

# Test Certificate



Certificate No.:

41678 BUN

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si , Gyeonggi-do 412-520, Republic of Korea

Manufacturer

Goyang

2010-11-10

Place of test

Date of test

**Item of Test** 1 pc(s), Control Air Dryer

## Technical Data

Desiccant(heatless) vertical type

Design pressure : 9.9bar

Max. design temperature :100 C

Serial No. :101034

Materials	Item	Material grade	Material standard	Certificate no.	Certificate type
	1	SS400	JIS G 3101	011125-KHNE-040-001	Manufacturer Inspection Certificate
	1	STPG370	JIS G 3454	0200460	Manufacturer Inspection Certificate

**Approval** KHDM-100/200-GA-005 10-100444 / 2010-09-01

The drawings were approved by GL under ref. no.

## Inspection and Test

**Inspection / Test** Visual inspection

Hydrostatic pressure test carried out, test pressure Tp = 14.9 bar

**Results** No objection

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

## Additional Statements

Daewoo shipbuilding & Marine Engineering Co., Ltd.

Intended for

-

Continue intended for

H3303

Customer order no.

-

Manufacturer order no.

41678 BUN

T.P. 14.9bar

11



10

Stamping

We hereby certify that the item(s) described above was (were) tested in accordance with the mentioned test procedure(s) under supervision of our surveyor.



Seoul, 2010-11-16

Place / Date

Gyeong Tae Seog

Signature of GL Surveyor

A handwritten signature in black ink, appearing to be 'Gyeong Tae Seog', written over a horizontal line.

# Test Certificate



Certificate No.:

44166 BUN

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si , Gyeonggi-do 412-520, Republic of Korea

**Manufacturer**

Goyang

2010-12-28

**Place of test**

**Date of test**

**Item of Test** 1 pc(s), Control Air Dryer

## Technical Data

Desiccant(heatless) vertical type  
Design pressure : 9.9bar  
Max. design temperature :100 C  
Serial No. :101242

Materials	Item	Material grade	Material standard	Certificate no.	Certificate type
	1	SS400	JIS G 3101	011125-KHNE-040-001	Manufacturer Inspection Certificate
	1	STPG370	JIS G 3454	0200460	Manufacturer Inspection Certificate

**Approval** KHDM-100/200-GA-005 10-100444 / 2010-09-01

The drawings were approved by GL under ref. no.

## Inspection and Test

**Inspection / Test** Visual inspection

Hydrostatic pressure test carried out, test pressure  $T_p = 14.9$  bar

**Results** No objection

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

## Additional Statements

Daewoo shipbuilding & Marine Engineering Co., Ltd.

**Intended for**

-

**Continue intended for**

H3304

**Customer order no.**

-

**Manufacturer order no.**

44166 BUN

T.P. 14.9bar

12



10

Stamping

We hereby certify that the item(s) described above was (were) tested in accordance with the mentioned test procedure(s) under supervision of our surveyor.

Seoul, 2011-01-05

Place / Date



Gyeong Tae Seog

Signature of GL Surveyor

A handwritten signature in black ink, appearing to be 'Gyeong Tae Seog', written over a horizontal line.

Germanischer Lloyd SE • P.O. Box 11 16 05 • 20415 Hamburg • Germany

Kyung Nam Dryer Co., Ltd.  
Attn. In-Geun, Kim  
306-1, Naeyu-dong Deokyang-gu  
Goyang-si, Gyeonggi-do 412-520  
Republic of Korea

Head Office  
Brooktorkai 18  
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Your reference  
KND11 - 0802- 001

Your letter of  
2011-07-31

Our reference  
11-091918/HPe

Extension  
+49 40 36149-241

Date  
2011-09-15

Drawing Approval of Heat Exchanger and Air Dryer intended for  
Shipyard: Samsung Heavy Industries Co., Ltd., Geoje Shipyard  
Nb.-No.: 1940  
GL-Reg. No.: 116367

Dear Mr. In-Geun,

Please find enclosed one copy of the following drawings, which have been received electronically by GL GLOBE-System:

Drawing No.	Drawing Title	Status	Remarks	Red entries
KADM60-FSD-002	Control Air Dryer KADM-60, Flow Schematic Diagram	For information only	<input type="checkbox"/>	<input type="checkbox"/>
KADM60-GA-003	Refrigerated Type Control Air Dryer, General Arrangement Drawing	For information only	<input type="checkbox"/>	<input type="checkbox"/>
KADM60-HEE-004	Refrigerated Type Control Air Dryer, Heat Exchanger Evaporate Drawing (1/2)	Approved	<input checked="" type="checkbox"/>	<input type="checkbox"/>
KADM60-HEE-005	Refrigerated Type Control Air Dryer, Heat Exchanger Evaporate Drawing (2/2)	Noted	<input type="checkbox"/>	<input type="checkbox"/>
DHA-1002515	Control Air Cooler DHA-60, General Assembly	Approved	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Data Sheet (Shell & Tube)	Noted	<input checked="" type="checkbox"/>	<input type="checkbox"/>
KND-GTAW-WPS002	3 (110802) WPS(welding procedure spec)	For information only	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The drawing has been examined according to our Rules for Classification and Construction "I – Ship Technology, Part 1 – Seagoing Ships, Chapter 2 – Machinery Installations, Section 8 – Pressure Vessels" and marked with our sign of approval / perusal respectively.

Chairman of the Supervisory Board: Dr Wolfgang Peiner • Executive Board: Erik van der Noordaa (Chairman) • Dr Joachim Segatz • Pekka Paasivaara  
Germanischer Lloyd SE, Registered Office Hamburg No. HRB 115442

Place of performance and jurisdiction is Hamburg. The latest edition of the General Terms and Conditions of Germanischer Lloyd is applicable. German law applies.

Kindly observe our remarks:

	Reply by client necessary	Follow-up by surveyor	For info, no reply necessary
1. The materials used for pressure bearing parts have to comply with the requirements specified in our Rules for Materials referred to in Table 8.2 (Rules and Guidelines Chapter I – Ship Technology, Part 1 – Seagoing Ships, 2 Chapter – Machinery Installations, Section 8 – Pressure Vessels and Heat Exchangers, B3 – Approved Materials).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2. In case of using the welding joint efficiency factor of $v=1.0$ for the shell (reference is made to the submitted strength calculations) following non-destructive test shall be carried out according to our Rules and Guidelines:  100 % x-ray or ultrasonic examination of the longitudinal weld  25 % x-ray or ultrasonic examination of the circumferential welds  at least 10% of the circumferential and longitudinal welds as well as all butt and fillet welds of weld-in and weld-on components shall be subject to a surface crack examination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. We take for granted that the screwed socket connections (unions) comply with the requirements of a recognized national or international standard and that all gaskets, bolts, nuts, flanges and other parts are in accordance with the stated standard specification and are suitable for the pressure and temperature conditions in these cases.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Yours faithfully,

**Germanischer Lloyd**

  
Holger Peters

  
Guido Friederich



# Test Certificate



Certificate No.:

56661 BUN

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si, Republic of Korea

Manufacturer

Goyang

Place of test

2011-09-21

Date of test

**Item of Test** 1 pc(s), Control Air Dryer

**Technical Data** Design pressure : 9.9 bar

Max. design temperature : 100 °C

Serial No. : 110824

Materials	Item	Material grade	Material standard	Certificate no.	Certificate type
	Cover Plate	SS400	JIS G 3101	-	Manufacturer Inspection Certificate
	Shell	STPG370	JIS G 3454	-	Manufacturer Inspection Certificate
	Tube	C1220T	KS D 5301	-	Manufacturer Inspection Certificate

**Approval** KADM60-FSD-002 11-091918/hpE / 2011-09-15

The drawings were approved by GL under ref. no.

## Inspection / Test

Visual inspection

Hydrostatic pressure test carried out, test pressure  $T_p = 14.9$  bar

**Results** No objection

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

**Additional Statements** SAMSUNG HEAVY INDUSTRIES CO., LTD.

Intended for

-

Continue intended for

HN1940

Customer order no.

A11CA02309

Manufacturer order no.

56661 BUN	
T.P. 14.9bar	
09	11
GL	

Stamping

We hereby certify that the item(s) described above was (were) tested in accordance with the mentioned test procedure(s) under supervision of our surveyor.

Seoul, 2011-09-21

Place / Date



C.H. JUNG

Signature of GL Surveyor



# Test Certificate for Heat Exchanger



Certificate No.:

56660 BUN

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si, Republic of Korea

Manufacturer

Goyang

2011-09-21

Place of test

Date of test

**Technical Data** 1 pc(s) Control Air Cooler

Quantity

Description

DHA-60

110824

Type

Serial no.

F.W. (Tube side)

7 bar

50 °C

1.01 m<sup>2</sup>

Tube or bundle side / Medium

Max. allow. work. press.

Design temp.

Heat trans. area

AIR (Shell side)

9.7 bar

80 °C

Shell side / Medium

Max. allow. work. press.

Design temp.

**Manufacture** Tube Expanding

Method of manufacture

Shop approval no.

**Materials**

Item	Material grade	Material standard	Certificate no.	Certificate type
CHANNEL HEAD, FLANGE	SS400	JIS G 3101	-	Manufacturer inspection certificate
TUBE	C7060T-0	JIS H 3300	-	Manufacturer inspection certificate
SHELL	STPG370	JIS G 3454	-	Manufacturer inspection certificate

**Approval** DHA-1002515

Drawing no.

11-091918/HPe / 2011-09-15

The drawings were approved by GL under ref. no.

**Inspection / Test** The heat exchanger was examined and subjected to a pressure test according to the rules. No defects were found.

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

Certificate No.:

56660 BUN  
Page 2 of 2

**Additional  
Statements**

SAMSUNG HEAVY INDUSTRIES CO., LTD.

Intended for

-

Continue intended for

HN1940

Customer order no.

A11CA02309

Manufacturer order no.

56660 BUN

TP 10.5 / 14.6 bar

09



11

Stamping

We hereby certify that the heat exchanger described above was tested under supervision of our surveyor.

Seoul, 2011-09-21  
Place / Date



C.H. JUNG

Signature of GL Surveyor





Germanischer Lloyd SE • P.O. Box 11 18 06 • 20416 Hamburg • Germany

Kyung Nam Dryer Co., Ltd.  
306-1, Naeyu-dong, Deokyang-gu  
Goyang-si, Gyeonggi-do 412-520  
Republic of Korea

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20457 Hamburg  
Germany

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

Your reference	Your letter of	Our reference	Extension	Date
	2012-02-02	12-013042/MaCam	+49 40 36149-3418	2012-02-07

Extension of Drawing Approval of Heat Exchanger and Air Dryer intended for  
Shipyard: Samsung Heavy Industries Co., Ltd. Geoje Shipyard  
Hull No.: 2012  
GL-Reg. No.: 116715  
Our recent Ref. No.: 11-091918/HPe

Dear Sir,

The following drawing approval is extended to the a.m. new project, provided that the design and the design conditions (pressure, temperature and the kind of operating media) remain unchanged and no modifications were introduced into the drawings. Our previous remarks are still to be observed.

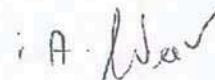
Drawing No.	Title	Our previous Ref. No.	Date
KADM60-HEE-004	Refrigerated Type Control Air Dryer, Heat Exchanger Evaporate Drawing (1/2)	11-091918/HPe	2011-09-15
DHA-1002515	Control Air Cooler DHA-60, General Assembly		

The current Ref. No. 12-013042/MaCam will be used for this project in the inspection certificate.

Yours faithfully,

**Germanischer Lloyd**

  
Guido Friederich

  
Stefan Wiemer

Chairman of the Supervisory Board: Dr Wolfgang Peiner • Executive Board: Erik van der Noordaa (Chairman) • Dr Joachim Segatz • Pekka Paasivaara  
Germanischer Lloyd SE, Registered Office Hamburg No. HRB 115442  
Place of performance and jurisdiction is Hamburg. The latest edition of the General Terms and Conditions of Germanischer Lloyd is applicable. German law applies.



# Test Certificate



Certificate No.:

61913 BUN 01

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si, Gyeonggi-do 412-520, Republic of Korea

Manufacturer

Goyang

Place of test

2012-01-31

Date of test

**Item of Test** 1 pc(s), Refrigerated type Control Air Dryer

**Technical Data** Model : KADM-60

Design pressure : 9.9bar

Max. design temperature : 100 C

Serial No. : 111244

Materials	Item	Material grade	Material standard	Certificate no.	Certificate type
	1	SS400	JIS G 3101	080505-KHNE-113901	Manufacturer Inspection Certificate
	1	STPG370	JIS G 3454	1102092	Manufacturer Inspection Certificate
	1	C1220T	KS D 5301	08-03-10	Manufacturer Inspection Certificate

**Approval** KHDM60-HEE-004 12-013042 / 2012-02-07

The drawings were approved by GL under ref. no.

## Inspection / Test

Visual inspection

Hydrostatic pressure test carried out, test pressure  $T_p = 14.9$  bar

**Results** No objection

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

## Additional Statements

Samsung Heavy Industries Co., Ltd.

Intended for

-

Continue intended for

H2012

Customer order no.

-

Manufacturer order no.

61913 BUN

T.P. 14.9bar

01



12

Stamping

We hereby certify that the item(s) described above was (were) tested in accordance with the mentioned test procedure(s) under supervision of our surveyor.

Seoul, 2012-03-02

Place / Date



Gyeong Tae Seog

Signature of GL Surveyor



# Test Certificate for Heat Exchanger



Certificate No.:

61913 BUN 02

Page 1 of 2

**General Data** Kyung Nam Dryer Co., Ltd., Goyang-si , Gyeonggi-do 412-520, Republic of Korea  
 Manufacturer  
 Goyang  
 Place of test  
 2012-01-31  
 Date of test

**Technical Data** 1 pc(s) Shell and tube type heat exchanger  
 Quantity Description  
 Control Air Cooler 111244  
 Type Serial no.  
 F.W 7 bar 50 °C 1.01 m<sup>2</sup>  
 Tube or bundle side / Medium Max. allow. work. press. Design temp. Heat trans. area  
 Air 9.7 bar 80 °C  
 Shell side / Medium Max. allow. work. press. Design temp.

**Manufacture** Tube expanding  
 Method of manufacture  
 Shop approval no.

Materials	Item	Material grade	Material standard	Certificate no.	Certificate type
	1	SS400	JIS G 3101	070713-PHNE-1 58-001	Manufacturer inspection certificate
	1	STPG370	JIS G 3454	207	Manufacturer inspection certificate
	1	C4621P	JIS H 3100		Manufacturer inspection certificate

**Approval** DHA-1002515 12-013042 / 2012-02-07  
 Drawing no. The drawings were approved by GL under ref. no.

**Inspection / Test** The heat exchanger was examined and subjected to a pressure test according to the rules. No defects were found.

**Remarks** As far as it could be seen, the workmanship of the component during inspection / test has been to the satisfaction of the undersigned surveyor.

Additional  
Statements

Samsung Heavy Industries Co., Ltd.

Intended for

-

Continue intended for

H2012

Customer order no.

-

Manufacturer order no.

61913 BUN

TP 10.5 / 14.6 bar

01



12

Stamping

We hereby certify that the heat exchanger described above was tested under supervision of our surveyor.

Goyang, 2012-03-02  
Place / Date



Gyeong Tae Seog  
Signature of GL Surveyor