



## Document Control

Rev	Date	By	Comments
A	Jun'16	L. Davies	Technical update review
B	Oct'17	L. Davies	Technical update review
C	Dec 17	UoL	Sign off for release
D	Apr 19	L. Davies	Technical update review
E	Mar'20	J Thrupp	March 2020 Issue
F	June 23	A Singleton	Revised to update inc new regulations
G	July 2023	A Singleton	Further Revisions to new regulations

## Design Guidance

1. The containment systems, types of wiring and methods of installation shall meet, in full, the latest revisions of the Wiring Regulations and British Standards including BS7671. This design guide gives additional guidance that is required by the University and highlights some points within the same.
2. The choice of the type of wiring system and the method of installation shall include careful consideration of the nature of the location, the nature of the structure supporting the wiring, the accessibility of wiring to persons, the voltage, the electromechanical stresses likely to occur due to short circuit and earth fault currents, any electromagnetic interference and other external influences (e.g. mechanical, thermal and those associated with fire) to which the wiring is likely to be exposed during the erection of the installation or in service.
3. The installation of the electrical equipment shall take full account of manufacturer's instructions and in particular final field mounted device mounting instructions.
4. Pay particular regard to the design of systems within Protected Escape Routes (as defined in the BS7671+A2:2022 Corrigendum may 2023).
  - a. These "Protected Escape Routes" include firefighting lobbies, shafts or staircases of a protected escape route.
  - b. Cables or other electrical equipment shall not be installed in protected escape routes unless part of the space essential fire or fire safety system, the general needs lighting or socket outlets provided for cleaning or maintenance.
  - c. Generally this means that cables in a firefighting lobby, shaft or staircase of a protected escape route should be limited to lighting and associated accessories, emergency lighting, fire detection, alarm systems and door access/controls.

Cable managements systems used in Protected Escape Routes shall be one or more of the following types and shall be of limited smoke production so as to not inhibit escape. These types are metallic conduit systems, metallic trunking systems, metallic cable tray and ladder rack systems and power track systems meeting the requirements of BS EN 61534

5. Wiring systems regulations state that wiring systems shall be supported such that they will not be liable to premature collapse in the event of a fire as any wiring systems hanging across access or egress routes may hinder evacuation and fire fighting activities. This requirement means that for all areas
  - a. cables installed in or on steel cable containment systems are deemed to meet the requirement of this regulation.
  - b. This regulation precludes, for example, the use of non-metallic cable clips or cable ties as the sole means of support where cables are clipped direct to exposed surfaces or suspended under cable tray, and the use of non-metallic cable trunking as the sole means of support for the cables therein.
  - c. Suitably spaced steel or copper clips, saddles or ties are examples that will meet the requirements of



this regulation. Spacing details are given within the regulations.

6. The wiring systems installation method selected shall be such that protection against expected external influences is provided in all parts of the wiring system. Particular care shall be taken at changes in direction and where wiring enters into equipment
7. All ladder rack containment shall be medium duty return flange as a minimum and shall be used in LV switchrooms and for all primary routes greater than 450mm in width.
8. Trunking within wet laboratories shall be anti-bacterial for 3 compartment dado and bench mounted containment. The trunking shall be white plastic c/w DDA contrasting faceplate frames/ inserts. Where local RCD's are provided these shall be mounted adjacent to the dado containment served in proprietary housings with protective cover.
9. All Dado trunking and bench containment shall be Cat 6A compliant and include provision for Approved Document Pt. M outlet identification via faceplate surrounds or inserts. Change of faceplate colour is not preferred.
  - a. Where wiring systems have to drop from ceiling voids to serve Dado systems the Dado itself shall be run neatly upwards in a corner into the ceiling void. No conduit droppers shall be used.
  - b. Where Dado already exists and further outlets are needed at differing heights then surface plastic conduit to match the Dado may be used.
  - c. Void or high level basket or tray containment systems serving the Dado trunking need to be run to within 150mm (no support) or 500mm (with Copex) of the Dado void or high level termination point.
  - d. Void or high level trunking containment systems serving the Dado trunking need to be run and connected to the Dado termination with conduited systems or to within 500mm of the same if Copex is used.
10. The University preference is to use rigid conduit on all projects.
  - a. Galvanised conduits shall generally be used wherever services are exposed and visible including floors, walls and soffits. The exception to this is where services are locally extended (small local runs) from existing plastic Dado trunking in which case plastic conduit can be used with agreement.
  - b. Where recessed, conduits may be installed using high impact PVC
  - c. However, on refurbishment projects only, where the above may prove difficult and only where written confirmation is agreed with the University, flexible steel core conduits may be used. See later in this document for details.
11. Where galvanised conduits are installed in surface/ exposed areas standard manufacturers installation methods shall be used throughout including the use of threaded couplers. Running couplers will not be permitted in surface exposed installations. Where galvanised conduit is utilised, it shall be threaded to form a continuous fixed wiring system.
12. Surface conduits shall utilise distance saddles throughout.
13. No inverted containment shall be installed.
14. Trunking connections to final DB's and Control panels shall incorporate pin racks as standard to facilitate the separation of terminating circuits for ease of future maintenance and to alleviate strain on cabling.
15. Basket containment may be used for Data, ELV cabling and T&E (6242Y) cabling only. Where basket is utilised, this shall be installed in accordance with the manufacturers details only including the use of couplers, bends, sets and flanges.
16. Cable support and containment systems shall be provided with 25% spare capacity to each compartment and also an additional 25% allowance shall be added to the calculated safe working load (SWL) for supports, for the provision of future cabling.
17. As a guide to good workmanship the University are keen to ensure full compliance with the regulations. For example
  - a. Where galvanised steel cable support and containment systems are cut all burrs must be removed and edges suitably painted with cold galvanise zinc-rich paint before erection.
  - b. All cuts shall be straight and squared off where required.
  - c. Where the galvanised coating to systems, fittings and accessories has been damaged the damaged



- areas must also be painted with cold galvanise zinc-rich paint.
- d. Excess thread lengths must be cut off and made good.
  - e. No exposed threads on couplings are allowed.
  - f. All cable support and containment systems must be fully continuous throughout and utilise (where applicable) couplers, joint strips, connectors, brackets, bends, gussets, clips, clamps, risers, angles, tees, cross pieces, reducers, bell mouths, end caps, conduit boxes, adaptable boxes, conduit take-off plates and fixing components etc. from the same manufacturer.
  - g. Covers / lids and dividers /partitions shall be fully continuous throughout the entire cable support and containment system. All covers/lids and dividers/partitions shall be fixed using the manufacturer's proprietary screw fixings and self-tapping screws shall not be used.
  - h. Conduits and containment systems must be installed in horizontal and vertical runs with sets being installed symmetrically. Logic must be applied to the routes.
  - i. Distance saddles must be used on conduit systems as noted earlier.



## Design Components

	Manufacturer	Comments
Tray / Trunking	Simplex Davis Swifts	<p>Galvanised Medium duty, return flange cable tray shall be installed for LV submain cabling installations up to 450mm. Where greater than 450mm the use of heavy duty ladder racking will be utilised. In addition, where local to mains LV switchpanels, ladder racking shall be used as standard to facilitate ease of cable installation and terminations.</p> <p>Medium duty basket containment shall be used for all ELV cabling serving TV, security, data and controls cabling. Separate baskets in all cases shall be utilised for routing of independent specialist trade cabling systems (i.e. security/ IT/ TV etc.) Where fillet dividers are utilised, these shall be continuous in length including bends and shall be minimum 1.5mm in thickness.</p> <p>Multi-compartment galvanised trunking shall be installed for LV and ELV cabling systems in surface/ exposed installations. Individual compartmentation shall be used for LV and ELV circuits with multiple compartments being provided for independent specialist trade cabling systems.</p> <p>A minimum of 25% wiring capacity shall be provided in all containment systems applicable to each individual compartment</p> <p>Manufacturers fixing support recommendations shall be met. Generally, trapeze style site fabricated Unistrut bracketry shall be used throughout. Alternative fixing and support methods must be presented for university approval prior to specification.</p>
Dado Containment	MK Prestige 3D Marshall Tufflex Odyssey	<p>Dado containment to be white Cat 6A compliant using all manufactured bends, sets and tees to form a complete enclosed installation.</p> <p>Approved Document Pt. M compliance shall be achieved using charcoal grey accessory faceplate surrounds as a preference. Coloured faceplates are not preferred. Alternative products may be presented for consideration at design stage.</p>
Bench Trunking	MK Pinnacle Marshall Tufflex	<p>Bench containment to be white Cat 6A compliant using all manufactured bends, sets and tees to form a complete enclosed installation.</p> <p>DDA compliance shall be achieved using charcoal grey accessory faceplate surrounds/ coloured lid.</p>



### Design Components

	Manufacturer	Comments
Conduits	Simplex Davis Walsall Airedale Swifts	<p>Steel/ Galvanised conduit to Bs 4568 shall be installed to all exposed areas including walls, floors and soffits. PVC conduit will only be considered for recessed installations.</p> <p>PVC, where recessed, shall comply with Bs 4607 and 6099 and shall be heavy duty, white utilising all manufactured couplings, bends and sets and forming a completely enclosed conduit system.</p>
Flexible conduit (All Projects - Final Connections Only)	Kopex Adaptaflex Flexicon	<p>Where flexible conduit is used this shall be limited to final connections only up to a maximum length of 500mm and shall be cleated where appropriate.</p> <p>All flexible conduit should be metallic flexible conduit with PVC/rubber outer sheath.</p>
Flexible Conduit – Main Conduit Routes (Refurbishment Projects Only)	Kopex Adaptaflex Flexicon	<p>To be used <u>by exception</u> and then <u>only by derogation agreement</u> with the University and <u>only</u> when straight rigid conduit cannot be installed.</p> <p>All flexible conduit should be metallic flexible conduit with PVC/rubber outer sheath.</p> <p>Final installation details of this Flexible Conduit shall be agreed with the University prior to any installation taking place. Agreement of installation details will form part of the process of obtaining agreement from the University</p>