



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000013
Revision No:
17

This is to certify:

That

Hunan Valin Xiangtan Iron & Steel Co., Ltd.
XIANGTAN, HUNAN, China

is an approved manufacturer of
Steelmaking and Rolled Steel Products

in accordance with

DNV rules for classification – Ships
DNV-OS-B101 – Metallic materials
DNV class programme – DNV-CP-0243 Rolled steel products – non stainless steel

and the following particulars:

Application area	Normal strength steel High strength steel Extra high strength steel Z-grade steels (plates with trough thickness properties) Steels for boiler and pressure vessels Steel for low temperature service
Products	Plates
Manufacturing method	Basic Oxygen Converter, Continuous Casting/Ingot Casting
Max. thickness	See page 2 ff.
Heat treatment condition	See page 2 ff.
Additional approval conditions	See page 2 ff.

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 **2023-01-24**

This Certificate is valid until **2023-12-31**.

for **DNV**

DNV local unit: **Wuhan**

Approval Engineer: **Torben Schällicke**

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Thorsten Lohmann
Head of Section

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Particulars of the approval

Steel Plates Produced by Manufacturing Lines No. 1 & 2:

Normal strength steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. thickness [mm]	Heat treatment condition ²⁾	Z-quality
NV A, NV B	Plate	BOC, CC	Al	40	NR	Z35
			Al+Nb	60	N	Z35
NV B	Plate	BOC, CC	Al+Nb	40	TM	Z35
NV A, NV B, NV D	Plate	BOC, CC	Al	40	TM	Z35
NV D	Plate	BOC, CC	Al	40	NR	Z35
			Al+Nb	40	TM	Z35
			Al+Nb	60	N	Z35
NV E	Plate	BOC, CC	Al+Nb	60	N	Z35

High strength steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. thickness [mm]	Heat treatment condition ²⁾	Z-quality
NV A32, NV D32	Plate	BOC, CC	Al	40	TM	Z35
			Al+Nb	40	TM	Z35
			Al+Nb+Ti	100	N	Z35
				40	TM	Z35
NV A32, NV A36, NV D32, NV D36	Plate	BOC, CC	Al	40	NR	Z35
NV A36, NV D36, NV E32, NV E36	Plate	BOC, CC	Al+Nb	40	TM	Z35
NV A36, NV D36, NV E32, NV E36	Plate	BOC, CC	Al+Nb+Ti	100	N	Z35
				40	TM	Z35
NV F32, NV F36, NV A40, NV D40, NV E40, NV F40	Plate	BOC, CC	Al+Nb+Ti	40	TM	Z35
NV D36	Plate	BOC, CC	Al+Nb	40	CR	Z35
NV E32	Plate	BOC, CC	Al	40	TM	Z35

Steels acc. other standards

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
Steel acc. to EN 10025-2 ³⁾						
S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2, S355K2	Plate	BOC, CC	Acc. standard	100	Acc. standard	Z35
Steel acc. to EN 10025-4 ³⁾						
S275M, S275ML, S355M, S355ML	Plate	BOC, CC	Acc. standard	40	Acc. standard	Z35

**Steel Plates Produced by Manufacturing Line No. 3
 (5M Wide and Heavy Plate):**

Normal strength steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV A, NV B	Plate	BOC, CC	Al	40	NR	-
			-	40	AR	-
			Al	60	N	-
NV A, NV B, NV D	Plate	BOC, CC	Al	40	NR	Z35
NV A, NV B, NV D, NV E	Plate	BOC, CC	Al+Nb	100	N	Z35
			Al+Nb	40	TM	Z35
NV A, NV B, NV D, NV E	Plate	BOC, IC	Al+Nb+Ti	150	N ⁴⁾	Z35

High strength steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV A32	Plate	BOC, CC	Al	40	NR	Z35
			Al	35	AR	-
NV A32, NV A36, NV D32, NV D36	Plate	BOC, CC	Al	40	NR	Z35
NV A32, NV A36, NV D32, NV D36, NV E32, NV E36	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35
NV A40, NV D40, NV E40	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35
NV A32, NV A36, NV D32, NV D36, NV E32, NV E36	Plate	BOC, IC	Al+Nb+Ti+V	150	N ⁵⁾	Z35
NV A32, NV A36, NV D32, NV D36, NV E32, NV E36	Plate	BOC, CC	Al+Nb+Ti+V	150	N	Z35
NV A32, NV A36, NV D32, NV D36, NV E32, NV E36, NV F32, NV F36	Plate	BOC, CC	Al+Nb+Ti+V	120	N	Z35

High strength steels of improved weldability

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV A32-W200, NV D32-W200, NV E32-W200, NV A36-W200, NV D36-W200, NV E36-W200	Plate	BOC, CC	Al+Ti	40	TM	Z35

Extra high strength steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV A420, NV D420, NV E420	Plate	BOC, CC	Al+Nb+Ti	100	TM	Z35
NV A460, NV D460, NV E460	Plate	BOC, CC	Al+Nb+Ti	80	TM	Z35
NV A420, NV A460, NV D420, NV D460, NV E420, NV E460	Plate	BOC, CC	Al+Nb+Ti	50	QT	Z35
NV A500, NV D500, NV E500, NV A550, NV D550, NV E550 ⁷⁾	Plate	BOC, CC	Al+Nb+Ti	90	QT	Z35
NV A460, NV D460, NV E460, NV F460, NV A500, NV D500, NV E500, NV F500 ⁸⁾ , NV A550, NV D550, NV E550, NV F550 ⁹⁾ , NV A620, NV D620, NV E620, NV F620, NV A690, NV D690, NV E690, NV F690 ¹⁰⁾	Plate	BOC, CC	Al+Nb+V+Ti	120	QT	Z35
NV A620, NV D620, NV E620, NV A690, NV D690, NV E690	Plate	BOC, CC	Al+Nb+Ti	50	QT	Z35
NV A47, NV D47, NV E47	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35

Brittle Crack Arrest BCA Steel and COD Steel

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV A40 BCA1, NV A40 BCA2, NV A47 BCA1, NV A47 BCA2, NV D40 BCA1, NV D40 BCA2, NV D47 BCA1, NV D47 BCA2, NV E40 BCA1, NV E40 BCA2, NV E47 BCA1, NV E47 BCA2 ^{x)}	Plate	BOC, CC	Al+Nb+Ti	85	TM	Z35
NV A40 BCA1COD, NV A40 BCA2COD, NV A47 BCA1COD, NV A47 BCA2COD, NV D40 BCA1COD, NV D40 BCA2COD, NV D47 BCA1COD, NV D47 BCA2COD, NV E40 BCA1COD, NV E40 BCA2COD,	Plate	BOC, CC	Al+Nb+Ti	85	TM	Z35

NV E47 BCA1COD, NV E47 BCA2COD ^{x)}						
NV A40 COD, NV A47 COD, NV D40 COD, NV D47 COD, NV E40 COD, NV E47 COD ^{x)}	Plate	BOC, CC	Al+Nb+Ti	85	TM	Z35

^{x)} Including corresponding grades A36/D36/E36 with BCA1, BCA2 and COD properties. For acceptance testing the requirements as stated in the remarks in the *original* certificate shall be fulfilled.

Rolled steels for boiler and pressure vessels

Steel for low temperature service

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
NV 4-4L M32 S ¹²⁾ , NV 4-4L M36 S ¹³⁾	Plate	BOC, VD, CC	Al+Nb+Ti	40	TM	Z35
NV 360-2FN, NV 2-2, NV 2-3, NV 2-4, NV 2-4L, NV 4-2, NV 4-3, NV 4-4, NV 4-4L	Plate	BOC, VD, CC	Al+Nb+Ti	60 ¹¹⁾	TM	Z35
NV 9Ni/a	Plate	BOC, VD, CC	Al	50 ¹⁴⁾¹⁵⁾	QT	Z35

Rolled steels for boiler and pressure vessels according to other standards^{5) 6)}

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
ASME SA-516 Gr. 70, ASTM A516 Gr.70	Plate	BOC, VD, CC	acc. to standard	40	AR	Z35
ASME SA-516 Gr. 70, ASTM A516 Gr.70	Plate	BOC, VD, CC	acc. to standard	102	N	Z35
ASME SA-537 CL.2, ASTM A537 CL.2	Plate	BOC, VD, CC	acc. to standard	80	QT	Z35

Steels acc. other standards

Grade	Product	Steel making ¹⁾	Fine grain elements	Max. Thickness (mm)	Heat treatment condition ²⁾	Z-quality
Steel acc. to EN 10025-2 ³⁾						
S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2, S355K2	Plate	BOC, CC	Acc. standard	100	Acc. standard	Z35
Steel acc. to EN 10028-4 ³⁾						
X7Ni9, X8Ni9	Plate	BOC, VD, CC	Al	50	QT	Z35
Steel acc. to EN 10225-1 ³⁾						
S355MLO, S420MLO	Plate	BOC, CC	Al+Nb+Ti	100	TM	Z35

Remarks:

- 1) BOC: Basic oxygen converter; CC: Continuous casting; IC: Ingot casting; VD: Vacuum degassing
- 2) AR: as rolled; NR: normalising rolling; TM: thermo-mechanical rolling; N: normalised; QT: quenched and tempered; ACC: accelerated cooling
- 3) Possible application and certification of any material to classed object is subject to case by case approval
- 4) Specially approved rolling procedure 'Normalized preceded by Thermo-mechanical rolling with accelerated cooling' (TM+ACC+N). Approved as per RU Ship Pt.2 Ch.2 Sec.2 [2.7.9]
- 5) For applications subject to special plan approval for the respective grades due to possible deviations to DNVGL-RU-SHIP-Pt2-Ch2-Sec.3
- 6) Approved grades ASME SA-516Gr. 70 / ASTM A516Gr.70 can cover:
ASME SA-516Gr. 55, 60, 65, 70, ASTM A516Gr.55, 60, 65, GB/T 713 Q245R, P265GH acc. to EN 10028-2, ASME SA-285Gr.2, ASTM A285Gr.C.;
Approved grades ASME SA-537CL.2 / ASTM A537CL.2 can cover: ASME SA-537CL.1/3, ASTM A537CL.1/3
- 7) Qualified max. heat input. 3.0 kJ/mm. $C_{eq} = 0.55$ during weldability testing
- 8) Qualified max. heat input. 3.5 kJ/mm. $C_{eq} = 0.45$ during weldability testing
- 9) Qualified max. heat input. 3.0 kJ/mm. $C_{eq} = 0.61$ during weldability testing
- 10) Qualified max. heat input. 3.0 kJ/mm. $C_{eq} = 0.66$ during weldability testing
- 11) Thickness over 40 mm special approval required on a case-by-case basis. From 40 mm to 60 mm thickness the test temperature has been qualified as per the scheme in table 14 of DNV-RU-SHIP-Pt2-Ch2-Sec3 by extrapolation: each 5 mm additional thickness results in 5°C decreased test temperature.
- 12) NV 4-4L M32 S: specified mechanical properties (yield strength $R_p \min = 315 \text{ N/mm}^2$; tensile strength $R_m = 440 - 590 \text{ N/mm}^2$; elongation A5 min = 22 %)
- 13) NV 4-4L M36 S: specified mechanical properties (yield strength $R_p \min = 355 \text{ N/mm}^2$; tensile strength $R_m = 490 - 610 \text{ N/mm}^2$; elongation A5 min = 21 %)
- 14) Test temperature for $40 < t \leq 50 \text{ mm}$ in acc. with IACS W1
- 15) Max. heat input for weldability testing 35 kJ/cm