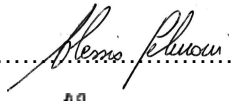



**TEST REPORT
ENVIRONMENTAL
EN 60529:1991+A1:2000**

Report Reference No. : 130313TRFENV
Tested by : Alessio Pelizzoni 
Verified by : Fabio Mauri 
Date of issue : 2009-06-19


Testing Laboratory : **Nemko Spa**
Address : Via del Carroccio 4
 I-20046 Biassono (MI)
Testing location/ procedure : Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing methods
 Non-standard testing methods
Testing location/ address : Nemko Spa - Via del Carroccio snc, I-20046 Biassono (MI)

Applicant's name : **AMARC Srl**
Address : Via Artigiani, 37 – 23874 Montecchia (LC)

Test specification
Standard : EN 60529:1991+A1:2000
Non-standard test method : N/A

Test Report Form No. : TRF EN60529
TRF Originator : Nemko Spa
Master TRF : 2009-05

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Test item description:: Head of Electric flanged heaters
Trade Mark: 
Manufacturer: **AMARC Srl**
Model: **DN Series**
Ratings: Not Relevant

ENV -- TEST REPORT

Type / Model: DN Series

Equipment: Head of Electric flanged heaters

Applicant: AMARC Srl

Address: Via Artigiani, 37 – 23874 Montevercchia (LC)

Manufacturer: AMARC Srl

Address: Via Artigiani, 37 – 23874 Montevercchia (LC)

Date of receipt of test sample 2009-05-05 / 2009-06-16

Testing commenced on 2009-05-07 / 2009-06-17

Testing concluded on 2009-05-12 / 2009-06-19

Test Result (according to the standards on page 4)	POSITIVE
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The test report merely corresponds to the test sample.

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1. TEST PERFORMED

Verification of protection provided by enclosure: IP66

2. TEST STANDARDS AND PROCEDURES

EN 60529:1991+A1:00

Degrees of protection provided by enclosures (IP code)

Nemko WM L0177

Use of measuring equipment to perform standards tests

Nemko WM L1002

Measurement Uncertainty - Policy and Statement

3. SUMMARY

3.1. **General remarks:**

The dust test was performed in a dust chamber in accordance with clauses 13.6, 13.6.2 of standard EN 60529. E.U.T has been considered on category 1

The water test was been performed in accordance with clauses 14.2.6 and 14.3 of EN 60529 standard.

This test report cover a DN series of head of electric flanged heaters. The heads are different for size according to table below. Has been tested heads which represent the worst case according to the maximum distances between screws used for close the cover. (Distances between screws, about 100mm)

Both Heads has been equipped with the maximum entries for cable gland admitted.

Model	Ø of top cover (mm)	No. of screws used for close top cover
DN 80	160	6
DN 100	180	6
DN 125	210	6
DN 150	230	8
DN 200	300	8
DN 250	350	16
DN 300	410	16
DN 350	460	16
DN 450	540	16

3.2. Definitions of symbols used in this Test Report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty circle indicates that the listed condition, standard or equipment is not applicable for this report.

3.3. Final assessment:

The protection requirements pertaining to the technical standards and tested operation modes are

- - fulfilled.
- - not fulfilled.

The equipment under test

- - fulfils the protection requirements cited in § 1.
- - does not fulfil the protection requirements cited in § 1.

3.4.

4. EQUIPMENT UNDER TEST

4.1. Power supply used

Power supply voltage : o 230V/50 Hz / 1 ϕ o 115V/60Hz / 1 ϕ
 o 400V/50 Hz 3PE o 400V/50 Hz 3NPE
 o 12 V DC ■ Not relevant for IP test

4.2. Short description of the Equipment Under Test (EuT)

The E.U.T. is a head of electric flanged heaters. It is composed by enclosure and top cover fixed by means of screws.

Number of tested samples: 2 (Model DN125 and Model DN450)
Serial Number: --

Technical data of **DN125**:

InternalHeight (h)	:127 mm
Internal Diameter (\emptyset)	:150 mm
Internal Volume (V)	:2,243 dm ³
No of screws	:6

Technical data of **DN450**:

InternalHeight (h)	:175 mm
Internal Diameter (\emptyset)	:473mm
Internal Volume (V)	:30,669 dm ³
No of screws	:16

4.3. EuT operation mode:

The E.U.T was mounted as in normal use and not powered.

4.4. EuT configuration:

The EUT have been supplied by manufacturer as following:

Model DN125: Supplied with no. 2 Cable glands (already certify IP66/67) equipped with the smallest cable diameter permissible. Cable glands have been closed with a torque described in the Annex C of EN60079-1. (No 1 ELFIT FG 2: 55Nm, No 1 ELFIT FL01: 40Nm)

The no. 6 screws used for close the top cover have been closed with a torque of **10Nm**.

Model DN450: Supplied with no. 5 Cable glands (already certify IP66/67) equipped with the smallest cable diameter permissible. Cable glands have been closed with a torque described in the Annex C of EN60079-1. (No 2 ELFIT FG 7: 140Nm; No 2 ELFIT FG 2: 55 Nm, No 2 ELFIT FL01: 40Nm)

The no. 16 screws used for close the top cover have been closed with a torque of **10Nm**.

4.5. Performance level

The test results shall be classified in terms of loss of protection or degradation of protection of the EuT, referred to a performance level defined by the standard and the relevant degree of protection.

Required performance level:

- based on EN 60529
- based on the declaration of the manufacturer, requestor or purchaser

The EUT shall comply with the following requirements:

- § 12.3.1 – The access of 1mm probe shall not touch hazardous live parts;
- § 13.6.2 – no deposit of dust is observable inside the enclosure at the end of the test
- § 14.3 – if any water has entered, it shall not:
 - be sufficient to interfere with the correct operation of the equipment or impair safety;
 - deposit on insulation parts where it could lead to tracking along the creepage distances,
 - reach live parts or windings not designed to operate when wet,
 - accumulate near the cable end or enter the cable if any.

5. TEST ENVIRONMENT

5.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 17-28°C

Humidity: 30 ÷ 60%

Atmospheric pressure: 860-1060 hPa

5.2. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to Nemko SpA Technical Procedure VML1002 and is documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability of Nemko Spa laboratory for the tests performed is reported:

6.2 IP Grade Protection					
6.2.1 Water Flow	The measurement uncertainty is the same defined by calibration certificates, giving the table.				
	<table border="1"> <thead> <tr> <th>Range</th> <th>Measurement Uncertainty</th> </tr> </thead> <tbody> <tr> <td>Water flow defined in EN 60529</td> <td>2 %</td> </tr> </tbody> </table>	Range	Measurement Uncertainty	Water flow defined in EN 60529	2 %
Range	Measurement Uncertainty				
Water flow defined in EN 60529	2 %				
6.2.2 Probe Dimension	The measurement uncertainty is the same defined by calibration certificates, giving the table.				
	<table border="1"> <thead> <tr> <th>Range</th> <th>Measurement Uncertainty</th> </tr> </thead> <tbody> <tr> <td>Probe dimensions defined in EN 60529</td> <td>Same measurement uncertainties defined at clause 6.3.2</td> </tr> </tbody> </table>	Range	Measurement Uncertainty	Probe dimensions defined in EN 60529	Same measurement uncertainties defined at clause 6.3.2
Range	Measurement Uncertainty				
Probe dimensions defined in EN 60529	Same measurement uncertainties defined at clause 6.3.2				

This table has been extracted from the relevant Technical Procedure Nemko Spa WML1002

6. TEST CONDITIONS AND RESULTS

6.1. IP 6X

Test probe diameter.....: 1 mm
Enclosure category: 1
Dimension of E.U.T.....: See § 4.2
Volume hour.....: < 40 volume for hours (both EUT)
Maximum depression.....: 20mbar
Test Duration: 8h (both EUT)

6.1.1. Photo documentation of the test set-up



Typical setup for IP Dust penetration test

6.1.2. Test result

The requirements are **Fulfilled**

Remarks:

For both equipments, test probe didn't penetrate inside the enclosure and dust was not present inside the enclosure after the test.

6.2. IP X6

Internal diameter of nozzle..... : 12,5mm
Delivery rate..... : 100 l/min
Test duration : 3min.
Distance to nozzle to E.U.T.....: from 2,5m to 3m

6.2.1. Photo documentation of the test set-up



Snooze for IP X6

6.2.2. Test result

The requirements are **Fulfilled**

Remark:

For both equipments, water was not present inside the enclosure after the test.

7. TEST EQUIPMENT

Equipment used for testing are recorded and saved into the company archive as file 130313INS.doc
It will be made available if requested.

8. PHOTOS

Model DN125



Fig.1: Equipment under test (EUT)



Fig. 2: Top view of EUT



Fig.3: Enclosure and top cover



Fig. 4: Internal view of EUT



Fig.5: Welding



Fig. 6: Gasket on top cover



Fig.7: EUT in a dust Chamber

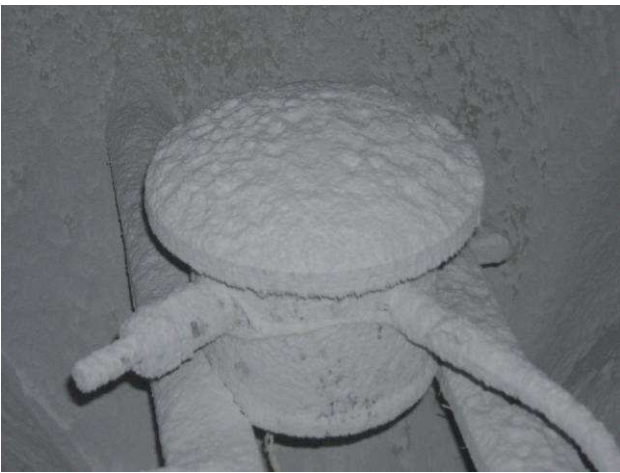


Fig. 8: EUT in a dust chamber



Fig.9: EUT during water test



Fig. 10: Internal view after IP66 test



Fig.11: Internal thread after IP 66 test



Fig. 12: Internal thread after IP66 test

Model DN450



Fig.1 Equipment under test (EUT)



Fig.2: Top view of EUT



Fig.3: EUT without cover



Fig. 4: EUT with Gasket



Fig.5: EUT without gasket



Fig.6: Gasket thickness and Enclosure thickness



Fig.7: EUT in a dust Chamber



Fig. 8: EUT during water test



Fig.9: EUT during water test



Fig. 10: Internal view after IP66 test



Fig.11: Internal thread after IP 66 test

- End of test report -