

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

Date of writing Report **10 NOV 1943** When handed in at Local Office **10 NOV 1943** Port of **Newcastle**  
 No. in Reg. Book **37352 (sup)** Survey held at **Newcastle** Date: First Survey **10-6-43** Last Survey **5-10-1942**  
 (No. of Visits **5**)

on the Refrigerating Machinery and Appliances of the **"EMPIRE FLAG"** Gross **4024.48** TONS Net **2733.63**  
 Vessel built at **Newcastle** By whom built **L. Steen & Co. Ltd.** Yard No. **4** When built **1943**  
 Owners **Ministry of War Transport** Port belonging to **Newcastle** Voyage **-**  
 Refrigerating Machinery made by **L. Steen & Co. Ltd.** Machine Nos. **2468 & 9** When made **1943**  
 Insulation fitted by **Lock Insulation Co. Ltd.** When fitted **10-1943** System of Refrigeration **NH3**  
 Method of cooling Cargo Chambers **Air** Insulating Material used **Slab cork & slag wool**  
 Number of Cargo Chambers insulated **3** Total refrigerated cargo capacity **284000** cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed

**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** <sup>single</sup> <sub>double</sub> } **reduction gearing.** **Compressors, single or double acting** \_\_\_\_\_ **If multiple effect compression** \_\_\_\_\_  
**Are relief valves or safety discs fitted.** \_\_\_\_\_ **No. of cylinders to each unit** \_\_\_\_\_ **Diameter of cylinders** \_\_\_\_\_  
**Diameter of piston rod** \_\_\_\_\_ **Length of stroke** \_\_\_\_\_ **No. of revolutions per minute** \_\_\_\_\_  
**Motive Power supplied from** **3 Boilers**  
 (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** \_\_\_\_\_  
**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** \_\_\_\_\_

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

**Can 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** \_\_\_\_\_ **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** \_\_\_\_\_ **Cast iron or steel casings** \_\_\_\_\_ **Cylindrical or rectangular** \_\_\_\_\_ **Are safety valves fitted** \_\_\_\_\_  
**to casings** \_\_\_\_\_ **No. of coils in each** \_\_\_\_\_ **Material of coils** \_\_\_\_\_ **Can each coil be readily shut off or disconnected** \_\_\_\_\_

**Water Circulating Pumps, No. and size of pumps available** **2** **how worked** **1 motor driven centrifugal** **Gas Separators, No. of** \_\_\_\_\_

**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** \_\_\_\_\_ **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** **6** **each of** **14500** **cubic feet capacity, at** **110 r.p.m.** **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.

See Major's R.M.E. Report No. 67329.

Are thermometers fitted to the outlets 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   
 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) ...						
GAS COMPRESSORS ...						
.. SEPARATORS ...						
.. MULTIPLE EFFECT RECEIVERS ...						
.. 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	5-10-43	✓	None	200	✓	
BRINE PIPING AFTER ERECTION IN PLACE...	✓	✓	✓	✓	✓	

*See Glasgow R.M.C. Report No 64329*

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 *26, 24, 23/10/43* 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 or brine cooled batteries.

*5°* & *8°* , outflow and return brine  &   
 atm sphere *50°* cooling water inlet and discharge *52°* & *55°* gas in condensers *51°* and evaporators *4°*  
 the average temperature of the refrigerated chambers *5°* and the rise of temperature in these chambers upon the expiration of *14* hours  
 time after the machinery and cooling appliances have been shut off *11-8°*

**SPARE GEAR.**

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

Has the spare gear required by the Rules been supplied  *Yes. As per specification.*

**Additional Spare Gear Supplied:**

The foregoing is a correct description of the Refrigerating Machinery.

Per *[Signature]* STEERNE & CO LTD

*[Signature]*



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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.
FRAME No. (Fore Peak)	A									
FRAME No. 133	F									
	A		Slag wool	8"	↑			Slag wool	8"	↑
FRAME No. 109	F							do	3"	
	A		Slag wool	14"				do	7"	
FRAME No. 84	F							do	10"	
	A									
FRAME No. (Boiler Room)	F				1/2" Soft.					1/2" Soft.
	A				wood					wood
FRAME No. 58 (Engine Room)	A		Slag wool	14"	with			Slag wool	10"	with
	F		do	8"	3/16" Hard			do	8"	3/16" Hard
FRAME No. 34	A				wood					wood
	F				plating					plating
FRAME No.	A									
	F									
FRAME No.	A									
	F									
FRAME No. (After Peak)	F									
SIDES			Slag wool	14"	↓			Slag wool	14"	↓
OVERHEADING								do	10 1/2"	↓
FLOORS OF CHAMBERS			Cork slabs	2 @ 3"	1 1/2" W.W.					
TRUNK HATCHWAYS										
THRUST RECESS, SIDES AND TOP								Slag wool	8"	↓
TUNNEL SIDES AND TOP								do	8"	↓
TUNNEL RECESS, FRONT AND TOP										

FRAMES OR REVERSE FRAMES, FACE 2"

BULKHEAD STIFFENERS, TOP BOTTOM AND FACE 2"

RIBBAND ON TOP OF DECKS

SIDE STRINGERS, TOP BOTTOM AND FACE

WEB FRAMES, SIDES AND FACE

BRACKETS, TOP BOTTOM AND FACE

INSULATED HATCHES, MAIN 1 1/2" W.W. - 6" old work - 1 1/2" W.W. 8 1/2" BILGE 1 1/2" W.W. - 3" old work - 1 1/2" W.W. 6 1/2" MANHOLE 1 1/2" W.W. - 3" old work - 1 1/2" W.W. 6 1/2"

HATCHWAY COAMINGS, MAIN 1 1/2" P. P. plating with 3/16" G.I. plating BILGE 2" P. P. plating to take plating.

HOLD PILLARS

MASTS 8" Slag wool + 1/2" soft board with 3/16" Hard wood plating

VENTILATORS

Are insulated plugs fitted to provide easy access to bilge suction roses *Yes.* tank, air, and sounding pipes *Portable lining* heels of pillars *Portable lining*

and manhole doors of tanks *Yes.* Are insulated plugs fitted to ventilators *Yes.* cargo ports *✓* and side lights *✓*

Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected *Yes* if so, how *3/4" Blue 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 *✓*

and for draining the tank top *✓*

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 *✓*

Cargo Battens, Dimensions and spacing, sides 2" x 2" @ 15 1/2" floors *✓* tunnel top 3" x 3" @ 15" 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 6 - 3 feet + 3 inches diameter 2 1/2" internal 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 *4" Brine trapped scuppers (10 x 15).*

Where ~~scuppers~~, 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 *Trapped scuppers to Eng Room Bilge with cup drain cork.*

brine return room *✓* fan room *✓* 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 *1 each to bilge & double bottom (P.S.) at aft end of hold.*  
 Diameter *2 1/2" internal* 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 *Beaded in Bitumen.*  
**Air Trunkways in Chambers.** Are the arrangements satisfactory and in accordance with the approved plans *Yes.*  
 Are they permanently fixed or collapsible, or portable *Supply Trunks to hold & twin ducts & exhaust Trunks from twin ducts fixed. Exhaust Trunks from Hold portable.*  
 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 *✓* Minimum thickness *✓* Are they galvanised externally *✓*  
 How are they arranged in the chambers *✓*  
**Thawing Off,** what provision is made for removing the snow from the cooling pipes in the chambers *✓*

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

*H. Howard.* Builders.

**Plans.** Are approved ~~Plans~~ Specifications forwarded herewith for the Refrigerating Machinery *Yes* and Insulation *Yes.*  
 (If not, state date of approval)  
 Is the Refrigerating Machinery and Appliances duplicate of a previous case *✓* 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

*See Glasgow R.M.C. Report 64329.*

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

*The materials used are in accordance with the approved standard specification and the workmanship is satisfactory.*

*The Refrigerating Machinery & Appliances of this vessel are eligible, in our opinion, for classification, with record of + Lloyd's R.M.C. 10-43.*

*Lloyd's Rule 1043*

*DM 19/4/43*

**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.
2	8	NH3.	L. Stern Co. Ltd.	1943	1. Air 2. Sea water & Rab cork	64	No	3	287000

Fee ..... £ 8 : 0 : 0 { Fee applied for 12 NOV 1943  
 Travelling Expenses £ : : { Received by me. 19

*Arthur Belloc*  
 Surveyor for Lloyd's Register.

TUES. 23 NOV 1943

Committee's Minute

Assigned

*+ Lloyd's R.M.C. 10.43.*

*White*



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