APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000013
Revision No:
6

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 GL rules for classification – Ships
DNVGL-OS-B101 – Metallic materials

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**
Products	**Plates**
Manufacturing method	**Basic Oxygen Converter,** **Continuous Casting/Ingot Casting**
Max. thickness	**See page 2 to 8**
Heat treatment condition	**See page 2 to 8**
Additional approval conditions	**See page 2 to 8**

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 GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Hamburg** on **2020-04-16**

This Certificate is valid until **2020-12-31**.
DNV GL local station: **Wuhan**

Approval Engineer: **Stefan Röhr**

for **DNV GL**
Digitally Signed By: Wildhagen, Christian
Location: DNV GL Hamburg, Germany
Signing Date: 2020-04-16, on behalf of

Thorsten Lohmann
Head of Section

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]	Delivery condition[2)]	Z-quality
VL A, VL B	Plate	BOC, CC	Al	40	NR	Z35
			Al+Nb	60	N	Z35
VL B	Plate	BOC, CC	Al+Nb	40	TM	Z35
VL A, VL B, VL D	Plate	BOC, CC	Al	40	TM	Z35
VL D	Plate	BOC, CC	Al	40	NR	Z35
			Al+Nb	40	TM	Z35
			Al+Nb	60	N	Z35
VL E	Plate	BOC, CC	Al+Nb	60	N	Z35

High strength steel

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
VL A32, VL D32	Plate	BOC, CC	Al	40	TM	Z35
			Al+Nb	40	TM	Z35
			Al+Nb+Ti	100	N	Z35
				40	TM	Z35
VL A32, VL A36, VL D32, VL D36	Plate	BOC, CC	Al	40	NR	Z35

Steels acc. other standards

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
Steel acc. to EN 10025-2[3)4)]						
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)4)]						
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]	Delivery condition[2)]	Z-quality
VL A, VL B	Plate	BOC, CC	Al	40	NR	-
			-	40	AR	-
			Al	60	N	-
VL A, VL B, VL D	Plate	BOC, CC	Al	40	NR	Z35
VL A, VL B, VL D, VL E	Plate	BOC, CC	Al+Nb	100 II)	N	Z35
			Al+Nb	40	TM	Z35
VL A, VL B, VL D, VL E	Plate	BOC, IC	Al+Nb+Ti	150	N[5)]	Z35

High strength steel

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
VL A32	Plate	BOC, CC	Al	40	NR	Z35
			Al	35	AR	-
VL A36, VL D32, VL D36	Plate	BOC, CC	Al	40	NR	Z35
VL A32, VL A36, VL D32, VL D36, VL E32, VL E36	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35
			Al+Nb+Ti+V	100 II)	N	Z35
VL A40, VL D40, VL E40	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35
VL A32, VL A36, VL D32, VL D36, VL E32, VL E36	Plate	BOC, IC	Al+Nb+Ti+V	150	N[5)]	Z35

II) Extension from previously 60 mm to now 100 mm. Pending: the following tests have to be performed successfully on one additional heat of VL E36 and VL E40 each, with t = 100 mm:

- Chemical composition
- Tensile tests
- KV tests (unaged)
- KV tests (aged)
- Micrographs

The test results shall be submitted to DNV GL Approval Unit (via local station) not later than 2020-02.

Extra high strength steel

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
VL A420, VL D420, VL E420, VL A460, VL D460, VL E460	Plate	BOC, CC	Al+Nb+Ti	80	TM	Z35
VL A420, VL A460, VL D420, VL D460, VL E420, VL E460	Plate	BOC, CC	Al+Nb+Ti	50	QT	Z35
VL A500, VL D500, VL E500, VL A550, VL D550, VL E550	Plate	BOC, CC	Al+Nb+Ti	50	QT	Z35
VL A620, VL D620, VL E620, VL A690, VL D690, VL E690	Plate	BOC, CC	Al+Nb+V+Ti	50	QT	Z35
VL A620, VL D620, VL E620, VL A690, VL D690, VL E690	Plate	BOC, CC	Al+Nb+Ti	50	QT	Z35
VL A47, VL D47, VL E47	Plate	BOC, CC	Al+Nb+Ti	90	TM	Z35

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Brittle Crack Arrest Steel

Grade	Product	Steel making[1)]	Fine grain elements	Delivery condition[2)]	Max. thickness [mm]	Z-quality
VL A47 BCA, VL D47 BCA, VL E47 BCA[I)]	Plate	BOC, CC	Al+Nb+Ti	TM	80	Z35
VL A47 BCACOD, VL D47 BCACOD, VL E47 BCACOD [I)]	Plate	BOC, CC	Al+Nb+Ti	TM	80	Z35
VL A47 COD, VL D47 COD, VL E47 COD [I)]	Plate	BOC, CC	Al+Nb+Ti	TM	80	Z35

Special remarks
I) Particulars for grade VL-A47 BCACOD, VL-D47 BCACOD, GL-VLD47 BCACOD, all grades including BCA grades, COD grades and Z35 grades, max. plate thickness t = 80 mm (in addition to the common requirements as per the DNVGL Rules):

- The production shall be in accordance with the manufacturer’s specification dd. 2014-03-11.
- Weldability testing for this approval was performed with lower heat input 15 kJ/cm and higher heat input 50 kJ/cm.
- Aim analysis for elements which are determining for BCA property is:
  0.47 ≤ % Ni;
  1.41 < % Mn < 1.84.
  For production testing, these limits have to be fulfilled.
  QEEMC /Span <</MCID 91/Lang (en-GB)>>BDC q 0.000008871 0 595.32 841.92 re W* n BT /F1 9 Tf 1 0 0 1 721.5 6

- For production testing, once per heat, on the thickest plate of the heat, Pellini testing is to be performed for surface, t/4 and t/2 position.
- For Pellini testing for surface position it must be fulfilled:
  NDTT ≤ -70 °C
  The appropriate test result must be indicated on each relevant inspection document.

- For production testing, once per heat, on the thickest plate of the heat, micrographs incl. microstructure analysis are to be performed for surface, t/4 and t/2 position. The micrographs and analysis have to be stored at Hunan Valin Xiangtan Iron & Steel Co., Ltd., and have to be submitted to DNV GL in quality copy when renewal of the approval is due, or on request of DNV GL.

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Rolled steels for boiler and pressure vessels

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
VL 360-2FN, VL 2-2, VL 2-3, VL 2-4, VL 2-4L, VL 4-2, VL 4-3, VL 4-4, VL 4-4L	Plate	BOC, VD, CC	Al+Nb+Ti	TM *2)	40	Z35

*2) It shall not be used where hot forming or normalizing will be carried out (RU SHIP Pt.2 Ch.2 Sec.3 [3.4])

Rolled steels for boiler and pressure vessels according to other standards [6) 7)]

Grade	Product	Steel making [1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	

Steels acc. other standards

Grade	Product	Steel making[1)]	Fine grain elements	Max. thickness [mm]	Delivery condition[2)]	Z-quality
Steel acc. to EN 10025-2 [3)4)]						
S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2, S355K2	Plate	BOC, CC	Acc. standard	100	Acc. standard	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) Certification of any material applied to classed object shall fulfil the applicable material requirements in the DNV GL class rules
4) Possible application and certification of any material to classed object is subject to case by case approval
5) 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]
6) For applications subject to special plan approval for the respective grades due to possible deviations to DNVGL-RU-SHIP-Pt2-Ch2-Sec.3
7) 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