ATEX
Nº 2642
CSTB
Centre Scientifique et Technique du Bâtiment

ECOFREEPLAN®

The ultimate eco-responsible and sustainable flooring system

VRS Technology (Volumetric Retraction Stability)

For high performance and low maintenance concrete floors.

RCR
Flooring Applications

ECOFREEPLAN®

The latest technological and environmental developments in industrial flooring.

Advantages of the system:

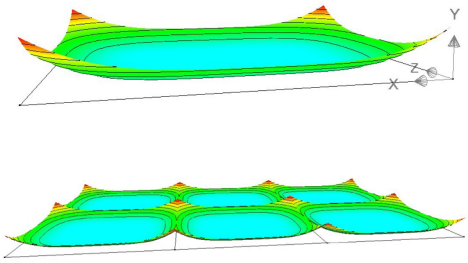
Execution of jointless large panel slabs

With **ECOFREEPLAN®** we can build monolithic slabs up to 2500 m2 without saw-cut joints. The system uses a new generation of additives, LINK EVR®, combined with steel fibres, stabilizing the volume and dimension of the slab.

Eliminating 90% of saw-cut joints improves usage and allows **full flexibility** in terms of storage and traffic for all types of forklifts. It is the optimal solution for automated warehouses with high traffic, especially large logistics platforms.

Geometrical flexibility for the planning of concrete pours

ECOFREEPLAN® allows irregular shapes (width to length ratio >1.5) such as walkways, platforms, without the need for saw cut joints. Therefore, it is possible to optimise the distribution of slabs panels for each individual project, adapting the shape of the slabs to the geometry of the building or the location of obstacles (posts, walls, etc.). It **increases productivity** while reducing the cost of construction joints.

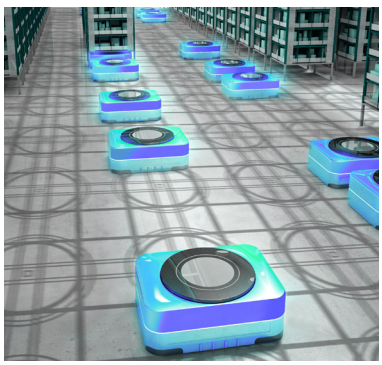


Curling control

ECOFREEPLAN®, with the use of LINK EVR® will result in a reduction in "curling" or warping at the edge of slabs. By counteracting the lifting along the construction joints, this results in greater slab performance while avoiding issues caused by excessive curling. Furthermore, this allows efficient use of trucks at maximum speed and in certain configurations, we can **optimize the thickness of the slab** during the design phase.

True flatness regularity

ECOFREEPLAN® helps achieve an accurate surface regularity with large panel pouring methods. The uniform setting time and the limited shrinkage **maintain the flatness characteristics** over time and beyond the initial recorded performance, as required by standards such as (EN, DIN, TR34, ASTM). In addition, this system meets the new requirements for automated platforms (ASRS, AGV, AMR).



Fewer joints, better performance

ECOFREEPLAN® substantially reduces the opening of the joints, which limits impact and premature wear of truck wheels.

This minimises vibrations and ensures greater comfort and safety for operators.

The **PERMABAN*** joints included in the **ECOFREEPLAN®** system have a triple function:

- Leave in place formwork to **confine the slab** during the expansion phase of **LINK EVR®**, ensuring precise slab lifting and controlled opening between two adjacent slabs.
- **Load transfer** designed according to traffic and lateral movement without swinging, due to the dowel systems placed in the centre of the formwork(*).
- **Joint edge protection**. Joint edge are protected by steel reinforcement (Alphajoint®) Or are protected by a triple wave steel plate (Permaban Wave). **Non-impact joints** not only protect the construction joint, but also the vehicles and forklift operator as they are not affected by impact or vibration. This generation of disruptive profile joints is ideal for the transportation of fragile products and autonomous vehicles.

(*) PERMABAN joints are CE marked CE

A more durable surface

The **ECOFREEPLAN®** system recommends the application of **ROCLAND QUALITOP VRS** surface hardener. This surface hardener offers maximum abrasion resistance (AR 0.5) and addition of **LINK EVR®** reduces the appearance of microcracks. Link EVR® is thinner than cement creating a less porous, more impermeable surface that is **easier to maintain** (less likely to stain and provides greater resistance to liquid penetration), aiding the cleaning process by limiting the consumption of detergent products.

The use of a light-coloured hardener (white or light grey) provides better **reflectivity** and reduces the lighting requirements of a building, consequently **saving energy**. A DRT Polish final treatment can be applied to increase the brightness and improve the energy performance of the building.

A green system

Optimized thickness and reinforcement will result in lower material consumption and production costs, leading to a significant reduction in the carbon footprint of the flooring.

This balance is improved using high-performance steel fibres recovered from the metal reinforcement threads for tyre rubber, contributing to **circular economy**.

These fibres allow a 95% reduction in carbon footprint compared to conventional reinforcement. In addition, the LINK EVR® used in the system is an excellent **CO2 absorber** (707g CO2 absorbed/Kg of LINK EVR® used).

The Permaban joints are manufactured under the disciplines of ISO 14001.

Rocland's hardeners are also **LEED v4 (Leadership in Energy and Environmental Design) certified**.

Following the recommendations for a clear and **highly reflective hardener** (see previous chapter) the result is even more spectacular.

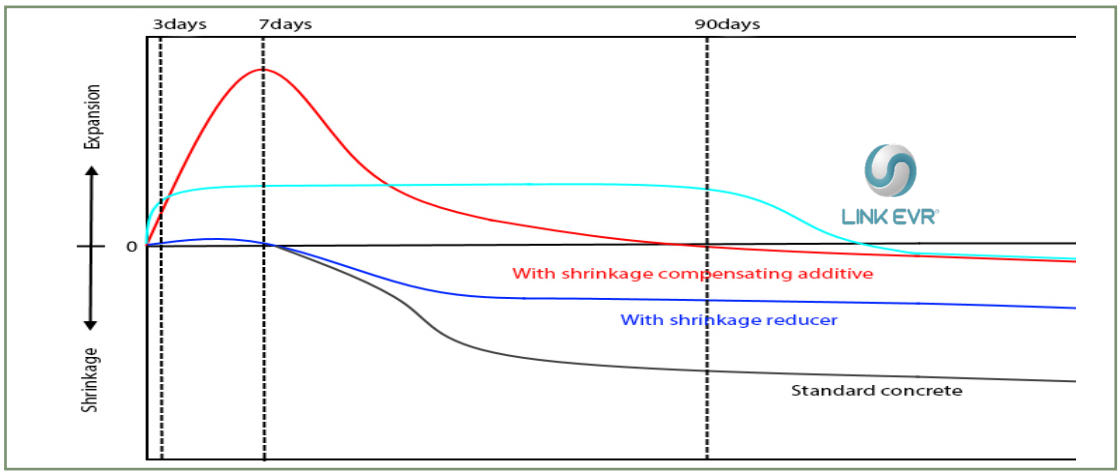
These properties make ECOFREEPLAN® **the most environmentally friendly building system**.

The energy balance and the savings obtained are submitted on request to be included in a file of **environmental excellence** (BREEAM, LEED, HQE, ...).

VRS technology: How does it work?

General concepts

This innovative technology is part of the family of shrinkage compensating concretes. The addition of the unique LINK EVR® additive allows for rapid initial expansion limited to the first three days. The main effect is observed during the plastic phase, followed by a long period of stability during the hardening phase (60-90 days) and finally a delayed shrinkage that compensates the initial expansion. The purity and homogeneity of LINK EVR® contributes to the stability of the results in different environments and in a wide variety of cements and concrete formulations.



The volume of the slab remains constant from the first days until the concrete achieves its full mechanical characteristics, the slab can then undergo moderate shrinkage of the same order as the initial expansion.
This characteristic differs from that of conventional compensated shrinkage concrete (see comparison curve). The fact that the expansion is smaller and concentrated in a shorter period considerably reduces the internal tensile effects during the drying phase and, therefore, does not require any steel bars to control the expansion and contraction phases.
This allows an optimization of the reinforcement system, using metal fibres to reinforce the concrete.

Preliminary study

The **design phase** is carried out by Monofloor consultants.

How to design?

The calculations established by Monofloor define, on the basis of the **essential data** collected for the work (quality of the platform, loads, environment...), the thickness of the slab, the correct dosage of the LINK EVR® and the metal fibres according to contractually recognised and experimentally validated methods.

Formulation of the concrete

After analysing and evaluating the materials available in each geographical area, Monofloor engineers optimise and validate by testing the concrete formula for each project, according to the necessary adjustments (cement class, composition, additives, granulometric curves).

Design and supervision

Monofloor also defines the specific details of reinforcement, construction methods, concreting phases and control processes.

Guarantees

Monofloor provides its **professional insurance policy** and offers its experience in hundreds of large projects in more than 15 different countries (3 million m^2). The possibility of taking out a **5-year insurance policy** with an international insurance company has also been agreed.

CSTB
le futur en construction

This innovative technique is recognized and certified within the framework of the ATEx CSTB: 2642_V2 (Experimental Technical Opinion) according to the French building certification framework CSTB (Scientific and Technical Centre for Building).

Exclusive ALL-IN-ONE system offered by RCR Flooring Applications

RCR Flooring Applications

- RCR Flooring Applications companies and their partners operate in over 40 countries
- Highly qualified teams with international experience in concrete and resins
- Controlled construction procedures and methods and high finishing requirements
- State-of-the-art equipment (Laserscreed®, spreaders, mechanical polishers)
- High performance and on-time delivery
- More than 6 million m2 built each year, creating value for the end user

RCR Flooring Products

- PERMABAN Construction joints
- ROCLAND Surface hardeners
- RINOL Synthetic coatings and curing agents
- Volumetric Control Additive LINK EVR®

Well-known brands sold in more than 50 countries

RCR Flooring Services

- MONOFLOOR industrial flooring consultants

Conception & design – On-site QA supervision

Surface regularity control – BIM management

- PERMANEO Maintenance – Repairs – Flooring renovation
- FLOOR DYNAMICS – 3D Floor Mapping – wet scan

The ECOFREEPLAN® system will be the most efficient for

- Intensive logistics and heavy industry
- Automated or robotized warehouses (eCommerce)
- Height storage systems(Very narrow aisles - VNA)
- Refrigerated and low temperature rooms
- Agrifood
- Recycling and waste treatment - Bulk storage

EUROPE

Spain:
Rinol Rocland Suesco, S.L.U.
C/ La Marga s/n
Pol. Ind. Ntra. Sra. del Rosario
45224 Seseña Nuevo (Toledo)
+34 91 801 29 21
www.rinol.es

Portugal:
ASIC, Pavimentos Industriais
Rua do Monte - Touria
2410-477 Pousos (Leiria)
+ 351 244 817 100
www.rinol.pt

France:
Placeo, Francia
59 Rue de l'Abondance
69003 Lyon
+33 4 75 48 37 50
www.placeo.eu

Czech Republic:
J&B
Strojírenská 2345
250 01 Brandýs nad Labem
Czech Republic
+420 606 085 692
www.jab.cz

LATIN AMERICA

Bolivia:
RINOL BOLIVIA
C/ Chaco, 50. Barrio Ramafa
Santa Cruz
+591-3 352 6517
www.rinolbolivia.com

Chile:
Rinol Hormipul, Chile
Avenida Colorado 581
Parque Industrial Aeropuerto
Quilicura, Santiago
Región Metropolitana
+56 2 23936100
www.rinolchile.com

Colombia:
RINOL PISOCRETO S.A.S Colombia
150 m Glorieta Siberia-Cota
Complejo Logístico Industrial
Siberia Bodega E 10. Cota
Cundinamarca
+571 8766299
+571 8766257
www.rinolcolombia.com

RCR Industrial Flooring headquarters
C/La Marga s/n
45224 Seseña Nuevo (Toledo)
+34 91 801 29 21
Spain

info@rcrindustrialflooring.com
www.rcrindustrialflooring.es

Ecuador:
Rinolpavimenta Ecuador S.A.
Av. 12 de Octubre N26-97 y Calle Abraham Lincoln
Edificio Torre 1492 Piso 12 Of. 1201
Quito
+ 593 02 2484953
www.rinolecuador.com

Mexico:
RINOL México S.A. de C.V.
Calle Maricopa 10 int. 701
Col Nápoles - Del. B. Juárez
03810 Ciudad de México
+ 52 (55) 5523 7480
www.rinolmexico.com

Panama:
RINOL Panamá S.A.
Ofi. Bodega G5-1, Panamá Viejo Business Center
Ciudad de Panamá
+507 396 3515
www.rinolpanama.com

Paraguay:
Rinol SA, Paraguay
Tte. Rolón Viera, 2596 C/San Rafael Lambaré
Asunción
+595 21 562046
www.rinolparaguay.com

Peru:
Rinol Pavimenta, Perú
Av. Las Gaviotas 146
Urb. La Campiña Chorrillos
Lima
+511 252 4179
www.rinolperu.com

Uruguay:
RINOL URUGUAY
21 de Setiembre 2938 of 602
Montevideo
+598 27121194
+598 97051102
www.rinoluruguay.com

AFRICA:

North África:
A2S Rinol Rocland, Marruecos
72, Résidence Al Hadika 4º
Aîn sebaa - 20250 Casablanca
Morocco
+21 25 2234 5960
www.a2srinolrocland.com

South África:
RCR Flooring Applications South Africa (Pty) Ltd.
19 Goud Street
Goedeburg, Benoni 1501
South Africa
+27 (0) 87 943 2397
www.rcrflooringapplications.com

RCR Flooring Applications

Leaders of the flat world