# ISO/TR 1281-1:2021-05 (E)

## Rolling bearings - Explanatory notes on ISO 28 1 - Part 1: Basic dynamic load rating and basic rating life

## Contents

Page


**Foreword** ..... **iv**

**Introduction** ..... **v**

**1 Scope** ..... **1**

**2 Normative references** ..... **1**

**3 Terms and definitions** ..... **1**

**4 Symbols** ..... **1**

**5 General** ..... **4**

**6 Basic dynamic load rating** ..... **4**

6.1 General ..... 4

6.2 Basic dynamic radial load rating, $C_r$, for radial ball bearings ..... 5

6.3 Basic dynamic axial load rating, $C_a$, for single row thrust ball bearings ..... 9

6.3.1 Thrust ball bearings with contact angle $\alpha \neq 90°$ ..... 9

6.3.2 Thrust ball bearings with contact angle $\alpha = 90°$ ..... 9

6.4 Basic dynamic axial load rating, $C_a$, for thrust ball bearings with two or more rows of balls ..... 10

6.5 Basic dynamic radial load rating, $C_r$, for radial roller bearings ..... 11

6.6 Basic dynamic axial load rating, $C_a$, for single row thrust roller bearings ..... 13

6.6.1 Thrust roller bearings with contact $\alpha \neq 90°$ ..... 13

6.6.2 Thrust roller bearings with contact angle $\alpha = 90°$ ..... 13

6.7 Basic dynamic axial load rating, $C_a$, for thrust roller bearings with two or more rows of rollers ..... 14

**7 Dynamic equivalent load** ..... **16**

7.1 Expressions for dynamic equivalent load ..... 16

7.1.1 Theoretical dynamic equivalent radial load, $P_r$, for single row radial bearings ..... 16

7.1.2 Theoretical dynamic equivalent radial load, $P_r$, for double row radial bearings ..... 20

7.1.3 Theoretical dynamic equivalent radial load, $P_r$, for radial contact groove ball bearings ..... 22

7.1.4 Practical expressions for dynamic equivalent radial load, $P_r$, for radial bearings with constant contact angle ..... 22

7.1.5 Practical expressions for dynamic equivalent radial load, $P_r$, for radial ball bearings ..... 25

7.1.6 Practical expressions for dynamic equivalent axial load, $P_a$, for thrust bearings ..... 26

7.2 Factors $X$, $Y$ and $e$ ..... 28

7.2.1 Radial ball bearings ..... 28

7.2.2 Values of $X$, $Y$ and $e$ for each type of radial ball bearing ..... 29

7.2.3 Tabulation of factors $X$, $Y$ and $e$ for radial ball bearings ..... 35

7.2.4 Calculated values of $Y$ and $e$ different from standard ..... 37

7.2.5 Thrust ball bearings ..... 37

7.2.6 Radial roller bearings ..... 38

7.2.7 Thrust roller bearings ..... 39

**8 Basic rating life** ..... **39**

**Bibliography** ..... **42**