



Certificate No.

IECRE.WE.TC.18.0017-R0

IECRE - IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications

TYPE CERTIFICATE
Wind Turbine

This certificate is issued to

Vestas Wind Systems A/S
Hedeager 42
8200 Aarhus N
Denmark

for the wind turbine

Vestas V126-3.45 MW / V126-3.60 MW HTq

wind turbine class (class, standard, year)

WT class S, IEC 61400-1: 2005+Amd1: 2010

This certificate is transferred from IEC 61400-22 to IECRE and attests compliance with IEC 61400 Series as specified in subsequent pages. It is based on the following reference documents:

Design basis evaluation conformity statement
Dated

DB-DNVGL-SE-0074-02868-2
2018-05-02

Design evaluation conformity statement
Dated

DE-DNVGL-SE-0074-02869-3
2018-05-02

Type test conformity statement
Dated

TT-DNVGL-SE-0074-02870-2
2018-05-02

Manufacturing conformity statement
Dated

ME-DNVGL-SE-0074-02871-3
2018-05-02

Type characteristics conformity statement
Dated

TCM-DNVGL-SE-0074-03829-0
2018-05-02

Final evaluation report
Dated

FER-TC-DNVGL-SE-0074-02867-3
2018-05-02

The conformity evaluation was carried out in accordance with the rules and procedures of the IECRE System www.iecre.org

The wind turbine type specification begins on page 2 of this certificate.

Changes in the system design or the manufacturer's quality system are to be approved by the Certification Body. Without approval, the certificate loses its validity.

This certificate is valid until:
2022-05-02

Approved for issue on behalf of the IECRE
Certification Body:



Ramakrishna Parasarampuram / Christer Eriksson
Project Manager / Service Line Leader, Type
Certification
Hellerup 2018-12-14

Renewables Certification
Brooktorkai 18
20457 Hamburg, Germany



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Machine parameters:

Power regulation:	pitch-controlled
Rotor orientation:	upwind
Number of rotor blades:	3
Rotor tilt:	6°
Cone angle:	4°
Rated power:	3450 kW / 3600 kW
Rated wind speed V_r :	See Annex 1
Rotor diameter:	126 m
Hub height(s):	See Annex 1
Hub height operating wind speed range $V_{in} - V_{out}$:	See Annex 1
Design life time:	20 years
Software version:	VMP Global version/build 2017.01

Wind conditions:

Characteristic turbulence intensity I_{ref} at $V_{hub} = 15$ m/s:	0.16
Annual average wind speed at hub height V_{ave} :	See Annex 1
Reference wind speed V_{ref} :	See Annex 1
Mean flow inclination:	8°

Electrical network conditions:

Normal supply voltage and range:	3 x 650 V 10.5-36 kV \pm 10 %
Normal supply frequency and range:	50 or 60 Hz \pm 6 % Hz
Voltage imbalance:	IEC 61000-3-6 TR max 2 %
Maximum duration of electrical power network outages:	Two 3 months periods
Number of electrical network outages	Max 52 per year



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Other environmental conditions (where taken into account):

Normal and extreme temperature ranges:

(*de-rating strategy above +30°C – V126-3.45 MW)

(*de-rating strategy above +20°C – V126-3.60 MW)

Low temperature turbine

(*de-rating strategy above +30°C – V126-3.45 MW)

(*de-rating strategy above +20°C – V126-3.60 MW)

Relative humidity of the air:

Air density:

Solar radiation:

Lightning protection system (standard and protection class):

Normal: -20°C to +45°C*

Extreme: -30°C to +50°C

Normal: -30°C to +45°C*

Extreme: -40°C to +50°C

100% (max 40% of time) and
90% (rest of life time)

1.225 / 1.325ⁱ kg/m³

ⁱ To account for low temperature operation, Vestas has applied higher air density for the following load cases: 1.2, 2.1, 3.1, 4.1 and 5.1

1000 W/m²

Designed acc. to IEC 61400-24,
Protection Level 1 and IEC
61312-1



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Major components:

**If not otherwise stated, the certificate holder
is the manufacturer.

Blade:

Type: Infused structural air foil shell
Material: Carbon fibres pultrusions, glass fibre
fabrics, balsa and PET foam core
Blade length: 61.65 m
Number of blades: 3
Manufacturer: Vestas Wind Systems A/S
Drawing / Data sheet / Part No.: 0028-7875, Rev.10 – V126 Blade
Aero add-ons:
0054-7820, Rev.2 – V126 STE kit
0055-5217, Rev.1 – V126 Root Vortex
Generator

Blade bearing:

Type: Double row four-point contact ball bearing
Manufacturer: LGN
Drawing / Data sheet / Part No.: 29058368, Rev.0

Blade bearing:

Type: Double row four-point contact ball bearing
Manufacturer: RLX
Drawing / Data sheet / Part No.: 29058368, Rev.0

Blade bearing:

Type: Double row four-point contact ball bearing
Manufacturer: LBC
Drawing / Data sheet / Part No.: 29058368, Rev.0

Blade bearing:

Type: Double row four-point contact ball bearing
Manufacturer: TMB



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Drawing / Data sheet / Part No.: 29058368, Rev.0

Pitch System:

Motor / Actuator Type: One hydraulic cylinder (140/90X922) per blade

Drawing / Data sheet / Part No.: 29080628, Rev. 1

Pitch Controller Type: Hydraulic actuation module

Drawing / Data sheet / Part No.: 29080632, Rev. 0

Main shaft:

Type: Cast hollow shaft

Material: EN GJS-500-14

Drawing / Data sheet / Part No.: 29085300, Rev. 1

Main bearing:

Type: Double-row spherical roller bearing

Manufacturer: SKF

Drawing / Data sheet / Part No.: 240/950 CA/C3LW 33VQ113

Main bearing:

Type: Double-row spherical roller bearing

Manufacturer: FAG

Drawing / Data sheet / Part No.: F-582562.PRL-WPO

Gearbox:

Type: 2 Planetary stages and one helical stage

Gear Ratio: 125.163

Manufacturer: ZF

Drawing / Data sheet / Part No.: EH922A

Yaw System:

Drive Type: Nacelle mounted electrical driven plain bearing with external toothing



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Bearing Type: Friction bearing, permanently pre-tensioned

Gear Type: Multiple stage gearbox

Manufacturer: Comer

Drawing / Data sheet / Part No.: PG 1903

Gear Type: Multiple stage gearbox

Manufacturer: Bonfiglioli

Drawing / Data sheet / Part No.: 709T4R

Brake Type: Electrical disc brake in yaw motors

Generator:

Type VND SFIG V2 - DASG 560/6M (Three phase induction generator with squirrel cage rotor)

Rated power 3450 kW, 3650 kW, 3800 kW

Rated voltage 750 V

Rated power factor (VFD) – Cos phi 0.87

Insulation class stator H

Protection class (acc. to IEC 529) IP54

Rated speed 1470 rpm

Converter:

Type Full-scale converter - cube power

Manufacturer Vestas Wind Systems A/S

Line side voltage level 650 Vac

Machine side voltage level 750 Vac

Nominal apparent power 4.4 MVA

Line side AC Frequency 50 / 60 Hz

DC-Link voltage 1150 Vdc



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Transformer:

Type	Dry-type transformer (ECO)
Manufacturer	SGB
Nominal power	4000 kVA
Nominal voltages (HV)	33 kV
Nominal voltage (LV)	650 V
Frequency	50 Hz
Vector group	Dyn5
Environmental Tests	E2
Climatic Tests	C2
Fire class	F1

Transformer:

Type	Dry-type transformer 3-Phase GEAFOL – Transformer (ECO)
Manufacturer	Siemens
Nominal power	4000 kVA
Nominal voltages (HV)	33 kV / 34.5 Hz
Nominal voltage (LV)	650 V
Frequency	50 Hz / 60 Hz
Vector group	Dyn5
Environmental Tests	E2
Climatic Tests	C2
Fire class	F1

Tower:

Type:	Tubular Steel Tower
Hub height:	See Annex 1
Drawing / Data sheet / Part No.:	See Annex 1

Manuals:

Operation & maintenance manual:	See list of manuals 0040-6996, Rev. 14
Transport manual:	See list of manuals 0040-6996, Rev. 14



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Installation & commissioning. manual:

See list of manuals
0040-6996, Rev. 14

Service lift

Manufacturer

Avanti

Type

Avanti Shark or Power Lift Sherpa-SD

Crane

Manufacturer

Star 071/95 Liftket

Type

max 800 kg



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Annex 1 – Configurations covered by this Type Certificate

Variants	IEC WT class*	V_r (m/s)	$V_{in} - V_{out}$ (m/s)	V_{ave} (m/s)	V_{ref} (m/s)	Tower (drawing no)
V126-3.45 MW/ V126-3.60 MW HTq (T3III421, HH 87m, China)	S	10.60 / 10.80	3 - 27.5	8.7	50.0	0066-6441.V00
V126-3.45 MW/ V126-3.60 MW HTq (T3III421, HH 87m)	S (II A)	10.60 / 10.80	3 - 27.5	8.5	42.5	0066-6441.V00
V126-3.45 MW/ V126-3.60 MW HTq (T3III422, HH 87m)	S (II A)	10.60 / 10.80	3 - 27.5	8.5	42.5	0059-2967.V01
V126-3.45 MW/ V126-3.60 MW HTq (T3III450, HH 117m)	S (II A)	10.60 / 10.80	3 - 27.5	8.5	42.5	0057-6926.V00
V126-3.45 MW/ V126-3.60 MW HTq (T3III453, HH 117m)	S (II A)	10.60 / 10.80	3 - 27.5	8.5	42.5	0062-0744.V00
V126-3.45 MW/ V126-3.60 MW HTq (T3III461, HH 137m)	S (III A)	10.60 / 10.80	3 - 30	7.5	37.5	0062-7557.V00
V126-3.45 MW/ V126-3.60 MW HTq (T3III470, HH 147m)	S (III A)	10.60 / 10.80	3 - 30	7.5	37.5	0052-6454.V01

*Notes:

S - The mean wind speed (V_{ave}) is increased to 8.7 m/s and the reference wind speed (V_{ref}) is increased to 50 m/s.

S (II A) - IEC wind turbine class IIA except for the temperature range.

S (III A) - IEC wind turbine class IIIA except for the temperature range.