

DIN EN 12817:2019-06 (E)

LPG Equipment and accessories - Inspection and requalification of LPG pressure vessels up to and including 13 m³

Contents		Page
European foreword		5
Introduction		6
1	Scope	7
2	Normative references	7
3	Terms and definitions	7
4	Safety	8
4.1	Safety precautions	8
4.2	Unsafe conditions	8
4.3	Leaks	8
5	Written scheme	9
6	Pressure vessel inspection, requalification and recommissioning	10
6.1	Routine inspection	10
6.2	Periodic inspection	10
6.3	Requalification	10
6.3.1	Requalification for aboveground pressure vessels	10
6.3.2	Requalification for underground pressure vessels	11
6.4	Recommissioning	12
7	Inspection of pressure vessel and pressure vessel fittings	12
7.1	Pressure vessel	12
7.2	Pressure vessel fittings and immediate pipework	12
7.3	Valve cover	12
7.4	Bonding	12
7.5	Pressure relief valve	12
7.6	Pressure gauge	13
7.7	gauges	13
7.8	Shut-off valves	13
7.9	Studs, bolts, nuts, and washers	13
7.10	Corrosion protection system	13
7.11	Piers and foundations for aboveground pressure vessels	13
8	Competence	14
8.1	General	14
8.2	Routine inspection competence	14
8.3	Periodic inspection competence	14
8.4	Requalification competence	14
9	Records	14
9.1	Pressure vessel data	14
9.2	Reports	14
Annex A (informative) Visual inspection		15
A.1	Internal and external visual inspections	15

A.2	Inspection techniques	15
A.2.1	External visual inspection	15
A.2.2	Internal visual inspection	15
A.2.3	Records	15
A.3	Additional inspection	16
Annex B (informative) Hydraulic pressure test		17
Annex C (normative) Acoustic emission testing		18
C.1	Scope	18
C.2	Testing procedure	18
C.3	Instrumentation	18
C.3.1	Sensors	18
C.3.2	Acquisition and evaluation system	18
C.4	Testing	18
C.4.1	Test instruction	18
C.4.2	Safety precautions	18
C.4.3	Sensor location	19
C.4.3.1	Overground pressure vessels	19
C.4.3.2	Underground pressure vessels	19
C.4.4	Pressurization	20
C.5	Data evaluation and analysis	21
C.5.1	Evaluation criteria	21
C.5.2	Real time control and stop criteria	21
C.5.3	Post analysis	21
C.5.4	Pressure vessel grading	21
C.6	Data storage and reporting	22
Annex D (informative) Ultrasonic thickness test		23
D.1	General	23
D.2	Apparatus setting	23
D.3	Control measurement	23
D.4	Shell thickness measurements	23
D.5	End thickness measurements	23
D.6	Interpretation	23
D.7	Rejection criteria	23
Annex E (informative) Assessment of pressure vessels by sampling		24
E.1	General	24
E.2	Homogeneous batch	24
E.3	Selection of samples	24
E.4	Sample selection	25
E.5	Inspection period	25
E.6	Presentation of results and decisions	25
E.7	Pass criteria	25
E.8	Example calculation of a sample	25
Annex F (informative) External monitoring by camera for underground pressure vessels		27
F.1	General	27
F.2	Inspection procedure	27
F.3	Interpretation of results	27
F.4	Records	27
Annex G (informative) Monitoring cathodic protection with sacrificial anodes for underground pressure vessels		28
G.1	General	28
G.2	Records	28

G.3	Procedure	28
G.4	Measurement of the galvanic current	28
G.5	Measurement of the potential difference of the pressure vessel to the reference electrode	28
G.6	Results	29
Annex H (informative) Evaluation of coating condition of underground pressure vessels (cathodic protection by impressed current)		30
H.1	General	30
H.2	Apparatus	30
H.3	Conditions	30
H.4	Isolation resistance of the coating	30
H.4.1	Procedure	30
H.4.2	Calculation	31
H.5	Results	31
H.6	Checking intervals	31
Annex I (informative) Corrosion monitoring by moisture and condensation detection for underground pressure vessels		32
I.1	General	32
I.2	Equipment characteristics	32
I.3	Monitoring	32
I.4	Interpretation	32
Annex J (informative) A-deviations		33
Bibliography		34