

PRESS RELEASE

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Tenova LOI Thermprocess decarbonizes modern HPH®-BAF

Tenova LOI Thermprocess achieves CO₂-neutral heat treatment of precision strip in an Ultra Low NO_x HPH®-flameless Bell-type Annealing Plant at thyssenkrupp Hohenlimburg.

Duisburg, January 16, 2024 - Tenova LOI Thermprocess, part of **Tenova** and one of the leading companies supplying industrial furnace systems for the heat treatment of metals, has once again proven that CO₂-neutral heat treatment can go together with low nitrogen oxide (NO_x) emissions in a cooperation project with **thyssenkrupp Hohenlimburg GmbH**.

In **bell-type annealing plants**, which have so far been mainly operated with natural gas, precipitation and spheroidizing annealing of steel coils is carried out to specifically adjust the mechanical properties for subsequent rolling processes or the required product properties at the end customer.

At **thyssenkrupp's Hagen-Hohenlimburg** site, **Tenova LOI Thermprocess's** latest generation heating hoods with LOI's patented **Ultra low NO_x HPH®-flameless concept** has been proving its worth for around 12 years. By significantly increasing air preheating temperatures to 600°C, this innovative technology has led to **energy and therefore CO₂ savings of up to 12%**.

In a campaign involving several annealing cycles, a further step has been taken towards decarbonizing steel production as part of the joint project. In production trials, the **fuel gas supply** for the heat treatment of hot-rolled narrow strip was **gradually converted from natural gas to up to 100% hydrogen**. For the **first time in the world**, 70 t of steel strip were heat-treated in a bell-type annealing plant with Tenova LOI's HPH®-flameless technology in a **locally CO₂-neutral process**. The flameless concept demonstrates its advantages impressively here because despite the higher combustion temperature compared to natural gas and thus a tendency towards higher nitrogen oxide emissions, it results in remarkably **low NO_x emissions**.

For the flexible delivery of natural gas/H₂ mixtures, a specially developed mobile natural **gas/hydrogen mixing station** was used during the annealing process in order to assess the influence of increased hydrogen admixtures on the overall system. The increased hydrogen requirements for the annealing cycles due to the approximately one-third lower calorific value were supplied by a special trailer and fed directly into the pipework systems of the bell-type annealing plant.

It has been proven that the particularly efficient Ultra low NO_x HPH®-flameless bell-type annealing plant from LOI Thermprocess is **ideally suited for use with hydrogen**. **Up to 2600 kg of CO₂** can be saved per annealing cycle by using regenerative produced hydrogen, while maintaining productivity and product properties.

*"The project is part of thyssenkrupp Steel Europe's long-term decarbonisation strategy and includes the goal of achieving **climate neutrality in all downstream production processes by 2045** at the latest, in addition to iron and steel production,"* says **Jan Bernhofen**, Team Coordinator Processing at thyssenkrupp Hohenlimburg GmbH.

*"The combustion of hydrogen is technically more complex than the direct use of electricity or the combustion of natural gas. This project has provided us with further insights into the **decarbonization***

*of the bell-type annealing process and is helping us on our joint path towards the **transformation to climate-neutral steel production**. Tenova LOI Thermprocess supplies the suitable technologies for a wide variety of plant types," says **Dr. Gökhan Gula**, Project Manager and Process Engineer at Tenova LOI Thermprocess.*

About LOI Thermprocess GmbH

LOI Thermprocess GmbH is one of the leading companies in supplying industrial furnace systems for the heat treatment and melting of metals. Clients all over the world from the steel, aluminium and automotive industries rely on the experience and technical solution competence of the traditional company representing the entire know-how in the field of material properties and secondary metallurgy. Tenova LOI Thermprocess is a trademark of Tenova, a Techint Group company.

For more information, visit www.loi.tenova.com

About Tenova

Tenova, a Techint Group company, is a worldwide partner for sustainable, innovative and reliable solutions in the metals and – also through the well-known TAKRAF and DELKOR brands – in the mining industries. Tenova leverages a workforce of over 2,300 forward-thinking professionals located in 19 countries across 5 continents, who design technologies and develop services that help companies reduce costs, save energy, limit environmental impact and improve working conditions.

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