DIN EN 13445-8:2014-12 (E)

Unfired pressure vessels - Part 8: Additional requirements for pressure vessels of aluminium and aluminium alloys

Contents

Page

Foreword 4

1 Scope 6

2 Normative references 6

3 Terms, definitions, symbols and units 7

4 General requirements 7

5 Materials 7
5.1 General 7
5.2 Elongation after fracture 7
5.3 Prevention of brittle fracture 7
5.4 Lamellar tearing 8
5.5 Chemical composition 8
5.6 Material grouping system 8

6 Design 9
6.1 General 9
6.2 Design temperature and properties 9
6.3 Time-independent nominal design stress 9
6.4 Thick walled, small bore piping for shells 9
6.5 Fatigue design 10
6.6 Lapped joints, joggle joints, permanent backing strips 10
6.6.1 General 10
6.6.2 Lapped joints 10
6.6.3 Joggle joints 10
6.6.4 Joints with permanent backing strips 11

7 Manufacture 11
7.1 General 11
7.2 Materials 11
7.3 Welding procedure specification (WPS) 11
7.4 Qualification of welding procedure specifications (WPQR) 11
7.5 Qualification of welders and welding operators 12
7.6 Joint preparation 12
7.7 Preheat 12
7.8 Production test, reference criteria 12
7.9 Extent of testing 13
7.10 Performance of test and acceptance criteria 13
7.11 Forming procedures 13
7.12 Heat treatment after forming 13
7.13 Sampling of formed products 15
7.14 Tests 15
7.14.1 Base material 15
7.14.2 Butt welds 16
7.15 Post weld heat treatment (PWHT) 16

8 Inspection and testing 16
8.1 General 16

8.2 Non-destructive testing of welded joints ... 16
8.2.1 General ... 16
8.2.2 Demonstration of satisfactory experience for testing group 2 ... 17
8.2.3 Symbols ... 18
8.3 Determination of extent of non destructive testing ... 18
8.4 Applicable non destructive testing techniques ... 21
8.4.1 NDT methods ... 21
8.4.2 Acceptance criteria for radiographic testing (RT) ... 22

Issue 1 (2014-09) 8.4.3 Acceptance criteria for visual and surface penetrant testing ... 22
8.4.4 Acceptance criteria for penetrant testing (PT) ... 23
8.5 Selection of non-destructive testing methods for internal imperfections ... 23
8.6 Standard hydrostatic test ... 24
8.7 Pneumatic testing ... 24

9 Inspection and testing of serially produced pressure vessels -- Model approval ... 24
9.1 General ... 24
9.2 Inspection and testing of pressure vessels subject to cyclic loads ... 24

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of the EU Pressure Equipment Directive 97/23/EC ... 26

Bibliography ... 27