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Application guide for on-load tap-changers

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

APPLICATION GUIDE FOR ON-LOAD TAP-CHANGERS

FOREWORD

1) The formal decisions or agreements of the I E C 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 I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This publication has been prepared by Sub-Committee 14B, On-load Tap-changers, of I E C Technical Committee No. 14, Power Transformers.

It constitutes an application guide for on-load tap-changers.

A first draft was discussed at the meeting held in Brussels in 1971, and a second draft was discussed at the meeting held in Paris in 1973. As a result of this meeting, a draft, Document 14B(Central Office)9, was submitted to the National Committees for approval under the Six Months' Rule in May 1974.

The following countries voted explicitly in favour of publication:

Australia
Austria
Belgium
Czechoslovakia
Denmark
Finland
France
Germany
Hungary
Italy
Japan
Netherlands
Norway
Poland
Portugal
Romania
South Africa (Republic of)
Spain
Sweden
Switzerland
Turkey
Union of Soviet Socialist Republics
United Kingdom
United States of America

Other I E C publications quoted in this publication:

Publication Nos. 76-1: Power Transformers, Part 1: General.
76-4: Part 4: Tappings and Connections.
76-5: Part 5: Ability to Withstand Short Circuit.
214 : On-load Tap-changers (second edition).
354 : Loading Guide for Oil-immersed Transformers.

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APPLICATION GUIDE FOR ON-LOAD TAP-CHANGERS

1. Scope

This application guide is intended to assist in the selection of suitable on-load tap-changers for use in conjunction with the tapped windings of transformers or reactors which, in the following text, are referred to as transformers.

As in the second edition of I E C Publication 214, On-load Tap-changers (revision of Publication 214 (1966)), the designation "on-load tap-changer" is shortened to "tap-changer" in the remainder of this guide and all the tap-changers referred to shall be presumed to comply with the requirements specified in I E C Publication 214.

The recommendations of the application guide are not mandatory and only represent advice to the tap-changer manufacturer and purchaser. The responsibility for the correct application of the fully assembled tap-changer in connection with the transformer is with the manufacturer of the transformer.

2. Selection of a tap-changer

2.1 *General remarks*

Since the tap-changer represents only a small part of the total cost of the equipment in which it is used, it should be freely chosen to suit the equipment. However, account should be taken of the available standard types of tap-changers.

2.2 *Insulation level*

The following values occurring on all tapping positions of the transformer should be checked against the tap-changer manufacturer's declared values in accordance with Sub-clause 8.6.4 of I E C Publication 214:

1) Normal power-frequency operating voltages appearing on the tap-changer in service.
2) Power-frequency voltages appearing on the tap-changer during tests on the transformer.
3) Impulse voltages appearing on the tap-changer during tests on the transformer or in service.

Note. — With some winding arrangements, the voltages appearing on the transformer can be abnormally high, e.g.:

— neutral point tappings in auto-transformers,
— line-end tappings, and
— booster transformer arrangements.

These voltages can be affected considerably by the choice of linear, coarse/fine or reversing tapping arrangements. Methods of catering for voltage variation which involve variations in the magnetic flux in the transformer core can also affect the voltages appearing on various parts of the tap-changer (see I E C Publication 76, Power Transformers).

2.3 *Current*

The tap-changer should satisfy the following conditions:

2.3.1 *Rated through-current*

The rated through-current of the tap-changer as defined in Sub-clause 4.17 of I E C Publication 214 should be not less than that resulting from the highest value of tapping current of the tapped winding of the transformer (in accordance with Sub-clause 4.2 of I E C Publication 76-1, Part 1: General).

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