

Repeat the procedure for the other concentric electrode contact.

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 voltage 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. An abrupt decrease can be indicative of damaged insulation.

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 accept returns after 90 days from invoice date.

Custom design products are non-returnable.

CONTACT INFORMATION

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CONCENTRIC ELECTRODES

USER INSTRUCTIONS



INTRODUCTION

Each Concentric Electrode is fabricated according to the specifications indicated on your design form. Before shipping, each electrode has been microscopically and electrically inspected to insure quality workmanship and proper connection and isolation between the inner and outer conductors.

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 X50 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 concentric electrodes 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 concentric electrodes 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

Miniature pin connectors (M201) are attached to the ends of the inner and outer electrodes and will mate with the two female connectors (M202), which are provided with each box ordered.

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 be 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 concentric electrode into the bath alongside an appropriate ground electrode.
- Connect one of the contacts of the concentric electrode to the negative pole of a potentiostat, stimulator, battery, or some other device capable of delivering precise DC voltage. The ground electrode should be connected to the positive pole.



It is critical that the concentric electrode contact be properly attached to the negative polarity and not positive, as positive voltage can cause the electrode metal to dissolve and further increase in impedance.



Do not attach the positive lead to the other contact on the concentric electrode. The positive lead must be attached to an appropriate ground electrode.

- 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.