



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000101
Revision No:
4

This is to certify:

That

JC NAVALIPS, S.L.U.
Maliaño-Camargo, Cantabria, Spain

is an approved manufacturer of
Copper Alloy Castings

in accordance with
DNV rules for classification – Ships

and the following particulars:

Application area	Castings for propellers and propeller parts
Alloy type(s)	Ni-Al-bronze (Cu3) Mn-Al-bronze (Cu4), See page 2
Manufacturing method	Sand casting
Max. weight	See page 2
Heat treatment condition	See page 2
Additional approval conditions	See page 2

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Hamburg** on **2023-01-18**

for **DNV**

This Certificate is valid until **2023-06-30**.

DNV local unit: **Area NB/CMC Iberia**

Approval Engineer: **Torben Schällicke**

Thorsten Lohmann
Head of Section

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Particulars of the approval

Castings for propellers

Alloy type	Grade ³⁾	Casting method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
Ni-Al-bronze	NV Cu3	SC	13 000	AC
Ni-Al-bronze	Cunial@060 ⁴⁾	SC	13 000	AC

Castings for propellers parts (hubs / bosses)

Alloy type	Grade ³⁾	Casting method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
Mn-Al-bronze	NV Cu4	SC	3 550	AC

Remarks:

- 1) SC: Sand Casting
- 2) AC: As cast
- 3) Certification of any material applied to classed object shall fulfil the applicable material requirements in the DNV GL class rules
- 4) Approved according to Wartsila's proprietary specifications:
 - a) Cunial@060 - foundry license document No. 20100317 NR sl, Sept. 10, 2010 rev. No. 001
 - b) Cunial@060 - production procedure document No. 20100323 NR sl, March 23, 2010 rev. No. 000
 - c) Qualification of material constants according to DNV GL Ship rules Pt. 4 Ch. 5 Sec. 1. Table 4 to be agreed with DNV GL Machinery Department
 - d) Weld repairs are not permitted in Zone A.