## `The Vikoma MiniVac Systems - portable recovery systems for the collection of spilt oils and floating contaminates'

What are the key features and benefits of this system?

- The flexibility and lightweight construction of the MiniVac system allows the components to be lifted by two people.
- The modular arrangement can be assembled and operated quickly and easily.
- Diesel power and high speed air systems ensure that the MiniVac is completely safe for use in most disaster areas.
- The MiniVac Basic system is ideal for rapid clean-up operations in the most remote and inaccessible areas and has a recovery rate of **24m$^3$/hr** as independently witnessed by Lloyds assessors.
- The MiniVac Plus system has the additional benefit that recovered fluids can be pumped away from the contamination site to transport tankers without the need for temporary storage tanks or drums.
- The compact design of the equipment makes it easy to store and transport.
- The MiniVac system has been used successfully around the globe and has proven to be extremely effective with very low maintenance.
- The MiniVac system was developed and tested to meet demanding design and performance criteria established following recent major oil spills.

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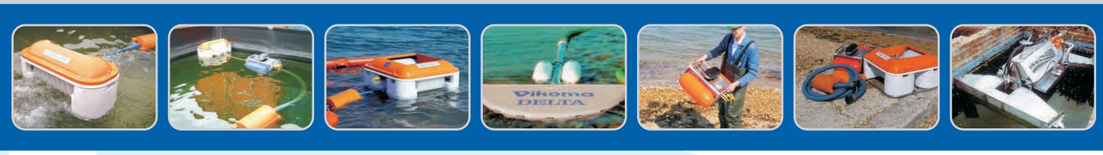
MV/B/3.02


# THE MINIVAC SYSTEM

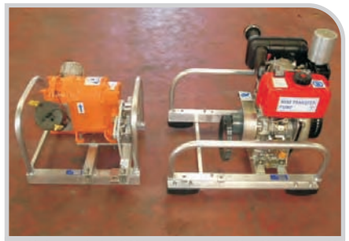
The ultimate lightweight, portable vacuum recovery system.



Technology for a Cleaner Environment

# THE MINIVAC SYSTEM

What is it? - The MiniVac system is a lightweight, aluminium, hand portable vacuum recovery system for the collection of spilt oils and floating contaminates. It is a unique modular system, available in three standard formats:


MODULAR DESIGN FOR EASE OF CARRYING

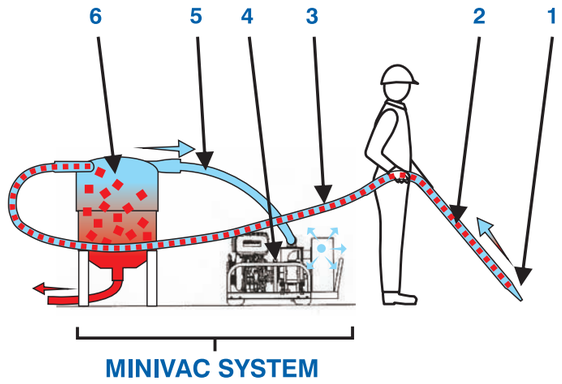
1) MiniVac Basic - a complete operational system comprising Mini-Vac, vacuum receptor, hoses and suction lance.

2) MiniVac Plus - an enhanced system, including all the MiniVac Basic equipment with an additional Mini transfer pump unit to empty the vacuum receptor to discharge.

3) MiniVac Plus Containerised - a custom built container housing all MiniVac Plus components.

Each MiniVac system has been designed to enable rapid clean-up in inaccessible areas and has a recovery rate of 24m$^3$/hr.

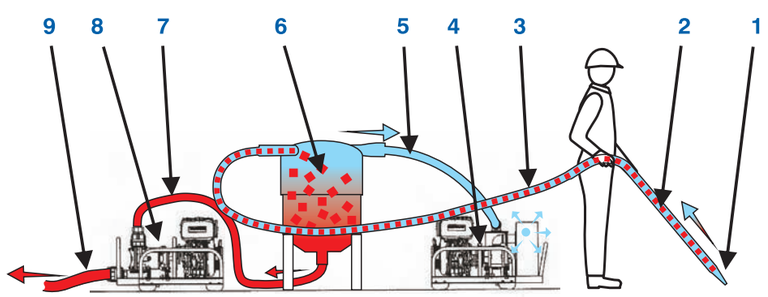
## MiniVac




**PRINCIPAL COMPONENTS**

1. TOOLS
2. LANCE
3. SOIL HOSE
4. MINIVAC UNIT
5. VACUUM HOSE
6. VACUUM RECEPTOR

## MiniVac *Plus*




**PRINCIPAL COMPONENTS +MINI PUMP**

1. TOOLS
2. LANCE
3. SOIL HOSE
4. MINIVAC UNIT
5. VACUUM HOSE
6. VACUUM RECEPTOR
7. SUCTION HOSE
8. MINI TRANSFER PUMP
9. DISCHARGE HOSE

Where is it used? - The MiniVac system can be lifted by two people and this makes it ideal for use in remote and inaccessible sites; for example where conventional skimmers could not operate, where wheeled trailers would be unable to negotiate the terrain or where the recovery with absorbents would be too costly. This includes rocky beaches, ponds & lakes, marshland, harbours and industrial pits. The MiniVac system has been successfully employed in locations all around the globe with emergency response organisations, Coast Guards, Fire Brigades and Port Authorities.


MINIVAC BEACH CLEAN-UP


MINI TRANSFER PUMP ASSEMBLED

How does it work? – The MiniVac Basic system provides initial air/vacuum recovery of fluids via a suction lance and hose to a vacuum receptor. The standard vacuum receptor comprises a dedicated, self-contained mini-hopper and vacuum head, although this can be customised to fit any particular user requirements. The MiniVac Plus system adds a positive displacement Mini pump to transfer recovered contaminates away from the disaster area - either to further pumping modules or direct to storage tanks.

MINIVAC *PLUS* VERSION

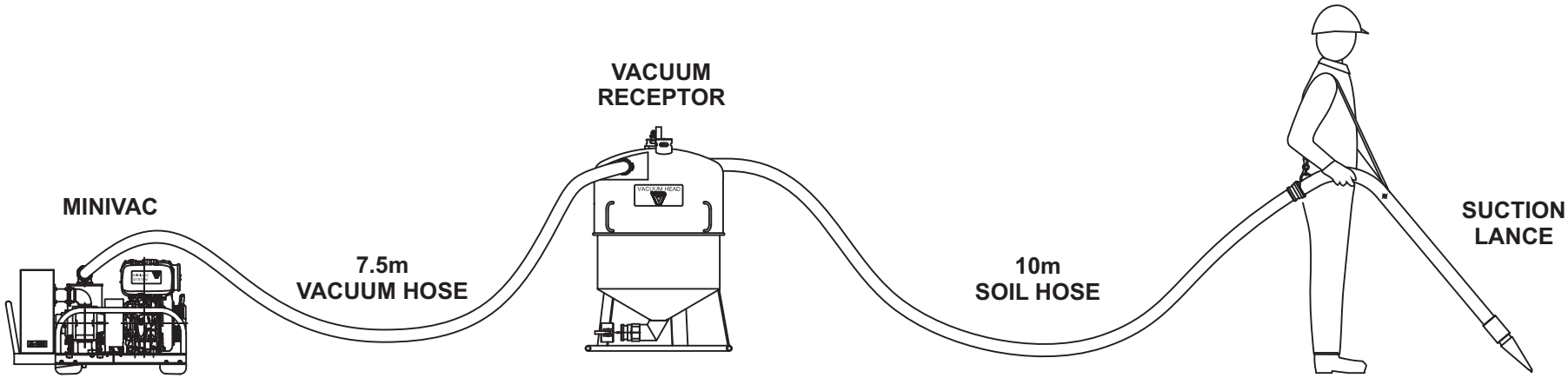
Which oils will it recover? - The MiniVac system recovers a wide range of light to medium oils including diesels and emulsions, plus the ability to handle debris.


MILITARY USE OF MINIVAC

Who can operate the system? - One of the unique features of the MiniVac and the MiniVac PLUS systems is the ability of both the MiniVac and the Mini transfer pump units to be easily separated into two units. This ensures that the whole system can be readily transported by two people into inaccessible areas, and falls within the EU manual handling recommendations.

10FT ISO CONTAINERISED MINIVACS

# MINIVAC - BASIC SYSTEM LAYOUT




| ISSUE | DATE | CHANGE No. | CHANGE |
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DO NOT MODIFY MANUALLY

MATERIAL: SEE LISTINGS

SCALE: NTS
DRAWN: PK
DATE: 231106
PRINT CHK'D: NP

UNLESS OTHERWISE STATED
1 DO NOT SCALE
2 REMOVE BURRS & SHARP EDGES
3 DIMENSIONS IN MILLIMETRES
4 DRG MODIFIED WITH BS 308
5 THIRD ANGLE PROJECTION

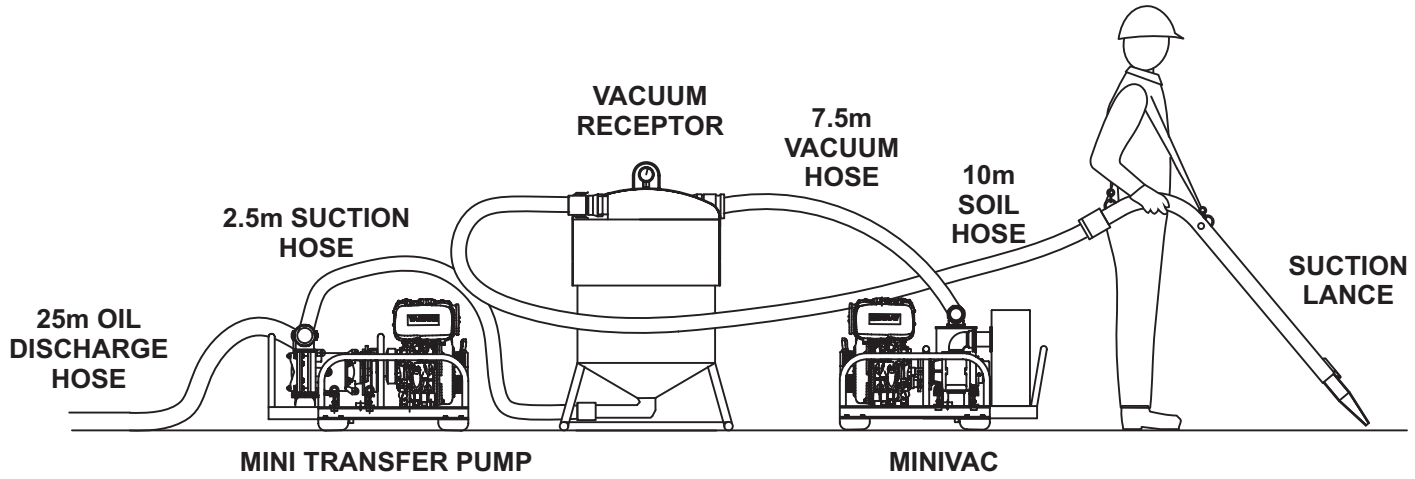
| DIMENSION | TOLERANCE |
|---|---|
| GENERAL | ±1.0 |
| HOLE CENTRES | ±0.4 |
| ANGLES | ±0.5 |

VIKOMA® INTERNATIONAL LIMITED

TITLE: **MINIVAC BASIC SYSTEM LAYOUT**

DRG. No. MVB/SL/3.01

# MINIVAC - PLUS SYSTEM LAYOUT

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| HOLE CENTRES | ±0.4 |
| ANGLES | ±0.5 |

VIKOMA® INTERNATIONAL LIMITED

TITLE: **MINIVAC *PLUS* SYSTEM LAYOUT**

DRG. No. MVP/SL/3.01

Lloyd's Register

*Certificate Number:* SOU 9900390/2
*Office:* SOUTHAMPTON
*Date:* 13/10/99
*Page:* 1 of 2

***This certificate is issued to*** **VIKOMA INTERNATIONAL LTD.** to certify that, at their request, the undersigned Surveyor did attend their premises at Cowes, Isle of Wight on the 28/9/99 and 30/9/99 for the purpose of witnessing the Flow Rate Testing of the Mini Vac Pump (Test 1) and the Full Mini Vac Transfer System Operational Test (Test 2) of the following items:

**Test 1**

| *Description* | *Quantity* |
|---|---|
| **Vikoma Mini Vac System** | **1 (ONE IN NUMBER)** |

This arrangement of the Vikoma Mini Vac System incorporates a Mini Vac vacuum pump system (450 mBar pump powered by a LS OAE - D 4.4 kW max continuous output Diesel Engine), 7.5 m length of 2 inch bore semi-rigid vacuum air hose, the Vikoma Mini Vac Hopper and Dome, a 10.0 m length of 2.5 inch bore semi-rigid soil hose and a 1.5 m standard lance.

***Scope of Survey***

Lloyd's Register was requested to attend as a third party witness to the flow rate testing of the Vikoma Mini Vac System. Trials were conducted to determine the time taken for the Mini Vac Pump to recover and discharge oil identified as Oily Water, Energol CS22, Energol CS220, Esso Residual Fuel Oil.

Each test involved the recovery of 'X' litres of the specified oil from a calibrated container, for which the recovery time was measured. Two runs of each test oil were performed with the average figure taken as being the performance obtained. Oily water viscosity is assumed not to be temperature dependent. The oil temperature was measured before each pumping test. The ambient air temperature was 17.0 °C.

Oil viscosity was estimated, from the values determined by the Paragon Scientific Ltd. and SGS Redwood (UK) Ltd. (laboratory services) analytical report, for the relevant oil temperature prior to pumping.

***Test Results:***

| OIL TYPE | TEST NO. | OIL TEMP. PRIOR TO TEST (°C) | OIL VISCOSITY (cST) | SYSTEM VACUUM PRESSURE (mbar) | VOLUME RECOVERED (LITRES) | TIME (secs) TO RECOVER 'X' LITRES | CALCULATED RECOVERY ($m^3$/hour) |
|---|---|---|---|---|---|---|---|
| Energol CS22 | 1 | 14.3 | - | -500 | 100 | 15.7 | - |
| | 2 | 14.3 | - | -500 | 100 | 14.6 | - |
| | Average | 14.3 | 70 | -500 | 100 | 15.2 | 23.7 |
| Energol CS220 | 1 | 14.9 | - | -500 | 100 | 99.7 | - |
| | 2 | 15.0 | - | -500 | 100 | 101.1 | - |
| | Average | 15.0 | 1100 | -500 | 100 | 100.8 | 3.57 |
| Esso Residual F. O. | 1 | 14.2 | - | -500 | 40 | 184 | - |
| | 2 | 15.7 | - | -500 | 40 | 216 | - |
| | Average | 15.0 | 13000 | -500 | 40 | 200 | 0.72 |





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**email: sales@vikoma.com** **www.vikoma.com**

## cont.

*Certificate Number:* SOU 9900390/2
*Office:* SOUTHAMPTON
*Date:* 13/10/99
*Page:* 2 of 2

**Test 2**

| *Description* | *Quantity* |
|---|---|
| **Vikoma Mini Vac Transfer System** | **1 (ONE IN NUMBER)** |

This arrangement of the Vikoma Full Mini Vac Transfer System incorporates a full oil drum, a 2.5 m length of 3 inch bore semi-rigid oil transfer hose, Oil Transfer Pump (rotary pump powered by a L7 OAE - S 4.4 kW max continuous output Diesel Engine), a 2.5 m length of 2.5 inch bore semi-rigid pump suction hose, the Vikoma Mini Vac Hopper and Dome, leading to a 5.0 m length of 2 inch bore semi-rigid vacuum air hose, the Vikoma Mini Vac vacuum pump system (450 mBar pump powered by a LS OAE - D 4.4 kW max continuous output Diesel Engine). The Vikoma Mini Vac Hopper and Dome also leads to a 10.0 m length of 2.5 inch bore semi-rigid soil hose, a 1.5 m standard lance, and an oil drum containing oil.

*Scope of Survey*

Lloyd's Register was requested to attend as a third party witness to the flow rate testing of the Vikoma Mini Vac System. Trials were conducted to determine whether it is possible for the Full Mini Vac Transfer System to recover and discharge oil identified as Energol CS220.

The ambient air temperature was 17.0 °C.

Oil viscosity was estimated, from the values determined by the Paragon Scientific Ltd. and SGS Redwood (UK) Ltd. (laboratory services) analytical report, for the relevant oil temperature prior to pumping.

*Test Results:*

It was found that the Vikoma Full Mini Vac Transfer System was capable of discharging Energol CS220 Oil with a total distance from suction to discharge of 17 m.

The Vikoma Test Report No. PD 010, dated 6.10.99 was duly endorsed.

J. L. Hall
**Surveyor to Lloyd's Register**



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