«PACIFIC ENGINEERING COMPANY»

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SURVEY VESSEL "DIABAZ"

Technical Specification

SURVEY VESSEL "DIABAZ"

S/V «Diabaz» is a multitask vessel of KM✪ L2 [1] class. It is designed for performance of the following engineering investigations: geophysical and 2D seismic surveys, drilling of engineering-geological boreholes and execution of geotechnical works. The vessel is able to drill the boreholes to the depth of 150 m at the water depth from 10 to 100 m. Boring rig 15 m high is located in the center of the vessel, 1.8 x 0.6 m moon pool. The vessel is equipped with a four-anchor stabilization system.

МКУБ СИСТЕМА УПРАВЛЕНИЯ БЕЗОПАСНОСТЬЮ сертифицирована РС
ISM CODE SAFETY MANAGEMENT SYSTEM certified by RS

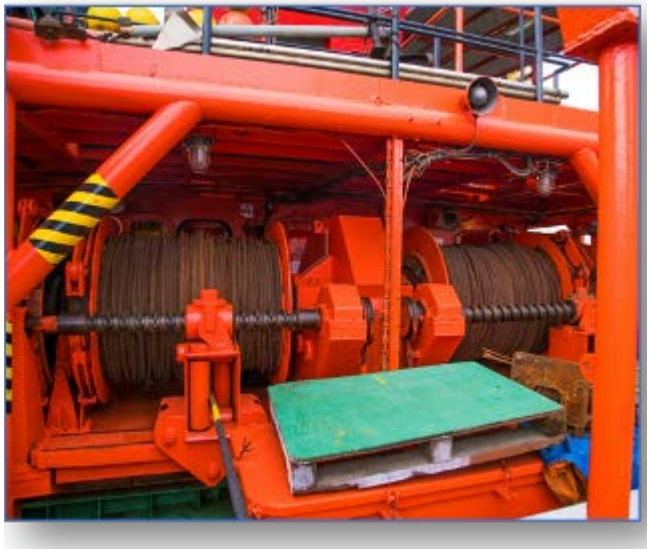
Safety Management System of the Company is certified by the Russian maritime register of shipping for correspondence with ISM Code (document of conformity No. 19.00038.172 valid to September 19th, 2022).

Register Data	
Vessel name	**DIABAZ**
Shipowner	Pacific Engineering Company Ltd.
Flag	Russia
Port of registry	Korsakov, Russia
Type. Employment	Special purpose ship (survey vessel)
Register class	KM✪ L2 [1]
Ship-classification society	Russian Maritime Register of Shipping
Registration number	822127
IMO ID-number	8138671
Call sign	UCIM
Place of manufacture	Russia, Yaroslavl
Year of manufacture	1983
Specifications	
Displacement	Fully loaded – 1185 t; empty – 903 t.
Capacity	Gross 774 r.t., net 232 r.t.
Dimensions (length overall, beam, board height)	53.74 m, 10.5 m, 6.0 m
Draught, max / min	4.4 / 4.0 m
Accommodation capacity	32 persons
Crew members	14 persons

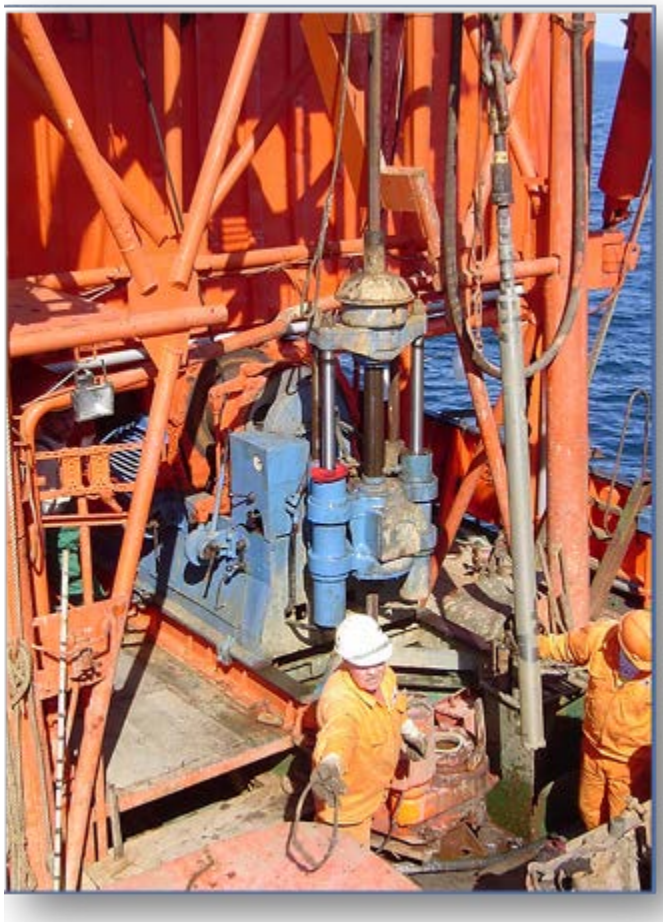
Main engine	1 x 8NVD48A- 2U, Germany, 1320 h.p., 970 kW, 428 rpm.
Screw number / type	1 / CPP
Auxiliary diesel – generators	3 x 6 chn 18\22 150 kW. 750 rpm
Thruster unit	Bow: PU-2.1(PU 130 A), 1x135 kW Stern: PU-2.1(PU 130 A), 1x135 kW
Living accommodation	- single cabins – 5 - double cabins – 7 - three-place cabin – 1 - four-place cabins – 3
Capacity and Consumption	
Fuel stock	160 ton
Oil stock	15 ton
Water capacity	130 ton
Osmotic declinator	KRO-030-V – 1pc, 3.0 t of water per day
Cruising radius	7700 miles
Speed (econ/max)	8.5 / 11 knots
Fuel consumption at full speed	5.64 ton
Self-sufficiency (in the sea)	30 days
Drilling Water depth	10 - 100 m, drilling depth up to 150 m in soil
Deck Machinery	
Electrohydraulic crane	Carrying capacity 950 kg
Anchor winches (bow, stern)	Bow winch of «LEYA» type - 2 pcs., carrying capacity 9 t Stern winch of «LETRS» type - 1 pc., carrying capacity 16.5 t
Single-arm davit / duty boat	DM-RB6-1000 / «Favorite» for 6 persons, 700 kg
Electro windlass	Carrying capacity 20 t - 1 pc.
Cable bridle	Diameter 31 mm, length 150 m
Bow anchor	Hall's anchor, 2 x 900 kg
Technical anchor	Hall's anchor, 4 x 2500 kg
Communication Equipment	
GMDSS equipment	FURUNO DS-80
Gyrocompass	TOKIO KEIKI INK. JAPAN, тип TG-8000
Hydroacoustic echo sounder	FE-700 "FURUNO" x 1pc.
Radar	KODEN MDC-2900 P JRC JMA-2300 x 1
Communication radio equipment VHF / MF	JHS-32A / SAMYANG SRG 2250DN
Satellite communication	C – JRC NDZ 127 C №427321 042
Satellite phone	VSAT № +7 929 420 00 92

Satellite Internet	VSAT
Satellite terminal	SAILOR 150 FleetBroadband
Satellite beacon	SETELLITE EPIRB CEP 100
Transponder (SART)	Tron SART/ DUIM-S x 1
Receiver	NAVTEX NSR-333
Portable communication radio stations	SAMYANG STV-160 x 3
E-mail	diabaz@shipmail.ru
Rescue Equipment	
Life Rafts	PSN-20 x 6; PSN-10 x 1
Life Jackets	33
Hydrothermosuits	33
Navigation Equipment	
Primary vessel positioning system	GNSS receiver C-Nav 3050M– 2sets
Navigation GNSS compass. Secondary vessel positioning system	GNSS compass Vector VS330 Hemisphere GPS
Echo sounder	Simrad EA300
Probe profilometer	Valeport Midas CTD 3000
Video Switch (Duplicator)	Video splitter on 4 VGA monitors VPro
Control, collection and processing of navigation data. The main navigation computer.	INS QINSy Syrvey 8.1. PC Cooller Master
Registration of field documentation, data archiving. Spare navigation computer.	PC VENTO AD ASUS Precision Work Station
Navigation software	QINSy Survey 8.1, QPS C-Setup 7.1, C&C Technologies VectorPC 1.0.6.0, Hemisphere GPS DataLog Express 0400/7115/H3, Valeport Ltd
Drilling and Geotechnical Equipment	
Drilling rig with a crownblock	Truss, carrying capacity 9 t
Height from the deck to the crownblock axis	15 m
Maximum length of the drill pipe string	10.5 m
Moon pool	Length 0.55 m, width 1.33 m with 1 m shift starboard off the centerline
Drill floor	Length 1.85 m, width 8.2 m
Drilling unit	Electrically driven ZIF-1200
System of the drill mud storage and preparation	Total capacity 5 m^3, with mechanical mixers
Specification of Drilling rig	
Drilling unit	Electrically driven ZIF-1200
Maximum drilling depth	up to 150 m at the sea depth up to 100 m
Maximum borehole diameter	168 mm

Rotation speed	25 – 300 rpm
Power unit	Electric motor
Drilling method	Core and hydraulic hammer drilling
Power consumption	55kW
Drill pumps	NB-32 x 2 pcs., piston type, pump delivery 294-594 l/min, pressure up to 4.0 MPa
Pipelines	Maximum pressure 5.0 MPa, outer diameter of drill mud hoses 58 mm, maximum pressure in drill mud hoses 6 MPa
Core extractor	Hydraulic extruder with force 1.5 t
Drill pipe elevator	EK-50, ring type, carrying capacity 10 t
Eye-bolt swivel	VS-5, carrying capacity 5 t, maximum working fluid pressure 5.0 MPa.
Swivel bail	BI249-144-00, carrying capacity 5 t
Travelling block	BI249-137, carrying capacity 10 t
Drill pipes	Diameter 50 mm.
Rock cutting tool	Hard-allow core bit: CM, CT, CA with a diameter 76, 93, 112, 132, 151 mm
Ultimately Acceptable Conditions for Drilling Works	- maximum vertical amplitude – 1.5 m - maximum pitching angle – 4 degrees - maximum roll angle – 4 degrees - maximum wind strength – 14 m/sec
Sampling	
Outboard hydraulic hammer sampler	UGVP-130
Outboard hydraulic hammer sampler	UGVP-150
Gravity sampler	PG-127
Bottom grab sampler type	«Van Vinn»
Onboard Soil Laboratory	
- penetrometer Humboldt MFG. Co. - mini vane WF 23500 - laboratory vane Humboldt MFG. Co. - hydrolic extruder - drying furnace SNOL 58/350 - scales with magnetic compensator Ohaus 700/800 Series - Munsel soil-color charts - device for point loading of strong rocks	



Anchor winches (bow, stern)



Drilling Rig

Drilling Rig

Winch for hydraulic hose of Outboard hydraulic hammer sampler UGVP-150

Outboard hydraulic hammer sampler UGVP-150





Engine room




Bridge

GEOPHYSICAL AND HYDROGRAPHIC EQUIPMENT	
NAVIGATION	
GNSS Receiver	- Accuracy (RMS): Horizontal / Vertical RTK (<40 km): 1 cm + 0.5 ppm / 2 cm + 1 ppm C-Nav Services (95%): 8 cm / 15 cm Velocity: 0.01 ms - User Programmable Output Rates: Position / Velocity / Time: 1, 5, 10, 25, 50, & 100 Hz Raw Data: 1, 5, 10, 25, 50, & 100 Hz
Gyro-Compass AD 100	- Accuracy Heading: ±0.6, GPS: 10 m, DGPS: 5 m - Follow-up 45°/s rate-of-turn - Settling time – 4 min
BATHYMETRY	
Multibeam Echosounder SeaBat T20-P	- 256 beams - Swath coverage (up to) 140° Equi-Distant 165° Equi-Angle - Frequency Agile (190-420 kHz) - Max Depth (FM3) 300 m - Ping rate (range dependent) Up to 50 pings/s - Pulse length (CW) 30 – 300 µs - Pulse length (FM) 300 µs – 10 ms - Depth resolution 6mm - Depth rating (sonar head) 50 m
Single Beam Echosounder Echotrac MKIII	- Frequency High band: 100 kHz-1 MHz, Low band: 3.5 kHz-50 kHz - Resolution 0.01m / 0.10 ft - Accuracy 0.01m / 0.10 ft. +/- 0.1% of depth @ 200 kHz, 0.10 m / 0.30 ft. +/- 0.1% of depth @ 33 kHz, 0.18 m / 0.60 ft. +/- 0.1% of depth @12kHz (corrected for sound velocity) - Depth Range 0.2-200 m / 1.0-600 ft. @ 200 kHz, 0.5-1500 m / 1.5-4500 ft. @ 33kHz, 1.0-4000 m / 3.0-13,123 ft. @ 12kHz - Sound Velocity 1370-1700 m/s, Resolution 1 m/s
Single Beam Echosounder Echotrac CV300	- Frequency High band: 100 kHz-1 MHz, Low band: 3.5 kHz-50 kHz - Resolution 0.01m/0.1 ft - Accuracy 0.01 m / 0.10 ft +/- 0.1% of depth @ 200 kHz, 0.10 m / 0.30 ft +/- 0.1% of depth @ 33 kHz, 0.18 m / 0.60 ft +/- 0.1% of depth @ 12 kHz - Depth Range 0.2-200 m /0.5-600 ft @ 200 kHz, 0.5-1600 m / 1.5-5000 ft @ 33 kHz, 1.0-4000 m/ 3.0-13,000 ft. @ 12 kHz - Sound Velocity 1370-1700 m/s, Resolution 1 m/s
Sound Velocity Valeport miniSVP Sound Velocity Valeport MIDAS CTD	- Sound Velocity Range 1375 – 1900 m/s - Sound Velocity Resolution 0.001 m/s - Sound Velocity Accuracy ±0.02 m/s

ACOUSTIC POSITIONING	
USBL Easytrak Transceiver 2681	- Slant Range accuracy 10 cm - Position accuracy 0.60° drms. 1.0 % of slant range - Bearing Resolution 0.1° displayed. Internally calculated to 0.01° - Heading sensor accuracy 0.5° rms standard; +/- 0.1° resolution/repeatability - Pitch/Roll sensor accuracy +/- 0.20° rms +/- 0.1° resolution/repeatability - Frequency Band (MF): Reception 22 - 30 kHz, Transmission 17 – 26 kHz
USBL Beacon/Transponder Fatboy 965D	- Transmit frequency range 27-33 kHz - Receive frequency range 17-27 kHz - Turn around time 15/30/60mS dependent on channel - Transmit pulse width 1.5/10mS dependent on channel - Available channels 144
SIDE SCAN SONAR SURVEY	
Side Scan Sonar Edgetech 4200-MP	- Frequency 100/400 kHz - Operating Range (meters/side) 100 kHz: 500 m, 400 kHz: 150 m - Horizontal Beam Width: In High Speed Mode: 100 kHz: 1.26°, 300 kHz: 0.54°, 400 kHz: 0.4°; In High Definition Mode: 100 kHz: 0.64°, 300 kHz: 0.28°, 400 kHz: 0.3° - Resolution Along Track: High Definition Mode: 100 kHz: 2.5 m @ 200 m, 300 kHz: 1.0 m @ 200 m, 400 kHz: 0.5 m @ 100 m - Resolution Across Track: 100 kHz: 8 cm, 300 kHz: 3 cm, 400 kHz: 2 cm, - Vertical Beam Width: 50° - Depression Angle: Tilted down 25°
MAGNETIC SURVEY	
Magnetometer SeaSPY2	- Absolute Accuracy 0.1 nT - Sensor Sensitivity 0.01 nT - Counter Sensitivity 0.001 nT - Resolution 0.001 nT - Range 18,000 nT to 120,000 nT - Gradient Tolerance Over 10,000 nT/m - Sampling Range 4 Hz – 0.1 Hz
HIGH RESOLUTION AND ULTRA HIGH RESOLUTION SEISMIC	
Digital Streamer XZONE BOOTTOM FISH	- 192 channel - Group base 6.25 m - Number of hydrophones in the group 12 - Sensitivity of the group 300 μB/ Pascal - Low-pass filter 6 Hz @ 6 Db/octave - Anti-alas filter 816 Hz or 408 Hz

Depth Controllers DIGICOURSE 5010, 5011E	- Frequency 26 kHz - Data rate 2400 bit/s - Operating Range 0 m to 122 m (0 ft to 400 ft) - Resolution 0.15 m (0.5 ft)
Source SLEEVE GUN	- 4 × 40 Cubic Inch - pressure 2000 PSI
Source Sparker Squid 2000	- Maximum Energy Input 2500 J - Operating Voltage 3000-4000 volts - Source Level 222 dB typical
Energy Source CSP-D 2400	- Voltage Output 2500 to 3950 Vdc - Output Energy 50; 100; 150; 200; 300; 400; 500; 600; 700; 750; 800; 900; 1000; 1250; 1500; 1750; 2000; 2250; 2400 Joules - Charging Rate 1500 J/second - Capacitance 240 µf, 108 shot life
SUB-BOTTOM PROFILERS	
Streamer Analog Hydrophones AH 150/20	- Number of elements 20 - Array sensitivity -161 dB ref 1 V per µPa - Frequency response 140 Hz to 10 kHz (-3dB)
Source Boomer AA200	- Maximum Energy Input 300 J/shot - Maximum power Input 600 J/second - Source level 215 dB re 1 µPa at 1 meter with 200 J - Pulse Length 120/150/180 mS at 50/100/200 J
Source Sparker Squid 500	- Maximum Energy Input 1200 J - Operating Voltage 3000-4000 volts - Source Level 216 dB typical
CSP-P 350	- Voltage Output 2500 to 3950 Vdc - Output Energy 50,100,150,200,300 and 350 Joules - Charging Rate 1500 J/second - Capacitance 48µF at 108 shot life

Legend:

1 GNSS Receiver
2 Single beam echosounder
3 Multibeam echosounder
4 USBL
5 SIDE SCAN SONAR
6 MAGNETOMETER
7 Digital Streamer
8 Depth Controllers
9 Buoy with GPS
10 Source SLEEVE GUN
11 Source Sparker
12 Streamer Analog Hydrophones
13 Source Boomer
14 Grab
15 Sampler