

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pressure Vessel**with type designation(s)
Type 4600

Issued to

ELWA Elektro-Wärme GmbH & Co. KG
Maisach, Bayern, Germanyis found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment**Application :****Pressure vessel(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Max. working temp.:** 0°C to 150°C
Design pressure: 10 bar
Operating Medium OilIssued at **Hamburg** on **2018-10-18**This Certificate is valid until **2023-10-17**.DNV GL local station: **Augsburg**Approval Engineer: **Stefan Wiemer**for **DNV GL**

Harald Pauli
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

Pressure vessel type 4600 intended for electric continues flow heaters, main parts are a welded cylindrical shell with a dished end on the one side and a flange ring on the other side. The flat end (for the flange ring) with the heating elements is not specified and not part of this type approval.

Dimensions of the shell:

Type	4603 4603-V	4606 4606-V	4609 4609-V	4612 4612-V	4618	4620-V	4624 4624-V
Diameter [mm]	114.3	168.3	200	200	250	200	250

Type (continued)	4636 4636-V	4648 4648-V	4660 4660-V	4672 4672-V	4696 4696-V	46128 46128-V	46152 46152-V
Diameter [mm]	300	350	400	450	500	550	600

For details of the pressure vessel (e. g. design data, materials or dimensions) see Approved Drawings (listed below in "Type Approval documentation").

Application/Limitation

The pressure vessel is approved according to DNV GL Rules Ship Pt.4 Ch.7 'Pressure Equipment' (Edition January 2018) and graded as pressure equipment class II (Pt.4 Ch.7 Sec.1 table 2). The joint efficiency is $v=0.85$, the corrosion allowance 1 mm (carbon steel).

All material used for pressurized parts shall be delivered with material certificates according to Pt.4 Ch.7 Sec.1 Table 6. The material used for pressurized parts shall be delivered by a manufacturer holding a valid certificate according to DNV GL CP-0346 'DNV GL approval of manufacturing scheme'.

Manufacturing, workmanship and testing shall be done according to Pt.4 Ch.7 Sec.7.

Walls in the region of supports or brackets shall be fitted with doubling plates (Pt.4 Ch.7 Sec.4 [2.3.2]).

Each pressure vessel manufactured to this type approval is to be:

- Constructionally checked and hydraulic pressure tested to minimum 1.5 x design pressure,
- Certified by DNV GL and to be delivered with a product certificate.

Type Approval documentation

Marking of product

For traceability to this type approval the products are at least to be marked with:

- the name and domicile of the manufacturer,
- the manufacturer's type designation and serial number,
- the year of manufacture,
- the design pressure,
- the design temperature in °C,
- the hydraulic test pressure, and
- DNV GL's identifying mark.

Job Id: **262.1-016786-3**
Certificate No: **TAP00001JB**

Periodical assessment

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 w.r.t. ensuring continued consistent production of the TA products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- review of TA documentation and that this is still used as basis for the production,
- review of possible changes in the design, the materials and the performance of the product, and
- verification of the product marking.

For retention of the TA certificate in its validity period the periodical assessments will be carried out bi-yearly.

Unscheduled assessments for retention of the certificate may be carried out when there is reason to believe that the type approval applicant has not adhered to the obligations stipulated in the type approval certificate.

End of Certificate