

DIN EN ISO 11439:2022-03 (E)

Gas cylinders - High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles (ISO 11439:2013 + Amd 1:2021) (includes Amendment :2021)

Contents		Page
	Foreword	4
	A₁ European foreword to Amendment A₁	5
	A₁ Foreword to Amendment A₁	6
	Introduction	7
1	Scope	8
2	Normative references	8
3	Terms and definitions	9
4	Service conditions	11
	4.1 General	11
	4.2 Maximum pressures	11
	4.3 Design number of filling cycles	11
	4.4 Temperature range	11
	4.5 Gas composition	12
	4.6 External surfaces	12
5	Inspection and testing	13
6	Type approval procedure	13
	6.1 General	13
	6.2 Type approval	13
	6.3 Statement of service	14
	6.4 Design data	14
	6.5 Manufacturing data	15
	6.6 Fracture performance and non-destructive examination (NDE) defect size	15
	6.7 Specification sheet	15
	6.8 Additional supporting data	15
	6.9 Type approval certificate	15
7	Requirements for type 1 metal cylinders	15
	7.1 General	15
	7.2 Materials	16
	7.3 Design Requirements	16
	7.4 Construction and workmanship	17
	7.5 Prototype testing procedure	18
	7.6 Batch tests	20
	7.7 Tests on every cylinder	22
	7.8 Batch acceptance certificate	22
	7.9 Failure to meet test requirements	22
8	Requirements for type 2 hoop-wrapped cylinders	23
	8.1 General	23
	8.2 Materials	23
	8.3 Design requirements	24
	8.4 Construction and workmanship	25
	8.5 Prototype testing procedure	27
	8.6 Batch tests on liners and cylinders	29
	8.7 Tests on every liner and cylinder	32
	8.8 Batch acceptance certificate	33
	8.9 Failure to meet test requirements	33

9	Requirements for type 3 fully-wrapped cylinders	34
9.1	General	34
9.2	Materials	34
9.3	Design requirements	35
9.4	Construction and workmanship	36
9.5	Prototype testing procedure	38
9.6	Batch tests on liners and cylinders	42
9.7	Tests on every liner and cylinder	43
9.8	Batch acceptance certificate	44
9.9	Failure to meet test requirements	44
10	Requirements for type 4 fully-wrapped composite cylinders	45
10.1	General	45
10.2	Materials	45
10.3	Design requirements	45
10.4	Construction and workmanship	46
10.5	Prototype testing procedure	47
10.6	Batch tests	54
10.7	Tests on every cylinder	55
10.8	Batch acceptance certificate	55
10.9	Failure to meet test requirements	56
11	Marking	56
12	Preparation for dispatch	57
Annex A	(normative) Test methods and criteria	58
Annex B	(normative) Ultrasonic examination	67
Annex C	(informative) Non-destructive examination (NDE) defect size by flawed cylinder cycling	71
Annex D	(informative) Report forms	72
Annex E	(informative) Standard working pressures	75
Annex F	(informative) Verification of stress ratios using strain gauges	76
Annex G	(informative) Manufacturer's instructions for handling, use and inspection of cylinders	77
A1	(informative) Corrosion resistance	79
A1	Bibliography	83