

APPROVAL IN PRINCIPLE

Particulars of product

Designer: SERO PumpSystems GmbH
Product: SHP22x Side Channel Pump for ammonia (NH₃) fuel supply

This is to verify:

that the proposed Pump for NH₃ fuel supply has been reviewed and assessed by DNV for principal compliance with current Rules of the Society, and that the mentioned concept can be used as basis for construction of for ammonia (NH₃) SHP22x Series Side Channel Pump in DNV Class.

Basis for approval

The documentation submitted for review by class specified in letter "Approval in Principle (AiP) for SHP22x Series Side Channel Pump for Ammonia (NH₃) fuel supply", has been assessed with respect to:

- DNV Rules Pt.5 Ch.7 "Liquefied Gas Tankers", July 2024 editions
- DNV Rules Pt.6 Ch.2 Sec.14 – Gas Fuelled Ship Installations - Gas Fuelled Ammonia
- DNV Class Program 0505 – Pumping Unit
- MSC.1/Circ.1687 – Interim Guidelines for the Safety of Ships using Ammonia as Fuel

Conditions and assumptions for approval

The comments and conditions for approval in principle are given in appendix to the letter [M-SA-GP/ACI/P125099-J-3], dated [2025-06-24] as mentioned above.

The AiP level assessment of proposed design was done basis evaluation of its compliance with the principal requirements for gas carrier vessels engaged in bunkering service according to mentioned above DNV classification rules for ships.

Before the construction, detailed technical documentation for the actual project shall be submitted for class review and formal approval process.

It is assumed that the equipment and components used in the construction are duly certified according to the Society requirements.

Place: Hamburg, Germany Date: 2025-07-01

for DNV



This document has been digitally signed and will therefore not have handwritten signature

Sven Klinger
Head of Section

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000, and any claims made against DNV based upon alleged defective services provided by DNV to designers, yards, manufacturers or other stakeholders in the newbuilding process shall under any circumstance be time-barred if made later than 12 months from delivery of the vessel. Based upon written request to the DNV legal entity which has issued this document, a higher limitation of liability may be agreed on a case-by-case basis.