

## **Annex V of the VAC**

### **Technical Specifications for the Equipment**

**Enclosed to Procurement Procedure No. EMSA/CPNEG/1/2017 concerning Service Contracts for stand-by oil spill recovery vessels**

**Competitive procedure with negotiations**

### **Phase II - Invitation to Tender**

**All the costs related to the purchase and transport of additional equipment and transportation and overhauling/servicing of the transferred equipment in line with this Annex and as per below requirements have to be included in the “equipment costs”**

#### **1. General Description**

- 1.1 Equipment Set Transferred
- 1.2 Overhauling and servicing
- 1.3 Additional Equipment

#### **2. Handover Procedure for equipment transferred**

- 2.1. Date and place of the handover
- 2.2. Transportation of equipment
- 2.3. Storage of equipment

#### **3. Installation of the oil pollution response equipment on-board the vessel**

#### **4. List of Transferable equipment**

#### **5. Description of the equipment**

- 5.1 LAMOR Stiff Sweeping Arms LSS 12
- 5.2 LAMOR Heavy Duty Boom 2000
- 5.3 LAMOR Brush Skimmer LFF 100 2C
- 5.4 LAMOR Brush Arctic Skimmer LAS 125 W/P
- 5.5 Slick Detection System Salesmar Selux ST 340
- 5.6 Communication devices (2 x VHF)
- 5.7 Sampling/testing equipment (minilab, flash point tester, gas detector)

## **1. General description**

The oil pollution response equipment comprises, as a minimum, two different at-sea oil recovery systems and an oil slick detection system. The primary system will consist of two rigid sweeping arms, one on each side of the vessel, specially designed to recover medium to high viscous oils. The second system will be based on a boom and skimmer for the recovery of light to medium viscous oils (two skimmers are available – an offshore free floating skimmer and an arctic skimmer). 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 sweeping arms, skimmers, boom and ancillary equipment (power packs, etc.) are dismountable and able to be stored in appropriate facilities for quick installation and operation in case they cannot permanently be installed on board. The storage of the full set of equipment during at-sea operations will be made in a safe way with sea fastenings where appropriate.

When flexible hoses are used, they should maintain the maximum grade of integrity in shape and shall not be exposed to wear and tear against sharp corners or similar.

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. Accordingly, if additional items need to be purchased to make the equipment function properly the associated costs shall be borne by the Contractor although they can be pre-financed or reimbursed by EMSA.

### **1.1. Equipment Set Transferred**

The contractor for lot 2 will receive from EMSA the equipment listed below. The contractor will need to undertake the necessary pre-fitting works in order to install:

1. LAMOR rigid Sweeping Arms LSS 12;
2. LAMOR Heavy Duty Boom 2000;
3. LAMOR Brush Skimmer LFF 120 2C;
4. LAMOR Brush Arctic Skimmer LAS 125 W/P;
5. Slick Detection System Salesmar Selux ST 340;
6. Communication devices (2 x VHF);
7. Sampling/testing equipment (minilab, flash point tester, gas detector).

All tenderers will have the opportunity to visually verify the condition of equipment in the stockpile in Gdansk, Poland, at request. In principle the visit will be organised in week 27. The visit details will be arranged with the requesting party.

Technical issues were experienced in the past with some equipment items, as listed below:

- October 2010: Noise from the hydraulic boom reel brake. Brakes of both offshore boom reels were checked by Lamor. The loose screws were tightened and reduction valves were added;
- August 2013: During a drill one pump from the sweeping arm set got jammed. After the drill, three pumps were sent to Lamor for maintenance.

## **1.2. Overhauling and servicing**

The equipment that will be transferred to the Contractor was purchased in 2010 except the Arctic skimmer (2006). Some items such as canvas, storage flat rack and spares parts for the Arctic skimmer were purchased in 2012. At the moment of transfer the age of the equipment will vary from 8 to 12 years. 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.

It needs to be noted that the equipment has been stored in a warehouse since mid-2016. The sweeping arms and cranes, after being stored outdoor, may require more extended servicing.

Nonetheless, taking into account that during the new contractual period (4+4 years), the Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment, the Contractor should arrange overhauling/servicing to the equipment after the handover but before expiration of the Preparation Phase. In such a case, each tenderer will include in its financial offer regarding the oil pollution response equipment, the estimated overhauling/servicing costs. This estimation will be considered as the ceiling that EMSA will reimburse in relation to the equipment overhauling/servicing.

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

The overhauling/servicing might be performed by a third party subcontracted by the contractor.

### **1.2.1. Equipment to be overhauled by the Contractor**

The contractor should arrange overhauling to the LAMOR Brush Arctic Skimmer LAS 125 W/P.

The overhauling should include as a minimum the following:

- Check and replace, if necessary, the hydraulic and oil hoses and couplings;
- Check and overhauling of the brush module, if necessary (e.g. replacement of all wearing parts from the hydraulic motor, replacement of brushes);
- Check and overhauling of the pump, if necessary (e.g. replacement of plate wheels, sealing ring, wheel shaft and bearing, sealing/bearing discs, cutting knife, etc.);
- Check and overhauling the hose reel, if necessary (e.g. replacement of all wearing parts from the hydraulic motor, reduction gear, hydraulic valves and levers);
- Brushing off rust, check paint and repaint, if necessary.

### **1.2.2. Equipment to be serviced by the Contractor**

The contractor should arrange servicing to the following equipment:

1. LAMOR rigid Sweeping Arms LSS 12;
2. LAMOR Heavy Duty Boom 2000;
3. LAMOR Brush Skimmer LFF 120 2C;

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 sweeping arms/free floating skimmer;
- Check and servicing of the pumps, if necessary;
- Check the paint and repaint, if necessary.

### 1.3. Additional Equipment

Tenderers will need to purchase/deliver the following equipment:

1. Power pack: One additional hydraulic power pack able to operate (each one separately) the boom and the two skimmers, according to their technical specifications.
2. Flashpoint of the arrangement: If the tenderer could offer an arrangement able to collect and store oil with a flashpoint below 60°C, then additional items may need to be purchased or replaced (e.g. for the power packs, remote controls, etc.). in order to maintain that class notation during OPR operations.
3. Flow-meter: to be used during drills and recovery operations to measure the flow of the pumps installed in the sweeping arms and skimmer.
4. Slick Detection System: The Oil Slick Detection System must be upgraded and updated. The tenderer has to check with the manufacturer (the relevant contact address is provided in Section 5, point 5.5) or an authorised representative whether the existing radar and antenna on board the vessel are compatible with the slick detection system provided by EMSA. In case of incompatibility, then new items must be purchased. The tenderer should foresee the necessary space in the bridge to install it.  
The system must be upgraded regularly throughout the duration of the contract.
5. Interface Detection System: When the oil/water mixture is stored in the tanks, the water and the oil is naturally separated due to the difference in density. The tenderer shall provide adequate equipment (fixed or portable) to detect the interface border between the oil and the water so that the quantity of actual oil stored is known.
6. Portable Cleaning System: In order to clean the equipment and deck after the first stage of operations, three portable high pressure hot water cleaning sets shall be provided with a flow range of at least 0.18-0.72 m<sup>3</sup>/h at 20-100 bar.
7. EMSA logo on equipment: At least one EMSA logo must be attached/painted on a visible position on each sweeping arm and crane, skimmer frame (if possible), boom reel, power pack, storage containers. The dimension of the logos shall be in proportion to the items to be marked.

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

8. Vessel Model: At the end of the preparation phase, the Contractor will deliver to EMSA, at its premises in Lisbon, a model(s) of the Vessel(s) at (approximate) scale 1/100. All oil pollution response equipment will be displayed, in the appropriate scale, on board the model(s). In

particular, one system must be deployed, simulating recovery of oil with the option to display the alternate system (sweeping arms or boom/skimmer systems). The model(s) should be as detailed as possible, preferably made of plastic or metal. The model(s) remains the property of EMSA, only to be used by the Contractor upon request with the agreement of EMSA. Any cost related to the production of the model and its transportation costs shall be borne by the Contractor<sup>1</sup>.

## **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 unless another solution is agreed with the Agency.

### **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 oil pollution response equipment items listed in point 1.1 above will be made available for handover and ready for transportation at their storage location in Gdansk (Poland) at a time to be mutually agreed between EMSA and the Contractor. The handover of this equipment shall not take place earlier than the day following the date of signature of the Contract by the last contracting party and no later than **15 March 2018**.

On the handover dates, the Contractor representative shall be present and verify the delivery of the equipment in question.

An equipment 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 equipment delivery/receipt statement on the handover date, the Contractor representative accepts the equipment in its current condition.

### **2.2. Transportation of equipment listed in point 1.1. above**

The Contractor shall bear all risks involved in transporting (including loading and unloading) for the equipment under 1.1. from the handover place to the new storage facility.

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) 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 of equipment**

Prior to the equipment handovers, the Contractor shall arrange for the appropriate storage and insurance of all the oil pollution response equipment.

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<sup>1</sup> The model price should be indicated in the bid for information only.

For the purpose of taking out the full risk insurance policy covering the transferred oil pollution response equipment items as listed in the table in Section 4 and described in details in Section 5, the equipment value shall be the equipment purchase value which is in the range of 1.25 million EUR (one million two hundred fifty thousand euro).

### **3. Installation of the oil pollution response equipment on-board the vessel**

The vessel must be pre-fitted in order to allow installation on board of any of the above listed oil pollution response equipment, taking into account the standardised containers/flat racks for storage.

The equipment that must be installed/carried simultaneously on board must include as a minimum the following:

- the sweeping arm system,
- the boom system (2 x reel),
- one skimmer system,
- the oil slick detection system,
- other equipment (minilab, cleaning machines, gas detector, flashpoint tester, etc.)

and their relevant power packs and ancillaries.

With regard to the two skimmer systems available (Lamor offshore skimmer and Lamor arctic skimmer), it is acceptable if only one system is installed on deck at a time. However, the tenderer shall make a suitable proposal that each skimmer system is deployed at-sea at least twice a year.

The tenderer may offer a different proposal to that described above with equivalent performance adapted to the vessel configuration. Such equivalence will be duly justified and motivated.

The general requirements to be considered for installing the equipment are included in Annex IV - Technical Specifications for the vessel/pool of vessels. In addition, point 1 of this document also includes general guidelines.

#### 4. List of Transferable Equipment

Ref. No.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.1	Sweeping arm set	5.1.1	Frame	Lamor, Rigid, LSS 12, 12m	ITEM	ALDM362201	1338	14/07/2010
		5.1.2	Frame	Lamor, Rigid, LSS 12, 12m	ITEM	ALDM362202	1339	14/07/2010
		5.1.3	Towing lines set	BOW WIRE 50 FOR JIB 12, 40 M	SET	ALDM374201	1340	14/07/2010
		5.1.4	Towing lines set	BOW WIRE 50 FOR JIB 12, 40 M	SET	ALDM374202	1341	14/07/2010
		5.1.5	Weir module	WEIR SKIMMER MODULE	ITEM	ALDM314401	1342	14/07/2010
		5.1.6	Weir module	WEIR SKIMMER MODULE	ITEM	ALDM314402	1343	14/07/2010
		5.1.7	Pump	Lamor GTA 140, OIL TRANSFER (12 BAR)	ITEM	ALDM283201	1344	14/07/2010
		5.1.8	Pump	Lamor GTA 140, OIL TRANSFER (12 BAR)	ITEM	ALDM283202	1345	14/07/2010
		5.1.9	Brush module	BRUSH MODULE UNIT 5 V-TYPE BRUSH CHAINS	ITEM	ALDM310701	1346	14/07/2010
		5.1.10	Brush module	BRUSH MODULE UNIT 5 V-TYPE BRUSH CHAINS	ITEM	ALDM310702	1347	14/07/2010
		5.1.11	Pump	MARIFLEX MSP 150, 350 m3/h, OIL TRANSFER (6 BAR)	ITEM	ALDM283203	1348	14/07/2010
		5.1.12	Pump	MARIFLEX MSP 150, 350 m3/h, OIL TRANSFER (6 BAR)	ITEM	ALDM283204	1349	14/07/2010
		5.1.13	Crane	DAVIT CRANE SYSTEM 12 M, HYDRAULIC WINCH	ITEM	ALDM131501	1350	14/07/2010
		5.1.14	Crane	DAVIT CRANE SYSTEM 12 M, HYDRAULIC WINCH	ITEM	ALDM131502	1351	14/07/2010
		5.1.15	Power pack	LPP 109 D, Diesel	ITEM	ALDM272801	1354	14/07/2010
		5.1.16	Power pack	LPP 109 D, Diesel	ITEM	ALDM272802	1355	14/07/2010
		5.1.17	Storage reel	HOSE WINDER LHW 60/2-AL (60 + 20 M)	ITEM	ALDM353401	1356	14/07/2010
		5.1.18	Storage reel	HOSE WINDER LHW 60/2-AL (60 + 20 M)	ITEM	ALDM353402	1357	14/07/2010
		5.1.19	Ancillaries	WATER INJECTION KIT 3/4" GT A 140 / INLET	ITEM	ALDM020201	1358	14/07/2010
		5.1.20	Ancillaries	WATER INJECTION KIT 3/4" GT A 140 / INLET	ITEM	ALDM020202	1359	14/07/2010
		5.1.21	Hydraulic hose(s)	SET FOR WEIR AND BRUSH SKIMMER UNITS, 20m	SET	ALDM223801	1360	14/07/2010
		5.1.22	Hydraulic hose(s)	SET FOR WEIR AND BRUSH SKIMMER UNITS, 20m	SET	ALDM223802	1361	14/07/2010
		5.1.23	Hydraulic hose(s)	SET FOR MSP150 AND GT A 140 PUMPS, 3 x 20m	SET	ALDM223803	1362	14/07/2010
		5.1.24	Hydraulic hose(s)	SET FOR MSP150 AND GT A 140 PUMPS, 3 x 20m	SET	ALDM223804	1363	14/07/2010
		5.1.25	Oil hose(s)	SEMI RIGID, CAMLOCK, 6", 20m	SET	ALDM263801	1364	14/07/2010
		5.1.26	Oil hose(s)	SEMI RIGID, CAMLOCK, 6", 20m	SET	ALDM263802	1365	14/07/2010

Ref. No.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.1	Sweeping arm set (continuation)	5.1.27	Cover	CANVAS FOR STIFF SWEEP BRUSH MODULE	ITEM	ALDM121401	1368	14/07/2010
		5.1.28	Cover	CANVAS FOR STIFF SWEEP BRUSH MODULE	ITEM	ALDM121402	1369	14/07/2010
		5.1.29	Cover	CANVAS FOR LPP 109 D	ITEM	ALDM121403	1370	14/07/2010
		5.1.30	Cover	CANVAS FOR LPP 109 D	ITEM	ALDM121404	1371	14/07/2010
		5.1.31	Storage container	10 FT CONTAINER (SIDE AND END DOORS)	ITEM	ALDM351201	1372	14/07/2010
		5.1.32	Spare parts	RIGID SWEEP BRUSH SPARE PART KIT	SET	ALDM343801	1373	14/07/2010
		5.1.33	Spare parts	SPARE PART KIT FOR GT A 140	SET	ALDM343802	1374	14/07/2010
		5.1.34	Spare parts	SPARE PART KIT FOR MSP 150	SET	ALDM343803	1375	14/07/2010
		5.1.35	Spare parts	SPARE PART KIT FOR LPP 109 D	SET	ALDM343804	1376	14/07/2010
5.2	Boom set	5.2.1	Segment	LAMOR, HDB 2000, Heavy duty, 250m	ITEM	ALDA073601	1377	14/07/2010
		5.2.2	Segment	LAMOR, HDB 2000, Heavy duty, 250m	ITEM	ALDA073602	1378	14/07/2010
		5.2.3	Towing bridles set	CROSS BRIDLE NO-450	SET	n/a	1379	14/07/2010
		5.2.4	Towing lines set	TOWING SET HDB 2000	SET	ALDA374201	1380	14/07/2010
		5.2.5	Towing lines set	TOWING SET HDB 2000	SET	ALDA374202	1381	14/07/2010
		5.2.6	Storage reel	BOOM REEL HSR H 1822 (HEAVY CONSTRUCTION)	ITEM	ALDA353401	1382	14/07/2010
		5.2.7	Storage reel	BOOM REEL HSR H 1822 (HEAVY CONSTRUCTION)	ITEM	ALDA353402	1383	14/07/2010
		5.2.8	Hydraulic hose(s)	SET FOR HSR H, 3/8", 15m	SET	ALDA223801	1384	14/07/2010
		5.2.9	Hydraulic hose(s)	SET FOR HSR H, 3/8", 15m	SET	ALDA223802	1385	14/07/2010
		5.2.10	Cover	CANVAS FOR BOOM REEL	ITEM	ALDA121401	1386	14/07/2010
		5.2.11	Cover	CANVAS FOR BOOM REEL	ITEM	ALDA121402	1387	14/07/2010
		5.2.12	Guiding reel	GUIDING ROLL FOR BOOM HDB 2000	ITEM	ALDA020201	1388	14/07/2010
		5.2.13	Air blower	HYDRAULIC AIR BLOWER HAB 200 (400 M3/H)	ITEM	ALDA032901	1389	14/07/2010
		5.2.14	Hydraulic hose(s)	SET FOR AIR BLOWER, 3 x 15m	SET	ALDA223803	1390	14/07/2010
		5.2.15	Cover	CANVAS FOR AIR BLOWER	ITEM	ALDA121403	1391	14/07/2010
		5.2.16	Spare parts	REPAIR KIT FOR BOOM	SET	ALDA343801	1392	14/07/2010
5.3	Skimmer set 1	5.3.1	Brush module	LAMOR LFF 100 2C, 2V*4 chain	ITEM	ALDI310701	1393	14/07/2010
		5.3.2	Oil hose(s)	SET FOR LFF 100 2C (UMBILICAL CHORD), 60m	SET	ALDI263801	1394	14/07/2010
		5.3.3	Storage reel	REEL FOR HOSE SET	ITEM	ALDI353401	1395	14/07/2010
		5.3.4	Pump	LAMOR GTA 140, OIL TRANSFER (12 BAR), 140m3/h	ITEM	ALDI283201	1396	14/07/2010



Ref. No.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.3	Skimmer set 1 (continuation)	5.3.5	Ancillaries	WATER INJECTION KIT 3/4" GT A 140/INLET	SET	ALDI020201	1397	14/07/2010
		5.3.6	Remote control	RADIO REMOTE CONTROL 3-6 EXZONE 1	ITEM	ALDI291301	1398	14/07/2010
		5.3.7	Ancillaries	SEA CATCH / RELEASE SET FOR SKIMMER	ITEM	ALDI020202	1399	14/07/2010
		5.3.8	Storage container	FLAT RACK CONTAINER 20 FT	ITEM	ALDI351201	1400	14/07/2010
		5.3.9	Spare parts	SPARE PART KIT FOR SKIMMER	SET	ALDI343801	1401	14/07/2010
		5.3.10	Spare parts	SPARE PART KIT FOR PUMP GT A 140	SET	ALDI343802	1402	14/07/2010
5.4	Skimmer set 2 (Arctic)	5.4.1	Brush module	LAMOR LAS 125 W/P, Arctic	ITEM	AACI310702	1403	23/05/2006
		5.4.2	Pump	LAMOR GTA 115, PDAS, 115m3/h	ITEM	AACE283201	1404	23/05/2006
		5.4.3	Frame	FLOAT FOR LAS	ITEM	AACI302203	1405	23/05/2006
		5.4.4	Frame	FLOAT FOR LAS	ITEM	AACI302204	1406	23/05/2006
		5.4.5	Storage reel	HOSE WINDER	ITEM	AACI353402	1407	23/05/2006
		5.4.6	Oil hose(s)	HOSES FOR LAS 125	SET	AACI263801	1408	23/05/2006
		5.4.7	Cover	CANVAS COVER FOR ARCTIC SKIMMER	ITEM	ALDI120001	1409	13/12/2012
		5.4.8	Storage flat rack	20' FOR ARCTIC SKIMMER	ITEM	ALDI352001	1410	13/12/2012
		5.4.9	Spare parts	CAMLOCK REDUCER COUPLING MALE 6" TO FEMALE 5"	SET	ALDI343101	1411	13/12/2012
5.5	Oil Slick detection	5.5.1	Consilium	OIL SLICK DETECTION SYSTEM SELESMAH SELUX ST 340 SE INCLUDING: MONITOR, SIMPLIFIED KEYBOARD, DISPLAY CORE UNIT	SET	ALDJ143301	1413	14/07/2010
5.6	Communication	5.6.1	VHF Portable	VHF RADIO PHONE VERTEX STANDARD VXA-220 PILOT VI AIRBAND H/H	ITEM	ALDC392901	1414	14/07/2010
		5.6.2	VHF Portable	VHF RADIO PHONE VERTEX STANDARD VXA-220 PILOT VI AIRBAND H/H	ITEM	ALDC392902	1415	14/07/2010
5.7	Sampling/testing	5.7.1	Gas detector	PORTABLE GAS DETECTOR / EXPLOSIMETER GX-2009B AND CHARGER	SET	ALDH191801	1416	14/07/2010
		5.7.2	Flash point tester	SETAFLASH SERIES 3 CLOSED CUP FLASHPOINT TESTER	SET	ALDH173901	1417	14/07/2010
		5.7.3	Mini lab	VISCOSITY METER	SET	ALDH231701	1418	14/07/2010
		5.7.4	Mini lab	DENSITY METER	SET	ALDH234301	1419	14/07/2010

## 5. DESCRIPTION OF EQUIPMENT

### 5.1 Sweeping Arm System

**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](mailto:info@lamor.fi), Website: [www.lamor.fi](http://www.lamor.fi)

**Year of purchase: 2010**



**Figure 1** LAMOR Stiff Sweeping Arm system LSS 12m

The sweeping arm system is supplied with an integrated weir skimmer and a brush module skimmer that can be assembled to the arm for recovery operations of high viscous oils. The skimmer may be equipped with a centrifugal pump with screw impeller, Mariflex MSP150 or with a LAMOR PDAS GT A 140 pump. The sweeping system includes the following components:

- Rigid Sweeping Arm Structure
- Brush Skimmer Module
- Weir Skimmer Module
- Pump Lamor GT A 140
- Pump Mariflex Centrifugal MSP150
- Davit Crane System

- Towing lines set
- Hydraulic Hoses
- Oil Transfer Hoses
- Storage reel
- Power Pack LPP 109 D
- Ancillaries: spare parts and canvas



**Figure 2** Deployment on ice of Lamor Stiff Sweeping Arms

#### **5.1.1 – 5.1.2 LAMOR Stiff Sweeping Arms LSS 12m Frames**

Each sweeping arm consists of an outer pontoon, a bridge and an inner pontoon welded together. The inner pontoon contains the weir collection chamber in which the pump (centrifugal or PDAS) is fitted. In this inner pontoon may be fitted the Brush skimmer module.

##### **Sweeping arm dimensions**

Width:	approx. 3300 mm
Length:	approx. 12000 mm
Height:	approx. 2130 mm
Weight:	approx. 4100 kg

The construction is made of aluminium and steel. The oil guiding plate is of polyethylene, an easy to clean, glossy surface where the oil does not stick.

### **Sweeping arm performance parameters**

Significant wave height:	1.5 m to 2 m
Recovery speed:	up to 3 knots
Sweeping width:	20 m + vessel beam
Recovered water:	< 5 % of total recovered volume (Brush skimmer pack)
Type of Oil to recover:	All grades and ages, including debris, seaweed and tar balls.
Min air temperature:	- 20 °C
Min water temperature:	0 °C
Max operating temperature:	+ 60 °C

#### **5.1.3 – 5.1.4 Towing lines set – Bow Wire for JIB 12, 40 m**

Towing chains and ropes as well as lifting slings are included.

#### **5.1.5 – 5.1.6 Weir Skimmer module**

The brush conveyor belt can be removed from the skimmer apex to create a weir type skimming system. The weir module consist of a stainless steel hopper in which bottom is fitted the oil pump. In the fore part of the hopper is assembled a plate that hinges up and down depending on the oil-water inflow rate. For the operation with the weir skimmer the sweeping arms may be fit with the Centrifugal screw impeller pumps MSP 150.



**Figure 3** LAMOR Stiff Sweeping Arm LSS 12m – weir skimmer module on the front

### 5.1.7 – 5.1.8 Lamor GT A 140 Pump

The Lamor GT A 140 pump is a multi-purpose submersible Archimedes screw pump with a pumping capacity of 140 m<sup>3</sup>/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.

#### Technical Specifications

Length:	500 mm
Width:	300 mm
Height:	598 mm
Weight:	71 kg
Capacity:	140 m <sup>3</sup> /h
Hydraulic flow:	160 max l/min
Hydraulic pressure:	210 max bar
Power req.:	56 max kW
Discharge pressure:	12 bar



**Figure 4** Oil Transfer PDAS Pump Lamor GT A 140

### 5.1.9 – 5.1.10 Brush Skimmer

The 5 Chain LAMOR Brush Conveyor Belt is a removable recovery system for oil spills on the water surface. The Brush Pack consists of 5 parallel brush chains, driven by a hydraulic motor and controlled by a control panel. The “brush conveyor” is supported and protected within a stainless steel frame. The brush cleaning mechanism is a comb-like device mounted at the upper end of the brush conveyor. During operation, the cleaner is positioned below the top axle of the conveyor, to allow recovered oil and debris to drop directly into the discharge chamber from which it is transferred to a storage tank on board by the oil transfer pumps. The conveyor belt is mounted in the apex of the Stiff arm and is removable.

The sweeping arms are equipped with the LAMOR GT A 140 PDAS pumps as they are more adequate to handle high viscous oils and the pumping rate meets the feeding capacity of the brush chains.



**Figure 5** LAMOR Stiff Sweeping Arm LSS 12m – brush skimmer module

#### Technical Specifications

Operational Sea State:	Effective in 2 meter significant waves and wind driven chop. This is highly depending also on the vessel size used.
Viscosity Range:	0 to > 3,000,000 cSt
Dimensions:	5 Brush Chains mounted in steel frame approx. 2000 mm long (between shafts)

Brush Cleaner:	Patented cleaner/comb installed at upper end for gravity discharge of oil and debris into collection hopper.
Hydraulic Motor:	Danfoss type, Installed and fitted with Quick Disconnects.

Once dismantled the sweeping arm recover the oil directly with the weir skimmer.

#### **5.1.11 – 5.1.12 Mariflex Centrifugal Pump MSP150**

##### **Manufacturer**

Mariflex Group

Postal Address:

MariFlex Group

Maassluissedijk 101,  
3133 KA Vlaardingen.

The Netherlands.

Phone: +31 10 - 434 44 45

Fax: +31 10 - 232 95 00

E-mail: [info@mariflex.net](mailto:info@mariflex.net)

<http://mariflexgroup.com/>

##### **Year of purchase: 2010**

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

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





**Figure 6** Mariflex Centrifugal Pump MSP150

**Technical Specifications**

Length	490 mm
Width	490 mm
Height	610 mm
Weight	83 kg
Pump capacity	350m <sup>3</sup> /hr
Discharge pressure	6 bar
Hydraulic pressure	250 bar
Hydraulic flow	130 l/min
Power requirement	50 kW



### 5.1.13 – 5.1.14 Davit Crane System System

#### Manufacturer

Hidroacar Ind. Machinery Industry&Trade Ltd. Co

Soganlik Yeni Mah. Balikesir Cad.No.6 Uprise Elit Residence K.17 D.154, Kartal,

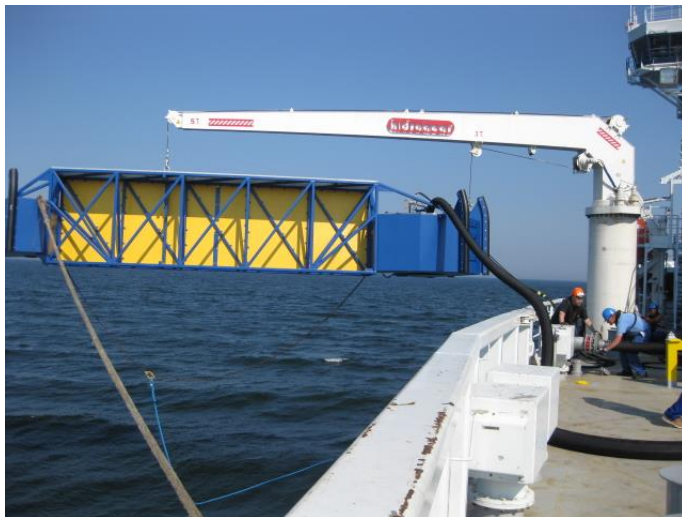
Turkey

Telephone: 90-216-2901330

Fax: 90-216-2901332

Mobile: 90-5334138739

**Year of purchase: 2010**



**Figure 7** Davit Crane System Hidroacar

The Rigid Sweeping Arm Deployment Crane fulfils the requirements of the CE directive (Finnish Government Decree 400/2008, machinery directive 2006/42/EC and Government Decree on the Safe Use and Inspection of Work Equipment 403/2008).

Two ship-assembling cranes which have a constant jib to clean seaside whereas the required technical features are given as follows:

#### Technical Specifications

75/40 Ton fixed boom crane

Maximum reach

15 meters

Capacity (SWL)

5 tons at 5,6 m radius

3 tons at 15,0 m radius

#### Capacity of Hoisting Drums

- |                  |                |
|------------------|----------------|
| 1. Hoisting Drum | 5 tons at hook |
| 2. Hoisting Drum | 3 tons at hook |

Hoisting speed	3 meters/min
----------------	--------------

Material	ST-52 on steel construction
----------	-----------------------------

Hinge Pins	Stainless steel
------------	-----------------

List and Trim	5 + 2 degrees
---------------	---------------

Slew Drive	Planetary double reduction drive, with fail-safe brake and dynamic motion control valve
------------	---

Slewing Angle	180°, continuous rotation
---------------	---------------------------

Wind speed	20 kts
------------	--------

Design Pressure	180 bar (2,600 psi) pressure drop across crane
-----------------	--

Design flow	150 l/min (40 GPM) winches and boom, 45 l/min (12 GPM) swing
-------------	--

Hydraulic Utilities	Optional
---------------------	----------

Crane Controls	Manually actuated valve, pedestal mounted
----------------	---

Mounting pedestal	1220 mm diameter x 1.8 meter height for weld down
-------------------	---

Weight of the crane	Approx. 6 800 kg each
---------------------	-----------------------

#### 5.1.15 – 5.1.16 Hydraulic Power Pack LPP 109 D

The Lamor Power Pack LPP 109 D is powered by a 4 cylinder water cooled Deutz 109 kW diesel engine and serves as a multipurpose power pack designated for the flexible operation of many types of hydraulically operated clean-up equipment.

Equipped with 2x3 hydraulic circuits the Lamor LPP 109 D can be used to power multiple users such as a skimmer and boom winder consecutively. The Lamor LPP 109 D is containerized within a steel frame designated to ensure a good circulation for the air cooled diesel engine.

The Lamor LPP 109 D is equipped with electric start and incorporates an easily accessible control panel and hydraulic oil cooler into the framework. The Lamor LPP 109 D utilizes a Sauer-Danfoss Proportional Hydraulic Valve System (PVG 32/100) making it possible to easily adjust the flow of oil to the supplied components.

The Lamor LPP 109 D is equipped with 4 point lifting rings and forklift channels making it easy to handle on land or offshore. For safety the hydraulic pump is equipped with an automatic shutdown system, also the LPP 109 D is standard equipped with a spark arrestor and Chawyn safety shut down valve.

#### **Technical Specifications:**

Length: 2300 mm

Width: 1300 mm

Height: 1900 mm

Weight: 2500 kg

Hy circuits: 2x3 pcs

Hydraulic flow: 330 l/min

Hydraulic pressure: 210/280 bar

Power: 109 kW

Oil tank capacity: 400 l

Fuel tank capacity: 200 l



**Figure 8** LPP 109 Power-pack



**Figure 9** Power pack hydraulic connections

#### **5.1.17 – 5.1.18 Storage Reel LHW 60/2-AL**

The Lamor Hose Reel is designed to store hydraulic and oil transfer hoses.

The frame is produced in steel protected with marine grade painting. The reels are sea water resistant aluminium.

The construction allows the transfer hoses and the hydraulic hoses to be winded and locked separately. The frame is equipped with 4-point lifting points and forklift channels.

Max capacity: 60 m hydraulic hoses and approx. 50 m rigid transfer hose.

Length: 1700 mm

Width: 1300 mm

Height: 1850 mm

Weight: 150 Kg

Capacity: 60 + 25 m

Reel diameter: 1700 mm

#### **5. 1.19 – 5.1.20 Water Injection Kit ¾" GT A 140 inlet**

The GT a PDAS pumps are equipped with a Fleming Co type inlet side hot/cold water Annulus Water Injection Flange (AWIF). The hot/cold water AWIF significantly increases the pump's ability to deal with high and extreme viscosity oil. The injection flange facilitates the in-flow of very viscous products and the injected water reduces friction inside the pump and in the discharge line.

Each pump is manufactured with a plugged water injection port on the inlet side. It is recommended that the supply line to the inlet AWIF is equipped with a non-return valve, which will prevent the line and the flange from getting contaminated inside by extremely sticky and viscous product. The inlet can be quickly retrofitted with a suitable water injection kit (3/4" for GT a 140).

#### **5.1.21- 5.1.22 Hydraulic hoses for the Weir and Brush Skimmer Units**

Same hose set for weir skimmer hydraulic lifting module and brush skimmer hydraulic motor to run the brush conveyor can be used depending which skimmer unit is in use with the Rigid Sweep.

The hydraulic hose set for the Weir Skimmer and Brush Skimmer units consists of 2 x Hydraulic hose L-20m/84-08/Tem 3811/3821.

#### **5.1.23 - 5.1.24 Hydraulic Hose Set for MSP 150 and GT A 140 Pumps**

The same hydraulic hose set is used for pumps in weir skimmer units (MSP 150) and Brush Skimmer unit (GTA 140) accordingly which of the skimming units of Rigid Sweeping Arm is used.

Lamor's hydraulic hoses are manufactured in a durable material for long service and meet the MED certificates for maritime use.

Each set is fitted with high quality TEMA quick release connectors as standard.

Hose construction: Tube: oil resistant synthetic rubber

Reinforcement: 2 high tensile steel wires braid

Cover: abrasion and weather resistant synthetic rubber

Temperature range: -40 C to +100 C (+120C max)

Standard Hydraulic Hose Set for Lamor Positive Displacement Pumps include the following components:

1 x Hydraulic hose L-20m/84-16/TEMA 10011/10021

1 x Hydraulic hose L-20m/84-16/TEMA 7511/7521

1 x Hydraulic hose L-20m/84-16/TEMA 3821

#### **5.1. 25 – 5.1.26 Oil hoses**

The equipment is supplied with 2 x Semi-Rigid Oil Transfer Hose 6" x 20m, Camlock

#### **Technical Specifications**

Operational temperature	-40... +90°C
Inner diameter	152
Outer diameter	170

Working pressure	15 bar
Exploding pressure	60 bar
Bending diameter	1220 mm
Weight (hose)	5,2 kg/m
Length	20m
Connectors	Camlocks (male/female) 6"



**Figure 10** LSS 12m, oil hose connected to weir skimmer module

#### **5.1.27 – 5.1.28 Canvas for Stiff Sweep Brush Module**

2 x covering canvas are included.

#### **5.1.29 – 5.1.30 Canvas for Power Pack LPP 109 D**

- Dimensions 2040x1140x1715 mm
- A4 side pocket
- Open corners
- Rope in sleeve
- Length: 2040 mm
- Width: 1140 mm
- Height: 1715 mm



### 5.1.31 10'ft Storage container

The container is fitted with double doors on the long side as well as standard end doors. Basic specification includes containers corners, non-slip floor and ventilation grids. The container is painted with Marine Grade coating inside and out. Inside the container is fitted with plywood floor, tie down points for equipment and shelving.

#### Technical Specifications:

Length: 2970 mm

Width: 2440 mm

Height: 2590 mm

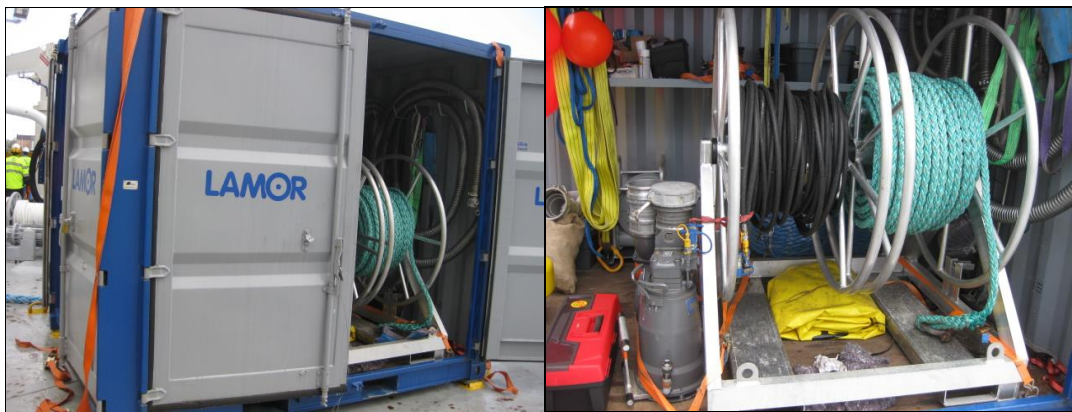
Weight: 1020 kg

Inner length: 2880 mm

Inner width: 2330 mm

Inner height: 2370 mm

Capacity: 16 m<sup>3</sup>



**Figure 11** Storage Container

### 5.1.32 – 5.1.35 Ancillaries: spare parts

- Spare part kit for MSP 150
- Spare part kit for GTA 140
- Spare part Kit for the power pack LPP 109 D

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

## 5.2 Oil Boom Set – Lamor Heavy Duty Boom (HDB) 2000

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](mailto:info@lamor.fi) Website: [www.lamor.fi](http://www.lamor.fi)

### General Description

The Lamor Heavy Duty Oil Boom (HDB) is specifically suited for use in open seas, harbours, semi-sheltered waters and permanent installations such as oil terminals and power plants. The Lamor HDB is constructed so that 2 layers of synthetic fabric are vulcanized together with synthetic oil resistant rubber outer layers. The synthetic coated outer layer gives the Lamor HDB excellent resistance to the effects of oil and UV degradation. The boom is equipped with galvanized ballast chain that guarantees correct deployment in sweeping operations and promotes sea keeping properties. The total boom weight is given including the ballast chain weight. The Lamor HDB comes with end ASTM connectors as standard and can be supplied with towing adaptors or other standard connectors at the customer's request. The Lamor HDB is constructed using fully vulcanized and rubber welded parts without the use of any pop rivets.

The system includes 2 units of 250m of boom on storage reels with all necessary deployment equipment including air inflation system. The space required on board is at a minimum as the boom is deployed directly from the reel over the aft or the side of the ship.

The Lamor – HDB 2000 set includes:

- Boom section,
- Towing set,
- Boom reel,
- Hydraulic hoses,
- Hydraulic blower and air hoses.

### 5.2.1 – 5.2.2 Boom section

On deployment the Lamor HDB sits symmetrically in the water allowing it to be maneuvered easily and face an oil slick from either side. Inflation of the Lamor HDB is quick and efficient thanks to the Lamor F1 air valve and use of a Lamor air blower. The aluminium F1 valve is flat in design and has an incorporated airlock. The complete use of the air valve at inflation can be done by one man without



additional help. Lamor HDB is stored on a dedicated hydraulically powered reel, enabling deployment of up to 200m in approximately 15 minutes.



**Figure 12** Lamor HDB 2000 Boom

### Technical Specifications

Section length	125 m
Freeboard	800 mm
Draft	840 mm
Boom Height	2000 mm
Standard Length	250 m
Colour	Black
Flotation	Air (atmospheric pressure)
Weight	17.1 kg/m
Ballast weight	4.4 Kg/m
Ballast Material	Galvanised Steel Chain
Temperature resistance	-40 ... +60°C
Base fabric	EP 400
Fabric tensile strength	20000 N/5cm
Air chamber length	2.6 m

Efficient in waves

Up to 4.5 m

### 5.2.3 Cross bridle for HDB 2000

The HDB-boom set includes a net piece that can be mounted on the boom to give it a desirable shape when towed in a J or U-formation. The cross bridle allows the boom to form a straight line 90 degree angle from reel/vessel to form the J- or U-sweep.

The cross passing bridle delivered together with the boom has to be connected to the boom during deployment. Once mounted on the boom, it can be wound on to the reel together with the boom if the boom is used in the same formation later.



**Figure 13** Cross bridle

### 5.2.4 – 5.2.5 Towing set

The Lamor TS HDB 2000 towing set consists of an aluminium ASTM connector bolted to a galvanized steel towing post fitted with a certified 3 point wire towing bridle, 12mm/4m. This configuration ensures even and stable operation when towing, mooring or trawling with the boom. Also supplied with the set is 55 m of 24 mm diameter towing warp and 400 mm diameter buoy.

Towing set for HDB 2000 components:

- 1 pc towing end
- 1 pc ASTM
- 1 pc braided polypropylene rope 24mm/55m
- 1 pc towing wire 12mm/4m
- 1 pc buoy 400 mm



**Fig 14** Towing Set

The towing sets can be used for conforming an open U configuration.

### 5.2.6 – 5.2.7 Boom reel HSR H 1822

#### Description

The Lamor hydraulic operated storage reel heavy model HSR H1822 is designed to store up to 200m length of up to 2000 mm height heavy duty oil booms like Lamor HDB offshore rubber boom. The reel frame is manufactured in steel and the spool in marine grade aluminium. The winder frame comprises fork lift channels and 4-point lifting points as standard for easy handling both on and offshore. Marine twist locks and container corner guides are fitted. The Lamor HSR-H is driven by 2 hydraulic motors, requiring a power-pack and allowing for easy deployment and recovery using minimal manpower. Base frame dimensions (footprint): 2740 x 1800 mm.

Standard hydraulic connectors: Tema 3811/3821



**Figure 15** Lamor Boom Reel HSR H 1822

#### Technical specifications

Length	2900 mm
Width	1800 mm
Height	2114 mm
Weight	605 kg

Reel diameter	1800 mm
Reel inner width	2200 mm
Reel material	Aluminium
Frame material	Steel
Forklift channels	Yes
4-point lifting rings	Yes
Hydraulic flow	10 l/min
Hydraulic pressure	200 bar
Power requirement	3 kW

#### **5.2.8 - 5.2.9 Hydraulic hoses**

Hydraulic hose set for Lamor Oil Boom Reels consists of 2 x 15 m 3/8" hydraulic hoses and with standard Tema couplings 3811 and 3821 (M/F)

Hose Construction:

Tube: oil resistant synthetic rubber

Reinforcement: two high tensile steel wire braids

Cover: abrasion and weather resistant synthetic rubber

Temperature range: -40 C to +100 C (+120 C max)

Length 15000 mm



**Figure 16** Hydraulic couplings

#### **5.2.10 – 5.2.11 Canvas for Boom Reel**

Canvases are included for protection of the stored boom.

#### **5.2.12 Guiding Roll for Boom Reel**

The Lamor Oil Boom Guide Roll GR HDB/FOB 200 is an essential tool when deploying and retrieving the boom.

The construction consists of 4 side rollers and 1 lower support roller manufactured from marine quality galvanized steel. It is designed to guide the boom to and from the winder correctly, eliminating any possibilities of twists.

**Specifications:**

Length: 2600 mm

Width: 700 mm

Height: 825 mm

Weight: 110 kg



**Figure 17** Lamor guiding roll for boom reel

**5.2.13 Hydraulic air blower**

The Hydraulic air blower HAB 200 is used for inflating the Lamor Inflatable Booms. The air blower consists of a hydraulic motor and air blower installed in a portable aluminium frame.

The unit is supplied with hydraulic quick release TEMA couplings. The internals of the Lamor HAB 200 are protected by a suction filter.



**Figure 18** Lamor Air Blower

The Lamor HAB 200 has a set discharge pressure so the oil boom cannot be damaged during the inflation operation. Additionally the HAB 200 can be configured to provide suction for deflation of the boom. The Lamor HAB 200 can be powered by one of the family of Lamor hydraulic power packs or using vessel hydraulics.

Hydraulic couplings: ½" TEMA 5011/21, drain TEMA 3821

Components and accessories included

- hy-motor Volvo Parker F11-10
- Ventur Air Blower
- 3" Camlock suction + pressure flange
- filling nozzle & T-key
- air hose 3" Camlock L-10 m with Y-junction
- 2 x air hose 2" Camlock L-5 m to be connected to the Y-junction

Length: 550 mm

Width: 410 mm

Height: 600 mm

Weight: 40 kg

Air flow: 400 m<sup>3</sup>/h

Speed: 4000 rpm

Pressure: adjusted to 0.10 bar

Hydraulic flow 25-40 l/min

Power requirement: 6 kW

#### **5.2.14 Hydraulic hoses set for Lamor HAB 200**

Components included:

- pc(s) Hydraulic Hose 1/2" x 15m Q/R Tema 5000
- 1 pc(s) Hydraulic Hose 3/8" x 15m DRAIN ISO75242

Hose Construction:

- Tube: oil resistant synthetic rubber
- Reinforcement: two high tensile steel wire braids
- Cover: abrasion and weather resistant synthetic rubber
- Temperature range: -40 C to +100 C (+120 C max)

#### **5.2.15 Canvas for Air Blower**

Description:

- A4 side pocket
- 2 open corners



- Rope in sleeve

### 5.2.16 Repair kit for Boom

Included in the system.

## 5.3 Skimmer Set – LAMOR LFF 100 2C

Manufacturer:

Lamor Corporation Ab

Urakoitsijantie 12

06450 Porvoo

Finland

Tel: +358 (0)20 7650 100

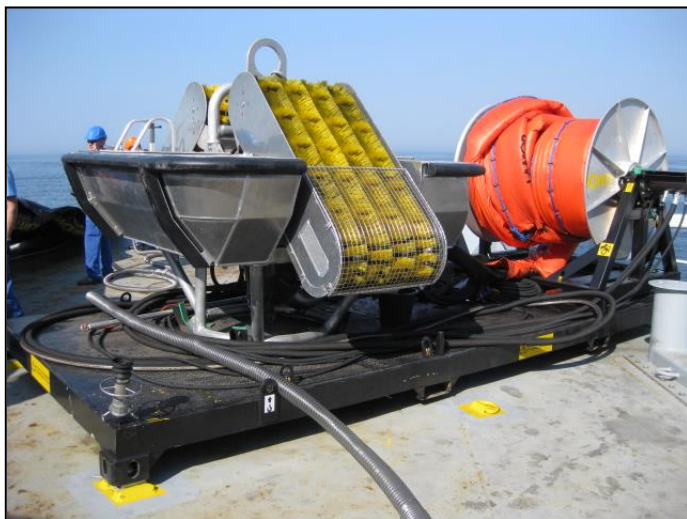
Fax: +358 (0)207 650 129

Email: [info@lamor.fi](mailto:info@lamor.fi), Website: [www.lamor.fi](http://www.lamor.fi)

### 5.3.1. Skimmer frame and Brush Module

The Lamor free floating offshore Skimmer LFF 100 2C is a skimmer designed for open ocean oil recovery operations.

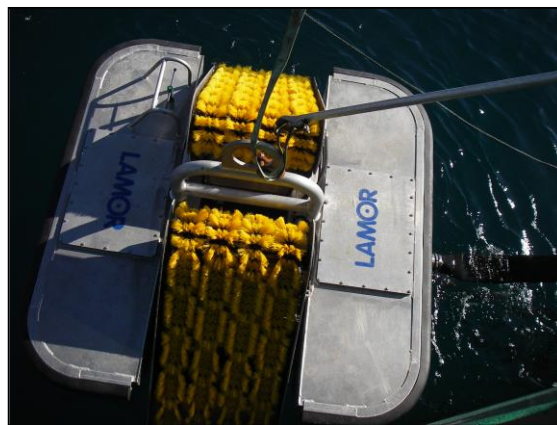
The LFF 100 2C is fitted with two V-chain-pocket- brush type conveyors for efficient collection of all types of floating oil from light to high viscosity oils and emulsion. Each brush chain conveyor consists of four brush chains. LFF 100 2C is equipped as standard pump outlet of 5" and Micro-control MC-3-5 Electric actuator PVEA 157B4735.



**Figure 19** Lamor Skimmer LFF 100 2C

The skimmer is hydraulically operated and fitted with two thrusters to allow the operator to manoeuvre the skimmer to where oil is most heavily concentrated. The skimmer is designed to collect these heavy materials floating on the water surface or submerged below the surface and feed the oil into a Lamor Archimedes screw pump.

A mechanical feeder skimmer lifts or drags - by means of more than just adhesion – the oil out of the water to a position above the water surface, and feeds or drops it into a collection tank and to the oil transfer pump. The mechanical feeder principle results in a significantly increased performance regarding high viscosity oils, debris, and low water recovered content.



**Figure 20** Skimmer deployment

#### **Technical specifications**

Length	2290 mm
Width	2250 mm
Height	1946 mm
Weight of the skimmer head	750 kg
Weight with the pump	830 kg
Design capacity	140 m3/h
Cap. Certified (1 mill cSt)	102,6 m3/h
Max tested capacity	202 m3/h
Hydraulic flow (skimmer only)	40-60 l/min
Hydraulic pressure	210 bar



Power requirement 30 kW

Free water collected < 2 %

The skimmer operation requires a crane with enough lifting capacity and range to place the unit in the water from the storage position.

The Lamor LFF 100 2C is fitted with a “sea catch” quick-release hook to facilitate the deployment. In addition an especial hook facilitates the retrieval of the unit.

### **5.3.2. Oil Hoses**

The standard Lamor hose set is designed not only to support the hydraulic and transfer hoses but also to act as an oil boom supporting and feeding the skimmer with oil during operation. Electric cable powering the EX PVG valves and the radio remote control are also included.

The floating hose set includes the following components:

3 x Layflat 5” transfer hose length 20 m each, totally 60m

2 x hydraulic hoses 1” length 60m

1 x hydraulic hoses 3/8” length 60m

1 x hydraulic hoses 1/4” length 60m

1 x water injection hose 3/4” length 60m

1 x electric cable for radio remote control, length 60m as back-up for the remote control.

### **5.3.3 Storage reel**

The light weight reel frame is manufactured in steel and the spool in marine grade aluminium. The reel frame comprises fork lift channels and 4-point lifting points as standard for easy handling both on and offshore. The reel is equipped with Stainless Steel rotary swivel mounted in the reel drum for hose connection.

The winder frame comprises fork lift channels and 4-point lifting points. The reel is driven by 1 hydraulic motor.

Standard hydraulic connectors: Tema 3811/3821

### **5.3.4 Oil Transfer Pumps: Lamor PDAS GT A 140**

This item is the same as the item described under point 5.1.7

### 5.3.5 Water Injection Kit ¾" GT A 140/inlet

This item is the same as the item described under point 5.1.19

### 5.3.6 Remote Control

The remote control allows the operator to control all the different elements of the skimmer.

It is a 24V Ex Proof design: Receiver EEX d/e IIB T5, remote control terminal EEx ib T4. The controls typically include:

- 1 pc remote terminal MC-3-6 ATEX approved zone 1
- 1 pc electric control terminal for ZONE 1
- Base unit RX Ex zone 1 T4
- charger 230VAC and 24 VDC (not Ex)
- cable for emergency use if error with remote control 5m

Length: 340 mm

Width: 220 mm

Height: 220 mm

Weight: 2,3 kg



**Figure 21** LFF 100 2C remote control

### 5.3.7 Sea catch/ Release Set for Skimmer

Off-shore Skimmer deploying and retrieving is easily and safely carried out by using the Sea Catch Release unit.

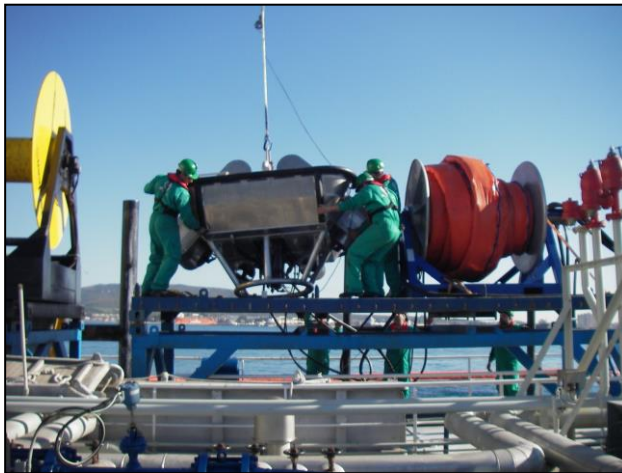
The following elements are included in the Catch/Release Set:

- SeaCatch TR 7 LM hook
- Aluminium lifting stick with support for S424 hook, L-5m
- Lifting hook S424 aluminium
- Duplex webbing lifting sling 60 mm 2T L-2m
- Lifting ring 2,2T (60x110) 8-7 NOR87
- Shackle 22mm, bow-type
- Shackle 19mm, bow-type

### 5.3.8 Storage Container 20 ft

The 20 ft. ISO standard container come equipped with twist locks for transportation, lifting hooks and forklift channels as standard.

The flat rack container is fitted with anti-slip floor for safety and brackets for equipment to be safely secured.



**Figure 22** Skimmer and winder on the flat rack

### 5.3.9 – 5.3. 10 Spare Parts

Includes spare parts for skimmer and for GT A 140 pump.

### 5.4 Brush Arctic Skimmer LAS 125 W/P

#### Manufacturer:

Lamor Corporation Ab  
Mestarintie 25  
06150 Porvoo  
FINLAND

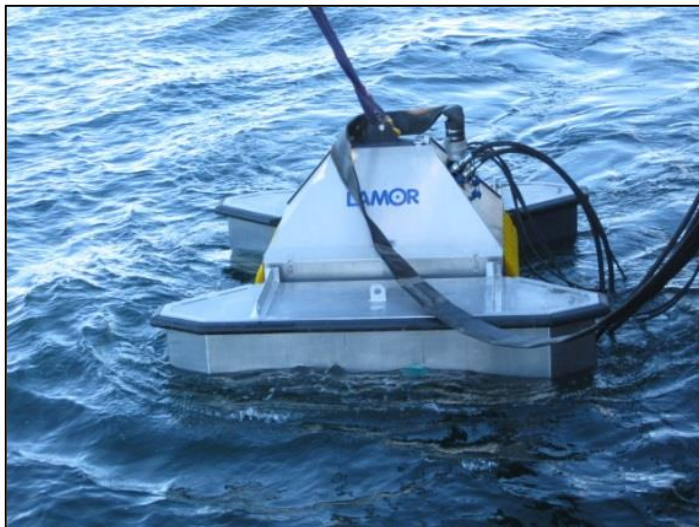
Tel: +358 (0)20 7650 100,

Fax: +358 (0)207 650 129

Email: [info@lamor.fi](mailto:info@lamor.fi)

Year of purchase:

2006



**Figure 23** Brush Arctic Skimmer LAS 125 W/P with floaters

This skimmer is a special purpose oil recovery skimming system designed for operation in extreme cold and broken ice conditions. LAS 125 skimmer is normally deployed by crane or davit but it is also equipped with floats. The skimmer incorporates static ice deflection pipes and rotating brush wheels for oil separation and collection. The two brushes wheels collect and separate the oil from the water, any encountered ice pieces are crushed by the ice crushing screws inside the hopper and these screws also feed the oil to the efficient built-in Lamor GT A 115 PDAS type oil transfer pump.

#### 5.4.1 Brush module



**Figure 24** Brush Arctic Skimmer LAS 125 W/P brush module

#### Technical Specifications

Length:	2980 mm
Width:	3110 mm
Height:	2182 mm
Weight:	830 kg
Weight with floats:	1160 kg
Capacity:	115 m <sup>3</sup> /h
Hydraulic flow (skimmer):	25 max l/min
Hydraulic pressure:	150 - 200 bar
Power req.:	20 - 30 kW
Discharge pressure:	12 bar

Note: The above weights are without GT A pump.

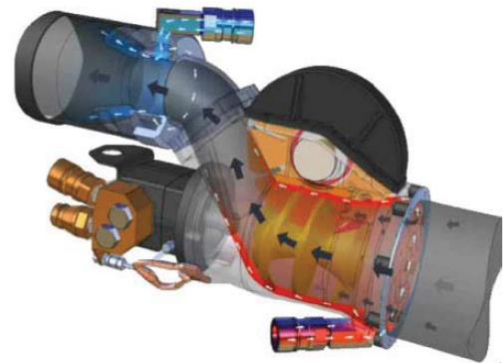


#### 5.4.2 Oil Transfer PDAS Pump Lamor GTA 115

The Lamor GTA 115 pump is a multi-purpose submersible Archimedes screw pump with a pumping capacity of 115 m<sup>3</sup>/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 Lamor GTA 115 pump can deliver a maximum of 12 bar outlet pressure and benefits from water/steam annular injection on the inlet as standard and debris cutting knife to handle solids such as seaweed, plastics and ropes.

##### Technical Specifications

Length	500 mm
Width	300 mm
Height	598 mm
Weight	71 kg
Manhole diam. min.	520 mm
Solid handling	30 mm
Certified capacity	119 m <sup>3</sup> /h
Certified discharge pressure	14 bar 203 psi
Hydraulic flow (max)	160 l/min
Hydraulic pressure (max)	210 bar



**Figure 25** Lamor GTA 115 Pump

#### 5.4.3 – 5.4.4 Floats for LAS 125 Skimmer

The sea water resistant aluminium floats can be attached to the skimmer. This way it can be transformed from a crane operated skimmer to a free floating offshore skimmer. The floats are shaped to guide the oil into the brush skimmer. The floats are equipped with four point lifting eyes.



**Figure 26** Floats for LAS 125 Skimmer (2 sets)

### Technical Specifications

Length:	2980 mm
Width:	790 mm
Heigh:	900 mm
Weight:	165 kg each

#### 5.4.5 Hose Winder for LAS 125 W/P Skimmer

The Lamor Arctic Skimmer Hose Winder is designed to store hydraulic and the oil transfer hoses. The winder frame is produced is steel protected with marine grade painting. The winders are sea water resistant aluminium. The construction allows the transfer hoses and the hydraulic hoses to be winded and locked separately. The frame is equipped with 4-point lifting points forklift channels. The hose winder can be seen below in Figure 27.

### Technical Specifications

Length:	1300 mm
Width:	1300 mm
Height:	1535 mm
Weight:	110 kg
Capacity:	40 m

#### 5.4.6 Hydraulic and Oil Hoses for LAS 125 W/P Skimmer

The hose set includes:

- 2x20 m hydraulic hoses for transfer pump,
- 2x20 m hydraulic hoses for brush wheels,
- 2x20 m oil transfer hoses 4",
- 2x20 m Steam hose ¾.

Weight: 270 kg.



**Figure 27** Hose Winder for LAS 125 W/P Skimmer with oil and hydraulic hoses

#### **5.4.7 Canvas for Arctic skimmer**

Description:

- A4 side pocket
- open corners
- Rope in sleeve

#### **5.4.8 Flat Rack Container 20'**

See description under the point 5.3.8



**Figure 28** Flat rack container for LAS 125 W/P Skimmer





**Figure 29** Flat Rack Container 20'

#### **5.4.9 The spare parts kit for LAS 125**

Includes spare parts for skimmer.

## 5.5 Slick Detection System

### 5.5.1 Consilium Selesmar Selux ST Display 340 SE

Manufacturer: Consilium  
Address: Valimotie 26 C, FI-01510 Vantaa, Finland  
Tel / Fax: +358 40 525 2825 / +358 42 525 2825  
Email / Web: [info@consiliummarine.fi](mailto:info@consiliummarine.fi) / [www.consiliummarine.fi](http://www.consiliummarine.fi)

Year of purchase: 2010

The Selux ST Display 340 SE is a ship remote sensing system for oil spill detection. On board an oil recovery vessel, the system provides continuous oil spill detection during emergency response operations.

The system is composed of:

#### Monitor Unit

The Monitor Unit represents the visual interface between the Operator and the Equipment.

Weight: ~ 21 Kg

#### Standard Keyboard

The Keyboard is the interface on which the operator can insert data, change the working parameters and perform the operations necessary for a correct use of the equipment.

Weight: ~2 Kg

#### Electronic Core Unit

The Electronic Core Unit is composed of a metal box closed by a cover in which the Selux ST Display electronic boards are mounted.

Weight: ~9 Kg

The main features of the system are:

- Ability to present relative signal dumping (oil concentration/thickness) inside the oil slick pattern;
- Automatic oil spot contour detection and area calculation;
- Assessment of the oil slick position, speed and direction;
- Recording of the operating history and instant screen dumps;
- Instrumental maximum oil spill detection range up to 12 Nm;
- Real-time processed images with selectable integration time between 30 seconds up to 2 minutes;
- Information display about wind conditions;
- Ability to increase the antenna rotation speed up to 44 revolutions per minute;



- Able to operate under all kinds of visibility conditions;
- Possibility to integrate external sensors and devices;
- Capacity to interface and receive signals from up to 2 radar sensors (up to four optionally) and allows the operator to select the transceiver to be used for oil spill detection.

Technical information:

- Power supply: Single phase 220 or 115 Vac +/- 15% 50/60 Hz
- Power consumption: 65 W (Monitor + Keyboard + Core Unit)
- Trigger amplitude: TTL to 40 V (peak)
- Serial interface input: RS232 or RS422
- Speed serial electronic input: RS422 standard NMEA or RS232
- Gyrocompass serial input: RS422 standard FNMEA or RS232
- Operating temperature: -15°C / +55°C

## 5.6 Communication

### 5.6.1 – 5.6.2 VHF Radio Phone Vertex

The Vertex Standard VXA-220 Pro VI is a compact and submersible (IP7: 3 ft for 30 minutes) hand-held transceiver providing communication (transmit and receive) capability on the international Aircraft Communication Band (“COM” band: 118 ~136.975 MHz) and it additionally provides receive on the “NAV” band (118 ~117.975 MHz). The VXA-220 boasts 0.7 Watt of clean audio output from its 1.4” (36-mm) diameter loudspeaker, and it also provides 8.33 kHz steps for the new narrow-band channel plan.

## 5.7 Sampling and Testing System

### 5.7.1 Gas Detector with charger

The gas detector model is GX-2009B, O<sub>2</sub>, H<sub>2</sub>S with charger. It detects simultaneous and real-time 4 gases LEL, O<sub>2</sub>, H<sub>2</sub>S and CO.



**Figure 30** Gas Detector

### 5.7.2 Flash Point Tester

The model is Setaflash series 3 closed cup tester. It can complete a flash/no-flash test in less than two minutes, or determine the flash point of a sample within a temperature range of 0 to 300°C in 8 minutes. All functions are accessed via a two button keypad and the Seta Multifunctional and Rotational Test control feature. The digital display shows test parameters, instrument status, and the test result.



**Figure 31** Flash point tester

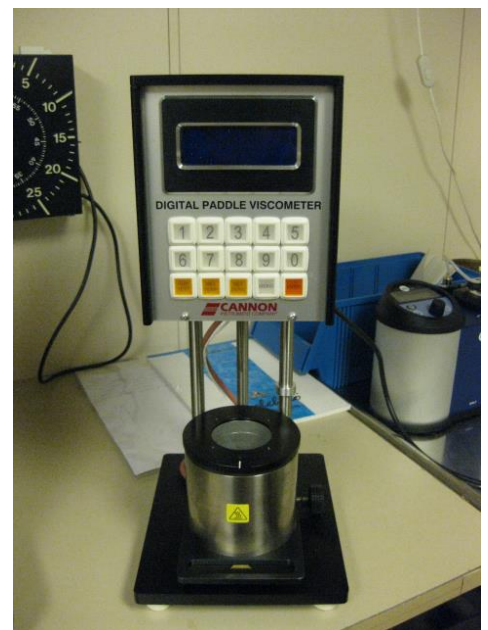
### 5.7.3 - 5.7.4 Mini-lab

The set includes:

- Digital paddle viscometer, 200 to 230 V;
- Portable density Meter Dendi 0.5-2.0g/Cm;
- Quartz Glass Float for Dendi
- N100 Viscosity Standard, 20 to 100Deg C
- Water free cleaning spray 400 ML



**Figure 32** Density meter



**Figure 33** Viscometer