

REPORT ON ELECTRICAL EQUIPMENT.

(OTHER THAN FOR THE PROPULSION OF THE VESSEL)

Date of writing Report 28/11 1938 When handed in at Local Office 1938 Received at London Office DEC 10 1938
 No. in Survey held at Odense Port of Copenhagen
 Reg. Book. 88364 on the Sing. S. Motor vessel "HULDA MÆRSK" Date, First Survey 6/9 Last Survey 24/11 1938
 (Number of Visits 12)

Built at Odense By whom built Odense Haalshiboværk Yard No. 75 Tons Gross 5601
Net 3390
 Owners A/S "Vendborg" og "A/S AF 1912, A/S" Port belonging to Copenhagen When built 1938
 Electric Light Installation fitted by A/S Dansk Elektricitets Company Contract No. When fitted 1938
 Is the Vessel fitted for carrying Petroleum in bulk No.

System of Distribution Two conductor insulated system.
 Pressure of supply for Lighting 220 volts, Heating 220 volts, Power 220 volts.
 Direct or Alternating Current, Lighting Direct Power Direct

If alternating current system, state frequency of periods per second
 Has the Automatic Governor been tested and found efficient when the whole load is suddenly thrown on or off yes.
 Generators, do they comply with the requirements regarding temperature rise yes., are they compound wound yes.
 are they over compounded 5 per cent. yes., if not compound wound state distance between each generator
 Where more than one generator is fitted are they arranged to run in parallel yes., is an adjustable regulating resistance fitted in series with each shunt field yes.
 Have certificates of test results for machines under 100 kw. been submitted and approved yes.
 Have machines over 100 kw. been inspected by the Surveyors during manufacture and testing yes.
 Have certificates for generators under 100 kw. been supplied and approved yes.

Are all terminals accessible, clearly marked, and furnished with sockets yes., are they so spaced or shielded that they cannot be accidentally earthed, short circuited, or touched yes.
 Are the lubricating arrangements of the generators as per Rule yes.

Position of Generators in the engine room, 2 port, 1 starboard., is the ventilation way of the generators satisfactory yes.
 are they clear of all inflammable material yes. if situated near unprotected woodwork or other combustible material, state distance of same horizontally from or vertically above the generators and
 are the generators protected from mechanical injury and damage from water, steam or oil yes., are their axes of rotation fore and aft yes.
 Are the bedplates and frames of the generating plant efficiently earthed yes. are the prime movers and their respective generators metallic contact yes.
 Main Switch Boards, where placed in the engine room

If the generators and main switchboard are not placed in the same compartment, is each generator provided with a fuse on each insulated pole as near as possible to the terminals of the generator, additional to that provided on the main switchboard yes.

Switchboards, are they placed in accessible positions, free from inflammable gases and acid fumes yes., are they protected from mechanical injury and damage from water, steam or oil yes., if situated near unprotected woodwork or other combustible material, state distance of same horizontally from or vertically above the switchboards and , are they constructed wholly of durable, non-ignitable non-absorbent materials yes.
 is all insulation of high dielectric strength and of permanently high insulation resistance yes.
 of an approved type yes., if semi-insulating material is used, are all conducting parts insulated from the slab with mica or micaite or other hygroscopic insulating material, and the slab similarly insulated from its framework yes., is the non-hygroscopic insulating material of an approved type yes.
 and is the frame effectively earthed yes. Are the fittings as per Rule regarding:— spacing or shielding of live parts yes.
 accessibility of all parts yes., absence of fuses on back of board yes., temperature rise of bus bars yes.
 individual fuses to voltmeter, pilot or earth lamp yes., are moving parts of switches alive in the position no.
 are all screws and nuts securing connections effectively locked yes. are any fuses fitted on the live side of switchboards no.

Main Switchgear, description of switchgear for each generator and each outgoing circuit, and arrangement of equalizer switches GENERATORS: One 2 pole circuit breaker with overload + reverse-current trip + single pole equalizer switches as per Rule 3, A (f). OUTGOING CIRCUITS: 2 pole circuit breaker with a fuse on each pole.
 Are cupboards or compartments containing switchboards composed of fire-resisting material or lined with approved material yes.
 Instruments on main switchboard 7 ammeters 2
 is there a synchronising device for paralleling purposes. For compound machines is the ammeter connected on the opposite pole to equaliser connection yes.

Earth Testing, state what means are provided at the main switchboard for indicating the state of the insulation of the system set of earth lamps and 1 Ohmmeter.
 Do they comply with the requirements of the Rules yes. are the fusible cutouts of an approved type yes. have the reversed

current protection devices been tested under working conditions. *yes* are all fuses labelled as per rule *yes*

Joint Boxes, Section and Distribution Boards. is the construction, protection, insulation, material, and position of these as per rule *yes*
(INSTALL CABLES RUN)

Cables: Single, twin, concentric, or multicore *single* are the cables insulated and protected as per Tables IV, V, X, XI, XII or XIII of the Rules *yes*

If the cables are insulated otherwise than as per Rule, are they of an approved type *yes* **Fall of Pressure,** state maximum between bus bars and any point of the installation under maximum load *light 2.5 V, power 9 V*

Cable Sockets, are the ends of all cables having a sectional area of 0.04 square inch and above provided with soldering sockets *yes*

Paper Insulated and Varnished Cambric Insulated Cables. If conductors are paper or varnished cambric insulated, is the dielectric at the exposed ends of the conductor protected from moisture by being suitably sealed with insulating compound *yes*, or waterproof insulating tape *yes*

Cable Runs, are the cables fixed as far as possible in accessible positions not exposed to drip or accumulation of water or oil, or to high temperature from boilers, steam pipes, uptakes or other hot objects, or to avoidable risk of mechanical damage *yes* are cables laid under machines or floorplates *No* if so, are they adequately protected *yes*

Are cables in machinery spaces, galleys, laundries, bathrooms and lavatories lead covered *yes*

Support and Protection of Cables, state how the cables are supported and protected *armoured cables supported by clips in hatches screened by metal strips*

If cables are run in wood casings, are the casings and caps secured by screws *yes*, are the cap screws of brass *yes*, are the cables run in separate grooves *yes* If armoured and lead covered cables are secured by metal clips, are the clips spaced as per Table VIII *yes*

Refrigerated Chambers, are the cables and fittings in accordance with the special requirements *yes*

Joints in Cables, state if any, and how made, insulated, and protected *No joints*

Watertight Glands and Deck Tubes, are all cables passing through decks and watertight bulkheads provided with deck tubes or watertight glands *yes*

Bushes in Beams and Non-watertight Partitions, where unarmoured cables pass through beams and non-watertight partitions, are the holes efficiently bushed *yes* state the material of which the bushes are made *lead*

Earthing Connections, state what earthing connections are fitted and their respective sectional areas *from headers, 4 sq in* are their connections made as per Rule

Alternative Lighting, are the groups of lights in the propelling machinery space arranged as per Rule *yes* **Emergency Supply,** state position and method of control of the emergency supply and how the generator is driven *generator placed in a deck house aft, driven by a 2-cyl. 45CSA oil engine, switch-over to switch-board for light.*

Navigation Lamps, are these separately wired *yes*, controlled by separate switch and separate fuses *yes*, are the fuses double pole *yes*, are the switches and fuses grouped in a position accessible only to the officers on watch *yes*

has each navigation lamp an automatic indicator as per Rule *yes* **Secondary Batteries,** are they constructed and fitted as per Rule *yes* are they ventilated as per Rule *yes*

Fittings, are all fittings on weather decks, in stokeholds and engine rooms and wherever exposed to drip or condensed moisture, watertight *yes* are any fittings placed in spaces in which goods are liable to be stacked in close proximity to them; if so, how are they protected *yes* are any fittings placed in spaces where inflammable or explosive dust or gases are liable to be present, if so, how are they protected *yes* how are the cables led *yes*

where are the controlling switches situated *yes*

are all fittings suitably ventilated *yes*, are all switches and lampholders constructed wholly of non-ignitable, non-absorbent materials *yes*

Heating and Cooking Appliances, are they constructed and fitted as per Rule *yes*, are air heaters constructed and fitted as per Rule *yes*

Searchlight Lamps, No. of whether fixed or portable *yes*, are their fittings as per Rule *yes*

Motors, are their working parts readily accessible *yes*, are the coils self-contained and readily removable for replacement *yes* are the brushes, brush holders, terminals and lubricating arrangements as per Rule *yes* are the motors placed in well-ventilated compartments in which inflammable gases cannot accumulate and clear of all inflammable material *yes* are they protected from mechanical injury and damage from water, steam or oil *yes* are their axes of rotation fore and aft *yes, except circ. pump for circ. eng. use* if situated near unprotected woodwork or other combustible material, are the motors of the totally enclosed, pipe ventilated, forced draught, drip or flame proof type *yes* if not of this type, state distance of the combustible material horizontally or vertically above the motors *yes* and *yes* have machines of over 100 BHP been inspected by the Surveyors during manufacture and testing *yes* have certificates for all motors for essential services been supplied and approved *yes*

Control Gear and Resistances, are the generator field and motor speed regulators, starters and controllers constructed and fitted as per Rule *yes* **Lightning Conductors,** where lightning conductors are required, are these fitted as per Rule *yes*

Ships carrying Oil having a Flash Point less than 150° F. Have the special requirements of the Rules been complied with regarding switches, joint boxes, section and distribution boards, protection of cables, method of distribution, lead of cables, lights and fittings *yes* are all fuses of the fitted cartridge type *yes* are they of an approved type *yes* If portable lamps for use in dangerous spaces are supplied, are they of a self-contained, battery-fed flameproof type approved for use in dangerous spaces *yes* **Spare Gear,** if the vessel is for open sea service have spares been supplied as per Rule *yes* are they suitably stored in dry situations *yes*

PARTICULARS OF GENERATING PLANT.

DESCRIPTION OF GENERATOR.	No. of	RATED AT				DRIVEN BY	WHERE DRIVEN BY AN INTERNAL COMBUSTION ENGINE.	
		Kilowatts.	Volts.	Ampères.	Revs. per Min.		Fuel Used.	Flash Point of Fuel.
MAIN	3	112	220	510	360	3 off 3-cyl 25CSA DIESEL OIL ENGINES	HEAVY OIL	ABOVE 150° F.
AUXILIARY								
EMERGENCY	1	7	220	32	1200	2-cyl. BUKH OIL ENGINE 45CSA	-	-
ROBARTY TRANSFORMER								

GENERATOR, LIGHTING AND HEATING CONDUCTORS.

DESCRIPTION.	CONDUCTORS.		COMPOSITION OF STRAND.		TOTAL MAXIMUM CURRENT. AMPERES.		Approximate Length. (Lead and Return.) Feet. in.	Insulated with	HOW PROTECTED.
	No. per Pole.	Total Nominal Area per Pole Sq. Ins. Circ.	No.	Diameter.	Circuit.	Rule.			
MAIN GENERATOR	2	2x200	37	2.62	510	490	24	RUBBER	Lead sheathed
EQUALISER CONNECTIONS	1	200	37	2.62	245	245	12-24-12	"	and
AUXILIARY GENERATOR	2	2x200	37	2.62	510	490	47	"	Steel wire armoured
EMERGENCY GENERATOR	1	35	19	1.53	32	77	78	"	"
ROBARTY TRANSFORMER MOTOR GENERATOR	2	2x200	37	2.62	510	490	23	"	"
ENGINE ROOM	1	10	7	1.35	20	38	42	"	"
BOILER ROOM									
AUXILIARY SWITCHBOARDS FOR LIGHT	1	70	19	2.16	100	124	42	"	"
ACCOMMODATION									
AFT SALOON	1	10	7	1.35	30	38	50	"	"
	1	35	19	1.53	40	77	38	"	"
WIRELESS	1	16	7	1.70	7	49	56	"	"
SEARCHLIGHT									
MASTHEAD LIGHT									
SIDE LIGHTS									
COMPASS LIGHTS	1	6	7	1.05	5	28	52	"	"
POOP LIGHTS									
CARGO LIGHTS									
HEATERS AND FANS	1	95	19	2.52	119	147	38	"	"

MOTOR CONDUCTORS.

DESCRIPTION.	No. of Motors.	CONDUCTORS.		COMPOSITION OF STRAND.		TOTAL MAXIMUM CURRENT. AMPERES.		Approximate Length. (Lead and Return.) Feet. in.	Insulated with	HOW PROTECTED.
		No. Per Pole.	Total Nominal Area per Pole Sq. Ins. Circ.	No.	Diameter.	In Circuit.	Rule.			
BALLAST PUMP	1	1	50	19	1.83	53	98	56	RUBBER	Lead sheathed
MAIN BILGE LINE PUMPS										and
GENERAL SERVICE PUMP										Steel wire armoured
SANITARY AND BILGE PUMP	1	1	25	7	2.13	50	63	62	"	(in hatches and
SANITARY PUMPS	2	1	2.5	7	0.67	3.5	15.5	74	"	when found in
CIRC. SEA WATER PUMPS	1	1	70	19	2.16	75	124	58	"	easy cases in
CIRC. FRESH WATER PUMPS	1	1	70	19	2.16	75	124	58	"	by steel plating
45CSA AIR COMPRESSORS	2	1	16	7	1.70	27	49	55	"	"
FRESH WATER PUMP										
ENGINE TURNING GEAR	1	1	16	7	1.70	27	49	86	"	"
ENGINE REVERSING GEAR										
LUBRICATING OIL PUMPS	2	1	200	37	2.62	165	270	70	"	"
OIL FUEL TRANSFER PUMP	1	1	16	7	1.70	40	49	52	"	"
WINDLASS	1	1	120	37	2.03	195	235	150	"	"
WINCHES, FORWARD	5 TS	4	1	120	37	2.03	220	235	117	"
	3 TS	6	1	95	19	2.52	165	195	77	"
WINCHES, AFT	3 TS	6	1	95	19	2.52	165	195	110	"
CARSTAN	1	1	50	19	1.83	165	195	160	"	"
STEERING GEAR										
(a) MOTOR GENERATOR										
(b) MAIN MOTOR										
WORKSHOP MOTOR	1	1	6	7	1.05	12.5	28	21	"	"
VENTILATING FANS										
STAND BY CIRC. WATER PUMP	1	1	70	19	2.16	75	124	58	"	"
CIRC. WATER P. FOR AUX. ENG.	1	1	16	7	1.70	12.5	49	76	"	"
PALM OIL PUMP	1	1	275	61	2.39	217	295	86	"	"
DONKEY BOILERS CIRCUL. PUMP	1	1	2.5	7	0.67	13	15.5	52	"	"
BLOWER FOR D. BOILER	1	1	6	7	1.05	12	28	54	"	"
OIL PURIFIERS	2	1	6	7	1.05	12	28	78	"	"
COOLING W. PUMPS FOR NH3 COND.	2	1	2.5	7	0.67	3	15.5	78	"	"

The Electrical Equipment is installed in accordance with the approved plans.

All Insulated Conductors are guaranteed to withstand the immersion and resistance tests specified in the Rules.

The foregoing is a correct description.

Dansk Elektricitetscompagni

Electrical Engineers.

Date 2-12-1938

COMPASSES.

Minimum distance between electric generators or motors and standard compass ca 35'

Minimum distance between electric generators or motors and steering compass ca 30'

The nearest cables to the compasses are as follows :-

A cable carrying 5 Ampères 15 feet from standard compass 12 feet from steering compass.

A cable carrying 0.5 Ampères 4 feet from standard compass 4 feet from steering compass.

A cable carrying 0.2 Ampères 8" feet from standard compass 8" feet from steering compass.

Have the compasses been adjusted with and without the electric installation at work at full power *yes*

Has the effect of switching on and off circuits, motors and other electro-magnetic apparatus within the vicinity of the compasses been noted *yes*

The maximum deviation due to electric currents was found to be 0 degrees on any course in the case of the standard

compass, and 0 degrees on any course in the case of the steering compass.

ODENSE STAALSKIBSVÆRFT
VED A. T. MØLLER

E. Ringstedt's Builder's Signature.

Date

Is this installation a duplicate of a previous case *No* If so, state name of vessel

General Remarks (State quality of workmanship, opinions as to class, etc.)

The electric light & power installation herein described has been fitted in accordance with the Society's Rules, the approved plans and the requirements contained in the Secretary's letter E dno 7/8 25/8 1938.

The material used is of good description throughout and the workmanship of high quality.

On completion the whole installation was tested under full power working conditions and as per Rules and found satisfactory.

Total Capacity of Generators 343 Kilowatts.

The amount of Fee ... N. 1112, 10 } When applied for, 28-11-38

Travelling Expenses (if any) £ : : } When received, 2-12-38

O. Stenholm
Surveyor to Lloyd's Register of Shipping.

Committee's Minute TUE 31 JAN 1939

Assigned *See FE machy pl.*

200.12.38-Transact.
The Structures are requested not to write on or below the space for Committee's Minute



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