ISCE

The Institute of Sound and Communications Engineers

Engineering Note 13.3

'Earthing' of loudspeakers

J M Woodgate *FInstSCE*

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100 V line loudspeakers do not need to be *earthed* for safety reasons.

There are at least two, and often four, layers of insulation between the mains and the metalwork of the loudspeaker:

- at least 'basic' (as defined in IEC/EN 60065) insulation in the mains transformer (or SMPS transformer), and between mains and the other circuits in the rest of the product;
- basic insulation in the output transformer, unless feedback is taken from the secondary winding;
- basic insulation in the line transformer;
- insulation between the voice-coil winding and the metalwork of the drive unit.

and two layers between the 100 V audio and the metalwork:

- basic insulation in the line transformer;
- insulation between the voice-coil winding and the metalwork of the drive unit.

However, ***metal-cased*** loudspeakers, ***even if low-impedance***, MAY need, when installed in some locations, notably swimming pools, bathrooms and the like, to be 'equipotentially-bonded' to other exposed metalwork in the same space. This is done by connecting them together with a THICK (minimum 2.5 square mm) piece of cable (green/yellow striped insulation), so that in the event of a serious short-circuit fault in the mains supply, no hazardous voltage can be developed between them, due to a large fault current flowing in the earth wiring. So such loudspeakers should be provided with a bolt or stud, 4 to 6 mm, to which a lug on the bonding cable can be fixed. See BS 7671 (the 'Wiring Regulations'), Regulations 413-02-04 and 547-03-03.

What you very definitely MUST NOT do is to earth a loudspeaker back to a remote amplifier by using a 3-core cable for the loudspeaker. This introduces a 'remote' earth into the space, which may present a serious shock hazard under fault conditions in the electricity supply wiring.