

COOLGRASS[®]

The coolest turf around, that's a fact.

BONAR YARNS

Delivering Tomorrow's Turf Solutions - Today.

Cooling down...



Bonar Yarns' total commitment to innovation is well illustrated by one of our revolutionary products - COOLGRASS® - which cools you down when the heat is on without using a single drop of water! It is an ideal solution for both sports fields and landscaping projects.

Bonar Yarns has been manufacturing cutting-edge synthetic turf yarns since the early 1960s. Thanks to an ongoing Research and Development programme, we continually raise the bar with new product types that improve the quality and performance of our yarns.

COOLGRASS®

Intelligent innovation

While synthetic turf is widely used as a durable and maintenance-friendly solution, it is also well known that synthetic turf can become very warm compared to natural grass. Therefore, working in close co-operation with our customers, suppliers and test institutes, we developed a yarn that stays much cooler in the sun than traditional turf yarns, yet preserves the traditional benefits such as skin friendliness, resilience and UV stability.

After extensive research and thorough in-house testing, backed by tests from independent institutes, COOLGRASS® was born and successfully launched in 2009. Since then, Bonar Yarns' COOLGRASS® technology has been successfully applied to synthetic turf installations throughout the world.

Keep searching for the best

However, Bonar Yarns always stays focused on yarn improvement! To develop further and to monitor the performance of COOLGRASS® on a continuous basis, we keep in close contact with our customers and the market to learn from their experiences in the field.

In addition, Bonar Yarns engineers are always on the lookout for new, better polymers and additives that could contribute to increasing the performance of our COOLGRASS® yarns.

On top of this, our Research and Development Centre continuously updates its test methods and also performs regular temperature measurements on our COOLGRASS® yarn, not only in the laboratory but also in the field. All our yarns of course are produced lead-free.

Bonar Yarns COOLGRASS® range

A selection of our product range is available in COOLGRASS® technology. Our yarns have a reputation for regularity and consistency - only the highest grade polymers, pigments and stabilizers are used in our products, which are monitored and controlled throughout the entire manufacturing process.

All our COOLGRASS® products have the same characteristics as traditional Bonar Yarns products, such as:

- Wear resistance
- Resilience
- Skin friendliness
- UV resistance
- Good ball roll behaviour (in sports applications)
- Natural look and feel
- Softness

Bonar Yarns has tailored the COOLGRASS® range to comply with the requirements of specific end-uses.



The following products are available with COOLGRASS® technology:

	MN ULTRA™	MN RELAX™	MX RELAX™	FB ULTRA™	TX PRO™
Landscape		✓	✓		
Soccer	✓			✓	
American Football	✓			✓	
Rugby	✓			✓	
Baseball	✓			✓	
Hockey					✓
Bowls					✓

How does the COOLGRASS®

Traditional yarns simply absorb heat which can result in uncomfortable surface temperatures, especially when using a conventional rubber infill. Bonar Yarns' COOLGRASS® reflects sunlight and dissipates heat into the atmosphere instead of absorbing it into the yarn, so the synthetic turf surface delivers a cooling effect overall.

The technology behind Bonar Yarns' COOLGRASS® is ideal for 4G systems with little or no infill.

COOLGRASS® can also be used in traditional 3G systems to help reduce the high temperatures which can be generated by rubber infill. There are two main mechanisms which underpin the COOLGRASS® system:

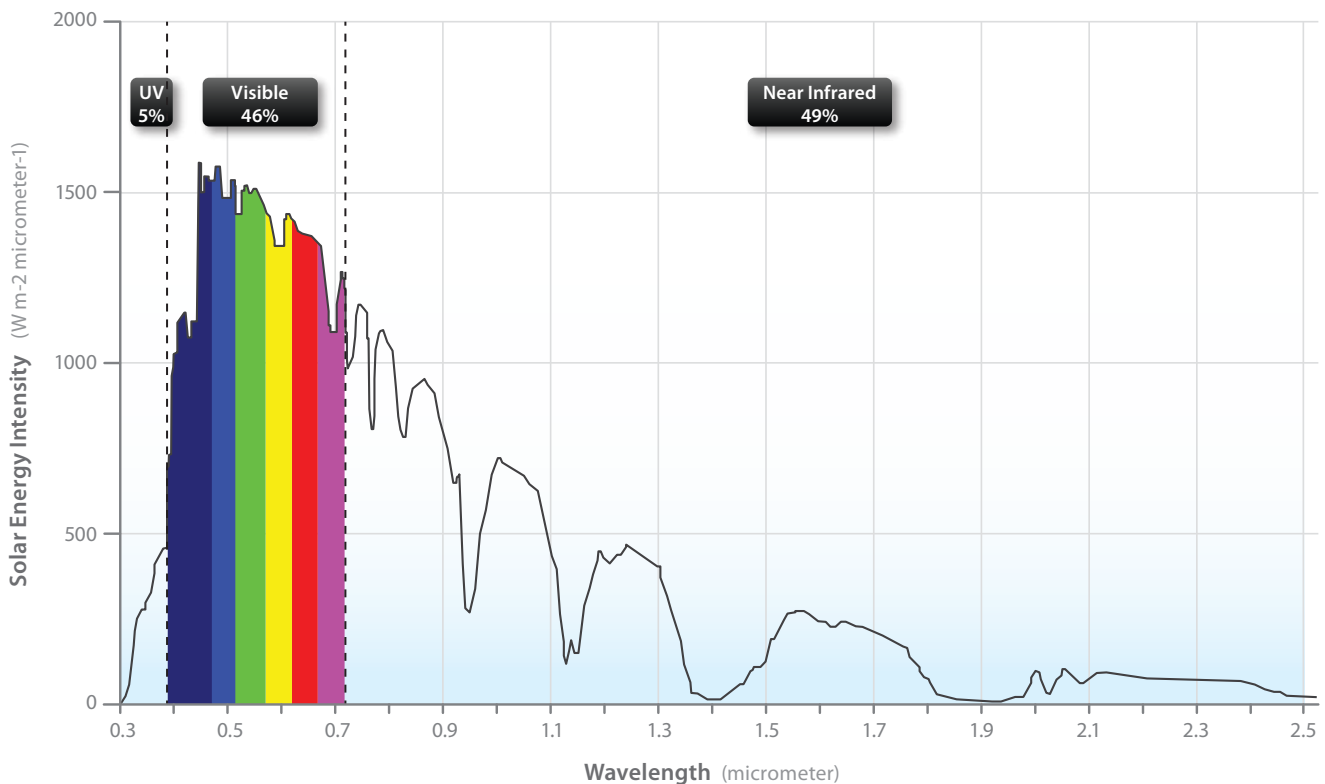
- Infrared reflectance
- Surface temperature

Let's have a closer look...

Infrared reflectance

The sun sends a broad spectrum of light to the earth. Part of this spectrum is absorbed by the earth's atmosphere, yet the total power reaching

the surface of the earth can still be as high as 1000 W/m². The spectrum of this solar light is shown in the graph below.



system work?

This graph shows how much radiation there is in a particular colour (wavelength). If the wavelength is longer than 0.7 micrometer (7×10^{-7} m) it is above the visible spectrum and is called Near Infra Red (NIR). Although we cannot see it, we feel it as heat. All of the power in the solar spectrum, including the NIR, contributes to grass heating. This occurs in natural grass in the

same way as in synthetic turf. However, natural grass cools very efficiently by evaporation of water, whereas the reduction of water usage is one of the strongest arguments for choosing synthetic turf. So if synthetic turf needs to be cooled, this must be achieved by a solution other than water.

Surface temperature

The heating effect on the synthetic turf is reduced by reflecting the NIR light. This is shown in the figure below. Natural grass and traditional synthetic turf absorb light including

the NIR. COOLGRASS® contains pigments that reflect this part of the spectrum. Thanks to this effect, less light is absorbed by the face yarn resulting in a lower surface temperature.

51% Visible UV Light

49% Near Infrared Light



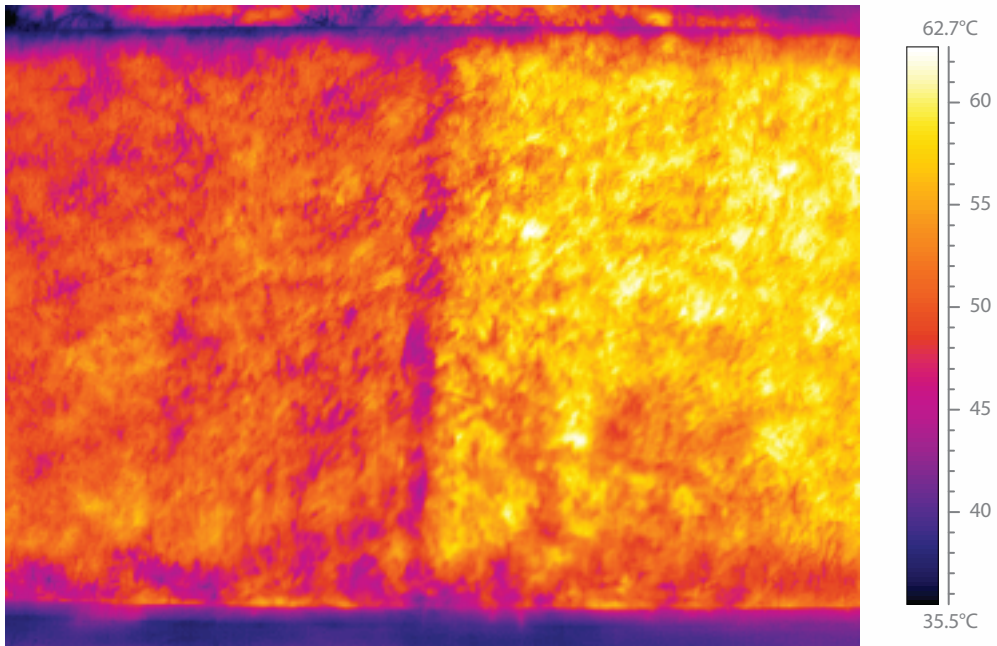
The NIR reflection can be seen in this picture taken with a special filter which excludes the visible light. This shows the reflection of the NIR light from two types of turf when illuminated by a halogen light source, simulating natural sunlight.

The left side (COOLGRASS®) is much brighter than the right side (traditional turf) which means it reflects the NIR light better than the traditional turf.



Coolgrass®

Traditional turf

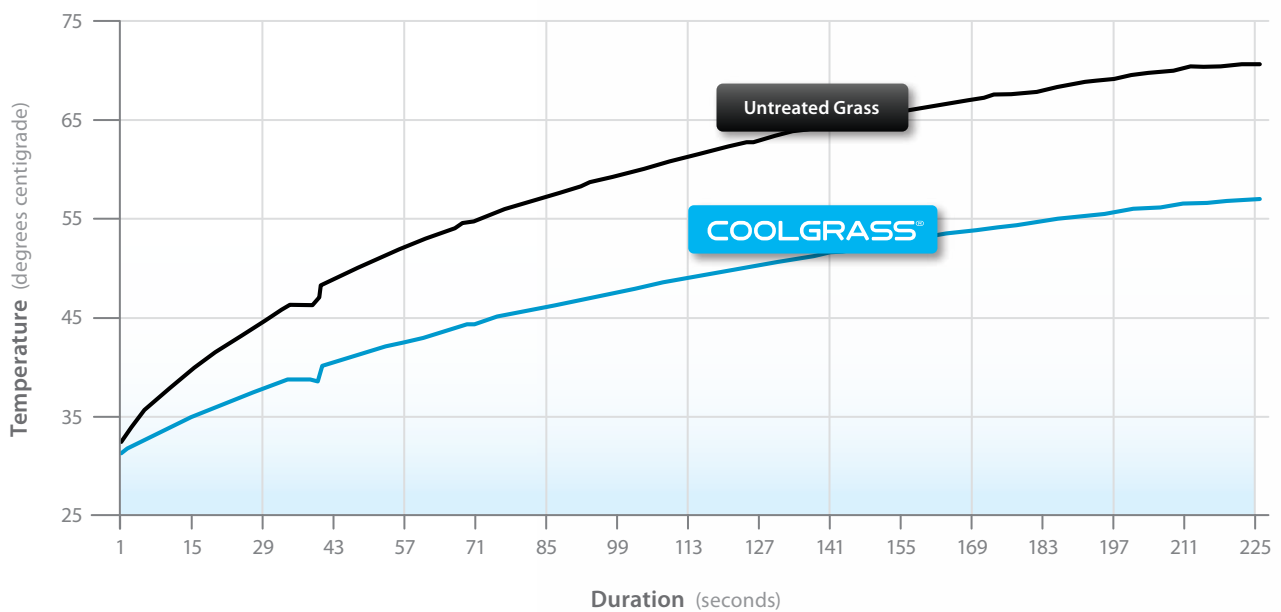


This picture was taken with an infrared camera and shows that the temperature of the two turf samples differs considerably.

Temperature difference

When the average temperature of these samples is plotted as a function of illumination time we

get a temperature difference of up to 10°C in this laboratory test.



Getting the most out of COOLGRASS®

The cooling effect of COOLGRASS® can be increased even further through a system approach. Other characteristics can have an impact on this cooling effect:

- The yarn itself, such as dTex, density, weight, number of filaments and thickness
- The colour of the infill: the lighter the colour the less heat absorption, or even use NIR-reflecting infill
- The type of infill, such as sand, rubber (coated versus non-coated) etc.
- The amount of infill
- Drainage layout
- The turf system itself

To get the best from our COOLGRASS® technology, this kind of system approach is an important part of the close cooperation between Bonar Yarns and our customers.

Shown here are a few examples of Bonar Yarns COOLGRASS® throughout the world...

To find out more, visit
www.bonaryarns.com



The Baylor School, Chattanooga, USA



Baseball centre, Japan



JJ Holland Park, Melbourne, Australia

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