



## Research Laboratories

Vibroacoustics, Shock Resistance  
and Magnetic Fields Laboratory

e-mail: [bl@ctm.gdynia.pl](mailto:bl@ctm.gdynia.pl)



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### TEST REPORT N° BL/005/118/17

### MECHANICAL TEST

**Oprawa/Luminaire  
EXP 83-2180/P13**

Gdynia, June 2017

tel.: +48 58 666 5 318  
fax.: +48 58 666 5 425

[ctm@ctm.gdynia.pl](mailto:ctm@ctm.gdynia.pl)  
[www.ctm.gdynia.pl](http://www.ctm.gdynia.pl)



|  |   |
|--|---|
| <b>1. Name and address of the purchaser:</b>                                   | REMONTOWA LIGHTING TECHNOLOGIES S.A.<br>Sucha 25, 80-531 Gdańsk   |
| <b>2. Location of performed testing:</b>                                       | Testing stand in OBR Centrum Techniki Morskiej S.A. Vibroacoustics, Shock Resistance and Magnetic Fields Laboratory, ul. Dickmana 62, 81-109 Gdynia |
| <b>3. Object/product description, condition and identification of testing:</b> |   |
| <b>3.1. Name of the object:</b>  | Oprawa/Luminaire EXP 83-2180/P13  |
| <b>3.2. Number of the object:</b>  | 0422  |
| <b>3.3. Manufacturer of the object:</b>  | REMONTOWA LIGHTING TECHNOLOGIES S.A.<br>Sucha 25, 80-531 Gdańsk   |
| <b>3.4. Condition of the object:</b>   | New   |
| <b>3.5. Components:</b>  | According to Tab. 1   |

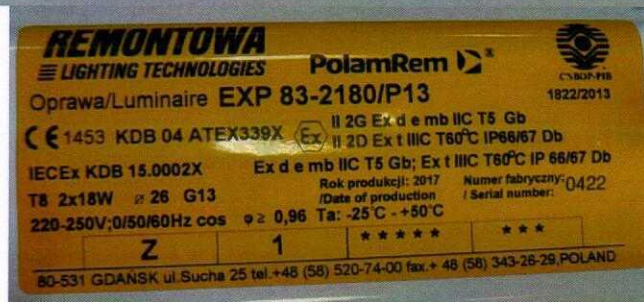


Fig. 1 Test object



Tab. 1 Components of the test object

| N° | Name of the object / Name of the components of the object | Type            | Number of the object |
|----|---|-----------------|----------------------|
| 1. | Oprawa/Luminaire  | EXP 83-2180/P13 | 0422                 |

**3.6. Additional equipment (not for tests):**

n/d

**4. Object/product - date of receipt for testing:**29<sup>th</sup> May 2017**5. Number and name of testing instruction/technical specification/testing procedure/standard:**

- PN-EN 60068-2-6:2008 - Environmental testing - Part 2-6: Tests - Fc: Vibration (sinusoidal);
- PRS Publication 11/P – ENVIRONMENTAL TESTS ON MARINE EQUIPMENT

**6. Measurements, tests scope and results:**

According to Tab. 2

Tab. 2 Measurements, tests scope and results

| N° | Name of the test | Requirement | Test method              | Test result |
|----|------------------|-------------|--------------------------|-------------|
| 1. | Vibration        | PRS 11/P    | PN-EN 60068-2-6<br>:2008 | Positive    |

**7. The method of EUT testing during and after the test and description of the proper operation**

During testing the lamp was switched on. The lamp was observed during the test and any mechanical damage was checked during and after the test.

After the test, there should be no mechanical damage, no cracks and the lamp should be illuminated with two LEDs.



**8. A detailed description of the tests / test records****8.1. Resistance on sinusoidal vibrations****8.1.1. Date of performed testing:** 30<sup>th</sup>, 31<sup>th</sup> May 2017**8.1.2. Detailed scope and parameters of tests:** According to Tab. 3

Tab. 3 Detailed scope and parameters of tests

| N° | Test parameters   | Comments   |
|----|---|--|
| 1  | Frequency range: <ul style="list-style-type: none"> <li>• 2,0 ÷ 25,0 Hz</li> </ul> Displacement amplitude: <ul style="list-style-type: none"> <li>• 1,6 mm</li> </ul> Frequency range: <ul style="list-style-type: none"> <li>• 25,0 Hz ÷ 100,00Hz</li> </ul> Acceleration amplitude: <ul style="list-style-type: none"> <li>• 4,0 g</li> </ul> 2 cycles per axis | The test was performed in each direction on three mutually perpendicular axis.                           |
| 2  | Frequency value: <ul style="list-style-type: none"> <li>• 30,0 Hz</li> </ul> Acceleration amplitude: <ul style="list-style-type: none"> <li>• 4,0 g</li> </ul> 1,5 hours per axis   | The test was performed in each direction on three mutually perpendicular axis for non-vibration products |

**8.1.3. Laboratory equipment used for testing:** According to Tab 4

Tab. 4 Laboratory equipment used for testing

| N° | Name, type   | Number       |
|----|--|--------------|
| 1. | Vibration system TIRA 5550/LS                          | CTM 801 0148 |
| 2. | Accelerometer type 353B31                              | 67193        |
| 3. | Accelerometer type 3185B                               | 2295         |
| 4. | Reference vibrations generator Bruel & Kjaer type 4294 | 1431250      |
| 5. | Vibration analyzer type SVAN 956                       | 12081        |
| 6. | Accelerometer type 3185B                               | 2295         |



#### 8.1.4. Detailed description of the test

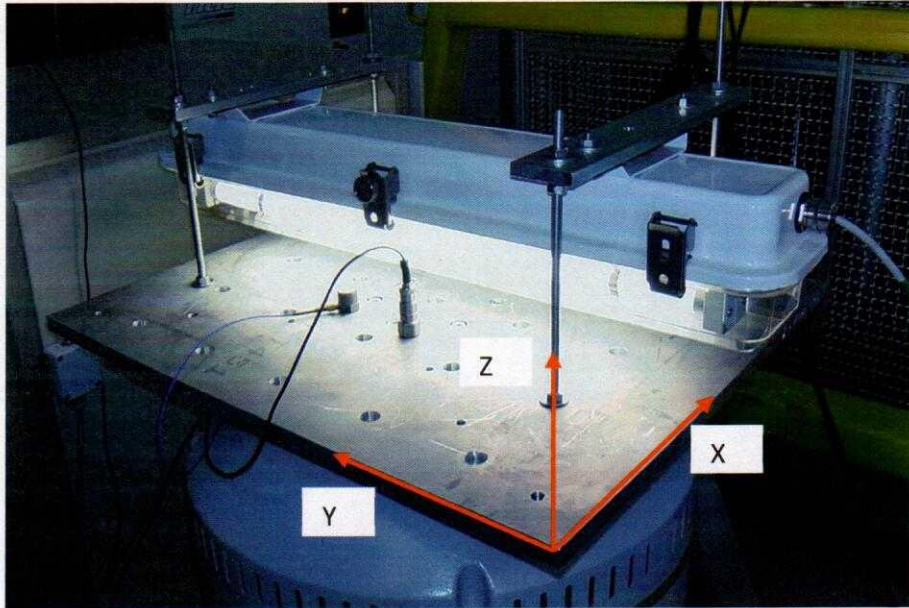


Fig. 1 EUT on test stand with three mutually perpendicular axis.

The object was exposed for each of the three mutually perpendicular geometric axes. Since no vibration effects were detected, the subject object was subjected to exposure in accordance with paragraphs 2 Tab. 3 for non-vibrating products.

#### 8.1.5. Detailed results of the test

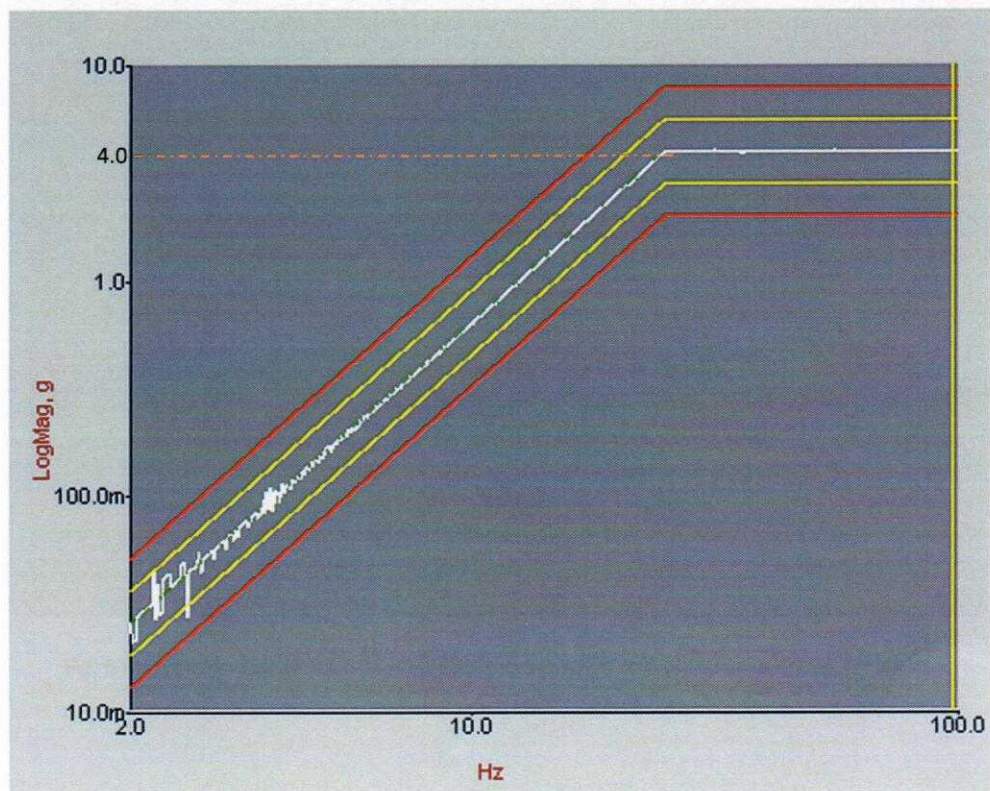


Fig. 3 Acceleration amplitude of vibration chart referred to frequency progress for X axis



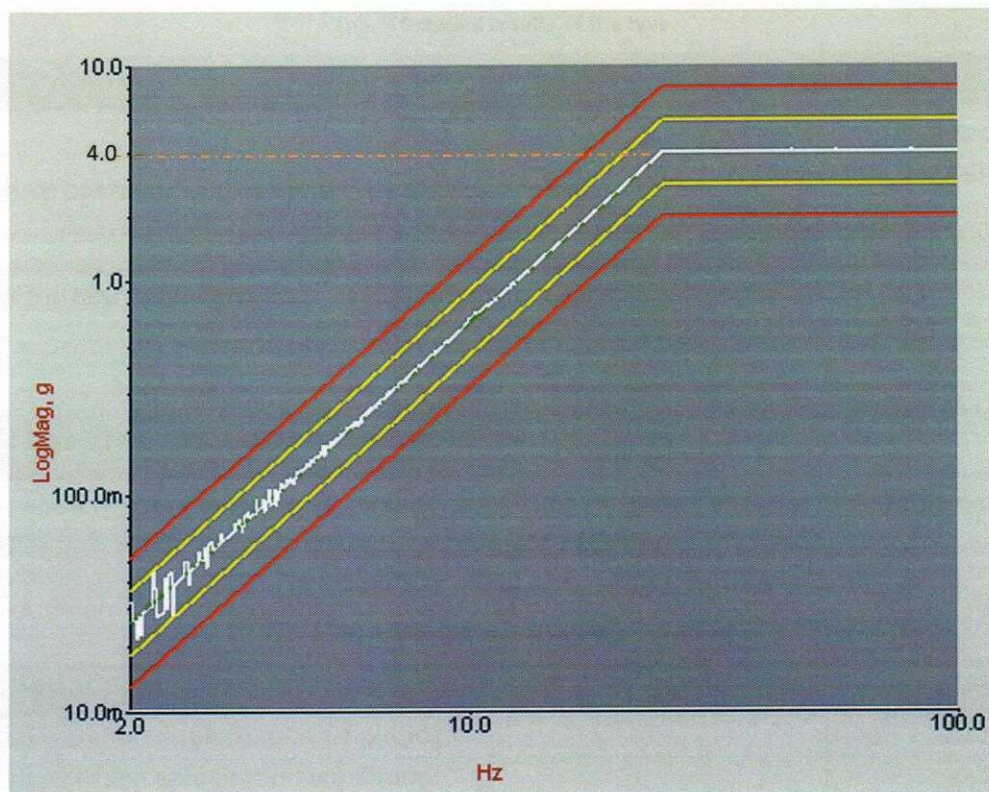


Fig. 4 Acceleration amplitude of vibration chart referred to frequency progress for Y axis

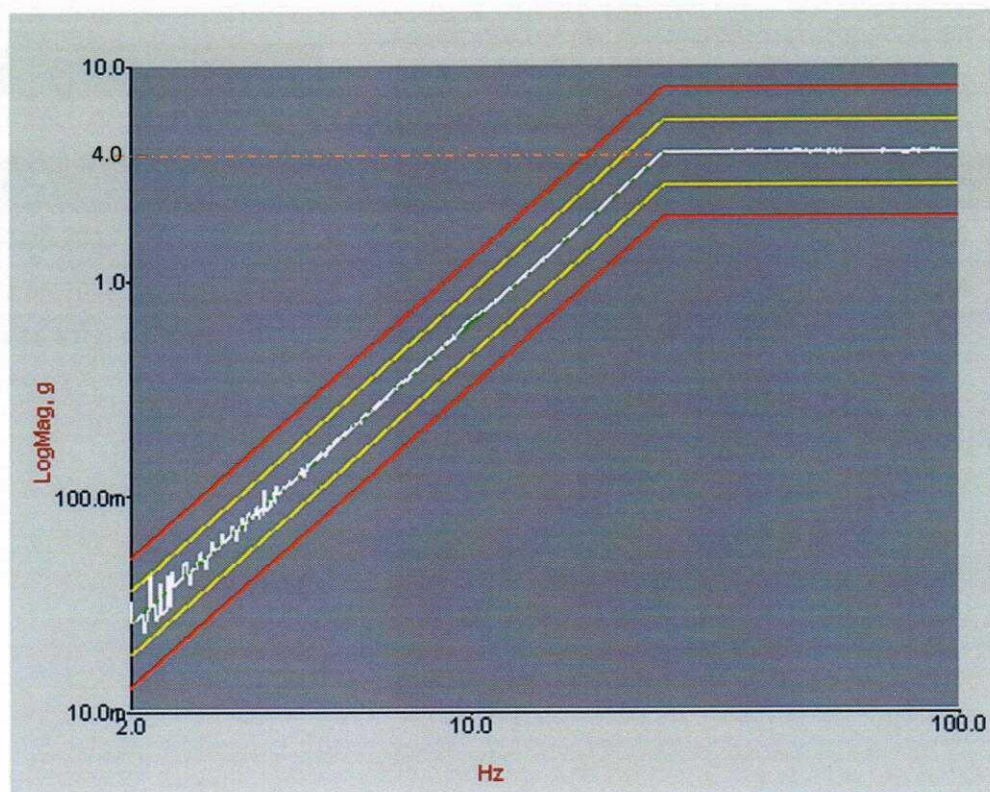


Fig. 5 Acceleration amplitude of vibration chart referred to frequency progress for Z axis



Tab. 5 Detailed results of the test

| N°  | Results of the test  | Comments  |
|---|--|---|
| 1   | normal operation within the technical requirements <sup>*)</sup> | <ul style="list-style-type: none"> <li>• no vibration effects were found</li> <li>• no mechanical damage has been detected</li> <li>• the lamp worked properly</li> </ul> |
| <sup>*)</sup> according to the description in p.7 |  |   |

**8.1.6. Measurement uncertainties:**

According to Tab. 6

In Tab. 6 the values of measurement uncertainty, which are expanded uncertainties with a confidence level of approximately 95% and a coverage factor  $k = 2$  have been given.

Tab. 6 The estimated measurement uncertainty

| N° | Measurement                                  | Uncertainty |
|----|--|-------------|
| 1. | Sinusoidal vibration displacement amplitude: | 0,13 mm     |
| 2. | Sinusoidal vibration acceleration amplitude: | 0,32 g      |
| 3. | Vibrations frequency for $f < 25$ Hz         | 0,1 Hz      |
| 4. | Vibrations frequency for $f < 100$ Hz        | 0,5 Hz      |

**8.1.7. Environmental conditions:**

According to Tab. 7

Tab. 7 Environmental conditions during the test

| Date of test | Humidity [%] | Temperature [°C] |
|--------------|--------------|------------------|
| 30.05.2017   | 52,3         | 21,6             |
| 31.05.2017   | 54,1         | 21,4             |

Electric field intensity:  $< 1$  V/m.

**NOTICE:**

- The Test Report shall not be replicated in any other manner than its entirety without a prior written authorisation of OBR CTM S.A., Vibroacoustics, Shock Resistance and Magnetic Fields Laboratory.
- Personal performing the test is independent from the supplier, did not participate in the processes of designing, production and sale of the test object.
- Test results reflect findings pertinent only to the following tested Oprawa/Luminaire EXP 83-2180/P13 number 0422.

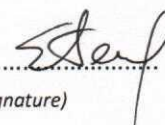
**Testing performed by:****Lead personnel:**

Przemysław Stencel, M.Sc. Eng.  
(given name and family name)

**Test performer:**

Przemysław Stencel, M.Sc. Eng.  
(given name and family name)

02 06 2017

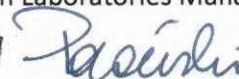


(date and signature)

**Responsible for authorization:**

Research Laboratories Manager

02 06 2017



Przemysław Pozański Ph. D.Eng

(personal stamp or a legible given/family name, function, date and signature)