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IP4X Requirements for Cable Trunking Systems in The Wiring Regulations

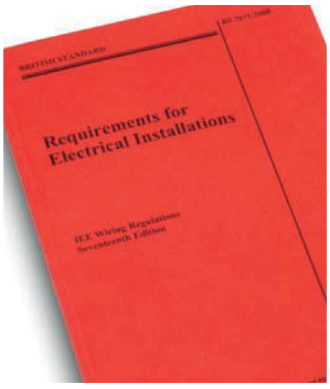
Regulation changes requiring cable trunking systems to be IP4X are largely unknown and have led to confusion within the electrical industry. Examination of both the Wiring Regulations and the British Standard for Cable Trunking is necessary to fully understand the requirement.

All installations carried out to the Wiring Regulations must comply with the IP4X requirement. In order to comply with this IP4X requirement the British Standard for Cable Trunking dictates that a butt joint is not permitted. Therefore a trunking installation must have apertures less than 1mm and cannot rely on butt joints to join lengths and fittings. Being unaware of the relationship between the Wiring Regulations and the British Standard does not escape liability or the possible costly implications.

This White Paper explains where the requirement originates and explains the regulations in simple terms. It shows how the Philip Grahame trunking range has been fully redesigned to comply with IP4X and concludes with the highlighted points.

To explain the changes we need to take a short history lesson on the Wiring Regulations.

BS 7671 IET Wiring Regulations Seventeenth Edition



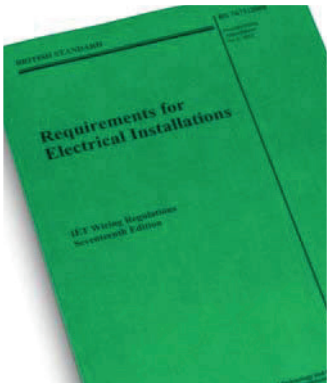
521.10.1 Non-sheathed cables for fixed wiring shall be enclosed in conduit, ducting or trunking. This requirement does not apply to a protective conductor complying with section 543.

Non-sheathed cables are permitted if the cable trunking system provides at least the degree of protection IP4X or IPXXD, **or** if the cover can only be removed by means of a tool or deliberate action.

The statement above has been enshrined in the wiring regulations for many years. There has always been an option for trunking to be either IP4X or have a cover that can only be removed using a tool. Having a trunking lid with a turnbuckle or screw fixing negates the requirement for ingress protection of IP4X. The important part of the statement is the 'or' in last sentence, highlighted in bold for illustrative purposes.

BS 7671 IET Wiring Regulations Seventeenth Edition Amendment No.1

The First Amendment came into effect on 1st. January 2012.



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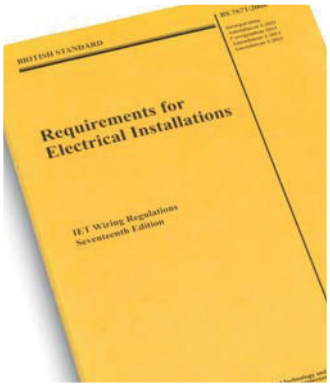
Non-sheathed cables are permitted if the cable trunking system provides at least the degree of protection IPXXD or IP4X, **and** if the cover can only be removed by means of a tool or deliberate action.

During harmonisation with European Standards the 'or' in the last sentence was changed to 'and', highlighted in bold for illustrative puposes. This amendment requires cable trunking systems to have a lid with a turnbuckle or screw fixing and also be IP4X. A change to one word had introduced the requirement for cable trunking systems to be IP4X. For this level of Ingress Protection a 1mm probe must not penetrate and enter the trunking.

However, following the First Amendment changes, conflict on interpretation ensued and trade contractor associations argued that IPXXD could be referenced instead of IP4X. This degree of ingress protection allows a 1mm probe to enter the trunking as long as it does not touch a hazardous part. It was argued that a single insulated cable was not considered a hazardous part. Further clarification was required.

BS 7671 IET Wiring Regulations Seventeenth Edition Amendment No.3



Non-sheathed cables for fixed wiring shall be enclosed in conduit, ducting or trunking. This requirement does not apply to a protective conductor complying with section 543.

Non-sheathed cables are permitted if the cable trunking system provides at least the degree of protection IPXXD or IP4X, and if the cover can only be removed by means of a tool or deliberate action.

NOTE: For a cable trunking system to meet IP4X requirements IP4X trunking and related system components would need to be installed. If a system includes site-fabricated joints the installer must confirm the completed item meets at least the degree of protection IPXXD.

ıme into effect on 1st. July 2015.

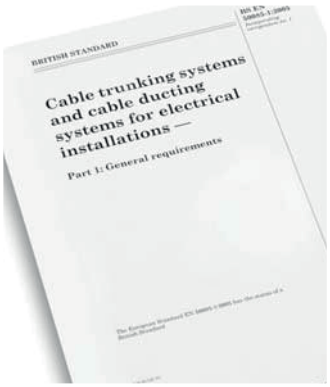
Clarification came with the third amendment. The 'NOTE:' was added to the end of the statement, highlighted in bold for illustrative puposes.

For a cable trunking system to meet IP4X requirements IP4X trunking and related system components would need to be installed.

This straight forward statement effectively made it a requirement to install IP4X compliant trunking.

BS EN 50085 Cable Trunking Systems

With the IP4X requirement now confirmed the British Standard has a further important requirement. Cable Trunking Systems are manufactured in accordance with BS EN 50085. Within this standard is the following section.



6 According to protection against ingress of solid foreign objects

IP4X or any higher degree of protection shall not be declared when it relies on butt joint or the accuracy of cutting of ducting lengths or trunking lengths or access covers without providing relevant fittings or assembly means or additional factory prefabricated sealing means.

Therefore as the Wiring Regulations require an IP4X cable trunking system a butt joint is no longer allowed. All couplings of length to length and length to fitting must have a factory-made sealing solution. Good workmanship to eliminate any gaps is no longer sufficient.

The Third Amendment of the Wiring regulations effectively made it a requirement for all Cable Trunking Systems to be IP4X. The British Standard effectively made butt joints non-compliant.

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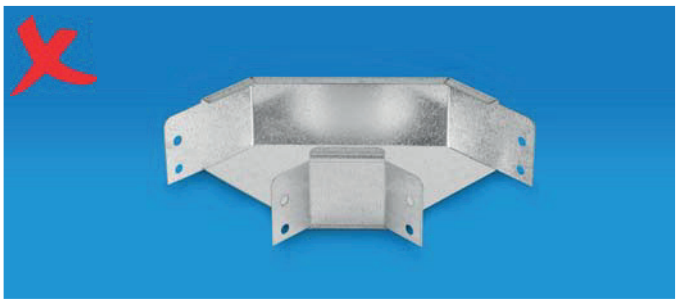
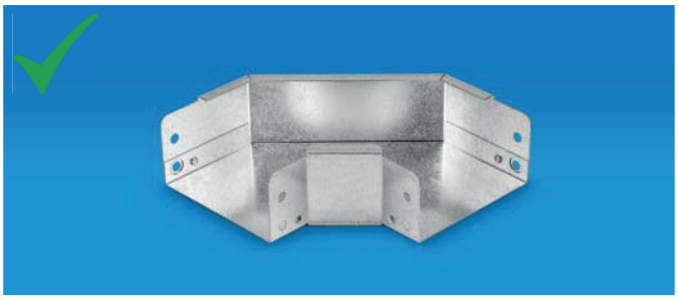
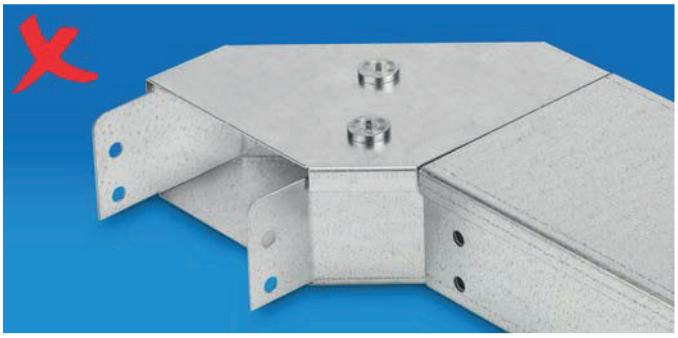
Philip Grahame IP4X Solution

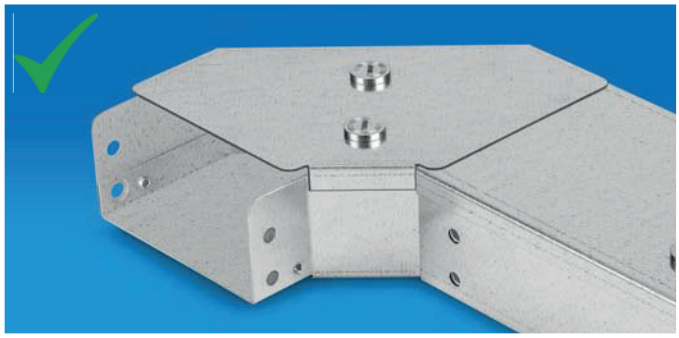
Various solutions have been implemented by manufacturers using clips and sleeves that must be added to their existing non IP4X accessories. Instead of this multi-piece kit approach Philip Grahame has completely redesigned their cable trunking range to comply with the regulations. This new range of fittings has an integral coupling and overlapping lid solution providing ease of installation and removing the need for additional component costs.



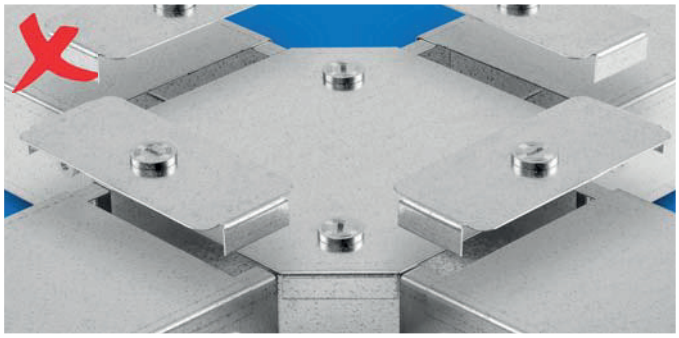


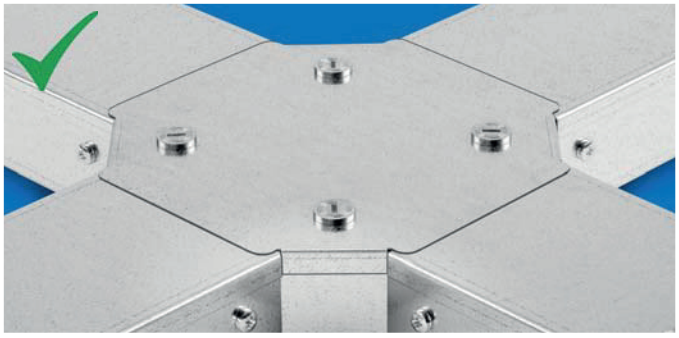
The old style fitting on the left relies upon a butt joint when connected to a trunking length and is non-compliant. The introduction of a factory fitted internal IP plate on the new design shown on the right eliminates the butt joint.



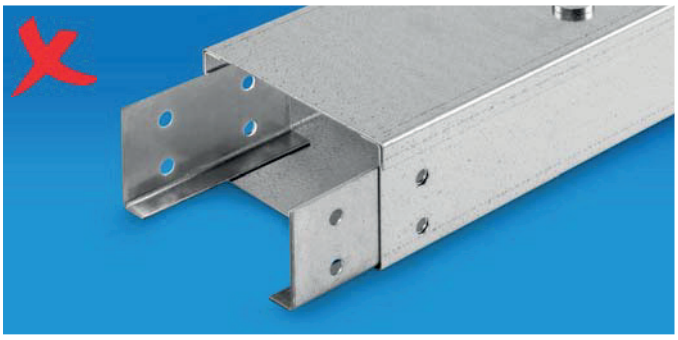


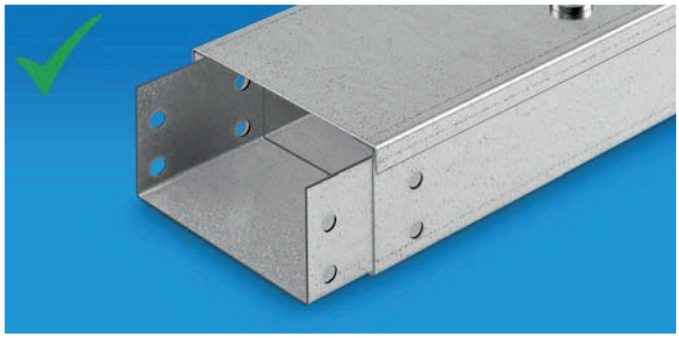
Again the lid joint on the left is non-compliant as it relies on a butt joint. The introduction of an overlapping lid on all Philip Grahame fittings shown on the right provides IP4X compliance.





The Philip Grahame IP4X range of cable trunking fittings provides an integral solution across the complete range of sizes. Multiple cover straps as shown above on the left are not required. Some other manufacturers' solutions require a cover strap on the body as well as the lid. The Philip Grahame solution requires no such cover straps on fittings, thus eliminating extra parts as well as product and labour costs.





The two piece coupler shown above on the left has been replaced with a full height one piece 'U' shaped coupler shown on the right. The new coupler joint no longer relies on a butt joint.

The lid joint on the left is again non-compliant. A cover strap is therefore required to keep the IP4X integrity on the length lid. This can be fixed anywhere along the length and does not require alignment with the coupler and screw heads.

Conclusions

1. All cable trunking systems must be IP4X compliant - BS7671 IET Seventeenth Edition Wiring Regulations.

2. A butt joint is non-compliant. A factory made sealing solution over all joints is required - BS EN 50085 Cable Trunking Systems.

3. IP4X Ingress Protection dictates that a 1mm probe must not penetrate the trunking - BS EN 60529 Degrees of Protection Provided by Enclosures.

4. Philip Grahame fittings have an integral coupling and overlapping lid solution. No additional cover strap components are required for fittings.

5. Philip Grahame lengths are supplied complete with a U shaped coupler. A cover strap for the length lid must be ordered separately.

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