



Germanischer Lloyd AG • P.O. Box 11 16 06 • 20416 Hamburg/Germany

Medium & Heavy Plant of Angang Steel Co., Ltd.  
Medium Plate Mill  
Attn. Mr. Wang Ruogang  
Tiexi, Anshan City  
114021 Liaoning Province  
China

GL Dalian Office			File of GI	
Incoming	F	E	M	L+A/D/C
Ref. No.	DLC-10-02139-1			
Date	2010-07-12			

Head Office Hamburg  
Brooktorkai 18  
20457 Hamburg/Germany

Phone +49 40 36149-0  
Fax +49 40 36149-200  
headoffice@gl-group.com  
www.gl-group.com

*PR → client*

Your reference

Your Letter of

Our reference

Extension

Date

070700-II-10/OKoe

+49 40 3 61 49-4561

2010-06-22

### Approval of your works for the manufacture of steel plates (prolongation)

Dear Mr. Wang Ruogang,

Thank you for your company's commitment to manufacture products with GL certification.

We refer to our Surveyor's report on the inspection of your works performed on 2010-05-20 and to his confirmation that the results of continuous delivery tests witnessed by him are in full compliance with our Rules for Materials.

Therefore the preconditions for prolongation of approval of your works granted by our letter ref. no. 016734-II-07 dated 2007-03-19 are complied with.

The material grades, supply conditions and dimensions / weights covered by the approval are indicated in the approval annex.

The manufacturing details covered by the approval are as follows:

#### 1. Products

Hot rolled steel plates designed for shipbuilding use

#### 2. Manufacturing process

##### No.1 Steel Making Plant

Hot metal from blast furnace, hot metal pre-treatment by torpedo ladle car and desulphurization by powder injection, basic oxygen furnace (BOF) with top blowing, secondary metallurgy by ladle furnace (LF) and vacuum treatment by tank degasser (VD) or recirculation degasser (RH), continuous casting by straight-curved type continuous slab caster with con-cast slab dimensions 230 / 300 x 1650-2000 mm

##### No.2 Steel Making Plant

Hot metal from blast furnace, hot metal pre-treatment by torpedo ladle car and desulphurization by powder injection, basic oxygen furnace (BOF) with top blowing, secondary metallurgy by ladle furnace (LF) and vacuum treatment by tank degasser (VD) or recirculation degasser (RH), continuous casting by straight-curved type continuous slab caster with con-cast slab dimension 150 x 1200 mm

##### No.3 Steel Making Plant

Hot metal from blast furnace, hot metal pre-treatment by torpedo ladle car, desulphurization by powder injection and hydraulic skimmer, basic oxygen furnace (BOF) with combined top-bottom

blowing, secondary metallurgy by ladle furnace (LF) and vacuum treatment (LF-TB), continuous casting by 2 medium-thin duo-stand continuous slab caster with bending of the strand  $R = 5.0$  m with con-cast slab dimensions 135 / 170 x 900-2000 mm

#### 2500 / 2450 mm Medium Plate Mill

Con-cast slab reheating by continuous heating furnace, descaling by high water pressure, hot rolling process by 2500 mm 2-high reversible roughing mill and 2450 mm 4-high reversible finishing mill, laminar cooling by Accelerated Cooling System (ACC), straightening by hot plate leveller, surface checking and clearance, straightening by hot plate leveller, cooling by 1# cooling bed, straightening by cold plate leveller, cooling by 2# cooling bed, surface checking and clearance, shearing by crop shear, trimming by rotary side trimmer, shearing by dividing shear, heat treatment, non-destructive testing by ultrasonic testing, marking, finishing, final inspection, despatch

### **3. Prematerial suppliers**

Only GL-approved material manufacturers for the relevant steel grades

### **4. Fabrication welding**

Not permitted

Our approval is granted under provision that all hull structural steel plates intended to be used for the construction of ships classed with our Society will comply with our Rules in all respects and will be tested in the presence of our Surveyor.

The quality of your company's manufactured products, within the valid approved scope, contributes to the safety and reputation of GL classed ships.

Your company has been added to the list of approved manufacturers, which is regularly published on the Internet. In order to view the appropriate data start the GL website <http://www.gl-group.com>, from the menu "GL Tools" select "Approval Finder", and then "Manufacturers of Materials".

Enclosed please find our certificate of approval no. **WZ 1061 HH 3**, valid until 2013-03-31, as well as the corresponding annex.

We thank you for your cooperation and wish your company every success.

Yours faithfully,

**Germanischer Lloyd**



Michael Kühnel



Oliver Krömer

Ref. no.: 070700-II-10



**Manufacturer: Medium & Heavy Plant of Angang Steel Co., Ltd.**

Medium Plate Mill

**List 1: Plates, Strips, Sections and Bars, Prematerial**

Grade Remarks	Key	Supply Condition (1)	min. Thick- ness, mm	max. Thick- ness, mm	Casting Method (2)	Deoxidation	Microalloy
GL-A	BL	AR	5	30	CC	killed	
GL-B	BL	AR	5	30	CC	killed	
GL-D	BL	CR	5	30	CC	killed	Al
GL-A32	BL	CR	5	30	CC	killed	Al+Nb+V
GL-A36	BL	CR	5	30	CC	killed	Al+Nb+V
GL-D32	BL	CR	5	30	CC	killed	Al+Nb+V
GL-D36	BL	CR	5	30	CC	killed	Al+Nb+V

Key: BD Strip BF Wide Flats BL Plate FO Sections HZ Prematerial (Ingots, Slabs, Billets) ST Bars WFS Bulb flats

(1):

AC, AF, AR = as cast, as forged, as rolled  
 CR = controlled rolled  
 F = ferritized  
 HF = hot formed  
 N = normalized

N+T = normalized + tempered  
 Q+T = quenched + tempered  
 SH = surface hardened  
 S+Q = solution annealed + quenched  
 TM = thermochemically rolled

(2):

CC = continuous casting  
 IC = ingot casting



Approval of Material Manufacturers  
*Zulassung von Werkstoffherstellern*



This is to certify that the works of  
*Hiermit wird bescheinigt, dass die Firma*

**MEDIUM & HEAVY PLANT OF ANGANG STEEL CO., LTD.  
MEDIUM PLATE MILL  
ANSHAN, LIAONING PROVINCE  
CHINA**

has been subjected to an approval test in accordance with the Society's Rules with satisfactory results and is approved for the manufacture of the following products:

*einer Zulassungsprüfung nach den Vorschriften des Germanischen Lloyd unterzogen wurde und für die Herstellung folgender Erzeugnisse zugelassen ist:*

**Normal and Higher Strength Hull Structural Steels  
in accordance with the GL-Rules for Metallic Materials,  
Chapter 2, Section 1.B**

This approval is granted provided that all products intended to be used for the construction of ships or installations classed with Germanischer Lloyd comply in every respect with the Society's Rules and Requirements.

*Die Zulassung erfolgt unter der Voraussetzung, dass alle Erzeugnisse, die zum Bau von Schiffen und Anlagen mit Klasse des Germanischen Lloyd bestimmt sind, die Vorschriften des Germanischen Lloyd in jeder Hinsicht erfüllen.*

Certificate of approval No.  
*Zulassungsbescheinigung Nr.*

WZ 1061 HH 3

This Certificate is valid until:  
*Diese Bescheinigung ist gültig bis:*

2013-03-31

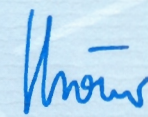
Part of the approval is our letter of approval ref. no. 070700-II-10 of 2010-06-22.

*Bestandteil der Zulassung ist das Zulassungsanschreiben, Tgb.-Nr. 070700-II-10 vom 2010-06-22.*

Hamburg, 2010-06-22.

**Germanischer Lloyd**

  
Michael Kühnel

  
i.A. Oliver Krömer

