DIN EN 15085-3:2023-07 (E)

Railway applications - Welding of railway vehicles and components - Part 3: Design requirements (includes Amendment A1:2023)

Contents

Page

European foreword 4

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 9

4 Design requirements 9
4.1 General 9
4.2 Dimensioning of welded joints 10
4.3 Stress categories and stress factors 10
4.4 Safety categories 10
4.5 Weld performance classes 10
4.6 Weld inspection classes 11

5 Quality levels for imperfections 12
5.1 General 12
5.2 Quality levels for imperfections for fusion welded joints (beam welding excluded) 12
5.3 Quality levels for imperfections for beam welded joints 13
5.3.1 General 13
5.3.2 Quality levels for imperfection for friction stir welding 14
5.3.3 Quality levels for imperfections for stud welding related to the weld performance class 14
5.3.4 Quality requirements for resistance spot welding, projection welding and resistance seam welding related to the weld performance class 14
5.3.5 Quality requirements for flash welding 15
5.3.6 Defining quality requirements for other welding processes 15

6 Selection of parent metals and welding consumables 15
6.1 Selection of parent metals 15
6.2 Selection of welding consumables 15

7 Weld joint design 16
7.1 General 16
7.2 Design guidelines 16
7.2.1 Fabricated box sections 16
7.2.2 Butt welds on parts of dissimilar thickness 17
7.2.3 Plug welds and slot welds 18
7.2.4 Proximity of two joints 19
7.2.5 Stiffeners welded across a butt weld 19
7.2.6 Openings 20
7.2.7 Design guidelines for stiffeners and gussets ends 20
7.2.8 Gusset shape 20
7.2.9 Weld return 21
7.2.10 Fillet weld 22
7.2.11 Use of run-on and run-off plates 23
7.2.12 Highly restrained joints 23
7.2.13 Mixing of joining techniques 24

7.2.14 Prevention of corrosion problems 25
7.2.15 Intermittent welds 25
7.3 Joint preparation 26
7.4 Methods to improve the fatigue strength (Post weld improvement) 26
7.4.1 General 26
7.4.2 Improvement of shape of weld toe 27
7.4.3 Post Weld Heat Treatment (PWHT) — stress relief 27
7.4.4 Introduction of compressive stress 28
8 Design documentation related to welding 28
8.1 Information on design drawings or documentation linked to the drawings 28
8.2 Design review of welded components 29
8.3 Use of existing drawings not according to EN 15085 30
Annex A (informative) List of welded joints (example) 31
Annex B (informative) Joint preparation of welds 32
Annex C (informative) Joint preparation for plug welds 40
Annex D (informative) Types of joints in relation to stresses and inspection classes 41
Annex E (informative) Flash welding 42
Annex F (normative) Resistance spot, seam and projection welding 45
F.1 General 45
F.2 Minimum shear pull forces 50
Annex G (informative) Determination of safety category for welded joints 52
A1 Annex ZA (informative) Relationship between this European Standard and the Essential requirements of Directive (EU) 2016/797 aimed to be covered A1 53
Bibliography 55