

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office.)

2 OCT. 1933

Date of writing Report 29th Sept 33 When handed in at Local Office 29th Sept 33 Port of Göteborg
 No. in Reg. Book. Survey held at Göteborg Date: First Survey 31st August Last Survey 24th Sept 1933
 (No. of Visits 20)

on the Refrigerating Machinery and Appliances of the U.S.M.S. "Washington Express" Tons {Gross 3643
 Net 2165

Vessel built at Göteborg By whom built A.B. Lpkawerken Yard No. 476 When built 1933-9

Owners Shib. A/S. Seattle Port belonging to Belo Voyage -

Refrigerating Machinery made by A/S Brannens Jernstøberi Machine No. 09 When made 1933

Insulation fitted by A.B. Lpkawerken When fitted whilst building System of Refrigeration CO₂

Method of cooling Cargo Chambers cold air Insulating Material used Expanded granulated cork

Number of Cargo Chambers insulated 5 Total refrigerated cargo capacity 175,207 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed on port side in the engine room

Refrigerating Units, No. of 2 Single, double, or triple 6 Cubic feet of air delivered per hour -

Total refrigeration or ice-melting capacity in tons per 24 hours - 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 each 2 cyls

Diameter of cylinders - Diameter of piston rod - Length of stroke - No. of strokes per minute -

Motive Power supplied from two electric motors direct coupled

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 enclosed ventilated No. of 2 Rated each 110 Kilowatts 220

Volts at 375 revolutions per minute. Diameter of motor shafts at bearings 1.30 in

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 - 135 tons per hour each how worked electrically Gas Separators, No. of -

Gas Evaporators, No. of 2 Cast iron or steel casings steel Pressure or gravity type -

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 2 with 16 Material of coils steel Can each coil be readily shut off or

disconnected yes Total cooling surface of battery coils 900 m² Is a watertight tray fitted under each battery yes

Air Circulating Fans, Total No. of 5 each of 700 cubic feet capacity, at 900/1120 revolutions per minute -

Steam or electrically driven electrically Where spare fans are supplied are these fitted in position ready for coupling up yes

Brine Circulating Pumps, No. and size of, including the additional pump 2 - 70 tons per hour each how worked electrically

Brine Cooling System, closed or open open Are the pipes and tanks galvanised on the inside no

No. of brine sections in each chamber 16 in No. 1 hold, No. 2 hold 8 in dk and 2.4 in after hold

and two dk.

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 *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*

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)						
GAS COMPRESSORS						
SEPARATORS						
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	13.9.33			6.1 kg/cm ²		

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory *yes*

Dates of test *23rd Sept. 1933* Density of Brine *300* by *Baumé* 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 *-11°C* & *-9.5°C*

atmosphere *+11°C* cooling water inlet and discharge *+15°C* & *+16°C* gas in condensers *+23 1/2°C* and evaporators *-14°C*

the average temperature of the refrigerated chambers *-6.2°C* 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 *5.1°C*

SPARE GEAR.

Are the machines in accordance with Section 4, Clause 2 of the Rules

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

ARTICLES SUPPLIED AS PER RULE.	ADDITIONAL SPARE GEAR SUPPLIED.
2 piston rods complete with piston rings and suction valves & suction & delivery valve plates, 2 springs for discharge valves & discharge valve complete, 1 pair main bearing bosses & bolts, 1 crosshead bearing with bolts, 1 pair bottom end bosses and bolts, 6 coupling bolts & leather washers, 2 spindles for regulating valve, 2 pistons & 2 springs for regulating valve, 1 length of CO ₂ pipe of each dimension, 1 pair CO ₂ flanges of each dimension, 1 stock & die for cutting pipehead, assorted bolts & nuts, 10 relief valve discs, 1 crosshead pin, 4 sets metallic gland packings, 2 sets piston rings, 1 sieve for strainer, 1 oil gauge glass, 1 pressure gauge, 1 suction gauge, 1 thermometer, 1 oil filter, one oil pump complete, 1 lubricator, 2 thermometer casings, 1 thermometer for discharge pipe, 10 for brine and 3 for condensers, 1 spindle for 48, 1 for 29 and 1 for 5 mm valve, 1 impeller and shaft for brine pump, 1 impeller and shaft for cooling water pump.	spares for electric motor: one fan motor complete, field coils, intake coils, 2 armatures for compressor motor, water & brine motors and carbon brushes & brush holders and central gear spares for all kind of motors

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

Manufacturer.

DESCRIPTION OF INSULATION.

All thicknesses of wood linings are the finished thicknesses when planed.

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. 129 (Fore Peak)	25%	4 1/2" x 5/8"	Insulated granulated cork	180%	7/8"					
FRAME No. 133								Insulated granulated cork	180%	7/8"
FRAME No. 110			"	180%	7/8"			"	180%	7/8"
FRAME No. 83 E.R.			"	250%	7/8"			"	250%	7/8"
FRAME No. 77 (Bridge Room) E.R.								"	250%	7/8"
FRAME No. 89 (Clinging Room)								"	180%	7/8"
FRAME No. 61 E.R.			"	250%	7/8"	f 58.		"	250%	7/8"
FRAME No.										
FRAME No.										
FRAME No. 9 (After Peak)	25%	4 1/2" x 7/8"	"	180%	7/8"			"	180%	7/8"
SIDES			"	210%	7/8"	3rd - 2nd Stn. 2nd - 4th Stn. Weather Str. only.		"	210 - 230%	7/8"
OVERHEADING			"	230%	7/8"			"	180%	7/8"
FLOORS OF CHAMBERS	2"	7/8"	"	100%	1 1/2" x 7/8"			"	190%	2 1/2" x 7/8"
TRUNK HATCHWAY								None		
TRUSS RECESS, SIDES AND TOP										
TUNNEL SIDES AND TOP										
TUNNEL RECESS, FRONT AND TOP										

FRAMES OR REVERSE FRAMES, FACE	6 1/2" x 2"
BULKHEAD STIFFENERS, TOP	2"
BOTTOM	2"
AND FACE	7" x 2"
RIBBAND ON TOP OF DECK	90% x 2" fir.
SIDE STRINGERS, TOP	
BOTTOM	
AND FACE	
WEB FRAMES, SIDES	
AND FACE	
BRAKETS, TOP	
BOTTOM	
AND FACE	
INSULATED HATCHES, MAIN	plug hatches 150% cork, 1 1/2" thick lining
plug hatches as tank top	MANHOLE
plug hatches as tank top	
HATCHWAY COAMINGS, MAIN	8 1/2" x 6 1/2" - 4" + 4" galv. plate
2"	
HOLD PILLARS	1 1/2" slab cork and 7/8" lining
MASTS	1 1/2" slab cork and 7/8" lining
VENTILATORS, TRUNKS	1 1/2" slab cork and 7/8" lining
Are insulated plugs fitted to provide easy access to bilge suction roses	Yes
tonk, air, and sounding pipes	portable lining
feets of pillars	Yes
and manhole doors of tanks	Yes
Are insulated plugs fitted to ventilators	None
cargo ports	None
and side lights	None
Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected	Yes
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	— No oil tanks adjacent.

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	Yes
Cargo Batches, Dimensions and spacing, sides	3" x 2" @ 14" centres
floors	Will be supplied by owner. 3" x 2" horizontal @ 15" centres.
fixed or portable on sides of hulls	—
Are screens fitted over the brine grids at chamber sides	—
hinged or permanently fixed	—
Thermometer Tubes, No. and position in each chamber	As per approved plan.
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. Where the chambers are situated below the load water line, what provision is made for draining the inside of the chambers	—
coupled to bilges with liquid sealed traps or self closing valves	—
Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off	self closing valves.
What provision is made for draining the refrigerating machinery room	2" scupper
brine rooms	2" scupper
fan room	None
water circulating pump room	—
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers	Yes

Sounding Pipes, No. and position in each chamber situated below the load water line *As per approved plan.*

Diameter *4"* 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 *-*

Air Trunkways in Chambers, inside dimensions, main *As per approved plan* and branch *-*

Are they permanently fixed ~~or collapsible~~ *or portable* *Yes.* State position in chambers *At sides.*

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.

AKTIEBOLAGET GÖTAVERKEN
L. W. S. Neelus

Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *16226/6 1933* and Insulation *Yes.*

(If not, state date of approval)

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 has been installed and the insulation fitted under an inspection and to our satisfaction. The insulation is good and in accordance with approved plans and Secretary's letter E 24.3.1933. A plan of the insulation as fitted is forwarded. The electric current for the refrigerating plant is supplied by four auxiliary diesel oil engine driven generators of 110 kw each. The spare gear has been checked on board.

The Refrigerating installation of this vessel is eligible in our opinion to be classed in the Register Book and to have record of + LLOYDS RMC 9.33 for a temperature of 33°F subject to the refrigerating machinery having been satisfactorily reported on by the Oslo Surveyors during construction.

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.
								5	175.207 c.f.

Fee *£23:00* { Fee applied for, *29/9 1933*
LATE FEE. *£25:00* { Received by me, *16/10 1933*
Travelling Expenses *£-*

S. Townshend & Partners
Surveyor to Lloyd's Register.

Committee's Minute

Assigned *+ Lloyd's RMC 9.33*
For Temp. 33°F

FRI. 6 OCT 1933

FRI. 17 NOV 1933

FRI. 26 JAN 1934

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Foundation