



# DET NORSKE VERITAS

## APPROVAL OF MANUFACTURER

### CERTIFICATE

CERTIFICATE NO. AMM-5903

*This is to certify that*

**Heavy Plate Mill of Medium and Heavy Plate Plant  
of Angang Steel Co., Ltd**  
ANSHAN, China

*is an approved manufacturer of*  
**Steelmaking and Rolled Steel Products**

*in accordance with*  
Det Norske Veritas' Rules for Classification Pt. 2  
Offshore Standard DNV-OS-B101

*and the following particulars:*

Product	Plates and slabs
Grades	Hull structural steels, see page 2 and 3 Steels for boilers and pressure vessels, see page 3 Steels for low temperature service, see page 4
Steelmaking	Basic oxygen converter, continuous casting
Deoxidation	Killed
Fine grain elements	See table pages 2 and 3
Delivery conditions	See table pages 2 and 3
Max. thickness	See table pages 2 and 3
Remarks	Including Hull structural steels intended for welding with high heat input

*Place and date*  
Høvik, 2012-11-01

for DET NORSKE VERITAS AS

*Harsharn S. Tathgar*

Harsharn Tathgar  
Head of Section



Local Office  
DNV Dalian

*This Certificate is valid until*  
2016-12-31

*Bjørn Inge Andersen*

Bjørn Inge Andersen  
Surveyor

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



**Particulars of the approval:**

**Steel Plates:**

<i>Normal Strength Steels:</i>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV A	BOC, CC	Al	AR	40	-
		-	AR	40	-
		Al	TM	100	Z35
NV B	BOC, CC	Al	AR	40	-
		Al	N	40	-
		Al	TM	100	Z35
NV D	BOC, CC	Al	CR	40	-
		Al	N	40	-
		Al+Nb	CR	40	-
		Al+Nb	N	40	-
		Al	TM	100	Z35
NV E	BOC, CC	Al	N	40	-
		Al	TM	100	Z35
<i>High Strength Steels:</i>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV A32	BOC, CC	Al+Nb+V	CR	40	-
		Al+Nb+V	N	40	-
		Al	CR	40	-
		Al	N	40	-
		Al+V+Nb+Ti	TM	100	Z35
NV D32	BOC, CC	Al+Nb+V	CR	40	-
		Al+Nb+V	N	40	-
		Al+V+Nb+Ti	TM	100	Z35
NV A36, NV D36	BOC, CC	Al+Nb+V	N	40	-
		Al+V+Nb+Ti	TM	100	Z35
NV E32, NV E36	BOC, CC	Al+Nb+V	N	40	-
		Al+V+Nb+Ti	TM	100	Z35
NV A40, NV D40, NV F32, NV F36, NV F40	BOC, CC	Al+V+Nb+Ti	TM	100	Z35

Remarks:

<sup>1)</sup> BOC: Basic Oxygen Converter; CC: Continuous Casting.

<sup>2)</sup> AR: As Rolled; CR: Controlled Rolled; N: Normalised; TM: Thermo-Mechanical rolling.



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<b>Normal Strength Steels intended for welding with high heat input<sup>3)</sup>:</b>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV A-W100, NV B-W100 NV-D-W100, NV E-W100	TDS, LD, CC	Al	TM	100	Z35
<b>High Strength Steels intended for welding with high heat input<sup>3)</sup>:</b>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV A32-W100, NV D32-W100 NV E32-W100, NV A36 -W100 NV D36-W100, NV E36-W100 NV A40-W100, NV D40 -W100 NV E40-W100	TDS, LDC, CC	Al+V+Nb+Ti	TM	100	Z35
<b>Extra High Strength Steels:</b>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV A420, NV A460, NV A500, NV A550, NV D420, NV D460, NV D500, NV D550, NV E420, NV E460, NV E500, NV E550, NV F420, NV F460, NV F500, NV F550	BOC, CC	Al+V+Nb+Ti	TM	80	Z35
<b>Boiler and Pressure Vessel Steels:</b>					
Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV 360-0A, NV 410-0A, NV 460-0A	BOC, CC	Al	AR	90	-
NV 360-0N, -1FN, NV 410-0N, -1FN, NV 460-0N, -1FN, NV 490-0N, -1FN	BOC, CC	Al	N	90	-
NV 360-0N, -1FN, NV 410-0N, -1FN, NV 460-0N, -1FN, NV 490-0N, -1FN, NV 510-0N	BOC, CC	Al+Nb+V	N, CR, TM	90	-

Remarks:

<sup>1)</sup> TDS: Torpedo-car Desulphurization; LDC: Linz Donawitz Converter; BOC: Basic Oxygen Converter; CC: Continuous Casting.

<sup>2)</sup> AR: As Rolled; CR: Controlled Rolled; N: Normalised; TM: Thermo-Mechanical rolling; QT: Quenched and tempered

<sup>3)</sup> Specially approved according to IACS W11, Appendix B.

*J. Sand*



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**Nickel Alloy Steels for Low Temperature Service:**

Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV 1.5 Ni, NV 3.5 Ni, NV 5 Ni, NV 9 Ni	BOC, CC	Al	QT	40	-

Remarks:

<sup>1)</sup> BOC: Basic Oxygen Converter; CC: Continuous Casting.

<sup>2)</sup> QT: Quenched and tempered

**Carbon- Manganese Steels for Low Temperature Service:**

Grade:	Steelmaking <sup>1)</sup> :	Fine grain treatment:	Delivery condition <sup>2)</sup> :	Max. Thickness (mm):	Z-quality:
NV 360 - 2FN	BOC, CC	Al	N	40	-
		Al	TM	50	Z35
NV 2 - 2	BOC, CC	Al	N	40	-
		Al+Nb+V	N	40	-
		Al	TM	50	Z35
		Al+V+Nb+Ti	TM	50	Z35
NV 2 - 3	BOC, CC	Al	N	40	-
		Al+Nb+V	N	40	-
		Al	TM	50	Z35
		Al+V+Nb+Ti	TM	50	Z35
NV 2 - 4	BOC, CC	Al+V+Nb+Ti	TM	50	Z35
NV 2 - 4L	BOC, CC	Al+Nb+V+Ti	TM	50	Z35
NV 4 - 2	BOC, CC	Al+Nb+V	N	40	-
		Al+Nb+V+Ti	TM	50	Z35
NV 4 - 3	BOC, CC	Al+Nb+V	N	40	-
NV 4 - 4	BOC, CC	Al+Nb+V+Ti	TM	50	Z35
NV 4 - 4L	BOC, CC	Al+Nb+V+Ti	TM	50	Z35

Remarks:

<sup>1)</sup> BOC: Basic Oxygen Converter; CC: Continuous Casting.

<sup>2)</sup> N: Normalised; TM: Thermo-Mechanical

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