

## Create aesthetic and durable solutions for your concrete structures

### Dramix® Green: a fresh approach!

Durability of the concrete has been and remains a very hot topic in the construction business for many years now. Several studies have shown that corrosion is the world's leading cause of damage in reinforced concrete. That is why we need to evolve more to an environment in building construction, where long-term performance is standard. At the same time we also want to see structures which are

aesthetically pleasing, with a clean look. **We understand that these demands are stretching you to the limit. But how can you face these challenges in a structured way?**

Let us show you how some of your fellow producers and engineers are dealing with these issues today ...



**Engineer Bernardino Chiaia**  
Professor Structural Mechanics at  
Politecnico di Torino  
Italy

“A survey confirmed the excellent results of the Dramix® Green steel fibres. After 2 years, both tunnels are still free of any cracks or rust spots.”

In 2004 I was consulted by the construction company Baldassini & Tognozzi S.p.A. for a two tunnel project near Turin. The tunnels had to be ready for the Winter Olympic Games 2006 in Turin, so time was extremely important. Thanks to Dramix® Green we were able to build the tunnels 3 times faster than anticipated and it offered our customer important economic benefits.

According to the new seismic law in Italy, this tunnel area was classified as a class 2 seismic area. The original project was designed with a standard reinforcement, but I feared that this wouldn't be sufficient to guarantee a good crack control. Therefore we carried out several preliminary tests with the Dramix® Green fibre at the university's laboratory where we obtained excellent results.

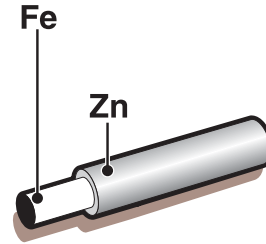
**In July 2007, 2 years after the construction of the tunnels, we surveyed their current condition. I must admit that I was very surprised by the good results we observed.** The upper part of both tunnels, which was unpainted, was still free of any cracks or rust spots.



## Why galvanized steel fibres?

When steel fibres are galvanized, the concrete surface will be clear of rust stains. Tests at Brite Euram showed that galvanized steel fibres are protected against corrosion even at a crack width of 0,2 mm. (BRPR-CT98-0813, Project No. BE 97-4163)

**A corrosion free surface also increases the durability of the concrete. This allows you to deliver both high quality and good looking products to your customer.**



A galvanized steel fibre avoids the process of corrosion

## Why Dramix® Green?

The problem with galvanized steel fibers is that the zinc coating causes the formation of gas when they are added to the concrete mix.



Our research and development department has taken this problem very seriously. That is why we came up with Dramix® Green, a specially designed galvanized steel fibre with a unique inhibitor added to its glue.

Thanks to its unique inhibitor, Dramix® Green is the only fibre that can guarantee perfect bond between the concrete and the galvanized steel. This patented technology by Bekaert passivates the zinc in an alkaline environment and avoids the formation of gas (hydrogen).



Spongy and porous surface around the galvanized steel fibres *without* inhibitor



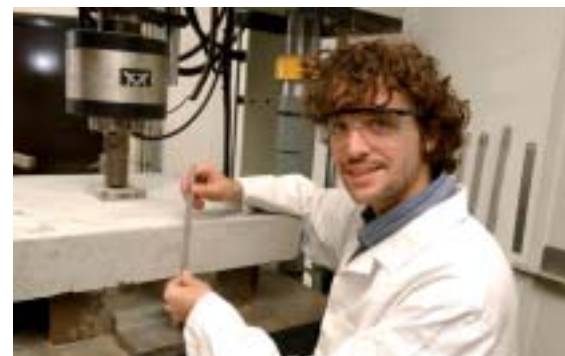
Smooth surface around Dramix® Green fibres *with* inhibitor

“An inhibitor on the zinc is more necessary than ever with today’s concretes!”

“We have performed several test programs to compare normal galvanized steel fibres with our Dramix® Green”, explains Thomas Bonamie. Following results came out of these test programs:

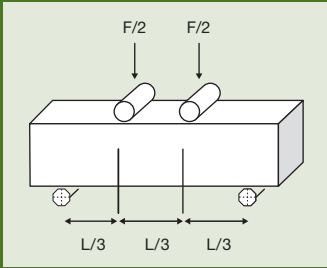
### WITHOUT INHIBITOR:

- Spectrum of fibres at the concrete surface
- Porous concrete surface because of bubbles
- Loss of durability because of gas formation
- Lack of bond leading to reduced structural performance

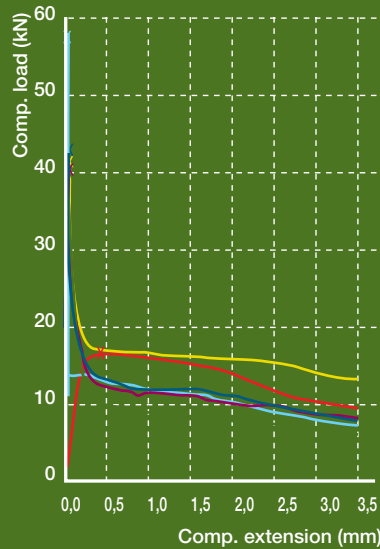


**Thomas Bonamie**

Concrete lab manager  
Bekaert Building Products



20 kg/m<sup>3</sup> fibres  
without inhibitor



20 kg/m<sup>3</sup> fibres  
with inhibitor



**=> Dramix® Green gives you a 40% higher residual strength compared to other galvanized steel fibres without inhibitor!**

“We take pride in delivering a clean-looking and qualitative end-product. After all, the client’s wish is our command.”

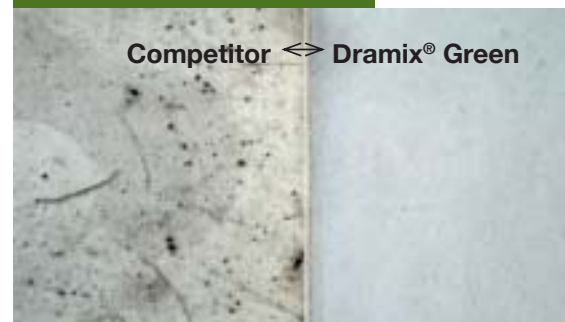
I think when you work in the precast industry, galvanized steel fibre is the norm. One of the reasons is the fact that customers are paying more and more attention to the appearance of the product. We take pride in delivering a clean-looking and quality end-product. After all, the client’s wish is our command.

**Dramix® Green turned out to be the best product to work with. I have done some comparative tests between different types of galvanized steel fibres and the results showed that the gas formation process caused by zinc could only be avoided by using the Dramix® Green fibre.** The fibre not only delivers a nice clean surface, it also makes our products more durable. Dramix® Green, which is CE-approved, can perfectly guarantee the long-term behaviour of our products.

**“Comparative tests convinced me of the advantages of Dramix® Green”** Hans Mesuere



**Hans Mesuere**  
Director of production  
Precast company Lithobeton N.V.  
Belgium





**Gale Stott**  
General manager AFTEC  
StoneTree wall system  
USA

“With Dramix® Green, we offer our customers decent concrete wall panels that will last for a very long time. We need our panels to be robust.”



**The main reason why we have chosen to recommend Dramix® Green to our customers is the fact that we do not have to worry about rust on the surface of our products while maintaining structural integrity.** This problem cannot be eliminated with traditional rebar and mesh, especially in thin wall panels which are often used in very humid and corrosive environments such as salt water.

A couple of years ago we first used a zinc coated twisted steel fibre produced in the North East US. This zinc coated steel fibre, without inhibitor, actually lost a considerable amount of its zinc protection somewhere in the production process which caused considerable corrosion and less than adequate performance. Several different test results from an independent testing laboratory concluded that this fibre was not nearly as strong as the Bekaert fibre in our applications.

## Other possibilities with Dramix Green®



Water channels Portugal



Pipes and manholes

## The next success story can be yours!

If you want to find out how these high quality fibres can work for you too, we are happy to advise. Please contact your local Bekaert specialist.

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