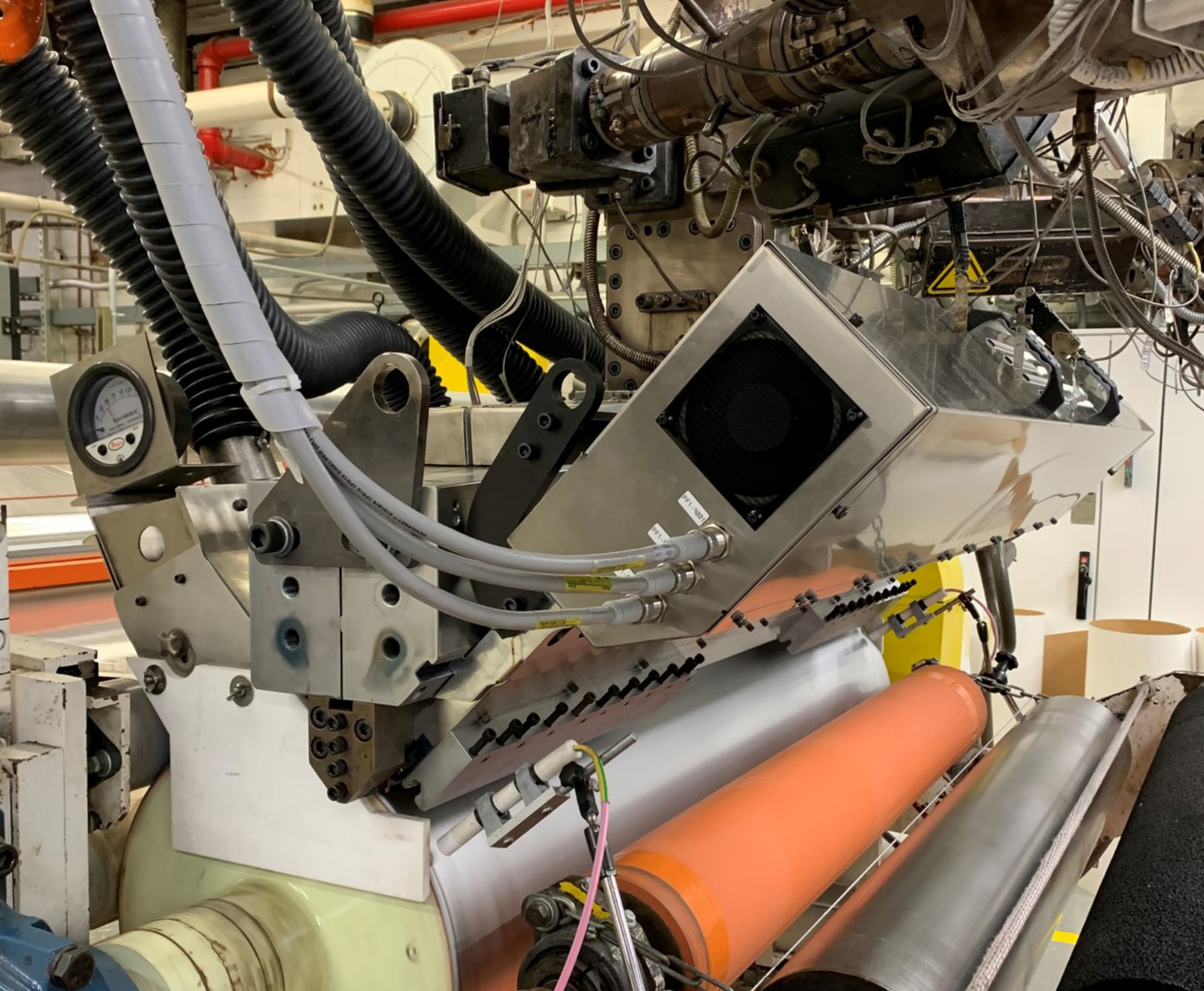




Prodigi™

Achieve Optimal Tolerances Faster: Case Study

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For years, automated lip adjustment has been achieved using thermally actuated bolts. Thermal bolts are highly influenced by external factors, so thickness uniformity and consistency are sometimes hard to realize. Thermal bolts typically require manual pre-tuning, so the process is not fully automated and consistency can be difficult to achieve. While conventional systems are generally effective and proven, it is clear that the industry is ready a next-level solution to meet production needs.

But what does a next-level solution truly mean? Feedback from global processors suggests it's more than achieving product uniformity. To truly offer game-changing performance, the technology must also offer increased automation. With skilled workers hard to find, straight-forward process control and less operator intervention is key to increasing a production line's overall profitability.

So, at a time when the industry is demanding more efficiency from fewer resources, Nordson developed a new automated lip adjustment system for their EDI® extrusion and fluid coating dies. The system, called Prodigy™, uses a series of Proflow actuators (manufactured by Honeywell Process Solutions) that are connected to the die's flexible lip. The actuators smoothly translate motor rotation into precise linear movement to locally open and close the lip. In addition, the accuracy and repeatability of the system enables operations to achieve saving tolerances four times faster than when conventional thermal bolt systems are used.

Testing the System

To evaluate the Prodigy™ motorized lip actuator system, Nordson first conducted a series of extrusion and fluid coating trials at its EDI® Technology Center in Chippewa Falls, Wisconsin, USA. When it came time to bring the system to a larger-scale pilot line, however, the company connected with world-class line supplier, Davis-Standard, LLC. The Davis-Standard laboratory in Fulton, New York, USA provided the perfect test environment for the first production-ready Prodigy™ system installed on a 60" (1524mm) EDI® Contour® die designed for cast film applications. Davis-

Standard had previously operated an EDI® Autoflex™ die system in their Fulton lab, providing baseline information for the Prodigy™ trials.

During lip gap setting trials, the die lip was successfully closed by 0.015" (0.381mm) in only 10 seconds using the Prodigy™ system. With a conventional automatic die system, this same procedure can take approximately 15 minutes and involves using feeler gauges and iterative manual adjustments for reasonably accuracy.

Preparing for Production

In production trials, the team used multiple LyondellBasell resins and the lab's existing installed NDC Technologies scanning system. These trials clearly showed how beneficial the Prodigy™ system could be in terms of product uniformity and control speed.

Once the desired lip gap was set, the initial thickness variation was measured at $\pm 25\%$. Within a matter of 44 seconds, the thickness variation decreased significantly, and after only three minutes from engaging Automatic Profile Control (APC), a nearly perfect gauge was measured across the complete length of the die. This compares to an average of 12 minutes to achieve the same tolerances using conventional thermal actuators, meaning operations will save significant time and be able to exactly repeat production cycles with the Prodigy™ system.

The faster set-up will also create much less scrap and add more productive time since final tolerances are achieved so quickly. In another test of the system, the team launched a saved recipe profile from a previous run. Once the recipe was launched, they were able to produce exceptionally flat film in only 30 seconds. Davis-Standard estimated the time from launching a recipe until acceptable tolerances are reached is approximately eight minutes with a conventional thermal bolt system.

An Industry User's Perspective

Global packaging supplier Amcor was also invited to the trials and provided additional insight on the Prodigy™ system's

performance. They observed the impressive reproducibility and speed, noting it will be a game-changer as the converting industry looks for tools to help reduce losses and improve Overall Equipment Effectiveness (OEE).

Reaching Peak Energy Efficiency

Another benefit of the Prodigy™ system is its high energy efficiency since the motorized actuators operate at a much lower temperature than thermal bolts. While the thermal bolts need constant heat during a production run, the Prodigy™ motorized lip actuator system uses little to no power after achieving steady state operation, reducing the overall energy consumption and environmental impact.

In fact, it's projected that the Prodigy™ lip adjustment system, under normal use and on annual basis, will consume less than 1% of the electricity needed to operate a comparable thermal bolt system.

Improving Team Safety

The Prodigy™ motorized lip actuator system is designed to be fully operational from a remotely controlled panel. This removes the operator or technician from the hot zone near the die surfaces and melt stream components.

The Prodigy™ system is also safe for use in certain fluid coating applications where solvents are being applied. The integrated motorized actuators may be safely used near solvent fumes and do not pose a risk for ignition.

Next-Level Performance in Die Automation

Trial results proved that the Prodigy™ die system offers global processors significant benefits by being faster, safer, and more energy efficient than conventional thermal bolt systems.

Prodigy™ may be easily integrated into any production line where a new or retrofittable EDI® extrusion or fluid coating die is being installed and is compatible with all major industry gauge scanning systems.

<i>Time to Lip Gap Setting (Closing 0.015")</i>	
Prodigy™ System	Conventional Automatic Die
10 Seconds	15 Minutes

Within 44 seconds, the thickness variation decreased significantly, and after only three minutes from engaging APC, a nearly perfect gauge was measured.

This compares to an average of 12 minutes when using conventional thermal bolts.

<i>Time to Launch a Saved Recipe</i>	
Prodigy™ System	Conventional Automatic Die
30 Seconds	8 Minutes

< 1%

Amount of electricity consumed annually by a Prodigy™ lip adjustment system during operation, when compared to a conventional thermal bolt system.



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