

Annex V of the VAC
Technical Specifications for the equipment
(Lot 2 - West Mediterranean Sea)

Procurement procedure: EMSA/CPNEG/1/2019

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

Phase II – Invitation to Tender

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

Content:

- 1. General description of the equipment**
 - 1.1 Equipment transferred
 - 1.2 Servicing of the equipment
 - 1.3 Additional equipment
- 2. Handover procedure for equipment**
 - 2.1. Date and place of the handover
 - 2.2. Transportation
 - 2.3. Storage and insurance
- 3. Use of the oil pollution response equipment**
- 4. List of transferred equipment**
- 5. Description of the transferred equipment**

1. General description of the equipment

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

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

1.1. Equipment Transferred

The contractor will receive from EMSA the equipment listed below:

- 1) LAMOR Stiff Sweeping Arm system LSS 12
- 2) NORLENSE NO-800-R oil boom
- 3) High-capacity Skimmer Normar 250 TI
- 4) 2 x ODME (PPM Reader) Hydrosense 2410
- 5) Sampling / testing equipment including:
 - Sampling mini-lab
 - Gas detector
 - Flash point tester
- 6) 2 x VHF
- 7) 3 x Portable cleaning machine

All tenderers will have the opportunity to visually verify the condition of equipment items listed from 1-4 above in the stockpile in Algeciras, Spain, at request. In principle the visit will be organised in week 28. The visit details will be arranged with the requesting tenderer.

1.2. Servicing of the equipment

The equipment that will be transferred to the Contractor will vary from 3 to 13 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.

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

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

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

The contractor should arrange servicing to the following equipment:

- 1) LAMOR Stiff Sweeping Arm system LSS 12;
- 2) NORLENSE NO-800-R oil boom;
- 3) High-capacity Skimmer Normar 250 TI;
- 4) Sampling/detection equipment.

The servicing should include the following:

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

1.3. Additional Equipment

Contractor will need to purchase/deliver the following equipment:

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

The system must be permanently installed onboard. In the case a “pool” of vessels is offered, then each vessel must have a system installed. During data capture, the vessel movement will be compensated in order to ensure the reliability of the information.

The system will be able to provide continuous monitoring of the slick area and, in combination with current and wind data, predict the oil spill trajectory. It will be possible to record the evolution of the spill trajectory in video format. Such a format should be compatible with common media players software.

The system should also provide an estimate of the spill area by size, real time distance measurement to a defined point and will be able to be overlaid with an electronic map. The ability to calculate volume in combination with other data is appreciated. However, a system which measures directly both slick size and thickness is preferred.

The detection range shall be at least 2 nautical miles and will operate efficiently in wind speed of 2m/s or more.

The integration with VHF frequency used in the AIS system is mandatory if such a system is not already installed on the vessel.

The Graphic User Interface shall be user-friendly with a PC-based data processing capability. The layout of display and colour, for use both day and night, will be specially made for operation on a vessel's bridge. The system must be regularly (annually) updated with the latest software for the system during the whole duration of the contract

2. Flow-meter: to be used during drills and recovery operations to measure the flow of the pumps installed in the sweeping arms and skimmer.
3. Interface Detection System: When the oil/water mixture is stored in the tanks, the water and the oil is naturally separated due to the difference in density. The tenderer shall provide adequate equipment (fixed or portable) to detect the interface border between the oil and the water so that the quantity of actual oil stored is known.
4. EMSA logo on equipment: At least one EMSA logo must be attached / painted on a visible position on each sweeping arm and crane, skimmer frame (if possible), boom reel, power pack, storage or tank containers. The dimension of the logos shall be in proportion to the items to be marked.

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

5. Vessel Model: At the end of the preparation phase, the Contractor will deliver to EMSA, at its premises in Lisbon, a model(s) of the Vessel(s) at (approximate) scale 1/100. All oil pollution response equipment will be displayed, in the appropriate scale, on board the model(s). In particular, one system must be deployed, simulating recovery of oil with the option to display the alternate system (sweeping arms or boom/skimmer systems). The model(s) should be as detailed as possible, preferably made of plastic or metal. The model(s) remains the property of EMSA, only to be used by the Contractor upon request with the agreement of EMSA. Any cost related to the production of the model and its transportation costs shall be borne by the Contractor¹.

2. Handover procedure for equipment

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

2.1. Date and place of the handover

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

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

Equipment	Location
Sweeping arms, Lamor, 12m	Algeciras, Spain
High-capacity skimmer system, Normar 250 TI	Algeciras, Spain

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

Boom system, 2x250 m, Norlense SPI NO-800	Algeciras, Spain
2 x ODME	Algeciras, Spain
Sampling mini-lab	Gdansk, Poland
Gas detector	Gdansk, Poland
Flashpoint Tester	Gdansk, Poland
2 x VHF	Gdansk, Poland
3 x portable cleaning machines	Gdansk, Poland

The handover shall not take place earlier than **20/03/2020** and not later than **30/04/2020**.

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

A delivery/receipt statement prepared by EMSA will be used in order to acknowledge handover of all the oil pollution response equipment items. By signing the delivery/receipt statement on the handover date, the Contractor representative accepts the equipment in its current condition.

2.2. Transportation

The Contractor shall bear all risks involved in transporting (including loading and unloading) for the items listed from 1-7 under point 1.1 above from the handover place to the new storage facilities.

The Contractor shall arrange the packing and preparation of the items for transportation, provision of stevedoring services and lifting resources (e.g. forklifts, mobile cranes, etc.) and all necessary shipment.

The costs related to the transportation (including insurance during transport) of the equipment must be paid initially by the Contractor. However, these costs are, within the contract budget ceiling, reimbursed by EMSA as part of the oil pollution response equipment. Accordingly, the tenderer shall include in its financial offer the estimated transportation costs for the oil pollution response equipment.

2.3. Storage and insurance

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

For the purpose of taking out the full risk insurance policy covering the transferred oil pollution response equipment items the value shall be the purchase value as described under in the tables in points 4 below.

3. Use of the oil pollution response equipment

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

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

and their relevant power packs and ancillaries.

This configuration must be tested during quarterly drills.

4. List of transferred equipment and description

Ref. No.	Category	No.	Item	Item Brand	Item Model	No of Pcs	Additional info	ID Code (old)	ID Code (new)	First Delivery Date
1	Sweeping arm system (EUR 801,995)	1.1	Frame	Lamor	LSS 12	1	Rigid with weir skimmer module (01C10-P2168/9)	DOHM362201	1524	19/06/2012
		1.2	Frame	Lamor	LSS 12	1	Rigid with weir skimmer module (01C10-P2168/9)	DOHM362202	1525	19/06/2012
		1.3	Storage container				2 CONTAINER CORNERS FOR STIFF SWEEPING ARM (90ROH-O1377). TWIST LOCKS	DOHM351201	1526	19/06/2012
		1.4	Storage container				2 CONTAINER CORNERS FOR STIFF SWEEPING ARM (02A07-P2323). TWIST LOCKS	DOHM351202	1527	19/06/2012
		1.5	Weir module			1	WEIR SKIMMER MODULE 01C10-P2459 WITH DEBRIS SCREEN	DOHM314401	1528	19/06/2012
		1.6	Weir module			1	WEIR SKIMMER MODULE 01C10-P2459 WITH DEBRIS SCREEN	DOHM314401	1529	19/06/2012
		1.7	Brush module			1	BRUSH SKIMMER UNIT, CONVEYOR BELT 5C 90ROH-O1065	DOHM310701	1530	19/06/2012
		1.8	Brush module			1	BRUSH SKIMMER UNIT, CONVEYOR BELT 5C 90ROH-O1065	DOHM310701	1531	19/06/2012
		1.9	Pump	Mariflex	MSP 150	1	OIL TRANSFER 03B02-P641 (201111150067)	DOHM280001	1532	19/06/2012
		1.10	Pump	Mariflex	MSP 150	1	OIL TRANSFER 03B02-P641 (201108050229)	DOHM280002	1533	19/06/2012
		1.11	Hydraulic hose(s)			3	SET FOR PUMPS :1 x 1", 1 x 3/8", 1 x 1/4"	DOHM223801	1534	19/06/2012
		1.12	Hydraulic hose(s)			3	SET FOR PUMPS :1 x 1", 1 x 3/8", 1 x 1/4"	DOHM223802	1535	19/06/2012
		1.13	Crane			1	SWEEPING ARM DAVIT CRANE SYSTEM (90ROH-O1246)	DOHM130001	1536	19/06/2012
		1.14	Crane			1	SWEEPING ARM DAVIT CRANE SYSTEM (90ROH-O1246)	DOHM130002	1537	19/06/2012
		1.15	Towing lines set				BOW LINE PP 40 mm / 50 m FOR LSS SA (90ROH-O1235) AND TOWING CHAIN & SLINGS (90ROH-O1066)	DOHM374201	1538	19/06/2012
		1.16	Towing lines set				BOW LINE PP 40 mm / 50 m FOR LSS SA (90ROH-O1235) AND TOWING CHAIN & SLINGS (90ROH-O1066)	DOHM374202	1539	19/06/2012
		1.17	Towing lines set				BOW LINE PP 40 mm / 50 m FOR LSS SA (90ROH-O1235) AND TOWING CHAIN & SLINGS (90ROH-O1066)	DOHM374203	1540	19/06/2012
		1.18	Towing lines set				BOW LINE PP 40 mm / 50 m FOR LSS SA (90ROH-O1235) AND TOWING CHAIN & SLINGS (90ROH-O1066)	DOHM374204	1541	19/06/2012
		1.19	Hydraulic hose(s)			2	(90ROH-O1237) FOR WEIR AND BRUSH MODULES	DOHM223803	1542	19/06/2012

		1.20	Hydraulic hose(s)		2	(90ROH-O1237) FOR WEIR AND BRUSH MODULES	DOHM223804	1543	19/06/2012
		1.21	Hydraulic hose(s)			SET POWER PACK TO PIPING(2x50mm/2meter, 2x35mm/2meter, 2x20mm/6meter, 1x20mm/6meter, 1x35mm/6meter, 2x20mm/2meter.	DOHM223805	1549	19/06/2012
		1.22	Oil hose(s)			SEMI RIGID, CAMLOCK (04A03-P2378)	DOHM263801	1544	19/06/2012
		1.23	Oil hose(s)			SEMI RIGID, CAMLOCK (04A03-P2378)	DOHM263802	1545	19/06/2012
		1.24	Oil hose(s)			SEMI RIGID, CAMLOCK (04A03-P2378)	DOHM263803	1546	19/06/2012
		1.25	Oil hose(s)			SEMI RIGID, CAMLOCK (04A03-P2378)	DOHM263804	1547	19/06/2012
		1.26	Oil hose(s)			SEMI RIGID, CAMLOCK (04A03-P2378)	DOHM263805	1548	19/06/2012
		1.27	Storage reel			HOSE WINDER LHW 40/2-AI (05B01-P1629)	DOHM353401	1552	19/06/2012
		1.28	Storage reel			HOSE WINDER LHW 40/2-AI (05B01-P1629)	DOHM353402	1553	19/06/2012
		1.29	Control desk		1	CONTROL PANEL, 5 VALVES (03A01-P1007)	DOHM110001	1554	19/06/2012
		1.30	Control desk		1	CONTROL PANEL, 5 VALVES (03A01-P1007)	DOHM110002	1555	19/06/2012
		1.31	Hydraulic hose(s)		7	Set (90ROH-O1703) (CONTROL PANEL TO CRANE)	DOHM223806	1556	19/06/2012
		1.32	Hydraulic hose(s)		7	Set (90ROH-O1703) (CONTROL PANEL TO CRANE)	DOHM223807	1557	19/06/2012
		1.33	Spare parts		1	CONTROL PANEL, 3 VALVES (03A01-P1003)	DOHM110003	1558	19/06/2012
		1.34	Power pack		1	HYDRAULIC POWER PACK BLOCK LPP 2x90 E (90ROH-O1692) WITH CLOSED FRAME AND INDEPENDENT OIL TANK (90ROH-O1693) AND PUMP	DOHM270001	1559	19/06/2012
		1.35	Spare parts			SPARAE PART KIT 2 FOR MSP 150 (03B02-P858)	DOHM343101	1560	19/06/2012
		1.36	Spare parts			SPARAE PART KIT 1 FOR LPP 90 (90ROH-O1407)	DOHM343102	1561	19/06/2012
		1.37	Cover		1	CANVAS FOR STIFF SWEEP BRUSH MODULE	DOHM120001	1550	19/06/2012
		1.38	Cover		1	CANVAS FOR STIFF SWEEP BRUSH MODULE	DOHM120002	1551	19/06/2012
		1.39	Spare parts			HYDRAULIC HOSES 16MX32mm, 30Mx32mm	DOHM343103	1562	19/06/2012
		1.40	Pump	Lamor	GT A 115	PDAS	AABE283201	1563	23/05/2006
		1.41	Pump	Lamor	GT A 115	PDAS (03B03-P1256, 140064)	AABE283203	1564	23/05/2006
		1.42	Pump	Lamor	GT A 115	PDAS (151B3037-2.1)	AABE283202	1569	23/05/2006
		1.43	Spare parts			SPARES PARTS FOR PUMP GT A 115	AABE343101	1565	23/05/2006

		1.44	Oil hose(s)				FLEXIBLE OIL TRANSFER HOSE FOR GT A 115	AABE263801	1566	23/05/2006
		1.45	Oil hose(s)				FLEXIBLE OIL TRANSFER HOSE FOR GT A 115	AABE263802	1567	23/05/2006
		1.46	Oil hose(s)				FLEXIBLE OIL TRANSFER HOSE FOR GT A 115	AABE263803	1568	23/05/2006
		1.47	Hydraulic hose(s)				HYD. HOSE FOR GT A 115 BOOM	AABE223801	1570	23/05/2006
		1.48	Hydraulic hose(s)				HYD. HOSE FOR GT A 115 BOOM	AABE223802	1571	23/05/2006
		1.49	Hydraulic hose(s)				HYD. HOSE FOR GT A 115 BOOM	AABE223803	1572	23/05/2006
2	Boom (EUR 396,973)	2.1	Segment PVC	Norlense	NO-800-R	1	Single point inflation - PVC, including towing lines, net bridle for J configuration and spares	n/a	2530	07/06/2017
		2.2	Segment PVC	Norlense	NO-800-R	1	Single point inflation - PVC, including towing lines, net bridle for J configuration and spares	n/a	2531	07/06/2017
		2.3	Towing cross bridle	Norlense		1	For "Open U" formation - 5 meters	n/a	2532	07/06/2017
		2.4	Cover	Norlense		1	Canvas for boom reel LW10.20		2533	07/06/2017
		2.5	Cover	Norlense		1	Canvas for boom reel LW10.20		2534	07/06/2017
		2.6	Cover	Norlense		1	Protection carpet for boom deployment		2535	07/06/2017
		2.7	Storage reel	Norlense		1	BOOM REEL T-10.20-2-5	AABA353401	1587	23/05/2006
		2.8	Storage reel	Norlense		1	BOOM REEL T-10.20-2-5	AABA353402	1588	23/05/2006
		2.9	Air blower	Dynaset		1	HYD. COMPRESSOR HKL 4100/8-113 & (2XAIR SUPP. /BACK UP AIR HOSES 30 m. AABA053601, AABA053602)	AABA073601	1595	23/05/2006
		2.10	Power pack	Lamor	LPP 50 D	1	HYDRAULIC	AABA272801	1597	23/05/2006
		2.11	Power pack spares	Lamor			SPARES POWER PACK	AABA223802	1598	23/05/2006
		2.12	Hydraulic hose(s)				SET POWER-PACK BOOM COMPRESSOR 4x15mm/0.5meter, 4x20mm/1.5meter, 6x20mm/12meter, 6x15mm/6meter, 3x20mm/6meter, 2x30mm/6meter,	AABA042901	1599	23/05/2006
		2.13	Hydraulic hose(s)				SET POWER-PACK BOOM REEL 4x15mm/0.5meter, 4x20mm/1.5meter, 6x20mm/12meter, 6x15mm/6meter, 3x20mm/6meter, 2x30mm/6meter,	AABA042901	1600	23/05/2006
		2.14	Twistlock			4	4 CONTAINER CORNERS FOR BOOM REELS AND LPP'S (02A07-P2323)	n/a	1601	23/05/2006
		2.15					Ventilation fan for Power-pack LPP50	n/a	1639	23/05/2006

3	HC Skimmer system (EUR 981,744)	3.1	Brush module	Norene	Normar 250 Ti	1	BRUSH-/DISC SKIMMER, FRAME, THRUSTERS AND CUTTING DEVICE FOR DEBRIS	DOHI310701	1617	24/07/2013
		3.2	Weir module	Norene	Normar 250 Ti	1	WEIR SKIMMER WITH 4 FLOATS, FRAME, 2 THRUSTERS , HYDRAULIC DRIVEN PUMP WITH CUTTING DEVICE FOR DEBRIS, DEBRIS SCREEN	DOHI314401	1618	24/07/2013
		3.3	Pump	Mariflex	MSP 150	1	SCREW/CENTRIFUGAL	DOHI280001	1619	24/07/2013
		3.4	Pump	Desmi	DOP 250 Dual	1	PDAS	DOHI280002	1620	24/07/2013
		3.5	Pump	Desmi	DOP 250 Dual	1	PDAS	DOHI280003	1621	24/07/2013
		3.6	Power pack			1	NORMAR DIESEL EX 3G, 107KW AT 2100RPM AND 120KW AT 2400RPM	DOHI270001	1622	24/07/2013
		3.7	Crane			1	HYDRAULIC STORAGE REEL INTEGRATED UMBILICAL, DN150 FLOATING HOSE, LENGTH 80M, DIAMETER 6" AND FLOWMETER INTEGRATED TELESCOPIC CRANE, SAFETY FACTOR 2 & INTEGRATED FLOW METER	DOHI130001	1623	24/07/2013
		3.8	Storage flatrack			1	20' ISO CORNERS FOR STORAGE AND TRANSPORTATION OF THE NORMAR SKIMMER	DOHI352001	1624	24/07/2013
		3.9	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR WEIR SKIMMER HEAD	DOHI120003	1625	24/07/2013
		3.10	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR BRUSH SKIMMER HEADS	DOHI120004	1626	24/07/2013
		3.11	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR HOSE REEL	DOHI120005	1627	24/07/2013
		3.12	Remote control			1	CAVOTEC REMOTE MICRO-CONTROL MC-3 SERIES, OPERATING RANGE 100-1000M,EX PROOF	DOHI290001	1628	24/07/2013
		3.13	Hydraulic hose(s)			3	SET 1 High pressure 1-1/2", 1 return 1-1/2", 1 leak 1/2"	DOHI223801	1629	24/07/2013
		3.14	Hydraulic hose(s)			3	SET 1 High pressure 1-1/2", 1 return 1-1/2", 1 leak 1/2"	DOHI223802	1630	24/07/2013
		3.15	Oil hose(s)				OIL HOSE 5", 2*6"10M	DOHI263801	1631	24/07/2013
		3.16	Spare parts				SPARE PARTS	DOHI343101	1632	24/07/2013
		3.17	Spare parts				Battery 10V 180 A/h	n/a	1637	24/07/2013
		3.18	Spare parts				Battery charger Strint-car 430	n/a	1638	24/07/2013

4	Decanting system (EUR 35,486)	4.1	ODME (PPM Reader)			PPM READER HYDROSENSE 2410 (INCLUDING STAND FOR PPM READER AABD020201)	AABD243001	1602	23/05/2006
		4.2	ODME (PPM Reader)			PPM READER HYDROSENSE 2410 (INCLUDING STAND FOR PPM READER AABD020202)	AABD243002	1603	23/05/2006
5	Sampling/testing Communication (EUR 28,900)	5.1	Gas detector			PORTABLE GAS DETECTOR / EXPLOSIMETER GX-2009B AND CHARGER	ALDH191801	1416	14/07/2010
		5.2	Flash point tester			SETAFLASH SERIES 3 CLOSED CUP FLASHPOINT TESTER	ALDH173901	1417	14/07/2010
		5.3	Mini lab			VISCOSITY METER	ALDH231701	1418	14/07/2010
		5.4	Mini lab			DENSITY METER	ALDH234301	1419	14/07/2010
6		6.1	VHF Portable			VHF RADIO PHONE VERTEX STANDARD VXA-220 PILOT VI AIRBAND H/H	ALDC392901	1414	14/07/2010
		6.2	VHF Portable			VHF RADIO PHONE VERTEX STANDARD VXA-220 PILOT VI AIRBAND H/H	ALDC392902	1415	14/07/2010
7	Cleaning (EUR 3,100)	7.1	Cleaning machine			HI-PRESSURE CLEANER ALTO POSEIDON 2-26	DFHB092901	0717	11/07/2008
		7.2	Cleaning machine			HI-PRESSURE CLEANER ALTO POSEIDON 2-26	DFHB092902	0718	11/07/2008
		7.3	Cleaning machine			HI-PRESSURE CLEANER NILFISK SC UNO 4M-140/620 PS	DFHB092903	0719	11/07/2008

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



Fig. 1 LAMOR Stiff Sweeping Arm system LSS 12m

The sweeping arm system is supplied with an integrated weir skimmer and a brush module skimmer that can be assembled to the arm for recovery operations of high viscous oils. The skimmer may be equipped with a centrifugal pump with screw impeller, Marflex MSP150-63 or with a LAMOR PDAS GT A 115 pump. The sweeping system includes the following components:

- Rigid Sweeping Arm Frame with container corners
- Weir Skimmer Module
- Brush Skimmer Module with canvas
- Pump Marflex Centrifugal MSP150-63
- Pump Lamor GT A 115
- Davit Crane System
- Towing lines set
- Hydraulic Hoses
- Oil Transfer Hoses
- Storage reel
- Hydraulic/Electric Power Pack LPP 2x90 E

- Control panel
- Ancillaries: spare parts and canvas

5.1.1 - 5.1.4 LAMOR Stiff Sweeping Arms LSS 12m with container corners

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:	11860 mm
Width:	3400 mm
Height:	2120 mm
Weight:	3600 kg
Hydraulic flow:	(skimmer ONLY) 20 l/min
Hydraulic pressure:	210 bar
Power requirement:	7

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:	122m + 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

There are 4 corner fittings used to build to a standard flat rack, 2 bottom right and 2 bottom left. 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.

5.1.5 – 5.1.6 Weir Skimmer

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



Fig. 2 LAMOR Stiff Sweeping Arm LSS 12m – weir skimmer module with debris screen

Weir skimmer dimensions:

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

5.1.7 – 5.1.8 Brush Skimmer

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

The sweeping arms may be equipped with the LAMOR GT A 115 PDAS pumps as they are more adequate to handle high viscous oils and the pumping rate meets the feeding capacity of the brush chains. Once dismantled the sweeping arm recover the oil directly with the weir skimmer.



Fig. 3 LAMOR Stiff Sweeping Arm LSS 12m – brush skimmer module

Technical specifications:

Operational Sea State:	Effective in 2 meter significant waves and wind driven chop. This is highly depending also on the vessel size used.
Viscosity Range:	0 to > 3,000,000 cSt
Dimensions:	5 Brush Chains mounted in steel frame approx. 2000 mm long (between shafts)
Brush Cleaner:	Patented cleaner/comb installed at upper end for gravity discharge of oil and debris into collection hopper.
Hydraulic Motor:	Danfoss type, Installed and fitted with Quick Disconnects.

5.1.9 – 5.1.12 Marflex Centrifugal Pump MSP150 with hydraulic hoses

Manufacturer:

Marflex B.V.

Postal Address:

Louis Pasteurstraat 12

3261 LZ Oud-Beijerland

The Netherlands

Phone: +31 186 89 02 00

Fax: +31 186 89 02 49

E-mail: info@marflex.com

www.marflex.com

Year of purchase: 2012

The Marflex 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.



Fig. 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" aeroequip.
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 – 5.1.14 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

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



Fig. 5 Davit Crane System Hidroacar

5.1.15 – 5.1.18 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.

5.1.19 – 5.1.21 Sweeping Arms hydraulic hoses and couplings

The equipment is supplied with all necessary hydraulic hoses and some spares. The hoses are manufactured in a durable material for long service and supplied with reliable stainless steel “Tema” connectors for secure linkages.

Technical specifications:

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)

5.1.22 – 5.1.26 Oil hoses

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



Fig. 6 LSS 12m, oil hose connected to weir skimmer module

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

5.1.27 – 5.1.28 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 wound and locked separately. The frame is equipped with 4-point lifting points and forklift channels.

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



Fig. 7 Hose Winders LHW 40/2-AL with hydraulic hoses for LSS 12m

5.1.29 – 5.1.33 Control panel with hydraulic hoses and spare parts

- Sweeping arms control panel 5 valves.
- Hydraulic hoses set control panel to crane.



Fig. 8 Sweeping arm control panel

5.1.34 Hydraulic Power Pack Block LPP 2x90 E

The LPP 2x90 E Lamor Power Pack features a frame and a joint hydraulic oil tank. The hydraulic units can be used with cross connection for Starboard or Port side if any operational failure.

The power unit is based on 1250 litre oil reservoir, pump/motor base and motor starter units. There is a dip tray for protection against oil leakage. The reservoir, pump base and motor starters can be separated for transportation. All necessary hoses and other related equipment for connecting reservoir, pumps, motor starters and electrical components of power unit are included.

Connections:

- pressure 2 x SAE 1.1/2" Code 62
- LS-signals 2 x UNF13/16-12 ORFS male for 12 mm tube
- return lines 2 x SAE 1.1/2" Code 61
- DR-line UNF 1-14 ORFS male for 14-16 mm tube
- water 2 x G1".

The power pack block consists of:

- 2 pcs electric motors 90 kW / 1500 rpm, U = 380 V / 50 Hz. The motors are equipped with standstill heating and thermistors.
- 2 pcs variable piston pumps, Parker PV180R1K1T1NZCC. Q max = 255 l/min, p max = 210 bar. The pumps are equipped with load sensing compensator with adjustable maximum pressure compensation and maximum input power limitation, P max = 90 kW / 1500 rpm.
- 2 pcs gear pumps attached to main pumps for filtering and cooling, Q = 75 l/min
- 2 pcs pressure relief valves, Parker R5V10 695, The valves are set to 240 bar

- 2 pcs pressure filters, Parker 70L405BT1KG241
- pcs special manifolds including a large check valve and SAE 1.1/2", code 62 shut off valve
- 4 pcs necessary shut off valves to connect pumps crosswise
- a special check valve manifold for connecting gear pumps to a seawater/oil cooler,
- the manifold includes also a pressure relief valve for cooling circuit and a shut off valve for oil filling
- a low pressure filter, Parker TTF1005QLBS1EG24
- an oil/seawater cooler Raja-Lovejoy BNZ-125-1225. Cooling capacity, when oil inlet temperature is 65 °C, seawater inlet temperature is 30 °C and water flow 4,5 m3/ h, is 66,7 kW
- a thermostat valve for water flow control, water circuit includes a water strainer
- a level switch
- a temperature switch for high oil temperature
- necessary equipments for pressure and temperature measuring
- 2 pcs oil level gauges
- 2 pcs air filters, Parker EAB20C015HC73-A
- 2 pcs motors starter units including following equipments:
- main switches and emergency stop button
- Parker 650VF/900 inverter drive, starting current of 90 kW motor will be less than 50 A
- start and stop buttons
- warning lights for low oil level, high oil temperature and filter clogging
- a contact that is closed when motor is running
- a general alarm contact which closes if: motor stopped, low oil level, high oil temperature or if a filter element needs to be replaced.

Dimensions of the Power Pack Block LPP 2x90 E:

Length:	2230 mm
Width:	2000 mm
Height:	1920 mm
Weight Dry:	Approx 2500 kg
Hy circuits:	Each 2 pcs
Hydraulic flow:	Each 255 l/min
Hydraulic pressure:	210 bar
Power:	Each 90 kW
Oil tank capacity:	1250 l
Speed:	1500 rpm
Electrical supply:	400 (50/60Hz) AC



Fig. 9 Hydraulic Power Pack Block LPP 2x90 E

5.1.35 - 5.1.39 Ancillaries: spare parts and canvas

The set of ancillaries consists of:

- Canvas for brush and wei skimmer
- Spare part kit for MSP 150
- Spare part Kit for the power pack LPP 90
- Hydraulic hoses
- Spare parts for pump GT A 115

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

5.1.40 – 5.1.49 Lamor pump GT A 115 with oil and hydraulic hoses

The pump GT A 115 is a multi - purpose submersible Archimedes screw pump with a pumping capacity of 115 m³ / h. The skimmer is fitted with one pump.

The pump is constructed from seawater resistant aluminium for the casings and stainless, acid proof steel internals with special seals that ensure the pump remains “dry”. The hydraulically driven, positive displacement pump with low screw speed avoids further emulsification of the recovery product thus making further separation more efficient. The pump can handle solids up to 30 mm in diameter, should the pump becomes clogged, it can be reversed to expel the blockage.

Technical specifications:

Length:	500 mm
Width:	300 mm
Height:	598 mm
Weight:	71 kg
Capacity:	115 m ³ /h
Hydraulic flow:	160 max l/min
Hydraulic pressure:	210 max bar
Power req.:	56 max kW
Discharge pressure:	12 bar



Fig. 10 Lamor GT A 115 Pump

5.2 Lamor-NorLense Boom NO-800-R

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 Website: www.lamor.fi

Year of purchase: System purchased in 2006, Segments PVC replaced in 2017

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

- The Lamor-NorLense Boom NO-800-R set includes:
- Boom section,
- Towing set,
- Spare parts kit for the NorLense NO-800 R boom,
- Air supply/back-up air hoses,
- Boom reel,
- Hydraulic compressor HKL 4100/8-113.
- Hydraulic power pack LPP 50 D,
- Spares for the power pack LPP 50 D,
- Hydraulic hoses.

5.2.1 – 5.22 Boom section

Technical specifications - NorLense NO-800 R:

Freeboard:	740 mm
Draft:	1020 mm
Boom Height:	1760 mm
Standard Length:	250 m
End Connectors:	Soft
Skirt Material:	PVC Fabric (1250 g/m ²)
Colour:	Orange
Flotation:	Air (atmospheric pressure)
Weight:	17 kg/m
Waterline Beam:	800 mm
Ballast Material:	13x100 Galvanised Steel Chain
Ballast Weight:	3.5 kg/m
Storage Volume:	10 m ³ /250 m
Operation: Personnel required	1 for Reel (and 1 towing vessel)
Deployment	Storage/Deployment Reel
Recovery and storage	NorLense 10 m ³ Storage Reel



Fig. 11 NorLense Rapid Deployment Boom NO-800-R

5.2.3 Towing set

The towing set includes all necessary parts for effective and safe deployment of the booms. All Tow sets come complete with connectors, shackles, rope and buoy.

The following components are included:

- 3 pcs connecting split links to the boom end,
- 9 m connecting ropes (2 x 12 mm, 1 x 18 mm)
- 1 pc braided polypropylene rope 26 mm/50 m with 3.25 Tn shackle
- 1 pc buoy 400 mm

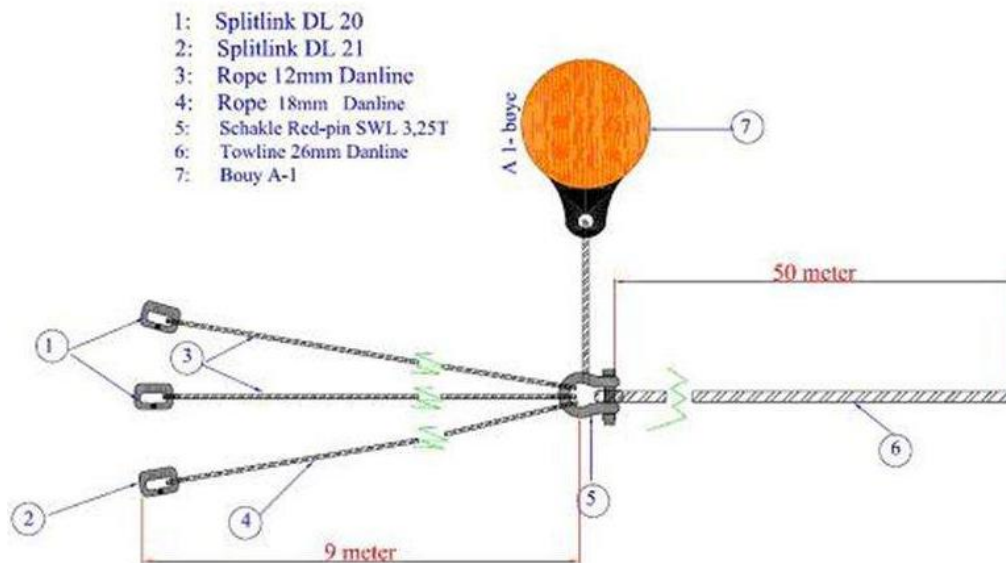


Fig. 12 Towing set

5.2.4 - 5.2.8 Boom winch LW 10.14 with cover

Base and drum are built-up of steel profiles/plates. The drum has a spherical roller-bearing at one end. At this end, it is mounted a rotating union who allow supplying air to the boom, while the winch is running. At the motor side, the motor take care of the bearing. The winch can be turned 20 degrees to each side through a vertical axis. The winch is arranged with pad eyes for lifting sling. Surface treatment: Primer and finish coatings. As option the steel construction can be sandblasted and metallized before painting.

Technical specifications - Boom winch LW 10.14:

Length:	appr. 3150 mm
Width:	2400 mm
Height:	appr. 3060 mm
Drum size:	508 mm
Flange diameter:	2400 mm
Drum capacity:	10 m ³
Power requirement:	22 kW
Drive:	Hydraulic motor with reduction gear and automatic hydraulic brake. Brake force stronger than pulling force.
Manoeuvring:	Control valve and double brake mounted permanently
Hydraulic connection – pressure:	Ø20 mm
Hydraulic connection – return:	Ø22 mm
Hydraulic connection – drain:	Ø12 mm
Air connection:	1 ½" Cam-Lock male
Pull:	Full drum - 1200 kp
Hauling speed:	0 - 15 m/min at empty drum
Oil flow:	62 l/min
Oil pressure:	Oil pressure: 210 bar
Weight:	2600 kg



Fig. 13 Boom winch

5.2.9 Hydraulic compressor HKL 4100/8-113

Manufacturer:

Dynaset OY

Menotie 3

FI-33470 Ylojarvi

Finland

Tel: +358 3 3488 200,

Fax: +358 3 3488 222

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

Year of purchase: 2006

The hydraulic compressor HKL 4100/8-113 is a hydraulically driven compressor that transforms the hydraulic power into a quality air pressure and which also can be easily connected to any working tool and the hydraulic line thereof.

The units are provided with cooled lubrication system, oil separator and relief valve on the air intake.



Fig. 14 Hydraulic compressor HKL/8-113

Technical specifications - hydraulic compressor HKL 4100/8-113:

Type:	Lamella compressor
Length	870 mm
Width	495 mm
Height:	770 mm
Weight	185 kg
Capacity	4100 l/min
Pressure:	8 bar
Hydraulic flow:	113 l/min
Hydraulic pressure:	210 bar nominal
Hydraulic pressure:	180 bar minimum
Hydraulic pressure:	250 bar maximum
Air flow:	4100 l/min at 8 bar

5.2.10 Hydraulic power pack LPP 50 D

Manufacturer:

Lamor Corporation Ab

Mestarintie 25

06150 PORVOO

FINLAND

Tel: +358 (0)20 7650 100,

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

Year of purchase: 2006

The LPP 50 D power pack is powered by a Deutz 50 kW diesel engine and serves as a multipurpose power pack designed for the flexible operation of many types of hydraulically operated oil spill clean-up equipment. Equipped with 3 hydraulic circuits the Lamor LPP 50 D can be used to power multiply users such as a skimmer and boom winder consecutively.

LPP 50 D is containerised within a steel frame designed to ensure a good circulation for the air cooled diesel engine. The power pack is equipped with electric start and incorporates control panel and hydraulic oil cooler into the framework. The LPP 50 D Power Pack utilizes a Sauer-Danfoss proportional hydraulic valve system making it possible to easily adjust the flow of oil to the supplied components.



Fig. 15 Hydraulic power pack LPP 50 D

Technical specifications - hydraulic power pack LPP 50 D:

Length:	1345 mm
Width:	810 mm
Height:	1100 mm
Weight:	600 kg
Hydraulic circuits:	3 pcs
Hydraulic flow:	106 l/min
Hydraulic pressure:	180 bar
Power:	50 kW
Oil tank capacity:	70 l
Fuel tank capacity:	25 l

5.2.11 Spares for the power pack LPP 50 D

The Lamor spare parts kit for LPP 50 D includes items necessary for field repair and maintenance.

5.2.12 – 5.2.13 Hydraulic hoses

Set of hydraulic hoses for the Power Pack LPP 50 D

5.2.14 – 5.2.15 Ancillaries

- 4 container corners for boom reels.
- Ventilation fan for power pack LPP 50.

5.3 NorMar 250 TI High Capacity Skimmer Set**Manufacturer:**

NOREN Bergen AS

Sørehavnveien 41

5179 Godvik

NORWAY

www.noren.no

Tel: +47 55 50 86 70

Year of purchase: 2013

Supplied by:

AllMaritim AS

Postboks 51

5812 Bergen

NORWAY

www.allmaritim.com

Tel: +47 55 33 61 60

Fax: +47 55 33 61 61



Fig. 16 NorMar 250 TI High Capacity Skimmer Set

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

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

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

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

Operational weather conditions:

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

5.3.1 Brush/Disc Skimmer module

The NorMar brush/disc skimmer is designed to recover oil with viscosities ranging from light to heavy oil. The cassette is equipped with four Archimedes screw soft shovels on all sides giving heavy oil

recovery capacities up to 250 m³/h. The skimmer is not sensitive to floating debris due to the inlet guard mounted in front of the soft shovel segments. The skimmer is designed to be operational in 4 meter waves.

Technical specifications:

Frame:	Aluminum
Transfer pumps:	2 x Desmi DOP-250 dual PDAS pump
Coupling:	6" flange coupling for floating hose
Floats:	4 x floats
Thrusters:	2 x 15 hp thrusters
Capacity:	250 m ³ /h
Discharge Pressure:	10 Bar
Skimmer:	4 soft shovel units
Length:	1910 mm
Width:	1910 mm
Height:	1600mm
Weight:	550 kg



Fig. 17 NorMar 250 TI High Capacity Skimmer Set. Brush/disc skimmer head.

5.3.2 Weir Skimmer module

The NorMar weir skimmer is built into a protective frame made from seawater resistant aluminium, ensuring safe operation and low weight. The skimmer frame is equipped with two thrusters 15 hp each. The weir is built with a self-adjusting floating ring. The external skimmer floats can easily be removed for storage, or for hook up of the heavy oil shovel brush cassette. The weir skimmer incorporates one Mariflex MSP 150 pump.

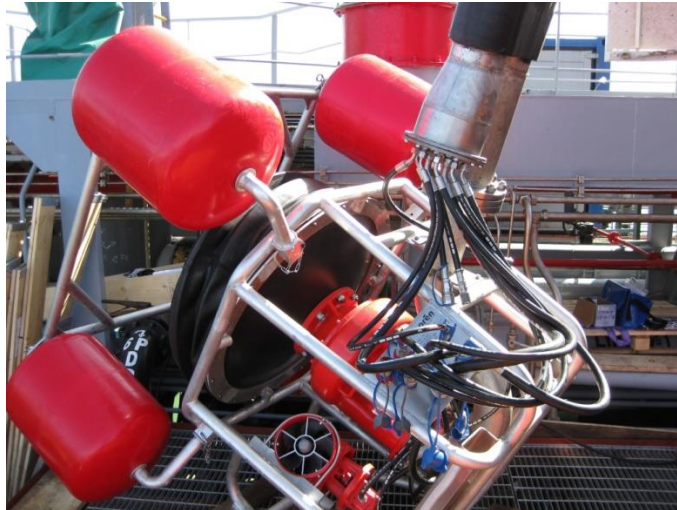


Fig. 18 NorMar 250 TI High Capacity Skimmer Set. Weir skimmer head.

Technical specifications:

Pump:	1 x Pump Mariflex MSP-150
Coupling:	6" flange coupling for floating hose
Floats:	4 x floats
Weir:	Floating ring with skirt
Thrusters:	2 x 15 hp thrusters
Capacity:	300 m ³ /h
Discharge Pressure:	10 Bar
Length:	1825 mm
Width:	1825 mm
Height:	1810 mm
Weight:	280 kg.

5.3.3 Pump Mariflex MSP-150

Manufacturer:

Mariflex Group
 Maassluisdijk 101
 3133 KA Vlaardingen
 Harbour no. 738
 The Netherlands
 Phone +31 10 - 434 44 45
 Fax +31 10 - 232 95 00

www.mariflex.net

Year of purchase: 2013



Fig. 19 Pump Mariflex MSP-150

Technical specifications:

Design :	Single stage centrifugal
Capacity / head :	300 m ³ /hr - 35 mwc max.
Viscosity / Specific gravity :	1.0 Cst. at 20 degr. / 1.0.
Speed :	3380 rpm max.
Materials casing :	Seawater resistant aluminium.
Impeller :	Nodular cast iron.
Hydraulic motor :	Built on, axial plunger.
Hydraulic pressure :	320 bar max.
Hydraulic oil flow :	140 l/min. max.
Discharge connection :	6 inch - 150 mm with adaptor to 6 inch quick coupling.
Max. outer diameter :	490 mm.
Height :	610 mm.
Weight excluding hoses:	83 kg

5.3.4 - 5.3.5 Desmi DOP-250 dual PDAS pump

Manufacturer:

Ro-Clean Desmi A/S

Hestehaven 21 B

DK-5260 Odense S

Denmark

Phone: +45 6591 0201

Fax: +45 6590 8877

Email: info@ro-cleandesmi.com

Website: www.desmi.com/ro-cleandesmi

Year of purchase: 2013

The NorMar brush/disc skimmer incorporates two Desmi DOP-250 pumps which deliver a maximum capacity of 250 m³/h and can develop discharge pressures up to 10 bar while maintaining nearly maximum flow. Two of these pumps are installed in the common brush/disc skimmer frame. Each pump is fitted with a cutting knife that will handle many types of trash found in oil spills.

Technical specifications:

Length:	720 mm
Width:	390 mm
Height:	670 mm
Weight:	78 kg
Max. pressure:	10 bar
Max. capacity:	100 m ³ /h
Viscosity range:	1 to > 1 million cSt
<i>Hydraulic system:</i>	
Prime mover:	Danfoss hydraulic motor, type OMTS 160
Max. speed:	800 rpm continuously
Max. input power:	47 kW continuously
Max. output power:	38 kW continuously
Max. oil flow:	160 l/min. continuously
Max. inlet pressure:	210 bar continuously
<i>Hydraulic connections:</i>	
Pressure line:	3/4" - 1" quick coupling male
Return line:	3/4" - 1" quick coupling male
Drain line:	3/8" quick coupling male

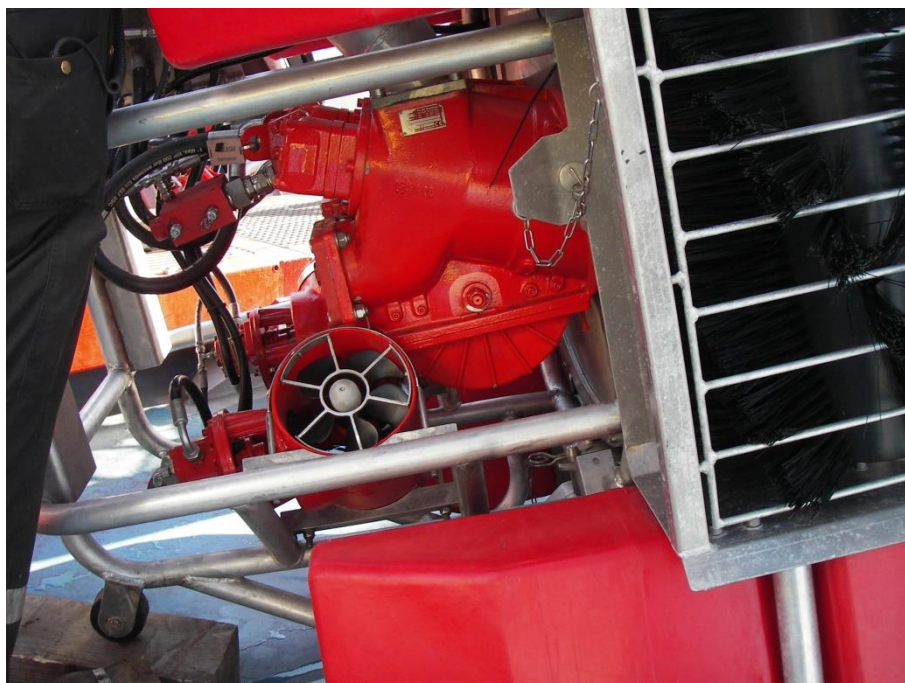


Fig. 20 Desmi DOP-250 dual PDAS pump

5.3.6 Diesel Hydraulic Power Pack NorMar DHPP

Technical specifications:

Length:	2300 mm
Width:	1070 mm
Height:	1740 mm
Weight (dry):	1 950 kg
Category:	EX 3G
Zone:	2
Gas Group:	IIB
Temp. Class:	T3
Power:	107 kW @ 2100 rpm, 120 kW @ 2400 rpm
Flow/Pressure:	320 ltr./min./210 bar
Engine:	Type Iveco PP7675 Si
Fuel tank capacity :	330 l.
Fuel Consumption:	30 l/h.



Fig. 21 Diesel Hydraulic Power Pack NorMar DHPP

5.3.7 Hydraulically driven reel with 360° turntable, umbilical hose and integrated crane

The hose reel is designed for storage of 80 meters of Noren 6" floating hose. The reel is hydraulically driven for launching and retrieval of the floating hose and skimmer unit. The hose reel is built together with a crane arm (A-frame) to allow handling and deployment of the skimmer heads over the side of a ship or other barriers. The crane arm is equipped with an automatic spooling device. The hose reel and crane arm is mounted on a common foundation allowing for 360° rotation. The system is mounted on a common foundation with 20 ft. container footprint with twist locks in each corner.

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



Fig. 22 Hydraulically driven reel with 360° turntable, umbilical hose and integrated crane

Technical specifications:

Length:	6241mm
Width:	2480 mm (2965 mm incl. operator platform)
Height:	2768 mm in stored position (3995 in operation)
Weight:	9000 kg (including crane arm and floating hose)

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

5.3.8 Storage Flat rack 20'

The skimmer is integrated with the 20' flat rack for storage and operation.



Fig. 23 Storage Flat rack 20' with the skimmer system

5.3.9 – 5.4.11 Ancillaries

NorMar 250 TI skimmer set includes ancillaries:

- Lifting arrangement and protective canvas for weir skimmer head;
- Lifting arrangement and protective canvas for brush/disc skimmer head;
- Lifting arrangement and protective canvas for hose reel.

5.3.12 Remote control

Manufacturer:

Cavotec Micro-control AS

Gevinglia 112

NO-7517, Hell

Norway

Phone: +47 74 83 98 60

Fax: +47 74 83 01 50

Email: microcontrol@cavotec.com

Web site: www.cavotec.com

Year of purchase: 2013



Fig. 24 Remote control for NorMar 250 TI High Capacity Skimmer

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

Technical specifications :

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

5.3.13 – 5.5.14 Hydraulic hoses set

Set of hydraulic hoses consists of 20 m of hydraulic hoses with connectors.



Fig. 25 Hydraulic hoses set connected to NorMar DHHP

5.3.15 Oil hoses set

Oil hoses set consists of 2 x 10 m sections of the semi rigid 6" oil hose.



Fig. 26 Semi rigid 6" oil hose

5.3.16 – 5.5.18 Spare parts

The spare part box contains skimmer discs and a short list of spare parts for the Normar 250 TI skimmer.



Fig. 27 Spare parts box for NorMar 250 TI High Capacity Skimmer

5.4.1 – 5.4.2 Oil in water monitor Hydrosense 2410 and ancillaries

Manufacturer:

Arjay Engineering Ltd.

Oakville (Toronto),

Canada, L6H 6C9

Phone: 001 (905) 829-2418

Fax: 001 (905) 829-4701

E-mail: arjay@arjayeng.com Website: www.arjayeng.com

Year of purchase: 2006

The HydroSense 2410 uses a UV fluorescence technique to target the aromatic component of the oil contamination. Through a site calibration this aromatic tag provides an indication relative to total oil. A continuous sample flow is tapped or pumped off the process line and directed through the HydroSense chamber. It passes behind the non-contacting UV light source and is targeted with filtered light energy. The soluble and emulsified oils in the water will excite from this light energy and fluorescent light energy back out of the water at a signature wavelength. The intensity of light energy at this wavelength is measured to provide an indication of the ppm concentration.

The performance is based on the site calibration to a known hydrocarbon concentration in stable background water. The oil in water monitor Hydrosense 2410 consists of:

- Monitor
- Stand for PPM reader

Technical specifications - Oil in water monitor Hydrosense 2410:

Range:	User selectable 0-10 to 0-300 ppm linear, trending from 300 ppm to 1,000 ppm
Display Resolution:	0.1 ppm
Instrument Accuracy:	+/- 0.1 ppm
Process Accuracy	+/- 1.0 ppm under stable conditions
Ambient Operating Temperature:	10°C to 50°C
Ambient Process Temperature:	0°C to 40°C
Power Input:	24 vdc or 110 vac or 220 vac
Alarm Relays:	4 x 10 amp, SPDT, dry
Output:	4-20 mA, Isolated
Interface:	RS-485 Modbus (optional HART)
Standards :	UL, CSA, CE, ABS, CSA Div 2, T3C ; Groups A,B,C,D, Zone 2. Pressurization/Purge available for use in Zone 2. NFPA/ATEX
Enclosure:	316 SS, Type 4X, IP65



Fig. 28 PPM reader

5.5 Sampling and Testing System

5.5.1 Gas Detector with charger

Manufacturer:

RKI Instruments Inc
 33248 Central Ave, Union City,
 CA 94587, USA
 Phone: (800) 754 - 5165
 Fax: (510) 441 - 5650
 Website: www.rkiinstruments.com

Year of purchase: 2010

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



Fig. 29 Gas Detector

5.7.2 Flash Point Tester

Manufacturer:

Stanhope-Seta

London Street, Chertsey, Surrey,
KT16 8AP, UK

Phone +44 (0)1932 564391

Fax: +44 (0)1932 568363

E-mail: service@stanhope-seta.co.uk Website www.stanhope-seta.co.uk

Year of purchase: 2010

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



Fig. 30 Flash point tester

5.5.3 - 5.5.4 Mini-lab

Viscometer

Manufacturer:

CANNON Instrument Company

2139 High Tech Road

State College PA 16803, USA

E-mail: service@cannoninstrument.com Website: www.cannoninstrument.com

Year of purchase: 2010

Density Meter DM-340.1 – DenDi

Manufacturer:

JSC LEMIS Baltic

26 Ganibu dambis Str.

Riga, LV-1005, LATVIA

Tel: +371 67383223 ; Fax: +371 67383270

E-mail: info@lemis-baltic.com; Website: www.lemis-baltic.com

Year of purchase; 2010

The set includes:

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



Fig. 31 Density meter

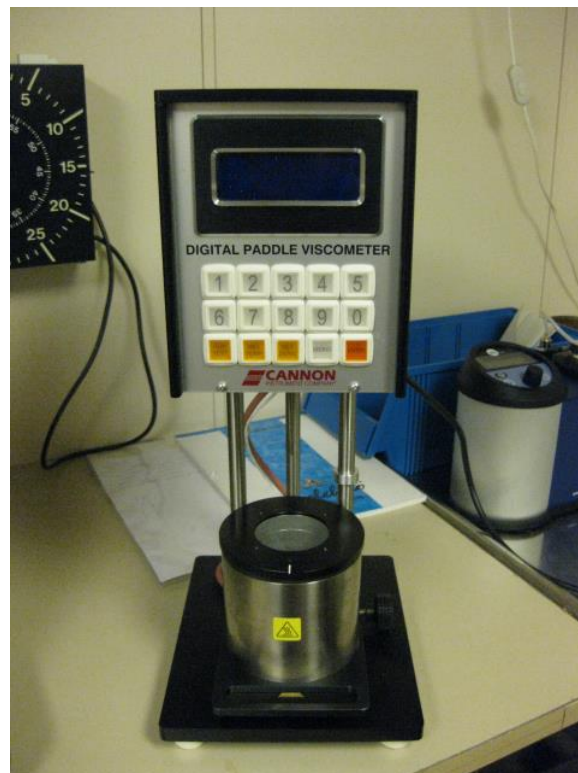


Fig. 32 Viscometer

5.6.1 – 5.6.2 VHF Radio Phone Vertex

Year of purchase: 2010

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

5.7.1 – 5.7.3 Cleaning machines

Year of purchase 2008

There are 3 cleaning machines available:

2 x Hi pressure cleaner ALTO Poseidon and

1 x Hi pressure cleaner NILFISK SC UNO 4M-140/620 PS.