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## Green Steel Initiatives Supported by CERO Waste Refractory Concept, Enhanced Slag Engineering and Using Circular Metallurgical Additives.

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In the pursuit of a sustainable refractory and steel industry, the circular economy offers the most resilient answer. RHI Magnesita and MIRECO close the loop by engaging producer, user and recycler of refractories. In addition to the CERO Waste Concept, this approach also involves a slag engineering solution and circular metallurgical additives. The CERO (Continuous Economic Recycling Optimization) Waste Concept encompasses the collection, sorting, reuse assessment and disposal, as well as legal management of refractory material. This concept generates circular minerals serving as alternatives to primary raw materials for circular refractory products and green metallurgical additives, thereby maximizing refractory recycling rates, reducing CO<sub>2</sub> emissions, and minimizing landfill use. A metallurgical consultancy service for slag engineering provides deep insights into process optimizations, the application of green metallurgical additives and slag compatibility with refractory linings. Three studies on electric arc furnaces, basic oxygen furnaces, and secondary metallurgy ladle treatments illustrate opportunities with circular metallurgical additives and address challenges such as MgO saturation, slag foaming, desulfurization and alloys saving. These studies, using e-tech slag modelling tools, highlight the added value in metallurgical, refractory, and circular economy knowledge for a steel plant's green steel strategy.

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