



Engineering Recommendation G81 Part 6

Issue 2 2016

Framework for new industrial and commercial
underground connections
Part 6 Installation and records

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First published, 2004; Amendment 1, 2008

Revised 2016

Amendments since publication

Issue	Date	Amendment
1	2004	First issue
1 + A1	2008	Amendment 1: Reference to Electricity and Pipe Line Works (assessment of environmental effects) Regulations removed. Reference to Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations changed to refer to the document amended in 2007. Reference to Electricity Safety, Quality and Continuity Regulations 2002 changed to refer to document amended in 2006.
2	2016	Minor revision to reflect changes in the Ofgem Competition in Connections regime and updating of reference publications and legislation. This issue includes the following principal technical changes. Clause 1: Scope amended to generally cover HV underground connections up to and including 20 kV to account for changes in ER G88. Added definition of “ADMD” and “IDNO”. Added requirement for fault level contribution from distributed generation to be considered. Clause 4: Changed ‘Building Regulations 2010’ to ‘Building Regulations (applicable to the location)’ to reflect different Building Regulations apply for different locations of the UK. Added explanatory footnote.

		<p>Clause 6.2:</p> <p>Added the requirement to comply with Volume 4 NJUG guidelines for installation of cables in proximity to trees.</p> <p>Added requirement to ensure the safety of trenches comply with HSE publication HSG 150.</p> <p>Added the requirement to comply with ENA ER G12 for PME installations.</p> <p>Changed phase colour references from Red, Yellow, Blue to Brown, Black, Grey.</p> <p>Updated requirements for cable laying, backfill and identification of jointer organisation.</p> <p>Changed "Construction File" to "health and safety file".</p> <p>Replaced 'Host DNO' with 'Host DLH'.</p> <p>Added requirement for testing of CTs and VTs to meet relevant Balancing & Settlement Code Metering Codes of Practice and MOCOP®.</p> <p>Deleted reference to BSCP 520.</p> <p>Clarification of minimum and maximum depths added.</p> <p>Clause 6.3 Plant:</p> <p>Added requirement for installations to incorporate adequate distances around plant for carrying out subsequent operation, inspection, maintenance and testing activities.</p> <p>Added "to moisture ingress" after "exposure".</p> <p>Added requirement for plant generally to be installed in accordance with the manufacturer's instructions including those for lifting, bolting down and venting/pressure relief.</p> <p>Added requirement for substation signage to be fitted prior to energisation.</p> <p>Clause 6.4:</p> <p>Reference to 'Black duct...' for service cables changed to 'Black or red duct, as specified by the Host DLH,...'.</p> <p>Clause 6.5:</p> <p>Installation requirements for multi-occupancy premises have been aligned with ENA publication for ER G87.</p> <p>Clause 6.5.3: Clarified "fire proof enclosure" as "...meeting the relevant requirements defined in the Building Regulations and Fire Safety Regulations...".</p> <p>Added requirement to comply with Electricity at Work Regulations 1989.</p> <p>Clause 6.5.5: Clarified "fire resistance" as "...meeting the relevant requirements defined in the Building Regulations and Fire Safety Regulations...".</p> <p>Minimum height above floor level for meters changed from "450 mm" to "500 mm" as defined in MOCOPA Schedule 5, 5(B).</p> <p>Added requirement for meter cabinets to conform to BS 8567.</p> <p>Clause 7:</p> <p>Added requirements to record link box locations, where applicable, date of manufacture for installed plant and settings for protection.</p> <p>Updated reference to record cables and joints in accordance with HAUC publication, <i>Code of Practice for Recording of Underground Apparatus in Streets</i>.</p> <p>Appendix A:</p> <p>Added functional test of alarms as well as interlocks and operation.</p>
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		<p>Changed “Gas pressure” to “Gas pressure/density”.</p> <p>For HV protection added requirement to carry out on-load measurements.</p> <p>Added tests for fault passage indicators and automation equipment.</p> <p>General:</p> <p>Reference to CDM Regulations changed from “2007” to “2015”.</p> <p>Added sheath test.</p> <p>Appendix B:</p> <p>Added requirement for meter cabinets to conform to BS 8567.</p> <p>Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).</p>
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Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREC G81 Part 6”.

This EREC replaces and supersedes ER G81 Part 6 2008 (as amended).

This document is a “qualifying standard”, being listed in Appendix 2 of The Distribution Code, and has been revised under the governance of the Distribution Code Review Panel and in association with the Ofgem Electricity Connections Steering Group.

EREC G81 is a suite of engineering documents that sets out a national framework to facilitate competition in new connections. EREC G81 Parts 4-6 are associated with commercial and industrial connections and associated new HV and HV/LV distribution substations, where the requirements are documented as follows:

- Part 4 – Design and planning.
- Part 5 – Materials specification.
- Part 6 – Installation and records (this document).

Since ER G81 was last amended in 2008 the contestability of connection work has been extended to include jointing of metered and unmetered supplies to existing low voltage mains cables and jointing to high voltage cables¹. In addition, a significant number of references in the documents have been superseded and new references relevant to EREC G81 have been published. These changes and resultant changes to requirements are captured in this revision. The opportunity has been taken to align the document with the current ENA engineering document template and ER G0 governing the rules for structure, drafting and presentation of ENA engineering documents.

This document is intended to be used by Independent Connection Providers (ICPs) and Independent Distribution Network Operators (IDNOs) that undertake new connections under the Ofgem Competition in Connections regime.

Where the term “shall” or “must” is used in this document it means the requirement is mandatory. The term “should” is used to express a recommendation. The term “may” is used to express permission.

NOTE: Commentary, explanation and general informative material is presented in smaller type, and does not constitute a requirement.

If there are queries about this document, please discuss them with the Host Distribution Licence Holder (Host DLH) in whose area it is proposed that work is to be undertaken. In the event that it is not possible to resolve the question with the Host DLH, please seek advice from the Connections Policy Team, Ofgem, 9 Millbank, London SW1P 3GE.

¹ See Ofgem decision letter dated 8 May 2012 [1].

1 Scope

This document sets out the minimum requirements for installation and recording of new low voltage and high voltage (generally up to and including 20 kV) underground electricity networks and associated distribution substations for industrial and commercial connections undertaken under the Ofgem Competition in Connections regime. It is one of the following suite of documents governing this work.

- Adoption Agreement².
- Design and planning framework (EREC G81 Part 4).
- Materials specifications framework (EREC G81 Part 5).
- Installation and records framework (EREC G81 Part 6).
- Underground unmetered connections framework.

This document must be read in conjunction with these documents as some issues, for example equipment ratings, are dependent both on the way equipment is specified, designed or installed.

NOTE: This suite of documents applies only to NEW installations and is not to be applied retrospectively.

This document sets out and makes reference to installation and recording requirements which have to be met for a Host DLH to adopt contested HV and LV networks and associated new HV and HV/LV distribution substations supplying industrial and commercial connections generally up to and including 20 kV. This includes industrial and commercial connections on both 'greenfield' and 'brownfield' sites.

This document supplements but does not amend, abridge or override any statutory legislation referred to within this document.

This suite of documents only applies to connections to single-occupied premises and street lighting installations although some relevant design aspects associated with multi-occupied premises, e.g. blocks of offices or shops, have been summarised from ER G87. Detailed arrangements associated with planning, connection and operation of new installations involving an interface between the Host DLH and IDNOs are specifically addressed in ER G88.

This suite of documents does not include any requirements in respect of generator or traction supply connections. These are subject to separate consideration.

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document and must be complied with unless otherwise agreed in writing with the Host DLH. The latest editions of these documents including all addenda and revisions shall apply unless otherwise agreed with the Host DLH.

NOTE: It is not appropriate to cross-reference all relevant requirements from the following publications in this document. Where a publication is not specifically cross-referenced in the main clauses of this document then all relevant requirements are deemed to apply.

² Also known as "Agreement to Adopt".

Standards publications

BS 7671, *Requirements for Electrical Installations (IET Wiring Regulations Seventeenth Edition)*

BS 8567, *Specification for outdoor electricity meter cupboards*

Energy Network Association publications³

ENA TS 12-23, *Polythene warning tape and polythene protection tape for buried electricity supply cable*

ENA TS 12-24, *Plastic ducts for buried electric cable*

ENA TS 37-2, *Public electricity network distribution assemblies*

ENA TS 41-24, *Guidelines for the design, installation, testing and maintenance of main earthing systems in substations*

ER G12, *Requirements for the application of protective multiple earthing to low voltage networks*

ER G39, *Model code of practice covering electrical safety in the planning, installation, commissioning and maintenance of public lighting and other street furniture*

ER G69, *Guidance on working with Sulphur Hexafluoride*

ER G87, *Guidelines for the provision of low voltage connections to multiple occupancy buildings*

ER G88, *Principles for the planning, connection and operation of electricity distribution networks at the interface between Distribution Network Operators (DNOs) and Independent Distribution Network Operators (IDNOs)*

National Joint Utilities Group (NJUG) publications

Volume 1, *NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus*

Volume 4, *NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*

Health & Safety Executive (HSE) publications

GS6, *Avoiding danger from overhead power lines*

HSG47, *Avoiding danger from underground services*

HSG150, *Health and safety in construction*

Balancing & Settlement Code

Balancing & Settlement Code (BSC) Procedure BSCP 520 Unmetered Supplies Registered in SMRS

Balancing & Settlement Code Metering Codes of Practice⁴

³ ENA documents can be obtained via the ENA web site: www.energynetworks.org.

Ofgem agreed publications

The Distribution Code

Standard Conditions of the Electricity Distribution Licence

Other publications

Highways Authorities and Utilities Committee (HAUC) Publication, *Code of Practice for Recording of Underground Apparatus in Streets*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Applicant

company wishing to undertake the contestable work

3.2

BS

British Standard

3.3

BS EN

European Standard adopted as a British Standard

3.4

BSI

British Standards Institution

3.5

CDM

Construction (Design and Management) Regulations 2015

3.6

Distribution Licence Holder (DLH)

Holder of an Electricity Distribution Licence as defined in the Electricity Act 1989 Standard conditions of the Electricity Distribution Licence

NOTE: Host DLH refers to the Distribution Licence Holder for the public electricity network concerned.

3.7

Distribution Service Area (DSA)

service area of a DLH

3.8

ENA

Energy Networks Association

3.9

ENA TS

Energy Networks Association Technical Specification

⁴ See <https://www.elexon.co.uk/bsc-related-documents/related-documents/codes-of-practice/>