

DIN EN 13445-8:2021-12 (E)

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

Contents		Page
European foreword.....		4
1	Scope.....	5
2	Normative references.....	5
3	Terms, definitions, symbols and units	7
4	General.....	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	10
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.....	11
6.6.4	Joints with permanent backing strips	11
6.7	Flat ends	11
6.8	Design by experiment.....	12
6.9	Port-hole-extruded tubes.....	12
7	Manufacture.....	12
7.1	General.....	12
7.2	Materials.....	12
7.3	Tolerances	12
7.4	Welding procedure specification (WPS).....	13
7.5	Qualification of welding procedure specifications (WPQR).....	13
7.6	Qualification of welders and welding operators	13
7.7	Joint preparation.....	13
7.8	Preheat.....	14
7.9	Production test, reference criteria	14
7.10	Extent of testing	15
7.11	Performance of test and acceptance criteria	15
7.12	Forming procedures.....	15
7.13	Heat treatment after forming	16
7.14	Sampling of formed products	17

7.15	Tests	18
7.15.1	Base material	18
7.15.2	Butt welds.....	18
7.16	Post weld heat treatment (PWHT)	18
8	Inspection and testing.....	18
8.1	General	18
8.2	Non-destructive testing of welded joints	19
8.2.1	General	19
8.2.2	Demonstration of satisfactory experience for testing group 2	20
8.2.3	Symbols	20
8.3	Determination of extent of non destructive testing.....	20
8.4	Applicable non-destructive testing techniques.....	23
8.4.1	NDT methods.....	23
8.4.2	Acceptance criteria for radiographic testing (RT)	24
8.4.3	Acceptance criteria for visual and surface penetrant testing	24
8.4.4	Acceptance criteria for penetrant testing (PT).....	25
8.5	Selection of non-destructive testing methods for internal imperfections.....	25
8.6	Standard hydrostatic test	26
8.7	Pneumatic testing.....	26
9	Inspection and testing of serially produced pressure vessels — Model approval.....	26
9.1	General	26
9.2	Inspection and testing of pressure vessels subject to cyclic loads	26
Annex A	(normative) Allowable design strength values	27
A.1	General	27
A.2	Extruded rod/bar, tube and profile	27
A.3	Cold drawn rod/bar and tube	29
A.4	Forgings.....	30
Annex Y	(informative) History of EN 13445-8.....	34
Y.1	Differences between EN 13445-8:2014 and EN 13445-8:2021	34
Annex ZA	(informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered	35
Bibliography	37