

Rpt. 17 (b)

LONDON

Date of writing Report  
Survey held at Nagasaki, Japan

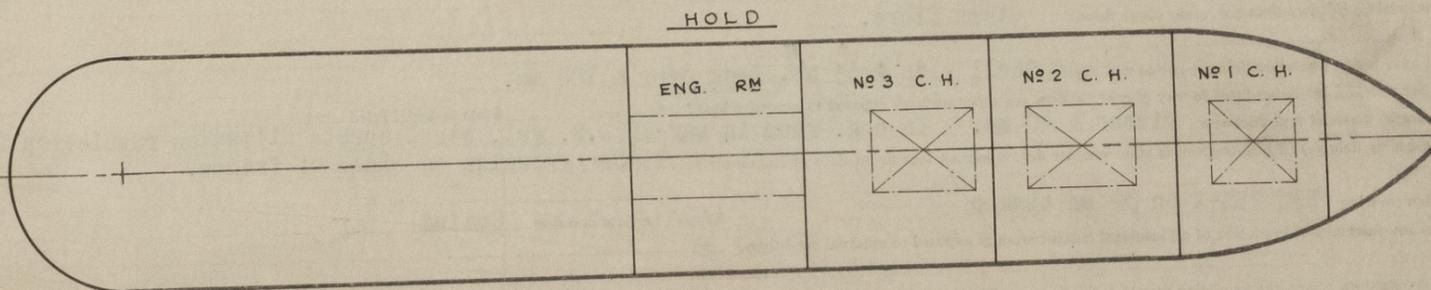
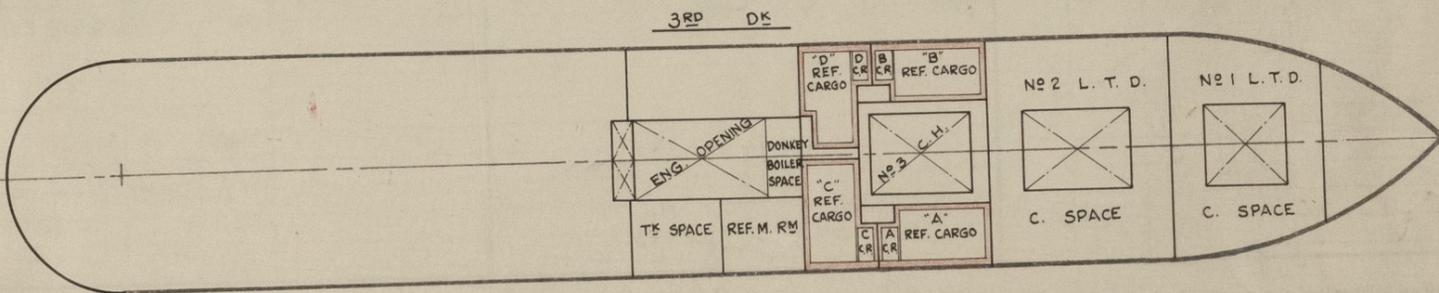
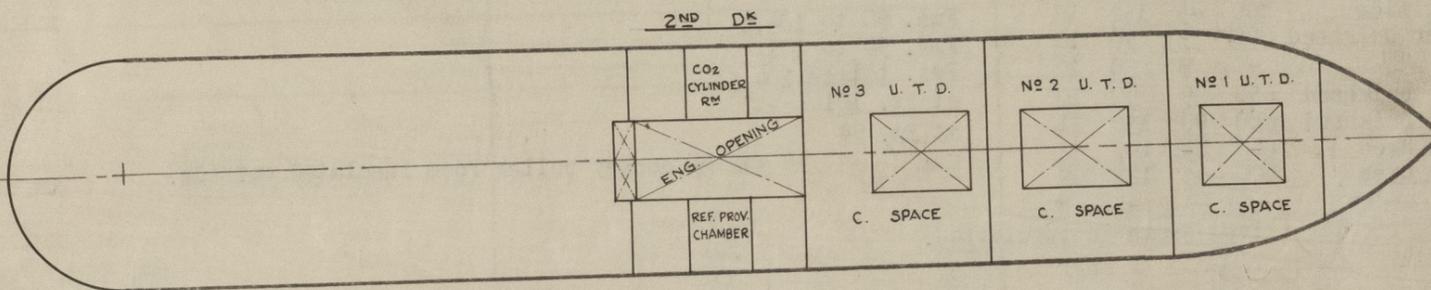
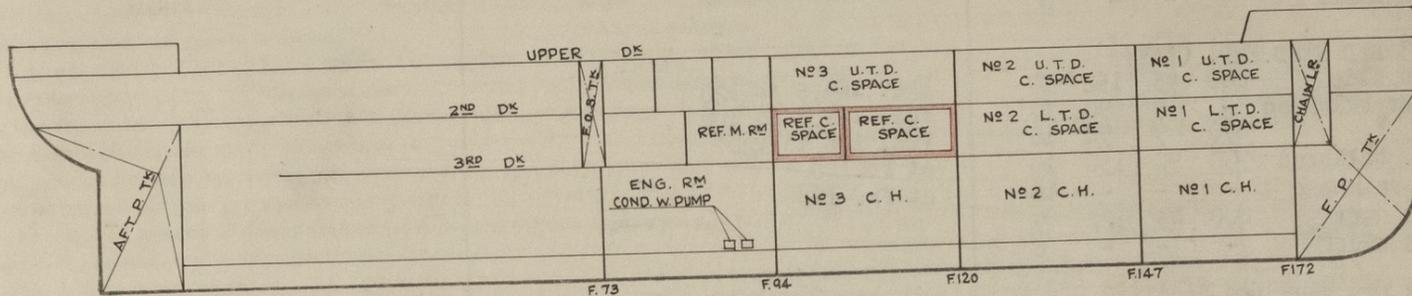
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# REFRIGERATED CARGO INSTALLATION—REPORT ON INSULATION WORK, ERECTION OF PLANT ON BOARD AND TESTS AFTER COMPLETION

No. in R.B. \_\_\_\_\_ Name **M.V. "KOTEI MARU"** Gross tons **9096.13**  
 Built at **Nagasaki, Japan** By whom **Mitsubishi Zosen K.K.** Yard No. **1499**  
 Owners **Daido Kaiun K.K.** Port of Registry **Kobe**  
 Refrigerating Machinery made by **Sabroe Co. of Japan Ltd.** Machine Nos. **330077, 330078 & 330079** When made **1958**  
 Insulation fitted by **Mitsubishi Zosen K.K., Nagasaki** Total No. of Chambers **4**  
 Total refrigerated cargo capacity measured in accordance with Society's requirements **11,091** 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 be 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.)



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, overheading, 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			(3) Depth of Insulation fitted	(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation			(3) Depth of Insulation fitted
	Pitch ins.	Width of face ins.	Depth ins.			Pitch ins.	Width of face ins.	Depth ins.	
No. 3 LTD PORT FWD. ("B")									
Ship side	800	800	45	152	10	Fms. 104,5 to 120.			
Inner bulkhead	-	9	90	10	10	Fms. 104,5 to 108.			
"	800	99	90	10	10	Fms. 108 to 120.			
Fwd. bulkhead	750	90	150	10	10	at Fm. 120.			
Aft. bulkhead	-	-	-	-	-	at Fm. 108.			
Deck over	800	45	127	9					
Deck under	-	-	-	-	8				
No. 3 LTD PORT AFT. ("D")									
Ship side	800	45	152	10	10	Fms. 94 to 104,5			
Inner bulkhead	-	-	-	-	-	Fms. 94 to 95			
"	800	9	90	10	10	Fms. 95 to 101			
"	-	9	90	10	10	Fms. 101 to 104,5			
Fwd. bulkhead	650	9	90	10	10	at Fm. 101			
Aft. bulkhead	680	90	150	11	11	at Fm. 94			
"	-	-	-	-	-	- " - in way of donkey boiler room insulated outside.			
"	625	9	90	10	10	at Fm. 95.			
Deck over	800	45	127	9					
Deck under	-	-	-	-	8				
No. 3 LTD STBD. FWD. ("A")									
Ship side	800	45	152	10	10	Fms. 104,5 to 120			
Inner bulkhead	-	9	90	10	10	Fms. 104,5 to 108			
"	800	9	90	10	10	Fms. 108 to 120			
Fwd. bulkhead	750	90	150	10	10	at Fm. 120			
Aft. bulkhead	-	-	-	-	-	at Fm. 108			
Deck over	800	45	127	9					
Deck under	-	-	-	-	8				
No. 3 LTD STBD. AFT. ("C")									
Ship side	800	45	152	10	10	Fms. 90 to 104,5			
Inner bulkhead	800	9	90	10	10	Fms. 94 to 101			
"	-	9	90	10	10	Fms. 101 to 104,5			
Fwd. bulkhead	650	9	90	10	10	at Fm. 101			
Aft. bulkhead	680	90	150	11	11	at Fm. 94			
Deck over	800	45	127	9		- " - in way of donkey boiler room insulated outside.			
Deck under	-	-	-	-	8				

\* Particulars given Depth in insulation.

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) **Glass fibre.**

Air space, if any, within insulation lining, position and depth. **Shell side & 55 mm. Deck over & 100 mm.**

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 **Timber & 40 mm. In eng. room in way of D.B. gal. steel sheets fitted on rusulation for ch**

Methods of securing lining(s) (if timber grounds state whether across face, on face or on sides of frames etc.) **Timber groomlds on sides of frames.**

Floor insulation covering **NEO TEX-X on 30 mm timber**

Support for floor covering **Coated**

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 -

Meat rail and/or grid hangers, state in which chambers -

State location and dimensions of all web frames, deep girders or beams within the insulation **Deep girders in port & Starboard Aft chambers & 500x100x12 mm.**

State how hold pillars and masts are insulated -

Are air ducts and insulation linings so constructed and erected as to prevent air entering insulation? **Yes.**

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

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

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

Are ~~hatch covers~~ chamber, air cooler and other access doors and frames, ~~hatch covers~~ 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? **Yes.** Dimensions and spacing on sides, vertical surfaces ~~and~~ **50x50 & 300 mm**

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

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

Are insulation linings ~~and~~ 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, ~~and~~, 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.

*S. Kaga*  
Builders of Insulation Contractors  
NAGASAKI WORKS  
MITSUBISHI SHIPBUILDING & ENGINEERING CO., L.

No. of refrigerating units **3** Can each unit operate on all chambers? **Yes.** if not, state how connected

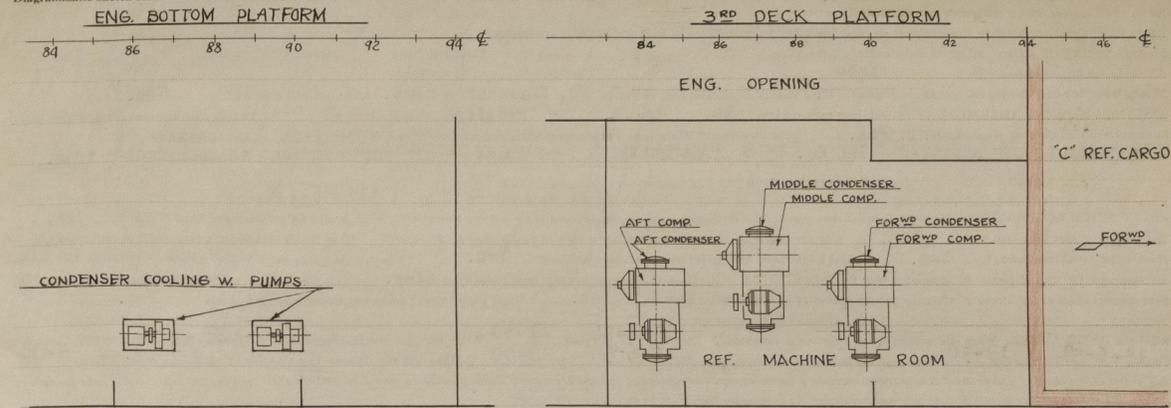
Primary refrigerant **Dichlorodifluoromethane**

Where specified in the Rules, is the machinery isolated in an efficiently ventilated compartment? **Yes.**

Medium for cooling chambers **Air**

For particulars of refrigerating machinery see **Kobe** Report No. **10**

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



Is provision made for subcooling the liquid refrigerant (if so, state method) **Yes.** Interstage coolers fitted.

MOTIVE POWER supplied from (state No. of boilers or electric generators) **3 electric generators** Condenser cooling medium (if not sea water)

CONDENSER COOLING PUMPS No. **2** Capacity of each **533** lit./min. at head of **1.6** m. B.H.P. of driving motors **5**

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

A stand by connection made to engine cooling sea water system.

BRINE PUMPS No. **-** Capacity of each **-** lit./min. at head of **-** m. B.H.P. of driving motors **-**

No. of brine temperatures which can be circulated simultaneously **-** Brine system "open" or "closed" type **-** Are safety valves fitted where required by the Rules? **-**

Are thermometers fitted to brine delivery and each return pipe? **-** If brine pipes and tanks are galvanized on brine side, is ventilation provided as per Rules? **-**

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

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

Where brine pipes are connected by screwed couplings, are the coupling and back nut threads a good fit? **-** What is the pipe thickness at the bottom of the thread? **-**

Are the screw threads clear of the coupling coated as required by the Rules? **-** Are air cooler coils parallel to or across the air stream? **Parallel.**

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 ~~by hot refrigerant gas~~ in chambers? **Hot refrigerant gas coculation and hot salt water spray.**

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	Number	Maximum RPM	Minimum RPM	Cubic ft. of air per minute at maximum RPM	Static water gauge ins.	BHP of fan motor	Motor inside or outside insulated envelope
No. 3 LTD PORT FWD.	-	-	-	-	-	596	2	1	1800	1200	95	45	4	Inside
No. 3 LTD PORT AFT.	-	-	-	-	-	596	2	1	1800	1200	95	45	4	Inside
No. 3 LTD STBD FWD.	-	-	-	-	-	596	2	1	1800	1200	95	45	4	Inside
No. 3 LTD STBD AFT.	-	-	-	-	-	596	2	1	1800	1200	95	45	4	Inside

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 ~~be~~ 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 & 1.83, 25.27 & 1.65, 22.3 & 1.65, 18.93 & 1.65, 16.55 & 1.25, 13.38 & 1.25, 10.2 & 1.25, 6.73 & 1.4, 3.55 & 1.4 mm.**

Material **Copper** How manufactured **Solid drawn** Pressure tests **24.5** kg./cm<sup>2</sup> hydraulic **14** kg./cm<sup>2</sup> air **14** lbs./in<sup>2</sup>

Pressure tests after erection **7** kg./cm<sup>2</sup> gas or air. Brine system pressure test on completion



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 **Yes.** No. **Yes.**  
 Where the machinery is driven by steam engines, is the exhaust steam connected to the main and auxiliary condensers? **Yes.**  
 Motors over 100 BHP driving refrigerant compressors. Port **Yes.** Certificate Nos. **Yes.**  
 Air cooler fan driving motors. Port **Kobe** Certificate Nos. **M-44415**  
 Motors under 100 BHP driving refrigerant compressors. Have makers' certificates been obtained? **No, Surveyor's cert.** Are certificates attached? **Yes.**  
 DISTANCE READING THERMOMETERS: Are they approved type? **No.** Makers **- received** type **-** Where tube thermometers are fitted, are the tubes in accordance with the Rule requirements? **Yes.** No. and position of thermometers in the cargo space and air ducts of each chamber. **2 in each chamber & Position as per approved plan No. P508 1 at outlet & 1 at inlet of air ducts in each in each cooler room.**

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 **15-6-58** Time **11-30** When was the desired temperature of **-18° C.** attained in the chambers? Date **15-6-58** Time **18-30** When was the balance test commenced? Date **16-6-58** Time **24-00** When was the Balance Test completed? Date **17-6-58** Time **6-00**  
 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. **47,831** ~~XXXXX~~ BTU/hr  
 Through refrigerant leads **6,140** ~~XXXXX~~ BTU/hr  
 Total **53,971** ~~XXXXX~~ BTU/hr

Ratio  $\frac{\text{measured heat leakage}}{\text{theoretical heat leakage}} = \frac{108,200 - (6,140 + 32,700)}{47,831} = 1.45$

Maximum ratio permissible for temperature qualification desired by Owners (state head office figure). **1.5**

MEASURED HEAT LEAKAGE

Compressor Operating Conditions:

State which compressor(s) used **Fwd. Compressor**  
 Average evaporator gauge **-19** ~~XX~~ °F  
 Average condensing temperature **82.5°** ~~X~~ °F  
 Compressor R.P.M. **527**  
 Machine output from curves **108,200** ~~XXXXX~~ BTU/hr  
 Fan, brine pump etc., heat load.  
 Average total fan heat load **32,700** ~~XXXXX~~ 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 **32,700** ~~XXXXX~~ BTU/hr  
 Total measured heat leakage load **75,500** ~~XXXXX~~ 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? **Yes.** if so, state name of vessel or Yard and Yard No. **"KOHOH MARU" & "KOBU MARU"**  
 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.)

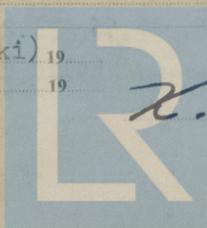
The Refrigerated Cargo Installation of this ship has been constructed under special survey in accordance with the Rules, approved plans and Secretary's letters. The materials and workmanship are good.  
 It is submitted that the Refrigerated Cargo Installation of this ship is worthy to be assigned the class notation of **+**Lloyd's RMC to maintain temp. 0°F with sea temp 90°F max. in the Appendix to the Register Book. For the report on survey of the Refrigerating Machinery during construction, see Kobe Surveyors Rpt. No. FE-5824 attached herewith.

PARTICULARS FOR REGISTER BOOK

MACHINERY			CARGO CHAMBERS				
No. of units	3	Prime movers	Electric Motor	Total capacity in cubic feet	11091	Total No.	4
Total BHP of all Compressor prime movers	90	Refrigerant	Drchlorodifluoromethane	No. Independent	4	No. independently refrigerated	4
Makers	Sabroe Co. of Japan	Date of Construction	1958	Method of Cooling	Direct expansion and air	Insulating material(s)	Glass fibre
Machinery particulars	3-3 cyl. SA Com. Compressors 150 & 150x125 mm x 500 pm			Insulation lining	Timber		
	3-S & T Condensers						

Survey Fee **£50,200** Fee applied for **4/8/58 (Shimonoseki)**  
 Travelling Expenses **FRIDAY 12<sup>th</sup> SEP 1958** Received by me **Rmt**  
 Date of Committee **+ Lloyd's RMC 7.58**  
 Class assigned **to maintain temp. 0°F with sea temp. 90°F maximum**

CERTIFICATE WRITTEN.



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