

Rpt. 17.

WRECK
SECTION

No. 618

No. 104243

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

15 AUG 1934

Date of writing Report

10

When handed in at Local Office

14 AUG 1934

Port of

LIVERPOOL

No. in

Reg. Book.

82591

Survey held at *Warrington & Rkn.* Date: First Survey *9/7/34* Last Survey *13/8/1934*

(No. of Visits)

9

on the Refrigerating Machinery and Appliances of the *S.S. 'Duel'*Tons { Gross *1539*Net *647*Vessel built at *Pt. Glasgow*By whom built *Ferguson Bros. Ltd.*

Yard No.

When built *1922*Owners *British & Continental S.S. Co. Ltd.* Port belonging to *Liverpool*

Voyage

Refrigerating Machinery made by *Liverpool Refrigeration Co. Ltd.* Machine No. *1699* When made *1934*Insulation fitted by *Liv. Refrig. Co. Ltd.*When fitted *1934*System of Refrigeration *CO₂*Method of cooling Cargo Chambers *air*Insulating Material used *cork & silicate cotton*Number of Cargo Chambers insulated *2*Total refrigerated cargo capacity *9700* cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY.

Where placed *top of engine room*Refrigerating Units, No. of *one* Single, double, or triple compressorsCubic feet of air delivered per hour *459,000* ✓Total refrigeration or ice-melting capacity in tons per 24 hours *6*

Are all the units connected to all the refrigerated chambers ✓

Compressors, driven direct or through *single* reduction gearing. Compressors, single or double acting *yes*No. of cylinders *2*Diameter of cylinders *13 1/2"*Diameter of piston rod *thunk piston*Length of stroke *4"*No. of strokes per minute *500* motive Power supplied from *main boiler auxiliary steam line*Steam Engines, high pressure, ~~compound~~, or triple expansion, surface condensing. No. of cylinders *one*Diameter *6"*Length of stroke *4"*Working pressure *120 lbs. sq. in.*Diameter of crank shaft journals and pins *2"*

Width and thickness of crank webs

No. of sections in crank shaft *one*Revolutions of engines per minute *500*

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

Width and thickness of crank webs

No. of sections in crank shaft

Revolutions of engine per minute

Electric Motors, type

No. of

Rated

Kilowatts

Rtts at

revolutions per minute. Diameter of motor shafts at bearings

Reduction Gearing, maximum shaft horse power at 1st pinion

Revolutions per minute at full power at 1st pinion

1st pinion

1st reduction wheel

main shaft

Pitch circle diameter, 1st pinion

2nd pinion

2nd 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

3rd 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

Diameter at wheel shroud, 1st

Main

Condensers, No. of *one*Cast iron or steel casings *yes*Cylindrical or rectangular *yes*No. of coils in each *3*Material of coils *S.D. copper*Can each coil be readily shut off or disconnected *yes*Water Circulating Pumps, No. and size of *3 1/2" x 6" 8+5x8"*How worked *steam*Gas Separators, No. of *1*Evaporators, No. of *one*Material of coils *S.D. steel*Pressure or gravity type *open tank*No. of coils in each casing *multitubular*Material of coils *S.D. steel*Can each coil be readily shut off or disconnected *yes*Direct Expansion or Brine Cooled Batteries, No. of *one*

Are there two separate systems, so that one may be in use while the other is being

red of snow

✓

No. of coils in each battery *3*Material of coils *S.D. steel*

Can each coil be readily shut off or

connected

✓

Total cooling surface of battery coils *905*Is a watertight tray fitted under *yes*Circulating Fans, Total No. of *one*each of *459000*cubic feet capacity, at *800*

revolutions per minute

Are electrically driven

✓

by *3 1/2 H.P. electric 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, 4+4x5" duplex*

how worked

steam

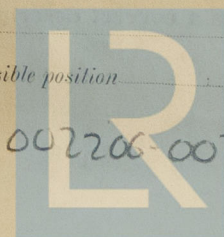
Brine Cooling System, closed or open

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



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Are thermometers fitted to the outflow and to each return brine pipe Yes 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 Yes

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

HYDRAULIC AND OTHER TESTS.

| DESCRIPTION. | Date of Test. | Working Pressure. | Hydraulic Test Pressure. | Air Test Pressure. | Stamped. | REMARKS. |
|--|----------------|--------------------------------|--------------------------|--------------------|----------|----------|
| ENGINE CYLINDERS (IF TESTED) | <u>✓</u> | | | | | |
| GAS COMPRESSORS | <u>20.7.34</u> | <u>1200 lbs</u> | <u>3000 lbs</u> | <u>✓</u> | <u>£</u> | |
| " SEPARATORS | <u>20.7.34</u> | <u>"</u> | <u>"</u> | <u>✓</u> | | |
| " CONDENSER COILS | <u>20.7.34</u> | <u>"</u> | <u>"</u> | <u>1500 lbs</u> | | |
| " EVAPORATOR COILS | <u>20.7.34</u> | <u>"</u> | <u>"</u> | <u>"</u> | | |
| " CONDENSER HEADERS AND CONNECTIONS | <u>20.7.34</u> | <u>"</u> | <u>"</u> | <u>"</u> | | |
| " CONDENSER CASINGS | <u>24.7.34</u> | <u>"</u> | <u>25 lbs</u> | | | |
| " EVAPORATOR CASINGS | <u>24.7.34</u> | <u>examined; open top tank</u> | | | | |
| NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE | <u>✓</u> | | | | | |
| BRINE PIPING AFTER ERECTION IN PLACE | <u>30.7.34</u> | <u>200 lbs</u> | <u>✓</u> | <u>90 lbs</u> | | |

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory

Dates of test 20.7.34 Density of Brine by 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 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.

ARTICLES SUPPLIED AS PER RULE.

ADDITIONAL SPARE GEAR SUPPLIED.

1 crank shaft
1 piston & trunk complete with rings
1 top end, 1 bottom end & 1 main bearing brasses.
1 ball thrust bearing.
2 conn. rod bottom end bolts.
1 cushion & 1 discharge valve assembly. 1 oil pump cyl. & plunger & lens glass.
1 cyl. head safety spring. 2 sets gland packing.
1 oil pump ball valve, spring. 1 gland brush.
1 set joint rings. 3 safety discs. 1 CO₂ gauge. 1 conn. rod.
1 CO₂ stop valve spindle & head; 1 CO₂ regulating valve.
3 lengths tubing & couplings; 1 set screwing gear.
Steam engine:- 1 crank shaft; 1 steam piston, rod & rings; 1 eccentric
cheave, strap & rod; 1 pair main bearing brasses; 1 set conn. rod
& 1 set crosshd. brasses; 2 main bearing studs & nuts; 2 conn. rod & 2
crosshd. bolts & nuts; 1 steam piston valve, rod & nuts; 1 set governor springs.
1 set of valves & springs for brine pump.
1 fan motor complete, with control gear spares.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

For THE LIVERPOOL REFRIGERATION CO. LTD.

Alfred B. Edwards
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. | | |
| BULKHEADS. | FRAME No. (Fore Peak) | A | | | | | | | | | | |
| | FRAME No. | F | | | | | | | | | | |
| | | A | | | | | | | | | | |
| | FRAME No. | F | | | | | | | | | | |
| | | A | | | | | | | | | | |
| | FRAME No. 90 partition. | F | | | | | | | | | | |
| | | A | ✓ | 7 1/2" W. Pine | gran. cork | 8" ✓ | 2-3/4" T. G. | ✓ | 3" W. Pine T. G. gran. cork | 8" ✓ | 2-3/4" T. G. | |
| | FRAME No. 80 (Boiler Room) | F | ✓ | ✓ | silic. cotton | 8" ✓ | 2-3/4" T. G. | ✓ | ✓ | silic. cotton | 8" ✓ | 2-3/4" T. G. |
| | | A | | | | | | | | | | |
| | FRAME No. (Engine Room) | A | | | | | | | | | | |
| | FRAME No. | F | | | | | | | | | | |
| | | A | | | | | | | | | | |
| FRAME No. | F | | | | | | | | | | | |
| | A | | | | | | | | | | | |
| FRAME No. | F | | | | | | | | | | | |
| | A | | | | | | | | | | | |
| FRAME No. (After Peak) | F | | | | | | | | | | | |
| SIDES | ... | ✓ | ✓ | gran. cork | 8 1/2" ✓ | 2-3/4" T. G. | ✓ | ✓ | gran. cork | 8 1/2" ✓ | 2-3/4" T. G. | |
| OVERHEADING | ... | ✓ | ✓ | slab work | 6" ✓ | 2-3/4" T. G. | ✓ | ✓ | gran. cork | 8 1/2" ✓ | 2-3/4" T. G. | |
| FLOORS OF CHAMBERS | ... | ✓ | ✓ | " | 4" ✓ | 1 1/2" asphalt. | | | | | | |
| 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 4" x 6" gran. cork, 2-1" T.G. BILGE 2 1/2" gran. cork, 1 1/2" T.G. MANHOLE 2" slab cork, 1 1/2" T.G.

HATCHWAY COAMINGS, MAIN Pitch Pine

BILGE Pitch Pine

HOLD PILLARS ✓

MASTS ✓

VENTILATORS ✓

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

and manhole doors of tanks Yes 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"

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 1" floors 2" x 2" tunnel top ✓

fixed, or portable on floors. Are screens fitted over the brine grids at chamber sides ✓ hinged or permanently fixed ✓

Thermometer Tubes, No. and position in each chamber 1 F, 1 A in each chamber

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

liquid sealed trap scupper. 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 scupper

brine return room scupper fan room scupper water circulating pump room ✓

Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers ✓

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Are there
Where to
Steam

ENGINE
Gas Cool
" SE
" Co
" Ev
" Co
" Co
" E
NH₃ Cool
BRINE

Cool
Date
Ten
or, a
atm
the
time

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, inside dimensions, main 2' x 1' Cold; 1'-7" x 1'-0" orlop or and branch ✓

Are they permanently fixed or collapsible, or portable ✓

State position in chambers sec. trunkson f. blkhd.

Del. trunks on a. blkhd., at top.

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 ✓

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

For THE LIVERPOOL REFRIGERATION CO. LTD.

Alfred B. Edwards, Builders.

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

Director and Insulation ✓

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 To complete the survey, the spare gear remains to be checked, & a cooling down test applied on the vessel's arrival at Mch., to 20°F. Surveyors advised.

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 & cooler have been installed on board in an efficient manner, and the installation will be eligible to be classed with record of + Lloyd's R.M.C. with date, for temperature of 20°F, on completion of survey.

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. |
| 1 unit 2 compressors. | Liverpool Refrig. Co. | 1934 | CO ₂ | air | Y. S. Cotton | 459,000 | 6 | 2 | 9700. |

Fee £ 6 : : : Fee applied for, 14 AUG 1934

Travelling Expenses £ : 10 : 10 Received by me, 10.10.34

Y. S. Cotton, P. Townsend, & H. R. Howells.

Surveyor to Lloyd's Register.

Committee's Minute

LIVERPOOL

14 AUG 1934

Assigned

Deferred
for comp.

FRI. 7 SEP 1934



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Is report not kept
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