



## **Important Things to Consider When Selecting a Manufacturer**

When selecting a manufacturer to complete your permeable paving project, there are many things to consider. It is important to know how different manufacturers produce, pack, ship and install their pavers, as well as what specific colors, styles, shapes and textures they offer for different applications. These are a few of the top points to take into consideration as you make your decision – to help ensure you get the ideal product for your project.

### ***How are permeable pavers made?***

Concrete pavers are typically produced on hydraulic press machines that are specifically designed to produce permeable pavers using low slump concrete under pressure and vibration. While other machines that produce concrete block or retaining wall units can produce permeable pavers, they typically require more vibration and longer cycle times, which will result in a more costly product. Pavers can also be made as a precast product, or on presses that utilize a vacuum process, high slump concrete and vibration.

### ***What product requirements should pavers meet?***

Whichever process is used to produce a permeable paver, these products need to meet ASTM C-936 specifications for concrete pavers. This quality standard will assure that the product they are specifying will provide a durable and long-lasting wearing course for the application. Materials should exceed 7,200psi and have an absorption rate (density) less than 5%. These qualities will produce a pavement surface that will not only withstand fire truck loads, but also resist deterioration due to salts that is commonly associated with poured-in-place concrete.

### ***How do specific manufacturers differ?***

Manufacturers will produce pavers in a variety of shapes, colors and textures. They also will produce these pavers in layers, and then package and ship these materials in a cube configuration. This cube of pavers can then be manually installed, or mechanically installed with machines that are specifically designed to place the pavers with a clamping device. Engineers, designers, specifiers and contractors that are planning a permeable paver project need to be aware of the features and capabilities of a manufacturer, and the pavers they offer, in order to effectively utilize the correct product for the specific project.



In addition, price, quality and service are aspects of each producer that need to be evaluated as typically many offer two of these aspects but not all three. Residential and commercial applications will require materials and features that are unique to their markets. Additionally, manually placed pavers and mechanically placed pavers will have features that are unique to their applications as well.

***What are the different methods and machines that can be used to produce pavers?***

Different manufacturers produce a variety of paver styles – and while specific paver colors are subjective, typically all manufacturers will offer pavers available in a monochromatic shade or in blends of two or three colors. When these pavers are produced, they will either be sent to a kiln to cure, or air-dried. Then, they are stacked in layers to create a cube of pavers that are made ready to ship.

There are three specific types of machinery in which pavers can be produced on:

- **Stationary cube machines** produce pavers and then stacks them in layers as they are made, creating a cube configuration. This cube is then sent away as is to cure.
- A **traveling press** is another form of production that will make layers of pavers and then travel to the next station and create a layer and so on. When the end of the track is reached, the machine returns to the original position and commences to lay the second layer of pavers on top of the previous layer, until all the cubes in the track area are complete. These cubes then remain in position until cured the following day, when they are removed for packaging.
- A **single pallet or board machine** is the most common machine used. This produces a layer of pavers and then sends them away to a kiln for curing. The layer is returned to a cubing station the following day, and then packaged in a cube condition. These cubes can be made ready for shipping with plastic sheets (shrinkwrap), banded with metal or plastic bands, or both banded and wrapped. They may also be shipped with or without pallets.

***What is the difference between the manual and mechanical installation processes?***

**Manual installation** will accommodate all types of manufacture, yet contractors typically do not utilize the banded materials efficiently. Paver buggies are dollies designed for one person to move a strap (band) of pavers (40+) rather than picking up a stack of pavers (8-10). This will increase the productivity of paver installation where normal hand carrying pavers in stacks require two-three persons supplying pavers to laying face with one person to laying these pavers. A paver buggy will require one person moving bands of pavers to the laying face and then 2-3 people can lay these pavers – which will double or triple the productivity of this crew. And because the pavers are laid by hand, different color combinations can be inter-mixed.



**Mechanical installation** will allow for a layer of pavers to be placed on a setting bed with a machine that is specifically designed for paver installation. This process will increase the productivity of a crew by 4-8 times that of a manual installation crew. However, it will not reduce the number of persons on the crew. Typically, it will actually require additional people to maintain a constant material flow and placement of the setting bed materials.

When using mechanical installation, the requirements from the manufacturer will change dramatically:

- The dimensional size requirement will be restricted both from a mold wearing aspect to the vertical height consistency, and in most cases will exceed ASTM C-936 requirements.
- The color process will be limited to a blend or method for blending by the contractor in a layer format, as pavers cannot be laid in vertical stacks to inter-mix colors as they are in manual installation.
- The manufacturer will be responsible for testing and controlling material shipments in a sequence to accommodate mold wear. The manufacturer will also need to produce and ship the material on a job specific basis and cannot ship random production runs to a site utilizing mechanical installation.
- The pavers will need to be produced in the laying pattern specified for the project. The layer will need to be contractor friendly, requiring few to no stone exchanges. The layer needs to maximize the capacity of the machine mold, which will increase the productivity of the contractor in the field. *For example, paver layers that are 9sf/layer versus paver layers that are 12sf/layer will increase productivity 30% without increased labor and result in a lower installed price.*

Through increased teamwork among the design team, manufacturer and contractor, you will be able to create a finished permeable paver system that will be the most cost effective solution for stormwater management. One that will not only reduce the need for offsite treatment, but prove to be a long-term asset for the community as well.