

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

Railway applications - Infrastructure - Flash butt welding 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 |