

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office 21 SEP 1936)

Date of writing Report 21 SEP 1936 When handed in at Local Office Greenock Port of London at 14 Sept. 1936  
 No. in Reg. Book. 87230 Survey held at Lancford Date: First Survey 10 Aug. 1936 Last Survey 14 Sept. 1936  
 (No. of Visits THREE)  
 (No. of Visits NINE)

on the Refrigerating Machinery and Appliances of the S/S ARABIAN PRINCE Tons Gross 1960  
Wm Hamilton & Co. Ltd. Net 1035  
 Vessel built at Port Glasgow By whom built (Lithgows Ltd) Yard No. 425 When built 1936  
 Owners Prince Line Ltd. Port belonging to London Voyage Mediterranean Ports  
 Refrigerating Machinery made by J. & E. Hall Ltd. Machine No. H.17381 When made 1936  
H.17382  
 Insulation fitted by Murray Insulation Co. When fitted 1936 System of Refrigeration CH<sub>2</sub>CL  
 Method of cooling Cargo Chambers Direct Expansion Grids Insulating Material used from a slab cork.  
 Number of Cargo Chambers insulated 2 Total refrigerated cargo capacity 2140 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed lower deck, adjacent to chambers.

Refrigerating Units, No. of 2 <sup>No. of machines</sup> 2 <sub>Single, double, or triple</sub> Cubic feet of air delivered per hour  
 Total refrigeration or ice-melting capacity in tons per 24 hours 2 Are all the units connected to all the refrigerated chambers yes

Compressors <sup>belt</sup> driven direct or through single <sub>double</sub> reduction gearing. Compressors, single or double acting single No. of cylinders 3 per machine  
 Diameter of cylinders 2 1/2" Diameter of piston rod trunk pistons Length of stroke 2 1/2" No. of strokes per minute 500 each  
 Motive Power supplied from Electric motors thro' "Prammar" Vee belts.

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 1 3/8" journals, 1 1/4" pins  
 Breadth and thickness of crank webs 4 5/8" x 1 1/4" inner No. of sections in crank shaft one Revolutions of engines per minute 500  
3/8" outer

Oil Engines, type 2 of 4 stroke cycle Single or double acting Single B.H.P. 3  
 No. of cylinders 2 Diameter 10" Length of stroke 10" Span of bearings as per Rule 10"  
 Maximum pressure in cylinders 100 lb Diameter of crank shaft journals and pins 1 3/8"  
 Breadth and thickness of crank webs 4 5/8" x 1 1/4" inner No. of sections in crank shaft one Revolutions of engine per minute 500  
3/8" outer

Electric Motors, type Enclosed ventilated No. of 2 Rated 3 B.H.P. Kilowatts 2.2  
 R.P.M. at 1100 D.C. at 1500 revolutions per minute. Diameter of motor shafts at bearings 1 1/2"  
 Reduction Gearing, maximum shaft horse power at 1st pinion 3 Revolutions per minute at full power at 1st pinion 1100

1st pinion 1st reduction wheel main shaft 1st pinion Pitch circle diameter, 1st pinion 10" 2nd pinion 10"  
 1st reduction wheel Main wheel Width of face, 1st reduction wheel 10" Main wheel 10"  
 Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, 1st pinion 10" 2nd pinion 10"  
 1st reduction wheel Main wheel Flexible pinion shafts, diameter 1st 1 1/2" 2nd 1 1/2"  
 Pinion shafts, diameter at bearings, External, 1st 1 1/2" 2nd 1 1/2" Internal, 1st 1 1/2" 2nd 1 1/2"  
 Diameter at bottom of teeth of pinion, 1st 1 1/2" 2nd 1 1/2" Wheel shafts, diameter at bearings, 1st 1 1/2"  
 2nd 1 1/2" Diameter at wheel shroud, 1st 1 1/2" Main 1 1/2"

Gas Condensers, No. of 2 Cast iron or steel casings cast iron Cylindrical or rectangular rectangular  
 No. of coils in each one Material of coils S.D. Copper Can each coil be readily shut off or disconnected yes  
 Water Circulating Pumps, No. and size of 2 - 3/4" centrifugal how worked electric direct Gas Separators, No. of none  
 Gas Evaporators, No. of Direct expansion grids in chamber Cast iron or steel casings Cast iron Pressure or gravity type Pressure

No. of coils in each casing 2 Material of coils S.D. Copper Can each coil be readily shut off or disconnected yes  
 Direct Expansion or Brine Cooled Batteries, No. of 2 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 2 Material of coils S.D. Copper Can each coil be readily shut off or  
 disconnected yes Total cooling surface of battery coils 200 sq ft Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 2 each of 1 cubic feet capacity, at 1000 revolutions per minute  
 Steam or electrically driven electric 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 2 - 3/4" centrifugal how worked electric direct

Brine Cooling System, closed or open direct expansion Are the pipes and tanks galvanised on the inside no  
 No. of brine sections in each chamber one per chamber  
 Can each section be readily shut off or disconnected yes Are the control valves situated in an easily accessible position yes

Im. 631.-T.

Are thermometers fitted to the outflow and to each return pipe Automatic Control 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	10-8-36	100 lbs □	300 lbs □	✓	DL	oil pressure
" SEPARATORS	none					
" CONDENSER COILS	10-8-36	100 lbs □		300 lbs □	DL	
" EVAPORATOR COILS	DIR EXP GRIDS 10-9-36		350 lbs □	300 lbs □	S.A.	
" CONDENSER HEADERS AND CONNECTIONS	CRANKCASE 10-8-36		300 lbs □	✓	DL	oil pressure
" CONDENSER CASINGS	10-8-36	5 to 10 lbs □	20 lbs □	✓	DL	
" EVAPORATOR CASINGS	none					
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE	9-10-36			220 lbs/in <sup>2</sup>		CO <sub>2</sub> gas used for test.

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

Dates of test 12th & 14th Oct. 1936 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 58°F cooling water inlet and discharge 53°F & 56°F gas in condensers 63°F and evaporators -12°F, the average temperature of the refrigerated chambers 6°F and the rise of temperature in these chambers upon the expiration of 10 1/2 hours time after the machinery and cooling appliances have been shut off 13 Fahr. degrees.

SPARE GEAR.

Are the machines in accordance with Section 4, Clause 2 of the Rules Yes

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

ARTICLES SUPPLIED AS PER RULE.	ADDITIONAL SPARE GEAR SUPPLIED.
<ul style="list-style-type: none"> <li>2 sets of main ball bearings</li> <li>1 piston complete with rings</li> <li>1 conn. rod complete with bolts</li> <li>1 set gland packing, 2 Dexine rings</li> <li>1 safety head</li> <li>1 spring for safety head</li> <li>1 do delivery valve</li> <li>1 impeller and spindle for water pump</li> <li>1 driving belt for water pump</li> <li>2 suction valves and 2 delivery valves</li> <li>3 pipe connections and 6 union nuts</li> <li>1 bell and bellows for thermostat units</li> <li>1 spare bellows for pressure cut out</li> <li>1 set of gland packing for gland type stop valves</li> <li>1 set of driving belts</li> <li>1-3' length of liquid pipe</li> <li>2 nuts for liquid pipe</li> <li>1 set of compressed asbestos fibre joint rings</li> <li>1 do copper joint rings</li> <li>3 diaphragms for auto regulator complete with rings</li> <li>1 insert for combined dryer strainer fitting</li> </ul>	<ul style="list-style-type: none"> <li>6 driving belts</li> <li>2 inserts for strainer dryer</li> <li>Set of bolts + nuts + studs fittings</li> <li>1 thermostatic regulator</li> <li>1-2 lb tin of calcium for dryer</li> <li>1 set tools + spanners</li> <li>1 spare gear box.</li> </ul>

ELECTRICAL SPARES.

2 sets of contacts for each Thermostatic unit.

Starter Spares.

- 2 sets contactor springs + brushes
- 2 sets main copper contacts
- 2 sets main contact arcing strips
- 2 of each type solenoid coils fitted
- 1 spare starting resistance

- 1 Armature for Machine motor
- 1 Set bearings do. do.
- 2 brush holders do. do.
- 1 set brushes do. do.
- 2 brush springs do. do.
- 1 set brushes for Water Pump motor
- 2 brush springs do. do. do.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

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	<i>Insulated cargo chambers in shelter tween decks.</i>									
FRAME NO.	F										
FRAME NO.	A										
FRAME NO.	F										
FRAME NO.	A										
FRAME NO.	F										
FRAME NO. (Boiler Room)	A										
FRAME NO. (Engine Room)	A										
FRAME NO.	F										
FRAME NO.	A										
FRAME NO.	F										
FRAME NO. (After Peak)	A										
SIDES						NONE	NONE	GRAN. CORK	10"	3/4" T.O.G. DOUBLE.	
OVERHEADING						"	"	SLAB CORK	10	"	
FLOORS OF CHAMBERS						"	"	"	8	GRANULITIC 1 1/2" THICK.	
TRUNK HATCHWAYS								<i>Divisional Bulkhead</i>			
TRUSS RECESS, SIDES AND TOP						NONE		GRAN. CORK	8	3/4" T.O.G. DOUBLE.	
TUNNEL SIDES AND TOP											
TUNNEL RECESS, FRONT AND TOP											

FRAMES OR REVERSE FRAMES, FACE

BULKHEAD STIFFENERS, TOP *UNDER INSULATION.* BOTTOM *UNDER INSULATION* AND FACE *UNDER INSULATION.*

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 *AT FOR. PORT. 10" GRAN. CORK. 3/4" T.O.G. DOUBLE.*

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 *YES.* 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

**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  floors *GRATINGS.* tunnel top

fixed or portable *PORTABLE.* Are screens fitted over the brine grids at chamber sides *YES.* hinged or permanently fixed *HINGED.*

**Thermometer Tubes**, No. and position in each chamber *1 AT CENTRE.*

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 TRAPPED SCUPPER TO BILGE.* Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off *YES.*

What provision is made for draining the refrigerating machinery room *2 TRAPPED SCUPPER TO BILGE.*

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. 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. BY AUTOMATIC.

**Air Trunkways in Chambers, inside dimensions, main** ✓ and branch ✓

Are they permanently fixed or collapsible, or portable. ✓ State position in chambers. ✓

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. 6'0" x 4'0" Where are the doors worked from. SHELTER TWEEN DECK'S.

**Cooling Pipes in Chambers, diameter.** 1 1/4" Are they galvanised externally. Yes

How are they arranged in the chambers. Roof + side grids.

**Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers** Gone.

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

Builders.

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery (If not, state date of approval) and Insulation Yes (1-97)

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. Complete.

**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 + Lloyds R.M.C. (with date) when the installation and testing have been satisfactorily completed.

The installation has been properly fitted on board, tried under working condition + found satisfactory. results of insulation test are embodied in this report.

The Refrigerating Appliances of this vessel are eligible in our opinion, to be classed in the Register Book with record + Lloyds R.M.C. - 10.36

*It is submitted that this vessel is eligible for THE RECORD. + Lloyds R.M.C. 10.36*  
 CERTIFICATE WRITTEN. 10/10/36  
 J.A. 16/10/36

**PARTICULARS TO BE ENTERED IN REGISTER BOOK.**

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity. Cubic ft.
2	6	Methyl Chloride	Jr. E. Hall Ltd.	1936	Direct Expansion		2	2	2140

Fee £ 2.0.0 }  
 £ 6 : 0 : 0 } Fee applied for, 16<sup>th</sup> Oct. 1936  
 Travelling Expenses £ : : } Received by me 28.12 1936 29/12

Committee's Minute TUE. 20 OCT 1936 FRI. 30 OCT 1936

D. Cummell  
 Surveyor to Lloyd's Register.

Assigned + Lloyds R.M.C. 10.36

FRI. 18 DEC 1936



Lloyd's Register Foundation

Price 5s. Office, London.  
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