

Quadra, 74130 Contamines-sur-Arve, France

State-of-the-art concrete block plant at Prefer in Belgium

Founded in 1977, Prefer has come a long way. Its small initial production of masonry blocks allowed it to position itself on the Belgian construction market. Today, the group has grown and owns four production units – precast, concrete blocks, railway equipment and slabs. Its tailor-made solutions and the diversity of its product range have enabled it to gain a foothold in new fields such as civil engineering and infrastructure, both road and rail. Its references speak for themselves, such as the large Liège hospital, the Liège tram, the Couvin motorway bypass, the new Namur station or the Waterloo RER.

In 2010, the former Prefer Briqueterie factory from 1977 was completely refurbished. All components of the production line, from manufacturing to packaging, have been replaced. The French manufacturer Quadra was selected to carry out the installation. The aim was to double the production capacity while continuing to manufacture high quality products.

In 2016, to pursue its growth objectives, Prefer acquired the company Blocs Bertrand, manufacturer of concrete blocks for construction since 1973. Now called Prefer Construct, this company located in Engis benefits from a significant investment program. To meet its customers' requirements, Prefer places great importance on the performance and quality of the equipment it acquires. This is why, after a first successful collaboration for the supply of the Flémalle plant in 2010, Prefer once again called on Quadra. A new partnership was signed between the two companies for the study, planning and commissioning of a new factory in Hermalle-sous-Huy.

The installation of this new plant had to meet very precise specifications both in terms of production performance and product quality. Quadra presented a solution capable of ensuring continuous operation of the vibrating press.

To achieve a high efficiency rate, simultaneous or independent production cycles have been proposed for the fresh products, the dry products and the packaging line:

- By ensuring at all times, the supply of the press with empty pallets to consume concrete continuously.
- By pre-storing a large quantity of dry products pallets, thus avoiding the presence and systematic intervention of an operator.

The handling solutions offered and the automated management of materials favouring the continuous operation of the



Factory located in Hermalle-sous-Huy in Belgium. It's the 2nd Prefer plant equipped with a Quadra production unit.

vibrating press are the reasons why Prefer decided to renew its confidence in Quadra for this new project.

State-of-the-art and highly productive plant

The core component of the production unit is the Quadra 12 High Performance vibrating press. This press Q12 HP press uses 1,350 x 1,300 x 14 mm steel pallets to manufacture high quality blocks, slabs, pavers, and curbs at high production rates. In the production of hollow blocks, 18 blocks of 20/20/40 arranged per panel are produced every 13 seconds. This kind of press is standing out with advantageous technical features. Fixed on anti-vibration feet, its frame (one-piece with a reinforced base unit for heavy loads) minimize the distribution of vibration to the floor and reduce noise. This also reduces strain on the machine during production and eliminates the need for a pit underneath the machine or any civil engineering for the machine base. Thanks to its elevated and ventilated design, cleaning and maintenance are done safely and easily.

Vibrating press with decisive technical features

The vibrating features developed by Quadra are patented and allow its block machines to stand out thanks to their uniform vibrating behaviour.

The motorization of the system is located on the side, which allows direct access to the motors, isolating them from vibration stresses and thus guaranteeing the reliability and longevity of the equipment.

This configuration enables to differentiate the vibration parameters between the front and the rear of the mold during the filling phase. As a result, the distribution of the concrete and the density of the products are homogeneous. This pre-vibration system has a decisive advantage in obtaining products of uniform density and consistency over the entire surface of the molding pallet.

It also ensures accurate dimensional characteristics of concrete products with less than 1 mm height tolerance. The press is equipped with systems allowing the pallet and the tamper to be mechanically referenced during the final vibration. It guarantees a finished product with constant height corresponding to the distance between the pallet and the tamper.

During the vibrating cycle, the pallet is held automatically in reference thanks to retractable statics bars. To ensure the upper reference of the product, the tamper stays in the down position as soon as mechanical contact is made with the stops. The position of the tamper is remotely controlled from the control panel, so no manual intervention is necessary.

The Q12HP vibrating press manufactures high quality concrete products at high production rates.

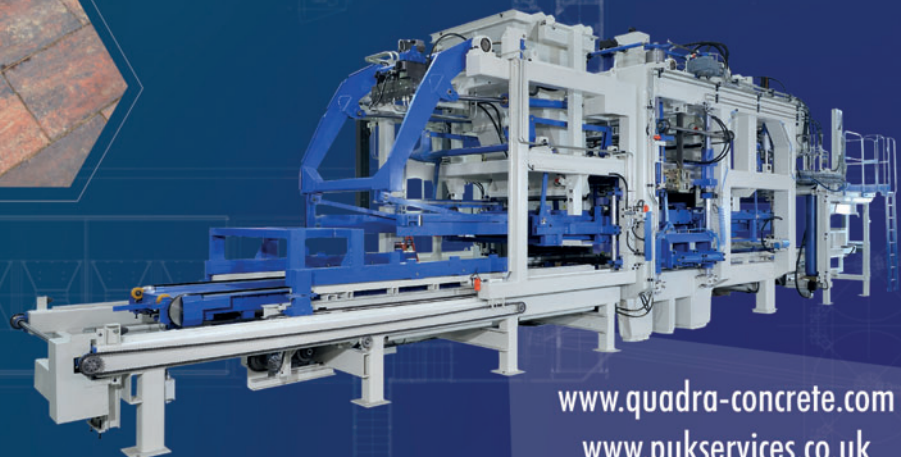


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Dry products transferred to the palletizing station.

These unique technical features developed by Quadra offer innovative manufacturing conditions. The synergy between electronics, mechanics and automation makes it possible to identify and adjust the optimal manufacturing conditions for each production cycle. This mechatronic developed by Quadra allows automated control of the machine during each cycle from filling to final vibration.

With its rigorous vibration characteristics, Quadra ensures a high quality of the manufactured products in terms of density, strength, weight and height in an optimal cycle time.

Handling system designed for greater productivity

Supplying the press with empty pallets is a priority to ensure high efficiency of the production unit. This is why an automatically managed storage has been set up between the production area and the palletizing area. It can contain up to 860 pallets. An automatic storage and retrieval system transports empty pallets in packs of 10 and ensures supply according to priorities.

The press output line transfers the pallets loaded with fresh products to the elevator where they will be stacked on 20 levels at 400 mm intervals. A finger car with rotative platform, carrying 20 pallets, performs storage and retrieval operations. This material saves a large building area and allows a rational steaming solution with optimal use of the area.



A storage of 860 pallets managed automatically by a storage and retrieval machine ensures continuous operation of the production unit.



A finger car with rotative platform, carrying 20 pallets, performs storage and retrieval operations. The curing area has a 4,920 pallets capacity and is equipped with a ventilation system.

The curing area can accommodate 4,920 pallets. It is equipped with a ventilated and humidity-controlled system to ensure rigorous drying and uniform conditions for curing and maturing of the products. The position of the finger car is continuously monitored by a laser and driven by servomotors for accurate platform positioning in front of the rails of the curing chamber, elevator and lowerator. Dry side conveyors of type walking beam allow the production pallets to be lifted and moved without friction. The handling and transfer of steel pallets have been designed and carried out to avoid noise and wear.

In order to keep up with the press speed and allow multi-format packaging, a 6-axis Kuka KR 1000 robot with a load capacity of 1,300 kg is in charge of palletizing. This robot is equipped with a pneumatic clamp designed, developed and manufactured by Quadra. Subject to continuous monitoring, the clamp fits all types of products and is sized to support heavy loads such as curbs. From the control cabin, the operator can configure the clamp by indicating the number of rows, the position of the products, their orientation as well as the number of products on each row. The products are then stacked on pallets.



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Equipped with 6 axes, the Kuka KR 1000 palletizing robot has a can load to 1,300 kg.

The shipping pallet buffer has a capacity of 144 empty pallets of 1,200/800 mm or 72 of 1,200/1,200 mm. Finished cubes are then strapped and evacuated on a slat conveyor. This conveyor can store up to 90 pallets outside the manufacturing building. Pallets of finished products can be removed for approximately 1,5 hours without requiring immediate intervention of a forklift to handle them in the park. This automatic pre-storage system offers flexibility and allows increased efficiency in terms of productivity.

Control station for greater product quality

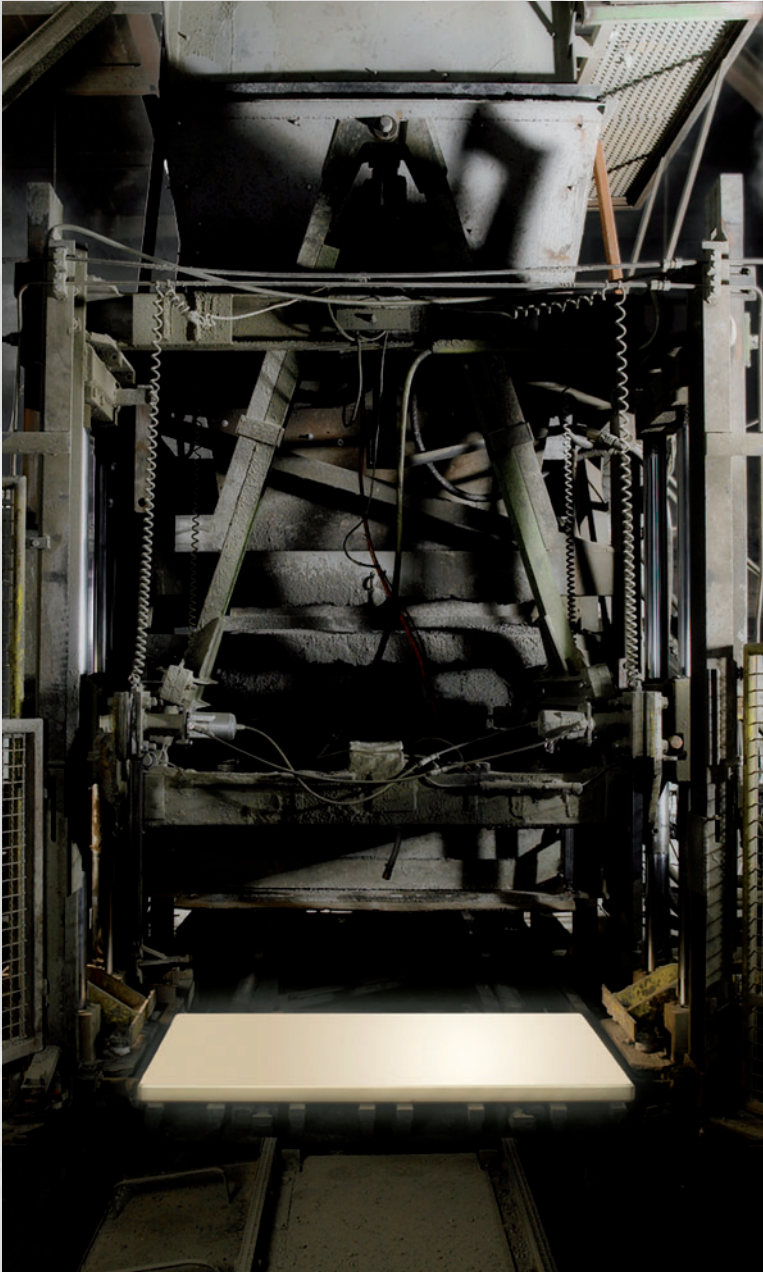
Prefer attaches great importance to the quality of its products. A control station has been set up on the fresh products conveyor. The integrated device allows the lifting of a pallet above the conveyor to human height and is accessible from a walkway. This temporary extraction of fresh products pallet to achieve control operation does not cause any production stop. Indeed, the pallets coming out of the press continue to reach the elevator passing below this station.



The shipping pallet buffer has a capacity of 144 empty pallets.






Conveyor for pre-storing up to 90 pallets outside of the production building.



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QUALITY TO THE POWER OF THREE.



Grinding machine located between the lowerator and the palletization area.

The quality control is done safely and this device allows the operator to take all the time necessary to carry out his controls. Once the check is complete, a reset button is activated to reintroduce the pallet into the line, again without causing production shutdown.

Block grinding machine for continuous and accurate machining

The grinding of concrete blocks was a requirement of Prefer's specifications. Depending on the use, concrete block is either mounted glued, or mounted dry and filled with concrete. The machining equipment, type "machine-tool", is ensuring concrete block height accuracy with a tolerance of less than 0.5 mm.

The grinding operation is performed in line between the lowerator and the palletization. A first robot picks the products up on the dry products conveyor to place them on the grinding machine conveyor which advances continuously. The blocks are moved by the conveyor under 3 successive diamond rollers, the first and second are roughing passes and the third is a finishing pass. Dry machining is carried out by tangential contact rollers. All grinding parameters can be adjusted and stored as recipes to match the machining of all types of concrete product. These adjustments are made from the control panel. Finally, a dust collection and treatment system has been set up to preserve the work environment. A safety cover helps to confine the dust which is directly vacuumed, filtered and then recovered outside the building. At the exit of the grinding machine line, another robot collects the products on the conveyor to palletize them directly.

Conclusion

With its new factory in Hermalle, Prefer is once again fully satisfied with its partnership with Quadra. In addition to the quality of service and support shown during the project study, Prefer has been enticed by the advanced technical characteristics of its new production unit. Quadra has succeeded in establishing the line in a functional and rational manner while



integrating the specific equipment required to meet the ambitious objectives in terms of product quality, production capacity and diversification.

With this new state-of-the-art concrete block plant, Prefer can now be part of a sustainable growth strategy. Modern, productive and personalized, this facility has been entirely defined according to the customer's requirements. All of the equipment provided enables to achieve remarkable production capacities and optimal quality of finished products. This new investment has allowed Prefer to increase its production capacities. ■

FURTHER INFORMATION



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