

Digitalisation boost for thermoplastic fibre composites

Neue Materialien Fürth GmbH is steadily advancing its digitalisation strategy. In order to sustainably optimise the production of continuous fibre-reinforced thermoplastic semi-finished products using CCM (Continuous Compression Moulding) technology, digital machine networking was expanded in the plastics engineering department, laying the foundation for 100% quality-controlled production.

Thermoplastic composite materials: lightweight construction with a future

The enormous lightweight construction potential of thermoplastic fiber composites is once again evident in various innovative applications in a wide range of industries. Robust and automated manufacturing processes are essential in order to produce these materials economically, energy-efficiently, and with consistently high quality. Thanks to years of expertise and state-of-the-art machinery, Neue Materialien Fürth GmbH is one of the world's leading research institutions in the field of CCM technology. Particularly noteworthy are the two interval hot presses with 25-inch and 50-inch production widths, which offer an extremely wide range of applications for versatile research and development tasks thanks to direct melt processing and local pressure adaptation (see Figure 1).



Figure 1: 25-inch CCM system with direct melt plasticization (left) and 50-inch CCM system with local pressure adaptation system (right) for the development and production of thermoplastic laminates

Digital networking for maximum process reliability

A key element of NMF's digitalization drive is the digital networking of all production facilities. All systems communicate directly with a highly powerful, self-contained NMF server platform via a standardized OPC UA interface. This allows process data to be collected and evaluated in real time in compliance with data protection regulations and fed back directly into the ongoing production process – an essential component for process stability and reproducibility. In close cooperation with our development partners, we have also integrated the flexible visualization and analysis platform Grafana®, which allows quality-relevant process parameters such as hydraulic pressures, press temperatures, and/or production speeds to be visualized in real time, independently of the machine control system. An 86-inch monitor enables both the live display of the dashboard with statistical evaluation for trend detection and the projection of the machine control system for process adjustment during production (see Figure 2).

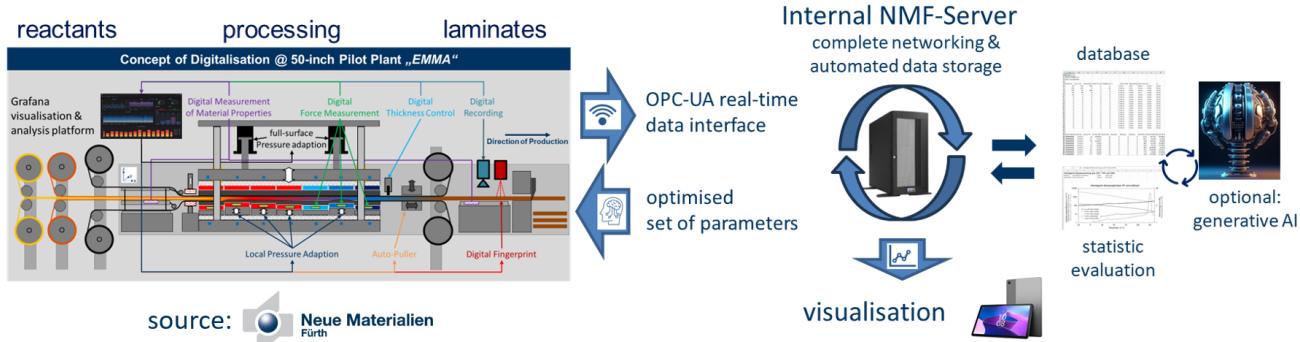


Figure 2: Digitization concept for the 50-inch pilot plant "EMMA" (left) and real-time data interface with closed NMF server platform and Grafana® visualization platform

Outlook: Fully automated process reporting

The next big step is already in the starting blocks: the automated generation of individual process reports and continuous 100% quality recording using digital thickness measurement and image documentation for every meter of laminate produced. This creates seamless documentation, strengthens quality assurance, and enables a new form of digital traceability. In the future, NMF will continue its digital development strategy and lay the foundations for even more efficient and data-driven production control in plastics technology (see Figure 3).



Figure 3: Real-time data evaluation of local CCM pressure distribution via Grafana® analysis platform

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