

Rpt. 17 (a)

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Survey held at Osaka, Japan No. of visits 3 Port KOBE  
First date 1st April, 1961 Last date 2nd June, 1961 No. FE-8937

## REFRIGERATED CARGO INSTALLATION REPORT ON REFRIGERATING MACHINERY

Machinery made by The Sabroe Co. of Japan Ltd.  
Intended for Yard No. or Ship's Name Ship No. 1561  
Built or building at Nagasaki, Japan  
OWNERS Daido Kaiun K.K.  
Primary refrigerant Dichlorodifluoro-methane  
Machine Nos. 330120, 330121, 330122  
When made June, 1961  
By whom Mitsubishi Shipbuilding & Eng. Co., Ltd.,  
Nagasaki Works  
Medium for cooling chambers (brine, primary refrigerant, etc.) Cold air circulation

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

#### RECIPROCATING TYPES

(1) No. of machines 3 No. of cylinders per machine 3 (2LP and 1 HP)  
Diameter of cylinders 150 mm Vertical, horizontal or Vee Vertical Single or double acting Single Single or two-stage Two  
No. of cranks 3 Stroke 125 mm Speed of machines as fitted: Maximum R.P.M. 500 Diameter of piston rod if double acting - Minimum R.P.M. 250  
Single speed, set speeds or variable speed Set speed Clearance volume as percentage of swept volume 3.7  
Swept volume of machine(s) at maximum R.P.M. 1st stage 2.21 M<sup>3</sup>/min. How driven (direct, V belt, gearing, etc.) V belt  
Prime Movers (steam engine, oil engine, electric motor, etc.) 2nd stage 1.1 M<sup>3</sup>/min. B.H.P. 30 Maximum R.P.M. 1,800  
Electric motor  
(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 crankshafts Steel forging  
Tensile strength 62.3, 61.0, 61.7 kg/mm<sup>2</sup> Have they been manufactured and tested in accordance with the Rules and/or Secretary's letters? Yes  
Are safety devices fitted to compressors in accordance with the Rules? Yes Have other important steel forgings and castings been manufactured and tested in accordance with the Rules? Yes  
Are compressors arranged for multiple-effect compression? No

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

(3)

Where two machines only are provided, are all the working parts interchangeable?  
Is provision to be made for liquid refrigerant sub-cooling? Yes If so, state method

Liquid discharges cooled by gas flow in interstage cooler, temperature of which controlled by expansion valve in liquid branch line.

### PARTICULARS OF GAS CONDENSERS OF EACH TYPE AND SIZE

No. of shell-and-tube type 3 No. of shells in each 1 No. of tubes per shell 158 Material and thickness of tubes Almi brass 1.24 mm  
Cooling medium and No. of passes Sea water, 4 passes No. of tubes each pass 39/40 Internal diameter of tubes 13.4 mm  
Total No. of tubes per condenser 158 Total external surface of tubes in each condenser 15.3 M<sup>2</sup>  
No. of coil-in-casing type No. of casings No. of coils each casing Material, external diameter and thickness of coils  
External surface of each coil Cooling medium and No. of passes  
Total external surface of coils each condenser 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  
No. of passes of brine No. of tubes each pass Internal diameter of tubes  
Total No. of tubes per evaporator Total external surface of tubes in each evaporator  
No. of coil-in-casing type No. of casings No. of coils each casing Material, external diameter and thickness of coils  
External surface of each coil Total external surface of coils in each evaporator Can each coil be readily shut off or disconnected?  
Other types

#### OTHER COMPONENTS, ETC.

No. of oil separators 6 No. of strainers 7 No. of liquid receivers 3 No. of driers 3 No. of brine heaters -  
Other pressure vessels, give particulars 3 interstage cooler  
Particulars of air cooler coils Sea water coils Plain coils, external diameter 34 mm Thickness 3.2 mm Material Seamless steel pipe  
Extended surface coils, internal diameter - Total extended surface per foot of pipe -  
Pitch of fins or plates - Dimensions of fins or plates -  
Air cooler coil assemblies, total No. 8 Length of pipe and No. of coils of each size 351.5 M, 6 coils per air cooler  
Cooling grid sections, total No. and length of pipe of each size I.D. 62.45mm 49.75 37.61 31.62 25.27 22.10 18.93 16.55 13.38 10.21  
Primary refrigerant piping, internal diameter and thickness of each size Thickness 2.11mm 2.11 1.83 1.65 1.65 1.65 1.65 1.25 1.25 1.25  
Material Copper How manufactured Cold drawn copper pipe

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





PRESSURE TESTS AT WORKS						
DESCRIPTION	Working Pressure	Hydraulic Pressure	Date of Test	Air Test Pressure	Date of Test	Stamped
Compressor cylinders ... ..	10.5 kg/cm <sup>2</sup>	24.5 kg/cm <sup>2</sup>	1-4-61	14.0 kg/cm <sup>2</sup>	1-4-61	YK
Compressor crankcases ... ..	7.0 "	14.0 "	1-4-61	10.5 "	1-4-61	YK
Oil separators, oil rectifiers ... ..	10.5 "	24.5 "	3-4-61	14.0 "	3-4-61	KT
Filters ... ..						
Driers ... ..						
Strainers ... ..	Not tested at Maker's works					
Stop valves and connections ... ..	10.5 kg/cm <sup>2</sup>	24.5 kg/cm <sup>2</sup>	1-4-61	14.0 kg/cm <sup>2</sup>	1-4-61	YK
Liquid receivers ... ..	10.5 "	24.5 "	3-4-61	14.0 "	3-4-61	KT
Condenser shells <del>and</del> Tubes ... ..	10.5 "	24.5 "	3-4-61	14.0 "	3-4-61	KT
Evaporator (brine cooler) shells or coils ... ..	-					
Condenser headers and connections ... ..	-					
Condenser <del>and</del> water ends ... ..	1.6 kg/cm <sup>2</sup>	7.0 kg/cm <sup>2</sup>	3-4-61	-	-	KT
Evaporator headers and connections ... ..	-					
Evaporator coil casings or brine ends ... ..	-					
Air cooler coil assemblies ... ..	10.5 kg/cm <sup>2</sup>	24.5 kg/cm <sup>2</sup>	2-6-61	14.0 kg/cm <sup>2</sup>	2-6-61	SH
Chamber grid sections ... ..	-					
Float regulators ... ..	-					
Brine heaters ... ..	-					
Primary refrigerant piping ... ..	Tested by Maker's Works					
Other pressure parts Inter stage cooler	10.5 kg/cm <sup>2</sup>	24.5 kg/cm <sup>2</sup>	3-4-61	14.0 kg/cm <sup>2</sup>	3-4-61	KT

PLANS: Drawing No. and date of approval of each plan concerned      Date of approval 28-2-61

Compressors, crankshaft      9022, TS-300  
 Filters      6103B  
 Evaporators      -  
 Condensers      8996.2  
 Air coolers      13568  
 Other pressure parts      Intercooler 9097A

Crankcases      3C TF-300  
 Separators      7771A  
 Strainers      10748  
 Driers      6103B

Cylinders      5A TF-300  
 Liquid receivers      6891  
 Float regulators      -  
 Brine heaters      -

General remarks (state quality of workmanship, opinions as to class, etc.)

The refrigerating machinery has been constructed under Special Survey in accordance with the requirments of the Rules, approved plans and Secretary's letters.

The materials and workmanship are sound and good.

The refrigerating machines complete with condensers were examined under working condition in the shop with satisfactory results.

# PARTICULARS OF MACHINERY FOR REGISTER BOOK

No. of units      3  
 Total B.H.P. of all compressor prime movers      90  
 Makers      The Sabroe Co. of Japan Ltd.

Prime Movers      Electric motor  
 Refrigerant      Dichlorodifluoro-methane  
 Date of construction      1961

## MACHINERY PARTICULARS:

3 - 3 cyl. S.A. com. compressors 150mm x 150mm x 125mm x 500 R.P.M.  
 3 S AND T Condensers

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

\* RMS Construction £51.100.-  
 25.1.62 Travelling expenses £ 4.000.-

Fee applied for,      AUG 16 1961  
 Received by me,      19

Date of Committee  
 Minute

See pag 1130

Y. Kojima  
 Surveyor to Lloyd's Register



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