**TEST REPORT**
**NOISE MEASUREMENT**

**Name and address of submitter (customer):**
ROBE lighting, s.r.o., Hážovice 2090, 756 61 Rožnov pod Radhoštěm, The Czech Republic

**Identification:**
Moving Head ROBIN 600 LEDWash, type LW 600

**Serial No.:**
1100303914

**Producer:**
ROBE lighting, s.r.o., Rožnov pod Radhoštěm, The Czech Republic

**Technical documentation:**
--

**Date of entrance test:**
11 May 2011

**Test method:** ČSN EN ISO 11 201, ČSN EN ISO 11 202 1)

**Date of test, place of test:**
11 May 2011

**Tests leader:**
Ing. Jiří LENIKUS

**Semi-anechoic chamber site Vyškov**

**Test carried out by:**
Ing. Jiří LENIKUS

**Issue date:**
24 May 2011

**Authorized by technical manager:**
Ing. Ivan ŠTUCHAL

**Test results:**
The sound pressure levels emitted by the equipment during determined operation conditions (three operation modes), on determined measurement places (the distance from the equipment centre – 1 m; 5 m and 10 m).

<table>
<thead>
<tr>
<th>Emission sound pressure levels A $L_{pA}$ (dB)</th>
<th>1. mode</th>
<th>2. mode</th>
<th>3. mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m</td>
<td>29,8</td>
<td>39,6</td>
<td>47,6</td>
</tr>
<tr>
<td>5 m</td>
<td>18,7</td>
<td>28,3</td>
<td>36,4</td>
</tr>
<tr>
<td>10 m</td>
<td>7,9</td>
<td>19,3</td>
<td>22,2</td>
</tr>
</tbody>
</table>

The expanded measurement uncertainty is a product of a measurement standard uncertainty and a coverage factor $K=2$, this corresponds to a coverage probability 95% for a normal distribution.

**Address:**
VOP-026 Šternberk, s.p.
site Vyškov
OZT – ZL č.1103
V. Nejedlého 691
682 03 VYŠKOV
THE CZECH REPUBLIC

**Telephone:**
00420 517 303 623

**Fax:**
00420 517 303 605

**E-mail:**
stuchal.i@vop.cz

---

Note:
This test report is translation of Czech version of test report No. 7230-71/2011. In the case of difference is valid Czech version of test report.
1) These standards are the Czech version of the European Standards.

The results contained within this report relates to the tested item only. This report shall not be reproduced except in full, without written approval of testing laboratory.
1 TEST CONDITIONS

- Test conditions of the test equipment:
  - stationary conditions, with determined operation conditions (three operation mode):
    1. operation mode – stationary mode, lamp is switched on,
    2. operation mode – dynamic mode with rotation movement (Pan, Tilt) and effect (Zoom),
    3. operation mode – dynamic mode with rotation movement (Pan, Tilt) and effect (Zoom), maximum ventilator speed (High mode).
  - the equipment was placed on a wooden table (distance from floor – 0.8 m, table desktop dimension: 1.0 m × 1.5 m × 0.035 m),
  - the equipment front panel (control panel) and the side part of the moving head was turned towards the microphone for 1. mode measurement, head is rotating (in 2. and 3. mode),
  - the equipment was placed in the centre of the test room (as possible),
  - the equipment was placed on one-reflective plane, in an indoor environment, in the semianechoic chamber – Figure 1,
  - the equipment basic dimensions: length – 0.343 m, width – 0.203 m, height – 0.444 m.

- Acoustic environment:
  - the semianechoic chamber (for EMC measurement), length – 12 m, width – 5 m, height – 5 m,
  - the reflective surface: concrete covered metal sheet,
  - test environmental correction $K_2$ (according to ČSN ISO 3744 [2] – calculation by means of test room absorbability),
    $K_{2(1m)} = 0.52 \text{ dB} < 2 \text{ dB} (\alpha = 0.5)$ – in compliance with standard ČSN EN ISO 11 201 [1] – for 3,28ft distance.
    $K_{2(5m)} = 1.73 \text{ dB} < 2 \text{ dB}$ (sound absorbability mean factor $\alpha = 0.5$) – in compliance with standard ČSN EN ISO 11 201 – for 5 m distance.
    $K_{2(10m)} = 3.95 \text{ dB} > 2 \text{ dB}$ (it is not in compliance with standard ČSN EN ISO 11 201, $K_{2(10m)} = 3.95 \text{ dB} < 7$ dB ($\alpha = 0.5$), it is in compliance with standard ČSN EN ISO 11 202 [3] – for 10 m distance.

Figure 1: Equipment under test in test chamber
2. MEASUREMENT LOCATION

It was defined measurement location according to the customer requirements, microphone height 1.10 m, the distance from equipment (centre of equipment) 1 m; 5 m and 10 m.

3. TEST RESULTS

$L^p_{PA}$ - measured sound pressure levels $A$
$Lp_A$ - emission sound pressure levels $A$ ($Lp_A = L^p_{PA} - K_1 - K_3$)

<table>
<thead>
<tr>
<th>Measurement location - distance (m)</th>
<th>1. mode</th>
<th>Background noise (dB)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L^p_{PA}$ (dB)</td>
<td>$K_1$ (dB)</td>
<td>$K_3$ (dB)</td>
</tr>
<tr>
<td>1</td>
<td>30.5</td>
<td>0.19</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>20.0</td>
<td>1.3</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>17.9</td>
<td>3.0</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement location - distance (m)</th>
<th>2. mode</th>
<th>Background noise (dB)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L^p_{PA}$ (dB)</td>
<td>$K_1$ (dB)</td>
<td>$K_3$ (dB)</td>
</tr>
<tr>
<td>1</td>
<td>39.6</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>28.6</td>
<td>0.3</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>26.8</td>
<td>0.46</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement location - distance (m)</th>
<th>3. mode</th>
<th>Background noise (dB)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L^p_{PA}$ (dB)</td>
<td>$K_1$ (dB)</td>
<td>$K_3$ (dB)</td>
</tr>
<tr>
<td>1</td>
<td>47.6</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>36.4</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>29.4</td>
<td>0.24</td>
<td>7</td>
</tr>
</tbody>
</table>

The reproducibility standard deviation $\sigma_{Ro} \leq 1.5$ dB (ČSN EN ISO 11 201).
The reproducibility standard deviation $\sigma_{Ro} \leq 3.0$ dB (ČSN EN ISO 11 202).
The results were acquired in compliance with standards ČSN EN ISO 11 201 (for distance 1 m and 5 m), ČSN EN ISO 11 202 (for distance 10 m).
4 MEASURING INSTRUMENTS

<table>
<thead>
<tr>
<th>Inventory number</th>
<th>Name</th>
<th>Calibration Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>106045</td>
<td>Sound analyzer B&amp;K 2260 „Observer“ SN 2354773</td>
<td>03.10.2012</td>
</tr>
<tr>
<td>106045.1</td>
<td>Microphone B&amp;K 4189 SN 2345687</td>
<td>29.09.2012</td>
</tr>
<tr>
<td>96015955</td>
<td>Calibrator Pistonphon B&amp;K 4220 SN 704632</td>
<td>15.01.2012</td>
</tr>
<tr>
<td>96012261</td>
<td>Measure Tape</td>
<td>26.02.2012</td>
</tr>
</tbody>
</table>

5 REFERENCES

[1] ČSN EN ISO 11 201 „Acoustics-Noise emitted by machinery and equipment-Determination of emission sound pressure levels at a work station and other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections”. December 2010.

This national standard is the Czech version of the European standard EN ISO 11201:2010.


This national standard is the Czech version of the European standard EN ISO 3744:2010.


This national standard is the Czech version of the European standard EN ISO 11202:2010.