

Rpt. 17 (a)

Date of writing Report 18th July, 1958 Received London No. of visits 53 Port First date 4th Feb., 1958 Last date 15th July, 1958 Survey held at Tamano, Japan

SEP 1958

FE-5921

REFRIGERATED CARGO INSTALLATION REPORT ON REFRIGERATING MACHINERY

Machinery made by Mitsui Shipbuilding & Eng. Co., Ltd., & Kunimori Eng. Works, Kobe Machine Nos. 52, 53, 54, 55, 56 & 57 When made 1958-May Intended for Yard No. or Ship's Name "MEGURO SAN MARU" Built or building at Mitsui S.B. & Eng. Co., Ltd., Tamano Wks. By whom Mitsui S.B. & Eng. Co., Ltd. 620 OWNERS Mitsui Steamship Co., Ltd. Primary refrigerant CCl2 F2 Medium for cooling chambers (brine, primary refrigerant, etc.) Primary refrigerant & air

PARTICULARS OF REFRIGERATING MACHINES OF EACH SIZE (Including machines (if any) for cooling liquid refrigerant)

RECIPROCATING TYPES

(1) No. of machines, No. of cylinders per machine, Single or double acting, Single or two-stage, Diameter of cylinders, Vertical, horizontal or Vee, Diameter of piston rod if double acting, No. of cranks, Stroke, Speed of machines as fitted: Maximum R.P.M., Minimum R.P.M., Single speed, set speeds or variable speed, Clearance volume as percentage of swept volume, Swept volume of machine(s) at maximum R.P.M., How driven (direct, V belt, gearing, etc.), Prime Movers (steam engine, oil engine, electric motor, etc.), B.H.P., Maximum R.P.M.

(2) No. of machines, No. of cylinders per machine, Single or double acting, Single or two-stage, Diameter of cylinders, Vertical, horizontal or Vee, Diameter of piston rod if double acting, No. of cranks, Stroke, Speed of machines as fitted: Maximum R.P.M., Minimum R.P.M., Single speed, set speeds or variable speed, Clearance volume as percentage of swept volume, Swept volume of machine(s) at maximum R.P.M., How driven (direct, V belt, gearing, etc.), Prime Movers (steam engine, oil engine, electric motor, etc.), B.H.P., Maximum R.P.M.

Material of compressor rotatory piston forged steel Have they been manufactured and tested in accordance with the Rules and/or Secretary's letters? Yes Tensile strength 32-36 ton/in2 Have other important steel forgings and castings been manufactured and tested in accordance with the Rules? Yes Are safety devices fitted to compressors in accordance with the Rules? Yes Are compressors arranged for multiple-effect compression? No

OTHER TYPES (e.g., Centrifugal, steam jet, etc.)

(3) Six sets of Rotary type compressor were installed, e.i. 4 sets of RL-80 & 2 sets of RL-20 Speed of Machines: 800 to 640 r.p.m. for RL-80, 1210 to 970 r.p.m. for RL-20 (Variable speed) Swept volume of machines at max. r.p.m.: 137 M3/h. for RL-80, 41 M3/h for RL-20 How driven; direct driven by electric motor, Diameter of cylinder; 170mm for RL-80, 100mm for RL-20. Diameter of rotary piston; 135mm for RL-80, 80mm for RL-20, Length of cylinder & piston; 340mm for RL-80, 200mm for RL-20, Prime movers; 25HP electric motor for RL-80, 8HP electric motor for RL-20.

Where two machines only are provided, are all the working parts interchangeable? battery rooms are laid parallel and, insulated as a whole Is provision to be made for liquid refrigerant sub-cooling? Yes If so, state method so that after evaporation may be avoided.

PARTICULARS OF GAS CONDENSERS OF EACH TYPE AND SIZE

No. of shell-and-tube type 6 No. of shells in each 1 No. of tubes per shell 130 & 65 Material and thickness of tubes Almi-brass, 1.24mm Cooling medium and No. of passes Sea water, 4 pass for RL80, 6 pass for RL-20 No. of tubes each pass 32 & 11 Internal diameter of tubes 13.5mm Total No. of tubes per condenser 130 & 65 Total external surface of tubes in each condenser 12.7M2 & 3.9 M2 No. of coil-in-casing type No. of casings No. of coils each casing Material, external diameter and thickness of coils Cooling medium and No. of passes Can each coil be readily shut off or disconnected? Other types

PARTICULARS OF EVAPORATORS (BRINE COOLERS) OF EACH TYPE AND SIZE.

No. of shell-and-tube type No. of shells in each No. of tubes per shell Material and thickness of tubes Internal diameter of tubes No. of passes of brine No. of tubes each pass Total external surface of tubes in each evaporator Total No. of tubes per evaporator Material, external diameter and thickness of coils No. of coil-in-casing type No. of casings No. of coils each casing Can each coil be readily shut off or disconnected? External surface of each coil Total external surface of coils in each evaporator Other types

OTHER COMPONENTS, ETC.

No. of oil separators 6 No. of filters 6 No. of liquid receivers Combined with condenser No. of driers 2 No. of brine heaters None Other pressure vessels, give particulars electric resistance welded steel pipe Particulars of air cooler coils and cooling grids: Plain coils, external diameter 34mm Thickness 3.2mm Material extended surface coils, internal diameter Thickness Total extended surface per foot of pipe Pitch of fins or plates Dimensions of fins or plates Air cooler coil assemblies, total No. 6 Length of pipe and No. of coils of each size 174M x 3; 4 sets, 174Mx4; 2 sets. Can each coil be readily shut off or disconnected? Cooling grid sections, total No. and length of pipe of each size 62.24/2.41, 49.75/2.11, 37.61/1.83, 31.62/1.65, 25.27/1.65, 22.10/1.65, 18.93/1.65, 13.30/1.25, 10.21/1.25, 7.03/1.25, Primary refrigerant piping, internal diameter and thickness of each size 3.85/1.25mm How manufactured Cold drawing Material Copper

Have all components of the refrigerating plant been constructed strictly in accordance with the Rules and approved plans? Yes Where additional spare gear has been supplied a list is to be attached to the Report. Has the spare gear required by the Rules been supplied? Yes MITSUI SHIPBUILDING & ENGINEERING CO., LTD., TAMANO WORKS. The foregoing is a correct description of the refrigerating machinery.

T. Okumura Senior Managing Director. Machinery Manufacturers.

PRESSURE TESTS AT WORKS

DESCRIPTION	Working Pressure	Hydraulic Pressure	Date of Test	Air Test Pressure	Date of Test	Stamped
casing						
Compressor XXXXX	7 kg/cm ²	24.5kg/cm ²	27,28,30-1-58	14 kg/cm ²	22,28,30-1-58	RS LR
Compressor XXXXX bearing cover	"	"	21,24,28-4-58	"	21,24,28-4-58	RS LR
Oil separators, oil rectifiers	"	"	5,30-5-58	"	5,30-5-58	RS LR
Filters	"	"	13-1-58	"	13-1-58	RS LR
Driers	"	"	6-3-58	"	6-3-58	SM LR
Strainers	"	"	17-3-58	"	17-3-58	RS LR
Stop valves and connections	"	"	6,11,14-4-58	"	6,11,14-4-58	RS LR
Liquid receivers	"	"	3,5,6-3-58	"	26-2-58	SM,KT LR
Condenser shells XXXXX	"	"	"	"	"	"
Evaporator (brine cooler) shells or coils	-	-	-	-	-	-
Condenser headers and connections	7 kg/cm ²	24.5kg/cm ²	3,5,6-3-58	-	-	-
Condenser XXXXX water ends	1 kg/cm ²	4kg/cm ²	6-3-58	14 kg/cm ²	26-2-58	SM,KT LR
Evaporator headers and connections	-	-	-	-	6-3-58	SM LR
Evaporator coil casings or brine ends	-	-	-	-	-	-
Air cooler coil assemblies	7 kg/cm ²	24.5kg/cm ²	1,3-3-58	-	-	-
Chamber grid sections	-	-	-	14 kg/cm ²	4,5,7-3-58	YK,SM,KT,YK LR
Float regulators	-	-	-	-	-	-
Brine heaters	-	-	-	-	-	-
Primary refrigerant piping	7 kg/cm ²	24.5kg/cm ²	20,14-6-58	-	-	-
Other pressure parts	-	-	-	14 kg/cm ²	20,14-6-56	SH& JN LR

PLANS: Drawing No. and date of approval of each plan concerned

Rotary piston	RL80	RL20	Date	Oct.7-57	RL80	RL20	Date	Oct.7-57
Compressors, crank shaft	1P-2222	2P-4729			1P-2219	2P-4708		
Filters	1P-2229	2P-4849			1P-2231	2P-4817		
Evaporators	-	-			-	-		
Condensers	RD143A, RD143B	May 2-58			RD143A	May 2 1958		
Air coolers	PC143A, PC143B	"			-	-		
Other pressure parts	Oil cooler: 1P2232	for RL-80, 2P4808			for RL-20			

General remarks (state quality of workmanship, opinions as to class, etc.) The Refrigerated Cargo Installation of this vessel has been built and installed under Special Survey in accordance with the Rules, Approved Plans and Secretary's letters. The materials and workmanship are sound and good..

The installation has been examined under full working conditions and found satisfactory.

In our opinion this Refrigerated Cargo Installation is worthy of the record of LLOYD'S RMC 7,58.

PARTICULARS OF MACHINERY FOR REGISTER BOOK

No. of units	6	Prime Movers	Electric motors
Total B.H.P. of all compressor prime movers	116	Refrigerant	CCl ₂ F ₂
Makers	Mitsui S.B.& Eng.Co.,Ltd.& Kunimori Eng.,Wks.	Date of construction	
MACHINERY PARTICULARS:	Type & No. of machine	Rotasco RL80x4 sets	Rotasco RL20 x 2 sets
	Diameter of cylinder	170mm	100mm
	Diameter of rotary piston	135mm	80mm
	Length of cylinder and piston	340mm	200mm
	Revolutions per minute	800/640	1210/970
	Ice melting capacity	10.22 ton/day	2.9 ton/day

SURVEY FEE (Based on measured cubic capacity on completion of installation.)

Construction & Inst.	£146,450.-	Fee applied for,	19
Travelling expenses	£ See Rpt.1 :	Received by me,	19

23.10.58
Date of Committee
Minute

TUESDAY 20 OCT 1958
See Rpt. 17 (R)

R.D. Sutherland
Surveyor to Lloyd's Register
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Foundation