

# REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

28 JUN 1935

Date of writing Report 25<sup>th</sup> June 1935 When handed in at Local Office

Port of BREMEN

No. in Reg. Book. BREMEN 2 Survey held at VEGESACK Date: First Survey 13.2.35 Last Survey 20<sup>th</sup> June 1935 (No. of Visits 14)

on the Refrigerating Machinery and Appliances of the STEEL M/V. DÜSSELDORF Tons Gross 4829 Net 2816

Vessel built at VEGESACK By whom built BREMER VULKAN Yard No. 711 When built 1935

Owners NORDDEUTSCHER LLOYD Port belonging to BREMEN Voyage WEST COAST OF SOUTH AMERICA

Refrigerating Machinery made by ATLAS WERKE AG Machine No. 27704 When made 1935

Insulation fitted by DUNKER & CO When fitted 1935 System of Refrigeration CARB. ANHY.

Method of cooling Cargo Chambers AIR Insulating Material used SLAB CORK, CEMENT FACED

Number of Cargo Chambers insulated 4 Total refrigerated cargo capacity 37850 cubic feet.

## DESCRIPTION OF REFRIGERATING MACHINERY. Where placed in Engine Room

Refrigerating Units, No. of 1 Single, double, or triple compound LP & HP Cubic feet of air delivered per hour

Total refrigeration or ice-melting capacity in tons per 24 hours 17 Are all the units connected to all the refrigerated chambers

Compressors, driven direct or through <sup>single</sup> ~~double~~ reduction gearing. Compressors, single or double acting LP double, HP single No. of cylinders 2

Diameter of cylinders 80 mm Diameter of piston rod 35 mm Length of stroke 150 mm No. of strokes per minute 230/340

Motive Power supplied from ELECTRIC MOTOR

Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders 1 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 A.E.S. 3.W.V.107 No. of 1 Rated 35.4 Kilowatts 120

Volts at 230/340 revolutions per minute Diameter of motor shafts at bearings 100 mm

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 One Cast iron or steel casings Steel Cylindrical or rectangular Rectangular

No. of coils in each 4 Material of coils copper 15/24 mm Can each coil be readily shut off or disconnected no

Water Circulating Pumps, No. and size of 1 how worked Electr. Motor Gas Separators, No. of 1

Gas Evaporators, No. of One Cast iron or steel casings Steel Pressure or gravity type gravity

No. of coils in each casing 4 Material of coils steel 28/38 mm Can each coil be readily shut off or disconnected no

Direct Expansion Brine Cooled Batteries, No. of 4 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 16000/12500 m<sup>2</sup> Material of coils steel Can each coil be readily shut off or

disconnected yes Total cooling surface of battery coils 240 m<sup>2</sup> Is a watertight tray fitted under each battery yes

REVERSIBLE Air Circulating Fans, Total No. of 4 each of 16000/12500 m<sup>2</sup> cubic feet capacity, at 1440/1625 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 of 23 m<sup>3</sup>/h 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 no brine pipes in chambers

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



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 yes

### HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
INTERMEDIATE PRESSURE RECEIVER	15.1.35	55	150	70	LLOYD'S TEST 15/1/35	
ENGINE CYLINDERS (IF TESTED)	13.2.35	90	210	105	NS. 15.1.35	
GAS COMPRESSORS	13.2.35	90	210	105	LLOYD'S TEST 210/105 atm	
" SEPARATORS	13.3.35	90	210	105	PC. 13.2.35	
" CONDENSER COILS	13.3.35	90	210	105	"	
" EVAPORATOR COILS	13.3.35	90	210	105	"	
" CONDENSER HEADERS AND CONNECTIONS	28.3.35	90	210	105	LLOYD'S TEST 210/105 atm	
" CONDENSER CASINGS	23.3.35	1	2	-	PC. 23.3.35	
" EVAPORATOR CASINGS	28.3.35	1	2	-	LLOYD'S TEST 210/105 atm	
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE	7.6.35	2	6.3	-	PC. 28.3.35	
BRINE PIPING AFTER ERECTION IN PLACE						

**Cooling Test.** Has the refrigerating machinery been examined under full working conditions, and found satisfactory yes  
 Dates of test 19-20<sup>th</sup> June 1935 Density of Brine 27° by Barni 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 brine cooled batteries - 11°C & - 10°C, outflow and return brine - 15°C & - 13°C  
 atmosphere + 14°C cooling water inlet and discharge 18.5°C & 20°C gas in condensers + 27°C and evaporators - 25°C  
 the average temperature of the refrigerated chambers - 10.5°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 5.5°C

### 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.
FOR COMPRESSOR ENG: 120 cylinder with 2 suction & 2 delivery valves	Spare parts for E MOTORS
140 " " " " " " " " " " " "	FOR COMPRESSOR:
2 compr. pistons with rods, 2 sets of piston rings	1 Armature commut.
3 suction valves commut. each with 6 springs	1 stator field coils
3 delivery " " " " " " " " " " " "	1 interpole coil
1 set of connecting rod bearing bolts	2 brushholders
2 sets of metal packing for piston rods	1 set of carbon brushes
1 suction gauge, 1 delivery gauge with alarm	FOR COOLING WATER PUMP:
5 sets of packing rings of copper or fibre	2 brushholders
1 filling pipe, 30 safety discs	1 set of carbon brushes
1 regulating valve spindle	FOR BRINE PUMPS:
1 crank shaft, 1 pair of main bearing brand & 2 rods	2 brushholders
Further: armature, commutator, and spie spanner.	1 set of carbon brushes
FOR COOLING WATER PUMP: 1 shaft with impeller & 1 set of bearings	
FOR BRINE PUMPS: 1 " " " " " " " " " " " "	
FOR each TYPE of BLOWERS: 1 spare motor with impeller	
1 stator field coil, 1 interpole coil	
1 set of carbon brushes with holders, 2 bearings	

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED yes

The foregoing is a correct description of the Refrigerating Machinery.

Atlas-Werke  
Aktiengesellschaft

Bischoff & Wittenberg



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Manufacturer.

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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.
BULKHEADS.	FRAME No. _____ A										
	(Fore Peak)										
	FRAME No. _____ { F										
	A										
	FRAME No. 90 { F										
	A 2" - SLAB CORK 8" Special Cement 1/2"	2"	-	SLAB CORK	8"	Special Cement 1/2"	2"	-	SLAB CORK	8"	Special Cement 1/2"
	FRAME No. 107 { F	2"	-	-	10"	1/2"	2"	-	-	8"	1/2"
	A										
	FRAME No. _____ { F										
	(Boiler Room)										
	LONGT. BULKH. { F										
	FRAME No. 118 { A	2"	-	SLAB CORK	6"	Special Cement 1/2"	2"	-	SLAB CORK	6"	Special Cement 1/2"
	(Engine Room)										
	FRAME No. _____ { F										
	A										
	FRAME No. _____ { F										
	A										
FRAME No. _____ F											
(After Peak)											
SIDES ...	1 1/4"	-	SLAB CORK	9"	Special Cement 1/2"	1 1/4"	-	SLAB CORK	9"	Special Cement 1/2"	
OVERHEADING ...	2"	-	-	8"	1/2"	2"	-	-	8"	1/2"	
FLOORS OF CHAMBERS ...	4	2 1/2	-	8"	TENOX PLATE 2 1/2"	-	-	-	-	-	
TRUNK HATCHWAYS ...											
THRUST RECESS, SIDES AND TOP ...											
TUNNEL SIDES AND TOP ...											
TUNNEL RECESS, FRONT AND TOP ...											

FRAMES OR REVERSE FRAMES, FACE *within insulation*

BULKHEAD STIFFENERS, TOP *within insulation* BOTTOM *within insulation* AND FACE *within insulation*

RIBBAND ON TOP OF DECKS ☒

SIDE STRINGERS, TOP ☒

BOTTOM ☒

AND FACE ☒

WEB FRAMES, SIDES ☒

AND FACE ☒

BRACKETS, TOP ☒

BOTTOM ☒

AND FACE *3" slab cork*

INSULATED HATCHES, MAIN *6" slab cork*

BILGE *8" slab cork*

MANHOLE *8" slab cork*

HATCHWAY COAMINGS, MAIN *wood 360 x 135/80 mm*

BILGE *wood 330 x 140/80 mm*

HOLD PILLARS *slab cork 3", special cement 1/2", galvanized 4" iron plating*

MASTS ☒

VENTILATORS ☒

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

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 *4 1/2" Oregon pine*

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 *on after part is a cofferdam*

Coal Bunker Bulkheads, and Brine Outflow and Return Pipes passing through coal bunkers. Is the insulation, so far as practicable, fireproof *none*

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 Battens, Dimensions and spacing, sides *2 1/2 x 2", spacing 10"* floors *grating 1 1/2 x 1/2", 4" tunnel top*

*sides fixed* fixed or portable *floor portable* Are screens fitted over the brine grids at chamber sides *no grids* hinged or permanently fixed ☒

Thermometer Tubes, No. and position in each chamber *one in each diameter side in way of frame 96/97*

diameter *3"*

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

*lined steel scuppers with screw down* Where sluices, 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 *situated in Engine Room*

brine return room *in Engine Room* fan room *yes* water circulating pump room *in Engine Room*

Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers *yes*

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*Two amidships in way of frame 90-91*  
**Sounding Pipes.** No. and position in each chamber situated below the load water line *one on each side in way of frame 90-91*

Diameter *1 1/2"* 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 *yes*

How is the expanded metal secured in place *nailed to the wood framing and to the cork slabs*

How are the cork slabs secured to the steel structure of the vessel *by bolted wood framing and iron & wood nuts*

**Air Trunkways in Chambers,** inside dimensions, main *none* 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 *none* 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 *by heated brine*

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

**Bremer Vulkan**  
**Schiffbau und Maschinenfabrik**

*Meyer & Co.* Builders.

**Plans.** Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *4. 1. 35* and Insulation *2. 1. 35 1. 5. 35*  
(If not, state date of approval)

Is the Refrigerating Machinery and Appliances duplicate of a previous case *yes* If so, state name of vessel *HERMONT'S 2 OSNABRÜCK*

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, etc.) *The Refrigerating Machinery and Appliances have been built under Special Survey in accordance with the approved plans and the Port Agent's letter, and otherwise in conformity with the requirements of the Rules. The Materials used in the construction as well as the workmanship throughout are of good quality. The whole Machinery has been tested under working condition and found in order. A covering down test of the insulated cargo chambers has been carried out with good result.*

*This Refrigerating Installation is eligible in my opinion to be placed in the Loc. Reg. Book with Record of : \* Lloyd's RMC 6. 35. for a temperature of 32° F.*

*It is submitted that this vessel is eligible for THE RECORD.*

*+ Lloyd's RMC 6. 35. for temp 32° F*

*SM 2/7/35*

**PARTICULARS TO BE ENTERED IN REGISTER BOOK.**

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity. Cubic ft.
<i>1</i>	<i>1</i>	<i>Carb. Am.</i>	<i>Atlas Works 9. 8.</i>	<i>1935</i>	<i>Air Star Cork Cement faced</i>		<i>17</i>	<i>4</i>	<i>37850</i>

Fee *RM : 2.40* { Fee applied for, *21. 6. 1935*  
Travelling Expenses £ *: 80* { Received by me, *12. 7. 1935*

*S. Carstensen*  
Surveyor to Lloyd's Register.

Committee's Minute *FRI. 5 JUL 1935*

Assigned *+ Lloyd's Rmc 6.35 Rb  
for temp 32° F*

CERTIFICATE WRITTEN



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