

DIN EN 13445-8:2013-12 (E)

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

Contents	Page
Foreword	4
1 Scope	5
2 Normative references	5
3 Terms, definitions, symbols and units	6
4 General requirements	6
5 Materials	6
5.1 General	6
5.2 Elongation after fracture	6
5.3 Prevention of brittle fracture	6
5.4 Lamellar tearing	7
5.5 Chemical composition	7
5.6 Material grouping system	7
6 Design	8
6.1 General	8
6.2 Design temperature and properties	8
6.3 Time-independent nominal design stress	8
6.4 Thick walled, small bore piping for shells	8
6.5 Fatigue design	9
6.6 Lapped joints, joggle joints, permanent backing strips	9
6.6.1 General	9
6.6.2 Lapped joints	9
6.6.3 Joggle joints	9
6.6.4 Joints with permanent backing strips	10
7 Manufacture	10
7.1 General	10
7.2 Materials	10
7.3 Welding procedure specification (WPS)	10
7.4 Qualification of welding procedure specifications (WPQR)	10
7.5 Qualification of welders and welding operators	11
7.6 Joint preparation	11
7.7 Preheat	11
7.8 Production test, reference criteria	11
7.9 Extent of testing	11
7.10 Performance of test and acceptance criteria	12
7.11 Forming procedures	12
7.12 Heat treatment after forming	12
7.13 Sampling of formed products	14
7.14 Tests	14
7.14.1 Base material	14
7.14.2 Butt welds	15
7.15 Post weld heat treatment (PWHT)	15
8 Inspection and testing	15
8.1 General	15

8.2	Non-destructive testing of welded joints	15
8.2.1	General	15
8.2.2	Demonstration of satisfactory experience for testing group 2	16
8.2.3	Symbols	17
8.3	Determination of extent of non destructive testing	17
8.4	Applicable non destructive testing techniques	20
8.4.1	NDT methods	20
8.4.2	Acceptance criteria for radiographic testing (RT)	21
Issue 5 (2013-07)	8.4.3 Acceptance criteria for visual and surface penetrant testing	21
8.4.4	Acceptance criteria for penetrant testing (PT)	22
8.5	Selection of non-destructive testing methods for internal imperfections	22
8.6	Standard hydrostatic test	23
8.7	Pneumatic testing	23
9	Inspection and testing of serially produced pressure vessels -- Model approval	23
9.1	General	23
9.2	Inspection and testing of pressure vessels subject to cyclic loads	23
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of the EU Pressure Equipment Directive 97/23/EC	25
Bibliography		26