

Annex V of the VAC
Technical Specifications for the equipment
(Lot 1 – Channel and North Sea)

Procurement procedure: EMSA/CPNEG/3/2022

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/servicing of the equipment
 - 1.3 Additional equipment
- 2. Handover procedure for equipment transferred**
 - 2.1. Date and place of the handover
 - 2.2. Transportation
 - 2.3. 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 system Koseq 12 m
2. High-capacity skimmer: Lamor HCS
3. Oil boom: Vikoma Hi Sprint 2000.
4. Sampling and testing equipment:
 - a. Minilab
 - b. Flashpoint tester
 - c. Gas detector
5. Cleaning machines
6. Flow meter
7. Interface detector
8. Discharging pumps

All tenderers will have the opportunity to visually verify the condition of equipment items listed above in the stockpile in Ostend, Belgium, except one Markleen and one Lamor power packs that are stored in Rotterdam, Netherlands, at request. In principle the visit will be organised in week 29. 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.

1.2. Overhauling/servicing of the equipment

Most of the equipment that will be transferred to the Contractor was purchased in 2009 (except the Minilab purchased in 2010, cleaning machines purchased in 2015 and Lamor High Capacity Skimmer purchased in 2018). The equipment is generally in good condition. The sweeping arm system (including sweeping arms and cranes) was overhauled and refurbished in 2015. New electric/hydraulic powerpack for the system was purchased in 2015. The boom underwent an extensive servicing in 2015. Sampling and testing equipment was serviced and calibrated also in 2015.

The equipment has never been used to recover oil and it was deployed few times per year for the purpose of drills and exercises (4 quarterly drills and 1 exercise per year). The equipment is categorised and appropriately labelled. It underwent regular maintenance according to the manufacturer's specification. The maintenance was closely monitored by EMSA. The working condition of the equipment is regularly verified by the Agency during drills.

The Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment. Therefore, the Contractor should arrange servicing/overhauling 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 servicing costs. This estimation will be considered as the ceiling that EMSA will reimburse in relation to the equipment servicing.

Detailed report of the service(s) 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/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 previous experience, below is the indicative list of the overhauling 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 (12m) (including weir module)	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
3 x Power Pack	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

1.2.2. Equipment to be serviced

The contractor should arrange servicing to the following equipment:

1. Oil boom: Vikoma Hi Sprint 2000. In addition, some items of the transferred boom system will have to be replaced (e.g. boom sections, hoses). More details are presented in point 5.2 of this document.
2. Sampling and testing equipment: minilab, flashpoint tester, gas detector
3. Cleaning machines
4. Interface detector
5. Flow meter
6. Discharging pumps

The servicing to this equipment should include the following:

- Check, test (new certification) and replace, if necessary, the hydraulic and cargo hoses;
- Check and replace, if necessary, the cables, wires, ropes, etc.;
- General overhauling of all pumps;
- Check the wear of the brushes of the skimmer and replace, if necessary;
- Check of power packs, change the engine and hydraulic oil, coolant liquid, filters (oil, air, fuel), belts;
- Replace all rusty couplings;
- Replacement of all seals, O-rings, etc, where applicable;
- Check the paint and repaint, if necessary;
- Calibrate the Sampling and Testing Equipment, if necessary.

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. If the proposed vessel cannot use its own hydraulic stem nor cannot make use of the electrohydraulic power pack transferred by EMSA, then the two transferred Markleen power packs should be adjusted/adapted in order to be able to run the sweeping arms system.
3. Communication 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.
4. 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.

5. 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 Contractor¹.

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.

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

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. All the equipment will be available in Ostend, Belgium with the exception of two power packs that will have to be transported from Rotterdam, Netherlands.

The handover will be done at a date to be mutually agreed between EMSA and the Contractor and shall not take place earlier than 24/06/2023 and not later than 24/07/2023.

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.

This configuration will be tested during all quarterly drills every year.

4. List of transferred equipment

Category	Item	First Reception Date	Additional info	ID Code (old)	ID Code (new)	Comments
1. Sweeping arm system EUR 600,000	1. Frame	25/11/2009	Koseq VEEGARMEN RIGID-WEIR SKIMMER 12m + Towing lines and chains	CBOM362201	0120	Refurbished in 2015
		25/11/2009	Koseq VEEGARMEN RIGID-WEIR SKIMMER 12m + Towing lines and chains	CBOM362202	0121	Refurbished in 2015
	2. Pump	25/11/2009	Marflex SCREW/CENTRIFUGAL MSP 150-63	CBOM283201	0122	Refurbished in 2015
		25/11/2009	Marflex SCREW/CENTRIFUGAL MSP 150-63	CBOM283202	0123	Refurbished in 2015
	3. Crane	25/11/2009	Port side	CBOM131501	0124	Refurbished in 2015
		25/11/2009	Starboard side	CBOM131502	0125	Refurbished in 2015
	4. Control desk & Remote control	25/11/2009	HYDRAULIC CABINET WITH EMERG. STOP	CBOM111301	0126	top of the crane
		25/11/2009	HYDRAULIC CABINET WITH EMERG. STOP	CBOM111302	0127	top of the crane
		24/09/2015	Wireless remote control for port side crane	n/a	2527	Added in 2015
		24/09/2015	Wireless remote control for starboard side crane	n/a	2528	Added in 2015
	5. Hydraulic /oil hose(s)	25/11/2009	HOSE SET WITH QUICK CONECTION COUPLINGS (DISCHARGE 6", HYCRAULIC PRESS. 1", RETURN 1.5" & DRAIN 0.5") (12 m)	CBOM020201	0128	
		25/11/2009	HOSE SET WITH QUICK CONECTION COUPLINGS (DISCHARGE 6", HYCRAULIC PRESS. 1", RETURN 1.5" & DRAIN 0.5") (12 m)	CBOM020202	0129	
	6. Power pack	24/09/2015	Electric / hydraulic power pack	n/a	2074	It can serve all systems not just the sweeping arms.
	7. Power pack	25/11/2009	Markleen DHPP 90 diesel hydraulic power pack	CBNI272802	0247	
		25/11/2009	Markleen DHPP 90 diesel hydraulic power pack	CBOI272801	0229	Located in Rotterdam
2. Oil boom EUR 243,678 To be adjusted after replacing the boom fabric	1. Boom sections	25/11/2009	Hi sprint 2000 Heavy duty single point inflation with ASTM connectors 250m	CBOA073601	0168	
		25/11/2009	Hi sprint 2000 Heavy duty single point inflation with ASTM connectors 250m	CBOA073602	0169	
	2. Towing lines and bridles set	25/11/2009	2 TOW ROPE (BREAK LINE 1.5 TONNES)	CBOA374201	0170	
		25/11/2009	2 TOW ROPE (BREAK LINE 1.5 TONNES)	CBOA374202	0171	
		25/11/2009	UNICOM CONNECTOR TOWING BRIDLE	CBOA370601	0172	

		25/11/2009	UNICOM CONNECTOR TOWING BRIDLE	CBOA370602	0173	
		25/11/2009	2 TOW ROPE (BREAK LINE 1.5 TONNES)	CBOA374203	0174	
		25/11/2009	2 TOW ROPE (BREAK LINE 1.5 TONNES)	CBOA374204	0175	
		25/11/2009	UNICOM CONNECTOR TOWING BRIDLE	CBOA370603	0176	
		25/11/2009	UNICOM CONNECTOR TOWING BRIDLE	CBOA370604	0177	
	3. Storage reel with cover and ancillaries	25/11/2009	TYPE 600P REEL ASSY YANMAR ENGINE & MOD. FRAME MASTER	CBOA353401	0178	
		25/11/2009	SPARK ARRESTOR FOR BOOM REEL	CBOA020201	0179	installed in the engine that is mounted on the boom reel
		25/11/2009	AUTOMATIC SHUTDOWN VALVE FOR BOOM REEL	CBOA020202	0180	installed in the engine that is mounted on the boom reel
		25/11/2009	BOOM REEL COVER FOR BOOM REEL	CBOA121401	0181	
		25/11/2009	BOOM REEL COVER FOR BOOM REEL	CBOA121402	0182	
		25/11/2009	TYPE 600P REEL ASSY YANMAR ENGINE & MOD. FRAME MASTER	CBOA353402	0183	
	4. Air blower with air hose(s) ancillaries	25/11/2009	AIR PACK INFLATOR G.A. ELECTRIC START	CBOA032901	0184	
		25/11/2009	FLEXIBLE HOSE 3" WITH CAMLOCK CONNECTORS (10 meters)	CBOA053601	0185	
		25/11/2009	SPARK ARRESTOR FOR BOOM INFLATOR	CBOA020203	0186	
		25/11/2009	DEFLATOR KIT FOR BOOM INFLATOR	CBOA020205	0187	back pack
	5. Assembly for U configuration	25/11/2009	GATE BOOM ASSEMBLY FOR U CONFIGURATION 4-5 METERS	CBOA020206	0188	
		25/11/2009	GATE BOOM ASSEMBLY FOR U CONFIGURATION 8-10 METERS	CBOA020207	0189	
3. High Capacity Skimmer EUR 798,329	1. Power reel	11/07/2019	Lamor LUT 5 80 Umbilical Hose Reel Telescopic LUT 5/80 on a 10' flat rack footprint	n/a	6139	
	2. Umbilical hose	11/07/2019	Lamor LUT 5 80 Umbilical Hose LUH 5" 80m, 11 Ch, Anti-static	n/a		
	3. Remote control	11/07/2019	Radio Remote Control MC-3-6 EX M36-EX501058 with Receiver Base Units 1 (LWS 1300) 2 (UHW)	n/a	6140	
	4. Flow meter	11/07/2019	AISI316 DN125, PN16 20-135 m3/h - integrated	n/a		
	5. Hydraulic hose(s)	11/07/2019	Set 10m, SS for Umbilical Hose Reel, incl. Water Injection Hose SS, 10m	n/a		
	6. Weir module with ancillaries	11/07/2019	With hydraulic thruster set	n/a	6141	
		11/07/2019	Removable Debris Screen for LWS 1300 Mk II	n/a		

		11/07/2019	Water injection outlet assembly, DIN 5" flange D125 PN 16 SS, TEMA 5011 RFV SS, for LWS 1300 Mk II skimmer	n/a		
	7. Brush module	11/07/2019	Brush adaptor with removable debris screen	n/a	6142	
		11/07/2019	Brush adaptor with removable debris screen	n/a	6143	
		11/07/2019	Brush adaptor with removable debris screen	n/a	6144	
	8. Pump	11/07/2019	GT A 140 Cargo pump with water injection kit, inlet 3/4"	n/a	6145	
		11/07/2019	LIP 400 IP Water injection pump for HC skimmer and PDAS pump	n/a	6146	
	9. Water injection	11/07/2019	Ancillaries for the water injection pump 1 x water suction hose semi rigid Apollo 2 1/2" L-5m; 1 x suction stainer & check valve camlock 2 1/2" SS 1 adapter camlock 2 1/2" -TEMA 1/2" SS 2 x water injection hose 20m, SS 2 x hydraulic hose 1/2" x 15m, SS TEMA 5000	n/a		
	10. Oil hose(s)	11/07/2019	Semi Rigid, multi-oil blue heavy duty 5", 2 x L-10m, anti - static	n/a		
	11. Cover	11/07/2019	20' Steel container storage roof with side door for 2 x 10' flat-racks (power reel and LWS 1300 skimmer) including 8 lashing twist locks	n/a	3046	
	12. Spare parts	11/07/2019	Spk1 for GTA; Kit rubber adhesive for LUH; Spk1 for weir skimmer; Spk1 for Brush adapter; Spk1 for LPP 95; 1 Hydraulic Hose set between LUH and LWS; 1 hydraulic hose set 10m for power reel; paint repair kit	n/a		
	13. Power pack	11/07/2019	LPP 95 power pack, diesel driven, hydraulic start, battery 70 Ah Installed inside of a 10' ISO closed container"	n/a	6147	Located in Rotterdam
4. Sampling / Testing EUR 18,881	Mini lab	15/07/2010	Densimeter	CMPH232501	1336	
		15/07/2010	Viscosimeter	CMPH232501	1933	
		15/07/2010	Hydrometer	CMPH232501	1935	
		15/07/2010	Flash point tester	CMPH232501	1934	
		01/10/2015	Gas detector Benelux Mini Rae 3000	n/a	2103	
5. Cleaning equipment EUR 6,500	Cleaning machines	24/09/2015	High pressure Karcher HDS 801	n/a	2092	
		24/09/2015	High pressure Karcher HDS 801	n/a	2093	
6. Interface detector EUR 9,573	Interface detector	24/09/2015	Oil/water interface detector system for decantation	n/a	2094	
7. Flow meter	Flow meter	01/10/2015	Micronics portable	n/a	2102	

EUR 6,532.50						
8. Discharging equipment EUR 14,732	Pumps	25/11/2009	Vogelsang, model VX186-260 Q DREHKOLBENPUMPEN (ODIN POMPTECHNIEK)	CBOE283201	0258	
		25/11/2009	Vogelsang, model VX186-260 Q DREHKOLBENPUMPEN (ODIN POMPTECHNIEK)	CBOE283202	0259	

5. Equipment description

5.1. Sweeping Arm system

Manufacturer:

KAMPERS OIL SPILL EQUIPMENT B.V
Oosthavenzijde 5
P.O. Box 5606
3297 ZG Puttershoek
The Netherlands
Tel: +31 78 6763811
Fax: +31 78 6764853
E-mail: design@koseq.com Web-site: <http://www.koseq.com>

Year of purchase 2009

The Koseq Rigid Sweeping Arm System consists of two 12 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.

The system consists of:

- 5.1.1 Sweeping Arms
- 5.1.2 Marflex Centrifugal Pump MSP150-63 (sweeping arms)
- 5.1.3 Sweeping arms cranes, Lagendijk SK 5/10-5000/1000
- 5.1.4 Control cabinets and radio remote control
- 5.1.5 Oil hoses/hydraulic hoses and cables (Sweeping arms and associated cranes)
- 5.1.6 Electric/hydraulic power pack
- 5.1.7 Markleen power packs

5.1.1. Koseq Rigid Sweeping Arms

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 sweeping arm pontoons are equipped with foldable ends.

Specification:

Function:	Collecting of oil
Year of purchase:	2009
Overall Length:	12115 mm
Overall width:	3330 mm
Overall height:	2370 mm
Weight (including pump and hoses):	4300 kg.
Type of skimmer:	integrated weir skimmer
Skimmer pumps:	centrifugal pump with screw impeller



Fig. 1. Koseq Rigid Sweeping Arm

5.1.2 Marflex Centrifugal Pump (Light/Medium oil skimmer module)

Manufacturer:

Marflex B.V.
 Louis Pasteurstraat 12
 3261 LZ Oud-Beijerland
 The Netherlands
 Tel: +31 186 89 02 00
 Fax: +31 186 89 02 49
 Email: info@marflex.com
 Website: www.marflex.com

The Marflex pump type MSP-150-63 is a hydraulically driven single stage vertical centrifugal pump that has been designed for efficient handling of viscous liquids, bulky solids and shear-sensitive liquids. The MSP 150 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.

Specification:

Design:	Single stage centrifugal
Capacity/head:	360 m ³ /h – 40 mlc. max.
Viscosity/specific gravity:	1.0 cSt. at 20°C/1.0
Speed:	2000 rpm max.
Required power:	45 kW
Hydraulic motor type:	Axial plunger with mechanical seal
Hydraulic working pressure:	200 bar
Hydraulic pressure, max.:	320 bar
Hydraulic flow, max.:	130 l/min
Maximum outer diameter:	490 mm
Height:	610 mm
Weight, excl. hydraulic hoses:	83 kg



Fig. 2. Marflex Pumps

5.1.3 Sweeping arm crane, 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 Koseq Sweeping Arm System for which specially purpose were designed.



Fig. 3. Sweeping Arm Crane

Specification:

Year of construction:	2009
Type:	SK 6.9-5000/13.3-1000
Main dimensions:	Length: 13.5 m – Width: 1.9 m
Propulsion:	Hydraulic
Lifting capacity:	5000 kg – 8.9 m / 1000 kg – 13.3 m
Tilt:	3° max.

5.1.4 Control cabinets, control panel and radio remote control



Fig. 4 and 5. Control Panel of Koseq Sweeping Arm

The crane and sweeping arms are operated through the control panel attached to the crane top. The panel is made up of 6 handles with which the operator can control the following elements:

- Sweeping arm pump.
- Sweeping arm weir skimmer height.
- Sweeping arm debris screen.
- Crane winch (1 Ton.)
- Crane winch (5 Ton.)
- Crane Cylinder.

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

Specification:

Model:	AUTEC FJL
Power supply:	7.4 VDC (Li-Ion Battery) 7.2 VDC (NiMH Battery)
Frequency band:	863-870 MHz (128 channels) – 915 MHz (260 channels) 447 MHz (32 channels) – 434 MHz (63 channels)
Hamming distance:	≥ 15
Typical working range:	100 m
Average usage time fully charged battery (continuous use at 20°C):	18.5 h (Li-Ion), 11 h (NiMH Battery)
Safety performance of the STOP function:	(EN ISO 13849-1 / EN IEC 62061) up to PL e, cat. 4 / SIL 3
Protection degree:	IP65 (NEMA 4)
Operating and storage temperature operating:	(-25 °C) ÷ (+55 °C) / storage: (-40 °C) ÷ (+85 °C)
Dimensions:	221 x 170 x 134 mm
Weight:	1.4 kg



Fig. 6. Sweeping arm radio remote control

5.1.5 Oil hoses/hydraulic hoses and cables (for sweeping arms and associated cranes)

The pressure, return and drain lines for the hydraulic motor and the discharge line for the pump consist of flexible hoses. All hoses are provided with stainless steel couplings.

Set of hoses consists of:

Hydraulic pressure hose: 1 “

Hydraulic return hose: 1½ “

Discharge hose: 6 “

5.1.6 Electric /hydraulic power pack

Manufacturer:

Luteijn Hydraulics BV
Deltahoek 15
4511 PA Breskens
The Netherlands
T +31 (0)117 376 353
E info@luteijn-hydraulics.nl
NL 8506.53.241.B01

Year of purchase 2009



Fig.7. Electric/hydraulic power pack

5.1.7 Markleen power packs

Manufacturer:

Markleen AS
Vollen Marina
Slemmestadveien 416
1390 Vollen, Norway
Tel: +47 66 85 51 40
Fax: +47 66 85 51 41
E-mail: markleen@markleen.com
www.markleen.com

Year of purchase: 2009

Specification:

Model:		MARKLEEN DHPP 90
Engine:		John Deere 4 cylinder water-cooled diesel engine
Starter:		Electric. 12 V / 140 Ah battery. Optional spring starter.
Max. rated power:		93 kW @ 2400 rpm
Hydraulic pump:		Variable displacement pump with axial pistons and open loop circuit.
Load sensing control:		Standard
Heat exchanger:		Air / Oil
Max. hydraulic flow rate	l/min	175
Max. hydraulic oil pressure	bar	310
Number of hydraulic circuits		1 - 6
Build of:		Stainless steel frame, tanks & panels
Fuel tank:	l	120
Hydraulic oil tank:	l	300
Hydraulic couplings:		Pressure, return & drain on each circuit
Controls:		Proportional distributor valve on each circuit, accelerator, emergency stop button.
Instruments:		Pressure gauge for each circuit, hydraulic oil level and temp., fuel level gauge.
Handling and transport:		4 hoist points, 2 ISO fork tunnels.
Measurements (l x w x h):	m	1.75 x 1.2 x 1.55



Fig. 7A Markleen DHPP 90 Power Pack

5.2 Vikoma Hi Sprint Boom 2000 Set

Manufacturer:

Vikoma International Ltd.
Kingston Works
Kingston Road
East Cowes
Isle of Wight
PO32 6JS. UK
Tel: +44 (0)1983 200560
Fax: +44 (0)1983 200561
email: sales@vikoma.com

Year of purchase 2009

The Set of Vikoma Hi Sprint Boom 2000 consists of:

- 5.2.1 Vikoma Hi Sprint Boom 2000 sections (2 x 250 m)
- 5.2.2 Towing ropes and bridles (2 Sets)
- 5.2.3 Vikoma Type 600 Boom Reel with Yanmar powerpack (x1)
Vikoma Type 600 Boom Reel without the powerpack (x1)
- 5.2.4 Air pack inflators AP/0080 with boom deflator kit and 10 m air hose
- 5.2.5 Boom gate assemblies for U configuration (8-10 m and 4-5 m)

5.2.1 Vikoma Hi Sprint Boom 2000 section (to be replaced)

Specification:

Dimensions

Length:	250 m (50m sections)
Weight:	12.68 kg/m
Minimum height:	2000 mm
Freeboard:	750 mm
Draft:	1250mm

Wave following characteristics

Boom air pressure:	0.3 psi
Buoyancy/weight ratio:	34.1:1

Fabric construction

Material:	Reinforced double-faced Neoprene
Tensile strength:	309.75kN
Tear strength:	323 N
Ballast chain:	19 mm (enclosed)



Fig. 8. Vikoma High Sprint Boom 2000 section

5.2.2 Towing bridle and ropes set

Specification:

Towing bar:	Marine grade aluminium, self-buoyant
Strops:	High integrity webbing (no metal)
Rope:	Polypropylene self-buoyant

5.2.3 Type 600 Boom Reel (to be serviced)

Vikoma Type 600 reels are intended for the storage, deployment and recovery the Vikoma High Sprint Boom 2000. Boom set includes 3 boom reels:

1 x Vikoma Type 600 Boom Reel with Yanmar powerpack and

2 x Vikoma Type 600 Boom Reel without the powerpack (1 for the boom storage and 1 spare for the boom cleaning). The covers for 2 reels are included

Specification:

Dimensions

L x W x H:	195 cm x 364 cm x 233cm
Weight:	1400 kg (bare reel)

Hydraulics (reel drive + control):	Double stage planetary gearbox driven by hydraulic motor; Forward and reverse; Dead-man's stop; Low/high torque selection 0-12 rpm
------------------------------------	--

Construction (Reel structure and spool):	Steel tube and box section
--	----------------------------

Operation (lifting and securing):	Four tested lifting ayes, forklift pockets and ISO blocks
-----------------------------------	---

Power Pack Requirements:	The GP10-2 Diesel/Hydraulic power pack can be used to power this reel
--------------------------	---



Fig. 9. Type 600 Boom Reel

The hydraulic power pack, which is mounted on the reel frame, consists of a single cylinder air-cooled diesel engine driving two hydraulic pumps via a reduction ratio unit.

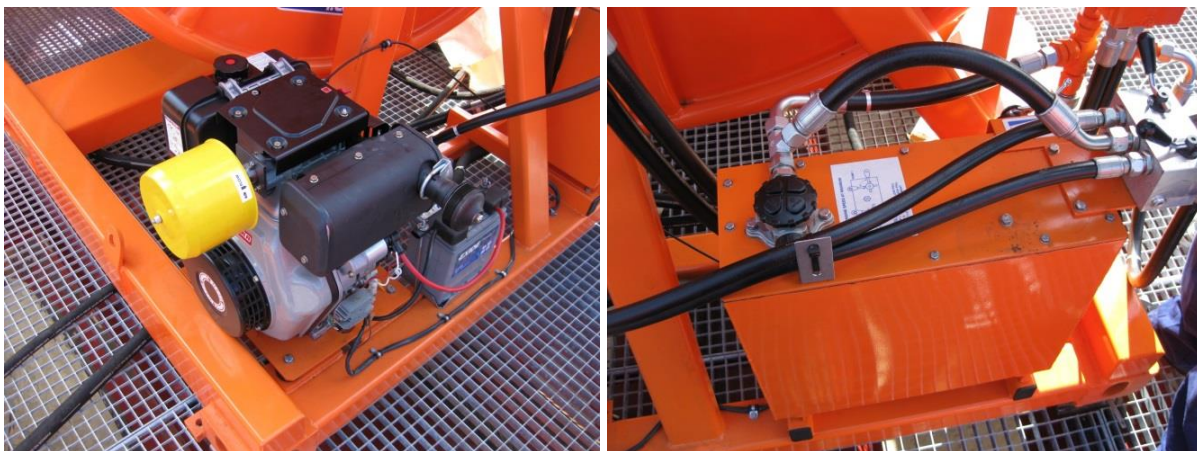


Fig. 10 and 11. Type 600 Boom Reel integrated power pack diesel engine and hydraulics

5.2.4 Air pack inflator AP/0080 with boom deflator kit (to be serviced)

Specification:

L x W x H:	84 cm x 45 cm x 59 cm
Weight:	75 kg (dry)
Engine:	Single cylinder diesel, air cooled; Electric start
Power:	4.1 kW @ 3300 rpm
Safety devices:	Overspeed shut down valve; Spark arrestor
Fuel Tank:	3.5 l
Type:	Centrifugal, high volume, low pressure
Control:	Via engine speed
Frame and belt cover:	Marine grade aluminium alloy



Fig. 12. Air pack inflator AP/0080

5.2.5 Boom gate assemblies for U configuration 8-10 m and 4-5 m

The Vikoma High Sprint Boom 2000 can be deployed in so called “U” formation. To achieve this formation it is necessary to create a gap (a gate) between boom sections in the apex of the boom. For that purpose the boom is equipped with two gate boom assemblies: 8-10 m and 4-5 m.



Fig. 13. Boom gate assembly for "U" configuration

5.3 Lamor High Capacity Skimmer System LUT 5/80 Skimmer

Manufacturer:

Lamor Corporation Ab
Urakoitsijantie 12
06450 Porvoo
Finland Tel: +358 (0)20 7650 100
Fax: +358 (0)207 650 129
Email: info@lamor.fi, Website: www.lamor.fi

Year of purchase: 2018

The system consists of:

- 5.3.1 Umbilical Hose Reel LUT 5/80, with Telescopic Crane Arm, Turntable on a 10' Flat Rack
- 5.3.2 Umbilical Hose LUH 5" 80m
- 5.3.3 Radio Remote control MC-36 with Receiver Base Unit
- 5.3.4 Flow meter
- 5.3.5 Hydraulic hoses set for the reel
- 5.3.6 Skimmer weir module with ancillaries
- 5.3.7 Brush module
- 5.3.8 Oil Transfer Pump GT A 140 PDAS
- 5.3.9 Water injection pump with ancillaries
- 5.3.10 Oil hoses
- 5.3.11 Cover
- 5.3.12 Spare parts
- 5.3.13 Power pack

5.3.1 Umbilical Hose Reel LUT 5/80, with Telescopic Crane Arm, Turntable on a 10' Flat Rack

The telescopic crane arm is built according to NOFO standards. At max reach of 5.5 m, it has a lifting capacity of 1.5 tons and a maximum lifting capacity of 1.7 tons is reached at 38° angle of the arm with reach of 4.7 m. The whole unit is built on 10" flat racks with turntable and the hose reel can be rotated 360°. The Oil Transfer and Hydraulic hoses are connected to manifold at the hub of the reel with pump-through swivel joints to allow the hoses to be energized continuously and at any deployed length. Maximum reel rotation speed approximately 2.5 rpm.

The reel is powered by a hydraulic motor with hydraulically released brake. Hydraulic flow rate and pressure inlet regulators are included. Controls consist of forward/neutral/reverse, brake release, and counter-balance valve. The reel is furnished with one (1) 5" Stainless Steel rotary swivel mounted in the reel drum and one (1) Carbon steel rotary swivel in the turntable. The reel is furnished according to requirements of EX proof zone II.

Specification:

Length:	5630 mm
Width:	2437 mm
Height:	3871 mm
Light weight:	6595 kg
Weight with hose:	10600 kg
Capacity hose:	80 m
Load at standard reach:	1500 kg
Standard reach, total: m	5,5 m
Lifting capacity: @ 38deg.	@ 38deg. 1.7 tons
Rotation:	360 deg
Rotation torque:	40 kNm
Footprint:	10"
Hydraulic flow:	25 l/min
Hydraulic pressure:	210 bar
Power requirement:	15 kW



Fig. 14. Umbilical Hose Reel LUT 90, with Telescopic Crane Arm

5.3.2 Umbilical Hose LUH 5" 80m

The umbilical hose is 80 m long. The Oil Transfer and Hydraulic hoses are connected to manifold at the hub of the reel with pump through swivel joints to allow the hoses to be energized continuously and at any deployed length. High-grade Neoprene hose cover resistant to ageing, abrasion, weathering, sunlight, tearing, oil, and seawater permeation. Skimmer end of hose cover vulcanized to steel termination plate for waterproof seal. The Umbilical hose and its Handling Reel are engineered to permit safe lifting of the Skimmer using only the Umbilical hose.

Specification:

Length:	80 m
Weight:	(total operational) 31 kg/m
Total weight:	2480 kg



Fig. 15. Umbilical Hose LUH 52 80m, 11 Ch anti-static

5.3.3 Radio Remote Control MC 3-6 with receiver base units

Remote control system for oil recovery equipment 24V includes:

- 1 pc remote terminal MC-3-6
- 1 pc electric control terminal for Zone1
- Base unit RX Ex zone 1 T4 (6xpropotional, 4/7xON/OFF, antenna Dipol)
- charger 230VAC and 24 VDC
- cable for emergency use if error with remote control 5 m
- DNV-Ex certificate
- Carrier belt

Controls:

1. On/Off Switch of the remote-control unit
2. Activate the operation by pressing START
3. Controls for skimmer thrusters/flow impellers
4. Speed controls for Brush Conveyors/Brush Wheels
5. Reverse direction for the Brush Conveyors/Brush Wheels
6. Speed control for Oil Transfer Pump
7. Reverse direction for the Transfer Pump
8. Deployment of the side sweep
9. Emergency stop

Specification:

Length:	340 mm
Width:	220 mm
Height:	220 mm
Weight:	2.3 kg



Fig. 16. Radio Remote Receiver Box

5.3.4 Flow meter

The DP65 target disc flowmeter is a metallic flowmeter for liquids and gases. It is based on the indirect measurement of the force which is exerted on a disc suspended in the trajectory where a fluid flows at a certain speed.



Fig. 17. DP 65 target disc flowmeter

5.3.5 Hydraulic hoses

Hydraulic Hose Set 10 m SS for Umbilical Hose Reel and water injection hose SS anti-static 10 m

5.3.6 Skimmer weir module with ancillaries

Manufacturer:

Lamor Corporation Ab

Urakoitsijantie 12

06450 Porvoo

Finland Tel: +358 (0)20 7650 100

Fax: +358 (0)207 650 129

Email: info@lamor.fi, Website: www.lamor.fi

Year of purchase: 2018

The Lamor Free-Floating Offshore Weir Skimmer LWS 1300 Mk II is a very high capacity weir skimmer designed for off-shore oil recovery operations. It is equipped with a floating weir lip to separate and collect the oil into the hopper. The floating weir lip has separate small ballast weights that can be independently adjusted for perfect floatation even in difficult sea conditions.

The LWS 1300 Mk II is a Weir skimmer frame. It can be used as a normal weir skimmer together with optional oil transfer pump, typically like Lamor GTA 140 or MSP 150. The LWS HTh is a hydraulically operated thruster set for the Lamor LWS Weir skimmer-range. The skimmers are fitted with two thrusters to allow the operator to manoeuvre the skimmer.

Specification:

Length:	2660 mm
Width:	2214 mm
Height:	2190 mm
Diameter weir:	1300 mm
Weight:	420 kg
Draft:	1420
Design capacity:	250 m ³ /h
Capacity, certified ASTM:	112,2 m ³ /h

Ancillaries:

- Removable Debris screen for LWS 1300 MkII;
- Water injection outlet assembly DIN 5" flange D125;
- Water injection pump with water injection kit, inlet 3/42.



Fig. 18. Lamor Free Floating High Capacity Offshore Skimmer weir module

5.3.7 Lamor Free Floating High Capacity Offshore Skimmer LWS 1300 Mk II / MSP150 Brush Adapter

The skimmer can also be equipped with hydraulically operated Brush Adapter to increase the skimmers ability to collect medium to high viscous oils. The Lamor Brush Adapter LBA 1300 Mk II is a brush-type oil recovery module designed to fit quickly and easily onto the hopper of the Off-Shore Weir Skimmer Lamor LWS 1300 Mk II. The purpose of the device is to improve the overall recovery efficiency (reduce free water recovered

with oil) and to improve the performance in very high viscosity oils. The three LBA brush banks are mounted within a sturdy aluminium frame with a centre-lifting eye. The brushes are driven by two hydraulic motors, which are powered by a single hydraulic circuit. The LBA can be easily installed on the Lamor LWS 1300 skimmer hopper in place of the fluid oil adapter and is secured with stainless steel clamps.

Specification:

Length:	2210 mm
Width:	1930 mm
Height:	760 mm
Weight:	235 kg
Design capacity:	3x60 m ³ /h
Capacity, certified ASTM:	3x74 m ³ /h
Free water collected:	< 5 %
Hydraulic flow (skimmer ONLY):	20 l/min
Hydraulic pressure:	170-200 bar
Power requirement:	6.5 kW



Fig. 19. Brush Adapter

6.3.8 Oil Transfer Pump GT A 140 PDAS 5.2.4

The Lamor GT A 140 pump is a multi-purpose submersible Archimedes screw pump with a pumping capacity of 140 m³/h. This pump has been designed for use in skimmers and transfer or offloading pump applications and is able to pump a wide range of liquids ranging from water to the heaviest debris-laden viscous oils. The GT A 140 pump can deliver a maximum of 12 bar outlet pressure, benefits from water/steam annular injection on the inlet as standard and debris cutting knife to handle solids such as seaweed, plastics and ropes.

Specification:

Length:	500 mm
Width:	300 mm
Height:	598 mm
Weight:	71 kg
Pump capacity:	140 m ³ /h
Discharge pressure:	12 bar
Hydraulic flow:	160 max l/min
Hydraulic pressure:	210 max bar
Power requirement:	56 max kW
Standard hydraulic connector Pressure:	3/4" TEMA 7511 (female)
Standard hydraulic connector Return:	1" TEMA 10021 (male)
Standard hydraulic connector Drain:	3/8" Aeroquip (male)
Standard discharge outlet:	5" Camlock, male



Fig. 20. Oil Transfer Pump GT A 140 PDAS

5.3.9 Water injection pump Hydraulic LIP 400 XP EX ZONE II with ancillaries

The LIP 400 is built in a wheel frame and is powered by a hydraulic power pack, Lamor LIP 400 IP ATEX EX Zone II has designed according 2014/34/EU ATEX directive. The LIP 400 IP EX ATEX-code is II 2 G e IIA T3 Gb.

Specification:

Type:	LIP 400
Pump Capacity:	10 m ³ /h
Length:	920 mm
Width:	850 mm
Height:	770 mm
Weight:	150 kg
Discharge Outlet:	2" Male Camlock

Ancillaries for the water injection pump:

- 1 x water suction hose semi rigid Apollo 2 1/2" L-5m;
- 1 x suction stainer & check valve camlock 2 1/2" SS
- 1 adapter camlock 2 1/2" -TEMA 1/2" SS
- 2 x water injection hose 20m, SS
- 2 x hydraulic hose 1/2" x 15m, SS TEMA 5000

5.3.10 Oil hoses

Semi Rigid, multi-oil blue heavy duty 5", 2 x 10m

5.3.11 Cover

LUT system is furnished on a 10' (ISO 668) flat rack base. This compact sized platform allows installation of the system onto a limited work space. When combined with the 10' skimmer base and the 20' roof module, the equipment is containerized for storage and transport

System dimensions:

Assembled system of two flat racks and roof dimensions are:

Width:	2.438 m / 8' 0"
Height:	4 m / 13' 2"
Length:	6.058 m / 19' 10.5"
Weight:	(Dry) 14 tonnes (Weight wet 15 tonnes)
Foot print:	10ft container
Length:	2990 mm
Width:	2437 mm
Height:	3950 mm
Weight (dry:)	10 000 kg (Weight wet 11 000 kg)
System pressure:	210 bar
Skimmer flat:	
Length:	2990 mm
Width:	2437 mm
Height:	2650 mm (skimmer with flat rack)
Weight:	With skimmer 1500 kg



Fig. 21. 20' roof module and 10' bases for skimmer and LUT

5.3.12 Spare parts for high capacity skimmer system

The Lamor spare parts kits include all necessary items for field repair and maintenance.

Spare part kits include:

- 1 Spare part kit for GT A 140;
- 1 Kit rubber adhesive for LUH;
- 1 Spare part kit for weir skimmer;
- 1 Spare part kit 1 for Brush adapter;
- 1 Spare part kit for LPP 95;
- 1 Hydraulic Hose set between LUH and LWS;
- 1 Hydraulic hose set 10m for power reel;

- 1 Paint repair kit

5.3.13 Lamor Power pack LPP 95

The Lamor Power pack LPP 95 is a diesel engine driven hydraulic unit suitable for operation in hazardous area Zone II.

A Flame protection system is fitted to the diesel engine in such a way that the outside temperature of diesel engine and even the exhaust system and other hotspots of diesel engine never exceeds beyond the conditions which are guilty for above mentioned protection group.

Several safety devices are fitted on the Power Pack and diesel engine and will do stop the Power Pack and the diesel engine in case of dangerous situations or mechanical failures.

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



This Power Pack is designed to use on open hydraulic systems only. The hydraulic pump is a variable displacement hydraulic pump of axial piston swashplate design, for open circuit hydraulic systems.

Lamor Power Pack Type LPP 95J EX Zone II has designed according 2014/34/eu ATEX directive. The LPP 95J EX ATEX-code is II 3 G Ex h IIA T3 EPL Gc.

The power pack is installed in a **10 ft container** designed to be used for stowing and running Lamor Oil Spill equipment. The container is ISO 668:2013 compliant and has dedicated fittings for Lamor LPP 95 J, EX Zone II Power Pack. It also has an Earthing Point, one at blank side and second for internal connections. the 10 ft Container is designed to be used in hazardous area Zone II as described in 2014/34/eu ATEX directive.

Lamor Power pack LPP 95 operational specifications

Technical Parameter	Parameter value
Make/type	JCB 444 / PP1254
Design	4 cylinder line, water-cooled
Rated power	93 kW at 2200 rpm
Zone	II 3G IIA T3
Start system	Hydraulic start
Cooling system	Water cooling (coolant)
Coolant type	774F OEM RED, -39°C
Fuel system	Dual filter incl. water separator
Fuel type	EN 590 diesel fuel, (additive recommended when in storage) see JCB User's manual
Fuel consumption	N 225 g / kW / h (@ 2 200 r/min, max load)
Fuel tank	Basement tank, incl. filler breather filter and level gauge
Lubricant type (engine oil)	See JCB User's Manual

	MOBIL DELVAC 15W40 or equivalent
Air inlet	Dry filter with dust cyclone and safety element. Flame arrestor installed in inlet system
Exhaust	Exhaust gasses cools down by cooling system and Stainless-steel Flame/Spark arrester is in-stalled in exhaust system
Indicators	Engine speed, Water temperature, Exhaust temperature, Oil pressure, Hydraulic oil pressure and Hydraulic oil temperature
Protection against	1. Low pressure (0,75 bar, 10,9 psi) of lubricant 2. High temperature of exhaust gasses, 200°C 3. High temperature of engine(coolant), 100°C 4. Overspeed of diesel engine. 2300 rpm 5. Hand operated emergency stop which is closing the air inlet valve.
Operating temperature	Between -20 °C and +50 °C
Starting temperature	Min -20 °C, Requires Winter or Arctic type fuel, engine oil and hydraulic oil i.e. Neste Oil Neste diesel -29/-34 °C, or better
Storing temperature	-40 °C to +50 °C

Lamor Power pack LPP 95 technical specifications and dimensions

Technical Parameter	Parameter value
Length	1500 mm
Width	2 050 mm
Height	1750 mm
Volume of fuel tank	210 litres
Volume of lubricant for engine	14 litres
Volume of hydraulic oil tank	260 litres
Volume of cooling system	22 litres
Weight	1800 kg dry weight excluding hydraulic oil and diesel fuel
Weight	2300 kg including hydraulic oil and diesel fuel
Color	Lamor colors, Main frame RAL 5010. Doors, tank RAL 1023.

Technical data 10' container

Technical Parameter:	LIP 400
Length	2291 mm (91 in)
Width	2438 mm (96 in)
Height	2591 mm (30 in)
Weight	3500 kg (7720 lbs)
Painting system	EN ISO 12944 C5-M (Marine) EPZnEPPUR200/4- Fe Sa2½ Exteriors: Blue RAL 5010 Interior: Gray RAL 7001

5.4. Sampling / Testing

Zematra Mini lab

5.4.1 Densimeter

5.4.2 Viscosimeter

5.4.3 Hydrometer

The closest you can get to your own on-board laboratory. Zematra's Mini Lab contains every necessary piece of test equipment for testing the main parameters of your ships fuel and lubricants.

The test equipment is safely contained in a robust casing which can be fixed against a wall to save space. The two folding doors and extendable bottom plate makes the equipment easily accessible and after testing it can be neatly stowed away and locked safely inside the cabinet.



Zematra Mini-lab in the cabinet

The MFV-1000

The **CANNON®** MFV-1000 Marine Fuels Viscometer is designed to measure viscosity of marine fuels between 30 and 1000 cP with accuracy exceeding industry requirements. Because of its precision, durability, excellent temperature control and ease of use, the MFV-1000 is also suitable for other applications where viscosity must be measured accurately at controlled temperatures.

Temperature control options

The **CANNON®** MFV-1000 is designed for viscosity testing at 40°C, 50°C, 80°C and 100°C.

Instrument operation

The MFV-1000 offers convenient keypad controls for test operations.

MFV-1000 description

The MFV-1000 Marine Fuels Viscometer consists of a base, adjustable heater block/tray, sample cups, head unit and spindle apparatus.

MFV-1000 function

Microprocessor circuitry, functioning in tandem with twin temperature probes and sophisticated internal electronic sensors detect and analyze temperature and viscosity data as a rotor immersed in the test oil is turned at a fixed rate.

Reading test results

Viscosity test results are continuously updated on a digital display screen on the front panel of the head unit.



Figure 1: The MFV-1000 Marine Fuels Viscometer

Seta flash point tester

The Flash Point is the lowest temperature, corrected to one atmosphere (101.3 kPa), at which vapours above an oil sample ignite in air when exposed to a flame under specified test conditions.

In this closed cup tester the oil sample of 2 ml is enclosed for one minute until a test flame is applied at a specified temperature. If, after 1 minute, the vapour in the closed cup ignites the Flash Point is lower than the specified temperature if not then the Flash Point is higher. If the vapour ignites then the specified temperature should be lowered each time by 5°C till the Flash Point has been reached.

If the Flash Point is not reached, the oil sample is covered and the oil temperature is increased at a specified rate and the process is repeated.

>>>>>>>>>>>

To determine the fire and explosion danger of an oil slick the simplest and fastest method is the determination of its Flash Point. The Flash Point is a good indication of the potential formation of explosive situations on board (in and near the hopper/storage tank).



5.5.5 Gas detector Benelux Mini Rae 3000

The MiniRAE 3000 is a comprehensive handheld VOC (Volatile Organic Compound) monitor that uses a third-generation patented PID technology to accurately measure one of the highest levels of ionizable chemicals available on the market.



Instrument Specifications	
Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV or 11.7 eV lamp
Battery	<ul style="list-style-type: none"> Rechargeable, external field-replaceable Lithium-Ion battery pack Alkaline battery adapter
Running time	16 hours of operation (12 hours with alkaline battery adapter)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading <ul style="list-style-type: none"> VOCs as ppm by volume (mg/m³) High values STEL and TWA Battery and shutdown voltage Date, time, temperature
Alarms	95dB at 12" (30 cm) buzzer and flashing red LED to indicate exceeded preset limits <ul style="list-style-type: none"> High: 3 beeps and flashes per second Low: 2 beeps and flashes per second STEL and TWA: 1 beep and flash per second Alarms latching with manual override or automatic reset Additional diagnostic alarm and display message for low battery and pump stall
EMC/RFI	Compliant with EMC directive (2004/108/EC) EMI and ESD test: 100MHz to 1GHz 30V/m, no alarm Contact: ±4kV Air: ±8kV, no alarm
IP Rating	<ul style="list-style-type: none"> IP-67 unit off and without flexible probe IP-65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span. Reflex PID Technology™ Calibration memory for 8 calibration gases, alarm limits, span values and calibration dates
Sampling Pump	<ul style="list-style-type: none"> Internal, integrated flow rate at 500 cc/mn Sample from 100' (30m) horizontally or vertically
Low Flow Alarm	Auto pump shutoff at low-flow condition
Communication & Data Download	<ul style="list-style-type: none"> Download data and upload instrument set-up from PC through charging cradle or using BLE module and dedicated APP Wireless data transmission through built-in RF modem
Wireless Network	Mesh RAE Systems Dedicated Wireless Network
Wireless Range (Typical)	Up to 15ft (5m) for BLE EchoView Host: LOS > 660 ft (200 m) ProRAE Guardian & RAEMesh Reader: LOS > 660 ft (200 m) ProRAE Guardian & RAELink3 Mesh: LOS > 330 ft (100 m)
Safety	US and Canada: CSA, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D
Certifications	Europe: ATEX II 2G EEx ia IIC T4
Temperature	-4° to 122° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)

5.5. Cleaning machine HDS-E 8/16-4 M 12 kW

kW Power supply (~V/Hz) 3/420/50
Water flow rate (l/h) 300-760
Pressure (bar/MPa) 30-160/3-16
Max. temperature (°C) 30/85
Connected load (kW) 16.5kW
Fuel/Detergent tank (l) 25 + 20
Weight (kg) 108
Dimensions (L x W x H) (mm) 1330 x 750 x 1060



Fig. 22. Cleaning machine

5.6. Interface detector

Manufacturer: Aquasant Measuring Technique Ltd
Hauptstrasse 22
CH - 4416 Bubendorf / Switzerland
. +41 (0)61 935 5000
. +41 (0)61 931 2777
. info@aquasant-mt.com
. www.aquasant-mt.com

T



The measurement unit processes the digital measurement signal transmitted by the measurement technology. The intrinsically safe voltage supply to the measurement electronics in the connection head is provided via the signal line. A modern operating and calibration concept allows for an extremely short commissioning of the analog measurement. Measurement signal mA, percent or impulse value are displayed, as selected, on the display. An mA analog signal that corresponds to the measurement value and a relay output are available as output signals. The membrane keyboard with a functional and fully graphic display contributes toward the user friendliness and safe working

5.7. Flow meter



PORTAFLOW 300 SPECIFICATION

IP66 Protection Class Material High density P.U. foam

Weight < 1.5 Kg

Dimensions 275 x 150 x 55 mm

Display 240 x 64 graphics LCD with backlight

Keypad IP68 16 key tactile membrane

Connections IP66 Lemo connectors

Temperature range 0°C to +50°C operating

-10° to +50°C storage

SUPPLY VOLTAGE:

Power supply/charger Input 100-260 VAC ±10% @ 50/60 Hz Max. 9 watts

Output 9VDC unregulated

BATTERY PACK:

Internal Batteries 5 x 4/3 AA nickel metal hydride 24-30 hrs continuous operating on fully charged battery cells

Recharge time 10-16 hours

External battery can be connected to the Portaflow 300 for remote flow monitoring (contact Micronics)

OUTPUTS:

Languages (optional) English/German/French

Display Volumetric flow units m³, litres, gallons (Imperial and US)

Velocity units metres/sec, feet/sec

Flow velocity range 0.2...12 m/sec to 4 significant figures

Total volume 12 Digits - forward and reverse

Continuous battery level indication

Continuous signal level indication

ERROR messages

Analogue 4-20mA into 750 Ω User definable scaling

Resolution 0.1% of full scale

Pulse 5 Volts

Max. 1 pulse per second User definable scaling

Printer/Terminal Serial RS232-C inc. handshaking

User definable scaling

DATA LOGGER:

Memory capacity 100K (50,000 readings)

Output Via RS232 or displayed graphically

Logs Block data storage with text and graphic display, transferred to Microsoft Windows or

PIPE MATERIALS

Any sonic conducting medium such as Carbon Steel, Stainless Steel, Copper, UPVC, PVDF, Concrete,

Galvanised Steel, Mild Steel, Glass, Brass. Including Lined Pipes – Epoxy, Rubber, Steel, Plastic.

REPEATABILITY

± 0.5% with unchanged transducer position.

ACCURACY:

2% or ± 0.02 m/sec whichever is the greater. Accuracy achieved under ideal calibration conditions on a 4" plastic

5.8. Discharging equipment

Discharging pumps - Vogelsang

Manufacturer:

Hugo Vogelsang Maschinenbau GmbH

Holthöge 10-14

49632 Essen/Oldb.

Postfach 1264

49628 Essen/Oldb.

Tel: +49 (0) 54 34 83 0

Fax: +49 (0) 54 34 83 10

E-mail: www.vogelsang-gmbh.com

Year of purchase: 2009

Specification:

Type:	VX 186 -260	
Displacement:	l	10.06
Shaft Ø:	mm	85
Maximum operating pressure:	bar	5
	bar	10
Maximum flow rate:	m ³ /h	360
	l/min	6000
Maximum rotational speed:	rpm	600



. Vogelsang pump