

Annex V of the VAC

Lot 1 – Southern Black Sea

Technical Specifications for the Equipment

Enclosed to Procurement Procedure No. EMSA/CPNEG/17/2016 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 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

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 medium to light 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.

In addition, a combined containment and recovery system – Vikoma weir boom will be transferred to the contractor. Depending on the type of vessel and space available on deck the contractor should make the necessary arrangement, if possible, to install and handle the system.

The sweeping arms, skimmers, boom, weir 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 necessary space on deck for storage and deployment of the above mentioned systems will be available (for the installation and deployment of the weir boom system – if appropriate). 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 Stiff Sweeping Arms LSS 15;
2. LAMOR Offshore skimmer LWS 1300;
3. LAMOR Heavy Duty Boom 2000;
4. Communication devices (2 x VHF);
5. Sampling/testing equipment (gas detector, minilab, flash point tester);
6. Cleaning equipment (3 x portable cleaning);
7. Miros Slick Detection System;
8. Vikoma Weir Boom 180 (depending on the type of vessel and arrangement offered).

All tenderers will have the opportunity to verify the state of equipment in the stockpile in Varna, Bulgaria, at request. In principle the visit will be organised in week 33. The visit details will be arranged with the requesting party.

1.2. Servicing

The equipment that will be transferred to the Contractor was purchased in 2012 except the weir boom (2014). At the moment of transfer the age of the equipment will vary from 3 to 5 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.

Nonetheless, taking into account that during the new contractual period, the Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment, the Contractor 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.

Proof of the service(s) actually carried out on the equipment item(s) shall be included by the Contractor as part of the Completion Report.

Following the completion of the Contract Preparation Phase, the invoices for all services performed on the equipment items and bank statements proving payments shall be submitted to EMSA as described in Enclosure T.3 – Pre-financing Guidelines.

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

Problems were experienced in the past with some equipment items. These problems are listed below:

- February 2014: Problems with air valves of ten boom sections. Problem reported to the manufacturer. New valves delivered and installed.
- September 2014: MIROS computer failed to start. Computer has been sent to the manufacturer. Hard disc replaced.
- December 2014: MIROS computer did not synchronize with the radar. Issue fixed with the help of the manufacturer.
- October 2015: One hydraulic hose (between pump 1 and 2 of the Weir Boom) found slightly damaged. Hose replaced with a new one.

Equipment to be serviced by the Contractor

The contractor should arrange servicing to the following equipment:

1. LAMOR Stiff Sweeping Arms LSS 15;
2. LAMOR Offshore skimmer LWS 1300;
3. LAMOR Heavy Duty Boom 2000;
4. Vikoma Weir boom 180.

The servicing should include the following:

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

1.3. Additional Equipment

Tenderers will need to purchase/deliver the following equipment:

1. 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.).
2. Flow-meter: to be used during drills to measure the flow of the pumps installed in the sweeping arms and skimmer.
3. Slick Detection System: The Oil Slick Detection System must be upgraded and updated. The tenderer has to check this with the manufacturer (the relevant contact address is provided in Section 5, point 5.7). The tenderer should foresee the necessary space in the bridge to install it.
Every 2 years the system must be updated back-to-back with a refreshing training session on the system.
4. 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 oil storage tanks will be equipped with a sensor to detect the interface border between the oil and the water so that the quantity of actual oil stored is known.
5. 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.

6. 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.

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

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 vicinity of Varna (Bulgaria) 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 of February 2017**.

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 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.

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 2.4 million EUR (two million four hundred 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 Lamor boom system (2 x reel) + Lamor offshore skimmer system
or
Vikoma weir boom system, if applicable,
- the oil slick detection system,
- other equipment (minilab, cleaning machines, gas detector, flashpoint tester, etc.)

and their relevant power packs and ancillaries.

For lot 1 - if the vessel proposed is also able to accommodate the weir boom system (**preferred**), it is acceptable that either the Lamor boom and Lamor offshore skimmer or Vikoma weir boom system is installed on deck at a time. In this case, the tenderer shall make a suitable proposal that the Lamor boom + Lamor offshore skimmer and Vikoma weir boom system are deployed at-sea at least twice a year.

In case the vessel proposed is not able to accommodate the weir boom system, the tenderer shall make a suitable proposal that the Vikoma weir boom system is deployed into sea (from a pier or another port facility) 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. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.1	Sweeping arms	5.1.1	Frame	Rigid, Lamor LSS 15	ITEM	GPRM362201	1641	21/12/2012
		5.1.2	Frame	Rigid, Lamor LSS 15	ITEM	GPRM362202	1642	21/12/2012
		5.1.3	Twist Locks	4 CONTAINER CORNERS FOR STIFF SWEEPING ARM TWIST LOCKS	SET	GPRM351201	1643	21/12/2012
		5.1.4	Twist Locks	4 CONTAINER CORNERS FOR STIFF SWEEPING ARM TWIST LOCKS	SET	GPRM351202	1644	21/12/2012
		5.1.5	Crane	DAVIT CRANE SYSTEM, LAMOR	ITEM	GPRM130001	1645	21/12/2012
		5.1.6	Crane	DAVIT CRANE SYSTEM, LAMOR	ITEM	GPRM130002	1646	21/12/2012
		5.1.7	Weir module	WEIR SKIMMER MODULE WITH DEBRIS SCREEN	ITEM	GPRM314401	1647	21/12/2012
		5.1.8	Weir module	WEIR SKIMMER MODULE WITH DEBRIS SCREEN	ITEM	GPRM314402	1648	21/12/2012
		5.1.9	Hydraulic hose(s)	SET FOR WEIR SKIMMER	SET	GPRM223801	1649	21/12/2012
		5.1.10	Hydraulic hose(s)	SET FOR WEIR SKIMMER	SET	GPRM223802	1650	21/12/2012
		5.1.11	Pump	SCREW/CENTRIFUGAL, MARIFLEX - MSP 150	ITEM	GPRM280001	1651	21/12/2012
		5.1.12	Pump	SCREW/CENTRIFUGAL, MARIFLEX - MSP 150	ITEM	GPRM280002	1652	21/12/2012
		5.1.13	Spare parts	SPARE PART KIT 2 FOR MSP 150	SET	GPRM343101	1653	21/12/2012
		5.1.14	Hydraulic hose(s)	SET FOR MSP 150 PUMPS	SET	GPRM223803	1654	21/12/2012

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.1	Sweeping arms (continuation)	5.1.15	Brush module	BRUSH SKIMMER UNIT, CONVEYOR BELT 5C	ITEM	GPRM310701	1655	21/12/2012
		5.1.16	Brush module	BRUSH SKIMMER UNIT, CONVEYOR BELT 5C	ITEM	GPRM310702	1656	21/12/2012
		5.1.17	Hydraulic hose(s)	HOSES FOR BRUSH MODULES	SET	GPRM223804	1657	21/12/2012
		5.1.18	Cover	CANVAS FOR STIFF SWEEP BRUSH MODULE	ITEM	GPRM120001	1658	21/12/2012
		5.1.19	Cover	CANVAS FOR STIFF SWEEP BRUSH MODULE	ITEM	GPRM120002	1659	21/12/2012
		5.1.20	Pump	LAMOR GT A 140 with 6" outlet flange	ITEM	GPRM280003	1660	21/12/2012
		5.1.21	Pump	LAMOR GT A 140 with 6" outlet flange	ITEM	GPRM280004	1661	21/12/2012
		5.1.22	Spare parts	SPARE PART KIT 1 FOR GT a 140 PIUMP	SET	GPRM343102	1662	21/12/2012
		5.1.23	Water injection flange	WATER INJECTION KIT 3/4 I/O GTA 140, with WATER INJECTION OUTLET 5" GTA 140	ITEM	GPRM454701	1663	21/12/2012
		5.1.24	Water injection flange	WATER INJECTION KIT 3/4 I/O GTA 140, with WATER INJECTION OUTLET 5" GTA 140	ITEM	GPRM454702	1664	21/12/2012
		5.1.25	Hydraulic hose(s)	SET FOR GTA 140 PUMP, 30xTEMA M/F COUPLINGS	SET	GPRM223805	1665	21/12/2012
		5.1.26	Storage reel	REEL FOR HOSE STORAGE	ITEM	GPRM353401	1666	21/12/2012
		5.1.27	Storage reel	REEL FOR HOSE STORAGE	ITEM	GPRM353402	1667	21/12/2012
		5.1.28	Cover	PLASTIC COVER FOR REEL	ITEM	GPRM120003	1668	21/12/2012

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.1	Sweeping arms (continuation)	5.1.29	Cover	PLASTIC COVER FOR REEL	ITEM	GPRM120004	1669	21/12/2012
		5.1.30	Control desk	REMOTE CONTROL BOX	ITEM	GPRM110001	1670	21/12/2012
		5.1.31	Control desk	REMOTE CONTROL BOX	ITEM	GPRM110002	1671	21/12/2012
		5.1.32	Oil hose(s)	SEMI RIGID, CAMLOCK, 10 pcs, 6"	SET	GPRM262801	1672	21/12/2012
		5.1.33	Oil hose(s)	SEMI RIGID, CAMLOCK, 10 pcs, 6"	SET	GPRM262802	1673	21/12/2012
		5.1.34	Oil hose(s)	SEMI RIGID, CAMLOCK, 10 pcs, 6"	SET	GPRM262803	1674	21/12/2012
		5.1.35	Oil hose(s)	SEMI RIGID, CAMLOCK, 10 pcs, 6"	SET	GPRM262804	1675	21/12/2012
		5.1.36	Towing lines set	BOW LINE PP 40 mm / 50 m FOR LSS SA AND TOWING CHAIN & SLINGS	SET	GPRM374201	1676	21/12/2012
		5.1.37	Towing lines set	BOW LINE PP 40 mm / 50 m FOR LSS SA AND TOWING CHAIN & SLINGS	SET	GPRM374202	1677	21/12/2012
		5.1.38	Towing lines set	BOW LINE PP 40 mm / 50 m FOR LSS SA AND TOWING CHAIN & SLINGS	SET	GPRM374203	1678	21/12/2012
		5.1.39	Towing lines set	BOW LINE PP 40 mm / 50 m FOR LSS SA AND TOWING CHAIN & SLINGS	SET	GPRM374204	1679	21/12/2012
		5.1.40	Storage container	10 FT CONTAINER WITH MISC. SPARES	ITEM	GPRM351203	1680	21/12/2012
		5.1.41	Water injection pump	ELECTRIC WATER PUMP EVML5AISI 316, INEGRATED IN THE HOT WATER BOILER	ITEM	GPRM455001	1681	21/12/2012
		5.1.42	Power pack spare parts	SPARE PARTS KIT 1 FOR LPP 90 CU	SET	GPRM343103	1682	21/12/2012

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
		5.1.43	Power pack	LAMOR LPP 90 CU - Diesel hydraulic	ITEM	GPRM270001	1683	21/12/2012
5.2	Skimmer	5.2.1	Frame	LAMOR LWS 1300 WEIR SKIMMER MK II/MSP 150, WITH THRUSTERS	ITEM	GPRI302201	1684	21/12/2012
		5.2.2	Brush module	LAMOR LWS 1300 BRUSH ADAPTOR LBA 1300 MK II	ITEM	GPRI310701	1685	21/12/2012
		5.2.3	Cover	CANVAS FOR LBA 1300 MK II	ITEM	GPRI120001	1686	21/12/2012
		5.2.4	Pump	LAMOR GTA 140 with WATER INJECTION KIT 3/4 I/O	ITEM	GPRI280001	1687	21/12/2012
		5.2.5	Storage reel	HOSE REEL WITH 9-CH SWIVEL LHR 60	ITEM	GPRI353401	1688	21/12/2012
		5.2.6	Hydraulic hose(s)	SET FOR LHR 60 9CH - 60 meters in length	SET	GPRI223801	1689	21/12/2012
		5.2.7	Hooking system	SEA CATCH/RELEASE SET FOR LFF OFFSHORE SKIMMERS	ITEM	GPRI440001	1690	21/12/2012
		5.2.8	Storage flat rack	CONTAINER 20`	ITEM	GPRI352001	1691	21/12/2012
		5.2.9	Cover	CANVAS FOR LWS 1300 MK II	ITEM	GPRI120002	1692	21/12/2012
		5.2.10	Cover	CANVAS FOR HOSE SET 60	ITEM	GPRI120003	1693	21/12/2012
		5.2.11	Control desk	CONTROL PANEL 4 VALVES	ITEM	GPRI110001	1694	21/12/2012
		5.2.12	Power pack	LAMOR LPP 90 CU - Diesel hydraulic	ITEM	GPRI270001	1695	21/12/2012
		5.2.13	Pump	MARIFLEX MSP 150 - SCREW/CENTRIFUGAL - 350 m3/h	ITEM	GPRI280002	1696	21/12/2012

Ref. No.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.3	Boom	5.3.1	Segment	LAMOR HDB 2000, HEAVY DUTY, 250 m	ITEM	GPRA073801	1697	21/12/2012
		5.3.2	Segment	LAMOR HDB 2000, HEAVY DUTY, 250 m	ITEM	GPRA073802	1698	21/12/2012
		5.3.3	Storage reel	LAMOR HSR H 1822/PVG VALVE4 VCONTAINER /CORNER/CANVAS COVER	ITEM	GPRA353401	1699	21/12/2012
		5.3.4	Storage reel	LAMOR HSR H 1822/PVG VALVE4 VCONTAINER /CORNER/CANVAS COVER	ITEM	GPRA353402	1700	21/12/2012
		5.3.5	Hydraulic hose(s)	15m, 3/8, TEMA COUPLING	SET	GPRA223801	1701	21/12/2012
		5.3.6	Hydraulic hose(s)	15m, 3/8, TEMA COUPLING	SET	GPRA223802	1702	21/12/2012
		5.3.7	Towing bridles set	1 TOWING END/1 ATSM/1 ROPE 55M/24MM/1 BUOY 400MM	SET	GPRA370601	1703	21/12/2012
		5.3.8	Towing bridles set	1 TOWING END/1 ATSM/1 ROPE 55M/24MM/1 BUOY 400MM	SET	GPRA370602	1704	21/12/2012
		5.3.9	Towing bridles set	1 TOWING END/1 ATSM/1 ROPE 55M/24MM/1 BUOY 400MM	SET	GPRA370603	1705	21/12/2012
		5.3.10	Towing bridles set	1 TOWING END/1 ATSM/1 ROPE 55M/24MM/1 BUOY 400MM	SET	GPRA370604	1706	21/12/2012
		5.3.11	Towing bridles set	CROSS BRIDLE NO-450_600 S	SET	GPRA371601	1707	21/12/2012
		5.3.12	Air blower	AIR BLOWER HAB 200/FILLING NOZZLE&T-KEY/1 AIR HOSE 3", 10M, CAMLOCK/2 AIR HOSES 2", 5 M, CAMLOCK	ITEM	GPRA030001	1708	21/12/2012
		5.3.13	Hydraulic hose(s)	HOSES FOR AIR BLOWER HAB 200/2XHOSE 1/2", 15 M/1XHOSE3/8"	SET	GPRA223803	1709	21/12/2012

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
		5.3.14	Power pack	LAMOR LPP 90 CU - Diesel hydraulic	ITEM	GPRA270001	1710	21/12/2012
5.4	Communication	5.4.1	VHF Portable	VHF RADIO PHONE VXA-220 PILOT VI AIR BAND H/H	ITEM	GPRC390001	1711	21/12/2012
		5.4.2	VHF Portable	VHF RADIO PHONE VXA-220 PILOT VI AIR BAND H/H	ITEM	GPRC390002	1712	21/12/2012
5.5	Sampling/testing	5.5.1	Gas detector	PORTABLE GAS DETECTOR / EXPLOSIMETER GX-2009-B	ITEM	GPRH190001	1713	21/12/2012
		5.5.2	Flash point tester	SETAFLASH SERIES 3 CLOSED CUP FLASH POINT TESTER	ITEM	GPRH170001	1714	21/12/2012
		5.5.3	Mini lab	SAMPLING MINI LAB FOR OIL VISCOSITY AND DENSITY	ITEM	GPRH230001	1715	21/12/2012
5.6	Cleaning	5.6.1	Cleaning machine	PORTABLE CLEANING SYSTEM, HIGH PRESSURE CLEANER	ITEM	GPRB090001	1716	21/12/2012
		5.6.2	Cleaning machine	PORTABLE CLEANING SYSTEM, HIGH PRESSURE CLEANER	ITEM	GPRB090002	1717	21/12/2012
		5.6.3	Cleaning machine	PORTABLE CLEANING SYSTEM, HIGH PRESSURE CLEANER	ITEM	GPRB090003	1718	21/12/2012
5.7	Slick detection	5.7.1	Computer	MIROS WAVEX/OSD WITH KEYBOARD AND TRACKER BALL, WITH EXTENDED GUARANTEE	ITEM	GPRJ201001	1719	21/12/2012
		5.7.2	Monitor	19" FLAT PANEL DISPLAY	ITEM	GPRJ202701	1720	21/12/2012
		5.7.3	Wind sensor	NMEA INTERFACES TO GYRO, GPS, WIND SENSORS	ITEM	GPRJ203701	1721	21/12/2012

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
		5.7.4	Interface box	MIROS RADAR INTERFACE UNIT EM -129 INTEGRATED VIDEO DIGITIZER	ITEM	GPRJ203702	1722	21/12/2012
		5.7.5	Software	USER LICENSE FOR MIROS OSD SYSTEM SOFTWARE	ITEM	GPRJ330001	1723	21/12/2012
		5.7.6	Radar	12 KW FURUNO X-BAND STANDARD RADAR	ITEM	GPRJ203301	1724	21/12/2012
		5.7.7	Antenna	6,5' ANTENNA FOR RADAR	ITEM	GPRJ200301	1725	21/12/2012

5.8	Weir Boom	5.8.1	Segment	VIKOMA WEIR BOOM 180 - 370 M BOOM WITH 76 M WEIR SECTION, INCLUDING, INTERNAL TRANSFER PUMPS, HYDRAULIC AND DISCHARGE HOSES, 6" INTEGRATED FLOW-METER	ITEM	GPRA073801	1730	26/02/2014
		5.8.2	Pump	WATER PUMP WITH FLOTATION ATTACHED TO THE BOOM	ITEM	GPRA280001	1731	26/02/2014
		5.8.3	Pump	TRANSFER PUMP, ROTARY LOBE PUMP	ITEM	GPRA280002	1732	26/02/2014
		5.8.4	Storage reel	WEIR BOOM DECK REEL WITH FLEETING ROLLER AND ARM TO ASSIST DURING THE RETRIEVAL	ITEM	GPRA353401	1733	26/02/2014
		5.8.5	Oil hose(s)	4X5 M 8" SUCTION HOSES AND 3X15 M 6" DISCHARGE HOSES	ITEM	GPRA260001	1734	26/02/2014
		5.8.6	Power pack	Diesel, EX 3G, IIB, 105 kW, T3 RATED FOR HAZARDOUS AREAS ZONE II.	ITEM	GPRA270001	1735	26/02/2014
		5.8.7	Power pack	Diesel, EX 3G, IIB, 105 kW, T3 RATED FOR HAZARDOUS AREAS ZONE II.	ITEM	GPRA270002	1736	26/02/2014

Ref. N°.	Category	No.	Item	Additional info	Unit	ID Code (initial)	ID Code (new)	Purchase Date
5.8	Weir Boom (continued)	5.8.8	Control desk	HYDRAULIC CONTROL DESK COMPLETE WITH MANIFOLDS , VALVING/CONTROLS	ITEM	GPRA110001	1737	26/02/2014
		5.8.9	Hydraulic hose(s)	SET SUPPLIED TO RUN FROM POWER PACKS TO CONTROL CONSOLE AND FROM THE CONSOLE TO THE ANCILLARY EQUIPMENT (pressure, return & drain with connectors) - 20 m	SET	GPRA223801	1738	26/02/2014
		5.8.10	Towing lines set	TOWING WARPS	SET	GPRA374201	1739	26/02/2014
		5.8.11	Air blower	AIR INFLATION SYSTEM, BLOWER	ITEM	GPRA030001	1740	26/02/2014
		5.8.12	Air hoses	1X10 METERS OF 3" FLEXIBLE HOSE WITH 1 X BOOM DEFLATION ADAPTOR	SET	GPRA053801	1741	26/02/2014
		5.8.13	Hydraulic hose(s)	2 pcs, 5m, 1/2" - FOR AIR BLOWER	SET	GPRA223802	1742	26/02/2014
		5.8.14	Storage flat rack	20' FLAT RACK for REEL WITH BOOM AND PUMPS	ITEM	GPRA352001	1743	26/02/2014
		5.8.15	Storage container	20' CONTAINER	ITEM	GPRA351201	1744	26/02/2014
		5.8.16	Spare parts	SPARE PARTS FOR AIR FAN, WEIR BOOM REEL, HOSE KIT, TRANSFER	SET	GPRA340001	1747	26/02/2014

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, Website: www.lamor.fi

Year of purchase: 2012



Figure 1 LAMOR Stiff Sweeping Arm system LSS 15m

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 MSP150-63 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 Marflex Centrifugal MSP150-63
- Davit Crane System
- Towing lines set
- Hydraulic Hoses
- Oil Transfer Hoses
- Storage reel
- Power Pack LPP 90 CU
- Control desk
- Ancillaries: spare parts and canvas

5.1.1 – 5.1.2 Rigid LAMOR Stiff Sweeping Arms LSS 15m

With the LAMOR Stiff sweep arm deployed, the entire vessel becomes an "oil slick processing system". The forward motion of the vessel deflects surface water and oil from the collection area formed by the sweeping arm into the recovery process in the apex formed by the sweeping arm and vessel hull. The flow leads the oil to the collection module which is equipped either by LAMOR brush pack skimmer or a weir type skimmer and the oil transfer pump. The superior advantage of the brush assisted stiff sweep system is that the brush conveyor separates the oil from the flow and compared to the weir type stiff sweep arrangement, which typically collects approx. 90 % water, the free water content with the brush conveyor can be limited to less than 10 %. The conveyor belt is mounted in the apex of the Lamor Stiff arm LSS 15. When the system isn't in use, it is stored on deck or on-land storage, and the vessel can be exploited for other activities.

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

Length:	15000 mm
Width:	3400 mm
Height:	1900 mm
Weight:	4500 kg
Hydraulic flow (skimmer only):	20 l/min
Hydraulic pressure:	210 bar
Power requirement	7 Kw

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 Container Corners for LSS

There are 4 x corner fittings - 2 bottom right and 2 bottom left. This is a complete set assembled on the LSS. These are the fittings found on all ISO type Containers used in the intermodal shipping arena. They are designed to accept a variety of ISO standard Containers.

- Material: Low Carbon Steel for Welding
- Corner conforms to ISO 1161.

Container corners welded on the LSS:

- 16241 bottom corner front right/back left
- 16240 bottom corner front left/back right

5.1.5 – 5.1.6 Davit Crane System Hidroacar

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: 2012



Figure 2 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).

Technical Specifications

Capacity (SWL):	6 tons at 5,7 m 4,5 tons at 12,7 m
Length of Jib (radius):	12,7 m
Height of mounting pedestal:	3074 mm
Construction material:	DIN 17100 ST-52-3, EN 10025 S355J2G3

Hinge pins:	Stainless steel
Hydraulic pipes and fittings:	Stainless steel
Revolution angle:	180 degrees
Capacity of Hoisting Drum:	1. Hoisting Drum : 6 ton, single wire with 8.5t 2. Hoisting Drum : 4,5 ton, single wire with 8.5t
Hoisting speed;	3 meters/min
Crane class:	A-3
Machinery class:	M-4
Weight:	~ 8.000 kg
Hydraulic operation pressure:	max 210 bar

5.1.7 – 5.1.8 Weir Skimmer Module for Stiff Sweep

The weir skimmer module is a removable unit assembled in the apex of the stiff sweep skimmer arm. It can be replaced at any time with brush conveyor belt skimmer (to be quoted separately) for enhanced recovery of high viscous oils and reducing the amount of collected water. The weir skimmer module is also equipped with oil transfer pump.

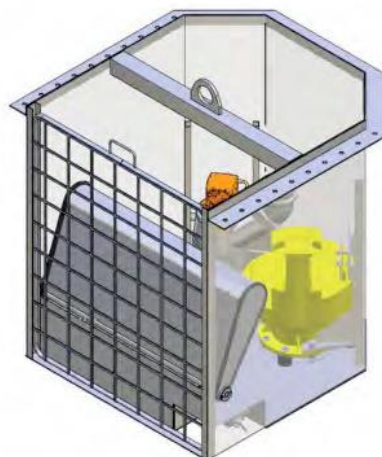


Figure 3 LAMOR Stiff Sweeping Arm LSS 15m – weir skimmer module

Technical Specifications

Length:	1290 mm
Width:	1291 mm
Height:	1436 mm
Weight:	210 kg

5.1.9 – 5.1.10 Hydraulic Hoses Set for Brush Skimmer and Weir

Lamor's Hydraulic Hoses are essential accessories for the efficient and reliable functioning of your equipment. These sturdy hoses are manufactured in a durable material for long service. All Lamor hydraulic hoses meet the MED certificates for maritime use. Lamor Hydraulic Hoses are supplied as complete units rated according to expected Hydraulic flow. Each set is fitted with High Quality TEMA Quick Release Connectors as standard. Other quick couplings on the hoses are available on request. 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 (+120 C max)

5.1.11 – 5.1.12 Mariflex Centrifugal Pump MSP150

Manufacturer:

Mariflex Group

Postal Address:

MariFlex Group

Maassluisdijk 101,
3133 KA Vlaardingen.

The Netherlands.

Phone: +31 10 - 434 44 45

Fax: +31 10 - 232 95 00

E-mail: info@mariflex.net

<http://mariflexgroup.com/>

Year of purchase: 2012

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 4 Mariflex Centrifugal Pump MSP150

Technical Specifications

Design:	Single stage centrifugal
Capacity/Head:	360m ³ /h-40 mcl
Viscosity/Specific Gravity:	1.0 Cst. At 20°C/1.0
Speed:	2000 rpm. maximum
Hydraulic Motor Type:	Axial Plunger with Mechanical Seal.
Hydraulic working Pressure:	200 bar
Maximum Pressure:	320 bar

Maximum Return Pressure:	6 bar
Maximum oil flow:	130 l/min
Outer Diameter:	490 mm
Height:	610 mm
Weight excluding hoses:	85 kg
Hydraulic connections (Tema quick couplings):	1" Tema 10021, 3/4" Tema 7511, drain 3/8" aerequip.
Power required:	50 kW
Discharge connector:	6" Camlock or flange (included adaptor to 5")
Materials:	Housing – Aluminium Impeller – Nodular Cast Iron Seals – Nitrile Hydraulic Motor – Cast Steel Quick Couplings – Yellow Passivated Steel

5.1.13 Spare part kit 2 for MSP 150

2 pc 81602 Oil seal, teflon
 2 pc 58774 O-ring, Viton
 2 pc 37302 O-ring, Nitrile
 2 pc 39318 O-ring, Nitrile
 2 pc 37878 O-ring, Nitrile
 4 pc 370815 Hexacon nut
 4 pc 382701 Lock washer
 12 pc 337704 Socket head cap screw M10
 12 pc 382659 Lock washer
 2 pc 491277 Distance foot
 1 pc 531546 Dust cap
 1 pc 532040 Quick coupling Male 1"

1 pc 532546 Dust cap

1 pc 532039 Quick coupling Male 1 1/2"

2 pc 51120 O-ring, Viton

5.1.14 Hydraulic Hose Set for MSP 150 and GT A 140

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

5.1.15 – 5.1.16 Brush Skimmer Unit, Conveyor Belt 5C

The advantage of the brush assisted stiff sweep system is that the brush conveyor separates the oil from the flow and compared to the weir type stiff sweep arrangement, which typically collects approx. 90 % water, the free water content with the brush conveyor can be limited to less than 10 %. The conveyor belt is mounted in the apex of the Lamor Stiff arm LSS 15. When the system isn't in use, it is stored on deck or on-land storage, and the vessel can be exploited for other activities. One Stiff sweep, Length 15m SB or PS with brush conveyor 5C comes with following accessories:

- weir skimmer module and/or brush skimmer module
- towing chain 22m
- rope 40mm/55m
- rope 24mm/55m

Technical Specifications

Length:	15000 mm
Width:	3400 mm
Height:	2120 mm
Weight:	4500 kg
Hydraulic flow (skimmer only):	20 l/min
Hydraulic pressure:	210 bar
Power:	90 kW



Figure 5 LAMOR Stiff Sweeping Arm LSS 15m – 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.

5.1.17 Hydraulic hoses for brush module (see point 5.1.9)

5.1.18 – 5.1.19 Canvas for stiff sweep brush module

2 x covering canvas are included.

5.1.20 – 5.1.21 LAMOR GT A 140 with 6" outlet flange

The GT A PDAS pumps are as standard 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). This kit includes also the non-return valve and water supply coupling for the outlet. The outlet discharge Camlock connector needs to be replaced with suitable outlet water Annulus Water Injection Flange. A standard high pressure steam- or hot water cleaner is recommended for the provision of steam/hot water to the inlet AWIF. The recommended heating capability of the cleaner unit is minimum 35 kW for the GT A 140 pump. There are several obvious applications for the steam injection technique, of which a few could be:

- Emergency pump transfer of oil under arctic conditions
- Emergency pump transfer of cold bunker C from sunken vessels
- Pump transfer of bitumen from skimmers or temporary storage tanks
- Clearing a "path" through discharge lines clogged with solidified product

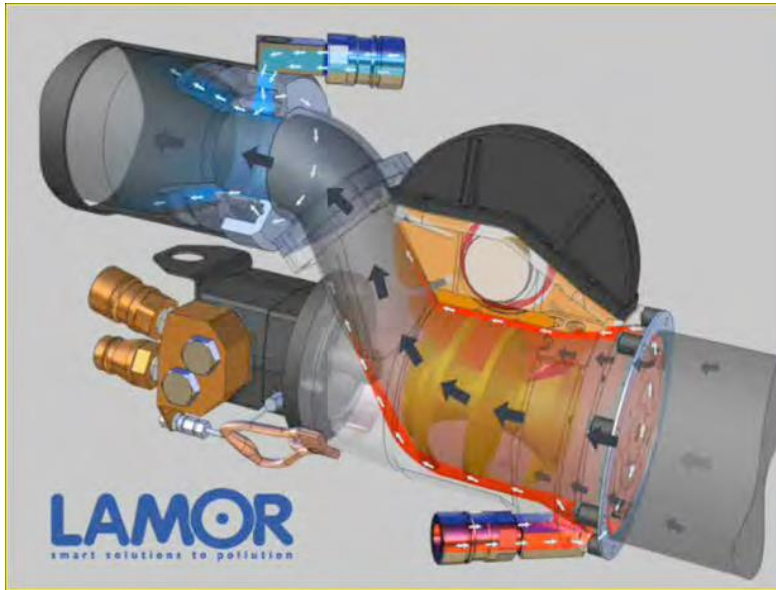


Figure 6 - LAMOR GT A 140

5.1.22 Sparepart kit 1 for GT A 140

The Lamor spare parts kit includes all necessary items for field repair and maintenance.

The parts included comprise:

9 Plate wheel sealing disc for GT A 140 03B03-A115-A401-B

1 Screw sealing ring for GT A 140 03B03-A115-A301-B

1 Hardened bushing for GT A 140 03B03-A115-A501-B

2 Sealing ring Omniseal 23930 X1200 0331 C2-203914

1 Plate wheel wear ring for GT A 140 03B03-A115-A601-B

2 Plate wheel side wear plate for GT A 140 03B03-A115-A407-C

1 Plate wheel plain bearing for GT A 115 03B03-A115-A404-B

1 Grease nipple M6x1 AISI 304 C2-205950

2 Plate wheel slide bearing for GT A 115 03B03-A115-A405-B

2 Shaft oil sealing ring BABSL 55x72x7 FKM C2-205997

2 Shaft oil sealing ring BABSL 60x80x7 FKM C2-205998

1 V-sealing ring VITON VA-110 C2-205999

1 Shaft sealing ring ECOTAL A13_55x73x2 C2-206000

1 Lock nut DIN 934 M30 C2-206001

5.1.23 – 5.1.24 Water injection flange - kit 3/4" I/O GTA 140 with Water injection outlet 5" GTA 140

The kit is retrofitted by removing the original outlet assembly with the Camlock (4 bolts) and bolting on the new assembly. It is recommended that the supply lines to the inlet and outlet Annular Water Injection Flanges (AWIF) are equipped with a non-return valve, which will prevent the line and the flange from getting contaminated inside by extremely sticky and viscous product. Under the product "water injection kit I/O" a suitable water injection kits (3/4" for GT A 140) for both inlet and outlet AWIF are included. A standard high pressure steam- or hot water cleaner is recommended for the provision of steam/hot water to the outlet AWIF. The recommended heating capability of the cleaner unit is minimum 35 kW for the GT A 140 pump. There are several obvious applications for the steam injection technique, of which a few could be

- Emergency pump transfer of oil under arctic conditions
- Emergency pump transfer of cold bunker C from sunken vessels
- Pump transfer of bitumen from skimmers or temporary storage tanks
- Clearing a "path" through discharge lines clogged with solidified product

5.1.25 Hydraulic Hose Set for GT A 140, 30xTEMA M/F COUPLING

Lamor's Hydraulic Hoses are essential accessories for the efficient and reliable functioning of your equipment. These sturdy hoses are manufactured in a durable material for long service. All Lamor hydraulic hoses meet the MED certificates for maritime use. Lamor Hydraulic Hoses are supplied as complete units rated according to expected hydraulic flow.

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 (+120 C max)

5.1.26 – 5.1.27 Storage Reel for Hose Winder LHW 40/2-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.



Figure 7 - 2 Hose Winders LHW 40/2-AL with hydraulic hoses for LSS 15m

Technical Specifications

Max. capacity:	40 m hydraulic hoses and 200 m layflat hose (alternatively approx. 40 m rigid transfer hose).
Hose reel package weight:	40 m Hydraulic hose weight approx. 40 kg 200 m Layflat oil transfer hose weight approx. 450 kg With the hose winder (110 kg) the whole package weight is approx. 600 kg.
Length:	1300 mm
Width:	1300 mm
Height;	1535 mm
Weight:	110 kg
Capacity;	40+200 m
Reel diameter:	1300 mm

5.1.28 – 5.1.29 Cover - Canvas for Hose Winder LHW

Canvas for manual Hose winders LHW, 1300 mm.

- black
- A4 side pocket
- 2 open corners
- rope in sleeve
- 2 Lamor logo on long sides

5.1.30 – 5.1.31 Control desk – Remote Control Panel, 7 valves

The Lamor Hydraulic Control Panel uses Danfoss proportional PVG-32/100 valves and operates the oil recovery system, oil transfer pumps, oil boom winder and other related equipment as required. The control valves are installed in a separate aluminum box that can be placed anywhere on the deck to ensure safe and reliable operation. Lamor can produce hydraulic control panels to the clients required specification and according to the required circuits. Typical controls can be as follows:

- speed control for oil transfer pumps
- speed control for flow impellers
- speed control for skimmers
- opening/closing of deck hatches
- locking/unlocking of deck hatches



Figure 8 - Control desk – Remote Control Panel, 7 valves

5.1.32 - 5.1.35 Oil hoses, Semi-Rigid Oil Transfer Hose 6" x 10m, Camlock

The equipment is supplied with 4 Semi-Rigid Oil Transfer Hose 6" x 10m, Camlock

Technical Specifications

Inner tube:	oil and petrol resistant NBR, black. smooth
Reinforcement:	synthetic textile, braids with embedded steel helix
Cover:	oil and weather resistant CR, black
Temperature range:	-40 C to +100 C
Electrical properties:	conductive tube
Standard/Approval:	: EN 1761, EN 12115
Inner diameter:	152 mm
Outer diameter:	170 mm
Bending radius:	1220 mm
Working pressure:	15 bar
Weight (total operational):	5,2 kg/m
Length:	10000 mm



Figure 9 LSS 15 m, oil hose connected to weir skimmer module

5.1.36 – 5.1.39 Towing lines and chains set

The Towing lines and chains set consists of:

- 50 meter / 40 mm ropes for securing the LSS sweep arm;
- Towing chains and slings for securing the LSS sweep arm.

5.1.40 Storage container - 10 ft container with misc. spares

Lamor 10 foot Containers are modified new build ISO shipping containers specifically designed for the storage and deployment of OSR equipment. Each container is fitted with double doors on the long side as well as standard end doors. Basic specification includes a non slip floor and ventilation grids. Shelving and tie down points can be supplied according to individual needs. All Containers are painted with Marine Grade coatings inside and out and can be supplied with the customers logo upon request. The containers are tailored for equipment storage or for other purposes. Inside the container is fitted with plywood floor (optionally a corrosion resistant tread plate floor can be quoted), tie down points for equipment and shelving. 4 natural ventilation points with filters for sand and dust or mosquito nets are fitted to ensure adequate air flow throughout the container. Fully furnished and insulated containers with heating and /or air conditioning can also be supplied.



Figure 10 Storage container

Technical Specifications

Length:	2970 mm
Width:	2500 mm
Height:	2590 mm
Weight:	1800 kg
Inner length:	2080 mm
Inner width:	2330 mm
Inner height	2370 mm
Capacity	16 m ³

5.1.41 Water Injection Pump

Lamor Electric Water Pump EVML5 AISI 316 16N5/3 kW

APPLICATIONS

- Offshore and vessel pumping systems
- Ideal for AWI water supply for GTA pump water injection
- Civil, Industrial, farming, fire-fighting, boosting systems
- Water treatment plants (reverse osmosis, filtrations)
- Irrigation system
- Washing system
- Movement of hot and cold water for heating, cooling and air-conditioning system.
- Boiler feeding
- Movement of moderately aggressive chemical liquids without solids.
- Asynchronous 2 poles motor
- 3-phase 230/400 V, 50 Hz, Delta connection

Pumping capacity: 130 l/min

Max working pressure: 12 bars

Weight: pump + motor: 43 kg

MATERIALS

- Impeller, diffusers, casing cover, outer casing, shaft sleeve, coupling covers, fixing in contact with liquid: AISI 316 stainless steel
- Bottom casing: AISI 316 stainless steel
- Motor bracket and base: cast iron + AISI 316 stainless steel
- Bearings (in contact with liquid): tungsten carbide
- Mechanical seal: Silicon carbide/carbon/FPM
- Mechanical seal seat: AISI 316 stainless steel
- Shaft: AISI 316 stainless steel
- Tie rods and fixings not contact with liquid: zinc coated stainless steel

Safety valve 15 bar included in the Lamor delivery

Technical Specifications

Length:	240 mm
Width:	195 mm
Height:	995 mm
Capacity:	130 l/min
Working pressure:	12 bar
Power requirement:	3 Kw
Discharge Port:	1 ¼ in.

5.1.42 Power pack spare parts

- Spare part Kit for the power pack LPP 90 Cu

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

5.1.43 Hydraulic Power Pack LPP 90 Cu



Figure 11 Hydraulic Power Pack LPP 90 Cu

The Lamor Power Pack LPP 90 Cu is powered by a water cooled Cummins turbocharged/intercooled diesel engine and serves as a high capacity multipurpose powerpack designed for the flexible operation of many types of hydraulically operated oil spill clean-up equipment.

The 4-cylinder engine is an in-line design with full-authority electronic controls and combines powerful performance with cost effectiveness. A High Pressure Common Rail (HPCR) fuel system delivers

greater power at every rpm. Together with vertically centred fuel injection and a symmetrical cylinder bowl, it produces exceptional low-end torque and power with reduced emissions and increased fuel efficiency. Additional torque and faster throttle response make it the perfect choice for many applications. The engine is certified according to the following emission certificates: U.S. EPA Tier 3, CARB Tier 3 and EU Stage IIIA.

Equipped with 3-11 hydraulic circuits the Lamor LPP 90 Cu can be used to power multiple users such as a skimmer and boom winder consecutively. The Lamor LPP 90 Cu is containerized within a steel frame designed to ensure a good circulation for the air cooled diesel engine.

The Lamor LPP 90 Cu is equipped with electric start and incorporates control panel and hydraulic oil cooler in the framework. The Lamor LPP 90 Cu utilizes a Danfoss PVG-100 Proportional Hydraulic Valve System making it possible to easily adjust the flow of oil to the supplied components. The flow will always remain set even when the pressure varies according to consumption.

The Lamor LPP 90 Cu is equipped with 4 point lifting rings and forklift channels making it easy to handle on land or offshore. For safety the LPP 90 Cu power pack is equipped with an automatic shut down system, also the power pack can be equipped with a spark arrestor or Chalwyn safety shut down valve.

Technical Specifications

Length:	ca 2300 mm
Width:	ca 1400 mm
Height:	ca 1800 mm
Weight:	ca 2000 kg
Power:	90 kW
Hydraulic flow;	320 l/min
Hydraulic pressure:	210 bar
Fuel tank capacity:	200 l
Hydraulic oil tank capacity:	400 l
Speed:	2200 rpm

5.2. Lamor LWS 1300 Weir Skimmer Mk II/MSP 150 with thrusters

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

5.2.1 Weir Skimmer LWS 1300 Mk II / MSP150 with thrusters

Year of purchase: 2012

The Lamor Free-Floating Offshore Weir Skimmer LWS 1300 Mk II/MSP150 is a very high capacity weir skimmer designed for open ocean 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 skimmer is hydraulically operated and fitted with two thrusters to allow the operator to maneuver the skimmer to where oil is most heavily concentrated. The radio remote control can be operated from up to 200 m distance to the skimmer. The oil on the surface of the water is drawn into the skimmer by gravitational flow over the weir lip and with the added suction of the MSP 150 screw pump. The skimmer can efficiently recover and pump a wide range of oils from light products to medium viscous debris-laden emulsions. The skimmer is manufactured from stainless steel with 3 specially designed hollow floats with internal, separated chambers. These chambers can be filled with water for optional ballast and floatation level adjustment. The skimmer incorporates a large diameter free floating weir and that all gives it excellent wave following characteristics.

The LWS range of weir skimmers has been specifically designed to work with the wide range of oil transfer pumps. The MSP 150 gives a very high pumping capacity of light to medium viscous oils. Please note that the pump always will be quoted separately. The MSP 150 pump can easily be dismantled from the skimmer and used as an independent offloading or transfer pump.

To improve the recovery capability of heavy oils the skimmer can be fitted with a removable brush adapter. The LWS range can be powered from one of the range of Lamor LPP power packs, or from an independent power source using the Lamor LCP remote control panel.



Figure 12 – Weir Skimmer LWS 1300 Mk II with brush and weir modules

Technical Specifications

Length:	2850 mm
Width:	2590 mm
Height;	1830 mm
Diameter	weir: 1300 mm
Weight	250 kg
Draft	1100 mm
Design Capacity:	250 m ³ /h
Capacity, certified ASTM	112,2 m ³ /h
Capacity, certified max	360 m ³ /h

Skimmer Hydraulic Thruster set for LWS 1300 Mk II 90ROH-O1386

The LWS HTh is a hydraulically operated thruster set for the Lamor LWS Weir skimmer-range. The skimmers will be fitted with two thrusters to allow the operator to manoeuvre the skimmer to where the oil is most heavily concentrated. This upgrade will include 2 x 190 mm diameter marine thrusters, mounting frame in marine grade aluminium. This thruster arrangement built on the frame is connected to the skimmer head. The weight increase of the thruster arrangement on top of the skimmer and pump weight is approx. 130 kg.

Technical Specifications

Weight:	Plus 130 kg
Hydraulic flow (skimmer ONLY)	2 x 25 l/min
Hydraulic pressure	150 bar
Power requirement	Total 16,5 kw

5.2.2 Brush adapter LBA 1300 Mk II

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 LBA 1300 Mk II has three banks of brush drums, which rotate downward into the oil layer creating a strong inflow. Lamor has conducted tests certified by Bureau Veritas demonstrating similar brush adapter unit corresponding to oil recovery capacity of greater than 100 m³/h in 25 mm thick layer of medium viscosity fuel oil. The LBA 1300 Mk II brush banks are mounted within a sturdy aluminium frame with a centre-lifting eye. The brushes are driven by three hydraulic motors, which are powered by a single hydraulic circuit. The LBA 1300 Mk II can be easily installed on the Lamor LWS 1300 Mk II skimmer hopper in place of the fluid oil adapter and is secured with stainless steel clamps. The design of the LBA 1300 Mk II allows it to be quickly adapted for use with many types of weir skimmers found in today's oil spill response inventories.

Standard hydraulic connectors: Tema 3/8", 3811/3821.

Technical Specifications

Length:	2050 mm
Width:	1800 mm
Height;	570 mm
Weight	220 kg
Design Capacity:	3x60 m ³ /h
Capacity, certified ASTM	3x74 m ³ /h

Free water collected	<5 %
Hydraulic flow (skimmer ONLY)	20 l/min
Hydraulic pressure	1700-200 bar
Power requirements	6,5 kw

5.2.3 Canvas cover for LBA 1300 Mk II

Canvas cover for LBA 1300 Mk II, black with yellow Lamor-logo. 900gsm fabric with A4 document pocket.

Technical Specifications

Length:	2100 mm
Width:	1805 mm
Height;	570 mm

5.2.4 Oil Transfer PDAS Pump Lamor GTA 140

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.

Technical Specifications

Length:	500 mm
Width:	300 mm
Height:	598 mm
Weight:	71 kg

Capacity:	140 m ³ /h
Hydraulic flow:	160 max l/min
Hydraulic pressure:	210 max bar
Power req.:	56 max kW
Discharge pressure:	12 bar



Figure 13 Oil Transfer PDAS Pump Lamor GTA 140

5.2.5 Hose Reel with 9-ch Swivel LHR 60 9ch

The light weight reel frame is manufactured in steel and the spool in marine grade aluminum. The reel frame comprises fork lift channels and 4-point lifting points as standard for easy handling both on and offshore. The hoses comprise all needed for an offshore skimmer system. The capacity of the reel is approx. 60 m of hydraulic and oil transfer hoses with PVC hose floatation for a skimmer/oil transfer pump system. The reel is equipped with Stainless Steel rotary swivel with 9 hydraulic channels mounted in the reel drum for hose connection. 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 can be fitted as desired. The Lamor LHR 60 is driven by 1 hydraulic motor, operated typically with the hydraulic power pack serving the connected skimmer system allowing for easy deployment and recovery using minimal manpower.

Standard hydraulic connectors: Tema 3811/3821.

Base frame dimensions (footprint): 1940 x 1627 mm.

The standard Lamor hose set for free floating off-shore skimmers 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. This feature increases the flexibility of the skimmer package. The hose floatation made of PVC binds the hoses and also protect them from possible damage.

Technical Specifications

Length:	2020 mm
Width:	1630 mm
Height:	1880 mm
Weight:	reel only ca. 500 kg
Capacity:	60 m
Reel diameter:	1540 mm
Reel inner width	10 l/min
Hydraulic flow	1538 mm
Reel material	Aluminum
Frame material	Steel
Forklift channels	Yes
4-point lifting rings	Yes
Hydraulic pressure	200 bar
Power requirement	3 kW

5.2.6 Hydraulic hose Set 60m for LHR 60 9ch

The standard Lamor hose set for free floating off-shore skimmers 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. This feature increases the flexibility of the skimmer package. The hose floatation made of PVC binds the hoses and also protect them from possible damage. The electric cable powering the PVG valves and the radio remote controls is also installed in the package.

The floating hose set includes the following components:

2 x Layflat 5" transfer hose length 40m each, totally 80m with 5 " Camlock

1 x hydraulic hoses 1 1/4" length 80m (return) with TEMA 15011

1 x hydraulic hoses 1" length 80m (pressure) with TEMA 10021

1 x hydraulic hose 3/8" length 80m (drain) with Aeroquip 3/8"

1 x hydraulic hose 1/2" length 80m (LS) with TEMA 3821

1 x electric cable (inside 1/2" protective hose) for radio remote control, length 80m

1 x Water injection hose 80m

Length 60m

Weight ca. 700 kg

5.2.7 Sea Catch/Release Set for LFF Offshore Skimmers

Off-Shore Skimmer deploying and retrieving is easily and safely carried out by using the Sea Catch Release unit. Also oil spill boom handling and laying workboats are excellent examples to utilize the Sea Catch TR7LM fitted to an innovative multi-directional tow point. Device locking: Having secured the recommended shackle to the rear end of the Sea Catch, open the jaw by removing the hitch pin and prying up the release lever and opening it to the released position. Insert the pin of the shackle to be released into the jaw opening. Secure the shackle by closing the release lever to the locked position and firmly lock the toggle pin over center with a vice-grip-like snap. The shackle is now held firmly locked even with no load on the device. The hitch pin can be reinserted to prevent inadvertent release. The Sea Catch is now ready to be loaded. Once the hitch pin is removed, the Sea Catch is armed and ready to be released. Device releasing: Release of the loaded Sea Catch is activated by first removing the hitch pin and then pulling firmly on a release line connected to the end of the release lever. The release line can be activated in any direction within the 90 degrees perpendicular and parallel to the line of load. The use of the hitch pin is not required to secure the device in the locked position. It is an added safety measure preventing inadvertent release. A hitch pin is provided with each unit.

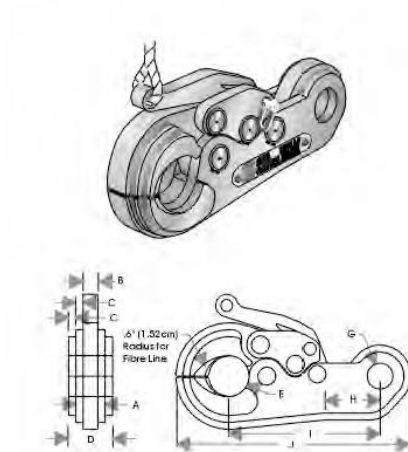


Figure 14 Sea Catch/Release Set for LFF Offshore Skimmers

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

SeaCatch TR 7 LM hook	C2-201218
Aluminum lifting stick with support for S425 hook, L-5m	C2-208433
Lifting hook S425, aluminum	C2-205341
Duplex webbing lifting sling 60mm 2T L-2m	C2-208360
Lifting ring 2,2T (60x110) 8-7 NOR87	C2-208361
Shackle 22mm, bow-type	C2-208358
Shackle 19mm, bow-type	C2-208359
Rope 8mm 15m blue	
Rope 8mm 15m red	

5.2.8 Flatrack for skimmer system

20 ft flatrack black.

Technical Specifications

Length:	6056 mm
Width:	2437 mm
Height:	320 mm

Weight:	1550 kg
Footprint:	20 ft cont

5.2.9 Canvas for LWS 1300 Mk II

1x canvas is included.

5.2.10 Canvas for Hose Set 60

1x canvas is included.

5.2.11 Control Panel, 4 valves

The Danfoss proportional PVG-32 valves operate the oilboom winder and the airblower. The control valves are installed in a separate aluminium box that can be place anywhere on the deck to ensure safe and reliable operation.

Technical Specifications

Width:	450 mm
Height:	750 mm
Weight:	50 kg

5.2.12 Hydraulic Power Pack LPP 90 Cu (see point 5.1.43 and 5.3.14)

5.2.13 Mariflex Centrifugal Pump MSP150 (see point 5.1.11)

5.3 Boom set

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: 2012

5.3.1/2 Oil Boom Set – Lamor Heavy Duty Boom (HDB) 2000

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
- Cross Bridle
- Power pack
- Hydraulic hoses
- Hydraulic air blower and air hoses
- Boom reel

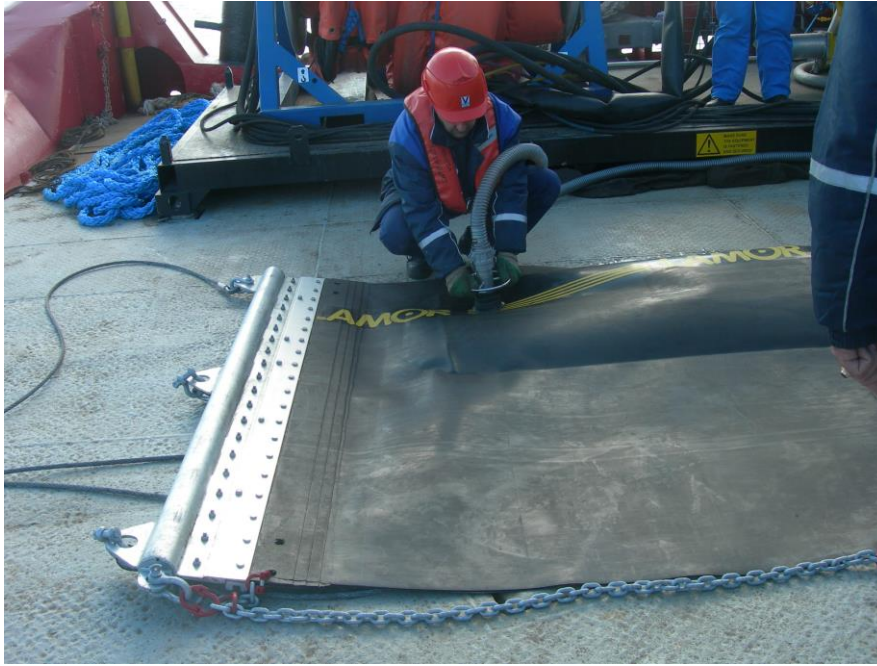


Figure 15 Oil Boom Set – Lamor Heavy Duty Boom (HDB) 2000

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 16 Lamor HDB 2000 Boom

Technical specifications HDB 2000

Section length	125 m
Freeboard	560 mm
Draft	1160 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	3 m
Efficient in waves	Up to 4.5 m

5.3.3 -5.3.4 Boom Reel Heavy Construction HSR H 1822/corners/canvas cover

The reel frame is manufactured in steel and the spool in marine grade aluminum. 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 can be fitted as desired. The Lamor HSR H 1822 is driven by 2 high torque hydraulic motors, together with planetary reduction gears with high gear ratio. It is operated by a hydraulic power pack which allows easy deployment and recovery using minimal manpower. A Lamor HSR H cover can also be supplied ensuring maximum protection for the stored boom.



Figure 17 Boom Reel Heavy Construction HSR H 1822

Technical specifications

Length	2900 mm
Width	1800 mm
Height	2114 mm
Weight	790 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 min	35 l/min

Hydraulic pressure	180 bar
Power requirement	14 kW
Length	2900 mm
Width	1800 mm

Container Corners for Boom Reels

There are 4 corner fittings used for standard boom reels - 2 bottom right and 2 bottom left. This set is sold complete assembled on the reel frame. These are the fittings found on all ISO type Containers used in the intermodal shipping arena. They are designed to accept a variety of ISO standard Containers.

- Material: Low Carbon Steel for Welding
- Corner conforms to ISO 1161.

Container corners welded on HSR Boom reels:

- 16241 bottom corner front right/back left
- 16240 bottom corner front left/back right

Canvas for HSR H models

Canvas for Hydraulic Boom Reel HSR H models.

- yellow
- A4 side pocket
- 2 Lamor logo on long sides

5.3.5 – 5.3.6 Hydraulic hoses set for HSR L/H

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: 15 m.

5.3.7 – 5.3.10 Towing bridle 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 1800 components:

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

5.3.11 Cross Bridle

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



Figure 18 Towing Set

5.3.12 – 5.3.13 Hydraulic Air Blower HAB 200 and air hoses

The Hydraulic Airblower 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 aluminum frame. The unit is supplied with hydraulic quick release TEMA couplings. The internals of the Lamor HAB 200 are protected by a suction filter. 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 ILB boom.



Figure 19 Hydraulic Air Blower HAB 200 and air hoses

The Lamor HAB 200 can be powered by one of the family of Lamor hydraulic power packs or using vessel hydraulics.

Hydraulic couplings: 1/2" TEMA 5011/21, Aeroquip 3/8" DRAIN ISO75242

Components and accessories included:

- HAB 200 air blower
- filling nozzle & T-key
- air hose 3" Camlock L-10 m with Y-junction (2" / 3" / 2" Camlocks)
- 2 x air hose 2" Camlock L-5 m to be connected to the Y-junction

Technical specifications

Length:	550 mm
Width:	410 mm
Height:	600 mm
Weight:	40 kg
Air flow	400 m ³ /h
Speed	400 rpm
Pressure:	Adjusted to 0.10 bar
Hydraulic flow	25-40 l/min
Power req.:	6 kW

5.3.14 Hydraulic Power Pack LPP 90 Cu

The Lamor Power Pack LPP 90 Cu is powered by a water cooled Cummins 4.5 l turbocharged/intercooled diesel engine and serves as a high capacity multipurpose power pack designed for the flexible operation of many types of hydraulically operated oil spill clean-up equipment.

The 4-cylinder engine is an in-line design with full-authority electronic controls and combines powerful performance with cost effectiveness. A High Pressure Common Rail (HPCR) fuel system delivers greater power at every rpm. Together with vertically centered fuel injection and a symmetrical cylinder bowl, it produces exceptional low-end torque and power with reduced emissions and increased fuel efficiency. Additional torque and faster throttle response make it the perfect choice for many applications.



Figure 20 Hydraulic Power Pack LPP 90 Cu

The engine is certified according to the following emission certificates: U.S. EPA Tier 3, CARB Tier 3 and EU Stage IIIA. Equipped with 3-11 hydraulic circuits the Lamor LPP 90 Cu can be used to power multiple users such as a skimmer and boom winder consecutively. The Lamor LPP 90 Cu is containerized within a steel frame designed to ensure a good air circulation inside the power pack frame. The Lamor LPP 90 Cu is equipped with electric start and incorporates control panel and hydraulic oil cooler in the framework. The Lamor LPP 90 Cu utilizes a Danfoss PVG-100 Proportional Hydraulic Valve System making it possible to easily adjust the flow of oil to the supplied components. The flow will always remain set even when the pressure varies according to consumption.

The Lamor LPP 90 Cu is equipped with 4 point lifting rings and forklift channels making it easy to handle on land or offshore. For safety the LPP 90 Cu power pack is equipped with an automatic shut down system, also the power pack can be equipped with a spark arrestor or Chalwyn safety shut down valve.

Technical Specifications

Length:	ca 2300 mm
Width:	ca 1400 mm
Height:	ca 1800 mm
Weight:	ca 2000 kg
Hy circuits:	3-11 pcs
Power	90 kW

Hydraulic flow:	320 l/min
Hydraulic pressure:	210 bar
Fuel tank capacity	200 l
Hydraulic oil tank capacity	400 l
Speed	2200 rpm

5.4 Communication equipment

5.4.1 - 5.4.2 VHF Portable Radio Phone VXA-220 Pilot VI airband H/H

The Vertex Standard VXA-220 Pro VI is a compact, stylish, solid, aluminum case submersible (IP7: 1 m 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 (108 ~ 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 synthesizer steps for the new narrowband channel plan. The VXA-220 displays with exclusive Omni-Glow™ display back-lighting for minimal degradation of the night vision, NOAA weather band monitoring, 8-character Alpha/Numeric Display, 150 Memory Channels, and 100 "Book Memory" Channels. VOX Operation (Voice Activated Transmit/Receive).

Loud Audio (700 mW): Ideal for reception in noisy environments, high-powered audio of the VXA-220 is coupled to a large internal speaker, assuring solid copy throughout difficult and noisy conditions.

5-Watts TX Output Power (at 7.2 V. 5 W P.E.P typ., 1.5 W carrier): For reliable communications over difficult communications paths, the VXA-220 provides 5 Watts (PEP) of transmitter power (1.5 W carrier).

250 Memory Channels (Incl. Pre-Programmed Book Memory Channels): The 150 regular memory channels and 100 pre-programmed "Book" memory channels can store just about any commonly-used operating frequencies that you choose. The memories may also be labeled with an Alpha-numeric title of up to 8 characters, for easy recognition.

8 Character Alpha Numeric Display: Providing an Alphanumeric Channel Label of up to 8 characters, the LCD display also provides convenient operating function icons to provide instant recognition of radio statuses.

Back-lit Keypad and Display with Dimmer: For quick access to operating frequencies, simply enter the frequency information directly from the 17 button keypad, then press the "Push To Talk" (PTT) button to transmit.

Other Features: Automatic Noise Limiter, One-Touch Squelch (Monitor) Control, External DC Jack (12V), 8.33 or 25 kHz Channel Steps, Stop Watch and Count Down Timers, Easy to use Menu System

for Custom Configuration - PC Programmable (Requires programming cable CT-29+CT-97 and software CE88).



Figure 21 VHF Portable Radio Phone VXA-220 Pilot VI airband H/H

Technical Specifications

Length:	60 mm
Width:	30 mm
Height:	125 mm
Weight:	0,36 kg
Temperature resistance:	- 10 to + 60 °C
Frequency range:	118,000 – 136,975 Mhz

5.5 Sampling and testing equipment

Year of purchase: 2012

5.5.1. Portable Gas detector

The gas detector model is GX-2009B, O₂, H₂S with charger. It detects simultaneous and real-time 4 gases LEL, O₂, H₂S and CO.



Figure 22 Gas Detector

5.5.2 Flash point tester - Setaflash Series 3 Closed Cup

33000-0 Setaflash 3 is an easy to use instrument that 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 typically 8 minutes.

All functions are accessed via a two button keypad and the Seta Multifunctional And Rotational Test (SMART) control feature. The digital display shows test parameters, instrument status, and the test result. An audible prompt is sounded when an action is required from the operator. An automatic flash detector reduces the chance of mis-interpretation of the test result by the operator, and enhances repeatability. The temperature ramp mode allows rapid determination of the flash point of a sample in accordance with ASTM D7236 and IP 534. The cup is heated at a rate of 2°C per minute from the start temperature. An audible prompt to carry out a flash test occurs every 1°C rise up to 100°C, every 2°C rise over 100°C. For safety purposes, if no flash is detected when the temperature reaches 40°C above the start temperature, the flash tester automatically terminates the test. A new higher start temperature would have to be entered and the test started again. Gas for the test jet/shutter assembly is supplied from an integral gas tank, which is filled using a standard butane (lighter) refill cartridge. The instrument is lightweight and suitable for mobile use when operated from the optional 12 volt power supply adaptor.

Technical Specifications

Length:	280 mm
Width:	260 mm
Height:	260 mm
Weight:	4 kg
Battery endurance	Up to 20 h



Figure 23 Flash point tester

5.5.3 Mini-Lab for Oil Viscosity and Density

C2-211730 - Digital Paddle Viscometer, 200 to 230 V The Digital Paddle Viscometer has been designed to accurately measure the viscosity of asphalt emulsions, suspensions, marine fuels, residual oils, slurries, paints and similar materials between 30 and 30,000 centipoise (mPa·s) at temperatures of 25°C, 40°C, 50°C, 80°C, and 100°C. Meets ASTM D 7226 for asphalt emulsion testing. Ideally suited for field use, the Digital Paddle Viscometer can determine the viscosity of lubricating oils, marine fuels and other liquids, yielding results with an accuracy of five percent or better for most materials—better than that required by ASTM D 445 for residual oils at 50°C. The Digital Paddle Viscometer consists of a base, adjustable heated tray assembly, two sample cups, head unit, and two paddles (high and low viscosity), each with a one hundred-fold range. A digital display on the front panel of the head unit indicates viscosity in centipoise (cP or mPa·s), or centistokes (cSt or mm²/s) and Saybolt Furol Seconds if a known density value is input by the operator prior to testing. The digital display also indicates the temperature, duration of test, and test status. Test data can be transferred to the optional label printer via an RS232 connector.

C2-211734 - Portable Density Meter Dendi 0,5-2,0g/Cm

New Di-series of digital density meters can replace all kinds of glass hydrometers in your laboratory. It provides remarkable accuracy for a wide range of liquids and eliminates any subjective mistake due to data readings on LCD. The compact device is maintenance free and simple in using: one-button control doesn't require proficient staff for its operating. Calibration is realized by distilled water. Versatile measurement formats of DenDi enable flexible reporting options:

Real Density (g/cm or kg/m) or Specific Gravity or API Gravity;

Reduced Density to 15°C or 20°C or 60°F;

Temperature (°C or °F).

Observed results can be transferred to PC, pocket PC or miniprinter via built-in IR data port

C2-211735 - Quartz Glass Float for Dendi

C2-211736 - N100 Viscosity Standard, 20 to 100 Deg C

C2-211737 - S600 Viscosity Standard, 20 to 100 Deg C

C2-211738 - Water Free Cleaning Spray 400 MI



Figure 24 Mini-Lab for Oil Viscosity and Density

5.6 Cleaning equipment

5.6.1 – 5.6.3 Portable Cleaning equipment - Hi-Pressure Cleaner

The Lamor High Pressure Cleaner to use vessels hot water supply is designed to meet all the demands of use in maritime environmental protection. The Lamor HHC is the machine of choice for multi-purpose cleaning tasks, such as removing oil pollution from different surfaces such as rocky coastlines, harbour walls, boats and oil spill equipment.

5.7 MIROS Oil Slick Detection System

Manufacturer:

Miros AS

Solbråveien 32,

1383 Asker

Norway

Phone: +47 66 98 75 00

Fax : +47 66 90 41 70

E-mail : office@miros.no

<http://www.miros.no>

Year of purchase: 2012

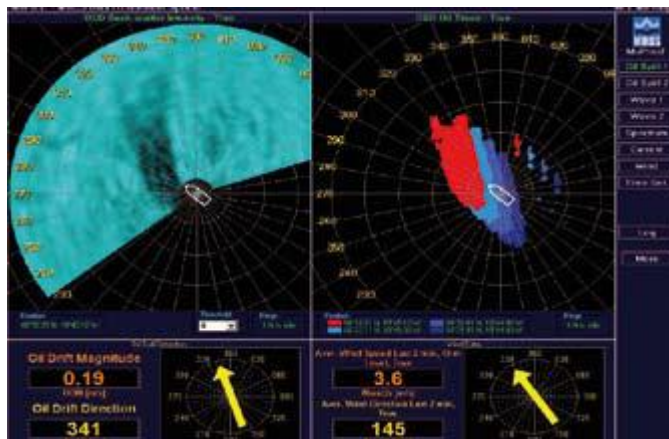


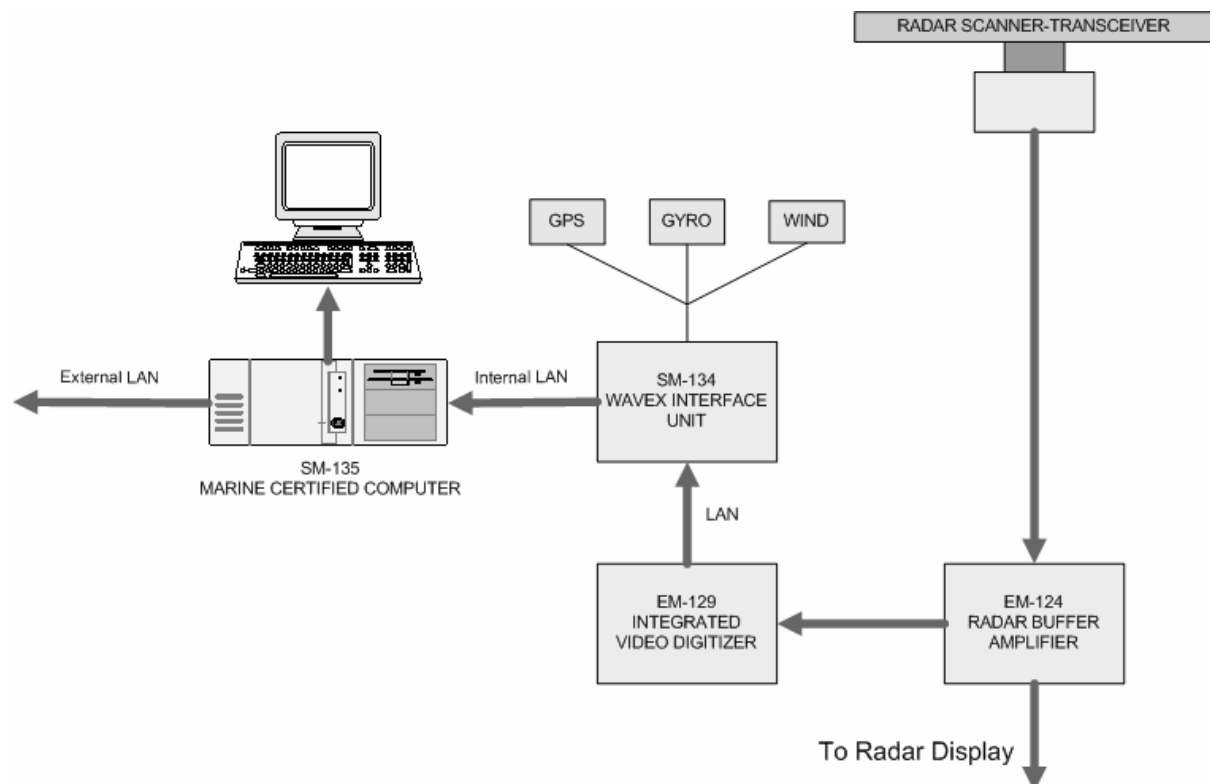
Figure 25 MIROS OSD

5.7.1 Computer MIROS WAVEX/OSD

The Wavex system measures surface wave parameters in the basis of digitized sea clutter images provided by standard marine X-band (3 cm) radar. Since “a copy” of the raw radar signal is used, the Wavex system does not interfere or affect the radar signals to the navigation radar display. By collecting sea clutter data in “sets of images” during a defined time period, the system performs its parameter calculations. The calculated wave parameters are then a representative average of the wave parameters during the data collection period. Please note that the system does not measure individuals waves.

A typical Miros OSD system hardware configuration comprises the following components:

- Type approved Maritime System Computer
- Flat-screen monitor with night vision dimming functionality
- Integrated Video Digitizer unit
- Display, keyboard & mouse/joystick
- Gyro, GPS and Wind sensor interfaces
- Marine X-band radar, either the ship's navigation radar or a dedicated OSD radar



The Wavex Computer is equipped with two network interfaces. The main Wavex system components are communicating on an internal LAN (local sub-net), while all communication with the external world is via the customer LAN.

The SM-135 Wavex Computer is a fan-less maritime computer type HT B08CD STD-A1 with the following options:

- Memory upgraded to 3 GB
- 120 GB hard disk
- 4 port isolated RS422 serial card (optional).

The computer is preinstalled with WinXP SP2 OS which is configured for optimum Wavex operation. This applies to Windows update, daylight saving time and firewall settings. Further specifications are:

- 2 x 10/100 Mb/s LAN (RJ45)
- 1xPCI slot, half length
- Dual DVI functionality (DVI-I and DVI-D).

The DVI-I connector can function as a regular RGB output using a DVI-I to RGB/VGA adapter. The

DVI-D connector is strictly for DVI use only.

The optional CP-134U-I-DB9 plug-in serial card offers 4 independent RS-422/485 serial ports for connecting data acquisition equipment and other serial devices to the PC. It provides a reliable communication link (RS-422/485) over a long distance (up to 4000 ft), and is suitable for industrial environments.

Computer specifications:

Physical

Size (w x l x h): 310 x 368 x 100

Weight: 5kg

Material: Aluminium

Colour: Black

Electrical

Power requirements: 115/230VAC, 100 W

Environmental

EMC: IEC-60945

Temperature: -15°C to +55°C (operating)

Humidity: 95%

5.7.2 Monitor - 19" flat panel display

Recommended marine type approved monitors and associated equipment include 19" model from Hatteland-Display:

Specifications:

Power requirements: 115 & 230VAC - 50 / 60Hz

Temperature: -15°C to +55°C

Humidity: 95%

EMC: IEC-60945

Size: 483 (W) x 444 (H) x 82 (D) mm

Weight: 12 kg (approx. w/bracket)

Power consumption: 47.2 W (typical)



Figure 26 MIROS OSD display

5.7.3 Wind sensor - NMEA interfaces to gyro, gps, wind sensors

The SM-098 wind sensor is a special configuration of the Ultrasonic Gill sensor WindObserverII – 1390. The sensor comes with a 15 m long cable tail, type MP-303 mounting bracket and provides digital output data on RS422 format.

The main performance specifications are

Wind speed

Range: 0 – 65 m/s (0 – 145 mph)

Accuracy: 2%

Resolution: 0.01m/s

Direction

Range: 0 - 359°

Accuracy: $\pm 2^\circ$

Resolution: 1°

Electrical, environmental and physical specifications

Power requirements: 9-30VDC, 60mA

Serial interface: RS422

Weight sensor: 3kg (5kg inclusive mounting bracket)

Size (length x dia) 380 x 210 mm (sensor)

5.7.4 Interface box - MIROS radar interface unit em -129 integrated video digitizer

The Miros EM-129 Integrated Video Digitizer is designed for the Miros Wavex Wave Monitoring and Oil Spill Detection (OSD) systems. It comprises a radar interface board (EU-044) and a powerful radar image processing board (EU-043).

The EM-129 performs the following functions:

- Programmable radar signal conditioning
- Fast A/D conversion
- Accommodation of azimuth and heading pulses
- Programmable pulse-to-pulse processing
- Programmable bounce filters on trigger inputs.

5.7.5 Software - user license for Miros osd system software

The computer comes delivered with Miros Software installed. In addition to the Miros specific software, the computer comes with support applications and certain windows components.

5.7.6 Radar - 12 kW Furuno X-band standard radar

In principle any X-band marine navigation radar can be used with the Wavex system, either an existing radar, shared with a navigation system or a dedicated radar. In this case a dedicated 12 kW X-band radar is installed to avoid any possible conflict with navigational requirements.

5.7.7 Antenna - 6,5` antenna for radar

It is a 6,5` antenna for the radar, upgraded with 42 RPM scanner motor.

5.8 Weir boom set

Manufacturer:

Vikoma International Ltd

Kingston Road

East Cowes, Isle of Wight

PO32 6JS UK

Telephone: +44 (0)1983 200560

E-mail: sales@vikoma.com

Year of purchase: 2014

5.8.1 VIKOMA WEIR BOOM180 - 370 m boom with 76 m weir section, including, internal transfer pumps, hydraulic and discharge hoses, 6" integrated flow-meter

The Weir Boom 180, recovers up to 180 m³ per hour. An upper air tube and lower water ballasted stabilising tube run the entire length of the boom. Where the weirs and Weir Pumps are located the Water Tube is of a larger diameter, this provides more stability to offset any effects of turbulence around the pumps. The Water Ballast Tube is not a sealed tube it has holes along its entire length and an opening at the extreme end nearest to the Secondary vessel. The Weir Boom section of the boom also has attached to it an extra buoyancy tube, which also carries the hydraulic hoses to the Weir Pumps. Below the extra buoyancy tube is the discharge tube in which the Weir Pumps are mounted. The Weir and Deflector booms are similarly constructed and joined together during manufacture to form a continuous boom of some 370 metres long. The 4-tube section, 70.5 metres long, being termed the Weir Boom and the 2-tube section, 300 metres long, being termed as the Deflector Boom. Access to the weir pumps and the hydraulic connections are through zippers in the discharge and extra buoyancy tubes. The gallery is accessible for cleaning purposes. A Pressure Relief Valve the DUMP VALVE is mounted in the end of the discharge tube. The boom is anchored to the Primary vessel by a rope attached to a strop bolted to the boom end. A rope and strop assembly bolted to the boom end anchors the deflector boom end to the secondary vessel.



Figure 27 Weir boom deployed

5.8.2 Pump - water pump with flotation attached to the boom

The water tube ballast pump is an axial propeller pump, used to pump sea water into the ballast tube of Vikoma Weir Boom. The pump is attached to the Weir Boom Buoy end assembly.

Construction

Outer Casing	Rolled marine grade aluminium alloy sheet with stainless steel debris guard.
Impeller	Polypropylene

Hydraulics

Drive	Hydraulic motor directly coupled to propeller.
Demand	Maximum 25 litres per minute @ 140 bar
Displacement	48.35 cm ³

Controls

Speed control mounted on the control console

Operating Speed

0 – 450 rpm



Figure 28 Water ballast pump

5.8.3 Pump - transfer pump, rotary lobe pump

Hydraulically driven positive displacement pump which is specially designed to be mounted within the discharge tube of the Weir Boom. The function of the vane pumps is to transfer oil from the weir into

and along the discharge tube towards the Recovered Oil Discharge Pump which is sited on the vessel. The pump is light in weight but extremely strong in order to withstand the crushing loads when it is loaded onto a reel. The vane pump copes well with a wide range of viscosities. Access to the pump when mounted within the weir boom is facilitated by large heavy duty zips. Hydraulic fittings are stainless steel to ensure good corrosion resistance. Maintenance of the pumps is easy, access to pump internals is gained by removing the end cap.



Figure 29 Oil transfer pump inside the tube

Pump

Type	Positive displacement, vane Drive Hydraulic
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Dimensions

Length	667 mm
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Diameter	306 mm
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Weight	25 kg
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Hydraulic Requirements

Maximum flow	16.5 lpm
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Maximum pressure	140 bar
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Pump manifold fitted with fixed flow limiter.

Construction

Casings	FRE (glass, carbon fibre)
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Rotor	PET/PETP for high mechanical strength and wear resistance.
Vanes	Composite – high strength, water lubricated.
Manifold	Marine grade aluminium with stainless fittings.

Performance

Maximum flow	60 m ³ /h
Maximum head	3.9 m (water)

This discharge pump is a hydraulically driven, positive displacement, self-priming rotary lobe pump, which has the ability to pump normal and high viscosity fluids. The pump unit is mounted in a steel drip tray.

Dimensions

Length	122 cm
Width	92 cm
Height	69 cm
Weight	340 Kg

Construction

Pump	Cast iron housing with oil resistant rotary lobes.
Trip tray	Painted mild steel. Mild steel work shot blasted, 2 coats epoxy primer and 2 coats polyurethane enamel – Orange RAL 2008

Lifting

4 lifting eyes.
Forklift pockets

Pump Features

Sealed flexible coupling
Hydraulic drive
8" male Camlock connector on inlet
6" male Camlock connectors on outlet
Quick release hydraulic couplings

Pump Capacities

MAXIMUM (not available simultaneously)

Volume	180 m ³ /h
Suction lift (restricted)	2.5 m head water

Discharge Pressure	3.5 bar
Suction line limiting valve	250 mbar
Hydraulic requirement	110 litre/min@140bar

5.8.4 Storage reel - weir boom deck reel with fleeting roller and arm to assist during the retrieval

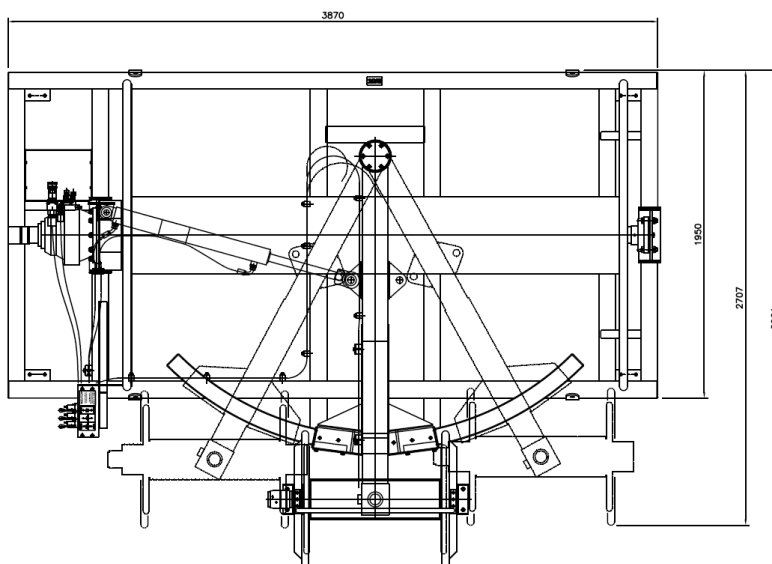


Figure 30 Weir boom storage reel and dimensions

5.8.5 Oil hoses

The set includes 4x5 m 8" suction hoses and 3x15 m 6" discharge hoses.

5.8.6 – 5.8.7 Power pack - Diesel, EX 3G, IIB, 105 kW, T3 rated for hazardous areas zone II

Hydraulic power is provided by 2 similar diesel driven Power Packs located in the container from which they are to be operated. Both Power Packs exhausts are vented through the container side. Either of the 2 units have the ability to recover the boom from the water should one or the other fail. This GP70 ATEX version powerpack is configured to supply the hydraulic power necessary to operate the Weirboom System or other Vikoma equipment via a separate dedicated control console. The powerpack is ATEX compliant for Zone II, category 3G, gas group IIB, temperature class T3.



Figure 31 Vikoma weir boom power packs in container

Dimensions

Length	1900 mm
Width	1100 mm
Height	1895 mm

Construction

Base Frame	Mild steel
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Hydraulic tank	SS304 with 200 litre capacity
Diesel Fuel Tank	SS304 with 100 litre capacity
Paint finish	2 coats polyurethane primer and 2 coats polyurethane top coat RAL 2008
Lifting	Fork pockets on all sides. (Lifting eyes on top are to lift cover only)

Performance

160 bar maximum system pressure.

Engine

A Yanmar 4TNV98-ZNS naturally aspired diesel engine drives the hydraulic system. Four cylinder; water-cooled; diesel emission compliant to Stage 3A & Interim Tier 4.

Power rating	47 kW at 2,100 rpm
Maximum engine speed	2200 rpm
Idle engine speed	800 rpm
Safety Devices	Automatic air intake shut off valve for over speed protection. Exhaust spark arrestor. Low engine oil pressure shutdown. High coolant temperature shutdown. Hydraulic oil low level shutdown. Hydraulic oil high temperature shutdown.

Hydraulics

Hydraulic Pump	Axial piston type directly coupled to engine
Cooling	Hydraulic oil cooled via a secondary radiator
Max. Output	125 litres/min @ 160 bar
Hydraulic Couplings	Quick release couplings 2 x Pressure: Female 1" 2 x Return: Male 1¼" 2 x Drain: Male 3/8"

Instrumentation / Controls

Hydraulic

Pressure control
Pressure relief valve

System pressure gauge

Oil level sight glass

Oil level indicator warning light

Oil high temp indicator warning light

Engine

Speed control

Fuel level sight gauge

Battery isolator Main switch

Alternator light

Stop control

Electric start

Oil pressure indicator warning light

Coolant temp indicator warning light

Exhaust high temp indicator warning light

5.8.8 Control desk - hydraulic control desk complete with manifolds, valving/controls

The Control Console can be moved around the deck area to enable the operator to observe the boom during deployment and recovery. It receives hydraulic power from both No 1 and No 2 Power Packs. Hydraulic power is distributed and controlled from No1 Power Pack to the Weir Pumps, Water Pump and Air Fan. Hydraulic power from No2 Power Pack is distributed and controlled to the Reel and Recovered Oil Discharge Pump. Flow gauges are provided to observe the Weir Pumps and Discharge Pump speed and operation. The console also provides the facility to allow No 1 &2 Power Packs to provide hydraulic power to the services run by either Power Pack should one of them fail. Disconnecting the hoses at the QRC's on the failed unit and connecting to the QRC's provided achieve this. The control console has COLOUR coded indicators to correspond to the appropriate COLOUR coded system hose connection.



Figure 32 Control desk

5.8.9 Hydraulic hoses

A set of hoses (pressure, return and drain with connections) from power packs to control console and from console to the ancillary equipment, 20 m.

5.8.10 Towing lines set - towing warps

Webbing towing strops and tow ropes

5.8.11 Air blower - air inflation system, blower

The Vikoma boom air inflation fan provides continuous buoyancy during the deployment, operation and recovery of the weir boom. The adaptor between air fan and boom is fitted with a non-return valve. The standby air fan adaptor connects to the GRP adaptor by a quick release fitting.

Construction

Framework	Marine grade aluminium alloy
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Hydraulics

Drive	Hydraulic motor directly coupled to impellor
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Demand	Max 28 litres per minute @ 140 bar
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Dimensions

Length	88 cm
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Width	62 cm
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Height	72 cm
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Weight	73 Kg
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Controls

Speed control mounted on control console

Output

28m³/minute @ 0.02 bar



Figure 33 Air blower

5.8.12 Air hoses

2 hoses, 5m, 1/2" for the air blower

5.8.13 Hydraulic hoses

2 hoses, 5m, 1/2" for the air blower

5.8.14 Storage flat rack - 20' flat rack for reel with boom and pumps

The Weir boom/deflector boom complete with Vane Pumps, Pressure Relief Valve and hydraulic hoses are stored on a hydraulically powered reel. The reel is used during the deployment and recovery of the boom. A hydraulically powered fleeting arm and roller provide assistance to fleet the boom across the entire width of the reel during the recovery operation. Controls for these operations are mounted on the reel.

5.8.15 Storage container – 20' container

20ft ISO container for storage of powerpacks, discharge pump, air fan, discharge & hydraulic hoses, control console, discharge assembly and spare

5.8.16 Spare parts - spare parts for air fan, weir boom reel, hose kit, transfer pump, vane pump, water pump and weir boom

Spares Kit, Cold Glue Repair Kit, Weir Pump , System Hoses, Pump, 1 metre Site Press