

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office

-2 NOV 1936)

Date of writing Report 9-10-1936 When handed in at Local Office 9-10-36 Port of Bombay  
 No. in Reg. Book. Survey held at Bombay Date: First Survey 2-7-36 Last Survey 2-10-1936  
79883 (No. of Visits 12)

on the Refrigerating Machinery and Appliances of the S.S. "MRSULA" Tons { Gross 7326  
 Net 4566

Vessel built at Glasgow By whom built Barclay Curlew & Co. Ltd. Yard No. When built 1919-6

Owners British India Steam Navigation Co. Ltd. Port belonging to Glasgow Voyage

Refrigerating Machinery made by J & E Hall Ltd. Machine No. 9507 When made 1936

Insulation fitted by Garden Reach Workshops When fitted October 1936 System of Refrigeration CO<sub>2</sub> & Brine

Method of cooling Cargo Chambers Brine grids & air circulation Insulating Material used Granulated & slab block

Number of Cargo Chambers insulated 5 Total refrigerated cargo capacity 10,170 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed Main deck P+S of engine casing

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

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 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 See London Report No 58636 date 6-7-36

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



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.

Exhaust to main & auxiliary condensers.

### HYDRAULIC AND OTHER TESTS.

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						
BRINE PIPING AFTER ERECTION IN PLACE	26-9-36	20-25 lb	50 lb	✓	✓	✓

**Cooling Test.** Has the refrigerating machinery been examined under full working conditions, and found satisfactory Yes  
Dates of test 1-10-36 Density of Brine 43 by T. Waddell's 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 -10°F & 8°F  
atmosphere 98°F cooling water inlet and discharge 87°F & 95°F gas in condensers 106°F and evaporators -20°F  
the average temperature of the refrigerated chambers 10°F 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 18°F

### 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 Yes

ARTICLES SUPPLIED AS PER RULE.

ADDITIONAL SPARE GEAR SUPPLIED.

See London Report.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

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.
BULKHEADS.										
FRAME No. (Fore Peak)	A									
FRAME No.	F									
FRAME No. <sup>137</sup> <sub>125</sub>	F					NIL	NIL	granulated cork	10" ✓	1" T+G.
FRAME No.	A					NIL	NIL	- do -	10" ✓	1" T+G.
FRAME No.	F									
FRAME No.	A									
FRAME No. (Boiler Room)	A									
FRAME No. (Engine Room)	A									
FRAME No.	F									
FRAME No.	A									
FRAME No.	F									
FRAME No.	A									
FRAME No.	F									
FRAME No.	A									
FRAME No. (After Peak)	F							granulated cork.	11" ✓	1" T+G.
SIDES						NIL	NIL	- do -	12" ✓	1 1/4" T+G.
OVERHEADING						NIL	NIL	both slabs	10" ✓	2 1/2" x 2 1/2" GRATING.
FLOORS OF CHAMBERS						NIL	NIL	curbstones	1" ✓	
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										
RIBBAND ON TOP OF DECKS										
SIDE STRINGERS, TOP										
BOTTOM										
AND FACE										
WEB FRAMES, SIDES										
AND FACE										
BRACKETS, TOP										
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										
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										
2 1/2" x 2 1/2" wood grating										
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										
2 clear of grids at fore & after ends.										
diameter										
2 1/2"										
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. Where the chambers are situated below the load water line, 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										
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers										



*All chambers above load water line*  
**Sounding Pipes**, No. and position in each chamber situated below the load water line *One in each outboard chamber. Two in centre chamber.*  
 Diameter *Bilge 1 1/2" Deck 1 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 *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 *Cork slabs on floor only. Sealed with Bismuth compound & covered with "Durastic".*  
**Air Trunkways in Chambers**, inside dimensions, main *circulating trunks cover 3 sides and branch.* *completely.*  
 Are they permanently fixed or collapsible, or portable *Permanent* State position in chambers *3 sides*

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 on sides & deck head.*

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

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

*J. Bower, General Manager, Garden Reach Workshops Ltd. Builders.*

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *✓* and Insulation *Yes.*  
 (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 except for cargo battens at sides. Arrangements have been made to fit. These as required at loading port.*

**General Remarks** (State quality of workmanship, opinions as to class, &c.)

*The insulation, structure, fittings, machinery & appliances have been installed under special survey. The materials and workmanship are good and the tests found to be satisfactory.*

*It is considered that the vessel is eligible to have the record + LLOYDS R.M.C - 10,36 in the Register Book*

**NOTE -** *Where the brine leads pass through the hull deck the casing is sheathed with steel and the pipes lagged with silicate cotton*

*It is submitted that this vessel is eligible for THE RECORD.*

*+ Lloyds R.M.C 10.36.*

*SA 4/4/36.*

**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	2	bart cylinder	J. & S. Hall Ltd	1936	Brine & salt insulated slab cork		2 1/2	5	19,170

Fee *Rupiahs 250/-* { Fee applied for, 10-10-1936  
 Travelling Expenses £ : { Received by me, 19 .

*E. O. Kelly*  
 Surveyor to Lloyd's Register.

Committee's Minute *FRI. 6 NOV 1936*

Assigned *+ Lloyds R.M.C, 10,36*

CERTIFICATE WRITTEN



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