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THE DREADED *"ANTISTATIC ZONE"*

(A SUMMARY OF MATERIAL RESISTIVITY CLASSIFICATION)

Triboelectric Charge Generation is caused by the separation of materials. Charge generation can be caused by separating similar materials (film coming off a reel or tape off a roll) and dissimilar materials (lifting a package off a workbench). Prior to 1981, static control material was classified as to its "*antistatic performance*" using surface resistivity. Until that time, the classifications according to Mil-Standard 883 and DOD-HDBK-263 (1980) were:

Conductive	Less than 1×10^5 Ω/sq.
Dissipative	Between 1×10^5 & 1×10^9 Ω/sq.
Antistatic	Between 1×10^9 & 1×10^{14} Ω/sq.
Insulative	Above 1×10^{14} Ω/sq.

During development of specification EIA-541 in 1981, it was agreed that the term "antistatic" was being misapplied. According to the current version of the ESD Association's Glossary of Terms (ESD ADV 1.0), the word "antistatic" refers to a material's ability to resist tribocharging and is *NOT* a function of a material's surface resistivity. (It is, however, true that in many cases, materials with lower resistivities tend to exhibit better antistatic characteristics.) A common example of the triboelectric charge generation phenomena is when a person walks across a rug in the winter and touches a doorknob causing a spark discharge. Several times each year we come across companies referencing this older information. The current classifications for surface resistivity per EIA-541 and other specifications is:

Conductive	Less than 1×10^5 Ω/sq.
Dissipative	Between 1×10^5 & 1×10^{12} Ω/sq.
Insulative	Above 1×10^{12} Ω/sq.

ESD Association Test Method S11.11 "Surface Resistance of Dissipative Planar Material" is currently superceding surface resistivity per ASTM D-257 for categorizing static dissipative material in many commercial and military applications.

When evaluating resistance data, the following rules should be applied:

***** If the information is listed in **Ohms per Square (Ω/sq.)**, the measurement is always a *SurfaceResistivity* measurement. Surface resistivity is referenced by specifications such as EIA-541, Mil-B-81705C and NFPA 99. All these specifications in turn reference test method ASTM D-257 for measuring surface resistivity.

* If the information is listed in **Ohms (Ω)**, it is always a *Resistance* measurement. It may be referred to as *Surface Resistance, Volume Resistance, Point-to-Point or Point-to-Ground Resistance*. Resistance measurements are currently referenced in test methods such as ESD S4.1, S7.1, S11.11 and STM 11.12.

* If the information is listed in **ohm-cm (Ω-cm)**, it is always a *Volume Resistivity* measurement. Volume Resistivity is referenced by test methods such as ASTM D-257 and D-991.

There are currently several ways the antistatic characteristics of a material can be measured. Suggested procedures can be found in ESD Association Advisory ESD ADV11.2 or you may contact the ETS Independent ESD Materials Testing Laboratory for additional information.