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Research area: Product aims

End products made of paper, paperboard and board // Corrugated products

Key words:

Corrugated board, starch, borax-free adhesives, Stein-Hall-System

TITLE:**"BORAWELL" - borax-free corrugated board production****Background/Problem area**

Borax (sodium tetraborate) is used for cross-linking starch molecules in starch pastes and controlling the rheological and adhesive properties. Since 2010, boric acid and sodium borates have been classified as CMR (carcinogenic, mutagenic and reproduction-toxic) substances of very high concern (SVHC) by the European Chemical Agency (ECHA). In 2011 REACH imposed even more stringent classification criteria, leading to all boron compounds being classified as Substances of Very High Concern and making it mandatory to label any product containing at least 0,1 % boron compounds. If the EU imposes even more stringent classification requirements for boronic substances or completely withdraws its authorization to use borax in adhesives for corrugated board production, corrugated board producers will no longer be able to use commercial starch-based adhesive products. Because starch-based adhesives cannot be produced without boron compounds by means of state-of-the-art technology, starch producers could lose one of their main markets when their customers from the corrugated board sector have to resort using petrol-based adhesive products instead.

Objectives/Research results

Aim of the research project is to develop a novel starch-based corrugated board adhesive by substituting borax in Stein Hall systems by borax-free starch-based solutions without losses in adhesion and converting properties. Alternative cross-linking systems will be defined and tested to scale-up borax-free Stein Hall adhesive solutions for industrial implementation, taking into account the typical service life of corrugating machines as well as economic aspects. To assess the suitability of the new adhesive system, it will be benchmarked against the performance spectrum of established borax-containing adhesive systems.

Application/Economic benefits

A complete ban of borax would affect the economic situation of the starch industry. Without alternative cross-linking additives, starch adhesives would no longer be competitive compared to synthetic binders. The starch manufacturers would lose substantial amounts on corrugated board market. Therefore the aim of the project is to counteract this dangerous trend.

Since starch is a renewable and natural raw material, a successful project will contribute to conserving finite fossil resources. Besides the advantages in the processability of the corrugated board, the use of starch in corrugated board bonding systems can potentially contribute to a better recyclability and promote the development of innovative starch products.

Its cost advantage compared to synthetic products can be passed on along the entire value chain beginning with starch manufacturers and ending with producers of paper and board materials and supplier industries.

Period of time: 01.11.2015 – 30.04.2018

Remarks

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