

**Electrostatic Solutions Technical Brief No. 6**

## **Triboelectrification – how materials charge by contact**

When two materials make contact with each other, some electrical charge transfers from one material to the other. One material gains an excess of electrons and becomes negatively charged. The other material loses an equal amount of electrons, and becomes positively charged.

If the materials are then separated, each can take its charge with it. The charge will try to recombine, or dissipate to earth. If there is no conducting path to allow these processes, then the charges remain static as static electricity.

The process of materials becoming charged through contact is called triboelectrification.

### **Triboelectric series**

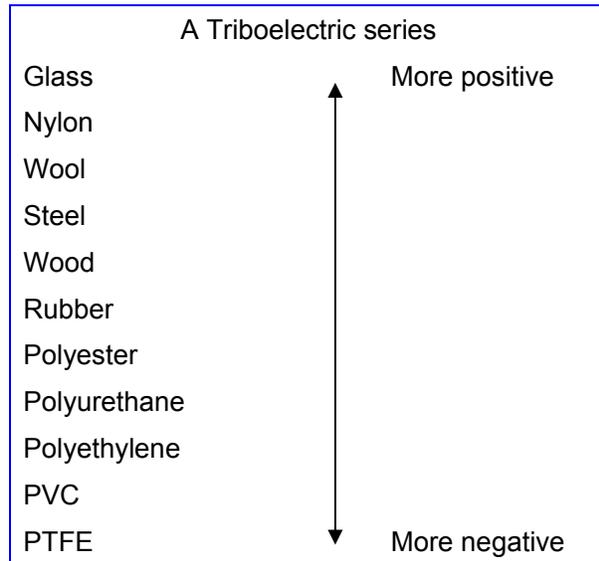
The amount which a material will charge by triboelectrification depends on many factors, and in particular on the two materials in contact.

A material may charge positive when in contact with one material, and negative with another. For example, polyester is normally expected to charge positive when in contact with PTFE, and when in contact with nylon.

If a range of materials are tested, a table can be drawn up, for example with each material charging positive with respect to the one above, and negative with respect to the one below. This is called a triboelectric series. An example is given below.

Materials widely separated in the series will tend to charge strongly against each other, for example nylon and PTFE. Materials close together, for example polyester and polyurethane, will tend to charge less strongly against each other. The strength of charging will depend also on other factors, especially the atmospheric humidity.

Because there are a large number and wide variety of factors involved, a triboelectric series found in one experiment is not necessarily the same as that found in another experiment. The surface condition of the materials is important, and contaminants also may have a large effect. Triboelectric series are therefore at best a guide to the charging behaviour that may be experienced in practice.



The information given here is believed to be correct but no liability is accepted for any consequences arising from the application of the information.

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