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Telecommunications cabling installation BS 6701:2004 – a standard for the 21st century

Installation standards please - really?

As chairman of the BSI committee responsible for “Telecommunications: Installation Requirements” and Technical Director of the FIA, I have been requested, for as long as I care to remember, by clients, consultants and professional installers for “proper” standards for the installation of telecommunications cabling.

This is understandable from the clients perspective. Standards are perceived to provide some guarantee of product performance or quality assurance and one should not discount the attraction of the “you never get sacked by buying to a standard” concept. The latter is possibly why consultants nominate so many standards in their specifications - valid ones, obsolete ones, contradictory ones etc., etc., etc.

In contrast, the uninitiated might be tempted to ask why would installers want standards - don't standards contain ill-conceived requirements that are incompatible with making a profit? There are two rather glib answers to that question: the first being “it depends who wrote the standards and why they were written” and the second is “it depends on the who is on the receiving end of a complaint”. In short, installers do want standards but they want them to protect them - not pillory them.



Standards for something as complex as the installation of telecommunications cabling are difficult to produce. For a start, there are a lot of different people with roles to play - the premises owner, the tenant, the architect, the cabling designer, the main contractor, other trades and last, but not least, the installer. Then there is the matter of the relationship of the installation with the building - most buildings are not empty shells into which the cabling is installed in sterile conditions. Products and services are installed before the cabling arrives on the scene and others will follow it. The cabling installer has to bend to the prevailing conditions - be they conditions of contract or environment. Underpinning everything are the commercial

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issues. Every installer can relate stories of their competitors who are buying business by ignoring any pretence of good installation practice and the temptation to compete by doing the same is enormous - standards must not complicate matters further.

So what does a standard for the installation of telecommunications cabling have to do?

Firstly it has to be a true standard. This means that it has to contain requirements that are clear, well-defined and verifiable. Recommendations are, in contract law, probably not worth the paper they are written on. A good standard needs to be full of "shalls" with "shoulds" kept to a bare minimum or banished entirely. Secondly, an installation standard has to reflect the complex bi-lateral nature of an installation contract. There is no point in requiring an installer to do something if the client is able to, accidentally or on purpose, prevent that requirement being met. Installers can never unilaterally comply with an installation standard. To address this an installation standard has to separate the responsibilities of those involved in the design and planning from those doing the actual installation. Thirdly, an installation standard should contain the minimum set of requirements that reflect a basic quality-assured service: not high quality, medium quality or low quality. Defining minimum requirements in this way, allows installers to define their base quality systems, quote accurately and offer any additional features as cost-options.

Lastly, and most difficult to deliver, an installation standard has to be so pervasive and implicit in its application so that it has to be used even if it is not specified in a contract. Why? Because most complaints that are received by BSI, the FIA and other trade associations cannot be adjudicated because the installation contract contained no requirements.

BS 6701:2004 has arrived

Having spent the last sixty seconds reading this article you may be wondering what has happened to justify your effort. The answer is BS 6701:2004 - a true United Kingdom standard with the title "Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance". It aims to deliver clear, minimum requirements and apportion responsibilities in a way that has not been seen before. More importantly, in the long term, it has become the template for similar standards across Europe.

What has changed?

For those readers who are also "Only Fools and Horses" fans you may remember the scene where Trigger, the road sweeper, say to Del that he has had his brush for fifteen years and would not wish to part with it. "It's a great brush" he says "it's had five new handles and ten new heads". This anecdote is very applicable to BS 6701:2004. The original BS 6701:1994 was a Code of Practice covering the rather vague subject of the "installation of apparatus intended for connection to certain telecommunications systems". The new BS 6701 is a British Standard Specification, has a different title and has radically different contents. Only the number has stayed the same.

What forced the changes?

Both BS 6701:1994 and BS 7718:1996 were used as input to the development and publication of EN 50174-1 and EN 50174-2 in 2001 and EN 50174-3 in 2004. However, in order to comply with European agreements which require the removal of existing or conflicting standards text within member countries, the UK publication of the BS EN 50174 series of standards demanded the revision of BS 6701 and withdrawal of BS 7718.

BS 7718 was withdrawn in Q3, 2003. Some text of BS 7718 has been included within the revised BS 6701. Other text from BS 7718 that could not be included within a standard but which was thought to be useful information has been provided to other standards bodies and the Fibreoptic industry Association for consideration in their Technical Support Documents.

In order to match the BS EN 50174 documents, which are true standards rather than Codes of Practice, it was obvious that the status of a revised BS 6701 would have to be elevated from a Code of Practice. The transition to a BS Specification automatically brought with it another key change - any requirements must be verifiable and the responsibility for meeting the requirements must be clearly allocated.

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So what does BS 6701:2004 cover?

The title says the “installation, operation and maintenance of telecommunications equipment and (all types of) telecommunications cabling”. The term “telecommunications” means all forms of communication including processing, displaying or transferring information as numerical data, text, audio, still or moving images together with any combination of these. BS 6701:2004 requirements are independent of the standard used in the design of the cabling - the standard is equally applicable to building control systems, basic telephone wiring, cabling in support of ISDN and ADSL services and “structured cabling” in accordance with standards such as ISO/IEC 11801, BS EN 50173-1 and ANSI/TIA-568-B etc.

Who is responsible for compliance?

The wording in BS 6701:2004 is very particular; requirements are denoted by the use of the word “shall” and the requirements have been written such that they can be verified. Conformance with BS 6701:2004 is assessed against compliance with all such requirements. The responsibilities for the installation, operation and maintenance of telecommunications cabling and equipment are divided between the “owner of the premises” and the “installer”.

The “owner of the premises” is either the owner of the premises containing the telecommunications cabling and equipment or the authorised persons to which specific responsibilities have been delegated e.g. tenant, design consultant, systems integrator etc.

The “installer” is the competent person contracted to undertake the installation task. The installer does not, under the separation of responsibilities within BS6701:2004, undertake other tasks such as infrastructure design, product selection etc. Where installation organisations undertake both design and installation services, the design aspect is considered as being undertaken on behalf of the “owner of the premises”.

For what cabling is BS 6701:2004 implicitly mandatory?

BS 7671, the IEE Wiring Regulations, requires conformance with BS 6701 in relation to segregation of telecommunications circuits. This is one of the reasons why BS 6701:2004 is now a British Standard Specification (with specific and verifiable conformance requirements) rather than a Code of Practice. So, within premises containing electrical wiring that is procured and installed according to the IEE Wiring Regulations, certain aspects of BS 6701 are required to be complied with even when BS 6701 is not explicitly referenced in documentation covering the procurement of the telecommunications installation. In such premises, the requirements of BS 6701:2004 and, by normative reference from BS 6701:2004, the requirements of BS EN 50174 series of standards apply to the installation of all telecommunications equipment and telecommunications cabling.

BS 6701:2004 - The “One-Stop Shop” Installation Standard

As mentioned above, in order to lock-in the demands of the BS EN installation standards, to which it gave birth, conformance to BS 6701:2004 demands automatic conformance to BS EN 50174-1, BS EN 50174-2 and BS EN 50174-3. BS 6701 continues to draw attention to national regulations and contains normative references to other British Standards including BS 7671.

As a result, BS 6701:2004 is good news for consultants (who can now stop listing lots of different standards in their tender documentation). The relationship between the various standards can be seen in Figure 1 which shows, for each stage in the life of a telecommunications cabling infrastructure, how BS 6701 provides the central focus for quality assurance.

Although BS 6701:2004 demands conformance with the BS EN 50174 series of standards, none of these contain a simple conformance clause. Certainly, the word “shall” always defines a requirement. However, other terms or phrases are also used in the BS EN 50174 series to define requirements including “it is essential that”, “under no circumstances”. Similarly, in the BS EN 50174 standards the word “should” represents a recommendation or a statement of best practice. However, there are also other unfortunate phrases such as “it is vital that” which could either be requirements or recommendations depending on their context. Also, the boundaries of responsibility in the BS EN 50174 standards are blurred.

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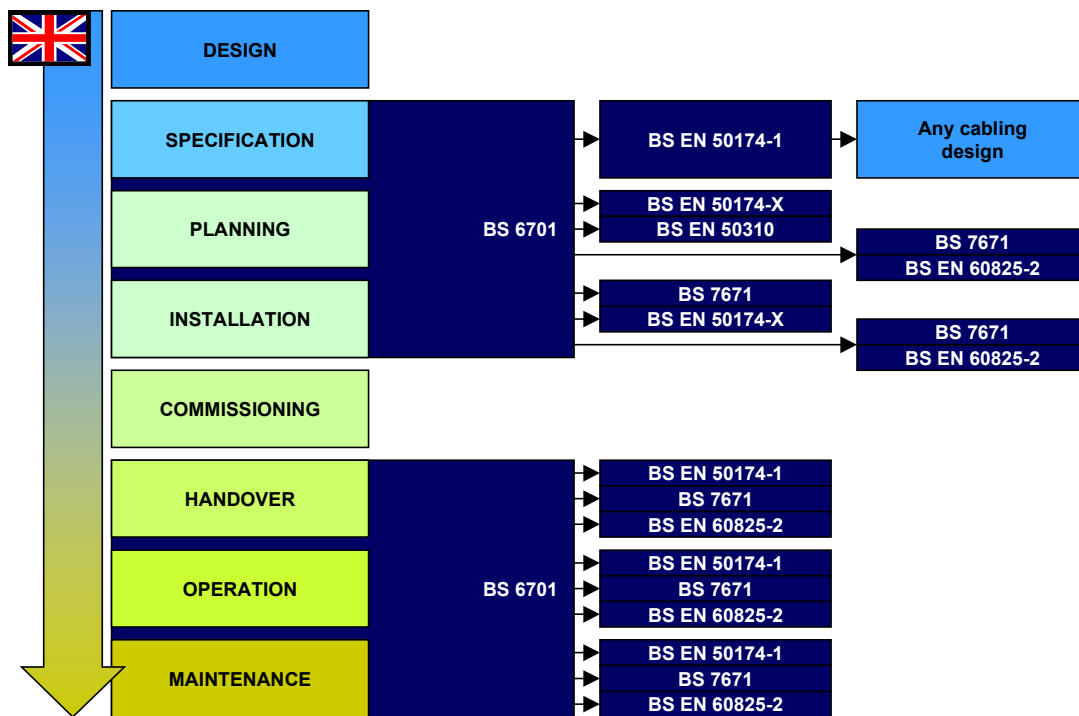


Figure 1 - UK telecommunications cabling installation standards 2004

In order to clarify the situation, the BSI experts responsible for BS 6701:2004 have produced a Business Information Publication which maps the requirements of each of the BS EN 50174 standards on to the sub-clause headings of BS 6701:2004 and defines the party responsible for each particular requirement. In addition, BIP0007 provides information that is considered to be “best practice” where the BS EN 50174 series of standards are less than clear or not explicit.

BIP0007, published in parallel with and free-of-charge upon purchase of BS 6701:2004, is jointly sponsored by the Electrical Contractors Association, the Fibreoptic Industry Association and the Telecommunications Industry Association. It is a free download to FIA members from the members-only area of the FIA web-site and equivalent arrangement are believed to apply in the other trade associations.

Where do we go from here?

Armed with BS 6701:2004 and BIP0007, installers are now able to respond to well-defined demands for installation quality assurance. As usual, it pays to attain an understanding of the requirements applicable to both the installers and customers. BS 6701: 2004 contains five pages of requirements for installers and only two for “premises owners” but BIP0007 points out the requirements of the EN 50174 series standards which are considerable more voluminous. Most of the requirements for the installer are unsurprising but there are few key issues that deserve special mention.

One is that the installer shall obtain instructions for the installation, operation and maintenance of the telecommunications cabling. The other requires the installer to provide all relevant documentation to enable the user to implement operating procedures for the telecommunications system(s). These requirements are, in fact, a reminder of responsibilities under the Electricity at Work Act. The first also serves to ensure that cabling is installed as defined by the manufacturer(s) of the products used and the second effectively requires the installer to provide a User Manual.

The User Manual has been an often talked about but rarely delivered item for cabling. Its mandatory nature within BS 6701:2004 focuses on the need for the user to use the correct types and lengths of cords, for example, to maintain channel performance. While some installers will see the User Manual as an imposition, others will see it as a sale tool.

As usual, the contents of any standard can be viewed in two ways by the “glass half empty” and “glass half full” brigades.

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However, installers should be assured that BS 6701:2004 provides them with protection and opportunities rather than being a stick to beat them with. Installers need to promote the existence and availability of BS 6701:2004 and BIP0007 to clients and consultants at every stage.

A big thank you to the members of TCT7/-/3

The review and withdrawal of BS 7718, the rework of BS 6701 and the production of BIP0007 began in September 2001 and was completed in May 2004. In those thirty months there were twenty-two meetings of the TCT7/-/3 group of BSI. This represents an unparalleled level of activity and credit goes to the experts involved as listed in Figure 2.

BSI TCT 7/-/3 Cabling: Infrastructure standards - UK implementation panel	
CHAIRMAN	
Mike Gilmore	e-Ready Building Limited (and the FIA)
SECRETARY	
Rob Cardigan	Molex Premise Networks
EXPERTS	
Mike Andersson	Andstrom Consulting Limited
Steve Banks	Nightlake Limited (and the TIA)
Alan Derbyshire	(Line Management Group until mid-2004)
John Kellow	Siemon Corporation
Tim Oldershaw	J. Brand Limited
Stuart Reeves	Krone (UK) Technique Limited
Dave Stefanowicz	Electrical Contractors Association
Roger Springett	Minimax Marketing Limited (BT until mid-2004)

Figure 2 – Members of BSI TCT7/-/3

Looking to the future

One thing is for sure - BS 6701:2004 is not going away. Since it was published in June, sales of the document have been strong and at a level rarely seen by BSI. The effect of the standard is pervasive. A number of cabling system suppliers are actively considering the possibility of reflecting the contents of BS 6701 in their supply chain approvals. Merlin Gerin have already announced their intentions in this area. The FIA have already agreed to re-write their "Approved Installer Scheme" system to reflect the contents of BS 6701 instead of referencing ISO 9000 as the basis of system assurance.

But BS 6701:2004 is not only influencing the supply-side industry in the United Kingdom. It is also having an impact outside the UK and in the development of the very European standards that caused its development - the basic template of BS 6701:2004 is to be used for future revisions of the EN 50174 series of standards.

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