

# Micastat® Static Protective Laminate Installation and Maintenance

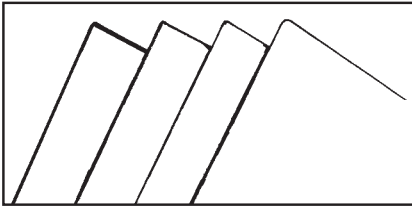


Figure 1. Micastat® Protective Laminate ESD Blue, ESD Grey, ESD Beige, ESD White

## Description

Micastat® is a high pressure static dissipative laminate designed for workbench tops used in the manufacture and assembly of ESD susceptible electronic components. Micastat® meets working surfaces Rp and Rg requirements of IEC 61340-5-1 paragraph 5.2. Its patented multi-layer construction features a conductive layer which ensures dissipative properties independent of ambient humidity. Micastat® shows superior abrasion resistance and provides rapid, non-sparking charge dissipation. It can be laminated to plywood, fibre board, particle board tables and bench tops with conventional contact adhesives. It is resistant to most solvents and greatly exceeds the NEMA specification for wear resistance.

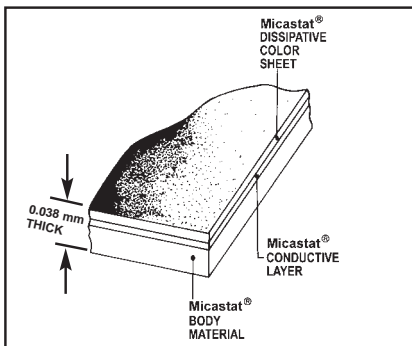


Figure 2. Micastat® layered construction

## Installation

Micastat® is designed to be laminated to wooden tables or bench tops with conventional contact adhesive and will perform very well in the most rigorous postforming applications to a minimum of 16mm radius. Charleswater suggests the use of a high quality contact cement such as Pioneer No. P98NF. Micastat® is a universal grade laminate for use in general purpose,

postforming and high wear applications. For details on the installation of Micastat® and other high pressure laminated plastic sheets refer to National Electrical Manufacturers Association (NEMA) publication LD 3-1991 or follow these step by step directions for non-postforming applications.

1. Prepare the face of the substrate. It should be clean, dry and free of all contaminants which would interfere with adhesion. All the materials, Micastat®, substrate and cement, must be allowed to condition at 21°C to 24°C and 45-50 percent relative humidity for 48 hours prior to assembly.
2. Stir the adhesive thoroughly and apply an even coat of adhesive by either spray, roller or brush to both the substrate face and the Micastat® back. Do not allow coated surfaces to touch. Allow the cement to dry. When bonding to plywood, apply a second coat if the first coat completely penetrates the wood. Use uncoated wood strips to assist in connecting coated surfaces.
3. Place thin, uncoated, wooden strips 305mm apart across the substrate face. This will keep coated surfaces apart; bonding will occur once contact is made.
4. Position the over-sized Micastat® sheet on top of the wooden strips.

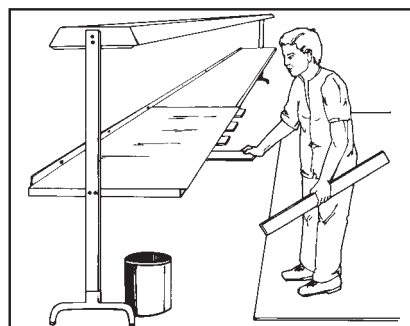


Figure 3. Micastat® sheet on wooden strips

5. Slowly remove strips of wood taking care to keep the Micastat® in position. The Micastat® should fall into position.
6. Push the laminate down with even hand pressure.
7. If the Micastat® falls out of position, squirt

solvent (Charleswater recommends the use of ST102 solvent from Pionite) between the two surfaces and gently lift the Micastat® sheet up. Wait a minimum of 4 hours before reapplying another coat of adhesive, solvent must evaporate totally. Apply another coat of adhesive to both surfaces and reposition.

8. When Micastat® is in the correct position, seal the bond with a rubber "J" roller or a carpeted block and rubber mallet. Use either roller or block and mallet in a pattern that forces any air bubbles out from underneath laminate. If Micastat® sheet is oversized, sheet can now be trimmed with a router. After trimming, edges should be filed for a smooth splinter free edge.

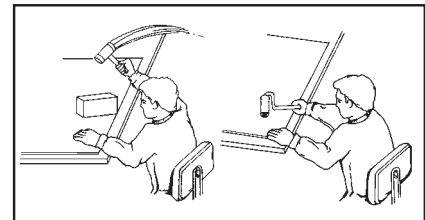


Figure 4. Wooden block and rubber mallet and "J" roller technique.

Once installed, Micastat® must be grounded to ensure proper charge dissipation. Refer to "General Grounding Guidelines" on the next page.

## Postforming Application

When the universal grade Micastat® is exposed to a temperature of 163 degrees Celsius it will soften momentarily, allowing a straight line bend to be made. This bend should be made quickly and uniformly and have a radius equal to or greater than 16mm. The chemical change that takes place in this process cannot be reversed; Micastat® cannot be reheated. Proper postforming machinery and close attention to details such as time and temperature are essential for best results. Preinstallation storage conditions are critical to postforming performance. For detailed postforming information please

\*Micastat® is a registered trademark of Desco Industries, Inc. and is manufactured under one or more of the following U.S. patents: 4,455,350, 4,589,954, 4,645,717, 4,454,199.

refer to NEMA publication LD 3-1995 or follow these general directions.

1. Micastat® should be conditioned at 21°C to 24°C and 45-50 percent relative humidity for 48 hours prior to postforming. Recommended postforming machinery includes Midwest Automation and Evans Rotatorque.
2. The radiused edge of substrate must be smooth, rounded, and free of irregularities and loose particles.
3. Lead-in cracks may be minimized by ensuring a smooth cut on the edge of the laminate.
4. Always bond Micastat® to a suitable substrate such as medium to high density fiberboard, or particleboard. It should not be glued directly to plaster walls, gypsum wallboard, concrete, or metals.
5. Recommended adhesives include solvent or water-based contact cement, white glue (PVA), epoxy, and hot melt glue. Consult your adhesive supplier for specific application requirements.
6. The use of a backing sheet is recommended to minimize warpage. The thickness of the backing sheet should be relatively equal to the thickness of the decorative laminate on the face of the assembly.
7. The decorative surface to be formed should be heated to a temperature of 165°C to 190°C.
8. Heat the Micastat® "wings" only, to 165°C to 190°C with a Chomelux heater held 5mm to 6mm from the surface. Tempilaq® liquid temperature indicator or equivalent should be used to determine the temperature.
9. The desired heat-up rate of 165°C should be one second for every 0.0254mm of thickness (i.e., 30 seconds for .711mm, 38 seconds for .965mm).
10. Forming should be accomplished within 5 seconds of achieving proper surface temperature.
11. Heat up rates of laminate are affected by thickness, color, and finish. Temperatures should be verified by temperature-indicating wax (Tempilaq®).
12. Let the Micastat® laminate cool for five to ten minutes under pressure.

## Fabrication Tips

1. All saw blades and router bits used for cutting should be carbide tipped. Feed rate should be slow and tool speed should be high. To minimize the development of surface scratches caused by router bits, lubricating the laminate edge with a wax stick is recommended prior to tooling.
2. Inside corners of cutouts for electrical outlets, sinks, etc., should have a minimum radius of 3mm and should be filed smooth. This reduces the likelihood of stress cracks.
3. All edges of laminate should be filed smooth with file direction towards substrate to help prevent stress cracks and to minimize chipping.
4. When nails or screws must be used, it is advisable to first drill an oversized hole through the laminate. This reduces the likelihood of stress cracks.
5. Micastat® is intended for interior use only, and should not be exposed to extreme humidity, continuous sunlight, or temperatures about 135°C for extended periods of time.
6. Work surfaces must be grounded for proper static dissipation.

For more information on the characteristics of nonindustrial laminates related to end-user applications please refer to National Electrical Manufacturers Association, publications LD 3-1995. The address for NEMA is:

NEMA  
1300 North 17th Street, Suite 1847  
Rosslyn, Virginia 22209 USA  
Phone: 703-841-3200  
Web: www.nema.com

Once installed, Micastat® must be grounded to insure proper charge dissipation.

## General Grounding Guidelines

1. When grounding Micastat®, it is essential to make good contact with the conductive layer which is directly below the dissipative, colour layer. See the diagram on page 1 showing the multi-layered construction.
2. For proper and safe ESD protection, the grounding wire must be tied directly to and at the same potential as the mains supply ground. It is acceptable to ground to the mains supply by using an appropriate connector.

3. If power is to be used at the ESD protected workstation, a Ground Fault Circuit Interrupter (GFCI) is recommended.
4. Test all workstation grounds for proper resistance to ground.
5. The selection of ground cords is intimately related to the organisation's material handling procedures. It is important for a user to be familiar with his/her own organisation's grounding specifications and ESD procedures prior to selecting ground cords.

## Grounding Methods for Installed Sheet Goods

Charleswater offers Item 90204 ground system that will ground your static dissipative laminate worksurface. This ground assembly kit is for use when the laminate sheet is installed on a wooden workbench top.

**Item No. 90204:** Our Flush Mount Insert Grounding system is also available without a dual wrist strap ground sold as Item No. 90202. Both 90202 and 90204 can be easily installed with our Drill Kit Item No. 90200.

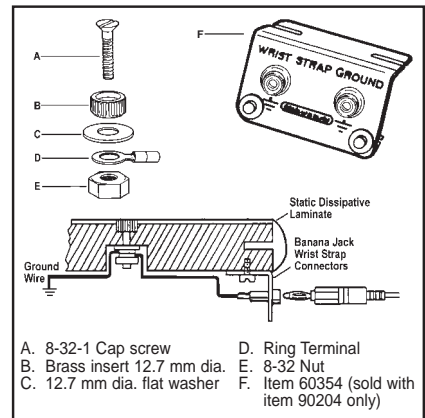


Figure 5. Component Parts and Installation of 90202 and 90204.

## Installing the Flush Mount Insert Ground System

The following instructions are based on a top with a thickness of 30mm.

- 2.1. Using drill tool 90200:

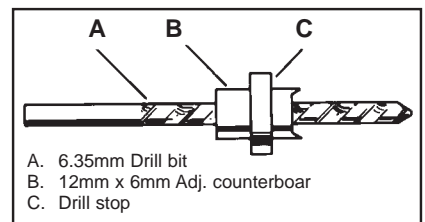


Figure 6. Drill Tool 90200.

- a. Set the 6mm drill bit and adjustable counterbore so that the 6mm bit will drill clear through the work surface.
- b. Set the drill stop so the drilling depth of the 12mm counterbore is 5mm (+0.000mm - 0.254mm)

- 2.2. Using the drill kit 90200 as adjusted above, position drill bit on the top of the worksurface at the point you want to install the flush mount insert.
- 2.3. Drill perpendicular from the top surface straight into the work surface until the drill stop touches the laminate surface. This should be at a depth of 5.08mm.
- 2.4. Using the 6mm pilot hole on the bottom of the work surface drill a 38.1mm diameter counterbore 16 mm deep or no more than 1/2 the thickness of the worksurface.
- 2.5. Seat the 8-32 cap screw through the brass insert so that it sits flat with the top of the insert.
- 2.6. Push the cap screw and brass insert assembly into the 12mm diameter hole on top of the worksurface. Attach and tighten the 8-32 nut until the brass insert is flush with the laminate surface.
- 2.7. Remove the 8-32 nut and install the flat washer, ring terminal and 8-32 nut as shown above. The ring terminal is for a ground wire attachment.
- 2.8. Using approximately 22 gauge wire, crimp the supplied ring terminal to the wire and secure it to the 8-32 cap screw using the 8-32 nut. Attach the unterminated wire end to a building ground. **THE MICASTAT® WORK-SURFACE IS NOW GROUNDED.**
- 2.9. FOR INSTALLING dual wrist strap ground (item 60354) included with item 90204 ONLY. Place item 60354 at the position desired to install, screw in place using enclosed screws.
- 2.10. Using the ground wire from the 60354, cut the length of the ground cord so that it will reach from the 60354 to the underside of the worksurface at the 8-32 screw. Crimp the extra ring terminal to the end of the wire and bolt it to the underside of the work surface using the 8-32 cap screw and nut.
- 2.11. Using the remaining wire cut from the

60354, attach the ring terminal end to the 8-32 cap screw and nut. Using the ring terminal enclosed, terminate the other end to a ground source. This will GROUND both the Micastat® top and the dual wrist strap ground.

## Grounding Method for Continuous Monitors

### Materials Needed for Item 99071:

- 2 ea. 90202 Flush Mount Laminate Ground Insert
- 1 ea. 90200 Installation Tool for Flush Mount Insert

1. Install the Flush Mount Inserts first. It is recommended to install one in the right back corner and the other in the left back corner of the Micastat® laminated bench top.
2. Once both inserts are installed, cut the ground cord supplied with the monitor into two pieces; make sure that the tinned end is long enough to connect from the monitor to one of the flush mount terminals located under the bench.
3. The remaining wire can then be used to connect the other flush mount terminal to ground using the supplied ring terminal. The shrouded molded end can then be cut off.

When complete, one flush mount terminal will connect the Micastat® laminate to ground, while the other will connect it to a monitor. The monitor then monitors the ground connection between the two inserts, and since Micastat® is the only ESD laminate made with a physical uniform ground layer, it will monitor the entire Micastat® surface ground. The wires will stay under the bench, maximising the usable space on the bench top.

### Materials Needed for Item 99078:

- 2 ea. 90202 Flush Mount Laminate Ground Inserts
- 1 ea. 90200 Installation Tool for Flush Mount Insert
- 1 ea. 88014 Universal Snap Kit
- 2 ea. 8-32 button cap screws

1. Install the 90202 Flush Mount Inserts in the snap pattern for the monitor.
2. Once installed, remove the 8-32 taper head screw supplied.
3. Place a 10mm snap socket on top of the installed 90202 brass insert.
4. Screw the 10mm snap socket into place

on the insert using an 8-32 button cap screw.

5. Do this for both inserts and snap attach the 99078 Mini Monitor into place; it is now grounded to and monitoring the Micastat®.

## Testing

There are two types of tests for monitoring Micastat® surface electrical characteristics. One type of test is Rg - Resistance to Ground (see Figure 7). In this test you measure the resistance of the laminate surface to the installed ground bolt.

A second type of test is Rp (Resistance, Point to Point). Here you measure the resistance from one 2.27kg. probe to another 2.27kg. probe; see probe test positions A, B, C, and D in Rp test diagram, Figure 9. This is the test that is more often used in the laboratory to determine Micastat® compliance with electrical specifications.

Both test procedures are outlined in this Technical Bulletin using the Charleswater Digital Resistance Test Kit Item No. 99100.

## Resistance To Ground (Rg):

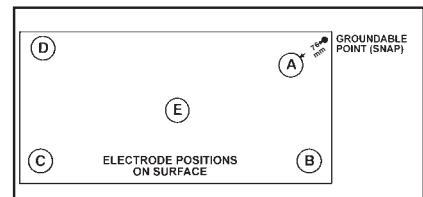
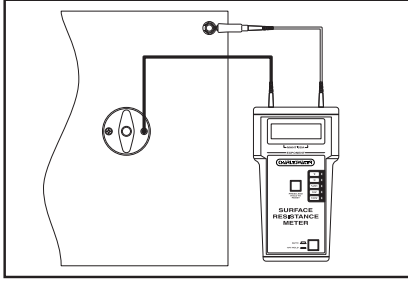


Figure 7. Electrode positions on surface of pad, Rg test.

1. Locate the five electrode positions, as described below, to be used on the Micastat® surface in relationship to the installed ground bolt (or snap on the Micastat® Pad). Use the relative positions shown above.
  - A - At least 50 mm from any surface edge and 75 mm from the ground bolt.
  - B, C & D - The furthest corners from the ground bolt and 50 mm from any surface edge.
  - E - The geometric centre of the surface.
2. Disconnect the surface to be tested from its normal ground connection.
3. Connect one black lead to the meter and

the other end of this lead to the 2.27kg. electrode.

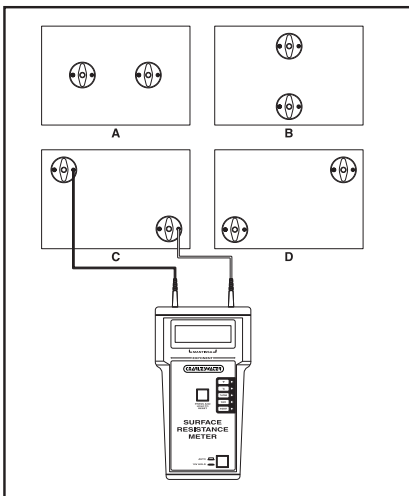
Figure 8. Proper connection of leads.



4. Connect the other black lead to the meter and the groundable point on the mat.
5. Place the electrode at position A on the mat (see the Rg diagram) and set the meter selector switch to 100V.
6. Push on On/Off button, wait 15 seconds and then record the reading in ohms.
7. Release the On/Off button. Move the electrode to each of the other four positions on the surface and repeat the test.
8. Average the results of the five readings to obtain an average measurement of the resistance of surface to ground.

### Resistance Point to Point (RTT):

Figure 9. Electrode positions on surface of



pad, RTT test.

1. Locate the four pair of electrode positions to be used approximately as shown in the RTT test diagram above. Position electrodes at least 250 mm apart and not less than 50 mm from any edge.
2. Disconnect the surface to be tested from its normal ground connection.

3. Connect one end of the black lead to the meter. Connect the other end of this lead to either one of the electrodes. It does not matter which lead is connected to which weighted electrode.
4. Connect the other lead to the meter. Connect the other end to the other weighted electrode.
5. Place the electrodes in position A as shown in RTT test diagram (Fig. 9). Set the meter selector switch to 100V.
6. Push the On/Off button, wait 15 seconds and then record the reading in ohms.
7. Release the On/Off button. Move the electrode to each of the other three positions on the surface and repeat the test.
8. Average results of the four readings to obtain an average measurement of the resistance of the surface between two points.

### Maintenance

1. It is important to store Micastat® laminate sheets at the same relative humidity as the material to which it will be bonded. This will prevent a moisture imbalance in application.
2. Micastat® may swell slightly if a damp object is kept in continuous contact with the surface for more than 12 hours. This is normal; the swelling will disappear soon after the damp object is removed.
3. Micastat® may be cleaned with Reztore® Antistatic Surface and Mat Cleaner, Item No. 71021 or any household soap solution. Be careful that household soaps do not leave an insulative layer behind. This will reduce electrical properties. Difficult stains may be removed with organic solvents such as acetone, alcohol, methyl ethyl ketone (MEK) or paint thinner.

### RoHS Compliance Statement

None of the following materials are intentionally added in manufacturing this product: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) as outlined in the Directive 2002/95/EC Article 4.1. See Desco Industries Inc. letter on-line at [Charleswater.co.uk](http://Charleswater.co.uk)

### Limited Warranty

Charleswater expressly warrants that for a period of one (1) year from the date of purchase, Charleswater Micastat® Static Protective Laminate will be free of defects in material. Within the warranty period, the material will be replaced at Charleswater's option, free of charge. Call Customer Service at 00 44 (0) 1892-665313 for proper shipping instructions and address. Include a copy of your original packing slip, invoice or other proof of purchase date. Any material under warranty should be shipped prepaid to the Charleswater factory. Warranty replacements will take approximately one week.

### Warranty Exclusions

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

### Limit of Liability

In no event will Charleswater or any seller be responsible or liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, users shall determine the suitability of the product for their intended use, and users assume all risk and liability whatsoever in connection therewith.

*"It should be understood that any object, item, material or person could be a source of static electricity in the work environment. Removal of unnecessary nonconductors, replacing nonconductive materials with dissipative or conductive materials and grounding all conductors are the principle methods of controlling static electricity in the workplace, regardless of the activity." [ESD Handbook TR 20.20 section 2.4]*