

DIN EN 14427:2014-09 (E)

LPG equipment and accessories - Transportable refillable fully wrapped composite cylinders for LPG - Design and construction

| Contents | | Page |
|--------------------|---|-------------|
| Foreword | | 4 |
| Introduction | | 5 |
| 1 | Scope | 6 |
| 2 | Normative references | 6 |
| 3 | Terms and definitions | 8 |
| 4 | Design and manufacture | 10 |
| 4.1 | General | 10 |
| 4.2 | Liner | 11 |
| 4.2.1 | Metallic liners | 11 |
| 4.2.2 | Non-metallic liners | 12 |
| 4.2.3 | Design drawing | 12 |
| 4.3 | Composite overwrap | 12 |
| 4.3.1 | Materials | 12 |
| 4.3.2 | Winding | 13 |
| 4.3.3 | Cylinders without liners comprising two parts | 13 |
| 4.4 | Finished cylinder | 13 |
| 4.4.1 | Design drawings | 13 |
| 4.4.2 | Cylinders without liner | 14 |
| 4.4.3 | Autofrettage | 14 |
| 4.4.4 | Manufacturing requirements for the finished cylinder | 14 |
| 4.4.5 | Neck ring | 15 |
| 4.4.6 | Cylinder stability | 15 |
| 5 | Cylinder and material tests | 15 |
| 5.1 | General | 15 |
| 5.2 | Test procedures and test requirements | 16 |
| 5.2.1 | Test No. 1 - Composite material tests, including adhesives (where applicable) | 16 |
| 5.2.2 | Test No. 2 - Liner material tests | 17 |
| 5.2.3 | Test No. 3 - Liner burst test | 18 |
| 5.2.4 | Test No. 4 - Hydraulic proof test of finished cylinders | 19 |
| 5.2.5 | Test No. 5 - Cylinder burst test | 20 |
| 5.2.6 | Test No. 6 - Pressure cycle test | 21 |
| 5.2.7 | Test No. 7 - Artificial ageing test | 21 |
| 5.2.8 | Test No. 8 - Exposure to elevated temperature at test pressure | 22 |
| 5.2.9 | Test No. 9 - Cylinder body integrity impact tests | 23 |
| 5.2.10 | Test No. 10 - Drop test | 27 |
| 5.2.11 | Test No. 11 - Flawed cylinder test | 28 |
| 5.2.12 | Test No. 12 - Extreme temperature cycle test | 29 |
| 5.2.13 | Test No. 13 - Fire resistance test | 30 |
| 5.2.14 | Test No. 14 - Spike puncture test | 31 |
| 5.2.15 | Permeability test of cylinders with non-metallic liners or without liners | 32 |
| 5.2.16 | Test No. 16 - Torque test | 33 |
| 5.2.17 | Test No. 17 - Neck strength test | 33 |
| 5.2.18 | Test No. 18 - Neck ring test | 34 |
| 5.3 | Failure to meet test requirements | 34 |
| 5.3.1 | Metallic liners | 34 |

| | | |
|--|--|----|
| 5.3.2 | Complete cylinder | 34 |
| 6 | Conformity assessment | 35 |
| 7 | Marking | 35 |
| Annex A (normative) Prototype testing, design variant testing and production testing | | 36 |
| A.1 | General | 36 |
| A.2 | Prototype testing | 36 |
| A.2.1 | General | 36 |
| A.2.2 | Definition of new design | 36 |
| A.2.3 | Prototype testing requirements | 37 |
| A.2.4 | Prototype testing certificate | 38 |
| A.3 | Design variant testing | 39 |
| A.3.1 | General | 39 |
| A.3.2 | Definition of a design variant | 39 |
| A.3.3 | Design variant test requirements | 42 |
| A.3.4 | Design variant testing certificate | 43 |
| A.4 | Production testing | 45 |
| A.4.1 | General | 45 |
| A.4.2 | Production test requirements | 45 |
| A.4.3 | Liner batch tests and inspections | 45 |
| A.4.4 | Composite materials batch tests and inspections | 46 |
| A.4.5 | Tests and inspections of the finished cylinder | 46 |
| A.4.6 | Batch acceptance certificate | 48 |
| Annex B (informative) Examples of type approval and production testing certificates | | 49 |
| B.1 | Type approval certificate - composite cylinders with metallic liners | 49 |
| B.2 | Type approval certificate - composite cylinders with non-metallic liners | 50 |
| B.3 | Type approval certificate - composite cylinders without liners | 51 |
| B.4 | Design variant approval certificate - composite cylinders with metallic liners | 52 |
| B.5 | Production test certificate | 53 |
| Annex C (informative) Environmental checklist | | 55 |
| Bibliography | | 57 |