

**Laboratory**                      **Wind Turbine Test Station (Large and Small Wind Turbines),  
National Institute of Wind Energy, 657/1A2, Velachery-Tambaram  
Main Road, Pallikaranai, Chennai, Tamil Nadu**

**Accreditation Standard**    **ISO/IEC 17025: 2005**

**Certificate Number**        **TC-5059** (in lieu of T-1144 & T-1145)                      **Page 1 of 4**

**Validity**                            **03.02.2017 to 02.02.2019**                                      **Last Amended on 27.02.2017**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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**ELECTRICAL TESTING**

<b><u>AT SITE</u></b>				
<b>I.</b>	<b>WIND TURBINE</b>			
<b>1.</b>	<b>Wind Turbine</b>	Power performance measurement (PPM)	IEC 61400-12-1 Year 2005-12	
		Wind speed (Hub height)		0-70 m/s; 0-113 Hz
		Wind speed (Reference height)		0-70 m/s; 0-113 Hz
		Wind direction		0°-360° mechanical angle (vector type)
		Relative humidity		0.8 to 100%RH
		Air temperature		-39.2°C to 60°C
		Air pressure		600 hPa to 1060 hPa
		Rotor speed(Generator speed)		0-3000 RPM
		Pitch angle		-6° to 90°
		Rain status (ON/OFF)		Qualitative (Status 1 or 0 Logic )
		Active power		P-1250 to + 1250W (430V type) P-2000 to + 2000W (660V type)
		Reactive power		Q-1250 to + 1250VAR (430V type) Q-2000 to + 2000VAR (660V type)
		Grid frequency		45 Hz to 55 Hz
		Generator status (ON/OFF)		Status 1 or 0Logic
		Brake status (ON/OFF)		Status 1 or 0 Logic

**Ashutosh D. Tatwawadi**  
Convenor

**N. Venkateswaran**  
Program Director

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**MECHANICAL TESTING**

<b><u>AT SITE</u></b>				
<b>I.</b>	<b>PERFORMANCE / DURABILITY / SAFETY TEST</b>			
<b>1.</b>	<b>Wind Turbine</b>	<b>Performance Tests</b> Yaw efficiency test (YET) Wind speed (Hub height) Wind speed (Reference height) Wind direction	Danish recommendations for basic tests Year 1997 (guiding document) IEC 61400-1, Edition 3.1, Year 2014-04	0-70 m/s; 0-113 Hz 0-70 m/s; 0-113 Hz 0°-360° mechanical angle (vector type)
		Yaw direction		2° to 346°
<b>2.</b>	<b>Wind Turbine</b>	<b>Safety tests</b> Safety and function testing (SFT) Wind speed (Hub height) Wind direction Rotor speed Rotor azimuth position Yaw direction Edgewise bending moment Flap wise bending moment Shaft torsion Active power	IEC 61400-1, Edition 3.1, Year 2014-04 IEC 61400 – 13, Edition 1.0, Year 2015-12 Danish recommendations for basic tests Year 1997 (guiding document)	0-70 m/s; 0-113 Hz 360° mechanical angle (vector type) 0-3000RPM 0-360° 2° to 346° 0-6000 kNm 0-6000 kNm 0-6000 kNm P-1250 to + 1250W (430V type) P-2000 to + 2000W (660V type)

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		Reactive power		Q-1250 to + 1250VAR (430V type) Q-2000 to + 2000VAR (660V type)
		Grid frequency		45 Hz to 55 Hz
		Generator status		Status 1 or 0 Logic
		Brake status		Status 1 or 0 Logic
<b>3.</b>	<b>Wind Turbine</b>	<b>Performance Tests</b>	IEC 61400 – 13, Edition 1.0, Year 2015-12	
		Load Measurements (LM)		
		Wind speed (Hub height)	IEC 61400 – 13, Edition 1.0, Year 2015-12	0-70 m/s; 0-113 Hz
		Wind speed (Reference height)	IEC 61400 – 13, Edition 1.0, Year 2015-12	0-70 m/s; 0-113 Hz
		Wind direction		0°-360° mechanical angle (vector type)
		Relative humidity		0.8 to 100%RH
		Air temperature		-39.2°C to 60°C
		Air pressure		600 to 1060 hPa
		Rain status (on/off)		Status 1 or 0 Logic
		Rotor speed (Generator speed)		0-3000 RPM
		Rotor azimuth position		0-360°
		Yaw direction		2° to 346°
		Active power		P-1250 to + 1250W (430V type) P-2000 to + 2000W (660V type)
		Grid frequency		45 Hz to 55 Hz
		Generator status (on/off)		Status 1 or 0 Logic
		Brake status (on/off)		Status 1 or 0 Logic
		Nacelle acceleration		-54.49 to +54.49 m/sec <sup>2</sup>
		Edgewise bending moment		0-6000 kNm
		Flapwise bending moment		0-6000 kNm

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		Shaft bending moments		0-6000 kNm
		Shaft torsion		0-6000 kNm
		Tower top bending moment		0-20000 kNm
		Tower top torsion		0-20000 kNm

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