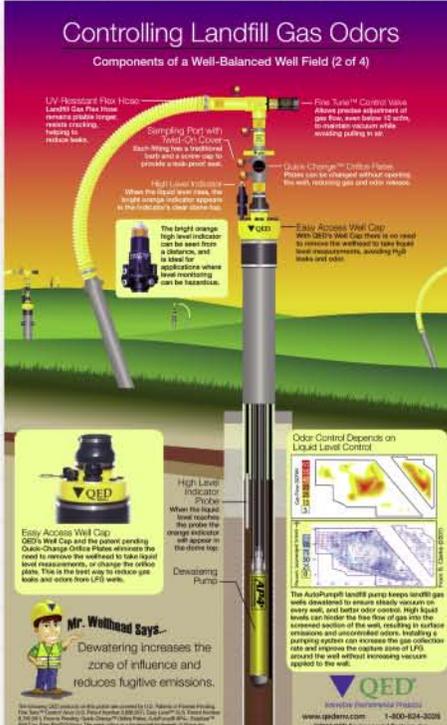


Controlling Landfill Gas Odors
 Components of a Well-Balanced Well Field (2 of 4)



UV Resistant Flex Hose: Landfill Gas Flex Hose remains pliable longer, resists cracking, tearing & reduces leaks.

Sampling Port with Test-On-Cover: Each flex hose is furnished with a screw cap to provide a leak proof seal.

Full Liquid Indicator: When the liquid level rises, the liquid level indicator appears in the indicator's clear observation.

High Level Indicator Probe: When the liquid level reaches the probe the orange indicator will appear in the down top.

Easy Access Well Cap: QED's Well Cap and the patent pending Quick-Change Odor Plates eliminate the need to remove the wellhead to take liquid level measurements, or change the odour plate. This is the best way to reduce gas leaks and odors from LFG wells.

Odor Control Dependent on Liquid Level Control:

The AutoPurge[™] landfill pump keeps landfill gas wells deaerated to ensure steady vacuum on every well, and better odor control. High liquid levels can hinder the flow of gas into the submerged portion of the well, resulting in surface emissions and uncontrolled odors. Installing a purging system can increase the gas collection rate and improve the capture zone of LFG around the well without increasing vacuum applied to the well.

Mr. Wellhead Says...
 Dewatering increases the zone of influence and reduces fugitive emissions.

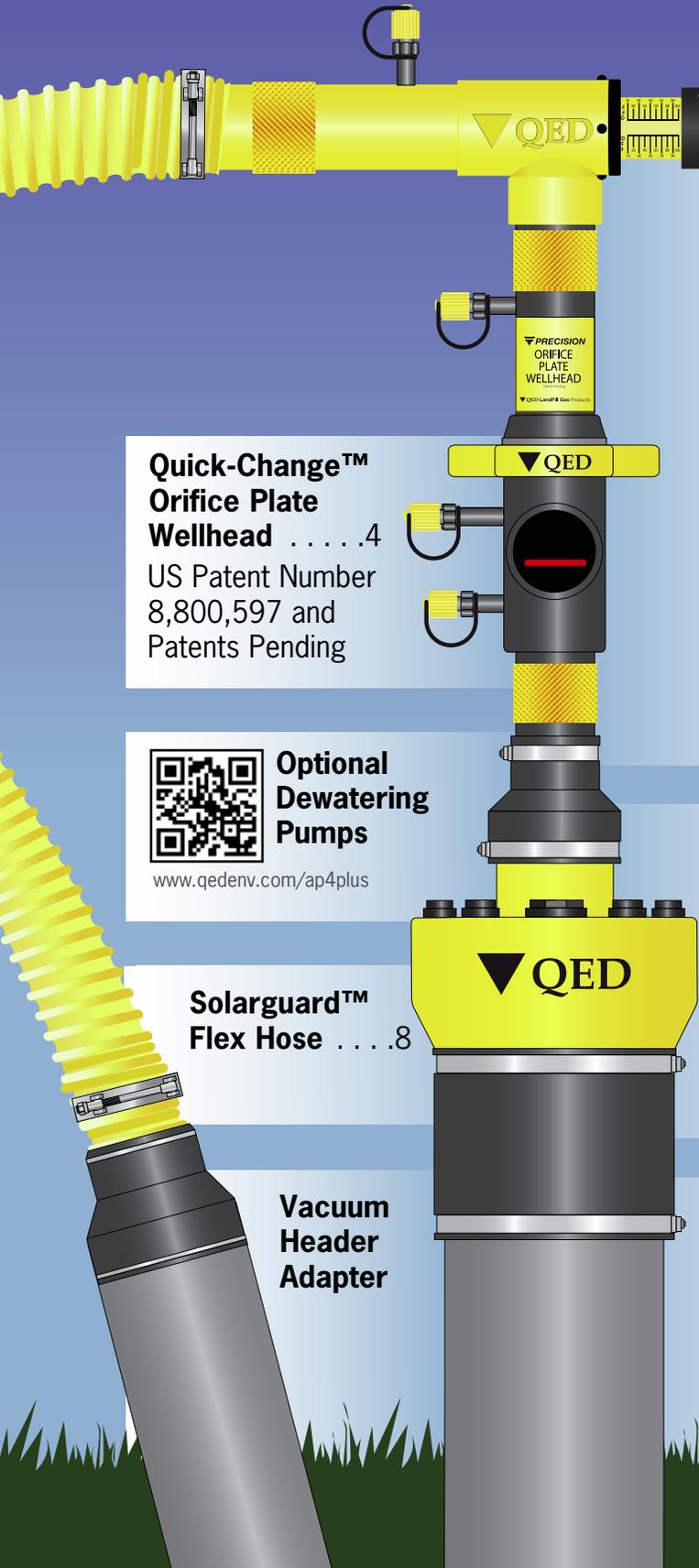
QED
 Innovative Environmental Products
 www.qedenv.com 1-800-624-2026
 ©2017 QED Environmental Systems, Inc.

Landfill Gas Products

The First Engineered Solutions for LFG Measurement & Control



New wellheads reduce balance gas and oxygen concentrations while increasing or maintaining a steady flow of methane.



WELLHEADS

Fine Tune™ Control Valves3



Linear gas flow adjustment over the entire range of valve movement, even under 10 SCFM.

Quick-Change™ Orifice Plates5



Accessible orifice plate housing allows for quick and easy confirmation of plate size and placement.

QED Union Orifice Plate Wellheads6

Quick-Change™ Orifice Plate Wellhead4

US Patent Number 8,800,597 and Patents Pending



Optional Dewatering Pumps

www.qedenv.com/ap4plus

Solarguard™ Flex Hose8

Vacuum Header Adapter

WELL CAPS

Stabilizer™ Well Cap7



Unique support ring feature stabilizes the wellhead, reducing leaks.

Landfill Gas Calculator6



Measure the value of your increased gas flow with our innovative Landfill Gas Calculators.

CONTROL VALVE

The heart of every QED Wellhead, the Fine Tune™ Control Valve allows fine tuning even under 10 SCFM

QED's Precision Fine Tune™ Control Valve (U.S. Patent Number 8,800,597) is a revolutionary breakthrough in landfill gas well field tuning. Unlike traditional "gate" type valves, this allows you to easily and precisely adjust the gas flow from a well, rather than just turning the flow on or off. The valve design gives you the ability to achieve linear flow adjustment across the entire range of valve movement.

The valve also has a high visibility metered scale that allows you to observe the valve setting, and quickly and accurately return to the exact flow setting after a shutdown. The rising stem valve exposes more of the metered scale as it is opened, allowing you to see and record numerically exactly how far the valve is open.

The valve uses a "flow-tuned" design valve plug, which allows for fine tuning even at very low gas flow rates (under 10 SCFM).

The stainless steel rugged valve stem and glass-filled polypropylene handle make the valve much more durable in the harsh outdoor environment to which landfill gas wells are exposed.

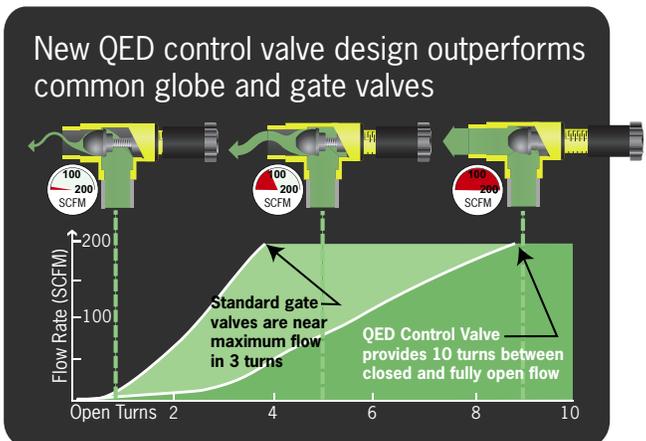


Fine Tune Control Valve Advantages:

- Linear flow over the entire range of valve movement, including less than 10 SCFM flow.
- Position scale shows exact valve setting and open/closed at a glance.
- Heavy-duty stainless steel stem and glass-filled polypropylene handle for strength and long-term durability.



Heavy-duty stainless steel stem and glass-filled polypropylene handle outlasts plastic used in standard gate valves



www.qedenv.com/controlvalve



Specifications:

Model Number:

Flow at 40" w.c. vacuum:

Materials:

2"

CV200M

200 SCFM (340 m³/h)

304 Stainless Steel, Polypropylene, Viton®

CV3000

400 SCFM (680 m³/h)

304 Stainless Steel, PVC, Viton®

Control Valves not intended for leak tight shutoff over 5 psi

CV2000AM

CV2000AM Material is glass-filled polypropylene with PVC adapter to use the Fine Tune Control Valve with an existing wellhead.



WELLHEADS



Quick-Change™ Orifice Plate Wellhead

Revolutionary orifice plate can be viewed and changed instantly

QED's new Quick-Change™ Orifice Plate Wellhead (U.S. Patent Number 8,800,597 & Patents Pending) combines easy plate exchanges for accurate flow measurements with precise adjustment control over a broad flow range.

The Quick-Change™ Orifice Plate (Patent Pending) feature makes it as easy as 1-2-3 for the operator to change to the most appropriate size plate for the given conditions. The accessible plate housing allows for easy confirmation of plate size and placement giving you the highest confidence in your flow reading.



Accessible housing allows easy viewing of installed plate

Changing to the correct orifice plate can be done in seconds, and there is no time wasted shutting down the control valve or rebalancing the well field. These benefits all save valuable field time and help reduce labor costs.

The Wellhead's control valve design allows you to finely control gas flow even at rates under 10 SCFM. This unique design will change the way operators adjust gas flow. Wells can now be tuned by flow rather than by vacuum. Well Cap is sold separately.



www.qedenv.com/quickchange

Quick-Change Orifice Plate Advantages:

- Saves time – plates can be changed in seconds
- Accurate flow measurements – match the right plate with the gas flow
- Reduces reporting errors – easy to identify the plate in use



ORP215MHL – horizontal configuration

WELLHEADS

Quick-Change™ Orifice Plate Wellhead



Specifications:

Model:

Optimal Flow Range:

Wellhead Materials:
PVC, Viton®, glass-filled polypropylene for 1.25" and
Fitting Options:
Brass barsbs, quick connect



1¼" (32 mm)
ORP115M
0-60 scfm
(0-102 m³/h)

vertical



2" (50 mm)
ORP215M
0-125 scfm
(0-212 m³/h)



3" (80 mm)
ORP315
30-300 scfm
(50-500 m³/h)

horizontal



2" (50 mm)
ORP215MHV
0-125 scfm
(0-212 m³/h)



ORP215MHL

Quick-Change Orifice Plates

Nylon Plate Kit



40770
set of 6 Nylon plates:
0.40" (10 mm)
0.50" (13 mm)
0.75" (19 mm)
1" (25 mm)
1.25" (31 mm)
1.40" (35 mm)

1¼" vertical Plate Kit

40747
set of 4 SS plates:
0.26" (6.6 mm)
0.40" (10 mm)
0.75" (19 mm)
0.95" (24 mm)

2" vertical Plate Kit

40640
set of 6 SS plates:
0.40" (10 mm)
0.50" (13 mm)
0.75" (19 mm)
1" (25 mm)
1.25" (31 mm)
1.40" (35 mm)

3" vertical Plate Kit

40660
set of 3 SS plates:
1.25" (31 mm)
1.75" (44 mm)
2.10" (53 mm)

2" horizontal Plate Kit

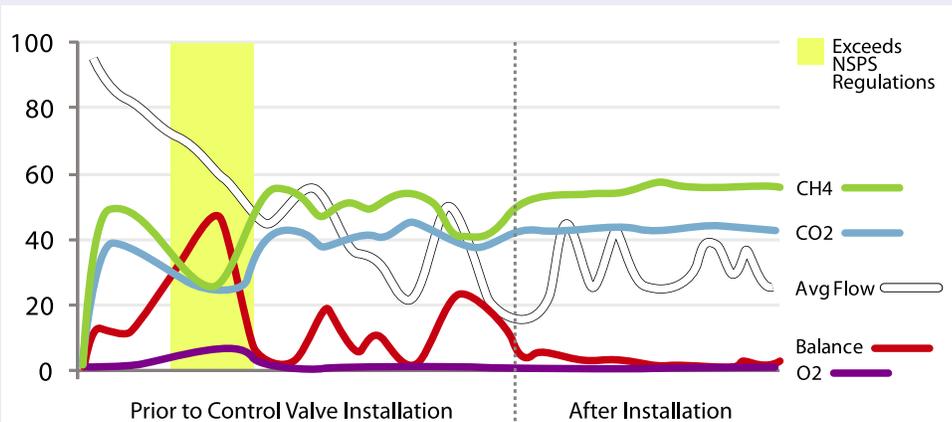
40690
set of 6 SS plates:
0.40" (10 mm)
0.50" (13 mm)
0.75" (19 mm)
1" (25 mm)
1.25" (31 mm)
1.40" (35 mm)



QED's Quick-Change Orifice Plates are constructed of fiber reinforced nylon or ⅛" stainless steel. With several sizes of orifice plate available, it is easy to select the right plate for the appropriate pressure drop allowing for accurate flow measurement readings.

South Texas Landfill Case Study

Prior to the installation of the Fine Tune Control Valve, Well 90 (right) was out of compliance. Oxygen concentration had increased to 6.4% and the balance gas concentration spiked at 48.4%. After installation, those concentrations have been reduced, helping maintain compliance while gently increasing methane production.



WELLHEADS

ORIFICE PLATE TOOLS

ORIFICE PLATE SELECTOR GUIDE



Download a printable and foldable Orifice Plate Guide at www.qedenv.com/files/ORPcurvecard-WEB.pdf. Or contact QED to have one mailed to you.

ORIFICE PLATE FLOW CALCULATOR

Use the mobile version of the Orifice Plate Flow Calculator at www.qedenv.com/orpcalculator



LANDFILL GAS CALCULATOR

| | Starting Value | Ending Value |
|------------------------------------|----------------|---|
| Landfill Gas Flow (SCFM) | 34 | 38 |
| Annualized LFG Collected (SCF) | 17,870,400 | 19,972,800 |
| Methane Content (percent) | 51 | 54 |
| Annualized Methane Collected (SCF) | 9,113,904 | 10,785,312 |
| (mmBtu) | 9,113 | 10,785 |
| Annual Total \$ | 36,455.61 | 43,141.24 |
| Summary of Changes | | |
| | | Additional SCFM 4 |
| | | Additional Methane (mmBtu) 1,671 |
| | | Value of Additional Methane \$ 6,685.63 |

Current Methane Value (U.S. Dollars per mmBtu) 4.00
 Current Annual Value of 1 SCFM (U.S. Dollars per 1,000 cubic feet) 1,072.22

(800) 624-2026
www.qedenv.com/landfillgas2

Measure the value of your increased gas flow with our innovative Landfill Gas Calculators:

Calculate increased methane value using landfill dewatering pump systems at www.qedenv.com/landfillgas.

See the value of increased flow and methane content at www.qedenv.com/landfillgas2.



QED Union Orifice Plate Wellhead

QED's new Traditional Orifice Plate Wellhead is available for both 2" and 3" pipes. The wellhead is constructed of sturdy,



Set of interchangeable orifice plates

economical Schedule 80 PVC and QED's Orifice Plates are constructed of 1/16" stainless

steel. Using the most appropriate orifice plate size with minimal pressure drop is essential to generate stable flow readings with the best resolution. Using the right size plate means you will always have confidence in your flow reading and you will be sure to meet your compliance regulations.



www.qedenv.com/traditional-wellhead

| Specifications: | 2" (50 mm) | 3" (76 mm) |
|---------------------|---|---|
| Model: | OPU200 | OPU300 |
| Optimal Flow Range: | 0-125 SCFM (0-212 m ³ /h) | 30-300 SCFM (50-500 m ³ /h) |
| Materials: | 304 Stainless Steel, PVC, Viton® | |

40572 2" Orifice Plate Kit – includes all 6 orifice plates for OPU200
 40600 3" Orifice Plate Kit – includes 3 orifice plates for OPU300



QED's Educational Poster Series

A series of 4 educational posters are available for download online www.qedenv.com/landfills

WELL CAPS

Look for QED's distinctive yellow color well caps. Stabilizer™ Well Caps allow easy liquid level access and reduce wellhead leaks

QED's innovative Stabilizer™ LFG Well Caps (US Patent number 9,068,421) feature a unique support ring molded directly into the Cap that aligns and stabilizes the LFG wellhead. This takes pressure off the flexible coupling and the flex hose and, along with watertight threads, reduces leaks from the wellhead. The caps are molded in a distinctive yellow*, which ensures you are receiving genuine QED well cap.



Unique support ring feature helps prevent wellhead leaks

This is the first engineered gas well cap that allows liquid level readings without removing the wellhead – faster, safer, less system disruption. Air introduction and gas release are minimized, eliminating the need to shut down the vacuum system for level measurements and rebalancing of the well field.



www.qedenv.com/wellcaps

Well Caps without pump fittings are a good way to start on gas recovery wells. A pump fitting kit can be added later for dual extraction wells.

Designed to work with 6" and 8" diameter wells with 2" or 3" wellheads, all models provide ports to accommodate a downwell pump. There is also an economy model for 6" gas-only wells.



Stabilizer™ LFG Well Cap Advantages:

- Support ring reduces wellhead leaks, minimizing air introduction and gas release
- Easy access for liquid level reading – faster, safer, less system disruption
- Pump fitting kits allow conversion of gas recovery caps to dual extraction

| Well Caps without fittings | | | | |
|---|---|---|---|----------------------|
|  |  |  |  | |
| Model GWC62 | Model GWC63 | Model GWC82 | Model GWC83 | |
| Well Diameter: 6" (152 mm) Gas Wellhead: 2" (50 mm) pipe Ports: .5" (12 mm), 2 @ .75" (19 mm), 1.5" (38 mm), 1" (25 mm) | Well Diameter: 6" (152 mm) Gas Wellhead: 3" (76 mm) pipe Ports: .5" (12 mm), 2 @ .75" (19 mm), 1.5" (38 mm), 1" (25 mm) | Well Diameter: 8" (203 mm) Gas Wellhead: 2" (50 mm) pipe Ports: .5" (12 mm), 3 @ .75" (19 mm), 1.5" (38 mm) | Well Diameter: 8" (203 mm) Gas Wellhead: 3" (76 mm) pipe Ports: .5" (12 mm), 3 @ .75" (19 mm), 1.5" (38 mm) | |
| Well Caps with fittings | | | | |
|  |  |  |  | |
| Model GWC6284 | Model GWC6384 | Model GWC8284 | Model GWC8384 | |
| Well Diameter: 6" (152 mm) Gas Wellhead: 2" (50 mm) pipe Ports: 1" (25 mm), .75" (19 mm) | Well Diameter: 6" (152 mm) Gas Wellhead: 3" (76 mm) pipe Ports: 1" (25 mm), .75" (19 mm) | Well Diameter: 8" (203 mm) Gas Wellhead: 2" (50 mm) pipe Ports: 2 @ .75" (19 mm) | Well Diameter: 8" (203 mm) Gas Wellhead: 3" (76 mm) pipe Ports: 2 @ .75" (19 mm) | |
| 1" (25 mm) discharge | Model GWC6283 | Model GWC6383 | Model GWC8283 | Model GWC8383 |
| 1-1/4" (31 mm) discharge | | | | |

*The color yellow is a (registered) trademark of Graco Inc.

ACCESSORIES

Solarguard™ Flex Hose

Reduce Your Flex Hose Cost!
UV-resistant flex hose **lasts twice as long** as conventional PVC hose



Solarguard™ Flex Hose from QED is made with UV-resistant flexible PVC with a rigid PVC helix. This unique formula extends the useful life of Solarguard hose over typical clear PVC landfill gas flex hose. Tests have shown that Solarguard hose maintains tensile strength and lasts twice as long as standard PVC hose.

With Solarguard hose, you'll save on both the cost of replacement hose and the labor costs of fixing air leaks from cracked hose. QED's Banding Kits save you even more, with a lower purchase price, longer service life, and easier installation and removal than helical hose clamps, which can be expensive, difficult to use, and tend to corrode easily. The banding coils are uniquely designed to fit Solarguard hose, and use high strength, all stainless steel clamps, which are user friendly, durable, and far less expensive.

Solarguard™ Flex Hose

| Size | Models | Dia. in. (mm) | Length ft. (m) |
|------|--------|---------------|----------------|
| 2" | 40946 | 2.38 (61) | 100 (31) |
| | 40947 | 2.38 (61) | 5 (1.5) |
| 3" | 40948 | 3.5 (89) | 100 (31) |
| | 40949 | 3.5 (89) | 5 (1.5) |

High Strength, Stainless Steel Banding Kits

| Size | Models |
|--------|--------|
| For 2" | 40979 |
| For 3" | 40980 |

The Solarguard™ trademarks in this publication are trademarks of Kuriyama of America, Inc.

Easy Level™ High Level Indicator

The Easy Level™ indicator makes it easy to see if the liquid level has exceeded the maximum level desired



Easy Level™
(U.S. Patent Number 8,756,991)

- Quick and easy indication of excess liquid levels.
- Use in landfill gas wells, leachate risers, tanks, sumps, pits and wells.
- Shows orange when liquid level rises above the predetermined level.
- Liquid sensing ports and level measurement system can read liquid level above the probe.



www.qedenv.com/easylevel

OTHER EASY PRODUCTS



Easy Connections with Easy Fitting™ Quick-release Connectors

- Pump is easy to snap onto and off of the tubing with Easy Fitting™ connectors without cutting the tubing.
- Our sheathed tubing is available cut-to-length and individually labeled, with Easy Fitting connectors factory-installed.
- Our sheathed nylon pump tubing sets offer maximum chemical resistance, reduced weight, and less tangling.

Easy Bolt™ Flange Clamp

Easy Bolt™ clamps provide the function of traditional nut and bolt sets by using a lever action clamp to tighten the flange. Makes flanges easy to access with no wrenches or tools.



Questions?

Do you have questions about landfill gas management?
Call us to speak with an experienced technical sales expert at:

1-800-810-9908

Email us at info@qedenv.com or visit us on the web at www.qedenv.com/landfills

AIR-POWERED LANDFILL PUMPS

For over 20 years, the AutoPump® (Patent Pending) AP4+ has been the go-to pump for landfill and remediation sites. It has proven itself #1 in reliability, long service life and the longest warranty in the industry. The new AP4+ model builds on the AutoPump reputation with a proven internal mechanism design, industry leading pumping rates, and low air consumption.

The AutoPump® AP4+ is the industry standard for reliability, long service life, and longest warranty

Upgraded Materials

- All nonmetallic internal parts are made of PVDF – a high-grade engineering plastic with higher strength at elevated temperatures and extremely broad chemical resistance, including to acidic and oxidizing cleaning agents sometimes used for pump maintenance.
- All stainless steel parts have been upgraded to 304-grade or higher for improved corrosion resistance.



Easy to Clean

- 3 bolts attach the pump inlet and open up the pump.
- The precision ID pump casing ensures a more controlled fit, and the smoother internal surface reduces buildup of silts and deposits inside the case.
- Easy Fittings make it a snap to remove the tubing.
- The float is now easily removed by pulling a clip.

| | 4" Pump Long AP4+B | 4" Pump Short AP4+B | 4" Pump LD AP4+B | 4" Pump Long AP4+T | 4" Pump Short AP4+T | 4" Pump LD AP4+T |
|-----------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Fluid Inlet | Bottom | Bottom | Bottom | Top | Top | Top |
| Diameter | 3.6 in. (9.1 cm) OD |
| Length | 51.4 in. (131 cm) | 39.3 in. (100 cm) | 27.5 in. (70 cm) | 56.7 in. (144 cm) | 45 in. (110 cm) | 30.75 in. (78 cm) |
| Maximum Flow | 14 gpm (53 Lpm) | 13 gpm (49 Lpm) | 7 gpm (26.5 Lpm) | 10 gpm (38 Lpm) | 9 gpm (34 Lpm) | 6.4 gpm (24 Lpm) |
| Maximum Depth | 250 ft. (76 m) |
| Actuation Level | 38.4 in. (98 cm) | 26.7 in. (68 cm) | 15.3 in. (39 cm) | 53.3 in. (135 cm) | 41.6 in. (106 cm) | 27.4 in. (70 cm) |

New and Improved Warranty

- Straight 5-year warranty with no pro-rating.
- Proof of the successful history and continued improvements of the AP4+.



www.qedenv.com/ap4plus



Pull out the release clips.



Once the clips are removed, simply pull the connections apart.



Removing the spring clip allows for easy disassembly of the float.

AP4 ULTRA PUMPS



Low-maintenance pump lasts up to 10 times longer between service events and requires 50% less time to clean

Field tests have shown that the New AutoPump® (Patent Pending) AP4 Ultra will last up to 10 times longer between service events. Tested in the most severe applications, the new pump ran longer and was easier to clean than a standard pump.

Several improvements contribute to this new longevity. The AP4 Ultra uses proprietary non-stick finishes on the float and discharge tube to reduce solids buildup, extending the time between cleaning and making it much faster and easier to clean the pump. All metallic parts are 316-grade Stainless Steel, which has greater corrosion resistance and can withstand attacks of the harshest leachate. This pump uses new and improved valve stem connections, no fasteners or cotter pins are required. Some models have temperature ratings up to 250 °F, making them ideal for high temperature applications.

“Cleaning has been an easy task, most times just requiring a water spray,” said one user. From another, “We removed residue with some clean water and a swipe of the hand.”

The Ultra builds upon the established AutoPump system, which has been the industry leader for over 30 years, and includes QED’s unmatched customer service.

Like to try one?

Call (800) 624-2026

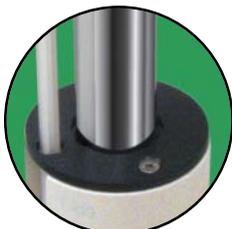
or visit www.qedenv.com/ultra



Top Inlet Ultra 4.0

Bottom Inlet Ultra 4.0

| | 4" Pump Long AP4.0B | 4" Pump Short AP4.0B | 4" Pump Long AP4.0T | 4" Pump Short AP4.0T |
|-----------------|------------------------|------------------------|------------------------|------------------------|
| Fluid Inlet | Bottom | Bottom | Top | Top |
| Diameter | 3.6 in. (9.1 cm) OD |
| Length | 51.4 in. (131 cm) | 39.3 in. (100 cm) | 56.7 in. (144 cm) | 30.75 in. (78 cm) |
| Maximum Flow | 14 gpm (53 Lpm) | 13 gpm (49 Lpm) | 10 gpm (38 Lpm) | 6.4 gpm (24 Lpm) |
| Maximum Depth | 250 ft. (76 m) | 250 ft. (76 m) | 250 ft. (76 m) | 250 ft. (76 m) |
| Actuation Level | 38.4 in. (98 cm) | 26.7 in. (68 cm) | 53.3 in. (135 cm) | 27.4 in. (70 cm) |



Extended Uptime
Proprietary finishes reduce buildup and extend the time between cleaning.



Minimized Downtime
These special non-stick finishes require less than half the time to clean than traditional pumps.



316 Stainless Steel
All metallic parts are 316-grade SS for greater corrosion resistance.



New and Improved Valve Stem Connection
No fasteners; no cotter pins. Exhaust seat is easy to adjust.