High Permeability Pervious Concrete

Pervious concrete is a high porosity concrete composed of Portland cement, coarse aggregates, water, and admixtures. The combination of these ingredients will produce a hardened material with interconnecting voids of 2 to 8 mm size. This type of concrete allows for the precipitation of water and other sources as well as for air to pass directly through the sub-base, thereby reducing the runoff from a site and allowing for groundwater recharge.

Pervious concrete is a green building alternative suitable for better storm water and land utilization management. It reduces soil erosion and allows for the filtering of deleterious materials. The drainage rate will normally hover around 700 L/min/m². Local vegetation is allowed to thrive with reduced drainage requirements. Typical applications include parking surfaces, areas with light traffic, residential streets, courtyards, drainage areas, pedestrian sidewalk embankments, tennis courts, swimming pool decks, patios, greenhouses and zoo areas.

The high porosity of pervious concrete is attained from the highly interconnected void structure. Typically pervious concrete has little or no fine aggregates and has just enough cementitious paste to coat the coarse aggregate particles so as to preserve void interconnectivity. The limestone aggregates used must be properly graded to achieve an air content structure in the 20% to 35% range. Water cement ratios in the range of 0.25 to 0.35 are normally used to foster the structure.

To achieve such low water cement ratios, Holderchem provides contractors with efficient high-range and mid-range polycarboxylate based admixtures, which can be adapted to meet climate requirements. SBR latex may also be used to enhance mix design performances.

The low water cement ratio and high void structure tend to speed the hydration process hence making placement difficult. Hydration-controlling admixtures can be incorporated in the mix design to slow down the hydration process as well as rheology modifying admixtures to make the concrete more manageable by their fattening and lubricating effects.

Typical low slump concrete challenges stem from the need to add water on site to discharge the material from the truck, the stiffening and loss of workability from fast cement hydration and the difficulty in placing the concrete. The Holderchem solution to resolve these challenges allows for the easy discharge of trucks by increasing the mix flowability without having to add water and thus without any adverse effect on compressive strength.

Pervious concrete should meet the requirements of ASTM C 1688, which defines the requirements pertaining to density and void content of pervious concrete, and ACI 522 R06. Holderchem provides customers with assistance in the optimization of their mix designs, upon request.

The Batimix admixture pervious concrete system includes the following components:

**Batimix HWR 1500**, a high-range water-reducing admixture that is designed to provide adequate dispersion of the cement particles to achieve better hydration with low water
content. The air void structure of pervious concrete negatively affects strength, but to a large extent loss of strength is compensated by lower water cement ratios.

**Batimix Retarder 210**, a hydration-controlled admixture that is used as a stabilizer to slow down the hydration process and extend the mix workability thus doing without the need to add water on site.

**Batimix VMA 510**, a viscosity-modifying admixture that is used to facilitate the pumping process and prevent the paste drain down of low slump mixes, thus enhancing mixture flowability and cohesiveness.

**Batimix Retarder 220**, a rheology-controlling admixture that is used to lubricate low slump mixes and ensure suitable flowability for discharging concrete from trucks and for better concrete placement and compaction.

**Batimix Pervious Concrete 501**, a ready-to-use product that only requires the mixing with water on site. Major benefits include consistent properties of the fresh and hardened products, reduced bleeding and segregation, improved dimensional compatibility, good degree of adhesion to existing substrates, and high level of water penetrability.