

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Pumps**

with type designation(s)
HSHP-L15-001

Issued to

HYUPSUNG METALLIZE CO., LTD
Busan, Korea, Republic of

is found to comply with
DNV rules for classification – Ships

Application :

High pressure LNG fuel supply system for ships.

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

Max. working press.: 320 bar
Operating media: LNG, LN2
Temperature range: -196 to 65 deg.C

Issued at **Høvik** on **2023-01-03**

This Certificate is valid until **2028-01-02**.

DNV local unit: **Gimhae Station**

for **DNV**

Approval Engineer: **Dag Harald Williksen**

Olaf Drews
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.

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 300,000 USD.



Product description

High pressure reciprocating pump for LNG fuel supply systems.

Application/Limitation

High pressure LNG fuel supply system for ships with the following main performance data:

	Design values	Operating values, LNG
Pump speed	900 rpm	415 rpm
Capacity	3-15 m3/hour	15 m3/hour
Suction pressure	16 bar	4 bar
Discharge pressure	480 bar	320 bar
Material of cold end	ASTM A479-304	

Type Approval documentation

Drawing No	Revision	Drawing title
	0	Misc. drawings
	0	High Pressure Pump for LNG Fuel Gas Supply System
	1	HP 15 Pump Structural Analysis Report
		TA Hydraulic test Report
		TA Performance test Report
-	0.42	Installation Operation Maintenance Manual
KIMM-22-0202	2022-06-07	Test Report (excluding Compliance)
-	-	DNV TA - List of Delivered
-	-	LNG HIGH PRESSURE PUMP PFD_221212

Tests carried out

Performance test carried out with model HSHP-L15-001 at Hyupsung Metallize Co., Ltd. on the 2022-11-24.

Hydraulic test carried out with serial no HSHP-L15-CE2201/-CE2202/-CE2203 at Hyupsung Metallize Co., Ltd on the 2022-11-24

Marking of product

The product to be marked with manufacturer's name or trademark and type number identification.

Periodical assessment

For retention of the type approval, a DNV surveyor shall perform an assessment after 2 years and after 3.5 years to verify that the conditions of the type approval are complied with.

In case where the type approved product is manufactured at other companies, the periodical assessment shall verify that the type approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore, periodical assessment shall be carried out randomly at these companies.

END OF CERTIFICATE