

Session	Energy Efficiency in Glass Production
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Chair	Tolga Uysal



Infra-Red Does Not Lie! We Have Just Never Seen It Before in Base of Regenerators

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Biography

Neil Simpson holds a Bachelor (Hons) of Engineering in Energy from Edinburgh Napier University. Worked for Laidlaw Drew to develop oxy burners, including oxy oil, then BOC's CGM development team in Ohio, US. BOC GMIC representative and chair of the Energy Efficiency Committee. He moved back to the UK and joined Eclipse as Glass Industry Manager and then re-joined BOC in the UK with responsibility for Glass, Metals and Cement.

Ten years ago, Neil established Simpson Combustion and Energy Ltd as an independent consultancy to work with the glass industry worldwide. He is a registered trainer for CelSian. His own courses include Basics of Combustion, Oxy Fuel, In Furnace Thermal Optimisation and Industrial Combustion Decarbonization 101.4.

Over 20 published patent applications, he is a Chartered Engineer, a member of the Energy Institute, and the Institute Refractory. He is also a Fellow of the Society of Glass Technology, and previously a Chairman of the Board of Fellows and previously chaired the Melting Technical Committee, which organises Furnace Solutions.

In 2016, he became a consultant to AMETEK Land and, in June 2017, was part of the team, including AMETEK Land and Encirc, that won a British Glass - Glass Focus Innovation Award. Supporting AMETEK Land in the optimisation of glass furnaces, he has supported joint papers presented at Glass Problems Conferences and Hotbels. He won the 2023 BTU Award.

Abstract

For decades the regenerator checker shadow pack has been the visual way to check the condition of the regenerator pack. A bright floor with well-defined pack has been the traditional sign of clear regenerators. Less bright areas and less well-defined checker shadow suggests the start of some blockages. Visible dark areas suggest a blockage. Clearly the use of a water-cooled endoscope can provide a clearer image of the blockage of light but does it show that the pack is blocked? A controlled burn-out to help clear may cause greater damage if there is still a path for the air and exhaust gases.



At the 2023 SiseCam Conference the IPA concept for automatic reversal control for end fired furnaces was introduced. As part of the IPA technology a Long Wave Infra Red [LWIR] instrument was used for the first time to look at the rider arches and measure the change in temperature. The logical next step was to look at the impact on cross-fired furnaces. Three cross fired furnaces of different sizes, ages and condition were inspected. The first furnace was a furnace which had some challenges which were not obvious by conventional trouble-shooting. As an experiment the LWIR was positioned in the gable end of the common regenerator. The initial results suggested that there was more than sulphates on the regenerator floor. Use of a different LWIR with a wider angle and different temperature ranges provided a view of the floor and the rider arches. Subsequent measurements can be used to establish if the condition has stabilised or degrading.

Unlike an in-furnace thermal imaging camera which is permanently installed in a water cooled lance on a retraction mechanism the LWIR instrument is around the size of a refractory brick and in the examples shown was installed for 40-60 minutes survey per side to catch both the firing and exhaust side.

