

Rpt. 17.

noted for R.M.C. newentr.

R.M.C. No.

39343.

No. 10.587

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

30 MAY 1930

(Received at London Office)

8 MAY 1930

12 MAR 1931

Date of writing Report

19

When handed in at Local Office

8 MAY 1930

Port of

London

No. in

Reg. Book. Survey held at Belfast.

Date: First Survey 20 FEBRUARY 1930 Last Survey 23 MAY 1930

92260

Suff.

on the Refrigerating Machinery and Appliances of the S.S. REINA DEL PACIFICO Tons

Gross 1707
Net 10745

Vessel built at Belfast. By whom built Harland & Wolff. Yard No. 852 When built 1930

Owners Pacific Steam Navigation Co. Port belonging to Liverpool Voyage

Refrigerating Machinery made by J. E. Hall Ltd. Machines Nos. 8231 8232 8233 When made 1930

Insulation fitted by The J. D. Insulating Co. When fitted 1931 System of Refrigeration CO₂ + Brine

Method of cooling Cargo Chambers Brine grids + Air; Insulating Material used Slab cork

Number of Cargo Chambers insulated 4 Total refrigerated cargo capacity 22,000 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed Between shafts aft of main E.R.

Refrigerating Units, No. of 3 Single, double, or triple Cubic feet of air delivered per hour

Total refrigeration or ice-melting capacity in tons per 24 hours 42 Are all the units connected to all the refrigerated chambers yes.

Compressors, driven direct or through reduction gearing. Compressors, single or double acting Single No. of cylinders 6 per mach.

Diameter of cylinders 3" Diameter of piston rod 1 3/8" Length of stroke 4" No. of strokes per minute 350 each

Motive Power supplied from Electric motors, direct coupled.

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 4 1/2" journals, 4 1/2" pins

Breadth and thickness of crank webs x 2 1/2" thk. No. of sections in crank shaft one Revolutions of engines per minute 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 -

Breadth and thickness of crank webs - No. of sections in crank shaft - Revolutions of engine per minute -

Electric Motors, type Supplied by shipboard. No. of one per mach. Rated 55 B.H.P. Kilowatts

Volts 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

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 3 Cast iron or steel casings Cast iron Cylindrical or rectangular cylindrical.

No. of coils in each 6 Material of coils S.D. Copper 3/4" x 1" o.d. Can each coil be readily shut off or disconnected yes

Water Circulating Pumps, No. and size of one 5" vert. centri. how worked Direct coupled electric Gas Separators, No. of 6

Gas Evaporators, No. of 3 Cast iron or steel casings Steel Pressure or gravity type pressure.

No. of coils in each casing 4 Material of coils S.D. Steel 1 1/4" x 1 1/2" o.d. 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

cleared of snow no. Air blown over side grids in N° 4 lower tween deck stor. for food + Berths

disconnected yes. Total cooling surface of battery coils 600 sq. ft. Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 3 - 1 1/2" each of 3150 cubic feet capacity, at 1400 revolutions per minute

Steam or electrically driven electrically 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 4 - 3" vert. centri. how worked Direct coupled electric

Brine Cooling System, closed or open open Are the pipes and tanks galvanised on the inside no.

No. of brine sections in each chamber

Can each section be readily shut off or disconnected yes. Are the control valves situated in an easily accessible position yes.

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

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	2-5-30	1000 lb. □	3500 lb. □	3500 lb. □	L.Y.	
SEPARATORS	13-5-30	do.	do.	do.	□	
CONDENSER COILS	20-2-30	do.	do.	do.	□	
EVAPORATOR COILS	8-3-30	do.	do.	do.	□	
CONDENSER HEADERS AND CONNECTIONS	7-4-30	do.	do.	do.	□	
CONDENSER CASINGS	14-6-30	do.	do.	do.	□	
EVAPORATOR CASINGS	5-8-30	do.	do.	do.	□	
NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE	16-4-30	5 to 10 lb. □	30 lb. □	✓	□	
BRINE PIPING AFTER ERECTION IN PLACE	24-6-30	20 to 25 lb. □	50 lb. □	✓	□	

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

Dates of test 19th + 20th February 1931 Density of Brine 52 by Swaddle 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. +12°F & 22°F, outflow and return brine -17°F & -15°F

atmosphere 51°F cooling water inlet and discharge 40°F & 45°F gas in condensers 52°F and evaporators -24°F

the average temperature of the refrigerated chambers 3 forward chambers -2°F Aft Chamber 20½°F and the rise of temperature in these chambers upon the expiration of 18½ hours

time after the machinery and cooling appliances have been shut off 14.7°F for 3 forward and 14.25°F for aft chambers

SPARE GEAR.

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

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

ARTICLES SUPPLIED AS PER RULE.	ADDITIONAL SPARE GEAR SUPPLIED.
1 Crankshaft	1 Set of screwing dies for 1½" + 1¼" B.S.P.
1 Set of rings for each comp ^r piston	1 pair CO ₂ flanges each size fitted
1 piston + rod for each comp ^r	1 regulator spindle
1 addl. brine pump fitted in E.R.	2 Secondary brine cocks + valves.
2 bolts + nuts for main bearing	Assorted bolts, studs + nuts.
2 do. do. Conn. rod big end.	12 lubricator piston leathers
2 do. do. crosshead bearing	12 lubricator gland leathers
1 spindle + impeller for water pump	2 sets copper joint rings for comp ^r joints.
1 set of bushes for water pump	8 sets copper joint rings other joints.
1 set of 2 leather moulds.	2 sets special metal packing for comp ^r
3 lengths each 1¼" + 1½" W.I. pipe	3 bolts + 3 sets of leather washers
3 bends each do. do.	for machine couplings.
12 sockets + 12 backnuts for do.	1 fitted box for comp ^r parts.
1 spindle + impeller for brine pump	
1 set of bushes for do. do.	

Spares for Brine + Water Pump Motors:- 4 carbon brushes, 2 brush springs, 1 set of bearing bushes + 1 brush holder.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

MR J. & E. HALL, LTD

Manufacturer.

DESCRIPTION OF INSULATION.

IN LOWER HOLD CHAMBERS.						IN TWEEN DECK CHAMBERS. A deck to lower deck				
	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.	F								
		A								
	FRAME No.	F								
		A								
	FRAME No. (Boiler Room)	F								
		A								
	FRAME No. (Engine Room)	F								
A										
FRAME No. 49 aft	F					Outer slabs	Slab cork	4"		
	A					metal faced	- do -	7"		
FRAME No. 59 aft	F					- do -	- do -	4"		
	A					- do -	- do -	4"		
FRAME No. 73 aft	F					- do -	- do -	10"		
	A									
FRAME No. (After Peak)	F									
SIDES						Outer slabs	Slab cork	10"		
OVERHEADING						metal faced	- do -	10"		
FLOORS OF CHAMBERS						1/2" T.G.	- do	10"		
TRUNK HATCHWAYS										
THRUST RECESS, SIDES AND TOP										
TUNNEL SIDES AND TOP										
TUNNEL RECESS, FRONT AND TOP										
FRAMES OR REVERSE FRAMES, FACE 2" Slab cork metal faced.										
BULKHEAD STIFFENERS, TOP	✓				BOTTOM	✓			AND FACE	✓
RIBBAND ON TOP OF DECKS	✓									
SIDE STRINGERS, TOP	✓				BOTTOM	✓			AND FACE	✓
WEB FRAMES, SIDES	✓				AND FACE	✓				
BRACKETS, TOP	2" wood-guides brackets				BOTTOM	✓			AND FACE 2" slab corks.	
INSULATED HATCHES, MAIN	Plugs.				BILGE	✓			MANHOLE	✓
HATCHWAY COAMINGS, MAIN	✓				BILGE	✓				
HOLD PILLARS	2" slab cork, covered with galvanised sheet metal.									
MASTS	✓				VENTILATORS	Within ships side insulation.				
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. ✓										
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. Yes										
Cargo Battens, Dimensions and spacing, sides 2x2' approx. 14" c. to c. floors. ✓ tunnel top ✓										
fixed or portable ✓ fixed to portable ✓ Are screens fitted over the brine grids at chamber sides. Yes ✓ hinged or permanently fixed ✓ Portable										
Thermometer Tubes, No. and position in each chamber 2 in each Port & Starboard forward chamber, 1 in centre forward 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. None passing.										
Draining Arrangements. Where the chambers are situated below the load water line, what provision is made for draining the inside of the chambers										
Scuppers 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. Bilge suction.										
brine return room. Bilge suction ✓ fan room ✓ water circulating pump room. Bilge suction.										
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers. No air spaces.										

Sounding Pipes, No. and position in each chamber situated below the load water line *None*

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 *None*

How is the expanded metal secured in place *✓*

How are the cork slabs secured to the steel structure of the vessel *Bituminous adhesive applied hot and secured to fixed grounds by cork screws taking metal strip.*

Air Trunkways in Chambers, inside dimensions, main *2-6 square* and branch *✓*

Are they permanently fixed or collapsible, or portable *Permanently fixed* State position in chambers *Sides and after end of after chamber.*

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 *1 1/2 bore* Are they galvanised externally *Yes*

How are they arranged in the chambers *In grids*

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *By steam from waste heat boilers.*

The foregoing is a correct description of the Insulation and Appliances. For HARLAND AND WOLFE LIMITED.
Chas. Payne 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 *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.*

This machinery has been satisfactorily installed in a limited space abaft the main motor room. The three forward chambers were cooled down simultaneously with the after chamber. The latter was cooled to 20 1/2 °F when the fans were stopped and the brine cooling of the three forward chambers continued for a further 4 1/2 hours bringing them down to -2 °F. In my opinion this vessel is now eligible for record in LLOYD'S R.M.C. 3.31 for temperature 20 °F

*apt chamber
 for temp 20 °F
 see correspondence
 R Lee James
 Belfast.*

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.
3	6	Comb. Duty	J. E. Hall Ltd.	1930	(1) Brine + Air (2) 3 forward chambers (3) apt chamber	42	42	(1) 3 ch. 9650 (2) 1 ch. 13200 Total 22850	

*Lon No. 12,000 } Fee applied for, 11 Nov 1931.
 Fee 6 : 0 : 0
 Travelling Expenses £ 16 : 0 : 0 Received by me, 28.3.1931
 Committee's Minute TUE. 17 MAR 1931
 Assigned + Lloyd's R.M.C. 3.31
 Apt chamber for Temp. 20 °F
 D. Gemmell.
 Surveyor to Lloyd's Register.*