Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Publication date: 2018

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 127).
Research output: Book/Report › Report – Annual report year: 2018 › Research
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Havnsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Villanueva, H., Gómez Arranz, P.
Publication date: 2018

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Havnsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 26
Publication date: 2018

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU’s test site for large wind turbines at Havnsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 28
Publication date: 2018
Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 35
Publication date: 2018

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a four-beam nacelle based lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 51
Publication date: 2018

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 28
Publication date: 2018
Calibration of other type Ground-based Lidar
This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU's test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from the wind vanes is also given.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 32
Publication date: 2018

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 132).
Research output: Book/Report › Report – Annual report year: 2018 › Research

Calibration of other type Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a four-beam nacelle based lidar at DTU's test site for large wind turbines at Høvsøre, Denmark.Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 27
Publication date: 2018

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 137).
Research output: Book/Report › Report – Annual report year: 2018 › Research

Installation of Nacelle-based Lidar instruments
This report describes the installation of 3 nacelle lidars of type 4-beam, at DTU's test site for large wind turbines at Høvsøre, Denmark. The report shall not be reproduced except in its entirety without the written permission of the measurement laboratory. The work described in this report was carried out on a given period.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 6
Publication date: 2018

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 139).
Research output: Book/Report › Report – Annual report year: 2018 › Research

Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A part of the sensors has been installed by others, the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine.
Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A part of the sensors has been installed by others, the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine.

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

Power Curve Measurements FGW
This report describes power curve measurements carried out on a given turbine in a chosen period. The measurements are carried out in accordance to IEC 61400-12-1 Ed. 1 and FGW Teil 2.
Power Curve Measurements FGW
This report describes power curve measurements carried out on a given turbine in a chosen period. The measurements are carried out in accordance to IEC 61400-12-1 Ed. 1 and FGW Teil 2.

Power curve measurement uncertainty – follow up comparative exercise for IEA Task 32: Paper
A comparative exercise for estimating the uncertainty associated with new methods for power performance measurements was coordinated by the International Energy Agency (IEA) Wind Task 32. Both IEA Task 32 and the Power Curve Working Group (PCWG) have identified the application of the new uncertainty guidelines as a problem area. One time series dataset from a wind turbine, hub height mast and vertical profiling lidar was provided to calculate the power curve using three different wind speed definitions. For each wind speed definition, participants had to estimate the wind speed
measurement uncertainty based on the guidance provided by the June 2016 Final Draft International Standard (FDIS) of IEC 6140012-1 Edition 2. The comparative exercise included three iterations over the course of one year to incrementally harmonize the calculations and assumptions. The exercise showed significant variability among participants reflecting difficulty with the interpretation and application of the informative guidance. It also demonstrated that when using current technology and the available calibration techniques the use of a standalone lidar with a short met mast resulted in a significantly higher uncertainty compared to only using a hub height mast (with some measurements of wind shear and wind veer in the lower rotor).

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements, DNV GL USA, Deutsche WindGuard GmbH, Siemens Gamesa Renewable Energy, AWS Truepower
Corresponding author: Simmons, L.
Contributors: Simmons, L., Franke, K., Tsouknidas, C., Saez-Gallego, J., Weyer, E., Gómez, P.
Number of pages: 9
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Physics: Conference Series
Volume: 1037
Issue number: 5
Article number: 052028
ISSN (Print): 1742-6596
Ratings:
BFI (2018): BFI-level 1
Scopus rating (2018): CiteScore 0.51 SJR 0.221 SNIP 0.454
Original language: English
Electronic versions:
Simmons_2018_J._Phys._3A_Conf._Ser._1037_052028.pdf
DOIs:
10.1088/1742-6596/1037/5/052028

Bibliographical note
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Source: FindIt
Source ID: 2435910056
Research output: Contribution to journal › Conference article – Annual report year: 2018 › Research › peer-review

Spinner anemometer - best practice
Spinner anemometer is used to measure traceable and calibrated wind speed, yaw misalignment and inflow angle. Free wind speed may be measured by application of a spinner wind speed transfer function. Spinner anemometer free wind speed measurements are used in power performance measurements according to the standard IEC61400-12-2 on use of nacelle anemometry. An improved procedure, developed specifically for power performance measurements with spinner anemometry, without considering the use of nacelle anemometry, is the aim of this document. The best practice description for spinner anemometry provides procedures for mounting, calibrations, measurements and uncertainty calculation. As such it could provide input to a separate IEC standard on wind speed, yaw misalignment and inflow angle measurements with spinner anemometry. This best practice procedure for wind measurements is used in the PTP demo project for power performance measurements on 90 wind turbines. The experience from the measurements will be used to demonstrate and support the further development of the best practice procedures.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Friis Pedersen, T., Gómez Arranz, P.
Number of pages: 56
Publication date: 2018

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy #: No. 165).
Electronic versions:
DTU_E_0165_Spinner_Aнемometry_Best_Practice.pdf
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Fernandez Garcia, S., Gómez Arranz, P.
Number of pages: 33
Publication date: 2017

Publication Information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 105).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU’s test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from the wind vanes is also given.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 33
Publication date: 2017

Publication Information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 110).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU’s test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from the wind vanes is also given.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Calibration of Ground-based Lidar instrument

This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU’s test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from the wind vanes is also given.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 30
Publication date: 2017

Calibration of Ground-based Lidar instrument

This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Publication date: 2017

Calibration of Ground-based Lidar instrument

This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 117).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Test and Measurements, Department of Wind Energy
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 27
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 125).

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 31
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 118).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU’s test site for large wind turbines at Havsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 32
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 119).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU’s test site for large wind turbines at Havsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 32
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 120).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research
Calibration of Nacelle-based Lidar instrument. Comparison

This report presents the result of the comparison of the calibrations performed for the same lidar at DTU’s test sites. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only. The purpose of this report is the comparison of calibration results of the same lidar unit in two calibration campaigns, at 2 separate test sites. For this purpose, only the results at 2 heights are presented.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Eisenberg, Y.
Number of pages: 30
Publication date: 2017

Calibration of Nacelle-based Lidar instrument. Comparison

This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU’s test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from wind vanes is also given.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Eisenberg, Y.
Number of pages: 29
Publication date: 2017

Calibration of scanning Lidar

This report describes the tests carried out on a scanning lidar at the DTU Test Station for large wind turbines, Høvsøre. The tests were divided in two parts. In the first part, the purpose was to obtain wind speed calibrations at two heights against two cup anemometers mounted on a mast. Additionally, comparison of wind direction and wind shear measurements were made, for informative purposes, although they are not formally considered calibrations. In the second
part, we performed the calibration of the inclinometers and the check of the positional accuracy of the scanner head.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 42
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 108).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2017 › Research

Calibration of three Nacelle-based Lidars
This report presents the result of the lidar calibration performed for three two-beam, continuous wave, nacelle based lidars at DTU’s test site Risø, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements, Meteorology & Remote Sensing
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 57
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 109).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2017 › Research

Measurement methodologies for wind energy based on ground-level remote sensing

General information
Publication status: Published
Organisations: Department of Wind Energy, Meteorology & Remote Sensing, Test and Measurements, CNRM Centre National de Recherches Meteorologiques, Finnish Meteorological Institute
Number of pages: 28
Pages: 29-56
Publication date: 2017

Host publication information
Title of host publication: Renewable Energy Forecasting: From Models to Applications
Publisher: Woodhead Publishing
Editor: Kariniotakis, G.
ISBN (Print): 978-0-08-100504-0
ISBN (Electronic): 978-0-08-100505-7
DOIs:
10.1016/B978-0-08-100504-0.00002-0
Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A part of the sensors has been installed by others, the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 88
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1185).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research

Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A part of the sensors has been installed by others, the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 94
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1186).

Research output: Book/Report › Report – Annual report year: 2017 › Research

Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A part of the sensors has been installed by others, the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 94
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1186).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2017 › Research
Nacelle Transfer Function
The report describes measurements carried out on a given turbine. A comparison between wind speed on the met mast and Nacelle Wind speed are made and the results are presented on graphs and in a table. The data used for the comparison are the data that are same as used for the power curve report. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 98
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1170).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Nacelle Transfer Function
The report describes measurements carried out on a given turbine. A comparison between wind speed on the met mast and Nacelle Wind speed are made and the results are presented on graphs and in a table. The data used for the comparison are the data that are same as used for the power curve report. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Kock, C. W.
Number of pages: 100
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1183).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Nacelle Transfer Function
The report describes measurements carried out on a given turbine. A comparison between wind speed on the met mast and Nacelle Wind speed are made and the results are presented on graphs and in a table. The data used for the comparison are the data that are same as used for the power curve report. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Georgieva Yankova, G., Gómez Arranz, P.
Number of pages: 86
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1204).
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 75
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1187).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2017 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 73
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1199).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2017 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 80
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
Power Curve Measurements

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 78
Publication date: 2017

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1221).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2017 › Research
Power Curve Measurements FGW
This report describes power curve measurements carried out on a given turbine in a chosen period. The measurements are carried out in accordance to IEC 61400-12-1 Ed. 1 and FGW Teil 2.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 63
Publication date: 2017

Power Curve Measurements REWS
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to a draft of IEC 61400-12-1 Ed.2

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 96
Publication date: 2017

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Havsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Publication date: 2016

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 31
Publication date: 2016
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 095(EN)).
Keywords: DTU Wind Energy LC I-095(EN), LC-I-095, LC-I-095EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 29
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 096(EN)).
Keywords: DTU Wind Energy LC I-096(EN), LC-I-096, LC-I-096EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

Calibration of Nacelle-based Lidar instrument
This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.
Calibration of Nacelle-based Lidar instrument

This report presents the result of the lidar calibration performed for a two-beam nacelle based lidar at DTU's test site for large wind turbines at Havsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 28
Publication date: 2016

Power Curve Measurements

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 88
Publication date: 2016

Power Curve Measurements

This report describes the power curve measurements performed with a nacelle LIDAR on a given wind turbine in a wind farm and during a chosen measurement period. The measurements and analysis are carried out in accordance to the guidelines in the procedure “DTU Wind Energy-E-0019” [1]. The reporting format is based on the reference standard [2]. The data has been provided by the customer. The analysis has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 89
Publication date: 2016
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 97
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1152(EN)).
Keywords: DTU Wind Energy WTT I-1152(EN), WTT-I-1152, WTT-I-1152(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Power Curve Measurements FGW
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to IEC 61400-12-1 Ed. 1 and FGW Teil 2.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 68
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1163(EN)).
Keywords: DTU Wind Energy WTT I-1164(EN), WTT-I-1164, WTT-I-1164(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Power Curve Measurements FGW
This report describes power curve measurements carried out on a given turbine in a chosen period. The measurements are carried out in accordance to IEC 61400-12-1 Ed. 1 and FGW Teil 2.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 68
Power Curve Measurements, quantify the production increase
The purpose of this report is to quantify the production increase on a given turbine with respect to another given turbine. The used methodology is the “side by side” comparison method, provided by the client. This method involves the use of two neighboring turbines and it is based on the assumption that the wind field in front of the tested turbines is statistically the same (i.e. has in average the same mean wind speed conditions in front of both turbines). The method is only used for the evaluation of a relative change in the AEP, not the AEP itself.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 38
Publication date: 2016

Power Curve Measurements REWS
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU’s measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 107
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1150(EN)).
Keywords: DTU Wind Energy WTT I-1150(EN), WTT-I-1150, WTT-I-1150(EN)
Bibliographical note
This is an internal report and therefore not available in full text. Please contact author’s or director of author’s department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research
Power Curve Measurements REWS
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 92
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1145(EN)).
Keywords: DTU Wind Energy WTT I-1145(EN), WTT-I-1145, WTT-I-1145(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Power Curve Measurements REWS
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU’s measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 115
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1153(EN)).
Keywords: DTU Wind Energy WTT I-1153(EN), WTT-I-1153, WTT-I-1153(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Site assessment
This report describes the site assessment of given position in a given site, for a wind turbine with a well-defined hub height and rotor diameter. The analysis is carried out in accordance to IEC 61400-12-1 [1], and both an obstacle assessment and a terrain assessment are performed.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 23
Publication date: 2016

Publication information
Site calibration
Performing site calibration using two Ground-based lidars and REWS method

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 118
Publication date: 2016

Publication information
Publisher: DTU Wind Energy
Original language: English
(Keywords: DTU Wind Energy WTT I-1151(EN), WTT-I-1151, WTT-I-1151(EN))

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2016 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 30
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(Keywords: DTU Wind Energy LC I-065(EN))

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2015 › Research

Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of Ground-based Lidar instrument
This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of Ground-based Lidar instrument

This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 072(EN)).
Keywords: DTU Wind Energy LC I-072(EN), LC-I-072, LC-I-072(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2015 › Research
Calibration of Ground-based Lidar instrument

This report presents the result of the lidar calibration performed for the given Ground-based Lidar at DTU’s test site for large wind turbines at Havšere, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of Ground-based Lidar instrument
This report presents the result of a test of a ground-based lidar of other type. The test was performed at DTU's test site for large wind turbines at Høvsøre, Denmark. The result as an establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The comparison of the lidar measurements of the wind direction with that from the wind vanes is also given.

Measurement System and Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A major part of the sensors has been installed by others (see [1]) the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine.

Measurement System and Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A major part of the sensors has been installed by others (see [1]) the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine.
Nacelle Transfer Function
The report describes measurements carried out on a given turbine. A comparison between wind speed on the met mast and Nacelle Wind speed are made and the results are presented on graphs and in a table. The data used for the comparison are the data that are same as used for the power curve report. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 82
Publication date: 2015

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Villanueva, H.
Number of pages: 75
Publication date: 2015
Power Curve Measurements, FGW

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Vesth, A., Gómez Arranz, P.
Number of pages: 85
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1102(EN)).
Keywords: DTU Wind Energy WTT I-1102(EN), WTT-I-1102, WTT-I-1102(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2015 › Research

Site assessment
This report describes the site assessment of given position in a given site, for a wind turbine with a well-defined hub height and rotor diameter. The analysis is carried out in accordance to IEC 61400-12-1 [1], and both an obstacle assessment and a terrain assessment are performed.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Vesth, A., Gómez Arranz, P.
Number of pages: 16
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1116(EN)).
Keywords: DTU Wind Energy WTT I-1116(EN), WTT-I-1116, WTT-I-1116(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Research output: Book/Report › Report – Annual report year: 2015 › Research

Site calibration
Performing site calibration using two Ground-based lidars and REWS method

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 68
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1129(EN)).
Keywords: DTU Wind Energy WTT I-1129(EN), WTT-I-1129, WTT-I-1129(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.
Site calibration
The report describes site calibration measurements carried out on a site in Denmark. The measurements are carried out in accordance to Ref. [1].
The site calibration is carried out before a power performance measurement on a given turbine to clarify the influence from the terrain on the ratio between the wind speed at the center of the turbine hub and at the met mast. The wind speed at the turbine is measured by a temporary mast placed at the foundation for the turbine. The site and measurement equipment is detailed described in [2].
The possible measurement sector for power performance according to [1] is also described in [2] and no results from the site calibration have shown any necessary exclusion from this sector.
All parts of the sensors and the measurement system have been installed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Georgieva Yankova, G.
Number of pages: 66
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1135(EN)).
Keywords: DTU Wind Energy WTT I-1135(EN), WTT-I-1135, WTT-I-1135(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2016 › Research

Performing site calibration using two Ground-based lidars

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 66
Publication date: 2015

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1139(EN)).
Keywords: DTU Wind Energy WTT I-1139(EN), WTT-I-1139, WTT-I-1139(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2016 › Research

Calibration of ground-based Lidar instrument WLS7-218
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Calibration of ground-based Lidar instrument WLS7-219
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havseræ, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Calibration of ground-based Lidar instrument WLS7-222
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havseræ, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014
Calibration of ground-based Lidar instrument WLS7-264
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(Keywords: DTU Wind Energy LC I, No. 055(EN)).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Calibration of ground-based Lidar instrument WLS7-318
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(Keywords: DTU Wind Energy LC I, No. 056(EN)).

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Calibration of ground-based Lidar instrument WLS7-341
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Calibration of ground-based Lidar instrument WLS7-343

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Calibration of ground-based Lidar instrument WLS7-389

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014
Calibration of ground-based Lidar instrument WLS7-377
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Havssøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 058(EN)).
Keywords: DTU Wind Energy LC I-058(EN), LC-I-058, LC-I-058(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2014 › Research

Calibration of ground-based Lidar instrument WLS7-51
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havssøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 053(EN)).
Keywords: DTU Wind Energy LC I-053(EN), LC-I-053, LC-I-053(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2014 › Research

Calibration of ground-based Lidar instrument WLS7-66
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havssøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Calibration of ground-based Lidar instrument WLS7-73
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

Calibration of ground-based Lidar instrument WLS866-12
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of ground-based Lidar instrument WLS866-13
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Havsnere, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 059(EN)).
Keywords: DTU Wind Energy LC I-059(EN), LC-I-059, LC-I-059(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS866-8
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Havsnere, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 044(EN)).
Keywords: DTU Wind Energy LC I-044(EN), LC-I-044, LC-I-044(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS866-9
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Havsnere, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Measurement System & Calibration report
This Measurement System & Calibration report is describing DTU's measurement system installed at a specific wind turbine. A major part of the sensors has been installed by others (see [1]) the rest of the sensors have been installed by DTU. The results of the measurements, described in this report, are only valid for the specific wind turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 75
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1070(EN)).
Keywords: DTU Wind Energy WTT I-1070(EN), WTT-I-1070, WTT-I-1070(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2014 › Research

Nacelle lidar power curve
This report describes the power curve measurements performed with a nacelle LIDAR on a given wind turbine in a wind farm and during a chosen measurement period.
The measurements and analysis are carried out in accordance to the guidelines in the procedure "DTU Wind Energy-E-0019" [1]. The reporting format is based on the reference standard [2].
The data has been provided by the customer. The analysis has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 85
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1071(EN)).
Keywords: DTU Wind Energy WTT I-1071(EN), WTT-I-1071, WTT-I-1071(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2014 › Research
Power curve investigation
This report describes the analysis carried out with data from a given turbine in a wind farm and a chosen period. The purpose of the analysis is to correlate the power output of the wind turbine to the wind speed measured by a nacelle-mounted anemometer. The measurements and analysis are not performed according to IEC 61400-12-1 [1]. Therefore, the results presented in this report cannot be considered a power curve according to the reference standard, and are referred to as “power curve investigation” instead. The measurements have been performed by a customer and the data analysis has been performed by DTU. There is not enough information available for DTU to perform a quality control.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 19
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1080(EN)).
Keywords: DTU Wind Energy WTT I-1080(EN), WTT-I-1080, WTT-I-1080(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 71
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1053(EN)).
Keywords: DTU Wind Energy WTT I-1053(EN), WTT-I-1053, WTT-I-1053(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 64
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1061(EN)).
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 81
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1063(EN)).
Keywords: DTU Wind Energy WTT I-1063(EN), WTT-I-1063, WTT-I-1063(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 87
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1065(EN)).
Keywords: DTU Wind Energy WTT I-1065(EN), WTT-I-1065, WTT-I-1065(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2014 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 65
Publication date: 2014
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 66
Publication date: 2014

Power Curve Measurements, AEP evaluation
The purpose of this report is to quantify the production increase on a given turbine with respect to another given turbine. The used methodology is the “side by side” comparison method, provided by the client. This method involves the use of two neighboring turbines and it is based on the assumption that the wind field in front of the tested turbines is statistically the same (i.e. has in average the same mean wind speed conditions in front of both turbines). The method is only used for the evaluation of a relative change in the AEP, not the AEP itself.
Power Curve Measurements, AEP evaluation
The purpose of this report is to quantify the production increase on a given turbine with respect to another given turbine. The used methodology is the “side by side” comparison method, provided by the client. This method involves the use of two neighboring turbines and it is based on the assumption that the wind field in front of the tested turbines is statistically the same (i.e. has in average the same mean wind speed conditions in front of both turbines). The method is only used for the evaluation of a relative change in the AEP, not the AEP itself.

Power Curve Measurements, FGW
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.
Power Curve Measurements, FGW
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Vesth, A., Gómez Arranz, P.
Number of pages: 95
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1082(EN)).
Keywords: DTU Wind Energy WTT I-1082(EN), WTT-I-1082, WTT-I-1082(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2014 › Research

Power Curve Measurements, REWS
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 75
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1097(EN)).
Keywords: DTU Wind Energy WTT I-1097(EN), WTT-I-1097, WTT-I-1097(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's department for further information.

Research output: Book/Report › Report – Annual report year: 2015 › Research

Power curve report - with rotor equivalent wind speed
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 70
Publication date: 2014
Power curve report - with rotor equivalent wind speed
This report describes the power curve measurements carried out on a given wind turbine in a chosen period. The measurements were carried out following the measurement procedure in the draft of IEC 61400-12-1 Ed.2 [1], with some deviations mostly regarding uncertainty calculation. Here, the reference wind speed used in the power curve is the equivalent wind speed obtained from lidar measurements at several heights between lower and upper blade tip, in combination with a hub height meteorological mast. The measurements have been performed using DTU’s measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Villanueva, H., Gómez Arranz, P.
Number of pages: 88
Publication date: 2014
Power curve report - with turbulence intensity normalization
This report describes power curve measurements carried out on a given wind turbine in a chosen period. The analysis presents two significant deviations with respect to the standard IEC 61400-12-1 Ed.1 [2], and consequently the results of this report don’t comply with the reference standard. First, additional shear and turbulence intensity filters are applied on the measured data. Secondly, the method for normalization to a given reference turbulence intensity level (as described in Annex M of the draft of IEC 61400-12-1 Ed.2 [3]) is applied. The measurements have been performed using DTU’s measurement equipment, the analysis and quality control has been performed by DTU.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R., Vesth, A.
Number of pages: 100
Publication date: 2014

Publication information
Publisher: DTU Wind Energy
Original language: English
Keywords: DTU Wind Energy WTT I-1073(EN), WTT-I-1073, WTT-I-1073(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS7-139
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
Keywords: DTU Wind Energy LC I-038(EN), LC-I-038, LC-I-038(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS7-150
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Calibration of ground-based Lidar instrument WLS7-226

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 28
Publication date: 2013

Calibration of ground-based Lidar instrument WLS7-269

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 29
Publication date: 2013
Calibration of ground-based Lidar instrument WLS7-283
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 023(EN)).
Keywords: DTU Wind Energy LC I-023(EN), LC-I-023, LC-I-023(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2013 › Research

Calibration of ground-based Lidar instrument WLS7-284
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 034(EN)).
Keywords: DTU Wind Energy LC I-034(EN), LC-I-034, LC-I-034(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2013 › Research

Calibration of ground-based Lidar instrument WLS7-326
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Calibration of ground-based Lidar instrument WLS7-327
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 30
Publication date: 2013

Calibration of ground-based Lidar instrument WLS7-328
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 30
Publication date: 2013
Calibration of ground-based Lidar instrument WLS7-34
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havsorte, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 028(EN)).
Keywords: DTU Wind Energy LC I-028(EN), LC-I-028, LC-I-028(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS7-37
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havsorte, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 28
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 015(EN)).
Keywords: DTU Wind Energy LC I-015(EN), LC-I-015, LC-I-015(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS7-9
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havsorte, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Calibration of ground-based Lidar instrument WLS866-1
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

Calibration of ground-based Lidar instrument WLS866-3
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of ground-based Lidar instrument WLS866-4
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 030(EN)).
Keywords: DTU Wind Energy LC I-030(EN), LC-I-030, LC-I-030(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Calibration of ground-based Lidar instrument WLS866-5
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 29
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 029(EN)).
Keywords: DTU Wind Energy LC I-029(EN), LC-I-029, LC-I-029(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Comparison between measurements from WLS7-91 and WLS866-4
This report presents the comparison of two windcubes calibrated at the same time at DTU’s test site for large wind turbines at Høvsøre, Denmark. The comparison is based on measurements obtained during the calibration of the two units.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Yordanova, G., Gómez Arranz, P.
Number of pages: 11
This report presents comparison between the initial and post calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbines at Havsøre, Denmark. It was calibrated twice – first in 2010 and later in 2013. The comparison of the results obtained from the two different sets of data shows that the lidar data is still of sufficiently good quality.

The report describes measurements carried out on a given turbine. A comparison between wind speed on the met mast and Nacelle Wind speed are made and the results are presented on graphs and in a table. The data used for the comparison are the data that are same as used for the power curve report. The measurements have been performed using DTU’s measurement equipment, the analysis and quality control has been performed by DTU.
using DTU's measurement equipment, the analysis and quality control has been performed by DTU.

**General information**
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Vesth, A., Gómez Arranz, P.
Number of pages: 77
Publication date: 2013

**Publication information**
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1038(EN)).
Keywords: DTU Wind Energy WTT I-1038(EN), WTT-I-1038, WTT-I-1038(EN)

**Bibliographical note**
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

**Power Curve Measurements**
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.
Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 64
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1041(EN)).
Keywords: DTU Wind Energy WTT I-1041(EN), WTT-I-1041, WTT-I-1041(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2013 › Research

Power Curve Measurements
The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 64
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1050(EN)).
Keywords: DTU Wind Energy WTT I-1050(EN), WTT-I-1050, WTT-I-1050(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2013 › Research

Site Calibration report
This report describes the site calibration carried out at Østerild, during a given period. The site calibration was performed with two Windcube WLS7 (v1) lidars at ten measurements heights. The lidar is not a sensor approved by the current version of the IEC 61400-12-1 [1] and therefore the site calibration with lidars does not comply with the standard.
However, the measurements are carried out following the guidelines of IEC 61400-12-1 where possible, but with some deviations presented in the following chapters.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 116
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
Test of ground-based Lidar instrument WLS200S-10

This report presents the result of the test performed for the given Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. The test aims at establishing a relation between the reference wind measurements and corresponding lidar wind indications, and evaluating a set of quality checks defined by the customer.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P.
Number of pages: 20
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
Keywords: DTU Wind Energy WTT I-1048(EN), WTT-I-1048, WTT-I-1048(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2013 › Research

Test of ground-based Lidar instrument WLS200S-11

This report presents the result of the test performed for the given Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. The test aims at establishing a relation between the reference wind measurements and corresponding lidar wind indications, and evaluating a set of quality checks defined by the customer.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P.
Number of pages: 20
Publication date: 2013

Publication information
Publisher: DTU Wind Energy
Original language: English
Keywords: DTU Wind Energy LC I-021(EN), LC-I-021, LC-I-021(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2013 › Research

Test of ground-based Lidar instrument WLS7-106

This report presents the result of the test performed for the given Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. The test aims at establishing a relation between the reference wind measurements and corresponding lidar wind indications, and evaluating a set of quality checks defined by the customer.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P.
Number of pages: 23
Calibration of ground-based lidar instrument WLS7-202
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

Calibration of ground-based lidar instrument WLS7-203
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.
Calibration of ground-based lidar instrument WLS7-204
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 28
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 005).
Keywords: DTU Wind Energy LC I-005(EN), LC-I-005, LC-I-005(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2012 › Research

Calibration of ground-based lidar instrument WLS7-207
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Courtney, M.
Number of pages: 28
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 007).
Keywords: DTU Wind Energy LC I-007(EN), LC-I-007, LC-I-007(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2012 › Research

Calibration of ground-based lidar instrument WLS7-213
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Calibration of ground-based lidar instrument WLS7-218

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 28
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 008).
Keywords: DTU Wind Energy LC I-008(EN), LC-I-008, LC-I-008(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2012 › Research

Calibration of ground-based lidar instrument WLS7-219

This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 28
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 009).
Keywords: DTU Wind Energy LC I-009(EN), LC-I-009, LC-I-009(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Calibration of ground-based lidar instrument WLS7-221
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 28
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 010).
Keywords: DTU Wind Energy LC I-010(EN), LC-I-010, LC-I-010(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2012 › Research

Calibration of ground-based lidar instrument WLS7-222
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 29
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 011).
Keywords: DTU Wind Energy LC I-011(EN), LC-I-011, LC-I-011(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2012 › Research

Calibration of ground-based lidar instrument WLS7-99
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

General information
Publication status: Published
Power Curve Measurements

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 65
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1014).
Keywords: DTU Wind Energy WTT I-1014(EN), WTT-I-1014, WTT-I-1014(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2012 › Research

Power Curve Measurements

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for different wind directions are used in the present analyze of power performance of the turbine.

General information
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 67
Publication date: 2012

Publication information
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1021).
Keywords: DTU Wind Energy WTT I-1021(EN), WTT-I-1021, WTT-I-1021(EN)

Bibliographical note
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.
Research output: Book/Report › Report – Annual report year: 2012 › Research

Power Curve Measurements

The report describes power curve measurements carried out on a given wind turbine. The measurements are carried out in accordance to Ref. [1]. A site calibration has been carried out; see Ref. [2], and the measured flow correction factors for
different wind directions are used in the present analyze of power performance of the turbine.

**General information**
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Vesth, A.
Number of pages: 65
Publication date: 2012

**Publication information**
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy WTT I; No. 1022).
Keywords: DTU Wind Energy WTT I-1022(EN), WTT-I-1022, WTT-I-1022(EN)

**Bibliographical note**
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2012 › Research

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**Test of ground-based lidar instrument WLS7-159**
This report presents the result of the test performed for the given Windcube at DTU's test site for large wind turbine at Høvsøre, Denmark. The test aims at establishing a relation between the reference wind measurements and corresponding lidar wind indications, and evaluating a set of quality checks defined by the customer.

**General information**
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 27
Publication date: 2012

**Publication information**
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 012).
Keywords: DTU Wind Energy LC I-012(EN), LC-I-012, LC-I-012(EN)

**Bibliographical note**
This is an internal report and therefore not available in full text. Please contact author's or director of author's institute for further information.

Research output: Book/Report › Report – Annual report year: 2012 › Research

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**Calibration of ground-based lidar instrument WLS7-151**
This report presents the result of the lidar calibration performed for the given WLS7 Windcube at DTU’s test site for large wind turbine at Høvsøre, Denmark. Calibration is here understood as the establishment of a relation between the reference wind speed measurements with measurement uncertainties provided by measurement standard and corresponding lidar wind speed indications with associated measurement uncertainties. The lidar calibration concerns the 10 minute mean wind speed measurements. The comparison of the lidar measurements of the wind direction with that from wind vanes measurements are given for information only.

**General information**
Publication status: Published
Organisations: Department of Wind Energy, Test and Measurements
Contributors: Gómez Arranz, P., Wagner, R.
Number of pages: 28
Publication date: 2011

**Publication information**
Publisher: DTU Wind Energy
Original language: English
(DTU Wind Energy LC I; No. 001).
Keywords: DTU Wind Energy LC I-001(EN), LC-I-001, LC-I-001(EN)

**Bibliographical note**