ecoBETON®

Vetrofluid®

Concrete roads and airport pavement.

HANDBOOK FOR PROFESSIONAL PRACTICE - REVIEW: 02 OC

PLEASE NOTE:

This document extends the technical data sheet of Vetrofluid® regarding its application on concrete roads and airport pavements. Please refer to the datasheet for all the information and data about other types of application on concrete. Some application procedures in this document are specific to pavement with high traffic and could supersede the information contained in standard technical datasheet.

Purpose of using the product:

Vetrofluid® is a deep penetrating sealer for concrete. It penetrates into the concrete and reacts with the alkali of the cement, growing the silica matrix and filling up the micropores of concrete. The treatment is wholly inorganic and the reaction is permanent.
Vetrofluid® will fill up to 98% of porosity for a depth up to 40mm, depending on the age, composition, mix-design and pollution condition of the concrete.
Vetrofluid® will seal and waterproof the concrete from both positive and negative side, i.e. from rising damp through the slab. It significantly improves the concrete resistance to deicing salts, freeze-thaw cycles, chemicals, weathering in general.
Vetrofluid® reduces the penetration of rubber from aircraft tires at the ends of a runway so that in extends the time between necessary maintenance.
Vetrofluid® seals the concrete against rising damp, extending the lifespan of painted marking as well as the durability of concrete repairs to the runway or road.
Vetrofluid® provides the necessary protection against the penetration of oils and chemicals like deicing agents.

Use in green concrete:

One of the most exciting properties of **Vetrofluid®** is its use on freshly placed concrete, just after the concrete set. In this case, the product will also act as a membrane curing layer, protecting the surface from early evaporation and reducing the risk of plastic shrinkage cracking significantly. It is worthy of knowing, according to European norm EN 13670:2010, that curing does increase surface strength and durability. In annex F, the norm defines four curing classes: class 2 corresponds to a surface concrete strength equal to 35% of the specified characteristic strength, while class 4 corresponds to 70%. **Vetrofluid®** will definitively help to achieve the top curing class, and so the maximum surface strength.
Moreover, by convention, the compressive strength of concrete is measured at 28 days; experience has shown, the maximum chemical resistance of concrete is achieved not before six months from the cast. Curing and protecting the green concrete in the early stage is crucial for improving the durability of the pavement.
Vetrofluid® does not form any film or debonding layer allowing the application of any subsequent products without special preparation except those provided in the relative technical data sheets.

Types of concrete:

Vetrofluid® reacts with the cement contained in the concrete matrix. The result is an improvement of the performances, both mechanical and chemical, in per cent value; this means that the most remarkable improvement will happen when more cement is present in the mix. Any structural concrete (concrete of class C25 and higher) is a suitable candidate for application. All the tests and data refer to Portland cement concrete; however, experience has shown the use of concrete made of any cement, including Portland cement blend, calcium aluminate cement, calcium sulfoaluminate cement and others.
In lightweight concrete, drainage concrete, or any other type of high porosity concrete, the effects of the treatment are limited. In overly damaged concrete, for example in concrete subjected to heavy acid attack, the damaged surface should be removed completely before the application.

Cracks and fissures:

Concrete has an autogenous healing capacity as unhydrated cement is present in the matrix. When water gets in contact with the unhydrated cement, further hydration occurs. Furthermore, dissolved CO_2 reacts with Ca^{2+} to form $CaCO_3$ crystals. The treatment with **Vetrofluid®** promotes and extends the autogenous healing capacity, sealing cracks up to 0.5mm wide. Fissures wider than 0.5mm should be mechanically opened and repaired with an appropriate system, depending on the nature of the crack. The treatment with **Vetrofluid®** can be done indifferently before or after the reparation.

Application of the product:

The preferred application is that of spraying, using low-pressure pumps. Suitable devices for spraying are handheld pumps, like the ones used to apply release agent on the concrete formworks, or any mechanical machine of the type used in agriculture to spray treatments, e.g. on vineyards.
Two or more coats are recommended, crossing the direction of application. The second coat could be applied as soon as the first coat has dried up, usually after 2 hours in normal environment condition. Cold weather or cold substrate could dramatically slow down the reaction time.
The substrate could be either dry or moist, but not wet with puddles on the surface. On aged concrete is recommended to damp the concrete before application, such as water-pressure cleaning the day before the treatment. Water will help with the penetration of the product.
Application over painted marking, lighting, drains, tip or other infrastructure elements usually does not lead to any problems. Protect glass, glazed surfaces and aluminium during application (watches, glasses, windows, etc.) as the product can damage them.

Application data sheet- - Vetrofluid® for concrete roads and airport pavement.

Dosage and yield:

The absorption and porosity of concrete pavements may vary a lot, also depending on the age of the structure; the average yield is about 400 grams per square meter, in two coats (ca. 200 g per coat). The dosage can be reduced up to 200 grams per sqm in total, always in two coats, when the support is less absorbent, for example, when a dry-shake floor hardener has been used. When chemical resistance has to be enforced, the treatment must be carried out until saturation, in several coats. If in doubt, we suggest testing a small area to determine the optimal dosage of the product.

Overdose and skid resistance:

With standard application procedure, the product should penetrate completely into the concrete without leaving any residue on the surface. There is no reduction of skid resistance. The reduction of concrete water absorption could lead to a more significant effect of water planning, even if in practice, no impact has ever been observed. Overdose of **Vetrofluid®** may result in the formation of puddles of products, that will eventually turn in white glass in the surface. To avoid this effect is sufficient to rinse the surface with water about 2 hours after the last coat of product. After the reaction, if the glass forms on the top of the concrete slab, use a mechanical device to remove the product (grinding, sandblasting or other).

Opening to traffic:

Traffic may be allowed as soon as the product dry on the surface. The reaction will continue several days after application, inside the concrete. The product is rain-free after 2 hours from application, in normal temperature and humidity condition. To achieve the desired chemical resistance or the resistance to water pressure, wait for the full curing of the product, about 4 to 5 weeks.

Subsequent treatment (painting, repairing, etc):

Water-based products like paints or cementitious mortars could be applied as soon as **Vetrofluid®** has dried, in normal condition after 2 hours from application. For the application of resins or solvent-based products, a minimum of 7 days is requested.
Particular attention should be paid to those floors that can be contaminated by deicing salts, chemicals, oil or concrete slabs with symptoms of rising damp. Healing those surfaces needs time, and coating them before the process is finished may lead to delamination, blistering or other failings of the paint or overlay.
On polluted surfaces to be overlayed, a pre-treatment with **Ecobeton Degreaser** is highly recommended. After the application of **Vetrofluid®** on contaminated concrete, the residual activity of rising substances (salts, oil, etc.) of at least one week is expected. Proceed with a water-pressure cleaning after 7 days before overpainting or overlay.
When active rising damp is present, always test the surface one week after the treatment with **Vetrofluid®** and before overpainting. If necessary, repeat the treatment until the rising damp is completely solved.

Other information:

Please feel free to contact our technical staff for any further information, write an email to info@ecobeton-usa.com

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