



of **Element Materials Technology Rotterdam. B.V.  
Laboratory**

This annex is valid from: **24-12-2019** to **01-09-2020**

Replaces annex dated: **04-12-2019**

**Location(s) where activities are performed under accreditation**

**Head Office**

Vooref 18  
4824 GN  
Breda  
The Netherlands

| Location                                                         | Abbreviation/ location code |
|------------------------------------------------------------------|-----------------------------|
| Vooref 18<br>4824 GN<br>Breda<br>The Netherlands                 | BR                          |
| Schutterstraat 27B<br>6191 RZ<br>Beek<br>The Netherlands         | BE                          |
| Zekeringstraat 33<br>1014 BV<br>Amsterdam<br>The Netherlands     | AM                          |
| Jan Tinbergenstraat 128<br>7559 SP<br>Hengelo<br>The Netherlands | HE                          |
| Kapitein Nemostraat 12<br>7821 AC<br>Emmen<br>Nederland          | EM                          |
| 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



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| No. | Material or product    | Type of activity <sup>1</sup>                      | Internal reference number                                                                                                                                                                                                              | Location              |
|-----|------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1   | Metal and metal alloys | Tensile Test at (283 – 308) K                      | SOP 10-01<br>In accordance with EN 10002 1:2001, ASTM A370, ASTM E8, ASTM B 557, ISO 6892-1, ISO 9018, ISO 4136, EN 895:1995, EN 2002-001, ISO 22674, ISO TR 6892-5                                                                    | BR, BE, AM, HE, EM    |
| 2   |                        | Tensile Test at elevated temperature (293 -1173) K | SOP 10-02<br>In accordance with EN 10002-5:1992, ASTM E21, ISO 6892-2, ISO 783:1999                                                                                                                                                    | BR, AM                |
| 3   |                        | Impact Test at temperatures between (76 - 493) K   | SOP 10-03<br>In accordance with NEN-EN 10045-1:1990, ISO 148, ISO 9016, ASTM A370, ASTM E23, EN 875:1995                                                                                                                               | BR, BE, AM, HE, EM    |
| 4   |                        | Hardness Test; Brinell                             | SOP 10-30<br>In accordance with ISO 6506, ASTM A370, ASTM E10                                                                                                                                                                          | BR, BE, AM, HE, EM    |
| 5   |                        | Hardness Test; Vickers Load between (49 – 294) N   | SOP 10-31<br>In accordance with ISO 6507, ISO 9015, ASTM E92                                                                                                                                                                           | BR, BE, AM, HE, O, EM |
| 6   |                        | Hardness Test; Rockwell                            | SOP 10-32<br>In accordance with ISO 6508, ASTM A370, ASTM E18, NASM1312-6                                                                                                                                                              | BR, BE, AM, HE, EM    |
| 7   |                        | Bending Test                                       | SOP 10-04<br>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 | BR, BE, AM, HE, EM    |
| 8   |                        | Flattening Test                                    | SOP 10-10<br>In accordance with ISO 8492, ASTM A370, ASTM A530                                                                                                                                                                         | BR, AM, HE, EM        |

<sup>1</sup> If there is a referral to a code starting with NAW, NAP, EA or IAF, this concerns a scheme mentioned on the [RvA-BR010-lijst](#).  
 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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|-----|------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 9   | Metal and metal alloys | Drift Expanding Test                                                                          | SOP 10-11<br>In accordance with ISO 8493, ASTM A370, ASTM A450                                                                                                                                                                                                                                                                                                                         | BR, AM, HE            |
| 10  |                        | Ring Expanding Test                                                                           | SOP 10-12<br>In accordance with ISO 8495                                                                                                                                                                                                                                                                                                                                               | BR, AM, HE, EM        |
| 11  |                        | Ring Tensile Test                                                                             | SOP 10-13<br>In accordance with ISO 8496                                                                                                                                                                                                                                                                                                                                               | BR, AM, HE            |
| 12  |                        | Visual inspection of welds including macro-structure and weld geometry                        | SOP 60-01<br>In accordance with AD Merkblatt HP2/1, AD Merkblatt 5/3 en 5/2, TRD 201, ASME VIII, 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, EN13445, EN 12732, BS 4515, NEN 3650, Vd TÜV 1158, ISO 9606, ISO 5817, ISO 15614, ISO6520-1                                                                              | BR, BE, AM, HE, O, EM |
| 13  |                        | Break Test on welds                                                                           | SOP 10-42<br>In accordance with API 1104, API 1107, ASME VIII, ASME IX, ISO 9606, AD Merkblatt HP3, EN 287, EN 13445                                                                                                                                                                                                                                                                   | BR, BE, AM, HE, EM    |
| 14  |                        | Fillet weld break Test                                                                        | SOP 10-43<br>In accordance with ASME VIII, ASME IX, API 1104, AWS D1.1, AWS D1.2, AWS D1.6, AWS D1.9, EN 287-1, Vd TÜV 1158, ISO 9606                                                                                                                                                                                                                                                  | BR, BE, AM, HE, O, EM |
| 15  |                        | Shear Test                                                                                    | SOP 10-15<br>In accordance with DIN 50162, DIN 50141, ISO 9018, ASME IX, ASTM A263/264, ASTM A265                                                                                                                                                                                                                                                                                      | BR, AM                |
| 16  |                        | Destructive testing of qualifying welds for weldmethod-qualification and welder-qualification | SOP 10-40<br>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, ASME 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, ISO 15614, ISO 9606, EN 13445, EN 12732, ASME B31.1, ASME B31.3, NEN 3650 | BR, BE, AM, HE        |



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| 17 | Metal and metal alloys                                                                                                          | Salt Spray Test<br>(mass up to 250 kg;<br>size approx 1,75x1 m)                 | SOP 40-01<br>In accordance with ASTM B117, ASTM B 368,<br>ASTM G 85, DIN 50021, ISO 10289, ISO 9227,<br>NEN 10068 | BR, AM                      |
| 18 |                                                                                                                                 | Inter-granular Corrosion Test<br>Strauss-Test                                   | SOP 40-10<br>In accordance with ASTM A262 practice E,<br>ISO 3651-2, DIN 50914                                    | BR, BE,<br>AM, HE,<br>EM    |
| 19 |                                                                                                                                 | Inter-granular Corrosion Test<br>Streicher-Test                                 | SOP 40-11<br>In accordance with ASTM A262 practice B,<br>ASTM G28                                                 | BR, BE,<br>AM, HE,<br>EM    |
| 20 |                                                                                                                                 | Inter-granular Corrosion Test<br>Huey-Test                                      | SOP 40-12<br>In accordance with ASTM A262 practice C,<br>ISO 3651-1                                               | BR, BE,<br>AM, HE,<br>EM    |
| 21 |                                                                                                                                 | Inter-granular Corrosion Test<br>Oxalic acid Test                               | SOP 40-13<br>In accordance with ASTM A262 practice A                                                              | BR, BE,<br>AM, HE           |
| 22 |                                                                                                                                 | Pitting-corrosion Test                                                          | SOP 40-14<br>In accordance with ASTM G48, ASTM G46,<br>ASTM A923                                                  | BR, BE,<br>AM, HE,<br>EM    |
| 23 |                                                                                                                                 | Semi-quantitative material analysis;<br>X-ray fluorescence measurement<br>(PMI) | SOP 20-01<br>In accordance with ASTM E 1476                                                                       | BR, BE,<br>AM, HE, O        |
| 24 |                                                                                                                                 | Hardness measurement on location<br>with portable devices                       | SOP 10-33<br>In-house method                                                                                      | BR, BE,<br>HE, O            |
| 25 |                                                                                                                                 | Ferrite Measurement: Inductive<br>method                                        | SOP 30-01<br>In-house method                                                                                      | BR, BE,<br>AM, HE,<br>O, EM |
| 26 |                                                                                                                                 | Ferrite Measurement: Manual Point<br>Count                                      | SOP 30-02<br>In accordance with ASTM E562                                                                         | BR, BE,<br>AM, HE           |
| 27 | Grain size determination                                                                                                        | SOP 30-03<br>In accordance with ISO 643,<br>ASTM E112, AFNOR NFA 04-102         | BR, BE,<br>AM, HE                                                                                                 |                             |
| 28 | Microstructure on location:<br>microscopic and / or electron<br>microscope research on replica's<br>(magnification up to 1000x) | SOP 30-04<br>In-house method                                                    | BR, BE,<br>AM, HE,<br>O, EM                                                                                       |                             |



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| 29 | Metal and metal alloys                   | Microstructures analysis (magnification up to 1000x)                                                                                                    | SOP 30-05<br>In accordance with ASTM E 3, 45, 112, 247, 381, 384, 562, 883, 930, 1077, SAE J422, ISO 26146                        | BR, BE, AM, HE, EM    |
| 30 |                                          | Fracture analysis                                                                                                                                       | SOP 30-07<br>In-house method                                                                                                      | BR, BE, AM, HE, O     |
| 31 |                                          | Creep analysis by microstructure                                                                                                                        | SOP 30-08<br>In accordance with Stoomwezen Regels T0102, -T0204, Vd TÜV Merkblatt 451, ASTM E 1351, ISO 3057, VGB-TW507, VGB-S517 | BR, BE, AM, HE, O, EM |
| 32 |                                          | Micro Hardness measurement: Knoop, Vickers, load (0,049 – 29,4) N                                                                                       | SOP 10-34<br>In accordance with ISO 6507-1, ISO 9015, ISO 4545, ISO 4516, ASTM E384                                               | BR, BE, AM, HE, EM    |
| 33 |                                          | Coating thickness measurement: microscopic                                                                                                              | SOP 50-02<br>In accordance with ISO 1463                                                                                          | BR, BE                |
| 34 |                                          | Degree of purity Non-metallic inclusions                                                                                                                | SOP 30-22<br>In accordance with DIN 50602, ASTM E45                                                                               | BR, BE                |
| 35 |                                          | Crack Tip Opening Displacement (CTOD-Test)<br>Fracture mechanical Test<br>Single Edge Notched Bend (SENB) specimens<br>Temperature limits: 76 K – 673 K | SOP 10-18<br>In accordance with BS 7448 part 1-4, ASTM E1290, ASTM E1820, ASTM E339, ISO 12135, ISO 15653, API 1104, DNV-OS-F110  | BR, EM                |
| 36 | Aging Sensitivity Unalloyed Carbon steel | SOP 10-20<br>In accordance with DIN 17102 par.7.4.1.5, EN 10225                                                                                         | BR                                                                                                                                |                       |
| 37 | Clad welding Bend Test                   | SOP 10-44<br>In accordance with DIN 17100 par.9.5.7, SEP 1390                                                                                           | BR, BE                                                                                                                            |                       |
| 38 | Thermoplastics                           | Deformation Bend Test                                                                                                                                   | SOP 80-01<br>In accordance with DVS 2203 Teil 1 + 5                                                                               | BR                    |
| 39 | Epoxyhars                                | Pressure Test on Pedding-, Cushioning materials; (load up to 1200 kN)                                                                                   | SOP 80-02<br>In-house method                                                                                                      | BR                    |
| 40 | Metals and Synthetics                    | Surface roughness (Ra, Rz value)                                                                                                                        | SOP 50-01<br>In accordance with NEN 3635                                                                                          | BR, O                 |
| 41 | Metals and metal alloys                  | Ferrite measurement: Magne-gage                                                                                                                         | SOP 30-30<br>In-house method                                                                                                      | BR, AM, EM            |



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| 42 | Metals and metal alloys                        | Chloride Tension Corrosion Test                                                                                                                                | SOP 40-15<br>In accordance with ASTM G36                                                       | BR, BE            |
| 43 |                                                | Chemical Composition; Optical Emission Spectrometry                                                                                                            | SOP 20-02<br>In-house method                                                                   | BR, AM, HE, O, EM |
| 44 | Metals and metal alloys and corrosion products | Scanning Electron Microscopy (SEM)                                                                                                                             | SOP 30-40<br>In-house method                                                                   | BR, BE, AM, HE    |
| 45 |                                                | Energy Dispersive X-Ray Analysis (EDX)                                                                                                                         | SOP 30-40<br>In-house method                                                                   | BR, BE, AM, HE    |
| 46 | Metals and metal alloys                        | Single Edge Notched Tension Test (SENT-Test)<br>Fracture mechanical Test<br>Single Edge Notched Tensile (SENT) specimens<br>Temperature limits: 7693 K – 523 K | SOP 10-19<br>In accordance with ISO 15653, BS 7448 part 1-4, BS 8571, DNV-OS-F101, DNV-RP-F108 | BR                |
| 47 | Metals                                         | Fracture mechanical research:<br>Heat treatment<br>Temperature up to 1373K                                                                                     | SOP 50-04<br>In-house method                                                                   | EM                |
| 48 | Metallic pipe and plate                        | Fracture mechanical research:<br>Drop weight shear test<br>Energy up to 20kJ<br>Temperature range 77K to 505K                                                  | SOP 10-23<br>In accordance with API RP 5L3, ASTM E436, EN10274                                 | EM                |
| 49 | Ferretic steels                                | Fracture mechanical research:<br>Temperature Range 77K to 505K                                                                                                 | SOP 1021<br>In accordance with ASTM E208                                                       | EM                |

#### Opinions & Interpretations

|    |                        |                                                         |                              |                   |
|----|------------------------|---------------------------------------------------------|------------------------------|-------------------|
| 50 | Metal and metal alloys | Failure analysis, using the tests as given in this list | SOP 30-06<br>In-house method | BR, BE, AM, HE, O |
|----|------------------------|---------------------------------------------------------|------------------------------|-------------------|

#### Mechanical testing

|    |                              |                 |                                                                               |        |
|----|------------------------------|-----------------|-------------------------------------------------------------------------------|--------|
| 51 | Metals                       | Flanging        | SOP 10-14<br>In accordance with ISO 8494                                      | AM, HE |
| 52 | Cladded material             | Shear Test      | SOP 10-16<br>In accordance with DIN 50162, AD 2000-Merkblatt W8, ASTM A 264   | AM, HE |
| 53 | Reinforced steel connections | Tensile testing | SOP 10-50<br>In accordance with NEN-EN 10002-1:2001, NEN-EN 10326, ISO 6892-1 | AM     |



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| 54 | Reinforced steel connections | Bend testing                       | SOP 10-51<br>In accordance with ISO 7438, EN 10326                                                     | AM |
| 55 | Reinforced steel bars        | Tensile testing                    | SOP 10-52<br>In accordance with NEN-6008, BRL 0504, ISO 15835-1 en ISO 15835-2                         | AM |
| 56 |                              | Shear testing                      | SOP 10-53<br>In accordance with NEN-6008, BRL 0503                                                     | AM |
| 57 | Reinforced steel bars        | Shear stress measurements of welds | SOP 10-54<br>In accordance with NPR-2053, BRL 0512, ISO 17660-1, ISO 17660-2, ISO 15630-1, ISO 15630-2 | AM |
| 58 | Reinforced steel bars        | Fatigue testing                    | SOP 10-55 and SOP 10-57<br>In accordance with EN 10080, NEN 6008, BRL 0504 en BRL 0501                 | AM |
| 59 | Reinforced steel bars        | Dimensional inspection             | SOP 10-56<br>In accordance with NEN-6008, ISO 15630-1, EN 10080, BRL 0503 en ISO 15630-2               | AM |
| 60 | Hoisting hook                | Load Test                          | SOP 10-80<br>In-house method                                                                           | AM |

#### Metallographic Investigations

|    |        |                |                              |        |
|----|--------|----------------|------------------------------|--------|
| 61 | Metals | Image analysis | SOP 50-03<br>In house method | AM, HE |
|----|--------|----------------|------------------------------|--------|

#### Corrosion Testing

|    |          |                                       |                                              |    |
|----|----------|---------------------------------------|----------------------------------------------|----|
| 62 | Metals   | Hydrogen Induced Cracking Test        | SOP 40-20<br>In accordance with NACE TM-0284 | AM |
| 63 |          | Sulfide induced Stress Corrosion Test | SOP 40-21<br>In accordance with NACE TM-0177 | AM |
| 64 | Coatings | Cathodic Disbondment Test             | SOP 93-01<br>In accordance with ISO 21809-3  | AM |