

DIN EN 12245:2012-03 (E)

Transportable gas cylinders - Fully wrapped composite cylinders (includes Amendment A1:2011)

Contents	Page
Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms, definitions and symbols	8
3.1 Terms and definitions	8
3.2 Symbols	10
4 Design and manufacture	10
4.1 General	10
4.2 Liner	10
4.2.1 Metallic liners	10
4.2.2 Non-metallic liners	11
4.2.3 Design drawing	11
4.2.4 Design of ends	12
4.2.5 Neck ring	12
4.3 Composite overwrap	12
4.3.1 Materials	12
4.3.2 Winding	12
4.3.3 Cylinders without liners comprising two or more parts	13
4.4 Finished cylinder	13
4.4.1 Design drawings	13
4.4.2 Cylinders without liner	13
4.4.3 Autofrettage	14
4.4.4 Manufacturing requirements for the finished cylinder	14
5 Cylinder and material tests	14
5.1 General	14
5.2 Requirements and test methods	15
5.2.1 Test 1 - Composite material tests, including adhesives (where applicable)	15
5.2.2 Test 2 - Liner material tests	16
5.2.3 Test 3 - Liner burst test at ambient temperature	17
5.2.4 Test 4 - Pressure test of finished cylinders at ambient temperature	17
5.2.5 Test 5 - Cylinder burst test	18
5.2.6 Test 6 - Resistance to pressure cycles at test pressure (ph) and ambient temperature	19
5.2.7 Test 7 - Immersion in salt water	21
5.2.8 Test 8 - Exposure to elevated temperature at test pressure	22
5.2.9 Test 9 - Drop test	22
5.2.10 Test 10 - Flawed cylinder test	24
5.2.11 Test 11 - Extreme temperature cycle test	26
5.2.12 Test 12 - Fire resistance test	27
5.2.13 Test 13 - High velocity impact (bullet) test	29
5.2.14 Test 14 - Permeability test of cylinders with non-metallic or without liners	29
5.2.15 Test 15 - Test of compatibility of thermoplastic liners with air or oxidising gases	30
5.2.16 Test 16 - Torque test	30
5.2.17 Test 17 - Neck strength	31
5.2.18 Test 18 - Cylinder stability	31

5.2.19	Test 19 - Neck ring	32
5.3	Failure to meet test requirements	32
5.3.1	Metallic liners	32
5.3.2	Complete cylinder	32
6	Conformity evaluation	32
7	Marking	32
8	Operating instructions (cylinders with non-metallic liners)	33
Annex A (normative) Prototype, design variant and production testing		34
A.1	General	34
A.2	Prototype testing	34
A.3	Design variant testing	38
A.4	Production testing	42
Annex B (informative) Examples of prototype approval and production testing certificates		45
B.1	Type approval certificate - composite cylinders with metallic liners	45
B.2	Type approval certificate - composite cylinders with non-metallic liners	46
B.3	Type approval certificate - composite cylinders without liners	47
B.4	Design variant approval certificate - composite cylinders with metallic liners	48
B.5	Production test certificate	49
Bibliography		51