

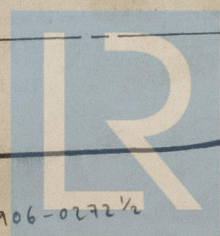
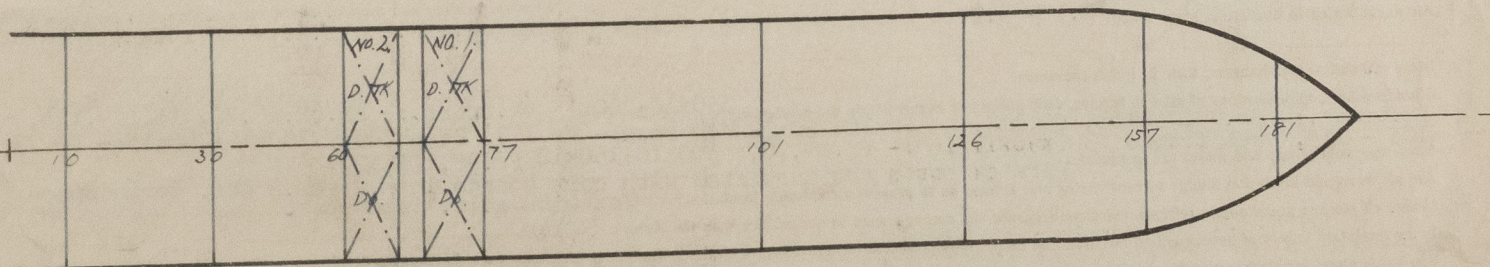
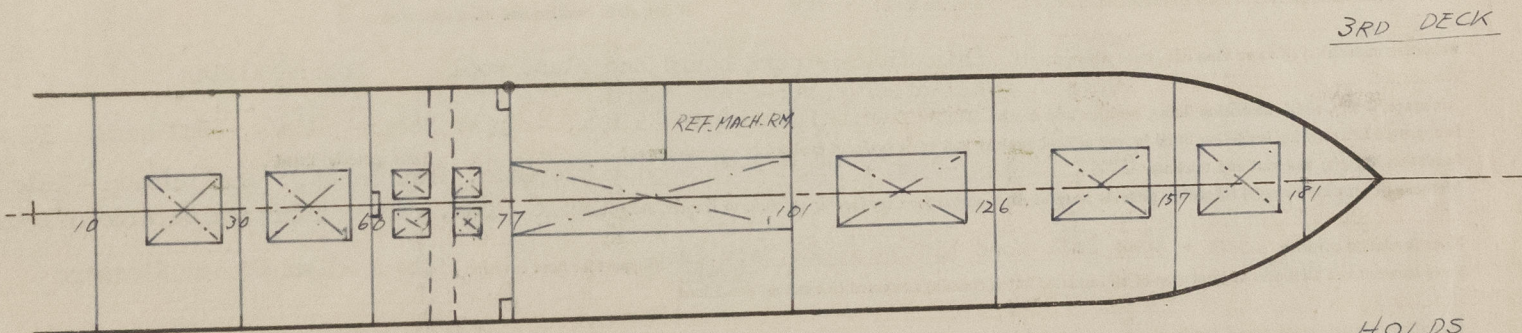
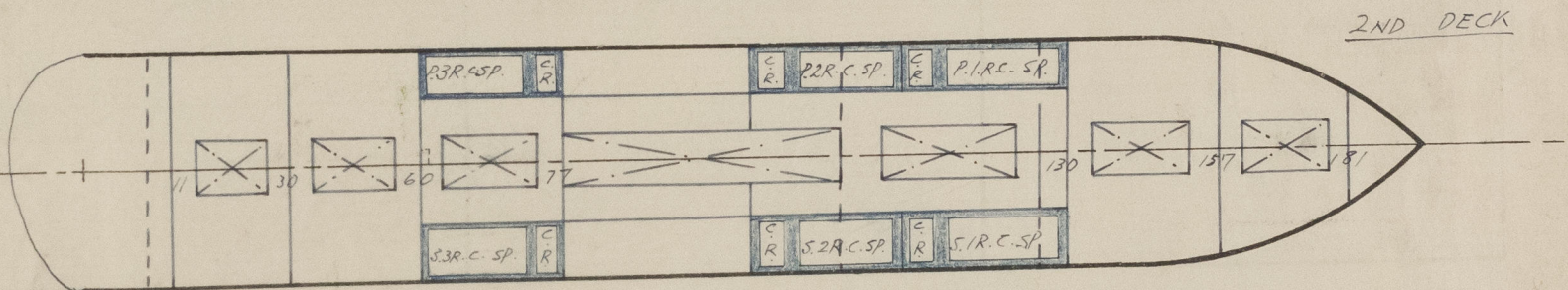
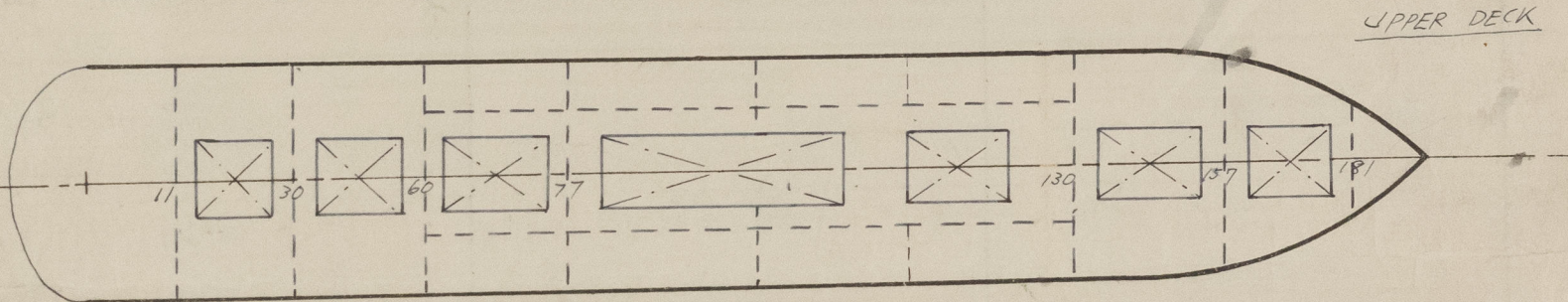
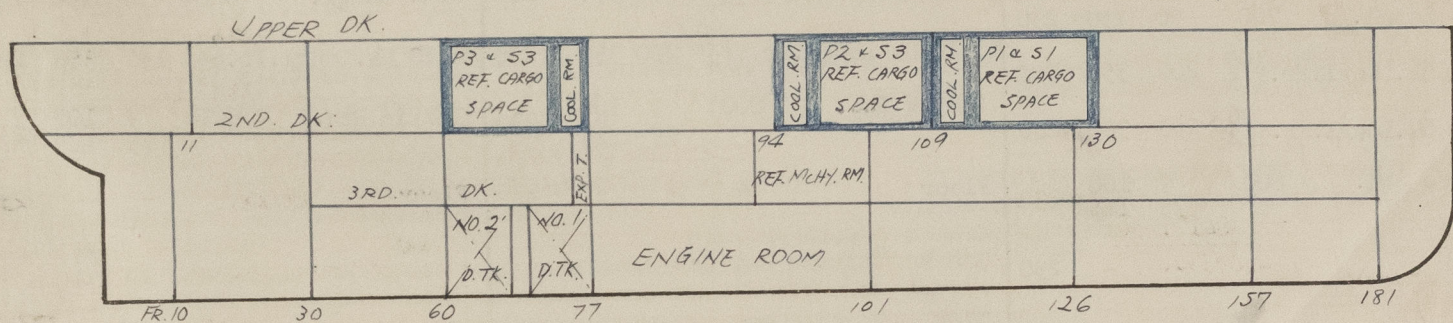
Rpt. 17 (b)

Date of writing Report Tamano, Japan Received London 53 Port KOBE No. FE-5921
 Survey held at Tamano, Japan No. of visits 53 First date 4th Feb., 1958 Last date 15th July, 1958

REFRIGERATED CARGO INSTALLATION—REPORT ON INSULATION WORK, ERECTION OF PLANT ON BOARD AND TESTS AFTER COMPLETION

No. in R.B. "MEGUROSAN MARU" Gross tons 9,565.69
 Built at Tamano, Japan By whom Mitsui Shipbuilding & Eng. Co., Ltd., Tamano Works Yard No. 630
 Owners Mitsui Sempaku K. K. Port of Registry Tokyo
 Refrigerating Machinery made by Mitsui S.B. & Eng. Co., Ltd. Machine Nos. 51, 52, 53, 54, 56, 57 When made May, 1958
 Insulation fitted by Mitsui S.B. & Eng. Co., Ltd., Tamano Works Total No. of Chambers 6
 Total refrigerated cargo capacity measured in accordance with Society's requirements 22,327 cu. ft.

Location and boundaries in elevation and plan of each refrigerated cargo chamber, main and refrigerating machinery space(s), evaporator and brine rooms, and cooler houses to be shown by inserting decks and bulkheads in the diagrams. The frame numbers to be shown at each transverse bulkhead. The decks to be clearly marked in elevation and plan. Insulation to be shown by a line (preferably in colour) on the appropriate side or sides of decks and bulkheads. Oil storage tank tops and bulkheads adjoining refrigerated chamber(s) also to be shown. (If desired, a separately prepared diagram sheet may attached by paste or staples provided the size is not greater than that below, all the required particulars are shown and the sheet is signed by the Surveyor.)



© 2021

Lloyd's Register
Foundation

013900-013906-0272 1/2

INSULATION OF BOUNDARIES EXPOSED TO EXTERNAL CONDITIONS											
In cols. (1) identify each chamber by position (e.g. No. 2 UTD PORT) with each of its exposed surfaces immediately below (e.g. ship's side, overhanging, etc.), where the size of frames etc., change on any surface, give frame Nos. (e.g. Fms. 102 to 109) applicable to each size, on separate lines. Depth of insulation in cols. (3) to exclude any air space, linings, etc.											
(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation			(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation			(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation		
	Pitch ins.	Width of face ins.	Depth of Insulation fitted		Pitch ins.	Width of face ins.	Depth of Insulation fitted		Pitch ins.	Width of face ins.	Depth of Insulation fitted
P.1 and S.1				P.2 and S.2				P.3 and S.3			
Ship side frame	800		200	Ship side frame	800		200	Ship side frame	800		200
Do.	Fr. 112, 115, 119, 126	65	200	Do.	Fr. 105	90	200	Do.	Fr. 62, 66, 73	90	200
Web Frame	Fr. 123	150	400	Web frame	Fr. 96, 101	150	400	Web frame	Fr. 69, 70	90	300
For'd Bhd.	740	75	125	For'd Bhd.	740	75	125	For'd Bhd.	-	-	150
Aft Bhd.	-	-	-	Aft Bhd.	-	-	-	Aft Bhd.	-	-	150
Overhanging				Overhanging				Overhanging			
Web beam	Fr. 123	150	500	Dk. trans.	Fr. 101, 105	250	350	Dk. trans.	Fr. 66, 70	200	350
Dk. trans.	Fr. 112, 126	250	350	Dk. Longl.	740	90	150	Dk. Longl.	Fr. 73	250	350
Do.	Fr. 115, 119	200	350	No. 7 Dk. Longl.	Fr. 105, 115	200	350	No. 10 Dk. Longl.	Fr. 77, 79	150	350
Dk. Longl.	740	90	150	No. 10 Dk. Longl.	Fr. 96, 112	200	350	Inside Bhd.	800	9	100
No. 7 Dk. Longl.	Fr. 105, 115	200	350	Inside Bhd.	800	9	100	Floor	-	-	230
No. 10 Dk. Longl.	Fr. 96, 112	200	350	Floor	-	-	-				
Inside Bhd.	800	9	100								
Floor	-	-	-								

No. of refrigerating units 6 Can each unit operate on all chambers? Yes if not, state how connected.

Primary refrigerant C Cl₂ F₂ Where specified in the Rules, is the machinery isolated in an efficiently ventilated compartment? Yes

Medium for cooling chambers Air circulation system For particulars of refrigerating machinery see 2P6214, 1P-2216, 1P-2217, 1P-3089, 1P-3068, 1P-3069 Report No.

Diagrammatic sketch sufficient to show relative position (port or starboard, fore or aft) of each compressor, condenser, evaporator (brine cooler), condenser cooling pumps, and brine pumps.

3RD. DK. PLAN FR. 96 SECTION (LOOKING FORD)

FR. 91 96 (PORT SIDE) 101

CONDENSER MOTOR COMPRESSOR OIL SEPARATOR PRESS. REGULATOR PANEL EXP. V. PANEL 2ND. DK. COOLER

PORT FORE

ENG. CASING

Heat exchangers are not provided for sub-cooling liquid refrigerant however liquid & suction refrigerant lines are tied up together by use of insulation materials for the benefit of sub-cooling liquid refrigerant

Is provision made for subcooling the liquid refrigerant (if so, state method) 3 electric generator Condenser cooling medium (if not sea water)

MOTIVE POWER supplied from (state No. of boilers or electric generators) 3 electric generator

CONDENSER COOLING PUMPS No. 2 Capacity of each 667 lit./min. 1.6 kg./cm². B.H.P. of driving motors 6 HP

Are safety valves fitted where required by the Rules? Yes No. of sea connections 2

BRINE PUMPS No. Capacity of each lit./min. 667 gals./hour at head of 1.6 kg./cm². B.H.P. of driving motors 6 HP

No. of brine temperatures which can be circulated simultaneously 2 Brine system "open" or "closed" type open

Are steel brine and refrigerant pipes, cooling grids and air cooler coils galvanized externally where required by the Rules? Yes

Are thermometers fitted to brine delivery and each return pipe? Yes

How are the brine and refrigerant steel pipes connected (flanges, butt welds, screw joints, etc.) flanges

Where brine pipes are connected by screwed couplings, are the coupling and back nut threads a good fit? Yes

Are the screw threads clear of the coupling coated as required by the Rules? Yes

Is provision made for air refreshing? Yes If so, are the arrangements in accordance with the Rules? Yes

What provision is made for defrosting air cooler coils and/or cooling grids in chambers? Hot gas and hot water.

What is the pipe thickness at the bottom of the thread? Parallel

Are air cooler coils parallel to or across the air stream? Parallel

PARTICULARS OF COOLING APPLIANCES IN EACH CHAMBER											
Identify each chamber by position (e.g. No. 2 LTD. Port, No. 3 Orlop D., No. 5 L.H. etc.)											
Chamber(s)	Capacity measured in accordance with Society's requirements cu. ft.	Roof grids		Side grids		Battery coils		FANS			
		Length in ft.	No. of sections	Length in ft.	No. of sections	Length in ft.	No. of sections	Maximum RPM	Minimum RPM	Cubic ft. of air per minute at maximum RPM	Static water gauge ins.
P. 1	4,584					out. dia. 1" x 2.289	4	1,800	1,200	5,298	1 9/16"
S. 1	4,616					do.	4	do.	do.	do.	4
P. 2	2,963					out. dia. 1" x 1.709	3	2,000	1,330	3,532	do.
S. 2	2,984					do.	3	do.	do.	do.	3
P. 3	3,592					do.	3	do.	do.	do.	3
S. 3	3,588					do.	3	do.	do.	do.	3

Are air cooler fans reversible? Yes Is access to the refrigerating plant including air cooler fans and their motors, in accordance with the Rules? Yes

Can each section of air cooler coils and chamber grids be readily isolated? Yes

Where cooling pipes pass through watertight bulkheads or deckplating, are the fittings and gland packing both watertight and fire resisting? Yes

PRIMARY REFRIGERANT PIPING (not fabricated at Plant Makers Works) internal diameter and thickness of each size 62.45/2.11, 49.75/2.11, 37.61/1.65, 31.62/1.65, 25.27/1.65, 22.10/1.65, 18.93/1.65, 13/38/1.25, 10.21/1.25, 7.75/0.89, 4.57/0.87 (mm)

Material Copper How manufactured ROLL Pressure tests 350 lbs./in² hydraulic 200 lbs./in² air

Pressure tests after erection 100 Brine system pressure test on completion

Are all divisional bulkheads of steel construction in accordance with the Rule? Yes If not, state position and when approved

Insulating material(s) (if more than one, state where fitted) Ship sides:- cork board and glass wool Door:- alflex

All other part:- cork board

Air space, if any, within insulation lining, position and depth Ship side & Bulkhead:- 35 m/m, Upper Deck:- 50 m/m, 2nd Deck:- 30 m/m

Is approved fire resisting insulation fitted in way of coal bunkers and other surfaces exposed to excessive heat? State material fitted

Insulation lining(s) material and thickness Inner Lining:- 25mm + 16mm, Soft wood & #26 Galv. Iron Sheet, Out Lining:- 16mm Soft Wood

Methods of securing lining(s) (if timber grounds state whether across face, on face or on sides of frames, etc.) 32mm x 230mm, Wooden furrings on side of frames

Floor insulation covering 25mm + 16mm Soft Wood Lining & #22 Galv. Iron Sheet Support for floor covering 32mm x 230mm Wooden Sleepers

State location and thickness of insulation of all insulated hatch coamings exposed to external conditions

Insulation ribbands state where, the insulating material, thickness, width and covering

Hatch covers, type and thickness of insulation Exposed loading and tonnage doors, state thickness of insulation 1" + 2" x 4 Alfl

Air ducts buried in insulation, state where P.1 & S.1:- Fr. 113 1/2 & 128 1/2 of inner Bulkhead, P.2 & S.2:- Fr. 101 1/2 & 105 1/2 of Upper Deck

Meat rail and/or grid hangers, state in which chambers 350x10+200x15 Dk. trans.:- Fr. 62, 66, 70, 115, 119, 126, 350x10+250x15

State location and dimensions of all web frames, deep girders or beams within the insulation Dk. trans.:- Fr. 73, 96, 101, 105, 112, 350x10+150x12 Web Beam:- Fr. 123 Deep Long. 350x10+200x15:- Fr. 73 - 77, 96 - 11

State how hold pillars and masts are insulated 105 - 115 Web frames 300x90x11/16:- Fr. 69, 70, 400x10+150x12 Fr. 96, 101, 123

Are air ducts and insulation linings so constructed and erected as to prevent air entering insulation? Yes with galv. iron sheet

Where oil storage tanks adjoin refrigerated chambers, are the arrangements in accordance with the Rules? Yes

Is the insulation in way of hatchways on the tank and tunnel tops protected in accordance with the Rules? Yes

Are screens fitted over cooling grids on sides of chambers? Yes

Are hatch plugs and their supports; chamber, air cooler and other access doors and frames; closing appliances of tonnage openings; bilge limbers and plugs, satisfactorily fitted and airtight? Yes

Are access plugs and/or panels provided in the insulation where required for easy access to the bilges, bilge suction roses, drains, tank manhole doors, air and sounding pipes? Yes

Are cargo battens provided in accordance with the Rules? Dimensions and spacing on sides, vertical surfaces and tunnel top 50x50 230 - 300 apart

Have all ventilators and ducts passing through refrigerated chambers to other compartments been made airtight and efficiently insulated? Yes

Where ventilators are provided to refrigerated spaces, are they provided with airtight and insulated closing appliances? Yes

Are insulation linings and air screens on the sides of chambers suitably stiffened to prevent crushing by cargo? Yes

Are all steel bolts, nuts, hangers and fixtures which support or secure cooling appliances, insulation, meat rails, etc., galvanized? Yes

Is the insulation and air ducting in accordance with the approved plans and specification? Yes

The foregoing is a correct description of the insulation and appliances.

MITSUBISHI SHIPBUILDING & ENGINEERING CO., LTD., YAMANO WORKS.

T. Ohmura Senior Managing Director. Builders or Insulation Contractors

Do all pipes, including scupper pipes, air pipes and sounding pipes which pass through refrigerated chambers comply with, and are they erected and insulated in accordance with the Rules? Yes
Are air cooler trays provided in accordance with the Rules? Yes Are the drainage arrangements of the refrigerated chambers, cooler trays and air spaces behind insulation in accordance with the Rules? Yes Are liquid sealed traps provided as required by the Rules? Yes Has the spare gear (see Report 17(a)) been placed on board? Yes
Is a separate plant fitted for ships stores and/or air conditioning purposes? Yes Where the installation is on a ship not classed or intended to be classed with the Society, have the generator engines and electrical equipment which supply power to the refrigerating plant been examined generally and under working conditions and found sufficient and satisfactory? Yes
Steam or oil engines driving refrigerant compressors. Report 4c, Port No.
Where the machinery is driven by steam engines, is the exhaust steam connected to the main and auxiliary condensers? No.
Motors over 100 BHP driving refrigerant compressors. Port
Air cooler fan driving motors. Port Kobe
Motors under 100 BHP driving refrigerant compressors. Have makers' certificates been obtained? Yes Certificate Nos. DC M. 1219,1220,1221,1222,1223,1224 (1228,1229)
DISTANCE READING THERMOMETERS: Are they approved type? No Makers Shimazu Seisakusho Type ARB-212 Are certificates attached? Yes
In accordance with the Rule requirements? Yes No. and position of thermometers in the cargo space and air ducts of each chamber. One thermometer tube on Upper Dk for each cargo space and one thermometer at each door.

For inlet and outlet air duct:- each one

TESTS AFTER COMPLETION: Have the thermometers provided for measuring chamber, air suction and air delivery temperatures been checked for accuracy and found in order? Yes
Have the air cooler fans been tested? Yes (the statements showing the results of these tests to be attached to the report). Have the air distribution arrangements in each chamber been checked and found satisfactory? Yes Has all the plant been tested under working conditions? Yes Where a plant is operated by thermostatic refrigerant control, are the arrangements for manual control in accordance with the Rules? Yes Have the manual controls been tested? Yes Were all the plant electrical instruments, gauges and thermometers checked for accuracy before the commencement of the refrigeration test? Yes Have the air cooler defrosting arrangements been tested? Yes

REFRIGERATION TEST. When did cooling down chamber(s) commence? Date 30-6-58 Time 16 H. When was the desired temperature of 19.1 °C attained in the chambers? Date 1-7-58 Time 18 H. When was the balance test commenced? Date 2-7-58 Time 18 H. When was the Balance Test completed? Date 3-7-58 Time 24 H.
Log sheets of the chamber and external temperatures, machinery operating conditions including fan and brine pump motor particulars, also a copy of the sheet showing the calculations of the estimate of the theoretical heat leakage on the average temperatures during the balance test period, to be attached to the report.

TOTAL THEORETICAL HEAT LEAKAGE DURING THE BALANCE TEST PERIOD

Through surfaces, etc., of cargo chambers, brine rooms, cooler houses, etc. 95868.77 BTU/hr
Through refrigerant leads 13531 BTU/hr
Total 109399.77 BTU/hr

Ratio $\frac{\text{measured heat leakage}}{\text{theoretical heat leakage}} = \frac{118417.056}{109399.77} = 1.088$

Maximum ratio permissible for temperature qualification desired by Owners (state head office figure). 1.43

MEASURED HEAT LEAKAGE

Compressor Operating Conditions:
State which compressor(s) used No. 1,3,4 (25 HP) & No. 5 (8 HP)
Average evaporator gauge -18 °F -18 °F
Average condensing temperature 82 °F 82 °F
Compressor R.P.M. 600
Machine output from curves 53500 BTU/hr 1560 BTU/hr
Fan, brine pump etc., heat load.
Average total fan heat load 57682.944 BTU/hr
Average total brine pump heat load - kg. cal./hr BTU/hr
Any other heat load such as heaters in chamber - kg. cal./hr BTU/hr
Total of above loads 57682.944 BTU/hr
Total measured heat leakage load 118417.056 BTU/hr

If the arrangements and details are not precisely in accordance with the approved specifications and plans, have full details of deviations been forwarded with this Report?
Is the refrigerated cargo installation a duplicate of a previous case No If so, state name of vessel or Yard and Yard No.
If the survey is not complete, state what arrangements have been made for its completion and what remains to be done completed.

GENERAL REMARKS. (State whether installation has been constructed under special survey in accordance with the Rules, approved plans and Secretary's letters. State quality of materials and 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 FOR REGISTER BOOK

MACHINERY
No. of units 6 Prime movers Electric Motor
Total BHP of all Compressor prime movers 116 HP
Refrigerant C CL₂ F₂
Makers Mitsui S.B. & Eng. Co., Ltd. Date of Construction 24th May, 1958
Machinery particulars "RL-80" "RL-20"
Diameter of cylinder 170 m/m 100 m/m
Diameter of rotary piston 135 " 80 "
Length of cylinder & piston 340 " 200 "
Revolutions per minute 800/640 1210/970
Ton per day 7.4 2.8
Motor horse power 25/20 HP 8/6.5 HP
Survey Fee See Rpt. 17(a)-5921 Fee applied for, See Rpt. 1
Travelling Expenses
Date of Committee TUESDAY 7 OCT 1958
Class assigned Lloyd's RMC 7,58 to maintain

CARGO CHAMBERS
Total capacity in cubic feet 22,327 Total No. 6
No. Independent 6 No. independently refrigerated 6
Method of Cooling Cold air circulation over direct expansion batte
Insulating material(s) Cork board & glass wool
Insulation lining 25 m/m, 16 m/m, soft wood & galv. iron sheet

