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SHUNT CAPACITORS FOR A.C. POWER SYSTEMS HAVING A RATED VOLTAGE ABOVE 660 V PART 2: ENDURANCE TESTING

Condensateurs shunt destinés à être installés sur des réseaux à courant alternatif de tension assignée supérieure à 660 V
Deuxième partie: Essais d'endurance

Parallelkondensatoren für Wechselspannungs-Starkstromanlagen mit einer Nennspannung über 660 V
Teil 2: Lebensdauerprüfung

BODY OF THE HD

The Harmonization Document consists of:

- IEC 871-2 (1987) ed 1; IEC/TC 33, not appended

This Harmonization Document was approved by CENELEC on 12 June 1989.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1989-12-01

to publish their new harmonized national standard by or before 1990-06-01

to withdraw all conflicting national standards by or before 1990-06-01.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Deuxième partie: Essais d'endurance

Shunt capacitors for a.c. power systems having a rated voltage above 660 V

Part 2: Endurance testing

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SHUNT CAPACITORS FOR A.C. POWER SYSTEMS HAVING A RATED VOLTAGE ABOVE 660 V

Part 2: Endurance testing

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This report has been prepared by IEC Technical Committee No. 33: Power capacitors.

The text of this report is based on the following documents:

Six Months' Rule	Report on Voting
33(CO)71	33(CO)80

Full information on the voting for the approval of this report can be found in the Voting Report indicated in the above table.

The following IEC publications are quoted in this report:

Publications Nos. 70 (1967): Power capacitors.
143 (1972): Series capacitors for power systems.
871-1 (1987): Shunt capacitors for a.c. power systems having a rated voltage above 660 V, Part 1: General – Performance, testing and rating – Safety requirements – Guide for installation and operation.

SHUNT CAPACITORS FOR A.C. POWER SYSTEMS HAVING A RATED VOLTAGE ABOVE 660 V

Part 2: Endurance testing

INTRODUCTION

The endurance test requirement is at present based on too little international experience and is therefore issued as an IEC report.

SECTION ONE – GENERAL

1. Scope

This report applies to capacitors according to IEC Publication 871-1 and gives the requirements for endurance testing of these capacitors.

2. Definitions

For the purpose of this report the following definitions apply, in addition to those given in IEC Publication 871-1:

2.1 *Test (capacitor) unit (for endurance test)*

The test unit may be one of the units to be manufactured or a special unit which, with respect to the properties to be checked by the endurance test, is equivalent to the units to be manufactured.

Notes 1. – The reason for using a special test unit is to match the unit with the available test power supply.

2. – For limits of test unit size and its manufacture, see Appendix B.

3. – Where the capacitor design to be tested includes discharge resistors and/or internal fuses, similar representative components should be included with the special unit.

2.2 *Comparable element design*

Comparable element design is a range of element constructions that will be comparable in performance, under the endurance test procedure, with the elements in the test unit. (See Appendix B for detailed design limits.)

2.3 *Inter-element insulation*

The insulation between two series-connected elements inside the capacitor unit.

The inter-element insulation consists of:

- the outer turns of the insulation layers around the electrodes in an element;
- the inter-element insulation may also include a separate insulation layer placed between the two elements. This separate insulation layer may protrude outside the width and (or) length dimension(s) of the flattened element (see Appendix C).

SECTION TWO – QUALITY REQUIREMENTS AND TESTS

3. Classification of endurance tests

The endurance test is a type test carried out in order to ascertain that repeated overvoltage stresses do not cause a dielectric breakdown.

The endurance test shall be carried out by the manufacturer. The purchaser shall on request be supplied with a certificate detailing the results of such a test.

4. Endurance test and requirements

If the endurance test is to be performed on capacitors intended to be used at a frequency below 50 Hz, the test conditions shall be agreed upon between manufacturer and purchaser.

For capacitors which are exposed to higher overvoltages, transients, etc. (e.g. see IEC Publication 871-1, Sub-clause 9.1, Note 5, and Sub-clause 31.1), the amplitude of the applied test voltages in the endurance test (Sub-clauses 4.1, 4.2, 4.4, 4.5 and Appendix A) shall be increased in proportion.

The endurance testing of a test unit shall be carried out in the sequence given below.

The applied test voltage shall have a frequency of 50 Hz or 60 Hz except for the test according to Sub-clause 4.1 where a d.c. voltage can be used according to Sub-clause 9.2 of IEC Publication 871-1.

4.1 *Routine test*

The test unit shall be subjected to the routine voltage test between the terminals (see IEC Publication 871-1, Clause 9) with an amplitude such that the correct test voltage is obtained across each element.

4.2 *Conditioning of the units before the test*

The test unit shall be subjected to a voltage of not less than 1.1 times U_N at an ambient temperature of not less than +10 °C for 16 h to 24 h.

Note. – The conditioning is carried out to stabilize the dielectric properties of the test unit.

4.3 *Initial capacitance and loss measurements*

The test unit shall be placed for at least 12 h in the unenergized state in a chamber with forced air circulation having a temperature selected from the range +60 °C to +75 °C with a permitted variation of ±2 °C.

The unit, at the same ambient temperature, shall then be subjected to U_N. The capacitance and the losses shall be measured within 4.5 min to 5.5 min after the voltage application.

Notes 1. – The repeatability of the loss measurement should be such that a deviation of 5.10^{-5} (0.05 W/kvar) can be detected when the unit is subjected to the same test later (Sub-clause 4.6).

2. – The measuring procedures according to Sub-clauses 7.1 and 8.1 of IEC Publication 871-1 should be followed except for the temperature and measuring time requirements which are according to this sub-clause.

3. – Instead of performing the test at the same ambient temperature the test unit may be thermally insulated in order to avoid a temperature decrease in the test unit before the measurement has been completed.

4.4 *Overvoltage test*

The unit shall be placed for at least 12 h in the unenergized state in a chamber with forced air circulation having a temperature not exceeding the lower limit of the temperature category (see IEC Publication 871-1, Sub-clause 4.1).