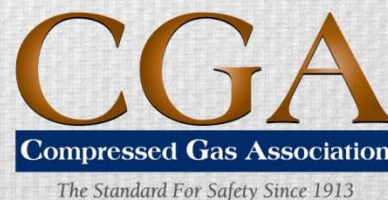


CGA C-6.2—2019

**STANDARD FOR VISUAL INSPECTION
AND REQUALIFICATION OF
FIBER REINFORCED
HIGH PRESSURE CYLINDERS**

EIGHTH EDITION



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Work Item 18-033
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NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendices A and B (Informative) are for information only.

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Contents	Page
1 Introduction.....	1
2 Scope and purpose	1
2.1 Scope	1
2.2 Purpose	2
3 Definitions.....	2
4 Required publications	5
5 General design information	6
5.1 Composite cylinders	6
5.2 Carbon composite cylinders	6
5.3 Cylinder components.....	6
6 Recommended inspection equipment	7
7 Exterior inspection.....	7
7.1 Inspection procedure for composite cylinders	7
7.2 Preparation for inspection	7
8 Types of damage.....	8
8.1 Abrasion damage	8
8.2 Cut damage.....	11
8.3 Impact damage.....	11
8.4 Structural damage	15
8.5 Chemical exposure.....	15
8.6 Heat or fire damage.....	15
9 Levels of damage	16
9.1 Level 1 damage (acceptable).....	16
9.2 Level 2 damage (rejectable—additional inspection or rework required).....	16
9.3 Level 3 damage (condemned—not reworkable)	16
10 Acceptance criteria.....	17
10.1 Abrasions.....	17
10.2 Cuts	17
10.3 Impact damage.....	18
10.4 Structural damage (level 3)	19
10.5 Chemical exposure damage (level 3).....	19
10.6 Heat exposure	19
10.7 General acceptable conditions	20
10.8 Rework	23
11 Manufacturer's label	25
11.1 Marking examples	25
11.2 Canadian equivalency certificates	25
12 Interior inspection	25
12.1 Preparation for internal inspection.....	25
12.2 Threads	26
12.3 O-ring gland.....	26
12.4 Interior	26
12.5 Dents	26
13 Hydrostatic test (requalification)	26
13.1 General.....	26
13.2 Test pressure.....	26
13.3 Test adapter	27
13.4 Test equipment.....	27
13.5 Test procedures.....	27
13.6 Test criteria.....	27

14	Special requirements for composite cylinders.....	27
14.1	Condemned cylinder.....	28
14.2	Marking of cylinders.....	28
14.3	Service life.....	28
15	References	28

Figures

Figure 1	—Full-wrapped cylinder with one port.....	3
Figure 2	—Full-wrapped cylinder with two ports	3
Figure 3	—Hoop-wrapped cylinder with flat bottom	4
Figure 4	—Hoop-wrapped cylinder with round bottom	4
Figure 5	—Hoop-wrapped cylinder with two ports	4
Figure 6	—Paint stripping (condemned)	7
Figure 7	—Cylinder with protective end boots	8
Figure 8	—Abrasion level 1 (glass fiber).....	8
Figure 9	—Abrasion level 2 (glass fiber).....	9
Figure 10	—Abrasion level 2 (aramid fiber)	9
Figure 11	—Abrasion level 3 (glass fiber).....	10
Figure 12	—Abrasion level 3 (aramid fiber)	10
Figure 13	—Abrasion level 3 (carbon fiber)	10
Figure 14	—Cut level 1 (glass fiber).....	11
Figure 15	—Cut level 1 (carbon fiber)	11
Figure 16	—Cut level 3 (glass fiber with delamination and lifting fiber)	12
Figure 17	—Cut level 3 (aramid fiber)	12
Figure 18	—Cut level 3 (carbon fiber).....	12
Figure 19	—Cut level 3 (carbon fiber)—dome	13
Figure 20	—Impact level 1 (glass fiber)	13
Figure 21	—Impact level 1 (carbon fiber).....	13
Figure 22	—Impact level 3 (glass fiber) with cuts	14
Figure 23	—Impact level 3 (glass fiber) with cut and fiber lifting.....	14
Figure 24	—Impact level 3 (carbon fiber) with liner indentation	14
Figure 25	—Structural damage level 3 (glass fiber).....	15
Figure 26	—Heat damage level 3 (carbon fiber).....	16
Figure 27	—Fire damage level 3 (carbon fiber)	16
Figure 28	—Cut length definition.....	18
Figure 29	—Cut level 2 (repairable delamination of glass fiber over a label).....	18
Figure 30	—Heat exposure level 1 (carbon fiber)	20
Figure 31	—Heat exposure level 1 (carbon fiber)	20
Figure 32	—Level 1 bottom filler material expansion cracking (acceptable).....	21
Figure 33	—Level 1 resin expansion crack (acceptable)	21
Figure 34	—Level 1 water seepage (acceptable)	22
Figure 35	—Examples of variations in cylinder dome shapes	22
Figure 36	—Length measurement of level 2 cut (glass fiber)	23
Figure 37	—Depth measurement.....	23
Figure 38	—Resin mixing.....	24
Figure 39	—Resin application	24
Figure 40	—After cure	24

Table

Table 1	—Typical service and test pressures	27
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Appendices

Appendix A	—Hoop-wrapped cylinders (Informative)	30
Appendix B	—Full-wrapped aramid and glass fiber cylinders (Informative).....	31

1 Introduction

Composite high pressure cylinders have been used in commercial service since 1976. Several million composite cylinders are currently in service. These cylinders have been manufactured under various government standards including:

- Special permits granted by the U.S. Department of Transportation (DOT) based on:
 - DOT FRP-1 Standard, *Basic Requirements for Fiber Reinforced Plastic Type 3FC Composite Cylinders*, for full-wrapped cylinders [1]¹
 - DOT FRP-2 Standard, *Basic Requirements for Fiber Reinforced Plastic Type 3HW Composite Cylinders*, for hoop-wrapped cylinders [2]
 - *Basic Requirements for Fully Wrapped Carbon-Fiber Reinforced Aluminum Lined Cylinders (DOT-CFFC)*, for carbon full-wrapped cylinders [3];
- Transport Canada (TC) specifications TC-3FCM for full-wrapped cylinders and TC-3HWM for hoop-wrapped cylinders, as specified in CSA B339, *Cylinders, spheres, and tubes for the transportation of dangerous goods* [4]; and
- Special permits issued by the former Canadian Transport Commission (CTC) and equivalency certificates (formerly called permits for equivalent level of safety) issued by TC in *Transportation of Dangerous Goods Regulations*, Part 14 [5].

The technology for these cylinders was developed by the aerospace industry during the 1960s for rocket motor cases and other pressure vessels. Composite cylinders have successfully provided high pressure gas containment for those applications where minimal weight and high strength is critical or desired.

2 Scope and purpose

2.1 Scope

This standard addresses the techniques for the inspection and requalification of composite overwrapped high pressure cylinders. The use of this standard is required in the United States by Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) Part 180.205(f)(1) and in Canada by CSA B339, Clause 24 [6, 4]. The requalification consists primarily of an internal and external visual inspection followed by hydrostatic testing. This standard highlights those items that are essential for an accurate appraisal of a composite overwrapped cylinder for compressed gas service. For information on requirements of general cylinder inspection and requalification (visual inspection and hydrostatic testing), refer to the publications listed in Section 4.

NOTE—49 CFR and CSA B341, *UN pressure receptacles and multiple-element gas containers for transport of dangerous goods* allow the use of UN certified composite cylinders in the United States and Canada [6, 7]. Periodic inspection and testing of UN composite cylinders shall be conducted in accordance with ISO 11623, *Gas cylinder—Composite construction—Periodic inspection and testing* [8].

It is important to be aware of the design life of the cylinder before filling or requalifying. The user or requalifier shall consult the appropriate special permit, equivalency certificate, or specification to determine the appropriate design life. The composite cylinder shall be removed from service and condemned at the termination of the cylinder design life (i.e., the appropriate period in years following the original manufacturer's test date). Failure to do so is in direct violation of federal regulations and can increase the risk to public safety.

Not all of the considerations for requalification (visual inspection and hydrostatic testing) of composite cylinders are covered in this standard. Questions regarding specific cylinders should be directed to the manufacturer.

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.