SWITCHGEAR

This document is for Relevant Electrical Standards document only.

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PURPOSE AND SCOPE

This document describes the technical requirements for User's equipment directly connected to the England and Wales Transmission system and located within NGET's busbar protection zone operating at nominal voltages of 400 kV, 275 kV, 132 kV and 66 kV unless otherwise agreed with the user as defined in the Bilateral agreement. The principles of this document applies to equipment connected at other voltages".

This document defines the technical requirements for switchgear connected to the National Grid Electricity Transmission System at 400kV, 275kV, 132kV. The principles of this document also apply to equipment connected at other voltages.

This Specification applies to all switchgear for connection to, the National Grid 66kV, 132kV, 275kV, 400 kV and connected 50 Hz systems. It specifies the requirements for items of switchgear but does not cover application, protection and automatic switching requirements; neither does it cover fixed ancillary installations where they have no direct bearing on the service operation of the switchgear specified. These aspects are covered in companion Technical Specifications.

PART 1 – PROCEDURAL

1 GENERAL REQUIREMENTS

1.1 General

1.1.1 All mandatory requirements of IEC 62271-1 shall be met.

1.2 Compressed Gas

1.2.1 Where compressed gas is used for arc extinction or operation, abnormal gas system condition alarms shall be provided. The alarms shall indicate falling gas density/pressure and shall operate at a higher level than any low gas density/pressure lockout devices.

1.2.2 Provision shall be made for remote indication or alarm of abnormal gas system conditions and low density/pressure lockout.

1.2.3 Instruments and alarms shall be provided to ensure safe and reliable operation of all compressed gas systems.

1.3 Operating Mechanisms, Ancillary Equipment and their Enclosures

1.3.1 Switchgear with power operated mechanisms shall be provided with means of initiation of closing and opening, and selection of local/remote control, at the local control point.

1.3.2 Three phase switching devices with separate phase mechanisms shall be controllable from a single point,

1.3.3 Auxiliary switches shall be positively driven in both directions.

2 PERFORMANCE REQUIREMENTS

2.1 Gaseous Insulation

2.1.1 Means shall be provided to enable gas systems to be safely replenished whilst the equipment is in service.

2.2 Rated Voltage of Closing and Opening Releases and Operating Devices

2.2.1 The rated supply voltage of the D.C. system at National Grid substations is 125 V. Closing and Opening releases and operating devices shall operate over the voltage ranges, measured at their terminals during operation, given in Table 1.

2.2.2 The characteristics of the current required by the closing and opening releases and operating devices when operating at the minimum operating voltage shall be declared.

		D.C. System	**Closing and Opening Releases and Operating Devices**	
			Close	Open
Maximum Operating Voltage	Volts	137.5	137.5	137.5
Minimum Operating Voltage	Volts	93.5	87.5	77

Table 1: Rated Supply and Operating Voltage Range for D.C. Systems and Operating Devices

Informative:

Users may employ their own DC voltage supply limits, providing their d.c. systems are not connected to NG supplies

2.2.3 Alternating current control systems are not acceptable for the control of circuit-breakers, switches, disconnectors or earthing switches.

3 TEST REQUIREMENTS

3.1 Dielectric Tests

3.1.1 Dielectric tests on Gas Insulated Switchgear shall be to the requirements of IEC 62271-203. Where doubt exists regarding the path of any breakdown during testing it shall be assumed that the breakdown involved non-self restoring insulation.

3.1.2 Dielectric tests on Air Insulated Switchgear shall be to the requirements of IEC 62271-1. Where doubt exists regarding the path of any breakdown during testing it shall be assumed that the breakdown involved non-self restoring insulation.

3.2 Mechanical Strength of Pressurised Hollow Ceramic Insulation

3.2.1 Pressurised hollow ceramic insulation shall be designed and tested according to IEC 62155.

Informative: The total loading requirement includes consideration of the 100% wind pressure without ice accretion, 100% short-circuit forces, equipment internal pressure, equipment mass and mechanical operation.

3.3 Mechanical Strength of Hollow Composite Insulation

3.3.1 Hollow composite insulation for unpressurised and pressurised applications shall be designed and tested in accordance with IEC 61462.

Informative: The total loading requirement includes consideration of the 100% wind pressure without ice accretion, 100% short circuit forces, equipment internal pressure, equipment mass and mechanical operation.

4 FORMS AND RECORDS

Not applicable.

PART 2 - DEFINITIONS AND DOCUMENT HISTORY

5 DEFINITIONS

Not Applicable.

6 AMENDMENTS RECORD

Issue	Date	Summary of Changes / Reasons	Author(s)	Approved By (Inc. Job Title)
1	October 2014	New document	Richard Poole	GCRP

6.1 Procedure Review Date

5 years from publication date.

PART 3 - GUIDANCE NOTES AND APPENDICES

7 REFERENCES

7.1 BS 1710 Specification for Identification of pipelines and services

7.2 IEC 60376 Specification of technical grade sulfur hexafluoride (SF_6) for use in electrical equipment

7.3 IEC 60480 Guidelines for the checking and treatment of sulfur hexafluoride (SF_6) taken from electrical equipment and specification for its re-use

7.4 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

7.5 IEC 62155 Hollow pressurized and unpressurised ceramic & glass insulators for use in electrical equipment with rated voltages greater than 1000V

7.6 IEC 62271-1 High-voltage Switchgear & Controlgear – Part1: Common Specifications

7.7 IEC 62271-203 High-voltage Switchgear & Controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52kV