

Code of practice for
**Design and installation of
temporary distribution
systems delivering a.c.
electrical supplies for lighting,
technical services and other
entertainment related
purposes**

ICS 29.240.01; 97.200.10

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee CPW/4, British Standards for imaging, to Subcommittee CPW/4/-/1, Distribution of a.c. electricity at locations, upon which the following bodies were represented:

- Association of British Theatre Technicians
- Association of Lighting and Studio Facility Companies Ltd.
- British Broadcasting Corporation
- British Film Institute
- British Kinematograph, Sound and Television Society
- Broadcasting Entertainment Cinematograph and Theatre Union
- Chartered Institution of Building Services Engineers
- Chief and Assistant Chief Fire Officers' Association
- Hire Association Europe
- ITV Association (Itva)
- National Illumination Committee of Great Britain
- Professional Lighting and Sound Association
- Services Sound and Vision Corporation
- Society of Television Lighting Directors

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Electrical Installation Equipment Manufacturers' Association (BEAMA Ltd.)
- Institution of Electrical Engineers
- Lighting Industry Federation Ltd.
- Production Services Association (Psa)

This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 December 1998

© BSI 1998

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
Committee reference CPW/4/-/1
Draft for comment 96/540343 DC

ISBN 0 580 29581 8

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Notification of requirements	6
5 Materials, appliances and components	6
6 Planning and design considerations	6
7 Work on site	11
8 Inspection and testing	14
9 Supervision during use	15
10 Additional earthing provisions	16
Annex A (normative) Construction recommendations for switchgear for temporary electrical supplies	17
Annex B (informative) Unit functions	17
Annex C (informative) Earthing for temporary installations	19
Annex D (informative) Standard connections for a 19 pin quarter turn connector	20
Annex E (informative) Bibliography	21
Figure 1 — Temporary electrical supply system: film or TV location installation	4
Figure 2 — Temporary electrical supply system: theatre or concert installation	5
Figure D.1 — Standard connections for a 19 pin quarter turn connector (outlet rear view)	21
Table 1 — Minimum IP protection (with all covers in place)	6
Table 2 — Preferred power distribution connectors	9
Table A.1 — Fault rating	17

Foreword

This British Standard has been prepared by Technical Committee CPW/4. It supersedes BS 5550-7.5.1:1981, which is withdrawn.

This British Standard is a complete revision of BS 5550-7.5.1:1981 *Cinematography – Production and presentation – Code of practice for distribution of a.c. electricity for location lighting*. This was written to provide the film and television location lighting industry with guidance on techniques urgently required to replace practices originating with the once prevailing use of 110 V d.c. supplies but which were recognized to be unsafe once the increasing use of 240 V a.c. was acknowledged.

Following a review of BS 5550-7.5.1:1981 it was agreed that the scope should be widened to encompass the practices of other entertainment industries using similar temporary power services: drama, ballet, opera and particularly pop music concerts having developed in recent years to use very extensive temporary and travelling performance facilities. At the same time the use of temporary power for purposes other than lighting was recognized. It was also agreed that some of the associated guidance not strictly related to the power distribution system, and some of the less important or now widely accepted original recommendations, should be withdrawn from the standard.

It is important to recognize the special requirements for temporary power services for entertainment use and the consequent justification for special safety guidance. Electrical power requirements range from 1 kW or 2 kW available from a domestic socket, to several hundreds of kilowatts obtained from direct connection to public or private electricity suppliers' systems or from mobile generating sets. In many cases temporary requirements far exceed the capacity of the accessible fixed installation. Consequently, heavy duty flexible cables connected by plug and socket may be required, together with specialist portable switchgear.

Considerations of portability limit the size and weight of component parts, and time and other constraints prevent the use of conventional fixing methods. Tight schedules, adverse weather and late changes of plan are routine problems. However, the reusable kits-of-parts developed for these circumstances are accepted as providing proper standards of safety if used correctly and this code of practice is intended to provide overall guidance for these circumstances.

It is not intended to recommend any departure from the requirements of legislation or the parts of BS 7671 applicable to temporary systems. However, design engineers and site electricians charged with interpreting these basic requirements have devised procedures that differ to some extent from those used for permanent installations. These have been considered by safety authorities and are set out here as examples of good practice.

Annex A gives construction recommendations for switchgear for temporary electrical supplies.

Annex B provides information on the unit functions referred to in this British Standard.

Annex C provides information on earthing for temporary installations.

Annex D illustrates the standard connections for a 19 pin quarter turn connector.

Annex E is a bibliography.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations

1 Scope

This British Standard deals with temporary distribution systems and use of low voltage a.c. electricity, for television, film, theatre, pop concerts and similar events, either indoor or outdoor. It aims to bring together in one document guidance on matters of common interest to producing companies, equipment hire companies, event organizers, electrical consultants, electrical installation contractors, electricity supply companies, service hire companies, equipment manufacturers, venues and authorities responsible for safety.

The power distribution equipment described in this British Standard operates at low voltage as defined in BS 7671:1992 (50 to 1 000) V a.c.

Equipment powered by the distribution system normally operates at 230 V nominal, single phase 50 Hz a.c. or 400 V nominal, three phase 50 Hz a.c.

d.c. supplies are not within the scope of this British Standard.

Electricity may be taken from an existing installed capacity, the public supply, other suppliers, or from mobile or portable generators, usually at low voltage.

The distribution systems described are for performance lighting and general lighting, and also for power for rigging, scenic effects, cameras, audio equipment, broadcast equipment, catering, wardrobe and other associated services.

This code of practice envisages that all switchgear, distribution panels, cables, luminaires, technical equipment and other loads used for these purposes are manufactured to appropriate standards, if available, and that installation and use are supervised and carried out by skilled persons.

It is envisaged that the temporary installation is supported by a suitable skilled person on site at all times.

With certain exceptions, all equipment is connected by prefitted plug-and-socket. Component parts are tested prior to use.

An installation is considered temporary if the components are intended for complete removal at the end of the period of use.

Although this standard is generally applicable to power distribution at fairgrounds and exhibitions, it is recommended that reference is made to IEC 364-7.711 and more specialized documents published by the National Association of Exhibition Hallowners.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 546:1950, *Specification — Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors.*

BS 1363 (all parts), *13 A plugs, socket-outlets and adaptors.*

BS 3535 (all parts), *Isolating transformers and safety isolating transformers.*

BS 4363:1991, *Specification for distribution assemblies for electricity supplies for construction and building supplies.*

BS 5550 (all parts), *Cinematography.*

BS 6007:1993, *Specification for rubber-insulated cables for electric power and lighting.*

BS 6141:1991, *Specification for flexible cables and insulated cords for use in high temperature zones.*

BS 6500:1994, *Specification for insulated flexible cords and cables.*

BS 6651:1992, *Code of practice for protection of structures against lightning.*

BS 7540:1994, *Guide to use of cables with a rated voltage not exceeding 450/750 V.*

BS 7671, *Requirements for electrical installations (The IEE wiring regulations).*

BS EN 60309-2:1992, *Dimensional interchangeability requirements for pin and contact-tube accessories of harmonized configurations.*

BS EN 60439 (all parts), *Specification for low-voltage switchgear and controlgear assemblies.*

BS EN 60529:1992, *Specification for degrees of protection provided by enclosures (IP code).*

BS EN 60598-1:1997, *Luminaires — General requirements and tests.*

BS EN 60598-2 (all sections), *Luminaires — Particular requirements.*

SI 1988 No. 1057, *Electricity Supply Regulations 1988 (as amended SI 1990 No. 390)*, HMSO.

SI 1989 No. 635, *Electricity at Work Regulations 1989*, HMSO.

HSE HS(G) 85, *Electricity at work — Safe working practices.*

HSE HS(G) 107, *Maintaining portable and transportable electrical equipment.*

HSE HS(R) 25, *Memorandum of Guidance to the Electricity at Work Regulations 1989.*

IEE Guidance Note 3, *Inspection and testing*, Institution of Electrical Engineers.

3 Definitions

For the purposes of this British Standard, the definitions given in BS 7671:1992 apply, together with the following.

NOTE Some of the definitions in this British Standard are simplified to assist the general reader.



Documents

Document Sharing Hub

3.1**backfeed**

connection of phase potential through a load to a neutral conductor that does not have the normal connection to system neutral

NOTE The neutral cable input connector is therefore at phase potential to earth and a hazard.

3.2**cable splitter unit (CSU)**

unit that enables a main distribution cable to be directed into two or more outgoing circuits without further overcurrent protection

3.3**control centre (CC)**

portable distribution unit accepting power from an intake switch unit and providing switch or contactor control of a number of outgoing circuits

NOTE Control centres, intake switch units and final distribution units may be constructed as composite units in any combination. Control centres may include dimmers and other power conditioning or controlling devices.

3.4**circuit protective conductor (CPC)**

earth wire, i.e. the conductor run with the phase and neutral conductors to all parts of an installation to connect all exposed conductive parts together and to the installation earth terminal

3.5**class II construction**

double insulated construction (see BS 7671:1992)

3.6**class III construction**

construction using safety extra-low voltage only (see BS 7671:1992)

3.7**dimmer**

device for varying the power supplied to a luminaire, varying the light output

3.8**discrimination**

design arrangements to ensure that, as far as possible, the overcurrent protection or RCD nearest to a fault operates before any other protection device

NOTE Proper application of discrimination minimizes the inconvenience resulting from an overcurrent or earth fault.

3.9**diversity**

allowance made in calculation of system or circuit capacity that predicts that the maximum available load will not be connected simultaneously

NOTE If a system or circuit is loaded above the diversity allowance, overcurrent protection operates to prevent danger.

3.10**entertainment industry**

all branches of theatre, opera, concerts, pop concerts, ballet, pageants, public spectacle, corporate and business events, sporting events, television news gathering, etc., staged as live performances for an immediate audience or for film or video recording

NOTE Entertainment events may also be staged at fairgrounds and exhibitions and may be subject to additional specialist regulations (see clause 2).

3.11**exposed**

outdoor, where severe adverse weather is probable

3.12**equipotential bonding**

electrical connections putting various exposed conductive parts and extraneous conductive parts at equal potential

3.13**final distribution unit (FDU)**

portable distribution unit that accepts power from a control centre and provides subcircuit protection and switching for a number of outgoing circuits (see note to 3.3)

3.14**ground(ing)**

connections to earth used by communications engineers to ensure correct equipment functioning

NOTE Grounding is usually best kept separate from the safety earth installation.

3.15**indoor use**

use limited to locations where protection against the effects of rain and other weather conditions deleterious to insulation and electrical safety is ensured

3.16**ingress protection classification system (IP)**

internationally agreed classification system that defines degrees of protection against solid objects, dust and liquids (see BS EN 60529)

3.17**instructed person**

person adequately advised, or supervised by skilled persons, to avoid dangers that electricity can create

3.18**intake switch unit (ISU)**

switchgear designed for connection between the source of temporary supply and the remainder of the temporary installation providing means of isolation

NOTE The ISU accommodates one incoming circuit and one or more outgoing circuits (see also note to 3.3).

3.19**location**

place where a temporary electrical installation for entertainment purposes is constructed

NOTE A location may also be known as a site or venue.

3.20**low voltage**

a.c. voltage below 1 000 V (see BS 7671)

3.21**main equipotential bond**

main connection between the temporary installation and local earth potential (see BS 7671)

3.22**outdoor**

conditions where rain and other effects deleterious to insulation and electrical safety are probable

3.23**production lighting**

electric lighting equipment especially transported to and temporarily installed at a site, for the purpose of lighting the event to the required artistic effect, or for technical requirements

3.24**residual current device (RCD)**

safety device to protect against earth faults (see BS 7671)

NOTE 1 The designation 30 mA/40 ms, applied to an RCD, denotes a device with a rated residual operating current not exceeding 30 mA and an operating time not exceeding 40 ms at a test current not exceeding 150 mA, as in BS 4293, BS 7071, BS 7288, BS EN 61008-1 or BS EN 61009-1.

NOTE 2 In BS EN 61008, an RCD without integral overcurrent protection is defined as an RCCB, and an RCD with integral overcurrent protection as an RCBO.

3.25**safety lighting**

part of a lighting installation provided to ensure the safety of all persons on the site in the absence of adequate daylight

NOTE 1 Part of a safety lighting system classified as emergency lighting may be provided with independent power supplies and wiring to reduce the risk of danger resulting from failure of the main system.

NOTE 2 Provision of adequate safety lighting can be a legal requirement.

3.26**skilled person**

person with relevant training and experience to identify, assess and avoid dangers that electricity can create

3.27**supplementary equipotential bond**

supplementary connection between a temporary installation and local earth potential, usually remote from the main equipotential bond (see BS 7671)

3.28**system**

distribution system including all switchgear, generators, cabling, connectors, protection and measuring devices and current consuming apparatus provided for a customer

NOTE There can be a main system and several subsystems connected, or several independent systems provided by separate contractors.

3.29**temporary system**

system in which the components are intended for complete removal at the end of the planned period of use

NOTE Some examples of typical temporary systems are given in Figures 1 and 2.

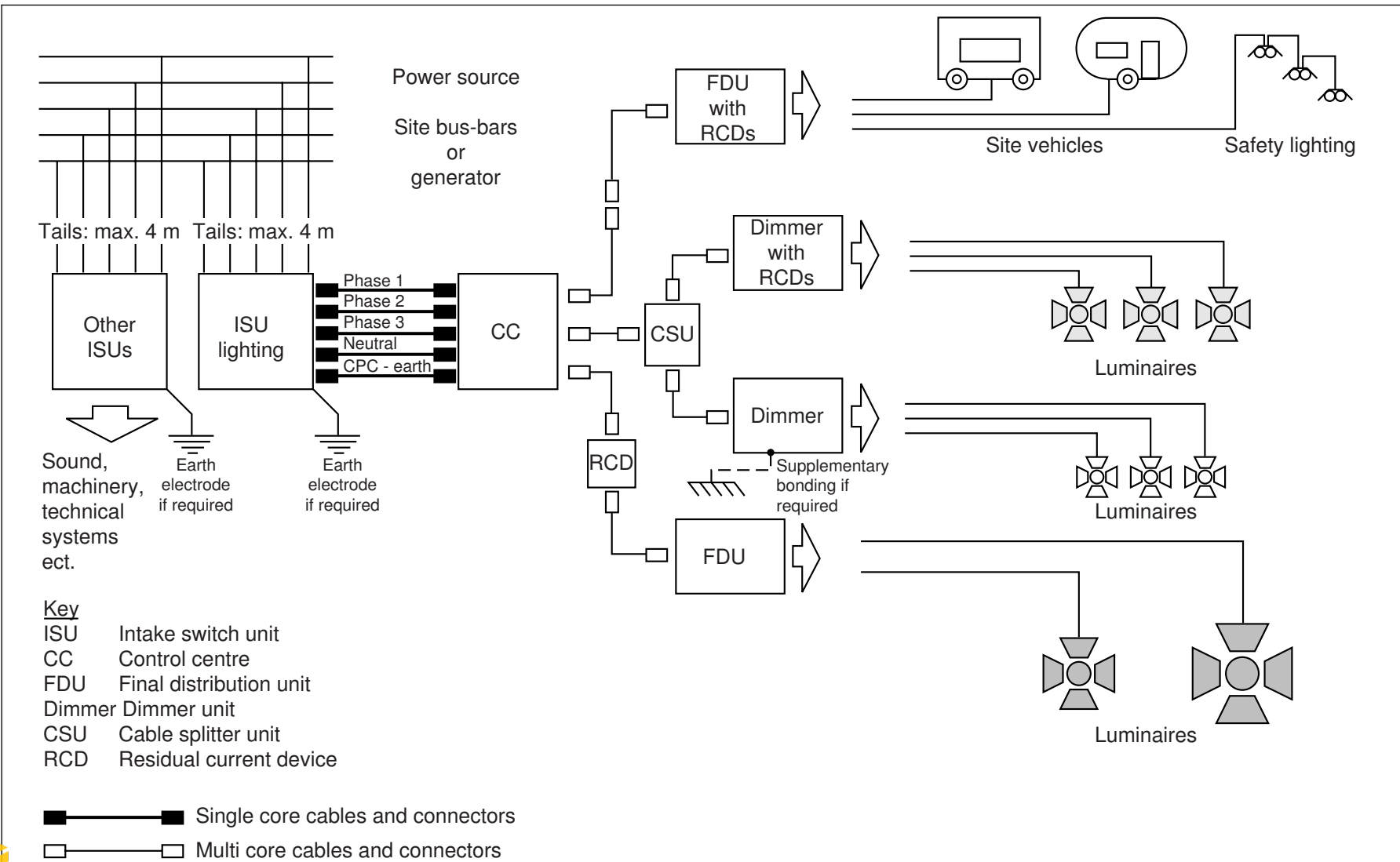


Figure 1 — Temporary electrical supply system: film or TV location installation