

PRESS RELEASE

Düsseldorf, March 10, 2020

Nucor Corporation places follow-up order with SMS group for the supply of slab and ingot reheat facilities and two heat-treatment lines for plate

Quality-enhancing heat-treatment technology from SMS group



The Nucor and SMS group team at the Brandenburg, Kentucky site.

Nucor Corporation has awarded SMS group a follow-up order for the supply of reheat and heat-treatment

facilities. The new equipment will be part of the new plate mill being built in Brandenburg, Kentucky. Nucor had already ordered the supply of a slab casting machine for the new mill from SMS group in 2019. “We are excited to be working with SMS group to have them supply critical equipment for our new plate mill in Kentucky, and to install their heat treatment line that utilizes the MultiFlex-Quench[®],” said Johnny Jacobs, Vice President and General Manager of Nucor Steel Brandenburg.

The new casting machine will become the largest slab caster in the world. It will produce slabs of 200 to 305 millimeters thickness and up to 3,150 millimeters width. The follow-up contract now received by SMS group is for all of the new plate mill’s slab and ingot reheat equipment, for a heat-treatment line for heavy plate of up to 356 millimeters thickness and for a continuous heat-treatment line with MultiFlex-Quench[®] technology for plate between 4.8 and 102 millimeters thickness and up to 4,267 millimeters width.

Under the new contract, SMS group will supply a wide range of equipment, including:

A walking-beam furnace for the transfer of slabs from the SMS group casting machine to the rolling mill. The furnace will be designed for slab direct, hot and cold charging. Slabs of the maximal possible length of 15,240 millimeters will be charged in a single row - shorter ones in two or three rows. As a highlight, the walking beam furnace will be fitted with SMS-ZeroFlame burners, which are characterized by extra-low NOx emissions.

For ingot reheating, SMS group is going to supply bogie hearth furnaces. These furnaces will be able to reheat ingots of various sizes.

The combustion process in all the reheat furnaces will be controlled by the proven, advanced SMS-PROMETHEUS[®] Level 2 technology.

Further to these supplies, SMS group’s contract volume includes additional bogie hearth furnaces and a quenching facility, which Nucor will be using for a wide

range of heat treatments – from low-temperature annealing through to normalizing. The connected quenching tank with water circulation will enable Nucor to precisely set the specific mechanical properties in heavy plate.

SMS group is also going to supply a continuous heat treatment line incorporating a MultiFlex-Quench[®], which will be arranged downstream of the rolling mill facilities. For hardening and normalizing, the plates will be heated in a high-temperature roller hearth furnace. The furnace will feature two chambers of different temperature ranges. The plates will be heated by radiant tubes in a nitrogen-based inert atmosphere. A large portion of the plates will be quenched or cooled to a defined temperature in the downstream MultiFlex-Quench[®], providing Nucor extremely great flexibility in terms of cooling strategies. Switchable pressure ranges enable different cooling patterns, including slow cooling and quenching, and freely selectable cooling stop temperatures. This flexibility provides the possibility of producing a much wider range of products than would be achievable with a conventional quench. Especially when processing thin plates, the roller guides with hydraulic clamping devices will prove highly effective in achieving optimum product flatness.

A low-temperature furnace installed in the line will be used for plate tempering (warming-up). A specially designed gas recirculation system provides for optimal convection within the furnace chamber, resulting in maximum temperature uniformity.

The leveler integrated into the continuous heat-treatment line will be designed for plates of 4.8 to 25 millimeters thickness and a maximum plate temperature of 300 degrees centigrade. It will come with a roller actuation system that enables each leveling roller to be adjusted individually and the leveling strategies to be specifically tailored to the individual product. This assures minimum internal stresses and excellent flatness results. Thanks to the possibility of actuating all the rollers separately, optimum torque distribution is achieved.

SMS group will supply all equipment complete with the associated electrical and automation systems. This includes the motors and converters, all sensors and technological measuring systems, the complete Level 1 automation, and Level 2 process models.

The process model for the MultiFlex-Quench[®] is one of the quality-features SMS group will integrate in the heat-treatment line and which will play a key part in assuring the highest product quality. The target values for the product mix are set based on physical and mathematical models and temperature curves can also be simulated. The model adapts to the specific needs of production by optimizing process control accordingly. The model also promotes the development of new steel grades, as it enables simulations with varying parameters to be performed.

The Level 2 / Level 1 tracking system in the continuous heat-treatment line assures a continuous and smooth material flow and plate transport from the registration of the incoming material up to and including the discharge from the roller table to the dispatch area.

SMS group's intuitive and ergonomically designed HMI concept ensures efficient control by operators with easy access to all relevant process information.

Commissioning of the plant is scheduled for 2022.

Nucor Corporation is the largest steel and steel products producer in the United States, with 27,000 teammates working safely at 25 steel mills and more than 300 operating facilities throughout North America. Last year, Nucor's revenues exceeded \$22.5 billion, and the company shipped more than 26.5 million tons of steel and steel products to outside customers. Nucor is also North America's largest recycler, using scrap steel as the primary raw material in producing its steel and steel products. In 2019, the company recycled approximately 20 million net tons of scrap steel.

SMS group is a group of companies internationally active in plant construction and mechanical engineering for the steel and nonferrous metals industry. It has some 14,000 employees who generate worldwide sales of more than EUR 2.8 billion. The sole owner of the holding company SMS GmbH is the Familie Weiss Foundation.