

DIN EN 13445-8:2016-12 (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
6.7	Flat ends	11
6.8	Design by experiment	11
6.9	Port-hole-extruded tubes	11
7	Manufacture.....	a
7.1	General.....	a
7.2	Materials	a
7.3	Tolerances	a
7.4	Welding procedure specification (WPS)	a
7.5	Qualification of welding procedure specifications (WPQR).....	a
7.6	Qualification of welders and welding operators.....	12
7.7	Joint preparation.....	12
7.8	Preheat.....	12
7.9	Production test, reference criteria	12
7.10	Extent of testing.....	13
7.11	Performance of test and acceptance criteria.....	13
7.12	Forming procedures	13
7.13	Heat treatment after forming	13
7.14	Sampling of formed products.....	15
7.15	Tests.....	15
7.15.1	Base material.....	15
7.15.2	Butt welds.....	16
7.16	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
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 A (normative) Allowable design strength values.....		24a
Annex Y (informative) History of EN 13445-8		25
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered		26
Bibliography		27