

# MAIN SPECIFICATIONS - NTK 150/25

QA 3.3.8.103 E  
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## 1. MAIN SPECIFICATIONS

Nominal rating : 150 kW  
Rotor diameter : 24.6 m  
Swept rotor area : 475 m<sup>2</sup>  
Hub height : 32.5 m  
Rotor speed : 38 rpm  
Complete weight approx.: 21 tons

## 2. ROTOR

Number of blades : 3  
Diameter: 24.6 m  
Swept rotor area : 475 m<sup>2</sup>  
Hub height standard: 32.5 m  
Rotor speed (Sync.): 37.6 rpm  
Tip speed (Sync.) : 48.4 m/s  
Rotor shaft tilt : 4  
Tip setting : 0.5  
Solidity : 7.3 %  
Power regulation : Stall  
Orientation : Upwind  
Complete weight approx.: 3.9 tons

## 3. BLADES

Manufacturer: LM GLASFIBER  
Type : LM 12 HHT  
Blade length : 11.5 m  
Material : Fibreglass/Polyester/Stainless steel  
Air brake system : Turnable blade tip  
Blade profiles : NACA 63200/400  
Twist : 20.5  
Biggest cord : 1.50 m  
Tip cord : 0.56 m  
Blade area : 11.6 m<sup>2</sup>  
Blade weight each : 830 kg

#### 4. HUB

Manufacturer: Kristiansand Jernstøberi  
Type : NTK 150  
Material : Meehanite SFF 400  
Protection : Sandblast, metallized and painted  
Weight : 1.3 tons

#### 5. ROTOR SHAFT

Manufacturer: NORDTANK design  
Type : Die forged shaft and flange  
Material : 30CrNiMo8V

#### 6. ROTOR BEARINGS

Manufacturer: SKF  
Type : Spherical roller bearings  
Bearing size : 2 pc: 23138 CC/W33 - 23036 CC/W33

#### 7. MAIN SHAFT SUPPORT HOUSING

Manufacturer: NORDTANK design  
Type : NTK 150 integrated double bearings  
Material : Meehanite SFP 500  
Total weight incl. rotor shaft: 500 kg

#### 8. GEARBOX

##### 8.1. General

Design : Two step parallel shafts/helical  
Ratio : 1: 39.90  
Low speed shaft nom. : 38.0 rpm  
High speed shaft max.: 1512 rpm  
Nominal mechanical power: 175 kW  
Application factor :  $K_A = 1.3$   
Safety against:  
1. Fatigue in cog roots:  $S_F$  1.6  
2. Pitting :  $S_H$  1.25  
3. Scuffing :  $S_S$  1.5

Shaft seals : Maintenance free labyrinth types  
Lubrication : Splash lubrication  
Oil type : Mobil SHC 632 - or  
Shell DK Gear Oil 320

#### 8.2. Gearbox - type I

Manufacturer: Jahnel Kestermann  
Type : AA410  
Oil sump : 60 l  
Weight complete with oil: 2.2 tons

#### 8.2. Gearbox - type II

Manufacturer: Flender  
Type : SZAK 2410  
Oil sump : 55 l  
Weight complete with oil: 2.2 tons

### **9. MECHANICAL BRAKE**

Manufacturer: NTK/Demag  
Type : Failsafe  
Brake disc : Cast iron, placed on the HSS  
Number of brake calibers: 1 pc

### **10. COUPLING**

Manufacturer: Centaflex CF-A-140-G-1  
Type : Flexible cardan

### **11. YAW SYSTEM**

Manufacturer: NORDTANK design  
Type : NTK 150 slide bearing system  
Control : Active yaw/wind vane  
Yaw fix into the wind: Yaw brakes and friction  
Number of yaw gear motors: 2 pc  
Number of yaw grips/brakes: 4 pc

### **12. YAW GEAR AND MOTORS**

Gear manufacturer : BONFIGLIOLI-TRASMITAL  
Type : Planetary/gear 303L2HZ-MAS25

Electric motor : Standard norm  
 Type/enclosure : 6-poles, IP54  
 Voltage : 3 x 400 Volt  
 Rating: 0.25 kW

### 13. GENERATOR

Manufacturer: ABB MOTOR  
 Type : M3CA 315 SMA, 4pole  
 Enclosure : IP54, closed, jacket cooled  
 Form of mounting : B3, foot mounted  
 Insulation class : Class F  
 Frequency : 50 Hz  
 Name plate rating : 150 kW/Class B temperature rise  
 Maximum power rating: 165 kW/Class F temperature rise  
 Full load current at 150 kW: 275 Ampere  
 No load current : 122 Ampere  
 Voltage : 3 x 400 Volt  
 Rotation : 1500 - 1512 RPM  
 KVAr no load: 72 kVAr  
 KVAr full load: 119 kVAr  
 Weight : 750 kg

Generator load	Efficiency %	Power factor
125 %	95.0	0.82
100 %	95.0	0.80
75 %	94.6	0.75
50 %	93.4	0.65
25 %	89.1	0.42

### 14. HYDRAULIC POWER STATION MECHANICAL BRAKE

Manufacturer: Industri Consult A/S  
 Type : IC 1F-1.5  
 Pressure area : 11-27 bar  
 Relief valve : 27 bar  
 Oil reservoir : 1.5 l  
 Oil type : Mobil SHC 524  
 Electric motor : Permanent magnetic motor  
 Type : PM50/42  
 Voltage : 24 Volt DC  
 Rating: 105 Watt

## 15. HYDRAULIC POWER STATION BLADE AIR BRAKES

Manufacturer: Industri Consult A/S  
Type : IC 1R-3.0T  
Pressure area: 62-88 bar  
Relief valve : 82 bar  
Pop-out valve: 88 bar  
Oil reservoir : 2.5 l  
Oil type : Mobil SHC 524  
Electric motor: Permanent magnetic motor  
Type : PM 50/42  
Voltage: 24 Volt DC  
Rating: 105 Watt

## 16. COLLECTOR RINGS

Manufacturer: NORDTANK design  
Carbon type power supply : Rekofa 8x4x16 M70  
Carbon type power control : Rekofa 16x8x25 M70

## 17. WIND TURBINE CONTROLLER

Manufacturer: Dan Control Engineering A/S  
Type : Microprocessor based  
Maximum current breaker : 400 Volt  
Thermal max. current range: 320-400 Ampere, slow reaction  
Magnetic short circuit protection: 2.0-4.0 kAmpere, quick reaction  
Capacitor battery voltage : 400 Volt  
Number of capacitors : 6 x 12.5 kVAr  
Max. cut-in current by thyristors: 343 Ampere  
Maximum current at motor start: 200 Ampere  
Cut-in system : Soft by thyristors  
Operational voltage range : 340-418 Volt  
Frequency : 50 +/-1 Hz  
Automatic motor start : Yes  
Weight : 200 kg

## 18. TOWER

Manufacturer: NORDTANK design  
Type : Conical tubular steel  
Tower height : 31 m  
Plate/flange materials: Steel 37.2  
Bolt material : ISO 8.8/10.9 hot dip galvanized

Protection :	Epoxy painted
Weld seam control:	Weld cl. B norm acc. to DS 412
Access :	Lockable door in the tower
Tower ascent :	Internal ladder
Access to the nacelle:	From nacelle platform
Total weight approx.:	11 tons

## 19. POWER CURVE

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(m/s)	kW
0	0,0
1	0,0
2	0,0
3	0,0
4	0,6
5	7,8
6	23,3
7	42,0
8	64,7
9	87,2
10	109,3
11	128,7
12	144,0
13	154,0
14	157,1
15	154,9
16	149,4
17	146,0
18	143,4
19	142,6
20	142,4
21	142,4
22	142,4
23	142,4
24	142,4
25	142,4

The power curve is shown at standard conditions according to DIN ISO 15 C air temperature, 1013 hPa air pressure and a maximum air turbulence intensity of 15%.

**Nordtank Energy Group reserves the right without any further notice to use components of alternative manufacture respecting the delivery to be of the same high quality and standard as in this survey.**