<table>
<thead>
<tr>
<th>Test Report issued under the responsibility of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETL Logo</td>
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**TEST REPORT**  

**9BIEC 61400-12-1:2017**  

**Wind turbines -Part 12-1: Power performance measurements of electricity producing wind turbines**

<table>
<thead>
<tr>
<th>IECRE Report Number. ................................ :</th>
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<tr>
<th>RETL internal Report Number. ....................... :</th>
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<tr>
<td>RETL member name</td>
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<table>
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<th>Testing location / address .......................... :</th>
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<tr>
<th>Applicant's name ..................................... :</th>
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<th>Test item description ................................ :</th>
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<table>
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<thead>
<tr>
<th>Model / Type reference ................................ :</th>
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<thead>
<tr>
<th>Ratings ................................................ :</th>
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<tbody>
<tr>
<td>Please, fill in the actual rating or ratings of the power output of the tested wind turbine model</td>
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<table>
<thead>
<tr>
<th>Tested by (name, function, signature)............... :</th>
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<tbody>
<tr>
<td>Printed name/function Author/ Signature</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Approved by (name, function, signature)........... :</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed name/function Approver/ Signature</td>
</tr>
</tbody>
</table>

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**General disclaimer:**
Summary Test Report

IECRE Report Number

Power Performance Measurement on a Wind Turbine of Type 10BWTG Type according to 9BIEC 61400-12-1:2017

Report and Turbine Data

<table>
<thead>
<tr>
<th>Report Number</th>
<th>Report Number</th>
<th>Reference Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETL Report Number</td>
<td>IECRE Report Number</td>
<td>IEC RE RETL member name</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicable Standard:</th>
<th>IEC 61400-12-1:2017</th>
<th>Technical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Turbine Type:</td>
<td>WTG Type</td>
<td>Rated Power: kW</td>
</tr>
<tr>
<td>Turbine Manufacturer/Client:</td>
<td></td>
<td>Rated Wind Speed: m/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cut out Wind Speed: m/s</td>
</tr>
<tr>
<td>Turbine Location (coordinates):</td>
<td></td>
<td>Rotor Speed (range): rpm</td>
</tr>
<tr>
<td>Serial Number of turbine:</td>
<td></td>
<td>Rotor Diameter: m</td>
</tr>
<tr>
<td>Blade (type and serial numbers)</td>
<td></td>
<td>Hub Height: m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power Control (Controller version, Power regulation):</td>
</tr>
</tbody>
</table>
### Measurement Campaign, Sensor Information, Wind Speed Definition and Power Curve Normalization

<table>
<thead>
<tr>
<th>Measuring Period (Begin - End):</th>
<th>Measurement Accuracy (Standard uncertainties)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power transducer(s):</td>
</tr>
<tr>
<td></td>
<td>Current transformers:</td>
</tr>
<tr>
<td></td>
<td>Voltage transformers:</td>
</tr>
<tr>
<td></td>
<td>Class / [kW]</td>
</tr>
<tr>
<td></td>
<td>Class / [kW]</td>
</tr>
<tr>
<td>Wind Speed definition (HH or REWS)</td>
<td>Fill in HH or REWS</td>
</tr>
<tr>
<td>If REWS:</td>
<td>Anemometer :</td>
</tr>
<tr>
<td>- Based on shear or shear+veer</td>
<td>(Model, Class number, Calibration Lab)</td>
</tr>
<tr>
<td>- Number of measurement levels</td>
<td>Fill in add. information if REWS</td>
</tr>
<tr>
<td>Wind Speed Measurement Setting (as per Column 1 / Table 2 of the Standard)</td>
<td>Remote Sensor Device:</td>
</tr>
<tr>
<td></td>
<td>(Model, Classification report, Calibration Lab)</td>
</tr>
<tr>
<td>Height of primary wind speed measurement:</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>Please fill in the accuracy K</td>
</tr>
<tr>
<td>Site Calibration and Method applied</td>
<td>Air pressure sensor:</td>
</tr>
<tr>
<td></td>
<td>Please fill in the accuracy hPa</td>
</tr>
<tr>
<td>Measurement sector of wind direction</td>
<td>from: to:</td>
</tr>
<tr>
<td>Add lines if more than 2 sectors</td>
<td></td>
</tr>
<tr>
<td>Normalization air density:</td>
<td>m/kg³</td>
</tr>
<tr>
<td></td>
<td>Please fill in the accuracy deg</td>
</tr>
<tr>
<td>Reference Air Density</td>
<td>m/kg³</td>
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<tr>
<td>Please fill in the air density for which this power curve is valid, e.g. site or standard air density</td>
<td>m/kg³</td>
</tr>
<tr>
<td>Normalization shear exponent</td>
<td>-</td>
</tr>
<tr>
<td>Normalization wind veer</td>
<td>deg/m</td>
</tr>
<tr>
<td>Normalization turbulence intensity</td>
<td>%</td>
</tr>
<tr>
<td>Normalization upflow</td>
<td>a</td>
</tr>
</tbody>
</table>

**Scope of Performance Measurement**

Please introduce anything which may be of relevance for the reader to understand the results, "e.g. site calibration performed, see report XYZ" or "Please note contractual filter criteria as per table below" or any applied procedures which are optional in the guideline.
## Data filtering applied:

<table>
<thead>
<tr>
<th>WTG available:</th>
<th>Filter of temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTG grid connected:</td>
<td>Filter of Icing</td>
</tr>
<tr>
<td>WTG curtailed:</td>
<td>Filter on turbulence intensity</td>
</tr>
<tr>
<td>WTG park controlled:</td>
<td>Filter on shear</td>
</tr>
<tr>
<td>WTG generator running:</td>
<td>Filter on veer</td>
</tr>
<tr>
<td></td>
<td>Filter on flow inclination</td>
</tr>
</tbody>
</table>

## Deviation(s) from the Standard

<table>
<thead>
<tr>
<th>Deviation</th>
<th>Influence on measurement results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please list all deviations to the applied standard here. Provide comments on how deviations have been dealt with</td>
<td>Provide an assessment of the influence of each individual deviation on the measurement result. Guidance is given in table below</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>No influence on measurement results expected. Deviation can be neglected.</td>
</tr>
<tr>
<td>low/minor</td>
<td>Minor influence on measurement results expected. There might be a minimal influence, which is included in the uncertainties of the results.</td>
</tr>
<tr>
<td>medium</td>
<td>Significant influence on the measurement results is expected, however, the influence is still expressed in the uncertainties.</td>
</tr>
<tr>
<td>high/major</td>
<td>Major influence on the measurement results is expected. This means that the requirements of the guideline are not met, hence the report is not compliant to the guideline.</td>
</tr>
</tbody>
</table>
Power Curve Graph

Measured power curve for reference air density [Kommentare] kg/m³ and wind speed definition, presenting only completed bins (for minimum three data sets).
## Power Curve Table

<table>
<thead>
<tr>
<th>Bin-No.</th>
<th>Normalized Wind Speed (at hub height) ( V_i ) [m/s]</th>
<th>Power Output ( P_i ) [kW]</th>
<th>( c_{p,i} )-value</th>
<th>Number of Data Sets ( N_i ) [-]</th>
<th>Category A Uncertainty ( S_i ) [kW]</th>
<th>Category B Uncertainty ( u_i ) [kW]</th>
<th>Combined Uncertainty ( u_{c,i} ) [kW]</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

*) Incomplete according to IEC 61400-12-1 (AEP-measured less than 95 % of the AEP-extrapolated)

## Annual Energy Production (AEP)

<table>
<thead>
<tr>
<th>Annual mean wind speed (Rayleigh distributed) [m/s]</th>
<th>Measured AEP [MWh]</th>
<th>Uncertainty of AEP for the measured power curve [%]</th>
<th>Extrapolated AEP [MWh]</th>
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<tbody>
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</tbody>
</table>

*) Incomplete according to IEC 61400-12-1 (AEP-measured less than 95 % of the AEP-extrapolated)