



CERTIFICATE NUMBER
STML-T1732320

ISSUING OFFICE
CN Shanghai SOED

CERTIFICATE OF STEEL MILLS FACILITY AND PROCESS APPROVAL

This is to certify that a representative of ABS did, at the request of
**YINSHAN SECTION STEEL CORPORATION
OF LAIWU STEEL GROUP LTD.**

Gangcheng District Laiwu City, LAIWU, China

attend its facilities as indicated in the ABS City CN Qingdao Branch Port port office survey report number 3464445 dated 09 March 2018 in order to carry out a survey of the facilities and associated quality procedures. The facility is considered capable of manufacturing

Plate components for marine applications

in accordance with the ABS Approval letter (Reference T1732320), ABS Rules, designated standards and ABS approved drawings. The approval is valid till 14 March 2023 subject to adherence to relevant ABS Rules and Survey requirements.



Marcus Cridland
Chief Metallurgist, ABS

ISSUE DATE: 09 March 2018
EXPIRY DATE: 14 March 2023

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. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

ABS58(0110)



Task - T1732320
Steel Mill Approval - Renewal
Certificate No. STML-T1732320

Attention: Ms. Yu Xiao-Mei, Yinshan Section Steel Corporation of Laiwu Steel Group Ltd.
(WCN 995681)

The documents shown in the attached list are reviewed or filed for reference in accordance with the applicable requirements of the following and the facility is considered approved to manufacture products for hull application as outlined in the process/product approval.

1. ABS Rules for Materials and Welding Part 2 (2018)

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.

For any clarifications, contact Ms. Lin Linhong at +86 21 23270994, (llin@eagle.org).

Very truly yours,

Wei-Biao (Bill) Shi
Vice President

Electronically Signed by: Satya Meruva



Document List

Drawing No.	Rev. No.	Title	Status
Correspondence	0	Acceptance of the fee	Correspondence
NA	0	Document for Renewal Approval	Reviewed
Declaration of Conformity	0	Declaration of Conformity (Laiwu Steel Yinshan Section)	Filed by ABS for reference only

Electronic copies of the documents, appropriately stamped are available through the ABS Eagle Construct Engineering Manager (O2E), Web portal.

Process/Product Approval

Product	Grade	Thickness	Fine Grain Practice	Casting Practice	Delivery condition
Plate	ABS – A*/B	40 mm	NA	CC	AR
Steel Making Practice: BOF Deoxidation Practice: Si Heat treatment Facility: In-house					
Plate	ABS – A*/B*/D	60 mm	Al	CC	CR
Plate	ABS – AH*/DH 32*/36	60 mm	Al+Nb+V+Ti	CC	CR
Plate	ABS – A*/B*/D*/E Z35	80 mm	Al+Nb+Ti	CC	N
Plate	ABS – AH*/DH*/EH 32*/36 Z35	80 mm	Al+Nb+V+Ti	CC	N
Plate	ABS – AH*/DH*/EH*/FH 32*/36*/40 Z35	50 mm	Al+Nb+Ti	CC	TMCP
Steel Making Practice: BOF Deoxidation Practice: Si-Al Heat treatment Facility: In-house					

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



Marine & Offshore

Certificate number: SMS.W.II./81674/C.0

www.veristar.com

RECOGNITION FOR BV MODE II SCHEME

Yinshan Section Steel Corporation of Laiwu Steel Group ,Ltd
Laiwu - CHINA

Summary of the range of the recognition which is detailed in the subsequent page(s):

PLATE, SECTION AND BAR - G0493

This certificate is issued to attest that Bureau Veritas Marine & Offshore has performed, at the above company's request and in compliance with the requirements of NR320, a satisfactory assessment of the manufacturing facilities and associated quality procedures related to the range of the recognition.

This certificate will expire on: 28 Jun 2022

For BUREAU VERITAS,

At BV SHANGHAI, on 06 Sep 2018,

George Qiao



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarnb.com/veristarnb/jsp/viewPublicPdfRecognition.jsp?id=hobtdx5fwv>

BV Mod. Ad.E 697 June 2017

This certificate consists of 2 page(s)

THE SCHEDULE OF RECOGNITION

1. RANGE OF THE RECOGNITION

The products listed in the table below are to be certified individually or per batch by Bureau Veritas Marine & Offshore in compliance with the applicable requirements (IBV products as defined in NR320).

App. number	Validity date	Item designation	Trade name
23264/B0 BV	17 Nov 2020	NORMAL STRENGTH HULL STEEL ROLLED PRODUCTS - 9006I	Hot rolled plates in steel grade A, B, D and E including Z properties.
23265/B0 BV	17 Nov 2020	HIGHER STRENGTH HULL STEEL ROLLED PRODUCTS - 9007I	Hot rolled plates in steel grades AH32 to FH40 including Z properties.

The products corresponding to the categories listed in the table below are to be certified individually or per batch by Bureau Veritas Marine & Offshore in compliance with the applicable requirements (IBV products as defined in NR320).

Generic product	Description
PLATE, SECTION AND BAR	Normal & high strength hull structural steel plate

2. LIMITATIONS

The certificates listed in the range of recognition are to be valid, as applicable.

Bureau Veritas Marine & Offshore is to be informed immediately of any modification to manufacturing facilities and associated quality procedures in order to agree on appropriate actions.

Yinshan Section Steel Corporation of Laiwu Steel Group ,Ltd has to apply for the periodical audits as agreed with Bureau Veritas Marine & Offshore.

3. PERIMETER OF CERTIFICATION

Quality system of following site(s) has been assessed:

Yinshan Section Steel Corporation of Laiwu Steel Group ,Ltd - Laiwu - CHINA

4. REMARKS

- 1.Address:No.99 Fuqian Street, Gangcheng District, Laiwu City, Shandong Province (China)
- 2.Annual Audit: 1 time/year before 28 June.

*** END OF CERTIFICATE ***



Ministry of Health
Taipei

REPUBLIC OF CHINA
Ministry of Health
Taipei 100, 101
Tel: (886) 2-2396-1234

Tel: (886) 2-2396-1234

APPROVAL CERTIFICATE ON MATERIALS

For the purpose of ensuring the safety and health of consumers, the Ministry of Health has approved the following materials for use in food packaging and containers.

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Remarks: This certificate is valid for the purpose of ensuring the safety and health of consumers.

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This certificate is valid for the purpose of ensuring the safety and health of consumers.

For the purpose of ensuring the safety and health of consumers, the Ministry of Health has approved the following materials for use in food packaging and containers.

Signature



This certificate is valid for the purpose of ensuring the safety and health of consumers. The Ministry of Health has approved the following materials for use in food packaging and containers.

This certificate is valid for the purpose of ensuring the safety and health of consumers. The Ministry of Health has approved the following materials for use in food packaging and containers.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates.

Steel grade	Deoxydation practice & Refining	Delivery conditions
A - B	Killed	As Rolled (AR) with thickness range 6mm up to 40mm
A - B - D	Killed and fine grain treated with Al	Controlled Rolled (CR) with thickness range 6mm up to 60mm
A - B - D - E (Z25/Z35)	Killed and fine grain treated with Al+Nb +Ti	Normalized (N) with thickness up to 80mm

Steelmaking by KR process, Basic Oxygen Furnace (BOF), CAS Argon bubbling and LF furnace. Continuous Casting.

2. DOCUMENTS AND DRAWINGS :

- "General information for works approval" issued by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd. dated January 2010.
- "Application and report for factory approval of hull structural steel plate of normal strength grade A, B, D, E (N) and high strength grade AH32, AH36, DH32, DH36, EH32, EH36 (N) and high strength grade AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, FH40 (TMCP)" issued by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd. dated October 2011.

3. TEST REPORTS :

As per following document issued by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.:

- "Test program for steelwork approval to produce normal strength A, B, D grades and high strength AH32, AH36, DH32, DH36 grades" dated January 2010, "Test reports for BV mill approval" dated July 2010,
- "Testing and verifying report of ship materials J10035-1", "Testing and verifying report of ship materials J10035-4" dated 06 May 2010,
- "Test program for steelwork approval to produce normal strength grade A, B, D, E(N) and high strength grade AH32, AH36, DH32, DH36, EH32, EH36 (N) and high strength grade AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, FH40 (TMCP)" dated October 2011, "Test reports for BV mill approval" dated January 2013,
- "Testing and verifying report of ship materials J12013LC", "Testing and verifying report of ship materials J12013HJ-4" dated 01 March 2013.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification

5. PRODUCTION SURVEY REQUIREMENTS :

The steel plates are to be supplied by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd. in compliance with the type and the requirements described in this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320. BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification. In addition to the material grade designation, products are to be marked with the symbol Z25-Z35 as appropriate.

7. OTHERS :

This certificate replaces approvals No.23264/A0 BV and No.23264/A1 BV.

*** END OF CERTIFICATE ***



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1. *Journal of Management Education*, 2000, 24(1), 1-10.
 2. *Journal of Management Education*, 2000, 24(1), 11-20.
 3. *Journal of Management Education*, 2000, 24(1), 21-30.

[illegible]

Table 1

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Abstract

Business Systems and Components (see Table 1)

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Abstract

Abstract

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Abstract



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THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates

Steel grade	Deoxydation practice & Refining	Delivery conditions
AH32 - DH32 AH36 - DH36	Killed and fine grain treated with Al+Nb+V+Ti	Controlled Rolled (CR) with thickness range 6mm up to 60mm
AH32 - DH32 - EH32 AH36 - DH36 - EH36 (Z25/Z35)	Killed and fine grain treated with Al+Nb+V+Ti	Normalized (N) with thickness range 8mm up to 80mm
AH32 - DH32 - EH32 - FH32 AH36 - DH36 - EH36 - FH36 AH40 - DH40 - EH40 - FH40 (Z25/Z35)	Killed and fine grain treated with Al+Nb+Ti	Thermo-Mechanical Control Process (TMCP) with thickness range 8mm to 50mm

Steelmaking by KR process, Basic Oxygen Furnace (BOF), CAS Argon bubbling and LF furnace. Continuous Casting.

2. DOCUMENTS AND DRAWINGS :

As per following document issued by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.:

- "General information for works approval" dated January 2010, Application and report for factory approval of hull structural steel plate of normal strength grade A, B, D, E (N) and high strength grade AH32, AH36, DH32, DH36, EH32, EH36 (N) and high strength grade AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, FH40 (TMCP)" dated October 2011.

3. TEST REPORTS :

As per following document issued by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.:

- "Test program for steelwork approval to produce normal strength A, B, D grades and high strength AH32, AH36, DH32, DH36 grades" dated January 2010, "Test reports for BV mill approval" dated July 2010,
- "Testing and verifying report of ship materials J10035-1", Testing and verifying report of ship materials J10035-4" dated 06 May 2010, "Test program for steelwork approval to produce normal strength grade A, B, D, E(N) and high strength grade AH32, AH36, DH32, DH36, EH32, EH36 (N) and high strength grade AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, FH40 (TMCP)" dated October 2011, "Test reports for BV mill approval" dated January 2013,
- "Testing and verifying report of ship materials J12013LC", "Testing and verifying report of ship materials J12013HJ-4" dated 01 March 2013, "CTOD test reports" dated 12 May 2012.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification

5. PRODUCTION SURVEY REQUIREMENTS :

The steel plates are to be supplied by Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd. in compliance with the type and the requirements described in this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320. BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification. In addition to the material grade designation, products are to be marked with the symbol Z25-Z35 as appropriate.

7. OTHERS :

This certificate replaces approvals No.23265/A0 BV and No.23265/A1 BV.

*** END OF CERTIFICATE ***



中国船级社
CHINA CLASSIFICATION SOCIETY

证书格式号/Form: W01.02-
HQ000120

工厂认可证书 CERTIFICATE OF WORKS APPROVAL

证书编号/Certificate No. QD18W00021

兹证明本证书所述制造厂具备按照下列标准的要求生产本证书所列产品的能力和条件。

This is to certify that the manufacturer stated in the certificate meets the requirements of the standards listed below and is available with the ability and conditions to produce the products as described in the certificate.

制造厂/Manufacturer

莱芜钢铁集团银山型钢有限公司

Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.

中国山东省莱芜市钢城区新兴路轧钢大街1号

No.1, Zhagang Street, Xinxing Road, Gangcheng District, Laiwu City, Shandong Province, China

认可产品/Product Approved

钢板

STEEL PLATE

一般强度船体结构钢, 高强度船体结构钢, Z向钢

Normal Strength Hull Structural Steel Plate, Higher Strength Hull Structural Steel Plate, Plates With Through Thickness Properties(Z-Direction Steels)

附加标志/Notations

无/Nil.

认可标准/Approval Standard

1. 中国船级社《材料与焊接规范》(2018) 及其修改通报第1篇第3章

Chapter 3, Part One of China Classification Society Rules for Materials and Welding 2018 and its Amendments

证书有效期至/ This Certificate is valid until

2022年5月27日 / May. 27, 2022

发证机构
Issued by 中国船级社青岛分社
CCS Qingdao Branch

签发日期
Date 2018年7月27日
Jul. 27, 2018

本证书根据中国船级社《钢质海船入级规范》及有关程序规定签发。关于证书的有关规定见本证书背面的说明。当本证书包括多页纸张时, 则所有证书页为一个整体, 必须同时使用。每一页证书均须由本社盖章方为有效。证书复印件无效。任何单位和个人均不应摘录或节选本证书的部分内容。本认可证书不代表本社对个体产品质量的检验。有关各方对所持证书的真实性有疑问时, 可以向本社检验机构咨询。
This Certificate is issued pursuant to the Rules for Classification of Sea-going Steel Ships and related procedures of the Society. Refer to the back of the certificate for detailed requirements of the certificate. When the certificate consists of more than one page, all pages of the certificate are taken as a whole and are used simultaneously. No certificate page is valid without bearing the stamp of the Society and no copied form of the certificate is regarded as valid. Any part of the certificate is not to be extracted or abridged by any unit or individual in any form. This approval certificate does not constitute the inspection of the Society about the quality of the unit/batch product. Related parties who are doubted about the authenticity of the certificate may inquire of the Society or its offices.



中国船级社总部/CCS headquarters: 北京市东直门南大街9号船检大厦 邮编: 100007 电话/Tel: +86(10)58112288 传真/Fax: +86(10)58112811
CCS Mansion, 9 Dongzhimen Nan Da Jie, Beijing 100007, China 网址/Web Site: <http://www.ccs.org.cn>
本地检验机构/CCS Local Office: 中国船级社青岛分社 CCS Qingdao Branch 电话/Tel: +86(532)85016478 传真/Fax: +86(532)85016456

QD18109344
No. 17539172

第 1 页 共 3 页 / Page 1 of 3

产品明细/ Product Description

一般强度船体结构钢/Normal Strength Hull Structural Steel Plate
钢材等级/Grade

: 产品明细见附页 | Product
Description See Additional
Page(s)

高强度船体结构钢/Higher Strength Hull Structural Steel Plate
钢材等级/Grade

: 产品明细见附页 | Product
Description See Additional
Page(s)

Z向钢/Plates With Through Thickness Properties(Z-Direction Steels)
钢材等级/Grade

: 产品明细见附页 | Product
Description See Additional
Page(s)

批准的图纸和设计计算书/ Approved Drawings and Design Calculations

图纸批准号/ Drawings Approval No. : QD18W00021

产品认可试验报告/ Approval Test Report

试验报告编号/Test Report No.	: LG2018005
试验报告日期/Test Report Date	: 2018-05-28
试验单位/ Laboratory	: 莱芜钢铁集团银山型钢有限公司 Yinshan Section Steel Corpration of Laiwu Steel Group, Ltd.
试验单位地址/ Test Address	: 山东省莱芜市钢城区新兴路轧钢大街1号 No. 1, Zhagang Street, Xinxing Road, Gangcheng District, Laiwu City, Shangdong
试验报告编号/Test Report No.	: JH18023HJ-2
试验报告日期/Test Report Date	: 2018-04-25
试验单位/ Laboratory	: 船舶材料验证试验中心 Testing and Verifying Center for Ship Materials
试验单位地址/ Test Address	: 河南省洛阳市滨河南路169号船检中心 Office of Testing and Verifying Center for Ship Materials, No. 169, Binhenan road, Luoyang City, Henan Province
试验报告编号/Test Report No.	: JL18023-PL-2
试验报告日期/Test Report Date	: 2018-04-15
试验单位/ Laboratory	: 船舶材料验证试验中心 Testing and Verifying Center for Ship Materials
试验单位地址/ Test Address	: 河南省洛阳市滨河南路169号船检中心 Office of Testing and Verifying Center for Ship Materials, No. 169, Binhenan road, Luoyang City, Henan Province
试验报告编号/Test Report No.	: JH18023LC
试验报告日期/Test Report Date	: 2018-04-10
试验单位/ Laboratory	: 船舶材料验证试验中心 Testing and Verifying Center for Ship Materials
试验单位地址/ Test Address	: 河南省洛阳市滨河南路169号船检中心 Office of Testing and Verifying Center for Ship Materials, No. 169, Binhenan road, Luoyang City, Henan Province

产品适用范围/ Application of the Product

船舶与海上设施/Ships and Offshore Installations.

认可保持条件/ Maintenance Requirements of Approval

1. 工厂认可后, 如果图纸、技术文件、工艺规程有较大改变, 应征得本社同意。若改变涉及或影响到产品的设计、主要制造材料、关键工艺或产品的特性、特征, 则与特性有关的图纸和技术文件应经过本社审批, 并在检验机构认为必要时, 经本社检验人员到厂进行检查和见证有关试验, 其结果应能证实仍符合认可条件。
After works approval, if there are any major changes to the drawings, technical documents,



specifications, prior consent should be obtained from the survey office of the Society. If the changes involve or affect product design, major construction materials, key workmanship or product characteristics and properties, drawings and technical documents related to properties are to be examined and approved by the Society and, where deemed necessary by the survey office, the surveyor to the Society will go to the manufacturer to inspect or witness relevant tests and the results of the tests should be able to demonstrate compliance with the approval conditions

2. 工厂的质量管理体系应保持有效运行, 并且与认可时一致。如果质量管理体系发生改变, 应经原体系认证机构审核并报本社批准。

The quality management system of the factory shall be ensure effective operation, and shall be the same as the situation of approval. If there are any changes to the quality management system, auditing of the original certification organization for quality management system and the society's approval shall be obtained.

3. 工厂认可证书获得者应接受本社每年一次的定期审核, 定期审核日为认可证书期满之日对应的每一周年日, 检查工作可在定期审核日的前后三个月内进行。Those who have obtained the certificate of works approval shall receive periodical audit done by the Society on an annual basis. The date of periodical audit shall be each anniversary date which corresponds to the date of expiry of the relevant certificate and the periodical audit may be done within a time span of three months before and after the annual surveillance date.

4. 在认可证书有效期内, 本社检验人员可在未经事先通知的情况下对工厂的产品制造过程进行审核, 以验证产品的生产是否符合业经本社批准的图纸和文件。工厂应予以配合。

Within the validity of the approval certificate, the surveyor to the Society may pay unannounced audit to the manufacturing process of the product in order to confirm whether it is in compliance with the drawings and documents approved by the Society. The factory should provide an active cooperation and necessary for the surveyor.

5. 认可证书有效期内, 如果出现可能导致本社暂停或撤销认可的情况, 工厂应及时采取有效的纠正措施。

Within the validity of the approval certificate, if cases occur that may cause the Society to suspend or withdraw the certificate, the manufacturer should take corrective actions in a prompt and effective manner.

认可后的产品检验方式/ Module of Product Inspection after Works Approval

按照规范每批抽样检验的产品/The product inspected by sampling in term of the rules:

认可后的产品检验应由本社验船师根据本社规范规定每批抽样按批准的产品检验计划进行检验, 经检验合格后由本社颁发船用产品证书。

After approval, product inspection should be carried out by sampling by the Surveyor of the Society in accordance with the approved product inspection scheme, and the Marine Product Certificate will be issued by the Society upon satisfactory inspection.

对于原材料和零部件的检验要求/ Inspection Requirements for Materials and Components

产品如下原材料和零部件应由本社认可的制造厂生产/The following materials and components of the product should be manufactured by the factory approved by the Society: 无/Nil.

产品如下原材料和零部件应经本社检验/The following materials and components of the product should be inspected by the Society: 无/Nil.

产品如下原材料和零部件的制造厂清单, 经本社批准方可变更/The list of manufacturer for the following materials and components of the product should not be changed without the Society's approval: 无/Nil.

责任声明/Statement of Responsibility

本社的认可不影响、替代与本社授权或检验无关的各方对上述工厂的认可和发证, 并且不对与本社授权或检验无关的各方负责, 不承担其未经应允而承认、接受本社认可所导致的法律和经济责任。

The approval of the Society does not affect and replace any approval and certification of the manufacturer by any parties that bear no relation with this Society's authorization or survey and therefore takes no responsibility for these parties. The Society does not undertake any legal and economic liabilities arising from accepting this Society's certificate without prior permission from this Society.

其他/Others

本证书由原工厂认可证书 (No. QD18W00008) 变更并替代原证书。

This Certificate is modified from and supersedes the previous Works Approval Certificate No. QD18W00008.

中国船级社青岛分社

CCS Qingdao Branch

*****本证书正文完/ End of Text*****

注: 本证书含有附页, 共1页

Note: The certificate is attached with 1 additional page(s)

产品明细
Product Description

序号 No.	钢材等级 Grade	最大厚度 Maximum thickness (mm)	冶炼方式 Melting process	浇铸方式 Casting process	脱氧方式 Deoxidation method	细化晶粒元素 /Grain refining elements	交货状态 Condition of supply
1	CCS-A/B	40	氧气顶吹 转炉 LD converter	连铸 Continuous casting	硅锰/ Si+Mn	-	热轧 AR
2	CCS -A/B/D	60				Al	控轧 CR
3	CCS-AH32/36	60				Al	控轧 CR
4	CCS-DH32/36	60				Al	控轧 CR
5	CCS-A,B,D,E Z25/35	80				Nb+Ti+ Al	正火 N
6	CCS-AH32/36, DH32/36, EH32/36, Z25/35	100				Nb+V+Ti+ Al	正火 N
7	CCS-AH32/36/40, DH32/36/40, EH32/36/40, FH32/36/40, Z25/35	60				Nb+Ti+ Al	温度-形变控轧 TMCP



*****结束/The end*****



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000WR
Revision No:
1

This is to certify:

That

Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.
Laiwu, Shandong, China

is an approved manufacturer of
Steelmaking and Rolled Steel Products

in accordance with
DNV GL rules for classification – Ships
Offshore Standard DNV GL-OS-B101

and the following particulars:

Product	Plates
Grades	Hull structural steels, see page 2
Steelmaking	Basic Oxygen Converter, Continuous casting
Deoxidation	Killed
Fine grain elements	See page 2
Delivery conditions	See page 2
Max. thickness	See page 2
Remarks	See particulars of the approval

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Høvik** on **2017-05-05**

This Certificate is valid until **2019-08-31**.

DNV GL local station: **Qingdao**

Approval Engineer: **Dechun Lou**

for DNV GL



Digitally Signed By: Gran, Terje

Location: DNV GL Høvik, Norway

Signing Date: 22.05.2017, on behalf of

Hanne Anita Hjerpetjonn
Head of Section



Job Id: **263.11-006474-2**
Certificate No: **AMMM00000WR**
Revision No: **1**

Particulars of the approval

Normal Strength Steels:					
Grade	Steelmaking ¹⁾	Fine grain treatment	Delivery condition ²⁾	Max. Thickness (mm)	Z-quality
VL A	BOC, LF, CC		AR	40	Z25/Z35
		Al	NR	60	Z25/Z35
		Al+Nb+Ti	N	80	Z25/Z35
VL B	BOC, LF, CC		AR	40	Z25/Z35
		Al	NR	60	Z25/Z35
		Al+Nb+Ti	N	80	Z25/Z35
VL D	BOC, LF, CC	Al	NR	60	Z25/Z35
		Al+Nb+Ti	N	80	Z25/Z35
VL E	BOC, LF, CC	Al+Nb+Ti	N	80	Z25/Z35
High Strength Steels:					
Grade	Steelmaking ¹⁾	Fine grain treatment	Delivery condition ²⁾	Max. Thickness (mm)	Z-quality
VL A32, VL D32	BOC, LF, CC	Al	NR	40	Z25/Z35
VL A32, VL A36 VL D32, VL D36	BOC, LF, CC	Al+Nb+Ti	NR	55	Z25/Z35
VL A32, VL A36 VL D32, VL D36 VL E32, VL E36	BOC, LF, CC	Al+Nb+Ti	N	65	Z25/Z35
VL A32, VL D32, VL A36, VL D36	BOC, FL, CC	Al+Nb+Ti+V	NR	60	Z25/Z35
			N	80	Z25/Z35
VL E32, VL E36	BOC, FL, CC	Al+Nb+Ti	TM	50	Z25/Z35
		A+Nb+Ti+V	N	80	Z25/Z35
VL A40, VL D40, VL E40, VL F32, VL F36, VL F40,	BOC, FL, CC	Al+Nb+Ti	TM	50	Z25/Z35

Remarks:

¹⁾ BOC: Basic Oxygen Converter; LF: Ladle Furnace; CC: Continuous Casting.

²⁾ NR: Normalising Rolling; N: Normalised; TM: Thermo-Mechanical rolling

Comparable steel grades covered:

- Hot rolled structural steel plates according to EN 10025-2 up to max. thickness of 80 mm; including Z25/Z35 grades
- Hot rolled weldable fine grain structural steel plates in grades S275N, S275NL, S355N, S355NL according to EN 10025-3 up to max. thickness of 80 mm; including Z25/Z35 grades
- Thermomechanical rolled weldable fine grain structural steel plates in grades S275M, S275ML, S355M, S355ML according to EN 10025-4 up to max. thickness of 50 mm; including Z25/Z35 grades




Certificate No : MD00/3855/0006/1

Appendix 1

LAIWU STEEL GROUP LTD. YINSHAN SECTION STEEL
Shuangquan Road,
Gangcheng district,
Laiwu,
Shandong
China, People's Republic of

Steelmaking	B.O.S. / Con Cast	Grades	
		As below	
Semi-Finished Products	Slabs	Grades	mm thickness Maximum
		As below	300.0
Semi-Finished Products	Billets	Grades	mm thickness Maximum
~	~	carbon, carbon-manganese	300.0
Plates	Normal Strength	Grades	mm thickness Maximum
As Rolled	Killed	A, B	40.0
Normalized	Fine Grain Al+Nb+Ti	A, B, D, E	80.0
Normalizing Rolled	Fine Grain Al	A, B, D	60.0
Plates	Higher Strength	Grades	mm thickness Maximum
Normalized	Fine Grain Al+Nb+V+Ti	AH32, AH36, DH32, DH36, EH32, EH36	80.0
Normalizing Rolled	Fine Grain Al+Nb+V+Ti	AH32, AH36, DH32, DH36	60.0
TM+Acc	Fine Grain Al+Nb+Ti	AH32, AH36, DH32, DH36, DH40, EH32, EH36, EH40, FH32, FH36, FH40	50.0
Plates	Boiler & Pressure Vessel	Grades	mm thickness Maximum
As Rolled	Killed	360AR, 410AR	40.0
Normalized	Fine Grain Al+Nb+V+Ti	360FG, 410FG, 460FG, 490FG, 510FG	80.0
Normalized	Fine Grain Al+Nb+Ti	360FG, 410FG	80.0
Normalizing Rolled	Fine Grain Al+Nb+V+Ti	360FG, 410FG, 460FG, 490FG, 510FG	60.0
Normalizing Rolled	Fine Grain Al	360FG, 410FG	60.0

Valid Until : 06 November 2019
Date of Issue : 31 January 2017


Gavin Young
 Metallurgical Specialist to Lloyd's Register EMEA
 A member of the Lloyd's Register group



Certificate No : MD00/3855/0006/1

Appendix 2

LAIWU STEEL GROUP LTD. YINSHAN SECTION STEEL

Shuangquan Road,

Gangcheng district,

Laiwu,

Shandong

China, People's Republic of

Con cast slabs approved up to 300mm x 2500mm section size.

Approval includes normalised and TM plates with Z25/35 through thickness properties.

Valid Until : 06 November 2019

Date of Issue : 31 January 2017

A handwritten signature in blue ink, appearing to read "G. Young", written over a horizontal line.

Gavin Young

**Metallurgical Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group**



Certificate No : MD00/3855/0006/1

LAIWU STEEL GROUP LTD. YINSHAN SECTION STEEL
Shuangquan Road,
Gangcheng district,
Laiwu,
Shandong
China, People's Republic of

has been approved as a manufacturer in accordance with the requirements of Lloyd's Register for :-


Steelmaking, Semi-Finished Products and Plates

This approval is subject to compliance with the Rules for the Manufacture, Testing and Certification of Materials. The full details of the processes and grades to which this approval applies are given in the Appendix of this certificate.

Lloyd's Register is to be notified of any change that may affect the validity of this Certificate.

This Certificate is issued to the above manufacturer and is valid until the date given below.

Valid Until : 06 November 2019
Date of Issue : 31 January 2017


Gavin Young
Metallurgical Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group



APPROVAL CERTIFICATE FOR MANUFACTURING PROCESS

Certificate No. : QDO25943-SP001 **Initial Approval** : 13th September, 2010.
Product : Rolled Steels
Manufacturer : Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.
Gangcheng District, Laiwu City, Shandong Province, P. R. China

Product Description : Rolled Steel Plates for Hull Structure

- Grade : A, B, D, E
AH32, DH32, EH32, FH32
AH36, DH36, EH36, FH36
AH40, DH40, EH40, FH40
- Steel making : Basic Oxygen Furnace
- Deoxidation : Killed
- Casting process : Continuous casting
- Supply condition : See the "Appendix 1"

Approval Condition : Individual Product Certification is required.

THIS IS TO CERTIFY that the manufacturing process for the above mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows and entered in the "List of Approved Manufacturer and Type Approved Equipment".

Pt. 2, Ch. 1, Sec. 3, Art. 301 of the Rules for the Classification of Steel Ships.

This Certificate is valid until 12th September, 2020.

Issued at Shanghai, China on 8th September, 2015.



General Manager of
Technical Support Team
CHINA KR Co., Ltd.

Note :1 : The approval will be automatically suspended and the Certificate become invalid from the expiry date of the Certificate in the event that the extension has not been granted or the renewal of the Certificate is not underway.

2 : The manufacturer should notify this Society of any modification or changes that may affect the validity of this Certificate.

Appendix 1

Product Description and/or Approval Condition

Certificate No : QDO25943-SP001

Date of Issue : 8th September, 2015.

© Product Description

Grade	Z-quality	Grain refining Elements	Max. Thickness (mm)	Supply Condition(1)
A, B	-	-	40	AR
A, B, D	-	Al	60	CR
A, B, D, E	Z25/Z35	Al+Nb+Ti	80	N
AH32, AH36 DH32, DH36	-	Al+Nb+V+Ti	60	CR
AH32, AH36 DH32, DH36 EH32, EH36	Z25/Z35	Al+Nb+V+Ti	80	N
AH32, AH36, AH40 DH32, DH36, DH40 EH32, EH36, EH40 FH32, FH36, FH40	Z25/Z35	Al+Nb+Ti	50	TM

Remark

(1) AR : As Rolled

CR : Controlled Rolling Condition

N : Normalized Condition

TM : Thermo-Mechanical Controlled Processing

< The end >



Approval No. ST33RO

Certificate No. TA18684E

APPROVAL OF MANUFACTURING PROCESS

This is to certify that

Yinshan Section Steel Corporation of Laiwu Steel Group, Ltd.
Laiwu, Shandong
China

has been approved for the manufacturing process of undermentioned materials by the NIPPON KAIJI KYOKAI in accordance with the requirements of 1.2, Part K of the Society's "Rules for the Survey and Construction of Steel Ships" and Chapter 1, Part 1 of the Society's "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use".

MATERIALS : Rolled Steels for Hull

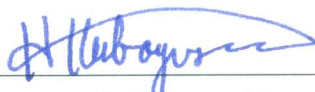
The details of the relevant approval conditions are given in the PARTICULARS OF APPROVAL listed in the reverse of this certificate.

The products for the ships classed with the Society are to be manufactured, tested and inspected in compliance with the Rules.

This certificate is valid from 5 June 2018 until 4 June 2023.

Issued at Tokyo on 5 July 2018.

Renewal Date : 5 June 2018



H. Kobayashi
General Manager
Material and Equipment Department





No. : TA18685E

Date : 5 July 2018

PARTICULARS OF APPROVAL

Approval Conditions for Manufacturing Process of Rolled Steels for Hull

- | | |
|----------------------------|---|
| 1. Manufacturer | : Yinshan Section Steel Corporation
of Laiwu Steel Group, Ltd. |
| 2. Kind of Product | : Plates |
| 3. Grade | : KA, KB, KD, KE, KA32, KD32, KE32, KF32,
KA36, KD36, KE36, KF36, KA40, KD40, KE40
and KF40 |
| 4. Deoxidation Practice | : See Table |
| 5. Grain Refining Elements | : See Table |
| 6. Max. Thickness | : See Table |
| 7. Condition of Supply | : See Table |
| 8. Steel Making Process | : Basic Oxygen Furnace |
| 9. Casting Process | : Continuous Casting |

(to be cont.)


No. : TA18685E

Date : 5 July 2018

Table Part of Approval Conditions

Grade	Deoxidation Practice	Grain Refining Elements	Max. Thickness (mm)	Condition of Supply	Note
KA	Killed	Not Applicable	40	AR	(1)
	Fine-grained Killed	Al	60	CR	(1)
		Al-Nb-Ti	80	N	(1)
KB	Killed	Not Applicable	40	AR	(1)
	Fine-grained Killed	Al	60	CR	(1)
		Al-Nb-Ti	80	N	(1)
KD	Fine-grained Killed	Al	60	CR	(1)
		Al-Nb-Ti	80	N	(1)
KE	Fine-grained Killed	Al-Nb-Ti	80	N	(1)
		Al-Nb-Ti-V	60	CR	(1)
KA32	Fine-grained Killed	Al-Nb-Ti-V	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
		Al-Nb-Ti-V	60	CR	(1)
KD32	Fine-grained Killed	Al-Nb-Ti-V	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
		Al-Nb-V-Ti	80	N	(1)
KE32	Fine-grained Killed	Al-Nb-V-Ti	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
KF32	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)
KA36	Fine-grained Killed	Al-Nb-Ti-V	60	CR	(1)
		Al-Nb-Ti-V	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
KD36	Fine-grained Killed	Al-Nb-Ti-V	60	CR	(1)
		Al-Nb-Ti-V	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
KE36	Fine-grained Killed	Al-Nb-V-Ti	80	N	(1)
		Al-Nb-Ti	50	TMCP(AcC)	(1)
KF36	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)
KA40	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)
KD40	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)
KE40	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)
KF40	Fine-grained Killed	Al-Nb-Ti	50	TMCP(AcC)	(1)

Note: (1) Through thickness property Z25 or Z35 is included.


H. Kobayashi
General Manager
Material and Equipment Department





**CERTIFICATE OF APPROVAL OF MANUFACTURERS OF
MATERIALS**
No. FAB074917WS

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>	Normal strength and higher strength hull steel plates
<i>Type</i>	A-B-D-AH32-AH36-AH40-DH32-DH36-DH40-EH32-EH36-EH40-FH32-FH36-FH40;
	WIDTH: 1500MM~4100MM
	LENGTH: 4000~18000MM
<i>Manufacturer</i>	YINSHAN SECTION STEEL CORPORATION OF LAIWU
<i>Place of manufacture</i>	STEEL GROUP, LTD
	GANGCHENG DISTRICT Laiwu
	CHINA
<i>Reference standards</i>	RINA Rules for the approval of manufacturers of materials

Issued in **SHANGHAI** on **October 1, 2016**. *This Certificate is valid until* **September 30, 2021**



This certificate consists of this page and 1 enclosure

CERTIFICATE OF APPROVAL OF MANUFACTURERS OF MATERIALS

No. FAB074917WS

Enclosure - Page 1 of 1

A-B-D-AH32-AH36-AH40-DH32-DH36-DH40-EH32-EH36-EH40-FH32-FH36-FH40**WIDTH: 1500MM~4100MM****LENGTH: 4000~18000MM****APPROVAL CONDITIONS**

- **Steel making** : Basic oxygen converter;
- **Casting process**: Continuous casting;
- **Deoxidation practice, condition of supply and thickness**:

Steel grades	Deoxidation	fine grained elements	Condition of supply and max. thickness	Z-property
A-B	Killed	-	AR; 40mm	Z25/35
A, B, D;	Killed	Al	CR ; 60mm	
AH32, AH36, DH32, DH36;	Killed	Al+Nb+Ti+V		
A-B-D-E	Killed	Al+Nb+Ti	N ; 80mm	
AH32, AH36, DH32, DH36; EH32, EH36	Killed	Al+Nb+Ti+V		
AH32, AH36, AH40, DH32, DH36, DH40, EH32, EH36, EH40; FH32, FH36, FH40	Killed	Al+Nb+Ti	TMCP ; 50mm	

Note: AR: As rolled, CR:Control rolling N: Normalized;
TMCP: Thermo-Mechanical Controlled Processing

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.

