

Rpt. 4b

Date of writing report Received London Port Copenhagen No. 20168
 Survey held at Copenhagen & Nakskov In shops 52 23.6.61 14.9.62
 No. of visits 42 On vessel First date 4.10.62 Last date 5.4.63

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. 92679 Name m.s. "KOSMONAVT" Gross tons 10658

Owners U.S.S.R. Managers - Port of Registry Odessa
 Hull built at Copenhagen By A/S Burmeister & Wain Yard No. 791 When 1963-4
 Main Engines made at Copenhagen By A/S Burmeister & Wain Eng. No. 7171 When 1962-7
 Gearing made at No gearing By Aalborg Værft A/S 2014 1962-1
Aalborg By Helsingør Skibsværft & 1269 1962-3
Helsingør Maskinbyggeri A/S
 Machinery installed at Copenhagen By A/S Burmeister & Wain When 1963-4

Particulars of restricted service of ship, if limited for classification None
 Particulars of vegetable or similar cargo oil notation, if required None
 Is ship to be classed for navigation in ice? Yes Class 3 Is ship intended to carry petroleum in bulk? No
 Is refrigerating machinery fitted? Yes If so, is it for cargo purposes? No Type of refrigerant C Cl₂ F₂
 Is the refrigerating machinery compartment isolated from the propelling machinery space? No Is the refrigerated cargo installation intended to be classed? No

The following particulars should be given as fully and as clearly as possible. Where the answer is "No" or "None", say so! Ticks and other signs of doubtful meaning are not to be used. Where the wording is not applicable to the installation, a black line may be inserted. If the main engines have been constructed at another port and are covered by a separate report, the particulars given in that report need not be repeated below, but the port and report number should be stated.

No. of main engines 1 No. of propellers 1 Brief description of propulsion system Reversible heavy oil eng. Direct to propeller.

MAIN RECIPROCATING ENGINES. Licence Name and Type No. B&W-DM.684VT2BF-180, Turbocharged, crosshead type, solid injection.

No. of cylinders per engine 6 Dia. of cylinders 840 mm stroke 1800 mm 2 or 4 stroke cycle 2 Single or double acting single
 Maximum approved BHP per engine 12600 at 110 RPM of engine and 110 RPM of propeller.

Corresponding MIP 9,5 kg/cm² (For DA engines give MIP top & bottom) Maximum cylinder pressure 65 kg/cm² Machinery numeral 2520
 Are the cylinders arranged in Vee or other special formation? No If so, number of crankshafts per engine -

TWO STROKE ENGINES. Is the engine of opposed piston type? No If so, how are upper pistons connected to crankshaft? -

Is the exhaust discharged through ports in the cylinders or through valve(s) in the cylinder covers? valve in cyl. cover No. and type of mechanically driven scavenge pumps or blowers per engine and how driven None
 No. of exhaust gas driven scavenge blowers per engine 2 Where exhaust gas driven blowers only are fitted, can the engine operate with one blower out of action? Yes

If a stand-by or emergency pump or blower is fitted, state how driven electrically driven No. of scavenge air coolers 2 Scavenge air pressure at full power 0,72 kg/cm² Are scavenge manifold explosion relief valves fitted? Yes

FOUR STROKE ENGINES. Is the engine supercharged? - Are the undersides of the pistons arranged as supercharge pumps? - No. of exhaust gas driven blowers per engine -

No. of supercharge air coolers per engine - Supercharge air pressure - Can engine operate without supercharger? -
TWO & FOUR STROKE ENGINES—GENERAL. No. of valves per cylinder: Fuel 3 Inlet ports in cylinder Exhaust 1 Starting 1 Safety 1

Material of cylinder covers cast steel Material of piston crowns cast steel Is the engine equipped to operate on heavy fuel oil? Yes
 Cooling medium for: Cylinders fresh water Pistons lub. oil Fuel valves fuel oil Overall diameter of piston rod for double acting engines -

Is the rod fitted with a sleeve? - Is welded construction employed for: Bedplate? Yes Frames? Yes Entablature? Yes Is the crankcase separated from the underside of pistons? Yes Is the engine of crosshead or trunk piston type? crosshead type Total internal volume of crankcase 193 m³ No. and total area of explosion relief devices 14-9884 cm² Are flame guards or traps fitted to relief devices? No Is the crankcase readily accessible? Yes If not, must the engine be removed for overhaul of bearings, etc? - Is the engine secured directly to the tank top Yes How is the engine started? By compressed air.

Can the engine be directly reversed? Yes If not, how is reversing obtained? -
 Has the engine been tested working in the shop? Yes How long at full power? 7 Hours

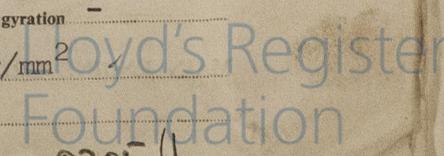
CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 11.8.61 State barred speed range(s), if imposed Not to be operated continuously between 35-45 RPM For spare propeller 35-45 RPM Is a governor fitted? Yes Is a torsional vibration damper or detuner fitted to the shafting? No

Where positioned? - Type - No. of main bearings 8 Are main bearings of ball or roller type? No Distance between inner edges of bearings in way of crank 1122 mm Distance between centre lines of side cranks or eccentrics of opposed piston engines -

Crankshaft type: Built, semi-built, solid. (State which) All built
 Diameter of journals 680 mm Diameter of crankpins 260mm centre hole Breadth of webs at mid-throw 1440 mm Axial thickness of webs 350 mm
 If shrunk, radial thickness around eyeholes 375 mm Are dowel pins fitted? No Crankshaft material Journals SM steel Minimum 44 kg/mm²
 Webs SM steel Tensile strength 44 kg/mm²

WD² Diameter of flywheel 12300 kgm² Weight - Are balance weights fitted? Yes Total WD² 39600 kgm² Radius of gyration -
 Diameter of flywheel shaft 680 mm Material SM steel Minimum approved tensile strength 44 kg/mm²
 Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which) Integral with crankshaft

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MAIN GAS TURBINES Name and Type No. _____

No. of sets of turbines _____ Open or closed cycle _____ BHP per set _____ at _____ RPM of output shaft _____

How is drive transmitted to propeller shaft? _____

ARRANGEMENT OF TURBINES. HP drives _____ at _____ RPM HP gas inlet temperature _____ pressure _____
 (A small diagram should be attached showing gas cycle.)
 IP drives _____ at _____ RPM IP gas inlet temperature _____ pressure _____
 LP drives _____ at _____ RPM LP gas inlet temperature _____ pressure _____

No. of air compressors per set _____ Centrifugal or axial flow type? _____ Material of turbine blades _____ Material of compressor blades _____
 No. of air coolers per set _____ No. of heat exchangers per set _____ How are turbines started? _____
 How is reversing effected? _____ Are the turbines operated in conjunction with free piston gas generators? _____
 Total No. of free piston gas generators _____ Diameter of working pistons _____ Diameter of compressor pistons _____ No. of double strokes per minute at full power _____ Gas delivery pressure _____ Gas delivery temperature _____ Have the turbines and attached equipment been tested working in the shop? _____ How long at full power? _____

ELECTRIC PROPULSION (Reciprocating engines or gas turbines. Electrical particulars to be reported on Form 4d.)

No. of generators _____ KW per generator _____ at _____ RPM AC or DC? _____ Position _____
 No. of propulsion motors _____ SHP per motor _____ at _____ RPM Position _____
 How is power obtained for excitation of generators? _____ Motors? _____

REDUCTION GEARING (Reciprocating engines or gas turbines. A small line sketch should be attached showing arrangement of gearing.)

Is gearing of single or double helical type? _____ If single, position of gear thrust bearing _____ Is gearing of epicyclic type? _____
 PCD of pinions: First reduction _____ Second reduction _____ PCD of wheels: First reduction _____ Main _____
 Material of pinions _____ Tensile strength _____ Material of wheel rims _____ Tensile strength _____
 Are gear teeth surface hardened? _____ How are teeth finished? _____ Diameter of pinion journals _____ Wheel shaft journals _____
 Are the wheels of welded construction? _____ Is gearcase of welded construction? _____ Has the wheel/gearcase been heat treated on completion of welding? _____ Where is the propeller thrust bearing located? _____ Are gear bearings of ball or roller type? _____

CLUTCHES, FLEXIBLE COUPLINGS, ETC. If a clutch or other flexible connection is fitted between engine/turbine and gearing or between engine and line shafting give brief description and, for clutches, state how operated _____

Can the main engine be used for purposes other than propulsion when declutched? _____ If so, what? _____

STRAIGHT SHAFTING. Diameter of thrustshaft _____ 550 mm ✓ Material SM steel ✓ Minimum approved tensile strength _____ 44 kg/mm² ✓
 reduced to 500 mm at coupling ✓
 Shaft separate or integral with crank or wheel shaft? _____ separate Diameter of intermediate shaft _____ 476 mm ✓ Material SM steel ✓
 Minimum approved tensile strength _____ 44 kg/mm² ✓ Diameter of screwshaft cone at large end _____ 570 mm ✓ Is screwshaft fitted with a continuous liner? _____ Yes ✓
 Diameter of tube shaft. (If these are separate shafts) _____ Is tube shaft fitted with a continuous liner in way of stern tube _____ Thickness of screwshaft liner at bearings _____ 26 mm ✓ Thickness between bearings _____ 26 mm ✓ Material of screwshaft _____ SM steel ✓ Minimum approved tensile strength _____ 44 kg/mm² ✓
 Is an approved oil gland fitted? _____ No ✓ If so, state type _____ Length of bearing next to and supporting propeller _____ 2400 mm ✓
 Material of bearing _____ Lignum Vitae ✓ In multiple screw vessels is the liner between stern tube and A bracket continuous? _____ If not, is the exposed length of shafting between liners readily visible in dry dock? _____

PROPELLER. Diameter of propeller _____ 5900 mm ✓ Pitch _____ 5977/4697 mm ✓ Built up or solid _____ solid ✓ Total developed surface _____ 14.24 m² ✓
 No. of blades _____ 4 ✓ Blade thickness at top of root fillet _____ 243 mm ✓ Blade material _____ Nikalium ✓ Moment of inertia of dry propeller _____ 96700 kgm² ✓
 If propeller is of special design, state type _____ Is propeller of reversible pitch type? _____ No ✓ If so, is it of approved design? _____
 State method of control _____ Material of spare propeller _____ Bronze ✓ Moment of inertia _____ 109/00 kgm² ✓

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine _____ None Can they be declutched? _____
 No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) _____ 2 electrically driven each 240 m³/hr. Engine room portside. CPN. Cert. dated 6/9/62
 No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) _____ Main:- 2-13m³. Engine room portside. CPN Cert. No. 1961 X. Aux:- 1-300 litres. Eng. room stbd. CPN Cert. No. 1955 X. By a hand starting oil engine
 How are receivers first charged? _____ Driven air compressor Maximum working pressure of starting air system _____ 25 kg/cm² Are the safety devices in accordance with the Rules? _____ Yes Has the starting of the main engines been tested and found satisfactory? _____ Yes

COOLERS. No. of main engine fresh water coolers _____ 2 No. of main engine lubricating oil coolers _____ 2

OIL FUEL TANKS. No. and position of oil fuel settling or service tanks not forming part of hull structure _____ None

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) _____ 6 fuel pumps

(I) Electr. driven, (II) Steam driven. Service for which each pump is connected to be marked thus X

INDEPENDENT PUMPS Name below essential pumps, state position and how driven. Give capacity of bilge pumps.	SUCTION										DELIVERY						
	Bilge Main	Bilge Direct	Ballast Main	Oil Fuel	Fresh Water Cooling	Sea	Feed Tanks	Lub. Oil	After Peak	Boiler Feed	Salt Water Cooling	Fresh Water Cooling	Oil Fuel Tanks	Fire Main	Lub. Oil	Piston Cooling	Sea
Engine Room port																	
(I) 2 fire pumps						X			X					X			
(I) 1 ballast	X	X	X			X							X				X
(I) 1 bilge	X	X															X
(I) F.W. cooling f. aux. engs.					X						X						
(I) F.W. cooling f. main eng.					X						X						
(I) 2 S.W. cooling f. main eng.		X				X				X							
(I) 2 lub. oil pumps									X						X	X	
Engine Room stbd.																	
(I) S.W. cooling f. aux. engs.						X					X						
(I) 1 ballast	X	X	X			X							X				X
(I) 2 fuel oil transfer			X	X									X				
Aux. Boiler Room																	
(II) 2 feed pumps									X		X						

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room _____ Holds 1 & 2:- 2-3 ins. Holds 3 & 4:- 2-3 1/2 ins. Hold 5:- 4-2 1/2 ins. ✓

No. and size connected to main bilge line in main engine room _____ P.S. 2-2 1/2 ins. S.S. 2-2 1/2 ins. Aft. 1-2 1/2 ins. Main Engine sump. 2-2 1/2 ins. In tunnel 2-2 1/2 ins. ✓

In aux. engine room _____ Size and position of direct bilge suction in machinery spaces _____ Port Side:- 2-3 1/2 ins. Stbd. Side:- 2-4 ins. ✓ Size and position of emergency bilge suction in machinery spaces _____ Port Side:- 1-8 ins. ✓

Is the bilge or ballast system fitted with means for separating oily water on the overboard discharge side? _____ Yes Do the piping arrangements comply with the Rules including special requirements for ships classed for navigation in ice? (strike out words not applicable). _____ Yes

STEAM & OIL ENGINE AUXILIARIES

Position of each	Type	Made by	Port and No. of Rpt. or Cert.	Driven Machinery (For electric generators, state output)
Fwd. inboard	heavy oil	Burmeister & Wain A/S	Cpn. Rpt. No. 20168 ✓	355 KVA Generator
Fwd. outboard	" "	"	" " " 20168 ✓	355 KVA "
Middle	" "	"	" " " 20168 ✓	215 KVA "
Aft.	" "	"	" " " 20168 ✓	215 KVA "
	" "	hain BRS. 10,660		Comp. 7

Is electric current used for essential services at sea? _____ Yes If so, state the minimum No. and capacity of generators required in order that the ship may operate at sea _____ 1-355 KVA Generator

Is an electric generator driven by Main Engine? _____ Yes

STEAM INSTALLATION. No. of donkey boilers burning oil fuel _____ 1 w.p. 7 kg/cm² Type _____ Vertical fusion welded water tube
 Position _____ In a separate boiler room at the fwd. end of engine room port side ✓
 Is a superheater fitted? _____ No Are these boilers also heated by exhaust gas? _____ No No. of donkey boilers heated by exhaust gas only? _____ 1 w.p. 7 kg/cm²
 Type _____ La Mont Position _____ Below base of funnel Can the exhaust heated boilers deliver steam directly to the range of donkey boilers? _____ Yes
 Port and No. of report on donkey boilers _____ Cpn. No. 20168 ✓ Is steam essential for operation of the ship at sea? _____ No heavy oil. Are any steam pipes over 3 ins. bore? _____ Yes If so, what is their material? _____ Copper ✓ For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? _____ Yes No. of oil burning pressure units _____ 1 No. of steam condensers _____ 1 No. of Evaporators (Atlas Freshwater Generator) _____ 1

STEERING GEAR. (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars) _____ 2-AC motors Nos. 221361-62 (John Hastie & Co. Steering Gear No. H.G. 8594/5) each 30 H.P. 380 volts, 45 amps, made by Hugh J. Scott & Co. 2- H.P. 12 Hele Shaw pumps Nos. K. 12934-35

Have the Rule Requirements for fire extinguishing arrangements been complied with? _____ Yes Brief description of arrangements _____ 10 Hydrants, 1-2000 litres froth tank, CO₂ installation, 1-45 litres & 12 portable extinguishers.

Has the spare gear required by the Rules been supplied? _____ Yes Has all the machinery been tried under full working conditions and found satisfactory? _____ Yes Date and duration of full-power sea trials of main engines _____ 3/4, 4/4 & 5/4-63 38 hours Does this machinery installation contain any features of a novel or experimental nature? (Give particulars) _____ No

The foregoing description of the main engine and installation is correct and the particulars are as approved for torsional vibration characteristics (strike out words not applicable) _____

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 BURMEISTER & WAIN'S MASKIN- OG SKIBSREGISTER
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Crown Stays: Material Tensile strength Diameter { at body of stay, or over threads. }
No. of threads per inch **Screw Stays:** Material Tensile strength
Diameter { at turned off part, or over threads. } No. of threads per inch Are the stays drilled at the outer ends
Tubes: Material External diameter { plain stay } Thickness { }
No. of threads per inch Pitch of tubes
Manhole Compensation: Size of opening in shell plate Section of compensating ring No. of rivets and diameter of rivet holes
Outer row rivet pitch at ends Depth of flange if manhole flanged
Uptake: External diameter Thickness of uptake plate
Cross Tubes: No. External diameters { } Thickness of plates { }

Have all the requirements of Sections 14 to 22 inclusive for boilers been complied with.....

The foregoing is a correct description,

.....
Manufacturer.

Dates of Survey while building { During progress of work in shops - - } Is the approved plan of boiler forwarded herewith (If not state date of approval.)
{ During erection on board vessel - - - } 9/1-14/1-21/1-30/1-8/2-11/2- Total No. of visits 13
13/2-14/2-18/2-7/3-3/4-4/4-5/4-63

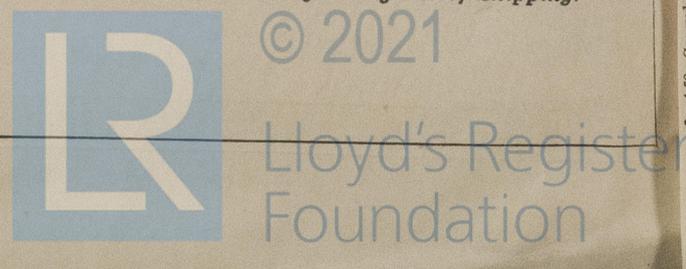
Is this Boiler a duplicate of a previous case Yes If so, state Vessel's name and Report No. m.s. "BELOVODSK" Cpn Rpt. No. 19869

GENERAL REMARKS (State quality of workmanship, opinions as to class, &c.) The boiler has been fitted on board under special survey in accordance with the requirements of the Rules.
On completion of the installation the boiler was examined under steam and the safety valves adjusted to 100 lbs. and the accumulation tested and found in order.

Survey Fee £ : : When applied for 19 ..
Travelling Expenses (if any) £ : : When received 19 ..

K. Hansen
Engineer Surveyor to Lloyd's Register of Shipping.

Date FRIDAY 28 JUN 1963
Committee's Minute *Subpt 1*



Is a Report also sent on the Hull of the Ship
(MADE AND PRINTED IN ENGLAND)
2m, 4, 59 - Copyable Ink.