

Tel: +44 (0)161 873 6543
Fax: +44 (0)161 848 7378

e-mail: Info@bttg.co.uk
Web: <http://www.bttg.co.uk>



Unit 14 Wheel Forge Way
Ashburton Road West
Trafford Park
Manchester M17 1EH
United Kingdom

ELECTROSTATIC DISSIPATIVE GARMENTS using EN 1149

Electrostatic Dissipative (“Antistatic”) Protective Clothing is designed to prevent incendiary discharges from the clothing and body. Discharges (sparks) from the human body and from clothing can ignite flammable gas, vapours, and dust clouds. The EN 1149 series of standards was developed to provide tests and requirements for fabrics and garments that would not ignite the most easily ignitable mixture of hydrogen gas and air.

**Antistatic clothing on its own does not provide complete protection.
The wearer must always be earthed.**

The relevant parts of EN 1149 are:

EN 1149-1:1995 Test method for surface conducting fabrics.
(Soon to be replaced by an updated version – no significant changes)

EN 1149-3:2004 Charge decay test method for all fabrics

prEN 1149-4 Garment test method
(No published document yet)

prEN 1149-5:2006 Performance requirements for fabrics and garments
(May be published as EN 1149-5 in 2006/7)

It will usually be necessary to combine EN 1149 with other standards, e.g. EN 531 for heat and flame resistance.



TYPES OF EN 1149 GARMENTS

EN 1149 garments can be classified according to the type of fabric used. There are two types of electrostatic dissipative fabrics, **surface conducting** and **corona**.

Surface conducting fabrics

These fabrics can be tested to EN 1149-1 or EN 1149-1 & -3.

Garments with surface conducting fabrics should conform to the Design Requirements of prEN 1149-5. They must be designed to be earthed directly (through earthing leads or boot straps) or to be earthed through the body (through skin contact).

Garments with surface conducting fabrics must have electrical continuity, i.e. they must meet the Surface Resistance requirements of EN 1149-1 *when tested as a garment*, measured from all areas of the garment to the earthing point. (This test will eventually be included in Part 4.)

Garments with surface conducting fabrics must be earthed.

An isolated EN 1149-1 garment may give a larger spark than ordinary clothing.

Corona fabrics

These fabrics are tested to EN 1149-3.

Garments with corona fabrics should conform to the Design Requirements of prEN 1149-5. They do not need to be earthed directly.

An EN 1149-3 test result does not necessarily mean that the fabric is a 'Corona' fabric.

REQUIREMENTS FOR ALL GARMENTS


prEN 1149-5 Design requirements (summary)

1. Electrostatic dissipative protective material to cover all non complying materials during use.
2. Labels, reflective stripes, etc. permitted provided they are permanently attached (no separation from fabric).
3. Conductive parts (zips, buttons etc.) must be covered.

prEN 1149-5 Marking



Marking according to EN 340.

The information pictogram  should be included.

Static pictogram (No 554 from ISO 7000).

prEN 1149-5 User Information

To comply with EN 340:2003, plus:

- The person wearing the electrostatic dissipative protective clothing shall be properly earthed through a resistance lower than $10^8 \Omega$
- Electrostatic dissipative protective clothing shall not be removed whilst in presence of flammable or explosive atmospheres or while handling flammable or explosive substances
- An instruction on how the garment shall be correctly fastened and worn
- Electrostatic dissipative protective clothing shall not be used in oxygen enriched atmospheres without prior approval of the responsible safety engineer
- The electrostatic dissipative performance of the electrostatic dissipative protective clothing can be affected by wear and tear, laundering and possible contamination.
- Electrostatic dissipative protective clothing shall permanently cover all non-complying materials during normal use (incl. bending and movements).

Limitations of EN 1149

- The requirements of EN 1149 may not be sufficient in oxygen enriched flammable atmospheres.
- EN 1149 compliant garments are not suitable for protection against mains voltages.
- EN 1149 is not intended for clothing designed to prevent nuisance sparks, e.g. in clean rooms, electronics, pharmaceuticals.
- It may be necessary to conduct additional tests or withdraw EC Type-Examination Certificates if radically different tests or requirements are introduced when EN 1149-4 and EN 1149-5 are published.

prEN 1149-5:2006 Annex A (informative) Explanation

The human body has a low enough volume resistivity to act as a conductor and – if insulated from earth – it can accumulate electrostatic charge. The charge may be produced by contact electrification, for example by walking across an insulating floor, or by touching charged equipment or materials. It may also arise by induction due to charge on the clothing or adjacent charged objects. A dangerous consequence of the electrostatic potential on charged personnel is that it can be high enough to cause hazardous spark discharges. The control of undesirable static electricity on people is necessary in areas where flammable or explosive atmospheres exist or might be present. In such cases people have to be earthed either directly or through conducting footwear (see EN ISO 20345).

In the case where the wearing of electrostatic dissipative protective clothing has been identified as necessary by risk assessment, clothing complying with the requirements of this standard may be suitable. These requirements may be necessary in addition to requirements of protective clothing basically designed for other hazards (e. g. chemicals). Therefore this standard should be used in such a way that the requirements supplement those of the specific protective clothing standard.

The material and design requirements as specified in this standard apply only to electrostatic dissipative protective clothing worn by persons that are earthed through a resistance lower than $10^8 \Omega$ (e.g. by wearing appropriate footwear such as safety shoes specified in EN ISO 20345, or by any other suitable means).

The basis for the material and design requirements presented in this standard, was obtained through research funded by the European Commission. The research work comprised ignition testing in hydrogen atmospheres. This research has shown that method 1 of EN 1149-3 is not suited to discriminate between safe and unsafe fabrics. Method 2 has been proven by extensive research to accurately predict incendiary behaviour of fabrics.

Chris Butcher.
Certification Officer, BTTG Certification Services.

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