

Rpt. 17.

No. 20941.

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office

Date of writing Report *4<sup>th</sup> April 1940* When handed in at Local Office *11<sup>th</sup> April 1940* Port of *Greenock*No. in Reg. Book. Survey held at *Greenock* Date: First Survey *17<sup>th</sup> Oct. 1939* Last Survey *5-4-40* 19  
*39917* (No. of Visits *23*)on the Refrigerating Machinery and Appliances of the *S.S. "LANARKSHIRE"* Tons *5816*Vessel built at *Greenock* By whom built *The Gt. Dock Co. Ltd.* Yard No. *437* When built *1940*Owners *Scottish Shipping Co. Ltd.* Port belonging to *Glasgow* VoyageRefrigerating Machinery made by *J. E. Hall & Co.* Machine No. *10284* When made *1939*Insulation fitted by *The Gt. Dock Co. Ltd.* When fitted *1940* System of Refrigeration *CO<sub>2</sub> BRINE*Method of cooling Cargo Chambers *Brine & Air* Insulating Material used *Gran. cork, Rub. cork & Silicate Cotton*Number of Cargo Chambers insulated *14* Total refrigerated cargo capacity *318,000* cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed

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

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

Compressors, driven direct or through <sup>single</sup> reduction gearing. Compressors, single or double acting \_\_\_\_\_ No. of cylinders \_\_\_\_\_

Diameter of cylinders \_\_\_\_\_ Diameter of piston rod \_\_\_\_\_ Length of stroke \_\_\_\_\_ No. of strokes per minute \_\_\_\_\_

Motive Power supplied from *Three Babcock & Wilcox boilers*

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 \_\_\_\_\_

Breadth and thickness of crank webs \_\_\_\_\_ No. of sections in crank shaft \_\_\_\_\_ Revolutions of engines per minute \_\_\_\_\_

Oil 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 \_\_\_\_\_

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

Electric Motors, type \_\_\_\_\_ No. of \_\_\_\_\_ Rated \_\_\_\_\_ 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 \_\_\_\_\_ Cast iron or steel casings \_\_\_\_\_ Cylindrical or rectangular \_\_\_\_\_

No. of coils in each \_\_\_\_\_ Material of coils \_\_\_\_\_ Can each coil be readily shut off or disconnected \_\_\_\_\_

Water Circulating Pumps, No. and size of \_\_\_\_\_ how worked \_\_\_\_\_ Gas Separators, No. of \_\_\_\_\_

Gas Evaporators, No. of \_\_\_\_\_ Cast iron or steel casings \_\_\_\_\_ Pressure or gravity type \_\_\_\_\_

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

cleared of snow \_\_\_\_\_ No. of coils in each battery \_\_\_\_\_ Material of coils \_\_\_\_\_ Can each coil be readily shut off or

disconnected \_\_\_\_\_ Total cooling surface of battery coils \_\_\_\_\_ Is a watertight tray fitted under each battery \_\_\_\_\_

Air Circulating Fans, Total No. of \_\_\_\_\_ each of \_\_\_\_\_ cubic feet capacity, at \_\_\_\_\_ revolutions per minute \_\_\_\_\_

Steam or electrically driven \_\_\_\_\_ Where spare fans are supplied are these fitted in position ready for coupling up \_\_\_\_\_

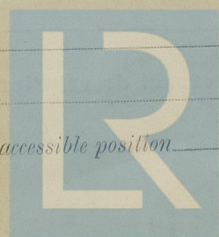
Brine Circulating Pumps, No. and size of, including the additional pump \_\_\_\_\_ how worked \_\_\_\_\_

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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Condensers in Refrigerating engine room

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED) ... ..						
GAS COMPRESSORS ... ..						
„ SEPARATORS ... ..						
„ CONDENSER COILS ... ..						
„ EVAPORATOR COILS ... ..						
„ CONDENSER HEADERS AND CONNECTIONS ... ..						
„ CONDENSER CASINGS ... ..						
„ EVAPORATOR CASINGS ... ..						
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE...	20/2/46 Co 15/3/40	30 LL	75 LL			
BRINE PIPING AFTER ERECTION IN PLACE...						

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

Dates of test 27<sup>th</sup> 28<sup>th</sup> March '40 Density of Brine 47 by Threddell 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~~ brine cooled batteries. 1.7° & 3.9°, outflow and return brine -7½ & -4  
atmosphere 41° cooling water inlet and discharge 45° & 49° gas in condensers 63 and evaporators -17,  
the average temperature of the refrigerated chambers 4.29 and the rise of temperature in these chambers upon the expiration of 12 hours  
time after the machinery and cooling appliances have been shut off 7.088°

*Manufacturer.*

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. 151	F	✓		✓	✓	✓		✓		✓	
	A	NONE.	NONE.	GRAN. CORN.	13"	1" T.O.G.	NONE.	NONE.	GRAN. CORN.	10"	1" T.O.G.
FRAME No. 117	F	NONE.	NONE.	"	3½"	"	"	"	3½"	"	
	A	"	"	"	12"	"	"	"	7½"	"	
FRAME No. 101	F	"	"	"	10"	"	✓		✓	✓	
	A	✓		✓	✓	✓		✓		✓	
FRAME No. 96 (Boiler Room)	F	✓		✓	✓	NONE.	NONE.	SIL. COT.	12"	1" T.O.G.	
	A	✓		✓	✓	✓		✓		✓	
FRAME No. 69 (Engine Room)	A	NONE.	NONE.	SIL. COT.	12"	1" T.O.G.	NONE.	NONE.	SIL. COT.	12"	1" T.O.G.
	F	"	"	GRAN. CORN.	3½"	"	"	GRAN. CORN.	3½"	"	
FRAME No. 53	A	"	"	"	8"	"	"	"	8"	"	
	F	"	"	"	10"	"	"	"	10"	"	
FRAME No. 27	A	✓		✓	✓	✓		✓		✓	
	F	✓		✓	✓	✓		✓		✓	
FRAME No. _____	A	✓		✓	✓	✓		✓		✓	
	F	✓		✓	✓	✓		✓		✓	
FRAME No. (After Peak)	F	✓		✓	✓	✓		✓		✓	
SIDES	...	NONE.	NONE.	GRAN. CORN.	2-3-5-13½"	1½" T.O.G.	NONE.	NONE.	GRAN. CORN.	10"	1" T.O.G.
OVERHEADING	...	"	"	"	2-3-5-11"	1" T.O.G.	"	"	"	11"	"
FLOORS OF CHAMBERS	...	2"	1" T.O.G.	SIL. CORN.	6"	2-1½" T.O.G.					
TRUNK HATCHWAYS	NONE.	✓	...	✓	...	✓					
THRUST RECESS, BELOW SIDES AND TOP	NONE.	NONE.	ASBESTOS.	2"	SHEET IRON.						
TUNNEL SIDES AND TOP	NONE.	NONE.	GRAN. CORN.	10"	1½" T.O.G.						
TUNNEL RECESS, FRONT AND TOP	✓	...	✓	...	✓						



Sounding Pipes, No. and position in each chamber situated below the load water line

N° 2 HOLD.	N° 3 HOLD.	N° 4 HOLD.	N° 5 HOLD.
1 P.S.	1 P.S.	1 P.S.	1 C. CENTRE.
2 1/2 DIA.	2 1/2 DIA.	1 1/2 DIA.	1 1/2 DIA.

Diameter 2 1/2 & 1 1/2 as shown. 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 *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 *Situated in squares bounded by 6x2 grounds & bedded in joint.*

Air Trunkways in Chambers, inside dimensions, main *Various* and branch *Various*.

Are they permanently fixed or collapsible, or portable *Permanent* State position in chambers *Round walls & under roof.*

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* Are they galvanised externally *yes*

How are they arranged in the chambers *Grids*

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *Boiler heater in refrigerator engine room*

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

*THE GREENOCK DOCKYARD CO. LTD.*  
*He Macdonald* *SECRETARY* Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery and Insulation *yes, 2 in N°*  
(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 appliances have been efficiently installed on board, tried out under full working conditions, with satisfactory results*

*The materials & workmanship are good. The installation is eligible in our opinion to be classed in the Society's Register Book with record + LLOYDS RMC 4-40 (in Red) as recommended in London RMC report N° 830.*

*It is submitted that this vessel is eligible for THE RECORD, + Lloyds RMC 4.40.*

*At this survey the brine pipes have been satisfactorily tested to 75 lbs per square inch over the working pressure at the time of construction.*

*15/4/40.*  
*CERTIFICATE WRITTEN*

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.
<i>2</i>	<i>J &amp; C Hall &amp; Co</i>	<i>1939</i>	<i>CO2</i>	<i>Halls</i>	<i>Brine &amp; Air</i> <i>Green. &amp; Stab</i> <i>Cork</i>		<i>117</i>	<i>14</i>	<i>318,000.</i>

Fee *London 9* *Greenock 18* *Travelling Expenses 1:1:0* (Fee applied for, 11<sup>th</sup> APRIL 1940.)

Received by me, *6-5-1940*

*N. L. Swinton & Charles G. Henders*  
Surveyors to Lloyd's Register.

Committee's Minute *8*

Assigned

*+ Lloyds R.M.C. 4.40*



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