

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

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(No. of Visits 16)

on the Refrigerating Machinery and Appliances of the CLAN UROUHART Tons {Gross.....  
Net.....  
Vessel built at Greenock. By whom built Greenock Dockyard Co. and No. 454 When built 1943  
Owners \_\_\_\_\_ Port belonging to \_\_\_\_\_ Voyage \_\_\_\_\_  
Refrigerating Machinery made by J. & E. Hall Ltd. Machine Nos. 11211 When made 1943  
Insulation fitted by \_\_\_\_\_ When fitted \_\_\_\_\_ System of Refrigeration CO<sub>2</sub> + Brine  
Method of cooling Cargo Chambers Air circulation Insulating Material used \_\_\_\_\_  
Number of Cargo Chambers insulated 12 Total refrigerated cargo capacity 423,250 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed main dk. midship P&S. of engine casing.

Refrigerating Units, No. of 2 No. of machines 2 Is each machine independent yes  
Total refrigeration or ice-melting capacity in tons per 24 hours 143 Are all the units connected to all the refrigerated chambers yes  
Compressors, driven direct or through single reduction gearing. Compressors, single or double acting double If multiple effect compression no  
Are relief valves or safety discs fitted yes No. of cylinders to each unit one Diameter of cylinders 6 1/8"  
Diameter of piston rod 2 3/4" Length of stroke 18" No. of revolutions per minute 145  
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 2 Diameter H.P. = 12", L.P. = 24"  
Length of stroke 18" Working pressure 120 lb. 0" Diameter of crank shaft journals and pins 7 1/2" jls - 8" pins  
Breadth and thickness of crank webs 11" x 6" No. of sections in crank shaft one Revolutions of engines per minute 145

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 2 Cast iron or steel casings 14 copper casing per unit. Cylindrical or rectangular cylindrical Are safety valves fitted \_\_\_\_\_  
to casings yes No. of coils in each 1 in each casing Material of coils copper Can each coil be readily shut off or disconnected yes

Water Circulating Pumps, No. and size of pumps available 2-6 best. cast iron how worked electrically Gas Separators, No. of 4  
Gas Evaporators, No. of 2 Cast iron or steel casings steel Pressure or gravity type pressure If pressure type, are safety valves fitted \_\_\_\_\_  
No. of coils in each casing 15 Material of coils S.D. steel 1 1/16" Can each coil be readily shut off or disconnected yes

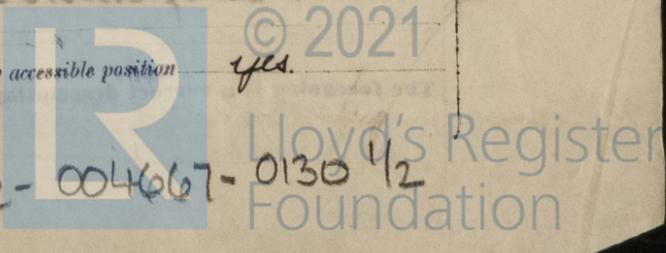
Direct Expansion or Brine Cooled Batteries, No. of 18 Are there two separate systems, so that one may be in use while the other is being cleared of snow no  
No. of coils in each battery see list attached Material of coils 1 1/2" box steel Can each coil be readily shut off or disconnected \_\_\_\_\_  
Total cooling surface of battery coils 26,000 sq. ft. Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of \_\_\_\_\_ each of \_\_\_\_\_ cubic feet capacity, at \_\_\_\_\_ 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 3-4" centrifugal how worked electrically  
Brine Cooling System, closed or open closed Are the pipes and tanks galvanised on the inside no  
No. of brine sections in each chamber see list attached

Can each section be readily shut off or disconnected yes Are the control valves situated in an easily accessible position yes

NOTE.—THE WORDS WHICH DO NOT APPLY SHOULD BE DELETED.

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Common  
 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  
 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 normally to special condensers, alternatively to Auxil. exhaust line.

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
H.P. -- 6-4-43	9-4-43	120lb. □	350lb. □			
ENGINE CYLINDERS (IF TESTED) L.P. --	23-3-43		250lb. □	✓	DL	
GAS COMPRESSORS	15-6-43					
SEPARATORS	7-9-43	1000lb. □	3000lb. □	1500lb. □	DL, R.M.	
MULTIPLE EFFECT RECEIVERS	13-8-43	do.	do.	do.	DL	
CONDENSER COILS	16-4-43	not fitted				
EVAPORATOR COILS	20-4-43	30-4-43	1000lb. □	3000lb. □	1500lb. □	DL
CONDENSER HEADERS AND CONNECTIONS	23-3-43	4-5-43	do.	do.	do.	DL
CONDENSER CASINGS	9-4-43	do.	do.	do.	do.	DL
EVAPORATOR CASINGS	13-4-43	do.	do.	do.	do.	DL
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE	8-6-43	10 to 15 lb. □	30 lb. □	✓	DL	
BRINE PIPING AFTER ERECTION IN PLACE	16-4-43	do.	do.	✓	DL	

Have important steel castings and forgings been tested in accordance with the Rules yes  
 Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory  
 Dates of test 20-4-43 Density of Brine 1.021 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  
 atmosphere cooling water inlet and discharge & gas in condensers and evaporators  
 the average temperature of the refrigerated chambers and the rise of temperature in these chambers upon the expiration of hours  
 time after the machinery and cooling appliances have been shut off

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:— 12 lubricator piston leathers, 1 set of 2 leather moulds, 1 Co<sub>2</sub> stop valve spindle each size  
 12 lubricator gland leathers, 12 Springs for Comp. valves, 1 Steam piston rod + nuts  
 2 Springs for water relief valve, 1 piston for H.P. cyl. 1 set steam piston rings H.P. + L.P. cyls  
 2 " " brine " " 1 H.P. steam piston valve, 1 eccentric sheave, strap + rod with brasses each pattern  
 2 " " CO<sub>2</sub> safety valves, 2 bolts + nuts for conn. rod big end, 2 brass cased thermos  
 2 " " H.P. L.P. steam cyl. relief valves, 2 " " " main bearing 2 for CO<sub>2</sub> pipe flanges  
 1 pump for pressure lubr. 2 " " " Comp. coupling 1-3/8 CO<sub>2</sub> gauge valve, 3 spare pipes  
 1 CO<sub>2</sub> gauge, 1 hydrometer 2 " " " Crosshead 12 Safety valve discs.  
 For Steam Condensing Sets:— 6 Condenser tubes, 24 ferrules with packing rings  
 1 pump piston rod for air pump, 1 set of valves for air pump, 1 set of valves for feed pump.  
 1 impeller and impeller shaft for brine and water pumps.  
 1 fitted box for comp. spares.

ELECTRICAL SPARES.

1 Armature	} Fan Motors each size fitted
1 Set of field coils	
1 Set of inter-pole coils	
1 Set of bearings	
1 line of brush holders	
1 Set of carbon brushes	
1 Set of controller spares	} Water Pump Motors
	} Pompe Pump Motors
	1 fan rotor for each size fitted

The foregoing is a correct description of the Refrigerating Machinery.

*W. P. ...*  
 L.D.  
 Manufacturer.  
 DIRECTOR

DESCRIPTION OF INSULATION.

	IN LOWER HOLD CHAMBERS.					IN 'TWEEN DECK CHAMBERS.				
	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of diaphragm.	Inner Lining.	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of diaphragm.	Inner Lining.
FRAME NO. (Fore Peak)	A									
FRAME NO.	F									
FRAME NO.	A									
FRAME NO.	F									
FRAME NO.	A									
FRAME NO. (Boiler Room)	F									
FRAME NO. (Engine Room)	A									
FRAME NO.	F									
FRAME NO.	A									
FRAME NO.	F									
FRAME NO.	A									
FRAME NO. (After Peak)	F									
SIDES										
OVERHEADING										
FLOORS OF CHAMBERS										
TRUNK HATCHWAYS										
THRUST RECESS, SIDES AND TOP										
TUNNEL SIDES AND TOP										
TUNNEL RECESS, FRONT AND TOP										
FRAMES OR REVERSE FRAMES, FACE										
BULKHEAD STIFFENERS, TOP										
RIBBAND ON TOP OF DECK										
SIDE STRINGERS, TOP										
WEB FRAMES, SIDES										
BRACKETS, TOP										
INSULATED HATCHES, MAIN										
HATCHWAY COAMINGS, MAIN										
HOLD PILLARS										
MASTS										
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										
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 floors tunnel top										
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										
diameter 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. 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 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**

Diameter \_\_\_\_\_ Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11

Are all wood linings tongued and grooved \_\_\_\_\_ 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 \_\_\_\_\_

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

Are they permanently fixed or collapsible, or 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.**

Builders. \_\_\_\_\_

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery \_\_\_\_\_ and Insulation \_\_\_\_\_  
(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 \_\_\_\_\_

*General Remarks* (State quality of workmanship, opinions as to class, &c.) *The refrigerating machinery was constructed under special survey and the materials and workmanship are good and it will be eligible for the notation + Lloyd's R.M.C (with date) when the installation and testing have been satisfactorily completed.*

**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.				No.	Capacity. Cubic ft.
2	2	Cas. Aubrey	J. E. Hall Ltd.	1943	1) Air	Tons. 143		12	423,250

Fee *Low 1/2 1/2* £36: 0: 0 } Fee applied for, 19  
Travelling Expenses £ : : } Received by me, 19

*D. Gemmell.*  
Surveyor to Lloyd's Register.

Committee's Minute \_\_\_\_\_

TUES. 11 JAN 1944

Assigned \_\_\_\_\_

*see minute on G.P. R.M.C. 28. Rpt 2236*



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