



Differences in Electrical Installations

Report compiled by the Safety4EI
partners in CY, DK, ES, MT, and
UK

Project: Safety4EI
Improved Safety for Electricians



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Differences in electrical installations across the participant countries

Introduction

Electricity was introduced as a commercial utility late in the 19th century. This led to the introduction of electrical regulations. The UK had the first set of rules and this was followed by other countries. Some countries abided by these regulations due to historical events while others modified them according to their particular needs.

Presently, electricians who work on electrical supplies across Europe come across situations which may be different from one country to another.

This report highlights the similarities and differences in regulations of electrical installations in the countries of participant members of the Safety for Electricians project.

Participating members:

- Denmark - SDE
- United Kingdom - Bridgwater and Taunton College
- Cyprus - Intercollege
- Spain – Politeknika Txorierrri
- Malta - MCAST

Overview

This report examines the similarities of seven main points in the electrical system. These are:

1. Standards and regulations

The UK and Malta abide by the electrical standards as per BS 7671:2008 17th edition. Cyprus operates BS 7671:2004 16th edition. This includes changes necessary to maintain technical alignment with CENELEC harmonisation documents. Malta has issued additional electrical regulations in 1995 which suit the Maltese conditions. Denmark is in the process of simplifying the legislation in the electrical area. This means that the government wants to use more international standards. All electrical installations must follow the electrical safety act (act no. 525), hereunder act no. 1082 and HD 60364, Operations of Electrical Installations EN 50110 and EN 60079-14 (ATEX) for electrical installations. Spanish low tension electric installations abide by the REBT-2002, which is based on the Spanish UNE rules, which are subject to constant revision and if these are renewed, they automatically become compulsory.



2. Earthing systems.

Mainly all earthing systems are employed. In the Spanish system a TT system is used to supply consumers. The Danish earthing systems in domestics are mainly TT systems and industry and businesses are mainly TN-C-S systems.

The UK uses a mix of systems. The TN-C-S is the main system used for supply of electrical power, however TT system is used in remote areas and farms. The IT system is mainly used for specialised areas like operating theatres.

In Cyprus and Malta the system is mainly a TT system. In Cyprus large installations have a TN-C-S system. In Malta any customer who has their own substation as part of the building has a TN-S internal system.

3. Cable colour coding

The cable colour coding is harmonised throughout all participant countries and is as follows: CY, UK, ES, MT

- L1 Brown
- L2 Black
- L3 Grey
- Neutral Blue
- Earth/CPC Green/Yellow

However it is important to note that up to pre-harmonisation period, the colour coding of cables in the UK, Malta and Cyprus were as follows:

- L1 Red
- L2 Yellow
- L3 Blue
- Neutral Black
- Earth/CPC Green/Yellow

Denmark is as follows:

- L1 Brown
- L2 Black or black-white (stripe)
- L3 Grey or black
- Neutral Pale blue
- Earth/CPC Yellow and green

4. Underground cables

Underground cables have mostly similar regulations. They must be installed at a safe depth underground. In addition tape must be laid above cables to indicate that an electric cable is below that area.

The underground cable must be protected from mechanical damage. This is reflected in the depth of cable. If cable is not mechanically protected, then the depth is increased. In different countries there are different interpretations for this situation.



In the UK and Malta the regulation leaves the depth of underground cables to the discretion of good workmanship; however it emphasises that underground cables should have adequate mechanical protection. In Denmark, Cyprus and Spain the depth of mechanically protected cable is about 40cm while for a non-mechanically protected cable depth is between 60cm to 80cm.

The tape used to indicate cable below is red in Denmark and yellow in the UK, Malta and Cyprus. The colour of the tape used in Spain to warn of underground cables is according to standard S 0580-Y20R which is very close to yellow-orange.

5. Main switchboard installation

Throughout the participant countries, there is a standard sequence of main switchboard equipment. The incoming supply must have a main protection device, normally in the form of a main switch which is followed by a residual current device (RCD) or this could be replaced by a residual current circuit breaker (RCBO). The RCD installed is a 30mA device, whereas in Cyprus it is 300mA Type AC-S.

Furthermore, switchboards inside houses and apartments for the connection of final circuits are protected with either fuses or miniature circuit breakers (MCB) and the RCD installed is a 30mA device.

6. Typical domestic circuits and circuit configuration

Typical final circuits are similar in all participant countries. Circuits are defined as follows:

- Lighting circuits with 6A or 10A protection
- Dedicated circuits for various loads like cookers, air conditioners, showers, water pumps and electric heaters for solar water heaters.
- Power circuits

Power circuits provide differences between the participant countries. The ring circuit is only used in the UK, Cyprus and Malta, using a wire size of 2.5mm² and a protection of either 30A or 32A. The radial/spur power circuit is common throughout all countries using different protection sizes according to the type of load or as per local standard.

7. Socket outlets and plugs

In all countries all plugs need to be earthed.

In the UK, Cyprus and Malta plugs and socket outlets are required to meet the standard of BS1363. The main difference being that the BS1363 plug is required to be fused. Equipment sold in countries using BS1363 which have socket outlets not meeting such requirements must either be provided with an approved adaptor or have its socket outlet changed.

8. Conclusion

Though electrical work in participant countries is moving towards a harmonisation process, there are still issues that electricians working from one place to another must be wary of. The purpose of this report is to highlight such differences that eventually may become an electrical hazard.