

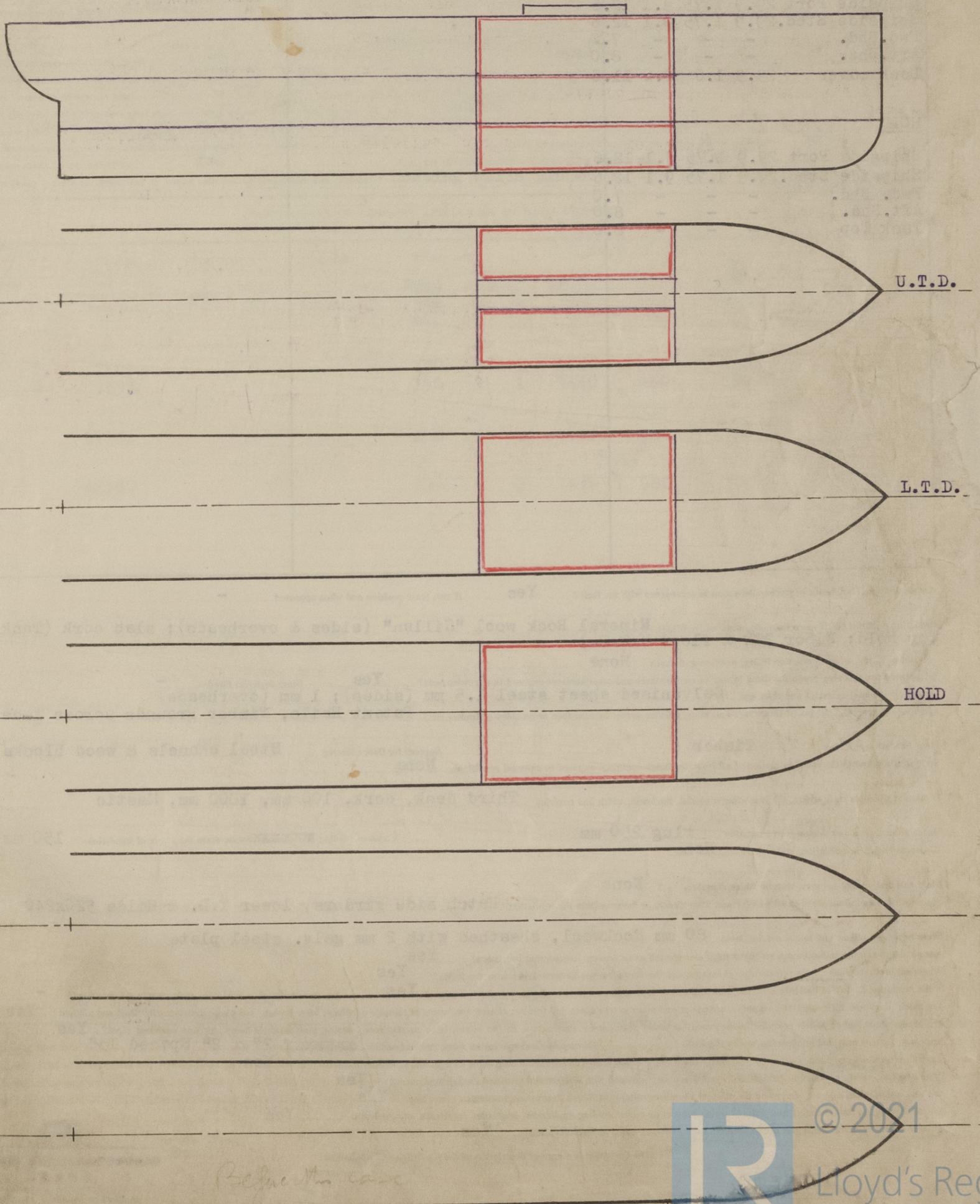
Rpt. 17 (b)

Date of writing Report 15.10.1960 Received London 16 Port of SPLIT No. 2254
Survey held at Brodogradilište "SPLIT" No. of visits 16 First date 15.7.1960 Last date 30.9.1960

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

No. in R.B. 91505 Name m.s. PADEREWSKI Gross tons 7277,02
Built at SPLIT By whom Brodogradilište "SPLIT" Yard No. 161
Owners POLSKIE LINIE OCEANICZNE Port of Registry GDYNIA
Refrigerating Machinery made by Thomas Ths. Sabroe & Co Machine Nos. 39317;39318;39319;39320 When made 1960
Insulation fitted by Grunzweig & Hartmann A.G. Total No. of Chambers 4
Total refrigerated cargo capacity measured in accordance with Society's requirements 95.460 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.)



Below the case

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.	
U.T.D. Port														
Shipside	29.9	1.7	7.9	11.0										
Fwd. Bhd.	-	-	-	7.9										
Aft. Bhd.	-	-	-	7.9										
Hatch Tr. Bhd.	29.9	.25	3.5	7.9										
Deck cover	27.5	1.5	7.0	11.0										
U.T.D. Starboard														
Shipside	29.9	1.7	7.9	11.0										
Fwd. Bhd.	-	-	-	7.9										
Aft. Bhd.	-	-	-	7.9										
Hatch Tr. Bhd.	29.9	.25	3.5	7.9										
Deck cover	27.5	1.5	7.0	11.0										
L.T.D.														
Shipside Port	29.9	1.75	9.1	12.6										
Shipside Stbd.	29.9	1.75	9.1	12.6										
Fwd. Bhd.	-	-	-	7.0										
Aft. Bhd.	-	-	-	8.0										
Deck cover	29.9	1.6	8.0	11.0										
HOLD														
Shipside Port	29.9	1.75	9.1	12.6										
Shipside Stbd.	29.9	1.75	9.1	12.6										
Fwd. Bhd.	-	-	-	7.0										
Aft. Bhd.	-	-	-	8.0										
Tank Top	-	-	-	8.0										

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

Insulating material (e) (if more than one, state where fitted) **Mineral Rock wool "Sillan" (sides & overheads); slab cork (Tank Top Hold; Floor LTD & floor U.T.D.)**

Air space, if any, within insulation lining, position and depth **None**

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

Insulation lining(s) material and thickness **Galvanized sheet steel 1.5 mm (sides); 1 mm (overheads)**

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

Floor insulation covering **Timber** Support for floor covering **Steel chamels & wood blocks**

State location and thickness of insulation of all insulated hatch coamings exposed to external conditions. **None**

Insulation ribbands state where, the insulating material, thickness, width and covering **Third deck, cork, 100 mm, 1000 mm, Mastic**

Hatch covers, type and thickness of insulation **Plug 250 mm** Exposed loading ~~xxxxxx~~ doors, state thickness of insulation **150 mm**

Air ducts buried in insulation, state where **None**

Meat rail and/or grid hangers, state in which chambers **None**

State location and dimensions of all web frames, deep girders or beams within the insulation **Hatch side girders, lower T.D. & Holds 520x240**

State how hold pillars and masts are insulated **80 mm Rockwool, sheathed with 2 mm galv. steel plate**

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? **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? **-**

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? **Yes** Dimensions and spacing on sides, vertical surfaces ~~xxxxxx~~ **2" x 2" Spaced 13"**

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.

Yes per Spt. R. 14/1/61

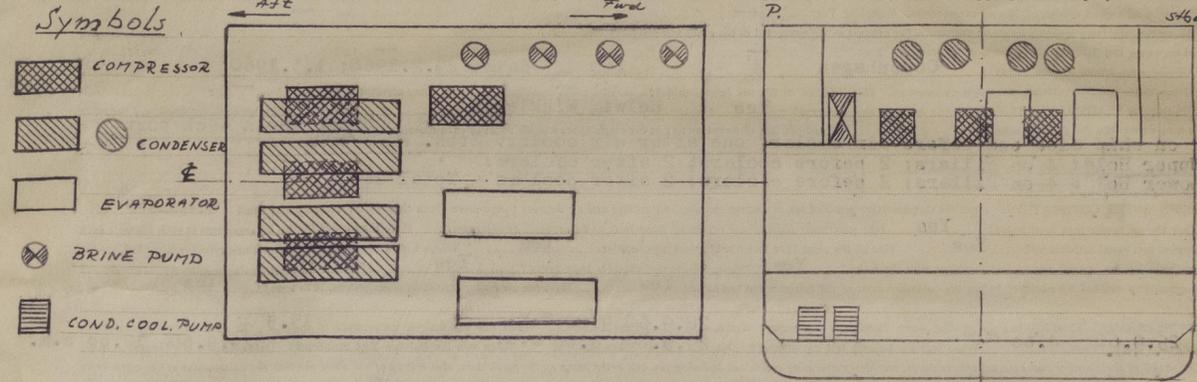
**WOODRAPHILISTE - SPLIT
SPACE**
Builders or Insulation Contractors

No. of refrigerating units **4** Can each unit operate on all chambers? **Yes** if not, state how connected -

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

Medium for cooling chambers **Brine** For particulars of refrigerating machinery see **17 a** Report No.

Diagrammatic sketch sufficient to show relative position (port or starboard, for 'ard or 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) **No**

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

CONDENSER COOLING PUMPS No **2** Capacity of each **2000** lit./min. ~~xxxxxx~~ head of **20 mts. WG** ~~xxxxxx~~ B.H.P. of driving motors **14**

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

BRINE PUMPS No. **4** Capacity of each **600** lit./min. ~~xxxxxx~~ **20 mts. W.G.** ~~xxxxxx~~ B.H.P. of driving motors **10**

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

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

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 ~~xxxxxx~~ chambers? **Heating coils placed in the trays and circulated hot Brine.**

PARTICULARS OF COOLING APPLIANCES IN EACH CHAMBER

Identify each chamber by position (e.g. No. 2 LTD. Port, No. 3 Orlap 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	Area xxxxxx m ²	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
U.T.D. P.	7593					190	2	1	1440	960	250		4/1.25	inside
U.T.D. S.	7593					190	2	1	1440	960	250		4/1.25	"-
L.T.D.	37894					410	2	2	1470	980	700		11/3.5	"-
HOLD	42380					410	2	2	1470	980	700		11/3.5	"-

Are air cooler fans reversible? **-** 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 **-**

Material **-** How manufactured **-** Pressure tests **-** kg./cm², lbs./in², hydraulic **-** kg./cm², lbs./in², air **4**

Pressure tests after erection **21** Brine system pressure test on completion **4**

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? **---**
 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? **---**
 Motors over 100 BHP driving refrigerant compressors. Port **---** Certificate Nos. **---**
 Air cooler fan driving motors. Port **Copenhagen** Certificate Nos. **dated 29.2.1960; 1.3.1960**
 Motors under 100 BHP driving refrigerant compressors. Have makers' certificates been obtained? **---** Are certificates attached? **---**
 DISTANCE READING THERMOMETERS: Are they approved type? **Yes** Makers **Helwig Mikkleson** type **---** Where tube thermometers are fitted, are the tubes in accordance with the Rule requirements? **No.** and position of thermometers in the cargo space and air ducts of each chamber, **Upper Tween deck port: 2 on ship side one before air cooler, one after air cooler. Stbd. side same**
Upper Hold: 4 on Pillars; 2 before coolers; 2 after coolers:
Lower Hold: 4 on Pillars; 2 before coolers; 2 after coolers - Total 24
 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 **28.9.60** Time **9.00 a.m.** When was the desired temperature of **13.5 °C** attained in the chambers? Date **29.9.60** Time **4.00 a.m.** When was the balance test commenced? Date **29.9.60** Time **6.00 a.m.** When was the Balance Test completed? Date **29.9.60** Time **12.00 a.m.**
 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.	20147	kg. cal./hr
Through refrigerant leads	21457	BTU/hr
	806	kg. cal./hr
	20953	kg. cal./hr
Total	21457	BTU/hr

Ratio $\frac{\text{measured heat leakage}}{\text{theoretical heat leakage}} = \frac{35080}{21457} = 1.64$ $\frac{41,480}{20,950} = 1.9$

MEASURED HEAT LEAKAGE

Compressor Operating Conditions:

State which compressor(s) used **Aft outboard (No.2)**

Average evaporator gauge **- 16,5** °C

Average condensing temperature **+ 24 °C** **± 20.5** °C

Compressor R.P.M. **970**

Machine output from curves $101.000 \times 970 / 1000 \times 0.75 = 73.600$ kg. cal./hr

Fan, brine pump etc., heat load. **1,73x380x63.3x0.8x860/1000 = 28.700** kg. cal./hr

Average total fan heat load **28.700** kg. cal./hr

Average total brine pump heat load **1,73x380x24,7x0.8x0.88x860/1000 = 9820** kg. cal./hr

Any other heat load such as heaters in chamber **-** BTU/hr

Total of above loads **28700 ± 9820 = 38.520** kg. cal./hr

Total measured heat leakage load **73.600 - 38520 = 35080** kg. cal./hr

Maximum ratio permissible for temperature qualification desired by Owners (state head office figure). **2.0**

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 **Yes** if so, state name of vessel or Yard and Yard No. **m.s. "MONIUSZKO" (Yd.No. 159)**
 If the survey is not complete state, what arrangements have been made for its completion and what remains to be done

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 constructed and fitted under Special Survey in accordance with the Society's plans and Secretary's letters. The materials and workmanship are good and subsequent tests under working conditions have been proved satisfactory.

This installation is in our opinion eligible to be classed with the notation **± LLOYD'S RMC 10,60** to maintain temp. 100°F in No. 3 Upper Tween Deck chambers port and starboard No.3 Lower Tween Deck and No.3 Hold with sea temperature 86°F maximum.

PARTICULARS FOR REGISTER BOOK

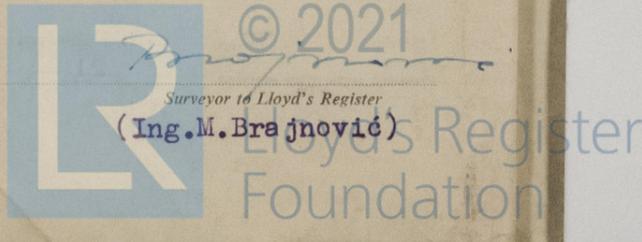
MACHINERY

No. of units **4** Prime movers **Electric motors**
 Total BHP of all Compressor prime movers **220**
 Refrigerant **Ammonia**
 Makers **Thomas Ths. Sabroe & Co** Date of Construction **1960**
 Machinery particulars **Four SMC 6-100 Single acting NH3 Compressors**
Four brine pumps type VMT 80
Four horizontal shell and tube Nh3 condensers
Two shell and tube evaporators (each in two sections)

CARGO CHAMBERS

Total capacity in cubic feet **4** Total No. **4**
 No. Independent **4** No. independently refrigerated **4**
 Method of Cooling **Brine & air**
 Insulating material(s) **Cork and mineral Rockwool**
 Insulation lining **Galvanised sheet steel**

Survey Fee **£ 104- 8- 0** Fee applied for, **19**
 Travelling Expenses **and Din. 129.600.** Received by me, **19**
 Date of Committee **FRIDAY 3 FEB 1961**
 Class assigned **+ Lloyd's Rmc. 10.60**
1/2 maintain temp. 10°C with sea temp. 86°F maximum.
CERTIFICATE WRITTEN



LLOYD'S REGISTER

This Certificate "While executed, it whatever to entry in the its Commitment"

(Rpt. 10) 300m

Special (1)

22.3.61