

# 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. Back-flush the device by applying vacuum through the fluid connector and immersing the glass tip within a clean solvent. This back-flush method can also be used to remove orifice clogs. Warm solvents under low power ultrasonication work best, but understand the dangers of heating and sonicating volatile solvents. Do not to sonicate for more than 1 minute and 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. After dispensing you should:**

- Back-flush the device with 1-3mL 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. Observe the tip of the dispensing device after 1 minute of back-flushing to verify all residues, particles or condensations have been removed. Repeat the procedure until the tip is clear. Lastly, back-flush the tip using DI or MilliQ water for at least one minute, followed by a one-minute back-flush using acetone. Apply vacuum for one-minute to dry the inside of the device prior to storage or use.
- Difficult materials, such as proteins, DNA, antibodies, etc., can be removed with a 10% sodium hypochlorite 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 back-flushing.

### ***Clogged Orifice Recovery Procedure***

An orifice blockage that cannot be removed using the cleaning and back-flushing 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 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 one minute. 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)** for overnight. Then, perform the 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 and a charge of \$75 will be applied (domestic return shipping included; \$40 per shipment international). The **Dispensing Device Return Form** located below must be completed and returned with the **MJ** device.

### ***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.

## **Operational Limitations**

The **MJ-AB** and **MJ-AT** devices can be operated reliably at temperatures of up to 80°C and  $V_1$  up to 70 Volts. At higher duty cycles / frequencies, lower limits on both temperature and voltage should be used.

# 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>Serial #:</b>                                  |                         |
| <b>Device Type:</b>                               |                         |
| <b>Failure Symptom:</b>                           |                         |
| <b>Device Jetting History:</b>                    |                         |
| <b>Glass Tip Conditions (Chips, Cleanliness):</b> |                         |
| <b>Glass Tip Orifice Clogged or Clear:</b>        |                         |
| <b>Body Overall Cleanliness:</b>                  |                         |
| <b>Wire Connections:</b>                          |                         |
| MICROFAB INSPECTIONS                              | MICROFAB RECOVERY WORKS |
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| HANDLING OPINION                                  |                         |
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**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 of \$75 will be applied (shipping included in the US).
- 4) Please return to address given below, attention: Paul Watson, RETURNS.

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