

noted for R.M.C. new entry

R. M. C. No.

36759

Bel 10,440.

No. 97125.

Rpt. 17.

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office 31 MAY 1930)

22 AUG 1930

Date of writing Report 19 When handed in at Local Office 29 MAY 1930 Port of LIVERPOOL
No. in Reg. Book. Survey held at Warrington Date: First Survey 25.3.30 Last Survey 23.5.1930
84463 (No. of Visits 4)

on the Refrigerating Machinery and Appliances of the m.v. 'Silverleaf' Tons {Gross: Net:
Vessel built at Belfast By whom built Harland & Wolff Ltd. Yard No. 884 When built 1930
Owners Silver Line Ltd. Port belonging to London Voyage
Refrigerating Machinery made by Liverpool Refrigeration Co. Ltd. Machine No. When made 1930
Insulation fitted by J. When fitted 1930 System of Refrigeration Ammonia
Method of cooling Cargo Chambers air Insulating Material used cork
Number of Cargo Chambers insulated 4 Total refrigerated cargo capacity 6000 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed shaft engine room, between hatches.

Refrigerating Units, No. of 2 Single, double, or triple 400 Cubic feet of air delivered per hour 2,400,000

Total refrigeration or ice-melting capacity in tons per 24 hours 50 Are all the units connected to all the refrigerated chambers 400

Compressors, driven direct or through ~~reduction gearing~~ Compressors, single or double acting 400 No. of cylinders 2 per unit

Diameter of cylinders 6" Diameter of piston rod Length of stroke 6" No. of strokes per minute 500

Motive Power supplied from electric generators.

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

Oil Engines, type 2 or 4 stroke cycle Single or double acting

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

Electric Motors, type enclosed, vent'd, D.C. No. of one Rated 47 Kilowatts 220

Volts at 500 revolutions per minute. Diameter of motor shafts at bearings 4"

Reduction Gearing, maximum shaft horse power at 1st pinion Revolutions per minute at full power at 1st pinion

2nd pinion 1st reduction wheel main shaft Pitch circle diameter, 1st pinion 2nd pinion

1st reduction wheel Main wheel Width of face, 1st reduction wheel Main wheel

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, 1st pinion 2nd pinion

1st reduction wheel Main wheel Flexible pinion shafts, diameter 1st 2nd

Pinion shafts, diameter at bearings, External, 1st 2nd Internal, 1st 2nd

Diameter at bottom of teeth of pinion, 1st 2nd Wheel shafts, diameter at bearings, 1st

Main Diameter at wheel shroud, 1st Main

Gas Condensers, No. of 2 Cast iron or steel casings 400 Cylindrical or rectangular multitubular

No. of tubes in each element, 19 Material of tubes, S.D. steel Can each coil be readily shut off or disconnected

Water Circulating Pumps, No. and size of 1, 18000 galls. per hour how worked 10 B.H.P. motor Gas Separators, No. of 2

Gas Evaporators, No. of 2 Cast iron or steel casings 400 Pressure or gravity type 400

No. of tubes in each element, 19 Material of tubes, S.D. steel Can each coil be readily shut off or disconnected

Direct Expansion or Brine Cooled Batteries, No. of 4 Are there two separate systems, so that one may be in use while the other is being

cleared of snow 400 No. of coils in each battery 4 Material of coils S.D. steel Can each coil be readily shut off or

disconnected 400 Total cooling surface of battery coils 5000 sq' Is a watertight tray fitted under each battery 400

Air Circulating Fans, Total No. of 4 each of 10,000 cubic feet capacity, at 480 revolutions per minute

Steam or electrically driven 4 7 B.H.P. motor Where spare fans are supplied are these fitted in position ready for coupling up

Brine Circulating Pumps, No. and size of, including the additional pump 2 centrif. 11000 galls. per hour how worked 10 B.H.P. motor

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

No. of brine sections in each chamber

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.

Im. 524-1

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
 Steam Condensing Plant. State what provision is made for condensing steam, in terms of Section 4, Clauses 13 and 14

HYDRAULIC AND OTHER TESTS.

| DESCRIPTION. | Date of Test. | Working Pressure. | Hydraulic Test Pressure. | Air Test Pressure. | Stamped. | REMARKS. |
|--|---------------|-------------------|--------------------------|--------------------|----------|----------|
| ENGINE CYLINDERS (if tested) | | | | | | |
| GAS COMPRESSORS | 25.3.30 | 150 lbs | 600 lbs | 300 lbs | | |
| SEPARATORS | 14.5.30 | | 2000 lbs | ✓ | | |
| CONDENSER Cases 46 x tubes | 5.5.30 | " | ✓ | 750 lbs. | | |
| EVAPORATOR Cases | 5.5.30 | " | ✓ | 750 lbs. | | |
| CONDENSER HEADERS AND CONNECTIONS | ✓ | | | | | |
| CONDENSER CASINGS | 5.5.30 | " | ✓ | 750 lbs. | | |
| EVAPORATOR CASINGS | 14.5.30 | 15 lbs | 30 lbs | ✓ | | |
| NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE | 18.8.30 | | | 260 lbs. | | |
| BRINE PIPING AFTER ERECTION IN PLACE | 27.30 | | | 70 lbs | | |

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory *Yes*
 Dates of test 20th + 21st August 1930 Density of Brine 49 by *Swadlow* hydrometer
 Temperatures (when the cargo chambers are cooled down to the required test temperatures) of air at the snow box and of the return air &
 or, delivery and return air at direct expansion or brine cooled batteries & outflow and return brine &
 atmosphere 56° cooling water inlet and discharge 56° & 60° gas in condensers 67° and evaporators
 the average temperature of the refrigerated chambers 21.74° and the rise of temperature in these chambers upon the expiration of *Swadlow* hours
 time after the machinery and cooling appliances have been shut off 8 7/8° = 7.8° per hour

SPARE GEAR.

| ARTICLES SUPPLIED AS PER RULE. | ADDITIONAL SPARE GEAR SUPPLIED. |
|---|---------------------------------|
| 1 crankshaft | |
| 2 compressor pistons & rings, 2 sets piston rings. | |
| 2 delivery heads, 2 screws & rings, 6 valves & springs. | |
| 1 gudgeon pin, 2 conn. rods, 3 main bearings. | |
| Oil pump driving disc & plunger, cover & drum. | |
| 6 sight glasses, 2 sets gland packing, gland end nut. | |
| 2 sets ammonia compressor joints; 2 suction strainer cages. | |
| 1 pair conn. rod bolts & nuts, 1 shaft coupling spring. | |
| 6 lengths 1 1/2" piping & couplings; 1 set screwing gear. | |
| 2 ammonia regulating & 3 stop valves, 3-1/2" brine valves. | |
| 1 wire pump impeller & spindle; 1 brine pump ditto. | |
| 1 set CO ₂ recorder spares. | |
| 1 fan runner shaft & 1/2 coupling; 1 fan bearing. | |
| Asorted bolts & nuts & brine joints. | |
| 4 brine thermometers; 2 ammonia gauges | |
| 1 set charging gear. | |
| 1 set wire & 1 set brine pump bearing brushes. | |
| 1 set elec. thermometer spares, 2 chamber units. | |
| Condenser zinc & 1 return bend. | |

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

For THE LIVERPOOL REFRIGERATION CO. LTD

The foregoing is a correct description of the Refrigerating Machinery.

W. S. Swadlow
 Managing Director, Manufacturer.

DESCRIPTION OF INSULATION.

| BULKHEADS. | 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. F | | | | | | | | | | |
| FRAME No. (Boiler Room) A | | | | | | | | | | |
| FRAME No. 21 (Engine Room) A | nil | nil | Silicat | 10" | 1" T & G | | | | | |
| FRAME No. 36 Division F | | | Gran Cork | 8" | 16WG Galv. sheeting | | | | | |
| FRAME No. 49 F | | | | 9 1/2" | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. (After Peak) F | | | | | | | | | | |
| SIDES | nil | nil | Gran Cork | 10 1/2" | 1" T & G 16WG Galv. sheeting | | | | | |
| OVERHEADING | | | | 10" | 3/4" T & G | | | | | |
| FLOORS OF CHAMBERS | 2" | 1 1/2" T & G and 15WG Gal. Lin | | 6" | 1 1/2" T & G | | | | | |
| TRUNK HATCHWAYS | | | | | | | | | | |
| THRUST RECESS, SIDES AND TOP | | | | | | | | | | |
| TUNNEL SIDES AND TOP | | | | | | | | | | |
| TUNNEL RECESS, FRONT AND TOP | | | | | | | | | | |

FRAMES OR REVERSE FRAMES, FACE 6" x 3" Pine Grounds
 BULKHEAD STIFFENERS, TOP 3/4" x 3/4" T & G BOTTOM 1 1/4" T & G AND FACE 1" T & G 16WG sheeting
 RIBBAND ON TOP OF DECKS ✓
 SIDE STRINGERS, TOP ✓ BOTTOM AND FACE
 WEB FRAMES, SIDES ✓ AND FACE
 BRACKETS, TOP ✓ BOTTOM AND FACE
 INSULATED HATCHES, MAIN 6 1/2" Gran Cork & Double 1" Pine Bilge MANHOLE
 HATCHWAY COAMINGS, MAIN 1" Pine 2 1/2" x 6 1/2" main Bilge
 HOLD PILLARS 2" Cork, 1" Pine and 1" Rope.
 MASTS ✓ VENTILATORS Plugs in overheading
 Are insulated plugs fitted to provide easy access to bilge suction roses Yes tank, air, and sounding pipes no heels of pillars no
 and manhole doors of tanks ✓ Are insulated plugs fitted to ventilators Yes cargo ports ✓ and side lights ✓
 Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected Yes if so, how 2" Elm

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.
 Coal Bunker Bulkheads, and Brine Outflow and Return Pipes passing through coal bunkers. Is the insulation, so far as practicable, fireproof
 Where Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof
 Cargo Battens, Dimensions and spacing, sides 2" x 2" spaced 9 1/2" floors 3" x 3" Pine spaced 12" tunnel top
 fixed or portable fixed Are screens fitted over the brine grids at chamber sides ✓ hinged or permanently fixed ✓
 Thermometer Tubes, No. and position in each chamber 2 in each chamber in overheading
 diameter 2 1/2" are they fitted in accordance with Section 3, Clause 8 Yes
 Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated Yes.
 Draining Arrangements. Where the chambers are situated below the load water line, what provision is made for draining the inside of the chambers
 2 1/2" NA. Valve Scuppers Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off no
 What provision is made for draining the refrigerating machinery room 2 Scuppers into tunnel
 brine return room 2 Scuppers fan room 2 Scuppers water circulating pump room 2 Scuppers
 Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers Yes.



Sounding Pipes, No. and position in each chamber situated below the load water line *one each side at after end in drain hat.*
 Diameter *2 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 *✓*
 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, inside dimensions, main *2-6" x 2-6"* and branch *3-0" to 2-0" square.*
 Are they permanently fixed or collapsible, or portable *fixed* State position in chambers *top & bottom of sides & ends.*
 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 *air ducts* Are they galvanised externally *yes.*
 How are they arranged in the chambers *"Cooling Chambers 3"*
Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *warm brine*

The foregoing is a correct description of the Insulation and Appliances.
J.W. Burrows for The Liverpool Refrigeration Co Ltd
Liverpool Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *no, 16.7.29* and Insulation *no*
 (If not, state date of approval)
 Is the Refrigerating Machinery and Appliances duplicate of a previous case *yes* If so, state name of vessel *m.v. 'Silverwalnut'*
 If the survey is not complete, state what arrangements have been made for its completion and what remains to be done, *to complete the survey, the insulation remains to be fitted, machinery, auxiliaries & appliances installed, spare gear checked, & a cooling down test applied.*

General Remarks (State quality of workmanship, opinions as to class, &c.) *The refrigerating machinery & appliances of this vessel have been built under Special Survey; the materials & workmanship are good. after erection in the shop the machinery is being forwarded to Belfast; & on completion, will be eligible for record of + Lloyds R.M.C. with date.*

The machinery has been satisfactorily installed and tested in a tunnel space abaft the motor room. The insulated spaces were cooled down, running the two motor compressors, in 12 hours. In my opinion the vessel is now eligible for record of LLOYDS R.M.C. 8.30 for temperature 20°F
R. Lee James
Belfast 21.8.30

+ Lloyds R.M.C. 8.30. For temp 20°F
J.W. Burrows 22/8/30

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

| REFRIGERATING MACHINES. | | | | | POWER. | | INSULATED CARGO CHAMBERS. | | |
|-----------------------------------|---|-----------------------|----------------|-------|--|---------------------------------------|------------------------------------|----------|---------------|
| No. and whether Single or Duplex. | Makers. | Date of Construction. | System. | Type. | System of (1) Refrigerating (2) Insulating the Chambers. | Cubic feet of air delivered per hour. | Ice melting capacity per 24 hours. | No. | Capacity. |
| <i>2, 4</i> | <i>Liverpool Refrigeration Co. Ltd.</i> | <i>1930</i> | <i>Ammonia</i> | | <i>(1) air (2) F. work P. Cotton</i> | <i>2,400,000</i> | <i>50</i> | <i>4</i> | <i>60,000</i> |

Fee *1/2 hkn. 2/3 Bel.* £ *9* : . . . } Fee applied for, 19 *30*
 Travelling Expenses £ *17* : . . . } Received by me, *6 June 1930. See London L.C. +*
L. 11- Special Attendance Paid 1/10/30
 Committee's Minute **LIVERPOOL 30 MAY 1930**
 Assigned *Deferred for comp.*

S. Lowndes *W. S. Shields*
 Surveyor to Lloyd's Register.
FRI. 22 AUG 1930
+ Lloyds R.M.C. 8.30
In temp 20°F
 Lloyd's Register Foundation
 CERTIFICATE WRITTEN.

Certificate to be sent to