

Quadra, 74130 Contamine-sur-Arve, France

Highly versatile wet-cast machine: more than 100 different product references daily manufactured

Founded in 1949, the company Daulouede has progressively achieved a strong position as a leading manufacturer of concrete products in the South-West of France. Currently comprising 6 plants, Daulouede is specialized in manufacturing concrete fences, window sills and other concrete products designed for landscaping (slabs, pool coping stones etc...). As the key customer of the company Ateliers du Loir, Daulouede has naturally solicited the manufacturer of equipment Quadra that acquired the company Ateliers du Loir in 2010. This range of equipment is designed for perfectly performing the automated precast production of concrete products by means of semi-dry demoulding, wet-cast demoulding, and mixed wet and semi-dry production. Quadra applies its renowned expertise in automated processes and its longstanding know-how of manufacturing special machines in view of offering the most suitable manufacturing solutions for the concrete industry.

In order to expand its product portfolio as well as to pursue the most-advanced quality, Daulouede chose to replace the machine type "Optimal" set-up in the headquarters since 1981. A complete installation type "Difal 3300" along with a batching and mixing plant has been designed and commissioned by Quadra for manufacturing window sills and concrete fences of various dimensions. This production line is made up of one manufacturing station

equipped with an automatic concrete dosing system, one curing facility operating with a travelling crane, and one automatic demoulding and palletizing station equipped with a turning table allowing responsive palletization to each product family. The full automatization of this newly commissioned production line has also involved the integration of additional equipment that improves the work conditions of the operators.

The moulds that are used in the process are type ABS moulds or steel moulds, and are fixed within mould frames sized 3300 x 1050 mm, with a height varying between 80 and 144 mm. The flexibility of this production line perfectly meets Daulouede's production needs and its large range of products. Daulouede manufactures concrete products of various lengths from 80 cm to 310 cm.



Storage area of Daulouede located in the South-West of France



Type of products manufactured by Daulouede

Quadra: unique contact for the full-scale realization and commissioning of the new production line.

The preparation of the concrete and the regularity and consistency of its composition is a key step in the manufacturing process.

The production of the concrete used by Daulouede is demanding. This manufacturer has also chosen to assign one batching and mixing plant to each machine.

As for the commissioning of the "Difal 3300", Daulouede has entrusted Quadra with the design, the manufacture and the commissioning of the mixing plant, and has managed to have one single contact for the complete installation, from the raw materials reception to the palletization of the finished products.


This batching and mixing plant is equipped with a mixer type OMG P375 delivering 0.375 m³ of fresh concrete. Both of the cement silos are made of polyester, optimizing the cement flow and avoiding any humidity. The mixing plant is made up of 5 storage hoppers of 5 m³ each. The dosing



Batching & mixing plant

and mixing operations are fully automatic. The extraction of each bin is carried out by the belt conveyor. The weight belt Valrol allows water tightness, without any loss of material during the process.


The batching and mixing plant is controlled by PLC (programmable logic controller), the operator follows the mixing process in progress in real time and chooses the manufacturing recipe suited for every kind of product. It also provides various informa-






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WET CAST PRODUCTION LINE

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Manufacturing unit



Automatic mould filling system

tion regarding the filling of the aggregate hoppers and the silos, and all other elements affecting the quality of the concrete (hygrometry, fluidity etc.). The equipment delivered by Quadra is fully-galvanised and ensures the customer the best sustainability over time.

Manufacturing station

The manufacturing station of this plant is divided as follows: one automatic oiling station, one automatic dosing and filling station, one mould-waiting station, and one vibrating station. The moulds are transferred from one station to the other via an automatic trolley which moves the moulds and makes them travel up and down. All the operations are carried out simultaneously (in hidden-time) in order to get shorter cycle times.

The oiling operation is performed by a trolley that is moving lengthwise. This trolley is equipped with adjustable jet orientation nozzles. This operation is done by means of oil spray and ensures a uniform and consistent oiling over the whole surface of the mould. All parameters such as the volume of the spray, the flow of the spray, and the length of the oiling are adjustable. Capturing and filtration measures are set-up and allow mist aspiration that is spread over during this process. This additional equipment therefore preserves the environment and the atmosphere on the production side.

The mould that has just been oiled is then transferred to the filling station. The mobile hopper moves above the mould and ensures the automatic concrete loading. With a capacity from 1000 to 1500 l, this hopper unloads the concrete through two pneumatically-controlled operating gates.

Filling, it is performed by two concrete screws located below the hopper. Disposed on an electronic weighing system, the exact quantity of concrete is discharged into the mould (precision +/-100 g. This filling operation is actually effected by the simultaneous action of the rotation of the screws and the movement of the hopper in the length of the mould.

Once filled with fresh concrete, the mould is moved to the waiting station, and then to the vibrating station equipped with vibrating trestles that are fixed to the ground. The operator has access to the mould when it is on the vibrating trestles, and can introduce the steel armature. The mould undergoes a homogeneous vibration, and is finally transferred to the elevator for being stored before curing.

This elevator/lowerator system is a mould handling system designed for allowing very short cycle times. This involves a quick mould transfer on the production side. The elevator stores a stack of moulds with fresh concrete that will be transferred to the curing zone, while the lowerator loads the manufacturing station with empty moulds that will begin a new cycle.

The capacity of the elevator/lowerator can receive from 6 to 10 moulds frame according to the height of the products.

Product storing and curing: mould handling operated by travelling crane

The high flexibility of this new plant type "Difal 3300" offers the opportunity to use and handle different sizes of moulds.

The curing area is operated by a travelling crane. The travelling crane handles the moulds as follows:

- From the manufacturing station to the curing area: the freshly filled moulds that are stored in the elevator are retrieved by the travelling crane and placed in the curing area. They remain stationary for about 24h. Curing takes place directly in the moulds.



Automated mould storage

- From the curing area to the demoulding station:
located in the curing area, the travelling crane retrieves the moulds with dry products and loads them to the lowerator on the demoulding side.
- From the demoulding station to the manufacturing station:
further to the demoulding, moulds are transferred from the elevator on the demoulding side to the lowerator on the production side for beginning a production cycle.

All the handling operations ensured by the travelling crane allow high efficiency and high productivity. No manual mould handling is required, and every movement of the travelling crane is optimized.

The mould frame, sized 3300 x 1030 mm, has a variable thickness (144/120/90/80 mm) according to the kind of product manufactured.

The curing area can accommodate 600 support pallets divided into 23 stacks (17 stacks of 24 pallets, thickness 120 mm, 1 stack of 20 pallets, height 140 mm, 2 stacks of 32 pallets, thickness 90 mm and 3 stacks of 36 pallets, thickness 80 mm).

The curing area is controlled by PLC. This automation system enables the operator to view the position of the moulds in storage, to identify the date and the time of the manufactured products, and to choose which kind of moulds has to be filled.

Ensuring a precise curing time, the automation system will not allow the demoulding of products that are not dry. Finally, the stock status is available in real time, and can be analyzed by the client.

Demoulding station

The demoulding/palletizing station comprises one elevator/lowerator handling system, one demoulding crane with vacuums, and one turning table for palletization. The mould loading and unloading system works in the same way as the manufacturing station. The lowerator, which has been loaded by the travelling crane, ensures the unloading of the moulds with dry products for demoulding and palletizing. Then, the elevator retrieves the empty moulds and stock them before their transfer to the manufacturing station for beginning a new production cycle.



Demoulding/Palletizing station

The demoulding crane removes the products thanks to 2 rows of 8 vacuums. The vacuum is carried out by a vacuum pump that provides the necessary power for demoulding. During the demoulding process, the mould remains clamped.

Each row of products is demoulded simultaneously. The demoulding crane enables the manufacturer to palletize products vertically or horizontally. The transport pallets are set-up on a turning table which provides the possibility of removing the finished pallets with a forklift while the next pallets are still in progress, without any cycle interruption. Several light barriers provide optimum safety during operator access to the finished products. When the pallet that was in progress is finished, or when there is a production changeover, the turning table has a 180° rotation. The next production can therefore be immediately resumed.



Turning table

Conclusion: the machine type Difal solves the equation efficiency, versatility and work conditions

This machine type "Difal 3300" provides utmost versatility. It allows the manufacture of a large range of concrete products with wet-cast process such as concrete fences, window sills, coping stones etc.. More than 100 different product references are manufactured every day.

This machine provides ease of operation and maintenance. Driven by PLC programmed by Quadra's engineers, the machine adapts automatically the manufacturing receipts according to the molds that arrive.

Quadra is a leader in the design and manufacture of automated wet-cast machines. These lines of production are fully customizable and tailored according to the type of products manufactured. According to the customers' specification, Quadra is able to provide highly suitable solutions in terms of quality, product aspect, efficiency, rates, automation and work conditions. ■

FURTHER INFORMATION



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