

DIN EN 15776:2022-09 (E)

Unfired pressure vessels - Requirements for the design and fabrication of pressure vessels and pressure vessels parts constructed from cast iron with an elongation after fracture equal or less than 15 %

Contents

Page

European foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms, definitions, units and symbols	7
3.1 Terms and definitions	7
3.2 Symbols	9
3.3 Inter relation of thicknesses definitions (EN 13445-6:2021)	11
4 Materials, limitations and service conditions	11
4.1 Materials and limitations on temperature, maximum allowable pressure and energy content	11
4.2 Cyclic loading	13
5 Design requirements	14
5.1 Design principle	14
5.2 Conceptual design and construction drawings	15
5.3 Static loading	15
5.3.1 General	15
5.3.2 Design by formula (DBF)	15
5.3.3 Design by analysis (DBA)	16
5.3.4 Design by experiment (DBE)	16
5.4 Temperature reduction factor	16
5.5 Wall thickness correction factor	16
5.6 Design for external pressure	17
5.7 Testing conditions	17
5.8 Design methods	17
5.8.1 General	17
5.8.2 Static loading	17
5.8.3 Dynamic loading	20
5.9 Construction details	25
5.9.1 Reinforcement of openings in cylinders, flat ends, dished ends, etc	25
5.9.2 Fillet radius	25
5.9.3 Dished cover	26
5.10 Technical documentation	26
5.10.1 General	26
5.10.2 Information to be contained in the technical documentation	26
5.10.3 Test reports	28
5.10.4 Design review	28
6 Founding, material and casting testing	29
6.1 Founding	29
6.1.1 General	29
6.1.2 Welding	29
6.2 Material testing	29

6.2.1	General	29
6.2.2	Frequency and number of tests	29
6.2.3	Inspection documents	30
6.3	Casting testing	30
6.3.1	General	30
6.3.2	Surface imperfections	30
6.3.3	Cracks, laps, cold shot and non-fused chaplets	30
6.3.4	Ultrasonic testing and/or sectioning	30
6.3.5	Liquid penetrant testing	31
6.3.6	Surface roughness	31
6.3.7	Minimum wall thickness	31
6.3.8	Wall thickness tolerances	31
6.3.9	Other dimensions	31
6.3.10	Qualification of testing personnel	31
7	Final assessment	31
7.1	General	31
7.2	Hydraulic test pressure	31
8	Pressure vessels assembled of a combination of parts in different materials	32
9	Marking and documentation	32
9.1	Marking of castings	32
9.2	Name plate for the complete pressure vessel	32
9.3	Documentation	32
Annex A (informative) Technical data for design calculations		33
Annex B (informative) Recommendations for in-service validation and inspection		36
B.1	Purpose	36
B.2	Tests during operation	36
Annex C (informative) Examples of fatigue design curves		37
Annex ZA (informative) Relationship between this European standard and the essential requirements of Directive 2014/68 EU aimed to be covered		40
Bibliography		41