

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

- 9 NOV 1942

Just Survey

Date of writing Report 19 *5/11/42* When handed in at Local Office *Port of Glasgow.*

No. in Reg. Book. *86293 ap* Survey held at *Glasgow.* Date: First Survey *9 June 1942* Last Survey *3rd Nov 1942*
 (No. of Visits *27*)

on the Refrigerating Machinery and Appliances of the M/V. "EMPIRE HIGHWAY" Tons *Gross 7166*
Net 4217

Vessel built at *Glasgow* By whom built *Barclay Curle & Co. L^{td}* Yard No. *690* When built *1942*

Owners *The Ministry of War Transport* Port belonging to *Glasgow* Voyage *✓*

Refrigerating Machinery made by *J & E Hall* Machine Nos. *10997*
10998 When made *1942*

Insulation fitted by *Donald-Bean & Co* When fitted *1942* System of Refrigeration *NH₃ + BRINE*

Method of cooling Cargo Chambers *Brine Cooled batteries & fans.* Insulating Material used *STILLITE*

Number of Cargo Chambers insulated *5 Hold & 5 Ice Decks.* Total refrigerated cargo capacity *368,000* cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed *Upper deck amidships*

Refrigerating Units, No. of _____ No. of machines _____ Is each machine independent _____

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 ^{single} / _{double} } reduction gearing. Compressors, single or double acting _____ If multiple effect compression _____

relief valves or safety discs fitted _____ No. of cylinders to each unit _____ Diameter of cylinders _____

meter of piston rod _____ Length of stroke _____ No. of revolutions per minute _____

motive Power supplied from _____ (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 _____ Diameter _____

Length of stroke _____ Working pressure _____ Diameter of crank shaft journals and pins _____

Width and thickness of crank webs _____ No. of sections in crank shaft _____ Revolutions of engines per minute _____

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 _____

Width and thickness of crank webs _____ No. of sections in crank shaft _____ Revolutions of engine per minute _____

DR RECEIVERS: — Is each receiver, which can be isolated, fitted with a safety valve as per Rule _____

Are the internal surfaces of the receivers be examined _____ What means are provided for cleansing their inner surfaces _____

Is there a drain arrangement fitted at the lowest part of each receiver _____ If made under survey _____

No. of Receivers _____ Capacity of each _____ Internal diameter _____ thickness _____

Material _____ Range of tensile strength _____ Working pressure by Rules _____

Electric Motors, type _____ No. of _____ Rated _____ Kilowatts _____

Speed 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 _____ Cast iron or steel casings _____ Cylindrical or rectangular _____ Are safety valves fitted _____

Material of coils _____ Can each coil be readily shut off or disconnected _____

Water Circulating Pumps, No. and size of pumps available _____ X how worked *See also 17/11/42 & 24/11/42 re Circ. pumps*

Gas Separators, No. of _____ 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 _____ 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 _____

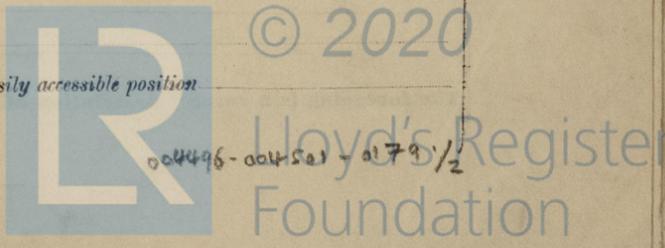
Brine Circulating Pumps, No. and size of, including the additional pump _____ how worked _____

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 _____

Form 1137-T. (MADE IN ENGLAND.)



Are thermometers fitted to the outflow and to each return brine pipe *Yes* Where the tanks are closed are they ventilated as per Rule *Yes*
 Where the tanks are ~~not closed~~ is the compartment in which they are situated efficiently ventilated *Yes*
 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 *Independent condensing plant.*

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						
MULTIPLE EFFECT RECEIVERS						
CONDENSER COILS						
EVAPORATOR COILS						
CONDENSER HEADERS AND CONNECTIONS						
CONDENSER CASINGS						
EVAPORATOR CASINGS						
NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE						

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 *1/11/42* Density of Brine *48°* by *Tinsdale* hydrometer

Temperatures (when the cargo chambers are cooled down to the required test temperatures) of delivery and return air at ~~direct expansion or~~ brine cooled batteries & outflow and return brine *-5° & -7°*

atmosphere *44°* cooling water inlet and discharge *50° & 52°* gas in condensers *80* and evaporators *-9°*

the average temperature of the refrigerated chambers *4.6°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 *8.36°F*

SPARE GEAR.

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

Has the spare gear required by the Rules been supplied

Additional Spare Gear Supplied:

See Log. Abt. H^o RMC 1293

The foregoing is a correct description of the Refrigerating Machinery.



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 Manufacturer.
 Foundation

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. 161 (Fore Peak)	✓	✓	STILLITE	8"	1" T&G.	✓	✓	STILLITE	8"	1" T&G.	
	FRAME No. 137	F	✓	✓	"	15 1/2"	1" T&G.	✓	✓	"	6"	1" T&G.
		A			RIBBAND 4 FT FROM TANK TOP & SHELL	4"	1" T&G.	IN WAY OF COOLERS	COVERED WITH 14 W.G. GALV SHEETS	4"	1" T&G.	
	FRAME No. 112	F	✓	✓	"	12 1/2"	1" T&G.	✓	✓	"	6"	1" T&G.
		A			RIBBAND 4 FT FROM TANK TOP & SHELL	4"	1" T&G.	IN WAY OF COOLERS	COVERED WITH 14 W.G. GALV SHEETS	4"	1" T&G.	
	FRAME No. 98	F	✓	✓	"	9 1/2"	1" T&G.	✓	✓	STILLITE	8"	1" T&G.
		A	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	FRAME No. (Boiler Room)	F										
	FRAME No. (Engine Room)	A										
	FRAME No. 61	F	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		A	✓	✓	STILLITE	9 1/2"	1" T&G.	N° 62 FRAME	✓	STILLITE	8"	1" T&G.
	FRAME No. 39	F			RIBBAND 4 FT FROM TANK TOP & SHELL	4"	1" T&G.	IN WAY OF COOLERS	COVERED WITH 14 W.G. GALV SHEETS.	4"	1" T&G.	
A		✓	✓	"	12 1/2"	1" T&G.	✓	✓	STILLITE	6"	1" T&G.	
FRAME No.	F											
FRAME No. 12 (After Peak)	F	✓	✓	STILLITE	8"	1" T&G.	N° 18 FRAME	✓	STILLITE	8"	1" T&G.	
SIDES	N° 1 HOLD			"	18 1/2" & 16 1/2"	1" T&G.	N° 1 HOLD TW DECK		"	9" & 10"	1" T&G.	
	N° 2, 4 & 5 HOLDS.			"	10 1/2" & 15 1/2"	1" T&G.	N° 2, 3, 4 & 5 "		"	9"	COVERED WITH 3/16 HARDBOARD IN WAY OF AIR TRUNK	
OVERHEADING	UNDER COOLERS			"	8 1/2"	1" T&G.						
	2 ND DECK. FRAME 12 TO 19.			"	11"	1" T&G.	OVERHEADING UPPER DECK					
FLOORS OF CHAMBERS IN HOLDS				CORK SLABS	6"	1 1/4" T&G.			STILLITE	11"	3/16 HARDBOARD	
BOTH LININGS FITTED AT WARTSHIP												
TRUNK HATCHWAYS							✓	✓	✓	✓		
THRUST RECESS, SIDES AND TOP							✓	✓	✓	✓		
TUNNEL SIDES AND TOP							✓	✓	STILLITE	8"	1" T&G.	
TUNNEL RECESS, FRONT AND TOP							✓	✓	FRONT " 8"	1" T&G.		
CENTRE LINE BHP (HOLDS)							✓	✓	TOP CORK SLABS 6"	1 1/4" T&G.		
RIBBAND 4'-0" FROM TANK TOP & BHP { 10 1/2" STILLITE ON STEER SIDE IN FORE HOLDS - 4" STILLITE ON FACE SIDE												

FRAMES OR REVERSE FRAMES, FACE 2" STILLITE

BULKHEAD STIFFENERS, TOP 1/2" HAIR FELT AT FACE OF BRACKETS BOTTOM 1/2" HAIR FELT AT FACE OF BRACKETS AND FACE 1/2" HAIR FELT.

RIBBAND ON TOP OF DECK: UPPER TOP - STILLITE FROM SHIPS SIDE TO 20" INBOARD. BOTTOM - STILLITE FROM SHIPS SIDE TO 1 1/2" BEYOND BEAM KNEES.

SIDE STRINGERS, TOP ✓ BOTTOM ✓ AND FACE ✓

WEB FRAMES, SIDES ✓ AND FACE ✓

BRACKETS, TOP ✓ BOTTOM ✓ AND FACE ✓

INSULATED HATCHES, MAIN PLUGS WITH 6" STILLITE BILGE PLUGS WITH 6" STILLITE MANHOLE PLUGS WITH 4" CORK.

HATCHWAY COAMINGS, MAIN OREGON PINE BILGE OREGON PINE.

HOLD PILLARS 3/4" FELT & 2" SISAL ROPE.

MASTS 6" STILLITE VENTILATORS NONE

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 ✓ cargo ports ✓ and side lights ✓

Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected ONLY TUNNEL TOP if so, how 1/4" STEEL PLATING.

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 COFFERDAM FITTED BETWEEN N° 3 HOLD & OIL FUEL BUNKER, AND ALSO BETWEEN N° 4 HOLD & DEEP TANK.

and for draining the tank top ✓

Fireproof Insulation. Is the insulation and woodwork fireproof in way of bulkheads or any surfaces exposed to excessive heat { SILICATE COTTON & 2 LAYERS OF ASBESTOS SHEETS

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 2" SPACED 15" floors TO BE FITTED AT LOADING PORT. tunnel top ELM SPACED 12"

fixed or portable FIXED Are screens fitted over the brine grids at chamber sides ✓ hinged or permanently fixed ✓

Thermometer Tubes, No. and position in each chamber 4 - 2 FOR^W & 2 AFT IN EACH HOLD & TWEEN DECK

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.

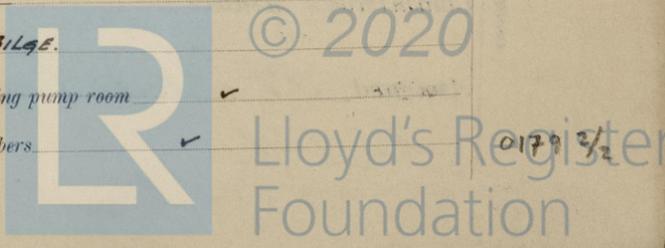
Draining Arrangements. What provision is made for draining the inside of the chambers TWEEN DECK - 2 1/2" " " } WITH BRINE SEAL & FITTED WITH NON RETURN CHECK VALVE.

Where scuppers, scupper pipes, and drain pipes are fitted are means provided for blanking them off No

What provision is made for draining the refrigerating machinery room SCUPPERS TO ENGINE ROOM BILGE.

brine return room { 2" SCUPPER WITH BRINE SEAL FITTED WITH N.R. CHECK VALVE } FULL ROOM SCUPPERS WITH BRINE SEAL FITTED WITH N.R. CHECK VALVE. 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 *THERMOMETER TUBES USED FOR SOUNDING ABOVE INSULATION.*

Diameter *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 *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 BEDDED ON "DURIP" & JOINTS OF SLABS SEALED WITH BITUMASTIC SOLUTION.*

Air Trunkways in Chambers. Are the arrangements satisfactory and in accordance with the approved plans *YES.*

Are they permanently fixed or collapsible, or portable *DELIVERY TRUNKS FIXED. SUCTION TRUNKS ON TANK TOP IN FOR? HOLDS PORTABLE. SUCTION TRUNKS IN AFT HOLDS. AT SIDES OF TUNNEL FIXED.*

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"* Minimum thickness *7 W.G.* Are they galvanised externally *COATED WITH BITUMIN.*

How are they arranged in the chambers *COOLING BATTERIES IN COOLER SPACE IN EACH INSULATED TWEEN DECK.*

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

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

FOR BARCLAY, CURLE & Co., Ltd.

Howalumbury, Secretary Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *✓* and Insulation *app'd Plans.*

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 and appliances have been fitted under special survey, tested under working conditions and found satisfactory and, in our opinion, the installation is eligible to be classed with **NEED + LLOYD'S RMC 11, 42***

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	Ice melting capacity per 24 hours.	Is Refrigerating Machinery Electrically Driven?	INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.				Tons.	No.
<i>3</i>	<i>6</i>	<i>Ammonia</i>	<i>J. L. Hall, Ltd.</i>	<i>1942</i>	<i>Air Drive Electric Cast Iron faced</i>	<i>200</i>	<i>No</i>	<i>5 HOLD 5 TW DECK</i>	<i>368,000</i>

Fee *£ 30 : 0 : 0* Travelling Expenses *£ 10 : 0 : 0* Fee applied for *in class 19* Received by me, *P. Dunsmuir & Co.* Surveyors to Lloyd's Register.

Committee's Minute *TUE 10 NOV 1942*
Assigned *Lloyd's Rmc 11, 42*
White & Carter



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