

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 m²
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 m²
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 m²
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.