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Superseded by AS 2729-1994 (Identical ISO 281/1)

AS 2729—1984
UDC 621.822.6/.8

Australian Standard 2729—1984

ROLLING BEARINGS—DYNAMIC LOAD RATINGS AND RATING LIFE—CALCULATION METHODS

(Title allocated by Defence Cataloguing Authority:
BEARINGS, ROLLER (Dynamic Load Ratings and Rating Life—
Calculation method) ... NSC 3110)

STANDARDS ASSOCIATION OF AUSTRALIA
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This Australian standard was prepared by Committee ME/37, Rolling Bearings. It was approved on behalf of the Council of the Standards Association of Australia on 29 June 1984 and published on 5 October 1984.

The following interests are represented on Committee ME/37:

Australian British Trade Association

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Department of Defence

Federation of Automotive Products Manufacturers

Institution of Engineers Australia

Metal Trades Industry Association of Australia

Railways of Australia Committee

Society of Automotive Engineers Australasia

Tractor and Machinery Association of Australia

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Suggestions for improvements to Australian standards, addressed to the head office of the Association, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This standard was issued in draft form for comment as DR 83214.

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AMENDMENT No 1
to
AS 2729—1984
ROLLING BEARINGS—
DYNAMIC LOAD RATINGS AND RATING LIFE—CALCULATION METHODS

REVISION

SUMMARY: This amendment applies to the Preface.

Published on 7 April 1986.

AMDT No 1 APR. 1986

Page 2. Preface

Delete:

The Technical Report (when published by ISO/TC4) will be obtainable from SAA and will be available at all SAA information centres. Until its publication, the ISO document on which it is based, ISO/TC 4-N926 will be available at all SAA information centres.

Substitute:

This Technical Report, ISO/TR 8646, Explanatory Notes on ISO 281/1—1977, was published in February 1985 and is available at all SAA information centres.

AUSTRALIAN STANDARD

ROLLING BEARINGS— DYNAMIC LOAD RATINGS AND RATING LIFE— CALCULATION METHODS

AS 2129—1984

First published 1984

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3469 9

PREFACE

This standard was prepared by the Association's Committee on Rolling Bearings. It is identical with and has been reproduced from International standard ISO 281/1, drawn up by ISO/TC 4, Rolling Bearings.

ISO 281/1 was prepared by the International Organization for Standardization's Technical Committee ISO/TC 4, Rolling Bearings. When issued for voting as a draft International standard, the member bodies of Australia, Bulgaria, Canada, Chile, Czechoslovakia, France, Germany, Hungary, India, Italy, Japan, Republic of Korea, Mexico, Netherlands, Poland, Romania, Republic of South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, U.S.A., U.S.S.R. and Yugoslavia approved its issue for publication as an International standard. The member body of Austria expressed disapproval of the document on technical grounds.

Attention is drawn to Clause 8. The data presented in this clause clearly indicates the need for knowledge of bearing specifications, application specification and the operating environment before a theoretical bearing rating can be calculated. However, it also has to be considered that factors a_1, a_2 and a_3 will vary from one bearing type to another when all other factors are equal.

ISO 281/1 makes mention of Part 2, Explanatory Notes, which gives supplementary background information regarding the derivation of formulas and factors given in Part 1. In subsequent decisions, ISO/TC 4 has agreed to publish this information as a Technical Report, complementing ISO 281/1, instead of issuing ISO 281/2. Accordingly, this Australian standard does not have the designation of 'Part 1'.

The Technical Report (when published by ISO/TC 4) will be obtainable from SAA and will be available at all SAA information centres. Until its publication, the ISO document on which it is based, ISO/TC 4 N 196 will be available at all SAA information centres. SEE AMENDMENT No. 1 April 1986

For the purpose of this Australian standard, the text of the ISO standard should be modified as follows:

(a) Terminology: The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.

(b) Decimal comma: The decimal point should replace the decimal comma wherever it appears.

CONTENTS

Rolling bearings — Dynamic load ratings and rating life — Calculation methods

0 INTRODUCTION

It is often impractical to establish the suitability of a bearing selected for a specific application by testing a sufficient number of bearings in that application. Other methods are therefore required to establish this suitability.

Life, as defined in sub-clause 2.1, represents the period of unimpaired performance of a rolling bearing when the bearing is properly mounted, adequately lubricated, protected from foreign matter and not otherwise subjected to extreme operating conditions. A reliable life calculation is therefore considered to be a suitable and advantageous substitute for testing.

The purpose of this International Standard is to provide the required basis for this life calculation.

1 SCOPE AND FIELD OF APPLICATION

This International Standard sets out methods of calculating the basic dynamic load rating and rating life of rolling bearings within the size ranges shown in the relevant ISO publications, manufactured from good quality hardened steel in accordance with good manufacturing practice and basically of conventional design as regards the shape of rolling contact surfaces.

This International Standard also specifies methods of calculating adjusted rating life to take into account various reliabilities, materials and operating conditions.

The present state of the art does not permit the inclusion in this International Standard of specifications such as, for example, that of the characteristics of good quality, hardened steel (analysis, inclusions, structure, hardness, etc.), or the inclusion of specific values of life adjustment factors for material and operating conditions. Revisions of this International Standard will therefore be required from time to time as the result of new developments or in the light of new information concerning specific bearing types.

Calculations according to this International Standard do not yield satisfactory results for bearings subjected to such application conditions and/or of such internal design which result in considerable truncation of the area of contact between the rolling elements and the ring raceways. Unmodified calculation results are thus not applicable, for example, to groove ball bearings with filling slots which project substantially into the ball/raceway contact area when the bearing is subjected to load in the application.

Calculations according to this International Standard do not yield satisfactory results for bearings subjected to such application conditions which cause deviations from a normal load distribution in the bearing, for example misalignment, housing or shaft deflection, rolling element centrifugal forces or other high speed effects, and preload or extra large clearance in radial bearings. Where there is reason to assume that such conditions prevail, the user should consult the bearing manufacturer for recommendations and evaluation of equivalent load and life.

This International Standard is not applicable to designs where the rolling elements operate directly on a shaft or housing surface, unless that surface is equivalent in all respects to the bearing ring (or washer) raceway it replaces.

Double row radial bearings and double direction thrust bearings are, when referred to in this International Standard, presumed to be symmetrical.

Further limitations concerning particular types of bearings are included in the relevant clauses.

2 DEFINITIONS

2.1 life : For an individual rolling bearing, the number of revolutions which one of the bearing rings (or washers) makes in relation to the other ring (or washer) before the first evidence of fatigue develops in the material of one of the rings (or washers) or rolling elements.

2.2 reliability (in the context of bearing life) : For a group of apparently identical rolling bearings, operating under the same conditions, the percentage of the group that is expected to attain or exceed a specified life.

The reliability of an individual rolling bearing is the probability that the bearing will attain or exceed a specified life.

2.3 basic rating life : For an individual rolling bearing, or a group of apparently identical rolling bearings operating under the same conditions, the life associated with 90 % reliability.

2.4 basic dynamic radial load rating : That constant stationary radial load which a rolling bearing can theoretically endure for a basic rating life of one million revolutions. In the case of a single row angular contact bearing, the radial load rating refers to the radial