

TRD 1443

Rpt. 17 (b)

7 AUG 1958

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

No. in R.B. 13567 Name S.S. "HILARY"  
Built at Birkenhead By whom Cammell Laird & Co. Ltd.  
Booth S.S. Co. Ltd. Gross tons 7415  
Refrigerating Machinery made by J. & E. Hall Ltd. Machine Nos. No additional machinery fitted When made 4.56  
Insulation fitted by Cork Insulation and Asbestos Co. Ltd. Total No. of Chambers 1 (Additional)  
Refrigerated cargo capacity measured in accordance with Society's requirements 510 cu. ft.

Position 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.)

Low temperature chamber in lower tween deck in way of  
Domestic chambers.



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**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. ships 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	(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.			Pitch ins.	Width of face ins.	Depth ins.	
Low Temp. chamber in lower tween														
store room spaces. Frames Nos. 49-54.														
Deck Over		B.A.	8	12										
Starboard Head	-	A.L.	10	12										
Aft Head	-	A.L.	7	9										
Port Head		A.L.	10	12										
Starboard Head		A.L.	7	9										
Deck	-	-	-	7 1/2"										
				1 1/2" Asphalt.										

refrigerating units Can each unit operate on all chambers? If not, state how connected

Where specified in the Rules, is the machinery isolated in an efficiently ventilated compartment? Report No.

For particulars of refrigerating machinery see

Automatic 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.

Provision made for subcooling the liquid refrigerant (if so, state method)

CONDENSER COOLING PUMPS No Capacity of each

Condenser cooling medium (if not sea water)

lit./min. galls/hour at head of

kg./cm<sup>2</sup> lbs./in<sup>2</sup> B.H.P. of driving motors

Are safety valves fitted where required by the Rules?

Brine system "open" or "closed" type

lit./min. galls/hour at head of

kg./cm<sup>2</sup> lbs./in<sup>2</sup> B.H.P. of driving motors

Are safety valves fitted where required by the Rules?

Brine pumps No. Capacity of each

Brine temperatures which can be circulated simultaneously

thermometers fitted to brine delivery and each return pipe?

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.)

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

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

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

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

if so, are the arrangements in accordance with the Rules?

provision made for air refreshing?

but provision is made for defrosting air cooler coils and/or cooling grids in chambers?

that provision is made for defrosting air cooler coils and/or cooling grids in chambers.

**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						Motor inside or outside insulated envelope
		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		
Temp. Chamber	510	-	-	-	-	550	2	1	2,500	-	600	$\frac{1}{2}$ "	$\frac{1}{4}$	External	

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) Slab and granulated cork

Air space, if any, within insulation lining, position and depth

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 3/4" Flywood

Methods of securing lining(s) (if timber grounds state whether across face, on face or on sides of frames etc.) On welded lugs

Floor insulation covering 1 1/2" Asphalt Support for floor covering None

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

Air ducts buried in insulation, state where

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 3" x 3" Bulb angle deck beams 31 1/2" Pitch

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 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?

Are cargo battens provided in accordance with the Rules? Yes Dimensions and spacing on sides, vertical surfaces and tunnel top On sides 2" x 2" x 12"

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? 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.

**CORK INSULATION & ASBESTOS Co. Ltd.**

130, COMMERCIAL ROAD,

LIVERPOOL 5.

Tel. NORTH 0555/6

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

Are air cooler fans reversible? 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 Suction 1 1/4" x 7 w.g. steel, 1 1/2" x 15 w.g. copper

Liquid and expansion 3/4" x 13 w.g. copper, Defrosting 3/4" x 17 w.g. copper.

Material Steel & copper How manufactured Solid drawn

Pressure tests 350

kg./cm<sup>2</sup> lbs./in<sup>2</sup> gas or air. Brine system pressure test on completion

kg./cm<sup>2</sup> lbs./in<sup>2</sup> hydraulic Direct expansion.

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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 Yes Certificate Nos. Yes  
Motors under 100 BHP driving refrigerant compressors. Have makers' certificates been obtained? Yes Are certificates attached? Yes  
DISTANCE READING THERMOMETERS: Are they approved type? Yes Makers Elliot Bros. Ltd. type Electrical 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. 1 - Centre of chamber  
1 Suction in air duct and 1 Delivery in air duct.

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                      Time                      When was the desired temperature of                      °C.                      °F. attained in the chambers?  
Date                      Time                      When was the balance test commenced? Date                      Time                      When was the Balance Test completed? Date                      Time                       
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.	kg. cal./hr BTU/hr
Through refrigerant leads	kg. cal./hr BTU/hr
Total	kg. cal./hr BTU/hr

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

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

#### MEASURED HEAT LEAKAGE

##### Compressor Operating Conditions:

State which compressor(s) used

Average evaporator gauge	°C	°F
Average condensing temperature	°C	°F

Compressor R.P.M.

Machine output from curves	kg. cal./hr BTU/hr	kg. cal./hr BTU/hr
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Fan, brine pump etc., heat load.

Average total fan heat load	kg. cal./hr BTU/hr
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Average total brine pump heat load	kg. cal./hr BTU/hr
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Any other heat load such as heaters in chamber	kg. cal./hr BTU/hr
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Total of above loads	kg. cal./hr BTU/hr
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Total measured heat leakage load	kg. cal./hr BTU/hr
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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? Yes  
Is the refrigerated cargo installation a duplicate of a previous case                      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 Complete

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 additional Refrigerated Cargo Installations of this vessel have been constructed under Special Survey in conformity with the Society's Rules, Regulations and Secretary's letters. The scantlings are in accordance with those shown on the approved plans. The materials and workmanship are sound and good. Satisfactory cooling down tests have been carried out, the chamber being cooled down to minus 12°F. The Refrigerated Cargo Installation of this vessel (Nos. 4 & 5 Tween Decks and low temp. chamber) are eligible in my opinion to remain as classed, with fresh record of \* LLOYD'S R.M.C.(RS) 6,58, and amended temp. notation "to maintain temp. 40°F in Nos. 4 & 5 tween deck spaces, or minus 5°F in the low temp. chamber when remainder not refrigerated, with sea temp. 85°F.Max."

#### PARTICULARS FOR REGISTER BOOK

##### MACHINERY

No. of units                      Prime movers                       
Total BHP of all Compressor prime movers                       
Refrigerant                       
Makers                      Date of Construction                       
Machinery particulars                     

##### Additional CARGO CHAMBERS

Total capacity in cubic feet 510 Total No. 1  
No. Independent 1 No. independently refrigerated 1  
Method of Cooling Direct expansion.  
Insulating material(s)                       
Insulation lining                     

Survey Fee                       
Travelling Expenses                       
Date of Committee                       
Class assigned                     

LIVERPOOL

+ Lloyd's R.M.C.(RS) 6:58

Fee applied for,  
Received by me,

Cost

with amended temperature notation.  
White Liv  
CERTIFICATE WRITTEN 2/9/58



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W.A. Lloyd

Surveyor to Lloyd's Register

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