

Annex V of the VAC

Technical Specifications for the equipment and dispersants

Procurement procedure: EMSA/CPNEG/1/2018

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

Phase II – Invitation to Tender

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

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1. General description of the equipment

The oil pollution 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 Arms LSS 15
- 2) LAMOR Neoprene Auto Boom SPI LAN 2200
- 3) LAMOR Weir Skimmer LWS 1300
- 4) High-capacity Skimmer Normar 250 TI
- 5) Dispersant application system (Jason spraying system, tank containers, loading system)
- 6) Slick Detection System MIROS
- 7) Sampling/testing equipment (minilab, flash point tester, oleometer)
- 8) New portable dispersant spraying systems (two single nozzle systems and one spraying arms)

All tenderers will have the opportunity to visually verify the condition of equipment items listed from 1-7 above in the stockpile in Limassol, Cyprus, at request. In principle the visit will be organised in week 27. The visit details will be arranged with the requesting tenderer.

The following technical issues regarding the transferred equipment occurred in the past during the previous contract implementation:

- September 2017: During deployment of port side sweeping arm steel wire was damaged. New wire was installed.
- March 2017: Improper closing of 2 valves of the boom sector. No reoccurrence in the following drills.
- February 2014: Some air valves are leaking and boom sections cannot be inflated. Valves were replaced.
- September 2012: Hydraulic oil leakage in boom compressor. Repaired.

1.2. Servicing of the equipment

The equipment that will be transferred to the Contractor was purchased in 2011 except the high-capacity skimmer that was purchased in 2013 and dispersant application system purchased in 2015. At the moment of transfer the age of the equipment will vary from 3 to 8 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 Arms system LSS 15
2. LAMOR Neoprene Auto Boom SPI LAN 2200
3. LAMOR Weir Skimmer system LWS 1300
4. High-capacity Skimmer system Normar 250 TI

The servicing should include the following:

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

1.3. Additional Equipment

Contractor will need to purchase/deliver the following equipment:

1. Flashpoint of the arrangement: As the arrangement must be able to collect and store oil with a flashpoint below 60°C, then additional items may need to be purchased or replaced (e.g. for the power packs, remote controls, etc.) in order to obtain the relevant Class notation for oil pollution response operations.
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. Slick Detection System: The Oil Slick Detection System must be upgraded and updated. The tenderer has to check with the manufacturer (the relevant contact address is provided in Section 5, point 5.6) or an authorised representative whether the existing radar and antenna on board the vessel are compatible with the slick detection system provided by EMSA. In

case of incompatibility, then new items must be purchased. The tenderer should foresee the necessary space in the bridge to install it.

The system must be upgraded regularly throughout the duration of the contract.

4. Communications Devices: At sea oil recovery operations require a number of different actors at different locations. In addition to the GMDSS area A3 requirements set in point 15 of Annex IV, the vessel must be able to communicate with aircrafts, so **two** VHF radiophone, aeronautic band, will be foreseen for recovery operations or exercises.
5. Interface Detection System: When the oil/water mixture is stored in the tanks, the water and the oil is naturally separated due to the difference in density. The tenderer shall provide adequate equipment (fixed or portable) to detect the interface border between the oil and the water so that the quantity of actual oil stored is known.
6. Gas Detector: It will be needed to check the presence of explosive gases.
7. Portable Cleaning System: In order to clean the equipment and deck after the first stage of operations, **three** portable high pressure hot water cleaning sets shall be provided with a flow range of at least 0.18-0.72 m³/h at 20-100 bar (another one will be transferred from EMSA).
8. 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.

9. 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. Dispersants transferred

The dispersants that the Agency will transfer are stored in Intermediate Bulk Containers (IBCs) of 1 m³ capacity each (weighing approximately one tonne).

The quantity of dispersant to be transferred by EMSA and stored is 201.4 tons (212 IBCs with dispersants plus 10 empty IBCs, total 222 IBCs).

Detailed information regarding dispersants is contained in point 6 of this document.

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

3. Handover procedure for equipment and dispersants transferred

The conditions of handover, transportation, storage and insurance of the equipment and dispersants 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.

3.1. 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 from 1-7 in point 1.1 and the dispersants described in point 2 above will be made available for handover and ready for transportation at their storage location in Limassol (Cyprus) at a date to be mutually agreed between EMSA and the Contractor. The handover shall not take place earlier than **5 May 2019** and not later than **30 May 2019**.

On the handover dates, the Contractor representative shall be present and verify the delivery of the equipment and dispersants 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 and dispersants. By signing the delivery/receipt statement on the handover date, the Contractor representative accepts the equipment and dispersants in its current condition.

The equipment listed under number 8 (portable dispersant spraying systems) in point 1.1 above will be delivered brand new to the contractor's warehouse in **April/May 2019**.

3.2. 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 and dispersants described in point 2 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 and dispersants 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 and dispersants purchase. Accordingly, the tenderer shall include in its financial offer the estimated transportation costs for the oil pollution response equipment and dispersants.

The transportation of the equipment listed under number 8 (portable dispersant spraying systems) in point 1.1 above will be arranged by EMSA.

3.3. Storage and insurance

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

For the purpose of taking out the full risk insurance policy covering the transferred oil pollution response equipment items and dispersants, the value shall be the purchase value as described under in the tables in points 5 and 6 below.

4. Use of the oil pollution response equipment and dispersant application system

4.1 Equipment for use onboard the vessel

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 three quarterly drills.

or

- the sweeping arm system,
- the dispersant application system (including tank containers with capacity for dispersant of min. 30 m³),
- the oil slick detection system,
- other equipment (minilab, flashpoint tester, etc.)

and their relevant power packs and ancillaries.

This configuration must be tested during one quarterly drill with a minimum one tank container installed on deck.

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.

4.1 Other equipment

With regard to the portable dispersant spraying systems (two single nozzle systems and one spraying arms system) and the second skimmer system available (Lamor weir skimmer LWS 1300) they are supposed to be stored in the warehouse, maintained and ready for mobilisation by EMSA. In any case, the tenderer shall make a suitable proposal that the operation of these systems is tested at least twice a year (the Lamor weir skimmer LWS 1300 shall be deployed in water).

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.

5. List of transferred equipment and description

Ref. No.	Category and purchase value	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 832,740)	1.1	Frame	Lamor	LSS 15	1	Rigid 15 m	FNQM362201	1422	05/08/2011
		1.2	Frame	Lamor	LSS 15	1	Rigid 15 m	FNQM362202	1423	05/08/2011
		1.3	Weir module			1	WEIR SKIMMER MODULE 01C10-P2459 WITH DEBRIS SCREEN	FNQM314401	1424	05/08/2011
		1.4	Weir module			1	WEIR SKIMMER MODULE 01C10-P2459 WITH DEBRIS SCREEN	FNQM314402	1425	05/08/2011
		1.5	Pump	Mariflex	MSP 150	1	OIL TRANSFER 03B02-P641	FNQM280001	1426	05/08/2011
		1.6	Pump	Mariflex	MSP 150	1	OIL TRANSFER 03B02-P641	FNQM280002	1427	05/08/2011
		1.7	Crane			1	SWEEPING ARM HANDLING CRANE	FNQM130001	1428	05/08/2011
		1.8	Crane			1	SWEEPING ARM HANDLING CRANE	FNQM130002	1429	05/08/2011
		1.9	Towing lines set				ROPES AND CHAINS FOR SA	FNQM374201	1430	05/08/2011
		1.10	Towing lines set				ROPES AND CHAINS FOR SA	FNQM374202	1431	05/08/2011
		1.11	Hydraulic hose(s)				6x20mm/7meter, 1x15mm/8meter, 6x20mm/1.5meter, 2x13mm/1meter, 2x13mm/0.5meter, 1x20mm/0.5meter, 2x40mm/12meter, 2x20mm/12meter, 1x15mm/12meter.	FNQM223801	1432	05/08/2011
		1.12	Hydraulic hose(s)				6x20mm/7meter, 1x15mm/8meter, 6x20mm/1.5meter, 2x13mm/1meter, 2x13mm/0.5meter, 1x20mm/0.5meter, 2x40mm/12meter, 2x20mm/12meter, 1x15mm/12meter.	FNQM223802	1433	05/08/2011
		1.13	Oil hose(s)				SEMI RIGID, CAMLOCK (04A01-P2378)	FNQM263801	1434	05/08/2011
		1.14	Oil hose(s)				SEMI RIGID, CAMLOCK (04A01-P2378)	FNQM263802	1435	05/08/2011
		1.15	Power pack		LPP 109 D	1	HYDRAULIC (03C15-P2073) WITH CLOSED FRAME (03C15-P2697)	FNQM270001	1436	05/08/2011
		1.16	Power pack		LPP 109 D	1	HYDRAULIC (03C15-P2073) WITH CLOSED FRAME (03C15-P2697)	FNQM270002	1437	05/08/2011
		1.17	Hydraulic hose(s)				SET POWER PACK TO PIPING(2x50mm/2meter, 2x35mm/2meter, 2x20mm/6meter, 1x20mm/6meter, 1x35mm/6meter, 2x20mm/2meter.	FNQM223803	1438	05/08/2011
		1.18	Cover			1	PLASTIC COVER FOR POWER PACK	FNQM120001	1439	05/08/2011
		1.19	Cover			1	PLASTIC COVER FOR POWER PACK	FNQM120002	1440	05/08/2011

		1.20	Brush module			1	BRUSH MODULE WITH 5 V-TYPE BRUSH CHAINS (90RAM-O1234)	FNQM310701	1441	05/08/2011
		1.22	Cover			1	CANVAS FOR STIFF SWEEP BRUSH MODULE (01C10-P2460)	FNQM120003	1444	05/08/2011
		1.23	Cover			1	CANVAS FOR STIFF SWEEP BRUSH MODULE (01C10-P2460)	FNQM120004	1445	05/08/2011
		1.24	Water injection kit				WATER INJECTION PUMP LAWI H 105, 2x(WATER INJECTION KIT 3/4" GTA 140/INLET (03B03-P2044))ONE FOR EACH SA, 2X(WATER HOSE SET PRESSURE FOR WATER INJECTION PUMP 20 METERS), 2X(WATER HOSE SET SUNCTION FOR WATER INJECTION PUMP 10 METERS), 2X(3 PCS OUTLET + 1 PCS INLET INJECTION FLANGE)	FNQM454501/ FNQM454701/ FNQM454702/ FNQM455001	1443	05/08/2011
		1.25	Storage reel			1	HOSE WINDER LHW 60/2-AL (05B01-P2523)	FNQM353401	1446	05/08/2011
		1.26	Storage reel			1	HOSE WINDER LHW 60/2-AL (05B01-P2523)	FNQM353402	1447	05/08/2011
		1.27	Pump	Lamor	GT A 140	1	OIL TRANSFER (03B03-P1256) (221)	FNQM280003	1448	05/08/2011
		1.28	Pump	Lamor	GT A 140	1	OIL TRANSFER (03B03-P1256) (222)	FNQM280004	1449	05/08/2011
		1.29	Control desk			1	CONTROL CABINET TO OPERATE ALL SYSTEMS, 6 VALVES (03A01-P1000)	FNQM110001	1450	05/08/2011
		1.30	Control desk			1	CONTROL CABINET TO OPERATE ALL SYSTEMS, 6 VALVES (03A01-P1000)	FNQM110002	1451	05/08/2011
		1.31	Storage container				CONTAINER 10' W SIDE AND END DOORS (13A01-P937)	FNQM343101	1487	05/08/2011
		1.32	Connector				STAINLESS STEEL TEMAS	FNQM223804/ FNQI223802/ FNQA223802	1452	05/08/2011
		1.33	Connector				STAINLESS STEEL HOSE ENDS	FNQM223805/ FNQI223803/ FNQA223803	1453	05/08/2011
		1.34	Ancillaries				2 CONTAINER CORNERS FOR RIGID SWEEP ARMS (02A07-P2323)	FNQM351201	1497	05/08/2011
		1.35	Spare parts				RIGID SWEEP BRUSH SPAREPART KIT / 1 YEAR (01C02-P690)	FNQM343102	1488	05/08/2011

		1.36	Pump spare parts	Lamor	GT A 140		SPARE PART KIT 1 (03B03-P1285)	FNQI343103	1489	05/08/2011
		1.37	Pump spare parts	Mariflex	MSP 150		SPARE PART KIT 1 (03B02-P858)	FNQM343104	1490	05/08/2011
		1.38	Power pack spare parts				SPARE PART KIT 1 FOR POWER-PACK (03C15-P2061)	FNQM343103	1491	05/08/2011
		1.39	Hydraulic hose(s)				Spare:2x20mm/9meters, 1x40mm/6meters, 1x20mm/2meters, 1x20mm/8meters, 2x20mm/6meters, 1x50mm/6meters, 1x50mm/20meters, 1x40mm/6meters, 1x40mm/12meters, 1x50mm/6meters, 3x20mm/2meters, 1x50mm/2meters.	FNQM343105	1494	05/08/2011
		1.40	Pump	Lamor	GT A 140		SPARE OIL TRANSFER PUMP (03B03-P1256) (219)	FNQI343102	1495	05/08/2011
2.	Boom system (EUR 199,166)	2.1	Segment	Lamor	LAN 2200	1	Heavy duty SPI Neoprene (02A04-P2823) 5x50m	FNQA073801	1468	05/08/2011
		2.2	Segment	Lamor	LAN 2200	1	Heavy duty SPI Neoprene (02A04-P2823) 5x50m	FNQA073802	1469	05/08/2011
		2.3	Storage reel			1	BOOM REEL (02A07-P1712)	FNQA353401	1470	05/08/2011
		2.4	Storage reel			1	BOOM REEL (02A07-P1712)	FNQA353402	1471	05/08/2011
		2.5	Cover			1	CANVAS FOR BOOM REELS (02A07-P1668)	FNQA120001	1472	05/08/2011
		2.6	Cover			1	CANVAS FOR BOOM REELS (02A07-P1668)	FNQA120002	1473	05/08/2011
		2.7	Ancillaries				GUIDING ROLL FOR AUTO-BOOM (02A08-P2251)	FNQA430001	1474	05/08/2011
		2.8	Towing cross bridle				CROSS BRIDLE (02A25-P2609) 2 TOWING BARS AND CONNEXION FOR OPEN-U FORMATION	FNQA371601	1475	05/08/2011
		2.9	Towing lines set				TOWING LINES (02A10-P1293), TOWING BAR AND ROPES (INCLUDING NET FOR J FORMATION)	FNQA374201	1476	05/08/2011
		2.10	Towing lines set				TOWING LINES (02A10-P1293), TOWING BAR AND ROPES	FNQA374202	1477	05/08/2011
		2.11	Air blower			1	LPP 14L WITH AIR BLOWER HAB 200 (03C02-P2706) (MOTOR AND COMPRESSOR) (AIRHOSE 10-15 METERS)	FNQA030001	1478	05/08/2011

		2.12	Cover			1	CANVAS FOR LAMOR AIR BLOWERS (02A09-P2702)	FNQA120003	1480	05/08/2011
		2.13	Air blower			1	ADDITIONAL AIR BLOWER (03C02-P2706) (COMPRESSOR)	FNQA030002	1479	05/08/2011
		2.14	Hydraulic hose(s)				4x15mm/0.5meter, 4x20mm/1.5meter, 6x20mm/12meter, 6x15mm/6meter, 3x20mm/6meter, 2x30mm/6meter	FNQA223801	1481	05/08/2011
		2.15	Ancillaries				4 CONTAINER CORNERS FOR BOOM REELS AND LPP'S (02A07-P2323)	FNQA351201	1496	05/08/2011
		2.16	Spare parts				BOOM REPAIR KIT FOR AUTOBOOM	FNQA343101	1493	05/08/2011
3.	Skimmer system (EUR 174,951)	3.1	Frame	Lamor	LWS 1300	1	WEIR SKIMMER MSP150 (01A07-P2257) WITH HYDRAULIC THRUSTER SET FOR LWS 1300 (01A07-P2630)	FNQI302201	1454	05/08/2011
		3.2	Cover			1	PLASTIC COVER FOR SKIMMER	FNQI120001	1455	05/08/2011
		3.3	Cover			1	PLASTIC COVER FOR REEL	FNQI120002	1456	05/08/2011
		3.4	Pump	Mariflex	MSP 150	1	OIL TRANSFER (03B02-P641) (24078154 7 202)	FNQI280001	1457	05/08/2011
		3.5	Pump	Lamor	GT A 140	1	OIL TRANSFER(03B03-P1256) (227)	FNQI280002	1458	05/08/2011
		3.6	Power pack			1	HYDRAULIC LPP (DIESEL) CLOSED FRAME	FNQI270001	1459	05/08/2011
		3.7	Cover			1	PLASTIC COVER FOR POWER PACK	FNQI120003	1460	05/08/2011
		3.8	Ancillaries				SEA CATCH/RELEASE SET FOR LFF OFFSHORE SKIMMERS (01A03-P2754)	FNQI440001	1461	05/08/2011
		3.9	Storage flatrack				CONTAINER/LOW 20' (13A04-P1941)	FNQI352001	1462	05/08/2011
		3.10	Storage reel			1	REEL FOR HOSE STORAGE	FNQI353401	1463	05/08/2011
		3.11	Hydraulic hose(s)				4x15mm/2meters, 2x20mm/2meters, 2x30mm/0.5 meters, 1x15mm/0.5meters, 2x50mm/3meters, 6x20mm/3meters, 1x15mm/3meters, 2x15mm/2meters, 2x20mm/6meters, 1x45mm/12meters, 1x35mm/12meters, 2x20mm/12meters, 1x50mm/20meters, 1x45mm/20meters, 6x20mm/20meters, 1x15mm/20meters	FNQI223801	1464	05/08/2011
		3.12	Oil hose(s)				HOSE SET 60 ON REEL FOR LFF 400 W/LFF 100 2C (01A03-P2178)	FNQI263801	1465	05/08/2011
		3.13	Control desk			1	CONTROL PANEL/HYDRAULIC BOX SKIMMER	FNQI110001	1466	05/08/2011

		3.14	Brush module			1	QUATTRO FOR LWS 1300 (01A08-P1833)	FNQI310701	1467	05/08/2011
		3.15	Spare parts				SPARE PART KIT 1 FOR SKIMMER (01A03-P2157)	FNQI343101	1492	05/08/2011
4.	HC Skimmer system (EUR 1,040,167)	4.1	Brush module	Norene	Normar 250 Ti	1	BRUSH-/DISC SKIMMER, FRAME, THRUSTERS AND CUTTING DEVICE FOR DEBRIS	FNQI310702	1503	20/08/2013
		4.2	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	FNQI314402	1504	20/08/2013
		4.3	Pump	Mariflex	MSP 150	1	SCREW/CENTRIFUGAL	FNQI280003	1505	20/08/2013
		4.4	Pump	Desmi	DOP 250 Dual	1	PDAS	FNQI280004	1506	20/08/2013
		4.5	Pump	Desmi	DOP 250 Dual	1	PDAS	FNQI280005	1507	20/08/2013
		4.6	Power pack			1	NORMAR DIESEL EX 3G, 107KW AT 2100RPM AND 120KW AT 2400RPM	FNQI270002	1508	20/08/2013
		4.7	Crane		Normar 250 Ti	1	HYDRAULIC STORAGE REEL INTEGRATED UMBILICAL, DN150 FLOATING HOSE, LENGTH 80M, DIAMETER 6" INTEGRATED TELESCOPIC CRANE, SAFETY FACTOR 2 & INTEGRATED FLOW METER	FNQI130001	1509	20/08/2013
		4.8	Storage flatrack			1	20' ISO CORNERS FOR STORAGE AND TRANSPORTATION OF THE NORMAR SKIMMER	FNQI352002	1510	20/08/2013
		4.9	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR WEIR SKIMMER HEAD	FNQI120004	1511	20/08/2013
		4.10	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR BRUSH SKIMMER HEADS	FNQI120005	1512	20/08/2013
		4.11	Ancillaries				LIFTING ARRANGEMENT AND PROTECTIVE CANVAS FOR HOSE REEL	FNQI120006	1513	20/08/2013
		4.12	Remote control			1	CAVOTEC REMOTE MICRO-CONTROL MC-3 SERIES, OPERATING RANGE 100-1000M,EX PROOF	FNQI290002	1514	20/08/2013

		4.13	Hydraulic hose(s)			3	SET (1 High pressure 1-1/2", 1 return 1-1/2", 1 leak 1/2")	FNQII223802	1515	20/08/2013
		4.14	Hydraulic hose(s)			3	SET (1 High pressure 1-1/2", 1 return 1-1/2", 1 leak 1/2")	FNQII223803	1516	20/08/2013
		4.15	Hydraulic hose(s)			3	SET (1 High pressure 1-1/2", 1 return 1-1/2", 1 leak 1/2")	FNQII223804	1517	20/08/2013
		4.16	Oil hose(s)				OIL HOSE 5", 2*6"10M	FNQII263803	1518	20/08/2013
		4.17	Spare parts				SPARE PARTS	FNQII343103	1519	20/08/2013
5.	Dispersant application system (EUR 163,680)	5.1	Pump	Grundfos	Centrifugal	1	Includes: 2 pipe adaptors, 2 non-return valves, 1 press. gauge, 1 orifice (T-40.0188 to avoid pump overheating when running with nozzles closed) and 2 couplings	n/a	1995	31/03/2015
		5.2	Pump	Grundfos	Centrifugal	1	Includes: 2 pipe adaptors, 2 non-return valves, 1 press. gauge, 1 orifice (T-40.0188 to avoid pump overheating when running with nozzles closed) and 2 couplings	n/a	1996	31/03/2015
		5.3	Frequency convertor			1		n/a	1997	31/03/2015
		5.4	Frequency convertor			1		n/a	1998	31/03/2015
		5.5	Pressure transmitter			1		n/a	1999	31/03/2015
		5.6	Actuator			1	For 1 1/4" ballvalve; S-20.0226	n/a	2000	31/03/2015
		5.7	Actuator			1	For 1 1/4" ballvalve; S-20.0226	n/a	2001	31/03/2015
		5.8	Actuator			1	For 1 1/4" ballvalve; S-20.0226	n/a	2002	31/03/2015
		5.9	Actuator			1	For 1 1/4" ballvalve; S-20.0226	n/a	2003	31/03/2015
		5.10	Eductor			1	Non self-priming pumps	n/a	2017	31/03/2015
		5.11	Eductor			1	Non self-priming pumps	n/a	2018	31/03/2015
		5.12	Vacuum meter			1		n/a	2004	31/03/2015
		5.13	Hydraulic power unit			1	Includes: control unit & 8 hydr. hoses (2 sections=8+8)	n/a	2005	31/03/2015
		5.14	Electro control cabinet	Jason		1		n/a	2006	31/03/2015
		5.15	Electro control cabinet	Jason		1		n/a	2007	31/03/2015
		5.16	Remote control	Jason		1	Wireless remote control box	n/a	2008	31/03/2015
		5.17	Winch			1	Hydraulic motor driven winch with 20m of nylon rope	n/a	2009	31/03/2015

5.18	Winch			1	Hydraulic motor driven winch with 20m of nylon rope	n/a	2010	31/03/2015
5.19	Winch			1	Hydraulic motor driven winch with 20m of nylon rope	n/a	2011	31/03/2015
5.20	Winch			1	Hydraulic motor driven winch with 20m of nylon rope	n/a	2012	31/03/2015
5.21	Support boom	Jason		1		n/a	2013	31/03/2015
5.22	Support boom	Jason		1		n/a	2014	31/03/2015
5.23	Spray boom	Jason		1	12 nozzles (twin system: 2 lines x 6 nozzles)	n/a	2015	31/03/2015
5.24	Spray boom	Jason		1	12 nozzles (twin system: 2 lines x 6 nozzles)	n/a	2016	31/03/2015
5.25	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2020	31/03/2015
5.26	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2021	31/03/2015
5.27	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2022	31/03/2015
5.28	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2023	31/03/2015
5.29	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2024	31/03/2015
5.30	Dispersant hose			1	Includes: quick release coupling-male and quick release hat	n/a	2025	31/03/2015
5.31	Flow meter			1		n/a	2019	31/03/2015
5.32	Tank container		T11 316L	1	10' tank container - 10.000 litres / EMSA logo	n/a	2027	31/03/2015
5.33	Tank container		T11 316L	1	10' tank container - 10.000 litres / EMSA logo	n/a	2028	31/03/2015
5.34	Tank container		T11 316L	1	10' tank container - 10.000 litres / EMSA logo	n/a	2029	31/03/2015
5.35	Cover			1	Cover for 10' tank container	n/a	2037	31/03/2015
5.36	Cover			1	Cover for 10' tank container	n/a	2038	31/03/2015
5.37	Cover			1	Cover for 10' tank container	n/a	2039	31/03/2015
5.38	Tank container		T11 316L	1	20' tank container - 23.000 litres / EMSA logo	n/a	2030	31/03/2015
5.39	Cover			1	Cover for 20' tank container	n/a	2040	31/03/2015
5.40	Pump			1	Pumping system to load tank container	n/a	2031	31/03/2015
5.41	Pump			1	Pumping system to load tank container	n/a	2032	31/03/2015

		5.42	Manifold			1	Manifold to connect several IBCs (with 4 lines)	n/a	2033	31/03/2015
		5.43	Manifold			1	Manifold to connect several IBCs (with 4 lines)	n/a	2034	31/03/2015
		5.44	Spill kit			1		n/a	2035	31/03/2015
		5.45	Spill kit			1		n/a	2036	31/03/2015
		5.46	Spare parts	Jason		1	1 box (~ 30 x 50 cm)	n/a	2026	31/03/2015
6.	Slick detection (EUR 130,500)	6.1	Computer	Miros			IACS E10 MARINE COMPUTER FOR WAVEX/OSD + NMA INTERFACES TO GYRO, GPS & WIND SENSOR + MIROS RADAR INTERFACE EM-129	FNQJ201001	1483	05/08/2011
		6.2	Monitor				IACS E10 MARINE COMPUTER FOR WAVEX/OSD KEYBOARD + TRACKER BALL + FLAT SCREEN	FNQJ202701	1484	05/08/2011
		6.3	Software				SOFTWARE USER LICENSE + OIL SPILL DISPLAY ON CHARTS + 2MANUALS USB MEMORY STICK	FNQJ330001	1485	05/08/2011
		6.4	Radar				X-BAND RADAR WITH DEDICATED DISPLAY UNIT AND UPGRADED WITH 42 RPM SCANNER MOTOR	FNQJ203301	1486	05/08/2011
7.	Sampling / testing (EUR 24,200)	7.1	ODME (PPM Reader)				HYDROSENSE 3420 PPM OIL IN WATER ALARM	FNQD240001	1482	05/08/2011
		7.2	Mini lab				SAMPLING MINI-LAB FOR OIL VISCOSITY AND DENSITY (90RAM-O1237)	FNQH230001	1498	05/08/2011
		7.3	Flash point tester				SETAFLASH SERIES 3 CLOSED CUP FLASHPOINT TESTER (17A02-P2756)	FNQH170001	1499	05/08/2011
8.	Portable dispersant spraying systems (EUR 60,000)	8.1	Single nozzle spraying system			2	BOATSPRAY 200D2F-TS	TBC	TBC	new
		8.2	Spraying arms with multiple nozzles (ATEX certified)			1	YMC 105	TBC	TBC	new

DESCRIPTION OF EQUIPMENT

5.1 Sweeping Arm System LSS 15

Manufacturer:

Lamor Corporation

Rihkamatori 2

06100 Porvoo, Finland

tel: +358 20 765 0100

fax: +358 20 765 0129

info@lamor.com

Year of purchase: 2011

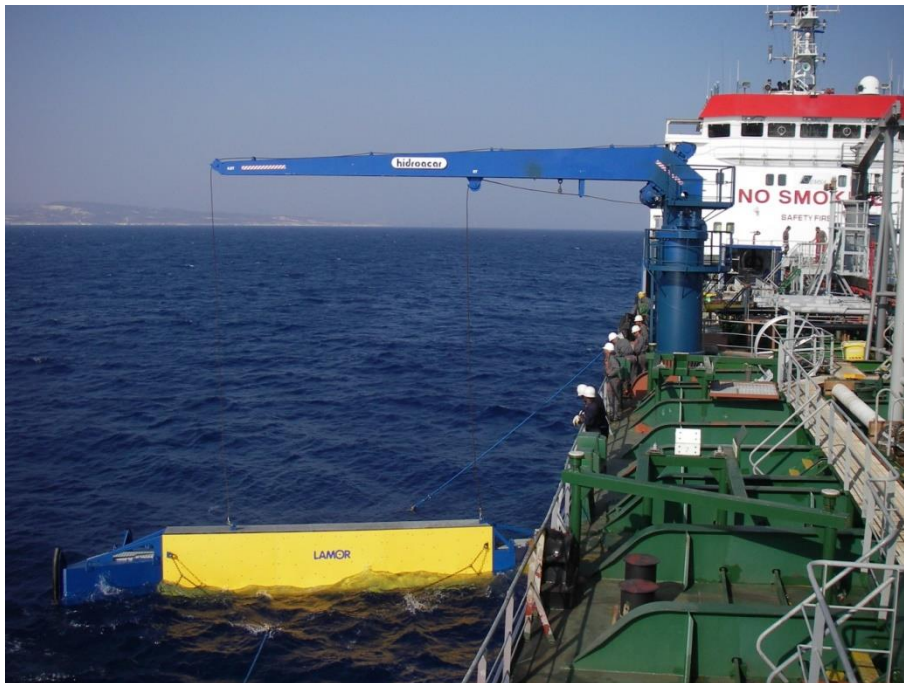


Figure 1. LAMOR Stiff Sweep Arm system LSS 15m

The LAMOR Stiff Sweep Arm system LSS 15 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
- Weir Skimmer Module
- Pump Marflex Centrifugal MSP150-63
- Sweeping Arm Davit Crane
- Towing lines set
- Hydraulic hoses set
- Oil hoses set
- Power Pack LPP 109 D

- Brush skimmer module
- Water injection kit
- Hose winder LHW
- Pump GT A 140
- Control desk
- 10' storage container
- Ancillaries, spare parts

5.1.1 – 5.1.2 Rigid LAMOR Stiff Sweeping Arms LSS 15m

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 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 2. LAMOR Stiff Sweeping Arm LSS 15m – weir skimmer module

Technical Specifications:

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

5.1.5 – 5.1.6 Oil transfer pump MSP 150

Manufacturer:

Mariflex Group
 Maassluisdijk 101,
 3133 KA Vlaardingén.
 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: 2011

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.



Figure 3. Mariflex Centrifugal Pump MSP 150

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 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")

5.1.7 – 5.1.8 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: 2011



Figure 4. Davit Crane System Hidroacar

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

5.1.9 – 5.1.10 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.

5.1.11 – 5.1.12 Hydraulic Hoses Sets for sweeping arms

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)

5.1.13 - 5.1.14 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 5. LSS 15 m, oil hose connected to weir skimmer module

5.1.15 – 5.1.19 Hydraulic Power Pack LPP 109 D with hydraulic hoses set and canvas

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

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

The Lamor LPP 109 D is equipped with electric start and incorporates an easily accessible control panel and hydraulic oil cooler into the framework. The Lamor LPP 109 D utilizes a Sauer-Danfoss

Proportional Hydraulic Valve System (PVG 32/100) making it possible to easily adjust the flow of oil to the supplied components.

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

Technical Specifications:

Length:	2300 mm
Width:	1300 mm
Height:	1900 mm
Weight:	2500 kg
Hydraulic circuits:	2x3 pcs
Hydraulic flow:	330 l/min
Hydraulic pressure:	210/280 bar
Power:	109 kW
Oil tank capacity:	400 l
Fuel tank capacity:	200 l



Figure 6. LPP 109 D Power-pack

Hydraulic hoses set for the power pack: 2x50mm/2meter, 2x35mm/2meter, 2x20mm/6meter, 1x20mm/6meter, 1x35mm/6meter, 2x20mm/2meter.

5.1.20 – 5.1.22 Brush Skimmer Unit, Conveyor Belt 5C with canvas

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



Figure 7. LAMOR Stiff Sweeping Arm LSS 15m – brush skimmer module

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
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.

5.1.24 Water injection kit - kit 3/4" I/O GTA 140

The GT A PDAS pumps are as standard equipped with a FlemingCo 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.

5.1.25 – 5.1.26 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 wound and locked separately. The frame is equipped with 4-point lifting points and forklift channels.



Figure 8. 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

5.1.27 – 5.1.28 Oil transfer pump LAMOR GT A 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.



Figure 9. Oil Transfer PDAS Pump Lamor GTA 140

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
Standard hydraulic couplings:	Pressure 3/4" TEMA, female Return 1" TEMA, male Drain 3/8" TEMA, male Hydraulic motor OMTS 160

5.1.29 – 5.1.30 Control desk – Remote Control Panel, 6 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. The controls are 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

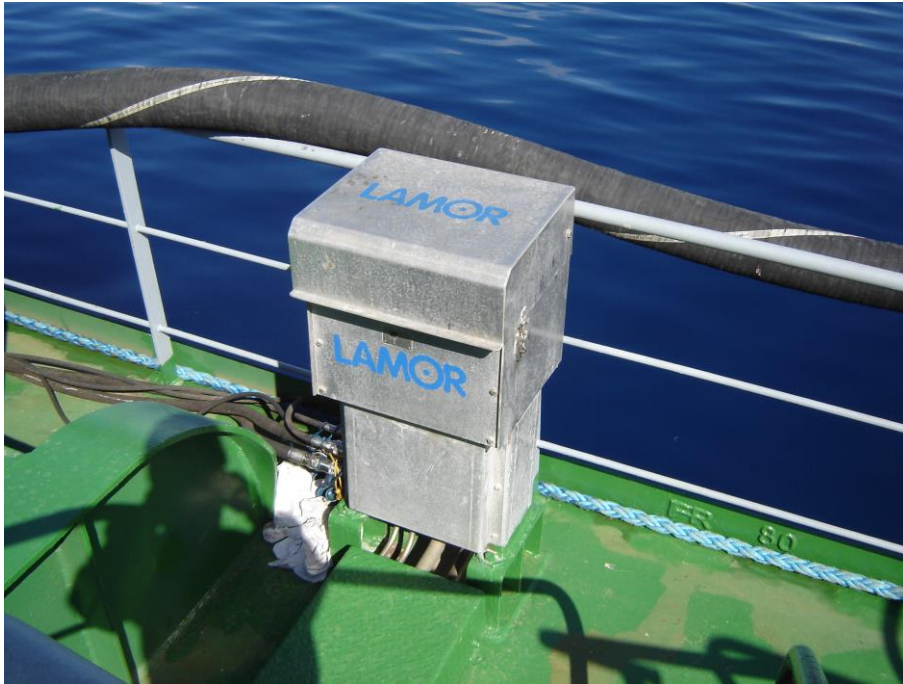


Figure 10. Control desk – Remote Control Panel, 6 valves

5.1.31 Storage container - 10 ft container



Figure 11. Lamor 10 ft. Container

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. 4 natural ventilation points with filters for sand and dust or mosquito nets are fitted to ensure adequate air flow throughout the container.

5.1.32 - 5.1.40 Ancillaries, spare parts

Spare parts include:

- Hose connectors (stainless steel TEMA)
- container corners for rigid sweeping arms
- Spare part kit for the Brush Skimmer
- Spare part kit for GT A 140
- Spare part kit for MSP 150
- Spare parts kit for power pack LPP 109 D
- Spare hydraulic hoses :
- 2x20mm/9meters, 1x40mm/6meters, 1x20mm/2meters, 1x20mm/8meters, 2x20mm/6meters, 1x50mm/6meters, 1x50mm/20meters, 1x40mm/6meters, 1x40mm/12meters, 1x50mm/6meters, 3x20mm/2meters, 1x50mm/2meters.
- Spare oil transfer pump GT A 140

5.2 Lamor Neoprene Auto Boom 2200

Manufacturer:

Lamor Corporation
Rihkamatori 2
06100 Porvoo, Finland
tel: +358 20 765 0100
fax: +358 20 765 0129
info@lamor.com

Year of purchase: 2011

The Lamor Neoprene Auto Boom 2200 has been developed to provide a safe, quick and efficient means of oil containment. As the boom is deployed from the storage reel it is automatically inflated from a single air source attached to the end of the boom. Upon inflation the patented internal design automatically separates the floatation chambers. Each Individual Buoyancy Chamber is isolated. In the event that one air chamber may become damaged or deflated adjacent chambers will not be affected and will remain inflated. A layer of closed cell foam provides additional floatation for positive reserve buoyancy on each chamber.



Figure 12. Lamor Auto Boom LAN 2200

5.2.1 – 5.2.2 Lamor Neoprene Auto Boom LAN 2200 section

Technical specifications:

Section length:	50 m
Freeboard inflated:	715 mm
Draft:	1070 mm
Total height deflated:	2200 mm
Weight (total operational):	13 kg/m
Ballast weight:	4 kg/m
Total strength:	325 kN
Fabric weight:	1550 g/m ²
Coating Alloy :	Neoprene
Base fabric:	Nitrile/PTMEG
Air chamber length:	4.7 m
Buoyancy/Weight Ratio:	22:1

5.2.3 – 5.2.7 Boom reel HSR H 1826 with canvas and guiding roll

The Lamor hydraulic operated storage reel heavy model HSR H1826 is designed to store heavy duty oil booms. The reel frame is manufactured in steel and the spool in marine grade aluminium. The winder frame comprises fork lift channels and 4-point lifting points as standard for easy handling both on and offshore. Marine twist locks and container corner guides are fitted. The Lamor HSR-H is driven by 2 hydraulic motors, requiring a power-pack and allowing for easy deployment and recovery using minimal manpower.



Figure 13. Boom reel HSR H 1826

Technical specifications:

Length:	3254 mm
Width:	1800 mm
Height:	2122.5 mm
Weight:	700 kg
Drum diameter:	1800 mm
Frame:	Steel
Drum:	Aluminium
Drive motor:	Danfoss OMSU 160 x 2
Surface treatment:	Sandblasted and marine painted
Connections:	Air connectors Kamlock 300C

5.2.8 – 5.2.10 towing lines set

Towing lines set includes:

- Towing lines
- Towing bridles
- Cross bridle
- Open U connection set

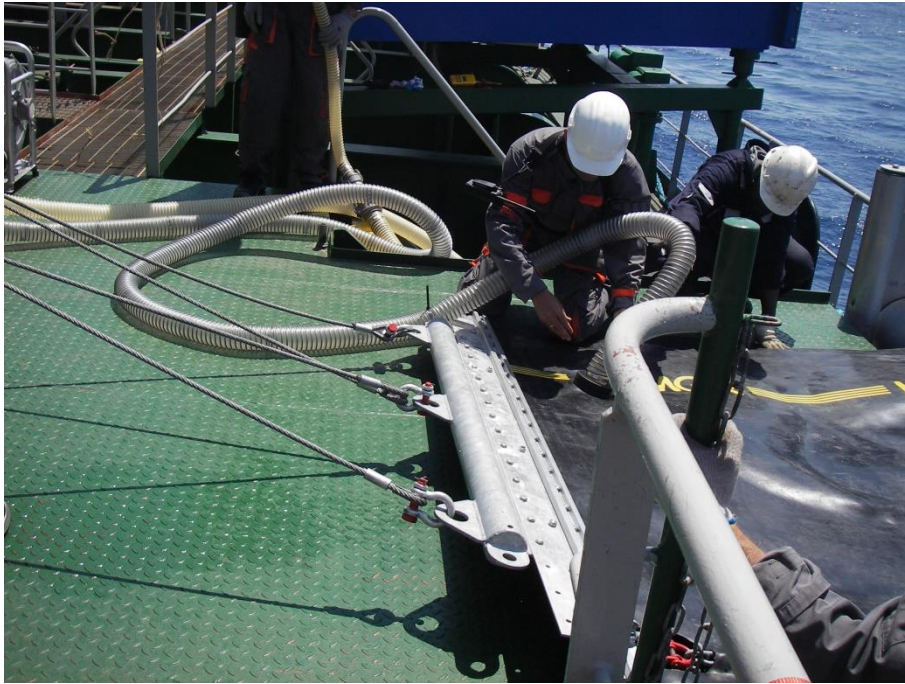


Figure 14. Towing bridle



Figure 15. Cross bridle

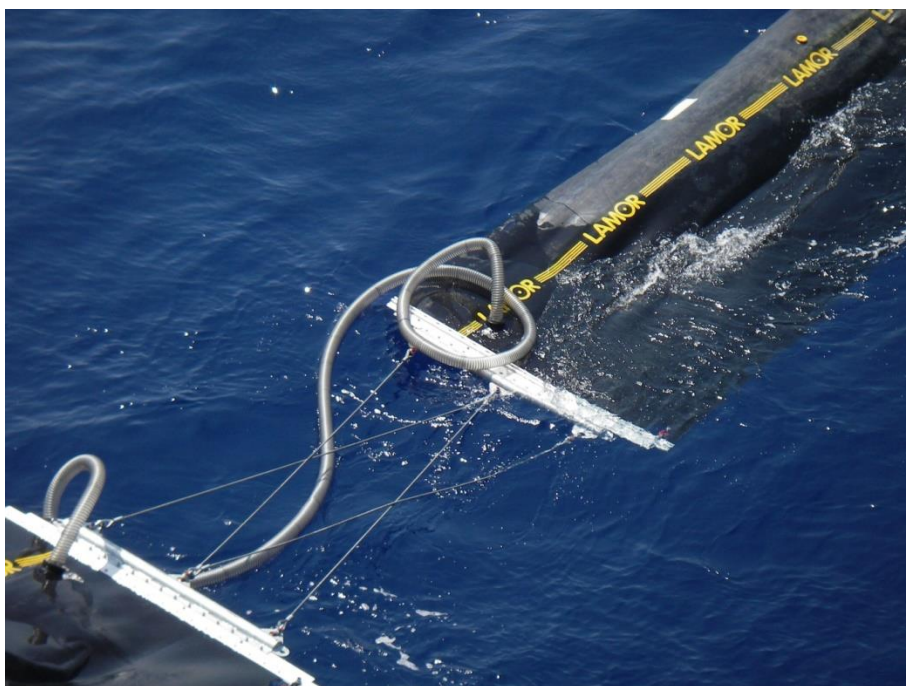


Figure 16. Open U connection

5.2.11 – 5.2.12 Power pack LPP 14 L with air blower and canvas

The Lamor Power Pack LPP 14L SNP2 D11 with integrated Hydraulic Air Blower HAB 200 is identical unit for deploying heavy duty oil booms from reels.

The Hydraulic Airblower HAB 200 is used for inflating the Lamor Inflatable Booms. The unit is supplied with hydraulic quick release TEMA couplings. The internals of the Lamor HAB 200 are protected by a suction filter.

The LPP 14L is equipped with a durable twin cylinder, air cooled diesel engine providing power of 14 kW. Electric start is fitted as standard, a hand start option is available. Also the LPP 14 L can be equipped with

optional spark arrestor and/or Chalwyn safety shut down valve. The Lamor HAB 200 has a set discharge pressure so the oil boom cannot be damaged during the inflation operation. The hydraulic power is provided by a Sauer Danfoss SNP2/11D 10.8 cm³(0.66 in³). Gear pump and is distributed via belt to air blower and through

Danfoss PVG 32 valve to other equipment.

The diesel engine, hydraulic pump and air blower are installed on a tough steel frame fitted with collapsible handle and wheels.

The main components of the Power Pack are:

- Air cooled diesel engine,
- Air Blower,
- Hydraulic pump,
- Hydraulic power outlet connectors,
- Hydraulic oil tank and fuel tank,
- Operation valve PVG 32,
- Battery and Frame.
- Hydraulic return filter UFI FRA31
- Standard hydraulic coupling for LPP outlet: 3/8" Tema 3811/3821 10 l/min

- Air blower hydraulic couplings: 1/2" TEMA 5011/21, Aeroquip 3/8" DRAIN ISO75242

Air Blower Components and accessories include:

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



Figure 17. Power pack LPP 14 L with air blower

5.2.13 Hydraulic air blower HAB 200

Technical specifications:

Width:	410 mm
Height:	600 mm
Weight:	40 kg
Casing:	Cast aluminium
Impeller:	Sheet steel
Capacity:	400 m ³ /h
Air Blower:	Ventur
Engine:	Volvo Parker F11-10



Figure 18. Hydraulic air blower HAB 200

5.2.14 Hydraulic hoses

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

Hose Construction:

Tube:	oil resistant synthetic rubber
Reinforcement:	two high tensile steel wire braids
Cover:	abrasion and weather resistant synthetic rubber
Temperature range:	-40 C to +100 C (+120 C max)
Length:	15000 mm



Figure 19. Hydraulic couplings

5.2.15 – 5.2.16 Ancillaries and spare parts

Content:

Boom repair kit for Autoboom

4 container corners for boom reels and power packs

5.3 Lamor LWS 1300 Weir Skimmer Mk II/MSP 150

Manufacturer:

Lamor Corporation

Rihkamatori 2

06100 Porvoo, Finland

tel: +358 20 765 0100

fax: +358 20 765 0129

Email: info@lamor.fi

Year of purchase:

2011

5.3.1 – 5.3.3 Weir Skimmer LWS 1300 Mk II / MSP150 with thrusters and canvas

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 manoeuvre 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.

To improve the recovery capability of heavy oils the skimmer can be fitted with a removable brush adapter.

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



Figure 20. Weir Skimmer LWS 1300 Mk II

5.3.4 Oil transfer pump MSP 150

See point 5.1.5 – 5.1.6

5.3.5 Oil Transfer PDAS Pump Lamor GTA 140

See point 5.1.27 – 5.1.28

5.3.6 – 5.3.7 Power Pack LPP 77 with canvas



Figure 21. LAMOR Power Pack

Technical specifications:

Diesel engine:	DEUTZ F6L912
Max. RPM:	2300
Power:	77 kW
Hydraulic pump:	Rexroth A10VO 100
Displacement:	100cm ³
Max. Pressure:	200 bars
Length:	1800 mm
Width:	1200 mm
Height:	1600 mm
Weight with hydraulic oil:	1800 kg

5.3.8 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 22. Sea Catch/Release Set for LFF Offshore Skimmers

5.2.9 Flatrack for skimmer system

20 ft. flatrack ..

5.3.10 Hose Reel LHR 60 9ch

The reel frame comprises of fork lift channels and 4-point lifting points as standard for easy handling both on and offshore. 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. 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.

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:	2 kW



Figure 23. Storage reel LHR 60

5.3.11 – 5.3.12 Hydraulic and oil hoses 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. 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 30m each, totally 60m with 5 " Camlock
- 1 x hydraulic hoses 1 1/4" length 60m (return) with TEMA 15011
- 1 x hydraulic hoses 1" length 60m (pressure) with TEMA 10021
- 1 x hydraulic hose 3/8" length 60m (drain) with Aeroquip 3/8"
- 1 x hydraulic hose 1/2" length 60m (LS) with TEMA 3821
- 1 x electric cable (inside 1/2" protective hose) for radio remote control, length 60m
- 1 x Water injection hose

5.3.13 Control Panel, 4 valves

The Danfoss proportional PVG-32 valves operate the oil boom winder and the air blower. 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



Figure 24. Skimmer Control Panel, 4 valves

5.3.14 Brush adapter LBA 1300 Mk II with canvas

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. 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 m³/h
Capacity, certified ASTM	3x74 m³/h
Free water collected	<5 %
Hydraulic flow (skimmer ONLY)	20 l/min
Hydraulic pressure	1700-200 bar
Power requirements:	6,5 kw

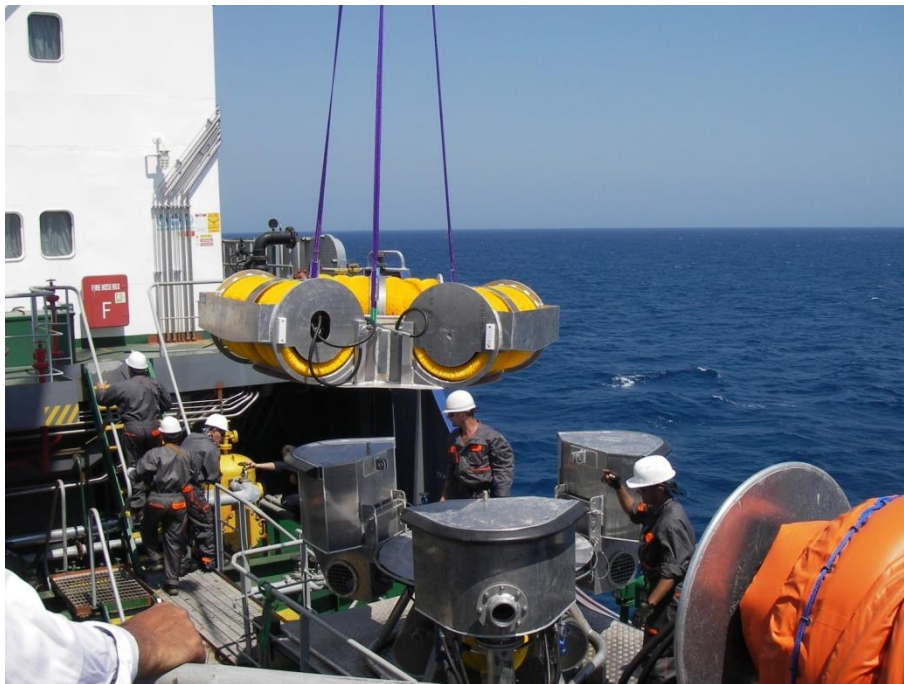


Figure 25. Brush adapter LBA 1300 Mk II

5.3.15 Spare parts

Spare part kit for skimmer

5.4 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

Supplied by:

AllMaritim AS
Postboks 51
5812 Bergen
NORWAY
www.allmaritim.com
Tel: +47 55 33 61 60
Fax: +47 55 33 61 61

Year of purchase: 2013



Figure 26. 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 aluminium 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

5.4.1 Brush/Disc Skimmer module



Figure 27. NorMar 250 TI High Capacity Skimmer Set. Brush/disc skimmer head.

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

5.4.2 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.

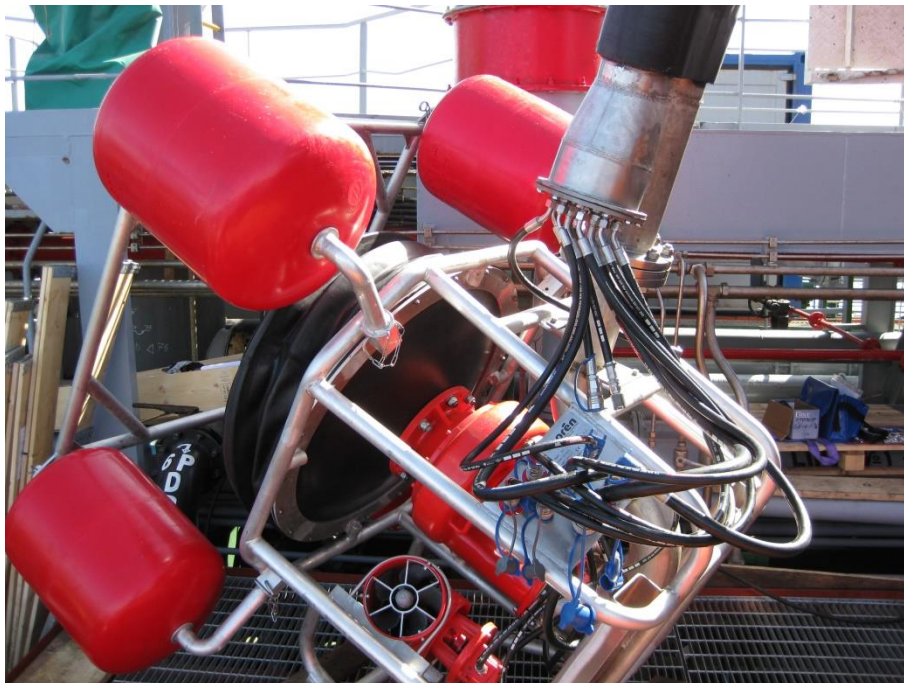


Figure 28. NorMar 250 TI High Capacity Skimmer Set. Weir skimmer head.

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.

5.4.3 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



Figure. 28 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

5.4.4 - 5.4.5 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

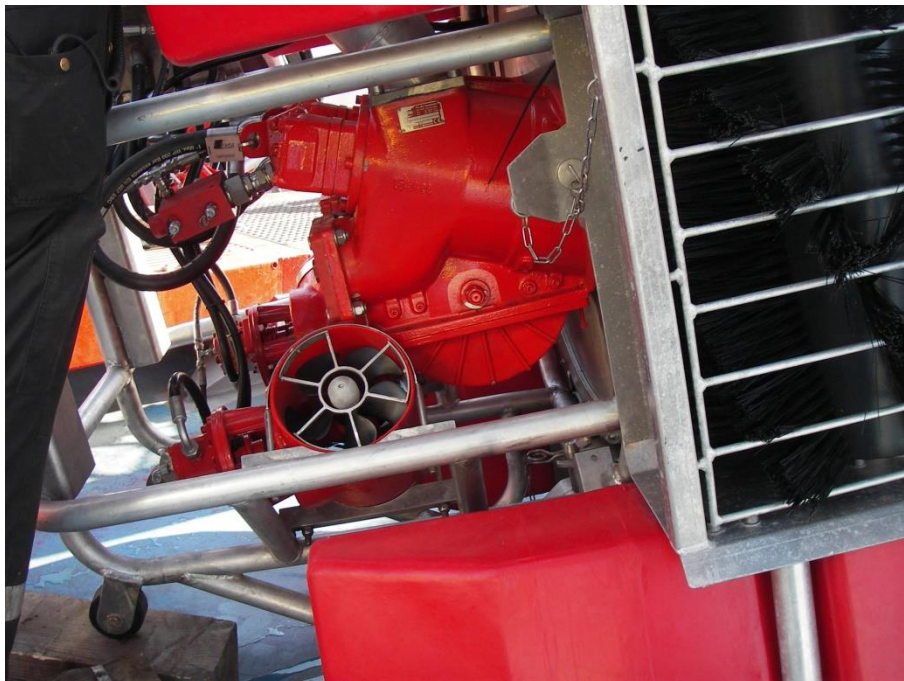


Figure 29. Desmi DOP-250 dual PDAS pump

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

5.4.6 Diesel Hydraulic Power Pack NorMar DHPP



Figure 30. 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.

5.4.7 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.



Figure 31. 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.

5.4.8 Storage Flat rack 20'

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



Figure 32. Storage Flat rack 20' with the skimmer system

5.4.9 – 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.

5.4.12 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



Figure 33. 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. The remote control unit MC-3-series system mainly consists of the following parts:

- Terminal
- Carrying belt/strap
- Rechargeable batteries
- Base unit
- Antenna

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

5.4.13 – 5.4.15 Hydraulic hoses set

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



Figure 34. Hydraulic hoses set connected to NorMar DHHP

5.4.16 Oil hoses set

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



Figure 35. Semi rigid 6" oil hose

5.4.17 Spare parts

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

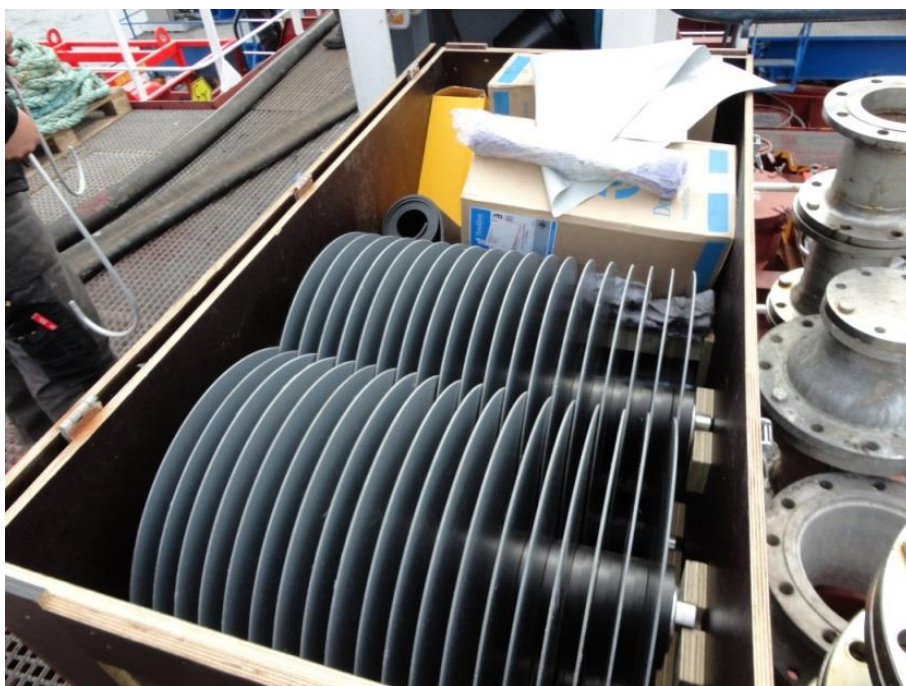


Figure 36. Spare parts box for NorMar 250 TI High Capacity Skimmer

5.5 Dispersant application system

Manufacturer:

Jason engineering AS
 Gronland 76-82 – Drammen, Norway
 Tel: +47 32 20 45 50
 Fax: +47 32 20 45 60
 Mail: jason@jason.no

Year of purchase: 2015

DSP – TW – 2P – H Twin boom spray system is designed for spraying dispersant to oil spill on the sea surface.

5.5.1 – 5.1.12 Pumping system

Technical specification:

Pump:	multistage non-self priming centrifugal Grundfos
Speed for pump data:	3514 rpm
Actual calculated flow:	12 m ³ /h
Resulting head of the pump:	57.6 m
Impellers:	05
Power (P2) required by pump:	3 kW
Mains frequency:	60 Hz
Rated voltage:	3 x 380-480 V
Rated current:	6,20-5,00 A
Gross weight:	65 kg



Figure 37. Centrifugal pump Grundfos

5.5.13 Hydraulic Power Unit

Hydraulic Power Unit consists of:

- Electric motor 1.5 kW
- Oil tank 14 l
- Pump
- Selenoid directional valves



Figure 38. Hydraulic Power Unit

5.5.14 – 5.5.15 Electric Control Cabinet



Figure 39. Electric Control Cabinet

5.5.16 Remote Control

The control cabinet can be operated in remote by radio Control box.



Figure 40. Remote Control

5.5.17 – 5.5.20 Winch

The hydraulic winch allows regulation of the distance from the water to the spraying boom by means of two ropes, jaggig wheels and hydraulic motor. Weight of the winch assembly is approx. 50 kg.



Figure 41. Hydraulic Winch

5.5.21 – 5.5.24 Support and Spray nozzle manifold

Two support booms of 7.2 m with nozzle manifolds of 10.2 m each one, are located port and starboard. Soft rubber hoses with quick couplings act as dispersant supply lines from the support boom down to the manifold. The support arm is fitted with “hook on” hinges for easy and quick mounting. The weight of the supporting arm is approx. 60 kg.



Figure 42. Support Boom

The dispersant spray nozzles are flat jet type with spray angle of approx. 45 degrees. Several nozzles are covering the whole length of the spray boom ensuring an even spray pattern. The spray nozzle manifold can be lowered or uploaded and therefore the distance from the water should be easily regulated.

Nozzle flow rate is approx. 10 and 2.5 litres/min at 2 bars inlet pressure and can be adjusted increasing or decreasing the frequency in the control cabinet and flow control.

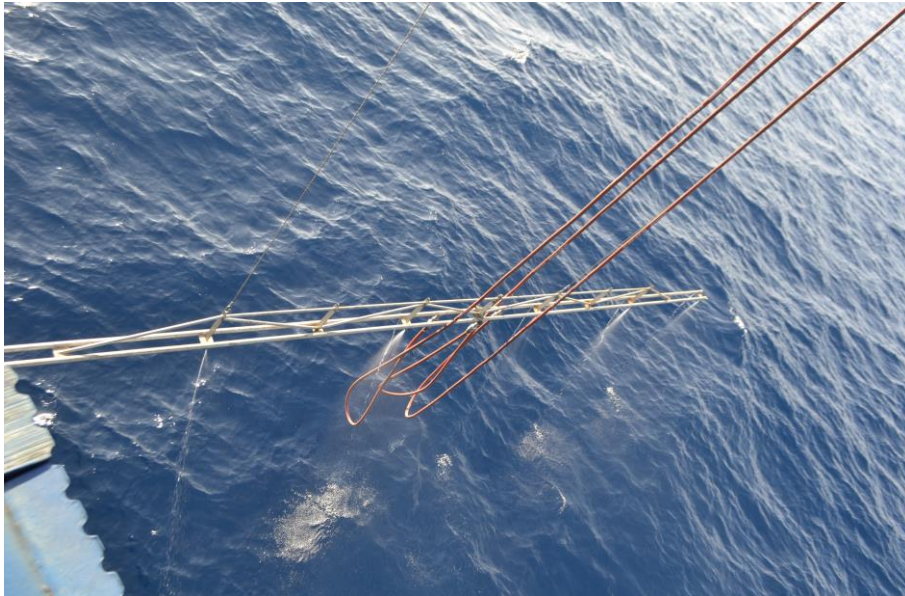


Figure 42. Spray nozzle manifold

5.5.25 – 5.5.30 Dispersant hoses



Figure 43. Dispersant loading hoses

5.5.31 Flow meter

Technical specification:

Meter type	Pulse
Flow Rate Ranges (Liters Per Minute):	Above 5 cPs 10 to 250 Below 5 cPs 15 to 235
Accuracy- Within (Of Reading)	+/-0,5%
Repeatability:	0,03%
Maximum Viscosity (Of Standard Model):	1000 Centipoise (> 1000 Hi Vis Rotors)
Maximum Operating Pressure:	5500 kpa
Pulses Per Litre:	14,5
Max. Operating Temperature:	80°C
Recommended Mesh Strainer Size:	60 Mesh

5.5.32 – 5.5.37 Dispersant tank container 10 m³ with canvas



Figure 44. Dispersant tank container 10 m³

Technical specifications:

Capacity:	10100 l
Overall dimensions (L x W x H):	2991 mm x 2438 x 2591
Tare weight:	2800 kg
Max. payload:	21200kg

5.5.38 – 5.5.39 Dispersant tank container 24 m³ with canvas

Technical specifications:

Capacity:	24000 l
Overall dimensions (L x W x H):	6058 mm x 2438 x 2438
Tare weight:	4316 kg
Max. payload:	26165 kg



Figure 45. Dispersant tank container 24 m³

5.5.40 – 5.5.43 Dispersant loading pump and manifold



Figure 46. Dispersant loading pumps and manifolds

5.5.44 – 5.5.45 Spill kit

5.5.46 Spare parts kit

5.6 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: 2011

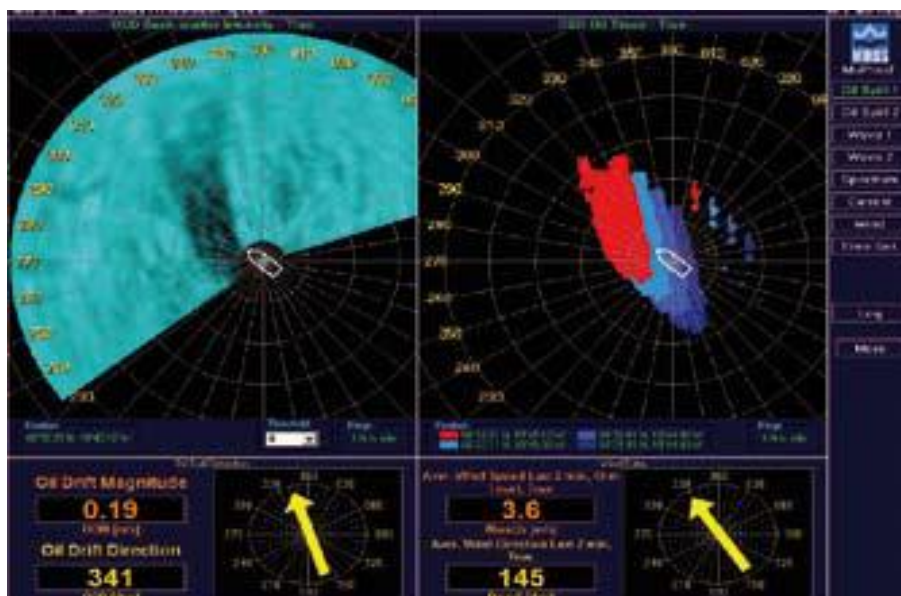


Figure 47. Miros OSD

5.6.1 Computer MIROS WAVEX/OSD with NMA interfaces to Gyro, GPS and wind sensors and Miros Radar Interface EM-129

The Wavex system measures surface wave parameters in the basis of digitized sea clutter images provided by standard marine X-band (3 cm) radar.

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

Computer specifications:

Physical:

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

Weight:	5kg
Material:	Aluminium
Colour:	Black
<i>Electrical:</i>	
Power requirements:	115/230VAC, 100 W
<i>Environmental:</i>	
EMC:	IEC-60945
Temperature:	-15°C to +55°C (operating)
Humidity:	95%

5.6.2 Monitor - 19" flat panel display

Technical 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 48. Miros OSD display

5.6.3 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.

5.6.4 Radar - 12 kW Furuno X-band standard radar

X-Band Radar with dedicated display unit with 42 rpm motor.

5.7 Sampling and Testing System

5.7.1 Oleometer - HydroSense 3420 PPM Oil in Water Alarm

Manufacturer:

Arjay Engineering Ltd
2851 Brighton Road
Oakville, Ontario
Canada L6H 6C9
Tel: +1 (905) 829-2418
Toll Free: +1 (800) 387-9487
Fax: +1 (905) 829-4701
E-mail: arjay@arjayeng.com

Year of purchase: 2011

Technical specifications:

Operating Temp:	10°C to 50°C (optional to 90°C)
Power Input:	24 vdc or 110 vac or 220 vac
Alarm Relays:	2 x 2 amp, SPDT, dry
Output:	4-20 mA or RS-485
Standards:	UL, CSA, CE
Enclosure Type:	4X polycarbonate, IP65
Range:	0-100ppm, minimum alarm setpoint 3 ppm
Display Resolution:	0.1 ppm
Instrument Accuracy:	+/- 0.1 ppm
Process Accuracy:	+/- 1.0 ppm under stable conditions
Oil Type:	All free and non-dissolved oils, > 2 micron



Figure 49. HydroSense 3420 PPM Oil in Water Alarm

5.7.2 Mini-lab

The set includes:

- Digital Paddle Viscometer, 200 to 230 V;
- Portable Density Meter Dendi 0.5-2.0g/Cm.

5.7.2.1 Digital Paddle Viscometer

Manufacturer:

CANNON Instrument Company
2139 High Tech Road
State College PA 16803, USA

Year of purchase:

2011

The CANNON Digital Rotational Paddle Viscometer has been designed to accurately measure the viscosity of emulsified asphalts, 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

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-hundredfold 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.

Technical specifications:

Dimensions (W × D × H):	19.1 cm × 23.5 cm × 45.1 cm (7.5 in × 9.5 in × 17.75 in)
Weight:	7.7 kg (17 lb)
Shipping dimensions (W × D × H):	38.1 cm × 40.6 cm × 53.3 cm (15 in × 16 in × 21 in)
Shipping weight (with all items):	12.3 kg (27 lb)
Maximum throughput:	2 to 4 samples per hour
Automated sample capacity:	1
Viscosity range & accuracy:	30 mPa·s (cP) to 30,000 mPa·s (CP)* 30 mPa·s (cP) to 3,000 mPa·s (CP) ± 5% 3,000 mPa·s (cP) to 30,000 mPa·s (CP) ± 10% *in 100-fold increments based on paddle selection
Minimum sample volume:	135 mL per test
Operating conditions:	15 °C to 30 °C, 10% to 75% relative humidity (non-condensing), Installation Category II, Pollution Degree 2
Electrical specifications:	115 VAC, 50/60 Hz; 230 VAC 50/60 Hz, 120 watts power consumption
Compliance:	CE Mark; EMC directive (2004/108/EC); Low voltage directive (2006/95/EC); HI-POT (1900 VAC, 60 sec.); ROHS
Data output:	RS-232



Figure 50. Viscosity meter

5.7.2.2 Density Meter DM-340.1 – DenDi

Manufacturer:

LEMIS Baltic

26 Ganību dambis

Rīga, LV-1005

Latvia, EU

Ph.: +371 6738 3223

Fax: +371 6738 3270

E-mail: info@lemis-process.com

Year of purchase:

2011

The portable laboratory density metre DenDi is designed for both – mobile and indoor laboratories for real density and temperature measurements of liquid in samples.

The device consists of density and temperature sensor combined with signal converter unit. All submersible parts are made from corrosion-resistant materials.

Technical specifications:

Range of	Density:	0.5000...2.000 g/cm ³ (500.0...2000.0 kg/m ³)
	Temperature:	+10...+50 Deg. Celsius
Accuracy of	Density:	± 0.0005 g/cm ³ (± 0.5 kg/m ³)
	Temperature:	± 0.2 Deg. Celsius
Resolution of	Density:	± 0.0001 g/cm ³ (± 0.1 kg/m ³)
	Temperature:	± 0.1 Deg. Celsius
Dimensions:	(HxLxW)	230 x 130 x 180 mm
Weight:		2.3 kg
Power supply:		NiMH battery 6V / 1200 mAh
Charging device:		90-240 V 50/60 Hz with output voltage 11-12

Submersible parts materials:
Volume of sample, max:
Accessories:

V and output current 600-700 mA
Quartz glass / Stainless steel
55 ml
Built-in IR data port



Figure 51. Density meter

5.7.3 Flash Point Tester.

Manufacturer:

Stanhope-Seta, London Street
Chertsey, Surrey, KT16 8AP, UK
Telephone: +44 (0)1932 564391
Fax: +44 (0)1932 568363

Year of purchase: 2011

The Setaflash Series 3 Closed Cup Flash Point Tester is an easy to use instrument that can complete a flash/no-flash test in less than two minutes and in many cases in 60 seconds, or determine the flash point of a sample within a temperature range of 0° to 300°C.

Technical specifications:

Temperature range:	Ambient to 300°C (0° to 300°C with 13870-0)
Cup material:	Aluminium
Test modes:	Rapid Equilibrium
Sample size:	2ml for flash points up to 100°C 4ml for flash points above 100°C
Test duration, Rapid Equilibrium Mode:	1 minute below 100°C, 2 minutes above 100°C
Heating and Cooling System:	Cartridge heater
Power:	2ml for flash points up to 100°C 4ml for flash points above 100°C
Voltage:	110/120V or 220/120V, 50/60Hz (switchable) 12Vdc with optional heater
Gas supply:	Laboratory gas, 3kPa (0.44psi) maximum pressure or Butane from optional Portable Gas Tank 13667-0
Size (HxWxD):	26 x 28 x 26cm
Weight:	4 kg



Figure 52. Flash Point Tester

5.8. Portable dispersant spraying systems

5.8.1. BoatSpray 200D2F-TS Single nozzle spraying system

The system is a portable, diesel powered dispersant spray system for the application of dispersant from Ayles Fernie designed AFEDO™ even drop-out nozzles. It consists of 2 spraying canons/hoses based on the single nozzle concept. The spraying canons are deployed on each side of the vessel with a total effective swath (length of the spray pattern) of minimum 15 meters on each side. The system is fully portable as it is diesel engine powered and the AFEDO nozzles are fitted with universal clamps which allow the AFEDO nozzles to be secured to any convenient structures such as the vessels rails or gunwales.

The system is equipped for full autonomous operation and includes diesel pump unit, AFEDO Nozzles, hoses and the entire system is stored in a tailor made aluminium container.

The deck space required is based on the footprint of the BS200D2F-TS container and the footprint of the pump unit when deployed. In addition, any dispersant drums or IBCs will take up additional deck space. When operating in dilute mode it is recommended the use of 1000 litre IBC for supplying sea water to the pump unit. This sea water IBC would be topped up from the vessel fire main.

Dimensions:

BS200D2F-TS Container:	L: 125 x W: 127 x H: 103 cms	Footprint: 3.24 m ²
1 x BS200D2F-TS Pump Unit:	L: 100 x W: 90 x H: 74 cms	
1 x Sea water IBC (dilute mode)	L: 120 x W: 100 x H: 116 cms	Footprint: 1.2 m ²
The weight of the complete system :	354 kg	



Figure 53. AFEDO™ Nozzle



Figure 54. BS200DFW Pump Unit with electric start option

5.8.2 YMC 105 Spraying arms with multiple nozzles

The YMC 105 dispersant spray system is a portable diesel driven sprayer set, for neat and concentrated chemical dispersant, consisting of diesel driven pump set, diaphragmatic pump, eductor set for dispersant dilution, aluminium spraying arms with nozzles and hoses with quick fittings. The two spraying arms/booms deployed on each side of the vessel have an effective swath (length of the spray pattern) of 5.2 meters each. Each arm is fitted with 4 nozzles in line to create a homogeneous spraying pattern. The YMC 105 system is designed to use all types of dispersant concentrated or diluted.

The length of the spraying pattern is 10,4 meters overall (5.2 per each side of the vessel) and allows the drop-size adjustment as well as the flow rate adjustment.

The system allows:

- Flow rate control from 55 to 130 ltrs/min;
- Pressure control adjusting the droplet size;
- Variable dilution rate.

The complete system is certified to operate in Hazardous Area Zone II according to the ATEX directive (ATEX 94/9/EC) as well as with the ATEX Directive 2014/34/EU. The system includes an ATEX certified spark arrestor and an over speed protection system that shuts down the system in case of over-speed of the engine. No electric parts are included in the system.



Figure 55. YMC 105 spraying boom

The spraying arms does not require pre-fitting. The pumping set is placed on a steel frame standing alone and the dispersant and sea water suction are ready for use. Unpacking and installation of the equipment on board requires 30 minutes. Two persons are required for handling and fitting the system on board the vessel. For operation one person is needed.

The system can be efficiently operated up to 10 knots speed.

The complete system is supplied in one stainless steel tailored made container (AISI 304) for easy handling and long-lasting protection of the system. The container dimension is 2,4 x 1,3 x 1,3m (LxWxH) fitted with forklift pockets and lifting eyes. Total weight of the system: 450 kg
Clear deck space required for handling and operation of the system: approximately 4 m².

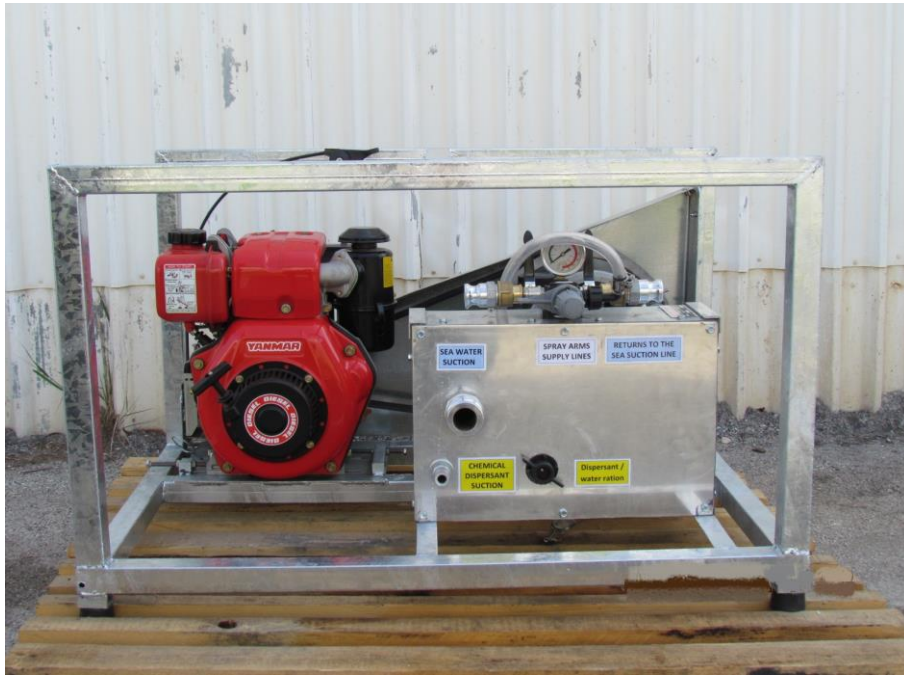


Figure 56. YMC 105 pumping set

6. 6. List of transferred dispersants and description

Item	Available [pcs]	Tons	Reception Date	Batch No.	IBC SN	ID Code (new)
IBC with dispersant	1	0.95	02/12/2014	2	0003	5001
IBC with dispersant	1	0.95	02/12/2014	3	0028	5002
IBC with dispersant	1	0.95	02/12/2014	2	0004	5003
IBC with dispersant	1	0.95	02/12/2014	3	0049	5004
IBC with dispersant	1	0.95	02/12/2014	2	0051	5005
IBC with dispersant	1	0.95	02/12/2014	3	0046	5006
IBC with dispersant	1	0.95	02/12/2014	3	0044	5007
IBC with dispersant	1	0.95	02/12/2014	2	0052	5008
IBC with dispersant	1	0.95	02/12/2014	3	0019	5009
IBC with dispersant	1	0.95	02/12/2014	2	0047	5010
IBC with dispersant	1	0.95	02/12/2014	2	0021	5011
IBC with dispersant	1	0.95	02/12/2014	6	0032	5012
IBC with dispersant	1	0.95	02/12/2014	3	0001	5013
IBC with dispersant	1	0.95	02/12/2014	2	0011	5014
IBC with dispersant	1	0.95	02/12/2014	1	0009	5018
IBC with dispersant	1	0.95	02/12/2014	3	0035	5019
IBC with dispersant	1	0.95	02/12/2014	3	0002	5020
IBC with dispersant	1	0.95	02/12/2014	3	0026	5021
IBC with dispersant	1	0.95	02/12/2014	2	0016	5022
IBC with dispersant	1	0.95	02/12/2014	2	0014	5023
IBC with dispersant	1	0.95	02/12/2014	3	0025	5024
IBC with dispersant	1	0.95	02/12/2014	3	0027	5025
IBC with dispersant	1	0.95	02/12/2014	3	0024	5026
IBC with dispersant	1	0.95	02/12/2014	2	0046	5027
IBC with dispersant	1	0.95	02/12/2014	2	0034	5028
IBC with dispersant	1	0.95	02/12/2014	2	0017	5029
IBC with dispersant	1	0.95	02/12/2014	2	0047	5030
IBC with dispersant	1	0.95	02/12/2014	2	0001	5031
IBC with dispersant	1	0.95	02/12/2014	2	0019	5032
IBC with dispersant	1	0.95	02/12/2014	2	0013	5033
IBC with dispersant	1	0.95	02/12/2014	2	0010	5034
IBC with dispersant	1	0.95	02/12/2014	2	0031	5035
IBC with dispersant	1	0.95	02/12/2014	2	0015	5036
IBC with dispersant	1	0.95	02/12/2014	2	0009	5037
IBC with dispersant	1	0.95	02/12/2014	2	0008	5038
IBC with dispersant	1	0.95	02/12/2014	3	0039	5039
IBC with dispersant	1	0.95	02/12/2014	3	0029	5040
IBC with dispersant	1	0.95	02/12/2014	3	0042	5041
IBC with dispersant	1	0.95	02/12/2014	2	0022	5042
IBC with dispersant	1	0.95	02/12/2014	2	0040	5043
IBC with dispersant	1	0.95	02/12/2014	2	0037	5044
IBC with dispersant	1	0.95	02/12/2014	3	0041	5045
IBC with dispersant	1	0.95	02/12/2014	1	0006	5046
IBC with dispersant	1	0.95	02/12/2014	2	0018	5047
IBC with dispersant	1	0.95	02/12/2014	3	0038	5048
IBC with dispersant	1	0.95	02/12/2014	2	0026	5049
IBC with dispersant	1	0.95	02/12/2014	3	0045	5050
IBC with dispersant	1	0.95	02/12/2014	1	0016	5051
IBC with dispersant	1	0.95	02/12/2014	3	0050	5052
IBC with dispersant	1	0.95	02/12/2014	2	0020	5053
IBC with dispersant	1	0.95	02/12/2014	2	0038	5054
IBC with dispersant	1	0.95	02/12/2014	2	0028	5055
IBC with dispersant	1	0.95	02/12/2014	2	0023	5056
IBC with dispersant	1	0.95	02/12/2014	2	0042	5057
IBC with dispersant	1	0.95	02/12/2014	1	0001	5058
IBC with dispersant	1	0.95	02/12/2014	2	0043	5059
IBC with dispersant	1	0.95	02/12/2014	2	0024	5060

IBC with dispersant	1	0.95	05/12/2014	2	0046	5061
IBC with dispersant	1	0.95	05/12/2014	2	0025	5062
IBC with dispersant	1	0.95	05/12/2014	1	0014	5063
IBC with dispersant	1	0.95	05/12/2014	2	0045	5064
IBC with dispersant	1	0.95	05/12/2014	2	0041	5065
IBC with dispersant	1	0.95	05/12/2014	1	0010	5066
IBC with dispersant	1	0.95	05/12/2014	2	0036	5067
IBC with dispersant	1	0.95	05/12/2014	2	0029	5068
IBC with dispersant	1	0.95	05/12/2014	1	0011	5069
IBC with dispersant	1	0.95	05/12/2014	2	0027	5070
IBC with dispersant	1	0.95	05/12/2014	2	0032	5071
IBC with dispersant	1	0.95	05/12/2014	3	0040	5072
IBC with dispersant	1	0.95	05/12/2014	1	0004	5073
IBC with dispersant	1	0.95	05/12/2014	2	0033	5074
IBC with dispersant	1	0.95	05/12/2014	2	0030	5075
IBC with dispersant	1	0.95	05/12/2014	1	0003	5076
IBC with dispersant	1	0.95	05/12/2014	3	0047	5077
IBC with dispersant	1	0.95	05/12/2014	3	0016	5078
IBC with dispersant	1	0.95	05/12/2014	3	0037	5079
IBC with dispersant	1	0.95	05/12/2014	1	0005	5080
IBC with dispersant	1	0.95	05/12/2014	2	0035	5081
IBC with dispersant	1	0.95	05/12/2014	3	0030	5082
IBC with dispersant	1	0.95	05/12/2014	1	0007	5083
IBC with dispersant	1	0.95	05/12/2014	2	0050	5084
IBC with dispersant	1	0.95	05/12/2014	2	0048	5085
IBC with dispersant	1	0.95	05/12/2014	1	0012	5086
IBC with dispersant	1	0.95	05/12/2014	3	0031	5087
IBC with dispersant	1	0.95	05/12/2014	3	0036	5088
IBC with dispersant	1	0.95	05/12/2014	3	0018	5089
IBC with dispersant	1	0.95	05/12/2014	2	0002	5090
IBC with dispersant	1	0.95	05/12/2014	1	0013	5091
IBC with dispersant	1	0.95	05/12/2014	3	0043	5092
IBC with dispersant	1	0.95	05/12/2014	2	0006	5093
IBC with dispersant	1	0.95	05/12/2014	6	0031	5094
IBC with dispersant	1	0.95	05/12/2014	3	0032	5095
IBC with dispersant	1	0.95	05/12/2014	3	0048	5096
IBC with dispersant	1	0.95	05/12/2014	3	0033	5097
IBC with dispersant	1	0.95	05/12/2014	1	0015	5098
IBC with dispersant	1	0.95	05/12/2014	2	0012	5099
IBC with dispersant	1	0.95	05/12/2014	3	0020	5100
IBC with dispersant	1	0.95	05/12/2014	2	0005	5101
IBC with dispersant	1	0.95	05/12/2014	2	0039	5102
IBC with dispersant	1	0.95	05/12/2014	2	0044	5103
IBC with dispersant	1	0.95	15/08/2016	7	0045	5105
IBC with dispersant	1	0.95	05/12/2014	3	0021	5106
IBC with dispersant	1	0.95	02/12/2014	1	0008	5107
IBC with dispersant	1	0.95	02/12/2014	3	0023	5108
IBC with dispersant	1	0.95	02/12/2014	2	0007	5109
IBC with dispersant	1	0.95	02/12/2014	3	0034	5110
IBC with dispersant	1	0.95	02/12/2014	2	0049	5111
IBC with dispersant	1	0.95	03/03/2015	6	0044	5112
IBC with dispersant	1	0.95	03/03/2015	6	0045	5113
IBC with dispersant	1	0.95	03/03/2015	6	0041	5114
IBC with dispersant	1	0.95	03/03/2015	6	0037	5115
IBC with dispersant	1	0.95	03/03/2015	6	0038	5116
IBC with dispersant	1	0.95	03/03/2015	6	0042	5117
IBC with dispersant	1	0.95	03/03/2015	6	0039	5118
IBC with dispersant	1	0.95	03/03/2015	6	0043	5119
IBC with dispersant	1	0.95	03/03/2015	6	0040	5120
IBC with dispersant	1	0.95	03/03/2015	6	0046	5121
IBC with dispersant	1	0.95	03/03/2015	6	0047	5122
IBC with dispersant	1	0.95	03/03/2015	6	0049	5123
IBC with dispersant	1	0.95	03/03/2015	6	0048	5124
IBC with dispersant	1	0.95	03/03/2015	6	0050	5125
IBC with dispersant	1	0.95	03/03/2015	6	0051	5126
IBC with dispersant	1	0.95	03/03/2015	6	0053	5127

IBC with dispersant	1	0.95	03/03/2015	6	0052	5128
IBC with dispersant	1	0.95	03/03/2015	6	0054	5129
IBC with dispersant	1	0.95	03/03/2015	6	0055	5130
IBC with dispersant	1	0.95	03/03/2015	6	0057	5131
IBC with dispersant	1	0.95	03/03/2015	6	0056	5132
IBC with dispersant	1	0.95	03/03/2015	6	0058	5133
IBC with dispersant	1	0.95	03/03/2015	5	0021	5134
IBC with dispersant	1	0.95	03/03/2015	5	0022	5135
IBC with dispersant	1	0.95	03/03/2015	5	0023	5136
IBC with dispersant	1	0.95	03/03/2015	5	0028	5137
IBC with dispersant	1	0.95	03/03/2015	5	0024	5138
IBC with dispersant	1	0.95	03/03/2015	5	0029	5139
IBC with dispersant	1	0.95	03/03/2015	5	0025	5140
IBC with dispersant	1	0.95	03/03/2015	5	0030	5141
IBC with dispersant	1	0.95	03/03/2015	5	0026	5142
IBC with dispersant	1	0.95	03/03/2015	5	0031	5143
IBC with dispersant	1	0.95	03/03/2015	4	0026	5144
IBC with dispersant	1	0.95	03/03/2015	5	0027	5145
IBC with dispersant	1	0.95	03/03/2015	4	0025	5146
IBC with dispersant	1	0.95	03/03/2015	4	0027	5147
IBC with dispersant	1	0.95	03/03/2015	4	0048	5148
IBC with dispersant	1	0.95	03/03/2015	4	0029	5149
IBC with dispersant	1	0.95	03/03/2015	4	0030	5150
IBC with dispersant	1	0.95	03/03/2015	4	0031	5151
IBC with dispersant	1	0.95	03/03/2015	4	0032	5152
IBC with dispersant	1	0.95	03/03/2015	4	0033	5153
IBC with dispersant	1	0.95	03/03/2015	4	0035	5154
IBC with dispersant	1	0.95	03/03/2015	4	0034	5155
IBC with dispersant	1	0.95	03/03/2015	5	0006	5156
IBC with dispersant	1	0.95	03/03/2015	5	0005	5157
IBC with dispersant	1	0.95	03/03/2015	5	0007	5158
IBC with dispersant	1	0.95	03/03/2015	5	0010	5159
IBC with dispersant	1	0.95	03/03/2015	5	0009	5161
IBC with dispersant	1	0.95	03/03/2015	5	0011	5162
IBC with dispersant	1	0.95	03/03/2015	5	0003	5163
IBC with dispersant	1	0.95	03/03/2015	5	0012	5164
IBC with dispersant	1	0.95	03/03/2015	5	0004	5165
IBC with dispersant	1	0.95	03/03/2015	5	0013	5166
IBC with dispersant	1	0.95	03/03/2015	5	0014	5167
IBC with dispersant	1	0.95	03/03/2015	5	0018	5168
IBC with dispersant	1	0.95	03/03/2015	5	0017	5169
IBC with dispersant	1	0.95	03/03/2015	5	0016	5170
IBC with dispersant	1	0.95	03/03/2015	5	0019	5171
IBC with dispersant	1	0.95	03/03/2015	5	0020	5172
IBC with dispersant	1	0.95	03/03/2015	5	0015	5173
IBC with dispersant	1	0.95	03/03/2015	5	0037	5174
IBC with dispersant	1	0.95	03/03/2015	5	0038	5175
IBC with dispersant	1	0.95	03/03/2015	5	0032	5176
IBC with dispersant	1	0.95	03/03/2015	5	0039	5177
IBC with dispersant	1	0.95	03/03/2015	5	0036	5178
IBC with dispersant	1	0.95	03/03/2015	5	0040	5179
IBC with dispersant	1	0.95	03/03/2015	5	0051	5180
IBC with dispersant	1	0.95	03/03/2015	5	0033	5181
IBC with dispersant	1	0.95	03/03/2015	5	0034	5182
IBC with dispersant	1	0.95	03/03/2015	5	0042	5183
IBC with dispersant	1	0.95	03/03/2015	5	0035	5184
IBC with dispersant	1	0.95	03/03/2015	5	0043	5185
IBC with dispersant	1	0.95	03/03/2015	5	0041	5186
IBC with dispersant	1	0.95	03/03/2015	5	0045	5187
IBC with dispersant	1	0.95	03/03/2015	5	0046	5188
IBC with dispersant	1	0.95	03/03/2015	5	0044	5189
IBC with dispersant	1	0.95	03/03/2015	5	0047	5190
IBC with dispersant	1	0.95	03/03/2015	5	0001	5191
IBC with dispersant	1	0.95	03/03/2015	5	0049	5192
IBC with dispersant	1	0.95	03/03/2015	5	0048	5193
IBC with dispersant	1	0.95	03/03/2015	5	0050	5194

IBC with dispersant	1	0.95	03/03/2015	5	0002	5195
IBC with dispersant	1	0.95	03/03/2015	6	0022	5196
IBC with dispersant	1	0.95	03/03/2015	6	0023	5197
IBC with dispersant	1	0.95	03/03/2015	3	0017	5198
IBC with dispersant	1	0.95	03/03/2015	3	0022	5199
IBC with dispersant	1	0.95	03/03/2015	6	0017	5200
IBC with dispersant	1	0.95	03/03/2015	6	0018	5201
IBC with dispersant	1	0.95	03/03/2015	6	0025	5202
IBC with dispersant	1	0.95	03/03/2015	6	0026	5203
IBC with dispersant	1	0.95	03/03/2015	6	0019	5204
IBC with dispersant	1	0.95	03/03/2015	6	0028	5205
IBC with dispersant	1	0.95	03/03/2015	6	0029	5206
IBC with dispersant	1	0.95	03/03/2015	6	0027	5207
IBC with dispersant	1	0.95	03/03/2015	6	0021	5208
IBC with dispersant	1	0.95	03/03/2015	6	0020	5209
IBC with dispersant	1	0.95	03/03/2015	6	0024	5210
IBC with dispersant	1	0.95	03/03/2015	6	0035	5211
IBC with dispersant	1	0.95	03/03/2015	6	0034	5212
IBC with dispersant	1	0.95	03/03/2015	6	0036	5213
IBC with dispersant	1	0.95	03/03/2015	6	0001	5214
IBC with dispersant	1	0.95	03/03/2015	6	0002	5215
IBC with dispersant	1	0.95	03/03/2015	6	0030	5216
IBC with dispersant	1	0.95	03/03/2015	6	0033	5217
IBC spare (empty)	1	0	03/03/2015	4		5218
IBC spare (empty)	1	0	03/03/2015	4		5219
IBC spare (empty)	1	0	03/03/2015	4		5220
IBC spare (empty)	1	0	03/03/2015	4		5221
IBC spare (empty)	1	0	03/03/2015	4		5222
IBC spare (empty)	1	0	05/12/2014	1		5015
IBC spare (empty)	1	0	05/12/2014	1		5016
IBC spare (empty)	1	0	05/12/2014	1		5017
IBC spare (empty)	1	0	05/12/2014	1		5104
IBC spare (empty)	1	0	05/12/2014	1		5160
Total cost of dispersants: EUR 538,585						

6.1 Dispersant Radiagreen OSD

Manufacturer:

Oleon NV (Headquarter)
Haven 6677A
Assenedestraat 2
9940 Ertvelde - Belgium
Tel: +32 (0)9 341 10 11
Fax: +32 (0)9 341 10 00
E-Mail: info@oleon.com

Year of purchase:

2015

Radiagreen OSD is a concentrated blend of natural surfactants and solvents.

Due to its high solvency power, Radiagreen OSD will easily penetrate into the oil slick as a result of which the surfactants will be incorporated rapidly. The surfactants will reduce the interfacial tension between oil and water, allowing it to divide the hydrocarbons in droplets of such a size that the physical and bacterial action is accelerated, leading to a faster degradation.

Radiagreen OSD (free of aromates) has been engineered for a large number of spills. We differentiate:

- Cleaning of oil spills (crude oil, diesel, gasoil, vegetable oil, other oils);
- Oil spills on warehouse floors, port quays, sea, bulkhead areas;
- Rocks and beaches;
- Oil and fats on machines and mechanical parts.

Flammable: Flash-point-ASTMD 93: >110°C

Maximum storage Temperature: 60°C

Minimum Temperature: -20°C

Optimal storage Temperature: 5 - 35 °C

The product will have a shelf life of minimum 5 years if the storage conditions are respected.

Radiagreen OSD is stored in standard IBC's with the following indicative external dimensions: Length 1.2 m x Width 1.0 m x Height 1.16 m.



Figure 57. IBC's with Radiagreen OSD