



Certificate no.:
TAP00002UF

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Pumps

with type designation(s)

VT-3 55/62 SIMPLEX, VT-3 55/58 DUPLEX, VT-3 55/62 DUPLEX, VT-3 55/62 TRIPLEX

issued to

Vanzetti Engineering S.p.A
Cavallerleone, CN, Italy

is found to comply with

DNV rules for classification – Ships

DNV class programme DNV-CP-0505 – Type approval – Pumping units

Application:

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

Type:	Max. working press.:	Operating media:	Temperature range:
VT-3 55/62 SIMPLEX	380	LIN; LNG	-196 deg. C.
VT-3 55/58 DUPLEX	380	LIN; LNG	-196 deg. C.
VT-3 55/62 DUPLEX	380	LIN; LNG	-196 deg. C.
VT-3 55/62 TRIPLEX	380	LIN; LNG	-196 deg. C.

Issued at **Høvik** on **2024-03-08**

This Certificate is valid until **2029-03-07**.

for **DNV**

DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Dag Harald Williksen**

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.



Form code: TA 251

Revision: 2023-09

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Product description

The VT-3 pumps are single stage reciprocating piston pumps with either 1, 2 or 3 pistons working in parallel. The pumps are lubricated and cooled by the pumping media, the crankdrive mechanism is lubricated by a separate TW 10 lubrication oil system. The pumps are driven by an electric motor via a belt.

Application/Limitation

The pump design is approved for handling liquified natural gas (LNG) on board ships and have the following operating range:

Type	VT-3 55/62 SIMPLEX	VT-3 55/58 DUPLEX	VT-3 55/62 DUPLEX	VT-3 55/62 TRIPLEX
Volume rate of flow [m ³ /hr]	0.45 – 3	0.9 - 6	0.9 - 6	1.35 – 9
MAWP, [bar]	380	380	380	380
Min. temperature, [degrees C]	-196	-196	-196	-196
Power consumption, [kW]	37-90	45-110	45-110	75-160
Cylinder, piston head and outlet valve materials	Austenitic stainless steel type AISI 316, CuSn8P (R550S) Monel K500			

Performance- and technical data see manufacturers data sheet & capacity curves.

Type Approval documentation

Drawing no	Rev.no	Drawing title
PR0001348_DNV	00	Assemb. crankshaft DUPLEX stroke 62mm TW10FL ATEX
PR0000050_DNV	00	Assemb. crankshaft TRIPLEX stroke 62mm TW10FL ATEX
PR0000339-DNV	00	Assembly cold end VT-3 55 ATEX
DI0001362-DNV	00	Assembly connecting rod TW10
PR0001360_DNV	00	Assembly crank shaft stroke 62 mm TW10FL ATEX
LNG Marine	-	Brochure of the VT-3 Series
DI0001085-DNV	00	Crosshead TW10
DI0000498-DNV	00	Eccentric stroke 58 mm
DI0000385-DNV	00	Eccentric stroke 62 mm
Evaluation of applicability of EN ISO 13710_2004 standard	02	Evaluation of applicability of EN ISO 13710_2004 standard
MA00000023	04	User's & Maintenance Manual – Cryogenic reciprocating pump
VA0000134	00	Foot mounted VT-3 55/58 DUPLEX TW10 FL ATEX
VA0000188	00	Foot mounted VT-3 55/62 DUPLEX TW10 FL ATEX
VA0000187	00	Foot mounted VT-3 55/62 TRIPLEX TW10 FL ATEX
VA0000203	00	Foot mounted VT-3 55/62 TW10FL ATEX
GR0000515	04	General arrangement drawing_Skid VT-3 DUPLEX 55-58 example
GR0000439	02	General arrangement drawing_Skid VT-3 DUPLEX 55-62 example
GR0000544	03	General arrangement drawing_Skid VT-3 SIMPLEX example
GR0000538	03	General arrangement drawing_Skid VT-3 TRIPLEX example
DI0002097-DNV	00	Internal cylinder VT-3
IT 21_rev6 Functional test reciprocating pump ita_en	06	IT 21_rev6 Functional test reciprocating pump ita_en
-	-	ITP standard Vanzetti for reciprocating HP pump skid Marine certification
-	-	Long-term experience reference
GR0000603	00	Set point of instruments & List of alarms, example
GR0000603	00	Operation & Logic and Control, example
ref. GR0000515	02	P&ID_Skid VT-3 DUPLEX 55-58 example
GR0000538	03	P&ID_Skid VT-3 DUPLEX 55-58 example
ref. GR0000439	06	P&ID_Skid VT-3 DUPLEX 55-62 example
ref. GR0000544	02	P&ID_Skid VT-3 SIMPLEX example
ref. GR0000538	03	P&ID_Skid VT-3 TRIPLEX example
		Performance test report VT-3_Skid VT-3 DUPLEX 55-58
		Performance test report VT-3_Skid VT-3 DUPLEX 55-62

		Performance test report VT-3_Skid VT-3 TRIPLEX 55-62
		Performance test report_Skid VT-3 DUPLEX 55-58
		Performance test report_Skid VT-3 SIMPLEX 55-62
DI0002140-DNV	00	Piston stem VT-3
	4	Pump design validation
-	07/01/2023	Pump Sizing report_VT-3 55-62 LNG Duplex_ODV22-00430_DNV
-	-	Pump Sizing report_VT-3 55-62 LNG SIMPLEX_ODV22-00755
		Pump Sizing report_VT-3 55-62 LNG TRIPLEX_ODV22-00687_8_9
DI0002148-DNV	00	Shaft TW10 DUPLEX
DI0001083-DNV	00	Shaft TW10 SIMPLEX
DI0000252-DNV	00	Shaft TW10 TRIPLEX
DI0002179-DNV	00	Sleeve VT-3-55
-	-	Technical features of Pump VT-3

Tests carried out

Satisfactory in-service experience is documented as an alternative to prototype testing, ref. DNV-RU-SHIP Pt.5 Ch.7 Sec.5 [13.5.1].

Performance tests attended by DNV carried out as follows:

- VT3 55/62 SIMPLEX on the 2022-06-29.
- VT-3 55/58 DUPLEX on the 2023-07-27
- VT-3 55/62 DUPLEX on the 2023-06-08 and 2023-07-20.
- VT-3 55/62 TRIPLEX on the 2023-08-03

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. A renewal assessment will be performed at renewal of the certificate.

In cases 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.

Other conditions

Pumps are subject to a performance test at the manufacturer's works under attendance of a DNV Surveyor and are to be presented for final inspection.

END OF CERTIFICATE