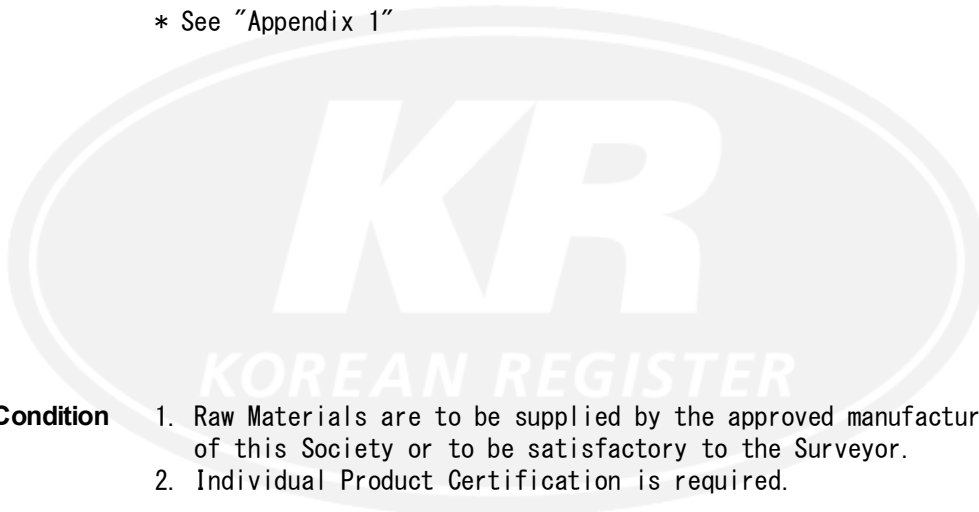


# Approval Certificate for Manufacturing Process

[ Rolled Steels ]



**Initial Approval** 22nd January, 2010  
**Manufacturer** Dongkuk Steel Mill Co., Ltd. Dangjin Works  
 25, Godaegongdan 1-gil, Dangjin-si, Chungcheongnam-do, Rep. of Korea  
**Product Description** Rolled Steel Plates for Hull Structures  
 Longitudinally Profiled Steel Plates for Hull Structures  
 \* See "Appendix 1"



**Approval Condition**

1. Raw Materials are to be supplied by the approved manufacturers of this Society or to be satisfactory to the Surveyor.
2. 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.

Pt. 2, Ch. 1, Sec. 3, Art. 301 & 310 of the Rules for the Classification of Steel Ships.

This Certificate is valid until 21st January, 2025

Reissued at Busan, Korea on 18th October, 2021



This certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No(ME21025483790) and certificate No.(PTD25394-SP001).



**KOREAN REGISTER**

*General Manager of  
Marine & Ocean Equipment Team*

**Note :**

1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.
2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.
3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.
4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

## Product Description and/or Approval Condition

Date of Issue : 18th October, 2021

### A. Rolled Steel Plates for Hull Structures

Grades	Z-quality	Deoxidation	Grain Refining Elements	Thickness Max. (mm)	Heat Treatment
A, B	Z25/Z35	Killed	Al	50	AR, CR (NR)
A, B	Z25/Z35	Killed	Al	50~100	ARS
D	Z25/Z35	Killed	Al	35	AR
D	Z25/Z35	Killed	Al	50	CR (NR)
A, B, D	Z25/Z35	Killed	Al	83	TMCP
A, B, D	Z25/Z35	Killed	Al	100	N
E	Z25/Z35	Killed	Al, Al+Ti, Al+Nb+Ti	83	TMCP, N
AH32S (1)	-	Killed	Al	25	LT-CR
AH32S, AH36S (2)	-	Killed	Al	25	TMCP
AH32S, AH36S (2)	-	Killed	Al	20	LT-CR
AH/DH/EH32/36	Z25/Z35	Killed	Al, Al+Ti, Al+V Al+Nb+Ti, Al+Nb+Ti+V	70	N
AH/DH32/36	-	Killed	Any	12.5	Any
AH32/36	Z25/Z35	Killed	Al, Al+Ti	12.5~35	AR
DH32/36	Z25/Z35	Killed	Al, Al+Ti	12.5~25	ARS
AH/DH32/36	Z25/Z35	Killed	Al, Al+Ti, Al+Nb+Ti	12.5~50	CR (NR)
AH/DH/EH32/36/40	Z25/Z35	Killed	Al, Al+Ti, Al+Nb+Ti	83	TMCP
FH32/36	Z25/Z35	Killed	Al, Al+Nb+Ti	50	TMCP
AH36/40	-	Killed	Al	15	CR (NR)

#### Remarks

(1) Specially approved with  $0.81\% \leq \text{Mn} \leq 0.89\%$  by ladle analysis.

(2) Specially approved with  $0.18\% < \text{C} \leq 0.21\%$  by ladle analysis.

## Product Description and/or Approval Condition

Date of Issue : 18th October, 2021

### B. Longitudinally Profiled Steel Plates for Hull Structures

Grades (1)	Z-quality	Deoxidation	Grain Refining	Thickness Max. (mm)	Taper Zone (mm)	Heat Treatment
A/B/D-T/S/B/M/Y	Z25/35	Killed	Al	35 (2)	Min. 400	AR
A/B/D-T/S/B/M/Y	Z25/35	Killed	Al	50 (7)	Min. 400	CR (NR)
A/B/D-D	Z25/35	Killed	Al	35 (3)	Max. 200	AR
A/B/D-D	Z25/35	Killed	Al	50 (6)	Max. 200	CR (NR)
AH/DH32-T/S/B/M/Y	Z25/35	Killed	Al+Nb+Ti	25 (2)	Min. 400	AR
AH/DH32-D	Z25/35	Killed	Al+Nb+Ti	25 (4)	Max. 200	AR
AH/DH32-D AH/DH36-D	Z25/35	Killed	Al+Nb+Ti	50 (6)	Max. 200	CR (NR)
AH/DH32-T/S/B/M/Y AH/DH36-T/S/B/M/Y	Z25/35	Killed	Al+Nb+Ti	50 (7)	Min. 400	CR (NR)
AH/DH32-D AH/DH36-D	Z25/35	Killed	Al+Nb+Ti	35 (4)	Max. 200	CR (NR)
AH/DH/EH32-T/S/B/M/Y AH/DH/EH36-T/S/B/M/Y	Z25/35	Killed	Al+Nb+Ti	60 (7)	Min. 400	TMCP
AH/DH/EH32-D AH/DH/EH36-D	Z25/35	Killed	Al+Nb+Ti	60 (6)	Max. 200	TMCP

(1) T : Taper, S : Single step, B : dog Bone, M : Multy step, Y : sYmmetry  
D : Differential thickness  
(2) Taper ratio  $\leq 10$  mm/m  
(3) Gap of thickness  $\leq 8$  mm  
(4) Gap of thickness  $\leq 6$  mm  
(5) Taper ratio  $\leq 8$  mm/m  
(6) Gap of thickness  $\leq 10$  mm  
(7) Taper ratio  $\leq 15$  mm/m

#### ※ Abbreviations

AR : As Rolled  
N : Normalized condition  
CR (NR) : Controlled Rolling Condition (Normalising Rolling)  
TMCP : Thermo-Mechanical Controlled Process  
ARS : As Rolled specially approved by this Society

< End of certificate >