



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00002C2
Revision No:
3

This is to certify:

That

Iraeta Energy Equipment Co., Ltd.
No. 9001 Jiwang Road, Zhangqiu Guanzhuang Sub-district office Zhangqiu district,
Jinan, Shandong Province,
China

is an approved manufacturer of
Steel Forgings

in accordance with
DNV GL rules for classification – Ships

and the following particulars:

Application area	Forgings for hull structures and equipment Forgings for shafting and machinery Stainless steel forgings
Steel type	Carbon and carbon-manganese, Alloy Austenitic stainless
Forging method	Open die forging, ring rolling
Max. weight	See page 2
Max. thickness	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 **2021-12-23**

for **DNV**

This Certificate is valid until **2025-01-31**.

DNV local station: **Qingdao**

Approval Engineer: **Stefan Röhr**

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.



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Particulars of the approval

Forgings for hull structures and equipment

Steel type	Grade ³⁾	Forging method ¹⁾	Max. weight [kg]	Max. thickness [mm]	Max. outer diameter [mm]	Heat treatment condition ²⁾
C and C-Mn	VL F400UW, VL F440UW, VL F480UW, VL F520UW, VL F560UW, VL F600UW	OD, RR	5 000	180	4030	NT
Alloy	VL F550AW, VL F600AW, VL F650AW	OD, RR	3 200	235	2375	QT

Forgings for shafting and machinery

Steel type	Grade ³⁾	Forging method ¹⁾	Max. weight [kg]	Max. thickness [mm]	Max. outer diameter [mm]	Heat treatment condition ²⁾
C and C-Mn	VL F400U, VL F440U, VL F480U, VL F520U, VL F560U, VL F600U, VL F640U, VL F680U, VL F720U, VL F760U	OD, RR	5 000	180	4030	NT
Alloy	VL F600A, VL F700A, VL F800A, VL F900A, VL F1000A, VL F1100A	OD, RR	3 200	235	2375	QT

Stainless steel forgings

Steel type ⁴⁾	Forging method ¹⁾	Max. weight [kg]	Max. thickness [mm]	Max. outer diameter [mm]	Heat treatment condition ²⁾
Austenitic stainless	OD, RR	450	80	790	SHT

Remarks:

- 1) OD: Open die forging
RR: Ring Rolling
- 2) QT: Quenched and tempered
N: Normalised
NT: Normalised and tempered
SHT: Solution Heat Treated (Solution Annealing)
- 3) Incl. equivalent grades in acc. to other standards
- 4) Stainless steel forgings shall be in accordance with recognized standards, e.g. EN 10222, ASTM A473/A965/A1049 and JIS G 3214, provided that supplementary requirements contained herein are also met. Recognition of other standards is subject to submission to the Society for evaluation.

Additional approval conditions:

Including austenitic stainless steel for approved low-temperature applications