DIN EN 13103-1:2019-02 (E)

Railway applications - Wheelsets and bogies - Part 1: Design method for axles with external journals

Contents

Page

Foreword ... 4

Introduction ... 5

1 Scope ... 6

2 Normative references ... 7

3 Terms and definitions ... 7

4 Symbols and abbreviations ... 8

5 *) **General** ... 9

6 Forces and moments to be taken into consideration ... 10
6.1 Types of forces ... 10
6.2 Influence of masses in motion ... 10
6.3 Effects due to braking ... 15
6.4 Effects due to curving and wheel geometry ... 20
6.5 Effects due to traction ... 20
6.6 Calculation of the resultant moment ... 21

7 Determination of geometric characteristics of the various parts of the axle ... 22
7.1 Stresses in the various sections of the axle ... 22
7.2 Determination of the diameter of journals and axle bodies ... 26
7.3 Determination of the diameter of the various seats from the diameter of the axle body or from the journals ... 26

8 Maximum permissible stresses ... 31
8.1 General ... 31
8.2 Steel grade EA1N and EA1T ... 32
8.3 Steel grade other than EA1N or EA1T ... 35

Annex A (informative) **Model of axle calculation sheet** ... 39

Annex B (informative) **Procedure for the calculation of the load coefficient for tilting vehicles** ... 41

Annex C (informative) **Values of forces to take into consideration for wheelsets for narrow gauge track (metre gauge or close to a metre gauge)** ... 43

Annex D (normative) **Method for determination of full-scale fatigue limits for new materials** ... 44

D.1 Scope **44**
D.2 General requirements for the test pieces **44**
D.3 General requirements for test apparatus **44**
D.4 Axle body fatigue limit ("F1") **44**
D.5 Axle bore fatigue limit ("F2") **46**
D.6 Wheel seat fatigue limit ("F3 and F4") **47**
D.7 Content of the test report **50**
Annex ZA (informative) **Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC** **51**
Bibliography **53**