Newcastle Report no. 101649

Rpt. 17.

No. 67329.

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office 7 JUL 1943)

Date of writing Report 19 When handed in at Local Office 5.7.43 Port of Glasgow.

No. in Reg. Book. Survey held at Glasgow Date: First Survey 8-9-42 Last Survey 29-4 - 1943 (No. of Visits 14)

on the Refrigerating Machinery and Appliances of the s.s. "Empire Flag" Tons { Gross 7024 Net 4734

Vessel built at Newcastle on Tyne. By whom built Armstrong Whitworth & Co Ltd Yard No. 4 When built 1943

Owners Ministry of War Transport Port belonging to Newcastle Voyage

Refrigerating Machinery made by L. Sterne & Co Ltd Machine Nos. 24689 When made 1943

Insulation fitted by ✓ When fitted ✓ System of Refrigeration NH3

Method of cooling Cargo Chambers Air Insulating Material used ✓

Number of Cargo Chambers insulated ✓ Total refrigerated cargo capacity 287000 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed

**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 64 Are all the units connected to all the refrigerated chambers Yes.

**Compressors,** driven ~~direct or through~~ Vee belt. single / double ~~reduction gearing.~~ Compressors, single or double acting Single If multiple effect compression No

Are relief valves or safety discs fitted Yes No. of cylinders to each unit 4 Diameter of cylinders 7¼"

Diameter of piston rod Trunk pistons Length of stroke 6" No. of revolutions per minute 410

**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 HP 6", LP 10½"

NH3 Compressor 3½" jls. 3½" pins

Length of stroke 6" Working pressure Diameter of crank shaft journals and pins Steam engine 3" jls 3" pins

Breadth and thickness of crank webs NH3 Compressor 4½" - 8¾" taper 2⅛" Thick Steam Engine 4" - 1⅝" No. of sections in crank shaft N.H.3 Compressor 1 Steam engine Revolutions of engines per minute 620

~~**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 Lap welded Cylindrical or rectangular Cylindrical Are safety valves fitted to casings No. No. of ~~coils~~ tubes in each 80 Material of ~~coils~~ tubes Solid drawn steel 1 1/16" O.D. x 10 WG Can each coil be readily shut off or disconnected ✓

**Water Circulating Pumps,** No. and size of pumps available how worked **Gas Separators,** No. of 1 Suction 2 Delivery

**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 6 Are there two separate systems, so that one may be in use while the other is being cleared of snow Yes No. of coils in each battery 5 Material of coils Hot rolled welded 1 2/3 2 O D x 7 W.G. Can each coil be readily shut off or disconnected Yes Total cooling surface of battery coils 12000 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 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.

Im.11.37.—L. (MADE IN ENGLAND.)



004520-004526-0109

*Are thermometers fitted to the outflow 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* ✓

## HYDRAULIC AND OTHER TESTS.

| DESCRIPTION. | Date of Test. | Working Pressure. | Hydraulic Test Pressure. | Air Test Pressure. | Stamped. | REMARKS. |
|---|---|---|---|---|---|---|
| ENGINE CYLINDERS (IF TESTED) | ✓ | ✓ | ✓ | ✓ | ✓ | |
| GAS COMPRESSORS | 9-11-42<br>4-1-43 | 190 lbs/□" | 600 lbs/□" | 300 lbs/□" | WAL | |
| „ SEPARATORS | 11-1-43<br>19-1-43 | 190 lbs/□" | 600 lbs/□" | 300 lbs/□" | WAL | |
| „ ~~MULTIPLE EFFECT~~ RECEIVERS | 4-1-43<br>8-1-43 | 190 lbs/□" | 600 lbs/□" | 300 lbs/□" | WAL | |
| „ CONDENSER ~~COILS~~ Shell & tube type | 19-1-43<br>9-2-43 | 190 lbs/□" | 600 lbs/□" | 300 lbs/□" | WAL | |
| „ EVAPORATOR COILS | 22-4-43<br>29-4-43 | 190 lbs/□" | 1500 lbs/□" | 500 lbs/□" | WAL | |
| „ CONDENSER HEADERS AND CONNECTIONS | 29-4-43 | 190 lbs/□" | 1000 lbs/□" | 500 lbs/□" | WAL | |
| „ ~~CONDENSER CASINGS~~ Crankcases | 8-9-42<br>5-3-43 | 40 lbs/□" | 300 lbs/□" | 150 lbs/□" | WAL | |
| Liquid trap coil | 11-1-43 | | 1500 lbs/□" | 500 lbs/□" | WAL | |
| „ ~~EVAPORATOR CASINGS~~ Liquid trap | 21-1-43 | 190 lbs/□" | 600 lbs/□" | 300 lbs/□" | WAL | |
| $NH_3$ 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* ✓

*Dates of test* ✓ **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* ✓ & ✓, *outflow and return brine* ✓ & ✓

*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:—** See attached list.

**The foregoing is a correct description of the Refrigerating Machinery.**

For L. Sterne & Co Ltd P. M. Bell Manufacturer.
Managing Director.

## DESCRIPTION OF INSULATION.

| BULKHEADS. | IN LOWER HOLD CHAMBERS. Air Space. | Outer Lining. | Non-conducting Material. | Thickness of ditto. | Inner Lining. | IN 'TWEEN DECK CHAMBERS. Air Space. | Outer Lining. | Non-conducting Material. | Thickness of ditto. | Inner Lining. |
|---|---|---|---|---|---|---|---|---|---|---|
| FRAME No. A (Fore Peak) | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F (Boiler Room) | | | | | | | | | | |
| FRAME No. A (Engine Room) | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F | | | | | | | | | | |
| FRAME No. A | | | | | | | | | | |
| FRAME No. F (After Peak) | | | | | | | | | | |
| 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 BOTTOM AND FACE

RIBBAND ON TOP OF DECKS

SIDE STRINGERS, TOP BOTTOM AND FACE

WEB FRAMES, SIDES AND FACE

BRACKETS, TOP BOTTOM AND FACE

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* ✓

*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* No 30-3-42 18-8-42 *and Insulation* (If not, state date of approval)

*Is the Refrigerating Machinery and Appliances duplicate of a previous case* Yes *If so, state name of vessel* S.S. Empire Clerant Glasgow Report No 66409

*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 notation + LLOYDS RMC (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. | | Tons. | | No. | Capacity. Cubic ft. |
| 2 | 8 | NH3 | L. STERNE & Co LTD. | 1943 | (1) AIR | 64 | NO | 1 | 287,000 |

2/3 Fee Glasgow ..... £ 16 : 0 : 0. *Fee applied for,* 6 JUL 1943 .

*Travelling Expenses* £ : : *Received by me,* 19 .

*Committee's Minute* GLASGOW 6 JUL 1943

*Assigned* Deferred for completion

Wm. A. Leggat.
*Surveyor to Lloyd's Register.*

Certificate to be sent to

LLO 3-7-43

Above Surveyor