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Research area: Process aims

Pulp production // recovered paper treatment

Key words:

Deinking, flotation, process water quality

Title:

Impact of process water quality on the deinking potential of paper for recycling and measures to increase the quality of deinked pulp

Background/Problem area

Deinking mills are forced to reduce their fresh water consumption with a resulting higher load of various contaminants in the process water and/or getting higher contamination levels in their mills due to lower recovered paper quality. This has an influence on achieving the target brightness levels since more bleaching chemicals are now required to recover the optical properties. Several reasons could explain this trend: (i) process water quality is altered (more coloured dissolved and colloidal molecules), (ii) conventional ink particles are less efficiently removed due to unknown interactions disturbing the flotation behaviour (iii) ink particles are being smaller due to the development of new printing processes including water based inks or getting larger due to more oxidative inks, (iv) peroxide in the pulping phase or during the bleaching treatments is less efficient due to the water loop closure.

It is therefore necessary to understand first the main causes and mechanisms of reduced water consumption on the impact of DIP quality. Based on those findings investigations on solutions are performed to overcome the problems including possibilities of efficient process water cleaning at minimum cost.

Objectives/Research results

The aim of the research project are to increase the DIP quality and to reduce variations in quality of DIP in use of paper for recycling for the production of graphic papers by improving existing processes (process water purification).

The objective of the work is to determine the main reason explaining poorer DIP quality or poorer deinking potential based on the impact of process water quality. Poorer DIP quality results in higher bleaching chemical consumption or has to find preventive process water treatment possibilities to stabilize optical DIP characteristics.

This requires a systematic assessment of differences in process water quality and their impact on the development of optical properties in the deinking process. From the results solutions will be worked out for improving the deinking results depending on the process water quality.

The tests regarding the impact of storage of process water samples on process water properties and the deinking potential of paper for recycling were carried out with process water from DIP lines. Process water properties of different deinking plants vary significantly. The storage of process water can impact both the process water characteristics and the deinking potential of paper for recycling. Deinking results regarding are relatively narrow in bandwidth. An exception is the filtrate from a deinking plant for newspaper production with a very high solids content which leads to a high brightness of the undeinked and deinked pulp, the highest dirt specks area and filtrate darkening. Unfortunately, there are no clear correlations to the investigated process water parameters.

Purification experiments were carried out by centrifugation, filtration and flotation. Regarding the reduction of dirt specks centrifugation and filtration are more effective than flotation. On the other hand, the flotation of the process water seems more suitable for filtrate darkening than centrifugation or filtration. The latter processes apparently remove fillers and enrich printing ink particles.

Application/Economic benefits

The project will increase the knowledge of the facts how to clean the water circuits in an economic way by evaluating chemicals, cleaning technology and dosage points of chemicals.

Period of time: 01.04.2015 – 31.07.2017

Remarks

The research project IGF IGF18698N is being funded Federal Ministry of Economic Affairs and Energy (BMWi) and carried out in cooperation with the TU Darmstadt (Paper Technology and Mechanical Process Engineering)