

CERTIFICATE NUMBER STML-T1370817-1

ISSUING OFFICE Houston Ship Engineering

# CERTIFICATE OF STEEL MILLS FACILITY AND PROCESS APPROVAL

This is to certify that a representative of ABS did, at the request of

#### JIANGSU SHAGANG GROUP CO., LTD.

CHIEF ENGINEER OFFICE, ZHANGJIAGANG CITY, China, 215625

attend its facilities as indicated in the ABS City CN Nantong Port (MLO) port office survey report number 2529059 dated 12 May 2015 in order to carry out a survey of the facilities and associated quality procedures. The facility is considered capable of manufacturing

#### Semi-finished product and Plate components for marine applications

in accordance with the ABS Approval letter (Reference T1567639), ABS Rules, designated standards and ABS approved drawings. The approval is valid till 11 May 2020 subject to adherence to relevant ABS Rules and Survey requirements.

Marcus Cridland Chief Metallurgist, ABS

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ISSUE DATE: 12 May 2015 EXPIRY DATE: 11 May 2020

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NOTE: This tertificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. This Certificate is a representation only that the structure, item of material, equipment, machinery or any other item covered by this Certificate has met one or more of the Rules, Guides, standards or other criteria of ABS as of the date of issue. Parties are advised to review the Rules for the scope and conditions of classification and to review the survey records for a full description of any restrictions or limitation on the vessel's service or surveys. The validity, applicability and interpretation of this Certificate is governed by the Rules and standards of ABS who shall remain the sole judge thereof. Nothing contained in this Certificate or in any notation made in contemplation of this Certificate shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied.



Jiangsu Shagang Group Co., Ltd. (148446) Chief Engineer Office Jinfeng, Zhangjiagang, P. R. China 215625

Reference:

JO/VB T1567639

Project Number: Certificate No:

3112099 STML-T1370817-1

ATTN: Dongsheng Liu

# Extension of Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Jinfeng, China

We have the ABS Nantong plant survey report NX2529059-A dated 12 October 2015, along with your submittals of 25 September 2015 together with enclosures relative to the subject. With regard thereto we advise that Jiangsu Shagang Group Co., Ltd. Is considered approved to produce rolled steel to the requirements of the ABS Rules for Materials and Welding 2-1-3 & 2-A4-2 (2016) and the ABS Guide for Application of Higher-Strength Hull Structural Thick Steel Plates in Container Carriers (2014) as outlined herein, provided the Rules are adhered to in all respects and all production, testing and inspection are to the satisfaction of the attending ABS Surveyor in association with the comments below.

In production, double-tension crack arrest tests (CCS Guidance Notes GD 07-2014 Appendix B) are to be carried out on each heat to confirm  $K_{ca} @ -10^{\circ}\text{C}$  is similar to values achieved during qualification (7140 N/mm<sup>3/2</sup>), and NRL Drop weight tests (ASTM E208) are to be carried out on each mother plate to determine the no-break temperature. Results should be used to correlate Crack Arrest Temperature (CAT) and NRL Drop weight test temperature; this equation is to be provided to ABS SED Materials Group.

The approval will expire on 11 May 2020. Please note it is the responsibility of the facility to inform ABS of any changes to the manufacturing parameters and request renewal of approval prior to the five year expiry date.

A copy of the documentation appropriately stamped to indicate our review is being retained. If you need to contact ABS regarding this review please email James Oehrle at joehrle@eagle.org.

Very truly yours

Roy H. Bleiberg

Vice President of Engineering,

ABS Americas



Jiangsu Shagang Group Co., Ltd. (148446) Chief Engineer Office Jinfeng, Zhangjiagang, P. R. China 215625 Reference:

JO/VB T1567639

Project Number:

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Very truly yours

Roy H. Bleiberg Vice President of Engineering,

ABS/Americas



# Extension of Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Jinfeng, China

Product	Specification	Grade	Maximum Thickness	Steel Making Practice	De-Oxidation Practice	Fine Grain Practice	Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	ABS	AH40*, DH40*, EH40 BCA* Z35	85 mm	BOF+LF+RH <sup>α</sup>	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	A*, B Z35	40 mm	BOF	Si	Al	СС	-	As Rolled (AR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si	Al	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	100 mm	BOF	Si-Al	Al+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B*, D Z35	35 mm	BOF	Si	Al	СС	In-House	As Rolled (AR)
Plates	ABS	A*, B*, D*, E Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B*, D*, E Z35	60 mm	BOF	Si-Al	Al+Nb	СС	In-House	TMCP**
Plates	ABS	AH32*, AH36	30 mm	BOF	Si-Al	Al	CC		As Rolled (AR)
Plates	ABS	AH32*, DH32 Z35	40 mm	BOF	Si-Al	Al+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)



Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb	CC	-	-
Slabs	ABS	AH32*, DH32*, EH32*, AH36*, DH36*, EH36	320 mm	BOF	Si-Al	Al+Nb	CC	-	-
Slabs	ABS	AH32*, DH32*, EH32*, FH32	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	AH36*, DH36*, EH36*, FH36*, AH40*, DH40*, EH40*, FH40	320 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	-	-
Slabs	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Slabs	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	, · · · -
Slabs	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70	320 mm	BOF	Si-Al	Al+Nb+Ti	CC		-



Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	100 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	AH32*, DH32*, EH32*, FH32*, AH36*, DH36*, EH36*, FH36 Z35	60 mm	BOF	Si-Al	Al+Nb	СС	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-Hosue	Quenching & Tempering (Q&T)
Plates	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-Hosue	Quenching & Tempering (Q&T)
Plates	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-Hosue	Quenching & Tempering (Q&T)
Slabs	ABS	A*, B	320 mm	BOF	Si-Al	Al+Ti	CC	-	-
Slabs	ABS	A*, B*, D	320 mm	BOF	Si-Al	Al	CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-



Marking

AB/A, AB/B, AB/D, AB/E, AB/AN, AB/BN, AB/DN, AB/EN, AB/A Z35, AB/B Z35, AB/D Z35, AB/D Z35, AB/BN Z35, AB/BN Z35, AB/DN Z35, AB/EN Z35, AB/AH32, AB/DH32, AB/EH32, AB/EH36, AB/EH36, AB/EH36, AB/EH40, AB/EH32, AB/EH32, AB/EH32, AB/EH32, AB/EH36, AB/EH32, AB/EH36, AB/EH32, AB/EH36, AB/EH32, AB/EH36, AB/EH36, AB/EH36, AB/EH36, AB/EH36, AB/EH32, AB/EH36, AB

<sup>\*</sup>Note: The approval of asterisk (\*) superscripted grades in the above table is based on the qualification test data presented on non-asterisk superscripted grades in the same table, and hence, the derivative benefit
\*\*Thermon-Mechanically Controlled Process

<sup>#</sup> BCA indicates steel with brittle crack arrest toughness ( $K_{ca}$ )  $\geq 6000 \text{ N/mm}^{3/2}$  @ -10°C determined by a Double-tension Crack Arrest testing during qualification.  $\alpha$  BOF = Basic Oxygen Converter; LF = Ladle Furnace; RH = Remove Hydrogen



## Attachment B

## Attachment to Approval letter Dated 12 May 2015

12 May 2015

Jiangsu Shagang Group Co., Ltd.

Jinfeng Town, Zhangjiagang City

Jiangsu Province

P.R.China

Refer to: SDL/ML

File Ref: S-6

Product	Specification	Grade	Maximu m Thicknes s	Steel Making Practic e	De- Oxidtio n Practic	Fine Grain Practice	Casting Practice	Heat Treatm ent Facility	Delivery Conditio n
Plates	ABS	AH40*,	85mm	BOF+L F+RH°	e Al	Al+Nb+V +Ti	CC	In- House	TMCP**
		DH40*, EH40 BCA# Z35	10	BOF	Si	Al	CC	-	As Rolled
Plates	ABS	A*, B Z35	40mm	ВОГ					(AR) Normaliz
Plates	ABS	A*, B Z35	60mm	BOF	Si	Al	CC	In- House	ed (N)/Contr ol Rolled (CR)
Plates	ABS	A*, B Z35	60mm	BOF	Si-Al	Al	CC	In- House	Normaliz ed (N)/Cont ol Rolled (CR)
Plates	ABS	A*, B Z35	100mm	BOF	Si-Al	Al+Ti	CC	In- House	Normalized (N)/Con ol Rolled (CR)
Plates	ABS	A*, B*, D Z35	35mm	BOF	Si	Al	CC	In- House	As Rolled
Flates	7.50				0: 1	Al+Nb+T	i CC	In-	(AR) Normali
Plates	ABS	A*, B*, D*, E Z35	100mm	BOF	Si-Al	AITIND		House	(N)/Cor of Rolle (CR)
Plates	ABS	A*, B*, D*, E	60mm	BOF	Si-Al	Al+Nb	CC	In- House	TMCP*
Plates	ABS	Z35 AH32*, AH36	30mm	BOF	Si-Al	Al	CC	-	As Rolled (AR)
1 10.00				DOE	Si-Al	Al+Ti	CC	In-	Norma
Plates	ABS	AH32*, DH32 Z35	2 40mm	BOF	SI-AI	731.11		Hous	e ed (N)/Co



							-		
Plates	ABS	AH32*,	40mm	BOF	O: AI				ol Rolled (CR)
Dist		AH36*, DH32*, DH36 Z35	4011111	BOF	Si-Al	Al+Nb+T	i CC	In- House	Normalized (N)/Contol Rolled
Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In- House	(CR) Normalized (N)/Contol Rolled
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	100mm	BOF	Si-Al	Al+Nb+V +Ti	CC	In- House	(CR)  Normalized (N)/Contol Rolled
Plates	ABS	AH32*, DH32*, EH32*, FH32*, AH36*, DH36*, EH36*, FH36 Z35	60mm	BOF	Si-Al	Al-Nb	CC	In- House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60mm	BOF	Si-Al	Al+Nb+V +Ti	CC	In- House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80mm	BOF	Al	Al+Nb+V +Ti	CC	In- House	TMCP**
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80mm	BOF	Al	Al+Nb+V +Ti	CC	In- House	TMCP**
Plates	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In- House	Quenchi ng & Temperin g (Q&T)
Plates	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56	100mm	BOF	Si-AL	Al+Nb+Ti	CC	In- House	Quenchi ng & Temperin g (Q&T)
Plates	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70 Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In- House	Quenchi ng & Temperin g (Q&T)
Slabs	ABS	A*, B				1		1	



Slabs	ABS	A*, B*, D	320mm	POF	0:				
Slabs	ABS	A*, B*, D*, E	320mm	BOF	Si-Al	Al	CC	-	-
Slabs	ABS	A*, B*, D*, E		BOF	Si-Al	Al+Nb+Ti	CC	_	-
Slabs	ABS	AH32*,	320mm	BOF	Si-Al	Al+Nb	CC	_	-
		DH32*,	320mm	BOF	Si-Al	Al+Nb	CC	-	
		EH32*,							-
		AH36*.							
		DH36*, EH36							
Slabs	ABS								
	7100	AH32*,	320mm	BOF	Si-Al	Al+Nb+Ti	CC	_	
		DH32*,						-	_
Slabs	ABS	EH32*, FH32							
Ciabs	ABS	AH36*,	320mm	BOF	Si-Al	Al+Nb+V	CC		
		DH36*,				+Ti	CC	-	-
		EH36*, FH36*,							
		AH40*,							
		DH40*,						1	
Claba		EH40*, FH40							
Slabs	ABS	AQ43*,	320mm	BOF	Si-Al	AL AU . T			
		DQ43*,		201	SI-AI	Al+Nb+Ti	CC	-	-
		EQ43*,							
		FQ43*,							
		AQ47*,							
		DQ47*,							
		EQ47*, FQ47							
Slabs	ABS	AQ51*,	320mm	D05					
		DQ51*,	320mm	BOF	Si-Al	Al+Nb+Ti	CC	_	_
		EQ51*,							_
		FQ51*,							
		AQ56*,							
		DQ56*,							
Slabs	ABS	EQ56*, FQ56							
	ADO	AQ63*,	320mm	BOF	Si-Al	Al+Nb+Ti	CC		
		DQ63*,				7.11.11		-	-
		EQ63*,							
		FQ63*,							
		AQ70*,	590						
		DQ70*,							
Marking	AD/A AD/D	EQ70*, FQ70							
harking	AB/A, AB/B, A	B/D, AB/E, AB/AN, A B/DN Z35, AB/EN Z3	B/BN, AB/D	N. AB/FN	ΔΒ/Δ 735	AD/D 725 AF	2/D 705		
	AB/BN 235, A	B/DN Z35, AB/AN, A AH40, AB/DH40, AB/	5, AB/AH32	. AB/DH32	ΔR/FH32	AD/D 235, AE	3/D 235, AB/E	E Z35, AB/AN	√Z35,
	AB/FH36, AB/	AHAO AR/DHAO AD	THAO ADIE	1110	-, , 10/11/02	, ADIT HOZ, AL	3/AH36. AB/I	)H36 AR/FH	36
	AB/DH36N, AF	3/FH36N AR/FH36N	AD/ALION:	70 =	" IOZIV, ADI	DI ISZIN, AD/E	H32N. AB/FF	132N AR/AH	36NI
	AB/DH36 Z35	AR/FH36 735 AL/F	1120 705 4	D /	102 200, A	D/L1132 235, /	AB/FH32 /35	AR/AH36 7	25
	235, AB/DH32	N 735 AR/FH32N 7	DE ADIELLO	201 =	9,710,0117	0 233, AD/EH	40 Z35. AB/F	H40 735 AF	IACCHA/S
	233, AB/AH40	N /35 AR/DHAON 7	DE ADIELLA			יוטכו ושושולטו	1 233. AB/FH	36N /35 AR	/ELIOCKI
	ADIAN40 BCA	Z35 AB/DH40 BCA	725 AD/EL	140 00 -		50, ADIA 140 E	DUA, AB/DH4	U BCA AR/F	HAO DCA
	ADIEU43, ABI	- (J43 AR/AO/13 735	AD/DO40 -	705 45	,	17, 10,01147,	AD/EH4/, AB	/A()43 AR/F	0013
	AD/FQ47, AB/A	104//35 AR/DO17	725 ADIEC	17 70-		D/1 Q TO 200, F	AD/AQ4/, AB	$(1)(1)47 \Delta R/F$	$\Omega$ 47
	AD/AQ51 235.	AB/DO51 735 AB/E	OF1 705 A	D/F0= -	411 20	o, ADIAGOI, A	AD/DUST. AB	$/$ E()51 $\Delta$ R/F	O51
	AB/DQ63 Z35	AB/EQ63 Z35, AB/F AB/FQ70 Z35	Q01 Z35, A	B/FQ51 Z3	35, AB/AQ6	3, AB/DQ63, A	AB/EQ63. AR	/FQ63 AR/A	062 725
	AB/EQ70 735	AR/EO70 725	403 235, Al	3/AQ70, A	B/DQ70, Al	3/EQ70, AB/F	Q70 AB/AQ7	0 725 AD/D	030 235,

<sup>\*</sup>Note: The approval of asterisk (\*) superscripted grades in the above table is based on the qualification test data presented on non-asterisk superscripted grades in the same table, and hence, the derivative benefit

<sup>\*\*</sup> Thermon-Mechanically Controlled Process

<sup>#</sup> BCA indicates steel with brittle crack arrest toughness ( $K_{ca}$ ) $\geqslant$ 6000 N/mm $^{3/2}$  @-10 $^{\circ}$ C determined by a Double-tension Crack Arrest testing during qualification.



 $\alpha$  BOF= Basic Oxygen Converter; LF= Ladle Furnace; RH= Remove Hydrogen

#### Remarks:

- Accompanied ABS certificate No: STML-T1370817-1.
- See also ABS approval letter dated 12 May 2015 for details of term and condition.

Michel Labrie

District Manager

Relevant report No. NX2529059



CERTIFICATE NUMBER STML-T1370817-3

ISSUING OFFICE
Houston Ship Engineering

# CERTIFICATE OF STEEL MILLS FACILITY AND PROCESS APPROVAL

This is to certify that a representative of ABS did, at the request of

#### JIANGSU SHAGANG GROUP CO., LTD.

CHIEF ENGINEER OFFICE, ZHANGJIAGANG CITY, China, 215625

attend its facilities as indicated in the ABS City CN Nantong Port (MLO) port office survey report number 2652950 dated 12 May 2015 in order to carry out a survey of the facilities and associated quality procedures. The facility is considered capable of manufacturing

## Plate and Semi-finished product components for marine applications

in accordance with the ABS Approval letter (Reference T1586972), ABS Rules, designated standards and ABS approved drawings. The approval is valid till 11 May 2020 subject to adherence to relevant ABS Rules and Survey requirements.

ORIGINAL CERTIFICATION OF SHIPPINGS

Marcus Cridland
Chief Metallurgist, ABS

ISSUE DATE: 12 May 2015 EXPIRY DATE: 11 May 2020

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. This Certificate is a representation only that the structure, item of material, equipment, machinery or any other item covered by this Certificate has met one or more of the Rules, Guides, standards or other criteria of ABS as of the date of issue. Parties are advised to review the Rules for the scope and conditions of classification and to review the survey records for a full description of any restrictions or limitation on the vessel's service or surveys. The validity, applicability and interpretation of this Certificate is governed by the Rules and standards of ABS who shall remain the sole judge thereof. Nothing contained in this Certificate or in any notation made in contemplation of this Certificate shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied.



Jiangsu Shagang Group Co., Ltd. (148446) Chief Engineer Office Jinfeng, Zhangjiagang, P. R. China 215625

Reference:

JO/VB T1586972

Project Number: Certificate No: 3840576

STML-T1370817-3

ATTN: Ms. Chun-Jie Lu

# Extension of Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Jinfeng, China

We have the ABS Nantong plant survey report NX2652950-A dated 22 November 2016, along with your submittals of November 2016 together with enclosures relative to the subject. With regard thereto we advise that Jiangsu Shagang Group Co., Ltd. Is considered approved to produce rolled steel to the requirements of the ABS Rules for Materials and Welding 2-1-2, 2-1-3 & 2-A4-2 (2016), the ABS Guide for Building and Classing Mobile Offshore Drilling Units 3-1-A3 (2016) and the ABS Guide for Application of Higher-Strength Hull Structural Thick Steel Plates in Container Carriers (2014) as outlined herein, provided the Rules are adhered to in all respects and all production, testing and inspection are to the satisfaction of the attending ABS Surveyor in association with the comments below.

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A copy of the documentation appropriately stamped to indicate our review is being retained. If you need to contact ABS regarding this review please email James Oehrle at joehrle@eagle.org.

Very truly yours

Roy H. Bleiberg Vice President of Engineering,

**ABS Americas** 



Slabs	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Marking	AB/AH32, AB/E AB/EH32N, AB, Z35, AB/EH362 Z35, AB/AH36N AB/DH40 BCA, AB/FQ43, AB/A Z35, AB/FQ47 Z AB/FQ63, AB/A Z35, AB/FQ70 Z	B/D, AB/E, AB/AN, AB DH32, AB/EH32, AB/F /FH32N, AB/AH36N, AZ35, AB/FH36 Z35, AB N Z35, AB/DH36N Z35 AB/EH40 BCA, AB/AH Q43 Z35, AB/DQ43 Z Z35, AB/AQ51, AB/DQ Q63 Z35, AB/DQ63 Z Z35, AB/ASTM A514 C	H32, AB/AH36, A AB/DH36N, AB/E AAH40 Z35, AB/ AB/EH36N Z35 A40 BCA Z35, AB, 35, AB/EQ43 Z3! AS1, AB/EQ63 Z3! AS5, AB/EQ63 Z3!	AB/DH36, AB/EH36N EH36N, AB/FH36N DH40 Z35, AB/EH , AB/FH36N Z35, /DH40 BCA Z35, A 5, AB/FQ43 Z35, A B/FQ51, AB/AQ5 5, AB/FQ63 Z35, A B/ASTM A517 Gra	36, AB/FH36, AB, N, AB/AH32 Z35, I40 Z35, AB/FH4I AB/AH40N Z35, AB/EH40 BCA Z3 AB/AQ47, AB/DQ 1 Z35, AB/DQ51 AB/AQ70, AB/DQ	/AH40, AB/DH4 AB/DH32 Z35, 0 Z35, AB/AH32 AB/DH40N Z35 5, AB/AH47, AB Q47, AB/EQ47, 7	10, AB/EH40, AB/EH32 Z33 1N Z35, AB/D , AB/EH40N 1/DH47, AB/E AB/FQ47, AB	AB/FH40, AB/AH32 5, AB/FH32 Z35, AB, H32N Z35, AB/EH3 Z35, AB/FH40N Z35 EH47, AB/AQ43, AB, JAQ47 Z35, AB/DQ	2N, AB/DH32N, /AH36 Z35, AB/DH36 2N Z35, AB/FH32N 5, AB/AH40 BCA, /DQ43, AB/EQ43, 47 Z35, AB/EQ47

<sup>\*</sup>Note: The approval of asterisk (\*) superscripted grades in the above table is based on the qualification test data presented on non-asterisk superscripted grades in the same table, and hence, the derivative benefit \*\*Thermon-Mechanically Controlled Process

<sup>#</sup> BCA indicates steel with brittle crack arrest toughness ( $K_{ca}$ )  $\geq 6000 \text{ N/mm}^{3/2}$  @ -10°C determined by a Double-tension Crack Arrest testing during qualification.  $\alpha$  BOF = Basic Oxygen Converter; LF = Ladle Furnace; RH = Remove Hydrogen



Plates	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-Hosue	Quenching & Tempering (Q&T)
Slabs	ABS	A*, B	320 mm	BOF	Si-Al	Al+Ti	CC	-	
Slabs	ABS	A*, B*, D	320 mm	BOF	Si-Al	Al	СС	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb	СС	-	-
Slabs	ABS	AH32*, DH32*, EH32*, AH36*, DH36*, EH36	320 mm	BOF	Si-Al	Al+Nb	СС	-	-
Slabs	ABS	AH32*, DH32*, EH32*, FH32	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	AH36*, DH36*, EH36*, FH36*, AH40*, DH40*, EH40*, FH40	320 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	-	-
Slabs	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-



Plates	ABS	AQ51*, PQ51*, EQ51*, FQ51*, AQ56*, DQ56*,	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-Hosue	Quenching & Tempering (Q&T)
Plates	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-Hosue	Quenching & Tempering (Q&T)
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40 BCA# Z35	85 mm	BOF+LF+RH <sup>α</sup>	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plates	ABS	AH32*, DH32*, EH32*, FH32*, AH36*, DH36*, EH36*, FH36 Z35	60 mm	BOF	Si-Al	Al+Nb	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	100 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	In-House	Normalized (N) / Control Rolled (CR
Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR
Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Normalized (N) / Control Rolled (CR



# Extension of Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Jinfeng, China

Product	Specification	Grade	Maximum Thickness		Slab Supplier	3.	Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	ASTM A514/A517	Grade Q MOD	152.4 mm	Jiangsu Sunan	Heavy Machiner Co., Ltd.	y Technology	сс	In-House	Quenching & Tempering (Q&T)
Plates	ABS	EQ70 Z35	152.4 mm	Jiangsu Sunan	Heavy Machiner Co., Ltd.	y Technology	CC In-House		Quenching & Tempering (Q&T)
Product	Specification	Grade	Maximum Thickness	Steel Making Practice	De-Oxidation Practice	Fine Grain Practice	Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	ABS	A*, B Z35	40 mm	BOF	Si	Al	CC	-	As Rolled (AR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si	Al	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	100 mm	BOF	Si-Al	A <mark>l</mark> +Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B*, D Z35	35 mm	BOF	Si	Al	CC	In-House	As Rolled (AR)
Plates	ABS	A*, B*, D*, E Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B*, D*, E Z35	60 mm	BOF	Si-Al	Al+Nb	CC	In-House	TMCP**
Plates	ABS	AH32*, AH36	30 mm	BOF	Si-Al	Al	CC	-	As Rolled (AR)
Plates	ABS	AH32*, DH32 Z35	40 mm	BOF	Si-Al	Al+Ti	СС	In-House	Normalized (N) / Control Rolled (CR)



#### Attachment A

## Attachment to Approval letter Dated 12 May 2015

Updated on 22 November 2016

Jiangsu Shagang Group Co., Ltd.
Jinfeng Town, Zhangjiagang City

Jiangsu Province

P.R.China

Refer to: SDL/ML

File Ref: S-6

Product Plates	Specifi cation  ASTM	Grade Q	Maximum Thickness		Slab Supp		Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	A514/A 517	MOD EQ70 Z35	152.4 mm	Technolo	Sunan Heavy ogy Co., Ltd.	4 H	CC	In-House	Quenching & Tempering (Q&T)
Product	Specifi			Technology Co., Ltd.		Machinery	CC	In-House	Quenching & Tempering (Q&T)
Plates	cation	Grade A*, B Z35	Maximum Thickness	Making Practice	Oxidtion Practice	Fine Grain Practice	Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	ABS	A*, B Z35	40mm 60mm	BOF	Si	Al	CC	-	As Rolled (AR)
			OOMM	BOF	Si	Al	CC	In-House	Normalized (N)/Control
Plates	ABS	A*, B Z35	60mm	BOF	Si-Al	Al	CC	In-House	Rolled (CR) Normalized (N)/Control
Plates	ABS	A*, B Z35	100mm	BOF	Si-Al	Al+Ti	CC	In-House	Rolled (CR) Normalized (N)/Control
Plates	ABS	A*, B*, D Z35	35mm	BOF	Si	Al	CC	In-House	Rolled (CR) As Rolled
Plates	ABS	A*, B*, D*, E Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	(AR) Normalized (N)/Control
Plates	ABS	A*, B*, D*, E Z35	60mm	BOF	Si-Al	Al+Nb	CC	In-House	Rolled (CR) TMCP**
Plates	ABS	AH32*, AH36	30mm	BOF	Si-Al	Al	CC	-	As Rolled
Plates	ABS	AH32*, DH32 Z35	40mm	BOF	Si-Al	Al+Ti	CC	In-House	(AR) Normalized (N)/Control
Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Rolled (CR) Normalized (N)/Control Rolled (CR)



Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	100mm	BOF	Si-Al	Al+Nb+V+ Ti	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	AH32*, DH32*, EH32*, FH32*, AH36*, DH36*, EH36*, FH36 Z35	60mm	BOF	Si-Al	Al-Nb	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60mm	BOF	Si-Al	Al+Nb+V+ Ti	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40 BCA# Z35	85mm	BOF+LF +RH°	Al	Al+Nb+V+ Ti	CC	In-House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80mm	BOF	Al	Al+Nb+V+ Ti	CC	In-House	TMCP**
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80mm	BOF	Al	Al+Nb+V+ Ti	CC	In-House	TMCP**
Plates	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47 Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Quenching & Tempering (Q&T)
Plates	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56 Z35	100mm	BOF	Si-AL	Al+Nb+Ti	CC	In-House	Quenching & Tempering (Q&T)
Plates	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70 Z35	100mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Quenching & Tempering (Q&T)
Slabs	ABS	A*, B	320mm	BOF	Si-Al	Al-Ti	CC	_	-
Slabs	ABS	A*, B*, D	320mm	BOF	Si-Al	Al	CC	-	-
Slabs	ABS	A*, B*, D*, E	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-



Slabs	ABS	A*, B*, D*, E	320mm	BOF	Si-Al	Al+Nb	CC	-	-
Slabs	ABS	AH32*, DH32*, EH32*, AH36*, DH36*, EH36	320mm	BOF	Si-Al	Al+Nb	CC	-	-
Slabs	ABS	AH32*, DH32*, EH32*, FH32	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Slabs	ABS	AH36*, DH36*, EH36*, FH36*, AH40*, DH40*, EH40*, FH40	320mm	BOF	Si-Al	Al+Nb+V+ Ti	CC	-	-
Slabs	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*,	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Slabs	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Slabs	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*,	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Marking	AB/FH36 AB/DH36 AB/DH36 Z35, AB/E Z35, AB/A AB/AH40 AB/EQ43 AB/FQ47, AB/AQ51 AB/DQ63	MB, AB/D, AB/E 35, AB/DN Z35, AB/AH40, AB/ N, AB/EH36N, Z35, AB/EH36 DH32N Z35, AB AH40N Z35, AB/E BCA Z35, AB/E AB/FQ43, AB/E AB/AQ47 Z35, Z35, AB/DQ51 Z35, AB/PQ63	DH40, AB/EHAB/FH36N, AZ35, AH/FH32N Z35, /DH40N Z35, /DH40 BCA Z3AQ43 Z35, AB/EQ6	140, AB/FH4 .B/AH32 Z35 .B6 Z35, AB/A AB/FH32N AB/EH40N .55, AB/EH40 B/DQ43 Z35 .55, AB/EQ47	10, AB/AH32N 10, AB/AH32N 10, AB/DH32 Z 11, AB/DH32 Z 11, AB/AH3 11, AB/AH3 11, AB/AH3 11, AB/AH3 11, AB/AH3 11, AB/AH3 12, AB/AH3 13, AB/AH3 14, AB/AH3 15, AB/AH3 16, AB/A	Z35, AB/B Z35, EH32, AB/FH32, I, AB/DH32N, AE 35, AB/EH32 Z3; /DH40 Z35, AB/DH3 0N Z35, AB/AH4 3/AH47, AB/DH4 35, AB/FQ43 Z3; /AQ63, AB/DQ6; 70, AB/EQ70, AE B/ATSM A517 G	AB/AH36, 3/EH32N, A 5, AB/FH3; EH40 Z35, 36N Z35, A 10 BCA, AE 17, AB/EH4 5, AB/AQ4 11, AB/DQ5 3, AB/EQ6	AB/DH36, A AB/FH32N, A 2 Z35, AB/AH AB/FH40 Z3 B/EH36N Z3 B/DH40 BCA, 7, AB/AQ43, 7, AB/DQ47, 1, AB/EQ51, 3, AB/FQ63,	B/EH36, B/AH36N, H36 Z35, S5, AB/AH32N 5, AB/FH36N AB/EH40 BCA, AB/DQ43, AB/EQ47, AB/FQ51,



\*Note: The approval of asterisk (\*) superscripted grades in the above table is based on the qualification test data presented on non-asterisk superscripted grades in the same table, and hence, the derivative benefit

\*\* Thermon-Mechanically Controlled Process

α BOF= Basic Oxygen Converter; LF= Ladle Furnace; RH= Remove Hydrogen

# BCA indicates steel with brittle crack arrest toughness ( $K_{ca}$ )  $\geq$  6000 N/mm<sup>3/2</sup> @-10°C determined by a Double-tension Crack Arrest testing during qualification. In production, double-tension crack arrest tests (CCS Guidance Notes GD 07-2014 Appendix B) are to be carried out on each heat to confirm  $K_{ca}$ @-10°C is similar to values achieved during qualification (7140N/ mm<sup>3/2</sup>), and NRL Drop weight tests (ATSM E208) are to be carried out on each mother plate to determine the no-break temperature. Results should be used to correlate Crack Arrest Temperature (CAT) and NRL Drop weight test temperature; this equation is to be provided to ABS SED Materials Group.

The approval will expire on 11 May 2020. Please note it is the responsibility of the facility to inform ABS of any changes to the manufacturing parameters and request renewal of approval prior to the five year expiry date.

#### Remarks:

Accompanied ABS certificate No: STML-T1370817-3.

• See also ABS approval letter dated 12 May 2015 for details of term and condition.

Michel Labrie

District Manager

Relevant report No. NX2652950-A



CERTIFICATE NUMBER STML-T1370817-5

ISSUING OFFICE
Houston Ship Engineering

## **CERTIFICATE OF**

# STEEL MILLS

## FACILITY AND PROCESS APPROVAL

This is to certify that a representative of ABS did, at the request of

### JIANGSU SHAGANG GROUP CO., LTD.

CHIEF ENGINEER OFFICE, ZHANGJIAGANG CITY, China, 215625

attend its facilities as indicated in the ABS City CN Nantong Port (MLO) port office survey report number 2935334 dated 07 August 2017 in order to carry out a survey of the facilities and associated quality procedures. The facility is considered capable of manufacturing

## Semi-finished and Rolled Plate product for marine applications

in accordance with the ABS Approval letter (Reference T1664667), ABS Rules, designated standards and ABS approved drawings. The approval is valid till 11 May 2020 subject to adherence to relevant ABS Rules and Survey requirements.

ORIGINAL CHILD

Marcus Cridland Chief Metallurgist, ABS

Could

ISSUE DATE: 12 May 2015 EXPIRY DATE: 11 May 2020

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. This Certificate is a representation only that the structure, item of material, equipment, machinery or any other item covered by this Certificate has met one or more of the Rules, Guides, standards or other criteria of ABS as of the date of issue. Parties are advised to review the Rules for the scope and conditions of classification and to review the survey records for a full description of any restrictions or limitation on the vessel's service or surveys. The validity, applicability and interpretation of this Certificate is governed by the Rules and standards of ABS who shall remain the sole judge thereof. Nothing contained in this Certificate or in any notation made in contemplation of this Certificate shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied.



Jiangsu Shagang Group Co., Ltd. (148446) Jinfeng Town, Zhengjiang City Jiangsu, P. R. China

Reference:

JO/VB T1664667

Project Number:

3966657

Certificate No:

STML-T1370817-5

#### ATTN: K. Hasegawa, Head of Quality Assurance Dept.

# Extension of Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Jiangsu, China

We have the ABS Nantong plant survey report NX2935334 dated 07 August 2017, along with your submittals of 07 August 2017 together with enclosures relative to the subject. With regard thereto we advise that Jiangsu Shagang Group Co., Ltd. is considered approved to produce rolled steel to the requirements of the ABS Rules for Materials and Welding 2-1-2, 2-1-3 & 2-A4-2/11 (2017), the ABS Rules for Building and Classing Mobile Offshore Drilling Units 3-1-A3 (2017) and the ABS Guide for Application of Higher-Strength Hull Structural Thick Steel Plates in Container Carriers (2017) and as outlined herein, provided the Rules are adhered to in all respects and all production, testing and inspection are to the satisfaction of the attending ABS Surveyor in association with the comments below.

The approval will expire on 11 May 2020. Please note it is the responsibility of the facility to inform ABS of any changes to the manufacturing parameters and request renewal of approval prior to the five year expiry date.

A copy of the documentation appropriately stamped to indicate our review is available through the ABS Eagle Construct Engineering Manager (O2E) Web Portal. If you need to contact ABS regarding this review, please email James Oehrle at joehrle@eagle.org.

Very truly yours

Roy H. Bleiberg Vice President of Engineering,

ABS Americas

Electronically published by ABS Houston. Reference T1664667, dated 18-AUG-2017.



# Extension of Steel Mill Facility and Process Approval ABS Approval of Nippon Steel & Sumitomo Metal Corp., Kashima Works, Japan

Product	Specification	Grade	Maximum Thickness	Steel Making Practice	De-Oxidization Practice	Fine Grain Practice	Casting Practice	Heat Treatment Facility	Delivery Condition	
Plate	ABS	AQ43*, DQ43*, EQ43*, FQ43 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	сс	In-House	TMCP**	
Plate	ABS	AQ47*, DQ47*, EQ47*, FQ47 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	In-House	TMCP**	
Plate	ABS	AQ51*, DQ51*, EQ51*, FQ51 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	сс	In-House		
Plate	ABS	AQ56*, DQ56*, EQ56*, FQ56 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	In-House	TMCP**	
Plate	ABS	A*, B Z35	40 mm	BOF	Si	Al	CC	_	As Rolled (AR)	
Plate	ABS	A*, B Z35	40 mm	BOF	Si-Al	Al	СС	-	As Rolled (AR)	
Plate	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	СС	In-House	Normalized (N) / Control Rolled (CR)	
Plate	ABS	A*, B Z35	100 mm	BOF	Si-Al	Al-Ti	СС	In-House	Normalized (N) / Control Rolled (CR)	
Plate	ABS	A*, B Z35	60 mm	BOF	Si	Al	СС	In-House	Normalized (N) / Control Rolled (CR)	
Plate	ABS	A*, B*, D Z35	35 mm	BOF	Si	Al	СС	-	As Rolled (AR)	
Plate	ABS	A*, B*, D Z35	40 mm	BOF	Si-Al	Al	СС	In-House	Control Rolled (CR)	
Plate	ABS	A*, B*, D*, E Z35	60 mm	BOF	Si-Al	Al+Nb	CC	In-House	TMCP**	
Plate	ABS	A*, B*, D*, E Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House		
Plate	ABS	A*, B*, D*, E Z35	40 mm	BOF+LF+RH	Si-Al	Al	СС	In-House	Normalized (N) TMCP w/AcC***	



Plate	ABS	AH32*, AH36	30 mm	BOF	Si-Al	AI	СС	-	As Rolled (AR)
Plate	ABS	AH32*, DH32 Z35	40 mm	BOF	Si-Al	Al+Ti	СС	In-House	Normalized (N) / Control Rolled (CR
Plate	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N) / Control Rolled (CR
Plate	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Ti	СС	In-House	Control Rolled (CR
Plate	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	СС	In-House	TMCP w/AcC***
Plate	ABS	AH32*, DH32*, EH32*, FH32 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Normalized (N)
Plate	ABS	AH32*, DH32*, EH32*, FH32*, AH36*, DH36*, EH36*, FH36 Z35	60 mm	BOF	Si-Al	Al+Nb	СС	In-House	TMCP**
Plate	ABS	AH36*, DH36*, EH36*, FH36*, AH40*, DH40*, EH40*, FH40 Z35	100 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	In-House	Normalized (N)
Plate	ABS	AH40*, DH40*, EH40*, FH40 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plate	ABS	AH32*, DH32*, EH32*, AH36*, DH36*, EH36 BCA Z35	85 mm	BOF+LF+RH	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plate	ABS	AH47*, DH47*, EH47 Z35,	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**



Plate	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	СС	In-House	TMCP**
Plate	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Quenched & Tempered (Q&T)
Plate	ABS	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Quenched & Tempered (Q&T)
Plate	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	СС	In-House	Quenched & Tempered (Q&T)
Plate	ABS	EQ70 Z35	152.4 mm		iangsu Sunan He echnology Co., Lt		СС	In-House	Quenched & Tempered (Q&T)
Plate	ABS	ASTM A514/A517: Grade Q MOD	152.4 mm		iangsu Sunan He echnology Co., Lt		СС	In-House	Quenched & Tempered (Q&T)
Plate	ABS	V-075 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	СС	In-House	
Plate	ABS	VH-075 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	CC		TMCP w/AcC***
Slabs	ABS	A*, B	320 mm	BOF	Si-Al	Al+Ti		In-House	TMCP w/AcC***
Slabs	ABS	A*, B*, D	320 mm	BOF	Si-Al	Al	CC	-	-
Slabs	ABS	A*, B*, D	220 mm	BOF+LF	Si-Al		CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al Al+Nb+Ti	CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
Slabs	ABS	A*, B*, D*, E	220 mm	BOF+LF+RH	Si-Al	Al+ND+11	CC	-	-



Slabs	ABS	AH32*, DH32*, AH36*, DH36	220 mm	BOF+LF+RH	Si-Al	Al+Ti	СС	-	_
Slabs	ABS	AH32*, DH32*, AH36*, DH36	220 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	AH32*, DH32*, EH32*, AH36*, DH36*, EH36	320 mm	BOF	Si-Al	Al+Nb	СС	-	-
Slabs	ABS	AH32*, DH32*, EH32*, FH32	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	AH36*, DH36*, EH36*, FH36*, AH40*, DH40*, EH40*, FH40	320 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	-	-
Slabs	ABS	AQ43*, DQ43*, EQ43*, FQ43*, AQ47*, DQ47*, EQ47*, FQ47*, AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56*, AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70	320 mm	BOF	Si-Al	Al+Nb+Ti	СС	-	-
Slabs	ABS	V-075	220 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	СС	-	
Slabs	ABS	VH-075	220 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	CC	-	-

Electronically published by ABS Houston. Reference T1664667, dated 18-AUG-2017.

Marking



AB/A, AB/B, AB/D, AB/E, AB/AN, AB/BN, AB/DN, AB/EN, AB/A Z35, AB/B Z35, AB/D Z35, AB/E Z35, AB/AN Z35, AB/BN Z35, AB/DN Z35, AB/EN Z AB/AH32, AB/DH32, AB/EH32, AB/FH32, AB/AH36, AB/DH36, AB/EH36, AB/FH36, AB/AH40, AB/DH40, AB/EH40, AB/FH40, AB/AH32N, AB/DH32N, AB/DH32N AB/EH32N, ABFH32N, AB/AH36N, AB/DH36N, AB/EH36N, ABFH36N, AB/AH40N, AB/DH40N, AB/EH40N, AB/FH40N, AB/AH32 Z35, AB/DH32 Z35, AB/EH32 Z35, AB/FH32 Z35, AB/AH36 Z35, AB/DH36 Z35, AB/EH36 Z35, AB/FH36 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, ABFH36N Z35 AB/AH40 Z35, AB/DH40 Z35, AB/EH40 Z35, AB/FH40 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N Z35, AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, AB/AH40N Z35, AB/DH40N Z35, AB/EH40N Z35, AB/FH40N Z35, AB/AH32 BCA, AB/DH32 BCA, AB/EH32 BCA, AB/AH36 BCA, AB/DH36 BCA, AB/EH36 BCA, AB/AH32 BCA Z35, AB/DH32 BCA Z35, AB/EH32 BCA Z35, AB/AH36 AB/AH36 BCA Z35, AB/AH36 AB/AH AB/DH36 BCA Z35, AB/EH36 BCA Z35, AB/AH47, AB/DH47, AB/EH47, AB/AH47 Z35, AB/DH47 Z35, AB/EH47 Z35, AB/AQ43, AB/DQ43, AB/EQ43, AB/FQ43, AB/AQ43 Z35, AB/DQ43 Z35, AB/EQ43 Z35, AB/FQ43 Z35, AB/AQ47, AB/AQ47, AB/EQ47, AB/FQ47, AB/AQ47 Z35, AB/DQ47 Z35, AB/EQ47 Z35, AB/FQ47 Z35, AB/AQ51, AB/DQ51, AB/EQ51, AB/FQ51, AB/AQ51 Z35, AB/DQ51 Z35, AB/EQ51 Z35, AB/FQ51 Z35, AB/AQ56, AB/DQ56, AB/EQ56, AB/FQ56, AB/AQ56 Z35, AB/DQ56 Z35, AB/EQ56 Z35, AB/FQ56 Z35, AB/AQ63, AB/DQ63, AB/EQ63, AB/FQ63, AB/AQ63 Z35, AB/DQ63 Z35, AB/DQ63 Z35, AB/EQ63 Z35, AB/FQ63 Z35, AB/AQ70, AB/DQ70, AB/EQ70, AB/FQ70, AB/AQ70 Z35, AB/DQ70 Z35, AB/EQ70 Z35, AB/FQ70 Z35, AB/V-075, AB/V-075 Z35,

\*The approval of asterisk (\*) superscripted grades in the above table is based on the qualification test data presented on non-asterisk superscripted grades in the same table, and hence, the derivative benefit

AB/VH-075, AB/VH-075 Z35

<sup>\*\*\*</sup> Thermo-Mechanically Controlled Process with Accelerated Cooling5

INVOICE NO: 100390547203



INVOICE

16855 Northchase Drive

Houston,TX 77060 United States

Phone: 1-281-877-6000 Fax: 1-281-877-6001

CUSTOMER NO:

1100830

CUSTOMER TAX NO: CUSTOMER ADDRESS: I/C-B GC CHINA WFOE 5TH FLOOR SILVER TOWER

NO. 85 TAO YUAN RD SHANGHAI, P.R. CHINA 200021 CHINA **BRANCH NO: 100390** 

BRANCH NAME: Houston Ship Engineering

CONTRACT/PO NO:

REQUESTER NAME:

INTERCOMPANY REF. NO:

(ABS USE ONLY)

CLASS NO: 3966657

**PROJECT NO: 3966657** 

REPORT NO:

ITEM

VESSEL NAME:

LAST VISIT DATE:

PLACE OF SERVICE:

ABS TAX NO:

Federal I.D. 13-4921556

TOTAL FEES:

EES: 4,770.00

TOTAL TAX:

0.00

TOTAL PAYABLE:

4,770.00

CURRENCY:

USD

M DESCRIPTION OF SERVICES / PRODUCTS PROVIDED

Jiangsu Shagang Group Co., Ltd. - Extension of Steel Mill Facility and Process Approval

TAX

4,770.00 USD

**FEES** 

TOTAL FEES:

4,770.00 USD

TOTAL TAX:

0.00 USD

TOTAL PAYABLE ON RECEIPT:

4,770.00 USD

AUTHORIZED SIGNATURE (IF REQUIRED)

PLEASE REMIT PAYMENT IN CURRENCY BILLED.

INVOICE DATE: 21-Aug-2017

PAYMENT INSTRUCTIONS:
Please provide Invoice Number or

Remittance copy with payment.

JP MORGAN CHASE BANK, N.A. HOUSTON, TX 77252-8025 USA

US\$ ACCOUNT No.: 0010-088-8180

SWIFT ADDRESS: CHASUS33

CHECKS PAYABLE TO:

On Receipt

DUE DATE:

WIRE TRANSFER:

ABS AMERICAS

ABS AMERICAS

P.O. BOX 301249

DALLAS,TX 75303-1249 REFERENCE INVOICE NUMBER

ABA NO. 021000021



Reference: Project No.:

LHL/JO T1602239

3800400

Date: 20 February 2017

JIANGSU SHAGANG GROUP CO., LTD. (WCN 148446) CHIEF ENGINEER OFFICE, JINFENG TOWN ZHANGJIAGANG, CHINA-215625

ATTN: Ms. Lu Chunjie,

## **Extension Steel Mill Facility and Process Approval** ABS Approval of Jiangsu Shagang Group Co., Ltd., Zhangjiagang, P. R. China

We have received your declaration stating that the materials used in the submittal are free from asbestos and the ABS plant survey report NX3238462 dated 19 January 2017, along with your submittals of 25 January 2017 together with enclosures relative to the subject. With regard thereto we advise that Jiangsu Shagang Group Co., Ltd., Zhangjiagang, P. R. China is considered approved to produce slabs & plates to the requirements of ABS Rules Part 2 for Materials & Welding (2017) as outlined herein, provided the Rules are adhered to in all respects and all production, testing and inspection are to the satisfaction of the attending

The extension approval will expire with the existing certificate on 15 August 2021. Please note it is the responsibility of the facility to inform ABS of any changes to the manufacturing parameters and request renewal of approval prior to the five year expiry date.

A copy of the documentation, appropriately stamped to indicate our review, is being retained. If you need to contact ABS regarding this review please email Lihong Lin at <a href="mailto:lin@eagle.org">lin@eagle.org</a>.

Very truly yours,

Bill W. Shi Vice President ABS Global Engineering

By:

Principal Engineer

Ship Engineering Department

CC: ABS Greater China, Nantong Port



## Extension Steel Mill Facility and Process Approval ABS Approval of Jiangsu Shagang Group Co., Ltd., Zhangjiagang, P.R.China

Product	Grades	Maximum Thickness	Steel Making Practice	Deoxidation Practice	Fine Grain Practice	Casting Practice	Heat Treatment Facility	Delivery condition	
Slabs	A*/B*/D	220 mm	BOF + LF	Si-Al Killed	Al Treated	Continuous Casting	NA	NA	
Slabs	A*/B*/D*/E	220 mm	BOF + LF + RH	Si-Al Killed	Al Treated	Continuous Casting	NA	NA	
Slabs	AH*/DH32,	220 mm	BOF + LF + RH	c: VI Killod	(AL . T:) Tasabad	Cti			
51403	AH*/DH36	220 111111	BOF + LF + KH	Si-Al Killed	(Al + Ti) Treated	Continuous Casting	NA	NA	
Slabs	AH*/DH32,	220 mm	POE LIE L DII	C: ALIVIIII	(Al + Nb + Ti )	0	NA		
Slabs	AH*/DH36		BOF + LF + RH	Si-Al Killed	Treated	Continuous Casting		NA	
Plates	A*/B Z35	40 mm	BOF + LF	Si-Al Killed	Al Treated	Continuous Casting	NA	AR	
Plates	A*/B*/D Z35	40 mm	BOF + LF	Si-Al Killed	Al Treated	Continuous Casting	In-house	CR (NR)	
Plates	A*/B*/D*/E Z35	40 mm	BOF + LF + RH	Si-Al Killed	Al Treated	Continuous Casting	In-house	TMCP with AcC	
Plates	AH*/DH32 Z35, AH*/DH36 Z35	40 mm	BOF + LF + RH	Si-Al Killed	(Al + Ti) Treated	Continuous Casting	In-house	CR (NR)	
Plates	AH*/DH32 Z35, AH*/DH36 Z35	40 mm	BOF + LF + RH	Si-Al Killed	(Al + Nb + Ti) Treated	Continuous Casting	In-house	TMCP with AcC	
	Marking	AB/A, AB/B, AB/E, AB/AN, AB/BN, AB/DN, AB/AH32, AB/AH36, AB/AH32N, AB/AH36N, AB/DH32N, AB/DH36N, AB/A Z35, AB/B Z35, AB/E Z35, AB/AN Z35, AB/BN Z35, AB/DN Z35, AB/AH32 Z35, AB/AH36 Z35, AB/AH32N Z35, AB/AH36N Z35, AB/DH32N Z35, AB/DH36N Z35							
	Remark			350	00 Medium Plate Pro	duction Line			

Note: \*Approval of these grades is based on qualification tests carried out the higher grade