

Reducing anisotropy with **MAZZAROPPI** **ENGINEERING** advanced control



minimising-or where possible eliminating-the primary process defects. “Everyone promises excellent tempering results,” says Antonio Mazzaroppi, CEO. “What matters is demonstrating with concrete data how this is achieved. When we say our systems make tempering simple, we mean that this ease of use is supported by advanced design capable of automatically managing the most critical process variables.”

HOW WE AVOID DISTORTIONS

At the core of the system is intelligent control software that coordinates temperature management, sheet handling and the cooling phase in real time. The software continuously self-regulates according to the characteristics of the glass being processed, optimising parameters such as transport speed, heat distribution and quenching sta-

How do Mazzaroppi furnaces achieve their guaranteed performance? The answer lies in intensive research and development that has result-

ed in advanced tempering technologies focused upon measurable outcomes. Mazzaroppi furnaces rank among the most energy-efficient in their category, with energy consumption up to 70 per-

cent lower than traditional systems. Yet efficiency alone is not the company’s objective. Based in Aprilia, the manufacturer has developed targeted solutions to improve tempered glass quality,

Advanced tempering technologies developed by MAZZAROPPI combine intelligent process control, segmented heating and optimised quenching to reduce energy consumption by up to 70 percent whilst minimising distortions and anisotropy. Real-time optical monitoring ensures consistent quality - supporting sustainable, high-performance glass production worldwide.

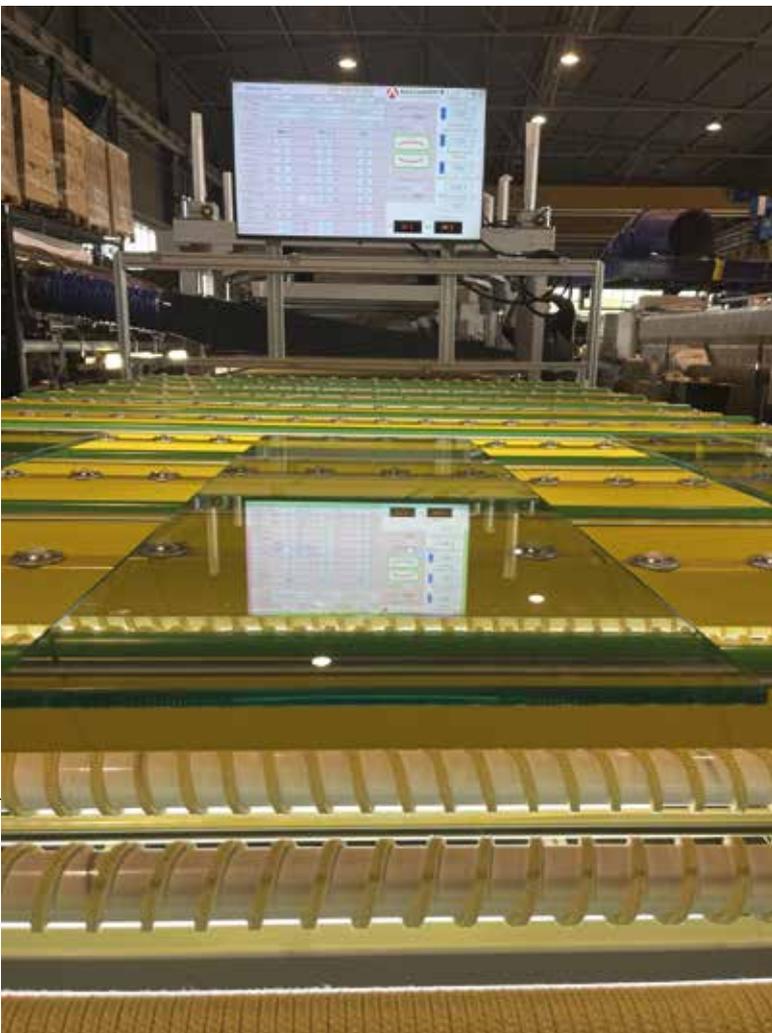
bility. “The transport of glass in our furnaces is designed to minimise phenomena such as roller wave,” explains Federico Mazzaroppi, Marketing Manager. High-precision servomotors control acceleration and speed with exceptional accuracy, automatically adapting to the

thickness and dimensions of each sheet. This approach limits stress while the glass is in a plastic state, significantly improving flatness and optical quality. Handling alone, however, does not determine quality. Cooling is equally critical. During quenching, maintaining an even and balanced airflow across the en-

tire sheet surface is essential, as even minimal variations can generate uneven stresses and deformations, including bowing, warping and edge lifting. Mazzaroppi furnaces are engineered to distribute cooling air uniformly and consistently across the glass surface, ensuring balanced tensioning and enhanced geometric stability in the finished product. The company’s technologies also significantly reduce typical tempering defects such as edge lifting, bowing and warping. A highly segmented, multi-zone heating system delivers extremely uniform thermal balance across the entire surface of the glass. This precise temperature control directly reduces anisotropy. Combined with optimised convection and intelligent transport management, it minimises the temperature differences that generate internal stresses and birefringence. The result is a reduction in anisotropy intensity of up to 97 percent, delivering excellent visual quality in finished tempered glass.

REAL-TIME QUALITY CONTROL

To maintain consistently high standards, furnaces can be equipped with optical control systems at the outlet, including the zebra panel, which immediately identifies any sheet distortions. These systems can be integrated with the latest-generation automatic scanners capable of monitoring flatness and optical quality in real time, making process control increasingly accurate, objective and repeatable. Extensively tested technologies now enable hundreds of glassworks and companies worldwide to achieve high performance and low consumption daily, supporting more sustainable tempering from both environmental and business perspectives.



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