Electrode impedance can be measured using a potentiostat or a low-current AC 1kHz impedance meter such as the MicroProbes for Life Science Model IMP-2A Impedance Tester. If an AC impedance tester that is accurate in this range is not available, use a sine wave generator with a large series resistance (1 MΩ) and blocking capacitor (0.1 µF) to generate a constant current sine wave. If you start with 10 V p-p @ 1 kHz, the signal across the electrode will be 10 mV/kΩ.

If damage is suspected along the electrode shaft, test by slowly lowering the electrode into the saline bath and observing any abrupt drop in impedance value. It is normal to observe a steady lowering of impedance as the electrode is immersed more deeply, due to the shunt capacitance associated with the electrode's thin insulation. However, an abrupt decrease can be indicative of damaged insulation.

⚠ In applications where higher impedance microelectrodes, typically above 2 MΩ, will be immersed more than 4 or 5 millimeters into a conductive medium, additional insulation should be considered to minimize shunting. Polyimide tubing, which is used in our PT electrode models, is recommended.

TERMS AND CONDITIONS

Please inspect the package carefully upon arrival and report any damage to us within 7 days of receipt of the package.

Unused items may be exchanged if items and packaging are undamaged and in good condition. Exchange must be made within 30 days of invoice date and with prior permission from our Customer Service Department. Please call 301-330-9788 or email support@microprobes.com to request a Return Material Authorization (RMA) number. We do not accepted returns after 90 days from invoice date.

Custom design products are non-returnable.

CONTACT INFORMATION

MicroProbes for Life Science

18247-D Flower Hill Way Gaithersburg, MD 20879
Phone: +1 (301) - 330-9788 Fax: +1 (301) - 330-9667
support@microprobes.com www.microprobes.com

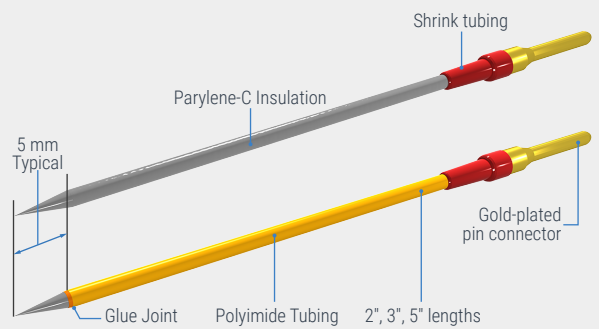
Microprobes for Life Science is ISO 9001:2015 certified.

ISO 9001:2015 is a quality management system which helps to achieve a consistent level of quality to customers by having well defined and regularly reviewed processes and procedures.

MicroProbes for Life Science

MICROELECTRODES PARYLENE-C INSULATED

USER INSTRUCTIONS



www.microprobes.com

INTRODUCTION

Each **Parylene-C Insulated Microelectrode** has been uniformly coated with the specified thickness of Parylene-C and the tips were exposed to produce the requested impedance value (+/- 20%).
Each electrode has been microscopically inspected, and the impedance measured at 1 kHz. Impedance values are marked on the box for all electrodes with impedance greater than 0.1 MΩ

HOW TO UNPACK

The electrodes are nested in foam slits for safe shipment and storage. To remove, grasp the electrode near the connector end, part the foam slit with your other hand, and gently lift the electrode out of the slit while being careful to not allow the tip to touch any surface. Inspect the electrode and, if damage is suspected, examine the tip under a light microscope with at least X100 power. Please note that the insulation is resilient enough that if the tip was bent, the electrode could still read the correct impedance value.

HOW TO STERILIZE

While microelectrodes intended for acute and non-critical applications can be cleaned and disinfected using a 70% alcohol rinse for 2 to 3 minutes, this is not recommended as a primary sterilization method for critical applications or chronic implantation. Our microelectrodes are compatible with a number of common primary sterilization methods, including autoclave and gas (EtO), as long as they are not exposed to a temperature greater than 150° C. Care must be taken to protect the electrode tips during sterilization. One common solution is to construct a container for use in gas sterilization by drilling holes into or otherwise propping open a plastic holding box, inside of which the electrodes are mounted using clips or tape.

CONNECTION TO THE MICROELECTRODES

The miniature male pin connector (M201) integrated with the end of the electrode mates with the female connector (M202) which is provided with each box ordered. If the male connector must be removed in order to connect to the experimenter's micro-drive system, the Parylene-C insulation may be removed by either scraping it off with a scalpel blade or melting it using a small flame. Some investigators have found that wedging the back end of the electrode, after removing about 1 inch of insulation, into a hypodermic needle works quite well. The hypodermic needle conveniently plugs into a standard banana jack. MicroProbes for Life Science also sells an easy-to-adapt electrode holder, Model #250, which will mount directly into most micro-drive systems.

CLEANING AND RE-USE

After removing the electrode from tissue, the electrode should be thoroughly cleaned by sonication in a 50% sodium hypochlorite (bleach) solution for 2 to 3 minutes. The electrode should then sonicated in distilled water for 2 minutes followed by 1 minute in 70% alcohol. If a sonic cleaner is not available, increase the soaking time for each step to 5-10 minutes. Once cleaned, the electrode can be reused or re-sterilized as normal. It is recommended that the electrode impedance be tested before reuse to verify proper function.

If you have trouble reproducing the measured impedance values as noted on the box (which may be the case after sterilization or prolonged storage), we recommend electrolytic cleaning of the surface using the following protocol:

- Prepare a bath of saline or PBS, and affix the microelectrode into the bath alongside an appropriate ground electrode.
- Connect the microelectrode to the negative pole of a potentiostat, stimulator, battery, or some other device capable of delivering precise DC voltage. The ground should be connected to the positive pole.

⚠ It is critical that the electrode be properly attached to the negative polarity and not positive, as positive current can drive the electrode metal to dissolve and further increase in impedance.

- Apply 2-3 volts DC across the electrode while it is immersed in a saline bath for a period of between five to ten seconds. It is not recommended that voltage be applied continuously for longer than ten seconds, as bubbling and heat can damage the microelectrode.

⚠ High impedance microelectrodes with impedance greater than 2.5 MΩ should not be continuously cleaned for longer than 5 seconds.