



SAFE ELECTRIC Newsletter

IMPORTANT

ET101 Amendment No. 2.2 is now in force



The requirement is for 'Twin & Earth' cable to have the earth conductor equal size to the phase conductor and to be insulated. From the 5th September 2017 all new twin and earth circuits **must** be wired using the new cable type.

We have had a number of reports that suppliers are still selling the old type 'Twin & Earth' cable. The installation of the smaller sized unsleeved earth conductor is no longer permissible in **any case**. If inspectors find that any of the old type cable has been installed since the 5th September, then REC's will be required to rewire the installation with the correct cable type. Otherwise the installation will not be in compliance with the current wiring rules and therefore un-certifiable.

LARGE TURN OUT FOR 2017 ROADSHOWS

We have had a good response to the 2017 Roadshows. The events were a mixture of industry talks and demonstrations. We had representatives from CER, NSAI, ESB and Gas Networks Ireland, who gave short presentations and were all available to answer any related questions. We had a number of 'Test Rigs' that were manned by Safe Electric inspectors who demonstrated Pre and Post Connection Tests.



These Roadshows are aimed at helping electrical contractors get to grips with a range of technical



issues. Topics covered in the seminar included:

2017 Building Regulations regarding residential fire alarms, controlled works, understanding insulation resistance testing and measurement of protective conductors. Understanding earth loop impedance and the testing of RCD's, Completing 'Test Record Sheets' and Certificates. A number of rule requirements were also discussed including the need for surge protection. Testing demonstrations at 'Test Rigs' showed Pre and Post Connection Test procedures. We plan to continue with Roadshows in 2018 with a new range of topics and would urge all contractors to attend, in order to keep informed of industry news. Please check website for the next Roadshow in your area.



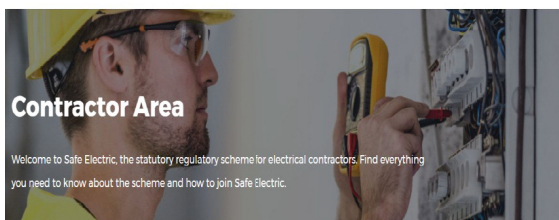
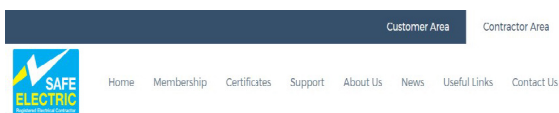
On the 2nd October 2017 The Commission for Energy Regulation changed its name to the **Commission for Regulation of Utilities (CRU)** to reflect the expanded remit of the organisation across energy, water and safety.

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We are happy to announce the new Safe Electric website was launched in July 2017. The website replaces the old RECI site and has been redesigned to improve user friendliness and appeal.

In addition to the changed design and layout of the pages, new functions have been implemented in this version.



The design of the web pages and the structure of information have been changed to improve overview and usability. The new design and colours now reflect the Safe Electric image. The site is split into two sections, the 'Customer Area' and the 'Contractors Area'

Please visit regularly to ensure that you are up to date with industry news. **Try it!**

FOCUS ON AGRICULTURAL AND HORTICULTURAL PREMISIS



This article considers some of the conditions and additional requirements for agricultural and horticultural locations. Please refer to section 705 of the wiring rules further information. Below are the most common problems that inspector's come across.



Rule 705.522.6.03 requires that in uncultivated ground with drainage, or arable land, and in areas of agricultural premises where vehicles and mobile agricultural machines are operated, cables buried in the ground shall be at least **1m** below the surface. Additional mechanical protection such as tiles or concrete slabs or metal covers must be provided where there may be risk of damage to the cable in future excavation work.

Rule 522.6.8.2 states that suitable indication shall be provided above a buried cable at a distance of approximately 300 mm.

Rule 705.544.2.01 States that equipotential bonding conductors shall be protected against mechanical damage and corrosion, and shall be selected to avoid electrolytic effects. Please ensure that these cables are run where they cannot be damaged by machinery or animals. Also due to the harsh environment and often the presence of chemicals please ensure that all bonding connections are protected.



Rule 705.411.3.01 details the following RCD requirements:

In final circuits supplying socket-outlets with rated current not exceeding 32A, RCDs with a rated residual operating current not exceeding 30mA,



In final circuits supplying socket-outlets with rated current more than 32A, RCDs with a rated residual operating current not exceeding 100mA.



- in **all** other circuits, RCDs with a rated residual operating not exceeding 300mA.



Rodents seem to have a taste for cable insulation, and rodent damage to cables and electrical installations is one of the main causes of fire. The installation should therefore be routed to minimise such damage. Wherever possible, electrical installations and equipment should be located so that they are out of reach of livestock.



Please consider installing 'Surge Protection' as recommended in 705.443 of the wiring rules.



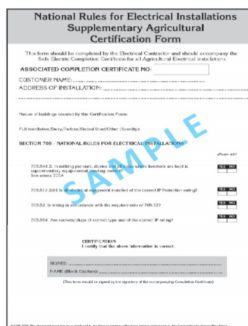
In agricultural installations, such locations include e.g. milking parlours, in particular the operator's pit where emergency stopping must be provided.

Where high density livestock rearing is carried out, safety services must be installed for ventilation, feed, water and light is to be installed as appropriate.



Please ensure that distribution boards are of the correct IP rating for their location and is also in compliance 530.5.3 A wall-mounted distribution board shall be mounted at a height not greater than 2.25 m measured from the floor to the top surface of the board.

In addition, where a wall-mounted distribution board is mounted at a height less than 1.4m measured from the floor to the bottom surface of the distribution board, it shall be accessible only by authorized persons. Inspectors often have to breach RECs on this rule. Please plan to comply with this rule. Due to the harsh environment it is very important that the RCDs are tested so please ensure a notice is fitted.



Installations in agricultural premises may also require a supplementary certification form to accompany the certificate where a government grant is requested.

Frequently Asked Questions

Q1 - How far away from a sink does a switch or a socket outlet have to be located?

A. There is no distance given in the current ET101 wiring rules. We recommend that all accessories are located where they are unlikely to be splashed.

Q2 - Can I run alarm cables and mains cable in the same containment?

A. Low voltage and extra-low voltage circuits shall not be contained in the same wiring system unless every cable is insulated for the highest voltage present. Also consideration of electrical interferences, both electromagnetic and electrostatic needs to be taken into account. Run alarm cables and mains in containment as detailed in rule 528.1.1

Q3 - I am wiring sockets in a computer room in a new school. I understand that computers leak current to earth, is there a recommended max number of computers for a circuit?

A. Yes, ET214:2013 Guide to the Selection and Use of Residual Current Devices - states: On installations where a large number of computers are supplied, no more than **four** computers should be protected by a single 30mA RCD. This guideline can be downloaded via web site address- http://www.etci.ie/docs/ET214_2013.pdf

Q4 - What is a 'Special Location' ?

A. Special Locations are covered in Part 7 of the wiring rules. They are locations that require additional protection from shock or fire due to their environment or location. For example 701 (*LOCATION CONTAINING A BATH OR SHOWER*) are high risk areas as water is very conductive therefore additional protective measures are required. Currently there are 19 Special Locations defined in the rule book.

Q5 - Can I install fire Alarm Cables in PVC conduit fixed to the ceiling?

A. No Rule 563.3.2 States: Wiring support structures and fixings shall have a resistance to fire at least equivalent to that of the wiring system selected.

Note: This requirement may involve additional fixings or reinforcement of supporting structures.

Inspectors also come across Fire Alarm cables tie wrapped to the underside of with PVC tie wraps. Stainless steel tie wraps may be an option in order to comply with the above rule.



Statement from the Commission for Regulation of Utilities

The Commission for Energy Regulation (CER) has recently changed its name to the Commission for Regulation of Utilities (CRU).

A key strategic goal for the CRU is to ensure that *'Energy and Gas are supplied safely'* and the Safe Electric Scheme is a cornerstone of that goal. In fulfilling that goal, we are committed to always acting in the public interest, to listening to stakeholders and to explaining our decisions. The Safe Electric Scheme is operated by RECI on behalf of the CRU.

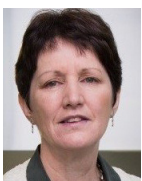
There are currently approximately 4,291 members in the Safe Electric Scheme. We acknowledge the positive contribution of Registered Electrical Contractors (RECs) to public safety and will continue to work with electrical contractors and RECI to ensure that the Safe Electric Scheme develops and remains effective.

A new Safe Electric website, www.safeelectric.ie was launched in July featuring separate targeted content for customers and contractors. This new website replaces both the old www.safeelectric.ie and www.reci.ie websites. We hope to expand the contractor area of the website later in 2017 to enable RECs to update their contact details, order certificates and pay membership fees online.

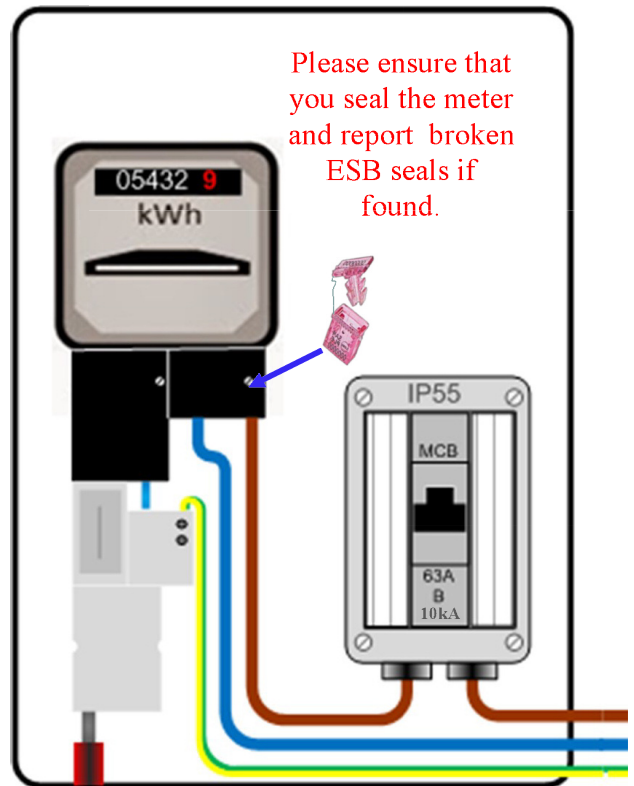
We launched a new national advertising campaign for Safe Electric in July (TV, radio, print and digital), encouraging domestic customers to use a Registered Electrical Contractor for any electrical work to be carried out. Work is also ongoing to ensure that an upgraded and fit for purpose electronic certification system is provided to RECs. Electronic certification will increase the level of accountability within the system and ensure that safety issues can be tracked and followed up on.

An electrical safety and statistics committee for accidents and fires caused by electricity (TC5), previously managed by the ETCI has transferred to the CRU and met in May. The purpose of the committee is to raise the awareness of risks associated with the use of electricity, and to promote measures to prevent accidents associated with electricity. The work of the committee is linked to our functions with regard to electrical safety and we welcome this opportunity to play a key role in supporting this important work.

We are committed to investigating all allegations of suspected illegal electrical works and to prosecuting those operating outside the Safe Electric Scheme. We encourage RECs to continue to report any suspected illegal electrical works to the CRU. We look forward to continuing to work with Safe Electric and its members to ensure the safety of all electrical works, both in homes and businesses.



*Ann McGarry
Director Energy Safety, CRU.
The CRU, 'Regulating Water, Energy and Energy Safety in the Public Interest'*



Seals can be obtained from Safe Electric

Green Gunge?



Green gunge is most prevalent in cables made between 1965 and 1971. The gunge is the result of the reaction between the plasticiser in the insulation and the copper. Although unsightly it does not reduce the electrical integrity of the conductor or the

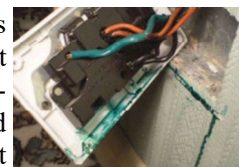
insulation.

Greening is the appearance of a wet green substance that is a product of an adverse reaction between certain types of plasticiser and the copper conductors. This greening, which is a rare occurrence, can happen either after a long period of time and can cause the cable insulation to become hard and brittle.

The plasticiser itself is a clear oily liquid that is non conductive. The green substance is a combination of copper oxide and plasticiser which may become conductive under certain adverse conditions.

Action if Greening is found

Whenever this green substance is found at socket outlets etc. initially it should be removed and the terminations cleaned or accessories replaced (gloves should be used) otherwise it is possible that tracking/overheating may occur. It is strongly recommended that rewiring should be carried out as soon as possible.



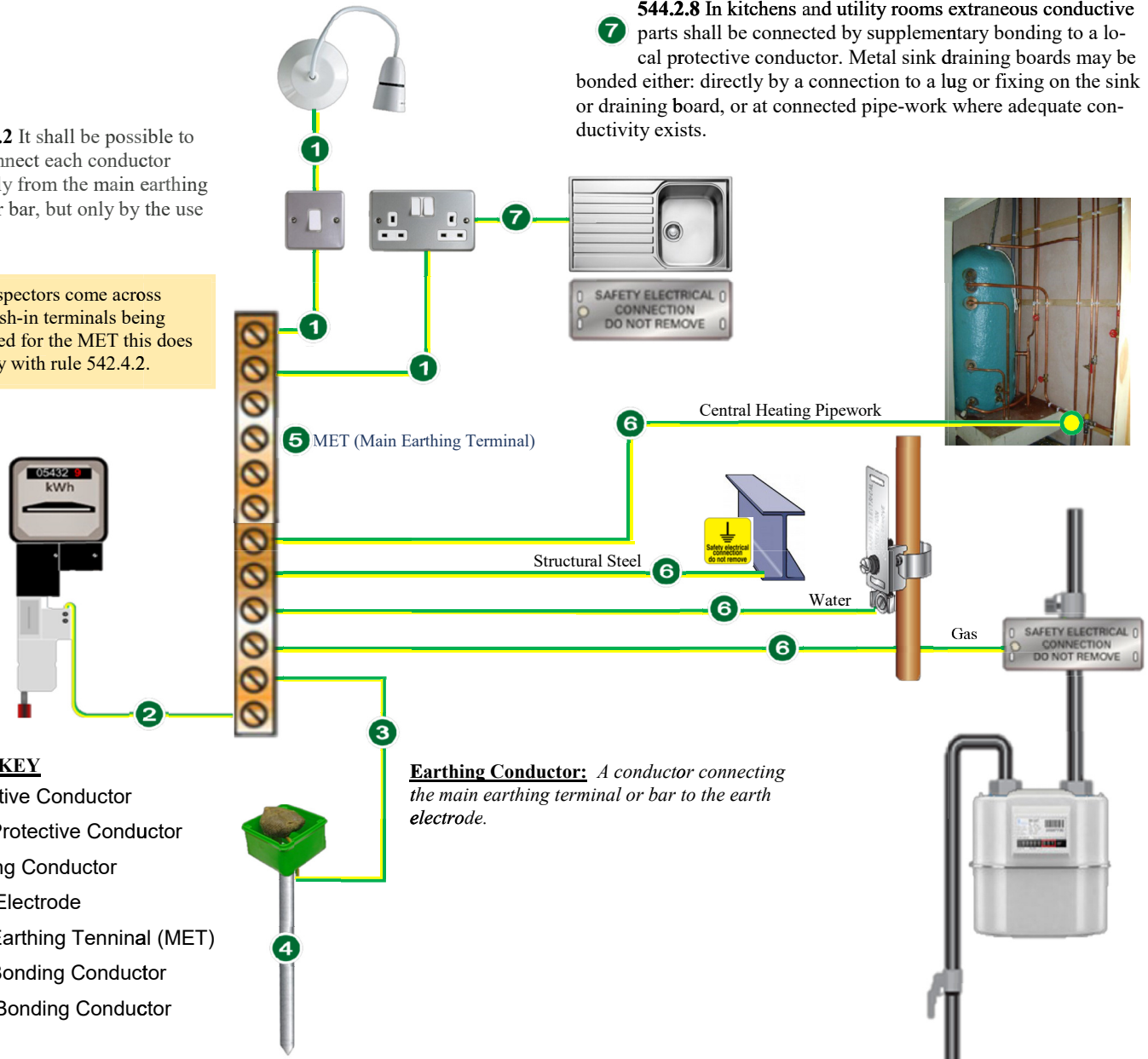
FOCUS ON EARTHING & BONDING

These 2 pages highlight useful information and terminology used regarding typical earthing and bonding requirements. Please refer to parts 54 and also 411 of ET101 current rules for full details.

5 542.4.2 It shall be possible to disconnect each conductor individually from the main earthing terminal or bar, but only by the use of a tool.

Inspectors come across push-in terminals being used for the MET this does not comply with rule 542.4.2.

7 544.2.8 In kitchens and utility rooms extraneous conductive parts shall be connected by supplementary bonding to a local protective conductor. Metal sink draining boards may be bonded either: directly by a connection to a lug or fixing on the sink or draining board, or at connected pipe-work where adequate conductivity exists.



KEY

- 1 Protective Conductor
- 2 Main Protective Conductor
- 3 Earthing Conductor
- 4 Earth Electrode
- 5 Main Earthing Terminal (MET)
- 6 Main Bonding Conductor
- 7 Local Bonding Conductor

Earthing Conductor: A conductor connecting the main earthing terminal or bar to the earth electrode.

3 Earthing Conductor (Copper)	
Largest Phase Conductor Size	Minimum Earthing Conductor size
Equal or Less than 16mm ²	10mm ²
Between 16mm ² and 35mm ²	16mm ²
Between 35mm ² and 120mm ²	Half the size of the Phase conductor
Greater than 120mm ²	70mm ²

See rule 542.3 and table 54A for full details

1 & 2 Protective Conductor (Copper)	
Phase Conductor Size	Minimum Protective Conductor size
Equal or Less than 16mm ²	Same size as the Phase conductor
Between 16mm ² and 35mm ²	16mm ²
Greater than 35mm ²	Half the size of the Phase conductor

See rule 543 and table 54C for full details

Inspectors often come across 25mm² main 'Tails' with 10mm² Earthing Conductor. This would not comply with Table 54A (rule 542.3). The table above is taken from this rule and shows that for 25mm² phase conductor the earthing conductor needs to be a minimum of 16mm²

6 544.1.3 Main bonding conductors provided for the main bonding system according to 411.3.2 shall have a conductivity (i.e. equivalent cross-sectional area) at least half that of the largest protective conductor in the installation, but shall not be less than **10 mm²** copper.

Note: The largest protective conductor is usually the Main Protective conductor (Number 2)

FOCUS ON EARTHING & BONDING

DEFINITIONS & RULES

1 & 2 Protective Conductor (symbol PE): A conductor required for certain measures of protection against electric shock which electrically connects any of the following Parts:

- exposed conductive parts,
- extraneous conductive parts,
- main earthing terminal
- earthed point of the source or artificial neutral.

3 **Earthing Conductor:** A conductor connecting the main earthing terminal or bar to the earth electrode.

4 **Earth Electrode:** A conductive part or a group of conductive parts in intimate contact with, and providing an electrical connection with, earth.

5 **Main Earthing Terminal or Bar:** A terminal or bar provided for the connection of protective conductors, main equipotential bonding conductors and conductors for functional earthing if any, to the means of earthing.

6 & 7 **Equipotential Bonding:** Electrical connections intended to maintain exposed conductive parts and extraneous conductive parts at the same or approximately the same potential, but not intended to carry current in normal service.

Exposed Conductive Part: A conductive part of electrical equipment, which can be touched and is not normally live, but may become live under fault conditions.

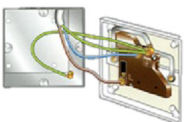
Extraneous Conductive Part: A conductive part, not forming part of the electrical installation, liable to introduce a potential, generally the earth potential.

Note: Examples are: Structural metal work of a building, metal gas pipes, water pipes and heating tubes, etc. non-electrical apparatus (radiators, gas or coal-fired cooking ranges, metal sinks, etc.).



526.5.2 Adequate electrical conductance shall be provided between metal sheaths or armouring of cables and the earthing terminals of equipment.

Note I: This requires proper design or a proprietary method.



554.1.6 The earthing contact of a socket-outlet assembly shall be connected to the protective conductor, except in the case of SELV circuits. The metal enclosure of a socket-outlet shall also be connected to the protective conductor; fixing screws **shall not** be used for this purpose



537.5.5 Wall-mounted switches shall be mounted in suitable boxes or enclosures of metal or other non flammable material, which may form part of the switch assembly. The box or enclosure shall contain an earthing terminal for connection to a protective conductor.



559.6.3.2 A ceiling rose shall contain an earthing terminal which shall be connected to a protective conductor.



544.1.6 In the case of mains gas services, the main electrical bonding connection shall be made on the consumer's side of the gas meter (and flexible pipe), but not in the meter box or enclosure.

Where the mains gas service is of metal and does not contain an insulating piece, a main bonding connector shall interconnect the metal pipe - work on either side of the gas meter (and flexible pipe).

Note: When making this connection, the bonding conductor should first be connected to the customer's side of the meter, and then connected to the mains side.



Where such items are not installed by the time the electrical installation is otherwise complete, a bonding conductor shall be provided from a local protective conductor to a termination which is permanently fixed and enclosed in a suitable box located in an appropriate position. The box shall be labelled: "BONDING CONDUCTOR FOR SINK/DRAINING BOARDS".



542.3.2 The connection of an earthing conductor to an earth electrode shall have adequate electrical conductivity and shall be mechanically robust. It shall be protected against corrosion by means of suitable protective tape, except where exothermic welding is used.



Where a clamp is used, it shall not damage the electrode or the earthing conductor. Clamps shall be of a suitable type, and shall be installed in accordance with the manufacturer's instructions. The use of perforated metal strip for this purpose is prohibited.



542.3.3 The connection of an earthing conductor to an earth electrode shall be enclosed in a suitable box having a close-fitting cover, or by other means providing equally effective protection.



542.3.5 A permanent label inscribed "SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE" shall be permanently affixed to the connection of an earthing conductor to an earth electrode.



IMPORTANT - A continuity test shall be made in order to verify that protective conductors and bonding conductors are electrically sound and correctly connected.



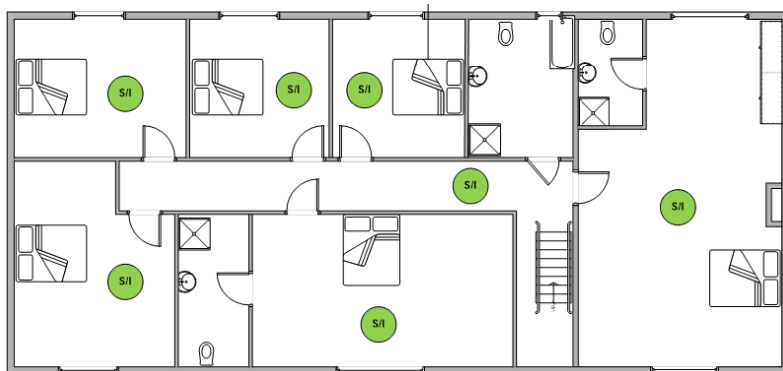
DOMESTIC FIRE ALARM UPDATE

Technical Document B Volume 2 applies to works to dwelling houses, or buildings in which a material change of use takes place, where the works or the change of use commence or takes place, as the case may be on or after **1 July 2017**

The 2017 TD'B' (volume 2) standard provides guidance on the provision of fire detection and alarm systems in dwellings. It refers to different grades and types of fire detection and alarm systems, which can provide varying levels of protection. TDB should be read in conjunction with the I.S. 3218 (2013) Fire alarm Standard.

Section 10 of the IS3218 deals with residential systems.

The **minimum** level of protection for a house up to 3 storeys is an LD2 system as shown in a typical example on the right hand side diagram.



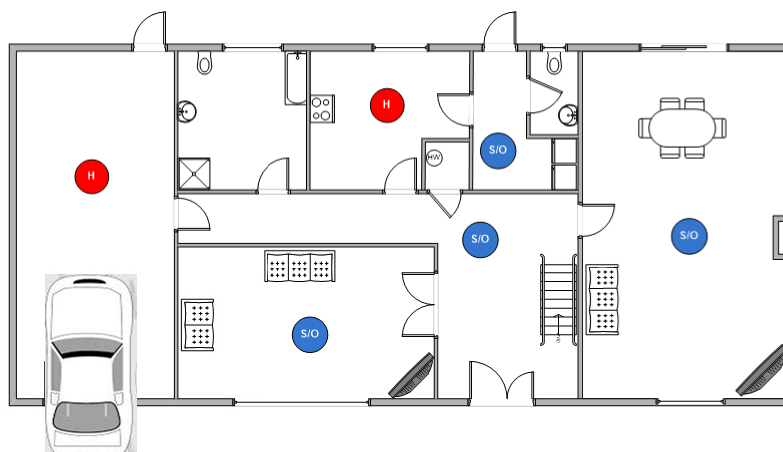
For dwellings larger than set out above or higher than three storeys the an LD1 system may be required.




Category LD1: Includes all those areas specified in LD 2 but also includes all rooms and areas (including attics/lofts/other spaces) in which a fire might start, other than toilets, bathrooms and shower rooms.

LD2 Requirement (Guide)

- (1) all circulation areas that form part of an escape route within the dwelling, and
- (2) all high fire risk areas/rooms e.g. kitchen, living rooms, garages, utility rooms and
- (3) all bedrooms

The purpose of the requirement is to ensure that **adequate early warning of fire is provided and a satisfactory standard of means of escape is provided for persons in the event of fire in a building.**



-  Optical smoke detector - recommended for ground floor use.
-  Ionisation smoke detector - recommended for upper floor use.
-  Heat detector - recommended for kitchens.

Smoke and heat alarms should preferably be fixed to the ceiling, at least 300mm from any wall or light fitting.



A Grade D system would be the minimum acceptable for a standard domestic installation. This consists of self-contained mains-powered smoke or heat alarms each provided with an integral standby power supply. Where multiple units are provided all devices shall be interconnected so that detection of fire by any one unit will provide an audible alarm from each unit. For Grade D installations interconnections may be by radio or wiring.

Certification

A Certificate of Commissioning shall be issued

The procedure for certifying a dwelling house fire alarm system is to print the details of the model certificate as show in Annex K of the IS3218 onto the design company's headed paper.

Note: This information is intended as a guideline only, please read the documents listed below to ensure that you are in full compliance.

The IS3218 2013 can be obtained via the NSAI web site or purchased from Safe Electric.

Technical Document B Vol 2 2017 can be downloaded via:

http://www.housing.gov.ie/sites/default/files/publications/files/technical_guidance_document_b_fire_safety_volume_2_dwelling_houses.pdf



GUIDELINES FOR CERTIFICATION FOR ALTERATIONS TO EXISTING INSTALLATIONS

(as defined in Annex 63B of ET101)

BASIC PRINCIPLES

1. New work must comply with the current Rules.
2. Before commencing new work, the installer should assess the existing installation to ensure that it will not impair the safety of the proposed new work, and likewise that the new work will not impair the safety of the existing installation.
3. Should the installer become aware of any defect in any part of the installation that would impair the safety of the new work, the client must be informed in writing thereof.
4. No new work should commence until these defects have been made good.

Applies to all installation types, Industrial, Commercial, Domestic, Agricultural etc.

Alteration to an existing installation, requiring a **completion certificate** to be provided by the installer and given to the client:
The provision of one or more additional circuits.

Replacement of a distribution board.

Replacement of the wiring for a circuit.

Replacement of a protective device.

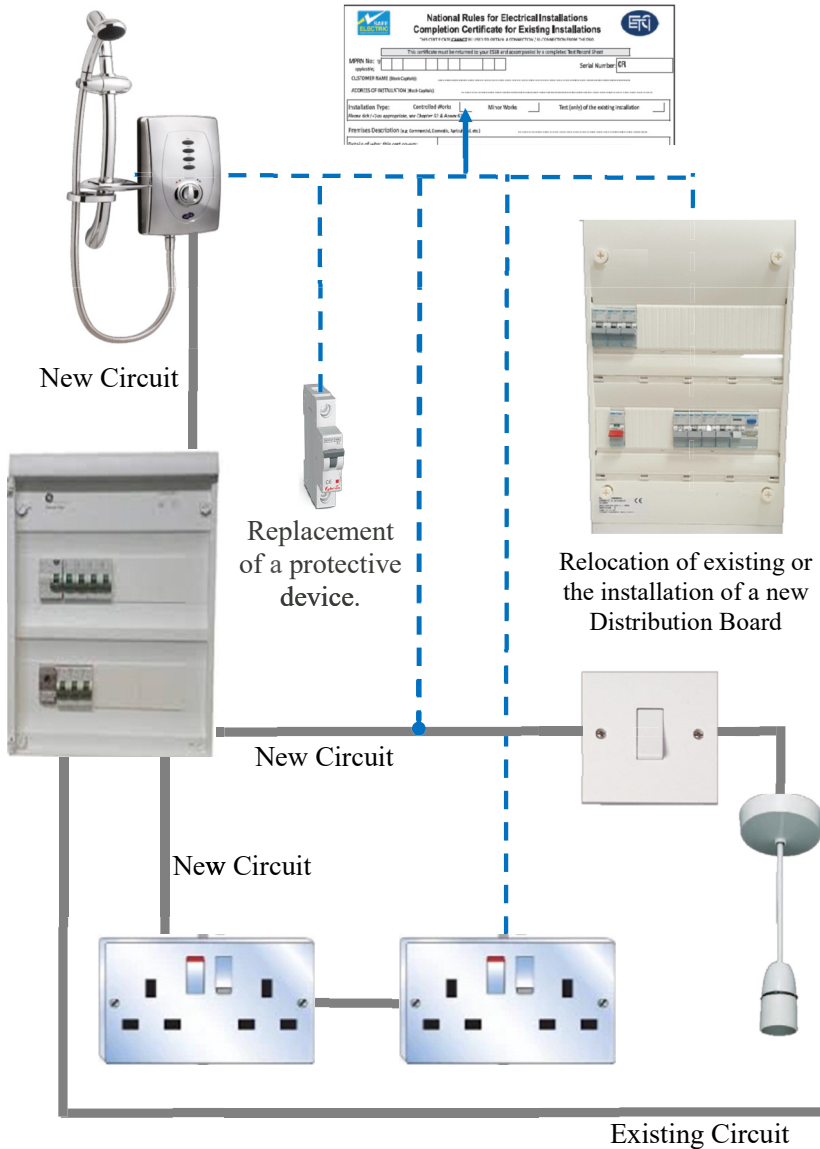
Relocation of a distribution board.

IMPORTANT

All new circuits **MUST** be certified. If you install a new circuit it must be certified. If the installation requires connection to the ESB then either cert No 1 or No 2 should be issued. All other new circuits installed in existing installations require certification using cert No 3.

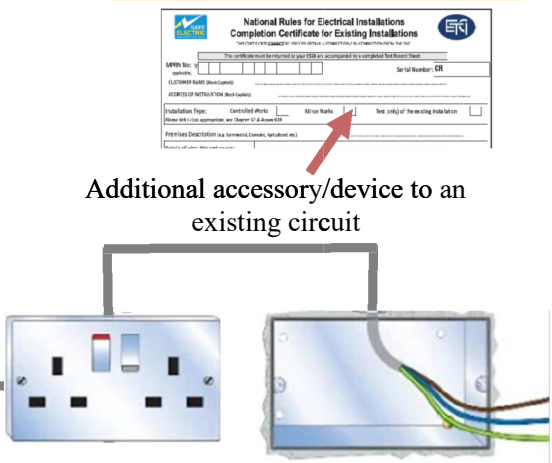
Please refer to Annex 63B of ET101 for full rule clarification.

Certificate **MUST** be issued for all of these works. A copy must be issued to the customer and a copy must be returned to Safe Electric.



Safe Electric Inspectors will be enforcing this rule requirement and will be requesting to inspect all certificates issued.
PLEASE ENSURE THAT YOU ARE COMPLIANT

Cert No 3 **MUST** be issued if requested by the customer for Minor works.



What is CIRI



The Construction Industry Register Ireland (CIRI)

The Construction Industry Register Ireland (CIRI) is an official online register of competent builders, contractors, specialist sub-contractors and tradespersons who undertake to carry out construction works. The Register is supported by Government, and its objective is to be recognised as the primary online resource used by consumers in the public and private procurement of construction services.

It is our understanding that Registered Electrical Contractors (100% electrical work) do not have to register with CIRI unless they desire to do so. This is based on information contained within The Building Control Bill 2017 (Head 3 Section 3):

This Act shall **not** apply to: - (b) electrical works to a building undertaken by a registered electrical contractor pursuant to the Electricity Regulation Act 1999

THE BUILDING CONTROL (CONSTRUCTION INDUSTRY REGISTER IRELAND) BILL 2017 can be downloaded from the link below:

http://www.housing.gov.ie/sites/default/files/legislations/general_scheme_of_the_building_control_construction_industry_register_ireland_bill_2017.pdf

The chart below gives an approximate ohms reading of cables when the phase (Rp) and the earth (Re) are the same size.


For example if you ran 30mts of 2.5mm² cable (e.g. new type twin and earth), the resistance reading you would expect would be approximately 0.44 ohms.

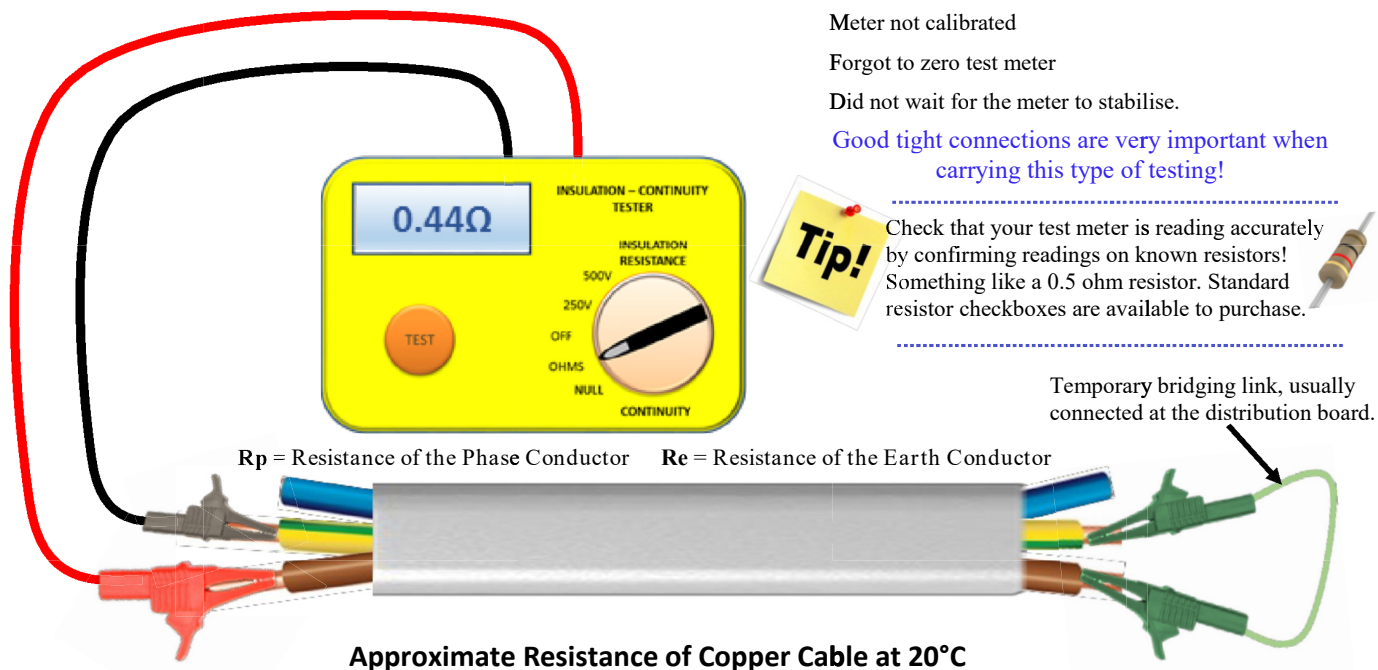
Common reasons why readings are incorrect:

- Poor or damaged test leads
- Poor or damaged probes or crocodile clips
- Poor condition of battery's
- Meter not calibrated
- Forgot to zero test meter
- Did not wait for the meter to stabilise.

Good tight connections are very important when carrying this type of testing!

Tip! Check that your test meter is reading accurately by confirming readings on known resistors! Something like a 0.5 ohm resistor. Standard resistor checkboxes are available to purchase.





Approximate Resistance of Copper Cable at 20°C

Cable size mm ²	Ohms Per 1mt	Ohms Per 10mts	Ohms Per 20mts	Ohms Per 30mts	Ohms Per 40mts	Ohms Per 50mts
	(Rp+Re)	(Rp+Re)	(Rp+Re)	(Rp+Re)	(Rp+Re)	(Rp+Re)
1.5	0.0242	0.24	0.48	0.73	0.97	1.21
2.5	0.0148	0.15	0.30	0.44	0.59	0.74
4.0	0.0092	0.09	0.18	0.28	0.37	0.46
6.0	0.0062	0.06	0.12	0.18	0.25	0.31
10.0	0.0037	0.04	0.07	0.11	0.15	0.18
16.0	0.0023	0.02	0.05	0.07	0.09	0.12

Please note the above readings have been rounded off to 2 decimal places. The above table is intended as a guideline only and all cables must fully tested using appropriate calibrated test equipment.

Disclaimer: The information contained within this document is intended for information purposes and Safe Electric accept no responsibility for any inaccuracies.