

# Scope of Work Generator

Scheduled Outages on SGen-3000W [THDF]

1 Medium Inspection				
2 Major Inspection				
Equipment (KKS)	Activity		Medium	Major
<b>A) General</b>				
<b>Visual inspections and / or functional check:</b>				
	Temperature and pressure measuring devices and transducers		x	x
	All valves		x	x
<b>Maintenance:</b>				
	Replacement of all dismantled gaskets		x	x
	Replacement of O-rings / flange gaskets			x
	Refurbishment/ replacement of valves, if required			x
<b>B) Stator (MKA)</b>				
<b>Electrical tests:</b>				
	Measurement of insulation resistances of each phase of stator winding		x	x
	Stator core inter-lamination verification testing			x
	Resistance temperature detector or thermo couple insulation resistance test		x	x
	Dielectric absorption and leakage		x	x
	Evaluate condition of insulation		x	x
	Voltage drop test at series and phase connections			x
<b>Mechanical tests:</b>				
	Conduct stator end-winding modal analysis			x
	Check anchor bolts			x
	Tightness test with air		x	x
<b>Visual inspection:</b>				
	Stator core condition		x	x

1 Medium Inspection

2 Major Inspection

Equipment (KKS) Activity

Medium

Major

Ventilation paths of core

x

x

Thermocouple and resistance temperature detector (RTD)-  
cables and seals

x

Bushings and adjacent component

x

x

Stator winding conditions

x

x

Teflon hoses

x

x

**Stator Water System:**

Stator winding tightness test

x

x

Clean stator water taper filters

x

Replacement of seals of stator winding PTFE-hoses

x

Check perforated plates in parallel ring flanges

x

**C) Terminal Bushing (MKA)**

Replacement of gaskets to casing and installation of new or  
refurbished bushings. Customer must purchase (subject to  
Change Order) the new or refurbished bushings, whatever is  
required.

x

**D) Rotor (MKA)**

**Electrical tests:**

Measurement of insulation resistance of rotor winding

x

x

Check for Interturn faults

x

x

**Mechanical tests:**

Hydrogen seal tightness test of axial leads

x

**Visual inspections:**

End winding area

x

x

Bearing journals (as far as possible)

x

Coupling flanges

x

Grounding brushes

x

x

Rotor body and components\*

x

x

\*NDE of the rotor retaining rings (e.g. by robotic tool) in addition  
to the visual inspection.

**Maintenance:**

Replacement of seals and multi-contact strips in pin-connection  
to exciter

x

1 Medium Inspection

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Equipment (KKS) Activity

Medium

Major

### E) Radial Blower and Diffusor (MKA)

#### Mechanical tests:

Examination of blower wheel (inlet and outlet) with dismantled diffusor, if required

x x

Examination of blower wheel (inlet only), if required

Clearances of labyrinth rings

x x

Axial and tangential position of blower to rotor

x x

#### Visual inspection:

Blower and diffusor parts

x x

Location of balancing weights

x x

### F) Cooler (MKA)

#### Mechanical tests:

Perform leakage / tightness test

x

#### Visual inspection:

Coolers (including water boxes and tube surfaces)

x x

Cooling water inlet and outlet pipes

x x

### G) Bearings (MKD)

#### Electrical tests:

Bearing insulation

x x

#### Mechanical tests:

Bearing surfaces, clearances and babbitt bonding

x x

Seating of bearing sleeves on bearing saddles

x

Clearance of labyrinth rings and seal strips

x x

#### Functional check and visual inspection:

Lift oil components

x x

Wiring

x x

#### Maintenance:

Check labyrinth rings

x

Replacement of lift oil hoses

x x

### H) Shaft Seals (MKA)

#### Electrical tests:

Check shaft seal insulation

x x

				Medium	Major
1	2				
1 Medium Inspection					
2 Major Inspection					
Equipment (KKS)	Activity				
<b>Visual inspection:</b>					
	Sliding surface of Gland Seal and seal retainer			x	x
	Clearances of Gland Seal and inner labyrinth rings			x	x
<b>Maintenance:</b>					
	Replace shaft seal insulation and gaskets			x	x
	Examination of sealing rings, if required			x	x
<b>I) Slip rings (MKC)</b>					
<b>Electrical tests:</b>					
	Insulation resistance of slip rings			x	x
	Bearing and pipe insulation (depending on design) (only if applicable)			x	x
	Measure insulation resistance of collector stationary rigging			x	x
<b>Mechanical tests:</b>					
	Performance of brush carrier and carbon brushes			x	x
	Bearing surfaces, clearances and Babbitt bonding (only if applicable)			x	x
	Seating of bearing sleeves on bearing saddles (only if applicable)				x
	Clearance of labyrinth rings and seal strips (only if applicable)			x	x
	Alignment (coupling)				x
	Run-out Deviation including Swing Check				x
<b>Visual Inspections:</b>					
	Coupling flange				x
	Condition of brush carrier and carbon brushes			x	x
	Condition of slip rings			x	x
<b>Maintenance:</b>					
	Replacement of air filter			x	x
	Cleaning of slip rings and insulation components			x	x
	Dismantle covers			x	x
	Check bearing and pipe insulation, replacement of all gaskets (only if applicable)				x
	Replacement of seal strips at labyrinth rings				x

1 **Medium Inspection**

2 **Major Inspection**

Equipment (KKS) Activity

Medium  
Major

**J) Generator Supervisory Equipment (MKA)**

Condition and performance of temperature gauges and alarms

x x

Replacement of gaskets at temperature measuring points

x

Condition and performance of liquid level alarm switches

x x

Condition and performance of grounding brushes

x x

(Pedestal) vibration device functional test

x x

1 **Medium Inspection**

2 **Major Inspection**

Equipment (KKS) Activity

Medium  
Major

**K) Generator Auxiliaries**

Gas System (MKG) **Mechanical test:**

Leakage test of H2- and inert gas system

x x

**Functional check and/or visual inspection:**

Inert gas system

x x

Sinter metal filters

x x

Gas dryer

x x

**Maintenance:**

Replacement of adsorbent material in gas dryer and cover gaskets

x x

Replacement of filter element

x x

Refurbishment of / replacement of solenoid valves, if required

x

Refurbishment of / replacement of all pressure reducers, if required

x

Refurbishment of sinter metal filters, if required

x

Replacement of bearings of gas dryer blower and blower drive motor

x x

**1 Medium Inspection****2 Major Inspection****Equipment (KKS) Activity****Medium****Major**

Replacement of bearings of standstill blower and blower drive motor

x

x

Replacement of o-rings of standstill blower

x

x

Stator Water System (MKF)

**Functional check and visual inspection:**

Coupling of stator water pumps

x

x

Performance of complete instrumentation

x

x

Check for leakages in stator water system

x

x

Stator water pumps

x

x

Alkalization diaphragm injection pump (Alkalization only)

x

x

Stator water tank liquid level detector

x

x

**Maintenance:**

Replacement of stator water cooler gaskets

x

Replacement of filter cartridges

x

x

Replacement of ion exchanger resins (Alkalization only)

x

x

Replacement of gaskets of stator water pumps

x

x

Replacement of bearings of stator water pump drive motors

x

x

Replacement of bearings of stator water pumps

x

x

Change bearing oil of stator water pumps

x

x

Waste Gas System (MKQ)

**Mechanical tests:**

Tightness test of waste gas line

x

**Functional check and/or visual Inspection:**

Waste gas outlets (roof area)

x

x

Inspection glasses in drain lines

x

x

Vapor exhausters

x

x

**Maintenance:**

Replacement of gaskets of vapor exhausters

x

x

Replacement of bearings of vapor exhausters and vapor exhauster drive motors

x

x

Replacement of valves smaller than DN25

x

Refurbishment of ball valves DN25 and larger, if required

x

Replacement of inspection glass gaskets

x

1 Medium Inspection				
2 Major Inspection				
Equipment (KKS)	Activity			Medium Major
Seal Oil System (MKW)	<b>Mechanical test:</b>			
	Perform hydrostatic pressure tests of coolers			x
	<b>Functional check and / or visual Inspection:</b>			
	Coupling on seal oil pumps		x	x
	Level monitoring system		x	x
	Seal oil pumps and drive motors		x	x
	Complete seal oil system		x	x
	Seal oil filters		x	x
	Coolers		x	x
	Pipe Connections		x	x
	Mounting and condition of seal oil components		x	x
	<b>Maintenance:</b>			
	Replacement of seal oil coolers or replace cooler gaskets			x
	Replacement of or clean cartridges/ replacement of gaskets at seal oil filters		x	x
	Replacement of bearings of drive motors		x	x
	Replacement of pumps		x	x
	Replacement of gland seals of seal oil pumps		x	x
Refurbishment of / replacement of all safety valves		x	x	

1 Medium Inspection				
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Equipment (KKS)	Activity			Medium Major
<b>Re-commissioning</b>				
Cold Re-commissioning	Check / change adjustment of the seal oil system		x	x
	Check the liquid detector		x	x
	Check of the gas system		x	x

**1 Medium Inspection****2 Major Inspection****Equipment (KKS) Activity****Medium****Major**

Check of the water system

x

x

Check for cleanness (inside and outside generator)

x

x

Fill generator with air until nominal pressure and start air leakage test

x

x

Plausibility check of generator temperature measuring device

x

x

Check vacuum pump and pressure regulator

x

x

Check and adjustment of primary water system

x

x

Functional check of H2 fast discharge (if available)

x

x

Check of the H2 cooler

x

x

Function check of waste gas exhaust blower

x

x

Check CO2 evaporator or Argon unit

x

x

Calibrate gas analyzer

x

x

Hot Re-commissioning

Purge generator with CO2/Ar and then with H2

x

x

Check the excitation system

x

x

Check the connection of lube oil and lift oil pipes to generator

x

x

Measure shaft voltage and shaft current if generator is on load

x

x

Optimization

Measure shaft voltage and shaft current if generator is on load

x

x

Final adjustment of all systems on load

x

x

Check all operating values local and in I&amp;C

x

x

Record of operating values (different load)

x

x