DIN EN 14587-1:2019-08 (E)

Railway applications - Infrastructure - Flash butt wel ding of new rails - Part 1: R220, R260, R260Mn, R320Cr, R350HT, R350LHT, R370CrHT and R400HT grade rails in a fixed plant

Contents

Page

European foreword 4

Introduction 5

1 Scope 6

2 Normative references 6

3 Terms and definitions 6

4 Requirements for the welding process 8
4.1 General 8
4.2 Rail end preparation and horizontal alignment requirements 8
4.3 Clamping force 8
4.4 Pre-heating 8
4.5 Final flashing 8
4.6 Upsetting 8
4.7 Unclamping 8
4.8 Slippage 9
4.9 Welding parameters 9
4.10 Steps across the weld 9
4.11 Removal of excess upset 11
4.12 Post-weld thermal treatment 13

5 Procedure approval 13
5.1 General 13
5.2 Information to be supplied by the purchaser 13
5.3 Sample preparation 14
5.4 Approval tests 14
5.4.1 Visual examination 14
5.4.2 Weld trimming 14
5.4.3 Weld straightness and flatness 14
5.4.4 Magnetic particle or dye penetrant testing 14
5.4.5 Bend test 14
5.4.6 Macro examination 15
5.4.7 Micro examination 16
5.4.8 Hardness test 16
5.4.9 Fatigue test 16
5.5 Test report 17

6 Approval of other rail profiles and grades 17
6.1 General 17
6.2 Sample preparation 17
6.3 Approval tests 17
6.4 Test report 17

7 Approval of the contractor 17
7.1 General 17
7.2 Welding procedure 18

7.3 Operators ... 18
7.4 Supervision ... 18
7.5 Weld testing ... 18
7.6 Equipment ... 18

8 Weld production following procedure approval ... 18
8.1 Weld production ... 18
8.2 Information supplied by the purchaser ... 18
8.3 Rail end preparation and horizontal rail alignment requirements ... 19
8.4 Weld parameter monitoring ... 19
8.5 Weld identification ... 19
8.6 Visual examination ... 19
8.7 Steps across the weld ... 19
8.8 Finishing ... 19
8.8.1 Correction of vertical and horizontal weld alignment ... 19
8.8.2 Profile finishing of the rail head ... 19
8.9 Weld straightness and flatness ... 20
8.9.1 Alignment requirements ... 20
8.9.2 Straightness and flatness measurement ... 20
8.10 Bend test ... 21
8.10.1 General ... 21
8.10.2 Additional test requirements ... 21
8.10.3 Bend test procedure ... 21
8.10.4 Interpretation of results ... 22
8.10.5 Retesting ... 22
8.11 Documentation ... 22

Annex A (normative) Bend test requirements ... 23

Annex B (normative) Test weld fracture faces - Recording of defects ... 25

Annex C (normative) Fatigue test method for flash butt welds ... 27

C.1 General ... 27
C.2 Test equipment ... 27
C.3 Calibration ... 29
C.3.1 General ... 29
C.3.2 Test piece ... 29
C.4 Fatigue test method ... 29
C.4.1 General ... 29
C.4.2 Staircase test method ... 29
C.4.3 Example of the data analysis of a fatigue strength determination by the staircase method ... 32
C.4.4 Past-the-post test method ... 32

Annex D (normative) Macro examination and micro examination ... 34

D.1 Macro examination ... 34
D.2 Micro examination ... 34

Annex E (normative) Hardness testing ... 36

Bibliography ... 37