

Report on Refrigerating Machinery and Appliances.

Received at London Office

Date of writing Report **20th Sept. 1944** When handed in at Local Office **20th Sept. 1944** Port of **Vancouver, B. C.**

No. in Reg. Book. **Survey** held at **Vancouver, B.C.** Date: First Survey **10th Aug., 1944** Last Survey **18th Sept., 1944**

(Number of Visits **19**)

on the Refrigerating Machinery and Appliances of the **Steel Single Screw Steamer "FORT EDMONTON"** Tons (Gross **7201.82** Net **4007.16**)
(Refrigerated Victualling Ship)

Vessel built at **North Vancouver, B.C.** By whom built **Burrard Dry Dock Co. Ltd.** Yard No. **212** When built **1944**

Owners **Minister of Munitions & Supply of Canada.** Port belonging to **--** Voyage **First**

Refrigerating Machinery made by **Carrier Corporation, Syracuse, U.S.A.** Compressors Nos. **1231/2/3** **1234/5/6** When made **1944**

Insulation fitted by **Burrard Dry Dock Co. Ltd.** When fitted **1944** System of Refrigeration **Dichlorodifluoromethane. (Freon 12)**

Method of cooling Cargo Chambers **Direct Expansion Batteries** Insulating Material used **Slab Cork and Palco Wool.**

Number of Cargo Chambers insulated **25 and One Ice Making and One Ice Storage Chamber.** Total refrigerated cargo capacity **111,480** cubic feet

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed **Refrigerating Engine Room constructed Single, double or triple in No. 3 Hold.**
Refrigerating Units, No. of **Six (6)** independent. **Quadruple** Is each machine independent **--** Cu. Ft. of air delivered per hr. **-5,933,400**
Total refrigeration or ice-melting capacity in tons per 24 hours **45** Are all the units connected to all the refrigerated chambers **Yes**

Compressors, driven direct or through **reduction gearing.** Compressors, single or double acting **Single Acting.** multiple effect compression **No**

Are relief valves or safety discs fitted **Yes** No. of cylinders to each unit **4** Diameter of cylinders **4-1/4"**

Diameter of piston rod **Trunk Piston** Length of stroke **3"** No. of revolutions per minute **600**

Motive Power supplied from **either Port or Starboard Main Boiler.**
(State number of boilers, oil engines or electric generators supplying the motive power.)

Steam Engines, **high pressure compound or triple expansion,** surface condensing. No. of cylinders **1** Diameter **8"**

Length of stroke **4"** Working pressure **100 - 125 lbs. per sq. inch** Diameter of crank shaft journals and pins **3-3/16"**

Breadth and thickness of crank webs **6 1/2" x 2 3/8"** No. of sections in crank shaft **One** Revolutions of engines per minute **600**

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 **--**

Air Receivers: Have they been made under survey **--** State No. of Report or Certificate **--**

Is each receiver, which can be isolated, fitted with a safety valve as per Rule **--**

Can the internal surfaces of the receivers be examined and cleaned **--** Is a drain fitted at the lowest part of each receiver **--**

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 **6** Cast iron or steel casings **Steel** Cylindrical or rectangular **Cylindrical** Are safety valves fitted **--**

to casings **Yes** No. of coils in each **Type - 48 tubes.** Material of **Admiralty Metal.** Can each be readily shut off or disconnected **Yes**

Water Circulating Pumps, No. and size of pumps available **2 - 90GPM** how worked **Each 2HP Electric Motor** liquid receivers, No. of **6**

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 **25** 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 **One** Material of coils **Seamless Drawn Copper.** Can each be readily shut off or disconnected **Yes**

Total cooling surface of battery coils **7080 Sq. Ft.** Is a watertight tray fitted under each battery **Yes**

Air Circulating Fans, Total No. of **9 - 1.5H.P.** each of **5050** cubic feet capacity, at **1430** revolutions per minute

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 **--**

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.

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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. -
 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)		100 to 125 lbs.	330 lbs.	-	Lloyd's	Covered by Toronto Certificates attached.
Gas Compressors		93 lbs. per sq. inch @ 86° F.		150 lbs.	Not Stamped.	
Liquid Receivers		" " "		400 lbs.	400 lbs. Lloyd's Test J.S.H. 12-4-44	
Multiple Effect Receivers		" " "		" " "	" " "	
Condenser Coils	4-9-44	" " "		200 lbs.	Not Stamped	
Evaporator Coils		" " "		" " "	" " "	
Condenser Headers and Connections	14-8-44	" " "		400 lbs.	Air Lloyd's Test	
Condenser Casings	4-9-44	" " "		200 " CO.	400 lbs. Lloyd's Test J.S.H. 14-8-44	
Evaporator Casings	" " "	" " "		200 " CO.	Not Stamped	
Condenser, Evaporator and Air Cooler Coils after erection in place	" " "	" " "		200 " CO.	Not Stamped	
Brine Piping after erection in place.						with Freon Tracer

Have important steel castings and forgings been tested in accordance with the Rules. -
 Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory. **Yes**
 Dates of test **7th - 10th Sept., 1944** 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 on brine cooled
 15° F. - Cold Rooms, 25 & 40° F. Chill Rooms,
 60 - 70° F. Air Conditioned Rooms. & outflow and return brine &
 atmosphere. 62.7° F. cooling water inlet and discharge. 58° F. & 74° F. gas in condensers. 98° F. max. and evaporators. -
 Cooled to required temperatures
 the average temperature of the refrigerated chambers and the rise of temperature in these chambers upon the expiration of 24 hours
 time after the machinery and cooling appliances have been shut off 15° Rooms - 26° F; 25° Rooms - 20° F; 40° Rooms - 14° F;
 60° - 70° Rooms - 7° F;

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:-
 Full List of Spare Gear attached to Vancouver Report No. 6216

The foregoing is a correct description of the Refrigerating Machinery.
 Burrard Dry Dock Company, Limited
 Shipbuilder.

P.W. = Palco Wool DESCRIPTION OF INSULATION. S.L. = Shiplap.

	IN LOWER HOLD CHAMBERS. Tank Top (60° - 70° F. Air Conditioned)					4th IN TWEEN DECK CHAMBERS. (15° - 18° Cold 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. 135	F	2 x 7/8"	Not Insulated				2 x 7/8"	Not Insulated		
	A	S.L.	Palco Wool 6"		2 x 7/8"	S.L.	Palco Wool 10"		2 x 7/8"	
Frame No. 128	F	do	do	3-11/16"	S.L.	do	do	5-11/16"	S.L.	2 x 7/8"
to " " 118	A									
Frame No. 106	F	do	do	12 1/2"		do	do	14"		
	A	do	do	2 3/4"		do	do	6 1/2"		
Frame No. 86 (Boiler Room)	F		Not Insulated			2 1/2"	do	do	14"	
	A		do							
Frame No. (Engine Room)	A									
Frame No. 99	F	2 x 7/8"	Palco Wool 3-11/16"		2 x 7/8"					
	A	S.L.			S.L.					
Frame No. 95 (Refrig. Eng. Room)	F	2 x 7/8"	Palco Wool 7"							
	A		Not Insulated							
Frame No. 99 to " " 92	F					2 x 7/8"	Palco Wool 5-11/16"		2 x 7/8"	S.L.
	A									
Frame No. (After Peak)	F	2 x 7/8"	Palco Wool 12"		2 x 7/8"					
	A	S.L.			S.L.	do		13"		
Sides		2 x 7/8"	do	9"		do	do	9"		
Overheading		2 x 7/8"	do	1"	2 x 7/8"	1 x 7/8"	Cork Board	3"		
Floors of Chambers		2"	S.L. Cork Board	1"	S.L.	Galv. Iron	Galv. Iron	6" for Rooms F3, 4.		
Trunk Hatchways			See bulkheads, Frames 95 to 99 & 128 to 118				See Bulkheads, Frames 99 to 95 & 128 to 118.			
Thrust Recess, Sides and Top										
Tunnel Sides and Top										
Tunnel Recess, Front and Top										
Frames on Reverse Frames, Face			(Covered with 1" Palco Wool; Covered by 2 layers of 7/8" Shiplap in 60°-70° (15°-18° F. Rooms.							
Bulkhead Stiffeners, Top		do	Bottom	do	and Face	do				
Ribband on Top of Decks			None							
Side Stringers, Top		No Stringers	Bottom		and Face					
Web Frames, Sides		No Web Frames	and Face							
Brackets, Top		Covered with 1" Palco Wool	Bottom	Covered with 1" Palco Wool.	and Face	Covered with 1" Palco Wool.				
Insulated Hatches, Main		None	Bilge	2 layers 7/8" S.L.	Manhole	2 layers 7/8" S.L.				
Hatchway Coamings, Main		9" P.W. @ 2 layers of 7/8" Shiplap on sides.	4" P.W. - 2 layers 7/8" S.L.	4" P.W. - 2 layers 7/8" S.L.		4" P.W. - 2 layers 7/8" S.L.				
Hold Pillars		1 1/2" P.W. minimum @ 2 layers of 7/8" Shiplap.								
Masts		No	Ventilators	No						
Are insulated plugs fitted to provide easy access to bilge suction roses		Yes	tank, air, and sounding pipes	Yes	heels of pillars	Yes				
and manhole doors of tanks		Yes	Are insulated plugs fitted to ventilators	None	cargo ports	None	and side lights	None		
Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected			Insulated		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			At No. 85 Frame, a 2" Dia. vent pipe is led from 2 1/2" air space to upper deck on Port and Starboard sides. Suitable holes cut in frames to permit of drainage to bilges and for draining the tank top. 2" clearance left between tank top and insulation with wood grounds placed athwartships.							
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			Yes							
Cargo Battens, Dimensions and spacing, sides		2" x 3" dressed	floors	2" x 3" dressed	tunnel top	None				
Sides - fixed, floors - portable sections.		Are screens fitted over the brine grids at chamber sides		hinged or permanently fixed						
Thermometer Tubes, No. and position in each chamber		Distant Reading Thermometers installed from each chamber.								
diameter		4-1/2" Dia.	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			Yes							
Draining Arrangements. What provision is made for draining the inside of the chambers			Trapped drains 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 Pump Suctions.							
brine return room			fan room	Drain to Bilge	water circulating pump room	Bilge Pump Suction.				
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers						Yes				

No.3 Hold - one Port, one Stard. side & one either side of Centre Line Bulkhead aft.
 No.2 Hold - one Port, one Stard. side and three Centre Line Bulkhead aft.

Sounding Pipes, No. and position in each chamber situated below the load water line. **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. **Shiplap** 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. **Asphalt Cement**
 Air Trunkways in Chambers. Are the arrangements satisfactory and in accordance with the approved plans. **Yes**
 Are they permanently fixed or collapsible, or portable. **Permanently Fixed.**
 State position in chambers. **- Top, sides and ends.**
 Where air trunkways pass through watertight bulkheads, are they fitted with watertight doors. **None** Are the door frames efficiently insulated. **-**
 Are insulated plugs supplied for the doorways. **-** Where are the doors worked from. **-**
 Cooling Pipes in **Fan Rooms** Chambers, diameter **7/8"** Minimum thickness. **-** Are they galvanised externally. **Tinned Copper.**
 How are they arranged in the chambers. **Batteries in Fan Rooms.**
 Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers. **Hot salt water sprays.**

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

Burrard Dry Dock Company, Limited

Ship Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery and Insulation. **Attached to Ver. Report No. 6271**
 (If not, state date of approval)

Is the Refrigerating Machinery and Appliances duplicate of a previous case. **Yes** If so, state name of vessel. **S.S. "FORT PROVIDENCE" (Ver. Report No. 6271)**

If the survey is not complete, state what arrangements have been made for its completion and what remains to be done. **Complete**

GENERAL REMARKS: The refrigerating machinery of this ship has been constructed partly under Special Survey. The compressors, liquid receivers, condensers and direct expansion batteries are covered by New York Report No. 45366 dated 15th August, 1944, copy attached. The steam engines driving compressors are covered by Toronto Certificates Nos. 506, 507, 510, 511, 513, & 514, copies attached. The fan motors and the two 50 K.W. Diesel driven generator sets and engines installed to deal with the additional refrigerating electrical load were not built under Survey; please see Vancouver electrical reports 4c & 13 (No. 6331) forwarded herewith.

The refrigerating machinery and appliances were installed on board under Special Survey in accordance with the approved plans, New York letters and otherwise in conformity with the Rules. The materials and workmanship are good and the tests required by the Rules have been satisfactorily carried out.

On completion the whole installation was tested under working conditions during a satisfactory cooling down test and the rises of temperatures noted for each chamber 24 hours after shutting down found satisfactory as per attached trial report sheets. In our opinion the refrigerating installation of this ship is eligible to be classed in the Register Book with Notation of Lloyd's R.M.C. 9, 44.

Compressors Serial Nos. 1237/8/41 mentioned on New York Report No. 45366 for Burrard Dry Dock Hull No. 212 have been fitted on board Hull 211. Whilst Compressors Serial Nos. 1231/2/3 mentioned on New York Report No. 45140 for Hull No. 211 have been fitted on Hull No. 212.

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

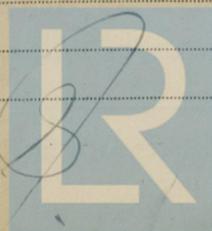
REFRIGERATING MACHINES.						System of (1) Refrigerating (2) Insulating the Chambers.	Ice melting capacity per 24 hours. Tons.	Is Refrigerating Machinery Electrically Driven?	INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.	No.				Capacity. Cubic ft.	
6	6	Freon-12	Carrier Corporation	1944	(1) Direct Expansion. (2) Palco Wool & Cork Board	45	Fans only	25	111,480	

Fee (Ver.) \$140.00 (New Yk.) \$100.00 Travelling Expenses \$48.00 (N.Y.)
 Fee applied for 14th Sept 1944
 Received by me, **W. G. Donald & A. B. M. Coleman**, 19
 Surveyors to Lloyd's Register.

FRI. 29 DEC 1944

Committee's Minute

Lloyd's R.M.C. 9, 44 for temperatures:
 Assigned: 2nd deck & tank top chamber 60-70°F
 3rd " B1 & 3 chambers 40°F
 B2 & 4 " 25-30°F
 E3 " 28°F
 E1, 2 & 4 & 4th deck chamber 15-18°F



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