시 험 성 적 서
Certificate of Test

1. 신 청 자
Applicant
   - o 회사명 : HIGEN Motor Co.,Ltd.
   Name
   - o 주 소 : 74-5, Seongsan-Dong, Changwon City, Gyeongnam, 641-714, Korea
   Address
   - o 접수일자 : Sep. 24, 2009
   Date of Receipt

2. 시험대상품
Equipment Under Test
   - o 시험품명 : Three Phase induction Motor
   Name of Product
   - o 모 델 : NF***5 (For detail, See Remark 1 of Page 10) o 일련번호 : -
   Model *Serial No.*

3. 성적서 용도 : Submission
Purpose of Certificate of Test

4. 시험규격 : IEC 60034-5 Ed. 4.1 b:2006
Test Standards

5. 시험환경 : o **Temperature :** (23.0 ± 5.0) ℃ , o **Relative Humidity :** (66 ± 5) % R.H.
Environment

6. 시험기간 : Oct. 07, 2009 ~ Oct. 13, 2009
Test Period

7. 발행일자 : Nov. 16, 2009
Issued Date

8. 시험결과 : **PASS**
Test Result

Nov. 16, 2009

Prepared by Documentation Specialist
Name : Sang-Hee Baek

Approved by Quality Manager
Name : Jae-Uk Kang

한국조선기자재연구원
Korea Marine Equipment Research Institute
부산광역시 영도구 동삼동 1125-22 (우 606-806)
1125-22, Dongsam-Dong, Youngdo-Gu, Busan, 606-806, Korea
Tel:+82-51-400-5000 Fax:+82-51-400-5091
http://www.komeri.re.kr

TEST REPORT

1. APPLICANT INFORMATION

Company	:	HIGEN Motor Co.,Ltd.
Address	:	74-5, Seongsan-Dong, Changwon City, Gyeongnam, 641-714, Korea
Name of Client	:	Jae-Hak, Kim
Telephone	:	+82-70-7710-3191
Facsimile	:	+82-55-603-3000

2. MANUFACTURER INFORMATION

Company	:	HIGEN Motor Co.,Ltd.
Address	:	74-5, Seongsan-Dong, Changwon City, Gyeongnam, 641-714, Korea
Telephone	:	+82-70-7710-3191
Facsimile	:	+82-55-603-3000

3. LABORATORY INFORMATION

Laboratory	:	Korea Marine Equipment Institute
Address	:	1125-22, Dongsam-Dong, Youngdo-Gu, Busan, 606-806, Korea
Telephone	:	+82-51-400-5000
Facsimile	:	+82-51-400-5091

4. EQUIPMENT UNDER TEST (EUT) INFORMATION

EUT Name	:	Three Phase induction Motor
Model	:	NF***5
Serial No.	:	-
Power	:	-

5. TEST SUMMARY

No.	Test Item	Test Standard	Result
1	PROTECTION AGAINST SOLID FOREIGN OBJECTS - IP5X	IEC 60034-5 Ed. 4.1 b:2006	PASS
2	PROTECTION AGAINST WATER - IPX6	IEC 60034-5 Ed. 4.1 b:2006	PASS

TABLE OF CONTENTS

1. PROTECTION AGAINST SOLID FOREIGN OBJECTS - IP5X -

1.1 TEST ENVIRONMENT

· Ambient Temperature	(23.0 ± 5.0) ℃	※15.0 ℃ to 35.0 ℃
· Relative Humidity	(66 ± 5) %R.H.	※25 %R.H. to 75 %R.H.

1.2 TEST STANDARD

· IEC 60034-5 Ed. 4.1 b:2006 : Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

1.3 TEST EQUIPMENT

	Description	Manufacturer	Model Number	Calibration Due
◆	Dust Tester	Dongboo Industry	-	~ 2010. 01. 21

1.4 TEST SET-UP

· The test shall be carried out with the EUT in normal operational condition, including mounting and supports, under its secured mechanical arrangement.

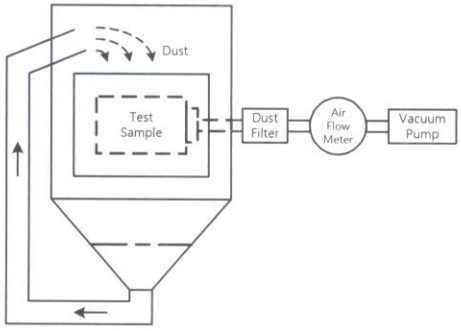


Figure 1-1 Test diagram

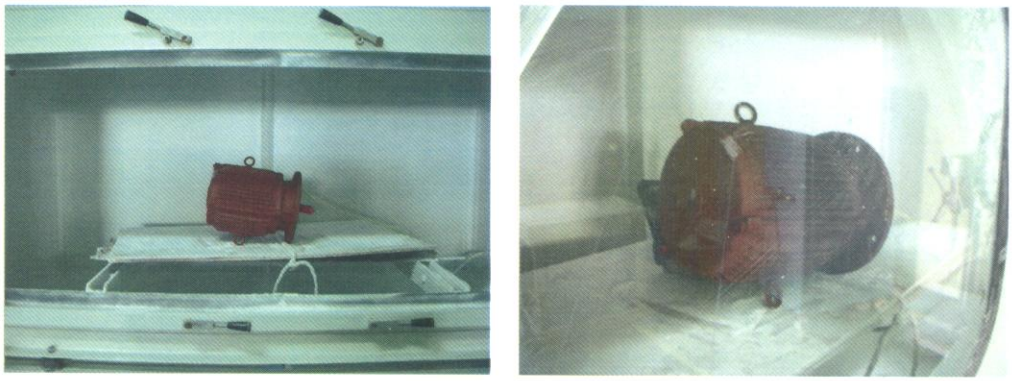


Photo 1-1 Test set-up for IP5X test

1.5 TEST PROCEDURE

· The test specimen was installed in the manner stated by the manufacturer.

· This examination retracts air that become 80 times of bulk of specimen tank that abstraction is tested doing not exceed 60 bulks per time inside tank repeatedly.

· Because maximum pressurization is 2 kPa and the abstraction speed is smaller than 40 bulks per time, test was gone during 8 hours until draw 80 bulks.

1.6 TEST RESULT

· Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity ot interfere with satisfactory operation of the apparatus or to impair safety.

Photo 1-2 Test results for IP5X (NF2155)

손준용

Tested by : Jun-Yong Shon

권혁상

Technical Manager : Hyuk-Sang Kwon

2. PROTECTION AGAINST WATER - IPX6 -

2.1 TEST ENVIRONMENT

· Ambient Temperature	(23.0 ± 5.0) ℃	※15.0 ℃ to 35.0 ℃
· Relative Humidity	(66 ± 5) %R.H.	※25 %R.H. to 75 %R.H.

2.2 TEST STANDARD

· IEC 60034-5 Ed. 4.1 b:2006 : Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

2.3 TEST EQUIPMENT

	Description	Manufacturer	Model Number	Calibration Due
◆	Water Spray Tester	Dongboo Industry	-	~ 2009. 11. 18

2.4 TEST SET-UP

· The test shall be carried out with the EUT in normal operational condition, including mounting and supports, under its secured mechanical arrangement.

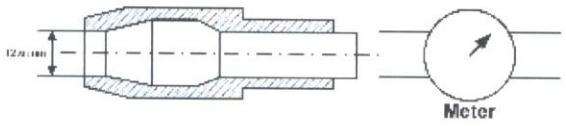


Figure 2-1 Test diagram

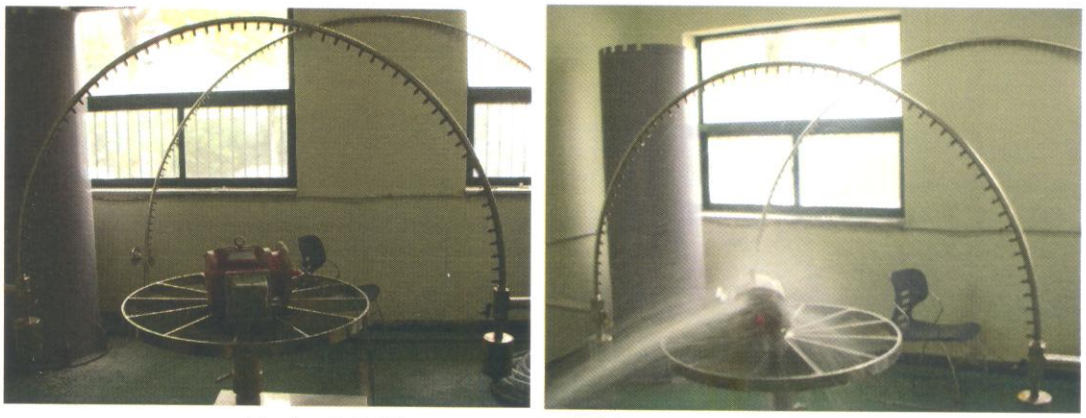


Photo 2-1 Test set-up for IPX6 test (NF2155)

Photo 2-2 Test set-up for IPX6 test (NF3005)

2.5 TEST PROCEDURE

· The test specimen was installed in normal position and in accordance with the manufacture's instructions.

· Water projected in powerful jets against the enclosure from any direction shall have no harmful effects and the specimen was sprayed from all practical directions.

· Test duration per square meter of enclosure surface area likely to be sprayed 1 min.

· The conditions to be observed are as follows:
- internal diameter of the nozzle : 12.5 mm
- delivery rate : 100 L/min ± 5 %
- distance from nozzle to enclosure surface 3 m.
- minimum test duration : 3 min

2.6 TEST RESULT

· Protected against spraying water.

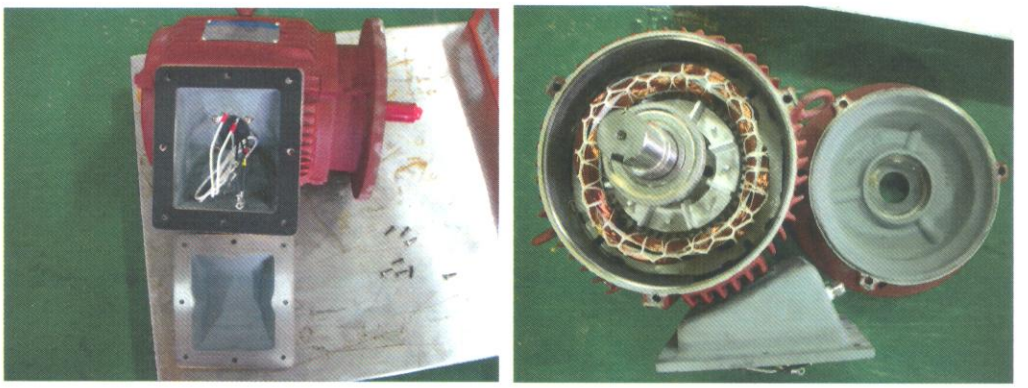


Photo 2-3 Test results for IPX6 (NF2155)

Photo 2-4 Test results for IPX6 (NF3005)

손준용

Tested by : Jun-Yong Shon

권혁상

Technical Manager : Hyuk-Sang Kwon

APPENDIX

Ⅰ. REMARK

· Model name description :

- Types : NF *** 5
- "***" can be size(center height or flange mounting PCD) and output(kW).

· Test sample : NF2155, NF3005

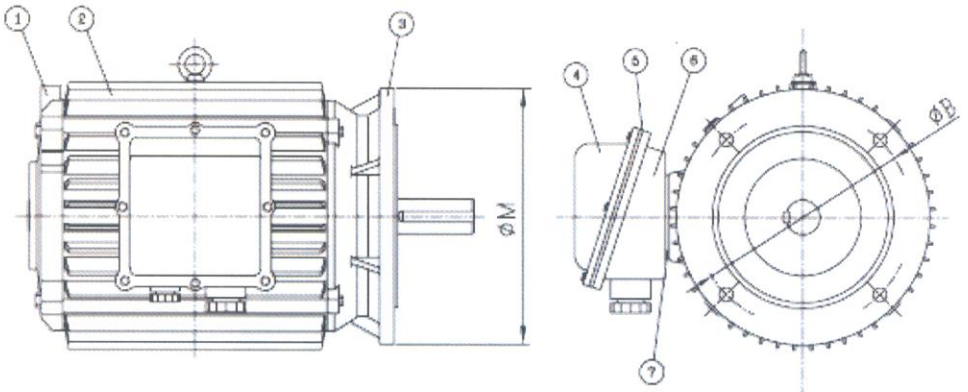
· Test sample types and other types are exactly same as each other except for center height and output.

II. DRAWING OF EQUIPMENT UNDER TEST

HIGEN MOTOR CONSTRUCTION DRAWING | TENV

SYM	REVISION DESCRIPTION	REV. NO.	DATE	CHK'D
1				
2				

TENV, Flange Mounting



N F * * * 5

- IP56
- OUT OF SHAFT PARTS SEALING: V-RING, OIL-SEAL or PROTECTOR
- SEALING OF JOINTS SURFACE: LIQUID GASKETS

CODE	FRAME SIZE	ØB Flange mount PCD	ØM Flange Out Dia
130	FF130	ø130	ø160
165	FF165	ø165	ø200
215	FF215	ø215	ø250
265	FF265	ø255	ø300
300	FF300	ø300	ø350
350	FF350	ø350	ø400
400	FF400	ø400	ø450
500	FF500	ø500	ø550
600	FF600	ø600	ø660

- Flange mounting
- TENV (Totally enclosure non ventilated)

Q'ty	NO	ITEM	MATERIAL
1	1	BRACKET	CAST IRON or STEEL
1	2	FRAME	CAST IRON
1	3	FLANGE	CAST IRON or STEEL
1	4	TERMINAL COVER	CAST IRON or STEEL
1	5	TERMINAL PACKING	RUBBER
1	6	TERMINAL BASE	CAST IRON or STEEL
1	7	TERMINAL BASE PACKING	RUBBER

UNIT	mm	SCALE	N/S	PROJECT'N	3rd Angle	TITLE	MOTOR ASSY
DESIGNED		CHECKED		APPROVED			
2009.09.11 K.I. HA		2009.09.11 K.I. HA		2009.09.11 H.T. KIM		SUBJECT	TENV, Flange Mounting 63Fr-315Fr, IP56
HIGEN Motor co., Ltd.						DWG. NO.	NF***5