

## 11.7 ANNEXE 7 – MODALITES DE MAINTENANCE SIEMENS GAMESA

### X MAINTENANCE PLAN AFTER 3 MONTHS FROM STARTUP

#### 15 GENERATOR SYSTEM


Chapter	Subsystem / Component	Task title	Comments
15.1	Generator - Brush	Checking wear and seat of phase brushes	
15.2	Generator - Brush	Checking wear and seat of ground brushes	

#### 20 BUILT-IN SYSTEMS

Chapter	Subsystem / Component	Task title	Comments
20.1	Predictive Maintenance System	Data collection	

#### 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Wind turbine	Maintenance of structural and electrical bolted joints	

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### I MAINTENANCE PLAN EVERY 6 MONTHS

#### NOTE:

The maintenance tasks defined below are to be performed every 6 months.

#### 01 YAW SYSTEM

Chapter	Subsystem / Component	Task title	Comments
01.1	Yaw system	Noise inspection of the yaw system	In models with automatic lubrication
01.2	Ring	Lubricating the yaw system ring teeth	Do not perform this task if the wind turbine includes the automatic lubrication system for the ring and pinions of the Yaw System. Carry out, in its place, tasks 01.8 to 01.11 of the maintenance plan every 12 months
01.3	Sliding element	Lubricating the sliding elements of the yaw system	Do not perform this task if the wind turbine includes the automatic lubrication system for the ring and pinions of the Yaw System. Carry out, in its place, tasks 01.8 to 01.11 of the maintenance plan every 12 months
01.4	Sliding element	Visually inspecting wear dust of the sliding elements and cleaning the grease collection trays	In models with automatic lubrication

#### 02 NACELLE AND ROTOR THERMAL CONDITIONING SYSTEM

Chapter	Subsystem / Component	Task title	Comments
02.1	Nacelle cover - front air inlet	Replacing air inlet filters (front area)	Only for wind turbines with HD (high dust) configuration
02.2	Nacelle cover - rear air inlet	Replacing air inlet filters (transformer area)	Only for wind turbines with HD (high dust) configuration
02.3	Nacelle cover - side air inlet	Replacing air inlet filters (stator electrical cabinet area)	Only for wind turbines with HD (high dust) configuration

#### 08 GEARBOX SYSTEM

Chapter	Subsystem / Component	Task title	Comments
08.1	Gearbox	Noise inspection	Only for the prototype
08.2	Gearbox	Inspection for the absence of metal particles in the oil	Only for the prototype
08.3	Gearbox - Oil	Sample taking	Only for the prototype

#### 15 GENERATOR SYSTEM

Chapter	Subsystem / Component	Task title	Comments
15.1	Generator - Bearings	Lubricating the LA and LOA bearings rollers	Do not perform this task if the wind turbine includes the automatic lubrication system for the generator bearings
15.2	Generator - Grease collection tray	Cleaning	

## 20 BUILT-IN SYSTEMS

Chapter	Subsystem / Component	Task title	Comments
20.1	Predictive Maintenance System	Data collection	

## 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Safety element	Checking the operation of the emergency shutdown push-buttons of the nacelle	Only for the prototype

## II MAINTENANCE PLAN EVERY 12 MONTHS NOTE:

The maintenance tasks defined below are to be performed every 12 months.

### 01 YAW SYSTEM

Chapter	Subsystem / Component	Task title	Comments
01.1	Clamp	Visually inspecting the bolted joints between the clamps and the frame	
01.2	Clamp	Readjusting the passive actuators of yaw system	
01.3	Ring - Base	Visually inspecting the bolted joint between the ring base and the tower	
01.4	Gear motor	Visually inspecting oil leaks	
01.5	Gear motor	Visually inspecting the bolted joints	
01.6	Position control unit - Yaw sensor	Visually inspecting the yaw sensor	
01.7	Automatic lubrication system: ring and pinions of the yaw system - Grease tubes	Checking the absence of loose tube	Optional according to the client
01.8	Automatic lubrication system: ring and pinions of the yaw system - Pump - Tank	Grease refill	Optional according to the client
01.9	Automatic lubrication system: ring and pinions of the yaw system - Complete system	Checking operation after refill	Optional according to the client
01.10	Automatic lubrication system: ring and pinions of the yaw system - Complete system	Checking the absence of leaks in tubes, connections and lubrication points	Optional according to the client
01.11	Automatic lubrication system: yaw system sliding elements - Grease tubes	Checking the absence of loose tube	Optional according to the client
01.12	Automatic lubrication system: yaw system sliding elements - Pump - Tank	Grease refill	Optional according to the client
01.13	Automatic lubrication system: yaw system sliding elements - Complete system	Checking operation after refill	Optional according to the client

01.14	Automatic lubrication system: yaw system sliding elements - Complete system	Checking the absence of leaks in tubes, connections and lubrication points	Optional according to the client
01.15	Automatic lubrication system: Sliding element	Visually inspecting wear dust of the sliding elements and cleaning the grease collection trays	

### 02 NACELLE AND ROTOR THERMAL CONDITIONING SYSTEM

Chapter	Subsystem / Component	Task title	Comments
02.1	Conditioning and air distribution system	Visually inspecting the fastening elements of the heaters in the yaw system and front frame area	Only for low-temperature wind turbine versions
02.2	Conditioning and air distribution system	Visually inspecting the fastening elements of heaters in the nacelle	Only for low-temperature wind turbine versions
02.3	Conditioning and air distribution system	Visually inspecting the fastening elements of the heaters in the front frame area	Only for wind turbines with VHC (very high corrosion)/nearshore configuration
02.4	Conditioning and air distribution system	Visually inspecting the fastening elements on the heaters in the nacelle and in the transformer compartment	Only for wind turbines with VHC (very high corrosion)/nearshore configuration
02.5	Nacelle cover - front air inlet	Replacing air inlet filters (front area)	Only for wind turbines with VHC (very high corrosion)/nearshore configuration
02.6	Nacelle cover - rear air inlet	Replacing air inlet filters (transformer area)	Only for wind turbines with VHC (very high corrosion)/nearshore configuration
02.7	Nacelle cover - side air inlet	Replacing air inlet filters (stator electrical cabinet area)	Only for wind turbines with VHC (very high corrosion)/nearshore configuration

### 03 BLADES

Chapter	Subsystem / Component	Task title	Comments
03.1	Blade system	Noise inspection of the blades	• Mechanical and aerodynamic noise
03.2	Structure	Visually inspecting the blades	
03.3	Joint - Bolted joint	Visually inspecting between the blade and blade bearing	
03.4	De-icing system	Visual inspection	Optional according to the client
03.5	De-icing system	Visually inspecting the bolted joints of the de-icing system - blade	Optional according to the client
03.6	De-icing system	Visually inspecting the bolted joints of the hub control electrical cabinet	Optional according to the client

### 04 HYDRAULIC SYSTEM AND PITCH CONTROL

Chapter	Subsystem / Component	Task title	Comments
04.1	Pitch control system - Cylinders	Noise inspection for gaps in the supports of the pitch control system cylinders	
04.2	Hydraulic unit - Manifold block	Inspecting and adjustment of the reducing valve of the yaw system brake (Pos. 110)	
04.3	Hydraulic unit - Manifold block	Inspecting and adjusting the mechanical brake's pressure relief valve (Pos.33)	
04.4	Hydraulic unit - Manifold block	Inspecting and adjusting the pressure limiting valve of the pitch control system brake (Pos. 25)	
04.5	Nacelle hydraulic circuit - Yaw system brake hydraulic circuit	Visually inspecting for leaks	
04.6	Nacelle hydraulic circuit - Mechanical brake hydraulic circuit	Visually inspecting for leaks	
04.7	Hydraulic unit - Yaw system brake accumulator	Verification of the precharge pressure and adjustment	
04.8	Hydraulic unit - Mechanical brake accumulator	Verification of the precharge pressure and adjustment	
04.9	Hydraulic unit - Pressure accumulators	Verification of the precharge pressure and adjustment	
04.10	Nacelle hydraulic circuit	Visually inspecting for leaks	
04.11	Pitch control system - Hydraulic circuit in rotor	Inspection of condition of hoses	
04.12	Nacelle hydraulic circuit	Inspection of condition of hoses	
04.13	Pitch control system - Hydraulic rotary joint	Visually inspecting for leaks	
04.14	Pitch control system - Hydraulic circuit in rotor	Visually inspecting for leaks	
04.15	Hydraulic unit - Oil filter	Filter cartridge replacement	
04.16	Pitch control system - Filtering system	Replacing the filter cartridge of the hub	
04.17	Thermal conditioning system	Visually inspecting and cleaning (as required) the intercooler	
04.18	Pitch control system - Solenoid valve for the hydraulic cylinder manifold block	Checking operation	
04.19	Pitch control system - Pressure switch	Verifying and adjusting the pressure switch (Pos. 98)	

04.20	Pitch control system - Hydraulic cylinder fork	Visually inspecting the bolted joints of the cylinder ball joint housings	
04.21	Pitch control system - Hydraulic cylinder bracket	Visually inspecting the bolted joint between the hydraulic cylinder bracket parts and the hub	
04.22	Hydraulic unit - Oil	Visually inspecting the oil level	Refilling as pending corrective action
04.23	Hydraulic unit - Air filter	Visual inspection and replacement (as required)	Replacement after visual inspection, depending on the condition
04.24	Pitch control system - Emergency accumulator supports	Visually inspecting the support - hub bolted joints	
04.25	Pitch control system - Emergency accumulator supports	Inspecting the accumulators-support bolted joints	
04.26	Pitch control system - Emergency accumulator supports	Visually inspecting the condition of the support of the accumulators and cabinet	
04.27	Pitch control system - Distributor block	Inspecting the bolted joints fastening the pitch control system distributor block	
04.28	Pitch control system - Pitch control system block	Inspecting the bolted joints fastening the cylinder manifold blocks of the pitch control system	

## 05 FRAME SYSTEM

Chapter	Subsystem / Component	Task title	Comments
05.1	Frame system	Visual inspection	
05.2	Frame system	Visual inspection	
05.3	Frame system	Visually inspecting the bolted joints between the front and rear frames	

## 06 HUB SYSTEM

Chapter	Subsystem / Component	Task title	Comments
06.1	Hub	Visual inspection	

## 07 HIGH SPEED SHAFT COUPLING SYSTEM

Chapter	Subsystem / Component	Task title	Comments
07.1	Coupling	Visually inspecting the bolted joints	
07.2	Coupling	Visual inspection	
07.3	Mechanical brake	Bleeding the hydraulic circuit	



07.4	Mechanical brake - Brake pad	Inspection and replacement	
07.5	Gearbox - Mechanical brake	Visually inspecting the bolted joints of the mechanical brake support	
07.6	Mechanical brake - Clamps	Visually inspecting the mechanical brake clamps	

## 08 GEARBOX SYSTEM

Chapter	Subsystem / Component	Task title	Comments
08.1	Gearbox	Noise inspection	
08.2	Gearbox	Inspection for the absence of metal particles in the oil	
08.3	Gearbox - Oil	Sample taking	
08.4	Gearbox	Visually inspecting the structure	
08.5	Lubrication system - Hoses	Visual inspection	
08.6	Cooling system	Inspection for leaks	
08.7	Gearbox - Oil filter	Replacement	Do not perform this task when the oil will be changed in the next 3 months or the oil has been changed in the last 3 months
08.8	Gearbox - <i>off-line</i> oil filtering system	Replacement	Do not perform this task when the oil will be changed in the next 3 months or the oil has been changed in the last 3 months
08.9	Cooling system - Intercooler	Visually inspecting and cleaning (as required)	
08.10	Gearbox - Torque arm	Visually inspecting the bolted joints between the torque arms and the gearbox	
08.11	Gearbox - Oil	Level inspection	
08.12	Gearbox - Torque arm	Inspecting the condition of gaps in the damper packages	
08.13	Gearbox - Air filter	Inspection and replacement	

## 09 MAIN SHAFT SYSTEM

Chapter	Subsystem / Component	Task title	Comments
09.1	Main shaft system	Visually inspecting for grease leaks in the main shaft bearings	
09.2	Main shaft - Grease collection tray	Cleaning the grease collection trays of the main shaft bearings	

09.3	Main shaft - Bearings	Lubrication of the main bearings with automatic refill system	
09.4	Main shaft - Bearings	Manual lubrication of the main bearings	
09.5	Main shaft	Visually inspecting the bolted joints between the hub and the main shaft	
09.6	Main shaft	Visually inspecting the bolted joints between the main shaft housings and the frame	
09.7	Main shaft	Visually inspecting the structure and the rotor lock disc	
09.8	Main shaft - Coupling flange - Bolted joint	Visually inspecting the bolted joints between the coupling flange and the main shaft	
09.9	Main shaft - Coupling flange - Bolted joint	Visually inspecting the bolted joints between the coupling flange and the gearbox	
09.10	Main shaft	Visually inspecting the bolted joints between the main shaft and the lock system ring	
09.11	Main shaft	Visually inspecting the bolted joints between the main shaft and the lock system ring	
09.12	Main shaft	Main shaft system - Rotor lock system - Visually inspecting the bolted joint between the rotor lock system and the front bearing housing	
09.13	Main shaft	Visually inspecting the bolted joint between the stiffeners and the bearing housings	

## 10 BLADE BEARING SYSTEM

Chapter	Subsystem / Component	Task title	Comments
10.1	Lubrication system	Visually inspecting for grease leaks in the lubricators and the blade bearing drainage holes	
10.2	Blade bearing unit - Blade bearing	Visually inspecting the condition of the lower retainer of the blade bearings	
10.3	Blade bearing unit	Visually inspecting the condition of the outer retainer of the blade bearings	
10.4	Blade bearing system	Blade bearing manual lubrication	• Do not perform this task if the wind turbine includes the automatic lubrication system for the blade bearings. Instead perform tasks 10.8 to 10.15
10.5	Blade bearing system	Manual lubrication of the blade bearing with semi-automatic system	
10.6	Blade bearing unit	Visually inspecting the bolted joints of the hub	



10.7	Blade lock	Visually inspecting the bolted joints of the blade lock systems	
10.8	Inner blade access cover	Visually inspecting the blade root access cover and the seal	
10.9	Automatic lubrication system: blade bearings - Pump - Tank	Checking the absence of cracks in the grease tank	Optional according to the client
10.10	Automatic lubrication system: Blade bearing - Grease collection containers	Checking the correct placement and drainage	Optional according to the client
10.11	Automatic lubrication system: blade bearings - Grease tubes	Checking the absence of loose tube	Optional according to the client
10.12	Automatic lubrication system: blade bearing - Pump system - Tank	Refilling grease and verifying the operation after refilling	Optional according to the client
10.13	Automatic lubrication system: blade bearing - Complete system	Checking the absence of leaks in tubes, connections and lubrication points	Optional according to the client
10.14	Automatic lubrication system: blade bearing - Pump - Support bolted joints	Visual inspection	Optional according to the client
10.15	Automatic lubrication system: blade bearing - Primary distributor - support bolted joints	Visual inspection	Optional according to the client
10.16	Automatic lubrication system: Blade bearings - Bolted joints of the support - blade bearing	Visual inspection	Optional according to the client

### 11 WIND TURBINE INSTRUMENTATION SYSTEM

Chapter	Subsystem / Component	Task title	Comments
11.1	Operating sensor - Vibration sensor	Checking the functioning of the vibration sensor	

### 12 TOWER SYSTEM

#### METAL TOWER

Chapter	Subsystem / Component	Task title	Comments
12.1	Tower - Structure - Metal joint structure	Visually inspecting the flange - ring welding	
12.2	Tower - Structure - Metal joint structure	Visually inspecting the bolted joints between sections	

12.3	Foundation - Metal foundation ring	Visually inspecting the flange	
12.4	Foundation	Visually inspecting the bolted joints between the foundation and lower section	
12.5	Foundation - Pedestal	Visual inspection	
12.6	Foundation	Inspection of gaps between the foundation section and the pedestal	
12.7	Foundation - Concrete tower	Inspecting the pre-stressed tendons	For towers of one or more concrete sections
12.8	Tower - Structure - Metal joint structure	Visually inspecting the bolted joints between the sections of a section (if applicable)	Only for towers with vertical bolted joints in the sections
12.9	Internal element - Lifeline	Prescribed inspection	Perform only by authorized personnel according to what is indicated by the supplier and current legislation

### 13 NACELLE COVER AND CONE SYSTEM

Chapter	Subsystem / Component	Task title	Comments
13.1	Cone unit	Visually inspecting the weld of the metal structure of the support cone	Only for the prototype
13.2	Cone unit	Visually inspecting the metal structure of the cone support	
13.3	Nacelle cover	Visual inspection (outside the transformer compartment)	
13.4	Nacelle cover	Visual inspection (inside the transformer compartment)	
13.5	Nacelle cover	Visually inspecting the fireproof fabrics (inside the transformer compartment)	
13.6	Cone unit	Visually inspecting the cone's fiber panels	
13.7	Cone unit	Visually inspecting the bolted joints between the ring support structure and the cone fiber	
13.8	Cone unit	Visually inspecting the bolted joints of the base plates of the cone support beams	
13.9	Cone unit	Visually inspecting the bolted joints between the rear supports and the cone fiber	
13.10	Cone unit	Visually inspecting the bolted joints between the cone support structure and the support ring	
13.11	Cone unit	Visually inspecting the bolted joints between the cone support ring and the fiber	

13.12	Nacelle cover	Visually inspecting the bolted joints between the fixed rafters and the fiber panels in the non-folding areas of the nacelle roof	
13.13	Nacelle cover	Visually inspecting the bolted joints between the gutter ring and the front fiber panels of the nacelle cover	
13.14	Nacelle cover	Visually inspecting the bolted joints of the fixed and folding rafters to the bridge crane structure	
13.15	Nacelle cover	Visually inspecting the bolted joints between the side and rear cover supports and the nacelle structure	
13.16	Nacelle cover	Visually inspecting the bolted joints between the rear nacelle cover supports and the frame	
13.17	Nacelle cover - Tower retainer	Visually inspecting the tower retainer	

#### 14 LOAD HOIST SYSTEM

Chap-ter	Subsystem / Component	Task title	Comments
14.1	Fixed hoist system	Visually inspecting the upper and lower bolted joints on the pillars of the bridge crane structure	
14.2	Fixed hoist system	Visually inspecting the bolted joint between the support structure of the generator and converter intercoolers and the nacelle structure	
14.3	Fixed hoist system	Visually inspecting the internal bolted joints of the structure of the generator and converter intercoolers	

#### 15 GENERATOR SYSTEM

Chap-ter	Subsystem / Component	Task title	Comments
15.1	Generator	Visually inspecting the bolted joints to the frame	
15.2	Generator - Electrical element	Inspection of the inside of the stator terminal box	
15.3	Automatic lubrication system: generator bearings - Grease tubes	Checking the absence of loose tube	Optional according to the client
15.4	Automatic lubrication system: generator bearings - Pump - Tank	Grease refill	Optional according to the client

15.5	Automatic lubrication system: generator bearings - Complete system	Checking operation after refill	Optional according to the client
15.6	Automatic lubrication system: generator bearings - Complete system	Checking the absence of leaks in tubes, connections and lubrication points	Optional according to the client
15.7	Generator - Bearings	Lubricating the DE ball bearing	
15.8	Generator - Brush	Checking wear and seat of phase brushes	
15.9	Generator - Brush	Checking wear and seat of ground brushes	
15.10	Generator - Ring body	Cleaning and measuring insulation	Perform the ring body cleaning task before the annual frequency if the production accumulated since the last ring cleaning exceeds the following values: <ul style="list-style-type: none"> <li>SG4.5 MW: 22 GWh/year</li> <li>SG5.0 MW: 24.3 GWh/year</li> </ul>

#### 18 TRANSFORMER SYSTEM

Chap-ter	Subsystem / Component	Task title	Comments
18.1	Transformer	Visually inspecting the neutral cable ground connection	
18.2	Transformer - Electrical safeguard	Visually inspecting surge arrester connections	
18.3	Transformer - Neutral relay	Checking the switchgear trip	
18.4	Transformer - Arc protector	Checking the operation of the arc sensor	
18.5	Wall - Lock system	Checking of transformer access door microswitches operation	
18.6	Transformer	Cleaning	
18.7	Transformer	Visually inspecting low-voltage cables, terminals and fuses	
18.8	Transformer	Visually inspecting the high-voltage delta connection and terminals	
18.9	Transformer - Structure	Visually inspecting the bolted joints between the transformer and the support	
18.10	Transformer - Structure	Visually inspecting the upper fastening bolted joints of the transformer	
18.11	Transformer	Visually inspecting the coil support blocks	

18.12	Transformer	Visually inspecting the bolted joints of the fuses and the low-voltage plates of the transformer	
18.13	Transformer	Visually inspecting the bolted joints between the neutral plate and the low-voltage plates of the transformer	
18.14	Transformer	Visually inspecting the bolted joints fastening the neutral cable of the transformer to the ground plate and to the neutral plate	
18.15	Transformer	Visually inspecting the bolted joints fastening the low-voltage braids to the transformer and to the fuse plates	
18.16	Transformer	Visually inspecting the bolted joints fastening the high-voltage terminals of the transformer	
18.17	Transformer	Visually inspecting the bolted joints fastening the transformer surge arresters	
18.18	Transformer	Visually inspecting the bolted joints fastening the groundings of the high-voltage cable to the ground plate	
18.19	Transformer	Visually inspecting the bolted joints fastening the high-voltage delta busbars of the transformer	
18.20	Transformer	Visually inspecting the bolted joints fastening the ground cable between the transformer support beam and the ground plate	
18.21	Transformer	Visually inspecting the bolted joints fastening the ground cables to the vertical ground plate inside the transformer compartment	
18.22	Transformer	Visually inspecting the bolted joint fastening the FG001N cable to the transformer neutral plate	
18.23	Transformer	Visually inspecting the bolted joint fastening the grounding cable of the stator electrical cabinet to the ground plate	

#### 19 ELECTRICAL CABINET SYSTEM

Chapter	Subsystem / Component	Task title	Comments
19.1	Tower base electrical cabinet	Air filter replacement	
19.2	Tower base electrical cabinet	Checking operation of differentials (sockets and lights)	

19.3	Tower base electrical cabinet	Cleaning	
19.4	Nacelle control electrical cabinet	Air filter replacement	
19.5	Nacelle control electrical cabinet	Cleaning	
19.6	Nacelle control electrical cabinet	Checking operation of differentials (sockets and lights)	
19.7	Hub control electrical cabinet	Air filter replacement	
19.8	Hub control electrical cabinet	Cleaning	
19.9	Converter electrical cabinet	Air filter replacement	
19.10	Converter electrical cabinet	Cleaning	
19.11	Stator module electrical cabinet	Air filter replacement	
19.12	Stator module electrical cabinet	Cleaning	
19.13	Electrical cabinet converter - Cooling system	Inspection of the hoses	
19.14	Electrical cabinet converter - Cooling system	Inspecting for leaks from the cooling circuit	
19.15	Electrical cabinet converter - Cooling system	Inspecting and cleaning (as required) the intercooler	
19.16	Hub control electrical cabinet	Visually inspecting the HUB control electrical cabinet - support bolted joints	
19.17	Stator module electrical cabinet - Circuit Breaker	Checking opening or closing maneuvers of circuit breaker FG008	
19.18	Auxiliary transformer	Visually inspecting the bolted joints (electrical and mechanical) of the auxiliary transformer	
19.19	Hub electrical cabinet	Visually inspecting the bolted joints between the HUB electrical cabinet and the accumulator structure	

#### 20 BUILT-IN SYSTEMS

Chapter	Subsystem / Component	Task title	Comments
20.1	Overspeed guard system	Checking the operation of the relay	
20.2	Active fire extinguishing system	Checking extinguisher cylinder charge	Optional according to the client



20.3	Active fire extinguishing system	Visually inspecting the proper service condition	Optional according to the client
20.4	Active fire extinguishing system	Checking the system operations in automatic mode	Optional according to the client
20.5	Active fire extinguishing system	Visually inspecting the conservation condition of the system elements	Optional according to the client
20.6	Active fire extinguishing system	Visually inspecting the integrity of the extinguishing circuits	Optional according to the client
20.7	Active fire extinguishing system	Visually inspecting the integrity of the intake circuits	Optional according to the client
20.8	Active fire extinguishing system	Cleaning the filters in ASD detectors	Optional according to the client
20.9	Active fire extinguishing system	Downloading the record of events in ASD detectors	Optional according to the client
20.10	Active fire extinguishing system	Integral operation test	Optional according to the client

## 26 COMPLETE NACELLE WIRING

Chapter	Subsystem / Component	Task title	Comments
26.1	Electrical equipment - Wiring	Visually inspecting the power wiring	

## 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Safety element	Checking the operation of the emergency shutdown push-buttons of the nacelle	
31.2	Safety element	Checking the operation of the Ground emergency disconnection push-button (switchgear trip)	
31.3	Safety element	Checking the operation of the emergency disconnection push-buttons in the nacelle (switchgear trip)	
31.4	Wind turbine	Cleaning	
31.5	Safety element	Visually inspecting the safety signs	
31.6	Safety element	Checking the operation of safety relay KR901	
31.7	Safety element	Visually inspecting the safety eyebolt of the emergency descent device	
31.8	Safety element	Inspecting the fire extinguishers	Only the authorized company can perform these tasks
31.9	Safety element	Inspecting the condition of the container with the descent device	

31.10	Safety element	Check of the last inspection date of the emergency descent device	
31.11	Safety element	Inspecting the overvoltage dischargers in tower base electrical cabinet	
31.12	Safety element	Inspecting the condition of the non-slip tape	

## 36 BEACON SYSTEM

Chapter	Subsystem / Component	Task title	Comments
36.1	Beacons	Checking operation	

## 37 LIGHTNING TRANSMISSION SYSTEM

Chapter	Subsystem / Component	Task title	Comments
37.1	Lightning transmission unit	Visual inspection	
37.2	Lightning transmission unit	Visually inspecting the bolted joints fastening the lightning transmission system	
37.3	Grounding connection	Visually inspecting the grounding cables between tower sections	
37.4	Grounding connection	Visually inspecting the transformer grounding cable	
37.5	Grounding connection	Visually inspecting the high-voltage switchgear grounding cable	
37.6	Grounding connection	Visually inspecting the foundation grounding cables	
37.7	Lightning transmission unit	Measuring blade conductivity	

### III MAINTENANCE PLAN EVERY 18 MONTHS

**NOTE:**

The maintenance tasks defined below must be performed every 18 months.

#### 15 GENERATOR SYSTEM

Chapter	Subsystem / Component	Task title	Comments
15.1	Generator - Bearings	Lubricating the LA ball bearings	

### IV MAINTENANCE PLAN EVERY 24 MONTHS

**NOTE:**

The maintenance tasks defined below are to be performed every 24 months.

#### 01 YAW SYSTEM

Chapter	Subsystem / Component	Task title	Comments
01.1	Gear motor - Oil	Inspecting gear motor oil levels	

#### 04 HYDRAULIC SYSTEM AND PITCH CONTROL

Chapter	Subsystem / Component	Task title	Comments
04.1	Hydraulic unit - Manifold block	Inspecting and adjustment of the reducing valve of the yaw system brake (Pos. 110)	
04.2	Hydraulic unit - pressure switch	Checking and adjusting the mechanical brake pressure switch (Pos.31)	

#### 05 FRAME SYSTEM

Chapter	Subsystem / Component	Task title	Comments
05.1	Rear frame system	Visually inspecting the bolted joints between the rear beams of the rear frame and the longitudinal beams	

#### 11 WIND TURBINE INSTRUMENTATION SYSTEM

Chapter	Subsystem / Component	Task title	Comments
11.1	Operating sensor - Smoke sensor	Checking smoke sensor operation	

#### 12 TOWER SYSTEM

##### METAL TOWER

Chapter	Subsystem / Component	Task title	Comments
12.1	Internal element - Light	Checking the operation of the lights	
12.2	Tower - Structure - Access door	Visual inspection	

#### 13 NACELLE COVER AND CONE SYSTEM

Chapter	Subsystem / Component	Task title	Comments
13.1	Nacelle cover	Visually inspecting the bolted joints between the split rafters of the nacelle roof folding gates	
13.2	Nacelle cover	Visually inspecting the bolted joints between the L-shaped profiles of the nacelle roof folding gates	
13.3	Nacelle cover	Visually inspecting the bolted joints between the rear nacelle cover and the frame	
13.4	Nacelle cover	Visually inspecting the side bolted joints between the nacelle cover and the frame	
13.5	Nacelle cover	Visually inspecting the lower bolted joints between the nacelle cover and the frame	

#### 15 GENERATOR SYSTEM

Chapter	Subsystem / Component	Task title	Comments
15.1	Generator - Mount	Visually inspecting the bolted joints between the generator and its mount	
15.2	Generator - Mount	Visually inspecting the bolted joints between the generator mounts and the frame	

#### 18 TRANSFORMER SYSTEM

Chapter	Subsystem / Component	Task title	Comments
18.1	Transformer - Fuse	Checking of fuse microswitch operation	

#### 19 ELECTRICAL CABINET SYSTEM

Chapter	Subsystem / Component	Task title	Comments
19.1	Stator module electrical cabinet - Circuit Breaker	Lubrication of the opening and closing mechanism of the FG008 circuit breaker switch	Only for FG008 <i>ABB</i>

#### 36 BEACON SYSTEM

Chapter	Subsystem / Component	Task title	Comments
36.1	Uninterruptible power supply for beacons (UPS)	Checking operation	Only for wind farms with beacon UPS

#### V MAINTENANCE PLAN EVERY 48 MONTHS

##### NOTE:

The maintenance tasks defined below are to be performed every 48 months.

#### 03 BLADES

Chapter	Subsystem / Component	Task title	Comments
03.1	Blade root	Visual inspection	

#### 10 BLADE BEARING SYSTEM

Chapter	Subsystem / Component	Task title	Comments
10.1	Blade bearing unit - Blade plate	Visually inspecting the bolted joints between the pin support and the blade plate	



#### VI MAINTENANCE PLAN EVERY 60 MONTHS

**NOTE:**

The maintenance tasks defined below are to be performed every 60 months.

##### 03 BLADES

Chapter	Subsystem / Component	Task title	Comments
03.1	Joint - Bolted joint	Visually inspecting and inspecting the tightening torque of the nut of the bolt that joins the lightning protection system to the blade root band	The tightening torque must be 50±5 Nm
03.2	Blade root	Visual inspection	After the tenth year: annually

##### 04 HYDRAULIC SYSTEM AND PITCH CONTROL

Chapter	Subsystem / Component	Task title	Comments
04.1	Hydraulic unit	Taking oil samples	Take the first sample starting from the 5th year, included

##### 08 GEARBOX SYSTEM

Chapter	Subsystem / Component	Task title	Comments
08.1	Gearbox - Oil	Synthetic oil replacement	

##### 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Safety element	Restamping extinguishers	Only the authorized company can perform these tasks

#### VIII MAINTENANCE PLAN EVERY 96 MONTHS

**NOTE:**

The maintenance tasks defined below are to be performed every 96 months.

##### 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Safety element	Replacing the ropes on the descent device	Only to be performed by a certified entity

#### VII MAINTENANCE PLAN EVERY 72 MONTHS

**NOTE:**

The maintenance tasks defined below are to be performed every 72 months.

##### 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Wind turbine	Applying anti-corrosion protection to bolted joints	For <i>NearShore/VHC</i> wind turbines

#### IX MAINTENANCE PLAN EVERY 120 MONTHS

**NOTE:**

The maintenance tasks defined below are to be performed every 120 months.

##### 08 GEARBOX SYSTEM

Chapter	Subsystem / Component	Task title	Comments
08.1	Gearbox - Oil	Synthetic oil replacement	Replacement every 5, 7 or 10 years according to oil supplier indications

**X MAINTENANCE PLAN AFTER 3 MONTHS FROM STARTUP**

**15 GENERATOR SYSTEM**

Chapter	Subsystem / Component	Task title	Comments
15.1	Generator - Brush	Checking wear and seat of phase brushes	
15.2	Generator - Brush	Checking wear and seat of ground brushes	

**20 BUILT-IN SYSTEMS**

Chapter	Subsystem / Component	Task title	Comments
20.1	Predictive Maintenance System	Data collection	

**31 WIND TURBINE**

Chapter	Subsystem / Component	Task title	Comments
31.1	Wind turbine	Maintenance of structural and electrical bolted joints	

**XI MAINTENANCE PLAN AFTER A STORM**

**NOTE:**

The maintenance tasks defined below are to be performed after each storm

**03 BLADES**

Chapter	Subsystem / Component	Task title	Comments
03.1	Blade system	Noise inspection of the blades	

**36 BEACON SYSTEM**

Chapter	Subsystem / Component	Task title	Comments
36.1	Beacons	Checking operation	

## XII MAINTENANCE PLAN IF THE CLOGGED FILTER SIGNAL APPEARS

### NOTE:

The maintenance tasks defined below are to be performed if the filter sensor signal appears clogged

### 08 GEARBOX SYSTEM

Chapter	Subsystem / Component	Task title	Comments
08.1	Gearbox - Oil filter	Replacement	Do not perform this task when the oil will be changed in the next 3 months or the oil has been changed in the last 3 months
08.2	Gearbox - <i>off-line</i> oil filtering system	Replacement	Do not perform this task when the oil will be changed in the next 3 months or the oil has been changed in the last 3 months

## XIII MAINTENANCE PLAN AFTER EACH USE

### NOTE:

The maintenance tasks defined below are to be performed after each use

### 12 TOWER SYSTEM

#### METAL TOWER

Chapter	Subsystem / Component	Task title	Comments
12.1	Tower - Structure - Access door	Inspecting the retention system of the tower access door	
12.2	Internal element - Lifeline	Verifying the last inspection date of the lifeline	

### 12 TOWER SYSTEM

#### ELEVATORS

Chapter	Subsystem / Component	Task title	Comments
12.1	Elevator	Inspecting and checking the operation of the elevator	<ul style="list-style-type: none"> <li>Check the manufacturer and model of the elevator on the nameplate</li> <li>Perform the inspections and checks prior to using the elevator according to the manual of the corresponding model</li> </ul>

### 13 NACELLE COVER AND CONE SYSTEM

Chapter	Subsystem / Component	Task title	Comments
13.1	Nacelle cover - Roof	Visually inspecting the bolted joints between the anchor points and nacelle roof	

### 14 LOAD HOIST SYSTEM

Chapter	Subsystem / Component	Task title	Comments
14.1	Fixed hoist system - Hoist component	Inspecting and checking the operation of the hoist	<ul style="list-style-type: none"> <li>Check the manufacturer and model of the hoist on the nameplate</li> <li>Perform the inspections and checks prior to using the elevator according to the manual of the corresponding model</li> </ul>



#### XIV MAINTENANCE PLAN EVERY TIME THE WIND TURBINE IS ACCESSED

**NOTE:**

The maintenance tasks defined below are to be carried out whenever accessing the wind turbine

##### 31 WIND TURBINE

Chapter	Subsystem / Component	Task title	Comments
31.1	Safety element	Checking the condition and last inspection date of the extinguisher on the tower platform	
31.2	Safety element	Checking the condition and last inspection date of the nacelle extinguisher	

#### XV MAINTENANCE PLAN ACCORDING TO THE MANUFACTURER MANUAL

**NOTE:**

The maintenance tasks defined below will be carried out according to the frequency established in the manufacturer manual

##### 12 TOWER SYSTEM

###### ELEVATORS

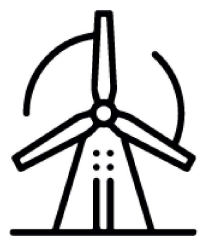
Chapter	Subsystem / Component	Task title	Comments
12.1	Elevator	Inspections and periodic checks of the elevator	<ul style="list-style-type: none"> <li>Check the manufacturer and model of the elevator on the nameplate</li> <li>Perform the inspections and checks prior to using the elevator according to the manual of the corresponding model</li> </ul>

##### 14 LOAD HOIST SYSTEM

Chapter	Subsystem / Component	Task title	Comments
14.1	Fixed hoist system - Hoist component	Periodic inspections and checks of the hoist	<ul style="list-style-type: none"> <li>Check the manufacturer and model of the hoist on the nameplate</li> <li>Perform the inspections and checks prior to using the elevator according to the manual of the corresponding model</li> </ul>

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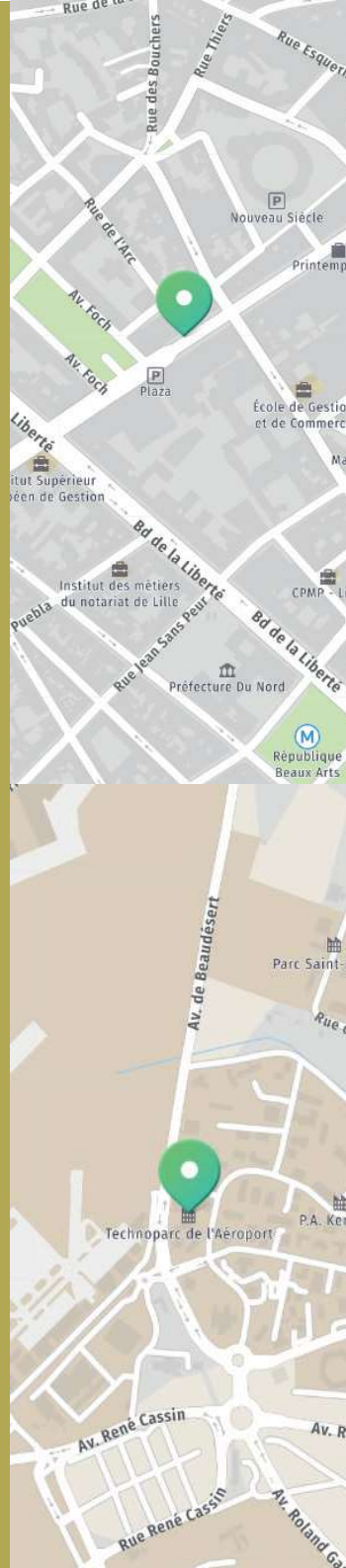
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