

73575/6/7

Overzicht machinegegevens generator N-101

AEG KANIS type GE 63 K

Serienummer 17536

73575/6/7



FOR : N.V. MEKOG
LOCATION : IJmuiden, The Netherlands.
SERVICE : Turbogenerator.
NO. REQUIRED: One (1)

Job No. : 5574
Item No. : N-101
Page No. : 101
Date : // FEB. '69.

TURBOGENERATOR SET DATA SHEET

Manufacturer: A.E.G.

Scope of Supply:

Turbogenerator set to be complete with generator, brushless excitation, automatic voltage regulator, air cooler, gear, turbine and lube oil system.

Installation

Turbine and generator to be suitable for installation under shelter with open sides. Control and regulating equipment will be installed in control room. All auxiliaries to be suitable for outdoor, unsheltered installation.

Generator will operate next to ammonia and synthesis gas compressor and therefore all equipment must be sparkless, so as to be incapable under normal conditions of igniting gas. The atmosphere will be contaminated also by ammonia and therefore will be corrosive. Copper or aluminium base alloys shall be avoided or must be suitably coated.

Baseplates

The manufacturer will supply a common baseplate for the turbine and gearbox, and a second common baseplate for the alternator and exciter.

GENERATOR

Duty: Maximum rating : 10,000 KVA
Voltage : 6,300 VOLTS
Phases : 3
Frequency : 50 cycles/sec.
Power factor : 0.85
Speed : 1,500 RPM
Rated current : 916 AMPS
Voltage regulation : 36.8%
Phase rotation : CLOCKWISE

Load%	100	75	50
Efficiency % at cos ϕ = 0.85	97.5	97.4	96.8
Efficiency % at cos ϕ = 1.0	98.1	98.0	97.4

The generator shall be capable of running in parallel with other machines of same waveform, voltage and frequency.

73575/6/7



Job No. : 5574
Item No. : H-101
Page No. : 101 A
Date : 11 FEB '66

Construction:

Type : 3 5890 d 4
Form : D6
Totally enclosed with brushless excitation. Type P 53r. Ex(f) to VDE 0171.
Totally enclosed cooling air circuit with water cooled air cooler.
Maximum temperature rise 80°C above ambient temperature.
Winding insulation Class "B".
No soft soldering permitted on any electrical connections.
Design shall be to VDE 0530 or equal.

Rotor construction : solid
Rotor material : forged steel
Stator material : steel of flux density 19,000 gauss
Radial bearings : plain sleeve. Dia. 200 mm driven end. 180 mm free end.
Thrust bearings : none.

Electrical Data

Synchronous reactance : $X_d = 187 \%$
Transient reactance : $X'_d = 40 \%$
Subtransient reactance : $X''_d = 17 \%$
Zero phase sequence reactance : $X_0 = 5.7 \%$
Negative phase sequence reactance : $X_2 = 16.5 \%$

Transient short circuit time constant : $T'_d = 1.3 \text{ secs}$
Subtransient short circuit time constant : $T''_d = 0.035 \text{ secs}$
Time constant of D.C. component : $T_a = 0.15 \text{ secs}$
Transient open circuit time constant : $T'_{d0} = 6.1 \text{ secs}$
Armature short circuit time constant : $T_0 = 0.175 \text{ secs}$
Short circuit ratio : $K_c = 0.6$

$K_c = \frac{\text{Excitation current with open terminals at nominal voltage and nominal speed}}{\text{Excitation current with short circuited terminals at full load current and nominal speed.}}$

Steady sustained 3 phase short circuit ratio at full load excitation $i_{fN}/i_{fk} = 1.8$

Sudden short circuit current (peak value) : $17.5 I_N$
Due to turbine governor response time :
Time taken for the speed to settle after full load shed : approx. 4 secs.
Time taken for the speed to settle after half load shed : approx. 3 secs
Speed rise on full load shed (droop) : adjustable 0 to 8 %



73575/6/7

Job No. : 5574
 Item No. : N-101
 Page No. : 101 B
 Date : // FEB. '69.

Protection and Termination

The six ends shall be brought out below the machine for connection to the Client's busbars. It is not intended to connect the star point of the machine to earth.

Voltage and current transformers associated with the automatic voltage regulator shall be supplied by the Manufacturer, but will be located by the Client under the machine in Purchaser's brick built compartment with double access doors. Current transformers for differential protection will be arranged by the Client.

Excitation

Because of the sparkless requirement, brushless excitation is mandatory.

Excitation power : 50.5 KW AT 71 VOLTS

Purging

Purge air or nitrogen will be piped by the Purchaser through the cooler brickwork for make-up of leakage. An independent flange will be provided on the exciter for Purchaser's connection.

Total make-up requirement is 1.3 metres³/min at 15 mm water gauge.

Generator Air Cooler

The generator air cooler will be mounted in a frame in brickwork such that the elements can be withdrawn.

Duty :	Air capacity	: 29,520 m ³ /hr.
	Heat load	: 194,000 K _J cal/hr.
	Cooling water quantity	: 40 m ³ /hr. (55 m ³ /hr. max.)
	Pressure drop waterside	: 0.3 at
	Water inlet temp.	: 32.2 °C. normal 34.4 °C max)
	Water outlet temp.	: 38 °C
	Water side design pressure	: 6 atd (9 atd hydrotest)
	Water velocity in tubes	: 1.5 M/sec. (2 m/sec max)
	Thermal conductance	: 4880 K _J cal/m hr °C
	Outlet air temperature	: 40 °C max.
	Pressure drop air side	: 12 mm water gauge.

Construction:

Water channel material	: steel. corrosion allowance 3mm
Tube sheets material	: steel
Tube sheets thickness	: 20 mm
Tube size	: 25 mm approx.
Tube material	: steel

Continued on Page 101C



73575/6/7

Job No. : 5574
 Item No. : N-101
 Page No. : 101C
 Date : 11 FEB. '69
 RAY 12 JUN '69

A section of steel ducting shall be provided under the alternator by the manufacturer under which the Purchaser will provide ducting extending down to the cooler.

Exciter Air Cooler

An all steel exciter air cooler will be mounted with the exciter and will be independent from the generator air cooler.

Duty :	Air capacity	:	900 m ³ /hr
	Heat load	:	4300 Kcal/hr
	Cooling water quantity	:	2 m ³ /hr (2.16 m ³ /hr max)
	Pressure drop waterside	:	0.2 at
	Water inlet temp.	:	32.2 °C normal (34.4 °C max)
	Water outlet temp.	:	38 °C
	Water side design pressure	:	6 at (9 at hydrotest)
	Water velocity in tubes	:	1.5 m/sec (2 m/sec max)

Controls

An automatic voltage regulator shall be supplied by the manufacturer located approximately 20 metres from the machine in the control room. A variable resistor shall also be provided for coarse voltage adjustment.

Accessories and Instruments

All accessories required including air filters, thermometers and pressure gauges shall be provided by the Manufacturer. A hand outlet valve on the alternator shall be supplied with two protective switches.

A thermometer shall be provided on each bearing and a pressure gauge on each bearing inlet line. The alternator bearings shall also have provision for the fitting of the vibration indication equipment specified on page 101M.

Remote indication of the stator temperature of the alternator is required.

The Manufacturer shall supply 9 resistance type temperature detectors disposed around the machine. 6 of these will be used with 2 spare.

The connections to these detectors shall be located below the machine in a suitable terminal box for connection to the Clients' cable.

Resistances are platinum, 100 Ω at 0°C. 3.85×10^{-3} Temperature coefficient



73575/6/7

Job No. : 5574
 Item No. : N-101
 Page No. : 101D
 Date : // Feb. '69.

Drying Out

Drying out of the generator will be done by an external electricity supply and not be means of the turbine driver which is subject to an exhaust temperature limitation.

Testing

The following witnessed tests will be carried out:

- a) Confirmation of no load losses and short circuit curve.
- b) Measurement of winding resistances.
- c) Heat run.
- d) V curves.
- e) Overspeed test at 1.2 x rated speed = 1800 rpm.
- f) High voltage stator and rotor insulation tests in accordance with VDE 0530.



73575/6/7

Job No. : 5574
 Item No. : N-101
 Page No. : 101 E
 Date : 11 FEB. '69.
 REV ① : 12 JUN 69
 REV ② : 25 JUN 69

Speed Reducing Gear

Between turbine and generator.

Manufacturer : Voith
 Model/size : AD 56 S
 Type : Double helical
 Centre Distance : 560 mm
 Face width : 355 mm
 Gear tooth ratio : 3.95
 Pinion hardness : HRC 59
 Gear hardness : HRC 59
 Service factor according to AGMA : 1.3
 Rated duty : 8750 KW
 Efficiency : 97.6% ± 0.4%

Thrust bearing to accept end thrust based on maximum torque and a friction factor of 0.15 in coupling.

Calculated thrust : 1700 Kg
 Allowable thrust bearing pressure : 12 Kg/cm²
 Thrust bearing active area : 165 cm²
 Thrust bearing type : Thrust shoulder
 Journal bearing type : Sleeve with white metal
 Lubrication : Force fed

Gear oil requirement to be compatible with turbine requirement.

Pressure gauge to be provided on lube oil inlet.

Each bearing to have one thermometer, the thrust bearing to have one thermometer on each side.

One locally mounted temperature indicator to be provided to measure oil return temperature.

Testing of gear box:

In addition to the manufacturer's standard tests, a witnessed two hour run at 1500 rpm is to be carried out. Temperature and vibration readings will be taken followed by a visual inspection.

High Speed Coupling

Manufacture : Maag ZLS6 $\frac{N}{r} = 2.5$
 Type : Tooth coupling
 Lubrication : Force fed

Low Speed Coupling

Type : Solid D6 Flange.



73575/6/7

METRIC

TURBINE DATA SHEET
MECHANICAL DRIVE

FOR N.Y. MEKOG
LOCATION INMUIDEN, THE NETHERLANDS
SUBJECT GENERATOR DRIVER
NO. REQUIRED ONE

JOB NO. 5574
ITEM NO. N-101 T
PAGE NO. 101 F
DATE 11 FEB 69

OPERATING CONDITIONS

REV'D 12 JUN 69
REV'D 25 JUN 69

	TURBINE RATING	MAX. DESIGN LOAD	100% NORMAL DESIGN LOAD	50% NORMAL DESIGN LOAD	
KW	TO GIVE 8.5 MW AT GENERATOR TERMINALS AT 0.85 P.F.				
STEAM - kg/kWh					
TOTAL - kg/h	DESIGN POINT 36,000 HIGH PRESSURE / 13,500 INDUCTION.				
NO. HANG UNANSWERED	INDUCTION STEAM CAPACITY FROM 0 TO 25,000 kg/h				
DESIRED STEAM RATE ± 5%	SEE CURVE (PAGE N101 G) TO DETERMINE STEAM RATIOS.				

3

SPEED - DESIGN	5925	RPM.	THROTTLE STEAM PRESSURE	40	ATA
SPEED - MAX ALLOW. FOR CONT. OPER	6350	RPM.	% SATUR OR TOTAL TEMP.	340	°C
STEAM EVALUATION			EXHAUST STEAM PRESSURE	0.14	ATA
			INDUCTION STEAM	3.8	ATA AT 227°C.
			TEMP. VARIABLE DES TO 340°C		

MECHANICAL DATA

SPECIFICATION	MWK J47-1E68 WHERE APPLICABLE	PACKING	LABYRINTH. SEE PAGE N101 H
MANUFACTURER	AEG-RANIS TURBINENFABRIK	SHAFT	SEE PAGE 101 H
TYPE AND SIZE	GE 63 K		
	MULTIVALVE MULTISTAGE CONDENSING WITH INDUCTION.	SPARE PACKING	---
STAGES	1 IMP/12 REACT. + 1 IMP./7 REACTON.	RADIAL BEARINGS	SEE PAGE 101 J
ROTATION	--- CLOCKWISE FACING COUPLING END	THRUST BEARINGS	SEE PAGE 101 J
CASING TYPE	HORIZONTALLY SPLIT	COOLING WATER - BEARINGS	---
CASING MATERIAL	SEE PAGE 101 H	COOLING WATER - OIL COOLER	SEE PAGE 101 E
FLG. SIZE AND RATING - INLET	NH 200 DIA. NO. 64 RF	COOLING WATER JACKET DES. PRESS.	" " atD
FLG. SIZE AND RATING - EXHAUST	NH 1200 DIA. NO. 10 EF	EXHAUST RELIEF VALVE CAPACITY BY PURCHASER	kg/h
BEARING LUBRICATION	FORCED FEED	EXHAUST RELIEF VALVE SETTING	0.5 atD
CONSTANT SPEED GOVERNOR TYPE	HYDRAULIC	HAND THROTTLE VALVES	---
EMERGENCY OVERSPEED GOV. TYPE	MECH/HYDRAULIC	SPEED CHANGER - TYPE	KALB
EMERGENCY OVERSPEED GOV. - SETTING	6600 RPM	SPEED CHANGER - RANGE	-8 TO +7% SPEED
STEAM SEAL PIPING FURNISHED BY	TURBINE MANUFACTURER	NET WEIGHT - TURBINE AND BASE	SEE PAGE 101 P kg
INSULATION FURNISHED BY	TURBINE MANUFACTURER	MAX. WEIGHT - MAINTENANCE	SEE PAGE 101 P kg
TURBINE LOCATION	SEE PAGE 101	SENTINEL VALVE BY MANUFACTURER	SET AT 0.55 ATU
FLANGE SIZE AND RATING	INDUCTION NH 350 DIA. NO. 16 RF	STEAM STRAINER BY MANUFACTURER	Y-TYPE
		FIRST CRITICAL SPEED	APP. 7500 MIN. RPM.

1

REMARKS

- The direction of rotation given above is that of the final output shaft as seen when looking on its coupling.
- TURBINE TO BE MECHANICALLY SUITABLE FOR STEAM OF 46 ATU AT 225°C.
- TURBINE TO BE SUITABLE FOR 30 MINS. CONTINUOUS OPERATION WITH NO LOAD ON GENERATOR WITH TURBINE EXHAUST TEMPERATURE OF 200°C.

CONTINUED ON PAGE 101 G

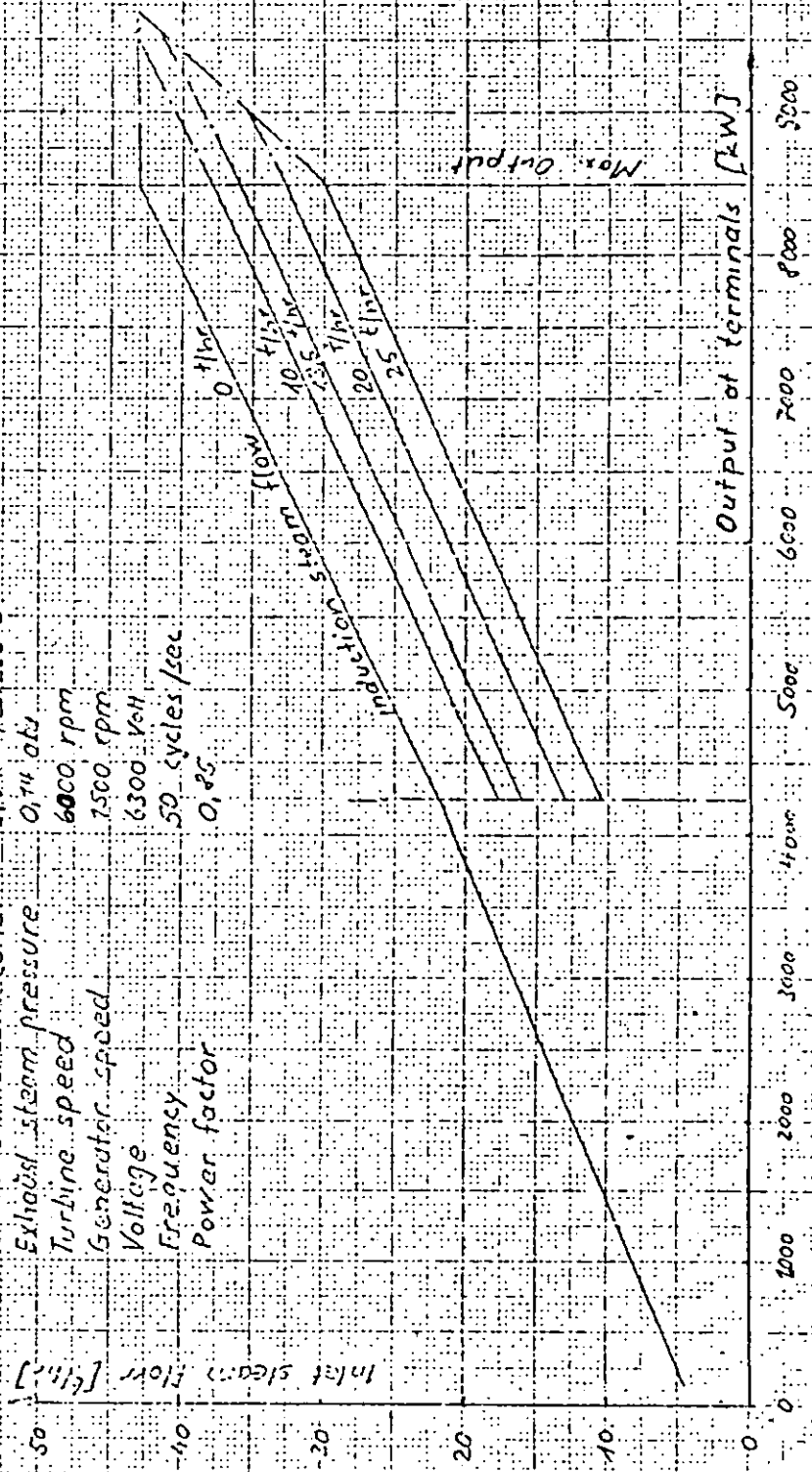
73575/617

N.Y. MEKOB
/IMIDEN, THE NETHERLANDS

JOB No. 5574
 ITEM No. N-1017
 PAGE No. 1018
 DATE 11 FEB 69

Induction steam turbine Type GE 63K

Inlet steam conditions 400 ps / 340°C
 Induction steam cond. 3,3.110 / 20, 220°C
 Exhaust steam pressure 0.14 aty
 Turbine speed 6000 rpm
 Generator speed 7500 rpm
 Voltage 6300 V_{CH}
 Frequency 50 cycles/sec
 Power factor 0.85





73575/6/7

Job No. : 5574
 Item No. : N-101T
 Page No. : 101 H
 Date : 11 FEB. '69.
 REV \square : 12 JUN 69

Casing

	Material	Design Pressure	Design Temperature	Hydrotest Pressure
H.P. steam chest	Cast steel GSC 25	46 atd	425 °C	95 atd
1st stage casing	Cast steel GSC 25	23 atd	400 °C	46 atd
Inlet of induction & L.P. casing.	Cast steel GSC 25	5.3 atd	340 °C	8 atd
Exhaust casing	Cast iron GG 26	1.5 atd	115 °C	1.75 atd

Purchaser to provide an adaptor to connect between exhaust flange and main at least 1500 mm long to allow for top half casing removal.

Blading

Rotor blades x 20 Cr Mo 12.1 Werkstoff No. 1.4120.
 These will be flame hardened to 40° - 50° Rockwell in wet steam band below 0.95 dryness factor.

Fixed blades x 20 Cr 13. Werkstoff No. 1.4021
 Radii at foot and root of all blades to be polished.
 Blade testing:-

1. Every blade to be magnaflux tested before fitting.
2. One blade out of every row will be tested to establish its natural frequency (up to 15,000 c/s).

Shaft

The shaft will be stiff.
 Material : 24 Cr NoV 55
 No sleeves.

Labyrinths

Material : Inner - Sn Bz 6W
 Outer and oil retaining ring -
 Al 99 F 11 to DIN 1747 Blatt 1.



73575/6/7

Job No. : 5574
 Item No. : M-101 T
 Page No. : 101 J
 Date : // FEB. '69.

Seals and Drains

Manufacturer to supply the complete gland sealing system including all the necessary pipework with a single inlet steam connection by Purchaser.

Manufacturer shall furnish valved drains as required from valve chests, nozzle chests and casings. The drains shall be manifolded to a single purchaser connection for piping to the condenser. Two atmospheric vents shall be provided. Estimated drain flow 2 to 3 tonnes/hr.

Bearings

Journals : Round sleeve type
 Diameter. H.P. end 125 mm. 4 oil grooves
 L.P. end 160 mm. 2 or 4 oil grooves.

Thrust : 12 pad Michell.
 Calculated thrust based on maximum torque and a friction factor of 0.15 at the coupling = 1550 Kgs.
 Calculated total thrust = 1700 Kgs.
 Maximum allowable thrust bearing pressure = 12 Kg/cm².
 Thrust area = 140 cm²
 I.D./O.D. = 140 mm/ 220 mm.
 Peripheral speed = 69 metres/sec.

Normal shaft axial movement = ± 0.3 mm.

Governor System

The governor shall be of the hydraulic (Kalb) type actuating hydraulic relays which shall control the high pressure steam and induction steam throttle valves.

The interlinked relays shall allow maximum usage of the induction steam with the induction valve closed. After the induction inlet valve is opened, the availability of induction steam will influence the high pressure steam requirement which will give speed control.

Governor range 0 to 110%, adjustment time 2 minutes.
 Actual speed changer range - 8 to + 7% speed.
 Governor droop. Adjustable from 0 to 8%.
 Sensitivity : within 10 rpm.

The emergency stop valves shall close automatically when the oil pressure reaches the lower safe limit. The arrangement of the valves shall be such that after tripping, the trip can only be reset manually after all the safety devices are back in safe working condition.

It is envisaged that valve opening ranges will be adjusted if steam conditions vary.

Continued on Page 101.K



73575/6/7

Job No. : 5574
 Item No. : N-101T
 Page No. : 101 K
 Date : 11 FEB. '69.
 REV \diamond : 12 JUN 69

Lubrication

Control oil and lubrication oil will be supplied to the turbine, gear box, flexible coupling and generator from one common oil system complete with all valves, vents, drains and gauges. A control device shall be fitted in each bearing supply line and a sight flow indicator in each return line. A check valve shall be fitted in each pump discharge line and isolating valves for maintenance.

The oil console is to be arranged at grade.

Oil requirements : Turbine : 160 litres/min.
 Gear and coupling : 450 litres/min.
 Alternator : 20 Litres/min.
 H.P. control valve : 180 litres/min.
 Induction control valve : 100 litres/min.

Oil specification : 4.5 Engler at 50°C (Shell Turbo 29 or equal).

There are to be ^{two} ~~three~~ 100% lube oil pumps. Discharge pressure 8 atü.

Manufacturer : ALLWEILER
 Type : Screw. Flow 56.3 m³/hr. 26 KW absorbed.

Main oil pump : Shaft driven at 1000 rpm.
 (This pump is not effective below a turbine speed of 3500 rpm).

First standby oil pump : Steam turbine driven.
 The turbine shall start up automatically if oil pressure falls below atü
 Complete automatic start up system to be supplied and oil accumulator to be provided if necessary to ~~prevent turbine~~ from shutting down.

Second standby pump : Motor driven.
 The motor shall start up automatically if oil pressure falls below 6.5 atü.



73575/6/7

Job No. : 5574
 Item No. : N-101T
 Page No. : 101
 Date : 11 FEB. '69.

Oil Tank

Capacity **7500** litres.

It shall have not less than eight minutes holding time plus the system contents. The tank is to be fitted with filling, vent, drain and anti-foaming device, level indicator and low level alarm switch. A steam heating coil with condensate trap shall be mounted below the tank suitable for steam at 5.3 atd and 340°C. The tank shall have no interior coating, only rust-proofing for shipping purposes is permitted. Connections shall be provided on the tank for piping up a centrifugal separator.

Filters

Duplex oil filters with transflow changeover valves shall be supplied.
 Manufacturer : BOLL AND KIRCH
 Code : A.D. Merkblatt.
 Material : V4A wired steel basket. Filtration 25 microns.
 Pressure drop. Clean **0.4** at. Dirty **1.5** at.

Coolers

Twin coolers with transflow changeover valves are to be supplied.

Manufacturer	:	ÖLTECHNIK	
Heat load	:	208,000	K. cal/hr.
Thermal conductance	:	4880	K. cal/hr. °C.
Cooling water inlet/outlet temperature	:	32.2 (34.4 max)	°C / 38 °C.
Cooling water flow	:	40	m ³ /hr.
Water velocity in tubes	:	1.8	m/sec.
Pressure drop on water side	:	0.3	at
Pressure drop on oil side	:	0.7	at
Water side design pressure	:	6	atd at. 100 °C
Oil side design pressure	:	9.5	atd
Hydrotest pressure	:	15	atd
Normal oil temperature	:	41	°C
Maximum oil temperature	:	43	°C.

A temperature switch shall be fitted in the oil outlet from the coolers to actuate Purchaser's alarm at **45** °C.

Materials

Shell : carbon steel, corrosion allowance 3mm.
 Water boxes : steel
 Tube sheets : steel **30** mm thick
 Tube material : steel
 Tube size : **16** mm
 Code : A.D. Merkblatt.



73575/6/7

Job No. : 5574
 Item No. : N-101T
 Page No. : 101 M
 Date : 11 FEB. '69.
 REV : 12 JUN 69

Oil Piping:

All oil piping shall be of carbon steel with DIN flanges suitable for the operating conditions and shall be supplied by the Manufacturer. Screwed connections shall be seal welded.

Instrumentation

All scales shall be metric.
 One electric tachometer is to be fitted with locally mounted speed indicator.
 Temperature gauges to be mounted locally:

On steam inlet valves.

Before and after oil coolers.

Stick thermometers shall be provided on each bearing.

Pressure gauges to be mounted locally (min. requirements).

Main lube oil pump discharge.

Each standby pump discharge.

Lube oil/governor oil filter differential.

Lube oil /governor after filter.

Governor oil pressure.

Lube oil header.

Lube oil to each bearing.

H.P. and induction steam inlets.

Steam chest.

~~Steam after first stage.~~

Exhaust casing.

Level gauge on oil tank.

All bearing caps (turbine, gear and alternator) shall have bearings caps machined suitable for Phillips PR 9266 vibration indication equipment.

Safety Devices

- (a) Overspeed trip, independent of the main relay system which shall actuate the emergency stop valves with switch.
- (b) Hydraulic shutdown on low lube oil pressure 0.4 atd.
- (c) A solenoid operated dump valve shall be supplied by vendor so as to vent relay oil from emergency trip and throttle valves. The solenoid will normally be energised and shall de-energise on failure. e.g. when any one of Purchaser's shutdown circuits are broken. Solenoid to operate on 110 volt DC continuously rated and ~~the valve~~ shall be of Exd 3n G5 classification.

Continued on Page 101 N



73575/6/7

Job No. : 5574
 Item No. : N-101 T
 Page No. : 101 N
 Date : 11 FEB. '69.
 REV 1 : 12 JUN 69
 REV 2 : 25 JUN 69

- (d) Rotor axial movement indicator with hydraulic shutdown device for excessive thrust bearing wear with indicator.
- (e) Low control oil shutdown device.
- ② (f) Low lube oil shutdown device. 0.5 atü.
- ② (g) Low lube oil pressure alarm (before shutdown) switch. 2.5 atü.
- (h) Shutdown switch on emergency stop valves for indicating shutdown and to isolate generator from grid.
- (i) Hydraulic relay to automatically start up the turbine driven standby oil pump. Alarm switch to be mechanically operated to indicate start up of this standby pump. 2.5 atü.
- ② (j) Switch to start up motor driven standby oil pump. 5 atü. *from control oil*
- (k) Interlock switch to prevent barring gear from operation with insufficient lube oil pressure. 2.0 atü.
- (l) Limit switch for automatic cut-out of barring gear motor to open when declutched.
- (m) Oil tank low level alarm switch.
- ① (n) High lube oil temperature after coolers alarm switch. Weatherproof industrial switches will be used suitable for connection to intrinsically safe circuits (24 volt DC, 1 amp contact rating). These shall normally be closed and shall open on fault.

Testing

The following witnessed tests will be carried out:

- (a) Hydrostatic tests to the pressures given on page 101 H
- (b) 1 hour no load run at full speed.
- (c) 2 minutes run at overspeed (6900 rpm).
- (d) 3 lube oil pressure trips.
- (e) Demonstration of hydraulic system, governor, pumps and control valves.
- (f) Vibrations shall be shown to be below 4 micron single amplitude when measured on the bearing housing.
- (g) Visual inspection of the bearings and the rotor after test run.

73575/6/7



Job No. : 5574
Item No. : N-101 T
Page No. : 101 P
Date : // FEB. '69.

Weights and Space Requirements

Approximate only, for exact dimensions refer to manufacturer's drawings.

	Weight (tonnes)	Size Length x Width x Height (mm)
Complete generator set	48	10,000 x 3200 x 3500
Turbine	21.5	4,100 x 2500 x 3500
Gear	4	1300 x 1400 x 1800
Generator & exciter.	22.5	4450 x 2250 x 2550
Air cooler.	1.5 (2.5 flooded)	-
Oil console.	7 (14 flooded)	4800 x 2900 x 4900
Max. Maintenance.	9 (turbine top casing)	-

General

1. Manufacturer to supply special tools for installation, adjustment and maintenance.
2. The manufacturer shall be responsible for the alignment of the turbine and generator and for ensuring the satisfactory arrangement of all connections between them.
3. Purchaser will furnish:
 - (a) Foundation bolts.
 - (b) All alarm and shutdown circuits.
4. Brass shall not be used for machine labels.

73575/6/7



METRIC

TURBINE DATA SHEET
MECHANICAL DRIVE

FOR N.V. MEKOG
LOCATION IJMUIDEN, THE NETHERLANDS
SUBJECT STANDBY LUBE OIL PUMP DRIVER
NO. REQUIRED ONE

JOB NO. 5574
ITEM NO. N-101(AIX)T
PAGE NO. 101 Q
DATE 11 FEB 69

OPERATING CONDITIONS

REQD 12 JUN 69
REQD 25 JUN 69

	TURBINE RATING	MAX. DESIGN LOAD	100% NORMAL DESIGN LOAD	50% NORMAL DESIGN LOAD		
 KW	26	22				
STEAM- Kg/KWh	39	40				
TOTAL- kg/h	1000	880				
NO. HAND VALVES CLOSED						
DESIRED STEAM RATE ± 5%						
SPEED-DESIGN	3000	RPM.	THROTTLE STEAM PRESSURE	39	atü	
SPEED-MAX. ALLOW. FOR CONT. OPER.	3300	RPM.	% SATUR. OR TOTAL TEMP.	340°C	°C	
STEAM EVALUATION			EXHAUST STEAM PRESSURE	3.7	atü	

MECHANICAL DATA

SPECIFICATION	MWK SPEC J44-1E2	PACKING	CARBON RINGS
MANUFACTURER	K.K.K.	SHAFT	CARBON STEEL WITH CHROME
TYPE AND SIZE	BF35/50	PLATE UNDER PACKING	
		SPARE PACKING	NONE
		RADIAL BEARINGS	BALL
STAGES	ONE	THRUST BEARINGS	BALL
ROTATION -	CLOCKWISE FACING COUPLING END	COOLING WATER-BEARINGS	— l/min
CASING TYPE	RADIALLY SPLIT	COOLING WATER-OIL COOLER	0.5 m ³ /h
CASING MATERIAL	CAST STEEL	COOLING WATER JACKET DES. PRESS.	6 atü
FLG. SIZE AND RATING-INLET	NN 50 NO 100 RF DIN	EXHAUST RELIEF VALVE CAPACITY BY PURCHASER	kg/h
FLG. SIZE AND RATING-EXHAUST	NN 150 NO 16 RF DIN	EXHAUST RELIEF VALVE SETTING	5.3 atü
BEARING LUBRICATION	SPLASH	HAND THROTTLE VALVES	NONE
CONSTANT SPEED GOVERNOR-TYPE	HYDRAULIC	SPEED CHANGER-TYPE	MANUAL
EMERGENCY OVERSPEED GOV.-TYPE	MECH. SPARKLESS	SPEED CHANGER-RANGE	+5% TO -25%
EMERGENCY OVERSPEED GOV.-SETTING	3600 RPM.	NET WEIGHT-TURBINE AND BASE	330 kg
STEAM SEAL PIPING FURNISHED BY	NONE	MAX. WEIGHT-MAINTENANCE	112 kg
INSULATION FURNISHED BY	TURBINE MANUFACTURER	SENTINEL VALVE BY TURBINE MFR.	SET AT 4.5 ATÜ
TURBINE LOCATION	OUTDOORS	STEAM STRAINER BY TURBINE MFR.	Y-TYPE
		FIRST CRITICAL SPEED	12000 RPM.

REMARKS

1. The direction of rotation given above is that of the final output shaft as seen when looking on its coupling.
2. TURBINE TO BE MECHANICALLY SUITABLE FOR STEAM AT 46 ATÜ AND 425°C.

73575/6/7

MOTOR DATA SHEET

ENG EA 136 4-67

FOR <u>N.Y. MEKOG</u>	JOB NO. <u>5574</u>
LOCATION <u>IJMUIDEN, THE NETHERLANDS</u>	SHEET NO. <u>101 R</u>
SERVICE <u>STANDBY LUBE OIL PUMP DRIVER</u>	ITEM NO. <u>N-101 (AUX 2) M</u>
NO. REQUIRED <u>ONE</u>	DATE <u>11 FEB 69</u>

OPERATING CONDITIONS REV 25 JUN 69

	RATED LOAD	75% RATED LOAD	50% RATED LOAD	K.I.C. MAX. DESIGN LOAD	K.I.C. NORMAL DESIGN LOAD
WATTS <u>KW</u>	<u>40</u>			<u>22</u>	
EFFICIENCY PERCENT _____					
POWER FACTOR PERCENT _____					

MOTOR SHALL BE FURNISHED IN ACCORDANCE WITH **MHX** SPECIFICATION No. J.46-1E2 AND ADDENDUM DATED INFORMATION BY KELLOGG INTERNATIONAL CORPORATION

SPECIFICATIONS

INFORMATION BY MANUFACTURER

TYPE <u>TOTALLY ENCLOSED FAN COOLED WEATHERPROOF SQUIRREL CAGE INDUCTION MOTOR FOR DIV 2 AREA TO VDE 0171 Exe B1</u>	MANUFACTURER <u>A.E.G.</u>
	TYPE <u>2AM 250 Mz 2 Ex.</u>
VOLTS <u>380</u> PHASE <u>3</u> CYCLES <u>50</u>	RATED LOAD R.P.M. <u>2970</u>
SYNCHRONOUS R.P.M. <u>3000</u>	RATED LOAD CURRENT <u>85</u> AMPERES
TEMPERATURE RISE DEGREES CENTIGRADE <u>75</u>	LOCKED ROTOR CURRENT <u>500</u> AMPERES
ALTITUDE, FT. <u>SEA LEVEL</u>	FRAME NO. <u>874.007.286</u>
BEARINGS <u>BALL</u>	NET WEIGHT <u>500</u> Kg
LUBRICATION <u>GREASE</u>	
BASE FURNISHED BY <u>TURBINE MANUFACTURER</u>	
COUPLING FURNISHED BY _____	
ROTATION _____ CLOCKWISE FACING COUPLING END	
<u>INSULATION CLASS "E"</u>	

REMARKS:

1. COOLING FAN TO BE OF CORROSION RESISTANT NON SPARKING MATERIAL
2. MOTOR TO BE SUITABLE FOR DIRECT ON LINE STARTING
3. TERMINAL BOX TO BE SUPPLIED COMPLETE WITH COMPRESSION TYPE CABLE GLAND FOR YGVMYKAS CABLE 25 mm², 4 CORE

73575/6/7

	Datum	Name	DATA SHEET	17536 GE63K
Geschrieb.	29.05.1979			
Geprüft:	No/Snw			

NEW ISSUE

Turbine series	GE63K
Serial number	17536
Built in	1969
Modification (initial steam II)	1978
Maximum rating	8500 kW
Speed:	
Turbine	5925 rpm
Alternator	1500 rpm
Trip speed:	
Turbine	6650 rpm
Alternator	1680 rpm
Initial steam pressure I, normal (Max. values: refer to appendix 75)	40 kp/cm ² abs
Initial steam pressure II	20 kp/cm ² abs
Initial steam temperature I, normal & maximum (Max. values: refer to appendix 75)	340 °C
Initial steam temperature II	330 °C
Secondary steam pressure	3.8 kp/cm ² abs
Secondary steam temperature	227 °C
Exhaust pressure	0.14 kp/cm ² abs
Minimum permissible exhaust pressure	0.09 kp/cm ² abs
Rotation:	
facing turbine shaft	c.w.
facing alternator shaft	c.w.
Nozzles:	
Inlet nozzle	n.b. 200 mm n.p. 64
Secondary nozzle	n.b. 350 mm n.p. 16
Exhaust nozzle	n.b. 1200 mm n.p. 10
<u>Control valves:</u> (fig. 33&33A)	<u>Throat area</u> <u>Lift</u>
HP control valves:	
1st valve	63 sq.cm 72 mm
2nd valve	16 sq.cm 15.5 mm
3rd valve	25 sq.cm 25 mm
Total lift	112.5 mm
LP control valves:	
1st valve	160 sq.cm 4 mm
2nd valve	160 sq.cm 41 mm
3rd valve	160 sq.cm 4 mm
4th valve	160 sq.cm 63 mm
Total lift	112.0 mm

Ohne unsere vorherige Zustimmung darf diese Unterlage weder vervielfältigt, noch Driften zugänglich gemacht werden, und sie darf durch den Empfänger oder Dritte auch nicht in anderer Weise mißbräuchlich verwendet werden.