

Part 1

Process Management in Pouch Making; Measure and Control for Verifiable Quality

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Introduction/background summary

As the flexible packaging market began to grow and stretch its boundaries into food, beverage and medical applications, end-users began to demand higher levels of quality and, in some instances, full validation of the sealing process. This, in turn, required converters to demand more robust sealant films from their suppliers. This, however, did not satisfactorily mitigate the risk, so extensive sampling and testing protocols were developed...adding time and cost to the production of these packages.

Presentation of the problem (unmet need):

Plastic Packaging substrates inherently possess subtle internal variations, which can affect the quality of the seal produced on it. The processing machinery itself possesses still more variables. When you combine these variables, the process has the potential to yield sub-standard seals, which could make their way into the supply chain undetected. This article will explore the importance of enhanced process management and real-time process feedback in the production of bags and pouches.

Art or Science?

It's been said that bag and pouch making is an 'art'. It is the assertion of this article that successful converters will minimize the 'art' of producing their product and maximize the 'science' of it.

Converters, faced with price-reduction pressures from customers, volatile raw material prices from suppliers and wage-and-benefit pressures from their employees, had to figure out how, in such a high-pressure environment, they could stay in business and remain profitable. To do so, the leaders in the industry turned to data. Process engineering positions were created with the sole purpose of driving internal costs out of the manufacturing process.

Data-driven process analysis tools have been utilized to provide significant gains in Overall Equipment Efficiency. As a result, millions of dollars have been saved, simply by recognizing and correcting process waste contributors. While gains in productivity are essential, providing a higher-quality product at a lower cost can gain the converter considerable market share – the highest prize of all.

It's all about the seal

When attempting to create a seal between two separate substrates, there are three critical components one must control: time (or dwell), temperature and pressure. The extent to which one can **measure and control all three** of these attributes is directly proportional to the overall quality of the seal itself. Up to now, technology has been focused on 'tightening-up' the process, not necessarily controlling it...mainly because there was no real need to do so.

As the market for high-end pouches and bags continues to expand into more demanding applications, quality requirements become increasingly stringent, and product traceability becomes imperative. These requirements are aimed at providing the end-user with **true confidence** in the integrity of the pouch or bag. Currently, most quality and process data is manually collected, manually entered, and manually analyzed. But all of this manual work takes time and people, both of which add cost to the overall process, not to mention the potential for human error. Add to that, current technology provides accurate data primarily for temperature. In some instances, you may be able to collect accurate pressure data. However, Dwell time settings are typically only references based on *mechanical position*, and not *actual time* in contact with the substrate. This lack of solid, reliable data produces uncertainty. Uncertainty produces more frequent testing, more frequent testing adds cost.

The Solution:

Process management can be a reality for today's pouch converters. It needn't have a negative impact on productivity, nor should it require extra people to manually collect data and manage paperwork. Such a possibility simply requires the right tools. Making such tools available to converters, tools that will allow them to automatically capture **actual real-time** measurements for **temperature, pressure and time**, will significantly change the flexible packaging and converting landscape.

That change is now approaching. Soon, converters will be able to automatically monitor and control the entire sealing process, using enhanced process management tools, available exclusively with PDI® Intelligent Sealing Technology. This traceable data for each aspect of the sealing process will allow converters to verify the quality of their product to a level never before attainable, thus creating the highest level of confidence in their product quality. Such verifiable product quality has a very positive upside. It may command a premium price; it may garner more market share or even provide a means to enter into new markets.

The first challenge for PDI® (A division of converting and packaging technology leader, [CMD Corporation](#) of Appleton, WI USA) was to develop this level of capability at a cost that will still allow the converter to realize the benefits to the bottom line. Once this was achieved, the technology team at CMD/PDI discovered bright new possibilities.....

Part 2

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A Bright Future:

Think about your pouch-making process. Your equipment may be older or it may be newer. In either case, you are likely to be in one of two categories. Either you currently collect process data around temperature, pressure and time (or dwell) through manual means, or you have installed secondary systems in order to help to automate this data collection process. In either category, most of the data you collect is more of a passive measurement, on which you must act, rather than an active means of controlling your process. If, for example, an operator fails to take a set of measurements, or fails to take the necessary action to correct a variation trend, your product has the potential to be compromised...a product of 'the human factor'. This is not to infer that the importance of data collection is, in any way, minimized. The fact is, it's imperative. But can there be something more? If only the sealer could act on that data...

Please consider Intelligent Sealing Technology. This new breakthrough, brought to you by PDI® (a CMD Packaging Solution), has successfully bridged the gap between passive data collection, and active process management.

What Is Intelligent Sealing Technology?

Since its birth in 1978, Process Driven Innovation has been the driving force behind CMD. It only made sense to take this same passion for technology and process improvement, which has been the mainstay for CMD's continuous-motion product line over the years, and infuse it into the PDI® intermittent-motion product offering. The result? Intelligent Sealing Technology

The engineers within the PDI® product group have been hard at work, learning about their customer's processes, and understanding the pain points converters experience as a result of processes that rely too much on the human element. The result of this effort was the introduction, in 2008, of a servo-actuated sealing platen, used primarily in the medical packaging market, which was able to successfully harness the data already available within the sealing system to provide passive measurement data, *as well as* a means for the machine to self-monitor and self-correct for process deviations: Intelligent Sealing Technology.

Based on the success of this technology, it became apparent that the same level of technology would be well-received in other areas of the medical packaging market, as well as within the stand-up pouch market in general. Imagine your customers' response, when you tell them that you can provide them with seal data for each pouch they've purchased from you. Imagine their surprise when you tell them that you can also provide them with an assurance of real-time automated process management not previously available.

Temperature, pressure and time data are automatically collected for each strike of the sealer. This data can be monitored in graphical form in real-time on the machine's HMI. In addition, this data is stored for up to seven days within the machine's PLC, so that the process engineer can upload the data to an Excel Spreadsheet, for full statistical analysis. But the benefits don't stop there. This data is fed back into the system for each strike of the sealer, so that if a deviation trend is sensed, the machine can self correct, to maintain a stable process.

Sealing rubber degradation is now recognized and corrected for. Differences between an 'old' sealing surface, and a newly replaced surface are automatically sensed and corrected for. Seal-bar contact time is now more than a 'move-parameter'. The system now senses the moment the bar makes contact, so mechanical binding, or sluggish cylinders no longer need to be factored in; dwell time is precise, consistent and repeatable. Temperature deviations are effectively recognized and isolated, and the machine will know to stop itself when a problem is encountered: this is Intelligent Sealing Technology.

How Can I Put Intelligent Sealing Technology To Work For My Customers?

Contact your CMD representative to learn more about PDI® Intelligent Sealing Technology, or visit our booth at K-2010 in Dusseldorf, Germany, to see a live demonstration of our new Medical Combination Pouch System, featuring Intelligent Sealing Technology.