



Dynamometer Specifications at the National Wind Technology Center

The National Wind Technology Center features three dynamometers that can perform research validation on wind turbine systems from 1 kW to 5 MW. The dynamometers replicate realistic operational conditions to assess drivetrain designs and increase the technical readiness of innovations.

		5-MW Dynamometer	2.5-MW Dynamometer	225-kW Dynamometer
Facility	Test Bay	<ul style="list-style-type: none"> 20- by 6-m (65- by 20-ft) test article footprint 6.1- by 9.8-m (20- by 32.2-ft) steel anchor floor with rectangle pattern of threaded holes Drive-through high bay for test article off load 	<ul style="list-style-type: none"> 12.2- by 15.2- by 9-m (40- by 50- by 30-ft) test article area 3.7- by 6.4-m (12- by 21-ft) t-slotted anchor floor 1.74- by 8.77- by 3.13-m (5.7- by 28.75- by 10-ft) direct-drive generator pit 	<ul style="list-style-type: none"> 12.2- by 15.2- by 9-m (40- by 50- by 30-ft) test article area 3.7- by 6.4-m (12- by 21-ft) t-slotted anchor floor 1.74- by 8.77- by 3.13-m (5.7- by 28.75- by 10-ft) direct-drive generator pit
	Lifting Capacity	<ul style="list-style-type: none"> Dual 68,000-kg (75-ton) overhead cranes 14-m (45-ft) maximum hook height 	<ul style="list-style-type: none"> 45,000-kg (50-ton) overhead crane 9.14-m (30-ft) maximum hook height 	<ul style="list-style-type: none"> 45,000-kg (50-ton) overhead crane 9.14-m (30-ft) maximum hook height
	Test Article Grid Connection	<ul style="list-style-type: none"> 480, 690, and 13,200 volts alternating current (VAC) 60 Hz Indoor stand for customer-supplied transformer 	<ul style="list-style-type: none"> 480, 690, and 13,200 VAC 60 Hz Indoor stand for customer-supplied transformer 	<ul style="list-style-type: none"> 120, 240, and 480 VAC 60 Hz
	Cooling/ Heating	<ul style="list-style-type: none"> Forced ventilation with outside air Gas-heated test bay Climate-controlled control room 	<ul style="list-style-type: none"> Forced ventilation with outside air Gas- and electric-heated test bay Climate-controlled control room 	<ul style="list-style-type: none"> Forced ventilation with outside air Gas- and electric-heated test bay Climate-controlled control room
Dynamometer	Prime Mover	<ul style="list-style-type: none"> 6-MW (8,000-hp) AC induction motor Variable-frequency drive (VFD) with full regeneration capacity, 350-Hz torque response 75:1 three-stage gear reducer 	<ul style="list-style-type: none"> 2.5-MW (3,351-hp) AC induction motor VFD with full regeneration capacity, 350-Hz torque response 51.4:1 three-stage gear reducer 	<ul style="list-style-type: none"> 225-kW (300-hp) AC induction motor VFD with full regeneration capacity, 350-Hz torque response Multiple gearboxes

		5-MW Dynamometer	2.5-MW Dynamometer	225-kW Dynamometer
Dynamometer	Rated Power and Speed to Test Article	<ul style="list-style-type: none"> 0–12 rpm: torque limited to 4.6 MNm (41 M in-lb) 12–24 rpm: power limited to 5.8 MW continuous 	<ul style="list-style-type: none"> 0–24 rpm: torque limited to 1 MNm 24–44 rpm: power limited to 2.5 MW 	
	Drive Table	<ul style="list-style-type: none"> 5-degree fixed inclination 4 m (13 ft) height of output end of dynamometer drive shaft 	<ul style="list-style-type: none"> 3.66 m (12 ft) maximum height at 0-degree tilt 0-to 6-degree tilt capacity 	<ul style="list-style-type: none"> Variable height and tilt
	Control System	<ul style="list-style-type: none"> Torque and speed control modes Ramp generation, arbitrary time series, and external command capacity 100-Hz update rate Custom scripting and programming 	<ul style="list-style-type: none"> Torque and speed control modes Ramp generation, arbitrary time series, and external command capacity 100-Hz update rate Custom scripting and programming 	<ul style="list-style-type: none"> Torque and speed control modes Ramp generation, arbitrary time series, and external command capacity 100-Hz update rate Custom scripting and programming
Nontorque Loading		<ul style="list-style-type: none"> Maximum yaw or pitch moment: 7.2 MNm (64 M in-lb) Maximum radial force: 3.2 MN (730 k lb) Maximum thrust: 4 MN (900 k lb) 	<ul style="list-style-type: none"> Radial capacity: 440 kN (100 Kip) force, 152 millimeters (6 inches) stroke by 2 Thrust capacity: 156 kN (35 Kip) force, 254 millimeters (10 inches) stroke 	<ul style="list-style-type: none"> Radial capacity: 440 kN (100 Kip) force, 152 millimeters (6 inches) stroke by 2 Thrust capacity: 156 kN (35 Kip) force, 254 millimeters (10 inches) stroke
Data Acquisition		<ul style="list-style-type: none"> 500+ channel 24-bit, distributed data acquisition Stand-alone power quality condition monitoring systems 	<ul style="list-style-type: none"> 500+ channel 24-bit, distributed data acquisition Stand-alone power quality condition monitoring systems 	<ul style="list-style-type: none"> 500+ channel 24-bit, distributed data acquisition Stand-alone power quality condition monitoring systems