ISO 11119-2:2020 (E)

Gas cylinders — Design, construction and testing of refillable composite gas cylinders and tubes — Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols

5 Inspection and testing

6 Materials

6.1 Liner materials
6.2 Composite materials

7 Design and manufacture

7.1 General
7.2 Design submission
7.3 Manufacturing

8 Type approval procedure

8.1 General requirements
8.2 Prototype tests
8.3 New design
8.4 Design variants
8.5 Type approval test procedures and criteria
8.5.1 Proof pressure test
8.5.1.1 Procedure
8.5.1.2 Criteria
8.5.2 Hydraulic volumetric expansion test
8.5.2.1 Procedure
8.5.2.2 Criteria
8.5.3 Liner burst test
8.5.3.1 Procedure
8.5.3.2 Criteria
8.5.4 Cylinder burst test
8.5.4.1 Procedure
8.5.4.2 Criteria
8.5.5 Ambient cycle test
8.5.5.1 For cylinders with test pressure equal to or greater than 60 bar
8.5.5.1.1 General
8.5.5.1.2 Procedure
8.5.5.1.3 Criteria
8.5.5.2 For cylinders with test pressure less than 60 bar
8.5.5.2.1 Procedure
8.5.5.2.2 Criteria
8.5.6 Environmental cycle test
8.5.6.1 General
8.5.6.2 Procedure

8.5.6.3 Criteria
8.5.7 Flaw test
8.5.7.1 Procedure
8.5.7.2 Criteria
8.5.8 Drop/impact test
8.5.8.1 General
8.5.8.2 For cylinders up to and including 50 l water capacity with unspecified gas service and cylinders with liquefied gas service
8.5.8.2.1 Procedure
8.5.8.2.2 Criteria
8.5.8.3 For cylinders up to and including 50 l water capacity with dedicated compressed gas service
8.5.8.3.1 Procedure
8.5.8.3.2 Criteria
8.5.8.4 For cylinders over 50 l water capacity
8.5.8.4.1 Procedure
8.5.8.4.2 Criteria
8.5.8.5 For tubes over 150 l water capacity
8.5.8.5.1 Procedure
8.5.8.5.2 Criteria
8.5.9 High velocity impact (gunfire) test
8.5.9.1 Procedure
8.5.9.2 Criteria
8.5.10 Fire resistance test
8.5.10.1 General
8.5.10.2 Procedure
8.5.10.2.1 General
8.5.10.2.2 Horizontal test
8.5.10.2.3 Vertical test
8.5.10.3 Criteria
8.5.11 Salt water immersion test
8.5.11.1 General
8.5.11.2 Procedure
8.5.11.3 Criteria
8.5.12 Torque test
8.5.12.1 General
8.5.12.2 Procedure
8.5.12.3 Criteria
8.5.13 Environmentally assisted stress rupture test
8.5.13.1 Procedure
8.5.13.2 Criteria
8.5.14 Resin shear strength
8.5.15 Glass transition temperature
8.6 Failure of type approval tests

9 Batch inspection and testing

9.1 Liner
9.2 Failure of liner batch tests
9.3 Overwrap materials
9.4 Composite cylinder
9.5 Cylinder failure during type approval or batch testing

10 Cylinder marking

10.1 General
10.2 Additional marking

Annex A (informative) Examples of design approval certificate

Annex B (informative) Specimen test reports

Annex C (informative) Test report for equivalency

Annex D (informative) Standardized test requirements for thermally activated pressure relief devices

D.1 General

D.2 Cylinder test
D.2.1 Cylinder set-up
D.2.2 Fire source
D.2.3 Temperature and pressure measurements
D.2.4 General test requirements
D.2.5 Test options
D.2.5.1 Option A — Controlled release of pressure
D.2.5.2 Option B — Fire test until rupture
D.3 PRD test
D.4 Vent test
D.5 System assessments
D.5.1 Qualification limit envelope
D.5.2 Service limit envelope
D.5.3 Acceptable results

Page count: 43