

Report on Refrigerating Machinery and Appliances.

Date of writing Report 24 June 1947 When handed in at Local Office 25 JUN 1947 Port of Copenhagen
 No. in Salborg and
 Reg. Book. Survey held at Copenhagen Date: First Survey 22 January Last Survey 21 June 1947
85648 (Number of Visits 39)

on the Refrigerating Machinery and Appliances of the Motor Vessel AFRICAN REEFER Tons (Gross 1862.14 Net 968.29)
 Vessel built at Elsinore By whom built M. Skovbygger's Yard No. 230 When built 1935
 Owners Federated Ocean Port belonging to Copenhagen Voyage ✓
 Refrigerating Machinery made by M. Skovbygger's Machine Nos. 1541-1542 When made 1935
 Insulation fitted by Salborg Væst When fitted 1947 System of Refrigeration Ammonia
 Method of cooling Cargo Chambers direct expansion & air Insulating Material used Granulated Cork & Isoplex
 Number of Cargo Chambers insulated 5 Total refrigerated cargo capacity 125505 cubic feet

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed In a separate compartment at the port
afternoon side of the engine room.

Refrigerating Units, No. of 3 No. of machines 3 Is each machine independent yes

Total refrigeration or ice-melting capacity in tons per 24 hours 86.4 Are all the units connected to all the refrigerated chambers yes

2 Compressors, driven direct or through reduction gearing. Compressors, single or double acting single If multiple effect compression No
 Are relief valves or safety discs fitted yes No. of cylinders to each unit 2 Diameter of cylinders 200 3/4

Diameter of piston rod ✓ Length of stroke 180 1/4 No. of revolutions per minute 400

Motive Power supplied from 3 x 180 BHP 3 cyl. 280 S.S. B. Whirling engine - 1 x 650 BHP 6 cyl. 45 C.S.A. "Cummins"
 (State number of boilers, oil engines or electric generators supplying the motive power.) heavy oil engine

Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders ✓ Diameter ✓

Length of stroke ✓ Working pressure ✓ Diameter of crank shaft journals and pins ✓

Breadth and thickness of crank webs ✓ No. of sections in crank shaft ✓ Revolutions of engines per minute ✓

3 Oil Engines, type heavy oil (B.M.) or 4 stroke cycle 2 Single or double acting single B.H.P. 180

No. of cylinders 3 x 3 Diameter 220 1/2 Length of stroke 3 x 370 1/2 Span of bearings as per Rule 3 x 280 1/2

Maximum pressure in cylinders 49 lb/cm² Diameter of crank shaft journals and pins 3 x 350 1/2

Breadth and thickness of crank webs 3 x 245 1/2 - 85 1/2 No. of sections in crank shaft 1 Revolutions of engine per minute 400

Air Receivers: Have they been made under survey yes - Bureau Veritas State No. of Report or Certificate ✓

Is each receiver, which can be isolated, fitted with a safety valve as per Rule yes

Can the internal surfaces of the receivers be examined and cleaned yes Is a drain fitted at the lowest part of each receiver yes

No. of Receivers 1 Cubic capacity of each 100 Internal diameter 335 1/2 thickness 8 1/4

Seamless, lap welded or riveted longitudinal joint seamless Material SMN Range of tensile strength 41-47 1/2 Working pressure by Rules 30 atm.

Electric Motors, type drip proof ventilated No. of 2 Rated 80 HP Kilowatts 220 Volts

at 400 revolutions per minute. Diameter of motor shafts at bearings 95 1/4

Reduction Gearing ✓ Pitch circle diameter, pinion ✓ Main wheel ✓ Width of face ✓

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, pinion ✓ Main wheel ✓

Pinion shafts, diameter at bearings ✓ Main wheel shaft, diameter at bearings ✓

Gas Condensers, No. of 3 Cast iron or steel casings steel tube Cylindrical or rectangular cylindrical Are safety valves fitted

to casings No No. of tubes in each 2 x 70 1/4 Material of coils SMN Can each coil be readily shut off or disconnected yes

Water Circulating Pumps, No. and size of pumps available 4 x 15 cm. 1/4 H. each electrically Gas Separators, No. of 3

LIQUID RECEIVER. Gas Evaporators, No. of 1 Cast iron or steel casings SMN Pressure or gravity type ✓ If pressure type, are safety

valves fitted ✓ No. of coils in each casing ✓ Material of coils ✓ Can each coil be readily shut off or disconnected ✓

Direct Expansion or Brine Cooled Batteries, No. of 5 Are there two separate systems, so that one may be in use while the other is being

cleared of snow yes No. of sections in each battery 2 Material of coils SMN Can each coil be readily shut off or

disconnected yes Total cooling surface of battery coils 871 1/2 Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 6 each of please see below cubic feet capacity, at ✓ revolutions per minute

Steam or electrically driven electrically Where spare fans are supplied are these fitted in position ready for coupling up yes

Brine Circulating Pumps, No. and size of, including the additional pump ✓ how worked ✓

Brine Cooling System, closed or open ✓ Are the pipes and tanks galvanised on the inside ✓

No. of brine sections in each chamber FORW. TW. DECH LOW HOLD I LOW HOLD II AFT. TW. DECH AFT. LOW. HOLD

NO. AND HP OF MOTORS 1 7.5 1 5.5 1 12 2 4 1 12

CAPACITY M³/HOUR. 36000 25000 48000 2 x 20000 48000

REVOLUTIONS / MIN. 1050 1050 1385 940 1385

Can each section be readily shut off or disconnected ✓ Are the control valves situated in an easily accessible position ✓

NOTE: THE WORDS WHICH DO NOT APPLY SHOULD BE DELETED.

Are thermometers fitted to the outflow and to each return brine pipe... ☒ Where the tanks are closed are they ventilated as per Rule... ☒
Where the tanks are not closed is the compartment in which they are situated efficiently ventilated... ☒
Are the number and capacity of the machines and the number of pumps and sea connections in accordance with Section 2, Clause 1 of the Rules... ☒
Is the exhaust steam led to the main and auxiliary condensers... ☒

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure. ATM.	Hydraulic Test Pressure ATM.	Air Test Pressure. ATM.	Stamped.	REMARKS.
COMPRESSOR		15	42	28		
Engine Cylinders (if tested)		3	28	14		
Gas Compressors CRANK CASE		15	42	25		
Separators		15	42	25		
Liquid		15	42	25		
Multiple Effect Receivers	16/4-18/4	1	35	17.5		Lloyd's Test 17.5 atm 4.6 18/4-22/4-47
SHELL AND TUBE	2/4-23/4					
Condensers						
Evaporator Coils		15	35	17.5		
Condenser Headers and Connections		15	35	17.5		
Condenser Casings		15	35	17.5		
AIR COOLER TW DECK AT	2/4-5/4-47	15	105	35		Lloyd's Test 105 atm 4.6 5-4-47
Evaporator Casings (Vapour)						
NH ₃ Condenser, Evaporator and Air	23/4-23/4-47			18		
Cooler Coils after erection in place						
Brine Piping after erection in place						

Have important steel castings and forgings been tested in accordance with the Rules... ☒

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory... ☒
Dates of test 19/6-20/6-21/6-1947 Density of Brine by hydrometer

Temperatures (when the cargo chambers are cooled down to the required test temperatures) of delivery and return air at direct expansion or brine cooled
HOLD I -15.7-17.4 HOLD II -12.5-15.5 AFT HOLD -14.5-17 FORW TWDK -17-19.8 AFT TWDK -16.9-18, outflow and return brine +25.5-25.5
atmosphere +22.4°C cooling water inlet and discharge +18°C and +19.5°C gas in condensers +28.5°C and evaporators -19
HOLD I -15.1, HOLD II -12.7, AFT HOLD -13.5°C and the rise of temperature in these chambers upon the expiration of 12 hours
the average temperature of the refrigerated chambers -13.5°C and the rise of temperature in these chambers upon the expiration of 12 hours
time after the machinery and cooling appliances have been shut off HOLD I 6.6°C HOLD II 4.2°C AFT HOLD 5.8°C FORW TWDK
7.1°C AFT TWDK 6.8 AVERAGE 6.1°C per 12 hours -0.5°C per hour

SPARE GEAR.

Are the working parts of the machines, pumps and motors respectively, interchangeable... ☒

Has the spare gear required by the Rules been supplied... ☒

Additional Spare Gear Supplied:—

The foregoing is a correct description of the Refrigerating Machinery.

AKTIESELSKABET ATLAS
København N.

Manufacturer.

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DESCRIPTION OF INSULATION.

	IN LOWER HOLD CHAMBERS.					IN 'TWEEN DECK CHAMBERS.				
	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.
Frame No. 124 (Fore Peak)	A	✓	1 1/4 t. gr. Gran. Cork	8	✓	✓	1 1/4 t. gr. Gran. Cork	8"	✓	✓
Frame No. 73 (Butter Room)	F	✓	1 1/4 t. gr. "	8 3/4	✓	✓	✓	✓	✓	✓
Frame No. 56 (Engine Room)	A	✓	1 1/4 t. gr. "	3	✓	✓	✓	✓	✓	✓
Frame No. 37	F	✓	✓	✓	✓	✓	✓	✓	✓	✓
Frame No. 10 (After Peak)	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sides	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Overheading	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floors of Chambers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trunk Hatchways	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thrust Recess, Sides and Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tunnel Sides and Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tunnel Recess, Front and Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Frames or Reverse Frames, Face	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bulkhead Stiffeners, Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ribband on Top of Decks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Side Stringers, Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Web Frames, Sides	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brackets, Top	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Insulated Hatches, Main	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hatchway Coamings, Main	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hold Pillars	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Masts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ventilators	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Are insulated plugs fitted to provide easy access to bilge suction roses.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Are insulated plugs fitted to ventilators.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Oil Storage Tanks, where adjacent to the insulated chambers, state what provision has been made for ventilating the air space between the insulation and the bulkhead plating.	2 ports necks 2"	✓	✓	✓	✓	2" lining, 4 1/2" isoflex.	✓	✓	✓	✓
and for draining the tank top.	Gutterway leading to bilge	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fireproof Insulation. Is the insulation and woodwork fireproof in way of bunkers or any surfaces exposed to excessive heat.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Cargo Batts. Dimensions and spacing, sides.	6 x 1 3/4. 9"	✓	✓	✓	✓	6 x 1 3/4 fir.	✓	✓	✓	✓
fixed or portable.	fixed on sides + tunnel top	✓	✓	✓	✓	fixed on sides + tunnel top	✓	✓	✓	✓
Thermometer Tubes, No. and position in each chamber.	2 1/2" as on approved plan.	✓	✓	✓	✓	2 1/2" as on approved plan.	✓	✓	✓	✓
diameter.	2 1/2"	✓	✓	✓	✓	2 1/2"	✓	✓	✓	✓
are they fitted in accordance with Section 3, Clause 8.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
Draining Arrangements. What provision is made for draining the inside of the chambers.	2 off screen down valves from br. decks.	✓	✓	✓	✓	2 off screen down valves from br. decks.	✓	✓	✓	✓
Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓
What provision is made for draining the refrigerating machinery room.	1 off 3" bilge pump suction	✓	✓	✓	✓	1 off 3" bilge pump suction	✓	✓	✓	✓
brine return room.	fan room.	✓	✓	✓	✓	fan room.	✓	✓	✓	✓
water circulating pump room.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers.	yes	✓	✓	✓	✓	yes	✓	✓	✓	✓

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Sounding Pipes, No. and position in each chamber situated below the load water line *one off each side after end of tanks.*

Diameter *1 1/2* Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11 *yes*

Are all wood linings tongued and grooved *yes* Are cement facings reinforced with expanded steel lattice *yes*

How is the expanded metal secured in place *✓*

How are the cork slabs secured to the steel structure of the vessel *yes*

Air Trunkways in Chambers. Are the arrangements satisfactory and in accordance with the approved plans *yes*

Are they permanently fixed or collapsible, or portable *permanently fitted*

Where air trunkways pass through watertight bulkheads, are they fitted with watertight doors *✓* Are the door frames efficiently insulated *✓*

Are insulated plugs supplied for the doorways *✓* Where are the doors worked from *✓*

Cooling Pipes in Chambers, diameter *3 1/4 1/2 3/4* Minimum thickness *4 1/2* Are they galvanised externally *No*

How are they arranged in the chambers *The coolers are placed in deck houses*

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *but not yes*

The foregoing is a correct description of the Insulation and Appliances.

AALBORG VÆRFT A/S

Paulsen Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *yes* and Insulation *yes*

(If not, state date of approval) Is the Refrigerating Machinery and Appliances duplicate of a previous case *No* If so, state name of vessel *✓*

If the survey is not complete, state what arrangements have been made for its completion and what remains to be done *✓*

General Remarks (State quality of workmanship, opinions as to class, &c.) *The above refrigerating machinery was built under Special Survey by Germanischer Lloyd. The whole installation has now been overhauled tested as per Rule and new parts have been made and fitted under Special Survey by Surveyors to this Society.*

The three ammonia compressors have been overhauled and repaired in shop, the cylinders re-bored, the pistons renewed, the crank shafts skimmed over on journals and pins and the whole metal in all brasses renewed. The tubes of the shell and tubes condensers renewed, condensers tested as per Rule.

The NH₃ pipes shipped in the holds examined and found good and together with the direct expansion batteries tested in place by air pressure to 18 kg/cm² and found tight.

The insulation on the tank top has been made 4" as required by the Secretary's letter E dated 31.1.1947 and the remaining requirements in the Secretary's letter E dated 21/11-25/11 1946 1/1-16/3/1-20/2-24/2 1947 complied with. The electric heaters in the holds removed.

The whole machinery tested under working conditions and found satisfactory.

An interim certificate issued as per copy enclosed

Recommend the vessel to have notation of LLOYD'S R.M.C 6.46 1

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	Ice melting capacity per 24 hours.	Is Refrigerating Machinery Electrically Driven?	INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.				No.	Capacity.
3	6	Ammonia	W. Madsen Copenhagen	1935	1) direct expansion 2) Gran cork bottles	Tons. 86.4	yes	5	Cubic ft. 12,505

Fee *£11.000* Fee applied for, 19

Travelling Expenses *£11.000* Received by me, 19

Paulsen 26th June
Surveyor to Lloyd's Register.

Committee's Minute

Assigned *Lloyd's R.M.C 6.47*

CERTIFICATE WRITTEN.



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