Dyeing without Water

Supercritical CO2: an Eco-Friendly Option and a Commercial Reality

By Tansy Fall

CO2 DYEING COMPANY DyeCoo has received a lot of attention recently thanks to promotion of its technology by sporting giant Nike, which has just launched its new collection of polo shirts, dyed without water.

DyeCoo's dyeing process has also been promoted by Adidas and IKEA; however the company told *International Dyer* that this is more than just a marketing tool – DyeCoo is a commercial reality.

Melanie Wijnands, marketing and communications manager at DyeCoo, said: "Our focus at the moment is not the brands; our focus now is really working together with textile manufacturers. However, seeing that brands are looking towards our technology, recognising the potential of it, and also recognising the marketing potential of it, is a good confirmation to have. It's a confirmation that the world and consumers and brands are actually waiting for a technology like ours.

"Of course it's a very powerful marketing tool if a company like Nike promote your technology. It's actually interesting that Nike never before promoted the manufacturing method. It's the first time they're ever showing a piece of equipment on their corporate website. So for us that's a huge endorsement and it helps with our marketing."

Business development manager Olaf Lohle, sales director at DyeCoo, added: "We want to show that we're not a fairy-tale anymore, that we are real – not only for people who want to be sustainable, but we can also compete with our operational costs, so it's not just sustainability; we definitely have a competitive edge.

"We don't just want to be a marketing tool, we want to be doing real business, showing that companies can be more profitable using our equipment."

Whilst this unique dyeing technology has been around for some years, it wasn't possible to scale it to an industrial size. Ms Wijnands said that the founders of DyeCoo recognised the potential of the technology and that, if it could be industrialised, it could have huge environmental benefits and also economic benefits for the textile industry.

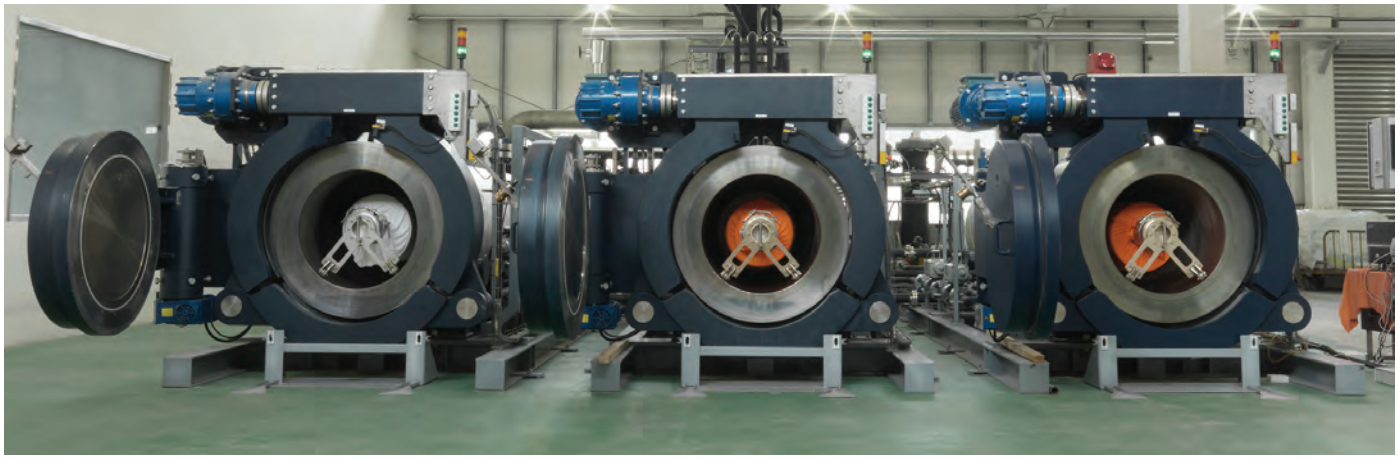
In terms of environmental benefits, were the whole textile industry to use the waterless dyeing process, enough water would be saved each year to provide every person on Earth with an extra 1,000 litres of water each. DyeCoo uses reclaimed CO2 so that it is already making use of a waste product. Under a certain pressure and temperature the CO2 becomes supercritical, a phase between a liquid and a gas, and in that phase, dyes dissolve very easily, even more so than in water.

Ms Wijnands elaborated on the technology, saying: "It's a beam dyeing construction so fabric is rolled on to a beam, placed into a vessel, and then the CO2 runs through the dyestuff, absorbing the dye and being dissolved into the textiles.

"Of all the CO2 we use, 95% of it is reused after each batch so that's an interesting factor of the process as well, and the process is significantly shorter than with water dyeing. We also use less energy so that also adds to the sustainability of the process but it also helps with the operational costs of course."

In addition, the process doesn't use any additional chemicals, which DyeCoo said facilitates a more even colour distribution, and the process also allows for 50% less dyestuff to be used. As a result, DyeCoo estimate that its process can reduce companies' costs by 40-60%.

DyeCoo's R&D department is working towards further increasing the energy savings delivered by its already efficient technology; however the focus for the company is currently on working



DyeCoo's technology consists of 3 vessels

with its dyestuff providers to encourage them to develop their dyes in accordance with DyeCoo's technology, for use with a variety of fabrics.

Ms Wijnands said: "We're now focused on dyeing polyester but we're also interested in getting our dyestuff providers to further that scope to other fibres, so we're not standing still: we'll always keep developing and improving the technology.

"The technology we have is actually suitable for all fibres so it's not that our technology is lacking something, it's that we need to find suitable dyestuff to fit with our technology. That is really up to dyestuff providers. They are the chemical part of the technology and that is not 100% caught-up to us yet, so we're not looking at polyester in particular but we are looking to increase our working together with dyestuff suppliers to see what the possibilities are."

DyeCoo has manufacturing facilities in Taiwan and Thailand, with its head office based in the Netherlands. However, the company works with dyestuff suppliers worldwide and will be continuing to look at the global market for new partners.

Ms Wijnands continued: "Working together with dyestuff providers is very important for us because it means these suppliers will catch up to our technology and will develop the correct chemicals for us, meaning that we can process other fibres."

DyeCoo is also looking to invest within the company and said something that is very important for its own development is setting up a maintenance and service structure, ensuring that it can service its customers across the globe.

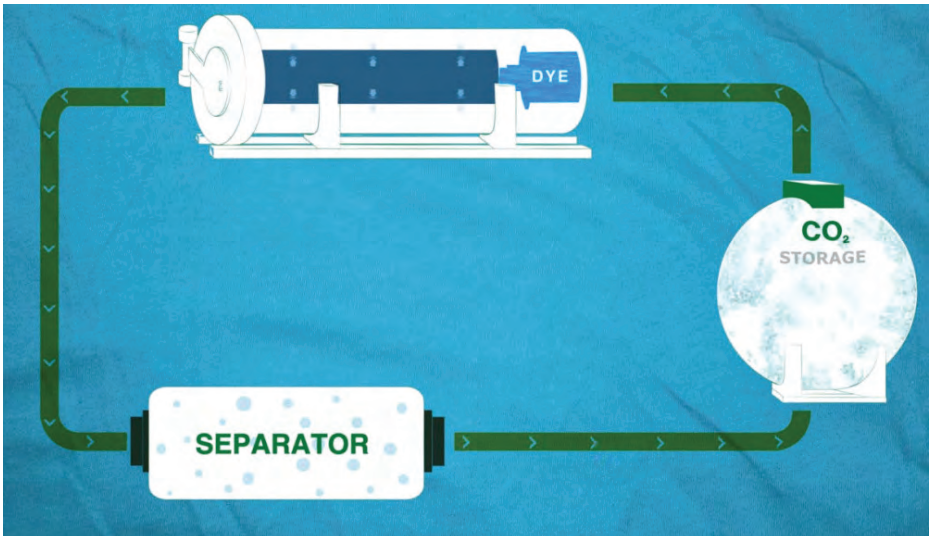
"We haven't clarified that perfectly yet, but we are currently in two countries, so we're just setting up the basics for those two countries for now. We're doing it on our own, so not via dyestuff providers, no," Ms Wijnands added. "The focus is eventually not to just sell a piece of equipment but the vision is to provide companies with a solution, maybe build a factory of the future where we're not only focused just on dyeing but also pretreatment and finishes, because the technology is also very suitable for those elements of textile processing.

"For example, cleaning of a textile before it can be dyed is something that we're looking into, as currently water is also used for that, and also the finishing of textiles – maybe making clothing waterproof. But these projects are really only in the start-up phase.

"We're not just trying to sell a large amount of steel to our customers; we really want to work with them so we can provide the complete solution that also fits with their current infrastructure and their market, and their wishes."

As part of its first steps towards this, DyeCoo is participating in this year's ITMA Milan, in November, and will be exhibiting one of the three vessels that make up the CO2 dyeing machine. Mr Lohle concluded: "We'll have a vessel on our booth so that people can see that it's tangible.

"The machine always consists of three vessels but, due to the size of the machine, the idea is to show with one vessel how it works: how it opens, closes and how the fabric is wound on to the beam."



DyeCoo's closed loop dyeing process

Loading fabric into the vessel