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.

AMERICAN BUREAU OF SHIPPING
ORIGINAL CERTIFICATE

Marcus Cridland
Chief Metallurgist, ABS

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

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

Reference: JO/VB T1567639
Project Number: 3112099
Certificate No: 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°C is similar to values achieved during qualification (7140 $N/mm^{3/2}$), 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

V. Balasubramaniam
Principal Engineer,
ABS Materials Houston

CC. ABS Nantong (Wen Jin Guo)

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

Reference: JO/VB T1567639
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Very truly yours

Roy H. Bleiberg
Vice President of Engineering,
ABS Americas

V. Balasubramaniam
Principal Engineer,
ABS Materials Houston

CC: ABS Nantong (Wen Jin Guo)

Electronically published by ABS Houston.
Reference T1567639, dated 06-OCT-2016.

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+RHα**	**Al**	**Al+Nb+V+Ti**	**CC**	**In-House**	**TMCP****
Plates	ABS	A*, B Z35	40 mm	BOF	Si	Al	CC	-	As Rolled (AR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si	Al	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	100 mm	BOF	Si-Al	Al+Ti	CC	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	CC	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	CC	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)
Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	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	CC	-	-
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	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	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	In-House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	CC	In-House	TMCP**
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	CC	In-House	TMCP**
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	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	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	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	CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-

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 Z35, 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/EH32N, AB/FH32N, AB/AH36N, AB/DH36N, AB/EH36N, AB/FH36N, 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/AH40 Z35, AB/DH40 Z35, AB/EH40 Z35, AB/FH40 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N Z35, AB/FH32N Z35, AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, AB/FH36N Z35, AB/AH40N Z35, AB/DH40N Z35, AB/EH40N Z35, AB/FH40N Z35, AB/AH40 BCA, AB/DH40 BCA, AB/EH40 BCA, AB/AH40 BCA Z35, AB/DH40 BCA Z35, AB/EH40 BCA Z35, AB/AH47, AB/DH47, AB/EH47, AB/AQ43, AB/DQ43, AB/EQ43, AB/FQ43, AB/AQ43 Z35, AB/DQ43 Z35, AB/EQ43 Z35, AB/FQ43 Z35, AB/AQ47, AB/DQ47, 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/AQ63, AB/DQ63, AB/EQ63, AB/FQ63, AB/AQ63 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

*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

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

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

FOUNDED 1862 ABS

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

									ol Rolled (CR)
Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	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	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	CC	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*, FQ47	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*, FQ70	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
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 Z35, 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/EH32N, AB/FH32N, AB/AH36N, AB/DH36N, AB/EH36N, AB/FH36N, AB/AH32 Z35, AB/DH32 Z35, AB/EH32 Z35, AB/FH32 Z35, AB/AH36 Z35, AB/DH36 Z35, AB/EH36 Z35, AH/FH36 Z35, AB/AH40 Z35, AB/DH40 Z35, AB/EH40 Z35, AB/FH40 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N Z35, AB/FH32N Z35, AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, AB/FH36N Z35, AB/AH40N Z35, AB/DH40N Z35, AB/EH40N Z35, AB/FH40N Z35, AB/AH40 BCA, AB/DH40 BCA, AB/EH40 BCA, AB/AH40 BCA Z35, AB/DH40 BCA Z35, AB/EH40 BCA Z35, AB/AH47, AB/DH47, AB/EH47, AB/AQ43, AB/DQ43, AB/EQ43, AB/FQ43, AB/AQ43 Z35, AB/DQ43 Z35, AB/EQ43 Z35, AB/FQ43 Z35, AB/AQ47, AB/DQ47, 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/AQ63, AB/DQ63, AB/EQ63, AB/FQ63, AB/AQ63 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								

*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

BCA indicates steel with brittle crack arrest toughness (K_{ca})≥6000 N/mm$^{3/2}$ @-10℃ determined by a Double-tension Crack Arrest testing during qualification.

FOUNDED 1862 ABS

α 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.

ABS NANTONG

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.

AMERICAN BUREAU OF SHIPPING
ORIGINAL CERTIFICATE

Marcus Cridland
Chief Metallurgist, ABS

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

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

Reference: JO/VB T1586972
Project Number: 3840576
Certificate No: 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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Very truly yours

Roy H. Bleiberg
Vice President of Engineering,
ABS Americas

V. Balasubramaniam
Principal Engineer,
ABS Materials Houston

CC ABS Nantong (Wen Jin Guo)

Slabs	ABS	AQ63*, DQ63*, EQ63*, FQ63*, AQ70*, DQ70*, EQ70*, FQ70	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
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 Z35, 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/EH32N, AB/FH32N, AB/AH36N, AB/DH36N, AB/EH36N, AB/FH36N, 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/AH40 Z35, AB/DH40 Z35, AB/EH40 Z35, AB/FH40 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N Z35, AB/FH32N Z35, AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, AB/FH36N Z35, AB/AH40N Z35, AB/DH40N Z35, AB/EH40N Z35, AB/FH40N Z35, AB/AH40 BCA, AB/DH40 BCA, AB/EH40 BCA, AB/AH40 BCA Z35, AB/DH40 BCA Z35, AB/EH40 BCA Z35, AB/AH47, AB/DH47, AB/EH47, AB/AQ43, AB/DQ43, AB/EQ43, AB/FQ43, AB/AQ43 Z35, AB/DQ43 Z35, AB/EQ43 Z35, AB/FQ43 Z35, AB/AQ47, AB/DQ47, 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/AQ63, AB/DQ63, AB/EQ63, AB/FQ63, AB/AQ63 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/ASTM A514 Grade Q MOD, AB/ASTM A517 Grade Q MOD							

*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

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

α 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	CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
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	CC	-	-
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	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	-	-

Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	AH32*, DH32*, EH32*, FH32 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Normalized (N) / Control Rolled (CR)
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	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40*, FH40 Z35	60 mm	BOF	Si-Al	Al+Nb+V+Ti	CC	In-House	TMCP**
Plates	ABS	AH40*, DH40*, EH40 BCA# Z35	85 mm	BOF+LF+RH$^{\alpha}$	Al	Al+Nb+V+Ti	CC	In-House	TMCP**
Plates	ABS	AH47*, DH47*, EH47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	CC	In-House	TMCP**
Plates	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	CC	In-House	TMCP**
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	AQ51*, DQ51*, EQ51*, FQ51*, AQ56*, DQ56*, EQ56*, FQ56 Z35	100 mm	BOF	Si-Al	Al+Nb+Ti	CC	In-Hosue	Quenching & Tempering (Q&T)

Electronically published by ABS Houston.
Reference T1586972, dated 08-DEC-2016.

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			Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	ASTM A514/A517	Grade Q MOD	152.4 mm	Jiangsu Sunan Heavy Machinery Technology Co., Ltd.			CC	In-House	Quenching & Tempering (Q&T)
Plates	ABS	EQ70 Z35	152.4 mm	Jiangsu Sunan Heavy Machinery Technology Co., Ltd.			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	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	CC	In-House	Normalized (N) / Control Rolled (CR)
Plates	ABS	A*, B Z35	100 mm	BOF	Si-Al	Al+Ti	CC	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	CC	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	CC	In-House	Normalized (N) / Control Rolled (CR)

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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	Specification	Grade	Maximum Thickness	Slab Supplier			Casting Practice	Heat Treatment Facility	Delivery Condition
Plates	**ASTM A514/A 517**	**Grade Q MOD**	**152.4 mm**	**Jiangsu Sunan Heavy Machinery Technology Co., Ltd.**			**CC**	**In-House**	**Quenching & Tempering (Q&T)**
Plates	**ABS**	**EQ70 Z35**	**152.4 mm**	**Jiangsu Sunan Heavy Machinery Technology Co., Ltd.**			**CC**	**In-House**	**Quenching & Tempering (Q&T)**
Product	**Specification**	**Grade**	**Maximum Thickness**	**Steel Making Practice**	**De-Oxidtion Practice**	**Fine Grain Practice**	**Casting Practice**	**Heat Treatment Facility**	**Delivery Condition**
Plates	ABS	A*, B Z35	40mm	BOF	Si	Al	CC	-	As Rolled (AR)
Plates	ABS	A*, B Z35	60mm	BOF	Si	Al	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	A*, B Z35	60mm	BOF	Si-Al	Al	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	A*, B Z35	100mm	BOF	Si-Al	Al+Ti	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	A*, B*, D Z35	35mm	BOF	Si	Al	CC	In-House	As Rolled (AR)
Plates	ABS	A*, B*, D*, E Z35	100mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	A*, B*, D*, E Z35	60mm	BOF	Si-Al	Al+Nb	CC	In-House	TMCP**
Plates	ABS	AH32*, AH36	30mm	BOF	Si-Al	Al	CC	-	As Rolled (AR)
Plates	ABS	AH32*, DH32 Z35	40mm	BOF	Si-Al	Al+Ti	CC	In-House	Normalized (N)/Control Rolled (CR)
Plates	ABS	AH32*, AH36*, DH32*, DH36 Z35	40mm	BOF	Si-Al	Al+Nb+Ti	CC	In-House	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	CC	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*, FQ47	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*, FQ70	320mm	BOF	Si-Al	Al+Nb+Ti	CC	-	-
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 Z35, 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/EH32N, AB/FH32N, AB/AH36N, AB/DH36N, AB/EH36N, AB/FH36N, AB/AH32 Z35, AB/DH32 Z35, AB/EH32 Z35, AB/FH32 Z35, AB/AH36 Z35, AB/DH36 Z35, AB/EH36 Z35, AH/FH36 Z35, AB/AH40 Z35, AB/DH40 Z35, AB/EH40 Z35, AB/FH40 Z35, AB/AH32N Z35, AB/DH32N Z35, AB/EH32N Z35, AB/FH32N Z35, AB/AH36N Z35, AB/DH36N Z35, AB/EH36N Z35, AB/FH36N Z35, AB/AH40N Z35, AB/DH40N Z35, AB/EH40N Z35, AB/FH40N Z35, AB/AH40 BCA, AB/DH40 BCA, AB/EH40 BCA, AB/AH40 BCA Z35, AB/DH40 BCA Z35, AB/EH40 BCA Z35, AB/AH47, AB/DH47, AB/EH47, AB/AQ43, AB/DQ43, AB/EQ43, AB/FQ43, AB/AQ43 Z35, AB/DQ43 Z35, AB/EQ43 Z35, AB/FQ43 Z35, AB/AQ47, AB/DQ47, 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/AQ63, AB/DQ63, AB/EQ63, AB/FQ63, AB/AQ63 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/ASTM A514 Grade Q MOD, AB/ATSM A517 Grade Q MOD								

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*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})≥6000 N/mm$^{3/2}$ @-10℃ 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℃ is similar to values achieved during qualification (7140N/ mm$^{3/2}$), 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.

AMERICAN BUREAU OF SHIPPING ORIGINAL CERTIFICATE

Marcus Cridland
Chief Metallurgist, ABS
ISSUE DATE: 12 May 2015
EXPIRY DATE: 11 May 2020

ABS
& AFFILIATED COMPANIES

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

V. Balasubramaniam
Principal Engineer,
ABS Materials Houston

CC: ABS Nantong (Wen-Jin Guo)

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

ABS
& AFFILIATED COMPANIES

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**	**CC**	**In-House**	**TMCP****
Plate	**ABS**	**AQ47*, DQ47*, EQ47*, FQ47 Z35**	**60 mm**	**BOF**	**Si-Al**	**Al+Nb+V+Ti**	**CC**	**In-House**	**TMCP****
Plate	**ABS**	**AQ51*, DQ51*, EQ51*, FQ51 Z35**	**60 mm**	**BOF**	**Si-Al**	**Al+Nb+V+Ti**	**CC**	**In-House**	**TMCP****
Plate	**ABS**	**AQ56*, DQ56*, EQ56*, FQ56 Z35**	**60 mm**	**BOF**	**Si-Al**	**Al+Nb+V+Ti**	**CC**	**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	CC	-	As Rolled (AR)
Plate	ABS	A*, B Z35	60 mm	BOF	Si-Al	Al	CC	In-House	Normalized (N) / Control Rolled (CR)
Plate	ABS	A*, B Z35	100 mm	BOF	Si-Al	Al-Ti	CC	In-House	Normalized (N) / Control Rolled (CR)
Plate	ABS	A*, B Z35	60 mm	BOF	Si	Al	CC	In-House	Normalized (N) / Control Rolled (CR)
Plate	ABS	A*, B*, D Z35	35 mm	BOF	Si	Al	CC	-	As Rolled (AR)
Plate	ABS	A*, B*, D Z35	40 mm	BOF	Si-Al	Al	CC	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	Normalized (N)
Plate	ABS	A*, B*, D*, E Z35	40 mm	BOF+LF+RH	Si-Al	Al	CC	In-House	TMCP w/AcC***

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

ABS
& AFFILIATED COMPANIES

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

ABS
& AFFILIATED COMPANIES

Plate	ABS	AQ47*, DQ47*, EQ47 Z35	80 mm	BOF	Al	Al+Nb+V+Ti	CC	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	CC	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	CC	In-House	Quenched & Tempered (Q&T)
Plate	ABS	EQ70 Z35	152.4 mm	Slab Supplier: Jiangsu Sunan Heavy Machinery Technology Co., Ltd.			CC	In-House	Quenched & Tempered (Q&T)
Plate	ABS	ASTM A514/A517: Grade Q MOD	152.4 mm	Slab Supplier: Jiangsu Sunan Heavy Machinery Technology Co., Ltd.			CC	In-House	Quenched & Tempered (Q&T)
Plate	ABS	V-075 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	CC	In-House	TMCP w/AcC***
Plate	ABS	VH-075 Z35	40 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	CC	In-House	TMCP w/AcC***
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	220 mm	BOF+LF	Si-Al	Al	CC	-	-
Slabs	ABS	A*, B*, D*, E	320 mm	BOF	Si-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	CC	-	-

ABS
& AFFILIATED COMPANIES

Slabs	ABS	AH32*, DH32*, AH36*, DH36	220 mm	BOF+LF+RH	Si-Al	Al+Ti	CC	-	-
Slabs	ABS	AH32*, DH32*, AH36*, DH36	220 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	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	CC	-	-
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	CC	-	-
Slabs	ABS	V-075	220 mm	BOF+LF+RH	Si-Al	Al+Nb+Ti	CC	-	-
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 Z35, 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/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 Z35, ABFH32N Z35, 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 BCA Z35, 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/DQ47, 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/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, AB/VH-075, AB/VH-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
**Thermo-Mechanically Controlled Process
*** 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:

VESSEL NAME:

INTERCOMPANY REF. NO:
(ABS USE ONLY)

CLASS NO: 3966657
PROJECT NO: 3966657
REPORT NO:
LAST VISIT DATE:
PLACE OF SERVICE:

ABS TAX NO:
Federal I.D. 13-4921556

INVOICE DATE: 21-Aug-2017
DUE DATE: On Receipt
PAYMENT INSTRUCTIONS:
Please provide Invoice Number or Remittance copy with payment.

WIRE TRANSFER:
JP MORGAN CHASE BANK, N.A.
HOUSTON, TX 77252-8025 USA
ABS AMERICAS
US$ ACCOUNT No.: 0010-088-8180
ABA NO. 021000021
SWIFT ADDRESS: CHASUS33

CHECKS PAYABLE TO:
ABS AMERICAS
P.O. BOX 301249
DALLAS,TX 75303-1249
REFERENCE INVOICE NUMBER

TOTAL FEES:	**4,770.00**
TOTAL TAX:	**0.00**
TOTAL PAYABLE:	**4,770.00**
CURRENCY:	**USD**

ITEM	DESCRIPTION OF SERVICES / PRODUCTS PROVIDED	TAX	FEES
1	Jiangsu Shagang Group Co., Ltd. - Extension of Steel Mill Facility and Process Approval	0	4,770.00 USD

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 .

American Bureau of Shipping (China) Ltd

Reference: LHL/JO T1602239
Project No.: 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 ABS Surveyor.

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 llin@eagle.org.

Very truly yours,

Bill W. Shi
Vice President
ABS Global Engineering

By: X. B. Meng
Xiang-Bin Meng
Principal Engineer
Ship Engineering Department

CC: ABS Greater China, Nantong Port

American Bureau of Shipping (China) Ltd

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, AH*/DH36	220 mm	BOF + LF + RH	Si-Al Killed	(Al + Ti) Treated	Continuous Casting	NA	NA
Slabs	AH*/DH32, AH*/DH36	220 mm	BOF + LF + RH	Si-Al Killed	(Al + Nb + Ti) Treated	Continuous Casting	NA	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		3500 Medium Plate Production Line						

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

ABS GREATER CHINA DIVISION
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