

Annex V of the VAC

Technical Specifications for the equipment (Lot 3 – West Mediterranean Sea)

Procurement procedure: EMSA/CPNEG/1/2020

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”

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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. Koseq Rigid Sweeping Arms;
2. Norlense Boom system;
3. Lamor high-capacity skimmer;
4. Sampling/testing equipment (minilab, flash point tester, gas detector, interface detector);
5. Communication equipment;
6. Cleaning equipment;

All tenderers will have the opportunity to visually verify the condition of equipment items listed above in the stockpile in Ravena and Rotterdam (Lamor High-Capacity Skimmer), at request (please see relevant location of each item in the table in point 3.1 below). In principle the visit will be organised in week 27. The visit details will be arranged with the requesting tenderer.

1.2. Servicing of the equipment

The equipment that will be transferred to the Contractor was purchased in 2006 except: Lamor High Capacity Skimmer (2018). It is generally in good condition. It 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. The sweeping arms were overhauled in 2017. The boom sections were replaced in 2018.

The Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment, the Contractor based on his own equipment condition assessment should arrange 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 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 Servicing might be performed by a third party subcontracted by the contractor.

The contractor should arrange servicing to the following equipment:

1. Kodeq sweeping arms;
2. Norlense Boom system;
3. Lamor high-capacity skimmer;
4. Sampling/testing equipment (minilab, flash point tester, gas detector);
5. 3 x cleaning machines

The servicing should include the following:

- Check and replace, if necessary, the hydraulic and oil hoses and couplings;
- 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 high-capacity skimmer;
- Check and servicing of the pumps, if necessary;
- Check the paint and repaint, if necessary.
- Calibration for the sampling/testing equipment, when applicable.

1.3. Additional equipment

Contractor will need to purchase/deliver the following equipment:

1. New power pack: Purchase of a new hydraulic power pack in order to be able to operate the boom system according to its technical specifications. Alternative proposals duly justified (e.g. use of ship's hydraulic system) can also be considered.
2. 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.

3. Flow meter. The contractor will be required to prove operational parameters of the oil recovery systems during quarterly drills. For that purpose, the contractor will purchase a flow meter for measuring pumping capacities.
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

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 because 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:

Equipment	Location
Sweeping arms, Koseq, 12m	Genova, Italy
Norlense Boom system	Genova, Italy
High-capacity skimmer, Lamor LUT	Rotterdam, The Netherlands
Sampling mini-lab	Genova, Italy
Interface detector	Genova, Italy

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

Gas detector	Genova, Italy
Flashpoint Tester	Genova, Italy
2 x VHF	Genova, Italy
3 x portable cleaning machines	Genova, Italy

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The handover will be done at a date to be mutually agreed between EMSA and the Contractor and shall not take place earlier than **27 August 2021** and not later than **30 September 2021**.

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 points 5.

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 configuration:

- the sweeping arm system;
- the boom system (2 x reel) + Lamor high-capacity skimmer system;
- the oil slick detection system;
- other equipment (minilab, flashpoint tester, etc.);
- relevant power packs and ancillaries.

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

4. List of transferred equipment

No.	Category / Price of purchase	No.	Item	Item Brand	Item Model	No of Pcs	Description	ID Code (old)	ID Code (new)	First Delivery Date
1	Sweeping arm / 800,500.00 Eur	1.1	Frame	Koseq		1	Rigid, foldable end with weir skimmer 12.00 m overhauled in 2017	DGIM362201	0721	28/02/2007
		1.2	Frame	Koseq		1	Rigid, foldable end with weir skimmer 12.00m overhauled in 2017	DGIM362202	0722	28/02/2007
		1.3	Ancillaries				FRAME FOR HOSES FROM PUMP TO CRANE	DGIM020201	0723	28/02/2007
		1.4	Ancillaries				FRAME FOR HOSES FROM PUMP TO CRANE	DGIM020202	0724	28/02/2007
		1.5	Ancillaries				PIPE FOR HOSES FROM PUMP TO CRANE	DGIM020203	0725	28/02/2007
		1.6	Ancillaries				PIPE FOR HOSES FROM PUMP TO CRANE	DGIM020204	0726	28/02/2007
		1.7	Pump	Marflex	MSP 150-63	1	CENTRIFUGAL overhauled in 2017	DGIM283201	0727	28/02/2007
		1.8	Pump	Marflex	MSP 150-63	1	CENTRIFUGAL overhauled in 2017	DGIM283202	0728	28/02/2007
		1.9	Pump	Marflex	MSP 150-63	1	CENTRIFUGAL	DGIM343201	0729	28/02/2007
		1.10	Pump ancillaries	Marflex	MSP 150-63	1	OUTLET INJ. FLANGE 6"	DGIM280201	0730	28/02/2007
		1.11	Pump ancillaries	Marflex	MSP 150-63	1	OUTLET INJ. FLANGE 6"	DGIM280202	0731	28/02/2007
		1.12	Oil hose(s)				SET 10.00 m	DGIM263801	0732	28/02/2007
		1.13	Oil hose(s)				SET 10.00 m	DGIM263802	0733	28/02/2007
		1.14	Hydraulic hose(s)			3	HYD./COUPLINGS/CABLES 5.00 m	DGIM223601	0734	28/02/2007
		1.15	Hydraulic hose(s)			3	HYD./COUPLINGS/CABLES 5.00 m	DGIM223602	0735	28/02/2007
		1.16	Crane				CRANE FOR SWEEPING ARMS LAGENDIJK SK 5.9-5000/10.3-1000 INCLUDING CONTROL PANEL	DGIM131501	0736	28/02/2007
		1.17	Crane				CRANE FOR SWEEPING ARMS LAGENDIJK SK 5.9-5000/10.3-1000 INCLUDING CONTROL PANEL	DGIM131502	0737	28/02/2007
		1.18	Power pack			1	POWERPACK HOLLAND SPECIAL PUMP 80KW DX125/PV140 SERIAL HSP-07093 DIESEL ENGINE DOOSAN L066TI overhauled in 2017	DGIM272801	0739	28/02/2007
		1.19	Power pack			1	POWERPACK HOLLAND SPECIAL PUMP 80KW DX125/PV140 SERIAL HSP-07092 DIESEL ENGINE overhauled in 2017	DGIM272802	0741	28/02/2007

2	Boom / 332,448.00 Eur	2.1	Segment	Norlense	NO-800-R	1	PVC, 800mm freeboard, 960 mm skirt depth, 17 kg/m, (bridle included)	n/a	2790	06/07/2018
		2.2	Segment	Norlense	NO-800-R	1	PVC, 800mm freeboard, 960 mm skirt depth, 17 kg/m, (bridle included)	n/a	2791	06/07/2018
		2.3	Air compressor	Dynaset	HKL 5000	1	Air flow rate 5000 l/min; weight 210 kg	n/a	2792	06/07/2018
		2.4	Hydraulic hose(s)					n/a	2795	06/07/2018
		2.5	Air hose(s)					n/a	2796	06/07/2018
		2.6	Towing bridle	Norlense		1	Open U-coupling 5 meter including hose set	n/a	2793	06/07/2018
		2.7	Towing cross bridle	Norlense		1	With net for J formation	n/a	2794	06/07/2018
		2.8	Towing cross bridle			1	Open-U crossbridle (ropes and hoses)	DGIA371601	0823	26/11/2013
		2.9	Towing lines set				Ø32 mm	n/a	2797	06/07/2018
		2.10	Cover	Norlense		1	Protection canvas for the boom on the reel	n/a	2798	06/07/2018
		2.11	Cover	Norlense		1	Protection canvas for the boom on the reel	n/a	2799	06/07/2018
		2.12	Spare parts	Norlense		1	For boom	n/a	n/a	06/07/2018
		2.13	Storage reel	Markleen		1	UNIREEL 12m3, Chipped & painted 16/2/2017. New joint pressure valve installed	DGIA353401	0748	28/02/2007
		2.14	Storage reel	Markleen		1	UNIREEL 12m3, Chipped & painted 16/2/2017. New joint pressure valve installed	DGIA353402	0749	28/02/2007
		2.15	Storage flatrack			1	ISO FLAT CONT	DGIA352001	0750	28/02/2007
		2.16	Storage flatrack			1	ISO FLAT CONT.	DGIA352002	0751	28/02/2007

3	HC Skimmer / 802,388.16 Eur	3.1	Power reel	Lamor	LUT 5 80	1	Umbilical Hose Reel Telescopic LUT 5/80 on a 10' flat rack footprint	n/a	2697	17/09/2018
		3.2	Umbilical hose			1	Umbilical Hose LUH 5" 80m, 11 Ch, Anti-static	n/a	2698	17/09/2018
		3.3	Remote control			1	Radio Remote Control MC-3-6 EX M36-EX501058 with Receiver Base Units 1 (LWS 1300) 2 (UHW)	n/a	2699	17/09/2018
		3.4	Flow meter		DP65/ED	1	AISI316 DN125, PN16 20-135 m3/h - integrated	n/a	2700	17/09/2018
		3.5	Hydraulic hose(s)				Set 10m, SS for Umbilical Hose Reel, incl. Water Injection Hose SS, 10m	n/a	2701	17/09/2018
		3.6	Weir module	Lamor	HC LWS 1300	1	With hydraulic thruster set	n/a	2702	17/09/2018
		3.7	Ancillaries			1	Removable Debris Screen for LWS 1300 MkII	n/a	2703	17/09/2018
		3.8	Ancillaries			1	Water injection outlet assembly, DIN 5" flange D125 PN 16 SS, TEMA 5011 RFV SS, for LWS 1300 Mk II	n/a	2704	17/09/2018
		3.9	Brush module			1	Brush adaptor with removable debris screen	n/a	2705	17/09/2018
		3.10	Brush module			1	Brush adaptor with removable debris screen	n/a	2706	17/09/2018
		3.11	Brush module			1	Brush adaptor with removable debris screen	n/a	2707	17/09/2018
		3.12	Pump	Lamor	GT A 140	1	Cargo pump with water injection kit, inlet 3/4"	n/a	2708	17/09/2018
		3.13	Pump	Lamor	LIP 400 IP	1	Water injection pump for HC skimmer and PDAS pump	n/a	2709	17/09/2018
		3.14	Ancillaries				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	2710	17/09/2018
		3.15	Power Pack	Lamor	LPP 95	1	Diesel driven, hydraulic start, battery 70 Ah Installed inside of a 10' ISO closed container	n/a	2711	17/09/2018
		3.16	Oil hose(s)			2	Semi Rigid, multi-oil blue heavy duty 5", 2 x L-10m,	n/a	2712	17/09/2018
		3.17	Cover				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	2713	17/09/2018
		3.18	Spare parts				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	2714	17/09/2018

4	Sampling - Testing / 18,944.65 Eur	4.1	Gas detector/explosi meter				GAS METER Drager X-am 5000 SN ARDA-200	DGIH191801	0803	28/02/2007
		4.2	Flash point tester				FLASH POINT TESTER STANHOPE SETA	DGIH173901	0804	28/02/2007
		4.3	Mini lab				SAMPLING MINILAB DENSITYETER ZEMATRA	DGIH231701	0805	28/02/2007
		4.4	Mini lab				SAMPLING MINILAB VISCOMETER ZEMATRA	DGIH234301	0806	28/02/2007
		4.5	Mini lab				THERMOMETER IP16C	DGIH234001	0807	28/02/2007
		4.6	Mini lab				PORTABLE GAS TANK	DGIH230201	0808	28/02/2007
		4.7	Mini lab				SPARE SILICOL RUBBER TUBE	DGIH2331 01	0809	28/02/2007
		4.8	Ancillaries				MMC OIL/WATER INTERFACE	DGIH020201	0810	28/02/2007
		4.9	Ancillaries				MMC OIL/WATER INTERFACE	DGIH020202	0811	28/02/2009
		4.10	Ancillaries				MMC OIL/WATER INTERFACE	DGIH020203	0812	28/02/2007

5	Communic ation / 3,224.00 Eur	5.1	VHF Portable				VHF AERONAUT BAND TRON AIR	DGIC392901	0813	28/02/2007
		5.2	VHF Portable				VHF AERONAUT BAND TRON AIR	DGIC392902	0814	28/02/2007

6	Cleaning / 6,141.00 Eur	6.1	Ancillaries				AUTOTRANSFORMES	DGIB020201	0815	28/02/2007
		6.2	Ancillaries				AUTOTRANSFORMES	DGIB020202	0816	28/02/2007
		6.3	Ancillaries				AUTOTRANSFORMES	DGIB020203	0817	28/02/2007
		6.4	Cleaning machine				CLEANING MACHINE	DGIB092901	0818	28/02/2009
		6.5	Cleaning machine				CLEANING MACHINE	DGIB092902	0819	28/02/2007
		6.6	Cleaning machine				CLEANING MACHINE	DGIB092903	0820	28/02/2007

5. Description of Transferred Equipment

5.1. Rigid Koseq 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: 677 Web-site: <http://www.koseq.com>

Year of purchase: 2007

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 includes the following parts described below;

- 5.1.1 - 5.1.2 Sweeping Arms Frames;
- 5.1.3 - 5.1.6 Sweeping Arms Ancillaries;
- 5.1.7 - 5.1.9 Marflex Centrifugal Pumps MSP150-63 (2 for sweeping arms, 1 spare);
- 5.1.10 - 5.1.11 Pumps ancillaries: water injection system (flanges 6" inlet / outlet, pump and hoses);
- 5.1.12 - 5.1.15 Oil hoses/hydraulic hoses (Sweeping arms and associated cranes);
- 5.1.16 - 5.1.17 Sweeping arms cranes, Lagendijk SK 5/10-5000/1000 (including Control cabinet and control panel);
- 5.1.18 - 5.1.19 Holland Special Pumps BV diesel-hydraulic power pack, Zone 2.

5.1.1 - 5.1.2 Sweeping Arms Frames

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.

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. They are fit with associated frames and piping to lead the oil hoses from the collection chamber to the crane arm (use of the frames during operations is optional).

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

Specification:

Function:	Collecting of oil
Overall Length:	12074 mm (11745 mm with pontoons folded)
Overall width:	3412 mm (2830 mm with pontoons folded)
Overall height:	3355 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

5.1.3 - 5.1.6 Sweeping Arms Ancillaries

There are available a set of frame and pipe for each sweeping arm which could support and connect the oil hoses coming from the pumps within to the sweeping arm module through the arm of the crane to the vessel tanks.

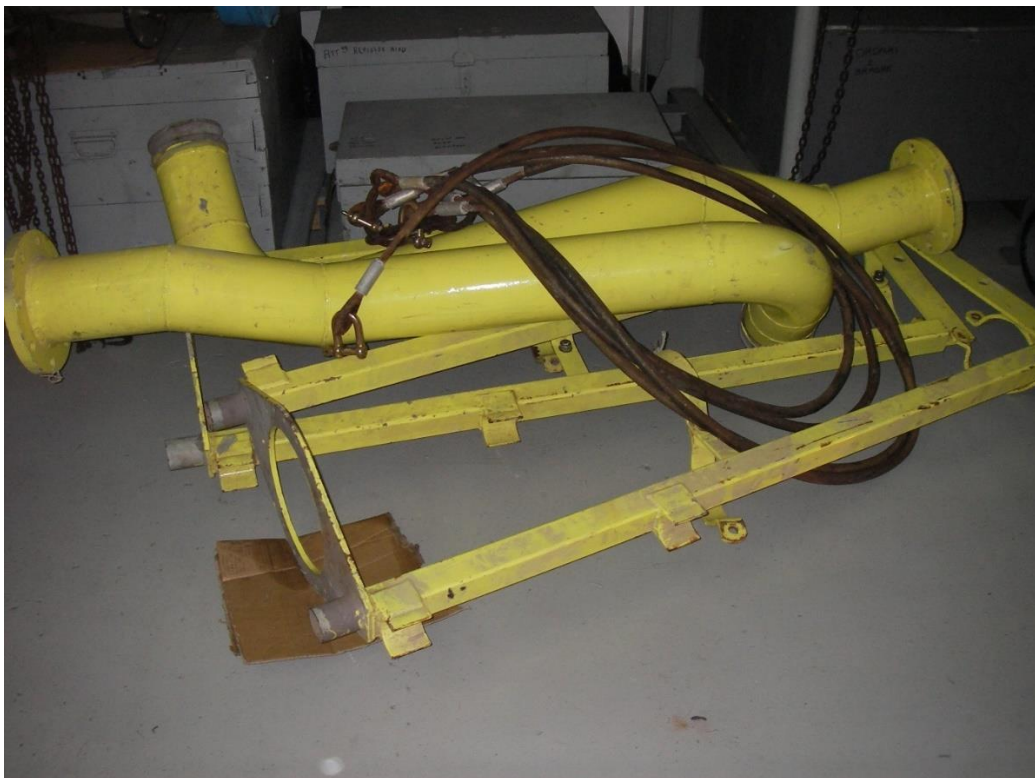


Fig. 2. Frames and pipes

5.1.7 - 5.1.9 Marflex Centrifugal Pump MSP150-63

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

Year of purchase: 2007

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. 3. Marflex MSP150-63 pump

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.

Specification:

The set of hoses for the MSP 150-63 consists of:

Hydraulic pressure hose:

1 "

Hydraulic return hose:

1½ "

Discharge hose:

6 "

5.1.10 - 5.1.11 Pumps ancillaries: water injection system (flanges 6" inlet / outlet, pump and hoses)

Manufacturer:

RO-CLEAN DESMI A/S

Hestehaven 21 B

DK-5260 Odense S

Denmark

Tel: +45 6591 0201

Fax: +45 6590 8877

e-mail: info@ro-cleandesmi.com

Year of purchase: 2007



Fig. 4. Water Injection Flange

The DESMI annular injection flanges are designed to effectively inject a thin water layer surrounding the column of oil being transported through a 10 metres hose. This small amount of water (5 - 10% of the pump flow) decreases the friction loss dramatically in the discharge line during high-viscous oil pumping operations. The flanges are equipped with a non-return valve to prevent the pumped media to enter the water supply line.

Water injection pump:

Manufacturer:

RO-CLEAN DESMI A/S
Hestehaven 21 B
DK-5260 Odense S
Denmark
Phone: +45 6591 0201
Fax: +45 6590 8877
e-mail: info@ro-cleandesmi.com

Year of purchase: 2007

The DESMI water injection unit is a portable hydraulic driven pump set designed for injection of water into the DESMI water injection flanges. The water injection unit is connected to the power supply by means of a hose set. The water injection unit should be placed in such a way that the best possible control of the operation is obtained.

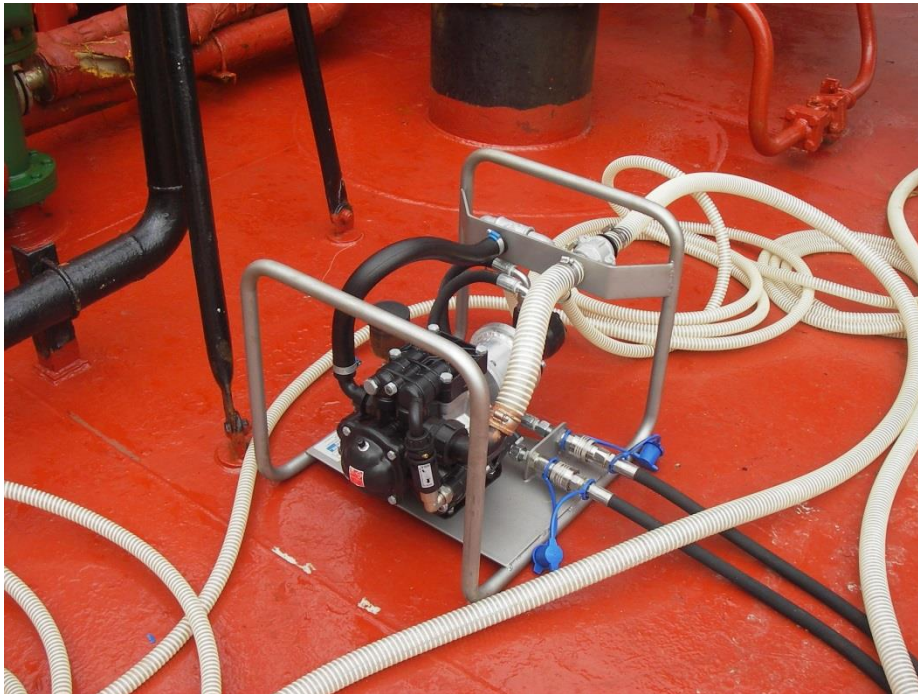


Fig. 5. Water injection pump with hoses

5.1.12 - 5.1.15 Oil hoses/hydraulic hoses (Sweeping arms and associated cranes)

Oil Hoses:

Specification:

Function:	Transfer of the recovered oil from the sweeping arms to the storage tanks.
Type:	Rig Supply Soft Wall
Size:	6" X 10 metres.
Couplings:	Kamlock 6"
Liner:	Nitrile, colour black
Cover:	Chloroprene, colour black

Hydraulic Hoses:

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. Further details may be found in the initial equipment list.

5.1.16 - 5.1.17 Sweeping arms cranes, Lagendijk SK 5/10-5000/1000 (including Control cabinet and control panel)

Manufacturer:

Lagendijk Constructie B.V.

Choorhoekseweg 3

4424 NW Wemeldinge

Tel: 0113-621385

Fax: 0113-622591

E-mail: info@lagendijk-constructie.nl

Web-Site: www.lagendijk-constructie.nl

Year of purchase: 2007

These Lagendijk store cranes are tailor-made for operating the sweeping arms.

Specification:

Type:	SK 5.9-5000/10.3-1000
Main dimensions:	Length: 11.2 – Width: 1.8 – height: 4.1 m
Propulsion:	Hydraulic
Lifting capacity:	5000 kg – 5.9 meters / 1000 kg – 10.2 m
Crane foundation:	
Outside diameter leg:	1220 mm
Wall thickness:	14.5 mm
Cross-sectional area:	54914.25 mm
Section modulus:	32710902.07 mm ³
Compressive stress:	2.03 N/mm ²
Bending stress:	21.54 N/mm ²
Resulting stress:	23.57 N/mm ²

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

Hydraulic requirements (200 Bar working pressure):

Skimmer (15 l/min), Debris Screen (5 l/min), Slewing Cylinder (15 l/min), Winch 5 Tons (60 l/min), Winch 1 Ton (30 l/min), pump (190 l/min)



Fig. 6. Koseq Sweeping Arm Crane



Fig. 7. Control cabinet

5.1.18 - 5.1.19 Holland Special Pumps BV diesel-hydraulic power pack, Zone 2

The Holland Special Pumps BV diesel-hydraulic power pack (Type DX125/PV140) is driven by a Daewoo engine (Doosan Infracore L066THI).

All items in dashboard are indicated with nameplates.

The parts of the dashboard are necessary to operate and control the most important functions of Power Pack. To prevent sparks between the Power Pack and deck or floor the base of Power Pack is equipped with wooden blocks mounted at the bottom of fuel tank. To check the level of fuel, the fuel tank is equipped with a level indicator. At the frame of Power Pack four hoisting eyes are mounted. Hoisting of Power Pack is only allowed by using these hoisting eyes.

Specification:

Type:	Hydraulic power generation in zone 2
Serial n°:	HSP-07092 and HSP 07093
Operational area:	Zone-2
Diesel engine:	Doosan Infracore L066THI
Rated power:	80 kW at 2200 rpm intermittent 300 Bar (180 liter)
Min. speed:	850 rpm
Max. speed:	2200 rpm
Hydraulic pump:	Kocsis Technologies Inc. Type A 70U- 1733-3K-B-12P (PV140R1K1T1NFFP)
Hydraulic oil flow:	180 ltr/min at 2200 rpm 80 kw 163 ltr/min at 2000 rpm 78 kw
Hydraulic oil pressure:	300 bar
Lub. Oil pressure:	4.1 Bar
Safety devices:	High hydraulic oil temperature Low hydraulic oil level High temp. engine Low oil pressure engine High temp. exhaust



Fig. 8. Diesel-hydraulic power pack for sweeping arms

5.2. Oil Boom Set

Year of purchase: System purchased in 2007, Segments PVC replaced in 2018

The system includes 2 units of 250m of boom on storage reels with all necessary deployment equipment including air inflation system. The system could be stored in and deployed from a dedicated ISO container. The space required on board is at a minimum as the boom is deployed directly from the reel over the side of the ship.

Oil Boom Set consists of:

5.2.1-5.2.2 Norlense 800 (2X250 m) Self inflatable Oil Boom

5.2.3 – 5.2.5 Air compressor DYNASET HKL 5000

5.2.6 -5.2.9 Towing lines set including towing and cross bridle

5.2.10-5.2.16 ISO flat container 20 ft. and hydraulic winder UNIREEL 12 M3 with cover and spare parts

5.2.17 -5.2.18 Markleen DHPP 60 power pack Ex Zone II with spare parts and maintenance kit

5.2.1 – 5.2.2 Boom section NorLense NO-800 R

Manufacturer:

Norlense AS

N-8317 Stronstad

Norway

E-mail: Firmapost@norlense.no

Web-Site: www.norlense.no

Year of purchase: 2018

Specification:

Diameter freeboard:	800 mm
Skirt depth:	960 mm
Breaking strength tension member top:	58,9 kN
Breaking strength tension member center:	58,9 kN
Ballast / tension member bottom:	13x82 mm Galvanized chain
Weight ballast:	2,95 kg/m
Breaking strength:	159 kN
tension member bottom:	
Storage volume:	13 m ³ /300 m
Buoyancy / weight ratio:	28/1
Weight boom:	17 kg/m
Freeboard and skirt material:	1250 g/m ² PVC/TPU-coated



Fig. 9. Norlense Rapid Deployment Boom NO-800-R

5.2.3 – 5.2.5 Hydraulic compressor HKL 5000/8-135 with hydraulic and air hoses

Manufacturer:

Dynaset OY

Menotie 3

FI-33470 Ylojarvi

Finland

Tel: +358 3 3488 200,

Fax: +358 3 3488 222

Email: info@dynaset.com Website: www.dynaset.com

Year of purchase: 2018

The hydraulic compressor HKL 5000 is a hydraulically driven compressor that transforms the hydraulic power into a quality air pressure and which also can be easily connected to any working tool and the hydraulic line thereof. The units are provided with cooled lubrication system, oil separator and relief valve on the air intake.



Fig. 10. Hydraulic compressor HKL 5000/8-135

Specification:

Type:	rotary vane compressor
Length:	890 mm
Width:	515 mm
Height:	790 mm
Weight:	185 kg
Capacity:	4100 l/min
Pressure:	8 bar
Hydraulic flow max:	135 l/min
Hydraulic pressure:	210 bar nominal
Hydraulic pressure:	150 bar minimum
Hydraulic pressure:	250 bar maximum
Air flow:	5000 l/min at 8 bar

Hydraulic hoses:

Pressure line:	BSP 3/4"
Return line:	BSP 1"

Air hose:	BSP1"
------------------	-------

5.2.6 - 5.2.9 Towing lines set including towing and cross bridle

Towing of the boom under operation is done with a towing rope between the vessel and the boom. The towing rope is connected to a bridle which distributes the towing force in pursuance to the strength of each tension member. There is one for each side of the boom. In the inner end it's shackled directly to the boom, and at the outer end there are split links for quick mounting on and off.

For maintaining the position and obtain optimal J-figuration or open J-figuration, the boom is pre-fitted with a cross bridle. The cross bridle consists of a figure cut net piece that's mounted under the freeboard, and 5 parts of rope that's mounted to the bottom. The 5 parts are joined to one point where there is a split link to the towing rope.

To give the boom necessary drive buoyancy at the outer end during towing, and for compensating for the weight of split links and plates, a buoy is mounted inside the freeboard.



Fig. 11. Towing arrangement



Fig. 12. Net bridle for J formation

5.2.10-5.2.16 ISO flat container 20 ft. and hydraulic winder UNIREEL 12 M³ with cover and spare parts

Manufacturer:

MARKLEEN TERRA, S.L.U.
Polígono Río Gállego, calle E, nº 22
50840 San Mateo de Gállego
Zaragoza
Tel. 976 683 000 – Fax 976 683 001
e-mail: markleen@markleen.com

Year of purchase: 2008

Hydraulic storage winder for 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.

Specifications:

Drum Length:	3312 mm
Height:	2985 mm
Width:	2438 mm
Total Length:	4464 mm
Total Width (including rotation):	3414 mm
Weight:	4990 kg
Drum Diameter:	508 mm
Disc Outside Diameter:	2380 mm
Working Hydraulic Pressure:	175 bar

The reel is equipped with a protecting canvas



Fig. 13. UNIREEL 12 m³

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
- 5.3.6-5.3.8 Skimmer weir module with ancillaries
- 5.3.9-5.3.11 Brush module
- 5.3.12 Oil Transfer Pump GT A 140 PDAS
- 5.3.13-5.3.14 Water injection pump with ancillaries
- 5.3.15 Containerised Hydraulic Power pack LPP 95 diesel driven
- 5.3.16 Oil hoses
- 5.3.17 Cover
- 5.3.18 Spare parts

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

5.1.5 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

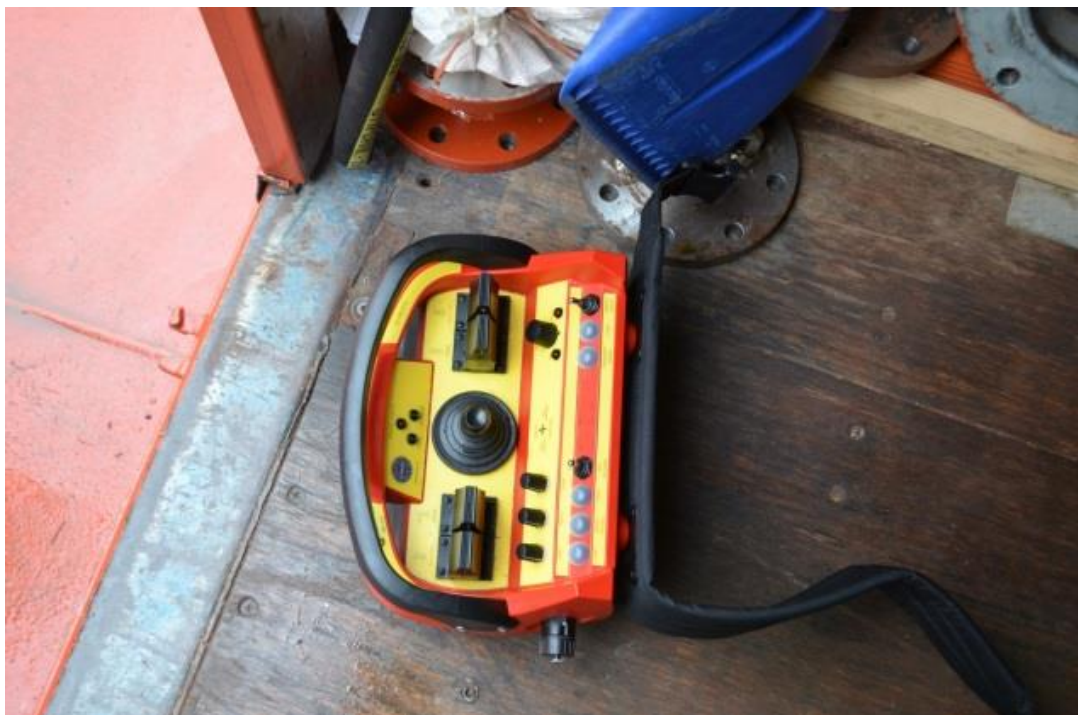


Fig. 17. Radio Remote Receiver Box

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. 18. DP65 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

5.3.6-5.3.8 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 m³/h
Capacity, certified ASTM:	112,2 m³/h
Capacity, certified:	Max. 360 m³/h



Fig. 19. Lamor Free Floating High Capacity Offshore Skimmer Brush module

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.

5.3.9 – 5.3.11 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 m³/h
Capacity, certified ASTM:	3x74 m³/h
Free water collected:	< 5 %
Hydraulic flow (skimmer ONLY):	20 l/min
Hydraulic pressure:	170-200 bar
Power requirement:	6.5 kW



Fig. 20. Brush Adapter

5.3.12 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. 21. Oil Transfer Pump GT A 140 PDAS

5.3.13-5.3.14 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 m³/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

5.3.15 Containerised Hydraulic Power pack LPP 95 diesel driven

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 also designed 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. the10 ft Container is designed to be used in hazardous area Zone II as described in 2014/34/eu ATEX directive.

Operational specification:

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 arrestor 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

Technical specification and dimensions:

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

10' container specification:

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



Fig. 21. Containerised Power pack LPP 95

5.3.16 Oil hoses

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

5.3.17 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)

Umbilical hose reel on flat rack:

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. 22. 20' roof module and 10' bases for skimmer and LUT

5.3.18 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

5.4 Sampling equipment

Sampling/testing equipment consists of:

- 5.4.1 Dräger X-am 5000 SN ARDA-200;
- 5.4.2 Stanhope seta flash point tester 13661-3;
- 5.4.3-5.4.7 Sampling-Test Kit Zematra-Minilab;
- 5.4.8 – 5.4.10 Oil water interface detector MMC D-2401-2;

5.4.1 Dräger X-am 5000 SN ARDA-200

Manufacturer:

Draeger, Inc.
7256 S. Sam Houston W Pkwy., Suite 100
Houston, TX 77085
+1-800-437-2437
+1-215-723-5935

Year of purchase: 2018



Fig. 23. Gas detector Dräger X-am 5000

The Dräger X-am® 5000 belongs to a generation of gas detectors, developed especially for personal monitoring applications. This 1- to 5-gas detector reliably measures combustible gases and vapors as well as CO₂ and harmful concentrations of toxic gases, organic vapors, Odorant and Amine.

5.4.2 Stanhope seta flash point tester 13661-3

Manufacturer:

STANHOPE SETA LTD
London Street, Chertsey
Surrey KT16 8AP, England
Tel: +44(0) 1932 564391
Fax: +44(0) 1932 568363
E-mail: sales@stanhope-seta.co.uk
Web-Site: www.stanhope-seta.co.uk

Year of purchase: 2007

The Stanhope Seta FP tester 13661-3 is intended to determinate the flash-point of petroleum products using the Pensky-Martens closed cup flash point test. In this test a brass test cup is filled with a sample of oil that is heated and stirred at specified rates. An ignition source is directed into the cup at regular intervals with simultaneous interruption of stirring until a flash that spreads throughout the inside of the cup is seen. The corresponding temperature is its flash point.

The system is equipped with an electrically heated cup, adjustable temperature ramp rate, and two speed stirrers (for ASTM D93-IP34 Methods A & B).



Fig. 24. Flash Point Tester

5.4.3-5.4.6 Sampling-Test Kit Zematra-Minilab.

Manufacturer:

Zematra BV,
Mandenmakerstraat 188,
3194 DG, Hoogvliet-rt,
The Netherlands,
Tel: +31-(0)10-4722080
Web-Site: www.zematra-marine.com

Year of purchase: 2007

With the Mini-lab it is possible to measure the following parameters from an oil sample:

Density

Zematra manufactures a density unit which is fully in accordance with the specifications as mentioned in ASTM D1298 and IP 160.

After checking the temperature a hydrometer is placed in the sample. Together with the hydrometer reading and a graph, one can now determine the density of the sample (fuel oil or lube oil) at 15°C.

Pour point

The portable Pour Point Test Kit allows determining the pour point (no-flow point) of oils and oil products by means of a simple but reliable kit of tubes, thermometer and coolant

Water in Oil Test

This test kit enables you to determine the percentage of water in your lube oil/fuel oil. The test is performed by means of the "Calcium Hydride Pressure Test vessel Method". The value obtained can be used as a check on the lube oil separator, any water leakages and operation contamination. With the basic kit approx. 50 tests can be done.

Salt in Water Test

Following the water test kit, Zematra has also developed a so-called "NATURE OF WATER" test. This is a method to determine fresh, brackish or salt nature of water.

Compatibility/Stability test

This compatibility/stability test is a modified version of the ASTM D4740-94 method. The test methods list two separate procedures for predicting stability of residual fuel oil and the compatibility of residual fuel oil with a blend stock.

Zematra TBN (Alkalinity) Test

This test kit is specially developed to check the TBN value (alkalinity) of the engine's lubricating oil. The test is performed by means of a pressure test vessel. With the basic kit approx. 50 tests can be done.

Viscosity meter by falling sphere method

The Zematra Mini-lab provides a simple way to determine the dynamic viscosity of the fuel.



Fig. 25. Zematra-Minilab

5.4.8-5.4.10 Oil water interface detector MMC D-2401-2

Manufacturer:

MMC International Corporation
60 Inip Drive, Inwood,
New York 11096-0664
Tel: 800-645-7339
Fax: 516-371-3134
E-mail: mmcinwd@aol.com
Web-Site: <http://www.mmcintl.com>

Year of purchase: 2007

The MMC D-2401-2 is a portable measuring device that incorporates extremely accurate instrumentation able to provide three measurements:

Measurement of surface ullage level of oil or other fluids to an accuracy and repeatability of $\pm 1/8$ inch.

- Determination of the exact location of the ullage level of the interface layer when an oil-water mixture is contained within the same tank.
- Measurement in either degrees F or degrees C of the fluid temperature at any desired ullage level. Measurement is given to the nearest 0.1 degree and is accurate to $\pm 0.2^{\circ}\text{F}$ over the calibrated temperature ranges given in the specifications.

The MMC system utilizes a sensor suspended at the end of a fluoro-polymer covered gauging tape wound on a reel assembly. The plastic covered steel gauging tape contains two isolated side conductors to carry the signal and power the electronic circuit within the sensor barrel. The plastic surface of the tape has been treated to make it sufficiently conductive to prevent the build-up of static charges. Temperature indication is provided by a large digital liquid crystal display housed within a sealed reel driving assembly.

Ullage and interface detection is provided by an audible signal obtained from a horn in the reel driving hub, when the bottom "U" gap in the sonic sensor is immersed in fluid. The audible signal heard, will be a continuous tone in a non-conductive fluid such as oil, gasoline, kerosene, etc., but will change to an interrupted tone when immersed in and fluid which is electrically conductive, such as water.

The system is certified as intrinsically safe for electrical equipment in hazardous atmospheres by Factory Mutual, BASEEFA /SIRA, CSA, and SAA.

The triple function temperature, interface, and ullage sensor is powered by a single 9 volt battery contained within the hub assembly. Battery drain is extremely low, (Approximately 1-1/4 Mili-amperes in either the ullage, interface or the temperature mode), insuring very long operation, without battery replacement. Low battery warning is provided at the upper left corner of the temperature display LCD, when the battery voltage has dropped to a level that would, with further operation, cause excessive errors in temperature readings.



Fig. 26. Oil water interface detector MMC D-2401-2

5.5 Communication equipment

5.5.1 Hand portable VHF Air Band JOTRON Tron Air

Manufacturer:

Jotron AS
P.O.Box 54
3280 Tjodalyng
Norway
Tel: +47 33 13 97 00
Fax: +47 33 12 67 80
E-mail: sales@jotron.com

Year of purchase: 2007

Tron AIR is a battery operated 200mW carrier AM transceiver for the VHF air band (118-137MHz) covering the two frequencies 121.5MHz and 123.1MHz. The unit is specially designed and manufactured as emergency two-way transceiver.

Tron AIR comes with a housing made of rough glass filled, and meets the requirements encountered under severe maritime conditions. The equipment is designed to comply MED 96/98/EC for Maritime VHF distress radio equipment operating on aeronautical frequencies. It conforms standards ETS TS 101089. SOLAS ref. Ch.IV/7.5

Tron AIR is waterproof and also floats in case of accidental drop into water. Tron AIR weights approximately 650 g (including battery) and it is easy to operate with one hand, even wearing gloves. The operating temperature range is -20°C to +55°C.

The lithium battery has a 4 years' service live.



Fig. 27. Hand portable VHF Air Band JOTRON

5.6 Cleaning equipment

5.5.8 High pressure hot water cleaning machine Karcher HDS 698 C ECO (supplied with 3 'step-down' transformers from 440 V to 400V).

Manufacturer:

Alfred Kärcher GmbH Co. KG
Alfred-Kärcher-Str. 28 - 40
71364 Winnenden (Germany)
Phone: +49 7195 14-0
Fax: +49 7195 14-2212

Year of purchase: 2007

Karcher HDS 698 C ECO is a hot water compact professional cleaner. This hot water high-pressure washer is a mid-sized machine and very compact. The HDS 698 C ECO has a built-in detergent tank for direct injection, high pressure detergent delivery and the ability to produce steam. See images below.

Features and specifications:

Water connection:	
Max. feed temperature:	30°C
Min. feed volume:	l/h (l/min) 900 (15)
Suck height from open container:	(20 °C) 0,5 m
Max. feed pressure:	MPa (bar) 0,6 (6)
Dimensions and weights:	
Length x width x height:	940 x 600 x 740 mm
Weight without accessories:	94 kg
Fuel tank:	16 l
Detergent Tank:	8 l



Fig. 28. High pressure hot water cleaning machine

