

Guide to Electrical Properties of Safety Footwear



Conductive
Sole resistance < 100 KΩ



ESD
Sole resistance 100 KΩ to 100 MΩ



Antistatic
Sole resistance 100 KΩ to 1000 MΩ



Electrical Insulative
Sole resistance > 1000 MΩ

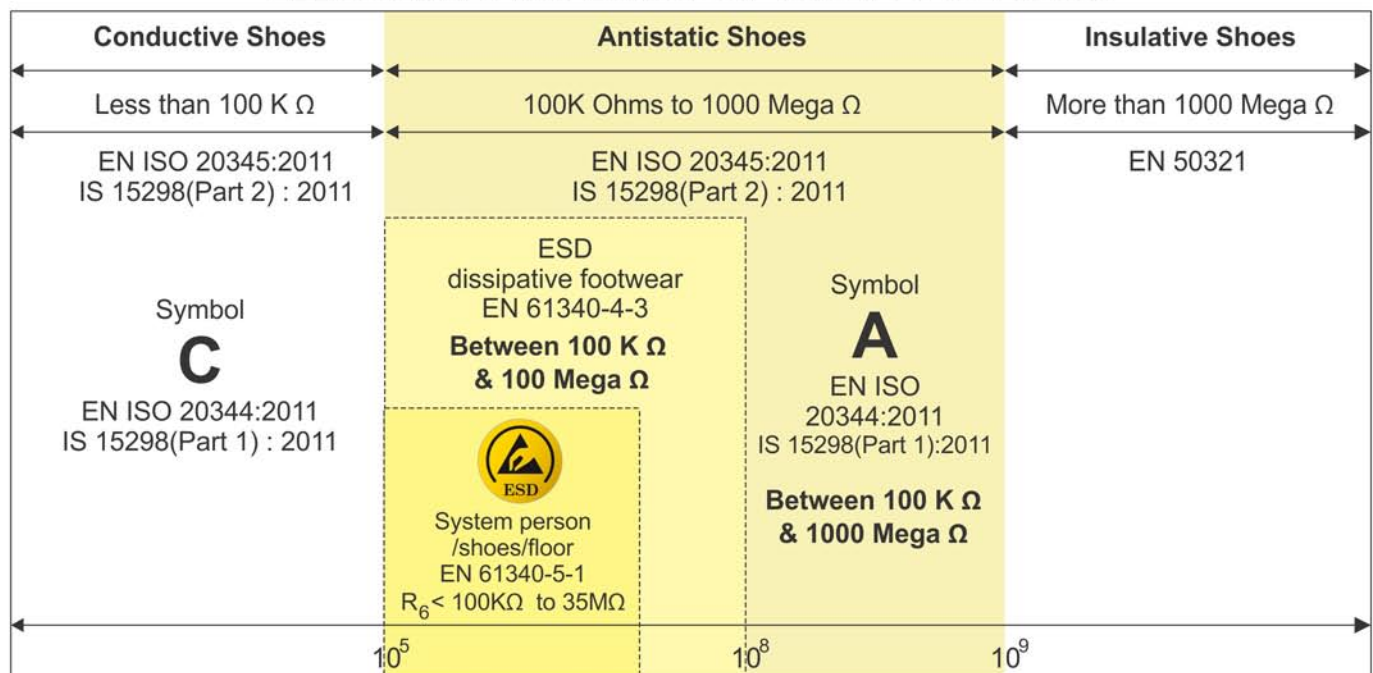
ELECTRICAL RESISTANCE

Electrical resistance is an important feature of safety footwear. It is relevant when it comes to making the right choice. They are broadly of two types:

- **LOW RESISTANCE FOOTWEAR** is used to prevent electrostatic charges by diverting this quickly.
- **HIGH RESISTANCE FOOTWEAR** offers protection from electrical shocks as they offer barrier to completion of circuit so that user is protected against electrical shock. It prevents too much electricity from passing through your body.

Depending on your work situation, you will need footwear with a certain resistance. JCB offers footwear with three types of electrical resistance: Anti-static, ESD & Electrical Insulative.

ELECTRICAL PROPERTIES OF SAFETY FOOTWEAR



Explanation: The symbols A & C mark addition requirements of occupational & safety shoes regarding electric property.
R₆ = Ground resistance



Earthmover

Excavator

Heatmax

FOOTWEAR WITH LOW ELECTRICAL RESISTANCE

Footwear with low electrical resistance diverts the electrostatic charge in a controlled manner. This prevents the accumulation of an excessively high charge (and an uncontrolled & intense discharge). The wearer must be working on a grounded surface in order to facilitate discharge via the shoe.

Electrostatic Discharge

Electrostatic discharge is important in situations involving danger of explosion (explosives, chemicals, gases, dust explosion), or if you work with sensitive electronics (microchips, hard drives, etc.). When you move, friction always causes an electrostatic charge in your body. Footwear and clothing that are not conductive (enough) can increase this charge. At a certain point, a discharge occurs. An electrical discharge that is too high or uncontrolled can have extremely uncomfortable and sometimes even serious consequences: an explosion due to spark formation, or damage to the electronic products you work with.

ESD

ESD (Electrostatic Dissipative) footwear has a sole electrical resistance between 100 Kilo Ω & 100 Mega Ω measured according to BS EN 61340-4-3:2002 (IEC 61340-4-3:2001). ESD footwear offers an extremely low electrical resistance under any conditions in order to prevent a strong, uncontrolled electrostatic charge. ESD footwear carries a distinct yellow button on the exterior of the footwear.

ESD Additional Standard

IEC 61340-5-1:2007 (IEC 61340-4-5) is another norm. In this norm testing is applied in practical ESD environments where footwear are actually worn by a test subject & the resistance of the footwear is measured on a conductive testing plate. The ESD footwear as per this norm must also have a resistance between 100 Kilo Ω & 35 Mega Ω . We follow BS EN 61340-4-3:2002.



ESD Tester



Flooring

It is very important to also include the type of flooring when considering all of the different types of electrical resistance of footwear. An ESD shoe cannot function without a suitable surface. For this reason, a separate testing method has been included in several norms, which prescribes a measurement that uses a combination of shoe and flooring.

Anti-static

Anti-static footwear have an electrical resistance between 100 Kilo Ω & 1000 Mega Ω , measured according to EN 20344: 2011 5 10. This value is a compromise between good protection from electrical shocks & sufficient dissipative capacity. These are most commonly used safety footwear for many different work environments.

Conductive

Conductive footwear has electrical resistance below 100 K Ω , measured according to EN 20344: 2011 5 10. These are actually only necessary in situations in which people work with highly explosive materials such as gunpowder or highly inflammable chemical vapors (Paint Shop). It should not be used during working with live electricity.

FOOTWEAR WITH HIGH ELECTRICAL RESISTANCE

Insulative footwear is footwear with an extremely high electrical resistance (Giga Ohms). Insulative footwear is necessary whenever people are at risk of high-voltage shocks (more than 1000V). Normal Antistatic footwear protect well against household electricity (300V). Most of the insulative footwear sole is made up of solid rubber & therefore they are little heavy than a PU soled footwear. They don't have any metal component in the sole complex but metal toecap is allowed. We offer footwear for these applications.

Query

For questions about electrical properties of footwear, or the suitability of certain footwear at your workplace, please contact us by writing an email: sudhir.agarwal@rahman-group.com. It will be our pleasure to assist you to find the appropriate footwear for your application.

For further details on the various norms and testing methods for electrical resistance of footwear and flooring please visit www.nen.nl.



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