

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

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on the Refrigerating Machinery and Appliances of the "EMPIRE PENNANT" Tons {Gross.....
Vessel built at Port Glasgow By whom built Lithgows Ltd. Yard No. 942 When built 1942
Owners _____ Port belonging to _____ Voyage _____
Refrigerating Machinery made by J. E. Hall Ltd. Machine Nos. 11080 When made 1942
Insulation fitted by _____ When fitted _____ System of Refrigeration NH₃ + Air.
Method of cooling Cargo Chambers Air Cooled Insulating Material used _____
Number of Cargo Chambers insulated 4 Total refrigerated cargo capacity 244,000 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed 2nd dk. aft, main eng. room

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 72 Are all the units connected to all the refrigerated chambers yes
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 8"
Diameter of piston rod trunk pistons Length of stroke 8" No. of revolutions per minute 400
Motive Power supplied from _____
(State number of boilers, oil engines or electric generators supplying the motive power.)

Steam Engines, high pressure, compound, ~~triple~~ expansion, surface condensing. No. of cylinders 2 Diameter H.P. = 4" L.P. = 11"
Length of stroke 5" Working pressure 180 lb. sq. in. Diameter of crank shaft journals and pins NH₃ Compr. 4 1/16" jls, 4 1/2" pins.
Breath and thickness of crank webs NH₃ Compr. 3 1/2" x 4 1/8" x 5 3/8" oval No. of sections in crank shaft one Steam engines 3" x 2 3/4" jls, 2 3/4" pins. Revolutions of engines per minute 700/350

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 _____
Breath 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 9 Material of coils S.D. Steel 1" x 1 5/16" Can each coil be readily shut off or disconnected yes

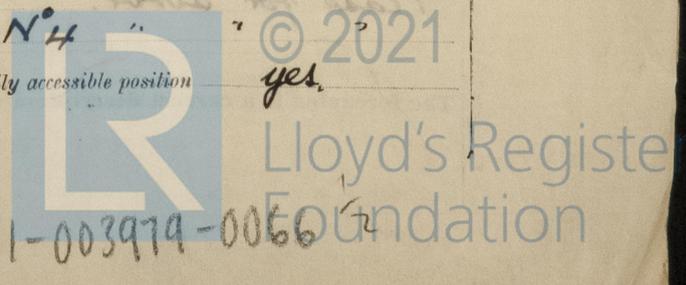
Water Circulating Pumps, No. and size of pumps available 1-horiz 4" centrif. worked elec. - direct Gas Separators, No. of 2 deliv.
Gas Evaporators, No. of _____ Cast iron or steel casings _____ Pressure or gravity type _____ If pressure type, are safety valves fitted _____
No. of coils in each casing _____ Material of coils _____ Can each coil be readily shut off or disconnected _____

Direct Expansion or Brine Cooled Batteries, No. of 4 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 6 Material of coils S.D. Steel 1 1/2" l. Can each coil be readily shut off or disconnected yes
Total cooling surface of battery coils 10,000 sq. ft. Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 4 { 2-37 1/2" each of 19000 cubic feet capacity, at 1320/920 revolutions per minute
{ 2-45" each of 28000 _____
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 _____ how worked _____
Brine Cooling System, closed or open _____ Are the pipes and tanks galvanised on the inside _____

No. of ~~brine~~ sections in each chamber 2 coolers each with 6 sects. working on N°2 Tw dk + Hold Combined
2 " " " 6 " " " N°4 " " " _____
Can each section be readily shut off or disconnected yes Are the control valves situated in an easily accessible position yes



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Common ^{NH₃} pipe yes. Where the tanks are closed are they ventilated as per Rule yes
 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 yes

HYDRAULIC AND OTHER TESTS.

| DESCRIPTION. | Date of Test. | Working Pressure | Hydraulic Test Pressure. | Air Test Pressure. | Stamped. | REMARKS. |
|--|---------------|------------------|--------------------------|--------------------|----------|----------|
| ENGINE CYLINDERS (IF TESTED) | | | | | | |
| GAS COMPRESSORS | 17-7-42 | 185 lb. □ | 600 lb. □ | 350 lb. □ | SA | |
| SEPARATORS | 18-8-42 | do. | 500 lb. □ | 300 lb. □ | SA | |
| CRANK CASES | 17-7-42 | 32 lb. □ | 300 lb. □ | 175 lb. □ | SA | |
| MULTIPLE EFFECT RECEIVERS | 25-8-42 | 185 lb. □ | 1500 lb. □ | 500 lb. □ | SA | |
| CONDENSER COILS | 1-9-42 | do. | do. | do. | SA | |
| EVAPORATOR COILS (air coolers) | 21-8-42 | do. | do. | do. | SA | |
| CONDENSER HEADERS AND CONNECTIONS | 1-9-42 | do. | do. | do. | SA | |
| CONDENSER CASINGS | 18-9-42 | 10-15 lb. □ | 30 lb. □ | | SA | |
| EVAPORATOR CASINGS | | | | | | |
| NH ₃ 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 yes
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) of delivery and return air at direct expansion or brine cooled batteries
 at 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: 3 main bearings for Compr., 1 Compr. Cyl. Cover, 3 sets gland packing
 2 oil sight glasses, 2 drip feed sight glasses, 1/2 doz safety disch, 1 NH₃ gauge, 1 gauge valve
 1 set dies for 1" x 2" pipe, 1 set Vee belts, 1 set Compr. joints, 2 sets of other NH₃ joints.
 1 crankshaft, 2 springs for water relief valve, 2 thermometers.
 1 plunger for forced lubr. pump, 2 pairs NH₃ flanges, 1 fitted box for Compr. parts
 1 impeller shaft for circulating water pump.

STEAM ENGINE SPARES.
 2 sets H.P. piston rings
 2 " L.P. " "
 2 " governor springs
 2 " springs for piston rings
 Secondary springs, 2 oil pump strainers & gauges
 2 sets metallic packing wearing parts for H.P. piston rod.
 2 " " " " " L.P. " "
 2 " " " " " " value rod.
 2 sets of center points
 1 pair crankpin bearings
 1 pair crankhead bearings
 1 set main bearings
 1 case for above.

ELECTRICAL SPARES.
 Water Pump motor
 1 Armature (packed)
 1 set bearings
 1 set field coils
 1 set interpole coils
 1 line of brush holder
 1 set Carbon brushes
 1 set controller spares.
 Fan motors each size
 1 complete motor
 2 sets carbon brushes
 1 set controller spares

The foregoing is a correct description of the Refrigerating Machinery.
 J. 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 lights | | | | | | | | | | |
| 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 Battens, 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 was constructed under special survey and the materials and workmanship are good and it will be eligible for the notation + Lloyd's P.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. | | | | Tons. | No. |
| 2 | 2 | Ammonia | J. & E. Hall | 1942 | (1) Air | 72 | | 4 | 244,000 |

Fee ^{Low} _{Gen} £ 14 : 0 : 0 } Fee applied for, 19 OCT 1942
Travelling Expenses £ : : } Received by me, 19

D. Gemmell
Surveyor to Lloyd's Register.

Committee's Minute TUE 22 DEC 1942

Assigned

See Gpk. 22/114



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