



# PERVIOUS CONCRETE



## WHAT IS PERVIOUS CONCRETE?

Portland Cement based Pervious Concrete (PCPC) is composed of portland cement, coarse aggregate, water, and admixtures. The lack of fine aggregate causes the concrete to have a void structure, which allows liquids and air to pass through the concrete and into a sub-base or collection pond. While Pervious Concrete can be more difficult to place, The Euclid Chemical Company has developed a system of chemical admixtures to help produce, place, and level this unique type of concrete.



### APPLICATIONS:

Sidewalks  
Parking Areas  
Residential Flatwork  
Drainage Areas  
Courtyards  
Embankments

## WHY SHOULD WE USE PERVIOUS CONCRETE?



- Green Building alternative suitable for many applications
- Natural run-off allows rainwater to drain directly to sub-base
- Reduced construction requirements for drainage structures
- Reduced pollution prevents environmental damage
- Protects streams and lakes and allows local vegetation to thrive



The ability of PCPC and the sub-base to filter deleterious materials dramatically reduces the effects of damaging chemicals, such as gas and oils, to the environment. Once the chemicals are trapped in the concrete and sub-base, biological activity breaks these materials down into their natural harmless form. Also, PCPC reduces the amount of local erosion being caused by runoff from conventional concrete structures. The EPA recognizes pervious concrete as a Best Management Practice (BMP), and building owners and designers are realizing more efficient land utilization while acquiring LEED credits through the use of pervious concrete structures.





## HOW DO I MAKE PERVIOUS CONCRETE?



### HRWR/MRWR and Polymer Admixtures

Our high efficiency polycarboxylate based high range and mid-range water reducers make mixing and placing Pervious Concrete easy. The extremely low W/C ratios required, coupled with the very low workability inherent with Pervious Concrete can make it a labor-intensive task. Our new generation **Plastol** and **ProFinish** line of water reducers will allow the producer to maintain the W/C, and still provide a mixture that is easy to place and level in all climates. Performance benefits have also been experienced with the use of specialty polymer additives.



### Rheology Modifying Admixtures

Euclid's **Eucon ABS** and **Visctrol** can make Pervious Concrete more manageable. These admixtures give the cement paste more of a 'body', and lubricate the cement particles. **Eucon ABS** and **Visctrol** also help keep the cement particles on the aggregate. Pervious Concrete mixtures can have a tendency to experience 'cement paste drain down'. The 'fattening' effect of these admixtures keep the cement particles adhered to the surface of the aggregate, helping to maintain the air void structure integrity.

### Hydration Control Admixtures

Pervious Concrete has a low water content and a high void structure. These factors allow ambient conditions to have more access to the cement paste and sometimes the cement particles tend to hydrate too fast to allow for time of placement. **Eucon W.O.** and **Eucon DS** will lessen this effect dramatically. These admixtures extend the working time of fresh PCPC even in the harshest of climates.



### PLACING PERVIOUS CONCRETE



### JOINTING PERVIOUS CONCRETE



### CURING PERVIOUS CONCRETE





## GETTING STARTED

**PERVIOUS CONCRETE** is a very design dependent mixture and should achieve a 15-25% air void structure. Aggregate gradation is one of the key elements of a successful project. The aggregate must be clean and appropriately graded. 3/8" 'rounded gravel' or limestone is typically used. Cement contents vary but generally fall in the 500 – 650 lb/yd<sup>3</sup> (300-385 kg/m<sup>3</sup>) range. Water content is kept as low as possible in order to maintain the void structure - approximately 0.25 – 0.32 water:cement is used. *The Euclid Chemical Company* manufactures and supplies various admixtures to aid in the production, placement, leveling, and curing of pervious concrete.

### TYPICAL MIX DESIGN

Material	(lb/yd <sup>3</sup> )	(kg/m <sup>3</sup> )
Cement	600	356
Coarse Aggregate 3/8 Limestone	2600	1543
Water	160	95
w/cm	0.27	0.27
Euclid Admixtures	(oz/cwt)	(mL/100kg)
Plastol 5500	2.5	163
Eucon W.O.	4.0	261
Eucon ABS	8.0	522

### TYPICAL CONCRETE PROPERTIES

Plastic Properties	(lb/ft <sup>3</sup> )	(kg/m <sup>3</sup> )
Density	125	2000
Air Void %	25	25
Hardened Properties	(psi)	(MPa)
Compressive Strength		
7 Day	1610	11.0
28 Day	1970	13.6
Flexural Strength		
28 Day	505	3.5

### Applicable Standards and Specifications:

- ACI 522 R06 - Pervious Concrete
- ASTM C138 - Density, Yield and Air Content



The Euclid Chemical Company has certified personnel, trained by NRMCA, for assistance in the design and placement of Pervious Concrete.

Cover Photo: Heritage Bomanite parking lot, Fresno, CA



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An RPM Company

**The Euclid Chemical Company**, founded in 1910, is today a worldwide supplier of quality products and services for the concrete and masonry industry. Marketed under the EUCO name, we offer a full line of admixtures, repair and maintenance products based on the latest technologies. We provide complete specification assistance and laboratory support as well as on-site service for guidance on proper product usage. EUCO materials are warehoused in over 200 locations in the USA and are available world-wide through international affiliates.

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