| Session | Energy Efficiency in Glass Production |
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| Chair | Tolga Uysal |

# Regenerator Efficiency Optimization through new Checker Settings and Shape Design

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## Biography

My journey in the glass industry began in 1993 when I joined Owens Illinois as a furnace designer. Over the next decade, I honed my expertise in this role, contributing to projects at the company's Technical Center in Italy and later in Toledo, USA. This foundational experience allowed me to deepen my knowledge of furnace design and its practical applications in the container glass industry.

In 2003, I transitioned to BDF Glass Technologies as Chief Technologist. For the next 10 years, I led and developed numerous international projects focused on furnaces and forehearths, further establishing my expertise in the container glass sector. My role involved close collaboration with global clients, ensuring innovative and efficient solutions tailored to their specific needs.

In 2019, I joined Stara Glass as Technical Manager, where I expanded my technical horizons by engaging in projects across a broader spectrum of the glass industry, including float glass and fiber glass. This period provided invaluable insights into the unique challenges and requirements of these segments, enriching my overall industry perspective.

Since 2022, I have been serving as Technical Marketing Manager at RHI Magnesita. This role leverages my extensive experience in the application of refractory materials for the glass industry while expanding my knowledge in refractory manufacturing and development. In this position, I focus on optimizing solutions for extreme operating conditions in the glass production, driving innovation, and ensuring the alignment of technical expertise with market needs.

Throughout my career, I have cultivated a deep understanding of glassmaking processes, furnace and forehearth design, and refractory applications. My experience spans diverse areas of the glass industry, enabling me to adapt to new challenges while contributing to the advancement of sustainable and efficient technologies.

## Abstract

Regenerators play a critical role in thermal efficiency and energy recovery in industrial processes, particularly in high-temperature applications like glass production. The performance of regenerators depends significantly on the configuration and shape of their internal checker bricks, which impact heat exchange efficiency and operational reliability. This presentation investigates the influence of different checker brick settings and geometries on regenerator performance, focusing on heat transfer efficiency and durability along the regenerators campaign.

Checker bricks, arranged in various patterns and fabricated in diverse shapes, are responsible for maximizing the surface area available for heat exchange while maintaining structural integrity. This research evaluates and compares standard configurations, such as arrangements with TG and TL shapes alongside shape variants like TLW. By employing our internally developed software called R21, it is possible to simulate the efficiency of different checker settings under given operating conditions and finally the study quantifies the effects of these variables on regenerator efficiency.

Results demonstrate that the application of advanced checker settings, involving the new developments in terms of shapes and in terms of applications, in combination with a proper material selection, offer superior heat transfer efficiency due to their high surface area-to-volume ratio, to the promotion of turbulence of the combustion air and waste gases flow and to the promotion of the flows homogeneous distribution. However, these designs necessitate optimization for specific operational contexts. Conversely, the application of straight settings in the lower checker area, like the LCP shapes show lower thermal efficiency but are advantageous in scenarios where high risk of clogging and reduced maintenance are needed.