

Hard Truth - ET Wells May Need Downhole Steel Pipe

Beyond 150°F, Plastic Tubing Can Pigtail, Stretch, Break; Stainless Steel Eductor Piping Goes Deep, with Low Maintenance

Top-head-drive piston pumps Ideal mates to rescue hot zones

Air pumps are not built to withstand the heat of elevated-temp zones.

When landfill liquids exceed 150°F / 66°C, not only do the pumps become encrusted, but the downhole air tubes or hoses also lose integrity, becoming elastic or brittle, altering shape and strength. Hose connections begin to leak. Systems fail.

In these difficult ET zones, and at sites where greater pumping depths are required, site managers are replacing thermoplastic tubing with stainless-steel hard pipe as the fluid eductor.

The ability of steel to maintain integrity at temps of 750°F / 400°C allows heat-resistant pumps, particularly top-head-drive piston pumps, to operate efficiently and for long periods in ET wells, avoiding common downhole pump failures and premature wear, while increasing well pumping production.

And as engineers go deeper in the landfill to 200 feet / 60 meter or more, they find that stainless pipe, unlike flexible tubing, has the structural strength to withstand increased weight pressure.

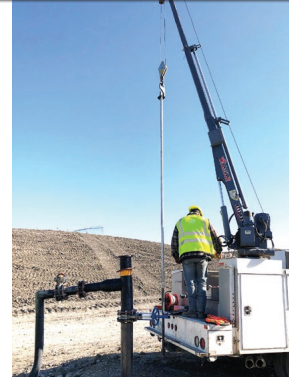
Hard-pipe installation at landfills is similar to that at water-well and oil-well operations, using readily available and inexpensive pump- and pipe-hoisting tools that are field-friendly.

Top-head-drive piston pumps, with mechanical drivers and power above the wellhead, are ideally suited to hard-pipe installations. A piston pump's drive piston and drive rod are installed permanently from the surface.

Primary pump maintenance is done above the wellhead. Piston-pump technology avoids the necessity of pulling a three-hose bundle immersed in downhole leachate.

Since its founding, Blackhawk's objective has been to lessen the down time of pulling and servicing downhole air pumps. Stainless steel riser/eductor pipe can be a significant advancement to this result.

For installation PowerPoint, contact Mark Bertane, mbertane@blackhawkco.com, 630-469-4916



Ten-foot segments of stainless-steel pipe, with drain connection attached, are hoisted above the wellhead.



The pipe is lowered into the well casing.



Pipe is clamped and secured on top of well casing.



New pipe section is threaded onto secured drain coupling.



Final section, with well seal attached, is lowered.



Well seal is secured.

Hard Truth - Downhole Steel Pipe Q & A



Drive piston and drive rod are installed.



Top-head drive motor is attached.



Piston Rod is connected to actuator rod. Insure rod does not slip into downhole.



V-2 pneumatic piston pump is installed with 8-inch steel flanged gas-well seal.

QUESTIONS & ANSWERS:

Q: What schedule stainless steel pipe does Blackhawk recommend?

A: 304 stainless steel, 1¼-in sch 40, in 10-foot sections with 304 SS drain couplings.

Q: At what depths has this been done?

A: Hard pipe use in landfills has ranged from 50 to 150 feet; oil-well installations to 760 feet.

Q: What is the weight of stainless pipe?

A: 1¼-in, sch 40 = 2.42 lb.-per-ft. without water, 3.069 lb.-per-ft. with water

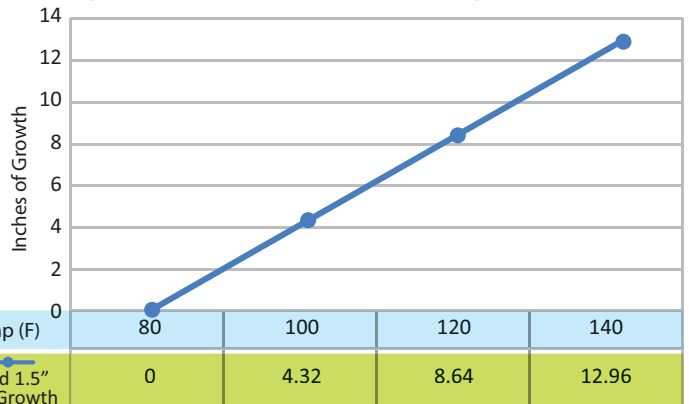
Q: How long does it take to replace a downhole pump?

A: Wellfield technicians and a truck-mounted, pipe-hoisting winch can install steel hard pipe in 10ft. segments in roughly the time it normally takes to pull and reinstall an air-drive pump, engineers report. When field techs are trained on the techniques, one site manager estimates an install time of one hour (or less) for a 100ft. well. Simple water-well tools make installation easier and safer, and using stainless drain-plug female NPT pipe coupling with each section pipe lowers the fluid weight of the hard pipe should it ever need to be pulled.

Q: How much does replacement cost?

A: One U.S. site estimates roughly \$750 for a 100-foot well, including the piping and connectors, using the site's technicians. Of course, unit prices fall with larger order

As Temperatures Increase, 1"-1½" HDPE Pipe Stretches



Q: What are consequences of using HDPE tubing at greater depths?

- A: • Premature rod wear – as the verticality of the well becomes less straight
- Lower flow rate per stroke –HDPE tubing elongation caused by excessive hanging length and heat
- “Pogo-stick” jerking up and down of the HDPE tubing
- Premature HDPE tubing ware – As the HDPE tubing becomes less vertical and stretches out its strength weakens and holes in the tubing may begin to appear.

Q: What are advantages of SS hard pipe?

- A: • Longer drive rod life
- Higher flow rate – increase flow rate by +17%
- More durable, will not leak
- Far less maintenance; field servicing focused on above-ground drive motor
- Significantly less, if any, downwell maintenance or pump pulling
- If the downhole drive piston seals ever need to be replaced, drive rod can be easily pulled to surface from inside riser pipe.

Q: Is there a safe way to drain 150°F+ liquid instead of simply unthreading the 10-foot sections?

- A: Yes. We have designed a SS drain coupling with a ¼-in drain-plug port. Prior to the decoupling of the well casing, the drain plug is removed, and the water is drained out through this port in a controlled way. (Note that the need to trip out the downhole pump and pipe is greatly reduced by using hard pipe.)



Q: It seems that pumps are the real reason for system failure, right?

- A: Wrong: Of course, pumps are not infallible. But pumps are often blamed when the real reason – beyond inadequate discharge capacity – is perforated, stretched or burst tubing; worn rods, or application demands that exceed the performance range of the eductor/riser tubing/hose.

The sites that identify the wells that are challenges and use hard pipe are enjoying much more pumping success and less pump down time.

The best-performing environmental pump in the business

