

# GEOTECHNICAL SURVEY VESSEL M.V. MARINER



The M.V. Mariner is a ship specially converted to perform geotechnical investigations in the form of soil borings or operating special geotechnical seabed tools. She has been operating since 1974, mainly in the northern North Sea known for its severe weather conditions, but also in the Mediterranean, Gulf of Suez, Middle East, India, Far East, Brazil and Australia. She has an outstanding record of performance in terms of endurance and workability in rough unprotected areas offshore.

## General Data

The M.V. Mariner was built as a general cargo vessel and measures 82 by 12 metres with a draft of 5 metres. The average speed when sailing is 9 knots. A bow-thruster gives the vessel a high degree of maneuverability. The workability is determined by vessel's response to swell, a midships heave of 2.0 to 2.5 m is acceptable. The vessel is equipped with a six point mooring system with the capability to anchor in very soft to hard bottoms in a maximum water depth of about 200 metres. With the anchoring assistance this water depth could be increased to 320 meters. The maximum endurance of 25-25 days is governed by the capacity of potable water.

## TECHNICAL INFORMATION OF GEOTECHNICAL SURVEY VESSEL M.V. MARINER

### General

Call sign	HO 9324
Classification society	Lloyd's Register of Shipping L.R. 100 A1 PTO. No. 5179208
Port of Registry	Panama R.P. Official number 6093-75
Inmarsat telephone	Satellite region + 335 62 9610
Inmarsat fax	Satellite region + 335 62 9612
Inmarsat telex	Satellite region + 435 62 9610 Satellite region + 435 62 9620

### Main characteristics

Length overall	81.8 m	(268 ft)
Beam	12.3 m	(40 ft)
Depth	6.3 m	(21 ft)
Draft	4.5 m	(15 ft)
Gross tonnage (GRT)	1655 ton	(4684 m <sup>3</sup> )
Nett tonnage (NRT)	496 ton	(1404 m <sup>3</sup> )
Speed	9 knot	
Total height above water level	28.2 m	(inclusive antennas)

### Propulsion systems

Main engine	Smit-Bolnes 1700 bhp 10 cylinder 275 rpm Direct reversible engine
Bowthruster	Schottel retractable and tunnel unit 360° revolving in extended mode. 5 ton thrust Electric drive motor 440 V

### Electrical systems

Main engine	3 Gen sets Hansa 412/2-220V-206Amp Driven by MWM RHS 518V 98 bhp at 1200 rpm.
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### Drilling System

The drilling systems include a hydraulic drilling winch for hoisting, a heave compensator, a hydraulic power swivel for rotation and a mud system consisting of 2 pumps, mixing and storage tanks situated below deck.

The standard method of drilling is a straight flush rotary without a riser. The drillstring is made up of an open face wing or roller-bit, drill collars (15 ft, 570 kg each) and 15, 20 or 30 ft drill pipes with an O.D. of 127 mm and an I.D. of 101.6 mm. A plug-bit can be used for full bore drilling and a Christensen core-barrel is available. The pipe rack has central pipe loading ramp which can be tilted to facilitate easy pipe handling. For lowering and retrieving tools, as well as for drive sampling, two freefall winches are available with a maximum pull of 750 kgs.

A hard-tie system can be rigged as required and provides optimum drill bit control in soft to very soft soils.

The vessel has a centerwell midships of 4.2 by 4.4 meters square with guide beams for seabed tools measuring 3.0 meters square. The centerwell is covered by a drill floor which can be opened for access.

The derrick standing over the centerwell is 6.0 meters square at the base and has a height of 23.75 meters, providing ample space to handle all sorts of tools besides the drillstring. The traveling block heave motion compensator has a stroke of 4.2 meters and a maximum capacity of 27 tons.

### Investigation System

The drilling system is purpose built for deployment of the full suite of our insitu testing and sampling systems such as:

- SEACLAM system
- WISON Cone Penetrometer
- WIPSAMPLER
- Piston Sampler
- Remote Vane
- Seismic Cone Testing

Furthermore seabed operated systems such as vibrocores, gravity cores and seabed cone penetrometer systems can be deployed from the Mariner.

Auxiliary engine room	2 Generator sets Delco 350-440VAC-60 Hz Driven by Detroit Diesel engine type 16V71N developing 540 bhp at 1800 rpm. 1 Harbour Generator Mecc.Alte.Spa – 37 SB – 150 KVA – 220 440V-60Hz Driven by Cummings Diesel Serie C-181 HP-1500 RPM 220VDC 440VAC-220VAC-110VAC / 60Hz
Electrical system	
<b>Compressed air systems</b>	
HP air system for motion compensators	2x Ingersoll Rand Type 30 T2 3500 PSI Capacity 450 nm <sup>3</sup> /min
Work air system	Atlas Copco BT4 25kW Cap 3m <sup>3</sup> /min Atlas Copco BT5 35kW Cap 5m <sup>3</sup> /min
<b>Fuel oil and fresh water capacity</b>	
Fuel oil (marine gas oil)	290 m <sup>3</sup>
Fresh water	230 m <sup>3</sup>
<b>Drilling equipment</b>	
Center well	4.2 x 4.4 m Guide rails at 3 m <sup>2</sup>
Derrick	30 ton SWL Height above main deck 25.2 m
Hydraulic drilling winch	150 m non spinning 16 mm wire rope
Power swivel	Hydraulic driven Wirth B3 Hydraulic gear shifter 3 gears 1 <sup>st</sup> gear 3150kgm at 28 rpm 2 <sup>nd</sup> gear 1200kgm at 74 rpm 3 <sup>rd</sup> gear 745kgm at 120 rpm
Drill string	Drill string 2000ft 5inch 19.5lb/ft IEU Tool joint 4.5 inch IF modified to 101,6 mm ID. X-over subs to suit Range of drilling bits to suit the soil conditions.
Mud system	Mud tanks 2x 25 m <sup>3</sup> Paddle mixer in each tank Mud storage 50 ton in bags Hydraulic driven mud pumps 2x Gardner Denver type FD FXX 5.5x8 inch. Pump capacities Liners 3.5 inch 85 GPM at 836 psi. Liners 5 inch 182 GPM at 409 psi.
Heavy load winch	SAS Gouda Max pull 25 ton at 14 m/min Rope capacity 550 m by 36 mm
Drill string heave motion compensator	Vetco type MC 60/15S Stroke maximum 4.2 m / 14 ft Compensating capacity maximum 27 ton / 60.000 pound. Accuracy 1,2% of maximum capacity

### Laboratory

Adjacent to the derrick a laboratory is available for soil testing. It has a hydraulic sample extruder, drying ovens and ample space on work benches for analysis and testing of the soil samples and cores.



Auxiliary heave motion compensator	Stroke 3 m / 10 ft to compensate heavy lift wires.
Deck crane equipment with Wylie Load indicator	Make Sanders Holland (Built 1989) Type DH 10-60 Maximum SWL 10 ton at 20 m. Fully revolving Main hoist 10 ton Auxiliary hoist 3 ton Driven by Detroit Diesel 6V-71 N
<b>Coring and Sampling Equipment</b>	Wire line drive sampler with a suite of sampling tubes. Push sampling equipment with a suite of sampling equipment. Christensen Marine Wire Line Core barrel with non-rotating inner barrel. Vibro corer with 16' x 2" tubes. Grab sampler capacity 24 liter. Gravity corer with sample tubes 15' x 2 1/2".
<b>Mooring equipment</b> Winches	Six point mooring system 2 x 3 drum hydraulic driven Bodewes winches. Remote controlled from bridge console 2 speeds. Maximum pull 34 ton (slow speed) Maximum pull 10 ton (fast speed) Delta Flipper 3000 kg (5+5 spare) 2000 m 32 mm (5+5 space)
Anchors Anchor wire rope	
	Self deployment of anchors in 200 m water. From 200 to 320 m the assistance of an anchor handler boat required.
<b>Accommodation</b>	Air-conditioned quarters and messing facilities for 35 persons.
<b>Crew composition</b>	1 Captain / Superintendent 2 Mates 1 Chief Engineer 2 Engineers 1 Oiler 1 Electrician 1 Fitter / welder 2 Cooks 2 Stewards 6 AB's /Roughnecks
<b>Navigation equipment</b> GPS	Koden KGP-97 Garmin 120-XL
Radar	Kelvin Hughes Nucleus 5000R Furno RDP 118
Echo sounder Gyro compass Magnetic receiver Navtex receiver Weather receiver	Odom Echotrac DF-3200 MK II Anschutz Standard 20 Wallbach Radio Holland Navtex2 JMC FX-220
<b>Gas detection system</b>	Make Draeger Polytron Type I & II Regard system Sensors 4 toxic & 4 combustible



### Communication systems

#### GMDSS

Sailor Compact HF-SSB-RE2100  
250 Watt (100Khz-30Mhz)  
DSC Watch Receiver Sailor RM 2150  
Sailor Trane & Trane-H2095B  
Inmarsat Terminal  
NERA Saturn C Inmarsat C Terminal  
NERA Saturn B Inmarsat B Terminal  
GMDSS Alarm Unit Sailor C2149  
Sailor Compact RT 2048 12V-DC 25 Watt  
Sailor Compact DSC Receiver RM 2042  
Skanti 3000-TRP 30 12V-DC-25 Watt  
Sailor VHS SP3110  
7 talk back stations

Portable VHF (3)  
Public Address (PA) system

#### Positioning systems

Starfix II Wide Area Differential Global Positioning System (DGPS) with connection to Inmarsat B terminal dome.  
Frequency translation unit.  
Starfix II demodulator.  
Trimble 4000DX GPS receiver.  
Computer 486/33 with Starfix II  
WADGPS software.  
Decca Navigator MK 53.

#### Life saving equipment

Life rafts  
MOB Boat

4 Life rafts with a total capacity of 75 persons.  
Viking 470 GRP-1 capacity 6 persons with 36 hp  
Yamaha Diesel engine.

#### Laboratory

Hand torvanes  
Pocket penetrometers  
Hydraulic extruder  
2 Laboratory ovens  
Miniature laboratory vane  
Motorized UU triaxial machine  
Point load tester (on request)

#### Deck office

On the port side of the boat deck a fully air-conditioned office is situated with a total work desk space of 4m<sup>2</sup>.  
This office can be used to install equipment during Geophysical surveys.

The specification of the equipment in this data sheet may be subjected to modifications without prior notice

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