

Annex V of the VAC
Technical Specifications for the equipment
(Lot 2 – Atlantic Middle)

Procurement procedure: EMSA/CPNEG/3/2022

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

Phase II – Invitation to Tender

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

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1. General description of the equipment

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

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

1.1. Equipment Transferred

The contractor will receive from EMSA the equipment listed below:

- 5.1. Koseq Sweeping Arm System
- 5.2. Oil Boom Set – Heavy duty boom Ro-Boom 2000
- 5.3. Skimmer Set – High Capacity Skimmer Transrec
- 5.4. Weir Boom Set – Vikoma weir boom 180
- 5.5. Interface detector
- 5.6. Sampling and Testing Equipment
 - a) Minilab – viscosity meter and density meter
 - b) Flashpoint tester
 - c) Gas detector
- 5.7. Communication devices
- 5.8. RPAS ancillaries
- 5.9. Discharging equipment
- 5.10. Cleaning Machines

All tenderers will have the opportunity to verify the state of equipment on board the vessel *Ria de Vigo* and in the stockpile in Vigo, Spain at request. In principle the visit will be organised in week 29. The visit details will be arranged with the requesting tenderer. If due to the COVID-19 travel restrictions or other health risk considerations the visits cannot be organised then EMSA will provide tenderers with additional detailed technical information on the transferred equipment including, manuals, pictures and videos.

1.2. Overhauling/servicing of the equipment

The equipment that will be transferred to the Contractor was purchased in different years. It is generally in good condition. The equipment has been categorised and appropriately labelled. It has undergone regular maintenance according to the manufacturer's specifications. The maintenance was closely monitored by EMSA. The working condition of the equipment is regularly verified by the Agency during drills.

The Contractor will be responsible for the safe, reliable and sustainable operational use of the equipment. Therefore, 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 overhauling/servicing might be performed by a third party subcontracted by the contractor (e.g. manufacturer of the equipment or a specialised local company).

1.2.1 Equipment to be overhauled

Overhauling of the OSR equipment systems shall include repair or replacement of damaged, defective or worn parts, reassembly, testing and trial-run prior to returning the item to its full operating level. The contractor should take care also for the proper disposal of the parts to be replaced.

The overhauling works should as a minimum requirement comprise in general the following items:

- Replacement of all worn parts: belts, gaskets, seals, filters, rusty screws and washers, O-rings of all parts of the set;
- Replacement of all fluids: lube oil, hydraulic oil, gear oil, coolant of all parts of the set;
- Replacement of all rubber/flexible hoses and couplings/connections: all hydraulic hoses;
- Cleaning/brushing off rust/limestone/chalky deposits from all parts:
 - bring all the parts to a “new” finish;
 - sandblasting of rusty steel parts;
 - repaint (where applicable) with original or equivalent marine resistant paint (zinc primer, marine epoxy coating, marine epoxy topcoat);
- Grease/lubricate all joints/points.

Based on previous experience, below is the indicative list of the overhauling works to be performed:

a. Koseq Sweeping arms system:

I	No	Description of overhauling works
2 x Sweeping Arm Crane	I.1.1	Brushing off rust and repainting with original or equivalent paint
	I.1.2	Replacement of worn parts of the slewing ring
	I.1.3	Replacement of turning cylinder
	I.1.4	Replacement of cylinder shaft
	I.1.5	Replacement of cable pulleys
	I.1.6	Replacement of all winch cables
	I.1.7	Replacement of screws and bolts of the foundation pillar
	I.1.8	Replacement of all hydraulic valves and levers
	I.1.9	Replacement of all wearing parts from the winches
	I.1.10	Replacement of hydraulic lines/pipes
2 x Frame (15m) (including weir and brush modules)	I.2.1	Brushing off rust and repainting with original or equivalent paint
	I.2.2	Replacement of rubber fenders at each end
	I.2.3	Replacement of hydraulic cylinder for oil collection chamber
	I.2.4	Replacement of hydraulic cylinder for debris screen

	I.2.5	Replacement of debris screen bearing and slide shaft
	I.2.6	Brushing off chalky/limestone deposits and bringing the aluminium parts to a "new" finish
	I.2.7	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.2.8	Replacement of the brushes of the brush module
	I.2.9	Replacement of all hydraulic connectors
2 x Pump MSP 150/63	I.3.1	Replacement of seals, O-rings, washers and dust caps
	I.3.2	Replacement of hydraulic connections
	I.3.3	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.3.4	Brushing off rust and repainting the exterior casing with original or equivalent paint
	I.3.5	Replacement of impeller (rotor)
	I.3.6	Renew protective coating of pump casing interior and suction cone interior with original or equivalent paint
2 x Power Pack	I.4.1	Replacement of all fluids, gaskets/seals & filters
	I.4.2	Cleaning of all tanks and radiators
	I.4.3	Replacement of belts
	I.4.4	Replacement of flexible lines
	I.4.5	Replacement of the battery
	I.4.6	Cleaning the exhaust flame trap
	I.4.7	Delivery of a new protection canvas
	I.4.8	Brushing off rust and repainting with original or equivalent paint
	I.4.9	Replacement of all wearing parts of the hydraulic pump (gaskets, O-rings)
	I.4.10	Replacement of all wearing parts from the spring starter
2 x Pump DESMI DOP 250	I.5.1	Replacement of plate wheel sectional discs and wear plates
	I.5.2	Replacement of sealing ring
	I.5.3	Replacement of plate wheel shaft
	I.5.4	Replacement of plate wheel bearing
	I.5.5	Replacement of sealing/bearing discs
	I.5.6	Replacement of V-seal
	I.5.7	Replacement of stator cutting knife
	I.5.8	Replacement of all wearing parts from the hydraulic motor(s) (seals, O-rings, gaskets)
	I.5.9	Brushing off rust and repainting with original or equivalent paint
	I.5.10	Replacement of pump screw
	I.5.11	Cleaning and painting the pump screw (rotor) and interior body with special heat treated ceramic paint

1.2.2. Equipment to be serviced

The contractor should arrange servicing to the following equipment:

1. Desmi Ro-boom system
2. High capacity skimmer Transrec
3. Weir boom Vikoma
4. Interface detector
5. Sampling and testing equipment
6. Discharging equipment
7. Cleaning machines

The servicing to this equipment should include the following:

- Check, test (new certification) and replace, if necessary, the hydraulic and cargo hoses;
- Check and replace, if necessary, the cables, wires, ropes, etc.;
- General overhauling of all pumps;
- Check the wear of the brushes of the skimmer and replace, if needed;
- Check of power packs, change the engine and hydraulic oil, coolant liquid, filters (oil, air, fuel), belts;
- Replace all rusty couplings;
- Replacement of all seals, O-rings, etc, where applicable;
- Check the paint and repaint, if necessary;
- Calibrate the Sampling and Testing Equipment, if necessary.

1.3. Additional equipment

Contractor will need to purchase/deliver the following equipment:

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

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

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

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

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

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

The Graphic User Interface shall be user-friendly with a PC-based data processing capability.

The layout of display and colour, for use both day and night, will be specially made for operation on a vessel's bridge. The system must be regularly (annually) updated with the latest software for the system during the whole duration of the contract.

2. Flow meter: to be used during drills to measure the flow of the pumps installed in the sweeping arms and the skimmer.
3. Communication devices: A headset with a 2-way VHF Radio and cable for connectivity
 - Waterproof VHF radio;
 - Headset with microphone;
 - Headset cable;
 - ATEX;
 - Can be used together with a hardhat
4. EMSA logo on equipment: At least one EMSA logo must be attached/painted on a visible position on each sweeping arm and crane, skimmer frame (if possible), boom reel, power pack, storage or tank containers. The dimension of the logos shall be in proportion to the items to be marked.

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

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

2. Handover procedure for equipment transferred

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

2.1. Date and place of the handover

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

The items listed in point 1.1 above will be made available for handover and ready for transportation at their relevant storage location in Vigo, Spain.

The handover will be done at a date to be mutually agreed between EMSA and the Contractor and shall not take place earlier than 12/03/2023 and not later than 12/04/2023.

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

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

2.2. Transportation

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

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

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

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

2.3. Storage and insurance

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

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

3. Use of the oil pollution response equipment

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

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

and their relevant power packs and ancillaries.

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

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

In case the vessel proposed is not able to accommodate the weir boom system, the tenderer shall make a suitable proposal that the Vikoma weir boom system is deployed into sea (from a pier or another port facility) at least twice a year.

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

2. List of transferred equipment

Category	Item	Model	Delivery Date	Additional info	ID Code	ID Code
					(old)	(new)
1. Sweeping arm (EUR 1,102,812)	Frame		15/07/2010	Koseq Rigid sweeping arm	CMPM362201	1209
	Frame		15/07/2010	Koseq Rigid sweeping arm	CMPM362202	1210
	Weir module		15/07/2010	WEIR SKIMMER CHAMBER	CMPM314401	1211
	Weir module		15/07/2010	WEIR SKIMMER CHAMBER	CMPM314402	1212
	Ancillaries		15/07/2010	DEBRIS SCREEN	CMPM020201	1213
	Ancillaries		15/07/2010	DEBRIS SCREEN	CMPM020202	1214
	Pump	MSP 150-63	15/07/2010	Mariflex centrifugal pump	CMPM283201	1215
	Pump	MSP 150-63	15/07/2010	Mariflex centrifugal pump	CMPM283202	1216
	Crane		15/07/2010	SWEEPING ARM HANDLING CRANE	CMPM131501	1217
	Crane		15/07/2010	SWEEPING ARM HANDLING CRANE	CMPM131502	1218
	Hydraulic hose(s)		15/07/2010	PRESSURE (SA to PANEL)	CMPM223601	1219
	Hydraulic hose(s)		15/07/2010	PRESSURE (SA to PANEL)	CMPM223602	1220
	Hydraulic hose(s)		15/07/2010	RETURN (SA to PANEL)	CMPM223603	1221
	Hydraulic hose(s)		15/07/2010	RETURN (SA to PANEL)	CMPM223604	1222
	Hydraulic hose(s)		15/07/2010	SA to PANEL	CMPM223605	1223
	Hydraulic hose(s)		15/07/2010	SA to PANEL	CMPM223606	1224
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223607	1225
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223608	1226
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223609	1227
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223610	1228
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223611	1229
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223612	1230
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223613	1231
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223614	1232
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223615	1233
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223616	1234
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223617	1235
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223618	1236
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223619	1237
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223620	1238
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223621	1239
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223622	1240
	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223623	1241

	Hydraulic hose(s)		15/07/2010	SA to SA	CMPM223624	1242
	Hydraulic hose(s)		15/07/2010	PRESSURE HOSE (TO SA)	CMPM223625	1243
	Hydraulic hose(s)		15/07/2010	PRESSURE (TO SA)	CMPM223626	1244
	Hydraulic hose(s)		15/07/2010	PRESSURE (TO SA)	CMPM223627	1245
	Oil hose(s)		15/07/2010	DISCHARGE HOSE	CMPM263801	1246
	Oil hose(s)		15/07/2010	DISCHARGE HOSE	CMPM263802	1247
	Ancillaries		15/07/2010	Towing lines for two sweeping arms		
	Power pack		15/07/2010	Motor Diesel, Zone II	CMPM272801	1249
	Power pack hour meter		12/06/2015	To record the number of running hours		2085
	Power pack spare parts		15/07/2010	SPARE PARTS FOR POWER PACK	CMPM272501	1250
	Cover		15/07/2010	PLASTIC COVER FOR POWER PACK	CMPM121403	1251
	Power pack	LPP 120 E	12/06/2015	Lamor power pack		2062
	Brush module		15/07/2010	BRUSH CASSETTES KOSEQ	CMPM310701	1252
	Brush module		15/07/2010	BRUSH CASSETTES KOSEQ	CMPM310702	1253
	Ancillaries		15/07/2010	STEAM FLANGE FOR DOP 250	CMPM020203	1254
	Pump	DOP 250 Dual	15/07/2010	Desmi PDAS pump	CMPM283203	1255
	Pump	DOP 250 Dual	15/07/2010	Desmi PDAS pump	CMPM283204	1256
	Pump		15/07/2010	PORTABLE WATER INJECTION PUMP SET 100 BAR	CMPM283205	1257
	Ancillaries		15/07/2010	3 PCS OUTLET + 1 PCS INLET INJECTION FLANGE	CMPM020204	1258
	Water hose(s)		15/07/2010	WATER HOSE SET PRESSURE FOR WATER INJECTION PUMP 3/4 INCH 5+20 METERS	CMPM403801	1259
	Water hose(s)		15/07/2010	WATER HOSE SET SUCTION FOR WATER INJECTION PUMP 1 1/4 INCH 10 METERS	CMPM403802	1260
	Hydraulic hose(s)		15/07/2010	SET PRESSURE AND RETURN FOR WATER INJECTION PUMP 10+15 METERS	CMPM223801	1261
	Logo		12/06/2015	Logo installation		2063
	Twistlock		12/06/2015	12 Twistlocks		2080

	Crane ancillaries		29/04/2009	WINCH WITHHELD FERRI	CDFM130201	0520
2. Boom (EUR 332,799)	Segment	Ro-boom 2000	15/07/2010	Desmi Heavy duty boom	CMPA073601	1286
	Segment	Ro-boom 2000	15/07/2010	Desmi Heavy duty boom	CMPA073602	1287
	Storage reel		15/07/2010	HYDRAULIC OPERATED BOOM REEL	CMPA353401	1292
	Storage reel		15/07/2010	HYDRAULIC OPERATED BOOM REEL	CMPA353402	1293
	Towing ancillaries		15/07/2010	TOWING BAR FOR BOOM TOWING SET	CMPA372201	1294
	Towing bridles set		15/07/2010	BRIDLE FOR TOWING SET	CMPA370601	1295
	Towing lines set		15/07/2010	TOW ROPES	CMPA374201	1296
	Towing ancillaries		15/07/2010	PICK UP BUOY FOR TOWING SET	CMPA370201	1297
	Towing ancillaries		15/07/2010	TOWING BAR FOR BOOM TOWING SET	CMPA372202	1298
	Towing bridles set		15/07/2010	BRIDLE FOR TOWING SET	CMPA370602	1299
	Towing lines set		15/07/2010	TOW ROPES	CMPA374202	1300
	Towing ancillaries		15/07/2010	PICK UP BUOY FOR TOWING SET	CMPA370202	1301
	Towing ancillaries		15/07/2010	TOWING BAR FOR BOOM TOWING SET	CMPA372203	1302
	Towing bridles set		15/07/2010	BRIDLE FOR TOWING SET	CMPA370603	1303
	Towing lines set		15/07/2010	TOW ROPES	CMPA374203	1304
	Towing ancillaries		15/07/2010	PICK UP BUOY FOR TOWING SET	CMPA370203	1305
	Towing ancillaries		15/07/2010	TOWING BAR FOR BOOM TOWING SET	CMPA372204	1306
	Towing bridles set		15/07/2010	BRIDLE FOR TOWING SET	CMPA370604	1307
	Towing lines set		15/07/2010	TOW ROPES	CMPA374204	1308
	Towing ancillaries		15/07/2010	PICK UP BUOY FOR TOWING SET	CMPA370204	1309
	Ancillaries		15/07/2010	REPAIR KIT FOR BOOM	CMPA022501	1310
	Air blower		15/07/2010	AIRBLOWER FOR SPI OPERATION	CMPA032801	1311
	Air hose(s)		15/07/2010	AIRHOSE 10-15 METERS	CMPA053801	1312
	Hydraulic hose(s)		15/07/2010	EN853 TO BOOM REEL PS	CMPA223801	1313
	Hydraulic hose(s)		15/07/2010	EN853 TO BOOM REEL SB	CMPA223802	1314
	Hydraulic hose(s)		15/07/2010	EN853 TO HOSE-REEL	CMPA223803	1315
	Hydraulic hose(s)		15/07/2010	EN853 TO AIRCOMPRESSOR	CMPA223804	1316
	Storage container		15/07/2010	STORAGE CONTAINER 10'	CMPA351201	1317
	Ancillaries		15/07/2010	REPAIR KIT FOR REEL	CMPA022502	1318

	Power pack		12/06/2015	Desmi Power pack with compressor		2061
	Power pack hour meter		12/06/2015	To record the number of running hours		2088
	Twistlock		12/06/2015	16 Twistlocks		2082
3. HC Skimmer (EUR 1,400,000)	Storage reel	Transrec 150	22/06/2010	Framo STORAGE AND HANDLING UNINT WITH 95 METERS UMBILICAL	CDFI353402	0522
	Weir module	Transrec 150	22/06/2010	Framo WEIR SKIMMER HEAD WITH PUMP, 2 THRUSTERS, FRAME AND CANVAS, INSTRUMENTATION PACKAGE AND EMULSION BREAKER	CDFI314402	0523
	Disc module	Transrec 150	22/06/2010	Framo HIVIS/HIWAX SKIMMER HEAD WITH 2 PDAS PUMPS, HOT WATER INJECTION SYS AND 2 THRUSTERS	CDFI311901	0524
	Ancillaries		22/06/2010	LIFTING DEVICE FOR STORAGE AND HANDLING	CDFI020203	0525
	Control desk		22/06/2010	RADIO REMOTE CONTROL SYS (INCL PANEL)	CDFI111302	0526
	Cover		22/06/2010	CANVAS FOR STORAGE AND HANDLING UNIT	GKMI352001	0527
	Ancillaries		22/06/2010	MANOMETER TOOL BOX	CDFI020204	0528
	Spare parts		22/06/2010	TRANSREC SPARE PARTS	CDFI343801	0529
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR TRANSREC	CDFI350201	0530
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR TRANSREC	GKMI350202	0531
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR TRANSREC	CDFI350203	0532
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR TRANSREC	CDFI350204	0533
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR DHPP	CDFI350205	0534
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR DHPP	CDFI350206	0535

	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR DHPP	CDFI350207	0536
	Ancillaries		22/06/2010	TWIST LOCK CONNECTORS FOR DHPP	CDFI350208	0537
	Oil hose(s)		22/06/2010	WITH 6" QUICK COUPLING FOR TRANSREC AND 6" FLANGE FOR STORAGE TANK CONNECTION	CDFI263801	0538
	Hydraulic hose(s)		22/06/2010	HOSES FOR CONNECTION BETWEEN TRANSREC AND POWER SUPPLY	CDFI223802	0539
	Power pack		22/06/2010	INCLUDING LIFTING SLING AND CANVAS	CDFi272801	0540
	Power pack ancillaries		22/06/2010	NOISE HOOD	CDFI72201	0541
	Power pack spare parts		22/06/2010		CDFI343802	0542
4. Weir Boom (EUR 603,594)	Segment	WeirBoom180	10/07/2014	Vikoma 370 M BOOM WITH 76 M WEIR SECTION, INCLUDING, INTERNAL TRANSFER PUMPS, HYDRAULIC AND DISCHARGE HOSES, 6" INTEGRATED FLOW-METER	CDFA073801	0543
	Pump		10/07/2014	WATER PUMP WITH FLOATATION ATTACHED TO BOOM	CDFA280001	0544
	Pump		10/07/2014	TRANSFER PUMP (ROTARY LOBE TRANSFER PUMP)	CDFA280002	0545
	Storage reel		10/07/2014	WEIR BOOM DECK REEL WITH FLEETING ROLLER AND ARM TO ASSIST DURING THE RETRIEVAL	CDFA353401	0546
	Oil hose(s)		10/07/2014	4X5 M 8" SUCTION HOSES AND 2X15 M 6" DISCHARGE HOSES	CDFA260001	0547
	Power pack		10/07/2014	DIESEL/HYDRAULIC, EX 3G, IIB, T3 RATED FOR HAZARDOUS AREAS	CDFA270001	0548
	Power pack hour meter		12/06/2015	To record the number of running hours		2086
	Power pack		10/07/2014	DIESEL/HYDRAULIC, EX 3G, IIB, T3 RATED FOR HAZARDOUS AREAS	CDFA270002	0549

	Power pack hour meter		12/06/2015	To record the number of running hours		2087
	Control desk		10/07/2014	HYDRAULIC CONTROL DESK COMPLETE WITH MANIFOLDS , VALVING/CONTROLS	CDFA110001	0550
	Hydraulic hose(s)		10/07/2014	SET SUPPLIED TO RUN FROM HYDRAULIC POWER PACKS TO CONTROL CONSOLE AND FROM THE CONSOLE TO THE ANCILLARY EQUIPMENT (pressure, return & drain with connectors)	CDFA223801	0551
	Towing lines set		10/07/2014	TOWING WARPS	CDFA374201	0552
	Air blower		10/07/2014	AIR INFL. SYSTEM-HYDRAULICALLY DRIVEN BLOWER, FREESTANDING AIR FAN IN ALUMINIUM ALLOY	CDFA030001	0553
	Air hose(s)		10/07/2014	1X10 METERS OF 3" FLEXIBLE AIR HOSE WITH 1 X BOOM DEFLATION ADAPTOR	CDFA053801	0554
	Hydraulic hose(s)		10/07/2014	FOR AIR BLOWER	CDFA223802	0555
	Storage flatrack		10/07/2014	20' FLAT RACK FOR REEL WITH BOOM AND PUMPS	CDFA352001	0556
	Storage container		10/07/2014	20' CONTAINER	CDFA351201	0557
	Spare parts		10/07/2014	SPARE PARTS FOR AIR FAN, WEIR BOOM REEL, HOSE KIT, TRANSFER PUMP, VANE PUMP, WATER PUMP AND WEIR BOOM	CDFA340001	0558
	Flow meter		10/07/2014	Including connectors to semi-rigid oil hoses	559	0559
	Crane		26/06/2014	Guerra TELESCOPIC MARINE CRANE MR75.45A3	CDFA130001	0562
	Remote control		26/06/2014	Guerra RADIO REMOTE CONTROL WITH ELECTRIC CONTROL VALVE AND CONNECTION BOX	CDFA290001	0563
5. Interface detector (EUR 3,400)	Oil water sensor		19/06/2006	PORTABLE INTERFACE DETECTOR OW INTERPH./ULLAGE/TEMP	CDFD383701	0507

6. Sampling/testing (EUR 24,488)	Mini lab		19/06/2006	SAMPLING MINILAB BIOBLOCK Sc.	CDFH234301	0508
	Mini lab		19/06/2006	SAMPLING MINILAB BIOBLOCK Sc.	CDFH231701	0509
	Flash point tester		19/06/2006	FLASH POINT TESTER PETROTEST	CDFH173901	0510
	Gas detector/ explosimeter		19/06/2006	Portable Drager	CDFH191801	0511
7. Communication (EUR 1.647)	VHF Portable		12/06/2015	VHF Air band and VHF antenna		2060
8. RPAS (EUR 3,427)	Computer		28/02/2019	Portable computer & wireless equipment for RPAS	n/a	2869
9. Discharging equipment (EUR 209,664)	Pump	TK 150	27/02/2008	Framo pump 6 bar	CDFM283203	0433
	Pump	TK 150	27/02/2008	Framo pump 6 bar	CDFM283204	0434
	Ancillaries		27/02/2008	HYDRAULIC FLOW CONTROL VALVES	CDFM020205	0435
	Ancillaries		27/02/2008	HYDRAULIC FLOW CONTROL VALVES	CDFM020206	0436
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283201	0474
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283202	0475
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283203	0476
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283204	0477
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283205	0478
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFE283206	0479
	Spare parts		19/06/2006	SPARES KIT DOP 250	CDFE343101	0480
	Spare parts		19/06/2006	SPARES KIT DOP 250	CDFE343102	0481
	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020201	0482
	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020202	0483
	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020203	0484
	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020204	0485

	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020205	0486
	Ancillaries		19/06/2006	PUMP WATER INJECTION FLANGE / OUTLET	CDFE020206	0487
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020207	0488
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020208	0489
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020209	0490
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020210	0491
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020211	0492
	Ancillaries		19/06/2006	PUMP RADIAL WATER INJECTION / INLET	CDFE020212	0493
	Pump	TK 150	27/02/2008	Framo pump 6 bar	CDFE283207	0494
	Pump	TK 150	27/02/2008	Framo pump 6 bar	CDFE283208	0495
	Spare parts		27/02/2008	SPARES KIT: 1 Hyd. motor,	CDFE343103	0496
	Spare parts		27/02/2008	SPARES KIT: 1 wearing rings,	CDFE343104	0497
	Spare parts		27/02/2008	SPARES KIT: 1 wearing rings,	CDFE343105	0498
	Spare parts		27/02/2008	SPARES KIT: 1 shaft seal	CDFE343106	0499
	Spare parts		27/02/2008	SPARES KIT: gasket and o-ring	CDFE343107	0500
	Spare parts		27/02/2008	Special tools	CDFE343108	0501
	Pump	DOP 250 Dual	19/06/2006	Desmi PDAS pump	CDFD283201	0506
	Pump ancillaries		29/04/2009	FLUIDMECANICA VARIOUS	CDFE280201	0521
10. Cleaning equipment (EUR 8,615)	Cleaning machine		19/06/2006	HIGH PRESSURE / TEMP EL. DRIVEN	CDFB092901	0513
	Cleaning machine		19/06/2006	HIGH PRESSURE / TEMP EL. DRIVEN	CDFB092902	0514
	Cleaning machine		19/06/2006	HIGH PRESSURE / TEMP EL. DRIVEN	CDFB092903	0515

5.1 Set of KOSEQ Sweeping Arm with Foldable Ends

Manufacturer:

Kampers Oil Spill Equipment B.V.
Oosthavenzijde 5
P.O. Box 5606
3297 ZG Puttershoek
The Netherlands
Tel: +31 78 6763811
Fax: +31 78 6764853
Email: design@koseq.com
Website: <http://www.koseq.com>

Purchase year: 2010

Set of KOSEQ Sweeping Arm with Foldable Ends consists of:

- 1) 2 Sweeping arm structures
- 2) 2 Weir skimmer cassettes with movable debris screen
- 3) 2 Brush skimmer cassettes
- 4) 2 Marflex MSP 150-63 Screw centrifugal pumps
- 5) 2 DESMI DOP 250 PDAS pumps
- 6) 2 Sets of Oil hoses
- 7) 2 Sets of Hydraulic hoses
- 8) 2 Sweeping arm cranes
- 9) 2 Power packs
- 10) Portable water injection pump set
- 11) Water outlet/injection flanges
- 12) Water hoses
- 13) Hydraulic hoses
- 14) Spare parts for power pack

5.1.1 Sweeping arm structure (length 15m, foldable end)

The sweeping arm pontoons are made of 4 mm steel. The bridge section is of lattice structure and the boarding is of oil resistance PVC. To reduce the foot print on deck, the end sections of the inner and outer pontoons are foldable.

The rigid sweeping arms are placed upon supports, welded to the ship's deck. On top of the supports ISO twist locks are welded for fixing the rigid sweeping arm to its supports.

The sweeping arm structure includes the following parts:

- a) INNERPONTOON 4 mm steel plating
 - 1x Foldable end with heavy steel hinges, stainless steel pin, bronze bushing, grease nipples and bronze fixing spindles.
 - 1x Weir oil collection chamber, including guides, movable pump frame, movable debris screen, and port hole.
 - 2x Hydraulic cylinders and hoses for moving the collection chamber and debris screen.
 - 1x Boulder.
 - 3x Rubber fenders.

- 1x Lifting lug
- 2x Towing lugs.
- 1x Offshore rated PVC anti slip grating on top.
- 1x Yellow coating RAL 1016
- 1x Inside preservation.

b) OUTERPONTOON 4 mm steel plating

- 1x Foldable end with heavy steel hinges, stainless steel pin, bronze bushing, grease nipples and bronze fixing spindles.
- 1x Man hole inspection cover.
- 1x Rubber fender.
- 2x Boulder.
- 2x Towing lugs.
- 1x Offshore rated PVC anti slip grating on top.
- 1x Yellow coating RAL 1016 (Paint schedule attached)
- 1x Inside preservation.

c) BRIDGE SECTION

- 1x Water tight lattice square piping framing.
- 2x Integrated CATCHERS systems.
- 9x Pipe stanchions (106 cm high) with chain and fixings.
- 6x PVC oil resistant boarding 2000 x 114 mm fixed with all stainless steel bolts, rings and nuts.
- 2x PVC oil resistant boarding 2000 x 117 mm fixed with all stainless steel bolts, rings and nuts.
- 1x Offshore rated PVC anti slip grating on top.
- 1x Yellow coating RAL 1016 (Paint schedule attached)



Koseq Rigid Sweeping Arm

5.1.2 Weir skimmer cassette with movable debris screen

The weir module consists of an oil collection chamber fitted with a pump. The height of the oil collecting chamber can be adjusted in order to optimise the flow to the pump. The optimal height depends on oil viscosity, thickness of the layer etc.

For the operation with the weir skimmer module each sweeping arm is fit with a centrifugal screw impeller pump MSP 150/63 which has a discharging capacity of 300 m³ per hour.



Weir Skimmer Module

5.1.3 Brush skimmer cassette with movable debris screen

This skimmer consists of an aluminium oil collection chamber, brush belt and a pump. The height of the collection chamber can be adjusted. For the operation with the brush skimmer module, each sweeping arm is fit with a Desmi DOP 250 pump which has a discharging capacity of 125 m³ per hour.



Brush Skimmer Cassette

5.1.4 Marflex Centrifugal Pump (Light/Medium oil skimmer module)

Manufacturer:

Marflex B.V.

Louis Pasteurstraat 12

3261 LZ Oud-Beijerland

The Netherlands

Tel: +31 186 89 02 00

Fax: +31 186 89 02 49

Email: info@marflex.com

Website: www.marflex.com

Purchase year: 2010

The Marflex pump type MSP-150-63 is a hydraulically driven single stage vertical centrifugal pump that has been designed for efficient handling of viscous liquids, bulky solids and shear-sensitive liquids. The MSP 150 pump is based upon a centrifugal screw impeller that combines the properties of a screw pump with those of a centrifugal one.

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

Specification:

Design:	Single stage centrifugal
Capacity/head:	360 m ³ /h – 40 mlc. max.
Viscosity/specific gravity:	1.0 cSt. at 20°C/1.0
Speed:	2000 rpm max.
Required power:	45 kW
Hydraulic motor type:	Axial plunger with mechanical seal
Hydraulic working pressure:	200 bar
Hydraulic pressure, max.:	320 bar
Hydraulic flow, max.:	130 l/min
Maximum outer diameter:	490 mm
Height:	610 mm
Weight, excl. hydraulic hoses:	83 kg

The pressure, return and drain lines for the hydraulic motor and the discharge line for the pump consist of flexible hoses. All hoses are provided with stainless steel couplings.

Set of hoses consists of:

Hydraulic pressure hose: 1 “

Hydraulic return hose: 1½ “

Discharge hose: 6 “



Marflex Pumps

5.1.5 DESMI DOP 250 PDAS Pump (Heavy oil skimmer module)**Manufacturer:**

RO-CLEAN DESMI A/S

Hestehaven 21 B

DK-5260 Odense S

Phone: +45 6591 0201

Fax: +45 6590 8877

e-mail: roclean-desmi@desmi.com

Purchase year: 2010

Specification:

Length: 720 mm
Width: 390 mm
Height: 670 mm
Weight: 78 kg
Max. pressure: 10 bar
Max. capacity: 100 m³/h
Viscosity range: 1 to > 1 million cSt

Material

Screw: Double-curved Archimedes' screw in cast stainless steel (Ni-Resist), machined in a 5-axis CNC centre.
Casing: Casing in seawater resistant aluminium, cast iron, or stainless steel. Standard is aluminium. Replaceable polyethylene sealing ring.

Hydraulic system

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

Hydraulic connections

Pressure line: 3/4" - 1" quick coupling male
Return line: 3/4" - 1" quick coupling male
Drain line: 3/8" quick coupling male



DESMI DOP 250 PDAS Pump

5.1.6 Set of Oil hoses

Manufacturer:

Goodyear Engineered Products Europe
Unit 25 Robins Road,
Zone 3, Burntwood Business Park,
Burntwood, Staffordshire
UK WS7 3XB
Tel: +44(0)1543 672511
Fax: +44(0)1543 674917

Purchase year: 2010

The set consists of Semi-rigid oil hose, diameter 6 inches, 2 section (10m each), including connectors and adaptors (6 to 8 inches).

Specification:

12m spiral hose section between ship's manifold and crane elbow.

Type: Spiral

Code: Rig Supply HW

Diameter: 6 inch

Work pressure: 20 bar

Burst pressure: 60 bar

Couplings: Female aluminium Camlock and one 6 inch steel flange

12 m soft wall section between the crane elbow and the pump.

Type: Soft wall

Code: 200224698

Diameter: 6 inch

Work pressure: 20 bar

Burst pressure: 60 bar

Couplings: Female aluminium Camlocks



Oil Hoses

5.1.7 Set of hydraulic hoses (pressure, return and drain hoses)

Manufacturer:

DUNLOP INDUSTRIAL HOSES

Benoni (+27) 011-741-2500

Howick (+27) 033-239-7200

e-mail: marketing@dunlopindustrial.co.za

Purchase year: 2010

Specification:

2 x 12m Hydraulic pressure hose 1"

2 x 12m Hydraulic return hose 1.5"

2 x 10m Hydraulic hose 3/4"

18 x 10m hydraulic hose 1/2"

1 x 10m Hydraulic pressure hose 1"

1 x 10m Hydraulic pressure hose 1.5"

1 x 10m Hydraulic pressure hose 3/4"

5.1.8 Lifting crane/davit Lagendijk

Manufacturer:

Lagendijk Constructie B.V.

Choorhoekseweg 3

4424 NW Wemeldinge

The Netherlands

Tel: +31 (0) 113 621385

Fax: +31 (0) 113 622591

Email: info@lagendijk-constructie.nl

Purchase year: 2010

Specification:

Type: SK 5/10-5000/1000

Main dimensions: Length: 13.43 – Width: 1.8 – height: 4.1 meters

Propulsion: Hydraulic

Lifting capacity: 5000 kg – 5.9 meters / 1000 kg – 10.2 meters

Tilt: 3° max.



Lifting crane/davit Lagendijk

5.1.9 Hydraulic power packs

a) Koseq Power Pack

Manufacturer:

Kampers Oil Spill Equipment B.V.
 Oosthavenzijde 5
 P.O. Box 5606
 3297 ZG Puttershoek
 The Netherlands
 Tel: +31 78 6763811
 Fax: +31 78 6764853
 Email: design@koseq.com
 Website: <http://www.koseq.com>

Purchase year: 2010

Explosion proof, ZONE II certified, diesel driven Hydraulic Power Pack (HPP). The HPP's is mounted in a rugged frame and are fitted with ISO twist locks to fit the deck mounted frame with counter twist locks for quick and easy seafastening.

The Power Pack consists of a variable, displacement, axial piston pump and is driven by the water cooled diesel engine.

Specification:

Type: Diesel

Make: Daewoo

Rated power: Approx. 125 KW at 2000 rpm intermittent.
Start system: Hydraulic starting equipment, accumulator, recharging hydraulic pump, filter and start handle.
Cooling system: Water cooling (coolant).
Fuel system: Double filter incl. water separator.
Fuel tank: Basement tank, incl. filler breather filter and level gauge.
Air inlet: Dry filter with dust cyclone and visual dirt indicator.
Exhaust: Exhaust gasses cooled down by cooling system and Stainless steel Spark arrestor.
Make: Pyroban
Indicators: Engine speed, Coolant temperature, Exhaust temperature and lubricant pressure.
Protection against: Low pressure of lubricant.
High temperature of exhaust gasses, 200 °C
High temperature of engine's cooling system, 100 °C.
Over speed of diesel engine 2000 rpm.
Hand operated emergency stop which is closing the air inlet valve.
Operation temperature: -20 °C. to + 50 °C.

Hydraulic system:

Hydraulic pump: Parker. PV 140 variable axial plunger.
Hydraulic system: Open.
Hydraulic oil flow: 200ltr. At 2000 rpm.
Hydraulic oil pressure: 350 bar max.
Cooling system: Water-cooled, thermostat controlled and integrated with diesel engine's cooling system.
Indicators: Hydraulic oil and temperature.
Protection against: Overpressure by relief valve in pressure system of Power pack (350 bar).
High temperature and low level of hydraulic oil.
Stop button which is indirect blocked the fuel to the fuel pump of the diesel engine.

Connections:

Hydraulic high-pressure side: 1" quick coupling, female.
Hydraulic return side: 1½" quick coupling, female.

Dimensions /volume weight/colour.

Length: 2200 mm.
Width: 1340 mm.
Height: 2210 mm.
Volume of the diesel fuel tank: 400 litres
Volume of hydraulic oil tank: 230 litres.
Volume of coolant system: 120 litres.
Weight: 2200 kg dry, 2830 kg. incl. hydraulic oil and diesel fuel.
Colour: Cadmium yellow, RAL 1016.

The fuel tank is designated to contain fuel for a long time of use and also designed that is possible to mount the diesel engine and hydraulic system of Power Pack in as small as possible frame.



Koseq hydraulic Power Pack

b) Lamor Power Pack

Manufacturer:

Lamor Corporation Ab
 Urakoitsijantie 12
 06450 Porvoo
 Finland Tel: +358 (0)20 7650 100
 Fax: +358 (0)207 650 129
 Email: info@lamor.fi, Website: www.lamor.fi

MARIFLEX BV
 Offices and workshops
 Maassluisdijk 101
 3133 KA Vlaardingenv
 The Netherlands
 Tel. + -31-10 434 44 45
 Fax. + -31-10 232 95 00
 E-mail: info@mariflex.net
 Website: www.MariFlex.net

Purchase year: 2015

The Hydraulic Power Pack is a high-capacity multipurpose power pack for flexible operations of several oil spill clean up units simultaneously. It is contained within a steel frame designed to protect and ensure good air circulation. The power pack is equipped with four-point lifting rings and forklift channels for easy handling on land or offshore. It is equipped with an electric start and incorporates a control panel and hydraulic oil cooler in the framework. The 6-cylinder engine has an in-line design with full-authority electronic controls. A High-Pressure Common Rail (HPCR) fuel system delivers greater power at every rpm. Together with vertically centered fuel injection and a symmetrical cylinder bowl, it produces exceptional low-end torque and power with reduced emissions and increased fuel efficiency. For safety reasons, the hydraulic power pack is

equipped with an automatic shut-down system in case of malfunction. The diesel engine complies with the required emissions standards.

Specifications:

Diesel engine:

Make/type: DEUTZ / BF6M-1013M

Design: 6 cylinder line, water-cooled.

Rated power : 126 kW at 1900 rpm. Intermittent DIN B 6270

Zone: II 3G IIA T3

Start system: Hydraulic start.

Cooling system: Water cooling (coolant).

Coolant type: See Deutz User's handbook

Fuel system: Single filter incl. water separator.

Fuel type: en509 diesel fuel See Deutz User's handbook

Fuel tank: Basement tank, incl. filler breather filter and level gauge.

Lubricant type: See Deutz User's handbook

Air inlet: Dry filter with dust cyclone and visual dirt indicator.

Flame arrestor installed in inlet system

Exhaust: Exhaust gasses cools down by cooling system and Stainless steel Flame/Sparke arrestor is installed in exhaust system.

Indicators: Engine speed, Coolant temperature, Exhaust temperature, Lubricant pressure, Lubricant temperature and Hydr. temperature.

Protection against: Low pressure (1.4 bar, 20 psi) of lubricant,

High temperature of exhaust gasses, 170°C

High temperature of engine's oil system, 108°C.

Overspeed of diesel engine. 2300 rpm.

Hand operated emergency stop which is closing the air inlet valve.

Operation temperature: -20°C. and +50°C.

Hydraulic system:

Hydraulic pump, make/type : Parker axial plunger, with variable setting

Hydraulic system: Open.

Hydraulic oil flow set point 1: 160ltr at 300bar.

Hydraulic oil flow set point 2: 320ltr at 210bar.

Hydraulic oil pressure: 320 bar max.

Filter: Full flow 10 micron, incl. visual dirt indicator and by-pass at 0.7 bar or red area.

Cooling system: Air-cooled, thermostat controlled and integrated with diesel engine's cooling system.

Indicators: Hydraulic oil pressure and temperature.

Protection against: Overpressure by pressure relief valve in pressure system of Power Pack (350 bar).

High temperature and low level of hydraulic oil.

Stop button which is indirect blocked the fuel to the fuel pump of engine.

Connections:

Hydraulic high-pressure side: VVS112GAS-F2 FASTER.

Hydraulic return side: T15010RV 1 ½" TEMA.

Hydraulic leak line: T5010RV ½" TEMA .

Hydraulic load sense: T3801RV 3/8" TEMA.

Dimensions/volume/weight/colour:

Length : 2300mm.
Wide: 1400 mm.
Height: 2100 mm.
Volume of fuel tank: 400 ltr.
Volume of lubricant for engine: 14 ltr.
Volume of hydraulic oil tank: 230 ltr.
Volume of cooling system: 100 ltr.
Weight: 1950 kg excl. hydraulic oil and diesel fuel.
Weight: 2643 kg incl. hydraulic oil and diesel fuel.
Colour: Lamor colors, Main frame RAL 5010.
Doors, tank, and engine RAL 1023.

Consumption:

Fuel consumption engine: 0,30 ltr / kW / h



Lamor hydraulic Power pack

5.1.10 Portable water injection pump set

Manufacturer:

Ro-Clean Desmi A/S
Hestehaven 21 B
DK-5260 Odense S
Denmark
Tel: +45 6591 0201
Fax: +45 6590 8877
Email: info@ro-cleandesmi.com
Website: www.desmi.com

Purchase year: 2010

The water injection unit is a portable hydraulic driven unit designed for injection of water into the DESMI water injection flanges.

The water injection unit is connected to the power supply by means of a ½" hydraulic pressure/return hose set.

Specification:

Dimensions:

Length: 0.56m

Width: 0.45 m

Height: 0.46 m

Weight: 37 kg

Hydraulically driven water injection pump: Annovi Reverberi AR 115 diaphragm pump

Max. water flow: 114 l/min.

Max pressure: 20 bar

Max rpm allowed: 550 rpm

Hydraulic motor: Sauer Danfoss OMP50

Max. hydr. flow: 25l/min.

Max. hydr. pressure: 120 bar

Hydr. connections:

Parker type quick couplings

Power supply connections:

Inlet (pressure): 1/2" - male

Return: 1/2" - female

Water hose connections:

Inlet (suction): 5/4" female cam-locking type

Outlet (pressure): 3/4" male cam-locking type

5.11 Water outlet/injection flanges

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



Water injection flange

5.1.12 Water hoses

Length: 30 meters

Manufacturer:

Ro-Clean Desmi A/S

Hestehaven 21 B

DK-5260 Odense S

Denmark

Phone: +45 6591 0201

+45 6590 8877

Website: www.desmi.com/ro-cleandesmi

Email: info@ro-cleandesmi.com

Fax:



Water hose

5.1.13 Hydraulic hoses (pressure and return)

These hydraulic hoses are used for the hot water injection pump set (see 5.1.4).

Length: 10 + 15 meters

Manufacturer:

Ro-Clean Desmi A/S

Hestehaven 21 B

DK-5260 Odense S

Denmark

Phone: +45 6591 0201

Fax: +45 6590 8877

Website: www.desmi.com/ro-cleandesmi

Email: info@ro-cleandesmi.com

5.1.14 Spare parts set for power pack

Manufacturer:

Kampers oil spill equipment B.V.

Oosthavenzijde 5

P.O. Box 5606

3297 ZG Puttershoek

The Netherlands

Tel: +31 78 6763811

Fax: +31 78 6764853

Email: design@koseq.com

Website: <http://www.koseq.com>

Purchase year: 2010

The spare parts set consist of consumables and spare parts for the sweeping arm power pack. The list of spare parts includes:

Specification:

- 1) 1 V-belts fan drive
- 2) 1 V-belts recharger pump
- 3) 2 lube oil filters
- 4) 2 fuel filters
- 5) 1 air filter
- 6) 1 tank return filter element
- 7) 1 filter element starter system HP
- 8) 1 spin on filter retour flow
- 9) 1 filter wrench
- 10) 1 panel mounted pressure gauge
- 11) 1 pressure gauge
- 12) 1 dummy yellow exhaust flam trap
- 13) 1 PVC storage boxes 60 x 40 x 42 cm

5.2 Skimmer Transrec 150

Manufacturer:

Frank Mohn Flatøy AS

Flatøyvegen 24

5918 Frekhaug

Norway

Phone: + 47 55 99 94 00

Telefax: + 47 55 99 95 81

E-mail: oil&gas@framo.no

- 5.2.1 Transrec 150 storage and handling unit
- 5.2.2 Skimmer module – Weir head
- 5.2.3 Skimmer module – HIWAX head
- 5.2.4 Control desk
- 5.2.5 Canvas for storage unit
- 5.2.6 Ancillaries
- 5.2.7 Spare parts – Transrec 150
- 5.2.8 Oil hoses
- 5.2.9 Hydraulic hoses
- 5.2.10 Power pack – 200 Kw
- 5.2.11 Spare parts – Power pack

Description

The Transrec oil recovery and transfer system consists of two interchangeable skimmer heads: a weir skimmer and a high viscosity skimmer head. 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 Transrec 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 Transrec System is a complete self-contained unit, including:

- Skimmer head
- Floating umbilical
- Storage and handling unit
- Integrated crane arm
- Diesel hydraulic power pack
- Skid

The system is designed for operation by only 1 person. All functions are operated from the machine control panel or from a radio control panel. Being a complete self-contained unit it can be installed at anywhere on-board a vessel, independent of other systems.

The integrated crane arm is used to lift and slew the skimmer head over the stern/side of a vessel. After deployment of the skimmer head, the floating umbilical is unwound to a length sufficient to reach into the V or U shape of the oil boom where the oil is concentrated.

Holding this position, the operator then starts the pump in the skimmer head and the oil recovery operation will take place. On completion of operation, the umbilical is rewound and the skimmer head lifted on-board and parked. No manual handling is required.

The system is designed and manufactured to comply with Det Norske Veritas for operation in hazardous area Gas Zone II, corresponding to the deck area of an oil recovery vessel during oil recovery operations.

5.2.1 Transrec 150 storage and handling unit

Handling Unit

The Transrec consists of the following main parts;

- skid
- drum for storage and handling of floating umbilical
- floating umbilical
- integrated crane arm with spooling device
- skimmer head

All functions are hydraulically operated.

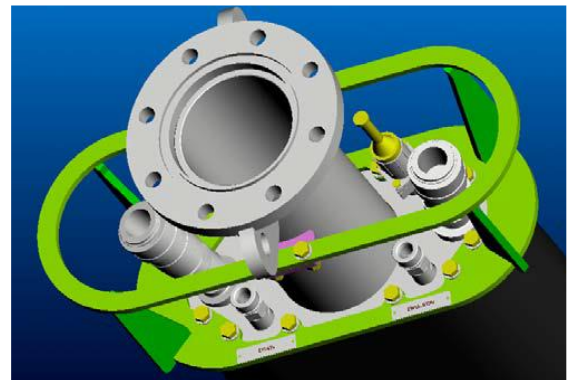


Transrec handling unit

Floating Umbilical

The Floating Umbilical has the following main functions;

- Lift the skimmer head for deployment and for retrieval
- Transfer hydraulic oil to and from the skimmer head
- Transfer oil from skimmer head to storage tanks
- Transmit electrical signals and power
- Transfer recovered oil (ship to ship)
- Off-loading of vessels in distress



Floating Umbilical

The following elements are vulcanised in fixed positions inside the floating umbilical:

- Cargo hose
- Hydraulic pressure hose
- Hydraulic low-pressure hose
- Line for electrical wires
- Line for emulsion breaker injection or for hydraulic drain oil
- Flotation elements
- Tension members

All lines are terminated into an endplate for connection to the skimmer heads.

Transportation

In an emergency situation the system can easily be transported by truck. The system is delivered with a standard ISO 20-ft containerized skid with standard twist lock connection for easy transportation by sea, rail, air or road.



Transportation by truck

Technical specifications

Storage and handling unit

1. Overall dimensions in stored position with 20-ft container type skid:

- Length: 6058 mm (20 ft)
- Width: 2440 mm
- Height: 3467 mm
- Weight complete w/umbilical: Approx. 18000 kg

2. Crane arm: Telescopic type

- outreach from centre drum : 7500 mm
- lifting capacity 3000 kg at max. outreach

3. Spooling device: Yes

4. Material: Hot galvanised carbon steel

5. Controllers;

- adjustable pump speed: Yes
- telescopic crane arm: Yes
- hydraulic arm up/down : Yes
- mooring control: Yes
- winding control: Yes
- rotating control (360°): Yes

6. Painting: FRAMO Standard

7. Electrical system: 240 V 50/60Hz 10A EEXD

Floating umbilical

1. Total length: 95 meters

2. Built in lines:

- 1 cargo hose: 6" oil resistant hose
- 1 high pressure hose: 1 1/4"
- 1 low pressure hose: 1 1/2"
- 1 for 6 electr. wires: 1/2"
- 1 for emulsion breaker: 1/2"

- 1 for drain: ½"

- 1 line in spare: ½"

3. Built in float material: Type PZ 940 Polyethelene with closed cells

4. Outer cover: Neoprene rubber

Connection to skimmer head: 6" Flange connected to longitudinal reinforced cargo hose and hydraulic quick couplings

Table 1 Operational limits

The maximum weather window is: Skimming condition.	Survival condition.	
Waves	6,0 m	8,0 m
Towing speed	0 – 4 knots	4,0 knots
Temp. range (air) (sea)	-40° C to + 50 °C -2° C to + 40 °C	
<i>Based on a Dynamic factor of 1,25</i>		

5.2.2 Skimmer module – Weir head

This skimmer head is designed to recover large quantities of light to medium viscosity oil.

Typical viscosities: 1 – 15 000 cSt.

Recovery rate: 0-400

m³/hr.



Weir Head

The skimmer head is equipped with an automatically adjusted wave compensated weir giving a minimum of free water intake. The skimmer head is fitted with thrusters for increased manoeuvrability.

Technical specifications Weir Head

Model	Weir Skimmer 150
Dimensions (ODxH)	2300 x 2320 mm
Weight	560 kg
Max. pump capacity	400 m ³ /hr
Material main frame	Seawater Resistant Aluminium NS 17305
Type of pump	Hydraulic driven centrifugal pump
Discharge flange	6" nominal DN150 PN 16 DIN 2633
Weir	Automatically adjustable, wave compensated
Weir entrance diameter	1600 mm
Materials	Oil Resistant PU
Thrusters	2

Positioning	45 degree
Power	2x7 hp
Operation	Hydraulic motor

5.2.3 Skimmer module – HIWAX head

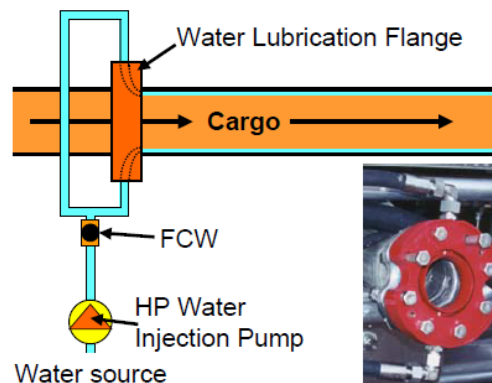
This skimmer head is built to handle extremely high viscosity oil as well as oils with high wax content. Typical emulsion viscosities range 10.000 -1 Mill cSt The skimmer head has drums with paddles catching the oil and squeezing it into the pump well. 2 thrusters force the skimmer head into the oil layer.



HIWAX Skimmer Head

Water Lubrication System

The HiWax skimmer head is equipped with a water lubricating system to decrease the friction in the cargo hose thus obtaining a higher flow capacity.



HIWAX Lubrication system

Technical specifications HIWAX Head

Main data	
Dimension (L x W x H)	3400x2790x1860 mm
Weight	1530 kg
Max. pump capacity	180 m ³ /hr
Max. hydr. pressure	280 bar
Max. oil flow	390 l/min
Type of pump	Archimedes, positive displacement, screw pump
Material	
Main body and paddles	Seawater Resistant Aluminium NS 17305
Drum data	
Quantity	2
Operation	Hydraulic motors, speed controlled
Adjustment	Electric hydraulic proportion

	reverse rev
Thrusters	
Quantity	2
Positioning	45 degree
Power	2x7 hp
Operation	Hydraulic motor

5.2.4 Control desk

Radio Control

The Transrec 150 is supplied with a portable radio control panel. This unit will allow the operator to operate the Transrec from different positions such as from the bridge and other suitable positions giving the operator the possibility to keep away from deck and thus be protected against all kinds of weathers. All functions of the Transrec can be controlled from the radio control panel.



Remote control

5.2.5 Canvas for storage unit

The storage and handling unit is covered with a PVC cover for protection of the equipment.



Protection cover

5.2.6 Ancillaries

A manometer tool box for the Transrec 150 is provided.

5.2.7 Spare parts – Transrec 150

A box with special spare parts for the Transrec 150 skimmer is provided.

5.2.8 Oil hoses

Standard hoses for connection between Transrec, hydraulic power supply and cargo line.

For the connection of the handling and storage unit to the vessels tank 12 m hydraulic hoses are included in the system.

Technical specifications cargo hose

Cargo hose	Length	Dimension	Material	Coupling Transrec	Coupling to vessel system
Cargo hose	12 m	6 "	External: Neoprene Internal: Nitril	6" Female Hammerlug coupling	6" Flange DN 150 PN 16 DIN 2623

5.2.9 Hydraulic hoses

For the connection of the handling and storage unit to the power pack 12 m hydraulic hoses are included in the system.

Table 5 Technical specifications hydraulic hoses

Hydraulic hoses	Length	Dimension	Material	Coupling Transrec	Coupling to vessel system
Pressure hose	12 m	1 1/4"	Nitril rubber	Snap tight SH71-2C16	Snap tight 71-SH71-2C16
Return hose	12 m	1 1/2"	Nitril rubber	Snap tight SVHC24	Snap tight SVHC24
Drain hose	12 m	1/2 "	Nitril rubber	Tema 5010 Femail 1/2"	Tema 5020 Mail 1/2"

5.2.10 Power pack – DPHH 150 -200 Kw

The Transrec System is supplied with a hydraulic power pack. The power pack is a separate portable containerised unit for easy transportation and may be used for other purposes such as emergency off-loading etc. It is compatible with the full range of FRAMO portable pumps.

Technical specifications

The power pack is a containerised unit built for operation of Transrec 150 or Framo portable pumps such as TK80, TK125, TK6 and TK150.



Power Pack DHPP 150

The unit is designed to operate in area classified as Gas Zone II.

1. Engine

- type: Water cooled, naturally aspirated 6 cyl., 4 stroke diesel engine, type Cummins
- Rating: 200 kw – 272 hp at 2300 rpm
- Fuel tank: 80 l
- Forklift channels: Yes
- Air filter: Dry type

- Instrumentation: Tachometer Hydraulic pump pressure gauge
 Hydraulic fluid level gauge
 Hydraulic fluid temperature
- Silencer/Spark arrestor: Yes
- Automatic stop: In case of to low lub-oil pressure
 In case of to high engine temp.
 In case of to low hydraulic oil level
 In case of over speed
- Starting equipment: Hydraulic, spark proof

2. Hydraulic system

- Hydraulic pump flow: 0 - 430 l/min max.
- Hydraulic pressure: 0 – 300 bar
- Hydraulic connection: 1" pressure, 1 1/2" return,
- Hydraulic oil cooler: Radiator type
- Hydraulic oil tank: 120 l

3. Material: Base, frame, tank and panel are all manufactured in SW-resistant aluminium alloy. All screw, nut and bolt connections in Stainless steel.

4. Weight/dimensions

- Weight: 1.950 kg incl. oil and water
- Dimension: (L x W x H): 2450x1378x1530 mm

5. Fuel consumption: Approx 60 l/hr at full load

6. Approval: Classified by D.n.V. for hazardous area Zone II operation and complies with EEMA, The Engineering Equipment and Material Users Association, Publication No. 107:1992

5.2.11 Spare parts – Power Pack

A box with special spare parts for the Power Pack DPHH 150 is provided.

5.3. Oil Boom Set

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

Purchase year: 2010

The system comprises the following parts:

- 1) Desmi Ro-boom 2000, 2 x 250 meters
- 2) Storage reel
- 3) Towing lines set
- 4) Air blower with air hoses
- 6) Hydraulic hoses for the boom reel
- 7) Storage container 10"
- 8) Repair kits for the reel and the boom

5.3.1 Desmi Ro-boom 2000 SPI, 2 x 250 meters

The Ro-boom 2000 SPI oil containment boom is a single point inflation heavy duty boom. It is moulded in a composite of Du Pont Hypalon and neoprene rubber and reinforced with two plies of polyester fabric. The unique construction ensures complete cross vulcanization of the composite materials resulting in a product with high abrasion resistance, peel resistance and tensile strength. The Ro-boom 2000 lies completely flat when deflated allowing easy cleaning, storage, recovery and maintenance. Individual air chambers provide high integrity. Even if one air chamber is deflated the freeboard is maintained by the adjacent air chambers. The Ro-boom 2000 is fitted with stainless steel fittings and hot galvanized ballast/tension chain, secured with reinforced chain attachment points. Internal fibre glass rods with stainless steel brackets ensure optimum skirt profile under tow.

The space required on deck to deploy the boom will be minimum 6 meters. In addition, rollers and guides will be needed for the safe deployment of the boom (see point 4: Requirements for the Vessel).

The Ro-boom withstands the effects of the sun, sea and oil, while attachments, such as eyelets and brackets, are made from stainless steel.



Desmi Ro-boom 2000

Specification:

Boom length:	2 x 250 meters
Purchased:	2007
Freeboard:	0.6 m
Draught:	1.1 m
Length of air chamber:	4.5 m
Section length:	50 m
Weight per metre incl. chain:	13.5 kg
Tensile strength chain:	200 kN
Buoyancy to weight ratio	20:1
Ballast chain:	13 mm
Operational temperature:	-40°C to 60°C
Efficient in waves up to:	4 m
Stable in current up to:	3 knots
Standard connector:	Stainless steel hinge
Maximum in-line towing speed:	10 knots

5.3.2 10' ISO flat rack reel

The Ro-boom 2000 is delivered on two winders. The winder frame is used for storage, transportation and handling of the Ro-boom. The standard winder frame is manufactured from specially designed steel and standard profiles.

Two frames with bearing housings for a shaft are mounted on the bottom frame. A drum with end flanges is mounted on the shaft and on one end of the shaft a sprocket wheel is mounted between the

drum and the bearing housing.

To rotate the drum a gearbox, with hydraulic motor, is mounted on a bracket plate on the bottom frame. The rotating power to the drum is transferred by a roller chain. On hand cranked winders the gear box with crank is placed on the side of the bearing frame.

In order to secure the boom to the drum before winding, the drum is on each side equipped with two eyes to which the two reeling wires are shackled.

The bottom of the winder frame is equipped with two ISO forklift channels and in the corners there are four lifting brackets for strops for lifting by crane. The corners have ISO corner fittings suitable for fixing to the flat rack by ISO twist locks.

Lashing points are provided on the bearing frames by transverse pipes situated under the bearing base plate.

Each winder is delivered with a canvas, which is mounted with rubber strops provided with steel hooks. The 10' storage container comes equipped with twist locks for transportation, lifting hooks and forklift channels.

Dimensions :

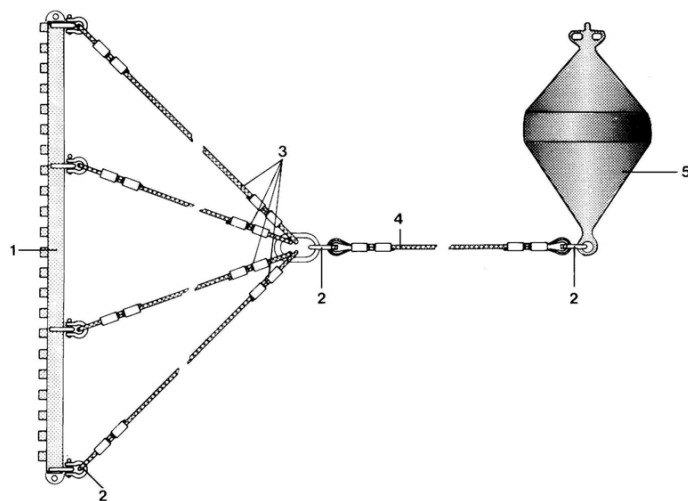
Length:	2991 mm
Width:	2438 mm



10' flat rack reel

5.3.3 Towing set

The Ro-Boom 2000 is provided with two sets of towing lines.



Towing bridle

Tow Bar

The hinge type tow bar is manufactured from heavy, threaded pipe, sealed at both ends by means of end covers with eyelets for mounting of chain, handling, etc. Tube stubs are mounted along one side of the bar, matching the hinge connectors of the boom. On the other side of the bar, heavy eyelets are welded to connect the bridle. The bar is hot dip galvanized.

Bridle

The bridle, consisting of polypropylene prongs with thimbles, is assembled with a ring at one end.

Tow Rope

The tow rope is a polypropylene rope with spliced eyelets in one end and thimble in the other. The eyelet with the thimble has a class 1 shackle and is shackled to the oval ring of the bridle. The opposite end is shackled to a buoy by means of a shackle.

Towing set components	Qty
Bridle with oval ring - 4 pr. Ø14 x (5000 & 5097)	2
Buoy - 60 litres - Ø450 x 720 mm	2
Tow rope - Ø32 mm x 70 m	2
Shackle - 7/8" class 1 - 6.5 T	4
Tow bar - 170 x 115 x 2000 mm	2
Shackle - 5/8" class 1 – 3.25 T	8
Wire with slip hook - Ø10 mm x 10 m	1
Shackle - ½" type D - 0.5 T	1

5.3.4 Air blower with air hoses

The Desmi air-blower is a movable unit designed for inflation/deflation of oil booms.



Desmi air blower

Specification:

Length:	750 mm
Width:	600 mm
Height:	1125 mm
Weight:	95 kg
<u>Hydraulically driven air blower:</u>	Elektorr HRD2
Max. air flow:	27 m³/h

Max air pressure:	0.086 bar
Max rpm allowed:	5800 rpm
Couplings:	2 x 4" Perrot
<u>Hydraulic control valves:</u>	Danfoss PVG 32 proportional valve
Max. hydr. flow:	100 l/min.
Max. hydr. pressure:	210 bar
Relief valve setting:	240 bar
<u>Hydr. connections:</u>	TEMA type quick couplings

5.3.5 Hydraulic hoses for the boom and air blower

5.3.6 Storage container ISO 10'

5.3.7 Spare parts (repair kit for the Ro-boom and the reel)

The spare parts kit includes items necessary for the field repair and maintenance of the Ro-boom 2000.



Repair kit for the Ro-boom 2000

5.3.8 Power pack Desmi DHPP 42 kW

DESMI Ro-Clean diesel driven hydraulic power pack (hydraulic power units) for operating oil spill control equipment such as boom reels, skimmers and pumps, as well as other devices.. The power packs are designed for easy access to components, and have steel frames that are hot galvanised or epoxy painted.

Advantages:

- Powerful diesel-hydraulic power pack 42kW
- Remote control
- Fitted with fork lift channels
- Skid mounted as standard
- Equipped with load sensing hydraulic control system (energy saving system)

Technical data:

Engine Power:	42 kW / 57 hp
Max total hydraulic flow & pressure:	160 lpm / 42 US gpm 210 bar / 3,045 psi
No of circuits:	1 to 4
Oil Cooler:	Yes
Starting options:	Electric / spring
Standard hydraulic connection:	$\frac{3}{4}$ in $\frac{1}{2}$ in $\frac{3}{8}$ in drain
Crane:	Optional
Air blower (for boom inflation):	Optional
Frame:	Skid
Weight:	750 kg / 1,653 lbs
Dimensions:	1.85 x 1.0 x 1.25 m / 73 x 39 x 45 in



Power pack Desmi DHPP 42 kW

5.4. Boom Set 2: Weir Boom

Manufacturer: Vikoma International LTD

Kingston Road, East Cowes, Isle of Wight, UK

PO326JS

Phone: +44 (0)1983200560

Fax: +44(0)1983200561

E-mail: sales@vikoma.com

Webpage : www.vikoma.com

5.4.1 Vikoma Weir boom 180

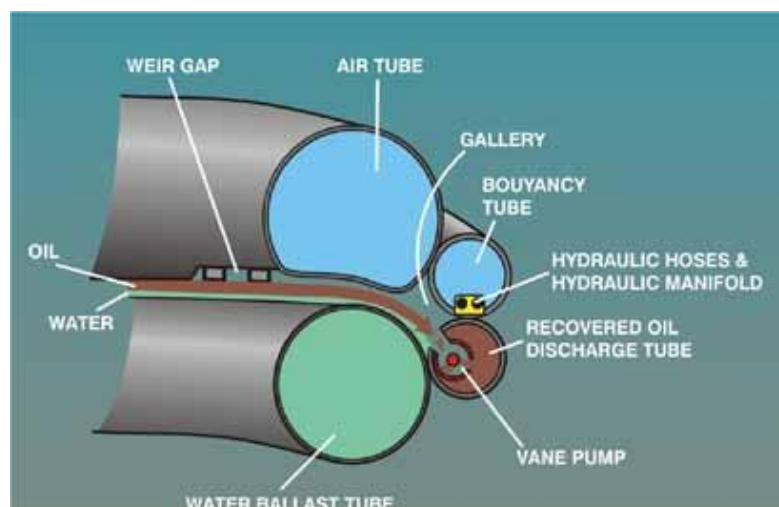
The boom is designated for deployment and operation from the starboard side only of a vessel. Deployment of the boom is carried out by what is termed the “Loop Laying” method. The first part of the boom off the reel is anchored to the Primary vessel; the remainder of the boom is “Loop Laid” along the side of the boom already deployed. When the total length of the boom is off the reel the last end off is passed to the Secondary vessel, the tow vessel. This end is the first end to be recovered.



Deployment of the Vikoma weir boom

The weir and deflector booms are similarly constructed and joined together during manufacture to form a continuous boom of some 370 metres long. The 4-tube section, 70.5 metres long, being termed the weir Boom and the 2-tube section, 300 metres long, being termed as the deflector Boom.

An upper air tube and lower water ballasted stabilising tube run the entire length of the boom. Where the weirs and weir pumps are located the water tube is of a larger diameter, this provides more stability to offset any effects of turbulence around the pumps. The water ballast tube is not a sealed tube it has holes along its entire length and an opening at the extreme end nearest to the secondary vessel.



Hoses arrangement

The weir section of the boom also has attached to it an extra buoyancy tube, which also carries the hydraulic hoses to the weir pumps. Below the extra buoyancy tube is the discharge tube in which the weir pumps are mounted.

Access to the weir pumps and the hydraulic connections are through zippers in the discharge and extra buoyancy tubes. The gallery is accessible for cleaning purposes.

A pressure relief valve the “dump valve” is mounted in the end of the discharge tube.

The boom is anchored to the Primary vessel by a rope attached to a strop bolted to the boom end. A rope and strop assembly bolted to the boom end anchors the deflector boom end to the secondary vessel.

Boom Material: Nylon reinforced, double faced neoprene fabric vulcanised under pressure.

Weir section: 70.5 meters

Deflector section: 300 meters

The system is supplied as two items: the reel with boom and pumps and the 20ft ISO container that contains the remainder of the equipment.

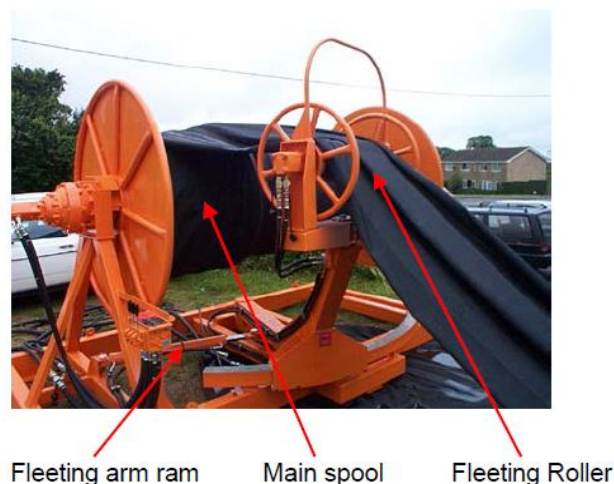
5.4.2 Storage reel

The boom complete with pumps and relief valve is deployed and recovered from a hydraulic powered reel system. The reel incorporates a powered fleeting roller and arm that assists with the boom recovery.

Lifting: 4 lift points

Weight: 5350kg

Dimensions: 3890x2500x2500 (base 3890x2215)



Storage reel

5.4.3 Water Pump

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

Construction

Outer casting: Rolled marine grade aluminium alloy sheet with stainless steel debris guard

Impeller: Polypropylene

Hydraulics

Drive: Hydraulic motor directly coupled to propeller.

Demand: Maximum 25 litres per minute @ 140 bar

Displacement: 48.35cm³

Controls

Speed control mounted on the control console

Operating Speed

0 – 450 rpm



Water pump

Dimensions:

Length: 1200 mm

Diameter: 353 mm

5.4.4 Recovered oil discharge pump

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

Dimensions:

Length: 122cm

Width: 92cm

Height: 69cm
Weight: 340Kg

Construction:

Pump: Cast iron housing with oil resistant rotary lobes.

Trip tray: Painted mild steel. Mild steel work shot blasted, 2 coats epoxy primer and 2 coats polyurethane enamel – Orange RAL 2008

Lifting

4 lifting eyes.

Forklift pockets

Pump Features

Sealed flexible coupling

Hydraulic drive

8" male camlock connector on inlet

6" male camlock connectors on outlet

Quick release hydraulic couplings

Pump Capacities

MAXIMUM (not available simultaneously)

Volume 180 m³/h

Suction lift (restricted) 2.5m head water

Discharge Pressure 3.5 bar

Suction line limiting valve 250mbar

Hydraulic requirement 110 litre/ min

@140bar



Oil discharge pump

5.4.5. Oil hoses

Pump section hose is 4 x 4.5 m length of semi-rigid hose, (8" bore) with 6" Camlock couplings.

5.4.6 and 5.4.7 Power Packs

This GP70 ATEX version powerpack is to supply the hydraulic power necessary to operate the Weirboom System or other Vikoma equipment via a separate dedicated control console. The powerpack is ATEX compliant for Zone II, category 3G, gas group IIB, temperature class T3.



Power pack

Dimensions:

Length 1900mm

Width 1100mm

Height 1895mm

Construction

Base Frame: Mild steel

Hydraulic Tank: SS304 with 200 litre capacity

Diesel Fuel Tank: SS304 with 100 litre capacity

Paint finish: 2 coats polyurethane primer and 2 coats polyurethane top coat RAL 2008

Lifting: Fork pockets on all sides.

(Lifting eyes on top are to lift cover only)

Performance: 160 bar maximum system pressure

Engine

A Yanmar 4TNV98-ZNS naturally aspired diesel engine drives the hydraulic system.

Four cylinder; water-cooled; diesel emission compliant to Stage 3A & Interim Tier 4.

Power rating: 47kW at 2,100 rpm

Maximum engine speed: 2200 rpm

Idle engine speed: 800 rpm

Safety Devices: Automatic air intake shut off valve for over speed protection.

Exhaust spark arrestor.

Low engine oil pressure shutdown.

High coolant temperature shutdown.

Hydraulic oil low level shutdown.
Hydraulic oil high temperature shutdown.

Hydraulics

Hydraulic Pump: Axial piston type directly coupled to engine

Cooling: Hydraulic oil cooled via a secondary radiator

Max. Output: 125 litres/min @ 160 bar

Hydraulic Couplings: Quick release couplings

2 x Pressure: Female 1"

2 x Return: Male 1¼"

2 x Drain: Male 3/8"

5.4.8 Hydraulic hoses

Set of hydraulic hoses supplied to run from hydraulic power packs to control console and from the console to the ancillary equipment.

5.4.9 Towing set

Towing warps: the boom is fitted with nylon webbing tow strops at both ends of the boom. Tow ropes are attached to the strops for towing and securing the boom during deployment.

5.4.10 Air blower system

Hydraulic Air Fan

A hydraulically driven air fan provides air to the main air tube and extra buoyancy tubes. A non-return valve in the GRP adaptor allows that the fan be shut down after the boom has been completely deployed, back pressure from the boom keeps the valve closed. DO NOT ISOLATE THE FAN FROM THE HYDRAULICS IT MUST REMAIN CONNECTED.

Construction:

Framework: Marine grade aluminium alloy

Hydraulics:

Drive: Hydraulic motor directly coupled to impellor

Demand: Max 28 litres per minute @ 140 bar

Dimensions:

Length: 88cm

Width: 62cm

Height: 72cm

Weight: 73Kg

Controls: Speed control mounted on control console

Output: 28m³/minute @ 0.02 bar



Air blower

Airpack Inflator

The Vikoma Airpack Inflator is used to supply the necessary air inflation during the deployment of the Vikoma HI Sprint Boom™. Inflator is supplied with hose kit.

Dimensions

Length 84cm

Width 45cm

Height 59cm

Weight 68Kg (hand start)

77Kg (electric start)

Construction

Frame Aluminium alloy

Belt cover Aluminium alloy

Engine

Single cylinder air cooled diesel.

Continuous power 4.1kW @ 3300 rpm

Hand starting Recoil

Electric starting Key ignition

12 volt battery charged by

alternator on engine.

Fuel capacity 2.7 litres

Air Fan

Type: Centrifugal, high volume, low pressure

Drive: Vee belt system @ 2.4:1 increase

Controls: Fan output via engine speed

Maximum Output: 16m³/min @ 8000 rpm

Pressure: 69 mbar



Air inflator

5.4.11 Air hoses

5.4.12 Hydraulic hoses

5.4.13 Flat rack

5.4.14 Container

This container is for the storage of power packs, discharge pump, airfan suction, discharge and hydraulic hoses, spares, control console and discharge assembly.

The 20 ft container has a side and end door.

Dimensions: 20ft ISO container

Weight: 7200 kg



Container

5.4.15 Spare parts

5.4.16 Control desk



Control desk

5.4.17 Remote control

All controls for the system are located on a freestanding moveable control console. The console is manufactured in stainless steel. All hydraulic connections are of the Quick Release type.

5.4.18 Crane with a winch, electric control valve and remote control

Crane: Model - Telescopic Marine Crane Guerra, MR75.45A3

- Lifting moment: 70,0 KNm.
- Horizontal hydraulic outreach: 8,50 m., with 3 hexagonal hydraulic extensions self-guided by sliding pads of polyamide and brass.
- Crane slewing of 373°, with 2 hydraulic cylinders in oil bath.
- (406/4) control valve and bearing at the foot of the crane.
- Safety valves in hydraulic circuits.
- Load limiting device.
- Emergency stop button.
- Square base (1.000 x 1.000).
- Paint RAL 2004 (orange) or RAL 5013 (blue).
- Special cylinders with Ni-Cr piston rods for marine environments.
- Grit blasted structure (SA 2 1/2 according to ISO 8501-1:1998) and metalized.
- Double primer and paint coating.
- Stainless steel hydraulic installation pipes and hoses, except for control valve and tube fittings.

The crane structure is built with high tensile stress steel. The equipment was designed according to DIN-15018 (H1-B3) regulation and manufactured under the Quality Management System Standard ISO 9001:2000.

Winch: GLR 130 hydraulic hoisting winch, capacity 950 kg, with 10x30 cable, limiting device, drum rope end, hydraulic anti-block system, direct pulley and counterweight, instaleed using crane free control valve element.

Electric control valve: 4 sections, with pressure filter.

Remote control: HBC radio remote control for 4/5/6 sections electric control valve, with connection box.

5.5 Portable Oil/Water Interface Detector

Manufacturer:

MMC International Corporation
60 Inip Drive, Inwood, New York 11096-0664
Phone: 800-645-7339
Fax: 516-371-3134
e-mail:mmcinwd@aol.com

Description:

Purchased:	2006
Model:	D-20401-2
Function:	Manual interface, ullage and temperature detector
Manual :	available



Interface detector

5.6 Sampling/Testing Equipment

5.6.1 Mini-lab Viscometer

Manufacturer:

A&D Instruments, Ltd.
Unit 24/26 Blacklands Way Abingdon Business Park,
Abingdon, Oxon OX14 1DY United Kingdom
Tel 44-1235-550420
Fax 44-1235-550485
www.adinstruments.com/contactus

Description:

Purchased:	2006
Type:	SV-10
Function:	Device for viscosity detection of high accuracy, wide range measurement and long continuous measurement time
Measurement Method:	Tuning Fork Vibration Method
Physical Dimensions:	Main Unit: 332 (W) x 314 (D) x 536 (H) mm. Approx. 5.0 kg
Display Unit:	238 (W) x 132 (D) x 170 (H) mm. Approx. 1.3 kg
Standard Accessories:	Manual, AC Adaptor, CD-ROM (WinCT-Viscosity), Sample Cups, RS-232C Cable (25 pins – 9 pins)
Manual:	available



Viscometer

5.6.2 Mini-lab Densimeter

Manufacturer:

Anton-Paar-Str. 20
Main Entrance: Kärntner Straße 322
A-8054 Graz, Austria/Europe
Tel: +43 / 316 257 / 0
Fax: +43 / 316 257 / 257
e-mail: info@anton-paar.com

Description:

Purchased: 2006
Type: DMA 35N
Function: Measures the density of liquids in g/cm³ or in kg/m³ according to the U-tube principle.
Manual: available



Density meter

5.6.3. Flash Point Tester

Manufacturer:

Petrotest® Instruments
GmbH & Co. KG
Ludwig-Erhard-Ring 13
15827 Dahlewitz / GERMANY
Tel. +49 (0) 33 708 56-300
Fax: +49 (0) 33 708 56-556
e-mail: info@petrotest.com

Description:

Purchased: 2006
Type: Miniflash
Function: Fully automatic Flash Point Testers by continuously closed cup (CCCFP) – Method according to ASTM D 6450
Manual: available



Miniflash

5.6.4. Portable Gas Detector

Manufacturer:

Dräger Safety AG & Co. KGaA
Revalstrasse 1
23560 Luebeck, Germany
Tel +49 451 882 0
Fax +49 451 882 2080
e-mail: www.draeger.com

Description:

Purchased:	2006
Type:	X-am 7000
Function:	For use in mixtures of flammable gases and vapours with air. Independent measurement of up to five gases, depending on installed sensors.
Manual:	available



X-am 7000

5.8 Communication devices

VHF Airband receiver ICOM IC-A110



VHF Airband receiver ICOM IC-A110

Specifications

Frequency range	118.000 - 136.975 MHz
Channel spacing (according to version)	8.33/25 kHz auto selection or 25 kHz only
Mode	6K00A3E (AM)
No. of memory Ch.	20
Antenna connector	SO-239 (50Ω)

Power supply requirement (negative ground)	13.75 V DC or 27.5 V DC automatic selection
Current drain (at 13.75 V DC)	
Transmitting	5.0A max.
Receiving	4.0A (at AF max.) 0.5A (at stand-by)
Operating temperature range	-30°C to +60°C; -22°F to +140°F
Frequency stability	±5 ppm (-30°C to +60°C)
Dimensions (projections not incl.)	150(W) × 50(H) × 180(D) mm 5 ^{29/32} (W) × 1 ^{31/32} (H) × 7 ^{3/32} (D) in
Weight (approx.)	1.5 kg; 3 lb 5 oz

Transmitter

Output power	36 W typ. pep (9 W typ. for CW)
Modulation limiting	70 - 100% (IC-A110)
Modulation compression	Linear 85% Max. 95%
AF harmonic distortion	Less than 10% (at max. mod.)
Hum and Noise ratio	More than 40 dB
Spurious emissions	Less than -16 dBm
Adjacent Ch. power	Less than 60 dB (25 kHz) Less than 50 dB (8.33 kHz)
Microphone connector	8-pin modulator (600Ω)

Receiver

Receiving system	Double conversion superheterodyne
Intermediate freq.	1st 38.85 MHz 2nd 450 kHz
Sensitivity (pd)	Less than 1 μV (at 6 dB S/N)
Squelch sensitivity (pd; at threshold)	Less than 0.3 μV
Selectivity 25 kHz Ch. Spacing	More than ±8 kHz (at -6 dB) Less than ±17 kHz (at -40 dB) Less than ±25 kHz (at -60 dB)
8.33 kHz Ch. Spacing	More than ±2.778 kHz (at -6 dB) Less than ±7.37 kHz (at -60 dB)

Spurious response	More than 74 dB μ
Intermodulation rejection ratio*	More than 64 dB
Blocking/desensitisation	More than 70 dB
Cross modulation rejection	More than 70 dB
Audio output power	(at 13.75 V; 10% dist.; 60% mod.)
Internal speaker	1.5 W typical w/8 Ω load
External Speaker	More than 10.0 W w/8 Ω load
Headset (side tone)	More than 0.1 W w/500 Ω load
AF output impedance	
EXT SP	8 Ω
Headset (side tone)	500 Ω

5.9 RPAS ancillaries

1. Laptop DELL Precision 7530

Processor:	Intel® Core™ i7-8750H 6 core, up to 4,1 GHz
Graphics:	NVIDIA® GeForce® P2000 GDDR5 4 GB
RAM:	16 GB DDR4 2666 MHz
Storage:	SSD 1TB
Display:	15.6 inch QHD (2560 x 1440) 120Hz,
Operating system and software	<ul style="list-style-type: none"> • Windows 10 Pro 64 bits • Microsoft Office Home and Business 2016 ESD Ubuntu Linux 18



Dell Laptop

2. WLAN equipment (router and extender) and cables

5.9 Discharging equipment

Pump DESMI DOP-250 DUAL

Manufacturer:

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

Purchase year: 2006

<u>Part</u>	<u>Qty.</u>
Sectional disc for plate wheel DS 250	10
Screw for sectional disc	10
Sealing ring	1
Plate wheel shaft for DOP-250 dual	1
Stop plate for DOP-250	1
Wear plate for DOP DUAL 250	2
Right sealing / bearing disc	1
Left sealing / bearing disc	1
Shaft sealing ring, Simrit	3
V-seal ring Teflon incl. pins	1
O-ring – ø40 x 2 mm – nitrile – DOP Dual	2
Stator cutting knife	1
Washer M6	2
CH-Screw M6 x 20	2

Manual: Included in the pump's manual

Spares Kit for DOP-250 DUAL

Manufacturer:

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

Description:

Purchase year: 2006

<u>Part</u>	<u>Qty.</u>
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Sectional disc for plate wheel DS 250	10	
Screw for sectional disc	10	
Sealing ring		1
Plate wheel shaft for DOP-250 dual		1
Stop plate for DOP-250	1	
Wear plate for DOP DUAL 250	2	
Right sealing / bearing disc		1
Left sealing / bearing disc		1
Shaft sealing ring, Simrit		3
V-seal ring Teflon incl. pins		1
O-ring – ø40 x 2 mm – nitrile – DOP Dual		2
Stator cutting knife		1
Washer M6		2
CH-Screw M6 x 20		2



Spare parts for Pump DESMI DOP -250 DUAL

Framo TK150 300m³/h 6 bar pumps

Pump Framo TK150 DHH56-A225-S

Manufacturer:

Frank Mohn Flatøy AS
N 5918 Frekhaug
Norway
Phone: + 47 55999400
Telefax: + 47 55999581
e-mail: fl-salg@framo.no

Description:

Purchase year: 2007
Pumps Certified: 2007

Dimensions/Capacities

Weight: 78 kg pump body
Ø x H: 300 x 855 mm

Min. manhole diameter:	12 ½" Butterworth opening
Pump outlet:	6" cam-locking type male outlet
Max. pressure:	10 bar
Max. capacity:	340 m³/h – 55 mwc / 40 m³/h – 95 mwc (sp.g. 1,0)

Hydraulic System

Prime mover:	Axial piston type A2F 56
Max. speed:	3700 rpm
Max. input power:	74.2 kW
Max. oil flow:	217 l/min
Max. inlet pressure:	235 bar
Hydraulic return oil pressure:	16 bar

Hydraulic connections

Pressure line:	1" quick coupling male
Return:	1 ½ "quick coupling male



Framo pumps

Water Injection Flanges DOP-250 - 6" Camlock inlet/outlet

Manufacturer:

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

Description:

Purchase year:	2006
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<u>Part</u>	<u>Qty.</u>
Intermediate flange 5"	1
6" Camlock flange	1
6" BSP flange	1

Bushing for flange		1
O-ring 144.5x3 NBR		1
O-ring 125x2.5 NBR		2
Allen screw M12x40		8
Pipe plug RG 3/8"		1
Fitting for non-return valve		1
Disc M8		2
Allen screw M8x16		2
Union elbow		1
Nipple 3/4x3/4 BSP		1
Bonded seal 3/8"		1
3/4" Camlock type - male		1
Non-return valve 3/4" st.	1	
6" Camlock female		1
SK screw M16x75		8
Washer M16		8
Nut M16		16
O-ring 174.5x3 NBR		1



Water Injection Flange- outlet

Pump hydraulic flow control valves



Hydraulic flow control valves

5.10 Cleaning Equipment

Cleaning equipment consists of three high pressure mobile cleaning machines.

Manufacturer:

KRÄNZLE Germany
Elpke 97
D-33605 Bielefeld
Tel.: +49.521.926260
Fax: +49.521.9262640
e-mail: info@kraenzle.com

Description:

Purchased:	2006
Type:	Therm 1165
High pressure:	30 – 195 bars,
Max. water temp:	80°C,
Max. hot vapour temp:	150°C



Cleaning machine