DIN EN 13981-4:2007-02 (E)

Aluminium and aluminium alloys - Products for structural railway applications - Technical conditions for inspectio n and delivery - Part 4: Forgings

Contents

Page

Foreword 4

1 Scope 5

2 Normative references 5

3 Terms and definitions 5

4 Ordering information 6

5 Requirements 6
5.1 Production and manufacturing processes 6
5.2 Quality assurance 6
5.3 Alloys, chemical composition and tempers 7
5.4 Mechanical properties of forgings 7
5.4.1 Mechanical properties of forgings under static loading 7
5.4.2 Mechanical properties of forgings under cyclic loading 7
5.5 Mechanical properties of welded joints 8
5.5.1 General 8
5.5.2 Mechanical properties of welded joints under static loading 8
5.5.3 Mechanical properties of welded joints under cyclic loading 8
5.6 Freedom from surface defects 9
5.7 Tolerances on dimensions and form 9

6 Qualification procedures 9
6.1 First-off article approval procedure 9
6.2 Additional qualification procedure 9

7 Sampling and test methods 10
7.1 General 10
7.2 Analysis of chemical composition 10
7.3 Tensile test 11
7.4 Preparation of test pieces for the testing of welded joints 11
7.5 Tensile testing on welded joints 11
7.6 Fatigue testing (parent material and welded joints) 11
7.7 Dye penetrant testing 12
7.8 Metallographic testing 12
7.9 Visual inspection 12
7.10 Measurement of dimensions 12
7.11 Ultrasonic testing 12

8 Traceability 13

9 Marking of forgings 13

10 Declaration of conformity 13

11 Record keeping 14

12 Packaging 14

13 Application and use 14

14 Complaints of non-conformity 14

Annex A (normative) Mechanical properties of alloys EN AW-6061 and EN AW-6110A 15

Annex B (normative) Test pieces for fatigue testing 16

Annex C (informative) Guidelines for application and use 17

C.1 Selection of alloys 17
C.2 Fatigue design 18
C.3 Welding 18

Annex D (normative) Chemical composition of EN AW-6110A [EN AW-Al Mg0,9Si0,9MnCu] 20

Bibliography 21

Figures Figure B.1 -- Test pieces for fatigue testing 16

Tables Table 1 -- Fatigue properties of forgings (not applicable for design purposes, see C.2) 7

Table 2 -- Fatigue properties of MIG welded butt joints (not applicable for design purposes, see C.2) 9

Table 3 -- Product inspection and testing procedures 10

Table 4 -- Fatigue test factor F 12

Table A.1 -- Mechanical properties of alloy EN AW-6061 and EN AW-6110A forgings 15

Table B.1 -- Dimensions of test pieces 16

Table C.1 -- Mechanical properties of welded butt joints, EN ISO 10042 class C, MIG welded 19

Table D.1 -- Chemical composition of alloy EN AW-6110A 20