

DIN EN 13445-6:2011-12 (E)

Unfired pressure vessels - Part 6: Requirements for the design and fabrication of pressure vessels and pressure parts constructed from spheroidal graphite cast iron

Contents		Page
Foreword		4
1	Scope	5
2	Normative references	5
3	Terms, definitions, units and symbols	6
3.1	Terms and definitions	6
3.2	Units	7
3.3	Symbols	7
3.4	Inter-relation of thicknesses definitions	9
4	Service conditions	9
4.1	Cyclic loading	9
4.2	Limitations on temperature and energy content	10
5	Requirements	10
5.1	Materials	10
5.2	Design	12
5.2.1	Technical documentation	12
5.2.2	Design methods	12
5.3	Founding	18
5.3.1	General	18
5.3.2	Welding	18
6	Material testing	18
6.1	General	18
6.2	Frequency and number of tests	18
6.3	Chemical analysis	18
6.4	Graphite structure	19
6.5	Inspection documents	19
7	Testing and final assessment	19
7.1	Testing	19
7.1.1	General	19
7.1.2	Testing requirements for CQ = 0,8	19
7.1.3	Testing requirements for CQ = 0,9	19
7.1.4	Surface imperfections	20
7.1.5	Cracks, laps, cold shut and non-fused chaplets	21
7.1.6	Ultrasonic testing and/or sectioning	21
7.1.7	Magnetic particle testing (only for ferritic grades)	21
7.1.8	Penetrant testing	21
7.1.9	Radiographic testing	21
7.1.10	Surface roughness	22
7.1.11	Minimum wall thickness	22
7.1.12	Wall thickness tolerances	22
7.1.13	Other dimensions	22
7.1.14	Qualification of testing personnel	22
7.2	Final assessment	22
7.2.1	General	22
7.2.2	Hydraulic test pressure	22

8	Pressure vessels constructed of a combination of parts in different materials	23
9	Marking and documentation.....	23
9.1	Marking of castings	23
9.2	Name plate for the complete pressure vessel	23
9.3	Documentation.....	23
	Annex A (normative) Technical data for the design calculations.....	24
	Annex B (informative) Ductility	26
	Annex C (informative) Determination of the minimum local wall thickness and minimum required burst test pressure	27
	Annex D (normative) Assessment of fatigue life.....	28
	Annex E (normative) Design by analysis for castings.....	41
	Annex F (informative) Recommendations for in-service validation and inspection	43
	Annex G (normative) Specific design requirements.....	45
	Annex H (normative) Experimental cyclic pressure testing procedure.....	47
	Annex Y (informative) History of EN 13445-6	51
	Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of the EU Pressure Equipment Directive 97/23/EC	52
	Bibliography.....	53