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Design and advantages of a hybrid furnace combining gas burners and induction heating

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This study introduces a hybrid heating furnace design that integrates gas burners and induction heating to achieve enhanced energy efficiency, precise temperature control, and operational versatility. Gas burners provide high thermal output, while induction heating enables rapid, localized temperature adjustments, making the system ideal for applications such as metal heat treatment, rolling and forging. The hybrid configuration reduces heating time and energy consumption, improving overall efficiency by if compared to conventional furnaces. Advanced control systems facilitate seamless switching between gas and induction heating modes, ensuring optimal performance across diverse industrial processes. Computational modeling and experimental validation demonstrate the system's superior thermal performance, energy savings, and sustainability, supported by features like waste heat recovery and reduced greenhouse gas emissions. This combined design offers a flexible, eco-friendly solution for industrial heating, with potential for scaling and integrating renewable energy sources to further enhance sustainability and reduce carbon footprints in manufacturing.

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