

Automation of Flat Film Lines

Desired Film at the Push of a Button

Precision setting of a coextrusion adapter or a flat die usually requires a highly intuitive operator – and a lot of time. At K2022, Reifenhäuser presented an automation system that uses motorized screwdrivers to speed up start-up and product changes in flat film and sheet production.

A clever solution: two motorized screwdrivers travel along the die, automatically adjusting all the set screws.

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Starting up a flat film extrusion line takes a lot of experience and time. A whole swath of individual operations have to be completed before the coextrusion adapter and die are set correctly. Up to now, the task of setting the profiling the individual film layers in the adapter has usually been done manually and with the line at a standstill. Often, the adjustment of the die lip is regulated by means of thermal expansion bolts. These are imprecise, have a sluggish response and consume a great deal of energy because they need a permanent supply of power.

Automated Line Start-up

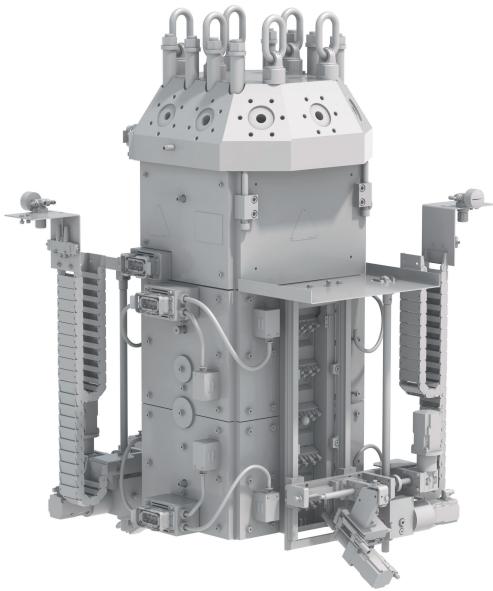
Reifenhäuser's solution to this problem is an automation option for coextrusion

adapters and slot dies for use in flat film and sheet production and extrusion coating. This system, called PAM (precise, autonomous, mechatronic), is essentially simple technology. Two motorized screwdrivers each move automatically along the adapter and die, adjusting all the set screws automatically with great precision. The high degree of automation greatly simplifies start-up and product changes for the machine operator, while boosting productivity, film quality and overall equipment efficiency (OEE) – according to the manufacturer.

Furthermore, recipes that have been set once can be stored and retrieved during product changes. They can thus be reproduced exactly – even by inexperienced operators.

Stored Recipes Enable Reproducible Results

This is a decisive advantage, because a shortage of skilled workers has plagued manufacturing companies everywhere for years. The stored settings facilitate not only production runs, but also the tracing of individual products, while providing proof for the company's own customers. Another advantage of the fully automated solution with PAM is that the line operator no longer has to work on the hot components, a fact which increases work safety. There is also a reduced risk of damage being done to the line components as a result of manual screw adjustment. PAM is available as an option for new Reifenhäuser "Pro" coextrusion adapters and for various



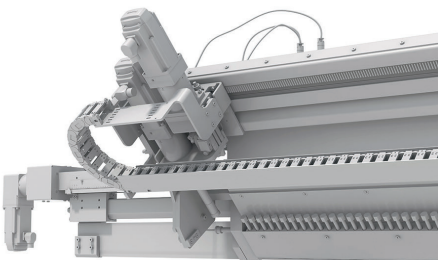
The Coextrusion Adapter Pro enables profiling of up to 11 individual layers – while the line is running. © Reifenhäuser

dies, but can also be retrofitted to existing lines. For dies, the system is also available for third-party systems, irrespective of manufacturer.

Profiling of the Individual Layers while the Line Is Running

According to the manufacturer, the Pro coextrusion adapter is the only coextrusion system on the market that allows individual layers to be profiled while the line is running. Unlike conventional solutions, this does not require elements located in the adapter to be removed, processed and reinstalled in a time-consuming process. Instead, the profilers can be flexibly controlled either individually or together during operation via a central adjustment.

“The PAM option goes one step further,” says Dr. Hanna Dornebusch, applications engineer at Reifenhäuser



The PAM system enables precise, autonomous and mechatronic adjustment and control of the flex lip. © Reifenhäuser

Cast Sheet Coating. “PAM uses integrated recipe management to automate the setting of the layer distribution and simplify adjustments and optimizations. This is especially worthwhile where multiple product changes are needed in production and for manufacturers of multi-layer films.”

With simple 3-layer composites, the coextrusion adapter is adjusted in a few steps, but barrier composites comprising 11 layers may require 70 profilers to be adjusted. Compared with manual adjustment by a machine operator, automation saves about half an hour of changeover time, with the exact time depending on the number of profilers to be adjusted.

Die Control Using the PAM System

PAM is the next logical successor to solutions based on translator technology and individual drives and is the outcome of decades of development in the field of die control. Boasting two motorized screwdrivers, the system combines energy efficiency with a control system that is easy to set up and operate.

PAM allows for autonomous and mechatronic adjustment and control of the flex lip via the system control. To an extent depending on the die design, autonomous adjustment of the dust bar, width adjustment and lip opening are also possible by adjusting the lower die lip.

“With this option, we now offer our customers a highly convenient solution that yields a fast return on investment,” explains Tim Bänisch, product manager at Reifenhäuser Extrusion Systems. “Compared with dies that are adjusted using thermal expansion bolts, changeover time and energy consumption are significantly reduced.” Switching from thermal expansion bolts to PAM on a 3000 mm wide die saves about 224,064 kWh per year. This is a decisive advantage, given the current high energy costs in Europe.

The newly launched system is a joint development by Reifenhäuser’s “Extrusion Systems” and “Cast Sheet Coating” business units. The PAM option can be selected independently for coextrusion adapters and dies – but it is only when they are used in combination that the automated components develop their full strength.

Strategic Partnership with an Automation Expert

The developer of the automation system – Maku AG – has entered into an exclusive strategic partnership with Reifenhäuser Extrusion Systems. The aim of the partnership is the joint marketing and further development of the automation system.

Uwe Gaedike, Managing Director of Reifenhäuser Extrusion Systems, explains: “Maku’s technology and experience are the perfect complement to our hot part expertise. With the automation option, we can now offer our customers a perfectly coordinated overall system that is second to none. We will work together with Maku to establish the technology in the market and continuously develop it further. What makes this special is that we also offer it as part of our refurbishment portfolio for all lines in the market.”

Reto Maeder, Managing Director and Co-Owner of Maku, adds: “We are very pleased to have found a strong partner in Reifenhäuser to market our technology globally. Together, we will leverage the potential of our cross-process expertise to create benefits for our customers. We combine hot part expertise with a high level of automation in the market. Maku will continue its classic retrofit business on existing dies unchanged. Reifenhäuser’s global service network enables us to offer our system to more customers outside Europe.” ■

Info

Reifenhäuser Group
www.reifenhäuser.com
 Maku AG
maku-ag.ch

Videos

You can find further information about the PAM system and two videos about the mode of operation at:
<https://bit.ly/3w6wRZv>

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A PDF file of the article can be found at
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