THIS ARTICLE looks at Mobile and Transportable Units - a proposed new Section for BS 7671:2008, 17th Edition of the IEE Wiring Regulations.

Currently, there is no Part or Section of BS 7671:2001(2004) covering Mobile and Transportable Units but information on such installations can be found in IEC 60364-7-717, HD 60364-7-717 and Guidance Note 7, Special Locations.

The proposed Section 717 of BS 7671:2008 is based on the CENELEC Harmonised Document HD 60364-7-717, of which, the UK is to incorporate the technical intent of that standard.

Please note that Regulations and Sections quoted within this article are from the proposed BS 7671:2008 and may be subject to change.

The Scope of Section 717
The term ‘unit’ is intended to include a vehicle and/or transportable structure in which all or part of a low voltage electrical installation is contained, which is provided with a temporary supply by means of a plug and socket-outlet, for example. The units are either of the mobile type, such as self-propelled/towed vehicles, or of the transportable type, such as containers or cabins.

Examples of such units include:
- outside broadcast units as used in the entertainment industry
- medical services such as blood donor or mobile breast screening units
- advertising trucks and “roadshow” vehicles
- fire fighting appliances
- mobile workshops
- modular office buildings and construction site huts
- transportable catering units and fast food vans

It is important to note that the following are not within the scope of Section 717:
- transportable generating sets
  (Section 551)

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by Mark Coles

- marinas (Section 709)
- pleasure craft (IEC 60092-507)
- mobile machinery (BS EN 60204-1)
- caravans and other leisure accommodation (Section 721)

Risks
BS 7671 covers electrical installations generally and, as with all special locations, where particular risks exist, additional measures for protection are to be applied. In some instances it may be necessary to refer to other Sections of Part 7 of BS 7671, where in the case of, for example, units incorporating showers are utilised.

The following are examples of particular risks associated with mobile and transportable units:
- loss of connection to earth
- different national and local electricity distribution networks
- impracticality of establishing an equipotential zone external to the unit
- open-circuit faults of the PEN conductor of PME supplies
Permitted types of supply to mobile and transportable units

There are a number of different types of electrical supplies permitted for mobile and transportable units.

**TN-S system**

TN-S systems are preferred for ease and reliability. See figure 1 and Appendix for the key to the figures.

**TT system**

If TN-S is not available then a TT system could be utilised but it is not always easy to install a suitable earth-electrode, particularly if the anticipated time period for use of the installation at that location is short. See figure 1 and Appendix for the key to the figures.

**TN-C**

The use of a TN-C system is not permitted inside any unit. Regulation 8(4) of the ESQC Regulations forbids the use of combined neutral and protective conductors in a consumer’s installation.

**TN-C-S**

TN-C-S systems should only be used where the installation is continuously under the supervision of a skilled or instructed persons and the suitability and effectiveness of the means of earthing has been confirmed before the connection is made. See figure 1 and Appendix for the key to the figures.

**Low voltage generating set**

The unit could also be supplied from a low-voltage generating set in accordance with Section 551 of BS 7671.

Figure 2 shows the connection to a low-voltage generating set located inside the unit. Note that the generator may also be located outside the unit. An earth electrode would be necessary if the generator is providing a switched alternative to the system of distribution to the public, as Regulation 551.4.2 implies.

**IT system**

An IT system can be created by
Wiring systems - external
Flexible copper cables according to BS 7919 should be used (harmonised codes H07BB-F, H07RN-F, H07BN4-F). The minimum cable size used should be 2.5 mm².

The flexible cable should enter the unit by an insulating inlet in such a way as to minimize the possibility of any insulation damage or fault which might energize the exposed conductive parts of the unit.

Wiring systems - internal
As some movement of wiring systems is inevitable, internal wiring should be of the flexible type:

- Where wiring is to be in conduit systems, then PVC insulated cable to BS 6004, Table 4B, should be used (harmonised code H07V-K).

Protection against electric shock
Regulation 415.1.1 requires that additional protection by residual current protective devices with a rated residual operating current not exceeding 30 mA is necessary for all socket-outlets intended to supply current-using equipment outside the unit. An exception is permitted for socket-outlets which are supplied from circuits with protection by SELV, PELV (Section 414) or electrical separation (Section 413).

Accessible conductive parts of the unit, such as chassis, body structure or tube systems, should be interconnected and, through the protective equipotential bonding conductors in accordance with Regulation 411.3.1.2, connected to the protective conductor of the TT, IT or TN systems within the unit.

The main equipotential bonding conductor should be finely stranded, to BS 6004, Table 4B (harmonised code H07V-K), to allow for movement.

Identification and labelling
A permanent notice should be fixed to the unit in a prominent position, preferably adjacent to the supply inlet connector. The notice should state in clear and unambiguous terms the following information:

- the type of supply which may be connected to the unit
- the voltage rating of the unit
- the number of phases and their configuration
- the onboard earthing arrangement
- the maximum power requirement of the unit
Where wiring is to be carried out using PVC sheathed cable then PVC/PVC cable to BS 6000 (harmonised code H0VV-F) should be used.

Green/yellow protective bonding conductors and earthing tails should be finely stranded flexible cable to BS 6004, Table 4B (harmonised code H07V-K).

Other equipment - Plug and socket-outlets

Plugs and socket-outlets used externally to the unit should be to BS EN 60309-1, with pin configurations to BS EN 60309-2. Plug and socket-outlet enclosures connecting the unit to the supply should be of an insulating material and if mounted outside must have an Index of Protection not less than IP44*.

* The Index of Protection IP44 gives protection against ingress of moisture from water splashing from any direction and ingress of solid foreign objects of 1.0 mm and greater. For socket-outlets outside the unit (e.g. for supplies to equipment outside the unit) the degree of protection should be not Less than IP 54.

Appendix

Key to diagrams - Mobile and Transportable Units

1a Connection of the unit to a supply through a transformer with simple separation in accordance with Regulation 717.411.6.2

1b Connection of the unit to a supply in which the protective measures are effective

1c Connection to a LV generator set in accordance with Section 551

2 Class II or equivalent enclosure up to the first protective device (see item 8 or 9) providing automatic disconnection of supply

6 Socket-outlets for use exclusively within the unit

7 Protective equipotential bonding in accordance with Regulation 717.411.3.1.2.1

7a To an antenna pole, if any

7c To a functional earth electrode, if required

7d To the conductive enclosure of the unit

7e To an earth electrode, for protective purposes, if required

8 Protective devices, if required, for overcurrent and/or for protection by disconnection of supply in case of a second fault

10 Socket-outlets for current-using equipment for use outside the unit

13 Current-using equipment used exclusively within the unit

14 Overcurrent protective device, if required

15 Overcurrent protective device (e.g. one P or PN circuit-breaker)

16a Residual current protective device rated with a rated residual operating current not exceeding 30 mA for protection by automatic disconnection of supply for circuits of equipment for use outside the unit

16b Residual current device for protection by automatic disconnection of supply

18 Main earthing terminal or bar

Thanks to Julian Parsons at BBC OB Resources for the images used.