

STORAGE, HANDLING and OPERATION of MICROCHANNEL PLATES

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.

- Dessicator type cabinets which utilize silica gel or other solid dessicants to remove moisture have been proven *unacceptable*.
- The most effective long-term storage environment for an MCP is an oil free vacuum.
- A dry box which utilizes an inert gas, such as argon or nitrogen, is also suitable.

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, TeflonTM 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**.
- 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. Careful note should be taken of 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} 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 480°C (**no voltage applied**) and operated at a maximum temperature of 350°C.

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.
- Voltage across single thickness MCPs should not exceed 1000 volts. Higher potentials may result in irreversible damage.