Industry & Facilities Division

**Inspection Report N°:** SOF/16/9288

**Date of issuance:** 12/07/2016

- Initial
- Initial
- Interim
- Interim
- Final
- Final

**Rev. n°:** n/a

**Reason of revision:** n/a

**Inspection requested by:** Institute of Metal Science, Equipment and Technologies with Hydro and aerodynamics Centre “Akad. A. Balevski” – BAS (IMSETHC-BAS)

**BV Inspection performed as Recognized Authority:** ☑ Yes  

**P/o nr:** (client to BV)

**P/o nr:** (client to Manufacturer)

**Location:** Institute of Metal Science, Equipment and Technologies with Hydro and aerodynamics Centre “Akad. A. Balevski” laboratory

**Previous Inspection:** (Date) N/A

**Next Inspection:** (Date) N/A

**MATERIAL / SUPPLY / SUBJECT OF INSPECTION**

<table>
<thead>
<tr>
<th>ITEM / TAG Nr</th>
<th>QTY</th>
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<tbody>
<tr>
<td>SS-05 S/N 0002 ID 72</td>
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<tr>
<td>SS-05 S/N 0004 ID 74</td>
<td>1</td>
</tr>
<tr>
<td>SS-05 S/N 0006 ID 76</td>
<td>1</td>
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<tr>
<td>SS-05 S/N 0007 ID 77</td>
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**REFERENCE DOCUMENTS:** See continuation sheet for additional documents: ☑ Yes ☐ No

<table>
<thead>
<tr>
<th>Title</th>
<th>Reference n°</th>
<th>Rev.</th>
<th>Approved by</th>
<th>Date</th>
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<tbody>
<tr>
<td>SS-05 Seismic sensor Technical requirements</td>
<td>СС 00.00.00.00 ТИ</td>
<td>n/a</td>
<td>Prof. d-r Stoychev</td>
<td>04/14/16</td>
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<td>SS-05 Seismic sensor Methodology for climatic laboratory</td>
<td>SS-05 00.00.00.00.00 МК</td>
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<td>Prof. d-r Stoychev</td>
<td>12/07/16</td>
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<td>SS-05 Seismic sensor Climatic laboratory program</td>
<td>SS-05 00.00.00.00.00 ПК</td>
<td>n/a</td>
<td>Prof. d-r Stoychev</td>
<td>12/07/16</td>
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<td>SS-05 Seismic sensor Methodology for mechanical laboratory vibration</td>
<td>SS-05 00.00.00.00.00 МВ</td>
<td>n/a</td>
<td>Prof. d-r Stoychev</td>
<td>12/07/16</td>
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<td>SS-05 00.00.00.00.00 ПВ</td>
<td>n/a</td>
<td>Prof. d-r Stoychev</td>
<td>12/07/16</td>
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</tbody>
</table>

**INSPECTION RESULT**

☑ Satisfactory ☐ Unsatisfactory: Non Conformities Raised  

(Total number of NCR: ……)

**BV Inspector:** Aleksandar Pandov

**BV Coordinator:** Tane Tanev

**BV Office:** BV SOF

**Attachments:**

☑ Yes (Total number of pages: 40) ☐ No

**Distribution:** ☑ CLIENT ☐ MANUFACTURER ☑ BV ☐ OTHER …… (specify)
Industry & Facilities Division

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**Rev. n°:** n/a  
**Reason of revision:** n/a

### Stage of inspection:
- [ ] Before manufacturing
- [ ] During manufacturing
- [x] Final
- [ ] Packing

### Type of inspection:
- [ ] Pre-inspection meeting
- [x] Witnessing tests
- [x] Final inspection
- [ ] Document and QC record review
- [ ] Manufacturing progress status
- [ ] Visual examination, checks
- [ ] Vendor assessment
- [ ] Packing

### Stamping:
- [x] No

### Results of inspection:
- [x] Satisfactory
- [ ] Unsatisfactory

**Non Conformities Reports (NCR):**
- [ ] NCR’s issued during reported period : NO
- [ ] List of outstanding NCR’s : N/A

**Main Conclusions & Remarks:** (for details see continuation sheet)
- [ ] Next visit scheduled: NO

### INSPECTION DETAILS:

**ATTENDEES:** See continuation sheet for additional documents: [ ] Yes  [x] No

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Title (*)</th>
<th>Note</th>
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<tbody>
<tr>
<td>Vencislav Pehlivanski</td>
<td>IMSETHC-BAS</td>
<td>Gl. As., PhD, M. Sc.</td>
<td></td>
</tr>
<tr>
<td>Stiliyan Goergiev</td>
<td>IMSETHC-BAS</td>
<td>PhD</td>
<td></td>
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<tr>
<td>Hristo Kolev</td>
<td>IMSETHC-BAS</td>
<td>As.prof.</td>
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<tr>
<td>Vladimir Varbanov</td>
<td>IMSETHC-BAS</td>
<td>PhD</td>
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<tr>
<td>Stoimen Balinov</td>
<td>IMSETHC-BAS</td>
<td>M. Sc.</td>
<td></td>
</tr>
</tbody>
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(*) specify if BV inspector has role as supervisor or mentor (e.g. “BV Inspector – supervisor –”)

**MEASURING EQUIPMENT USED:** See continuation sheet for additional documents: [ ] Yes  [x] No

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Equipment Identity n°</th>
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<th>Expiry date</th>
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<tbody>
<tr>
<td>Piezo electric accelerometer</td>
<td>61389</td>
<td>01/28/2016</td>
<td>01/2019</td>
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### MEASURING EQUIPMENT USED:

<table>
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<th>Expiry Year</th>
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<td>Vibration meter Robotron</td>
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<td>01/2019</td>
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<td>Digital thermohygrometer</td>
<td>02/QC73</td>
<td>01/14/2016</td>
<td>01/2019</td>
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<td>Digital Frequency Counter</td>
<td>DVM13MFC2</td>
<td>02/01/2016</td>
<td>02/2019</td>
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### LIST OF NON CONFORMITIES ISSUED:

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<th>Description of the Anomaly</th>
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### LIST OF NON CONFORMITIES CLOSED:

<table>
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<th>Ref report n°</th>
<th>Issued on</th>
<th>Description</th>
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<tbody>
<tr>
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### LIST OF ATTACHEMENTS

<table>
<thead>
<tr>
<th>Type of document</th>
<th>Identification number</th>
<th>Description</th>
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<tbody>
<tr>
<td>Technical requirements</td>
<td>Attachment 1</td>
<td>SS-05 Seismic sensor Technical requirements</td>
</tr>
<tr>
<td>Testing methodology</td>
<td>Attachment 2</td>
<td>SS-05 Seismic sensor Methodology for climatic laboratory</td>
</tr>
<tr>
<td>Testing program</td>
<td>Attachment 3</td>
<td>SS-05 Seismic sensor Climatic laboratory program</td>
</tr>
<tr>
<td>Testing methodology</td>
<td>Attachment 4</td>
<td>SS-05 Seismic sensor Methodology for mechanical laboratory vibration</td>
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<td>Testing program</td>
<td>Attachment 5</td>
<td>SS-05 Seismic sensor Program for mechanical laboratory vibration</td>
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<td>Communication codes</td>
<td>Attachment 6</td>
<td>Communication codes</td>
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<tr>
<td>Testing methodology (English)</td>
<td>Attachment 7</td>
<td>SS-05 Seismic sensor Methodology for climatic laboratory</td>
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<td>Testing program (English)</td>
<td>Attachment 8</td>
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<td>Testing methodology (English)</td>
<td>Attachment 9</td>
<td>SS-05 Seismic sensor Methodology for mechanical laboratory vibration</td>
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<tr>
<td>Testing program (English)</td>
<td>Attachment 10</td>
<td>SS-05 Seismic sensor Program for mechanical laboratory vibration</td>
</tr>
<tr>
<td>Calibration certificates</td>
<td>Attachment 11</td>
<td>Calibration certificates of measurement devices</td>
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</table>
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<tr>
<td>Test protocol</td>
<td>Attachment 12</td>
<td>Protocol N 2 from Climatic laboratory</td>
</tr>
<tr>
<td>Test protocol</td>
<td>Attachment 13</td>
<td>Protocol N 1 from Vibration laboratory</td>
</tr>
<tr>
<td>Test protocol</td>
<td>Attachment 14</td>
<td>Protocol N 3 from Climatic laboratory</td>
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</tbody>
</table>

Description of the inspections carried out:

1. Health and safety comments. All safety rules when working with electrical equipment are complied. There are no remarks or obstructions.

2. Manufacturing Progress Status (Quantities). The tested devices were manufactured from IMSETHC-BAS.

3. Details of inspection activities carried out with respect to scope of work (Visual examination, witnessing NDT, dimensional checks, material identification…)

   The inspection was carried out in accordance with points 5.5 and 5.10 of the technical requirements (att. 1), test methodologies (att. 2 and 4) and test programs (att. 3 and 5) provided by the client.

   The team performed the tests as follows: - Chairman Head Ass, PhD, M.Sc. Vencislav Pehlivanski, PhD Stiliyan Goergiev, As. prof. Hristo Kolev, PhD Vladimir Varbanov and M.Sc Stoimen Balinov from IMSETHC-BAS.

   The test was carried out in two successive stages.
   - Stage 1 - Verification of the efficiency of the sensor at vibration of 5 and 10 Hz for 20 minutes each. They were performed in the laboratory of the client with calibrated measuring devices, as shown in the section MEASURING EQUIPMENT USED of this report. The results of measurements are shown in pic. 2 to 27. They are documented in protocol att. 13. The measured values correspond to those of point 5.10 of the technical requirements (att. 1).

   - Stage 2 - Verification of the efficiency of the sensor at low temperatures of -30 degrees +/- 2 for 2 hours. Verification of the efficiency of the sensor at high temperatures of +60 +/- 2 degrees for 2 hours. They were performed in the laboratory of the client with calibrated measuring devices, as shown in the section MEASURING EQUIPMENT USED to this report. The results of measurements are shown in pic. 28 to 42. They are documented in protocols att. 12 and 14. The measured values correspond to those of point 5.5 of the technical requirements (att. 1).

   Inspection was conducted in the full range of client technical requirements (att.1) points 5.5 and 5.10. Results are documented according client requirements in 3 protocols (att. 12 to 14).

4. Results of Inspection

   The result of inspection is positive. The measured values correspond to those of points 5.5 and 5.10 of the technical requirements (att. 1). They were made with calibrated measuring devices, as shown in the section MEASURING EQUIPMENT USED of this report.
5. Problems pending. No problems were observed during the inspection.

**Digital Pictures (with Legend)**

Pic 1 - The testing team

Pic 2 - Tested devices SS 05 ID 74 and 77

Pic 3 - Tested devices SS 05 ID 72 and 76

Pic 4 - The devices are working – successful communication
Pic 5 – Calibration identification of Accelerometer

Pic 6 - Calibration identification of Frequency meter

Pic 7 - Calibration identification of Thermometer

Pic 8 - Calibration identification of Vibrometer

Pic 9 – Position of start

Pic 10 – Start time 5 Hz test
Pic 11 - Start frequency 5 Hz test
Pic 12 – Start vibration 5 Hz test

Pic 13 – End time 5 Hz test
Pic 14 - End frequency 5 Hz test

Pic 15 – End vibration 5 Hz test
Pic 16 – OK communication to the end of 5 Hz test
Pic 17 – Devices to the end of 5 Hz test

Pic 18 - Devices to the end of 5 Hz test

Pic 19 - Start time 10 Hz test

Pic 20 - Start frequency 10 Hz test

Pic 21 - Start vibration 10 Hz test

Pic 22 - End time 10 Hz test
Pic 23 – End frequency 10 Hz test
Pic 24 - End vibration 10 Hz test

Pic 25 - OK communication to the end of 10 Hz test
Pic 26 - Devices to the end of 10 Hz test

Pic 27 - Devices to the end of 10 Hz test
Pic 28 – Devices – start freezing
<table>
<thead>
<tr>
<th>Pic 29</th>
<th>Start freezing time and temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pic 30</td>
<td>Start freezing OK communication</td>
</tr>
<tr>
<td>Pic 31</td>
<td>Middle time and temperature - freezing</td>
</tr>
<tr>
<td>Pic 32</td>
<td>Middle time freezing OK communication</td>
</tr>
<tr>
<td>Pic 33</td>
<td>End time and temperature - freezing</td>
</tr>
<tr>
<td>Pic 34</td>
<td>End time freezing OK communication</td>
</tr>
<tr>
<td>Pic 35 – Devices – end freezing</td>
<td>Pic 36 - Start time and temperature - heating</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Pic 37 - Start time heating OK communication</td>
<td>Pic 38 - Middle time and temperature - heating</td>
</tr>
<tr>
<td>Pic 39 - Middle time heating OK communication</td>
<td>Pic 40 - End time and temperature - heating</td>
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</tbody>
</table>
Pic 41 - End time heating OK communication
Pic 42 – End time of heating - devices

Pic 43 – The testing team

END OF REPORT

Inspected by: Inspector Industrial Services
Name: Alexander Pandov
Signature:

Checked by: Bureau Veritas Bulgaria (IND)
Industry and Facility Development Manager
Name: Tane Tanev

Inspection Office: BV SOF
Supervision during performance  ☒ No  ☐ Yes