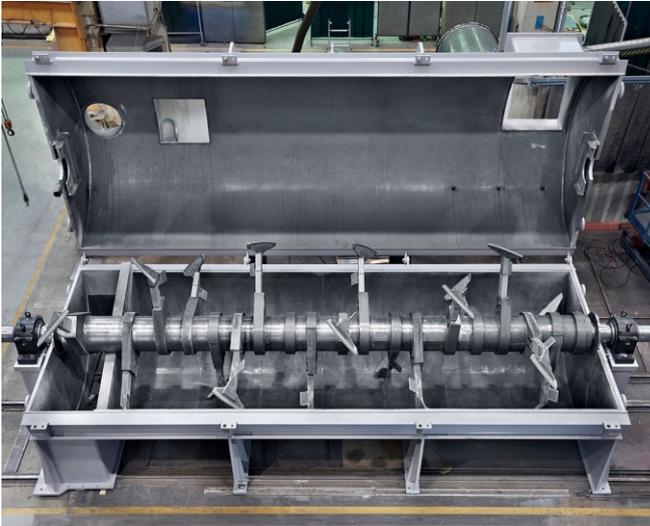


Horizontal Intensive Mixers and Granulators for Sinter Plants

- Highest homogeneity of the sinter mix
- Less binder and solid fuel required
- Higher granulate density
- Improved permeability
- Mixing and granulating drum in two-part design
- Optimum access to the inside of the drum

Horizontal Intensive Mixers and Granulators for Sinter Plants



Mixing drum opened



Mixing drum closed

The mixing and granulation of sinter material in the steel industry is a heavy duty application that makes specific demands on mixing and granulation technology: Large quantities of extremely abrasive materials have to be processed daily. The example of Gebr. Lödige Maschinenbau GmbH shows how a high mixing quality, extreme wear protection and particularly high ease of maintenance can be realised on a large scale. The company has produced the largest intensive mixer in its 75 years of company history for use in an Indian steel plant: the KM 57000 SIN.

Application

Sinter is required for producing pig iron in a blast furnace. The raw materials for sintering consist of iron ore, limestone, coke, return fines and binder. The various materials are fed in the correct ratios to the mixer from the respective storage bunkers, and are mixed and granulated before they are ignited in the ignition hood of the sinter strand. The material is subsequently transported on by the sinter strand while the sintering process continues to burn down through the sinter bed. The quality of the raw sinter mix achieved in the mixer and the granularity of the mix are very important as they, in addition to parameters such as the water content of the mix and the bed depth, determine the gas permeability of the sinter bed. Correct homogeneity and grain size distribution of the raw sinter mix improve the permeability of the mix and allow the sinter strand to travel at an increased speed, resulting in higher productivity.

Solution: Horizontal mixing and granulation technology from Lödige

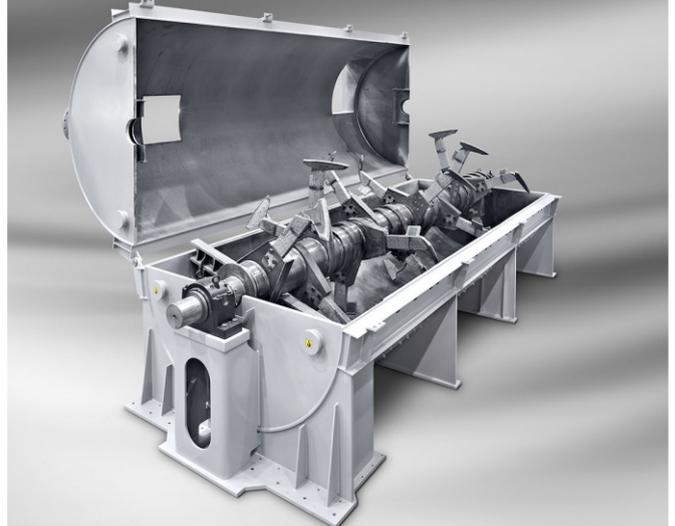
Mixing and pelletizing drums are usually used as standard in sinter plants. Due to the simple design - the material is moved by the slow rotation of the mixing elements - these machines are low maintenance, which is an advantage when processing abrasive materials. However, the mixing quality and granularity of the mix that can be achieved with this technology are limited. Intensive mixers and granulators are an economical alternative to the conventional mixing and pelletizing drums because they can meet the requirements of the industry.

On the one hand, they can be used for processing a wide range of raw materials that have different grain size distributions. The KM 57000 SIN is able to process, for example, ultrafine iron ore, so-called pellet feed and also the very abrasive return fines produced during crushing and screening of the finished sinter. On the other hand, the use of intensive mixers makes it possible to save considerably on the amount of binder and solid fuel required, which increases the profitability of the plant. The mixer achieves an excellent homogeneity and granularity of the mixture, which increases the productivity of the sinter plant.

Horizontal Intensive Mixers and Granulators for Sinter Plants



Discharge zone



Optimal access to the inside of the drum

Machine equipment

Mixers in this area are designed for high throughputs to meet the high demand of the steelworks for sinter. The intensive mixer developed by Lödige features a drum volume of 57,000 litres and can process more than 1,350 tonnes of raw sinter mix per hour. The rotation of the mixing tools creates a mechanical fluidised bed. Binding agent and water are added to the primary particles in the fluidised bed and distributed homogeneously throughout the material by the mixing unit. The intensive mixing process causes the primary particles to agglomerate to form granules. This process takes place around the clock as the supply to the blast furnace has to be guaranteed at all times. When designing the mixer, Lödige paid particular attention to protecting the machine against wear and ensuring high ease of maintenance.

Lödige was able to utilise its extensive experience gained over many years in the development of intensive mixers for iron ore pelletizing plants. The entire surface of the mixing shovels of the KM 57000 SIN are hard-faced with special tungsten carbide for heavy duty use in the steelworks. The lower part of the drum is lined with high strength rubber. In addition to protecting against wear, this lining also serves to reduce the build-up of material on the wall of the drum, thus reducing the vibrations of the mixer.

The mixer drum was designed in two parts to allow fast and easy replacement of the shovels, shaft and rubber lining, a real challenge given the scale of the machine.

The upper part of the eight metre long drum is opened using an existing crane in the steelworks. The advantage of this solution speaks for itself: The inside of the machine is perfectly accessible. To make it even easier to exchange the shovels, they can be moved at low speed into the desired position.

The split design of the mixing drum also offers another important advantage: The entire mixing shaft with its tools fitted can be removed within a short space of time in a single working shift. Thanks to this special design it is possible to achieve planned downtimes of less than two weeks per year.

Horizontal Intensive Mixers and Granulators for Sinter Plants

Conclusion

The mixing and granulating technology for the production of sinter in the steel industry has to overcome particular challenges due to the extremely abrasive materials and high throughputs. Although conventional systems used for production are low-maintenance, they cannot achieve the required quality of mixture and grain size distribution. In particular, they cannot be used for processing materials such as fine iron ore and pellet feed. Therefore intensive mixers and granulators provide an attractive alternative as they achieve an excellent mixing quality and optimum permeability, thus increasing the efficiency, productivity and profitability of the sinter plant. Lödige developed the KM 57000 SIN as a solution for this heavy duty application. The largest mixer ever produced in the history of the company stands out for its excellent wear protection and ease of maintenance: Thanks to its two-part design the eight metre long drum of the mixer can be opened to allow optimum accessibility to the interior of the mixer.



Fig. at the top: View inside the mixing drum

Fig. at the bottom: Mixing drum getting closed by using a crane



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