

Black Bear Goes Commercial

Black Bear has created a turning point in tyre pyrolysis; creating a sustainable and high quality solution to a traditionally polluting process and providing a suitable alternative for tyre recycling.

With over 30 years of experience in the rubber industry, researcher and developer Chris Twigg has become a well-known expert in the field of tyre pyrolysis. His enthusiasm for the Black Bear Carbon project withstood the cynicism of a market tired of the



seemingly endless stream of pyrolysis projects and developers that have come and gone over the past decade. The barrier that most pyrolysis projects face is a lack of investment combined with the lack of continuity of supply. However, when Jan Driessen's Kargro Recycling Group, as well as other private investors, became involved with plans to develop a sustainable tyre pyrolysis plant in the Netherlands, Black Bear's outlook improved considerably. Driessen's involvement immediately gave credibility to the project, for here was a leader in the field of end of life tyres and tyre recycling backing a tyre pyrolysis project.

Driessen's track record suggested a sound basis for Black Bear to expand and grow. Tyre and Rubber Recycling met with Black Bear's Rik Leunissen at BBC's Nederweert plant to get a

better picture of how the project is advancing. Leunissen explains that the operating facility, called 'Dutch Green Carbon', is a joint venture between Black Bear and Kargro. With a strong plant operating at commercial level, Black Bear is now in a position to market the project to tyre collectors and investors in other markets. The aim of Black Bear is not to be an equipment provider, but to closely partner with tyre collectors where it provides a turnkey solution to unlock higher value from end-of-life tyres, which meets the highest European standards of operation and emissions. Black Bear will co-invest with its partners to realise new production facilities and will, among other things, continue to bear responsibility for the marketing and sales of the high quality carbon blacks these facilities produce. Pyrolysis itself is not a new technology, Leunissen explains. It has been used for decades and has



Step Two – the Jet Mill



Step One – The Black Bear Kiln

been increasingly refined since then. Black Bear, however, has designed its own proprietary and innovative pyrolysis process with a clear focus on recovering the highest possible quality carbon black. This has resulted in a carbon black portfolio with technical properties in line with the 'virgin' carbon black



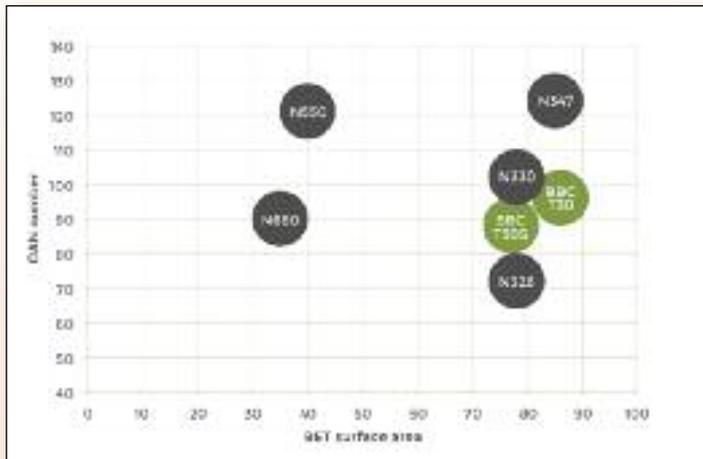
CLEAN & GREEN

WE ARE BLACK BEAR

BBC T30 and BBC T30S

- Improves tear strength and abrasion resistance
- Improves wet grip
- Enhances rubber-to-metal bond strength
- Reduces hysteresis and lowers rolling resistance
- Reduces electrical conductivity
- Receptive to silane-coupling





market (and superior in some cases) while preserving the environment. Currently, there is a great deal of attention being paid to the PAH content of recycled rubber materials and their use in products that require physical handling. So how does Black Bear deal with this concern?

Leunissen acknowledges PAH is indeed an increasingly important issue for carbon black users. He explains that the Black Bear process is designed to drive off the PAHs from the tyre granulates, effectively 'cleaning' the virgin carbon black and resulting in an extremely low PAH content. This can be done to such a high quality that Black Bear's speciality products can be used in food- and human skin contact applications (e.g. plastics and inks) as they comply to the strict EU no. 10/2011 regulations. Once operational, the plant generates ~90 per cent of its electricity consumption from the pyrolysis gas it produces. Combined with the oil output, a Black Bear processing line generates more energy than it consumes.

Leunissen clarifies by stating that most of the energy used is drawn from the Grid, and the electricity generated is fed back into the Grid. This is done to ensure stability of the power supply.

The outputs from the Black Bear plant are high-quality carbon black, oil and electricity (from the gas), all of which are of marketable quality. Much has been said about the quality specifications for Carbon Black, particularly about its use in the tyre sector. A common argument is that since rCB does not meet the ASTM standards for Carbon Black, it cannot replace it. Black Bear is in far developed cooperation with several global tyre manufacturers to prove the opposite.

The company produces a high

quality, versatile end-product that is comparable (and for some applications superior to the market) with a significantly positive environmental impact. For the tyre industry specifically, this involves two grades:

BBC T30 and BBC T30S

To illustrate, their BBC T30 acts as a 1:1 replacement for N330 and N660, providing similar hardness and a unique balance of mechanical and dynamic reinforcing properties.

Concretely this means:

- High mechanical reinforcement as defined by tensile properties, abrasion and tear resistance comparable or better than N330.
- Better dynamic performance than N660 as defined by low tan delta, very low hysteresis, Payne effect and lower rolling resistance.
- The versatility of the product allows substitution of N326, N347, N550 and N762 selectively.

Its BBC T30S offers a maximised amount of silica resulting in various distinct benefits:

- It improves tear strength and abrasion resistance
It is receptive to silane-coupling for optimum mechanical/dynamic reinforcement
- Reduces hysteresis and rolling resistance
- Improves wet grip
Enhances rubber-to-metal bond strength
- Reduces electrical conductivity; especially valuable in applications where higher electrical resistivity is required.

The positioning of Black Bear

Carbon grades can be seen in the chart placing it in comparison to ASTM Carbon Black standards. The key to the growing success of the company is its ability to produce a high quality carbon black at consistent quality and provide extensive technical support to carbon black users to adopt these materials.

In addition to tyres, Black Bear's products can be used as a reinforcing agent in technical rubbers and as a pigment in plastics inks and coatings.

When asked about the future of Black Bear, Leunissen commented that the company aims to expand the success of the Nederweert operation to the rest of the world together with partners and investors. Several new projects will be announced over the course of 2017.

With a sizeable market, scalable technology and the opportunity to substitute Carbon Black in various applications, the company is looking to put a little more 'green' in the world of Carbon Black.

Kargro and Rumal Aiming to be a One Stop Recycler

Rumal operates from a site in Nederweert where it processes tyres to create crumb rubber. The company is part of the Kargro Recycling Group and its site is home to Dutch Green Carbon and Black Bear Carbon.

Rumal's managing Director is Jan Van Den Brand, who has been involved with tyre recycling for more years than he cares to remember. There is not a great deal that he does not know about the world of tyre recycling. Van Den Brand explained the structure of what has become the Kargro Recycling Group, which covers casing handling, retreading, tyre collection, tyre recycling and now tyre pyrolysis with future plans for tyre devulcanisation. The tyre recycling world is curiously divided in its approach to dealing with end of life tyres, part of this is possibly due to differing market conditions, partly due to national approaches and partly due to the level of investment required. In the Netherlands there seems to be a focus on the future markets, whilst in neighbouring countries there

remains a focus on traditional ambient processing and the use of granulate as an end product or tyre chips as fuel.

At the Canadian TRAC conference



Rumal's Jan Van Den Brand

in Niagara in October 2016, Cees van Oostenrijk from Band & Milieu, the Dutch EPR scheme, espoused the belief that ambient processing was on the way out and that the future lay in pyrolysis and devulcanisation. At Rumal, that

