Certificate No:
TAP00002KW

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Seamless Gas Bottle

with type designation(s)
ISO406-CrMo-03 60 bar, ISO406-CrMo-03 100 bar

Issued to
Tianjin Tianhai High Pressure Container Co., Ltd.
Tianjin City, **China**

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

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Loading pressure:	Operating media:	Test pressure:
ISO406-CrMo-03 60 bar	60 bar	compressed or liquified gases	90 bar
ISO406-CrMo-03 100 bar	100 bar	(acc. ISO11114-1)	150 bar

Issued at **Hamburg** on **2022-10-20**
This Certificate is valid until **2027-10-19**.
DNV local unit: **Dalian NB & CMC**

Approval Engineer: **Malta Frederik Niederstadt**

for **DNV**

Jonathan Struwe
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.

Product description

Seamless gas cylinders acc. to ISO 9809-1:2019 for compressed or liquified gases.

Type	Water capacity (l)	Outside Diameter (mm)	Length (mm)	Minimum shell thickness (mm)
ISO406-CrMo-03 **60 bar**	80 to 230	406	825 to 2060	5.9
ISO406-CrMo-03 **100 bar**	80 to 230	406	825 to 2060	5.9

Seamless gas bottles are graded as class I pressure vessel acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 [5] (edt. July 2021) with zero (mm) corrosion allowance.

Place of production

Tianjin Tianhai High Pressure Container Co., Ltd.
268 Jinbin Avenue Binhai New Area
Tianjin, 300461 China

Application/Limitation

Design Data:

Type	Loading Pressure (bar)	Test Pressure (bar)	Temperature (°C)
ISO406-CrMo-03 **60 bar**	60	90	-50 to 65
ISO406-CrMo-03 **100 bar**	100	150	-50 to 65

Materials:

- 30CrMo acc. to GB/T 18248: with min. guaranteed 680 MPa yield strength and min. guaranteed 800 MPa to max. 950 MPa tensile strength for both bottle types ISO406-CrMo-03.

The combined content of the following elements shall not exceed 0.15 % (Clause 6.2.1):

- vanadium,
- niobium,
- titanium,
- boron,
- zirconium.

Sulfur and phosphorus (S+P) in the cast analysis of material used for the manufacture of gas cylinders shall not exceed acceptance limits specified by the design codes (Clause 6.2.2) or 0.025 %.

Media:

The gas cylinders are approved for the use in fixed fire extinguishing systems. For fire extinguishing media other than CO_2, ISO 11114-1 must be considered. The use in other systems or with other media is allowed for non-toxic, non-aggressive compressed or liquified gases. The use of other media is outside the range of this type approval and shall be subject to special consideration in each individual case.

Others:

In connection with certification the gas cylinders, manufacturing, workmanship and testing of cylinders shall be done according to design code clauses: 8, 9, 10 and 11.
Gas cylinders shall be delivered on board with a product certificate of the Society, following DNV-RU-SHIP Pt.4 Ch.7 Sec.1 [3.2.3].

Type Approval documentation
Tests carried out

Material certificate, Heat treatment certification, UT report, hardness test, thickness measurements, hydrostatic test, tensile test, bend test, impact test, base check, burst test and pressure cycling test.

Marking of product

Each cylinder shall be permanently and legibly marked on the shoulder or on a reinforced part of the cylinder or on a permanently fixed collar or neck ring as stated in the accepted type approval documentation, in accordance with ISO 13769.

Periodical assessment

Periodical assessments shall be carried out by a DNV surveyor. The objective of the periodical assessment is to verify that the conditions for the type approval (TA) have not been altered.

The main scope of the periodical assessment will normally include:

- verification of the TA applicant's production and quality system with relation to ensuring continue consistent production of the type approved products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- review of the TA documentation and that this is still used as basis for the production,
- review of possible changes to the design, the material and the performance of the product,
- verification of the product marking.

Periodical assessments for type approvals with a validity period of five years will be required after two years (+/- 90 days) and after 3.5 years (+/- 90 days). Unscheduled assessments for retention of the type approval may be carried out when there is reason to believe that the TA applicant has not adhered to the obligations stipulated in the TA certificate or in the applicable requirements.

END OF CERTIFICATE