DNV·GL

Certificate No:
TAP00000GR

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Seamless Gas Bottle

with type designation(s)
ISO1-352-150-840/R, ISO1-267-250-840/B/RC/1, ISO1-229-300-840/B/RC/1

Issued to
Faber Industrie S.p.A.
Cividale del Friuli UD, Italy

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Loading pressure:	Operating media:	Test pressure:
ISO1-352-150-840/R	**-40 °C to 65 °C**	**Halogenated compounds for fire extinguishing systems**	**150 bar**
ISO1-267-250-840/B/RC/1	**-40 °C to 65 °C**	**Halogenated compounds for fire extinguishing systems**	**250 bar**
ISO1-229-300-840/B/RC/1	**-40 °C to 65 °C**	**Halogenated compounds for fire extinguishing systems**	**300 bar**

This Certificate is valid until **2021-10-06**.

Issued at **Høvik** on **2016-10-07**

for **DNV GL**

DNV GL local station: **Venice**

Approval Engineer: **Maheshraja Venkatesan**

Marianne Spæren Marveng
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

Three types of seamless gas bottles for fire extinguishing systems designed and manufactured according to ISO 9809-1:2010

Type of cylinder: ISO1-352-150-840/R
- P_h (test pressure): 150 bar
- D (outside diameter): 352 mm
- a' (minimum thickness after forming): 3.7 mm
- Corrosion allowance: 0 mm
- Concave base end with 7.4 mm minimum thickness
- Overall length: 855/975/1085/1195/1305/1410/1520/1630/1670/1735/1845 mm
- Capacity: 60/70/80/90/100/110/120/130/134/140/150 liter
- Material and heat treatment: Material 34CrMo4 (according to EN10083) (Quenched & Tempered)

Type of cylinder: ISO1-267-250-840/B/RC/1
- P_h (test pressure): 250 bar
- D (outside diameter): 269 mm
- a' (minimum thickness after forming): 4.7 mm
- Corrosion allowance: 0 mm
- Concave base end with 9.4 mm minimum thickness
- Overall length: 700/795/890/985/1080/1175/1270/1365/1410/1420/1460/1555/1650/1745/1840 mm
- Capacity: 30/35/40/45/50/55/60/65/67.5/68/70/75/80/85/90 liter
- Material and heat treatment: Material 34CrMo4 (according to EN10083) (Quenched & Tempered)

Type of cylinder: ISO1-229-300-840/B/RC/1
- P_h (test pressure): 300 bar
- D (outside diameter): 229.5 mm
- a' (minimum thickness after forming): 4.8 mm
- Corrosion allowance: 0 mm
- Concave base end with 11.3 mm minimum thickness
- Overall length: 645/700/835/920/1000/1055/1190/1195/1325/1365/1385/1445/1590/1730 mm
- Capacity: 20/22/26.8/30/33/35/40/40.2/45/46.6/47.2/50/55/60 liter
- Material and heat treatment: Material 34CrMo4 (according to EN10083) (Quenched & Tempered)

Application/Limitation

Seamless gas bottles covered by this certificate shall be delivered with product certificate. Production tests on every seamless gas bottle shall be in accordance to ISO9809-1 section 11. Prototype test reports (of each batch) shall be subject to review before issuance of each product certificate.

Used Material shall be delivered with VL certificate, made by works approved by society (AOM) (Reference is made to DNV GL ship rules Pt.4 Ch.7 Sec.2 Table1)

Minimum guaranteed values of the yield strength & minimum guaranteed value of the tensile strength, in megapascals, for the finished cylinder shall be 840 & 990 respectively.

The following prototype tests on each batch(*) of cylinders shall be carried out:
- On one cylinder, one hydraulic burst test (Reference is made to ISO 9809-1 [10.5]).
- On a further cylinder:
  - one tensile test in the longitudinal direction (Reference is made to ISO 9809-1 [10.2]);
  - either two bend tests (Reference is made to ISO 9809-1 [10.3.1]) in a circumferential direction, one flattening test (Reference is made to ISO 9809-1 [10.3.2]) or one ringflattening test (Reference is made to ISO 9809-1 [10.3.3]);

  (*) Reference is made to ISO9809-1 [3.1]
- Pressure cycling test (Reference is made to ISO 9809-1 [9.2.2])
- Base check (Reference is made to ISO 9809-1 [9.2.3])

Type Approval documentation

The approval is based on the following documentation:-
Drawings:

ISO1-352-150-840/R, rev. 0 dated 2016-03-10
ISO1-267-250-840/B/RC/1, rev. 0 dated 2015-11-26
ISO1-229-300-840/B/RC/1, rev. 0 dated 2016-03-10

Strength calculation for ISO1-352-150-840/R Rev.0 dated 2016-03-10
Strength calculation for ISO1-267-250-840/B/RC/1 Rev.0 dated 2015-11-26
Strength calculation for ISO1-229-300-840/B/RC/1 Rev.0 dated 2016-03-10

Protoype test reports dated 2016-07-27 containing material test, dimensional inspection and base check, burst tests, pressure cyclic tests for model ISO1-352-150-840/R

Protoype test reports dated 2016-07-27 containing material test, dimensional inspection and base check, burst tests, pressure cyclic tests for model ISO1-267-250-840/B/RC/1

Protoype test reports dated 2016-07-27 containing material test, dimensional inspection and base check, burst tests, pressure cyclic tests for model ISO1-229-300-840/B/RC/1

Tests carried out

Hydraulic burst test, bend tests, pressure cycling test, base check

Marking of product

Each cylinder shall be permanently marked on the shoulder or on a reinforced part of the cylinder or on a permanently fixed collar or neck ring, in accordance with ISO 13769.

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a periodical assessment every second year and before the expiry date of this certificate to verify that the conditions for the type approval are complied with.
The main elements of the certificate retention survey are:

- Review of Type Approval documentation
- Review of possible changes in design, materials and performance
- Ensure traceability between manufacturer’s product type marking and Type Approval Certificate.
- Review of all prototype test reports (performed in last 5 years) on each batch