Production competence: Machine Factory:

Siempelkamp – Hot platen

Final machining

It is the product that started Siempelkamp's history and it is the heart of the proven ContiRoll® press. It is also one of the components within the machine factory with the highest vertical range of manufacture. The Siempelkamp hot platen! Whether as a component for a new plant, as a spare part or as a part of a modernization package: Siempelkamp hot platens always impress with high manufacturing quality and provide the best product properties for wood-based material or rubber presses. Since 1883 – the year the Krefeld company was founded – the hot platen is a symbol for Siempelkamp's production know-how.

By Andreas Freis

manufacturer since 1883

Over 130 years ago Gerhard Siempelkamp founded the company based on an idea he had: He started to supply hot platens to the Krefeld textile industry which could be directly heated through channels drilled into them. Shortly after, Siempelkamp specialized in the manufacture of hydraulic presses and opened up new markets in the wood-based material, rubber and plastics industries. Today, Siempelkamp experts design and manufacture hot platens according to the latest technology.

New plants, spare parts business, upgrades

The proven hot platen is a component of each continuous press made by Siempelkamp. It features high steel and surface quality as well as excellent dimensional tolerances. A special manufacturing process allows Siempelkamp to drill channels with high accuracy resulting in a uniform channel system inside the hot platen. The design of the channel plugs allows for even distribution of stresses. For Siempelkamp customers this translates into stress-free pressing with uniform temperature distribution on the product. The pressure-resistant and reliable hot platens have a long lifespan and ensure economic production.

Customers that invest in new plants aren't the only ones that benefit from these advantages. Siempelkamp hot platens also play an important role in our spare parts business and in upgrades and retrofits. These services include the spare parts service for existing plants, repairs and modernizations of field-proven hot platens (electrical, hydraulic, mechanical), the repair of hot platens in customer plants on site, hot platens for third-party presses, technical and technological consulting or simply the thermal insulation of the platens. This comprehensive range of services regarding hot platens is preceded by a long Siempelkamp history which reaches all the way back into the 19th century.

From the textile to the wood-based materials industry

In the early 1880s Krefeld's textile industry was booming. The city was famous for the elegant, pearly sheen of its fabric. To give the Krefeld textile its irresistible shimmer, presses with hot platens were needed. During his employment at Rheinische Röhrendampfkessel-Fabrik A. Büttner & Co., a factory that produced steam generators, the young metalworker Gerhard Siempel-

Straightening press

Pre-milling

Pre-machining

CNC deep hole drills

Notches and pockets

Welding

Finished side

kamp learned about a technical invention: a heatable steam press platen, which was made of a piece of solid wrought iron or steel and through which hot steam was channeled. For many years, platens used for hot pressing were heated over an open flame, a procedure that was both laborious and above all unreliable. By the 1870s, these solid platens had been replaced by hollow platens with integrated steam pipes. These platens comprised two pieces of sheet steel that were either welded or riveted together and were used in hydraulic presses. The problem with the new steam press platens was that they were not sufficiently robust: rolls of fabric left dents in the sheet steel, the pressure of the steam sometimes caused it to bulge outwards, and steam often escaped at the rivets.

To begin with, the Siempelkamp founder Gerhard Siempelkamp developed a special hot platen channel drilling machine that allowed heating channels to be drilled quickly and accurately into the solid platens using flat drills and, at a later date, twist drills. This was the starting point for the industrial production of steam press platens. In 1883 Siempelkamp began selling his self-designed steam press platens. Soon after Siempelkamp specialized in the manufacture of hydraulic presses and opened up new markets including the wood-based materials industry as well as the burgeoning plastics and rubber industries.

How does the Siempelkamp hot platen work?

With the drilled hot platen Gerhard Siempelkamp developed an innovative product for his time which had a simple operation. While then the hot platens were heated with superheated steam, today a special thermal oil is used as the heat transfer medium. For the ContiRoll® pressing process it is heated to approximately 270 °C. Because the oil has a maximum operating temperature of 320 °C, the process temperature is way below the boiling point. Thus, evaporations and combustions, along with the contaminations they create, are prevented. The thermal oil is pumped, using pumps which were designed to withstand the high temperatures, out of a boiler, passes through pipes by a flame and is thus heated. By the time it is entering the channel system of the hot platen, it has cooled down to 250 °C. Due to the continuous flow, the hot platen material heats up extremely evenly.

Up into the 1980s multi-daylight presses were built where the heat is directly transferred from the hot platen to the product. In today's continuous presses the heat is first transferred from the hot platen to the roller rod carpet and then to the steel belt. The steel belt transports the formed particle or fiber mat with speeds of up to 2,000 mm/s through the press and transfers the optimal

Applying pressure and rinsing

Rust-proofing

temperature for the pressing process to the product. Upon exiting the hot platen, the thermal oil, meanwhile cooled down to 230 °C, flows back into the boiler where the cycle starts again.

Production of a Siempelkamp hot platen: First step – surface machining

Siempelkamp's machine factory in Krefeld is the only manufacturing facility in the world for the Siempelkamp hot platen. The high quality of the hot platen is primarily due to the use of a highly wear-resistant material which complies with Siempelkamp standards and is ordered according to special guidelines with the relevant inspection certificates. In the last 130 years Siempelkamp has also consistently developed the special pre-treatment of the raw material. A special milling process using ceramic milling tools for a high surface finish is used. The low-stress machining of all sides is also carried out according to Siempelkamp standards and is based on many decades of experience. After machining, the plan parallelism and smoothness of the hot platens amounts to +/– 0.1 mm.

Second step – Deep hole drilling, welding, finish-machining and installation

The mechanical precision of the channel systems is achieved with special deep drilling units which drill the channels into the unfinished platens uniformly and with low tolerance exactly at the centerline of the platen. This ensures even heat distribution. Special channel deflectors, which ensure minimum resistance at extremely high flow speeds, have a positive effect on the heat distribution.

The deflection and sealing systems of the Siempelkamp hot platens are then, in one sitting, completely welded through via submerged arc welding. This method allows for thermal stresses to be absorbed better during future heating and cooling processes.

The finish-machining takes place almost stress-free with highly precise surface machining systems with magnetic clamping plates. The continuous inspection of the surfaces ensures the quality of the hot platens during this production step. Finally, the hot platens for the ContiRoll® are pre-assembled and equipped with pipe connections, insulation cassettes and functional elements. Prior to their delivery they are pressure-tested with a multiple of the operating pressure and the data resulting from this process is logged.

Because of the comprehensive production know-how they are based on and the high quality demands for their production, Siempelkamp hot platens remain the guarantee for high-quality products in the wood-based material and rubber industries and are therefore in demand by customers worldwide as a component for their continuous press line or multi-daylight press.