

## **SERIES NG 1400**

### **ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS**

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#### **NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATIONS OF SCOTLAND, WALES AND NORTHERN IRELAND**

Clause	Title	Page
<b>Northern Ireland</b>		
NG 1424NI	Inspection and Testing to be carried out by the Contractor	N1

# denotes a Clause or Sample Appendix which has a substitute National Clause or Sample Appendix for one or more of the Overseeing Organisations of Scotland, Wales or Northern Ireland.

# ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS

## NG 1401 General

- 1 The electricity supplier should be consulted on requirements for the nominal supply voltage and tolerances, and terminating power supply cable in Lighting Units and feeder pillars in the design stage, to avoid delay in connecting an electricity supply.
- 2 (05/06) Attention is drawn to the 'Code of Practice for Electrical Safety in Highway Electrical Operations' available from the Institution of Lighting Engineers (ILE).
- 3 The term 'network' is defined to ensure that testing to Clause 1424 is not applied to Lighting Units and feeder pillars where it could cause damage to equipment.
- 4 Where cable owned by the electricity supplier is utilized for the power supply to individual locations and the Contractor is not required to provide and install cables, the reference to 'network' is not applicable.

## NG 1402 Site Records

- 1 'As-built' drawings, which should include inserts to a larger scale when layouts are complex, may be produced either by the Overseeing Organisation from daily records or by the Contractor (these being checked by the Overseeing Organisation against its records). The requirements should be described in Appendix 14/1 for road lighting and traffic signs and for electrical schematics for private cable networks. If it is considered practical, any motorway communication details should also be added, otherwise these requirements should be included in Appendix 15/1 (see NG 1504).
- 2 During construction, the longitudinal locational measurements may have to be related initially to chainages and converted to refer to permanent highway features such as bridge abutments, or marker posts when these are defined.
- 3 The production of accurate daily site records, which should be on a form approved by the Overseeing Organisation, is of assistance in the preparation and checking of the 'as-built' drawings, and more particularly for the location of underground cables etc. and for fault-finding in the interval between the issue of a certificate of completion and the availability of 'as-built' drawings.

## NG 1403 Location of Lighting Units and Feeder Pillars

- 1 The approximate position of all Lighting Units and feeder pillars should be indicated on the Drawings and differentiation made between each type of Lighting Unit and feeder pillar. Location of overhead power lines should also be indicated to ensure that minimum safety clearances are maintained. Appendix 14/2 can be used to describe the location and type of all Lighting Units and feeder pillars. For example, the Appendix can be used to show in table form the set-back of lighting columns from the kerb or the edge of carriageway.

## NG 1404 Change of Lighting Arrangements

- 1 New Lighting Units should not normally be switched on and left in operation, apart from testing, before the road is opened to traffic. They are liable to mislead and confuse drivers particularly where temporary diversion routes have been introduced or a newly completed road has not been opened to traffic. Existing Lighting Units should not be switched off until the new permanent, or appropriate temporary, Lighting Units are available.

## NG 1405 Temporary Lighting

- 1 Appendix 14/3 should include details of the Overseeing Organisation's requirements for the provision of temporary Lighting Units required by the Overseeing Organisation, and design and specification requirements for temporary lighting which the Contractor may require in the execution of the Contract.

## NG 1407 Luminaires

- 1 Any particular requirements should be listed in Appendix 14/4 giving details of glare control (whether low threshold increment (LTI), moderate threshold increment (MTI) or other), lamp type and wattage, whether fitted with integral gear and whether to have higher IP rating. Luminaires not to be fitted with photo-electric control unit sockets should be included in the Appendix. If two part PECUs are specified, PECU sockets will not be required in the luminaires but alternative fixings should be detailed.

2 Appendix 12/1 should state which signs are to be lit by internal illumination and which by overhead or free-standing luminaires.

3 Particular requirements for Lit Sign Units should be given in Appendix 12/1.

4 If fuses are required in any integral gear compartment their rating should be specified in Appendix 14/4.

5 The procedure regarding aesthetic approval is given in Clause 1302.

### NG 1408 Lamps

1 Lamp type and wattage should usually be listed with the associated luminaire.

### NG 1409 Photo-electric Control Units (PECUs)

1 Photo-electric control units may be one part or two part. Where ballasts are incorporated in luminaires, one part units are more appropriate.

2 When luminaires are mounted in pairs on twin arm brackets, the use of shorting plugs is not normally practicable with two part units. The alternative with two part units is the separate control of each luminaire.

3 The switching level and differential of the PECU should be specified in Appendix 14/4.

### NG 1410 (05/01) Shorting Plugs (Dummy PECUs)

1 Shorting plugs (ie. dummy PECUs) are normally placed in all lanterns above a particular carriageway; their position in contiguous lighting should be considered in relation to planned maintenance access.

### NG 1411 Time Switches

1 Photo-electric cells are preferred but where it is not practical for them to be used, time switches may be specified in Appendix 14/4.

2 The switching capacity should be chosen to accord with that for PECUs in BS 5972.

### NG 1412 Ballasts

1 (05/01) If ballasts are for other than 230 V operation this should be specified in Appendix 14/4.

### NG 1413 Ignitors for Discharge Lamps

1 Ignitors integrated with lamps may be necessary as an alternative where particular circumstances require. Their use should be approved by the Overseeing Organisation.

### NG 1416 Cut-outs, Fuse Holders, Fuses and Miniature Circuit Breakers (MCBs)

1 The rating of fuses and MCBs in luminaires, columns, feeder pillars etc. should be specified in Appendix 14/4.

2 Proper discrimination in their operation should be ensured to avoid unnecessary interruption of supplies.

3 Where service cut-outs are provided by the electricity supplier, sufficient space should be left by the Contractor in Lighting Units and feeder pillars to accommodate them.

4 The type of cut-out, fuse holder and MCB required will be dependent upon the cabling system and cable size and should be specified in Appendix 14/4.

5 The class of MCB will depend on the maximum prospective fault current and should be specified in Appendix 14/4.

### NG 1418 Feeder Pillars

1 As the electricity supplier may require an undertaking to pay for energy before agreeing to provide a supply, the Overseeing Organisation should normally make arrangements with the supplier for the provision of services to Lighting Units and feeder pillars although it remains the Contractor's responsibility to ensure that supplies are available to meet his programme.

2 The material and construction of the feeder pillar case, and the finished treatment should be described in Appendix 14/4.

3 The equipment required in the feeder pillar should be specified in Appendix 14/4 as follows:

- (i) Mounting facilities for the electricity supplier's cable cut-out.
- (ii) Terminations, glands, trunking, method of fixing and sizes for cables and wiring.
- (iii) (05/06) Distribution boards fitted with MCBs or fuses for the outgoing cables. The maximum breaking capacity of the MCB should be not less than the prospective maximum short circuit current.

- (iv) (05/06) An earth stud with washers and clamping nuts.
- (v) (05/06) Circuit diagrams and labelling showing details of interconnection of equipment and the connection of cables to and from the pillar; all indelibly drawn or engraved on a material not subject to damage by the environment or normal use.
- (vi) (05/06) When required, a thermostatically controlled 60 watt heater should be mounted at the bottom of the base board.

**4** Where the Overseeing Organisation requires the supply of keys to the pillar door the requirements should be specified in Appendix 14/4.

**5** Where the group control of Road Lighting Units is required the requirements should be specified in Appendix 14/4.

**6** A drawing of each type of pillar should be provided showing:

- (i) The desired layout of the equipment. (It should be noted that the variety of suitable equipment available may make it impracticable to define specific sizes).
- (ii) Internal wiring details, including main earth connections as required by BS 7671 for the type of system of which the installation is to form a part, to take account of the requirements of the electricity supplier.
- (iii) The method of sealing the base of the pillar.

**7** The Contractor should be required to detail any variation from the feeder pillar layout described.

## NG 1419 Wiring

**1** Requirements for component layout and wiring should be detailed on typical schematic drawings; guidance is given in NG 1401.2. The Contractor is responsible for preparing detailed drawings for approval by the Overseeing Organisation.

**2** If the wiring specified in Clause 1419 is to be altered, Contract-specific requirements should be described in Appendix 14/4.

## NG 1420 Earthing

**1** Requirements for earthing arrangements should be detailed on typical schematic drawings.

**2** BS 7671 specifies the electrical requirements for safety and reference should be made to those Regulations and to BS 7430 when there is doubt on the

extent of bonding and of earth electrode provision required.

**3** When a TN-C-S service is provided by the electricity supplier, earth electrodes should be installed in accordance with the supplier's requirements, which should be given in Appendix 14/4 and with the requirements of BS 7430.

## NG 1421 Underground and Ducted Cables

**1** If the cable type required in Clauses 1420 and 1421 is to be varied (eg. concentric or split concentric) Contract-specific requirements should be described in Appendix 14/4.

**2** (05/04) Cable type conductors, sizes and materials should be shown on the Drawings, cross-referenced in Appendix 14/4 related to cable runs. It should be made clear where cables are to be laid in troughs, or in ducts, where they are to be attached to structures, and where additional protection and support is required. Where ducts are required these should comply with Clause 501 unless there are any particular requirements, which should be listed in Appendix 5/2. The Drawings should show that cables have a minimum clearance of 500 mm from safety barrier foundations.

**3** Cable supports should be provided as necessary where cables cross draw pit chambers etc. so as to maintain a maximum of 450 mm between supports. Where cables are laid in public footpaths and in other cases where additional protection is required, cable covers should be shown on the Drawings, cross-referenced in Appendix 14/4. Cover sizes should be 150 x 225 mm for one cable not exceeding 50 mm diameter and 225 x 300 mm for one cable exceeding 50 mm diameter or two not exceeding 37 mm each.

**4** Where existing buried cables are required to be removed, details should be included in Appendix 2/2 and the advice given in NG 201 followed.

## NG 1422 Cable Joints

**1** If several different types of joint are to be provided, the various types, eg. through, breeches and tee, should be shown on the Drawings, cross-referenced in Appendix 14/4 including cable sizes for both main and branch cables.

**2** Provision of joints not shown on the Drawings is generally unacceptable. Shortage of cable through incorrect measurement, wilful or accidental cable damage, should not be considered as justification for additional joints.

**3** (05/06) Jointing should be carried out under adequate supervision and comply with BS 6910-2. In establishing evidence of the jointer's competence, whether the jointer has recently attended a recognised course and his length of experience should be considered. If there are any doubts on the competence of a jointer, a sample joint should be required from the jointer prior to commencement of the work.

### **#NG 1424 Inspection and Testing to be Carried Out by the Contractor**

**1** The use of methods of testing other than those given in BS 7671 is not precluded provided they give no less effective results.

**2** An acceptable test of cable sheath insulation is provided by the application of 1000 V from an insulation tester.

**3** The Overseeing Organisation requires a certificate from the Contractor verifying compliance with BS 7671 in order that the Overseeing Organisation can fulfil its duties under the Electricity at Work Regulations 1989. The certificates should be forwarded to the Overseeing Organisation along with other site records.



## NG SAMPLE APPENDIX 14/1 : (05/01) SITE RECORDS

*[Note to compiler: Include as appropriate:]*

- 1 As-built drawings shall be produced by the Contractor, on..... number copies of drawing no..... which will be provided by the Overseeing Organisation/on ..... number copies of general arrangement drawings which shall be produced by the Contractor and shall be in accordance with the requirements of Clause 1402. The record drawings shall be produced on prints/transparencies/CAD/CD ROM/other medium.
- 2 Motorway communications details shall/shall not be included on the drawings.
- 3 The Contractor shall also supply test certificates cross-referenced to the apparatus identified on the as-installed drawings.
- 4 (05/06) The Contractor shall supply Operations and Maintenance manuals to support the site records. *[Include any additional requirements for site records] [1402.1]*

## NG SAMPLE APPENDIX 14/2 : LOCATION OF LIGHTING UNITS AND FEEDER PILLARS

*[Note to compiler: Include either:]*

(05/06) The position and description of Lighting Units, feeder pillars and electrical isolation pillars are shown on the following drawings.....*[1403.1]*

*[or:]*

The position and description of Lighting Units, feeder pillars and electrical isolation pillars are scheduled below:

Description of Equipment	Location of Equipment

*[Notes to compiler:]*

- 1 (05/06) Information on the design of road lighting in accordance with BS 5489-1 may be included.
- 2 The various types of Lighting Unit will call for different location dimensions and descriptions. Both position and description entries may be divided into normal and special categories for drawings or schedules.
- 3 (05/01) Prior agreement is required with the Overseeing Organisation to the position and description of the electrical isolation pillars *[1401.5]*. This should only be required in exceptional circumstances such as isolated lighting installations at rural roundabouts where the cost of separate power supplies to lighting on third party roads could be prohibitively expensive.]

## NG SAMPLE APPENDIX 14/3 : TEMPORARY LIGHTING

[Note to compiler: Include here:]

- (i) (05/06) The requirements for any temporary lighting. *[For example, for traffic management during temporary diversions for traffic, and at central reserve crossovers.] [1405.1]*
- (ii) The requirements for any advance fixed Road Lighting Units, *[in final positions as far as practicable]* to fulfil the requirements of (i).

## NG SAMPLE APPENDIX 14/4 : (05/01) ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

The Contractor shall insert below details of the equipment which he proposes to use in the Works and shall submit the information as soon as the Contract has been awarded.

### 1 Luminaires and Lamps

The luminaires shall be compatible with the columns and brackets offered in Appendix 13/2 and the information shall include the lamp type and wattage and luminaire circuit wattage.

(05/06) *[The compiler should state here any particular requirements described in NG 1407. For example: luminaire design attitude, luminaire (glare control) classification, LTI, MTI or other, IP (Ingress Protection) enclosure rating, any exclusion of PECU sockets, mounting height (nominal), ratings of fuses in integral gear compartments.] [1407.1, 1407.2(i), 1407.2(iii) to 1407.2(v) .....*

Manufacturer	Cat.No.	Glare Control (05/06)		IP Rating (05/06)		PECU Socket	(Design Table Ref. No.)*	(Isoluminance Template Ref. No.)*
		Luminous Intensity Class	Glare Index Class	Optical Housing	Control Gear Housing			

(05/06) *[\*If required, to ensure the assembly of Road Lighting Units conforms to the performance requirements of BS EN 13201-2.]*

## 2 Ancillary Equipment

[Note to compiler : Include here:]

- (i) (05/06) The positioning of equipment described in Clauses 1411 to 1416 within the base compartment of columns [1416.3, 1417.1].
- (ii) Requirements for wiring and installation of components within columns [1419.1].
- (iii) Requirements for group switching [1409.4].
- (iv) Requirement for and location of shorting plug where lanterns are a pair mounted on twin arm brackets [1409.3].

Clause	Item	Manufacturer	Catalogue or Type No	Requirements .[Compiler to complete]
1409	Photo-electric control units			Differential and switching levels (If required)
1410	Shorting plug			
1411	Time Switches			
1412	Ballasts			
1413	Ignitors			
1414	Starters			
1415	Capacitors			
1416	Cut-outs			Current rating
	Fuse Holders			Conductor size
	Fuse Links			Current rating
	MCBs			MCB class
1419	Wiring			

## 3 Feeder Pillars

(05/06) Feeder pillars shall be suitable for the layouts shown on drawing nos..... and conform with the requirements shown on the Drawings and in the following list.

[See also 1418.3, 1418.5 to 1418.7, 1419.7 and 1419.8]

[The compiler should state here:]

- (i) (05/06) Any particular requirements for hinges, locks, keys, circuit details, earth electrodes.

Location of Feeder Pillar	Manufacturer	Catalogue No.



#### 4 (05/01) Cables and Cable Joints

*[The compiler should state here:]*

- (i) References to drawings which show requirements for the installation of cable covers *[1421.3]*.
- (ii) Reference to drawings which show cable lines, cable joints and cable joint marker blocks *[1421.4, 1422.3, 1422.6]*.
- (iii) Particular requirements for cable laying, additional protection and support *[1421.5 and 1421.13]*.
- (iv) Requirement for cables following the same route if different from the requirement of sub-Clause 1421.7.
- (v) Requirements for installation of power supply cables adjacent to communication cables if different from the requirements of sub-Clause 1421.8.
- (vi) Reference to drawings which show identifying marks to be indented in permanent marker blocks *[1421.11]*.  
*[Cross-reference should be made to HCD drawing no. 11 where appropriate]*.
- (vii) Requirements for terminating armoured cables *[1423.1]*.

Location of (a) Cables (b) Cable Joints	Manufacturer	Catalogue No. Reference No. or Name of Cable

## NG SAMPLE APPENDIX 14/5 : ELECTRICAL EQUIPMENT FOR TRAFFIC SIGNS

*[Note to compiler: Include here:]*

1 The positioning of equipment described in Clauses 1411 to 1416 within the base compartment of posts *[1417.1]*.

2 Requirements for wiring and installation of components within posts and Lit Sign Units *[1419.1]*.

(11/03) *[Note to compiler: Electrical equipment for traffic signals, including those on cantilever masts, should be described in Appendix 12/5]*.

# NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF NORTHERN IRELAND

## **NG 1424NI Inspection and Testing to be Carried Out by the Contractor**

- 1** The use of methods of testing other than those given in BS 7671 is not precluded provided they give no less effective results.
- 2** An acceptable test of cable sheath insulation is provided by the application of 1000 V from an insulation tester.
- 3** The Overseeing Organisation requires a certificate from the Contractor verifying compliance with BS 7671 in order that the Overseeing Organisation can fulfil its duties under the Electricity at Work Regulations (Northern Ireland) 1991. The certificates should be forwarded to the Overseeing Organisation along with other site records.