



## Technical Specification 41-37

Issue 2 2015

Switchgear for use on 66 kV to 132 kV  
distribution systems

Part 1 Common clauses

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First published, September 2004

Revised, 2015

### **Amendments since publication**

<b>Issue</b>	<b>Date</b>	<b>Amendment</b>
Issue 2	2015	Major revision. This issue includes the following principal technical changes. 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).

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## Foreword

This Technical Specification (TS) 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 “ENA TS 41-37 Part 1”.

This document replaces and supersedes Technical Specification 41-37 Issue 1 2004.

This Technical Specification has been prepared by the Energy Networks Association.

ENA TS 41-37 is a suite of engineering documents that sets out ENA Member Company requirements for specification of switchgear for use on 66 kV to 132 kV distribution systems. ENA TS 41-37 is a multi-part document comprising of the following parts.

- Part 1 – Common clauses
- Part 2 – Gas-insulated metal-enclosed switchgear
- Part 3 – Alternating current circuit-breakers
- Part 4 – Disconnectors and earthing switches
- Part 5 – Inductive voltage transformers, capacitor voltage transformers, combined unit transformers and current transformers for use on 72.5 kV to 145 kV distribution systems
- Part 6 – Disconnecting circuit breaker with an integral earthing switch for use at 72.5 kV and 145 kV distribution systems

Switchgear covered by this Technical Specification shall conform to the latest issues of the relevant International and British Standards listed. This Technical Specification amplifies and/or clarifies the requirements of those Standards, where alternative arrangements are permitted and where additional information is required.

This specification should be read in conjunction with the relevant International and British Standards, and to assist in cross-reference, the document follows the format of the major International Standards. Where possible, the International Standards' clause numbers have been used preceded with the number of the relevant part of this specification.

The Electricity at Work Regulations 1989 made under the Health and Safety at Work Act 1974, apply to switchgear whenever manufactured, purchased or installed. Appendix 2 of the Memorandum of guidance on the Regulations lists Standards, Codes of Practice and other publications which contain guidance relevant to the Regulations and electrical safety.

Part 1 of the document covers all common clause requirements of switchgear, as defined.

Clauses specific to particular equipments are covered in the subsequent Parts of the document.

Annex A of the document provides a summary of range, technical requirements and ratings for each type of equipment for completion by the Purchaser.

A 'Self Certification Conformance Declaration' sheet is included with Parts 2 to 5 to enable the manufacturer to declare conformance or otherwise, clause by clause, with the specification.

## 1 General

IEC 62271-1 is the major normative Standard in this document and shall apply except where modified. Part 1 of this specification amplifies and clarifies the requirements of IEC 62271-1 where alternative arrangements are specified by ENA and further information is necessary to meet requirements of UK Distribution Network Operators.

### 1.1 Scope

This specification defines technical requirements for switchgear rated at voltages within the range 72.5 kV to 145 kV and applies to alternating current switchgear, designed for indoor or outdoor installation, cable or overhead conductor connected, and for operation at service frequency of 50Hz on systems having voltages at 66 kV and up to and including 132 kV.

Equipment covered by this specification is for use on systems with the neutral point earthed solidly, or effectively earthed through a resistor or reactor.

This specification presents the requirements which must be satisfied for all switchgear.

### 1.2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

#### Standards publications

IEC 60137, *Insulated bushings for alternating voltages above 1 000 V*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60480, *Guide to checking of SF<sub>6</sub> taken from electrical plant*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60815, *Guide for the selection of insulators in respect of polluted conditions*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61109, *Insulators for overhead lines – Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V – Definitions, test methods and acceptance criteria*

IEC 61462, *Composite hollow insulators - Pressurized and unpressurized insulators for use in electrical equipment with rated voltage greater than 1 000 V - Definitions, test methods, acceptance criteria and design recommendations*

IEC 62271-1, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62271-203, *High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

IEC 62271-303 High-voltage switchgear and control gear part 303 use and handling of sulphur hexafluoride (SF<sub>6</sub>)

IEV 441, Switchgear, control gear and fuses

BS EN 50522 Earthing of power installations exceeding 1 kV

BSEN ISO 13732-1 Methods for the assessment of human responses to contact with surfaces. Hot surfaces

BS EN ISO 13732-1, *Ergonomics of the thermal environment. Methods for the assessment of human responses to contact with surfaces. Hot surfaces*

BS 159, *Specification for high-voltage busbars and busbar connections*

BS 1710, *Specification for identification of pipelines and services*

BS 4781, *Specification for pressure sensitive adhesive plastic labels for permanent use*

BS 5499, *Graphic symbols and signs - safety signs, including fire safety signs*

### **Other publications**

[N1] Statutory Instrument 1989 No. 635, *The Electricity at Work Regulations 1989*

[N2] Statutory Instrument 2007 No. 320, *The Construction (Design and Management) Regulations 2007*

[N3] ENA TS 41-18, *Partial discharge testing of bushings, capacitors, instrument transformers and switchgear of rated voltage 7.2 - 420 kV inclusive*

[N4] ENA TS 41-37 Part 3, *Alternating current circuit-breakers*

[N5] ENA TS 50-18, *Design and application of Ancillary Electrical equipment*

[N6] ENA TS 50-19, *Specification for standard numbering for small wiring for switchgear and transformers together with their associated relay and control panels*

[N7] ENA TS 98-1, *Environmental classification and corrosion protection of structures, plant and equipment*

## **2 Normal and special service conditions**

Clause 2 of IEC 62271-1 shall apply with the following additions.

### **2.1 Normal service conditions**

#### **2.1.1 Indoor switchgear and controlgear**

Sub-clause 2.1.1 of IEC 62217-1 shall apply with the following addition.

- a) The ambient air temperature does not exceed 40 °C and its average value, measured over a period of 24 h, and does not exceed 35 °C. The minimum ambient air temperature is –5 °C

#### **2.1.2 Outdoor switchgear and control gear**

Sub-clause 2.1.2 of IEC 62217-1 shall apply with the following additions.

- a) The ambient air temperature does not exceed 40 °C and its average value, measured over a period of 24 h, and does not exceed 35°C. The minimum ambient air temperature is –25 °C
- b) Ice coating shall be 10 mm

## **2.2 Special service conditions**

### **2.2.1 Altitude**

Sub-clause 2.2.1 of IEC 62271-1 does not apply.

### **2.2.2 Pollution**

Sub-clause 2.2.2 of IEC 62271-1 shall apply.

### **2.2.3 Temperature and humidity**

Sub-clause 2.2.3 of IEC 62271-1 does not apply.

### **2.2.4 Vibrations , shock or tilting**

Sub-clause 2.2.4 of IEC 62271-1 does not apply.

### **2.2.5 Wind speed**

Sub-clause 2.2.5 in IEC 62271-1 does not apply.

### **2.2.6 Other parameters**

Sub-clause 2.2.6 in IEC 62271-1 shall apply.

### **2.2.100 Flood resilience**

The supplier shall declare the maximum depth of water, measured from the base of the equipment.(Including transformers, marshalling Kiosks, relay cabinets etc)

- a) at which full functionality is retained.
- b) at which , if the equipment is de-energised prior to the flooding, it can immediately be returned to service with full functionality, once the water depth is at the base of the equipment level, with no intervention necessary.

The supplier shall clearly define in the installation, commissioning and maintenance documents for the equipment any special installation measures which are required to achieve the above declared depths.

## **3 Terms and definitions**

Clauses 3 to 3.7.4 inclusive of IEC 62271-1 shall apply with the following additional definitions.

### **3.100**

#### **dependent manual operation**

operation solely by means of directly applied manual energy, such that the speed and force of the operation are dependent upon the action of the operator

[IEV 441-16-13 definition]