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Research area: Product aims

Paper, paperboard and board // Packaging papers and paperboard

Key words:

Paperboard, medium-density fibreboard, recovered paper, thermo-mechanical pulp, energy use, water use, packaging

TITLE:**Studies on producing paperboard in a dry process****Background/Problem area**

The co-operation project between the Institute of Wood and Paper Technology, Dresden, and PTS is relevant to the industrial sector of wood materials and paper technology. The project has as its interdisciplinary goal to study the usability of the technological and economic advantages of the dry process for producing thin, medium-density fibreboard (MDF) for the manufacture of board products. From the point of view of the paper industry, the motivation derives in particular from the necessity of searching for technical solutions designed to further reduce the specific expenditure in raw materials, water and energy in paperboard manufacture. Moreover, there is an expectation that, by using a dry process, board products can be produced that have an enhanced properties profile compared to conventional products. This includes a lower MD/CD ratio of the relevant strength properties, greater strength in the z direction as well as improved dimensional stability under moist ambience conditions. Realising these expectations would continue to strengthen the competitiveness of paperboard compared to petroleum-based plastics for packaging materials. From the point of view of the wood materials sector, the project aims on the one hand at expanding the fibrous raw materials that can be used for fibreboard manufacture by more intense utilisation of more cost-effective recovered paper belonging to ordinary grades. On the other hand, additional technological improvements in fibreboard production are to be developed in the course of the project. This refers in particular to the process control in pulp preparation and the use of environmentally compatible additives to guarantee the desired product properties, even including the material recyclability of such products. Ultimately, this is intended to open up new lines of application for thin, medium-density products. Developing a semi-dry process for board manufacture will incorporate process elements for the production of medium-density fibreboard (MDF) and sub-processes based on the airlaid principle that are used in the production of dry-lay nonwovens. Most of the necessary experimental investigations will be conducted at the pilot facilities of the two research institutes as well as with an external system in the textile research sector.

Objectives/Research results

The objective of the research project is to develop a technological concept for producing paperboard materials in a dry process. The aim is to achieve a grammage range between 300 g/m² and 800 g/m² with thicknesses ranging from 0.4 mm to 1.0 mm. The materials produced should have physical properties that make it possible both to convert them into packaging materials and to meet significant utility value requirements placed on board packaging materials. At the same time, the extent to which new possible uses in the wood management sector might be created for the new materials should be examined. Scientific-technical aims relating to pulp production are to determine optimal process parameters (such as pressure, temperature, time, for example) for the production of suitable wood pulps based on thermomechanical pulping as well as the production of optically homogeneous secondary fibre pulp from recovered paper by mechanical processes with the highest possible solids content. The objective of further studies is to determine a technologically and economically optimum mixing ratio of recovered paper and thermomechanical pulps and their further processing to form sheet materials in modified MDF or airlaid processes. Furthermore, the uses of additives should be studied for both web formation processes that are needed to realise the desired product properties. Starting from the developed technological concept, the specific expenditure of energy, water and funding must be presented that can be expected for industrial implementation compared to conventional processes of board manufacture.

Application/Economic benefits

The results of the research project are of special interest to firms in the wood materials industry, for the manufacturers of packaging materials as well as for firms in the paper industry that manufacture paperboard. Options for producing novel, fibre-based materials utilising a resource-saving technology will be developed both by the exclusive use of wood-based pulps and by using processes with very low specific fresh water requirements. A growing market for such materials can be posited owing to the growing priority placed on sustainability attributes by both manufacturers and consumers alike. Depending on the project findings, new product ranges might be created for the manufacturers of facilities for fibreboard production or possibly also for companies that sell processes and facilities for airlaid technology. It is also feasible that paperboard manufacturers in the paper industry might use dry processes to expand their portfolio of special-purpose products.

Period of time: 1.11. 2011 - 30.4. 2014

Remarks

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