

ISO 11119-4:2016-02 (E)

Gas cylinders - Refillable composite gas cylinders - Design, construction and testing - Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 l with load-sharing welded metallic liners

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Symbols	4
5	Inspection and testing	4
6	Materials	5
6.1	Liner materials	5
6.2	Composite materials	5
7	Design and manufacture	6
7.1	General	6
7.2	Design submission	6
7.3	Manufacturing	7
8	Type approval procedure	9
8.1	General requirements	9
8.2	Prototype tests	9
8.3	New design	10
8.4	Design variants	11
8.5	Type approval test procedures and criteria	14
8.5.1	Proof pressure test	14
8.5.2	Hydraulic volumetric expansion test	14
8.5.3	Liner burst test	15
8.5.4	Liner integrity test	15
8.5.5	Cylinder burst test	16
8.5.6	Ambient cycle test	16
8.5.7	Environmental cycle test	18
8.5.8	Flaw test	20
8.5.9	Drop test	22
8.5.10	High velocity impact (gunfire) test	23
8.5.11	Fire resistance test	24
8.5.12	Salt water immersion test	25
8.5.13	Torque test	26
8.5.14	Environmentally assisted stress rupture test	26
8.5.15	Leak test	27
8.5.16	Composite material mechanical properties tests	27
8.5.17	Failure of type approval tests	27
9	Batch inspection and testing	28
9.1	General	28

9.2	Liner	28
9.3	Failure of liner batch tests	29
9.4	Overwrap materials	29
9.5	Composite cylinder	29
9.6	Cylinder failure during type approval or batch testing	31
10	Cylinder marking	31
10.1	General	31
10.2	Additional marking	31
Annex A (informative) Examples of design approval certificate		33
Annex B (informative) Specimen test reports		35
Annex C (normative) Prototype, design variant, and production testing		38
Bibliography		40