



Viridian
Systems

Clearer Thinking

VP Pneumatic Pumps Installation and User Manual



Pumping Excellence



Viridian Systems has been building the VP range of pneumatic borehole pumps at our facilities in the Northwest England since 2001.

About Viridian

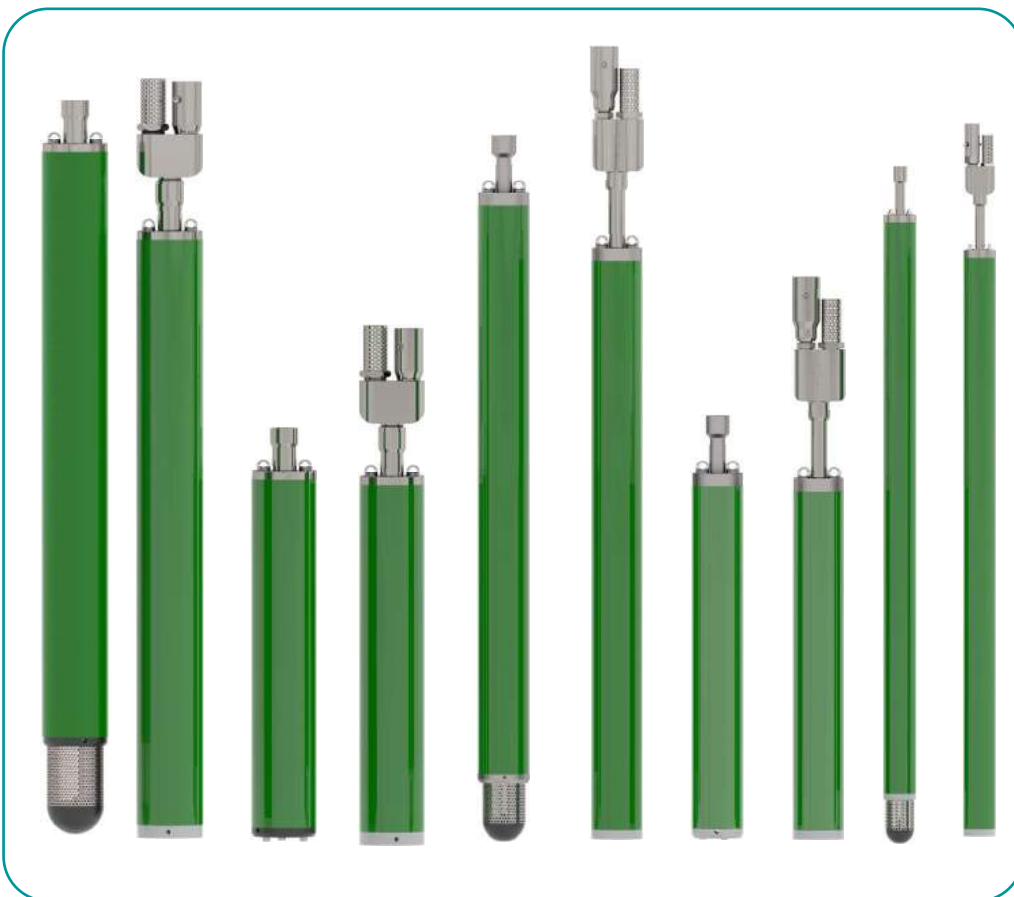
Viridian Systems has been providing unrivalled knowledge and expertise to the landfill and groundwater remediation sectors, designing and installing pumping systems. From our base in Northwest England, we supply our pumps to all international markets and have distributors and partners throughout the world.



The VP Pump Series

Pumping Versatility

The Viridian range of pneumatic pumps is available in an array of configurations to allow you to find a pump best suited to your application.



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How it works

VP4 Bottom Loader



- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the bottom check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the top check valve (enclosed in head) and out through the riser (9)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

VP4 Bottom Loader

Model & Type	VP4-BL
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	>2,880
Volume/Cycle: Litres	0.9-1.1
Pump Length: mm	1,030
Weight: Kg	6
Pump Diameter: mm	90
Pump Trigger Point: mm	770
Min Internal Well Dia: mm	100
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 - 12

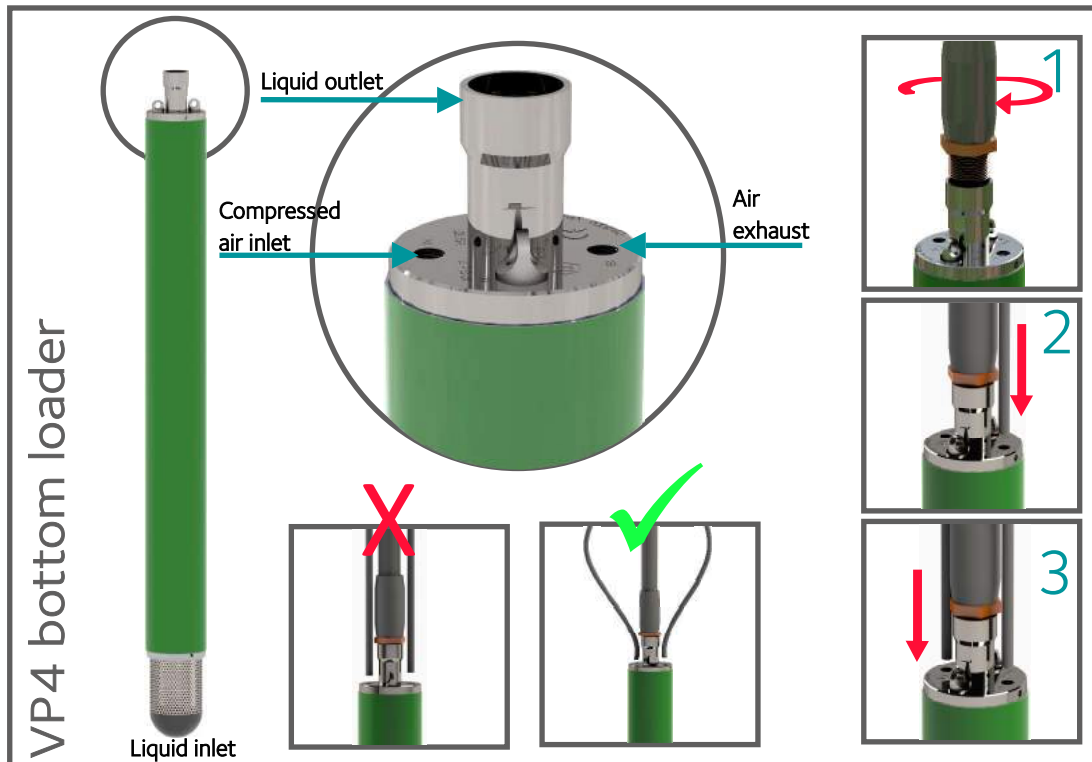
The VP4-BL can be installed in wells of 4"/100 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater.

The base of the pump is domed to aid installation and to deflect entrained gases in liquids.

Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.



Quick installation guide



VP4 Bottom Loader

DETAIL A
SCALE 2 : 1.4

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP4-001	Pump Head	1
2	VP4-005	Central Discharge Tube	1
3	VP4-015	Float P	1
4	VP4-007	BCV Seat	1
5	VP4-014	BCV Shuttle	1
6	VP4-008	Strainer Stud	3
7	VP4-009	Spider	1
8	VP4-011	BCV Strainer	1
9	VP4-010	BCV Dome	1
10	VP4-031	Strainer Stud Screw	3
11	VP4-012	BCV Spring Washer	7
12	VP4-013	BCV Dome Screw	1
13	VP4-004	Casing Seal	2
14	VP4-006	BCV Cage	1
15	VP4-037	BCV Split Washer	3
16	VP4-032	BCV Seal Screw	3
17	VP-001	Magnet Lifting Eye	2
18	VP-002	Magnet Holder	2
19	VP-003	Magnet	2
20	VP4-002	Riser	1
21	VP4-027	Actuator Rod Guide	1
22	VP4-021	Air Inlet Block	1
23	VP4-034	Air Inlet Poppet Valve Nut	1
24	VP4-022	Air Inlet Poppet Hex	1
25	VP4-020	Central Discharge Tube Pin	2
26	VP4-016	Rocker Arm	2
27	VP4-018	Rocker Arm Split Pin	2
28	VP4-019	Rocker Arm Valve Pin	2
29	VP4-017	Rocker Arm Spindle	2
30	VP-007	Actuator Rod	1
31	VP-031	Spring Guide Top Stop	1
32	VP-032	Actuator Spring Bottom Cap	1
33	VP-033	Actuator Spring Top Cap	1
34	VP4-030	Actuator Rod Top Stop	1
35	VP4-035	Air Exhaust Poppet Valve Nut	1
36	VP4-023	Air Exhaust Block	1
37	VP4-024	Air Exhaust Poppet Valve	1
38	VP4-026	Counter Weight Spool	1
39	VP4-025	Counter Weight	1
40	VP4-036	Rocker Arm Roller	2
41	VP4-038	Rocker O Ring	4
42	VP4-003	22mm Bolt	1
43	VP-016	Spring	1
44	VP-005	Rocker Arm Spring Washer	4
45	VP-006	Rocker Arm Screw	4
46	VP-015	Actuator Rod Pin	3
47	VP4-028	Actuator Rod Guide Screw	1
48	VP4-029	Actuator Rod Guide Nut	1
49	VP-013	Air Inlet Poppet Valve Rubber	1
50	VP-012	Air Inlet Poppet Valve Flat Washer	1
51	VP-011	Air Inlet Poppet Valve Star Washer	1
52	VP4-039	Outer Casing	1

B

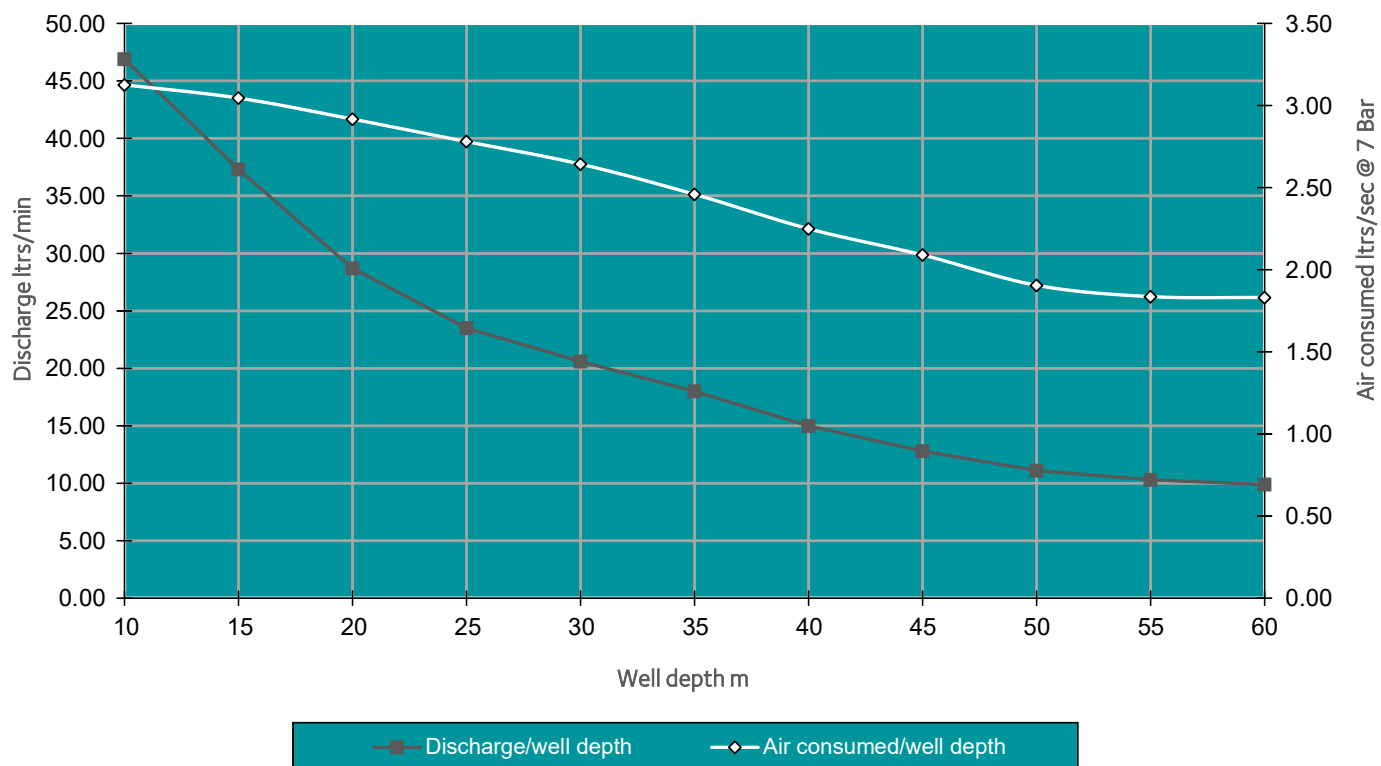
DETAIL B
SCALE 2 : 1

FOR PUMPS WITH PP FLOATS

<p>Viridian Systems</p> <p>Unit 39, Wind Business Centre Dock Road, Birkenhead, CH41 1JH 0151 639 8666 www.viridiansystems.com</p>	<p>VP4 Bottom Loader Assembly (exploded view)</p> <p>VP4 BL 002 PFF</p>
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VP4 BL Performance Curve

VP4-BL liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



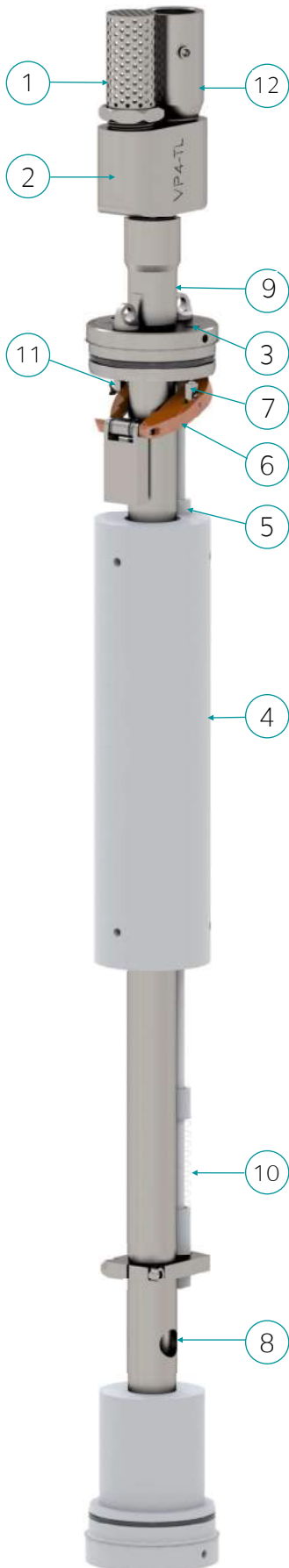
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	46.90	3.13	6.63
15	37.30	3.05	6.45
20	28.70	2.92	6.18
25	23.50	2.78	5.89
30	20.60	2.64	5.6
35	18.18	2.46	5.21
40	15.00	2.25	4.77
45	12.80	2.09	4.43
50	11.10	1.91	4.04
55	10.30	1.84	3.89
60	9.90	1.83	3.88

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP4 Top Loader



- Liquid enters the pump via the strainer (1) and inlet check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the inlet check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the riser (9) and out through the top check valve (12)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

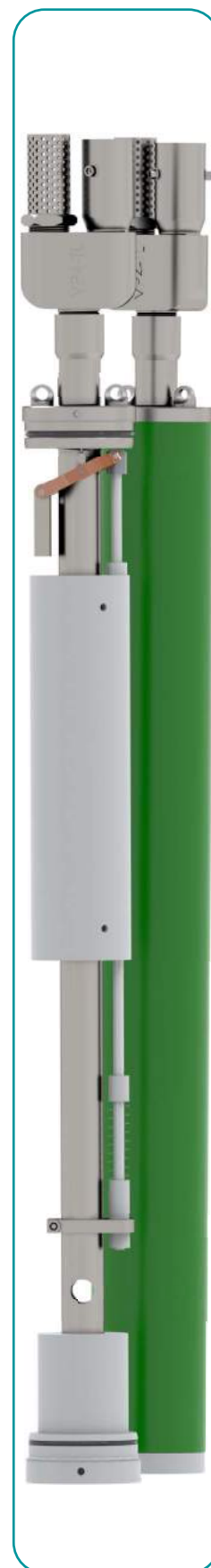
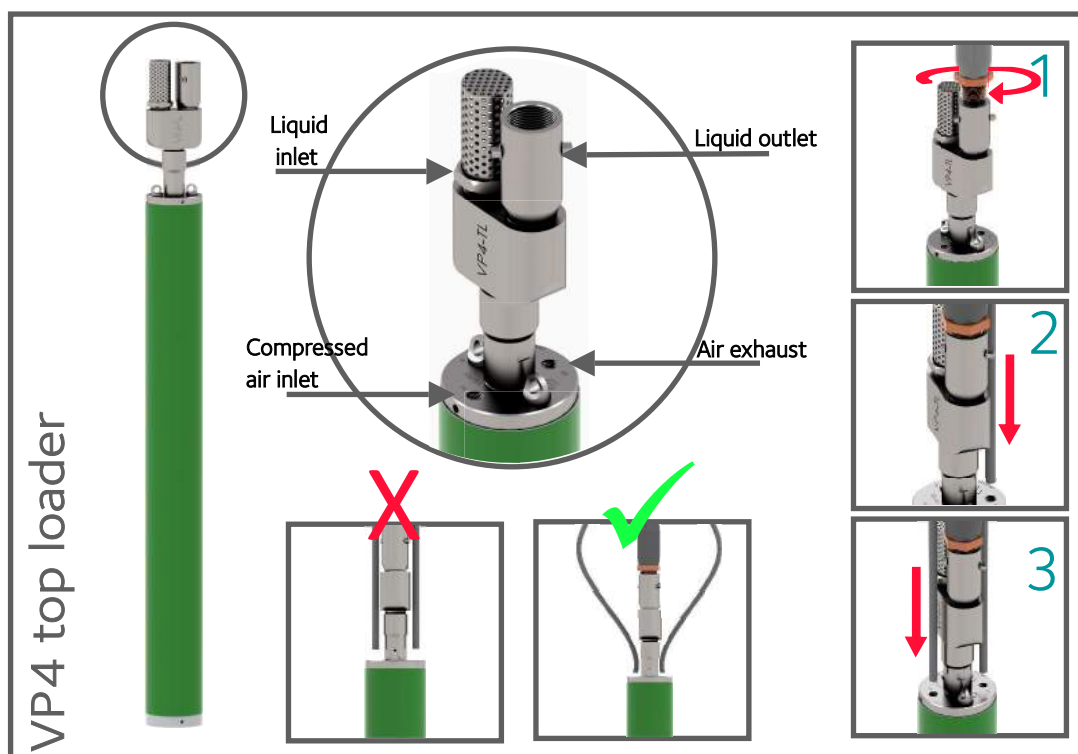
VP4 Top Loader

Model & Type	VP4-TL
Liquid Inlet Position	Top
Max Flow Rate Litres/hr	>2,100
Volume/Cycle: Litres	0.9-1.1
Pump Length: mm	1,070
Weight: Kg	8
Pump Diameter: mm	90
Pump Trigger Point: mm	620
Min Internal Well Dia: mm	100
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

The VP4-TL can be installed in wells of 4"/100 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater. Top-loaders can be very effective in leachate and gas wells with excessively gaseous/foamy leachate.

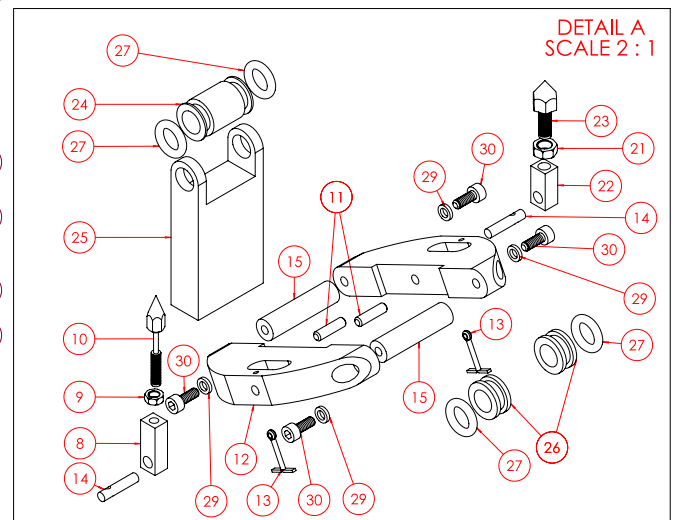
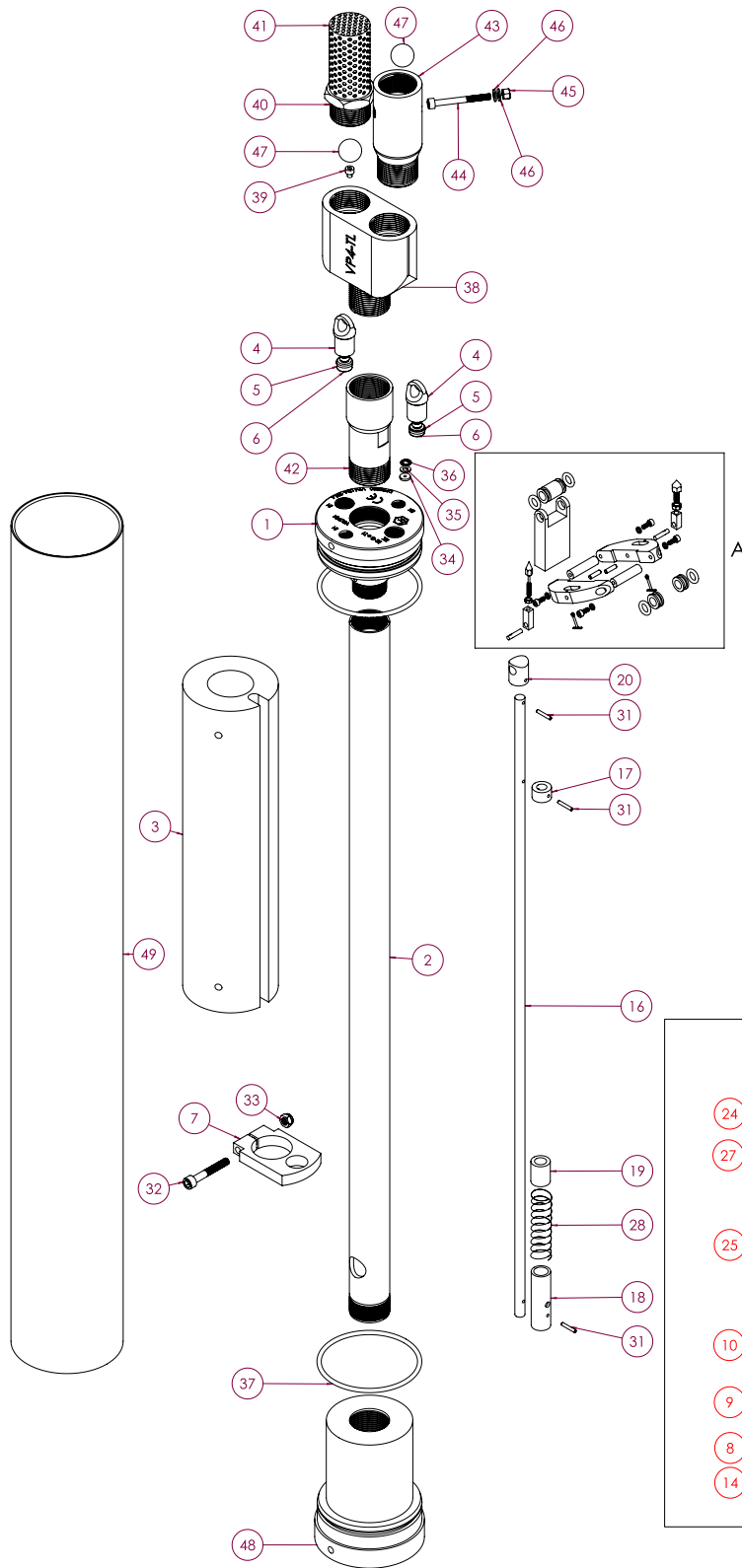
Top-loaders are often referred to as "Total Fluids" pumps in the contaminated groundwater sector because they are widely used for pumping LNAPL (Light Non-Aqueous Phase Liquids). Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

Quick installation guide



VP4 Top Loader

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP4-001	Pump Head	1
2	VP4-005	Central Discharge Tube	1
3	VP4-015	Float P	1
4	VP-001	Magnet Lifting Eye	2
5	VP-002	Magnet Holder	2
6	VP-003	Magnet	2
7	VP4-027	Actuator Rod Guide	1
8	VP4-021	Air Inlet Block	1
9	VP4-034	Air Inlet Poppet Valve Nut	1
10	VP4-022	Air Inlet Poppet Hex	1
11	VP4-020	Central Discharge Tube Pin	2
12	VP4-016	Rocker Arm	2
13	VP4-018	Rocker Arm Split Pin	2
14	VP4-019	Rocker Arm Valve Pin	2
15	VP4-017	Rocker Arm Spindle	2
16	VP-007	Actuator Rod	1
17	VP-031	Spring Guide Top Stop	1
18	VP-032	Actuator Spring Bottom Cap	1
19	VP-033	Actuator Spring Top Cap	1
20	VP4-030	Actuator Rod Top Stop	1
21	VP4-035	Air Exhaust Poppet Valve Nut	1
22	VP4-023	Air Exhaust Block	1
23	VP4-024	Air Exhaust Poppet Valve	1
24	VP4-026	Counter Weight Spool	1
25	VP4-025	Counter Weight	1
26	VP4-036	Rocker Arm Roller	2
27	VP4-038	Rocker O Ring	4
28	VP-016	Spring	1
29	VP-005	Rocker Arm Spring Washer	4
30	VP-006	Rocker Arm Screw	4
31	VP-015	Actuator Rod Pin	3
32	VP4-028	Actuator Rod Guide Screw	1
33	VP4-029	Actuator Rod Guide Nut	1
34	VP-013	Air Inlet Poppet Valve Rubber	1
35	VP-012	Air Inlet Poppet Valve Flat Washer	1
36	VP-011	Air Inlet Poppet Valve Star Washer	1
37	VP4-004	Casing Seal	2
38	VP4-039	Top Loader Y Piece	1
39	VP4-040	Y Piece Cap Head Screw	1
40	VP4-041	Top Loader Strainer Nut	1
41	VP4-042	Top Loader TCV	1
42	VP4-043	Top Loader Riser	1
43	VP4-044	Top Loader TCV Nut	1
44	VP4-045	Top Loader TCV Screw	1
45	VP4-046	Top Loader TCV Nut	1
46	VP4-047	Top Loader TCV Washer	2
47	VP-018	19mm Ball	2
48	VP4-048	Top Loader Bottom Plug	1
49	VP4-039	Outer Casing	1



FOR PUMPS WITH PP FLOATS

REVISION	DATE	BY	CHKD	APPD
1	20/01/2019	WJ	WJ	WJ
2	20/01/2019	WJ	WJ	WJ
3	20/01/2019	WJ	WJ	WJ
4	20/01/2019	WJ	WJ	WJ
5	20/01/2019	WJ	WJ	WJ

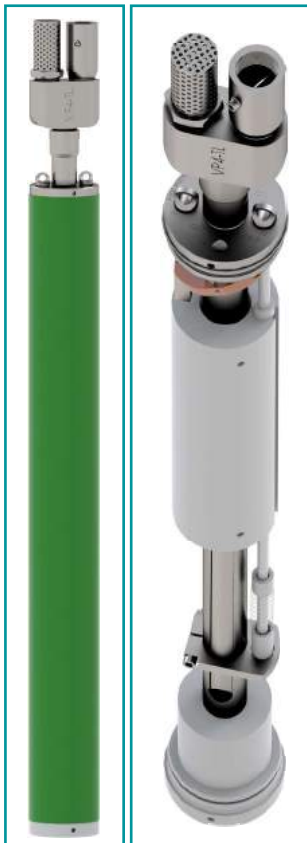
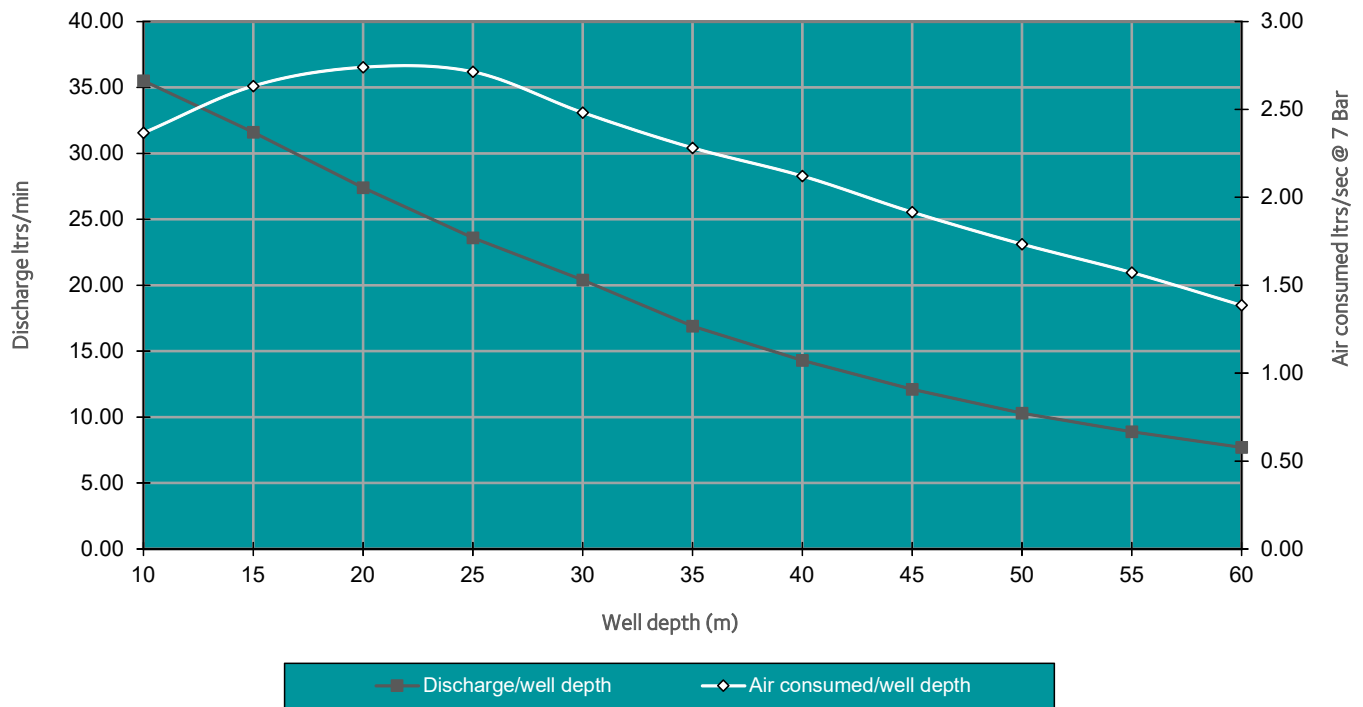
This drawing is copyright
Viridian Systems Limited.
Unit 39, Wind Business Centre
Dock Road, Bikenhead,
CH44 1JW
0121 639 8666
www.viridiansystems.com

VP4 Top Loader
Assembly
(exploded view)

VP4 TL 002 PP

VP4 TL Performance Curve

VP4-TL liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



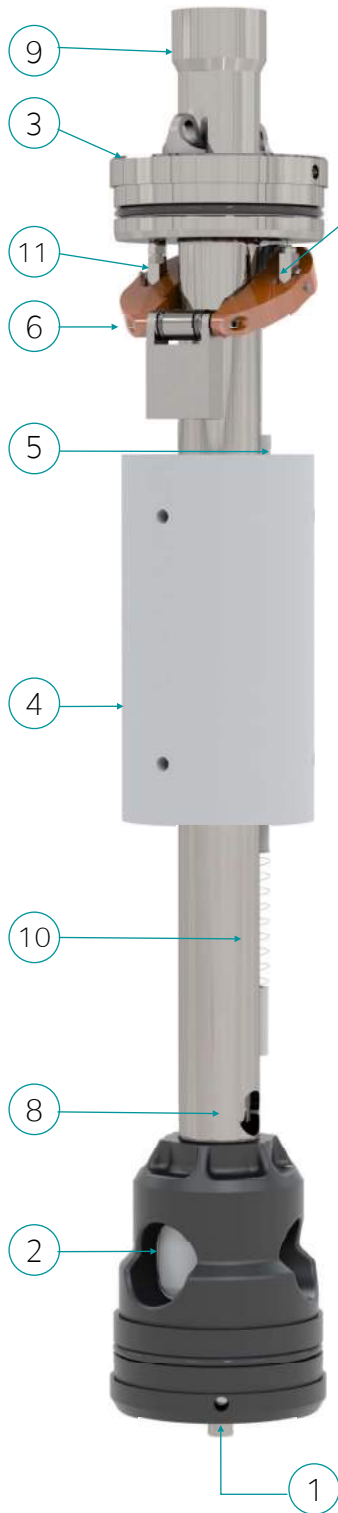
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	35.50	2.37	5.01
15	31.60	2.63	5.58
20	27.40	2.74	5.81
25	23.60	2.71	5.75
30	20.40	2.48	5.26
35	16.90	2.28	4.83
40	14.30	2.12	4.49
45	12.10	1.92	4.06
50	10.30	1.73	3.67
55	8.90	1.57	3.33
60	7.70	1.39	2.94

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP4 Bottom Loader LDD



- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the bottom check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the top check valve (enclosed in head) and out through the riser (9)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

VP4 Bottom Loader LDD

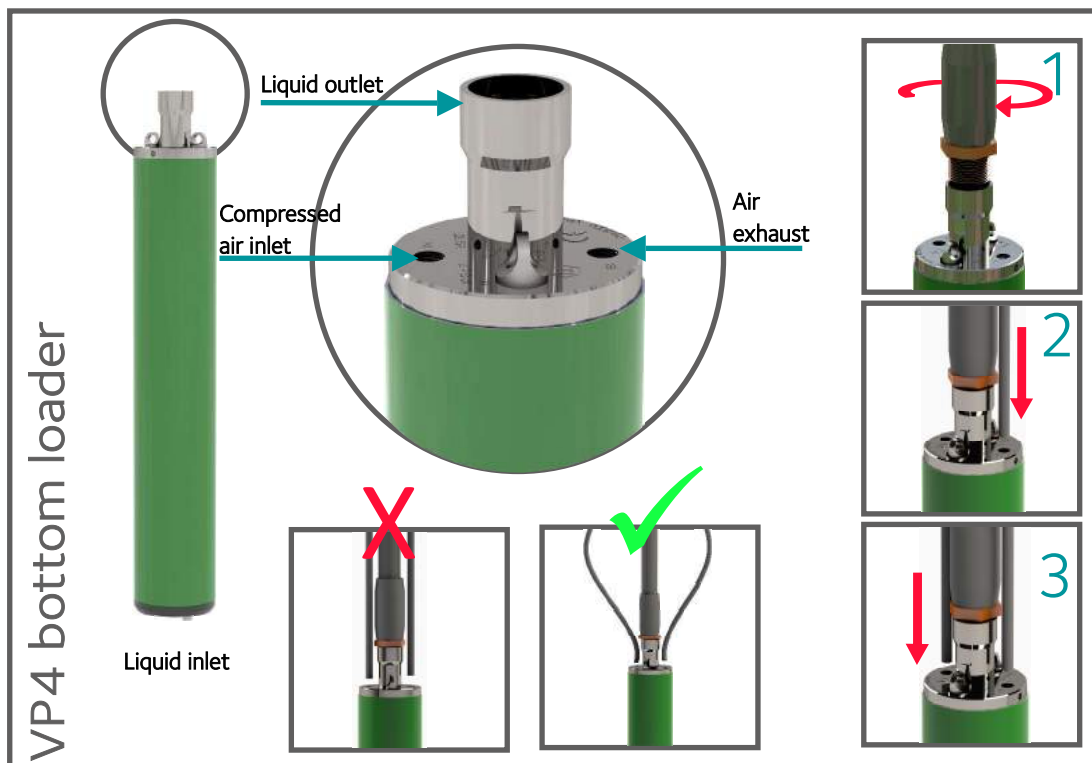
Model & Type	VP4-BL LDD
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	>1,200
Volume/Cycle: Litres	0.5
Pump Length: mm	580
Weight: Kg	5.5
Pump Diameter: mm	90
Pump Trigger Point: mm	370
Min Internal Well Dia: mm	100
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

The VP4-BL LDD can be installed in wells of 4"/100 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater down to a lower level than a standard VP4-BL.

Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

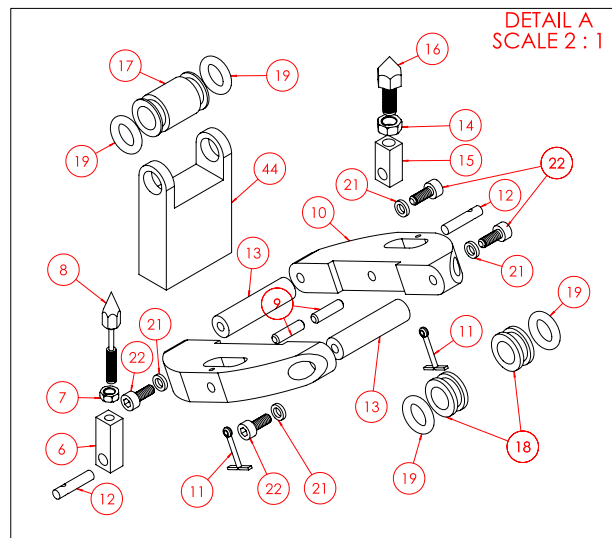
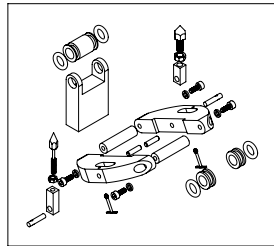


Quick installation guide



VP4 Bottom Loader LDD

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP4-001	Pump Head	1
2	VP-001	Magnet Lifting Eye	2
3	VP-002	Magnet Holder	2
4	VP-003	Magnet	2
5	VP4-002	Riser	1
6	VP4-021	Air Inlet Block	1
7	VP4-034	Air Inlet Poppet Valve Nut	1
8	VP4-022	Air Inlet Poppet Hex	1
9	VP4-020	Central Discharge Tube Pin	2
10	VP4-016	Rocker Arm	2
11	VP4-018	Rocker Arm Split Pin	2
12	VP4-019	Rocker Arm Valve Pin	2
13	VP4-017	Rocker Arm Spindle	2
14	VP4-035	Air Exhaust Poppet Valve Nut	1
15	VP4-023	Air Exhaust Block	1
16	VP4-024	Air Exhaust Poppet Valve	1
17	VP4-026	Counter Weight Spool	1
18	VP4-036	Rocker Arm Roller	2
19	VP4-038	Rocker O Ring	4
20	VP4-003	22mm Bolt	1
21	VP-005	Rocker Arm Spring Washer	4
22	VP-006	Rocker Arm Screw	4
23	VP-013	Air Inlet Poppet Valve Rubber	1
24	VP-012	Air Inlet Poppet Valve Flat Washer	1
25	VP-011	Air Inlet Poppet Valve Star Washer	1
26	VP4-004	Casing Seal	2
27	VP4-007	BCV Seat	1
28	VP4-014	BCV Shuttle	1
29	VP4-006	BCV Cage	1
30	VP4-012	BCV Spring Washer	3
31	VP4-032	BCV Seat Screw	3
32	VP2-052	Strainer Spacer Hex	3
33	VP4-051	LDD Strainer	1
34	VP4-049	LDD Strainer Screw	3
35	VP4-050	LDD Strainer Screw Washer	3
36	VP4-056	LDD Actuator Rod	1
37	VP4-055	LDD Actuator Spring Top Cap	1
38	VP4-053	LDD Actuator Spring Bottom Cap	1
39	VP-031	Spring Guide Top Stop	1
40	VP-054	Spring	1
41	VP-015	Actuator Rod Pin	2
42	VP4-030	Actuator Rod Top Stop	1
43	VP4-057	LDD Float	1
44	VP4-056	Counter Weight	1
45	VP4-058	LDD Outer Casing	1
46	VP4-059	LDD Centre Discharge Tube	1

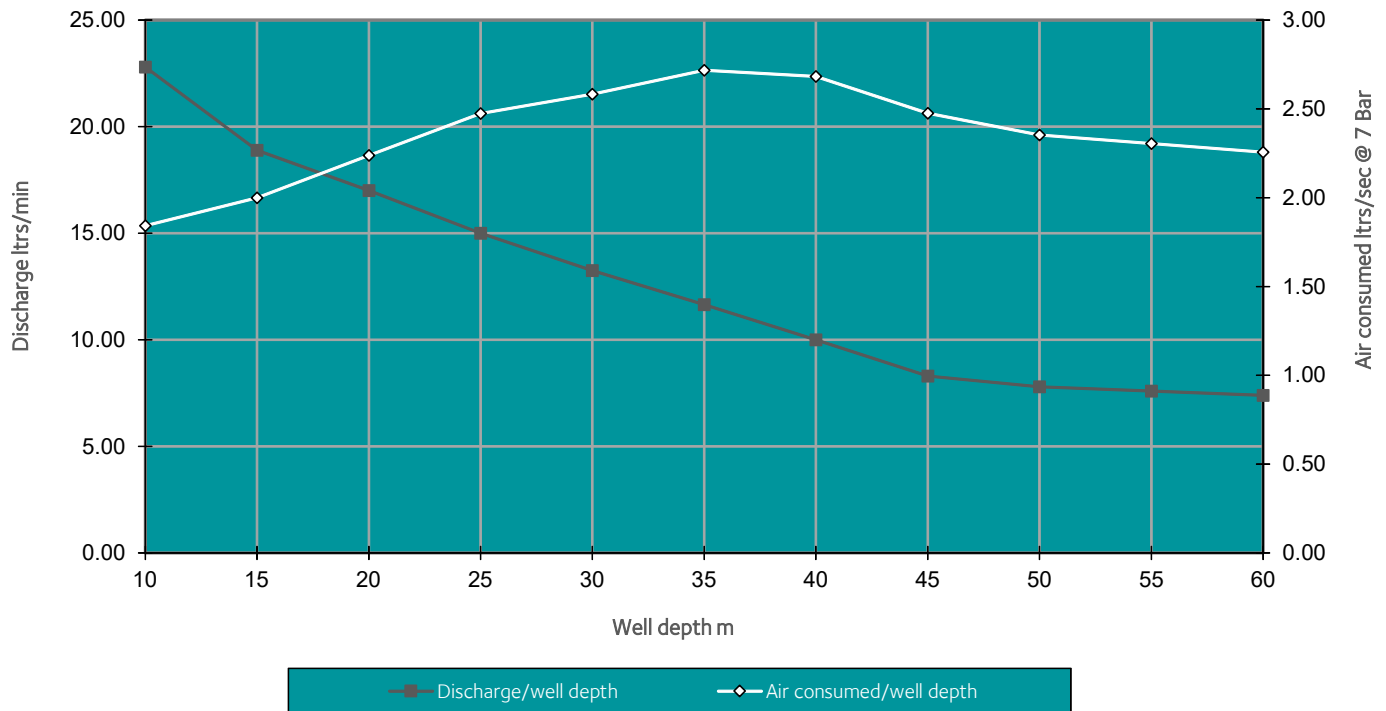


FOR PUMPS WITH PP FLOATS

<p>Viridian Systems</p> <p>Unit 39, Virid Business Centre Oak Road, Bickenhead, Chalfont St Giles, Bucks HP8 4JW 01494 689 866 www.viridiansystems.com</p>	<p>VP4 Bottom Loader LDD Assembly (exploded view)</p>
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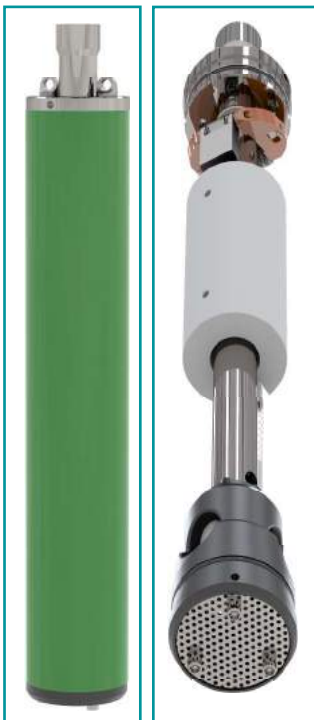
VP4 BL LDD Performance Curve

VP4-BL LDD liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	22.80	1.84	3.91
15	18.90	2.20	4.24
20	17.00	2.24	4.74
25	15.00	2.48	5.24
30	13.25	2.58	5.47
35	11.65	2.72	5.76
40	10.00	2.68	5.69
45	8.38	2.48	5.25
50	7.80	2.35	4.99
55	7.60	2.31	4.88
60	7.40	2.26	4.78

DATA table



Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP4 Top Loader LDD



- Liquid enters the pump via the strainer (1) and inlet check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the inlet check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the riser (9) and out through the top check valve (12)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

VP4 Top Loader LDD

Model & Type	VP4 TL LDD
Liquid Inlet Position	Top
Max Flow Rate Litres/hr	>1,200
Volume/Cycle: Litres	0.4
Pump Length: mm	750
Weight: Kg	6
Pump Diameter: mm	90
Pump Trigger Point: mm	330
Min Internal Well Dia: mm	100
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

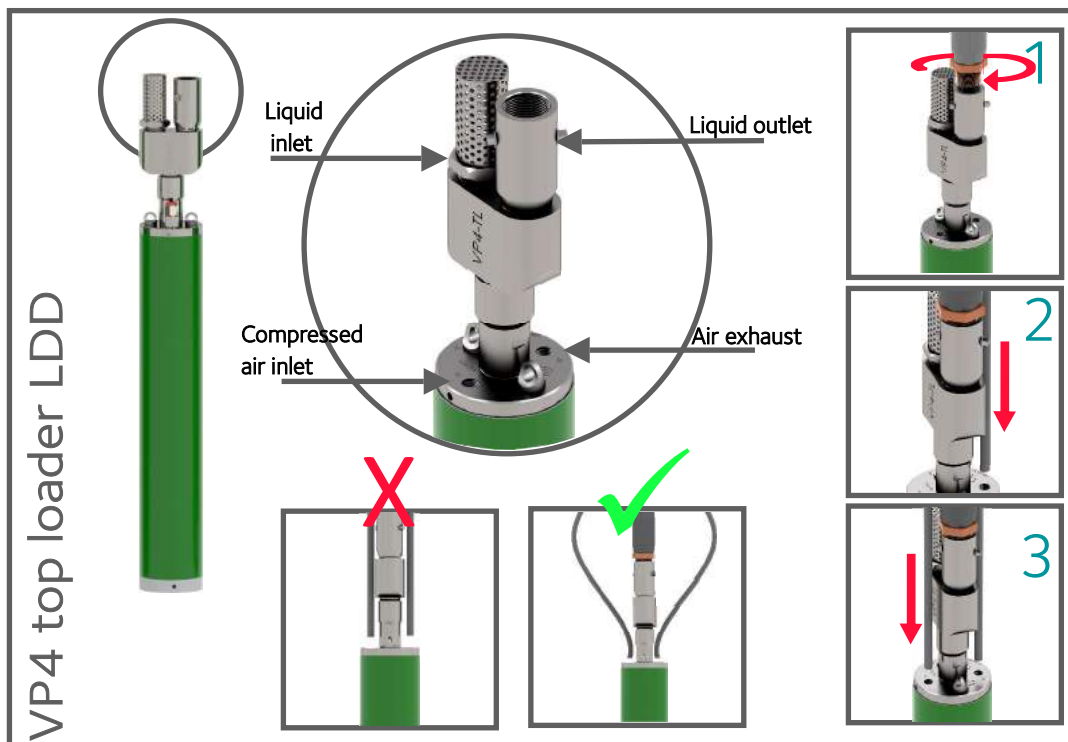
The VP4-TL LDD can be installed in wells of 4"/ 100 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater down to a lower level than a standard VP4-TL.

The VP4-TL LDD can draw the liquid level down to a similar level to the trigger point of VP4-BL. Top-loaders can be very effective in leachate and gas wells with excessively gaseous/foamy leachate. Top-loaders are often referred to as "Total Fluids" pumps in the contaminated groundwater sector because they are widely used for pumping LNAPL (Light Non-Aqueous Phase Liquids).

Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

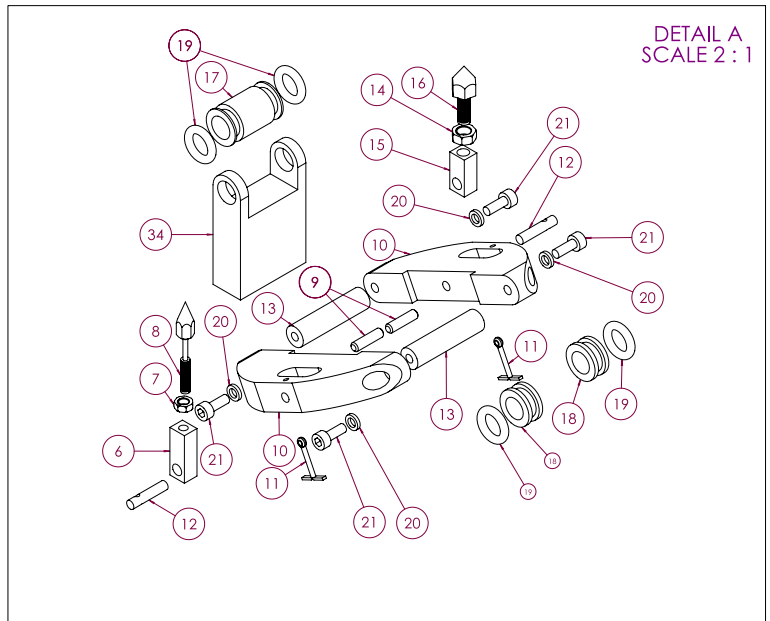
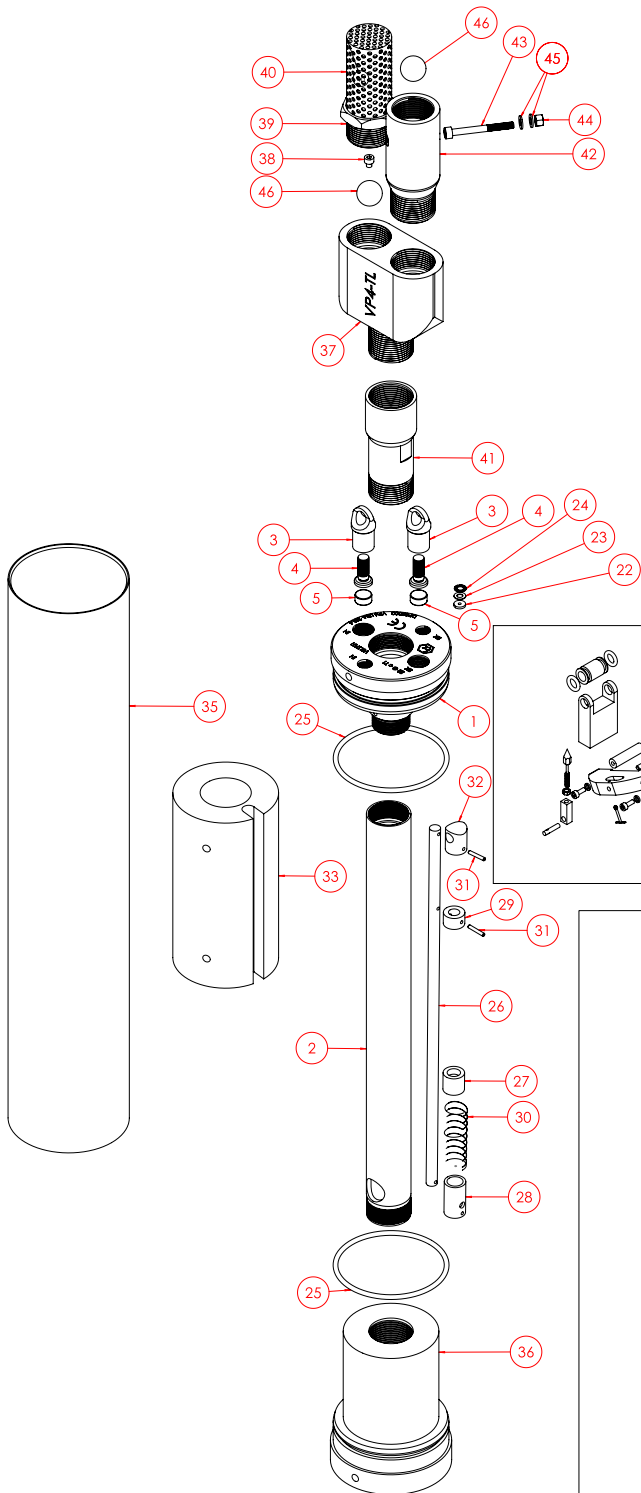


Quick installation guide



VP4 Top Loader LDD

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP4-001	Pump Head	1
2	VP4-059	LDD Centre Discharge Tube	1
3	VP-001	Magnet Lifting Eye	2
4	VP-002	Magnet Holder	2
5	VP-003	Magnet	2
6	VP4-021	Air Inlet Block	1
7	VP4-034	Air Inlet Poppet Valve Nut	1
8	VP4-022	Air Inlet Poppet Hex	1
9	VP4-020	Central Discharge Tube Pin	2
10	VP4-016	Rocker Arm	2
11	VP4-018	Rocker Arm Split Pin	2
12	VP4-019	Rocker Arm Valve Pin	2
13	VP4-017	Rocker Arm Spindle	2
14	VP4-035	Air Exhaust Poppet Valve Nut	1
15	VP4-023	Air Exhaust Block	1
16	VP4-024	Air Exhaust Poppet Valve	1
17	VP4-026	Counter Weight Spool	1
18	VP4-036	Rocker Arm Roller	2
19	VP4-038	Rocker O Ring	4
20	VP-005	Rocker Arm Spring Washer	4
21	VP-006	Rocker Arm Screw	4
22	VP-013	Air Inlet Poppet Valve Rubber	1
23	VP-012	Air Inlet Poppet Valve Flat Washer	1
24	VP-011	Air Inlet Poppet Valve Star Washer	1
25	VP4-004	Casing Seal	2
26	VP4-056	LDD Actuator Rod	1
27	VP4-055	LDD Actuator Spring Top Cap	1
28	VP4-053	LDD Actuator Spring Bottom Cap	1
29	VP-031	Spring Guide Top Stop	1
30	VP-054	Spring	1
31	VP-015	Actuator Rod Pin	2
32	VP4-030	Actuator Rod Top Stop	1
33	VP4-057	LDD Float	1
34	VP4-056	Counter Weight	1
35	VP4-058	LDD Outer Casing	1
36	VP4-048	Top Loader Bottom Plug	1
37	VP4-039	Top Loader Y Piece	1
38	VP4-040	Y Piece Cap Head Screw	1
39	VP4-041	Top Loader Strainer Nut	1
40	VP4-042	Top Loader Strainer	1
41	VP4-043	Top Loader Riser	1
42	VP4-044	Top Loader TCV	1
43	VP4-045	Top Loader TCV Screw	1
44	VP4-046	Top Loader TCV Nut	1
45	VP4-047	Top Loader TCV Washer	2
46	VP-018	19mm Ball	2

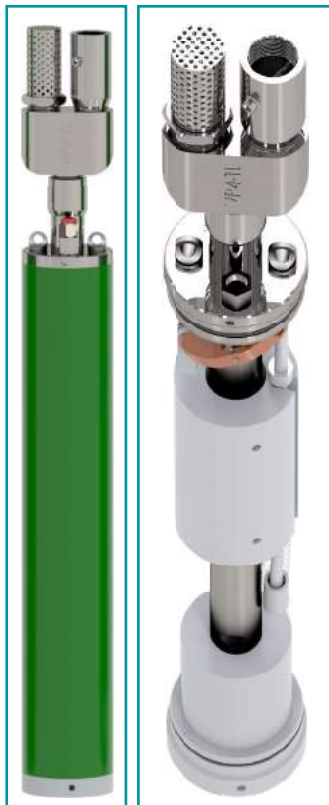
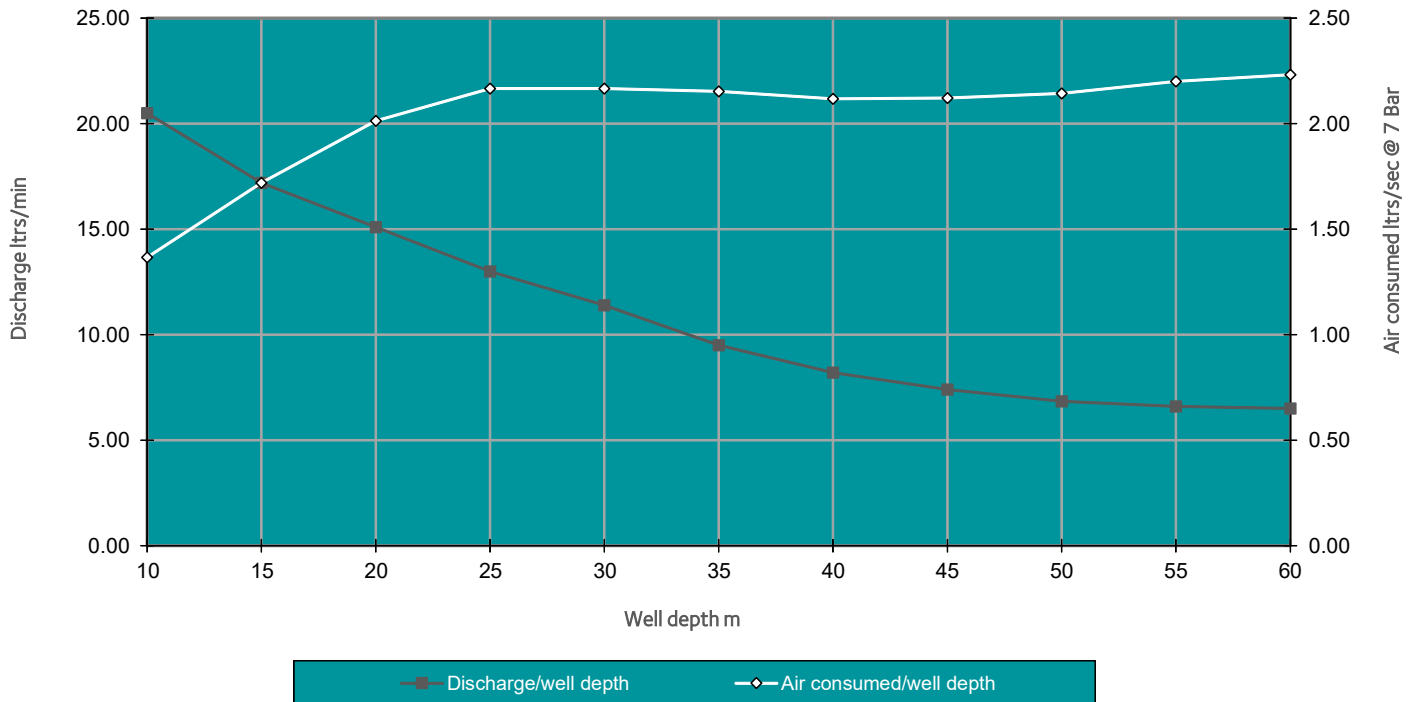


FOR PUMPS WITH PP FLOATS

<p>Unit 39, Windmill Business Centre Dock Road, Bournemouth, Dorset, BH11 1JY 01202 439 8666 www.viridiansystems.com</p>	<p>VP4 Top Loader LDD Assembly (exploded view)</p>
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VP4 TL LDD Performance Curve

VP4-TL LDD liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



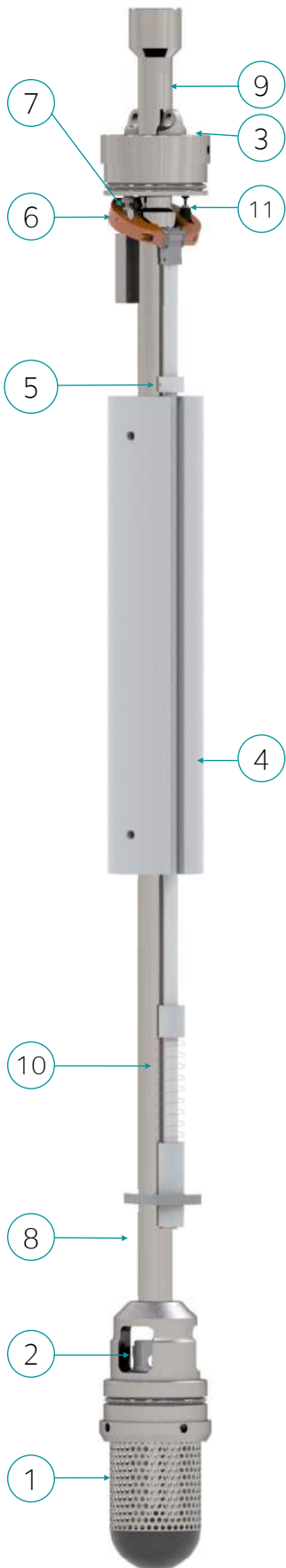
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	20.50	1.37	2.90
15	17.20	1.72	3.64
20	15.10	2.01	4.27
25	13.00	2.17	4.59
30	11.40	2.17	4.59
35	9.50	2.15	4.56
40	8.20	2.12	4.49
45	7.40	2.12	4.49
50	6.84	2.14	4.54
55	6.60	2.20	4.66
60	6.50	2.23	4.73

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP3 Bottom Loader



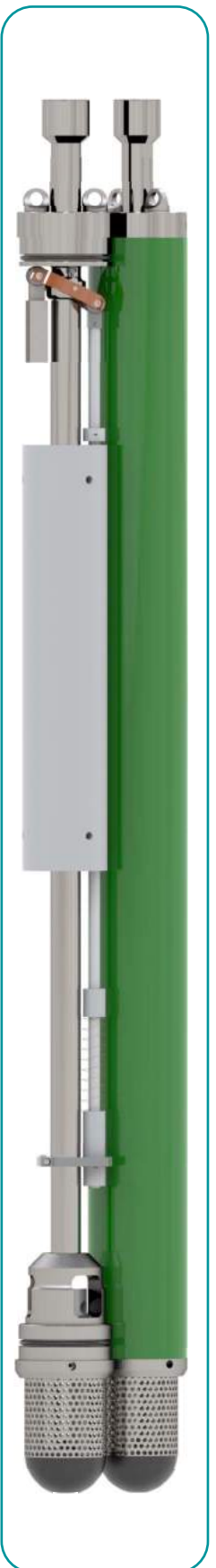
- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the bottom check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the top check valve (enclosed in head) and out through the riser (9)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

VP3 Bottom Loader

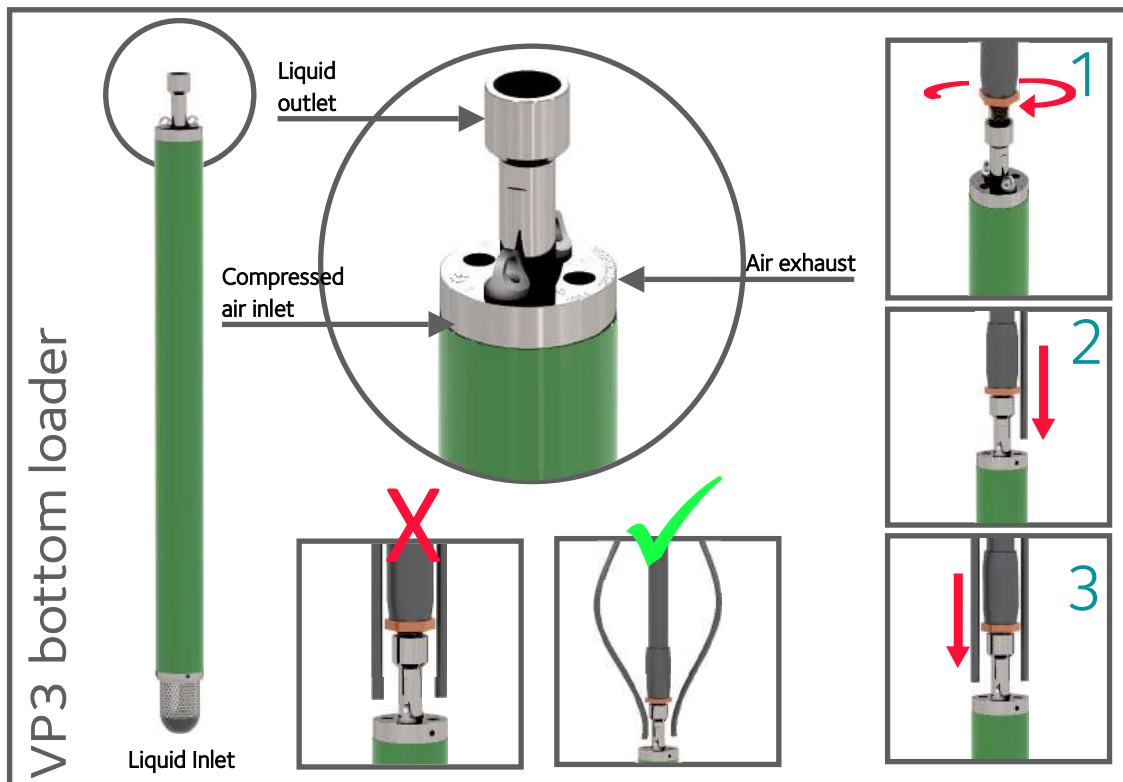
Model & Type	VP3-BL
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	>1,200
Volume/Cycle: Litres	0.6
Pump Length: mm	1,120
Weight: Kg	5
Pump Diameter: mm	70
Pump Trigger Point: mm	715
Min Internal Well Dia: mm	80
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

The VP3-BL can be installed in wells of 3"/80 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater. The base of the pump is domed to aid installation and to deflect entrained gases in liquids.

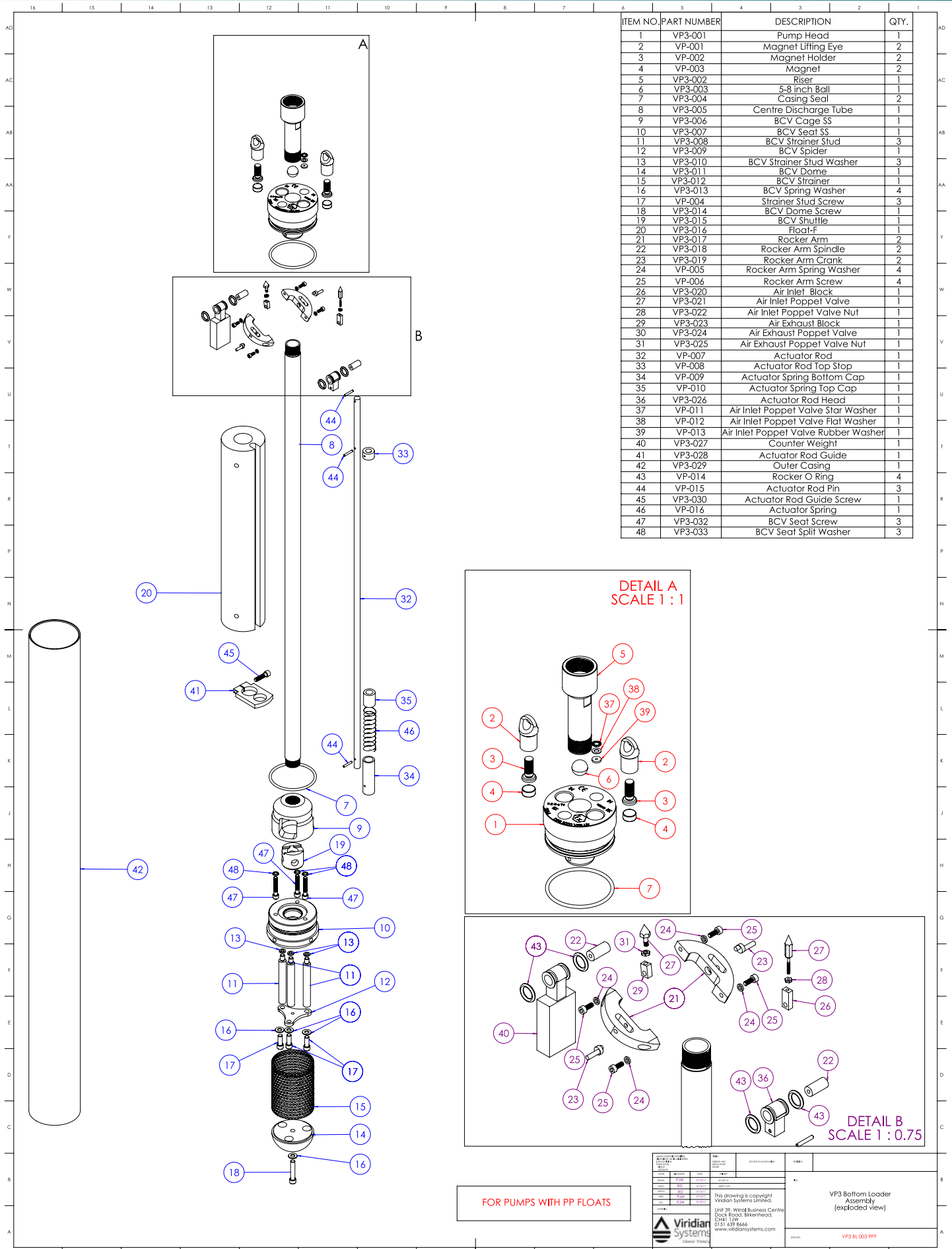
Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.



Quick installation guide

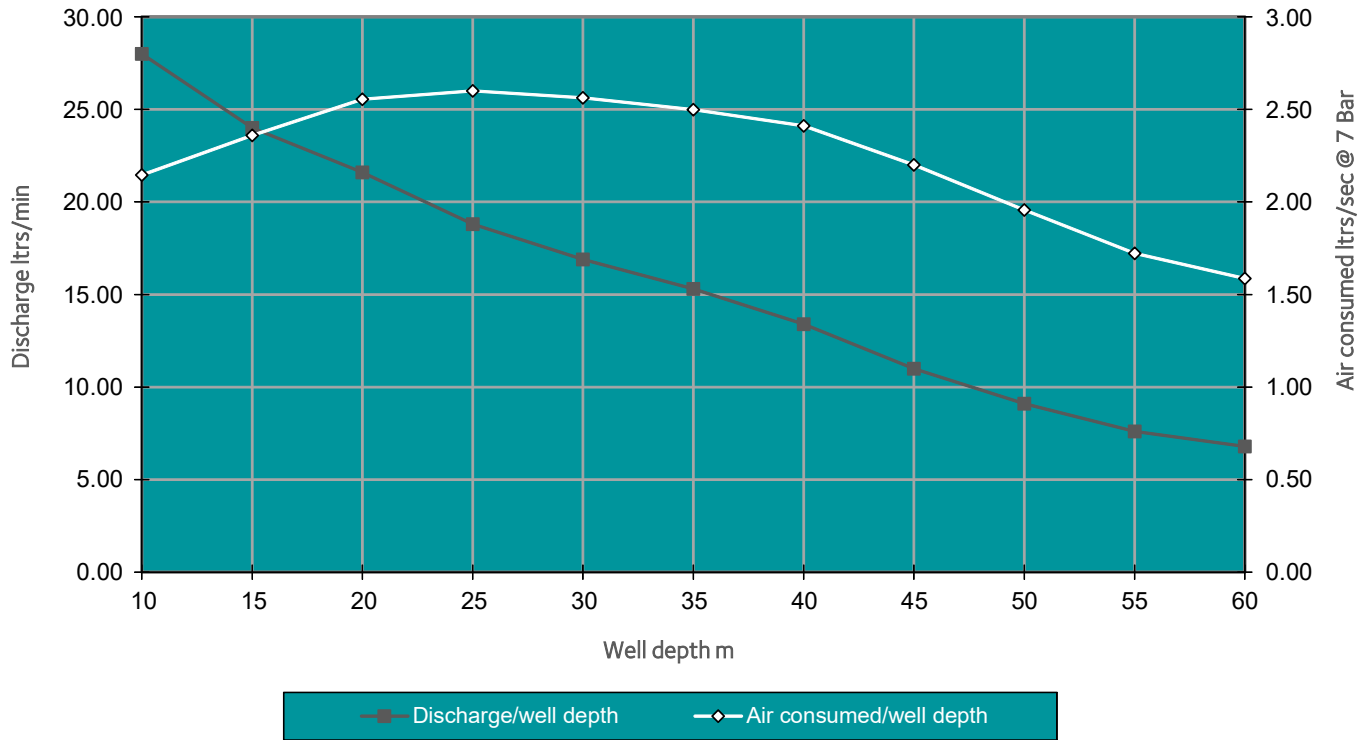


VP3 Bottom Loader



VP3 BL Performance Curve

VP3-BL liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	28.00	2.15	4.55
15	24.00	2.36	5.00
20	21.60	2.56	5.42
25	18.80	2.60	5.51
30	16.90	2.56	5.43
35	15.30	2.50	5.30
40	13.40	2.41	5.11
45	11.00	2.20	4.66
50	9.10	1.96	4.15
55	7.60	1.72	3.65
60	6.80	1.59	3.36

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP3 Top Loader



- Liquid enters the pump via the strainer (1) and inlet check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the inlet check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the riser (9) and out through the top check valve (12)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

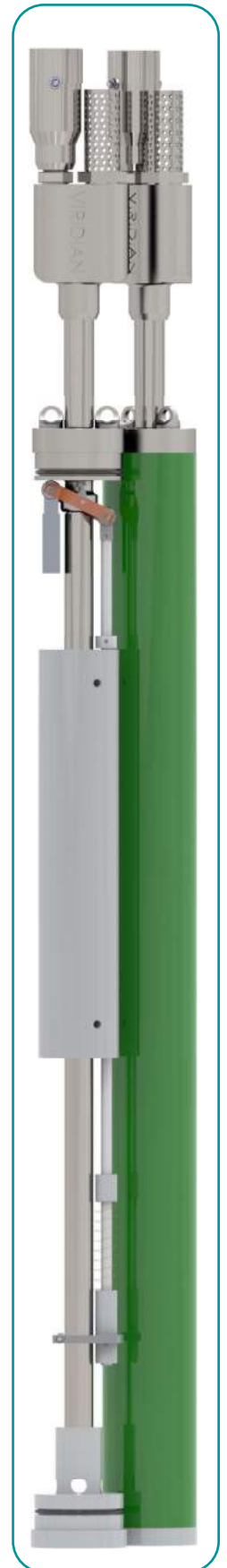
VP3 Top Loader

Model & Type	VP3-TL
Liquid Inlet Position	Top
Max Flow Rate Litres/hr	>1,000
Volume/Cycle: Litres	0.6
Pump Length: mm	1,130
Weight: Kg	5
Pump Diameter: mm	70
Pump Trigger Point: mm	630
Min Internal Well Dia: mm	80
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

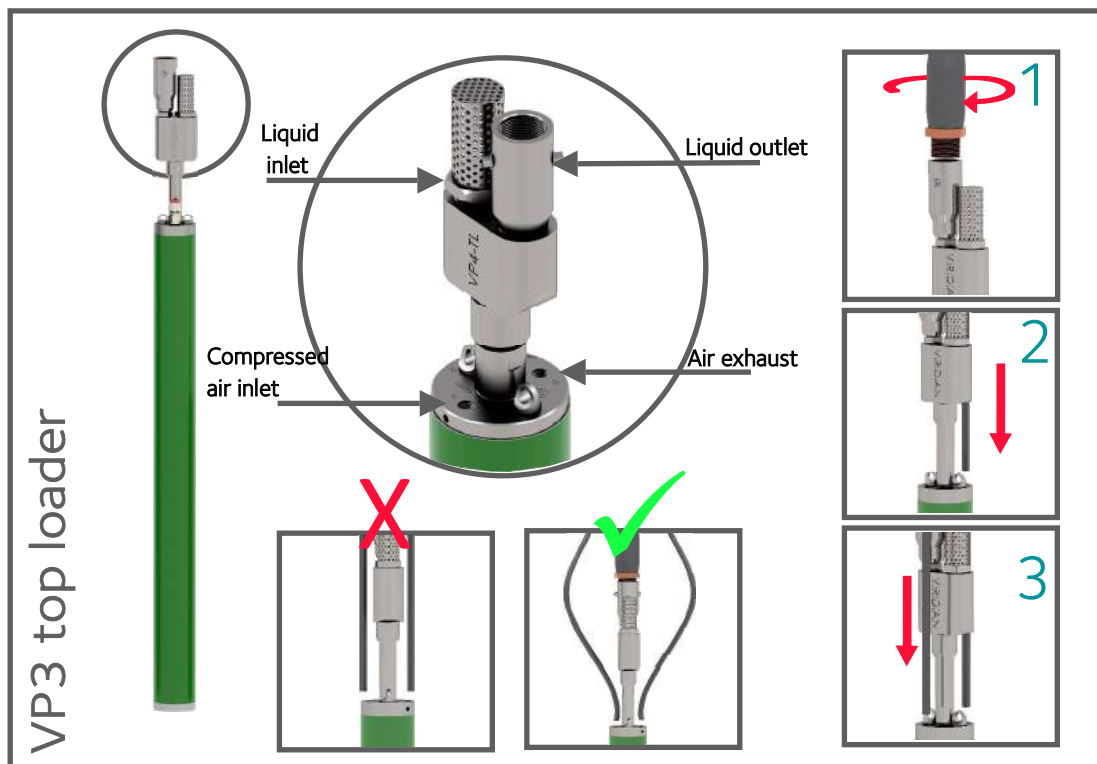
The VP3-TL can be installed in wells of 3"/80 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater.

Top-loaders can be very effective in leachate and gas wells with excessively gaseous/foamy leachate. Top-loaders are often referred to as "Total Fluids" pumps in the contaminated groundwater sector because they are widely used for pumping LNAPL (Light Non-Aqueous Phase Liquids).

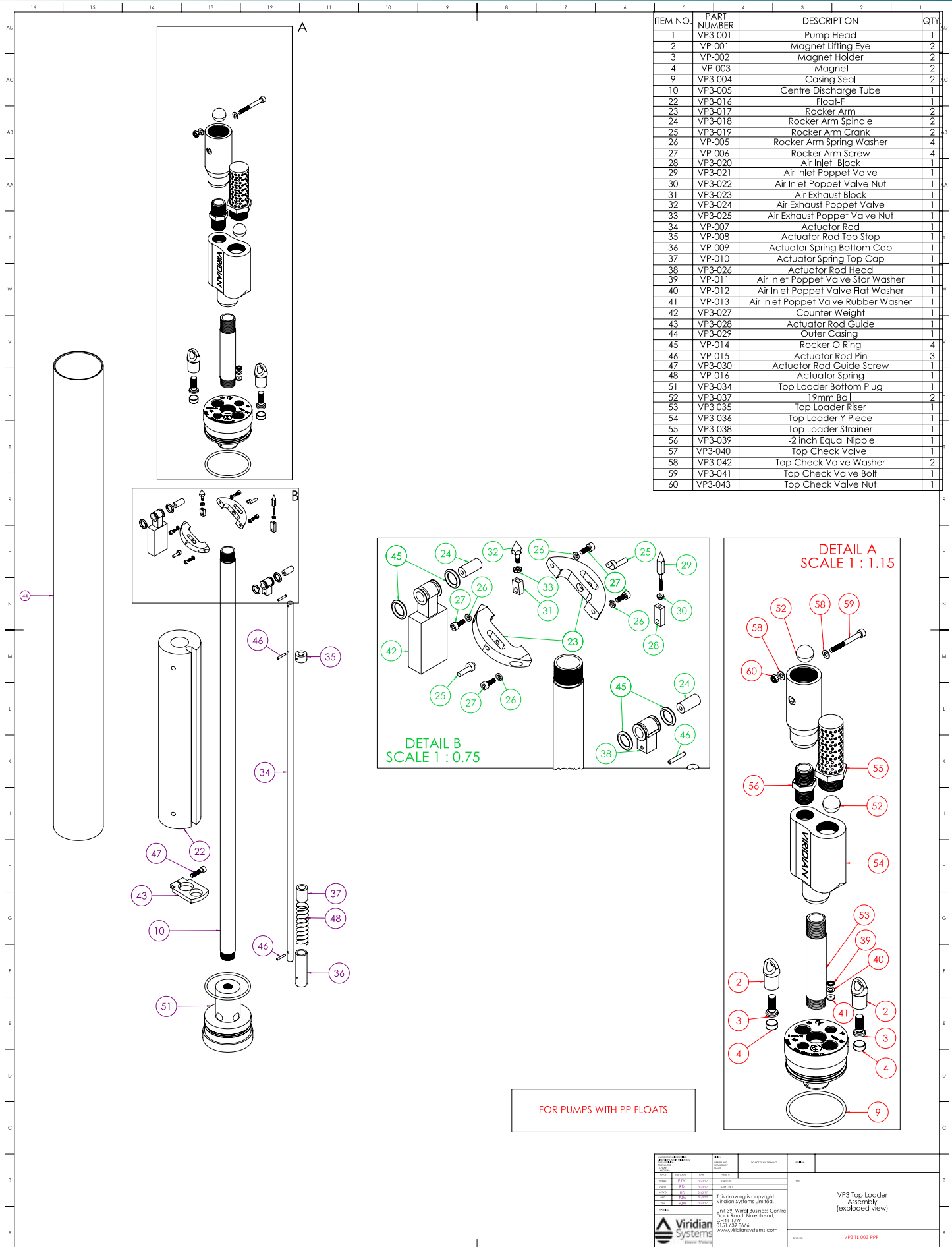
Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.



Quick installation guide

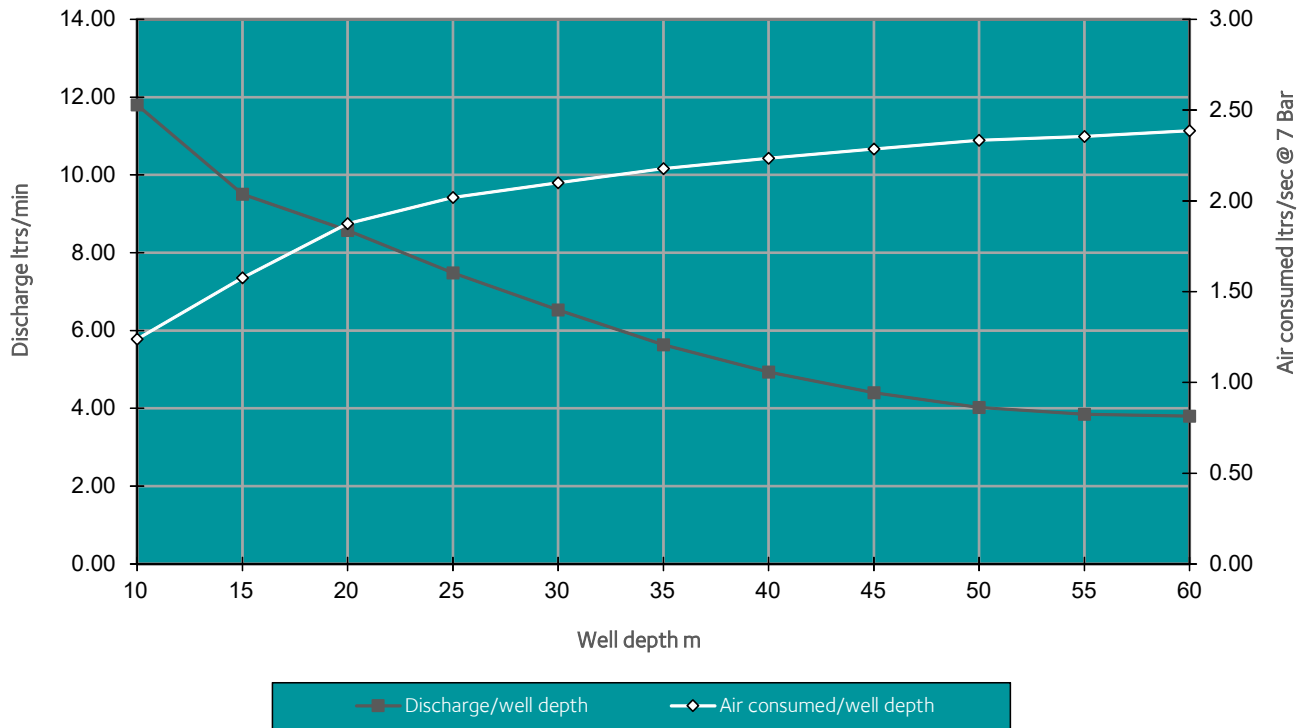


VP3 Top Loader



VP3 TL Performance Curve

VP3-TL LDD liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



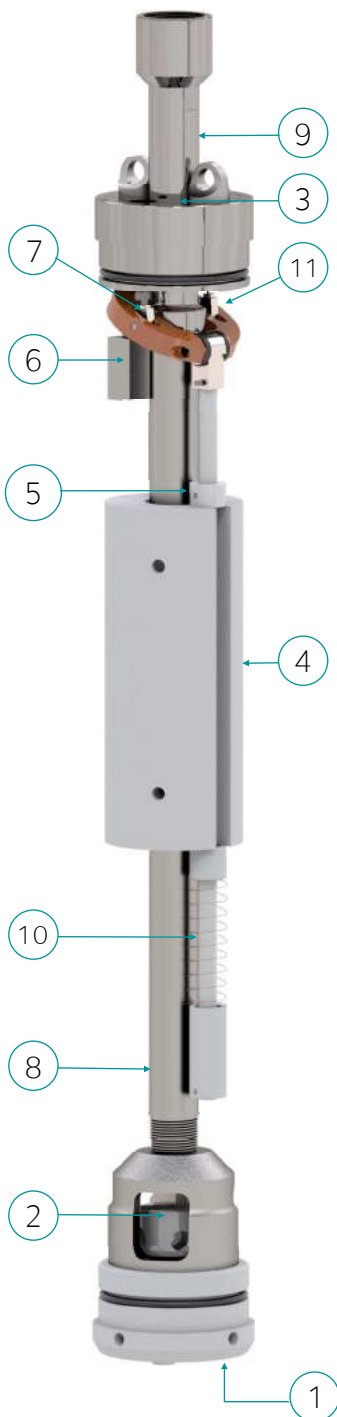
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	13.50	1.25	2.66
15	12.70	1.62	3.43
20	12.20	1.95	4.13
25	11.40	2.21	4.68
30	10.51	2.48	5.27
35	9.60	2.72	5.75
40	8.60	2.77	5.87
45	7.30	2.71	5.74
50	6.50	2.56	5.43
55	5.90	2.44	5.17
60	5.30	2.27	4.82

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP3 Bottom Loader LDD



- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the bottom check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the top check valve (enclosed in head) and out through the riser (9)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

VP3 Bottom Loader LDD

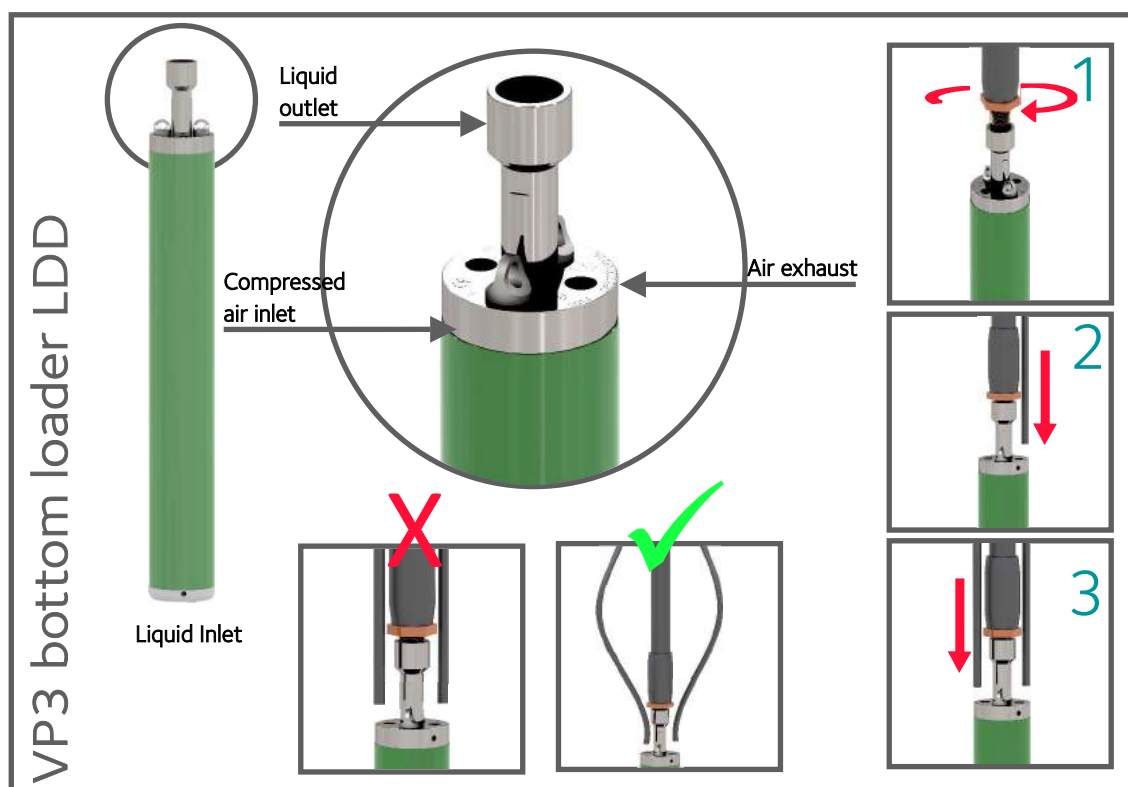
Model & Type	VP3-BL LDD
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	>1,200
Volume/Cycle: Litres	0.6
Pump Length: mm	1,120
Weight: Kg	5
Pump Diameter: mm	70
Pump Trigger Point: mm	715
Min Internal Well Dia: mm	80
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

The VP3-BL LDD can be installed in wells of 3"/80 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater down to a lower level than a standard VP3-BL.

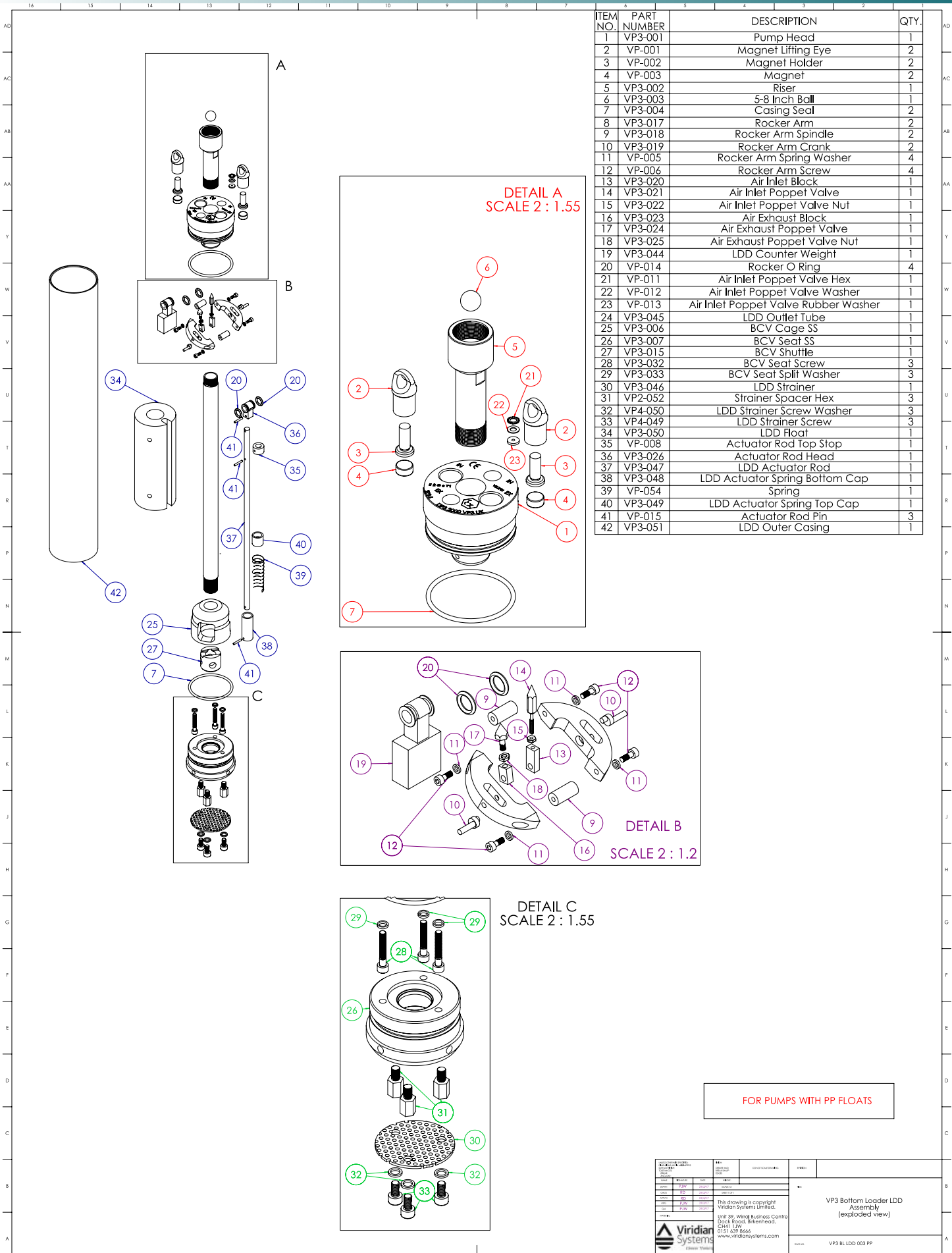
Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.



Quick installation guide

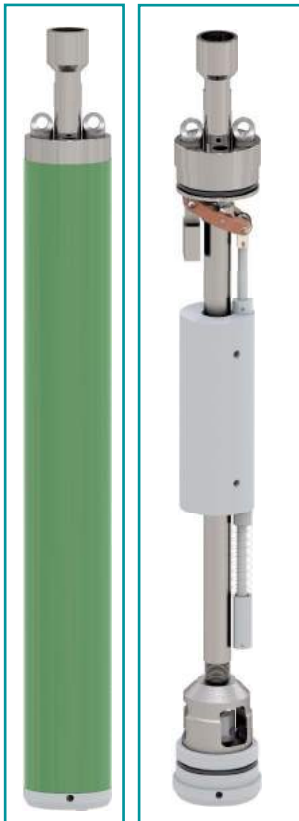
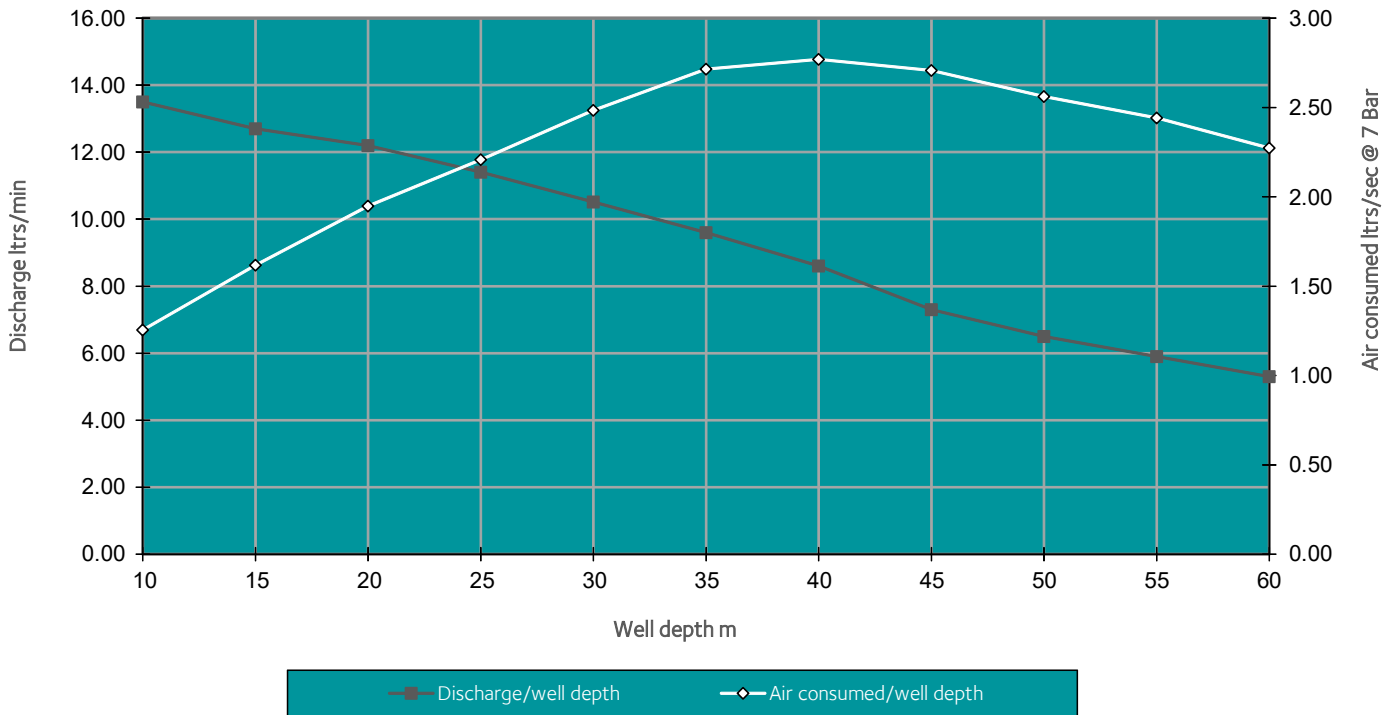


VP3 Bottom Loader LDD



VP3 BL LDD Performance Curve

VP3-BL LDD liquid discharged & air consumed/well depth.
Pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



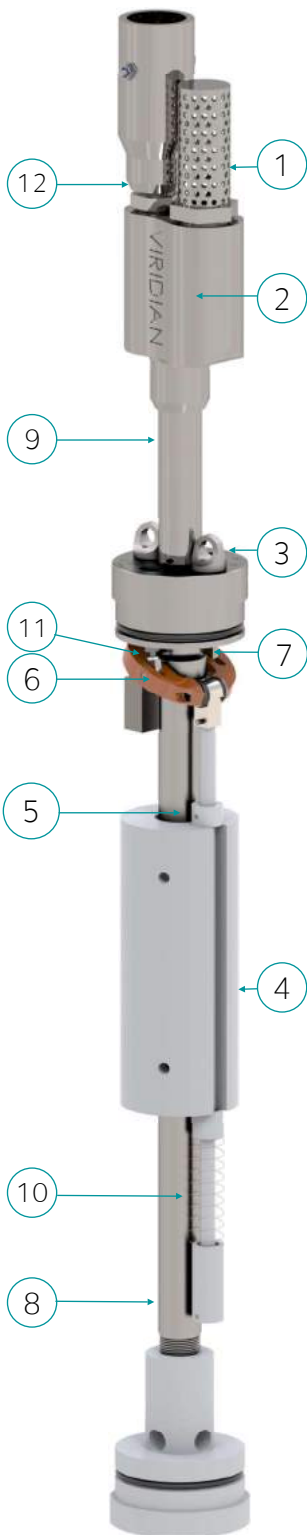
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	13.50	1.25	2.66
15	12.70	1.62	3.43
20	12.20	1.95	4.13
25	11.40	2.21	4.68
30	10.51	2.48	5.27
35	9.60	2.72	5.75
40	8.60	2.77	5.87
45	7.30	2.71	5.74
50	6.50	2.56	5.43
55	5.90	2.44	5.17
60	5.30	2.27	4.82

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP3 Top Loader LDD



- Liquid enters the pump via the strainer (1) and inlet check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the inlet check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the riser (9) and out through the top check valve (12)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

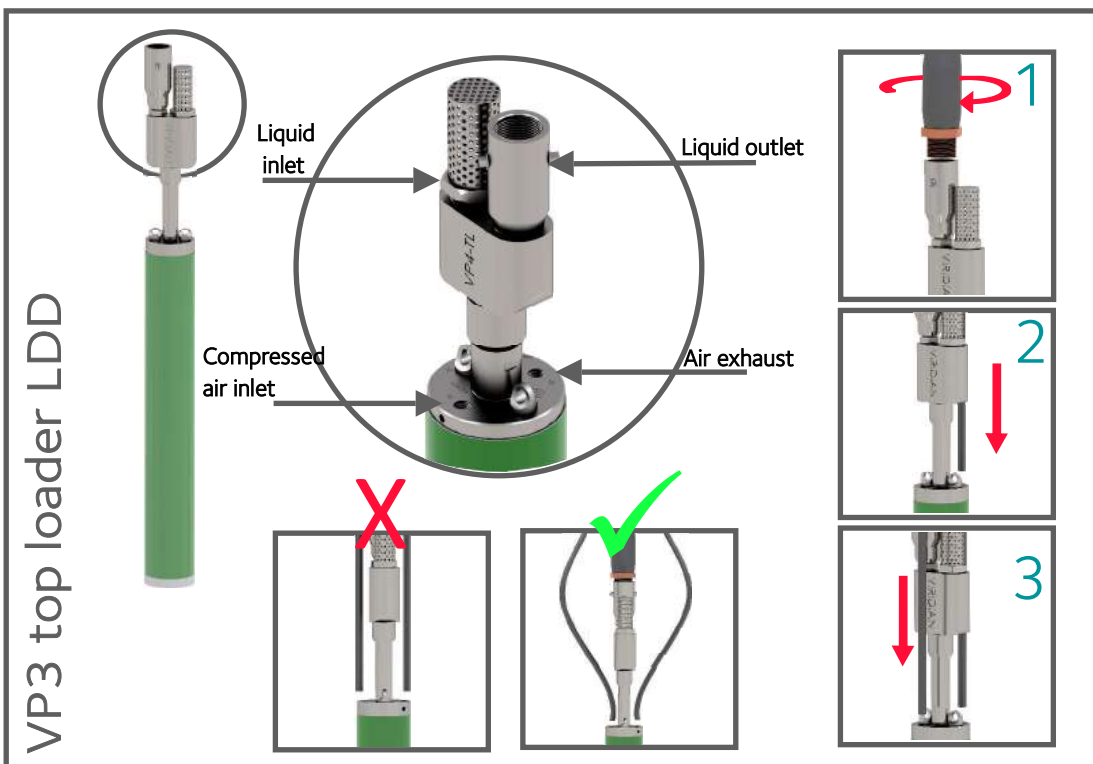
VP3 Top Loader LDD

Model & Type	VP3-TL LDD
Liquid Inlet Position	Top
Max Flow Rate Litres/hr	>1,000
Volume/Cycle: Litres	0.6
Pump Length: mm	1,190
Weight: Kg	5.5
Pump Diameter: mm	70
Pump Trigger Point: mm	630
Min Internal Well Dia: mm	80
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

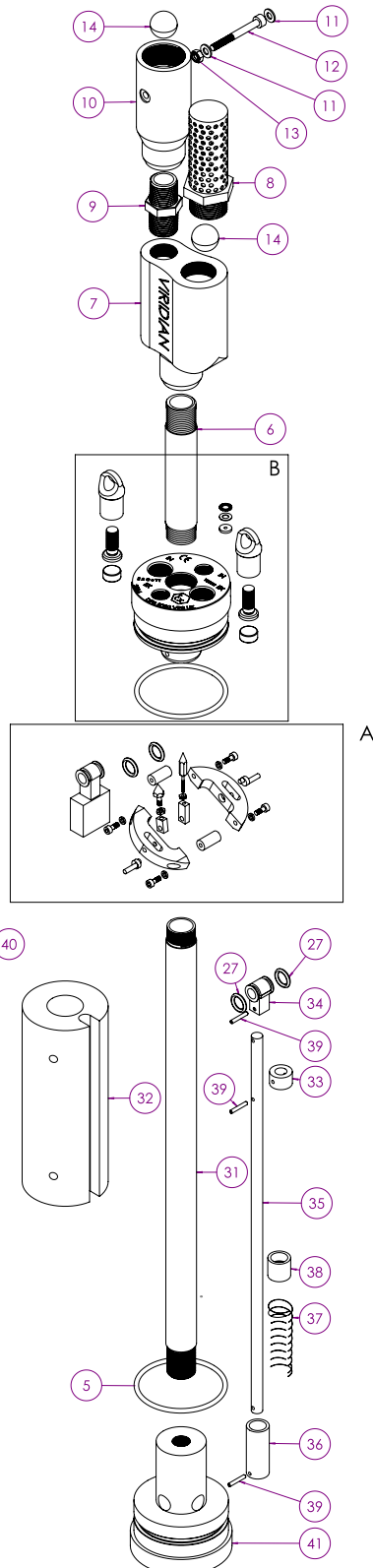
The VP3-TL LDD can be installed in wells of 3"/80 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater down to a lower level than a standard VP3-BL.

Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

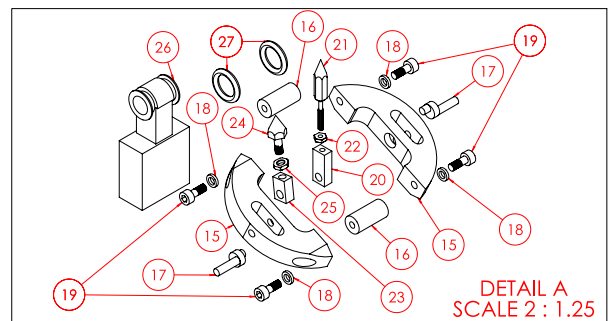
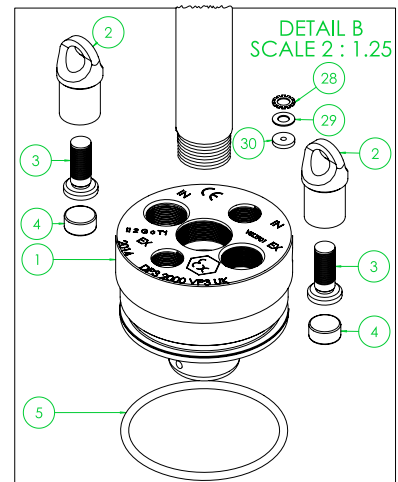
Quick installation guide



VP3 Top Loader LDD



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP3-001	Pump Head	1
2	VP-001	Magnet Lifting Eye	2
3	VP-002	Magnet Holder	2
4	VP-003	Magnet	2
5	VP3-004	Casing Seal	2
6	VP3-035	Top Loader Riser	1
7	VP3-036	Top Loader Y Piece	1
8	VP3-038	Top Loader Strainer	1
9	VP3-039	1-2 Inch Equal Nipple	1
10	VP3-040	Top Check Valve	1
11	VP3-042	Top Check Valve Washer	2
12	VP3-041	Top Check Valve Bolt	1
13	VP3-043	Top Check Valve Nut	1
14	VP3-037	19mm Ball	2
15	VP3-017	Rocker Arm	2
16	VP3-018	Rocker Arm Spindle	2
17	VP3-019	Rocker Arm Crank	2
18	VP-005	Rocker Arm Spring Washer	4
19	VP-006	Rocker Arm Screw	4
20	VP3-020	Air Inlet Block	1
21	VP3-021	Air Inlet Poppet Valve	1
22	VP3-022	Air Inlet Poppet Valve Nut	1
23	VP3-023	Air Exhaust Block	1
24	VP3-024	Air Exhaust Poppet Valve	1
25	VP3-025	Air Exhaust Poppet Valve Nut	1
26	VP3-044	LDD Counter Weight	1
27	VP-014	Rocker O Ring	4
28	VP-011	Air Inlet Poppet Valve Hex	1
29	VP-012	Air Inlet Poppet Valve Washer	1
30	VP-013	Air Inlet Poppet Valve Rubber Washer	1
31	VP3-045	LDD Outlet Tube	1
32	VP3-050	LDD Float	1
33	VP-008	Actuator Rod Top Stop	1
34	VP3-026	Actuator Rod Head	1
35	VP3-047	LDD Actuator Rod	1
36	VP3-048	LDD Actuator Spring Bottom Cap	1
37	VP-054	Spring	1
38	VP3-049	LDD Actuator Spring Top Cap	1
39	VP-015	Actuator Rod Pin	3
40	VP3-051	LDD Outer Casing	1
41	VP3-034	Top Loader Bottom Plug	1

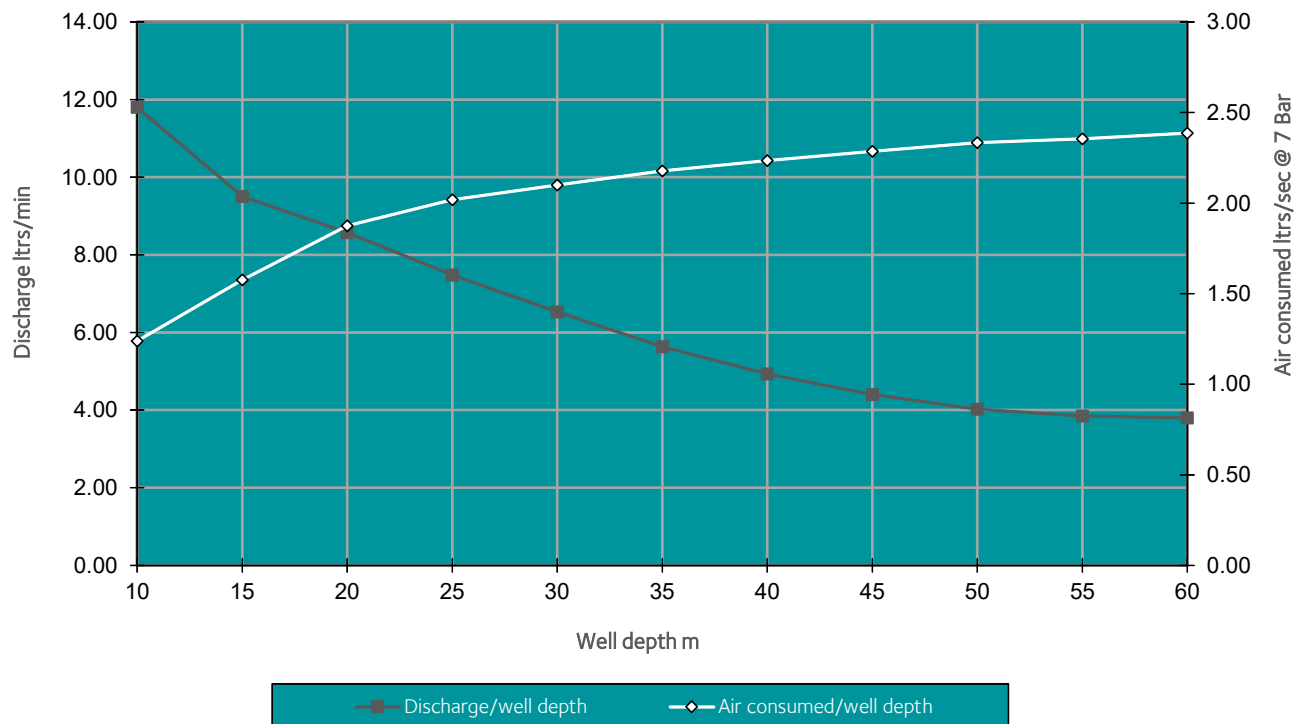


FOR PUMPS WITH PP FLOATS

REV	DATE	DESCRIPTION	BY	CHKD
1	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
2	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
3	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
4	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
5	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
6	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
7	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
8	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
9	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
10	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
11	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
12	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
13	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
14	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
15	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
16	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
17	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
18	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
19	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
20	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
21	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
22	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
23	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
24	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
25	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
26	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
27	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
28	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
29	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
30	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
31	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
32	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
33	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
34	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
35	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
36	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
37	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
38	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
39	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
40	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3
41	01/01/2011	ISSUED FOR PRODUCTION	VP3	VP3

VP3 TL LDD Performance Curve

VP3-TL LDD liquid discharged & well depth/air consumed
pump submerged by 3m and 25mm bore discharge hose.
Air inlet pressure 7 Bar



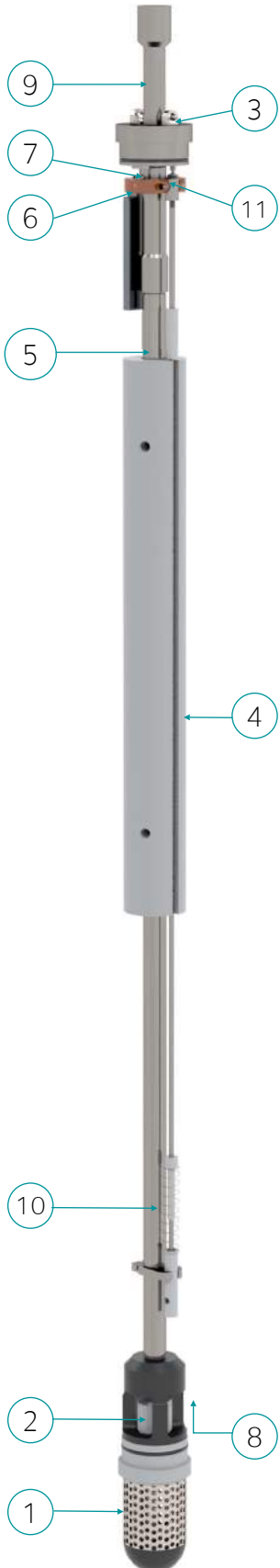
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	11.80	1.24	2.63
15	9.50	1.58	3.34
20	8.57	1.87	3.97
25	7.48	2.02	4.28
30	6.53	2.10	4.45
35	5.63	2.18	4.61
40	4.93	2.24	4.74
45	4.40	2.29	4.84
50	4.02	2.33	4.95
55	3.85	2.36	4.99
60	3.80	2.39	5.06

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP2 Bottom Loader



- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the bottom check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the top check valve (enclosed in head) and out through the riser (9)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

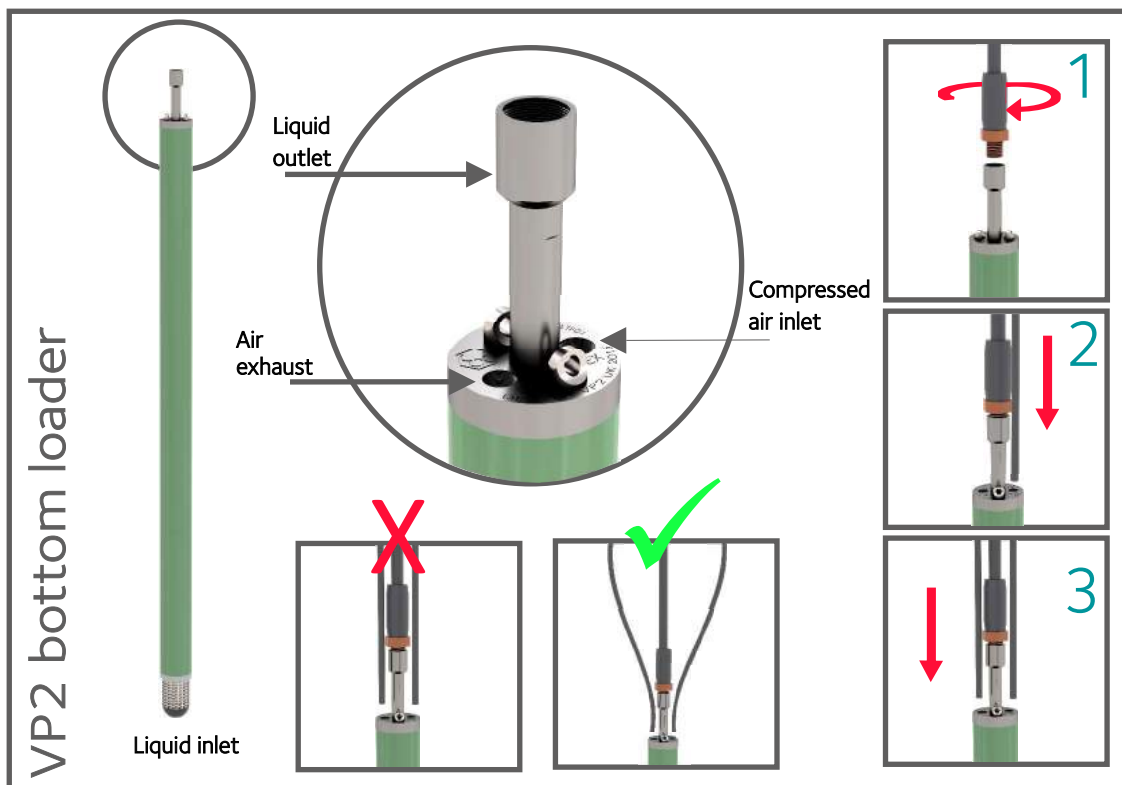
VP2 Bottom Loader

Model & Type	VP2-BL
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	>475
Volume/Cycle: Litres	0.33
Pump Length: mm	945
Weight: Kg	1.5
Pump Diameter: mm	44
Pump Trigger Point: mm	650
Min Internal Well Dia: mm	50
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

The VP2-BL can be installed in wells of 2"/50 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater. The base of the pump is domed to aid installation and to deflect entrained gases in liquids.

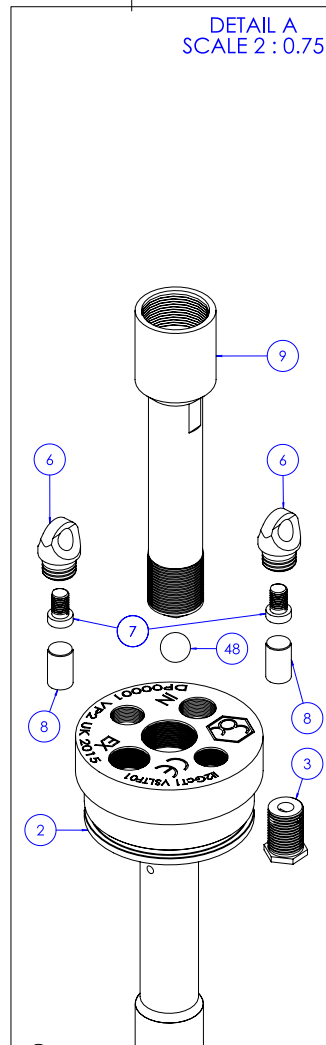
Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

Quick installation guide



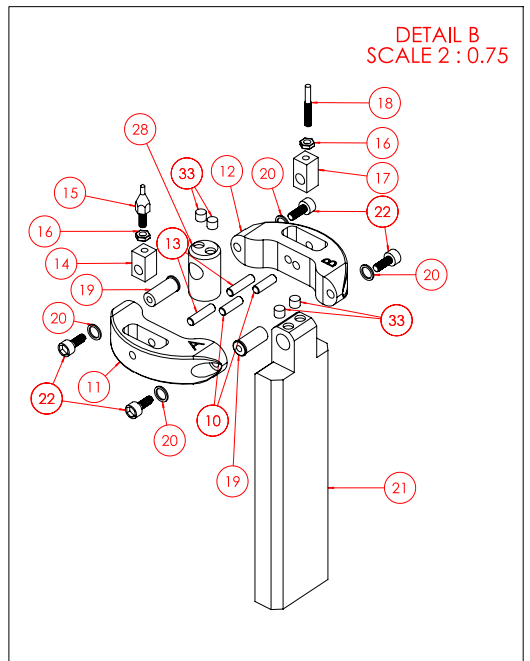
VP2 Bottom Loader

DETAIL A
SCALE 2 : 0.75



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	VP2-002	Outlet Tube	1
2	VP2-001	Pump Head	1
3	VP2-003	Inlet Valve Seat	1
4	VP2-004	3mm Ball	1
5	VP2-005	Push Fit	2
6	VP2-006	Magnet Lifting Eye	2
7	VP2-007	Magnet Holder	2
8	VP2-008	Magnet	2
9	VP2-009	Riser	1
10	VP2-010	Rocker Arm Pivot Pin	2
11	VP2-012	Rocker Arm A	1
12	VP2-013	Rocker Arm B	1
13	VP2-011	Rocker Arm Head Pin	2
14	VP2-014	Exhaust Poppet Block	1
15	VP2-015	Exhaust Valve	1
16	VP2-016	Rocker Assembly Nut	2
17	VP2-017	Inlet Poppet Block	1
18	VP2-018	Inlet Poppet	1
19	VP2-019	Rocker Arm Spindle	2
20	VP2-020	Rocker Arm Washer	6
21	VP2-047	Counter Weight	1
22	VP2-021	Rocker Arm Screw	4
23	VP2-022	Actuator Rod Guide	1
24	VP2-023	Float	1
25	VP2-024	Actuator Rod Long	1
26	VP2-025	Actuator Rod Top Stop	1
27	VP2-026	Actuator Rod Short	1
28	VP2-027	Actuator Rod Head	1
29	VP2-026	Actuator Sprint Top Cap	1
30	VP2-028	Actuator Spring Bottom Cap	1
31	VP2-029	Actuator Rod Washer	1
32	VP-016	Spring	1
33	VP2-031	Rocker Arm Buffer	4
34	VP2-032	Actuator Rod Guide Screw	1
35	VP2-033	Outer Casing	1
36	VP2-034	BCV Cage	1
37	VP2-033	Plunger	1
38	VP2-036	Inlet Valve Block	1
39	VP2-037	Spacer Tube	3
40	VP2-038	Strainer	1
41	VP2-039	BCV Seat Screw	3
42	VP2-040	BCV Dome Screw	1
43	VP2-041	Strainer Stud Screw	3
44	VP2-042	BCV Washer	7
45	VP2-043	BCV Dome	1
46	VP2-044	Spider	1
47	VP2-045	Casing Seal	2
48	VP2-047	7mm Ball	1

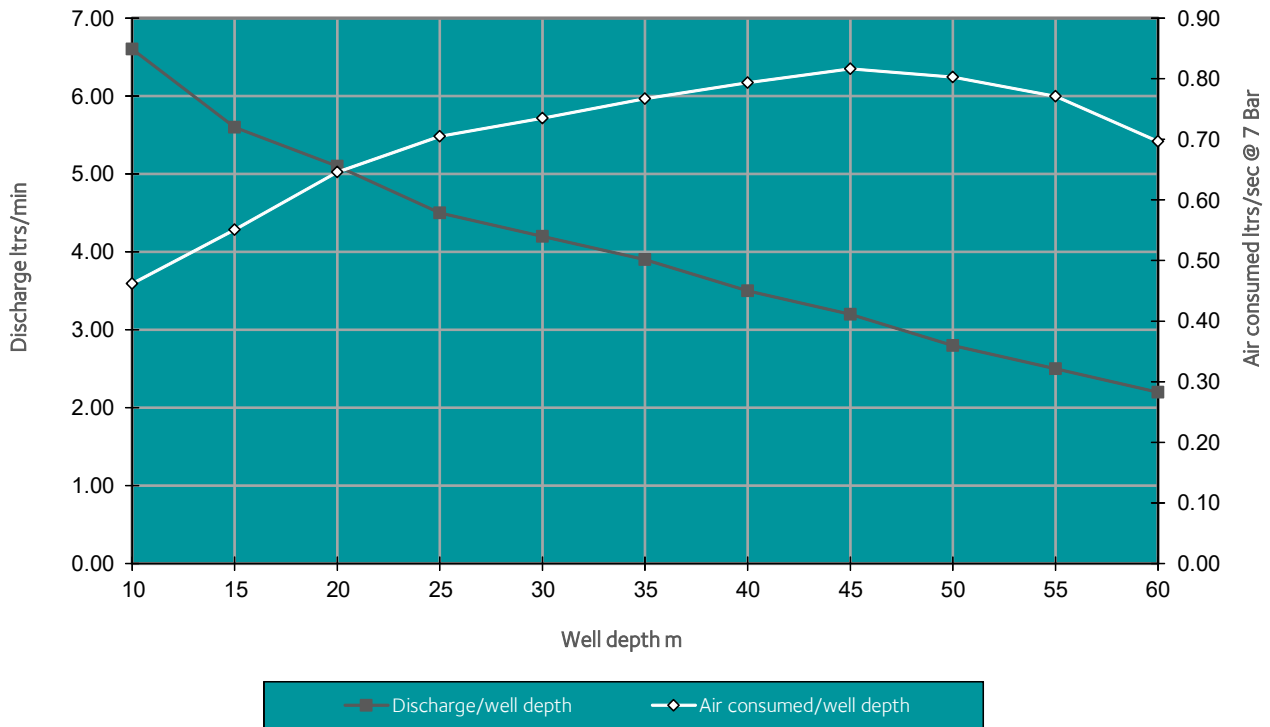
DETAIL B
SCALE 2 : 0.75



<p>VP2 Bottom Loader Assembly (exploded view)</p> <p>VP2 BL 003 PPF</p>	<p>Viridian Systems</p> <p>Unit 39, Wind Business Centre Dove Road, Bickenhead, CH44 1JY 0151 631 8844 www.viridiansystems.com</p>
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VP2 BL Performance Curve

VP2-BL liquid discharged & air consumed/well depth.
Pump submerged by 3m and 12.5mm bore discharge hose.
Air inlet pressure 7 Bar



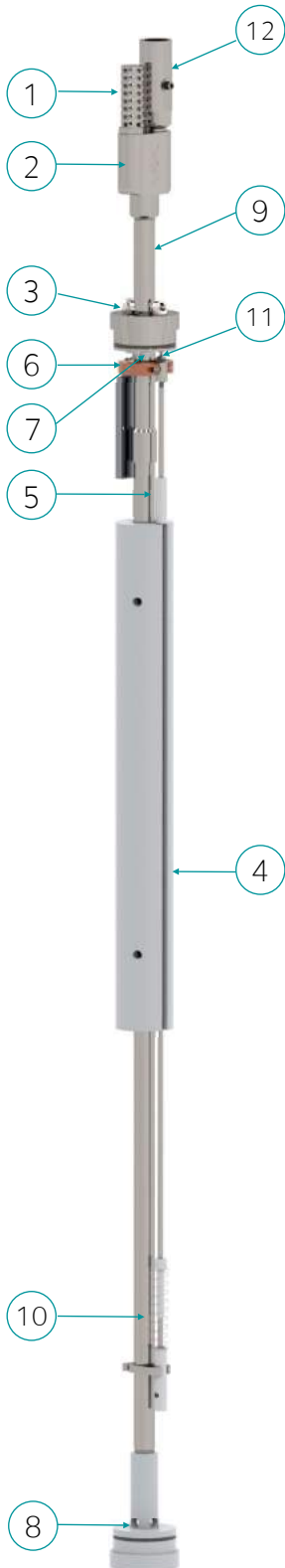
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	6.60	0.46	0.98
15	5.60	0.55	1.17
20	5.10	0.65	1.37
25	4.50	0.71	1.49
30	4.20	0.74	1.56
35	3.90	0.77	1.63
40	3.50	0.79	1.68
45	3.20	0.82	1.73
50	2.80	0.80	1.70
55	2.50	0.77	1.63
60	2.20	0.70	1.48

DATA table

Values for SCFM have been shown in the DATA table for ease of compressor specification.

How it works

VP2 Top Loader



- Liquid enters the pump via the strainer (1) and inlet check valve (2)
- Air trapped within the pump escapes through the air exhaust (3)
- The float (4) rises as the liquid enters and when it gets to the top of its travel (5), it trips the rocker mechanism (6)
- The air exhaust valve (11) closes
- The air inlet valve (7) opens allowing compressed air into the pump
- Compressed air closes the inlet check valve (2)
- Liquid within the pump is discharged from the pump through the discharge port (8) and up the central discharge tube
- Liquid passes through the riser (9) and out through the top check valve (12)
- The float descends as liquid is discharged
- The float pulls the rocker mechanism back when the spring (10) is compressed
- The air inlet valve (7) closes and the air exhaust valve (11) opens
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (3)
- The pump continues to cycle in this way

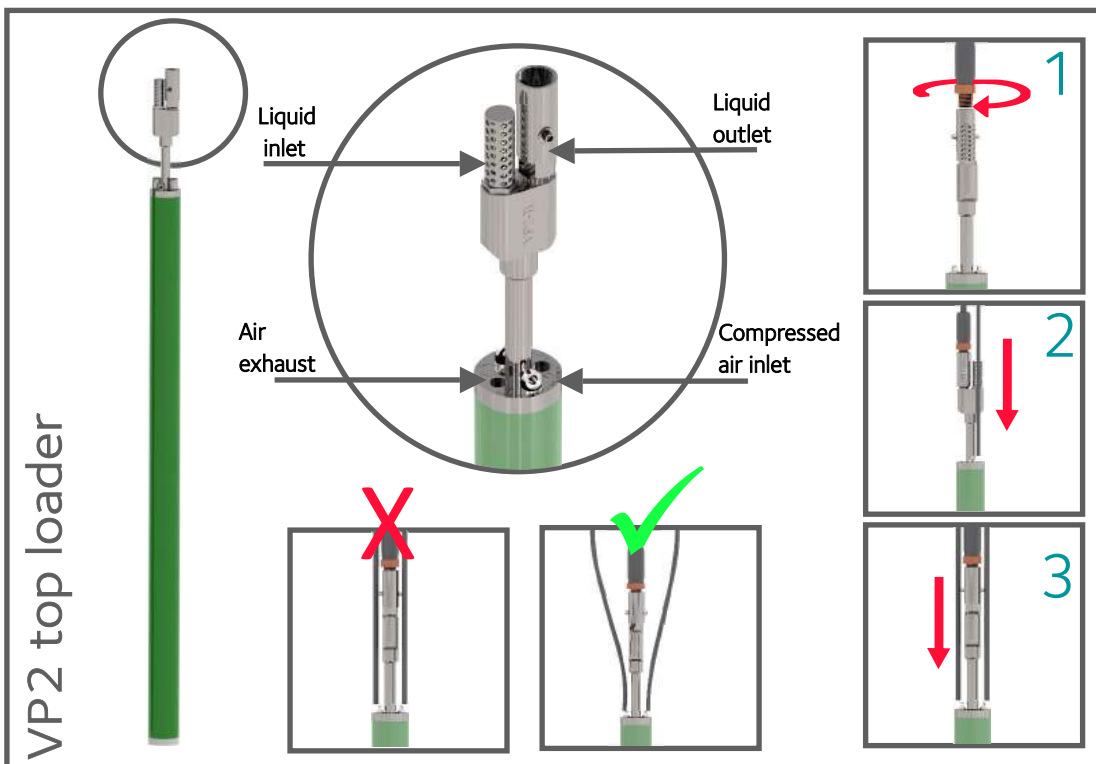
VP2 Top Loader

Model & Type	VP2-TL
Liquid Inlet Position	Top
Max Flow Rate Litres/hr	>400
Volume/Cycle: Litres	0.3
Pump Length: mm	995
Weight: Kg	2
Pump Diameter: mm	44
Pump Trigger Point: mm	595
Min Internal Well Dia: mm	50
Max Working Depth: m	130
Max Operating Temp: °C	100
pH Operating Range	3 -12

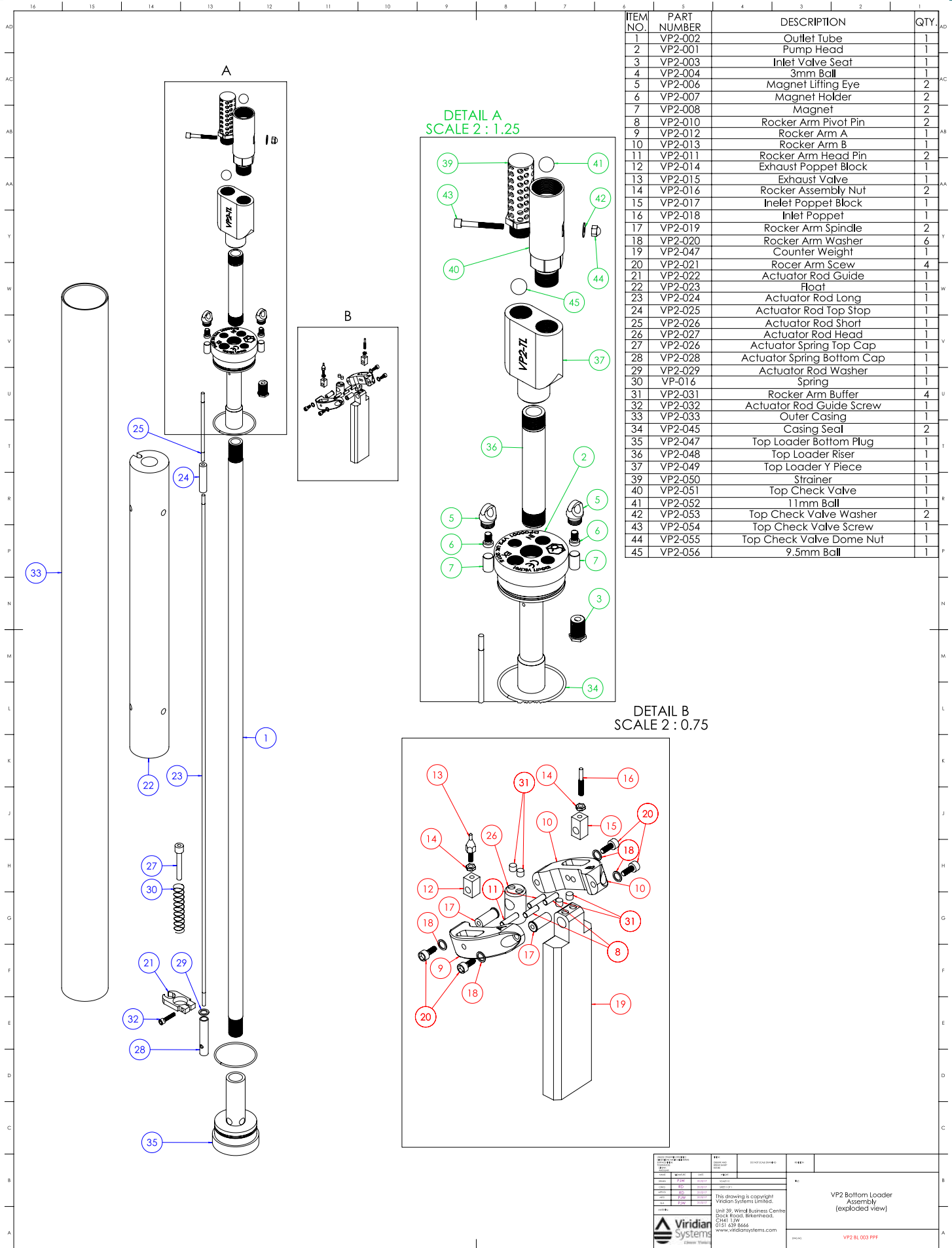
The VP2-BL can be installed in wells of 2"/50 mm minimum internal diameter. They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater. The base of the pump is domed to aid installation and to deflect entrained gases in liquids.

Viridian pumps are designed for user serviceability and longevity, providing the lowest whole-life cost of any similar pump on the market.

Quick installation guide

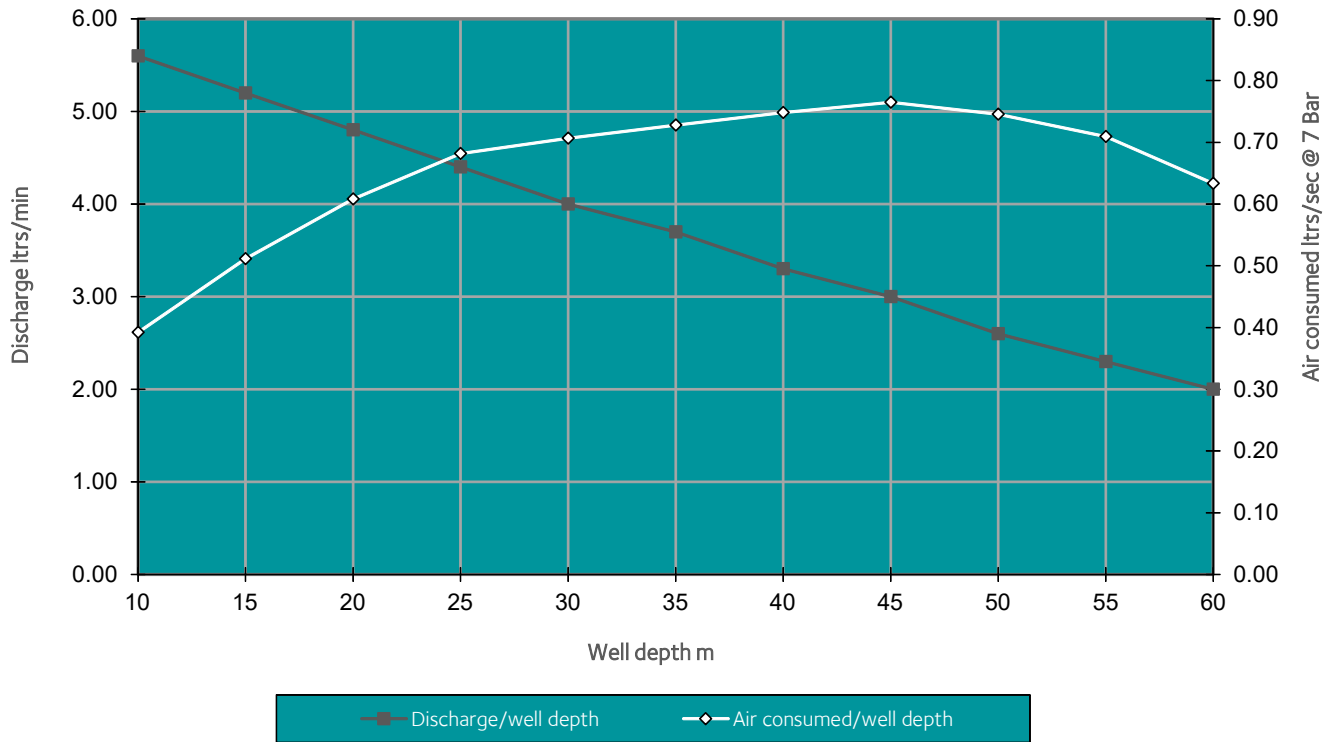


VP2 Top Loader



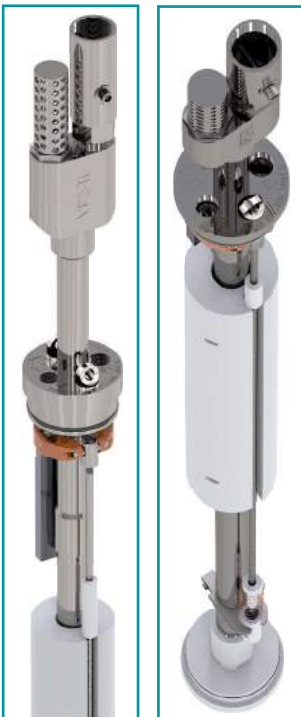
VP2 TL Performance Curve

VP2-TL liquid discharged & air consumed/well depth.
Pump submerged by 3m and 12.5mm bore discharge hose.
Air inlet pressure 7 Bar



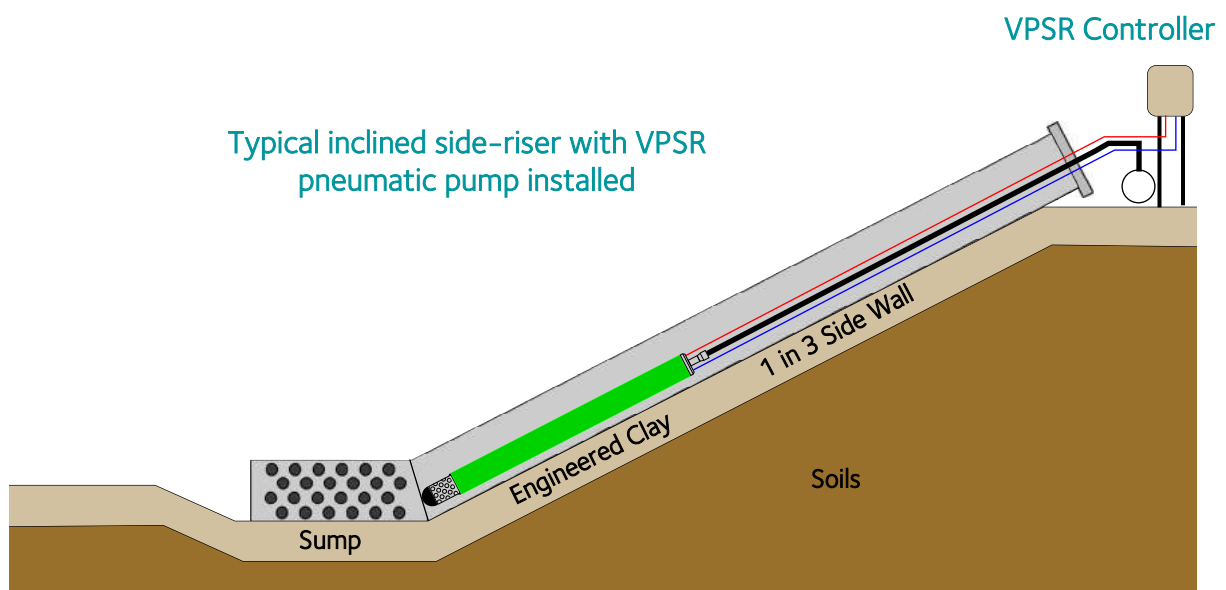
Well Depth	Discharge LPM	Total Air Requirement (L/S)	Total Air (SCFM) Requirement
10	5.60	0.39	0.83
15	5.20	0.51	1.08
20	4.80	0.61	1.29
25	4.40	0.68	1.45
30	4.00	0.71	1.50
35	3.70	0.73	1.54
40	3.30	0.75	1.58
45	3.00	0.77	1.62
50	2.60	0.75	1.58
55	2.30	0.71	1.50
60	2.00	0.63	1.34

DATA table



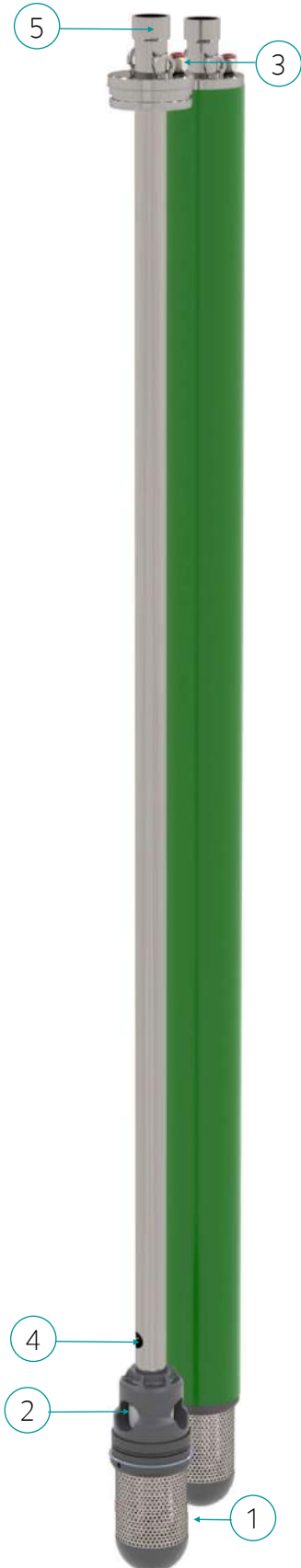
Values for SCFM have been shown in the DATA table for ease of compressor specification.

VPSR: the pneumatic pump for side risers



How it works

VPSR Side Riser Pump



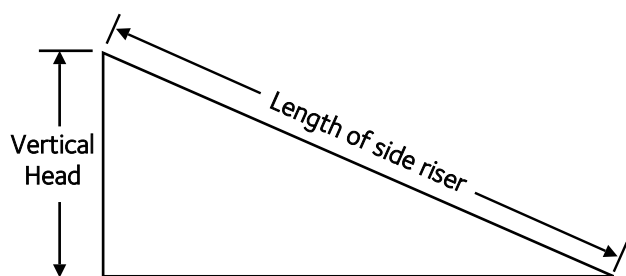
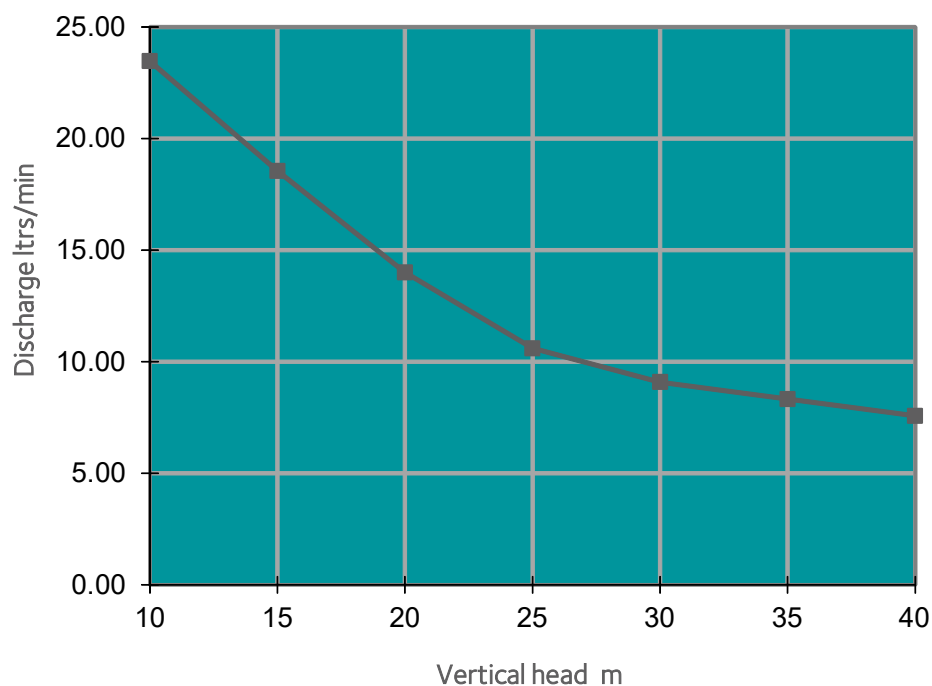
Although the VPSR will work when vertical, it is designed to work in inclined wells, typically on a slope angle of 1:3. It is not designed to work horizontally. The VPSR comprises of a pump, exhaust valve and control panel. The pump fills at the lower end and discharges at the upper end of the pump. There is an inlet check valve and a discharge check valve. There are no internal controls within the pump. The exhaust valve should be positioned within a short distance of the pump in the well such that it is not submerged during normal operation. The control panel is sited outside of the well at ground level and provides an operator settable timed intervals for exhaust/fill and discharge. Operation is as follows: -

- Liquid enters the pump via the strainer (1) and bottom check valve (2)
- Air trapped within the pump escapes through the air inlet/exhaust port (3)
- Liquid within the pump is discharged through the discharge port (4) and up the central discharge tube.
- Liquid is displaced by compressed air entering the pump via the air inlet/exhaust port (3)
- Liquid passes through the top check valve (enclosed in head) and out through the riser (5)
- Compressed air trapped within the pump can now escape to atmosphere via the air exhaust (not shown)
- The control panel incorporates timers which can be adjusted for site specific conditions. The timer functions are; timed delay - Exhaust/Fill and timed delay - Discharge
- The control panel also incorporates a pressure regulator which should be adjusted according to the vertical head and also to take account of friction losses in the pipework

Note: Level control to turn the pump on and off is an option available on request.

VPSR Performance Curve

VPSR liquid discharged & well depth,
pump submerged by 3m on a 1:3 slope angle and 25mm bore
discharge hose. Air inlet pressure 7 Bar



At fixed inlet air pressure and fixed pipe sizing, the main factors affecting the pumping rate are the vertical head and friction losses in the liquid discharge, air supply and air exhaust pipelines

DATA table

Vertical Head (m)	Horizontal length (m)	Length of side riser (m)	Discharge LPM
10	30	31.62	23.47
15	45	47.43	18.55
20	60	63.25	14.01
25	75	79.06	10.60
30	90	94.87	9.08
35	105	110.68	8.33
40	120	126.49	7.57

Compressed air consumption is typically around 7 SCFM to achieve the pumping rates shown in the data table

VPSR Specifications



Model & Type	VPSR
Liquid Inlet Position	Bottom
Max Flow Rate Litres/hr	2,100
Volume/Cycle: Litres	5-6
Pump Length: mm	1,706
Weight: Kg	7.5
Pump Diameter: mm	90
Min Internal Well Dia: mm	100
Max Vertical Working Depth: m	70
Max Operating Temp: °C	100
pH Operating Range	3-12

The VPSR can be installed in wells of 4"/100 mm minimum diameter. Although intended for installation into inclined wells (typically on a 1:3 gradient), they can also be used in vertical wells. They are not designed to be used horizontally.

They are designed to pump landfill leachate, landfill gas condensate and contaminated or clean groundwater.

The VPSR can be supplied with wheels to aid installation into side risers.

The VPSR's displacement depends on the angle of inclination. In the vertical plane, displacement is of the order of 6.5 litres. On a 1:3 gradient, the displacement is between 5 & 6 litres depending on the exhaust/fill dwell time and the depth of submergence of the pump.

Option 1 - no level control

- The VPSR pump
- The exhaust valve
- IP66 control panel

Option 2 – with level control

- The VPSR pump
- The exhaust Valve
- Enhanced IP66 control panel including P.V. solar charger/battery circuit for 24 hour operation
- Submersible ATEX certified pressure transducer (pressure compensated)
- Intrinsically safe barriers
- Readout unit to show liquid level locally at the well

Option 3 - with level control, flow meter and telemetry

- The VPSR pump
- The exhaust valve
- Enhanced IP66 control panel including P.V. solar charger/battery circuit for 24 hour operation
- Submersible ATEX certified pressure transducer (pressure compensated)
- Intrinsically safe barriers
- Readout unit to show liquid level locally at the well
- Piezoelectric flow sensor to provide an indication of cumulative flow
- Remote data acquisition via the 3G/GPRS network

VPSR Options

Tailored packages available on request including alternative electrical power sources

Installation

VP pumps are ATEX certified and should only be serviced by authorised persons. If they are dismantled and reassembled by the customer it may invalidate the ATEX certification.

Maintenance

Maintenance and servicing is recommended as a minimum every 6-months. A typical service should consist of dismantling, cleaning and de-scaling of receptive surfaces, replacement of worn parts, air leakage tests, reassembly setting/adjustment and operational testing.

Installation

It is imperative that the air supply and exhaust lines are checked for leakage and that the well head is gas-tight.

Installation:

- Attach the pipe-work to the pump through the pumping wellhead (if present).
- Ensure that all joints are secure and that the pipe-work is correctly fitted.
- Lower the pump down the well in a controlled manner until contact is made with the well base.
- Raise the pump (approximately 200 mm) and secure the pump in position.
- Connect the pipe-work to the relevant connections at the well site.
- Open the isolation valves at the well site.
- Regulate the pressure to the pump via the air regulator (located at the wellhead) as required.
- Replace the wellhead and reset the gas isolation valve (if present) to its original position.

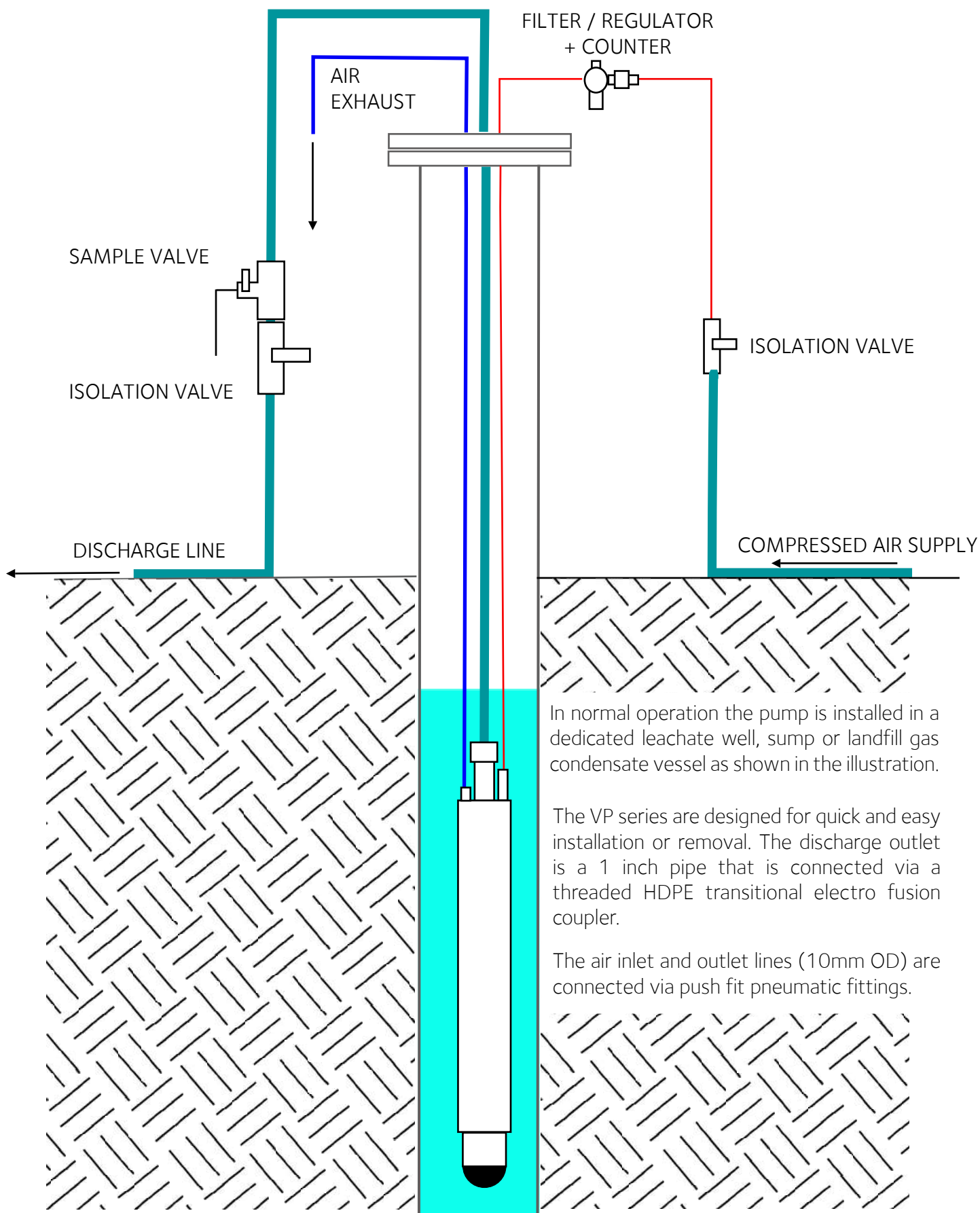
Removal:

- Isolate the airline to the pump via the valve arrangement at the well site. Ensure that the valve is fully closed.
- Remove the residual air from the line by altering the regulator, the gauge pressure will drop to zero when the line is empty.
- Isolate the leachate line at the valve arrangement at the well head. Ensure that the valve is fully closed.
- Remove the wellhead (if present) and remove the pump from the well. This operation may be performed by both operatives present and will remove the requirement to stand directly over the well. Operatives should avoid working directly over open wells.
- If the removal is to be for a period of time the pipe-work from the pump to the isolation valves should be disconnected and blank ends fitted to avoid accidental spillage.
- Replace the wellhead and open the gas isolation valve (if present) to the previous setting.

The pumping rate is dependent on a number of factors including: -

- The depth of liquid in the well.
- Liquid recharge rate in the well, i.e. if the well recharges at a rate of 100 litres/hour, the pump is limited to discharging at 100 litres/hour.
- The system air pressure.
- The system pressure differential i.e. the difference between the actual system air pressure and the losses incurred due to total static head plus frictional loss.

Typical Installation



Operational Parameters

VP pumps are submersible pumps, capable of pumping liquids (typically landfill leachate or condensate) in a gaseous atmosphere.

VP pumps are intended for use in wells, sumps or vessels in which an explosive atmosphere caused by mixtures of air and gases (generally methane) is likely to occur. In its normal operating environment, VP pumps are fully submerged in leachate or condensate.

VP pumps fulfil the following requirements: -

- Explosive protection.
- Group 'II' equipment for gaseous atmospheres.
- Zone '1' for gas.
- Category '2' equipment.
- 'G' for gas.
- 'c' for constructional safety.
- 'T1' for methane.

In the event of failure, the normal operational parts become static. It is then necessary to remove the pump from its normal operating environment to a service workshop; it is then no longer in an explosive atmosphere.

Pressure parameters: -

The maximum working pressure of the VP pumps is 10 Bar (gauge)

Special conditions of use: -

When installed in leachate or gas wells on a landfill site, control measure should be adopted to ensure the gaseous atmosphere is maintained within Zone-1 parameters:

- The well must be sealed to prevent air ingress.
- The condition of the well seals should be checked on a regular basis – e.g. Quarterly.
- The gas quality should be monitored on a regular basis – e.g. weekly and actions taken to address air ingress.
- The pump should be checked for air leakage on a regular basis – e.g. Monthly.
- The pump should not be allowed to exhaust into the well.
- The pump air supply should be fitted with an air fuse after the pressure regulator.
- It is essential that VP pumps are suspended as near vertical as possible; considerable inclination causes malfunction and could give rise to air escape.

Troubleshooting

Pumps Stalling (assuming leachate is available to pump in the well and tank is not full):			Action:
Faulty or incorrectly adjusted pump		1	Re-service pump
Valves turned off		2	Check all valves are open
Installation issues	Pump at angle in well	3	Turn-off discharge valve and test pump by opening sample valve, turning air on and off to see if pump stall and/or stutters
	Pump sitting on bottom of well	4	Check well depth and adjust suspension wire and pipework to suit
	Airline and /or air exhaust pipes cut too short which can cause the pump to kick over at an angle	5	Ensure airline and exhaust pipes are longer than leachate discharge line
	Bottom of pump stuck on a ledge in the well	6	Re-install pump
	Stainless steel harness suspending pump at an angle	7	Ensure the pump is suspended by the leachate discharge line, not the wire.
	Angle of the well	8	Check angle of well – if possible.
	Incorrectly configured pipework (very common problem)	9	See diagram 1.
Silt ingress into well and into pump		10	Check to see if pump is filling with silt or is stuck in silt.
		11	Check well depth
		12	De-silt the well
Scale forming in the pump		13	Turn-off discharge valve and test pump by opening sample valve, turning air on and off to see if pump stall and/or stutters
		14	De-scale and service pump
Air pressure too low at well	Compressor too small, pressure and air delivery rate	15	Calculate demand and upsize compressor
	Pipework too small, friction losses	16	Carry out flow analysis on the air and leachate Pipework
	Air leaks	17	Check for air leaks regularly and repair
	Condensate in air system – this is a major issue on many pumping system	18	Fit a Minimum Pressure valve on the air receiver and at strategic points in the air system
	Stalled pumps passing air into the leachate discharge pipework	19	Check operation of all pumps to see if any are passing air into the discharge system, worsening air locks in the force-main
	Airlocks in the leachate mains – this causes high discharge pressure and is very common	20	Install air-release valves at high points in the force-main
	Leachate in the airlines – this can happen when the air system is de-pressurised, the pump fills as normal which opens the air inlet valve and this allows leachate up and into the airline. In some cases, leachate can get into the air mains and to the compressor	21	Fit NRV's on the inlet to every pump (we do this as standard in the UK on every pump)

Troubleshooting - continued

Pumps Stalling (assuming leachate is available to pump in the well and tank is not full):			Action:
Continued from page 51			
Air pressure too low at well – continued	Blockages in air system, e.g. crushed pipe, vermin (mice) in the airline	22	Check the pipes are clear
	Blocked or leaking regulator	23	Clear the regulator or exchange it
	Blocked counters	24	Clean the counter out
	Faulty air isolation valve	25	Exchange the valve
High discharge pressure	Carbonate scaling in the pipework causing increased back-pressure	26	Cut in to the force-main to inspect for scaling. Scaling can be reduced by installing silt traps at strategic locations to reduce the amount of grit and silt which the scaling ions utilise as crystal nucleation sites.
	Incorrectly configured pipework (very common problem)	27	Review the pipework design and check pipework that has been added on to see if it needs to be Modified.
	Electric pumps discharging into same pipework cause over-pressure if the pipework is too small	28	Do not connect electric pumps to the same force-main as pneumatic pumps
	Airlocks in the leachate mains - this causes high discharge pressure and is very common	29	Please see separate information on air-locks
Debris in the well	Polythene bags in wells (they are sucked onto the pump inlet)	30	Hook debris out of the well or de-silt
Relative gas pressures in the well	Vacuum in the well causing the pump to stall	31	Fit VVA or exhaust into well
	Leachate foaming – gassy wells, the float can sink in foamy leachate, causing the pumping to stall	32	Extract gas and use a Top-Loader, they work much better in gassy wells or fit a gas deflector to a Bottom-Loader (Top-Loader is the best option)
Leachate in the exhaust	When a pump is de-pressurised, leachate can leak past the air exhaust valve, when the pump re-starts, leachate is blown out usually but there could be enough to stall the pump. Over time, leachate also causes scale to form in the exhaust tube, when it dries out, any movement cause the scale to crack and fall off, blocking the exhaust valve.	33	Check exhaust tubes regularly for blockage and/or restrictions and replace if necessary
Crushed pipes		34	Surface-lay all pipes if possible and check their condition regularly.

Warranties

Viridian Systems Limited ("VSL") warrants to the original purchaser of its products that, subject to the limitations and conditions provided below, products, materials and/or workmanship shall reasonably conform to descriptions of the product and shall be free of defects in materials and workmanship.

All warranty durations are calculated from the original date of purchase – determined as the date of shipment from either VSL or their appointed agent and the date VSL or their appointed agent is notified of a warranty claim.

VP Pneumatic Pumps

Five (5) year warranty. This limited warranty coverage applies to all pneumatic pumps in the VP range.

The Warranty is valid when the following conditions exist:

- Site pH is between 3 and 12
- Site liquid is between 1 and 100 degrees Celsius (34 and 212 degrees Fahrenheit)
- Site liquid is non-corrosive and not abrasive to the construction materials of the pump
- Suspended solids do not exceed 3mm (3/32 inch)

Hose, Tubing and Air Filtration

One (1) year warranty: 100% materials and 100% workmanship.

Parts and Repairs

Ninety (90) days warranty: 100% materials and 100% workmanship when repairs are performed by VSL or its appointed agent, from the date of the repair or for the full term of the original warranty, whichever is longer. Separately sold parts are warranted for ninety (90) days: 100% materials and 100% workmanship.

This warranty will be void in the event of unauthorised disassembly of component parts and assemblies. Defects in any equipment that result from abuse, operation in any manner outside the recommended procedures, use and applications other than for intended use, or exposure to chemical or physical environments beyond the designated limits of materials and construction will also void this warranty.

VSL shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than VSL service personnel or their appointed agents; resold to other parties; and/or moved or used on a site other than originally specified.

It is understood and agreed that VSL shall in no event be liable for incidental or consequential damages resulting from its breach of any of the terms of this agreement, nor for special damages, nor for improper selection of any product described or referred to for a particular application. Liability under this warranty is limited to repair or replacement F.C.A. VSL's workshop, or its appointed agent's workshop, of any parts which prove to be defective within the duration and conditions set forth herein.

Other Equipment Manufactured by Others

The foregoing warranty does not apply to other equipment, accessories, and parts manufactured by others, and such other equipment, accessories and parts are subject only to the warranties, if any, supplied by their respective manufacturers. VSL makes no warranty concerning products or accessories not manufactured by VSL. In the event of failure of any such product or accessory, VSL will give reasonable assistance to the buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

Warranties – continued

Continued from page 53

Warranty Claims Procedure (Responsibility of Purchaser)

The original purchaser's sole responsibility in the instance of a warranty claim shall be to notify VSL or its appointed agent of the defect, malfunction, or other manner in which the terms of this warranty are believed to be breached. The purchaser may secure performance of obligations by contacting VSL or its appointed agent, and:

- Identifying the product involved by model or serial number, or other sufficient description, that will allow VSL, or its appointed agent, to determine which product is defective.
- Specifying where, when, and from whom the product was purchased.
- Describing the nature of the defect or malfunction covered by this warranty.
- After obtaining authorisation from VSL or its appointed agent, sending the malfunctioning component to the address as provided.
- Equipment must be cleaned of contamination before shipment or it will be cleaned by VSL before any work is performed. The purchaser will be charged for such cleaning.

If any product covered hereby is actually defective within the terms of this warranty, the purchaser must contact VSL, or its appointed agent, for determination of warranty coverage. If the return of a component is determined to be necessary, VSL, or its appointed agent, will authorise the return of the component at the purchaser's expense. If the product proves not to be defective within the terms of this warranty, then all costs and expenses in connection with the processing of the purchaser's claim and all costs for repair, parts, labour, and shipping and handling, as authorised by the purchaser, shall be borne by the purchaser. In no event shall such allegedly defective products be returned to VSL, or its appointed agent, without its consent, and VSL's, or its appointed agent's obligations of repair, replacement or refund are conditional upon the purchaser's return of the defective product to VSL, or its appointed agent.

Purchaser's Remedies

The purchaser's exclusive and sole remedy for breach of this warranty shall be as follows: if and only if, VSL or its appointed agent, is notified within the applicable warranty period of the existence of any such defect in the said products, and VSL or its appointed agent, upon examination of any such defects, shall find the same to be within the terms of and covered by this warranty:

- VSL or its appointed agent will, at its option, as soon as reasonably possible, replace or repair any such product, without charge to the purchaser.
- If VSL or its appointed agent for any reason, cannot repair a product covered hereby within four (4) weeks after receipt of the original purchaser's notification of a warranty claim, then VSL's or its appointed agent's sole responsibility shall be, at its option, either to replace the defective product with a comparable new unit at no charge to the purchaser, or to refund the full purchase price.

VSL shall not in any event be liable for the cost of any labour expended on any such product or material or for any special, direct, indirect or consequential damages to anyone by reason of the fact that it shall have been deemed defective or a breach of said warranty.



Viridian Systems

Clearer Thinking

