Introduction to BS 7671:2008

BS 7671:2008 Requirements for Electrical Installations was published in January 2008, and amendments were incorporated in 2011.

Although the document is a British Standard, it is also known (and jointly labelled as) as the ‘IET Wiring Regulations Seventeenth Edition’.

Throughout this book, BS 7671:2008 incorporating Amendment No. 1:2011 is referred to as BS 7671:2008, BS 7671, the Wiring Regulations, the Regulations, the 17th edition or the Standard, depending upon the particular context.

The British National Committee is obliged to publish the technical intent of the CENELEC harmonization documents (HDs). However the committee have gone further and published the HDs verbatim, except where there is a more up to date International Electrotechnical Commission (IEC) standard and, in a few instances, where national circumstances warrant changes.

The general structure of IEC, CENELEC and BS 7671 is illustrated in Figure A 1.1.

© 2012 John Wiley & Sons, Ltd. Published 2012 by John Wiley & Sons, Ltd.
Most of the document originates from CENELEC in ‘harmonized documents’ (HDs). The parent document is known as the HD 60384 series and includes virtually all parts of the installation standard.

Within BS 7671:2008 there are now only a few regulations that are truly ‘UK only’, although some of the CENELEC parts of HD 60384 have been modified, cut, or expanded upon for BS 7671. Some of the appendices of BS 7671 are home grown.

The Wiring Regulations Committee has also used certain parts of the corresponding IEC document IEC 60364, either modified or virtually unmodified.

A list of the parts of the HD 60384 series used in BS 7671:2008 is shown in Table A 1.1.

**A 2  Plan and layout of BS 7671:2008**

Most users will not need to concern themselves with the correct terminology for groups of regulations and chapters etc, but an explanation of this has been added for completeness.
### Table A 1.1 CENELEC HD 60384 and IEC 6-364 documents used in BS 7671:2008.

<table>
<thead>
<tr>
<th>Document</th>
<th>Issue date</th>
<th>Title</th>
<th>BS 7671 reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD 60364-1</td>
<td>2008</td>
<td>Fundamental principles, assessment of general characteristics, definitions</td>
<td>Part 1, Part 2 (in part), Part 3</td>
</tr>
<tr>
<td>HD 60364-4-41 S2/A1</td>
<td>2007</td>
<td>Protection against electric shock</td>
<td>Chapter 41</td>
</tr>
<tr>
<td>HD 60364-4-42</td>
<td>TBA</td>
<td>Protection against thermal effects</td>
<td>Chapter 42</td>
</tr>
<tr>
<td>HD 60364-4-43</td>
<td>TBA</td>
<td>Protection against overcurrent</td>
<td>Chapter 43</td>
</tr>
<tr>
<td>IEC 60364-4-44</td>
<td>2008</td>
<td>Introduction to voltage &amp; electro disturbances</td>
<td>Chapter 44</td>
</tr>
<tr>
<td>HD 60364-4-442</td>
<td>1997</td>
<td>Protection of low voltage installations against temporary overvoltages</td>
<td>Section 442</td>
</tr>
<tr>
<td>HD 60364-4-443</td>
<td>2006</td>
<td>Protection against overvoltages</td>
<td>Section 443</td>
</tr>
<tr>
<td>FprHD 60364-4-444</td>
<td>200X</td>
<td>Measures against electromagnetic disturbances</td>
<td>Section 443</td>
</tr>
<tr>
<td>IEC 60364-4-44</td>
<td>2008</td>
<td>Introduction to voltage &amp; electro disturbances</td>
<td>Section 444</td>
</tr>
<tr>
<td>HD 60364-5-51</td>
<td>2006</td>
<td>Selection and erection of equipment – Common rules</td>
<td>Chapter 51</td>
</tr>
<tr>
<td>HD 60364-5-534</td>
<td>2008</td>
<td>Devices for protection against overvoltage</td>
<td>Section 534</td>
</tr>
<tr>
<td>HD 60364-5-54</td>
<td>2007</td>
<td>Earthing arrangements</td>
<td>Chapter 54</td>
</tr>
<tr>
<td>HD 384.5.551</td>
<td>1997</td>
<td>Low voltage generating sets</td>
<td>Section 551</td>
</tr>
<tr>
<td>HD 60364-5-559</td>
<td>2005</td>
<td>Outdoor lighting installations</td>
<td>Section 559</td>
</tr>
<tr>
<td>HD 60364-6</td>
<td>2007</td>
<td>Initial verification</td>
<td>Part 6, Appendix 14</td>
</tr>
<tr>
<td>HD 60364-7-701</td>
<td>2007</td>
<td>Locations containing a bath or shower</td>
<td>Section 701</td>
</tr>
<tr>
<td>FprHD 384-7-702</td>
<td>2009</td>
<td>Swimming pools and other basins</td>
<td>Section 702</td>
</tr>
<tr>
<td>HD 60364-7-703</td>
<td>2005</td>
<td>Rooms and cabins containing sauna heaters</td>
<td>Section 703</td>
</tr>
<tr>
<td>HD 60364-7-704</td>
<td>2007</td>
<td>Construction and demolition site installations</td>
<td>Section 704</td>
</tr>
<tr>
<td>HD 60364-7-705</td>
<td>2007</td>
<td>Agricultural and horticultural premises</td>
<td>Section 705</td>
</tr>
<tr>
<td>HD 60364-7-706</td>
<td>2007</td>
<td>Conducting locations with restricted movement</td>
<td>Section 706</td>
</tr>
<tr>
<td>HD 60364-7-708</td>
<td>2009</td>
<td>Caravan parks, camping parks and similar locations</td>
<td>Section 708</td>
</tr>
<tr>
<td>HD 60364-7-709</td>
<td>2009</td>
<td>Marinas and similar locations</td>
<td>Section 709</td>
</tr>
<tr>
<td>FprHD 60364-7-710</td>
<td>2010</td>
<td>Medical locations</td>
<td>Section 710</td>
</tr>
<tr>
<td>HD 384.7.711</td>
<td>2003</td>
<td>Exhibitions, shows and stands</td>
<td>Section 711</td>
</tr>
</tbody>
</table>

(Continued)
Let’s look at a single regulation such as 411.3.2.1 and provide a diagram of the structure.

Taking the first three digits, they relate as follows:

![Diagram]

The remaining numbers make up the group, sub-set and regulation, but really only the group is of any significance:
There are seven parts to BS 7671:2008, they are as follows:

<table>
<thead>
<tr>
<th>Part</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scope, Object and Fundamental Principles</td>
</tr>
<tr>
<td>2</td>
<td>Definitions</td>
</tr>
<tr>
<td>3</td>
<td>Assessment of General Characteristics</td>
</tr>
<tr>
<td>4</td>
<td>Protection For Safety</td>
</tr>
<tr>
<td>5</td>
<td>Selection and Erection of Equipment</td>
</tr>
<tr>
<td>6</td>
<td>Inspection and Testing</td>
</tr>
<tr>
<td>7</td>
<td>Special Installation or Locations</td>
</tr>
</tbody>
</table>

**A 3 Overview of major changes**

Most of the document has remained unchanged compared to the 16th Edition; many changes were due to formal incorporations of CENELEC drafts required for harmonization.

This section gives an overview of technical changes that will lead to a change in practice, or something that you should be aware of. As stated in the preface, the subject of BS 7671 can be very dry and this part of the book has been kept as short as possible. Readers may wish to skip this part of the book and start with the two key Chapters; these being Chapters C and D.

The following overview notes have been included in order of significance.

**Chapter 41 – protection against electric shock**

Revision to Chapter 41 is probably the most significant made for the 17th Edition. The whole structure of the chapter has been modified. The familiar terms used in the 16th Edition of ‘direct contact’ and ‘indirect contact’ have been replaced with ‘basic protection’ and ‘fault protection’ respectfully (see Figure A 3.1). This terminology change by itself had ramifications on many other parts of the Regulations and these brought about logistical modifications. The various measurers are termed ‘protective measurers’.

The structure of Chapter 41 was modified accordingly. Basic protection (insulation and enclosures) was considered something that designers and installers did not actually ‘consider’ and was shunted towards the rear of the chapter. The extremely rare measurers of ‘placing out of reach’, ‘obstacles’, ‘non-conducting locations’, ‘earth free local equipotential bonding’ and electrical separation were shunted further to the rear of the chapter. Thus the main reading in the front end of Chapter 41 is about automatic disconnection.

There have also been changes to protective device disconnection times. There are not any ‘mixed’ disconnection times and disconnection times for TT earthing systems have been reduced. As
protection in TT installations will virtually always require a RCD, the reduced disconnection times in the 17th Edition are easily achieved (0.2 seconds on final circuits).

A very significant new regulation (411.3.3) requires a 30mA RCD additional protection for socket-outlet circuits that are intended for use by ordinary persons. With a few exceptions, this means all domestic installations. Commercial installations will generally remain exempt, as in most situations individuals will have received instruction.

Guidance on the structure, disconnection times and the use of RCDs is given in Chapter C of this book.

**Bathrooms 701**  
The 17th Edition goes a bit further on harmonization with CENELEC for bathroom installations.

The 16th Edition introduced the concept of zones to the regulations for bathrooms but fell short of harmonization with Europe in one key area: socket-outlets in bathrooms.
Section 701 now aligns with the European ethos, there is not any Zone 3. Thus outside of Zone 2, which is 600 mm from the bath or shower outer edge, only the ‘general rules’ of the regulations apply and any equipment is allowed. However, socket-outlets have a special distance specified, which is at least 3m from the boundary of Zone 1.

All bathroom circuits now require 30mA RCD additional protection and a UK modification allows supplementary equipotential bonding to be omitted, under certain conditions.

**Tables and methods of cable current-carrying capacity (Appendix 4 of BS 7671)**

The whole of the first part of this appendix was modified for the 17th Edition and has been further modified by Amendment No. 1 with respect to calculating the current rating of cables laid in the ground.

**Swimming pools and other basins (702)**

For the 17th Edition, the scope of this section now includes the basins of fountains and areas of natural water including the sea and lakes, where they are specifically designated as swimming areas.

**Lighting and luminaires**

A completely new section for the 17th Edition is Section 559 ‘Luminaires and Lighting Installations’; which contains six pages of text and some 36 new regulations.

The new section deals with interior and exterior lighting installations and also applies to highway power supplies and street furniture.

The section specifies regulations for luminaire through-wiring and heat specification of terminal wiring and similar items. Through-wiring is only permitted where the luminaire is specifically designed for it.

**Inspecting and testing**

There is a new requirement that insulation resistance is measured between live conductors and the cpc, with the cpc connected to the earthing arrangement.

**Periodic inspection**

Whilst the text of Chapter 62 Periodic Inspection and Testing is unchanged, the forms in Appendix 6 have been substantially changed. They now detail extensive inspection requirements.

**New appendix with current-carrying capacity of busbars**

A new appendix has been added giving information on current-carrying capacity and voltage drop limitations for busbars and powertrack.

**Chapter 56 – safety services**

This chapter has been modified and specifies ‘break times’ for standby systems. It sets regulations for subjects like circuitry under fault conditions, parallel operation and specifies the life of certain critical back up batteries.
High earth leakage currents
Correctly termed ‘high protective conductor currents’, the former Section 607 has been incorporated into Chapter 54, with some limited removal of ambiguous regulations.

High voltage to low voltage faults
This is a new section for the 17th Edition, but this is not particularly significant for installers or designers; the section is only relevant for ‘private’ HV-LV sub-stations and even then the corresponding HV standards will need to be followed. Read Chapter D for a fuller explanation.

Voltage drop
Whilst in essence the basic requirements of the regulations on voltage drop have not fundamentally changed, a new appendix suggests maximum voltage drops for both utility and private supplies. These voltage drops are separated into suggested limits for lighting and other circuits.

Atmospheric and switching overvoltages
There are a few pages of regulations on this subject but they are not of much significance, unless you have overhead distribution cables within your installation.

Surge protective devices
Although these are not generally required, there are regulations for installing surge protective devices.

Insulation monitoring devices (IMDs) and residual current monitors (RCMs)
Similarly, although not specified, there are regulations for installing these devices. RCMs in particular are becoming more widely specified and there is guidance on this subject provided in Chapter D of this book.

Caravan and camping parks (708)
The main modification for the 17th Edition is that pitch socket-outlets are to be individually protected by a 30mA RCD.

New special installations or locations
The following Special Installations sections are new to the 17th Edition:

709 Marinas
711 Exhibitions shows and stands
712 Solar photovoltaic (PV) power supply systems
717 Mobile or transportable units
721 Electrical installations in caravans and motor caravans
740 Temporary electrical installations for structures, amusements and booths at fairgrounds
753 Floor and ceiling heating systems
A 4 Amendment No. 1:2011

The first amendment to BS 7671:2008 was issued on 1 July 2011 and is intended to come into effect on 1 January 2012. Installations designed (but not installed) after 31 December 2011 are to comply with BS 7671:2008 Amd No. 1.

The major changes are as follows:

Section 444 measures against electromagnetic disturbances
The new section includes mainly advice that consideration should be given to aspects of the installation relating to electromagnetic interference. However, there are also some specific requirements; e.g.

444.5.1.1 all protective and functional earthing conductors of an installation within a building shall be connected to the main earthing terminal

444.4.3.3 where a complete low voltage installation including the transformer is operated only by the user, an installation forming part of a TN-S system shall be installed

444.4.6 for TN or TT multiple-source power supplies to an installation, the system shall be earthed at one point only.

Section 534 devices for protection against overvoltage
Where Section 443 requires protection against overvoltage, surge protective devices must be selected in accordance with the new Section 534.2. In the UK (see regulation 443.2.2) it is likely that protection against overvoltage will not be required.

Part 6 inspection and testing
New detailed periodic inspection report forms are introduced in Appendix 6.

Part 7 new Specialist Installation section
Section 710 – medical locations
Section 729 – operating and maintenance gangways

Appendices
Appendix 11 (Effect of Harmonic Currents on 3 Phase Systems) and Appendix 12 (Voltage Drop in Consumers’ Installations) have been moved to Appendix 4.

Appendices 11 and 12 have been left blank for future use.