AS 3953—1996
IEC 905:1987/Corr.:1991

Australian Standard®

Loading guide for dry-type power transformers

This Australian Standard was prepared by Committee EL/8, Power Transformers. It was approved on behalf of the Council of Standards Australia on 6 November 1995 and published on 5 February 1996.

The following interests are represented on Committee EL/8:

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PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140
ISBN 0 7337 0212 0

PREFACE

This Standard was prepared by the Standards Australia Committee EL/8 on Power Transformers to supersede AS 3953—1991, *Loading guide for dry-type power transformers*. It is identical to and has been reproduced from IEC 905:1987, *Loading guide for dry-type power transformers*, as corrected by the Corrigendum of April 1991.

Australian variations to IEC 905 are listed in Appendix ZZ. The changes are indicated in the text by single marginal bars against the relevant clause, note, table or figure, or part thereof.

The text affected by the Corrigendum is marked with double marginal bars.

The objective of this Standard is to provide designers and users of dry-type power transformers with guidance in calculating the permissible loading and rated power of transformers complying with AS 2735, *Dry-type power transformers*, to promote better matching of load with power capacity.

The term 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

As this Standard is reproduced from an international Standard, the following applies:

(a) Its number appears on the cover and title page while the international Standard number appears only on the cover.

(b) In the source text, 'this International Standard' should read 'this Australian/New Zealand Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

Statements expressed in the international Standard in mandatory terms in notes to tables and figures are requirements of this Standard.

References to international Standards should be replaced by equivalent Australian Standards, as follows:

Reference to International Standard		*Australian Standard*	
IEC		AS	
76	Power transformers	2374	Power transformers
76-1	Part 1: General	2374.1	Part 1: General requirements
726	Dry-type power transformers	2735	Dry-type power transformers

CONTENTS

Originated as AS 3953—1991.
Second edition 1996.

NOTES

AUSTRALIAN STANDARD

LOADING GUIDE FOR DRY-TYPE POWER TRANSFORMERS

1. Scope

This guide is applicable to naturally cooled dry-type power transformers complying with IEC Publication 726 and operated within the limitations referred to in Clause 6. Six different insulation systems are taken into account, identified by their system temperatures.

Because there are numerous combinations of different insulation systems and constructions it is possible to make loading recommendations only of a general nature. For this reason the guide is in two parts:

— the first part makes no loading recommendations, but gives the method of calculating loading conditions when the variable parameters are known as the result of prototype testing of a particular construction and/or insulation system. The calculations are given in the form of an algorithm from which computer programs can be written;

— the second part assumes constant values for the variable parameters, with the exception of the insulation temperature limits (Table I) and the temperature of external cooling air, irrespective of insulation system or construction, thereby enabling load curves to be produced.

The guide indicates how dry-type transformers may be operated without exceeding the acceptable limit of deterioration of insulation through thermal effects. The acceptable limit of deterioration of insulation is defined as that which occurs when the dry-type transformer is operating under rated conditions at the basic temperature of the external cooling air.

2. Object

The object of this guide is to permit the calculation of, and to indicate the permissible loading under certain defined conditions in terms of rated current, for the guidance of users and to help planners to choose the rated power of transformers required for new installations.

The basic temperature of the external cooling air is assumed to be 20°C. Guidance is given for this temperature, and also for external cooling air temperatures of 10°C and 30°C. Deviations from these temperatures are provided for in such a way that the increased use of life when operated with a higher external cooling air temperature is balanced by a reduced use of life with a lower external cooling air temperature.

In practice, uninterrupted continuous operation at full rated current is unusual, and this guide gives recommendations for cyclic daily loads, taking into account seasonal variations of ambient temperature. The daily use of life due to thermal effects is compared with normal daily use of life which results when the dry-type transformer is operating at rated voltage and current, with an external cooling air temperature of 20°C.