

## ELECTRICAL PROPERTIES TRESPA ATHLON

### General

Electrostatic charges arise from changes in the contact between two materials (friction). The bigger the differences between the materials are and the faster contact changes appear, the bigger the charges are (frictional electricity). The static charges caused by people for example (friction, clothes) can generate electric tensions of ten thousands of Volt. Prevention of, or protection against, electrostatic discharge is possible at several levels:

1. The formation of electrostatic charge may be influenced by:
  - the level of the relative air humidity;
  - ionisation of the air;
  - the choice of the materials (for example clothes and shoes).
2. Conductive and deductive materials distract electrostatic charges whereby the rapidity of the distraction depends on the resistance.
3. Antistatic materials prevent accumulation of charges: these Materials cannot even be charged and thus make the local creation of increased potential differences impossible.

### Theory

#### Electrostatics

The behaviour of materials concerning the distraction of electrostatic charges can be described with the help of a scale that is divided based on the surface resistance in Ohm ( $\Omega$ ).

Charge distraction possible		Charge distraction limited possible	Charge distraction not possible
Materials cannot be charged		Transition zone	Materials can be charged
conductive	deductive	antistatic	isolating
$10^4$	$10^5$ $10^6$ $10^7$ $10^8$	$10^9$ $10^{10}$ $10^{11}$	$10^{12}$ $10^{13}$ $10^{14}$

Between the conductive ( $<10^5 \Omega$ ) and the isolating materials ( $>10^{12} \Omega$ ) there is a group of materials that is suitable for a couple of interesting applications. Within this group, there's a distinction between "antistatic" materials ( $10^9$  till  $10^{12} \Omega$ ) and "deductive" materials ( $10^5$  till  $10^9 \Omega$ ). It is true that electrostatic charges can be formed on antistatic materials as well, but these charges don't stay at one place and don't accumulate.

It is not possible to generate electrostatic charges on deductive materials, as far as these materials are grounded. In that case, applied charges are being removed relatively fast, depending on the deduction resistance.

### Test methods

The essential parameters are resistance and electric discharge time. Measuring results can strongly depend on the test method used. That's why it is important to indicate the test method for each measured value.

The resistance (R) and the specific resistance (p) can be measured with sheet materials like Trespa as follows:

- Between two electrodes on the surface of the sheet, the surface resistance  $R_o$  is determined,
- Between two electrodes on the front and back of the sheet the volume resistance or the deduction resistance  $R_a$  is measured.

To get reliable and reproducible values, it is very important that during the measurements the contact between the sheet and the surface of the electrodes is as big as possible (critical with rough surfaces!).

Measuring is done according to the European standard IEC 60093 (deduction resistance and surface resistance).

## Material properties

### Test results

The following data are based on information from the International Committee of Decorative Laminate Industries (ICDLI) and apply to HPL (High Pressure Laminate) in general as defined in EN 438-4. Trespa Athlon (melamine surface) falls among these. The following therefore only applies to Trespa Athlon panels.

HPL minimizes the generation of charge by contact-separation or rubbing with another material. It does not need to be grounded. Surface resistivity is between  $10^9 - 10^{12}$  ohms and a chargeability of  $V \leq 2$  kV according to CEI IEC 61340-4-1 so that HPL are considered as antistatic material.

The size of these values will be determined by several factors:

1. The climatologic ambient conditions, especially the fluctuations in the relative air humidity. HPL, which consists of wood based fibres, will be influenced by humidity. It is in dynamic balance with its environment. Therefore the surface resistance of HPL can amount to  $10^9 \Omega$  at room temperature and 60% Relative Humidity (RH) and  $10^{11} \Omega$  at room temperature and a RH of 20%.
2. Composition of HPL

Trespa Athlon is tested according to IEC 60093.

## Application

HPL as an antistatic material offers, without grounding, excellent protection against electrostatic charges in the environment.

Because of the excellent features, such as mechanical and chemical resistance and antistatic behaviour, HPL can be applied everywhere where the avoiding of electrostatic charge is required:

- Office- and laboratory furniture;
- Institutions;
- Clean rooms;
- Health care (hospitals, pharmacies);
- Optical industry;
- Production of sound carriers.

Document created by: Trespa Technology Center / Product Management - Code: U5210 - Version: June 2010

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