

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office

26 AUG 1933

Date of writing Report

14/8 - 33

When handed in at Local Office

23/8/33

Port of

Oslo

No. in
Reg. Book

12153

Survey held at

Drammen

Date: First Survey

18th May

Last Survey

4/8/1933

(No. of Visits

four

on the Refrigerating Machinery and Appliances of the yard N^o 476

Tons

Gross

Net

Vessel built at

Gothenburg

By whom built

A/B Götaverken

Yard No.

476

When built

1933

Owners

Messrs. Biörn Biörnstad & Co.

Port belonging to

Oslo

Voyage

Refrigerating Machinery made by

Drammens Jernstøberi & Maskinverktøjsfabrik

Machine No.

1388

When made

1933

Insulation fitted by

A/B Götaverken

When fitted

1933

System of Refrigeration

CO₂

Method of cooling Cargo Chambers

Brine & air

Insulating Material used

granulated cork

Number of Cargo Chambers insulated

10

Total refrigerated cargo capacity ab. 170,000 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed

Refrigerating Units, No. of

2

Single, double, or triple

double

Cubic feet of air delivered per hour

7,500,000

Total refrigeration or ice-melting capacity in tons per 24 hours

ab. 215.0

Are all the units connected to all the refrigerated chambers

yes

Compressors, driven direct or through

single

reduction gearing

Compressors, single or double acting

single acting

No. of cylinders

2 x 2

Diameter of cylinders

120 mm

Diameter of piston rod

55 mm

Length of stroke

130 mm

No. of strokes per minute

375 x 2 = 750

Motive Power supplied from

electric motors

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

No. of

2

Rated

120

Kilowatts

Volts at

375

revolutions per minute

Diameter of motor shafts at bearings

The motors will be supplied by Götaverken

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

4

Cast iron or steel casings

cast iron

Cylindrical or rectangular

cylindrical

No. of coils in each

9

Material of coils

copper

Can each coil be readily shut off or disconnected

yes

Water Circulating Pumps, No. and size of

2

how worked

by electr. motors

Gas Separators, No. of

2

Gas Evaporators, No. of

2

Cast iron or steel casings

steel casings

Pressure or gravity type

gravity

No. of coils in each casing

8

Material of coils

steel

Can each coil be readily shut off or disconnected

yes

Direct Expansion or Brine Cooled Batteries, No. of

5

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

coolers 2 - 24 coils

Material of coils

steel

Can each coil be readily shut off or

disconnected

yes

Total cooling surface of battery coils

ab. 9690 ft.²

Is a watertight tray fitted under each battery

yes

Air Circulating Fans, Total No. of

5

each of

24720

cubic feet capacity, at

900-1120

revolutions per minute

Steam or electrically driven

electr. driven

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

2, by Götaverken

how worked

by electr. motors

Brine Cooling System, closed or open

open

Are the pipes and tanks galvanised on the inside

no

No. of brine sections in each chamber

13 systems @ 2 sections in foreholds

2 - " - @ 2 - " - " after holds

Can each section be readily shut off or disconnected

yes

Are the control valves situated in an easily accessible position

yes

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 _____
Steam Condensing Plant. State what provision is made for condensing steam, in terms of Section 4, Clauses 13 and 14. _____

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED)	21-6-33	max. 90 atm.	210 atm.	105 atm.	LLOYDS TEST 210 atm. 21.6.33. P.E.	
GAS COMPRESSORS	21-6-33	" 90 "	210 "	105 "	LLOYDS TEST 210 atm. 21.6.33. P.E.	
" SEPARATORS	7/7-33	" 90 "	210 atm.	105 "	LLOYDS TEST 210 atm. 21.6.33. P.E.	
" CONDENSER COILS	24-7-33	alt. 30 "	210 "	105 "	LLOYDS TEST 210 atm. 21.6.33. P.E.	
" EVAPORATOR COILS	28-7-33	" 90 "	210 "	105 "	LLOYDS TEST 210 atm. 21.6.33. P.E.	
" CONDENSER HEADERS AND CONNECTIONS	7-7-33	" 90 "	210 "	105 "	LLOYDS TEST 210 atm. 21.6.33. P.E.	
" CONDENSER CASINGS	7-7-33	" 1 "	2 atm.	✓ "	LLOYDS TEST 2 atm. 7.7.33. P.B.R.	
" EVAPORATOR CASINGS	4-8-33	" 0.5 "	1 "	✓ "	LLOYDS TEST 1 atm. 4.8.33. P.B.R.	
NH, CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE						

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 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 _____ & _____
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 machines in accordance with Section 4, Clause 2 of the Rules _____ yes _____
Are the working parts of the machines, pumps and motors respectively, interchangeable _____ yes _____

ARTICLES SUPPLIED AS PER RULE	ADDITIONAL SPARE GEAR SUPPLIED.
2 pistons and rods complete	
1 pair main bearing brasses and bolts	
1 " crank bearing " "	
1 " crosshead bearing " "	
1 set coupling bolts and washers	
1 strainer	
1 crosshead pin	
1 spindle for each valve size	
4 sets metallic gland packings	
36 piston rings	
1 oil pump	
2 discharge valves	
4 valve discs	
1 oil filter	
1 oil lubricator and valve	
2 spindles, pistons and springs for automatic regulating valve	
1 thermometer for discharge pipe	
1 barometer	
1 stock & die for pipe threading	
10 thermometers +20° - -20° C	
3 " " 0° +40° C	
2 " " 0° +60° C	
2 pressure gauges	
1 oil gauge glass	
10 relief valve discs	
assorted copper jointings	
1 length C.O.2 pipes each size	
1 pair flanges for each size	

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED _____

The foregoing is a correct description of the Refrigerating Machinery. _____
as per 4/3 Drawings J. & M. V. 10/30/32
Manufacturer. _____

DESCRIPTION OF INSULATION.

IN LOWER HOLD CHAMBERS.										IN 'TWEEN DECK CHAMBERS.				
BULKHEADS.		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.	F												
	FRAME No.	A												
	FRAME No.	F												
	FRAME No.	A												
	FRAME No.	F												
	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												
	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 _____

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 _____ 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 _____
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 _____ 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, inside dimensions, main

and branch

Are they permanently fixed or collapsible, or portable

State position in chambers

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

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. To complete the survey the following remains to be done: Survey of the machinery during erection on board, and testing of same when completed. Examination of insulated holds & all test as per Rules. The above will be done at Gothenburg when the vessel is fitting out.

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

All parts of the above machinery, constructed at Drammen, have been carefully examined throughout. The materials employed were made at approved works and tested by the Society's Surveyors.

The workmanship appears to be very good. All hydraulic & air tests were carried out with satisfactory results.

It is recommended that this vessel's refrigerating machinery, when completed, be classed in the Society's Register Book, with notation

❖ Lloyd's R.M.C. with appropriate date.

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. and whether Single or otherwise.	Makers.	Date of Construction.	System.	Type.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity.
2	As Drammens Kjølefabrik	1933	CO ₂	Drammen	1/Brine & air 2/Brine & cork	7,500,000	2470	10	170,000
	double & 1/2 inch. Varksted						84	5	175,207

Fee £s. 120 .. (Fee applied for, 22/8/1933)
Travelling Expenses, £s. 75. 00 (Received by me, 12-2-1934)

Committee's Minute

FRI. 6 OCT 1933

FRI. 17 NOV 1933

Assigned

See R.M.C. 48027

FRI. 26 JAN 1934

Surveyor to Lloyd's Register

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Lloyd's Register
Foundation