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 27.02.201		

SI.	Product / Material	Specific Test	Test Method Specification	Range of Testing /
	of Test	Performed	against which tests are	Limits of Detection
			performed	

ELECTRICAL TESTING

<u>AT</u>	<u>SITE</u>			
1.	WIND TURBINE			
1.	Wind Turbine	Power performance measurement (PPM) Wind speed (Hub height) Wind speed (Reference	IEC 61400–12–1 Year 2005-12	0-70 m/s; 0-113 Hz 0-70 m/s; 0-113 Hz
		height) Wind direction		0°-360° mechanical angle (vector type)
		Relative humidity Air temperature		0.8 to 100%RH -39.2°C to 60°C
		Air pressure Rotor speed(Generator speed)		600 hPa to 1060 hPa 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

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SI.	Product / Material	Specific Test	Test Method Specification	Range of Testing /
	of Test	Performed	against which tests are	Limits of Detection
			performed	

MECHANICAL TESTING

<u>AT </u>	SITE			
Ι.	PERFORMANCE /	DURABILITY / SAFETY TEST		
1.	Wind Turbine	Performance Tests 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)
2.	Wind Turbine	Yaw direction Safety tests 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)	2° to 346° 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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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		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
3.	Wind Turbine	Performance Tests Load Measurements (LM)	IEC 61400 – 13, Edition 1.0,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
		Wind speed (Hub height) Wind speed (Reference height)	Year 2015-12 IEC 61400 – 13, Edition 1.0,	0-70 m/s; 0-113 Hz 0-70 m/s; 0-113 Hz
		Wind direction	Year 2015-12	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)	l	Status 1 or 0 Logic
		Nacelle acceleration		-54.49 to +54.49 m/sec2
		Edgewise bending moment		0-6000 kNm
		Flapwise bending moment		0-6000 kNm

Lab	Laboratory Wind Turbine Test Station (Large and Small Wind Turbines), National Institute of Wind Energy, 657/1A2, Velachery-Tambara Main Road, Pallikaranai, Chennai, Tamil Nadu					
Accreditation Standard ISO/IEC 17025: 2005						
Cer	tificate Number	TC-5059 (in lieu of T-1144 & T-1145)		Page 4 of 4	Page 4 of 4	
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SI.	Product / Material of Test	Specific Test Performed		od Specification nich tests are	Range of Testing / Limits of Detection	

	orrest	Performed	performed	Limits of Detection
		Shaft bending moments		0-6000 kNm
		Shaft torsion		0-6000 kNm
		Tower top bending		0-20000 kNm
l		moment		
		Tower top torsion		0-20000 kNm