
PERVIOUS CONCRETE

PRODUCT DESCRIPTION

FormCrete Pervious Concrete is a porous concrete paving material which permits rain and storm water run off to percolate through. It consists of 9mm to 12mm average diameter aggregates, hydraulic cement, admixtures and some proprietary additives. It is different from conventional concrete in that it contains no fines and is porous, hence it allows water to drain through and thus avoid ponding of water on its surface.

INSTALLATION PROCEDURES

Sub-grade and Sub-base Preparation

The top 6" of the sub-grade shall compose of gravelly soil that is predominately sandy with no more than a moderate amount of silt or clay. It shall be compacted by a vibratory compactor to a minimum density of 94%. The permeability of the sub-grade shall be no less than 1" per hour. Sub-base in the form of crushed stones or crusher run of 6" to 12" thick blinded with sand shall be placed and leveled as flat as possible over the sub-grade. The sub-base also acts as a retention space in providing extra area for water storage. In all cases, the study of the existing base soil conditions, specifications of sub-grade and sub-base, underground structural, drainage and other requirements, to receive the pervious concrete shall be recommended by an engineer specializes in hydrological design.

Formworks

Formworks shall preferably be made of steel or PVC hollow section of size 2"x4" (for 4" depth pervious concrete) or 2"x6" (for 6" depth pervious concrete). These two types of formworks are preferred as they are strong, straight and rigid enough to support the pavement and the leveling equipment without deformation. The edge of the completed pavement will then served as a form later when pouring new pervious concrete. Normal placement width is restricted between 10' to 15'.

Mixing

Pervious concrete shall preferably be mixed by means of concrete mixers or ready mix trucks at site as the mix must be used up immediately within 15-20 minutes after mixing. The mixing speed is controlled in such a manner which will result in 75 to 100 rotations before discharge.

Placing and Finishing

The sub-base should be wet thoroughly prior to the installation of the pervious concrete as this will help to cure the previous concrete during the curing process. It is to be noted that pervious concrete cannot be pumped, this makes site access an important planning consideration. The pervious concrete shall be deposited as close as possible to its final position as practicable such that fresh concrete enters the mass of the previously placed concrete in a homogeneous manner. An internal vibrator should not be used to consolidate the concrete as it will affect its permeability. Placement should be continuous; spreading action (with rakes and shovels) and striking off action (leveling with screed tools) should be rapid. It is recommended to strike off about 12mm to 15mm above the forms to allow for compaction. One technique to accomplish this is to attach a temporary wood strip above the form to bring it to the desired height. After strike off, the strips are removed and the concrete is consolidated to the height of the form by means of a mechanical vibratory screed



installed in lanes. It is also common to perform manual screed compaction using wood or aluminum floats if vibratory screed is not available

Edges at the pervious concrete near forms can be rounded off with a side edger and are compacted using a 300mmx300mm steel tamp (same as those used in stamp concrete), a float or other similar devices to prevent raveling of the edges. Further consolidation to the whole areas is accomplished by rolling over with a steel roller. The steel roller is made from a 10" diameter steel pipe of 6mm thick which shall have enough weight to provide a minimum of 10psi vertical force.

Joint Placement

Transverse control joints at a distance of about 20' apart shall be constructed within the pavement. The joint are to be installed during the plastic stage of the previous concrete after final compaction by mean of a roller with a flange welded to it (known as roller groover). Another technique is to drive a steel straightedge to the required depth with a hammer. The depth of the control joints shall be ¼ of the pavement thickness.

Curing and Protection

As soon as possible and within 15 minutes after compacting and joint placement, the pervious concrete should be misted with water and covered with impermeable plastic sheets of 0.6mm thickness. The plastic sheets shall cover all exposed concrete and overlap the edges and secured in position by steel rebar, wood sticks or other means. It is recommended that the pavements are to be cured and opened for traffic only after a minimum of 7 days. Additional wetting on top of the plastic surface should be done during the 7 days and continuous curing is recommended until the pavement is opened.

Sealing

Non-film forming sealers can be applied on the surface of the previous concrete to create a more uniform and a more beautiful wet look appearance. It also helps to minimize the patchiness on the surface after removal of the curing plastic sheet. However, care must be taken to ensure that the sealer dose not clog the pores. The most commonly used and most versatile sealer for external application is solvent based acrylic sealer.

MAINTENANCE

All pavements require some forms of maintenance depending on its location and the intensity of traffic. Pervious concrete usually requires some attention in cleaning and removal of particles dropped into the void. The best way to clean the surface and to remove particles from the open cell is to use street sweepers which combine the brushing operation with vacuuming. Pressure washing can also be used to clean the surface and to remove mold or algae. At areas where oil and grease stains are serious, oil-eating microbes may be included during the cleaning and maintenance operation.

OTHER DESIGN CONSIDERATIONS

Pervious concrete pavement can be used in combination with other pavement materials to create visual attraction. For example, coloured stamp concrete boarder, bloomed finished coloured concrete boarder, washed pebbles or other finishing boarders can be used around panels of pervious concrete to complement the overall setting.

