

PERISTALTIC PUMP *Vs.* *i*-FILL[®] TECHNOLOGY

ARE YOU SETTling FOR INFERIOR PERFORMANCE?



INTRODUCTION

INNOVATION, ACCURACY AND REPEATABILITY:

These are the values driving the biotech, pharmaceutical, and specialty chemical industries into the future. The professionals working in these ever-evolving fields expect nothing less from the equipment used in their labs and production facilities.



Here at Intellitech, product development for these critical industries is driven by our in-house engineering expertise and is shaped by customer need. Our custom liquid filling machines deliver innovative, highly accurate and repeatable results, ensuring ultimate reliability and ease of use for all of our clients.

Our advanced *i-FILL*® pumps, in particular, are used by companies working in some of the world's most demanding sectors. As compared to peristaltic filling technology, the *i-FILL*® offers a more reliable solution for many sensitive liquid filling applications.

So how does the i-FILL® stack up against peristaltic pumps?

Keep reading as we explore the differences between the two.

HOW PERISTALTIC PUMPS WORK

Originally developed in 1881, the peristaltic pump is modeled after one of the most complex, well-designed systems in the natural world: the human body. The peristaltic pump contains fluids in a flexible tube, housed by a circular pump casing; a rotor outfitted with a system of rollers (also called shoes, lobes, or wipers) gently compresses the tube as it turns, creating a continuous and seemingly biologically friendly flow of fluid.



Peristaltic pumps are typically used for sensitive, clean/sterile, or highly aggressive fluids, with single-use tubes carefully engineered to accommodate specialized contents. These pumps, therefore, are ideal for sensitive applications, such as heart-lung machines.

While the design of these pumps is highly sophisticated, it won't necessarily protect against certain kinds of degradation. For example, the pump's rollers can cause eventual damage to the tubing, which will wear and stretch over time. This, in turn, will necessitate periodic tubing replacement and maintenance.

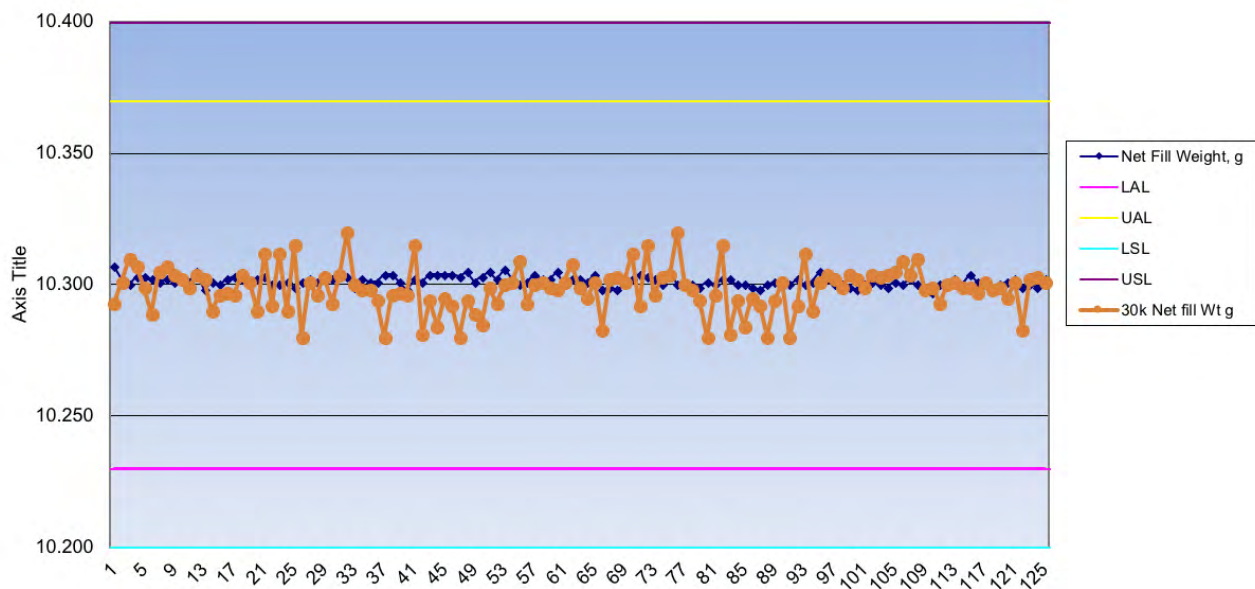
Despite the great versatility of these specialty pumps, they offer limited flow and pressure handling capabilities. And, more importantly, the pump's shearing force is not conducive for live cells.

INTELLITECH'S *i-FILL*® PUMP

The *i-FILL*® pump draws upon positive displacement pump design but features a unique innovation: the piston pump is driven with a digitally controlled smart servo motor and uses a rolling diaphragm in place of feet or lobes delivering repeatable liquid filling accuracy unachievable with a peristaltic pump.

Engineered to accommodate high-value, non-viscous products, the *i-FILL*® offers repeatable accuracy — crucial for sensitive products. The advanced pump technology maintains this accuracy via a single-use, no-shear, disposable fluid path from product source to dispense nozzle. The fluid path can accommodate thousands of cycles while easily maintaining optimal accuracy and can be disposed of when finished.

Pump Testing for new fill pump Test volume 10.3ml (10.20 - 10.40) 10 ml element fill micro pump
vs New 10 ml element cycled 30,000 times before testing.



i-FILL®'s unique flow technology offers a number of distinct advantages over traditional peristaltic options. A few key benefits are listed below.

This flow technology applies no pressure on the pump's tubing, eliminating problems caused by physical wear.

Gamma irradiated disposable fluid path kits make for easy installation, use and disposal.

Simple kit changeover takes mere minutes, with no tools required.

PRECIOUS CARGO:

DELICATE HANDLING FOR LIVE AND SENSITIVE CELLS

Peristaltic pumps have the ability to circulate live cells; after all, this pump design was first popularized by a heart surgeon. However, not all peristaltic pumps are created equal. Reliable handling of live cells depends on shear sensitivity and machine setup, with pump motor speed, occlusion, and occlusion geometry all taken into account.

The *i-FILL*® pump design is ideal for live cell handling because it eliminates the shearing forces that drive standard peristaltic pumps. It dramatically reduces, and, in some cases, eliminates damage to cell cultures or sensitive fluids. Because liquids in the *i-FILL*® pump are not passed through rollers, there's no opportunity for cultures or delicate specimens to be harmed as they go through the tubing.



PRECISION PUMPING:

REPEATABLE PERFORMANCE NOT ACHIEVABLE FROM PERISTALTIC TECHNOLOGY

The peristaltic pump is engineered as a closed loop, utilizing a sterile, single-use fluid path for aseptic filling and fluid movement. This ensures contents remain completely secure, as fluids never leave the tube.

If set up correctly, a peristaltic pump may not drip, or overflow within a tolerance range of the number of cycles. No production stops for spills between volumes less than 0.2 ml to more than 250 ml may be achieved. The potential for contamination from non-process areas and bioburden can be minimized.

However, peristaltic pumps can compromise product purity, as there is a risk of spalling. Though gentle, the shearing force driving the pump can release some small quantities of hose material into the fluid as it flows. This particle shedding, a result of poor abrasion resistance and general tubing wear, can contaminate the solution being handled.

THE *i-FILL*® PUMP:

A NEW STANDARD FOR PRECISION

Understanding the need for a no-shear aseptic fluid path and repeatable accuracy, the *i-FILL*® was designed to provide significant advantages, including:

There are no shearing forces in the fluid flow path. It is continuous containing only one-way check valves that start and stop product flow.

Disposable fluid path kits are assembled and packaged in an ISO Class 7 cleanroom and post-assembly gamma irradiated to eliminate or minimize risk from bio burden.

Kits contain all components required to transfer product from source to container allowing customers to order and stock one part number rather than many components. No-drip dispense technology for fill volumes ranging from 20 µl to 20 ml on a single cycle for the *i-FILL*® Micro, and *i-FILL*® larger liquid filler for 20 ml to multi-liter filling.

Cell cultures and other delicate aqueous-like products can be transferred with precision handling and filling accuracy.

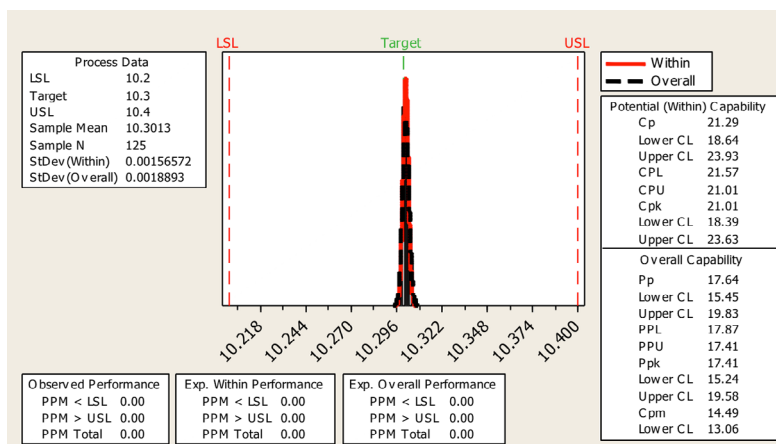
Users can set filling parameters to carefully control products that may foam, cavitate, or be shear-sensitive.

Users can expect years of performance, with reliable, fully repeatable filling/dispensing accuracy.

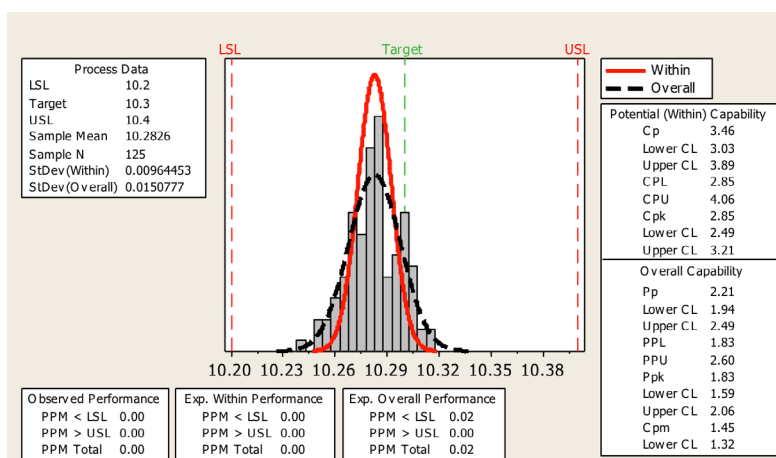
Fluid path kits contain USP Class VI-compliant materials.

Customers can provide specifications for custom kits and receive planned blanket releases of product.

i-FILL® Pump
(using 95.0% confidence)



Peristaltic Pump
(using 95.0% confidence)



SUSTAINABLE, ENERGY-EFFICIENT OPERATIONS:

REDUCING YOUR CARBON FOOTPRINT WITH *i-FILL*®

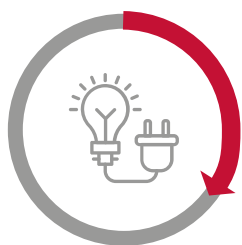
While the peristaltic pump offers high performance in its own right, the design is less suitable for applications requiring optimal energy efficiency and repeatable filling accuracy of shear-sensitive, high-value products. Peristaltic technology is primarily based on a pulsing flow, especially when operating on a lower rotational speed. Larger pump sizes are needed to adapt to increased flow rates.

In contrast, the *i-FILL*® is optimized to reduce users' carbon footprints on multiple levels. The smart servo-driven technology greatly minimizes pulsations; in fact, *i-FILL*® operates with low to no pulsations. With *i-FILL*® Micro drive assemblies available for 20 mcl to 20 ml applications, and the *i-FILL*® serving 20 ml to multi-liter filling jobs, users can easily find an appropriately sized pump to suit any application need.

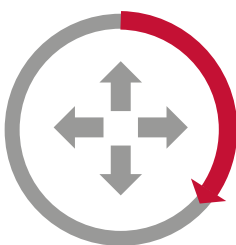
Plus, the single-use *i-FILL*® kits eliminate the risk of cross-contamination in fluid paths, not to mention all of the associated costs. This ease of use also reduces water and cleaning agent consumption.

As shown in the numbers below, *i-FILL*® pumps offer significant savings over standard technologies.

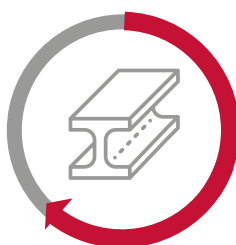
ELECTRICITY SAVINGS
Up to **30%**



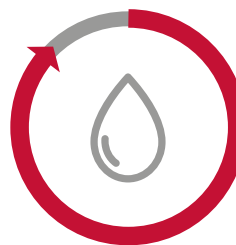
SPACE SAVINGS
Up to **38%**



STEELWORK SAVINGS
Up to **62%**



WATER SAVINGS
Up to **87%**



CLEANING MATERIAL SAVINGS
Up to **95%**



INDUSTRY-LEADING INNOVATION FROM INTELLITECH

Offering a full line of custom liquid fill and finish machinery, Intellitech is proud to support complex, specialty operations across a range of applications and industries. Our advanced solutions ensure reliable, long-lasting performance and optimal ease of use even in the most sensitive situations.

With our precision liquid filling solutions, automation equipment, robotics, and electrical controls helping to drive critical operations throughout the biotech, pharmaceutical, and specialty chemical industries, Intellitech is filling tomorrow's needs, today.

To learn more about our liquid filling solutions and discuss how they can help with your unique application needs, reach out to the team directly at +1 727-914-7000 or sales@intellitech-inc.com. We're on hand to answer any questions you may have.

REFERENCES



Visit:

<http://www.biopharminternational.com/environmental-impact-disposable-technologies>



The Environmental Impact of Disposable Technologies

Can disposables reduce your facility's environmental footprint?

Nov 02, 2008

By Miriam Monge, Andrew Sinclair, Lindsay Leveen, Stacey Cox, Janice Lim

BioPharm International

Volume 2008 Supplement, Issue 7

ABOUT US

What began as an engineering services provider in the basement of a home is now a manufacturer of a full line of liquid filling and closure machinery. Intellitech product development has been a combination of expertise and customer's need. Intellitech produces custom liquid fill and finish machinery that delivers precision results for regulated liquid filling environments. With proven experience in the design and integration of precision liquid filling, automation, robotics and electrical controls our products are satisfying customers through their ease of use and reliable performance for the biotech, pharmaceutical and specialty chemical industries. Innovation, precision and versatility are equipment attributes that Intellitech customers rely on.



TO LEARN MORE

about our liquid filling solutions and discuss how they can help with your unique application needs

CONTACT US



CAN'T FIND WHAT YOUR LOOKING FOR?

Visit our website for more information.

