

### CONCRETE PRODUCTS PRODUCTION PLANTS WITH TAMPING, VIBRATION & WET-CAST TECHNOLOGY

Kalkman Machinebouw B.V. is a 90 years old Dutch family-owned business, which has been concentrating its efforts on designing and manufacturing complete concrete products production plants during the last 60 years.



One of the first tamping machines.

We manage the entire process, from (mechanical and electrical) engineering to putting installations into operation.

We do not limit ourselves to production machines only, but also the handling of green products on pallets, moulds, stacking, curing and after-curing treatments, packaging etc.

Our starting points are maximum flexibility, minimum mould change times, ease of use, minimum use of "manpower" (we try to ensure, wherever possible, one-man operation of the complete installation), good accessibility for cleaning and carrying out maintenance work, etc.

We also pay much attention to the safety of the operator in combination with ease of operation to achieve the highest efficiency and output.

With tamping, cost effective production of material mixes can be achieved by using higher volume of finer aggregates like fly ash, lime stone, stone dust, stabilised earth concrete (SEC), recycled waste etc.

In addition as a result of the high compaction tamping system water absorption of the products is reduced substantially compared to standard vibration systems.

Furthermore, we will always try to find the best solution in each particular situation, suited to the customer's requirements.

Our work revolves around the concepts of "quality" and "quantity". Our main concern is to produce high numbers of high-quality concrete products. We take pride in our slogan:

## "KALKMAN FOR QUALITY AND QUANTITY"

The following pages are designed to offer you a better insight into our production systems.

# **PRODUCTION MACHINES**

We have developed various machines, each of which is suited to a certain type and quantity of products.

The machines can be divided into three categories:

A) Tamping Machines for processing semi-dry concrete (series KT)

B) Machines for processing wet-cast concrete (series KW)

C) Concrete product machines with vibration technology (series KV)

## A) Tamping Machines for processing semi-dry concrete (series KT)

In this type of machines, the moulds are mounted into a turntable, which turns around the various processing stations. The cycle time is starting from 7,0 sec. depending on the product specs and mix design.

This machine is available in two versions:

- Alpha II: with a double compaction (2 hammer system)
- Alpha IV: with a fourfold compaction (4 hammer system)



The most characteristic feature of these machines is that the products will be produced top down. This means that during the hammering process the faceplate rest on the steel anvil, which results in a high density of the product. This level of density cannot be reached by vibrating technology.

Both of these machines can be supplied with 4, 5, 6 or 8 processing stations. The basic machine has 4 processing stations: filling face-mix, filling backing mix, compacting and take-off device in combination with plate cleaning unit.

The above-mentioned standard machines can produce the following product sizes: 100x200, 200x200, 200x400, 150x300, 300x300, 300x450, 300x600, 400x400, 400x600, 500x500, 500 x 750, 600x600, 750x600 and 1200x600 mm (only with Alpha IV).

An indication of possible theoretical output for Alpha II is up to 1.250 m2 600x600 mm slabs or 1.150 m2 pavers 200x100 mm per shift. For Alpha IV the output is app. double. These figures are based upon experiences in Western Europe.





For **testing and small scale production** we developed a special machine **KT1H** with only one hammer. Filling and moving of the mould is done manually. A vacuum takeoff device is integrated. The maximum mould size is 600 x 300 mm and cycle time around 60 sec.

Advantages of the Tamping Machines:

The thickness adjustment mechanism enables the thickness of the products to be standard varied from 25 mm up to 80 mm, without mould change or change of other parts; higher thicknesses optional upon request.

The **moulds** used for the tamping machines have a long service life as only wear parts have to be changed. In addition we achieve excellent flexibility concerning height variations and designs by using customer designed matrixes and/or tamping plates.

Mold changes can be done in only a few hours after production during cleaning time. Essential is that once the molds have been in the machine and other exchangable parts are fitted the first time they always can be replaced at the same position. No extra time necessary for adjusting the machine!

As structural matrixes can be used special surfaces can be created which enables a large design flexibility for the customer looking for the production of added value products (pavers, slabs, bricks, blocks etc.).

### **Product Designs**



# B) Machines for the processing of wet-cast concrete (series KW)

Using machines for processing wet concrete, it is not only possible to produce products in various forms and sizes, but also panels, floor parts, attachments, ornaments, etc. The basic concept applicable to all these machines is that the concrete is dosed in a plastic or rubber mould, in which the product cures. The product is taken out of the mould after it has cured.



The moulds are placed in mould carriers, preferable steel ones. These mould carriers can be used in an (semi-) automatic system. The forms and or rubber mould, in which the products cure, are stored in a curing area. The product is taken out of the mould after it has cured. The forms and sizes of this system depend on the type of products that are to be made, and the resulting construction of the mould carriers.

Likewise, it is possible to automate the further processing of products. The manner in which this happens depends to a large extent on the product types. The transporting of stacks of mould carriers can also be turned into an automatic bypass system.

The maximum product format is "free". We experienced a maximum size of 1800x800 mm with thickness of 35 mm.

Cycle times depend upon the maximum dimensions e.g. the transporting time of the moulds. We realized a cycle time of about 10 sec. by producing 1 piece of 600x600 mm or approx. 1.000 m<sup>2</sup> per shift.

# C) Concrete product machines with vibration technology (series KV)

We also supply machines for the production of various concrete products by using vibration technology.

Our emphasis for those machines is as much technology as necessary and not as much as possible.

Our machines are highly robust. Integrated technology, especially regarding the hydraulic and electronic system, asks for extremely low maintenance, is easy to operate and may be repaired by local services where appropriate.

We offer various types of equipment.

The manually operated mobile block making machines (egg layers) **type KV12** produce 12 8" blocks at a time. A unit to place polystyrene inserts for better block insulation is also available.

The small (**type KV 5-20**) and medium (**type KV 12-48**) range stationary machines start with an output of approx. 720 m<sup>2</sup> of pavers or 7.600 hollow blocks up to 1.850 m<sup>2</sup> of pavers or 19.000 8" hollow blocks per shift. They can be operated with semi- or fully automatic handling systems by using forklifts or finger cars. The stacking of the production pallets can be done with legged pallets or normal pallets stacked in movable racks or automatic racking systems. The packing can be done with a manipulator or automatic cuber.



Machine KV 12

Machine KV 5-20



#### Machine KV 12-48

## HANDLING SYSTEMS

As we have already mentioned, Kalkman has always been a total supplier of production machines and handling machines for both freshly produced and cured products. Fifty years ago, our company already knew how to make highquality products: simply put down the freshly produced slabs on the surface and leave them to cure for 24 hours. Needless to say, this method requires more space and more investment than a system in which the slabs are placed immediately on their sides. However, our method has a number of advantages with regard to the composition of the mixture and dimensional stability. This helps reduce the percentage of waste resulting from cracks and rejects.



Optional fresh products can be turned 180 degrees and placed on the pallets with the face up.

#### - Pallets.

In our standard systems, the products are put down on specially constructed pallets. These pallets consist of a frame of box profiles with a steel covering plate.

For machines with vibration technology wooden pallets can be used also. We prefer pallets with dimensions 1400x950 mm for the medium size machine.

#### - Pallet handling systems.

With the passing of time, various handling systems have been developed for the abovementioned pallets. The operation of these systems is centred around the pallets being transported on a conveyer along the machine, where they are loaded up with fresh products (using the vacuum take-off device). The pallets are then stacked on top of each other and transported to the curing area. The stacking height depends on how the pallets are transported further. For this purpose a number of variants have been developed.





#### - Processing of cured products.

As described above, the pallets with cured products are transported back to a platform conveyer near the machine. Here, they are taken from the pallets with the aid of the vacuum or clamp take-off device.

#### Integrating more than one final processing line.



It is possible to integrate surface finishing processes for cured products in the overall system, mostly operated as stand-alone systems.

The tamping technology allows much stronger compaction so that any kind of post treatment activities / operations can be done much faster to save storage and handling cost.

### - Flat packaging.

In view of the increasingly stringent demands placed on working conditions during the manual handling of products, special equipment has been developed to aid mechanical paving. One condition is that the slabs are delivered flat, so that paving machines can easily pick them up. In preparation for this, we can provide additional equipment, enabling the slab manufacturer to deliver the slabs on their surface or on their sides.

### - Processing packages.

Once the cured products have been packaged, it is possible to process these packages in various ways. The basic method is to transport the packages on a packaging conveyer outside the building and to let a forklift truck with a clamp pick them up and transport them to the stockyard site. Another method involves taking the packages automatically from the conveyer.





There are two basic methods for further processing:

- stacking packages onto lorries.
- stacking packages in an intermediate storage area.

We trust that you will find the information to be of interest, but should you require further details please do not hesitate to contact us.

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