

Small Wind Turbine Certification and Labeling

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SWCC

Small Wind Turbines ($\leq 200 \text{ m}^2$)

- Certified to the AWEA Standard 9.1 – 2009:
Small Wind Turbine Performance and Safety Standard



Certificate number 3299.01



Dakota DT30 under test in Kansas

Medium Wind Turbines

> 200 m² < 1000 m²

Power

Performance
Certification per
IEC 61400-12-1



Certificate
number
3299.01

NEW Design

Certification per
IEC 61400-1

Acoustic

Performance
Certification per
IEC 61400-11



Certificate
number
3299.01

Brief History, SWT Certification

- Pre-2009
 - Time consuming, expensive, not required
 - Evolution of the IEC Standards
- 2009
 - BWEA Standard (UK) and AWEA Standard (US)
- 2010
 - MCS FIT in UK; States require certification in US
- 2012
 - Japan FIT, JSWTA0001 Standard
- 2013
 - Danish Energy Agency's Executive Order
- 2014
 - Following IEC-CAC, IECRE established, working toward globally harmonized scheme



Global Alignment

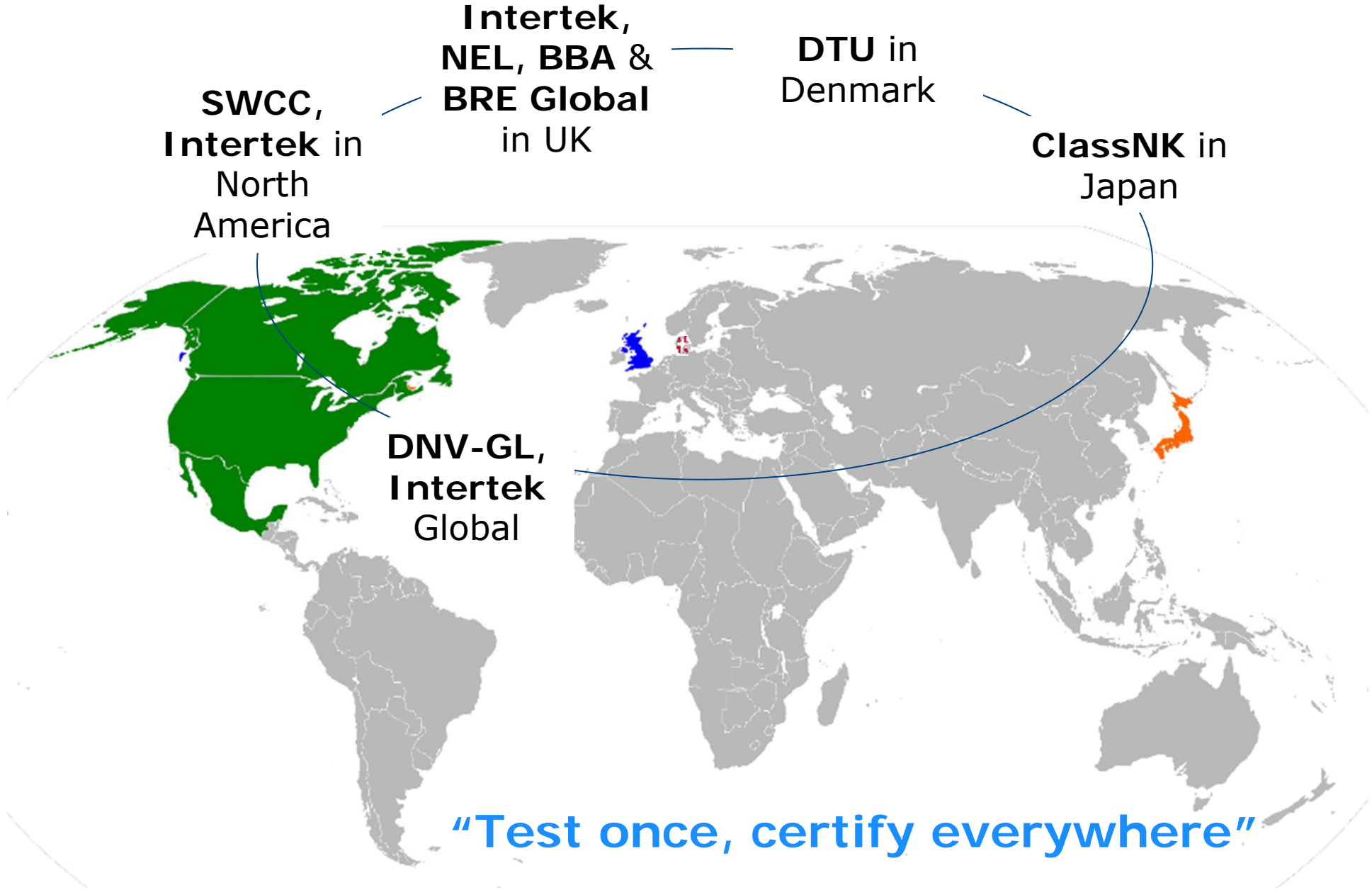
□ AWEA Std ~ RUK Std ~ Japan Std ~ DK order



- IEC 61400, foundation for all
- Requirements are similar, not same
- Loads modeling and structural analysis
 - IEC 61400-2
- Safety and Function Test
 - IEC 61400-2
- Duration Test
 - IEC 61400-2
- Static Blade test
 - IEC 61400-2
- Power Performance
 - IEC 61400-12-1
- Acoustic Test
 - IEC 61400-11



Certification Bodies



**SWCC,
Intertek** in
North
America

**Intertek,
NEL, BBA &
BRE Global**
in UK

DTU in
Denmark

ClassNK in
Japan

**DNV-GL,
Intertek**
Global

“Test once, certify everywhere”

Global Certification of SWT

- SWCC (7)

<http://smallwindcertification.org/certified-small-turbines/>

- Intertek (22; or 31 on MCS list)

<http://www.intertek.com/wind/directory/>

<http://www.microgenerationcertification.org>

- ClassNK (7)

https://www.classnk.or.jp/hp/pdf/activities/windmill_attestation/en/reg_wind_e.pdf

- DTU (13)

http://www.dawt.dk/DK/Godkendte_small_WT.htm

- BBA (1)

<http://www.microgenerationcertification.org>

- DNV-GL (5)

http://www.gl-group.com/pdf/Wind_Turbines.pdf

- BRE Global (4)

<http://www.microgenerationcertification.org/>

- TUV-NEL (6)

<http://www.microgenerationcertification.org/>

Model	Standard
SWCC	
http://smallwindcertification.org/certified-small-turbines/	
Bergo Windpower Co. Easol 18	WVER 3.1-2003
Bergo Windpower Co. Easol 6	WVER 3.1-2003
Enderass Wind Power Inc. S-365	WVER 3.1-2003
Energy Direct Wind Products Kvaløys-400k	WVER 3.1-2003
IPAL Ltd.	
Kiappan Environmental KWE	WVER 3.1-2003
Xerxes Wind Corporation 442SR	WVER 3.1-2003
Xerxes Wind Corporation Skulptura 3.7	WVER 3.1-2003
Intertek	
http://www.intertek.com/wind/directory/	
http://www.microgenerationcertification.org	
Aspirit (Included) Ltd Aspirit 50W	DW/EN
Aspirit (Included) Ltd Aspirit 180W	DW/EN
Aspirit (Included) Ltd Aspirit 280W	DW/EN
Bergo Windpower Company Easol 6	DW/EN
Bergo Windpower Company Easol 18	DW/EN
CF Green Energy CF10 (AP-P)	DW/EN
CF Green Energy CF11 (P-Low R)	DW/EN
CF Green Energy CF11 (P-High R)	DW/EN
CF Green Energy CF11 (S-P)	DW/EN
CF Green Energy CF11	DW/EN
CF Green Energy CF11 (up11)	DW/EN
CF Green Energy CF15 (S-P)	DW/EN
CF Green Energy CF15 (up11)	DW/EN
CF Green Energy CF15	DW/EN
CF Green Energy CF28	DW/EN
CF Green Energy CF28 (up11)	DW/EN
CF Green Energy CF28 (S-P)	DW/EN
Grube Energy Technology GHD 35-2000/III	GL-IV-2003
Kiappan Renewable KW15	DW/EN
Kiappan Renewable KW15 (up11)	DW/EN
Kiappan Renewable KW15 (S-P)	DW/EN
Oasis Energy Oasis 18	WVER 3.1-2003
Oasis Energy Oasis 18	IEC 61400-2
Seabro Energy S.5 SW	WVER 3.1-2003
Seabro Energy S.5 SW (S-P)	DW/EN
Seabro Energy S.5 SW	DW/EN
SUMEC HARDWARE & TOOLS CO., LTD PV081-38-48	WVER 3.1-2003
SUMEC HARDWARE & TOOLS CO., LTD PV082-48-48	WVER 3.1-2003
SUMEC HARDWARE & TOOLS CO., LTD PV083-44-258	WVER 3.1-2003
SUMEC HARDWARE & TOOLS CO., LTD PV085-58-288	WVER 3.1-2003
WindEa WindEa 45	DW/EN
ClassNK	
https://www.classnk.or.jp/hp/pdf/activities/windmill_attestation/en/reg_wind_e.pdf	
SEPHYR CORPORATION Nishikiya GTO / 2-1000-258	JSW/TAB001
Easol Wind Turbines Ltd 2-3000	JSW/TAB001
NI-VWNT Technology Corp. D53000	JSW/TAB001
SONHYO ENERGY WINDSPOTS 3KW	JSW/TAB001
HIKKO COMPANY HWG-1K	JSW/TAB001
Bergo Windpower Co. EXCEL 18	JSW/TAB001
RIAMWIND RW3K-JA-81	JSW/TAB001
DTU	
http://www.dawt.dk/DK/Godkendte_small_WT.htm	
Gala Wind A/S 153-18 MW	IEC 61400-2
HD Wind A/S V1000 25	IEC 61400-2
Solid Wind Power A/S SWP18-14T G28	IEC 61400-2
Solid Wind Power A/S SWP18-14T G28	IEC 61400-2
Oasis Energy Co., Ltd Oasis 18	IEC 61400-2
Regulen Big Star Vertical	Dansk requirements
Seabro Windup 3.5	Dansk requirements
Tik Mellus Luf Pikkell TWP 48-5	Dansk requirements
Tik Mellus Luf Pikkell TWP 48-18	Dansk requirements
Kiappan Environmental Ltd Kiappan KWE	Dansk requirements
KVA Direct KVA 5-18	Dansk requirements
Zoic Energy Z65	Dansk requirements
Zoic Energy Z68	Dansk requirements
BBA	
http://www.microgenerationcertification.org/	
Xerxes Wind Corp Xerxes 442SR Wind Generator...	DBA 0071
BRE-GL	
http://www.microgenerationcertification.org/	
Tuosi Hard... I TH 535 with ADD Inverter and S...	DW/EN
Tuosi Hard... I TH 535 with Grid-tie Inverter...	DW/EN
Tuosi Hard... I TH 535 with Grid-tie Inverter...	DW/EN
Tuosi Hard... I TH 535 with TDE Hesse Inverter...	DW/EN
Skulptura Windpower Skulptura 3.7	IEC 61400-2 (D-Design)
BRE Global	
http://www.microgenerationcertification.org/	
DeLuded Limited Easol R3000 Inverter 18k Fall...	DW/EN
Gala Wind Ltd Gala Wind 153-18W...	DW/EN
XERES Corp Skulptura 3.7...	DW/EN
XERES Corp Skulptura Marine 3.7M...	DW/EN
TUV-NEL	
http://www.microgenerationcertification.org/	
AIRCOR GmbH & Co. KG 185 (18kW 7.5 meter diameter)...	DW/EN
Kiappan Environmental Ltd Kiappan KWE ...	DW/EN
Shijiang Huiyuan Wind Power Generator Co., Ltd HVS 60S Wind Turbine...	DW/EN
Kiappan Environmental Ltd Kiappan KWE - Dual phase...	DW/EN
Kiappan Environmental Ltd Kiappan KWE - Three phase...	DW/EN
Easol Easol Winders 5...	DW/EN

Global Certification of SWT

- Certificates issued (74)
 - BWEA Std (38)
 - AWEA Std (13)
 - Danish Req (8)
 - IEC 61400-2 (7)
 - JSWTA0001 (7)
 - GL Guidelines (1)
- Unique turbine models (59)
 - Several are variants (e.g. power form)
 - Some turbines have multiple certs (e.g. Sonkyo Windspot has AWEA, BWEA, Japan, Danish...*and* is on the Austrian list)





**SWCC:
7 SWT certified, 1 LPP (Pika T701)
1 MWT Power & Acoustics**



SWCC Deliverables

- **Consumer Label**
 - Single-number ratings
- **Certificate**
 - Available online to confirm validity
- **Summary Report**
 - Summary of testing
 - Power curve
 - Annual energy curve
 - Acoustic Data

Small Wind Certification Council
Certified Small Wind Turbine

Manufacturer/Model

Bergey Windpower Company
Excel 10 (240 VAC, 1-phase, 60 Hz)


Rated Annual Energy
Estimated annual energy production assuming an annual average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, sea-level air density and 100% availability. Actual production will vary depending on site conditions.

Rated Sound Level
The sound level that will not be exceeded 95% of the time, assuming an annual average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, sea-level air density, 100% availability and an observer location 60 m (~ 200 ft) from the rotor center.

Rated Power
The wind turbine power output at 11 m/s (24.6 mph) at standard sea-level conditions.

Certified to be in Conformance with:
AWEA Standard 9.1 – 2009

For a summary report and SWCC Certificate visit:
www.smallwindcertification.org



CERTIFIED
SMALL WIND TURBINE
SWCC-10-12

13,800
kWh/year

42.9
dB(A)

8.9
kW

IEA Task 27

- ✓ Developed the consumer label
- ✓ Coordinating testing orgs (SWAT)
- VAWT design tools
- Small wind turbines in the built environment



**RECOMMENDED PRACTICES
FOR WIND TURBINE TESTING
AND EVALUATION**

**12. CONSUMER LABEL
FOR SMALL WIND TURBINES**

1. EDITION 2011

*Submitted to the Executive Committee of the
International Energy Agency
Implementing Agreement for Co-operation in the
Research, Development, and Deployment of
Wind Energy Systems*



11.3 Consumer label

It is recommended that a consumer label be provided in accordance with Annex M. If this is done the measurement reports used to complete the consumer label shall meet the requirements of ISO/IEC 17025 and relevant standards used to define the test requirements (e.g. IEC 61400-12-1).

Consumer Label in IEC 61400-2 ed.3

Tests for label

- Duration test per IEC 61400-2
- Power performance per IEC 61400-12-1
- Acoustic noise test per IEC 61400-11

Test Results	
Manufacturer	Manufacturer
Model	Model
Reference Annual Energy	### kWh/yr
at 5 m/s average wind speed, actual production will vary depending on site conditions	
Declared Sound Power Level	## dB(A)
at 8 m/s	
Turbine Test Class	II
(I-IV or S for Special)	
Tested by	Test Organisation
Published Date	2011-03-04
(Year-Month-Day)	
For more information, see	
www.ieawind.org	

Conclusions and questions

- SWT certification has matured
 - ~59 turbines certified
- “Test once, certify everywhere”
 - Portable test results
 - Meeting national differences can be significant
- IECRE
 - Can global harmonization be realized?
- What will “new” markets do?
 - China? Brazil? Others?
- How is labeling vs certification perceived?



Thank you

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www.smallwindcertification.org

