

ESD S4.1-2006

ESD Association Standard

ESD S4.1-2006

Reaffirmation of ANSI/ESD S4.1-1997

*For the Protection of Electrostatic
Discharge Susceptible Items*

Worksurfaces – Resistance Measurements



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***ESD Association Standard
for the Protection of Electrostatic Discharge Susceptible Items -
Worksurfaces – Resistance Measurements***

Approved February 26, 2006
ESD Association



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Foreword

The purpose of an ESD protective worksurface is to aid in the prevention of damage to ESD-susceptible parts. There are several ways these surfaces may act to provide this protection and they are often confused in practice. One involves the removal of charge residing on the surface of a material. A second charge-removal task involves the charge on an object such as a tote box that is placed on the surface. In this case, the charge must flow across the zone between the object and the worksurface, which can interpose a considerable contact resistance. A third charge removal task involves current flow from a charged, susceptible device placed on the surface. In this case, a low discharge current may be desirable.

The degree of protection afforded by a worksurface is strongly related to the time needed to discharge an object. In practice, some form of resistance value is commonly given as an indication of the effectiveness of the worksurface. Strictly speaking, this description is incomplete since discharge time depends on several other factors such as the effective capacitance of the worksurface, contact resistance and the actual discharge path.

However, the capacitance does not usually vary as much as resistance. The other effects are very dependent on the individual situation. As a result, resistance seems the best single predictor of performance of ESD-protective worksurfaces. This standard relies on *resistive* measurements, utilizing standard instruments, to provide a means of evaluation materials or installed worksurfaces. Conversely, *resistivity* is measured by specific equipment and is used to establish an intrinsic material property. *Resistivity* measurements are not within the scope or purpose of the standard.

This standard sets forth resistance test methods that can be used to characterize worksurfaces and to obtain relative estimates of their ability to remove electrical charge from non-insulative objects placed on the surface.

A worksurface, which is conductive enough to discharge an object, may also pose a safety hazard. The work performed on the worksurface often entails the use of tools and test instruments, which operate at voltages high enough to cause electrical shock. The presence of a worksurface tested using the methods described in this document will not guarantee personnel safety.

This standard was originally designated ANSI/ESD S4.1-1997 and approved on September 20, 1997. This standard is a reaffirmation of ANSI/ESD S4.1-1997 and was approved on February 26, 2006. This standard was prepared by the 4.0 Worksurfaces Subcommittee. The 1997 version was prepared by the 4.0 Worksurfaces Subcommittee. At that time the 4.0 Worksurfaces Subcommittee had the following members:

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