Annex to declaration of accreditation (scope of accreditation)
Registration number: L 063

of Element Materials Technology Rotterdam. B.V. Laboratory

This annex is valid from: 19-12-2018 to 01-09-2020
Replaces annex dated: 18-10-2017

Location(s) where activities are performed under accreditation

Head Office

Voorerf 18
4824 GN
Breda
The Netherlands

<table>
<thead>
<tr>
<th>Location</th>
<th>Abbreviation/ location code</th>
</tr>
</thead>
</table>
| Voorerf 18
4824 GN
Breda
The Netherlands         | BR                          |
| Schutterstraat 27B
6191 RZ
Beek
The Netherlands          | BE                          |
| Zekeringstraat 33
1014 BV
Amsterdam
The Netherlands          | AM                          |
| Jan Tinbergenstraat 128
7559 SP
Hengelo
The Netherlands          | HE                          |
| On-site                   | O                           |

This annex has been approved by the Board of the Dutch Accreditation Council, on its behalf,

J.A.W.M. de Haas
Director of Operations
Annex to declaration of accreditation (scope of accreditation)
Registration number: L 063

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Laboratory

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</table>
| 1   | Metal and metal alloys | Tensile Test at (283 – 308) K | SOP 10-01  
In accordance with EN 10002-1:2001,  
ASTM A370, ASTM E8, ASTM B 557,  
ISO 6892-1, ISO 9018, ISO 4136,  
EN 895:1995 | BR, BE, AM, HE |
| 2   |                      | Tensile Test at elevated temperature (293 -1173) K | SOP 10-02  
In accordance with EN 10002-5:1992,  
ASTM E21, ISO 6892-2,  
ISO 783:1999 | BR, AM, HE |
| 3   |                      | Impact Test at temperatures between (76 - 493) K | SOP 10-03  
In accordance with NEN-EN 10045-1:1990,  
ISO 148, ISO 9016, ASTM A370,  
ASTM E2, EN 875:1995 | BR, BE, AM, HE |
| 4   |                      | Hardness Test: Brinell | SOP 10-30  
In accordance with ISO 6506,  
ASTM A370, ASTM E10 | BR, BE, AM, HE |
| 5   |                      | Hardness Test: Vickers  
Load between (49 – 294) N | SOP 10-31  
In accordance with ISO 6507, ISO 9015,  
ASTM E92 | BR, BE, AM, HE, O |
| 6   |                      | Hardness Test: Rockwell B and C | SOP 10-32  
In accordance with ISO 6508, ASTM A370  
and ASTM E18 | BR, BE, AM, HE, O |
| 7   |                      | Bending Test | SOP 10-04  
In accordance with NEN 3650, ISO 7438,  
ISO 5173, ISO 9606,  
ISO 15614, ISO 5177,  
ASTM A370, ASTM E190, ASTM E290,  
ASME IX, AWS D1.1, AWS D1.2, AWS  
D1.6, AWS D1.9, EN 287, EN 910,  
EN 12732, EN 13445 | BR, BE, AM, HE |

\(^1\) If there is a referral to a code starting with NAW, NAP, EA or IAF, this concerns a scheme mentioned on the RvA-BP010 list.

If no date or version number is mentioned for a normative document, the accreditation concerns the most current version of the document or scheme.
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</table>
| 1   | Metal and metal alloys | Bending Test | SOP 10-04
In accordance with NEN 3650, ISO 7438, ISO 5173, ISO 9017, ISO 9606, ISO 15614, ISO 5177, ASTM A370, ASTM A615, ASTM E190, ASTM E290, ASME IX, AWS D1.1, AWS D1.2, AWS D1.6, AWS D1.9, EN 287, EN 910, EN 12732, EN 13445 | AM, HE |
| 2   | Metal and metal alloys | Flattening Test | SOP 10-10
In accordance with ISO 8492, ASTM A370, ASTM A530 | BR, AM, HE |
| 3   | Metal and metal alloys | Drift Expanding Test | SOP 10-11
In accordance with ISO 8493, ASTM A370, ASTM A450 | BR |
|     | Metal and metal alloys | | SOP 10-11
In accordance with ISO 8493 | AM, HE |
| 4   | Metal and metal alloys | Ring Expanding Test | SOP 10-12
In accordance with ISO 8495 | BR, AM, HE |
| 5   | Metal and metal alloys | Ring Tensile Test | SOP 10-13
In accordance with ISO 8496 | BR, AM, HE |
| 6   | Metal and metal alloys | Visual inspection of welds including macro-structure and weld geometry | SOP 60-01
In accordance with AD Merkblatt HP2/1, AD Merkblatt 5/3 en 5/2, TRD 201, ASME IX, AWS D1.1, AWS D1.2, AWS D1.6, AWS D1.9, API 1104, API 1107, BS4515, ASME B31.1, ASME B31.3, EN 287-1, EN13445, EN 12732, BS 4515, NEN 3650, vdt GV 1158, ISO 9606, ISO 5817, ISO 15614, ISO6520-1 | BR, BE, O |
|     | Metal and metal alloys | | SOP 60-01
In accordance with ASME VIII and IX, EN 287-1; ISO 15614, ISO 9606 | AM, HE |
### Annex to declaration of accreditation (scope of accreditation)

**Normative document:** EN ISO/IEC 17025:2005  
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</table>
| 13  | Metal and metal alloys | Break Test on welds | SOP 10-42  
In accordance with API 1104, API 1107,  
ISO 9606, AD Merkblatt HP3,  
EN 287-1, EN 13445  
SOP 10-42  
In accordance with ASME VIII and IX,  
ISO 9606, EN 287-1 | BR, BE |
| 14  |  | Fillet weld break Test | SOP 10-43  
In accordance with ASME IX, API 1104  
AWS D1.1, AWS D1.2, AWS D1.6, AWS D1.9, EN 287-1, vd TÜV 1158, ISO 9606  
SOP 10-43  
In accordance with ASME VIII and IX, EN 287-1, ISO 9606 | BR, BE, O |
| 15  |  | Shear Test | SOP 10-15  
In accordance with DIN 50162,  
ASTM A263/264, ASTM A265  
SOP 10-15  
In accordance with DIN 50141, ISO 9018,  
ASME IX | BR, AM, HE |
| 16  |  | Destructive testing of qualifying welds for weldmethod-qualification and welder-qualification | SOP 10-40  
In accordance with AD Merkblatt HP2/1,  
AD Merkblatt 5/3, 5/2, BS 4515,  
vd TÜV 1158, TRD 201,  
Stoomwezen regels T0112, T0101, -T0120, -T0205, -T0210, -T0215,  
ASME VIII, IX, API 1104, API 1107,  
AWS D1.1, AWS D1.2, AWS D1.6,  
AWS D1.9, Lloyd's Reg. Rules,  
DNV-rules for M.O.U., EN 287,  
EN 13445, EN 12732, ISO 15614,  
ISO 9606, ASME B31.1,  
ASME B31.3, NEN 3650  
SOP 10-40  
In accordance with ASME VIII, IX, EN 287, ISO 15614, ISO 9606 | BR, BE, AM, HE |

1. Type of activity and internal reference numbers may vary depending on the specific procedures and standards applied.
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<tbody>
<tr>
<td>17</td>
<td>Metal and metal alloys</td>
<td>Salt Spray Test (mass up to 250 kg; size approx 1,75x1 m)</td>
<td>SOP 40-01: In accordance with ASTM B117, DIN 50021, ISO 10289, NEN 10068</td>
<td>BR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SOP 40-01: In accordance with ASTM B 368, ASTM G 85, ISO 9227</td>
<td>AM</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Inter-granular Corrosion Test Strauss-Test</td>
<td>SOP 40-10: In accordance with ASTM A262 practice E and ISO 3651-2, DIN 50914</td>
<td>BR, BE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SOP 40-10: In accordance with ASTM A262 practice E and ISO 3651-2</td>
<td>AM, HE</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>Inter-granular Corrosion Test Streicher-Test</td>
<td>SOP 40-11: In accordance with ASTM A262 practice B, ASTM G28</td>
<td>BR, BE, AM, HE</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Inter-granular Corrosion Test Huey-Test</td>
<td>SOP 40-12: In accordance with ASTM A262 practice C, ISO 3651-1</td>
<td>BR, BE, AM, HE</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Inter-granular Corrosion Test oxalic acid Test</td>
<td>SOP 40-13: In accordance with ASTM A262 practice A</td>
<td>BR, BE, AM, HE</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Pitting-corrosion Test;</td>
<td>SOP 40-14: In accordance with ASTM G48, ASTM G46, ASTM A923</td>
<td>BR, BE, AM, HE</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>Semi-quantitative material analysis; X-ray fluorescence measurement (PMI)</td>
<td>SOP 20-01: In-house method</td>
<td>BR, BE, O</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SOP 20-01: In accordance with ASTM E 1476</td>
<td>HE</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>Hardness measurement on location with portable devices</td>
<td>SOP 10-33: In-house method</td>
<td>BR, BE, O</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>Ferrite Measurement: Inductive method</td>
<td>SOP 30-01: In-house method</td>
<td>BR, BE, AM, O</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Ferrite Measurement: Manual Point Count</td>
<td>SOP 30-02: In accordance with ASTM E562</td>
<td>BR, BE, AM, HE</td>
</tr>
</tbody>
</table>
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**Laboratory:** Element Materials Technology Rotterdam. B.V.

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</thead>
</table>
| 27  | Metal and metal alloys | Grain size determination | SOP 30-03  
In accordance with ISO 643, ASTM E112, AFNOR NFA 04-102 | BR, BE, AM, HE |
| 28  | | | SOP 30-04  
In-house method | BR, BE, AM, HE, O |
| 29  | | | SOP 30-05  
In-house method | BR, BE |
|     | | | SOP 30-05  
In accordance with ASTM E 3, 45, 112, 247, 381, 384, 562, 883, 930, 1077, SAE J422, ISO 26146 | AM, HE |
| 30  | | Fracture analysis | SOP 30-07  
In-house method | BR, BE, AM, HE, O |
| 31  | | Creep analysis by microstructure | SOP 30-08  
In accordance with Stoomwezen-Regels T0102V, vd TGV Merkblatt 451, VGB-TW507 | BR, BE |
|     | | | SOP 30-08  
In accordance with Stoomwezen T 0102 and T 0204; VGB Rule TW507, ASTM E 1351, Merkblatt Dampfkessel 451 83/6 (8.83), ISO 3057 | AM, HE, O |
| 32  | | Micro Hardness measurement: Knoop, Vickers, load (0,049 – 29,4) N | SOP 10-34  
In accordance with ISO 6507-1, ISO 9015, ASTM E384 | BR, BE |
|     | | | SOP 10-34  
In accordance with ISO 6507-1, ASTM E 384, ISO 4545, ISO 4516 | AM, HE |
| 33  | | Coating thickness measurement: microscopic | SOP 50-02  
In accordance with ISO 1463 | BR, BE |
| 34  | | Degree of purity Non-metallic inclusions | SOP 30-22  
In accordance with DIN 50602, ASTM E45 | BR, BE |

¹ Type of activity detailed in the second column.
Annex to declaration of accreditation (scope of accreditation)
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</thead>
<tbody>
<tr>
<td>35</td>
<td>Metal and metal alloys</td>
<td>Crack Tip Opening Displacement (CTOD-Test); temperature limits (76 – 296) K &lt;br&gt;Fracture mechanical test &lt;br&gt;Single Edge Notched Bend (SENB) specimens &lt;br&gt;temperature limits: 93K – 523K</td>
<td>SOP 10-18 &lt;br&gt;In accordance with BS 7448 part 1-4, ASTM E1290, ASTM E1820, ASTM E339, ISO 12135, ISO 15653, API 1104, DNV-OS-F110</td>
<td>BR</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>Aging Sensitivity Unalloyed Carbon steel</td>
<td>SOP 10-20 &lt;br&gt;In accordance with DIN 17102 par.7.4.1.5, EN 10225</td>
<td>BR</td>
</tr>
<tr>
<td>37</td>
<td></td>
<td>Clad welding Bend Test</td>
<td>SOP 10-44 &lt;br&gt;In accordance with DIN 17100 par.9.5.7, SEP 1390</td>
<td>BR, BE</td>
</tr>
<tr>
<td>38</td>
<td>Thermoplastics</td>
<td>Deformation Bend Test</td>
<td>SOP 80-01 &lt;br&gt;In accordance with DVS 2203 Teil 1 + 5</td>
<td>BR</td>
</tr>
<tr>
<td>39</td>
<td>Epoxyhars</td>
<td>Pressure Test on Pedding-, Cushioning materials; (load up to 1200 kN)</td>
<td>SOP 80-02 &lt;br&gt;In-house method</td>
<td>BR</td>
</tr>
<tr>
<td>40</td>
<td>Metals and Synthetics</td>
<td>Surface roughness (Ra, Rz value)</td>
<td>SOP 50-01 &lt;br&gt;In accordance with NEN 3635</td>
<td>BR, O</td>
</tr>
<tr>
<td>41</td>
<td>Metals and metal alloys</td>
<td>Ferrite measurement: Magne-gage</td>
<td>SOP 30-30 &lt;br&gt;In-house method</td>
<td>BR, AM</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Chloride Tension Corrosion Test;</td>
<td>SOP 40-15 &lt;br&gt;In accordance with ASTM G36</td>
<td>BR, BE</td>
</tr>
<tr>
<td>43</td>
<td></td>
<td>Chemical Composition; Optical Emission Spectrometry</td>
<td>SOP 20-02 &lt;br&gt;In-house method</td>
<td>BR, AM, HE, O</td>
</tr>
<tr>
<td>44</td>
<td>Metals and metal alloys and corrosion products</td>
<td>Scanning Electron Microscopy (SEM)</td>
<td>SOP 30-40 &lt;br&gt;In-house method</td>
<td>BR, BE, AM, HE</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>Energy Dispersi X-Ray Analysis (EDX)</td>
<td>SOP 30-40 &lt;br&gt;In-house method</td>
<td>BR, BE, AM, HE</td>
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</tbody>
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</table>
| 46  | Metals and metal alloys             | Single Edge Notched Tension Test (SENT-Test); (76 – 350) K Fracture mechanical test Single Edge Notched Tensile (SENT) specimens temperature limits: 93K – 523K | SOP 10-19  
In accordance with ISO 15653, BS 7448 part 1-4, BS 8571, DNV-OS-F101, DNV-RP-F108 | BR       |
| 47  | Metal and metal alloys              | Failure analysis, using the tests as given in this list | SOP 30-06  
In-house method | BR, BE, AM, HE, O |
| 48  | Metals                              | Flanging                           | SOP 10-14  
In accordance with ISO 8494 | AM, HE   |
| 49  | Cladded material                    | Shear test                         | SOP 10-16  
In accordance with DIN 50162, AD 2000-Merkblatt W8, ASTM A 264 | AM, HE   |
| 50  | Reinforced steel connections        | Tensile testing                     | SOP 10-50  
In accordance with NEN-EN 10002-1:2001, NEN-EN 10326, ISO 6892-1 | AM       |
| 51  |                                     | Bend testing                        | SOP 10-51  
In accordance with ISO 7438, EN 10326 | AM       |
| 52  | Reinforced steel bars               | Tensile testing                     | SOP 10-52  
In accordance with NEN-6008 | AM       |
| 53  |                                     | Shear testing                       | SOP 10-53  
In accordance with NEN-6008 | AM       |
| 54  |                                     | Shear stress measurements of welds  | SOP 10-54  
In accordance with NPR-2053 | AM       |
| 55  | Reinforced steel bars               | Fatigue testing                     | SOP 10-55 and SOP 10-57  
In accordance with EN 10080, NEN 6008 | AM       |
| 56  |                                     | Dimensional inspection              | SOP 10-56  
In accordance with NEN-6008, ISO 15630, EN 10080 | AM       |

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¹ Opinions & Interpretations

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</table>
| 47  | Metal and metal alloys | Failure analysis, using the tests as given in this list | SOP 30-06  
In-house method | BR, BE, AM, HE, O |

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**(Dutch Accreditation Council RvA)**

Page 8 of 9
Annex to declaration of accreditation (scope of accreditation)
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<tr>
<td>57</td>
<td>Hoisting hook</td>
<td>Load test</td>
<td>SOP 10-80, In-house method</td>
<td>AM</td>
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<tr>
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<tr>
<td></td>
<td><strong>Metallographic Investigations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Metals</td>
<td>Image analysis</td>
<td>SOP 50-03, In house method</td>
<td>AM, HE</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Corrosion Testing</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>59</td>
<td>Metals</td>
<td>Hydrogen Induced Cracking test</td>
<td>SOP 40-20, In accordance with NACE TM-0284</td>
<td>AM</td>
</tr>
<tr>
<td>60</td>
<td>Metals</td>
<td>Sulfide induced Stress Corrosion test</td>
<td>SOP 40-21, In accordance with NACE TM-0177</td>
<td>AM</td>
</tr>
<tr>
<td>61</td>
<td>Coatings</td>
<td>Cathodic Disbondment Test</td>
<td>SOP 93-01, In accordance with ISO 21809-3</td>
<td>AM</td>
</tr>
</tbody>
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