SuperWool - Sustainable, AOX-free Superwash Finishing of Wool Tops for the Yarn Production

LIFE05 ENV/D/000195

Project description Environmental issues Beneficiaries Administrative data
Read more

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Project description:

Background

Approximately 75% of machine-washable wool is treated by the so-called Chlorine-Hercosett shrinkproofing process. This method, which guarantees the felt-free superwash standard, works on the basis of chlorination and subsequent coating of the fibre material with a polyaminoamide. The process, which uses large amounts of water as well as dangerous substances, leads to significant pollution of wastewater with organic halogen compounds (AOX). For approximately 1 200 t/a of “Superwash” quality wool produced per year, this process consumes the following quantities of environmentally hazardous substances:

- 150 t sodium hypochlorite;
- 220 t resin; and
- 165 t other auxiliaries (sulphuric acid, wetting agent, defoamer, etc.)

Objectives

The LIFE SUPERWOOL project aimed to replace the current Chlorine-Hercosett process with the sustainable pre-treatment of wool using plasma. This new method, which has been successfully tested at research and development scale, still needs to be improved. In particular, the electrode systems must be improved to ensure the reproducible treatment of wool fibres. Additionally, a suitable resin

has to be selected to ensure that the yarn has the requisite anti-felt property.

Results

The SUPERWOOL project was completed and all planned actions fulfilled. This included the construction of a demonstration plant (opened spring 2008) with the innovative AOX-free plasma technology. Trials showed that the new process gives acceptable results for fine wool (socks, underwear etc). However there were still problems with coarse wool, which showed mingling after the washing process. Further tests with coarse wool will go on after the project end.

The treatment of wool tops with low-temperature plasma and alternative resin systems has turned out to be considerably better for the environment compared to the conventional Chlorine-Hercosett process; it is also economically very promising. This new approach not only leads to an AOX- and wastewater-free process, but can also drastically reduce the felting tendency of the material.

Substituting plasma treatment for the Chlorine-Hercosett process also gives advantages regarding the physical health of the operators. Since no hazardous chemicals - e.g. chlorine, sulphuric acid or volatile organic compounds - are needed, air contamination is significantly reduced and the risk of industrial accidents is lowered. The contamination of water bodies will also be reduced in developing countries that do not possess appropriate water treatment plants. Social benefits are strongly aligned with the outlined economical advantages, since the new technology could preserve employment in the textile industry in highly industrialised countries.

The environment-friendly plasma process has the potential to define a new Best Available Technique (BAT) and could therefore replace the Chlorine-Hercosett process worldwide. This would affect some 10 installed Hercosett plants in the EU (Germany, UK, Italy, France and the Czech Republic) as well as about the same number of plants in Asia. The established plasma technology has the potential to be extended to other areas of textile finishing such as needle felt production, where even more positive effects on the environment can be expected. Further textile applications for the plasma process might be the cleaning of cotton and improvement of the fibre-matrix adhesion in compound materials. The large-scale process established by this project may also be used in related fields such as treatment of synthetic surfaces (e. g. for medical technology) in order to obtain specific effects.

Whilst it is possible that the plasma process is not suitable for every wool product, the market share for the segment of fine wool products, such as socks, is the largest and gives sufficient scope to operate the plant at full capacity. Beneficiary Richter F&A plans to promote the SuperWool technology in Germany, Denmark, Italy,UK, Poland and the Czech Republic. Articles will be published in several journals and the technology will be presented at national and international fairs.

Further information on the project can be found in the project's layman report (see "Read more" section).

Top

Environmental issues addressed:

Themes

Environmental management - Cleaner technologies
Industry-Production - Textiles - Clothing

Keywords

emission reduction, coating, textile industry, alternative technology

Target EU Legislation

- Water
- Directive 76/464 - Pollution caused by certain dangerous substances discharged into the aquatic e ...
- Directive 80/68 - Protection of groundwater against pollution caused by certain dangerous substan ...
- Directive 2000/60 - Framework for Community action in the field of water policy (23.10.2000)
- Industry and Product Policy
- COM(2001)68 - "Final Green Paper on Integrated Product Policy (IPP)" (07.02.2001)

Natura 2000 sites

Not applicable

Top

Beneficiaries:

Coordinator	Richter
Type of organisation	SME Small and medium sized enterprise
Description	Richter Kammgarn GmbH was established in Germany in 1852. The company manufactures yarns for machine knitting and weaving and has, among others, a Chlorine-Hercosett production line.
Partners	None

Top

Administrative data:

Project reference	LIFE05 ENV/D/000195
Duration	01-SEP-2005 to 31-JAN -2009
Total budget	2,384,342.00 €
EU contribution	704,053.00 €
Project location	Hessen(Deutschland)

Top

Read more:

Project web site	Project's website (DE/EN)
Publication: Layman report	Title: Layman report (EN) Year: 2009 No of pages: 5
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Top

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