

Storage, Handling and Operation of Microchannel Plates

Microchannel Plates (MCP) and MCP-based devices must be adequately stored to ensure proper performance and longevity. This procedure details proper storage techniques. Any deviation from the recommended storage procedures will void the warranty. If you have any storage questions, please contact our Customer Service Department at 1-800-648-1800 (USA) or 1-508-347-4010.

STORAGE

Because of their structure and the nature of the materials used in manufacture, care must be taken when handling or operating MCPs. The following precautions are strongly recommended:

Containers in which microchannel plates are shipped are *not suitable* for storage periods exceeding the delivery time. Upon delivery to the customer's facility, microchannel plates must be transferred to a suitable long term storage medium.

- **The most effective long-term storage environment for an MCP is an oil free vacuum of at least 10^{-4} Torr.** When stored in vacuum, the parts can be removed from their aluminum vacuum storage bags,
- While vacuum storage is strongly recommended, a continuously purged dry box which utilizes a dry inert gas, such as argon or nitrogen, can be used for storage for up to several weeks. In this case it **is critical that the part remain in its sealed aluminum vacuum storage bag while in the purged dry box.**
- Desiccator type cabinets which utilize silica gel or other solid dessicants to remove moisture have been proven **unacceptable.**

HANDLING

- Shipping containers should be opened only under class 100 Laminar flow clean-room conditions.
- Personnel should always wear clean, talc-free, class 100 clean-room compatible, vinyl gloves when handling MCPs. No physical object should come in contact with the active area of the wafer. The MCP should be handled by its solid glass border using clean, degreased tools fabricated from stainless steel, Teflon™ or other ultra-high vacuum-compatible materials. Handling MCPs with triceps should be limited to trained, experienced personnel.
- MCPs without solid glass border should be handled *very* carefully with great care taken to contact the outer edges of the plate only.
- MountingPad™ MCP's should be contacted only at the mounting pads.
- All ion barrier MCPs should be placed in their containers with the ion barrier facing down.
- The MCP should be protected from exposure to particle contamination. Particles which become affixed to the plate can be removed by using a single-hair brush and an ionized dry nitrogen gun.
- The MCP should be mounted only in fixtures designed for this purpose. Care should be taken due to electrical potentials involved.
- **CAUTION:** Voltages must not be applied to the device while at atmospheric pressure. Pressure should be 1×10^{-5} or lower at the microchannel plate before applying voltage. Otherwise, damaging ion feedback or electrical breakdown will occur.

OPERATION

- A dry-pumped or well-trapped/diffusion-pumped operating environment is desirable.
- A poor vacuum environment will most likely shorten MCP life or change MCP operating characteristics.
- A pressure of 1×10^{-6} Torr or better is preferred. Higher pressure can result in high background noise due to ion feedback.
- MCPs may be vacuum baked to a temperature of 380°C (**no voltage applied**).

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- MCPs with standard bias currents (non-EDR MCP's) may be operated at a maximum temperature of 350°C. Contact PHOTONIS Technical Service to determine maximum operating temperature for MCPs with the EDR option.

When a satisfactory vacuum has been achieved, voltages may be applied. It is recommended that this be done slowly and carefully. Current measuring devices in series with power supplies aid in monitoring MCP behavior. Voltage drop across the meter should be taken into consideration when calculating the applied voltage.

- Voltage should be applied to the MCP in 100 volt steps. If current is being monitored, no erratic fluctuations should appear. If fluctuations do appear, damage or contamination should be suspected and the voltage should be turned off. The assembly should then be inspected before proceeding.
- Maximum voltage that may be applied across a single MCPs is:
 - L/D 40:1 is 1000 volts.
 - L/D 60:1 is 1200 volts
 - L/D 80:1 is 1400 volts
- Higher potentials may result in irreversible damage.