High-performance Laser Welding Machine from Siemens for Rapid and Reliable Joining of Strips with Thicknesses between 0.5 and 7 Millimeters

The LW 21 H laser welding machine from Siemens Metals Technologies is intended for operators of pickling lines and continuous rolling mills. It is a system for joining metal strips with thicknesses between 0.5 and 7 millimeters. The laser welding machine enables flexible and reliable welding of different high-strength steels with tensile strengths of up to 1,500 megapascals such as dual-phase steels and restaustenite (TRIP - transformation induced plasticity) steels or even steels with induced plasticity (TWIP - twinning induced plasticity steels). With a laser output of 8 kilowatts, welding speeds between 5 and 20 meters per minute are achieved. In addition, the welding machine has devices for polishing the weld seam and for thermal aftertreatment. The reliability of the laser welding machine is over 99 per cent.

In processing lines and continuous mills, strip welding machines play an important role in respect of output and product quality. The weld seam must be made quickly but still be able to withstand the tensile or rolling forces of the subsequent steps in the process. At the same time, thickened weld seams must be avoided in order to prevent damage to the strip surface during coiling. In the past, strips in pickling lines and continuous rolling mills were mainly joined together with the flash-butt welding method. However, this method is restricted to strip thicknesses of less than 1.2 millimeters.
The LW 21 H high-performance laser welding machine from Siemens includes the shear for cutting the strips which are to be joined together, a clamping device, a welding carriage in the form of a C frame, the laser unit and various devices for aftertreatment. During development, special attention was paid to the cutting process as cutting is one of the most important prerequisites for ensuring that the welding connections are of a constantly high quality. The shear is designed for steels with tensile strengths of up to 1,500 megapascals and can cut strips with thicknesses of 0.5 to 7 millimeters.

The shear is stationary – it is no longer necessary to move it between the parking and operating positions. This eliminates the risk of making imprecise cuts due to accidental displacement of the shear or wear on the guide rails. At the same time, less maintenance is required and the useful life of the shear increases. In addition, the machine has an integrated positioning device which is automatically moved to the correct position, depending on the position of the strip ends which are to be joined together. This minimizes the control effort for positioning the strip ends. The clamping device of the laser welding machine consists of two movable frames with high torsional rigidity. The opening, which is around one meter in size, facilitates access and therefore maintenance. The strip is clamped in place automatically and in relation to the strip thickness due to ascent of the lower welding die. This makes the position of the top side of the strip – and the distance to the shear – independent of its thickness.

The dual laser head is mounted in a C frame, whose resting position is on the drive side. The C frame also contains the devices for aftertreatment of the weld seam and is moved into position for welding, planishing or post-heating operations. Follower rolls driven by hydraulic cylinders keep the strip in position during welding. In order to increase reliability, the laser head is permanently installed. This solution ensures one single beam with problem-free access to all components. All the parts of the laser can only be moved along an axis and can be replaced without influencing the point where the laser beam meets the steel. For use in tandem rolling mills, the welding machine has polishing rollers to remove any thickening on the weld seams. Thermal aftertreatment is used especially for high-strength or sensitive types of steel.
Siemens Metals Technologies is a market leader in the supply of strip welding equipment. The new laser welding machine from Siemens is an addition to its existing range of conventional and proven solutions for flash-butt welding and resistance roller seam welding.

Further information on solutions for steelworks, rolling mills and processing lines at: [http://www.siemens.com/metals](http://www.siemens.com/metals)

This press release is supplemented by a photo which you can view on the Internet at: [http://www.industry.siemens.com/data/presse/pics/04076175.jpg](http://www.industry.siemens.com/data/presse/pics/04076175.jpg)
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Further information and downloads at: http://www.industry.siemens.com