

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office 17 AUG 1939)

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T.W. S.S. "LANARKSHIRE" 1939

on the Refrigerating Machinery and Appliances of the M.V. "AYRSHIRE". Tons Gross Net

Vessel built at Greenock By whom built Greenock Dockyard & Shipyard No. 434 When built 1939

Owners Blue Line Steamers Ltd. Port belonging to Voyage

Refrigerating Machinery made by J.E. Hall Ltd. Machine Nos. 10284 When made 1939

Insulation fitted by When fitted System of Refrigeration CO<sub>2</sub> + Brine

Method of cooling Cargo Chambers Brine + Air Insulating Material used

Number of Cargo Chambers insulated 14 Total refrigerated cargo capacity 318,000 / 322,000 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed Main Deck P+S of Eng. Rm. casing

Refrigerating Units, No. of 2 No. of machines 2 Is each machine independent yes

Total refrigeration or ice-melting capacity in tons per 24 hours 114 Are all the units connected to all the refrigerated chambers yes

Compressors, driven direct or through ~~single~~ reduction gearing Compressors, single or double acting double If multiple effect compression no

are relief valves or safety discs fitted yes No. of cylinders to each unit one Diameter of cylinders 5 3/4"

Diameter of piston rod 2 3/4" Length of stroke 18" No. of revolutions per minute 135

Motive Power supplied from (State number of boilers, oil engines or electric generators supplying the motive power.)

Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders 2 per unit Diameter 12" + 24"

Length of stroke 18" Working pressure 120 lb. sq. in. Diameter of crank shaft journals and pins 7 1/2" jls, 8" pins.

Breadth and thickness of crank webs 11" x 6" No. of sections in crank shaft one Revolutions of engines per minute 135

Oil Engines, type 2 or 4 stroke cycle Single or double acting B.H.P.

No. of cylinders Diameter Length of stroke Span of bearings as per Rule

Maximum pressure in cylinders Diameter of crank shaft journals and pins

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

AIR RECEIVERS:—Is each receiver, which can be isolated, fitted with a safety valve as per Rule

Can the internal surfaces of the receivers be examined What means are provided for cleansing their inner surfaces.

Is there a drain arrangement fitted at the lowest part of each receiver If made under survey

No. of Receivers Cubic capacity of each Internal diameter thickness

Seamless, lap welded or riveted longitudinal joint Material Range of tensile strength Working pressure by Rules

Electric Motors, type No. of Rated Kilowatts.

Volts at revolutions per minute. Diameter of motor shafts at bearings

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 2 Cast iron or steel casings cast iron Cylindrical or rectangular cylindrical Are safety valves fitted

to casings yes No. of coils in each 14 Material of coils S.D. Copper 3/4" x 1/8" Can each coil be readily shut off or disconnected yes

Water Circulating Pumps, No. and size of 2 - 6" centrifugal how worked electrically Gas Separators, No. of 4

Gas Evaporators, No. of 2 Cast iron or steel casings steel Pressure or gravity type pressure If pressure type, are safety

valves fitted vent pipe No. of coils in each casing 13 Material of coils S.D. Steel 1 1/2" x 1 1/8" Can each coil be readily shut off or disconnected yes

Direct Expansion or Brine Cooled Batteries, No. of 8 twin Are there two separate systems, so that one may be in use while the other is being

cleared of snow no No. of coils in each battery see list attached Material of coils S.D. Steel 1 1/2" x 1/8" Can each coil be readily shut off or

disconnected yes Total cooling surface of battery coils 15,800 sq. ft. Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 19 each of see list attached 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 no

Brine Circulating Pumps, No. and size of, including the additional pump 5 - 4" centrifugal how worked electrically

Brine Cooling System, closed or open closed Are the pipes and tanks galvanised on the inside no

No. of brine sections in each chamber see list attached

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

NOTE.—THE WORDS WHICH DO NOT APPLY, SHOULD BE DELETED.

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Are thermometers fitted to the outflow and to each return brine pipe *yes* <sup>common</sup> 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 *yes*  
 Is the exhaust steam led to the main and auxiliary condensers

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED)	H.P. 24-4-39 L.P. 23-5-39	120 lb. □"	350 lb. □" 250 lb. □"	✓	SH	
GAS COMPRESSORS	4-4-39	1000 lb. □"	3000 lb. □"	1500 lb. □"	SH	
SEPARATORS	28-4-39	do.	do.	do.	SH	
MULTIPLE EFFECT RECEIVERS	none					
CONDENSER COILS	10-5-39 23-5-39	do.	do.	do.	SH	
EVAPORATOR COILS	6-6-39 9-6-39 22-6-39	do.	do.	do.	SH	
CONDENSER HEADERS AND CONNECTIONS	4-4-39 14-5-39 23-5-39	do.	do.	do.	SH	
CONDENSER CASINGS	15-6-39	10 to 15 lb. □"	30 lb. □"	✓	SH	
EVAPORATOR CASINGS	30-6-39	do.	do.	✓	J.F.N.	
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR 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 Density of Brine by hydrometer

Temperatures (when the cargo chambers are cooled down to the required test temperatures)

or, delivery and return air at direct expansion or brine cooled batteries & outflow and return brine &

atmosphere cooling water inlet and discharge & gas in condensers and evaporators

the average temperature of the refrigerated chambers and the rise of temperature in these chambers upon the expiration of hours

time after the machinery and cooling appliances have been shut off

SPARE GEAR.

Are the working parts of the machines, pumps and motors respectively, interchangeable *yes*

Has the spare gear required by the Rules been supplied *yes*

Additional Spare Gear Supplied:-

- 12 lubr. piston leathers, 12 addl. compr. valve springs, 2 Springs Steam relief valve, 2 Spring water relief valve
- 12 " gland " , 1 crankshaft, 1 Steam piston rod & nuts, 2 Springs brine relief valve
- 1 set of 2 leather moulds, 1 piston for H.P. Cyl. with rings 2 " CO<sub>2</sub> " "
- 1 Set L.P. piston rings, 1 H.P. Steam piston valve, 1 eccentric sheave, Strap, rod and brass each pattern
- 2 bolts & nuts for crosshead, 2 bolts & nuts for Compr. Coupling, 1 pump for press. lubr., 1 CO<sub>2</sub> gauge.
- 2 " " " Can rod big end, 1 hydrometer, 2 brass case thermos, 12 safety discs
- 2 " " " main bearing, 1- $\frac{3}{8}$ " CO<sub>2</sub> gauge valve & 3 Spare pipe, 1 Set ratchet screw driver 1  $\frac{1}{2}$ " pipe
- 2 pairs CO<sub>2</sub> pipe flanges, 1 fitted box.
- Steam Condensing Sets. 1 Set valves for feed pump, 6 condenser tubes
- 24 ferrules with packing rings, 1 pump piston & rod for air pump, 1 Set valves for air pump
- Brine & water pumps. 1 impeller, 1 impeller shaft for each size brine pumps

ELECTRICAL SPARES.

- 1 Armature packed for storage
- 1 Set of bearings
- 1 Set of field coils
- 1 Set of interpole coils
- 1 line of brush holders
- 1 Set Carbon brushes
- 1 Set controller spares
- Water pump motor
- Brine pump motor each size.
- 1 Complete motor for external motor <sup>fan motor</sup>
- for each of these sizes internal motor
- 2 Sets Carbon brushes for external motor
- 2 " " " internal " "
- 1 Set Controller parts " external "
- 6 fan rotors, one for each size fitted

The foregoing is a correct description of the Refrigerating Machinery.

J. & E. HALL, LTD  
 F. W. Wells  
 Manufacturer.

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. (Fore Peak)	A									
FRAME No.	F									
FRAME No.	A									
FRAME No.	F									
FRAME No.	A									
FRAME No. (Boiler Room)	F									
FRAME No. (Engine Room)	A									
FRAME No.	F									
FRAME No.	A									
FRAME No.	F									
FRAME No.	A									
FRAME No. (After Peak)	F									
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 BOTTOM AND FACE

RIBBAND ON TOP OF DECKS

SIDE STRINGERS, TOP BOTTOM AND FACE

WEB FRAMES, SIDES AND FACE

BRACKETS, TOP BOTTOM AND FACE

INSULATED HATCHES, MAIN BILGE MANHOLE

HATCHWAY COAMINGS, MAIN BILGE

HOLD PILLARS

MASTS VENTILATORS

Are insulated plugs fitted to provide easy access to bilge suction roses tank, air, and sounding pipes heels of pillars

and manhole doors of tanks Are insulated plugs fitted to ventilators cargo ports and side tights

Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected if so, how

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

and for draining the tank top

Fireproof Insulation. Is the insulation and woodwork fireproof in way of bunkers or any surfaces exposed to excessive heat

Where Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof

Cargo Battsens, Dimensions and spacing, sides floors tunnel top

fixed or portable Are screens fitted over the brine grids at chamber sides hinged or permanently fixed

Thermometer Tubes, No. and position in each chamber

diameter are they fitted in accordance with Section 3, Clause 8

Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated

Draining Arrangements. What provision is made for draining the inside of the chambers

Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off

What provision is made for draining the refrigerating machinery room

brine return 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

Sounding Pipes, No. and position in each chamber situated below the load water line

Diameter \_\_\_\_\_ Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11

Are all wood linings tongued and grooved \_\_\_\_\_ Are cement facings reinforced with expanded steel lattice

How is the expanded metal secured in place \_\_\_\_\_

How are the cork slabs secured to the steel structure of the vessel \_\_\_\_\_

Air Trunkways in Chambers. Are the arrangements satisfactory and in accordance with the approved plans \_\_\_\_\_

Are they permanently fixed or collapsible, or portable \_\_\_\_\_

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 \_\_\_\_\_ Minimum thickness \_\_\_\_\_ Are they galvanised externally \_\_\_\_\_

How are they arranged in the chambers \_\_\_\_\_

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers \_\_\_\_\_

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

Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery \_\_\_\_\_ and Insulation \_\_\_\_\_  
(If not, state date of approval)

Is the Refrigerating Machinery and Appliances duplicate of a previous case \_\_\_\_\_ 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 refrigerating machinery has been constructed under special survey and the materials and workmanship are good and it will be eligible for the notation + Lloyd's R.M.C. (with date) when the installation and testing have been satisfactorily completed.*

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.
2	2	carb. Ammonia	J. E. Hall Ltd.	1939	(1) Brine & Air	Tons. 114		14	372,000

Fee London £ 9 : - : -  
GRK etc £ 18 : 0 : 0  
Travelling Expenses £ : : :  
Fee applied for, 1939  
Received by me, 19

*D. Gemmell*  
Surveyor to Lloyd's Register.

Committee's Minute

APR 16 1940

Assigned

*See Grk. Rpt. 20941*



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