that cannot be removed using the cleaning and vacuum backflushing procedures described above may be removed using the following protocols. Please note that leaving solutions in the device for extended periods of time, such as overnight, can result in orifice clogging.

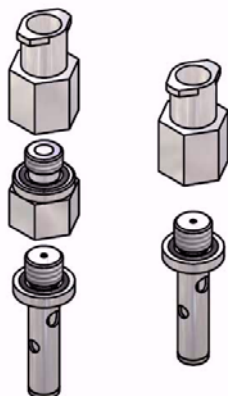
a) Immerse the tip of the device and vacuum backflush with a 2% solution (80°C) of **Micro-90 Cleaning Solution (Cole-Parmer cat. # U-18100-00)** in a beaker held in an ultrasonic cleaner. Avoid the use of high power output ultrasonic cleaners, as they can damage the fragile orifice. Also, minimize the amount of time the **MJ** device tip is exposed to ultrasonic cleaning. Check the condition of the orifice after a few moments of vacuum backflushing. Repeat if necessary. A cotton swab can be used to wipe the tip of the device during this procedure to help free the clog.

b) If the orifice remains clogged, immerse the tip of the device in a 5% water solution (80°C) of **Micro-90 Cleaning Solution (Cole-Parmer cat. # U-18100-00)** or the solvent for the solute clogging the device for overnight. Then, perform the vacuum backflush procedure described in “a” above.

c) The **MJ** device can be returned to MicroFab if the cleaning procedures described above fail to unclog the orifice. The device will be cleaned, retested, and returned with a service fee applied (domestic return shipping included). The **Dispensing Device Return Form** located below must be completed and returned with the **MJ** device with one form per return device. **Note: A completed form is required for each device returned. Do not combine multiple devices onto one Dispensing Device Return Form.**

### **Precautions**

Do not immerse the body of the **MJ** device into the **Micro-90 Cleaning Solution** or other solvent, as these fluids can damage the epoxy and nickel coating of the PZT. Water and/or IPA can be used to clean the **MJ** device casing. Avoid the use of high power output ultrasonic cleaners, as they can damage the fragile orifice. Also, minimize the amount of time the **MJ** device tip is exposed to ultrasonic cleaning.



**Figure 1.** Illustration of the three-component **MJ-AL** device. *Left:* female luer fitting, in-line filter, and device body. *Right:* The female luer fitting is reattached to the device body after removing the in-line filter prior to cleaning.

# DISPENSING DEVICE RETURN FORM

CUSTOMER INFORMATION	
<b>Company Name:</b>	<b>Contact Name:</b>
<b>Address:</b>	<b>E-mail Address:</b>
	<b>Phone #:</b>
<b>Date of Return:</b>	<b>Fax #:</b>
DEVICE INFORMATION FROM CUSTOMER	
<b>Device Type &amp; Serial #:</b>	
<b>Failure Symptoms:</b>	
<b>Device Jetting History:</b>	
<b>Glass Tip Conditions (Chips, Cleanliness), Orifice Clogged or Clear, Body Cleanliness, Wire Connections:</b>	
MICROFAB INSPECTIONS	MICROFAB RECOVERY WORKS
<b>Date:</b>	<b>Date:</b>
<b>Glass Tube Joint:</b>	<b>Cleaning:</b>
<b>Glass Tip Chips:</b>	<b>Repairs:</b>
<b>Glass Tip Cleanliness:</b>	<b>IPA Jetting Stability:</b>
<b>Orifice:</b>	<b>IPA Jetting at 3m/sec:</b>
<b>Body and Wires:</b>	<b>Water Jetting Stability:</b>
<b>Others:</b>	<b>Water Jetting at 1m/sec</b>
HANDLING OPINION	

**MicroFab Dispensing Device Policy:**

- 1) MicroFab will replace device with defects from original manufacturing or shipping;
- 2) MicroFab will not replace device with defects due to user's operation;
- 3) Clogged devices will be cleaned, retested, and returned and a charge will be applied.
- 4) Please return to address given below, attention: Paul Watson, RETURNS.

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