

**PRESS RELEASE**

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Revolutionary new development

**SMS Siemag presents a new electric arc furnace S/EAF® for continuous operation**

30 percent higher productivity with lower energy consumption.

The electric arc furnace is the core unit of an electric steelmaking plant and has a decisive impact on annual production and energy costs. A new development from SMS Siemag, Germany, is the ARCESS® steady EAF (S/EAF®), which allows real continuous operation for up to one week. The S/EAF® has been newly developed from scratch and combines innovations with proven technology. This technology arises from SMS Siemag's long-standing experience in the fields of submerged-arc furnaces (SAF) with over 300 references, electric arc furnaces (EAF), with over 1,300 references and CONARC® technology.

The result is a new type of electric arc furnace, yielding a 30 percent higher productivity with lower energy consumption thanks to its reliable continuous process. The integrated energy recovery system further improves the efficiency by utilizing the thermal energy of the hot furnace off-gas.

All components have been designed to allow continuous power-on operation for around one week. Uninterrupted operating practice is made possible by a patented system derived from SAF technology,

which allows the electrodes to be clamped and slipped continuously. Whenever an electrode has been used up, a fresh piece of electrode is joined on at its end. Both operations take place under “power-on”.

"Continuous operation in SAFs is only made possible by the electrode slipping device, which in these furnaces represents proven technology long since. That this principle will now be transferred into the new S/EAF<sup>®</sup> is a real innovation and it definitely results in an increased efficiency," says Prof. Bernd Friedrich at the Institute for Machine Elements and Machine Design at RWTH Aachen University.

Similarly to the operation of a submerged-arc furnace, the process takes place in a uniform way and is almost free of fluctuations since the S/EAF<sup>®</sup> is operated continuously in the flat bath phase with liquid initial bath. The geometry of the new furnace shell has been optimized accordingly and comprises a flat lower shell and a conical furnace roof placed closely on top. The S/EAF<sup>®</sup> is continuously charged with direct-reduced iron ore (DRI/HBI), hot metal or scrap through a material handling system that is also rated for the use of 600°C hot DRI.

In addition to the electrodes, water-cooled oxygen blowing lances are introduced through the furnace roof. This technology has been adopted from CONARC<sup>®</sup>, a furnace unit developed by SMS Siemag with the aim to rapidly decarburize melts with high carbon content. The level of foaming slag is controlled by a new, patented slag door system. The steel is tapped slag-free and likewise under “power-on”.

Since the S/EAF<sup>®</sup> is not opened during operation, no roof hood for the secondary gas collection is needed. Primary gases are directly exhausted through a furnace nozzle. This allows the connected gas cleaning plant to be dimensioned much smaller. The power-off times that previously affected the EAF no longer arise. Continuous

operation is interrupted only for regular maintenance work. For that purpose the lower furnace shell can also be driven to a maintenance stand. Heavy-duty gantry cranes with elaborate building structures and foundations are not needed.

The steady input of electrical energy and the flat-bath process prevent negative feedback on the electricity grid (for example flickers). Further advantages are the protection of the refractory lining and lower specific electrode consumption.

With more than 1,700 references, SMS Siemag is the market leader in the field of electric arc furnaces (EAF) and submerged-arc furnaces (SAF).

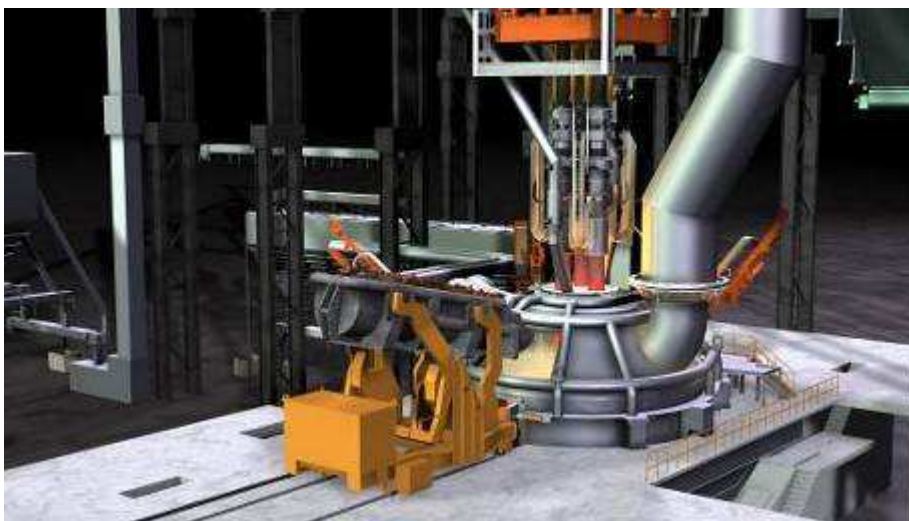
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Video: [http://www.sms-siemag.com/qr/s\\_eaf/](http://www.sms-siemag.com/qr/s_eaf/)



Electrode slipping device.



3D illustration: ARCESS<sup>®</sup> steady EAF (S/EAF<sup>®</sup>).

SMS Siemag AG is a company of the SMS group which, under the roof of the SMS Holding GmbH, consists of a group of companies internationally active in plant construction and mechanical engineering for the steel and nonferrous metals industry. With some 11,000 employees, the group generates sales of over EUR 3 billion.