



## 제 품 인 증 서

1. 제조업체명 : 두산중공업(주)
2. 대표자성명 : 최 형 희
3. 공장소재지 : (너셀·허브) 경상남도 창원시 성산구 두산블로로 22  
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4. 인증제품  
가. 표 준 명 : 해상용 중대형풍력터빈 설계 요구사항  
나. 표준번호 : KS C 8573  
다. 종류·등급·호칭 또는 모델 : WinDS3000/134 Offshore

「산업표준화법」 제17조제1항에 따른 인증심사를 한 결과 한국산업 표준(KS)과 인증심사기준에 적합하므로, 「산업표준화법」 제15조 및 같은 법 시행규칙 제10조제1항에 따라 위와 같이 한국산업표준(KS)에 적합함을 인증합니다.

2019년 02월 19일

한국에너지공단 부설  
신 재생 에너지 센터 소



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\* 첨부 : 제품인증 부속서 (본 증서는 부속서와 함께 제시될 경우에만 효력이 있음)



## 제품인증 부속서 - I. 근거문서

모델명	WinDS3000/134 Offshore
설비등급	IEC S
설계근거평가 적합확인서	발행기관 : - 문서번호 : -
설계평가 적합확인서	발행기관 : DEWI-OCC GmbH 문서번호 : STC-180606, Rev.2
제조평가 적합확인서	발행기관 : 한국에너지공단 문서번호 : WT-CS-ME-170144-00
형식시험 적합확인서	발행기관 : DEWI-OCC GmbH 문서번호 : STC-180608, Rev.0
최종평가 보고서	발행기관 : 한국에너지공단 문서번호 : WT-FE-170144-00
기타	발행기관 : - 문서번호 : -



## 제품인증 부속서 - II. 기본사양

### Machine Parameters :

Power regulation	Pitch control
Rotor orientation	Clockwise
Number of rotor blades	3
Rotor tilt	4.5 [°]
Cone angle	3.0 [°]
Rated power	3,000 [kW]
Rated wind speed $V_r$	10 [m/s]
Rotor diameter	134 [m]
Hub height(s)	90 [m]
hub Height operating wind speed range $V_{in} - V_{out}$	3 - 20 [m/s]
Design life time	20 [year]
Software version	Power/Speed Controller 0.0.1-64

### Wind Conditions :

Characteristic turbulence intensity $I_{ref}$ at $V_{hub} = 15$ m/s	0.16
Annual average wind speed at hub height $V_{ave}$	7.5 [m/s]
Reference wind speed $V_{ref}$	42.5 [m/s]
Mean flow inclination	0 [°]
Hub height 50-year Extreme wind speed $V_{e50}$	59.5 [m/s]

### Electrical Network Conditions :

Normal supply voltage and range	(22.9/33±2x2.5%)±3% [kV]
Normal supply frequency and range	50/60 Hz ± 2% [Hz]
Voltage imbalance	≤ 2% [V]
Maximum duration of electrical power network outages	3 [months]
Number of electrical network outages	20 [/year]



## 제품인증 부속서 - II. 기본사양

Other Environmental Conditions (where taken into account) :

	Wave conditions
	$H_{50} : 5.59 / H_{s1} : 4.13$ [m]
	$T_{p50} : 10.56 / T_{p1} : 8.84$ [s]
Design conditions in case of offshore WT	Water levels
	HSWL : 2.23 / HAT : 1.83 /
	MSL : -0.02 / LAT : -1.87 /
	LSWL : -2.26 [m]
Normal and extreme temperature ranges	-20 ~ 50 / -15 ~ 40 [°C]
Relative humidity of the air	100 [%]
Air density	1.225 [kg/m <sup>3</sup> ]
Solar radiation	1,000 [W/m <sup>2</sup> ]
Lightning protection system (standard and protection class)	LPL 1 (IEC61400-24)
Earthquake model and parameters (standard and key parameters e.g. spectrum, model, seismic zone, soil class, etc.)	N/A
Other design conditions	-



## 제품인증 부속서 - III. 주요부품

### Major Components :

#### Blade

Type	DSB65.5
Material	Glass/carbon fiber reinforced epoxy resin
Number of blades	3
Manufacturers	Human Composites
Drawing / Data sheet / Part No.	W33A-R-BL-20001

#### Blade bearing

Type	Double Rows Ball Bearing
Manufacturer 1	ThyssenKrupp Rothe Erde
Drawing / Data sheet / Part No.	092.60.2633.000.48.1421
Manufacturer 2	Seohan-NTN Bearing
Drawing / Data sheet / Part No.	17-05840-B
Manufacturer 3	CS Bearing
Drawing / Data sheet / Part No.	P.3.B.I.50.2305.0.00

#### Pitch system

Motor / Actuator type	Electrical
Pitch Controller type	Inverter
Manufacturer	ATECH or Freqcon GmbH

#### Main shaft

Type	Hollow & 1 support
Manufacturer	Doosan Heavy Industries & Construction
Material	EN-GJS400-18-LT
Drawing / Data sheet / Part No.	W33A-N-MF-10003 Rev.1 W33A-N-MF-10004 Rev.3, 5

#### Main bearing

Type	Double Tapered Roller Bearing
Manufacturer 1	SKF
Drawing / Data sheet / Part No.	BT2-8342
Manufacturer 2	TIMKEN
Drawing / Data sheet / Part No.	NP354544-90WC2



## 제품인증 부속서 - III. 주요부품

### Gearbox

Type	2 Planetary + 1 Parallel
Gear ratio	1:137.2
Manufacturer	Moventas Gears Oy
Drawing / Data sheet / Part No.	GDRM104161

### Yaw system

Drive Type	Electrical motor
Manufacturer 1	Brevini Power Transmission
Drawing / Data sheet / Part No.	SC0013428
Manufacturer 2	Bonfiglioli Transmittal
Drawing / Data sheet / Part No.	I7120T020500

### Bearing Type

Manufacturer 1	Single Row Ball Bearing
Drawing / Data sheet / Part No.	Seohan-NTN Bearing
Manufacturer 2	17-05841-B
Drawing / Data sheet / Part No.	ThyssenKrupp Rothe Erde
Manufacturer 3	062.55.3270.000.48.1521
Drawing / Data sheet / Part No.	CS Bearing
	Y.2.B.I.50.2948.0.00

### Gear Type

Manufacturer 1	5 Planetary gearbox
Drawing / Data sheet / Part No.	Brevini Power Transmission
Manufacturer 2	SI0013378
Drawing / Data sheet / Part No.	Bonfiglioli Transmittal
	I7120T020500

### Brake Type

Manufacturer 1	Hydraulic active brake
Drawing / Data sheet / Part No.	GKN Stromag
Manufacturer 1	381-01173
Drawing / Data sheet / Part No.	SangSin Brake
	X-WB100



## 제품인증 부속서 - III. 주요부품

### Generator

Type	Permanent Magnet Generator
Manufacturer	ABB Oy.
Drawing / Data sheet / Part No.	AMG 0560MP06 LAM
Rated Power	3150 [kW] / 3361 [kVA]
Rated Frequency	73.3 [Hz]
Rated Speed	1466 [rpm]
Max. Speed	1761rpm (2min.) / 1908rpm (10s) / 2055.2rpm (1s)
Rated Voltage	700 [V]
Rated Current	2 x 1366 [A]
Insulation Class	F
Degree of Protection	IP54

### Converter

Type	Full Power Converter
Manufacturer	ABB Oy.
Drawing / Data sheet / Part No.	ACS880-77LC-3372A/3254A-7
Rated Voltage(grid side)	690 [V]
Rated Current(grid side)	3254 [A]
Degree of Protection	IP54

### Transformer

Type	Cast Coil Dry, Cast-resin mold
Manufacturers	ABB Korea, Hyundai Electric
Drawing / Data sheet / Part No.	DS3000-134-DP00-0025 Rev.5
Degree of Protection	IP23
Location(e.g. tower bottom)	Nacelle Inside



## 제품인증 부속서 - III. 주요부품

### Tower

Type	Steel tubular tower
Manufacturer	Dongguk S&C
Sections	3 sections for 90m HH
Length	67.777m for 90m HH
Drawing / Data sheet / Part No.	W3SA-T-AS-20001

### Foundation

Type	Site-specific
Manufacturer	-
Drawing / Data sheet / Part No.	-

### Foundation adapter

Type	Site-specific
Manufacturer	-
Drawing / Data sheet / Part No.	-

### Manuals

Operation & maintenance manual	DS3000-134-MAN03-0042 (Operation) DS3000-134-MAN03-0004(Maintenance)
Transport manual	DS3000-134-MAN03-0048(Transport)
Installation & commissioning manual	DS3000-134-MAN03-0047 (Installation) DS3000-134-MAN03-0019(Commissioning)

### Outstanding issues:

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