DNV·GL

Certificate No:
TAE00000YN

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Generator

with type designation(s)
LSAM, LL and LC

Issued to
Leroy Somer S.A.
Angouleme, France

is found to comply with
DNV GL rules for classification – Ships and offshore units
DNV GL class programme CP-0393 – Type Approval of rotating electric machines

Application :

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

Enclosure class	**IP23, IP44 (derating 10%)**
Insulation class	**H**
Temp. class	**B, F or H**
Voltage class	**220V - 690V**
Power class	**10kVA to 2360kVA (50Hz) ; 12kVA to 2505kVA (60Hz)**
Frequency class	**50 or 60 Hz**
Speed	**1500 rpm or 1800 rpm**

This Certificate is valid until **2017-03-15**.

Issued at **Høvik** on **2016-02-04**

for **DNV GL**

DNV GL local station: **Saint Nazaire**

Approval Engineer: **Marta Alonso Pontes**

Marit Laumann
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.

Job Id: **262.1-021380-1**
Certificate No: **TAE00000YN**

Product description

AC Synchronous Generators for marine environments Type LSAM, LL and LC

LSAM types: 40, 42.2, 42,3, 43.2, 44.2, 44.3, 46.2, 46.3, 47.2, 49.1, 49.3, 50.2, 51.2, 52.3
LL/LC types: 10, 11, 15, 20, 30, 50, 61, 70 and LL81, 82, 91

Enclosure class:	IP23, IP44 (derating 10%)
Winding insulation:	Class H
Temperature rise limits:	Class B, Class F or Class B
Voltage class:	220V to 690V
Power class:	10kVA to 2360kVA (50Hz) ; 12kVA to 2505kVA (60Hz)
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 rpm
Duty type:	S1
Power factor:	0,8
Ambient temperature	45°C, 50°C
AVR:	R220, R250, R438, R449, R450, AREP, PMG

Application/Limitation

The generator must be regarded as a component. The voltage regulator is a part of this type approval. However, the end user / system responsible must insure that the generator including the voltage regulator fulfills the DNV GL Rules Pt.4 Ch.8 Sec.5 2.2. The adjustment of the AVR (Iexc max, droop, U/f, kneepoint) to be checked during commissioning on board

This type approval certificate does not replace the requirement to DNV GL Product Certificate.

Type Approval documentation

Tests carried out

Tested accoding to IEC 60034-1 / 2010-01 and GL Guidelines for the Performance of Type Approvals, VI-7-6 part 4, ed. 1999

Marking of product

Leroy Somer S.A, type designation. serial number, ingress protection (IP), ambient temperature, power factor, voltage, current, frequency, speed, output apparent power, winding insulation.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.
END OF CERTIFICATE