



**CERTIFICATE OF APPROVAL OF MANUFACTURERS OF
MATERIALS
No. FAB134024WS**

This is to certify that the manufacture of the product identified below is in compliance with the applicable requirements of the RINA Rules for the Approval of Manufacturers of Materials.

<i>Description</i>	Hull steel plates
<i>Type</i>	A/B/D/E/AH32/AH36/AH40/DH32/DH36/DH40/EH32/EH36/ EH40/FH32/FH36/FH40/A420/A460/A500/A550/A620/A690/ D420/D460/D500/D550/D620/D690/E420/E460/E500/E550/ E620/E690/F420/F460/F500/F550/F620/F690 EH36BCA1,EH40BCA1/2,EH47,EH47BCA1/2
<i>Manufacturer</i>	Jiangsu Shagang Steel Co., Ltd.
<i>Place of manufacture</i>	JINFENG TOWN, ZHANGJIAGANG Zhangjiagang (Jiangsu) CHINA
<i>Reference standards</i>	RINA Rules for the approval of manufacturers of materials

Issued in **RINA China Marine** on **October 23, 2024.** *This Certificate is valid until* **September 24, 2029**



Hong Gu

RINA Services S.p.A.

This certificate consists of this page and 1 enclosure

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Enclosure - Page 1 of 1

**A/B/D/E/AH32/AH36/AH40/DH32/DH36/DH40/EH32/EH36/
EH40/FH32/FH36/FH40/A420/A460/A500/A550/A620/A690/
D420/D460/D500/D550/D620/D690/E420/E460/E500/E550/
E620/E690/F420/F460/F500/F550/F620/F690
EH36BCA1,EH40BCA1/2,EH47,EH47BCA1/2**

APPROVAL CONDITIONS**Approval particulars:**

Grades	Steel-making ¹⁾	Deoxidation	Fine grain elements	Delivery condition ²⁾	Max. thickness (mm)	Z-quality
A,B	BOC,CC	Killed	Al	AR	40	Z25/Z35
			Al	N	60	
			Al+Ti	N	100	
			Al+Ti+Nb			
D	BOC,CC	Killed	Al	N	40	Z25/Z35
			Al+Ti			
			Al	TMCP	60	
			Al+Ti+Nb	N	100	
E	BOC,CC	Killed	Al	TMCP	60	Z25/Z35
			Al+Ti	N	100	
			Al+Ti+Nb			
AH32	BOC,CC	Killed	Al+Ti	AR	30	Z25/Z35
			Al+Ti	N	40	
			Al+Nb	TMCP	60	
			Al+Nb+Ti	N	100	
AH36	BOC,CC	Killed	Al+Ti	AR	30	Z25/Z35
			Al+Nb+Ti	N	40	
			Al+Nb	TMCP	60	
			Al+Nb+V+Ti	N	100	
DH32	BOC,CC	Killed	Al+Ti	N	40	Z25/Z35
			Al+Nb	TMCP	60	
			Al+Nb+Ti	N	100	
DH36	BOC,CC	Killed	Al+Nb+Ti	N	40	Z25/Z35
			Al+Nb	TMCP	60	
			Al+Nb+V+Ti	N	100	
EH32,FH32	BOC,CC	Killed	Al+Nb	TMCP	60	Z25/Z35
			Al+Nb+Ti	N	100	
EH36,FH36	BOC,CC	Killed	Al+Nb	TMCP	60	Z25/Z35
			Al+Nb+V+Ti	N	100	
AH40,DH40 EH40,FH40	BOC,CC	Killed	Al+Nb+V+Ti	TMCP	60	Z25/Z35
			Al+Nb+V+Ti	N	100	
A420,D420,E420,F420,	BOC,CC	Killed	Al+Nb+Ti	QT	100	Z25/Z35

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A460,D460,E460,F460						
A500,D500,E500,F500, A550,D550,E550,F550	BOC,CC	Killed	Al+Nb+Ti	QT	100	Z25/Z35
A620,D620,E620,F620, A690,D690,E690,F690	BOC,CC	Killed	Al+Nb+Ti	QT	100	Z25/Z35

Remarks:

1) BOC: Basic Oxygen Converter; CC: Continuous Casting;

2) N: Normalizing; AR: As Rolled; TMCP: Thermo-Mechanical rolling; QT: Quenching & Tempering

Approval particulars:

Grades	Steel- making ¹⁾	Deoxidation	Fine grain elements	Delivery condition ²⁾	Max. thickness (mm)	Z-quality
A,B,D,E	BOC, CC	Killed	Al+Nb+Ti	TMCP	100	Z35
AH32,DH32,EH32, AH36,DH36,EH36, AH40,DH40,EH40.	BOC, CC	Killed	Al+Nb+Ti	TMCP	100	Z35

Remarks:

1) BOC: Basic Oxygen Converter; CC: Continuous Casting;

2) TMCP: Thermo-Mechanical rolling;

Approval particulars:

Steel grades	Steel-making	Deoxidation	Fine grain elements	Delivery condition	Max. Thickness (mm)	Z-quality
EH36BCA1	BOC, LF, RH, CC	Killed	Al+Nb+Ti	TMCP	100	Z35
EH40BCA1/ EH40BCA2	BOC, LF, RH, CC	Killed	Al+Nb+Ti	TMCP	100	Z35
EH47/EH47BCA1/ EH47BCA2	BOC, LF, RH, CC	Killed	Al+Nb+Ti	TMCP	100	Z35

BOC: Basic Oxygen converter; EAF: Electric arc furnace ; CC: Continuous casting

TMCP: Thermo-Mechanical rolling;

Acceptance criteria in production for crack arrest toughness: Once per motherplate with Pellini tests (ASTM E208 specimen), two successful tests (2 specimens) for the following positions:

1) For EH40BCA2:

- on the surface: no break at -60 °C ($T_{NDT} \leq -65$ °C) (type P-3), or no break at -70 °C ($T_{NDT} \leq -75$ °C) (type P-1)

- on the plane at 1/2-thickness (t/2): no break at -40°C ($T_{NDT} \leq -45$ °C) (type P-3)

- on the side section: no break at -45°C ($T_{NDT} \leq -50$ °C) (type P-3)

2) For EH47BCA2:

- on the surface: no break at -65 °C ($T_{NDT} \leq -70$ °C) (type P-1 or P3)

- on the plane at 1/2-thickness (t/2): no break at -45°C ($T_{NDT} \leq -50$ °C) (type P-3)

- on the plane at 1/4-thickness (t/4): no break at -55°C ($T_{NDT} \leq -60^{\circ}\text{C}$) (type P-3)

Approval particulars:

Grade	Steel-making	Deoxidation	Fine grain elements	Delivery condition	Max.Thickness (mm)	Z-quality
AH32/36-W100 DH32/36-W100 EH32/36-W100	BOC,LF,RH,CC	Killed	Si+Nb+V+Ti	TMCP	70	Z35
AH32/36-W200 DH32/36-W200 EH32/36-W200	BOC,LF,RH,CC	Killed	Si+Nb+V+Ti	TMCP	35	Z35

Remarks:

- 1) BOC: Basic Oxygen Converter; LF: Ladle Furnace; CC: Continuous Casting;
RH: Ruhrstahl & Hereaeus vacuum refining treatment;
2) TMCP: Thermo Mechanical Control Process

Approval particulars:

Grade	Steel-making ¹⁾	Deoxidation	Grain refining element	Delivery condition ²⁾	Max. thickness (mm)	Z-quality
9.0 Ni	BOC, LF, RH, CC	Killed	Al	QT	50	Z25/Z35

Dimension:

Thickness: 8~50(mm); Width: 1500~4800(mm); Length: 3000~25000(mm);

Remarks:

- 1) BOC: Basic Oxygen Converter; LF: Ladle Furnace;
RH: Ruhrstahl & Hereaeus vacuum refining treatment; CC: Continuous Casting;
2) QT: Quenching & Tempering heat treatment.

Special Note:

This certificate supersede certificate No.FAB546723WS, FAB107920WS, FAB286520WS, FAB014719WS and FAB188620WS.

Survey condition:

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The plates are to be in compliance in all respects with the relevant RINA rules and are to be tested accordingly.

General conditions for the approval

-The approval is granted on condition that the RINA Rules for the approval, manufacture, testing and certification of materials are complied with in all respects.

-RINA is to be notified of any change of materials, manufacturing process, quality control routines that may affect the validity of this certificate.

**RINA China Marine October 23,
2024**