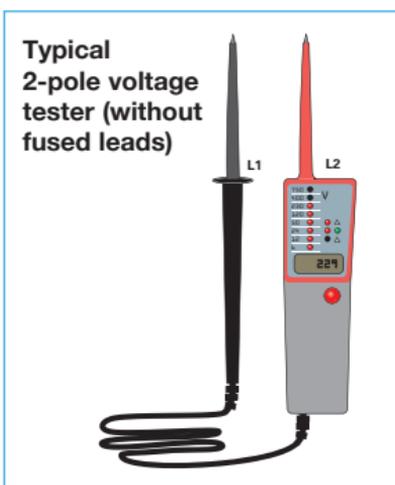
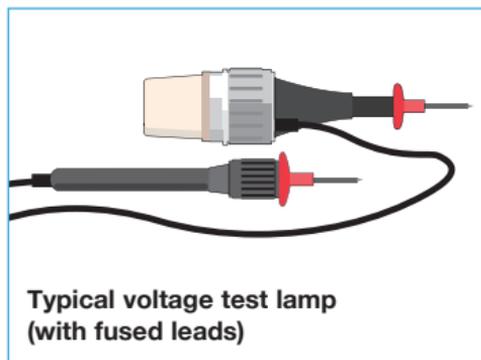


## TEST INSTRUMENT LEADS



- (1) This Guide includes recommendations on various British Standards Institution (BSI) guidance and Health and Safety Executive (HSE) guidance relating to test instrument leads. Such guidance should be followed to reduce the risk of electric shock or explosion and consequent serious injury or death when using electrical test equipment, and to meet the requirements of the *Electricity at Work Regulations 1989*.
- (2) As well as injury or death caused directly by electric shock or explosion, injury can occur when a person reacts to an electric shock, for example by falling from height or touching another hazard.
- (3) It is important that fused test instrument leads are used where there is a potential risk of a fault current passing through the test instrument leads that could cause damage to the instrument or the installation, and/or cause injury to the user of the instrument. Such a potential risk might be caused by a multimeter that has a voltage and current selector switch which is accidentally set to measure 'current', when in fact a 'voltage' from a high energy source (such as a 230 V circuit) is being measured (this type of instrument is not recommended for proving that a circuit is dead).
- (4) Appendix 1 of the HSE publication *The Electricity at Work Regulations 1989. Guidance on Regulations* lists HSE Guidance Note GS38 – *Electrical test equipment for use on low voltage electrical systems* as a publication being particularly relevant to regulations 10 (Connections), 14 (Work on or near live conductors) and 16 (Persons to be competent to prevent danger and injury).
- (5) HSE Guidance Note GS 38 is also referenced in HSE Guidance Note HSG 85 – *Electricity at work, safe working practices*. Paragraph 32 of HSG 85 advises using test equipment with insulated probes and, where appropriate, fused leads as suitable precautions to prevent injury. Furthermore, paragraph 54 of HSG 85 advises not to use multimeters, which can be set to the wrong function or non-contact devices, such as 'volt sticks' for proving dead.
- (6) HSE Guidance Note GS38 covers, amongst other things:
  - accident causes, such as inadequate insulation of test leads and probes
  - design safety requirements for test probes, test leads, and test equipment sockets/terminals
  - voltage detection instruments.

## TEST INSTRUMENT LEADS

- (7) Where there is no risk of test leads being accidentally short-circuited together AND the fault current in them is limited not to exceed their current-carrying capacity, for example by: (i) a voltage detector that conforms to *BS EN 61243-3: Live working – Voltage detectors – Two pole low-voltage type* or (ii) a test instrument that conforms to *BS EN 61010: Safety requirements for electrical equipment for measurement, control and laboratory use. Safety requirements for hand-held probe assemblies for electrical measurement and test* or *BS EN 61557: Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c.* fused leads may NOT be necessary. However, the design of the test probes and leads should meet the recommendations of GS 38 in other respects, such as having exposed metal tips not exceeding 4 mm in length (whilst *BS EN 61243-3* and *BS EN 61010-031* allow exposed tip lengths up to 19 mm).
- (8) When using any test leads and instruments, the instructions of the manufacturer(s) should be followed and the test equipment should be inspected regularly to confirm its continued suitability for safe use.
- (9) Contractors and their employees are reminded of their legal obligations relating to the safe use of test instruments, including those under the *Electricity at Work Regulations 1989* and the *Provision and Use of Work Equipment Regulations 1998*. In this context, contractors should carry out risk assessments to protect their employees, customers and bystanders from injury. Contractors should have appropriate test leads designed for use with each of their test instruments.

### HSE GS38 examples of design safety requirements

#### Test leads should

- be adequately insulated
- except for voltage detectors, be coloured so that one lead can be easily distinguished from the other
- be flexible and of sufficient capacity and duty
- be sheathed to protect against mechanical damage
- be of adequate length for use
- not have accessible exposed conductors, other than the probe tips, or have live conductors accessible to a person's finger if a lead becomes detached from a probe, indicator or instrument when in use.

#### Test probes should

- have finger barriers or be shaped to guard against inadvertent hand contact with live conductors
- be insulated to leave an exposed metal tip not exceeding 4 mm measured across any surface of the tip. Where practicable it is strongly recommended that this is reduced to 2 mm or less, or that spring retractable screen probes are used
- When used with a multimeter, have suitable high breaking capacity (hbc) fuses with a low current rating (usually not exceeding 500 mA) and/or a current-limiting resistor
- have appropriate types of tip for allowing access to the contact where detection is being made.