Cleaning equipment in the post COVID-19 world

When Motion Lab Systems receives items for repair, we take the following precautions based on the knowledge that our EMG systems are the items that are normally in contact with the subjects being evaluated. We have been working in the gait analysis environment and maintaining our customers equipment for over thirty years and the items that we receive back from all environments that usually require significant cleaning are the backpack and preamplifiers, although other items (e.g. goniometers, foot switches, cables, and interfaces) are also in direct physical contact with the subject.

Daily cleaning methods

These recommended cleaning methods are based on our maintenance experience and are provided as guidelines; your local procedures may vary and should be followed, potentially incorporating these methods where appropriate. Please always wear gloves to avoid direct skin contact with all cleaning solutions:

We recommend that our EMG preamplifiers and associated cables are cleaned with standard sanitary, methanol based, alcohol wipes. If there is any adhesive tape residue on the equipment then this can be removed by applying a small amount of Goo Gone® (a commercial product) to remove the tape residue before performing the sanitary cleaning. All cleaning fluids should be applied by wiping the device with a paper towel or gauze swab that holds the cleaning fluids.

While the EMG backpacks and preamplifiers can be cleaned by wiping cleansing agents over their surfaces, they are not hermetically sealed devices so the amount of cleanser needs to be limited to avoid a significant amount of liquid seeping into the devices. When performed each time the EMG system and connected devices are used, the simple act of wiping down the surfaces is normally quick and easy to perform and does not need excessive amounts of cleaner. If an excessive amount of cleaner is used then the device might need to be put to one side to allow the liquid to evaporate before use. In general all devices and associated cables can be quickly cleaned with a swab or paper towel dipped in methanol or another alcohol based cleanser, together with a small amount of Goo Gone® to release any tape residue, before performing any required local cleaning procedures that require that all devices are cleaned with specific products such as CaviWipes® designed for the hard, nonporous surfaces of devices like pre-amplifiers in health care settings.

If the lab is performing multiple sessions each day then the evaluations need be scheduled to permit the EMG system and any related devices in the testing environment to be cleaned (3D markers, force plates, chairs and assistive devices, etc.,) to meet local sanitary requirements. The cable that connects the backpack to the desktop unit has some possibility of contact, but generally just drags on the floor; which in a testing environment or research lab is normally cleaned regularly. An option for performing multiple evaluations daily would be to maintain one or more additional sets of preamplifiers so that after each session the subject preamplifiers could be cleaned to meet local sanitary requirements while the next evaluation is performed. All Motion Lab Systems preamplifiers are electrically identical so there are no problems switching from one set of devices to another.
An additional option for the patient attached preamplifiers is to use the MA420 or MA422 preamplifiers. These are electrically compatible with our MA411 skin surface preamplifiers, but are molded, sealed, and liquid-proof so if the local sanitary procedures recommend immersing the preamplifiers in a cleansing solution there will be no problems. In addition, the MA420 and MA422 preamplifiers use standard adhesive gel silver/silver-chloride electrodes so there is very little direct contact with the subjects. Under most situations cleaning these molded preamplifiers is simpler because the disposable silver/silver-chloride adhesive gel electrodes that were in contact with the subject can be discarded after each use.

The EMG backpack can normally just be wiped with a paper towel that applies an approved cleaning solution such as CaviCide® to the surfaces. If you are using a sanitary spray then apply the spray liquid to a paper towel and use the towel to wipe down the backpack surfaces to prevent excessive liquid entering the device. Note that while the backpack has openings for each of the individual gain controls for each EMG channel and an opening for the EMG test/calibration button, these can be covered with tape unless you frequently need to adjust the individual gain controls during a test. Covering the backpack face with a clear tape would make wiping the unit down easy because it would cover all of the backpack openings. Note that the EMG backpack is fully electrically isolated by the EMG systems desktop system so there is no electrical safety risk to cleaning the backpack while it is connected to the desktop unit via the coaxial cable although it is generally easier to simply unplug the unit, wipe it down and reconnect it once the surfaces are dry.

If EMG system backpack is normally carried by the subject wearing an accessory vest, then the vest should be easy to clean with a sanitary spray. Maintaining a few spare vests will allow you to ensure that each vest is clean and dry before use.

Please note that all cleaning methods should normally be performed in a well ventilated area and it is essential to meet OSHA standards covering the use and disposal of all cleaning fluids and materials used during cleaning and sanitization. While this application note illustrates the cleaning recommendations with specific products, there is no requirement that they are used if other products are recommended and supplied by local regulations or hospital management. Any equipment manufactured by Motion Lab Systems that is damaged by local sanitary cleaning procedure can be returned for repair.

**Motion Lab Systems maintenance cleaning**

When EMG system preamplifiers are returned for repair/refurbishment, the entire device is disassembled and the cable discarded. All of the device components are cleaned with a mix of methanol (denatured alcohol) and Goo Gone®, a mixture that removes all tape residue and should render all surfaces biologically clean. Once everything has been cleaned, it is placed in an ultrasonic cleaner for 20 minutes. Once the items are clean they rinsed in clean water and dried for several hours to complete the process and remove all traces of the cleansers. After the cleaning process has been completed all parts are examined and tested, any component that fails the testing or appears to have any damage beyond minor cosmetic scratches is discarded. Refurbished preamplifiers are then rebuilt, using the recycled components that meet basic functional standards and then tested to ensure that they meet the performance specification of a new product.

When performing maintenance and repair on EMG backpacks and desktop units all surfaces are normally cleaned by wiping all exposed surfaces with 100% methanol, any maintenance internally will perform any required cleaning procedures. The Velcro® on the rear of the backpack is cleaned with a wire brush to remove all visible dirt and will be removed and will be replaced if there are any marks that cannot be removed, or any signs of damage.

**Third Party Equipment cleaning**

Please refer to each manufacturers cleaning and disinfection descriptions for details of individual device procedures and cleaning methods, but you can contact Motion Lab Systems if you have any questions.