



# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM00001MK**  
Revision No:  
**5**

This is to certify:

That

**Doosan Enerbility Co., Ltd.**  
**2, Doosan Volvo-ro, Seongsan-gu,**  
**Changwon-si, Gyeongsangnam-do,**  
**Republic of Korea**

is an approved manufacturer of  
**Steel Castings**

in accordance with

**DNV rules for classification – Ships**  
**DNV-OS-B101 – Metallic materials**  
**DNV class programme – DNV-CP-0246 Steel castings**

and the following particulars:

<b>Application area</b>	<b>Castings for hull structures and equipment</b>
<b>Steel type(s)</b>	<b>Castings for machinery</b> <b>Carbon and carbon-manganese,</b> <b>Alloy,</b> <b>See page 2</b>
<b>Casting method</b>	<b>Sand casting</b>
<b>Max. weight</b>	<b>350 000 kg Carbon and carbon-manganese</b> <b>95 000 kg Alloy</b>
<b>Heat treatment condition</b>	<b>See page 2</b>
<b>Additional approval conditions</b>	<b>Approved as Independent Heat Treatment Company,</b> <b>see page 2</b>

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 **2023-12-08**

for **DNV**

This Certificate is valid until **2026-12-31**.

DNV local unit: **Gimhae Station**

Approval Engineer: **Andreas Koch**

.....  
**Thorsten Lohmann**  
**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 300,000 USD.



Form code: AM 311

Revision: 2022-12

www.dnv.com

Page 1 of 2

## Particulars of the approval

### Castings for hull structure and equipment

Steel type	Grade <sup>3)</sup>	Casting method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2)</sup>
C and C-Mn	NV C400UW, NV C440UW, NV C480UW	SC	350 000	N, NT, QT
Alloy	NV C550AW, NV C620AW	SC	95 000	QT

### Castings for machinery

Steel type	Grade <sup>3)</sup>	Casting method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2)</sup>
C and C-Mn	NV C400U, NV C440U, NV C480U, NV C520U	SC	350 000	N, NT, QT
Alloy	NV C550A, NV C600A, NV C690A	SC	95 000	QT

#### Remarks:

- <sup>1)</sup> SC: Sand Casting
- <sup>2)</sup> N: Normalized  
QT: Quenched and tempered  
NT: Normalized and tempered
- <sup>3)</sup> Incl. equivalent grades in acc. to other standards

### Approval scope for Independent Heat Treatment Company

Item	Description
Product type	Steel Castings
Steel Type	Carbon and carbon-manganese, Alloy
Maximum Loading Weight	No. 1-4-6A: 300 ton No. 2-2-1C: 120 ton
Max. thickness	1 000 mm
Heat Treatment Type	Annealing, Normalizing, Tempering and Stress relieving
Furnace Details	Type : Car bottom type, Working zone (mm) : No. 1-4-6A: Width 11 000, Legth 12 000 x Height 3 000 No. 2-2-1C: Width 5 500, Legth 13 500 x Height 3 500
Heat Treament Procedure	Doc. No. HTF-CF1406 Rev.2 dtd. 2019-10-01
Temperature Uniformity Survey Procedure	Doc. No. HTF-CF1405 Rev.2 dtd. 2019-03-04