European Maritime Safety Agency

Annex V of the VAC

Technical Specifications for the equipment (Lot 1 – Aegean Sea)

Procurement procedure: EMSA/CPNEG/2/2021

Title: Service Contracts for Stand-by Oil Spill Recovery Vessel(s)

Phase II – Invitation to Tender

All the costs related to the purchase and transport of additional equipment, transportation of transferred equipment as well as servicing of the transferred equipment in line with this Annex and as per below requirements have to be included in the ‘‘equipment costs’’

Content:

1. **General description of the equipment**
   - 1.1 Equipment transferred
   - 1.2 Overhauling and servicing of the equipment
   - 1.3 Additional equipment
2. **Handover procedure for equipment transferred**
   - 3.1. Date and place of the handover
   - 3.2. Transportation
   - 3.3. Storage and insurance
3. **Use of the oil pollution response equipment**
4. **List of transferred equipment and description**
5. **Description of equipment**

1. General description of the equipment

The oil pollution recovery equipment comprises two different at-sea oil recovery systems designed to recover medium to high viscous oils. Those systems will be installed on board when operating as an oil spill recovery vessel although they will not be used at the same time.

The Contractor will receive the set of equipment as listed in Section 4 and described in detail in Section 5 of this document. However, the Contractor will be responsible for the correct functioning of the equipment according to the parameters of its technical specifications.

1.1. Equipment Transferred

The contractor will receive from EMSA the equipment listed below:

1. Sweeping arms, Koseq, 15m;
2. High-capacity skimmer, Normar;
3. Boom Vikoma Hi-Sprint (2x250m);
4. Sampling mini lab;
5. Flashpoint Tester;
6. Communication equipment.

All tenderers will have the opportunity to visually verify the condition of equipment items listed above in the stockpile in Piraeus, Greece at request. In principle the visit will be organised in week 26. The visit details will be arranged with the requesting tenderer. If due to the COVID-19 travel restrictions or other health risk considerations the visits cannot be organised then EMSA will provide tenderers with additional detailed technical information on the transferred equipment including, manuals, pictures and videos.

There were no technical issues regarding the transferred equipment occurred in the past during the previous contract implementation.

1.2. Overhauling and servicing of the equipment

The equipment that will be transferred to the Contractor was purchased in 2008 (sweeping arms and boom system) and in 2012 (high-capacity skimmer). It is generally in good condition. The sweeping arms were used in an oil spill recovery and was properly cleaned afterwards. The rest of the equipment has never been used to recover oil and it has been deployed a few times per year for the purpose of drills and exercises (in average 4 quarterly drills and 1 exercise per year). The equipment has been categorised and appropriately labelled. It has undergone regular maintenance according to the manufacturer's specifications. The maintenance was closely monitored by EMSA. The working condition of the equipment is regularly verified by the Agency during drills. In addition, the booms segments were replaced with new ones in 2018.

The Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment. Therefore, the Contractor should arrange overhauling or servicing to the equipment after the handover but before expiration of the Preparation Phase. In such a case, each tenderer will include in its financial offer regarding the oil pollution response equipment, the estimated overhauling and servicing costs. This estimation will be considered as the ceiling that EMSA will reimburse in relation to the equipment overhauling and servicing.

Detailed report of the service(s) actually carried out on the equipment item(s) shall be included by the Contractor as part of the Completion Report. This report should include as a minimum list of works performed, list of parts replaced and/or repaired, photos, etc.

The overhauling and servicing might be performed by a third party subcontracted by the contractor (e.g. manufacturer of the equipment or a specialised local company).

1.2.1 Equipment to be overhauled

Overhauling of the OSR equipment systems shall include repair or replacement of damaged, defective or worn parts, reassembly, testing and trial-run prior to returning the item to its full operating level. The contractor should take care also for the proper disposal of the parts to be replaced.

The overhauling works should as a minimum requirement comprise in general the following items:

- Replacement of all worn parts: belts, gaskets, seals, filters, rusty screws and washers, O-rings of all parts of the set;
- Replacement of all fluids: lube oil, hydraulic oil, gear oil, coolant of all parts of the set;
- Replacement of all rubber/flexible hoses and couplings/connections: all hydraulic hoses;
- Cleaning/brushing off rust/limestone/chalky deposits from all parts:

  - bring all the parts to a “new” finish;

  - sandblasting of rusty steel parts;

  - repaint (where applicable) with original or equivalent marine resistant paint (zinc primer, marine epoxy coating, marine epoxy topcoat);

- Grease/lubricate all joints/points.

Based on the inspection of the condition of the equipment, below is the indicative list of the works to be performed:

a. Koseq Sweeping arms system:

I	No	Description of overhauling works
2 x Sweeping Arm Crane	I.1.1	Brushing off rust and repainting with original or equivalent paint
	I.1.2	Replacement of worn parts of the slewing ring
	I.1.3	Replacement of turning cylinder
	I.1.4	Replacement of cylinder shaft
	I.1.5	Replacement of cable pulleys
	I.1.6	Replacement of all winch cables
	I.1.7	Replacement of screws and bolts of the foundation pillar
	I.1.8	Replacement of all hydraulic valves and levers
	I.1.9	Replacement of all wearing parts from the winches
	I.1.10	Replacement of hydraulic lines/pipes
2 x Frame (15m) (including weir modules)	I.2.1	Brushing off rust and repainting with original or equivalent paint
	I.2.2	Replacement of rubber fenders at each end
	I.2.3	Replacement of hydraulic cylinder for oil collection chamber
	I.2.4	Replacement of hydraulic cylinder for debris screen
	I.2.5	Replacement of debris screen bearing and slide shaft
	I.2.6	Brushing off chalky/limestone deposits and bringing the aluminium parts to a "new" finish
	I.2.7	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)

	I.2.8	Replacement of all hydraulic connectors
2 x Pump MSP 150/63	I.3.1	Replacement of seals, O-rings, washers and dust caps
	I.3.2	Replacement of hydraulic connections
	I.3.3	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.3.4	Brushing off rust and repainting the exterior casing with original or equivalent paint
	I.3.5	Replacement of impeller (rotor)
	I.3.6	Renew protective coating of pump casing interior and suction cone interior with original or equivalent paint
2 x Power Pack Doosan	I.4.1	Replacement of all fluids, gaskets/seals & filters
	I.4.2	Cleaning of all tanks and radiators
	I.4.3	Replacement of belts
	I.4.4	Replacement of flexible lines
	I.4.5	Replacement of the battery
	I.4.6	Cleaning the exhaust flame trap
	I.4.7	Delivery of a new protection canvas
	I.4.8	Brushing off rust and repainting with original or equivalent paint
	I.4.9	Replacement of all wearing parts of the hydraulic pump (gaskets, O-rings)
	I.4.10	Replacement of all wearing parts from the spring starter

b. High-capacity skimmer Normar:

I	No	Description of overhauling works
Umbilical Hose Reel with Telescopic Crane (including flat rack)	I.1.1	Brushing off chalky/limestone deposits and bringing the aluminium frame to a "new" finish
	I.1.2	Replacement of gear oil
	I.1.3	Replacement of hydraulic oil
	I.1.4	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.1.5	Replacement of all wearing parts from the reduction gears
	I.1.6	Replacement of all hydraulic valves and levers
	I.1.7	Brushing off rust and repainting with original or equivalent paint
	I.1.8	Delivery of a new protection canvas
	I.1.9	Replacement of telescope load holding valve
	I.1.10	Replacement of telescope cylinders
Weir Module (including thrusters)	I.2.1	Replacement of floating skirt (rubber weir lip)
	I.2.2	Replacement of hydraulic connectors
	I.2.3	Brushing off chalky/limestone deposits and bringing the aluminium frame to a "new" finish
	I.2.4	Replacement of anode
	I.2.5	Delivery of a new protection canvas
	I.2.6	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)

	I.2.7	Replacement of all wearing parts from the thrusters
	I.2.8	Replacement of propeller blades
1 x Centrifugal Pump **MSP 150, 360 m^3/h**	I.3.1	Replacement of seals, O-rings, washers and dust caps
	I.3.2	Replacement of hydraulic connections
	I.3.3	Replacement of all wearing parts from the hydraulic motor (seals, O-rings, gaskets)
	I.3.4	Brushing off rust and repainting the exterior casing with original or equivalent paint
	I.3.5	Replacement of impeller (rotor)
	I.3.6	Renew protective coating of pump casing interior and suction cone interior with original or equivalent paint
Brush/Disc Module (including thrusters)	I.4.1	Replacement of hydraulic connectors
	I.4.2	Brushing off chalky/limestone deposits and bringing the aluminium frame to a "new" finish
	I.4.3	Replacement of all wearing parts from the thrusters
	I.4.4	Replacement of propellers blades
	I.4.5	Replacement of anode
	I.4.6	Delivery of a new protection canvas
	I.4.7	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.4.8	Replacement of brushes
2 x PDAS Pumps DOP 250 Dual	I.5.1	Replacement of plate wheel sectional discs and wear plates
	I.5.2	Replacement of sealing ring
	I.5.3	Replacement of plate wheel shaft
	I.5.4	Replacement of plate wheel bearing
	I.5.5	Replacement of sealing/bearing discs
	I.5.6	Replacement of V-seal
	I.5.7	Replacement of stator cutting knife
	I.5.8	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.5.9	Brushing off rust and repainting with original or equivalent paint
	I.5.10	Replacement of pump screw
	I.5.11	Cleaning and painting the pump screw (rotor) and interior body with special heat treated ceramic paint
Power Pack DHPP 120 kW	I.6.1	Replacement of all fluids, gaskets/seals & filters
	I.6.2	Cleaning of all tanks and radiators
	I.6.3	Replacement of belts
	I.6.4	Replacement of flexible lines
	I.6.5	Cleaning the exhaust flame-trap
	I.6.6	Replacement of all wearing parts from the hydraulic pump (gaskets, O-rings)
	I.6.7	Delivery of a new protection canvas
	I.6.8	Brushing off rust and repainting with original or equivalent paint
	I.6.9	Replacement of all wearing parts from the spring starter
	I.6.10	Delivery of a new spring starter (as back-up)

1.2.2. Equipment to be serviced by the Contractor

The contractor should arrange servicing to the following equipment:

a. Boom Vikoma Hi-Sprint (2x250m);
b. Sampling mini lab;
c. Flashpoint Tester.

The servicing to this equipment should include the following:

- Check and replace, if necessary, the hydraulic and oil hoses;
- Check and replace, if necessary, the crane cables, lifting wires, ropes, etc;
- Check of power packs, change the engine and hydraulic oil, coolant liquid, filters (oil, air, fuel);
- Check the brushes of the sweeping arms/skimmer;
- Replace all rusty couplings (e.g. hydraulic or oil hoses);
- Check and servicing of the pumps, if necessary;
- Check the paint and repaint, if necessary;
- Calibration of the mini lab and flashpoint tester.

1.3. Additional equipment

Contractor will need to purchase/deliver the following equipment:

1. Slick Detection System: The oil encounter rate is improved when the oil layer thickness of the recovery area is larger. The vessel will have a system installed, which, without external aid, is capable of detecting the location of the highest concentration of oil. The system will permit the vessel to continue oil detection in low visibility conditions so that the oil recovery operations are not aborted due to lack of visibility.

   The system must be permanently installed onboard. In the case a “pool” of vessels is offered, then each vessel must have a system installed. During data capture, the vessel movement will be compensated in order to ensure the reliability of the information.
   The system will be able to provide continuous monitoring of the slick area and, in combination with current and wind data, predict the oil spill trajectory. It will be possible to record the evolution of the spill trajectory in video format. Such a format should be compatible with common media players software.
   The system should also provide an estimate of the spill area by size, real time distance measurement to a defined point and will be able to be overlaid with an electronic map. The ability to calculate volume in combination with other data is appreciated. However, a system which measures directly both slick size and thickness is preferred.
   The detection range shall be at least 2 nautical miles and will operate efficiently in wind speed of 2m/s or more.
   The integration with VHF frequency used in the AIS system is mandatory if such a system is not already installed on the vessel.
   The Graphic User Interface shall be user-friendly with a PC-based data processing capability.
   The layout of display and colour, for use both day and night, will be specially made for operation on a vessel’s bridge. The system must be regularly (annually) updated with the latest software for the system during the whole duration of the contract.

2. Flow-meter: to be used during drills and recovery operations to measure the flow of the pumps installed in the sweeping arms and skimmer.

3. Interface Detection System: When the oil/water mixture is stored in the tanks, the water and the oil is naturally separated due to the difference in density. The tenderer shall provide adequate equipment (fixed or portable) to detect the interface border between the oil and the water so that the quantity of actual oil stored is known.

4. Gas Detector: It will be needed to check the presence of explosive gases.

5. Communications Devices: At sea oil recovery operations require a number of different actors at different locations. In addition to the GMDSS area A3 requirements set in point 15 of Annex IV, the vessel must be able to communicate with aircrafts, so two VHF radiophones, aeronautic band, will be foreseen for recovery operations or exercises.

6. Portable Cleaning System: In order to clean the equipment and deck after the first stage of operations, two portable high-pressure hot water cleaning sets shall be provided with a flow range of at least 0.18-0.72 m^3/h at 20-100 bar.

7. EMSA logo on equipment: At least one EMSA logo must be attached/painted on a visible position on each sweeping arm and crane, skimmer frame (if possible), boom reel, power pack, storage or tank containers. The dimension of the logos shall be in proportion to the items to be marked.

The Contractor will purchase the above listed additional oil pollution response equipment items and will obtain and conserve ownership of them until the Clearance of the Preparation Phase is completed. All provisions of the Contract including article IV.4.3 (transferable call option) shall apply to the additional oil pollution response equipment items.

8. Vessel Model: At the end of the preparation phase, the Contractor will deliver to EMSA, at its premises in Lisbon, a model(s) of the Vessel(s) at (approximate) scale 1/100. All oil pollution response equipment will be displayed, in the appropriate scale, on board the model(s). In particular, one system must be deployed, simulating recovery of oil with the option to display the alternate system (sweeping arms or boom/skimmer systems). The model(s) should be as detailed as possible, preferably made of plastic or metal. The model(s) remains the property of EMSA, only to be used by the Contractor upon request with the agreement of EMSA. Any cost related to the production of the model and its transportation costs shall be borne by the Contractor[1].

2. Handover procedure for equipment transferred

The conditions of handover, transportation, storage and insurance of the equipment are described below. If any part of the equipment delivered is not used by the Contractor due to the fact that it is not suitable for the vessel offered, the associated costs for the storage, insurance and maintenance shall be borne by the Contractor.

2.1. Date and place of the handover

Prior to the handover, the Contractor shall designate a representative whose name and position shall be communicated in writing to EMSA. The Agency may also designate a representative to witness the handover process.

The items listed in point 1.1 above will be made available for handover and ready for transportation at their relevant storage location as follows:

[1] The model price should be indicated in the bid for information only.

The handover will be done at a date to be mutually agreed between EMSA and the Contractor and shall not take place earlier than **1 April 2022** and not later than **30 April 2022.**
On the handover dates, the Contractor representative shall be present and verify the delivery of the equipment in question.
A delivery/receipt statement prepared by EMSA will be used in order to acknowledge handover of all the oil pollution response equipment items. By signing the delivery/receipt statement on the handover date, the Contractor representative accepts the equipment in its current condition.

2.2. Transportation

The Contractor shall bear all risks involved in transporting (including loading and unloading) for the items listed above from the handover place to the new storage facilities.
The Contractor shall arrange the packing and preparation of the items for transportation, provision of stevedoring services and lifting resources (e.g. forklifts, mobile cranes, etc.) and all necessary shipment.
The costs related to the transportation (including insurance during transport) of the equipment must be paid initially by the Contractor. However, these costs are, within the contract budget ceiling, reimbursed by EMSA as part of the oil pollution response equipment purchase. Accordingly, the tenderer shall include in its financial offer the estimated transportation costs for the oil pollution response equipment.

2.3. Storage and insurance

Prior to the equipment handover, the Contractor shall arrange for the appropriate storage and insurance of all the oil pollution response equipment.
For the purpose of taking out the full risk insurance policy covering the transferred oil pollution response equipment items, the value shall be the purchase value as described under in the table in point 4 below.

3. Use of the oil pollution response equipment

The equipment that must be installed/carried simultaneously on board for oil pollution response must include, as a minimum, the following configurations:

- the sweeping arm system,
- the boom system (2 x reel) + high-capacity skimmer system,
- the oil slick detection system,
- other equipment (minilab, flashpoint tester, etc.)

and their relevant power packs and ancillaries.

4. List of transferred equipment

Category	No	Item	Item Brand	Item Model	No of Pcs	Reception Date	Additional info	ID Code (old)	ID Code (new)
1. Sweeping arm set (EUR 806,280)	1.1	Frame	Koseq		1	24/07/2008	Rigid, foldable end with weir skimmer	FJLM362201	**1007**
		Frame	Koseq		1	24/07/2008	Rigid, foldable end with weir skimmer	FJLM362202	**1008**
	1.2	Control desk			1	24/07/2008	CONTROL CABINET	FJLM111301	1009
		Control desk			1	24/07/2008	CONTROL CABINET	FJLM111302	1010
	1.3	Remote control			1	24/07/2008	WIRELESS	FJLM111303	1011
	1.4	Crane			1	24/07/2008	CRANE INCL.TWO CATCHERS	FJLM131501	**1012**
		Crane			1	24/07/2008	CRANE INCL.TWO CATCHERS	FJLM131502	**1013**
	1.5	Oil hose(s)				24/07/2008		FJLM263601	1014
		Oil hose(s)				24/07/2008		FJLM263602	**1015**
	1.6	Hydraulic hose(s)				24/07/2008	COUPLINGS/CABLES	FJLM223601	**1016**
		Hydraulic hose(s)				24/07/2008	COUPLINGS/CABLES	FJLM223602	**1017**
	1.7	Pump	Marflex	MSP 150-63	1	24/07/2008	CENTRIFUGAL	FJLM283201	1018
		Pump	Marflex	MSP 150-63	1	24/07/2008	CENTRIFUGAL	FJLM283202	1019
	1.8	Power pack	Doosan	Infracore	1	24/07/2008	L066TI / DIESEL	FJLM272801	1021
		Power pack	Doosan	Infracore	1	24/07/2008	L066TI / DIESEL	FJLM272802	1023
2. Boom set (EUR 363,094)	2.1	Power pack			1	24/07/2008	JCB PP 854 EX-PROOF (from ex Markleen boom)	FJLA272801	1028
	2.2	Air compressor	Uniar		1	24/07/2008	HYDRAULIC (from ex Markleen boom)	FJLA032901	1032
	2.3	Storage reel			1	24/07/2008	UNIREEL 14 M3 (from ex Markleen boom)	FJLA413401	**1033**
		Storage reel			1	24/07/2008	UNIREEL 14 M3 (from ex Markleen boom)	FJLA413402	**1034**
	2.4	Storage container			1	24/07/2008	20' ISO FLAT CONTAINER (from ex Markleen boom)	FJLA351201	**1035**
		Storage container			1	24/07/2008	20' ISO FLAT CONTAINER (from ex Markleen boom)	FJLA351202	**1036**
	2.5	Segment	Vikoma	Hi Sprint 2000	1	04/06/2018	Neoprene, single point inflation, 1 click valve, 5x50m	n/a	2780
		Segment	Vikoma	Hi Sprint 2000	1	04/06/2018	Neoprene, single point inflation, 1 click valve, 5x50m	n/a	2781
	2.6	Air inflator	Vikoma		1	04/06/2018	Diesel, centrifugal, electric start, max. output 16m3/min @ 8000 rpm / 1 x 15m 3" NB quick couplings air hose / 1 x lifting sling (LS/4619) / 1 x colander deflation kit	n/a	2782
	2.7	Towing bridle	Vikoma		1	04/06/2018	For J configuration	n/a	2783
		Towing bridle	Vikoma		1	04/06/2018	For J configuration	n/a	2784
	2.8	Towing cross bridle	Vikoma		1	04/06/2018	For open U configuration - cross over assy	n/a	2785
	2.9	Towing lines set	Vikoma		1	04/06/2018	2 x 25 m (one for each towing bridle)	n/a	2786
	2.10	Spare parts	Vikoma			04/06/2018	Service spare for the Diesel driven air inflator (Yanmar L70N engine)	n/a	2787
	2.11	Repair kit	Vikoma			04/06/2018	SK/1041 repir kit for neoprene boom / cold glue repair	n/a	2788
	2.12	Spare parts	Markleen			24/07/2008	SPARE PARTS AND MAINTAINANCE KIT (ex Markleen)	FJLA340201	1026

3. HC Skimmer (EUR 999,821)	3.1	Brush module	Norene	Normar 250 Ti	1	16/11/2012	BRUSH/DISC SKIMMER, FRAME, THRUSTERS AND CUTTING DEVICE FOR DEBRIS	FJLI310701	1084
	3.2	Weir module	Norene	Normar 250 Ti	1	16/11/2012	WEIR SKIMMER WITH 4 FLOATS, FRAME, 2 THRUSTERS , HYDRAULIC DRIVEN PUMP WITH CUTTING DEVICE FOR DEBRIS, DEBRIS SCREEN	FJLI314401	1085
	3.3	Pump	Mariflex	MSP 150	1	16/11/2012	SCREW/CENTRIFUGAL	FJLI280004	1086
	3.4	Pump	Desmi	DOP 250 Dual	1	16/11/2012	PDAS	FJLI280005	1087
		Pump	Desmi	DOP 250 Dual	1	16/11/2012	PDAS	FJLI280006	1088
	3.5	Power pack			1	16/11/2012	NORMAR DIESEL POWERPACK EX 3G, 107KW AT 2100RPM AND 120KW AT 2400RPM	FJLI270002	1089
	3.6	Storage reel and crane				16/11/2012	HYDRAULIC STORAGE REEL INTEGRATED UMBILICAL, DN150 FLOATING HOSE, LENGTH 80M, DIAMETER 6" AND FLOWMETER INTEGRATED TELESCOPIC CRANE, SAFETY FACTOR 2 & INTEGRATED FLOW METER	FJLI130002	1090
						16/11/2012	HYDRAULIC STORAGE REEL	FJLI130002	1091
						16/11/2012	DN150 FLOATING HOSE, LENGTH 80M, DIAMETER 6"	FJLI130002	1092
						16/11/2012	INTEGRATED FLOW METER,	FJLI130002	1093
	3.7	Storage flatrack				16/11/2012	20' ISO CORNERS FOR STORAGE AND TRANSPORTATION OF THE NORMAR SKIMMER	FJLI352002	1094
	3.8	Ancillaries				16/11/2012	LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR WEIR SKIMMER HEAD	FJLI120001	1095
		Ancillaries				16/11/2012	LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR BRUSH SKIMMER HEADS	FJLI120002	1096
		Ancillaries				16/11/2012	LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR HOSE REEL	FJLI120003	1097
	3.9	Remote control				16/11/2012	CAVOTEC REMOTE MICRO-CONTROL MC-3 SERIES, OPERATING RANGE 100-1000M,EX PROOF	FJLI290001	1098
	3.10	Hydraulic hose(s)			2	16/11/2012	HOSES SET	FJLII223807	1099
	3.11	Oil hose(s)				16/11/2012	OIL HOSE 5", 2*6"10M	FJLII263805	1100
	3.12	Spare parts				16/11/2012	SPARE PARTS	FJLII343103	1101
		Upgrade	Norene	Normar 250 Ti		03/11/2016	Upgrade to Ex Zone 1	n/a	2529
4. Sampling/testing (EUR 14,821)	4.1	Mini lab				24/07/2008	CANNON	FJLH234301	1108
	4.2	Mini lab				24/07/2008	DM-340.2	FJLH231701	1109
	4.3	Flash point tester				24/07/2008	SEMI-AUTOM, PENSKY-MARTENS	FJLH173901	1110
5. Communication equipment (EUR 5,668)	5.1	Computer	HP		1	11/10/2019	HP ZBook 17 G5 Mobile workstation, bag, switch, MS Office,	n/a	2870
	5.2	VHF Headset			1	11/10/2019	HT944 Entel VHF; CXR5/950 Entel Skill mic including Radio, Battery Charger, Antenna	n/a	2871

Disclaimer

Any specifications and/or graphic material must not be understood as a commercial endorsement by the Agency of any given piece of equipment and/or manufacturer/supplier.

If there is a contradiction between this Enclosure and the manufacturers' manuals, the manufacturers' manuals take precedence.

5. Description of the Equipment

The equipment to be transferred from the expiring contract, as described in this section, consist of the following sets:

1. Sweeping Arm system

Manufacturer:

KAMPERS OIL SPILL EQUIPMENT B.V

Oosthavenzijde 5

P.O. Box 5606

3297 ZG Puttershoek

Holland

Tel: +31 78 6763811

Fax: +31 78 6764853

E−mail: design@koseq.com Web-site: http://www.koseq.com

The Koseq Rigid Sweeping Arm System consists of two 15-meter Sweeping Arm Structure with foldable end, oil transfer pumps, pumps ancillaries, control panel, hydraulic system, oil hoses, crane and hydraulic power pack.

The sweeping arm system is supplied with an integrated weir skimmer and centrifugal pump with screw impeller, Marflex MSP150-63 pre-installed with a hot water current radial system to facilitate pumping of high viscosity oil. The system is provided with a remotely controlled self-cleaning grating to prevent debris to obstruct the skimmer and pump.

1.1 Sweeping Arms

1.2 Control desks and control panel

1.3 Remote control

1.4 Sweeping arms cranes, Lagendijk SK 5/10-5000/1000

1.5 and 1.6 Oil hoses/hydraulic hoses and cables (Sweeping arms and associated cranes)

1.4 Marflex Centrifugal Pump MSP150-63 (sweeping arms)

1.8 Koseq/Doosan Infracore – L066 TI hydraulic power pack

1.1. Koseq Rigid Sweeping Arm 15m

Conditions for oil recovery operations

The vessel equipped with the sweeping arms is capable to remove oil from the sea under the following conditions:

- Wind up to Beaufort 4.
- Current between vessel and oil slick up to 2 knots
- Forward speed of the vessel maximum 3-4 knots. Actual speed depends on sea state conditions and thickness of the oil layer on water surface.

Description

Each sweeping arm is made up of an outer pontoon, a bridge and an inner pontoon welded together. The inner pontoon contains an adjustable oil collection chamber in which the pump is located.

Foldable ends

To make transport and storage easier, the seeping arm pontoons are equipped with foldable ends.

Description summary - Rigid Koseq Sweeping Arm System

Sweeping arm dimensions

Function:	Collecting of oil
Year of purchase:	2008
Overall Length:	15115 mm
Overall width:	3330 mm
Overall height:	3355 mm
Weight (including pump and hoses):	4800 kg.
Type of skimmer:	integrated weir skimmer
Skimmer pumps:	centrifugal pump with screw impeller

Koseq Rigid Sweeping Arm

1.2. Control desks

Control Panel of Koseq Sweeping Arm

The crane and sweeping arms are operated throughout the control desk/panel attached to the crane top.

The panel is made up of 6 handles with which the operator can control the following elements:

- Sweep. arm pump.
- Sweep. arm weir skimmer height.
- Sweep. arm debris screen.

- Crane winch (1 Ton.)
- Crane winch (5 Ton.)
- Crane Cylinder.

1.3. Remote control

The control panel is additionally equipped with a wireless remote control.

Sweeping arms remote control

1.4. Sweeping arms cranes, Lagendijk SK 6.8-5000/12.5-1000

Manufacturer:

Lagendijk-Constructie
Choorhoekseweg 3
4424 NW Wemeldinge
The Netherlands
Tel: 0113-621385

Fax: 0113-622591

E-mail: info@lagendijk-constructie.nl

Web-Site: www.lagendijk-constructie.nl

These Lagendijk store cranes are intended for operating the sweeping for which specially purpose were designed.

Sweeping Arm Crane

Sweeping arm crane specifications

Maker:	Lagendijk Constructie B.V.
Year of construction:	2007
Type:	SK 6.8-5000/12.5-1000
Main dimensions:	Length: 13.5 m – Width: 1.9 m
Propulsion:	Hydraulic
Lifting capacity:	5000 kg – 6.8 m / 1000 kg – 12.5 m
Tilt:	3º max.

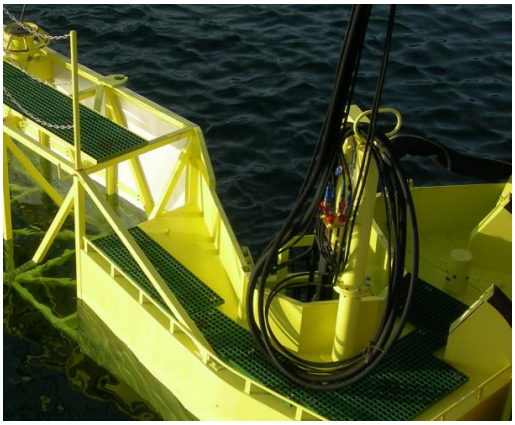
1.5. Oil hoses (SW arms and associated cranes)

The equipment is supplied with oil transfer semi-rigid hose sections (6'' x 10 meter) fitted with Camlock

Oil hoses for Sweeping Arm

1.6. Hydraulic hoses (SW arms and associated cranes)

The hydraulic hoses link the hydraulic pipelines on the crane with the elements of the sweeping arms operated from the crane control panel. Two sets of hydraulic hoses with Tema quick couplings are provided.



Hydraulic hoses for Sweeping Arm

1.7. Marflex Centrifugal Pump MSP150-63 (sweeping arms)

Manufacturer:

Marflex B.V.

Postal Address:

Louis Pasteurstraat 12

3261 LZ Oud-Beijerland

The Netherlands

Tel: +31 186 89 02 00

Fax:+31 186 89 02 49

E-mail: info@marflex.com

Web-Site: www.marflex.com

Marflex Pump

The Marflex pump type MSP-150-63 is a hydraulically driven portable single stage vertical centrifugal pump that has been designed for efficient handling of viscous liquids, bulky solids and shear-sensitive liquids. The MSP 150 portable pump is based upon a centrifugal screw impeller that combines the properties of a screw pump with those of a centrifugal one.

The pump impeller is keyed directly onto the hydraulic motor shaft. The high pressure oil is led into the hydraulic motor through the pressure hose, the leak oil connection is connected to the return oil outlet port on the hydraulic motor, the return oil flows back to the main hydraulic system. A special shaft seal arrangement has been developed in the hydraulic motor to segregate the hydraulic and the cargo.

1.8. Koseq/Doosan Infracore – L066TI diesel hydraulic Power Pack

Manufacturer:

KAMPERS OIL SPILL EQUIPMENT B.V

Oosthavenzijde 5

P.O. Box 5606

3297 ZG Puttershoek

Holland

Tel: +31 78 6763811

Fax: +31 78 6764853

E−mail: design@koseq.com Web-site: http://www.koseq.com

Description
The Koseq/Doosan Infracore – L066TI Power Pack is a compact designed diesel engine driven hydraulic unit suitable for operation in hazardous area zone 2. Therefore several protection devices are fitted on the diesel engine and hydraulic system to make it possible to run the Power Pack in the specified hazardous areas. The Power Pack incorporates a protection/ lifting frame built from high tensile seawater resistant aluminium and coated with two component paint.

The Power Pack consists of a variable, displacement, axial piston pump and is driven by the water cooled diesel engine.

The fuel tank is designated to contain fuel for a long time of use and also designed that is possible to mount the diesel engine and hydraulic system of Power Pack in as small as possible frame.

On the Power Pack a dashboard is mounted equipped with indicators and controls like:

1. Hydraulic oil pressure indicator
2. Hydraulic oil temperature indicator
3. Lubricant pressure indicator
4. Coolant temperature indicator
5. Speed/running hour indicator
6. Exhaust temperature indicator
7. Pilot control valve to set the hydraulic oil pressure
8. Vernier control to adjust the speed of diesel engine
9. Emergency stop handle to stop the air intake of engine
10. Stop button to stop the power pack by blocking the fuel supply to injection pump.

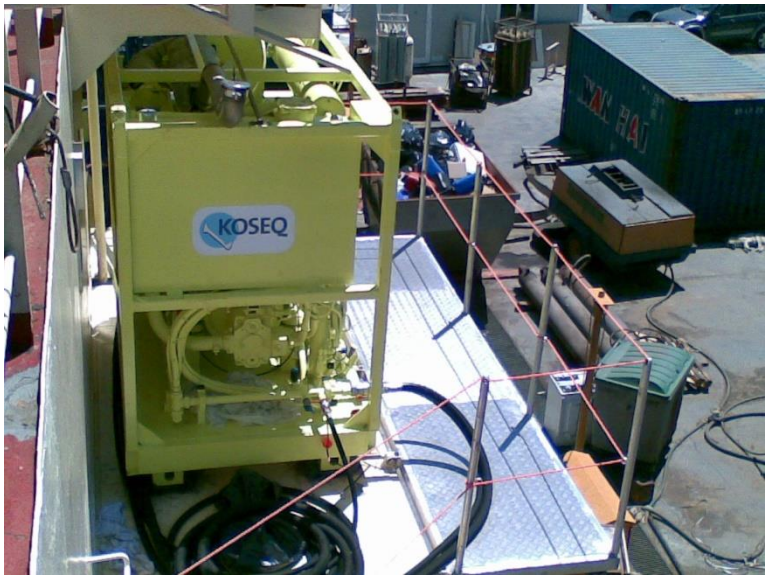
All items in dashboard are indicated with nameplates.
The above mentioned parts of the dashboard are necessary to operate and control the most important functions of Power Pack.
At the frame of Power Pack four hoisting eyes are mounted. Hoisting of Power Pack is only allowed by using these hoisting eyes.

Technical description

Doosan Power Pack specifications

Manufacturer:	Koseq/Doosan, Netherlands
Intended use:	Hydraulic power generation in zone 2
Year build:	2008
Operational area	Zone-2
Diesel engine	Daewoo L066TI
Rated power	125 kW at 2000 rpm intermittent
Fuel consumption engine	0.25 l/kw/h
Hydraulic pump	Parker PV 140
Hydraulic oil flow	200 ltr at 2000 rpm
Hydraulic oil pressure	350 bar max.
Connections	1” quick coupling, female (high-pressure side)
	½” quick coupling, female (return side)
Safety devices:	High coolant (motor) temperature High exhaust pressure Over speed of diesel engine High hydraulic oil temperature Low hydraulic oil level Manual operated stop devices Intake shutdown valve
Volume of fuel tank	400 l
Volume of lubricant for engine	25 l
Volume of hydraulic oil tank	230 l
Volume of cooling system	120 l
Length	2200 mm
Wide	1200 mm
Height	1800 mm
Weight	1600 kg excl. hydraulic oil and diesel fuel
Weight	2200 kg incl. hydraulic oil and diesel fuel.
Colour	Yellow RAL 1016

Doosan Power Pack for Sweeping Arm



Doosan Power Pack for Sweeping Arm

2. Boom set

Manufacturer:

Reel: MARKLEEN TERRA, S.L.U.

Polígono Río Gállego, calle E, nº 22

50840 San Mateo de Gállego

Zaragoza, Spain

Tel: 976 683 000

E-mail: markleen@markleen.com

Manufacturer:

Boom segments: VIKOMA INTERNATIONAL LTD

Kingston Road

East Cowes

Isle of Wight

PO32 6JS

Tel: +44 (0)1983 200560

sales@vikoma.com

2.1 Markleen DHPP 60 power pack Ex Zone II

Markleen hydraulic Power Pack DHPP60 Ex Zone II is a compact and robust unit provided with fork lift tunnels and lifting points and protected with marine grade paints to resist to resist corrosion. All its components are easily accessible for cleaning and maintenance operations. This unit is driven by a diesel engine which moves a hydraulic gear pump. The pump will be coupled to the motor using an integral close coupled configuration, delivering variable flow. This hydraulic power unit consists of two vertical reservoirs (hydraulic oil and fuel). The hydraulic tank incorporates sump drain, oil level gauge, filler/breather assembly and return connections. The fuel tank incorporates drain and fuel level indicator. It is provided with an ergonomic control panel that makes possible the operator controls the principal operational parameters from the engine.

The Power Pack feeds the hydraulic winder UNIREEL where the self-inflatable boom is stored. The unit also powers the hydraulic compressor that supplies with compressed air the same hydraulic winder. From the winder air supply system, the air is distributed throughout to the boom primary and secondary filling systems. The Power pack is provided with an ergonomic control panel that makes possible the operator controls the principal operational parameters from the engine.

Markleen Power Pack

Power Pack specifications

Model	**DHPP 60 EX ZONE II**
Construction Frame 304	Steel protected with marine grade paints Tanks: Stainless Steel AISI 304 Bodywork: Stainless Steel AISI
Engine	JCB PP 854 Ex-Proof
Start	Manual
Max. rated power	63 kW to 2200 rpm
63 kW to 2200 rpm Hydraulic Pump	Variable displacement pump
Max. hydraulic oil flow [l/min]	150
Max. hydraulic output [bar]	225
Fuel tank [litres]	95

Hydraulic oil tank [litres]	265
Hydraulic quick couplings (*)	Pressure: Male quick coupling 1" Return: Female quick coupling 1" Drain: Female quick coupling 3/8"
Controls	Start/ Emergency Stop lever Stop Accelerator Hydraulic ball valve for start and decompression
Gauges	Engine control box: Oil pressure, water temperature, exhaust temperature and tachometer Manometer Hydraulic oil level and oil temperature Fuel level
Handling and transport	4 hoisting points Forklift tunnels
Measurements (L x W x H) (mm)	2010 x 1160 x 1673
Weight (empty tanks / full tanks)	1500 / 1810
Built	2008

2.2 Air compressor UNIAIR 5000/8

The Markleen Uniair 5000/8 air compressor supplies a high rate of compressed air flow to inflate the Markleen Uniboom X-1900 SPI boom. The high rate of compressed air flow supplied by the Uniair 5000/8 compressor allows the booms to be inflated extremely quickly, both via the primary and the secondary (back-up) circuit.

Air Compressor

As the Markleen Uniair 5000/8 air compressor is hydraulically operated, it is suitable for use in explosive or flammable environments. The compressor is compact and robust, with frame in stainless steel and the components protected with marine grade paints to resist corrosion.

The Markleen Uniair 5000/8 air compressor needs only pressure and return line connection to the hydraulic system, but it is also provided with a drain line. Hydraulic assembly is configured with quick couplings.

The compressor needs more than 180 bar oil pressure to work properly. Max. oil pressure is 210 bar. If the power pack may supply more pressure, a separate pressure control valve has to be used.

The return line must connect directly to the oil tank and there should not be more than 10 bar back pressure when the hydraulic oil is flowing normally.

Air Compressor specifications

Length	1200 mm
Height	950 mm
Width	650 mm
Weight	210 kg
Compressed air flow rate	5000 l/min
Continuous air pressure	8 bar

2.3 and 2.4 Hydraulic winder UNIREEL 14 M3ISO flat container 20 ft. and

Description

Hydraulic storage winder for the oil boom mounted in a rotating platform over a 20' container base frame. The reel has a hinged operator platform with a control panel from where it is controlled the deployment and retrieval of the boom system. The reel has a separate retrieval line and set of air hoses for supply of air to primary and secondary inflation system.

The UNIREEL winder is driven by a hydraulic Power Pack Markleen DHPP 60 Ex Zone II.

Markleen Uniboom reel specifications

Length	1400 mm
Height	1814 mm
Width	1500 mm
Weight	1159 kg
Drum Diameter	1500 mm
Hydraulic Flow	10 l/min
Hydraulic pressure	200 bar max

Uniboom reel with Vikoma boom

2.5 Boom segments Vikoma

Constructed of exceptionally strong, highly flexible neoprene fabric, the boom has a smooth profile, combined with excellent heave response and high buoyancy to weight ratio providing excellent wave following characteristics. This means it contains oil extremely well, eliminating the vortices and splashover which may occur with less flexible booms. The flexible nature of the boom also minimises the stresses and weaknesses which can occur with more rigid booms. Single point inflation The boom is designed with a continuous inflation cuff running the full length of the boom, with sections joined by a special connector so the whole boom is inflated by a single inflator.

Independent chambers

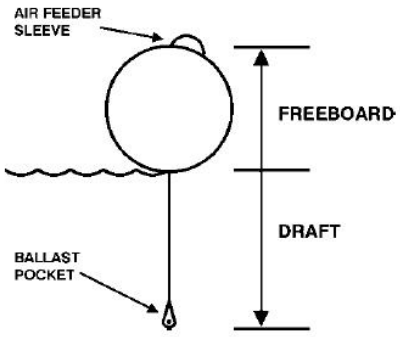
The boom itself is divided by internal bulkheads, every 3 -5 metres, to form independent chambers sealed by one-way valves. So if a chamber is damaged, the chambers to each side will support the deflated area and maintain the integrity of the boom.

Air Inflation System

Air feeder sleeves in each boom section are joined together. Air enters the individual buoyancy chambers via non-return valves. This allows rapid single point inflation from one end of the boom. An inflator on a towing vessel can, for example, be used to inflate the boom as it is deployed at high speed from the reel on a parent vessel. Operating pressure of Hi Sprint boom is 0.02 bar.

Deflation Valves

Supplied fitted with very high capacity, spring loaded, marine use deflation valves (MKXII) in each air buoyancy chamber are opened to allow deflation of the individual chambers as they are recovered onto the vessel. The valves are then closed once each chamber is wound onto the reel.



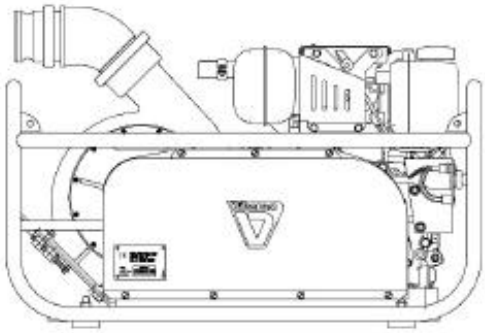
Ballast

Galvanised, long link ballast chain in double thickness skirt pocket, providing good underwater profile for maximum oil retention.

	Breaking Load N/50mm	Tear Strength (Warp/weft) N	Tensile Strength Fabric kN	Single Point Inflation	Ballast Chain Size mm	Tensile strength Chain kN	Reserve Buoyancy to Weight Ratio	Buoyancy Kg/m
Hi-Sprint 2000	4000	300/300	349.28	Yes	12.5 mm	74	32.7:1	441

2.6 Air inflator

AIRPACK INFLATOR
AP/0080-H (hand start)
AP/0080-E (electric start)



Application
The Vikoma Airpack Inflator is used to supply the necessary air inflation during the deployment of the Vikoma HI Sprint Boom™. Inflator is supplied with hose kit.

Dimensions

Length	84cm
Width	45cm
Height	59cm
Weight	68Kg (hand start) 77Kg (electric start)

Construction

Frame	Aluminium alloy
Belt cover	Aluminium alloy

Engine
Single cylinder air cooled diesel.

Continuous power	4.1kW @ 3300 rpm
Hand starting	Recoil
Electric starting	Key ignition 12 volt battery charged by alternator on engine.
Fuel capacity	2.7 litres

Air Fan

Type	Centrifugal, high volume, low pressure
Drive	Vee belt system @ 2.4:1 increase
Controls	Fan output via engine speed
Maximum Output	$16m^3$/min @ 8000 rpm
Pressure	69 mbar

Shipping Dimensions

Length	126cm
Width	86cm
Height	86cm
Weight	138kg

Hose Kit
1 x 15m 3"NB flexible air feeder hose with quick release couplings at each end.

Standard Equipment
2 x operation & maintenance manuals
1 x lifting sling (LS/4619)

Optional Accessories
Automatic air intake shutdown valve (MV/0072)
Spark arrestor exhaust (AP/0088)
Deflation kit (AP/0068)
PVC cover (8037CV)
Spares kit (SK/0083-C)

2.7 Towing bridles

VIKOMA TOWING BRIDLES

Application

Tow bridles fulfil a vital role in the operation of a boom system. They aid the towing, positioning and mooring of the deployed boom ensuring the most effective response to a containment situation. Through Vikoma's continuing development programme, limitations and dangers were highlighted when using metal towing bridles, i.e.: stainless steel / galvanised wire.

- Synthetic bridles contain no wire, therefore eliminates the hazard of frayed razor sharp metal strands puncturing a boom.
- A synthetic webbing system reduces the need for hard thimbles and ferrules, these are required in fabricating metal bridles which pose a danger to boom material.
- With a terylene webbing bridle sudden loads are partially dissipated before reaching the boom, due to the relatively inelastic nature of a metal bridle any snatch loads applied during towing are delivered directly to the boom.
- Synthetic bridles in comparison to their metal counterparts are much lighter. The heavy nature of metal bridles results in further ancillary equipment being required such as floatation buoys, increasing cost and reducing reel capacity and storage space.
- Synthetic bridles are resistant to corrosion. Over time, metal bridles will start to corrode resulting in deterioration in performance.

Dimensions

The tow bridle range covers all Vikoma® booms and floating storage tanks. They are available as standard in both Unicon™ and ASTM format. Please contact Vikoma International for assistance in specifying the correct bridle for your application.

Construction

Tow plates	Marine grade aluminium
Towing strops	Terylene webbing
Towing line	Polypropylene rope

Tow bridles come as standard with bolting locations and thumbscrews and are completely compatible with the Vikoma boom range.

3. Skimmer Normar 250 TI

Manufacturer:

AllMaritim AS

Fagernes 4

5043 Bergen

Norway

Phone: +47 55 33 61 60

Fax: +47 55 33 61 61

Email: post@allmaritim.com

Website: www.allmaritim.com

NorMar 250TI system

Description

The NorMar oil recovery and transfer system consists of two interchangeable skimmer heads: a weir skimmer and a high viscosity soft shovel skimmer cassette. The skimmer head is connected to the outer end of the floating umbilical. A dedicated power pack provides the necessary hydraulic supply. The system is a complete integrated unit with a built-in crane arm.

The materials are coated mild steel for the structure, seawater resistant aluminum for the skimmer frame and stainless steel for the hydraulic fittings. The system is all hydraulically operated, and therefore suited for deck operation during an oil spill.

Using two Desmi modified positive displacement Archimedes screw (PDAS) pumps in vertical design, type DOP-250 DUAL, the skimmer is able to efficiently recover light as well as heavy oil, also when mixed with debris normally found in oil spills.

The NorMar skimmer and hose handling system is designed to recover oil and oil emulsions with medium to high viscosity from the sea surface under calm to rough weather conditions. The skimmer has two thrusters to secure the best recovery position in the floating containment boom. The thrusters are hydraulically driven and controlled from the remote control box.

The NorMar double barrel free floating transfer hose is designed so that the hydraulic lines inside the transfer hose can easily be inspected or replaced without disturbing the floating transfer hose. The NorMar skimmer system is operated from an operator's platform located at the side of the unit. Each function is controlled by its own proportional valve. In addition to the manual operated proportional valves, the system is also remotely operated via an explosion proof remote control.

The NorMar skimmer is operational under the following weather conditions:

Wind:	15 m/sec
Waves:	up to 4 m
Max towing speed:	4 knots
Temperature air °C:	-40°C to + 50°C
Temperature sea °C:	-2°C to + 40°C

3.1 Brush module

The NorMar brush/disc skimmer is designed to recover oil with viscosities ranging from light to heavy oil. The cassette is equipped with four Archimedes screw soft shovels on all sides giving heavy oil recovery capacities up to 250 m^3/h. The skimmer is not sensitive to floating debris due to the inlet guard mounted in front of the soft shovel segments.

The skimmer is designed to be operational in 4 meter waves.

The main body comprises:

• Aluminum frame

• Transfer pumps (the brush skimmer head is placed on the same frame as the weir skimmer fitted with the two Desmi pumps, see 5.6.4.)

• Oil sump

• 6” flange coupling for connection to transfer hose

• 4 floats – as an integrated part of the skimmer body

• 4 soft shovel units

Brush skimmer head

Normar Brush Skimmer dimensions

Technical specifications	
Length:	1910 mm
Width:	1910 mm
Height:	1600 mm
Weight:	550 kg

3.2. Weir module

The NorMar weir skimmer is built into a protective frame made from seawater resistant aluminum, ensuring safe operation and low weight. The skimmer frame is equipped with two thrusters 15 hp each. The weir is built with a self-adjusting floating ring. The external skimmer floats can easily be removed for storage, or for hook up of the heavy oil shovel brush cassette. One MSP-150-63 pump is included in the weir skimmer module (see description in 5.6.3).

Weir skimmer head

Normar Weir Skimmer dimensions

Technical specifications	
Length:	1825 mm
Width:	1825 mm
Height:	1810 mm
Weight:	180 kg

3.3 Marflex Centrifugal Pump MSP150

Manufacturer:

Marflex B.V.

Postal Address:

Louis Pasteurstraat 12

3261 LZ Oud-Beijerland

The Netherlands

Tel: +31 186 89 02 00

Fax:+31 186 89 02 49

E-mail: info@marflex.com

Web-Site: www.marflex.com

Marflex MSP 150 Pump

The Marflex pump type MSP-150-63 is a hydraulically driven portable single stage vertical centrifugal pump that has been designed for efficient handling of viscous liquids, bulky solids and shear-sensitive liquids. The MSP 150 portable pump is based upon a centrifugal screw impeller that combines the properties of a screw pump with those of a centrifugal one.

The pump impeller is keyed directly onto the hydraulic motor shaft. The high pressure oil is led into the hydraulic motor through the pressure hose; the leak oil connection is connected to the return oil outlet port on the hydraulic motor, the return oil flows back to the main hydraulic system. A special shaft seal arrangement has been developed in the hydraulic motor to segregate the hydraulic and the cargo.

3.4 Desmi DOP-250 dual PDAS pump

Manufacturer:

Ro-Clean Desmi A/S
Hestehaven 21 B
DK-5260 Odense S
Denmark
Phone: +45 6591 0201

Fax: +45 6590 8877
Email: info@ro-cleandesmi.com

Website: www.desmi.com/ro-cleandesmi

Desmi DOP-250 Pump

Description

The NorMar skimmer incorporates two Desmi DOP-250 pumps which deliver a maximum capacity of 200 m³/h and can develop discharge pressures up to 10 bar while maintaining nearly maximum flow. Two of these pumps are installed in the common weir/brush skimmer frame.

The Desmi DOP-250 DUAL is in its basic design a modified Archimedes' screw pump. Inside the Desmi DOP-250 DUAL pump the pressure is built up between the screw and the engaging plate wheel. In order to withstand this pressure and the wear caused by abrasive media, the plate wheel is specially designed: a high-tensile steel core carries easily replaceable sectional discs of polyethylene.

Each pump is fitted with a cutting knife that will handle many types of trash found in oil spills.

Desmi DOP-250 pump specifications

Technical specifications	
Length:	720 mm
Width:	390 mm
Height:	670 mm
Weight:	78 kg
Max. pressure:	10 bar

Max. capacity:	100 m³/h
Viscosity range:	1 to > 1 million cSt
Material specifications	
Screw:	Double-curved Archimedes' screw in cast stainless steel (Ni-Resist), machined in a 5-axis CNC centre.
Casing:	Casing in seawater resistant aluminium, cast iron, or stainless steel. Standard is aluminium. Replaceable polyethylene sealing ring.
Hydraulic system	
Prime mover:	Danfoss hydraulic motor, type OMTS 160
Max. speed:	800 rpm continuously
Max. input power:	47 kW continuously
Max. output power:	38 kW continuously
Max. oil flow:	160 l/min. continuously
Max. inlet pressure:	210 bar continuously
Hydraulic connections	
Pressure line:	3/4” - 1” quick coupling male
Return line:	3/4" - 1” quick coupling male
Drain line:	3/8” quick coupling male

3.5 Diesel hydraulic power pack 120 kW

The power pack is mounted on the lower foundation of the storage and handling system. The base frame, the tank and the panel are all made from seawater resistant aluminium.

Power Pack

Technical specifications	
Diesel Engine:	Perkins 4 cylinder in-line or equal. Radiator cooled
Rating:	107 kW at 2100 rpm, 120 kW at 2400 rpm
Operational area:	Zone II
Length:	2300 mm
Width:	1070 mm
Height:	1740 mm
Weight:	1950 kg (dry)
Hydraulic working pressure :	320 bar
Adjustable pressure:	0-600 bar
Oil flow:	200 l/min
Controllers:	Instruments and controllers for both the diesel engine and the hydraulic system are assembled on a common panel
Safety control system	Overload protection by pressure relief valve. Emergency shut-down: - Low hydraulic oil level - High hydraulic oil temperature - High engine temperature - Low lubricating oil temperature - Over-speed
Fuel tank:	330 ltr

3.6 Hydraulically driven reel with 360° turntable and integrated crane

The hose reel is designed for storage of 80 meters of Noren 6" floating hose. The reel is hydraulically driven for launching and retrieval of the floating hose and skimmer unit. The hose reel is built together with a crane arm (A-frame) to allow handling and deployment of the skimmer heads over the side of a ship or other barriers.

The crane arm is equipped with an automatic spooling device. The hose reel and crane arm is mounted on a common foundation allowing for 360° rotation. The system is mounted on a common foundation with 20 ft. container footprint with twist locks in each corner.

NorMar reel

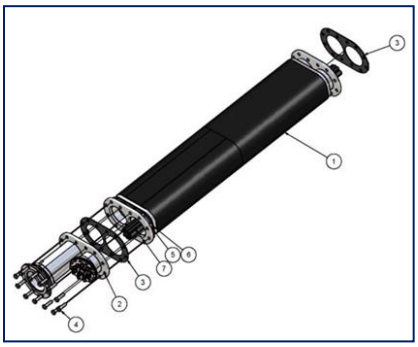
The crane is an integrated part of the hose handling reel, has a capacity of 6 tons and an outreach of 5.5 meters. All hydraulic connections are done via swivel arrangement at the base of the turntable as an integrated part of the unit.

Normar Reel handling system specifications

Technical specifications (NorMar TI hose handling system)	
Length:	6241 mm
Width:	2645 mm
Height:	3675 mm in stored position (3995 in operation)
Weight:	9000 kg (including hose)

Umbilical hose (including hydraulic and oil hoses)

The NorMar floating umbilical is made as a double barrel umbilical, where replaceable hydraulic lines are in one barrel, and the recovered oil is pumped through the other barrel. A water injection flange is mounted close to the connection between the skimmer head pump flange and the floating umbilical flange for lubrication and friction reduction in the transfer hose during recovery of heavy oils.



Floating umbilical

3.9 Remote control

Manufacturer:

Cavotec Micro-control AS

Gevinglia 112

NO-7517, Hell

Norway

Phone: +47 74 83 98 60

Fax: +47 74 83 01 50

Email: microcontrol@cavotec.com

Web site: www.cavotec.com

Description

The MC-3-series system mainly consists of the following parts:

Cavotec Remote Control

- Terminal
- Carrying belt/strap
- Rechargeable batteries
- Base unit
- Antenna

All the skimmer's hydraulic functions are remotely operated by radio. A 20 meters cable also connects the terminal to the base unit.

Normar remote control specifications

Control unit:	MC-3000-Ex
Operational area:	Zone II
Frequency range:	418-474 MHz
Max. operating distance:	200 m
Transmitter weight:	2.2 kg
Transmitter size:	305 x 200 x 190 mm
Control valves:	Danfoss PVG 120-32/9, 24 V 4 – 20 mA
Power supply:	220 V, 50/60 hz

3.10 Hydraulic hoses

ø 3/4 " x 50 m hydraulic pressure hose
ø 1 " x 50 m hydraulic return hose
4 x ø ½" x 50 m hydraulic hose for operation of 2 thrusters
ø ½ " x 50 m multipurpose hydraulic hose, to be used depending on the equipment configuration.

All hydraulic hoses are industry standard. All hydraulic couplings and fittings are in AISI 316 stainless steel.

3.11 Oil hoses

ø 6" x 80 meter cargo hose DN 150 5

3.12 Spare parts

A box with spare parts is provided.

4. Sampling equipment

4.1 Viscometer Cannon 2020

Manufacturer:

CANNON Instrument Company
2139 High Tech Road
State College PA 16803, USA

Tel. +1 814-353-8000, Fax +1 814-353-8007

E-mail: cannon@cannoninstrument.com, Website: www.cannoninstrument.com

Description

The CANNON Model 2020 Rotary Viscometer provides a convenient mean for the determination of viscosity. These easy-to-use instrument measures the viscous drag of a liquid against a rotating spindle. A digital readout displays viscosity directly in centipoise (shown as cP) or milliPascal-seconds (shown as mPa·s). No calculations are required just read the viscosity from the front panel display.

Model 2020 Rotary viscometer is available in two types. The low viscosity LV-2020 model measures viscosity from 1* to 2,000,000 centipoise. The medium viscosity MV-2020 model measures viscosity from 100* to 13,000,000 centipoise. Both models allow measurement at 18 speeds ranging from 0.3 to 100 rpm. By choosing the proper speed/spindle combination, any viscosity within the range of the instrument can be measured. Measurements can also be made using the same spindle at different speeds to determine the rheological properties of a material at different shear rates. Viscosity measurements are taken four times per revolution.

The Model 2020 viscometer includes a sophisticated display that shows the viscosity, % torque, and the speed/spindle in use. When the Auto Range button is pressed, the maximum (100%) torque viscosity attainable using the selected spindle at the selected speed is shown. A Select knob allows rapid scrolling through the available speed or spindle selections.

Technical Data

Shipping Dimensions:	40 cm wide x 25 cm high x 38 cm deep (19 x 10 x 15 inches)
Gross Weight:	9 kg (20 lb)
Net Weight:	7.7 kg (17 lb)
Power:	115 VAC or 230 VAC, 50/60 Hz, 20 watts (please specify voltage when ordering)
Spindle Speeds (rpm):	0.3, 0.5, 0.6, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 10, 12, 20, 30, 50, 60, 100
Accuracy:	±1.0% full scale range in use
Repeatability:	±0.2% full scale range in use
Operating Range:	LV-2020 measures viscosities between 1* and 2,000,000 cP MV-2020 measures viscosities between 100* and 13,000,000 cP

Cannon Viscosimeter 2020

4.2 Density Meter DM-340.2 – DenDi2

Manufacturer:

JSC LEMIS Baltic

26 Ganibu dambis Str.
Riga, LV-1005, LATVIA
Tel: +371 67383223 ; Fax: +371 67383270
E-mail: info@lemis-baltic.com; Website: www.lemis-baltic.com

Description

The portable laboratory density metre DenDi2 is designed for both – mobile and indoor laboratories for real density and temperature measurements of liquid in samples. The device can be operated in the following conditions:

- Ambient temperature: +15 - +30 Deg. Celsius
- Relative humidity: 45 – 80 % at 20 Deg. Celsius

The device consists of density and temperature sensor combined with signal converter unit. All submersible parts are made from corrosion-resistant materials. The operation principle of the DenDi2 is – weighting of the glass float in liquid. It allows measuring real density and temperature of wide range of liquids. The buoyancy force of liquid acts on the float, which has precise weight and volume; the float's movement is transmitted to the beam with balance. Converter processed electrical signal to digital signal. The results of measurement appear on the LCD. Besides data of real density and temperature, the device allows to read recalculated data of:

- D15 – relative density at 15 Deg. Celsius
- D20 – relative density at 20 Deg. Celsius
- SG – specific gravity at real temperature
- SG60F – specific gravity at 60 Deg. F
- API – API gravity at real temperature
- API60F - API gravity at 60 Deg. F
- Alc. – alcohol concentration

The device is not explosion proof; operation in an explosive zone is not permitted.

Technical Data

Density Meter specifications

Range of	density	0.5000…2.000 g/cm3 (500.0…2000.0 kg/m3
	temperature	+10…+50 Deg. Celsius
Accuracy of	density	± 0.0005 g/cm3 (± 0.5 kg/m3)
	temperature	± 0.2 Deg. Celsius
Resolution of	density	± 0.0001 g/cm3 (± 0.1 kg/m3)
	temperature	± 0.1 Deg. Celsius
Dimensions	(HxLxW)	230 x 130 x 180 mm
Weight		2.3 kg
Power supply		NiMH battery 6V / 1200 mAh
Charging device		90-240 V 50/60 Hz with output voltage 11-12 V and output current 600-700 mA
Submersible parts materials		Quartz glass / Stainless steel
Volume of sample, max		55 ml
Accessories		Built-in IR data port

Density Metre DM 340.2

4.3 Flash point tester Pensky-Martens HFP380

Manufacturer:

Walter Herzog GmbH

Testing Equipment for Petroleum Analyser

Badstraße 3-5

D-97912 Lauda-Königshofen

FAX: +49 9343 / 640-101

Internet: www.Walter-Herzog.com

Sales: Telephone: ++49 9343 / 640-111

E-Mail: Sales@Walter-Herzog.com

Service: Telephone: ++49 9343 / 640-181

E-Mail: HSC@Walter-Herzog.com

Description

Flash point testers in series HFP380 are used for the determination of the flash point of petroleum oil and other flammable liquids in accordance with the following procedures and standards : ASTM D93 A/B, DIN EN 22719 A/B, IP 34 A/B, ISO 2719 A/B, EN 22719 A/B, JIS K 2265.

Heating control

In addition to the test insert conforming to the standard the basic unit includes an electrical heating, which can be continuously adjusted by an output regulator via a potentiometer. The printed scale 0...100% gives a rough orientation on the current heating degree. The break/make ratio of the pulse-width modulation is indicated by a LED.

Heating

The test cup is heated by and a cast iron block prevents the direct contact with the heaters providing a uniform heating of the sample. Total power 1000 Watts.

Electrical Stirring Semi Unit

The sample is stirred by an electric gear motor. As described in the standards the rpm of 100, 250 or no stirring can be chosen by means of a change-over switch. The stirring will stop automatically during the dip-in.

Dip-in

As soon as the set temperature has been reached, the dip-in procedure starts with touching the key **Test.** To this end the dip-in motor makes a turn keeping its position after the test cover closed.

Semi-Unit

The „Semi-Unit“ holding the two motors and the change-over switch for the rpm speed is a tiltable frame and can be tilted back- and forwards to insert remove the cup easily. Both the stirring as well as the dip-in motor will couple with the test cover automatically via spring catches when the Semi-Unit is tilted downwards.

Technical Data

Flashpoint tester specifications

		Unit	Value
Mains voltage		V	230, 115
Mains frequency		Hz	50 / 60
Rated output		W	1000
Fuses			2 x 6,3A at 230 V 2 x 10 A at115 V
Dimensions (W x D x H)		mm	240 * 380 * 445
Weight	Gas ignition	kg	8,7
	with Blower	kg	9,9
	el. ignition	kg	10,0
	with Blower	kg	11,2
Operating temperature		° C	+0 ... + 40
		°F	+32 ... +104
Storing temperature		°C	-15... +55
		°F	5... 131

Flashpoint Tester Pensky Martens HFP 380

5. Communication equipment

Equipment	Component	Specifications
5.1 Portable computer (laptop) - DELL Laptop Alienware 17 R4	CPU	• Intel Core i7 7820HK(2.90GHz)
	GPU	• Nvidia GeForce GTX 1080 - 8192MB
	RAM	• 16GB
	Storage	• 256GB PCIe SSD + 1TB SSD
	Display	• 17.3" inch (3840 x 2160) 4k UHD IPS Nvidia G-Sync with Tobii Eye-Tracking
	Interface	• Alienware mSeries keyboard with per-key RGB LED AlienFX lighting • 2x USB 3.0 Type-A, 1x USB 3.0 Type-C • HDMI • Mini DisplayPort
	Communications	• Wireless LAN 802.11b/g/n/ac • Bluetooth • Network 10/100/1000 Mbit/s • 1 gigabit Ethernet (LAN) port
	Accessories	• Powered USB 3.0 hub with 4 ports • USB-to-Ethernet dongles • 4-port gigabit Ethernet switch • Multi-compartment laptop bag
	Operating system	• Windows 10 • Ms Office • Linux/Ubuntu 18 (the latest version) with no drivers issues with the hardware running Linux/Ubuntu 18
5.2 Waterproof VHF Headset system		HT944 Entel VHF CXR5/950 Entel Skull mic

DELL Laptop Alienware 17 R4

Powered USB 3.0 hub with 4 ports

USB-to-Ethernet dongles

4-port gigabit Ethernet switch

Multi-compartment laptop bag

Waterproof VHF Headset system