

Equipotential Bonding

Have you ever seen the warning notice bearing the words “SAFETY ELECTRICAL CONNECTION — DO NOT REMOVE” and “安全接地終端 — 切勿移去”? You probably see these notices at metallic water mains, gas pipes, windows or bathroom accessories. This notice is required under the Code of Practice for the Electricity (Wiring) Regulations published by the Electrical and Mechanical Services Department (EMSD) and should be provided at all main earthing and bonding connections. The above-mentioned earthing and bonding connections are commonly called “equipotential bonding”, i.e. the electrical connection linking various exposed conductive parts and extraneous conductive parts (liable to introduce a potential) so as to achieve a substantially equal potential between such parts. “Exposed conductive parts” include (i) metallic enclosure of current using equipment, other than double insulated equipment; (ii) metallic conduit, trunking and ducting for enclosure of cable(s); (iii) metallic enclosures of current distribution equipment such as switchgear and control gear assemblies. The provision of equipotential bonding is of paramount importance for protection against electric shock under fault conditions. It can minimise the faulty electric current which flows through the person and thereby effectively reduce the risk of electric shock arising from faulty electrical installations.

As a rule of thumb for electrical installation rated at 220V, if the insulation resistance between a conductive part and the main earthing terminal is maintained at not less than $21,000\Omega$ even under the worst conditions (e.g. high moisture), the metallic part may be considered as a non-extraneous conductive part and equipotential bonding would not be required. This “magic figure” was derived, with reference to IEC 479, by considering the fault current which could pass through a person without causing harmful physiological effect. Attention to equipotential bonding is required during installation and testing work as ineffective equipotential bonding can kill!

The Electrical Blog is contributed by the Electrical Division. If you would like to know more about this topic, please contact the Division Hon Secretary, Ir Simon Chung at simon.chung@arup.com