

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.

84463

Survey held at Harrington

Date: First Survey

25.3.30

Last Survey

13.5.

1930

(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.E.

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

Yes

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

Yes

Compressors, driven direct or through ~~reduction~~ ^{single} ~~gear~~ ^{drive}

Compressors, single or double acting

Yes

No. of cylinders

2

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

Yes

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

Yes

Pressure or gravity type

Yes

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

Yes

No. of coils in each battery

4

Material of coils

S.D. steel

Can each coil be readily shut off or

disconnected

Yes

Total cooling surface of battery coils

5000 sq'

Is a watertight tray fitted under each battery

Yes

Air Circulating Fans, Total No. of

4

each of

10,000

cubic feet capacity, at

480

revolutions per minute

Steam or electrically driven

Yes

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. 524-1-1

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	15.8.30			260 lbs		
BRINE PIPING AFTER ERECTION IN PLACE	15.7.30			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 *5°* & *8°*
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 *Twelve* hours
time after the machinery and cooling appliances have been shut off *8 7/8° = 7.8° F 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 & stop valves, 3 - 1 1/2" brine valves.
1 wire pump impeller & spindle; 1 brine pump ditto.
1 set CO₂ recorder spares.
1 fan runner shaft & 1 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 bond.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

For THE LIVERPOOL REFRIGERATION CO. LTD

The foregoing is a correct description of the Refrigerating Machinery.

Managing Director, 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.	F									
FRAME No. (Boiler Room)	A									
FRAME No. 21 (Engine Room)	A	nil	nil	Silicat 10"	1" T & G					
FRAME No. 36 Division	F			Bottom Gran Lark 8"	16WG Salve sheeting					
FRAME No. 49	A			8"						
FRAME No.	F			9 1/2"						
FRAME No.	A									
FRAME No. (After Peak)	F									
SIDES	nil	nil	Gran Lark	10 1/2"	1" T & G 16WG					
OVERHEADING				10"	Salve sheeting 3/4" T & G					
FLOORS OF CHAMBERS	2"	1 1/2" T & G and 25WG Red 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 Lark & Double 1 Pine top & bottom* BILGE MANHOLE
HATCHWAY COAMINGS, MAIN *1" Pine 2 1/2" x 6 1/2" mean* BILGE
HOLD PILLARS *2" Lark, 1" Pine and 1" Rope*
MASTS *✓* VENTILATORS *Plugs in overheadings*
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 overheadings*
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 put down in a tunnel space abait the motor room. The insulated spaces were cooled down, running the two motor compressors in 10 hours. In my opinion the record is now eligible for record of + Lloyds R.M.C. 8.30 for temperature 20°F

R Lee Jones
Belfast 21.8.30

+ Lloyds R.M.C 8.30. For temp 20°F

22/8/30

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER		INSULATED CARGO CHAMBERS.	
No. and whether Single or Duplex.	Makers.	Date of Construction.	System.	Type.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity.
<i>2, 4</i>	<i>Liverpool Refrigeration Co. Ltd.</i>	<i>1930</i>	<i>Ammonia</i>		<i>(1) air (2) F. cork & 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 *June 1930.*

Travelling Expenses £ *. : 17 : .* } Received by me, *6 June 1930.* See London L.R.C. +

Committee's Minute *LIVERPOOL 30 MAY 1930*

Assigned *Deferred for comp.*

S. Lowndes & *W. S. Shields.*
Surveyor to Lloyd's Register.

S. Kendall

FRI. 22 AUG 1930

+ Lloyds R.M.C 8.30
In temp 20°F
Lloyd's Register
Foundation
CERTIFICATE WRITTEN