

M-real Alizay: the biggest enzymatic conversion unit in the world

OPERATIONAL SINCE THE END OF 2008 IN THE FRENCH COMPANY M-REAL ALIZAY, THE NEW CONTINUOUS ENZYMATIc CONVERSION, SUPPLIED BY ROQUETTE, IS THE BIGGEST IN THE WORLD, WITH A CAPACITY OF 4,200 KG/HR. FOR THIS PAPER MANUFACTURER, THIS INVESTMENT MARKS A STRATEGIC CHANGE TOWARDS THE PRODUCTION OF OFFICE PAPERS FROM RECYCLED FIBRE.

by: Valerie Lechiffre - ENP

The last few months have been marked by an important strategic change at M-real Alizay, which has embarked upon, since December 2008, the production of recycled papers, mainly from the Evolve range. The aim is to change the profile of the site from one that just produces 'commodities' papers to a manufacturer of added-value products.

"We are now using around 80,000 t/yr of recycled pulp which we buy from the St. Regis paper mill," (New Thames, UK) explains Sandrine Dauster, assistant to the CEO, Denis Beauséjour, and in charge of communications.

"From an annual output of 320,000 t/yr of printing/writing paper, we produce between 100,000 and 120,000 t/yr of recycled papers, sold mainly in the UK and Germany".

Investment in deinking

At the end of 2008 and after an investment of 4.5 MEUR, the mill installed a continuous pulper, supplied by Kadant Lamort, with a 900 t/day capacity; as well as a new FMW conveying line of pulp bales (dry pulp). Further additions are a Vurton Steel vibrating table equipped

with blades for cutting recycled pulp as well as a new conveying line especially dedicated to transport this pulp bales (with 50% humidity) to the pulper (a 3.1 MEUR investment).

Also, the PM circuits have been modified (3.1 MEUR) to improve efficiency, thus reducing waste and water consumption. Finally, the winder has been modernized in order to increase capacities (3.2 MEUR). Due to market instability, the



With continuous operation and fully automated in accordance with the new 'isochore' principle, the enzymatic conversion supplied by Roquette allows for a greater volume of dry substance in the film press. It brings also the possibility to eliminate the use of zinc.



(from left to right), Sandrine Dauster, Jean Gorriez, Marcel Dondeyne and Isabelle Goninet-Goutorbe.

production of pulp (virgin pulp) has been stopped since 1st March until the end of the year.





SAEL



Group

AZIONAMENTI PER CARTIERE

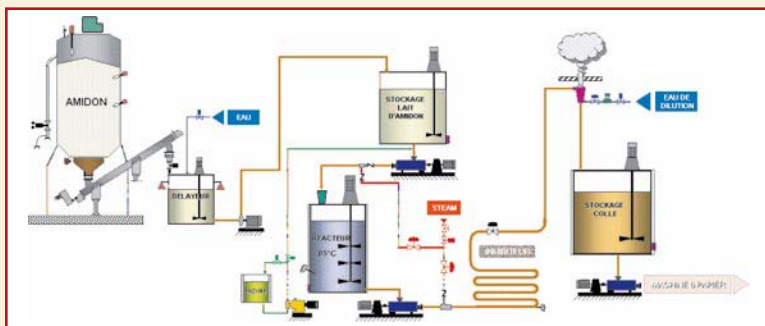
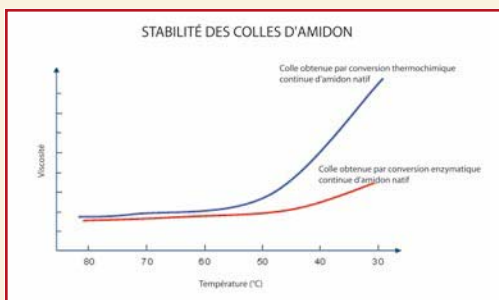
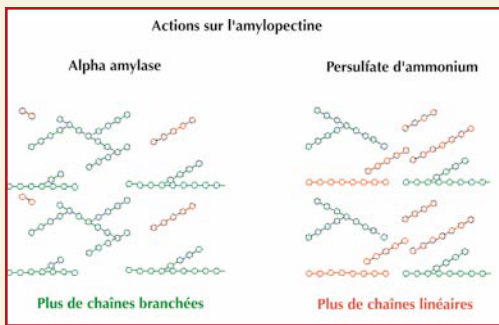


A quanti hanno condiviso con noi un altro anno di progetti vincenti in cartiera i nostri ringraziamenti ed i migliori auguri per un nuovo anno.

Buon Natale!



Starch conversion systems: some technical data



The use of starch glues as coatings improves surface resistance and printability. A further effect is the reduction of dust formation during the fast printing stage. To deposit an adequate quantity of starch on the sheet, it needs to be partially depolymerized in order to reduce the viscosity of the glue and make it compatible with the equipment (size-press or film-press).

This occurs with the use of one of the following conversion systems: continuous thermochemical, discontinuous enzymatic or continuous enzymatic.

Thermochemical conversion: Uses the action of oxidizing agents (ammonium persulphate, hydrogen peroxide). Hydrolysis is achieved in a jet cooker at 140-150° C for 3 minutes. The cut of the starch molecule is random and results in a larger number of lineal molecules that rejoin during the cooling process of the glue, generating 'retrogradation'. The viscosity of the glue obtained is unstable on cooling and the rejoined molecules lose a lot of their binding properties. Costs, both in chemicals and steam, are high.

Discontinuous enzymatic conversion: Uses enzyme action, often of the alpha-amylase type, to create a selective starch hydrolysis. Only the lineal parts are cut. The resultant glue has the same proportion of long-chain branched and linear molecules as the product in use.

This allows for good stability and weak retrogradation. After conversion, the enzyme must be inhibited by the joint action of the temperature and a metallic salt, usually zinc sulphate.

Costs, particularly in zinc sulphate, are high and the presence of zinc in the glue can generate deposits in the machine.

Continuous enzymatic conversion: Also uses an alpha-amylase enzyme. The conversion is induced in a converter, with inhibition in a jet cooker at 130°C. This allows inhibition to occur without using a chemical product and without introducing metals into the glue and therefore, the finished paper. Furthermore, thermic inhibition allows for perfect cooking when compared to discontinuous

conversion. The resultant glues are more stable and less subject to retrogradation, with lower costs.

Variations exist in the converter: conversion tube and vertical reactor.

The tube permits a decrease in the initial investment but has several inconveniences: an over-consumption of enzymes due to short contact time, difficulty in modifying the properties of the resultant glue and running at a constant speed, with a number of stops/starts which increases maintenance costs.

In view of this, Roquette has opted to develop enzymatic conversion plants with vertical reactor. The operational principle has given a constant conversion time of 20 minutes. The installation thus regulated the level in the converter to maintain this time, whatever the deficit. Recent operations have been driven by the 'isochore' principle; the reactor operates with a constant (maximum) speed and the contact time varies. The enzyme dosage is adjusted to the installation deficit to produce the same grade of conversion in all the flows. The reactor is dimensioned to obtain a contact time of 20 minutes with maximum flow. This way, the abovementioned continuous enzymatic conversion permits a further reduction in enzyme costs.

Enzymatic conversion: reasons behind this choice

It is in this context that M-real wanted to improve the coating starch cooking plant. The aim was to improve the quality of the starch mix on entry through an RMSP. "We had to improve the stability of the glue and limit the expansion of amylose-lipid complexes that carry

deposits to the machine." On the other hand, the firm wanted to maximize flexibility, to be able to absorb a capacity increase and adapt to future demands. "We also aim to eliminate zinc sulphate from the process, which can be harmful to the environment and because it can be the source of deposits in the machine," explains Isabelle Gononet-

Goutorbe, Project/Development Engineer at M-real Alizay. "After analysing the situation with Roquette, we have opted for a continuous converter that allows us to double capacity." A logical decision for Alizay as the two companies have a long standing business history, dating back to the start up of the PM at Alizay in 1991. Roquette supplies



New conveying line for recycled pulp.

at least 15,000 tons of starch solutions for mass and surface to the company every year. Furthermore, the two firms have worked together on collaborative projects to reduce amylose deposits.

Advantages of Roquette's continuous enzymatic conversion

"Started since December 2008, this installation is the biggest conversion unit in the world" emphasizes Jean Gorriez, director of French markets and Key Accounts Europe at Roquette.

The volume of the enzymatic reactor is 4,000 litres which enables an operational maximum capacity effect of 4,200 kg/hr of 560P maize starch, a Roquette product for improving paper printability.

"This system is light and flexible, which is very interesting", says Isabelle Gononet-Goutorbe. It allows for a deposit that may vary from 3 gr/m² on both sides for a 70 gr/m² paper, operating at a minimum speed of 900 m/min, to 5 gr/m² on both sides for a 90 gr/m² paper operating at a



With the new Evolve range, made with 100% recycled pulp, M-real Alizay proposes added-value products.

M-real Alizay in figures

- **Hardwood pulp:** 300,000 mt/yr capacity, iddled since 1st March until the end of 2009.
- **Paper machine:** Capacity: 320,000 mt/yr. Average speed: 1,100 m/mn. Winder trim width: 8.7 m. Three sheeters with a total capacity of 750 mt/day. More than 80% of production sold in reams.
- **400 strong workforce.**
- **Located on a 100 ha site near Rouen.**

maximum speed of 1,350 m/min. With fully automated, continuous operation according to the new 'Isochore' principle, invented by Roquette, the new equipment enable optimization of the qualitative products of the starch glue, lowering operating costs: the saving in enzymes is 30%. Another advantage is that this enzymatic conversion allows for the use of a higher quantity of dry substance in the film press. The

elimination of the use of zinc sulphate in the process fits in with Alizay's sustainable development policy.

"Compared to the discontinuous process, you can see a saving in energy and a reduction in the quantity of chemical products used," adds Marcel Dondyne, technical support and development engineer in charge of senior clients, and responsible for the Engineering Department in the 'industrial starches' commercial/marketing unit. Isabelle Goninet-Goutorbe reveals that "the operation of the PM has improved due to fewer breakages. The web deposit is also more regular now that the mix is more homogeneous, thus delivering better results."

The plant was started up in October this year with an investment of 350,000 EUR, an investment justified by the results. Viscosity levels in the starch mix are superior and the impact of this parametre on dust formation is still under evaluation. "We propose global solutions to our clients in terms of sales of starch and in terms of engineering for special request operational start ups," concludes Jean Gorriez. ●



Soluzioni e service per cilindri che trovano impiego in tutte le applicazioni del settore dell'industria Cartaria

- Gomma & Poliuretano
- New Roll shells & Riparazioni
- Hard Coating, Thermal Spray



Manutenzione in Cartiera

- Rettificazione, patinatura & verniciatura on-site
- Produzione, riammodernamento e manutenzione di cilindri allargatori



Come fornitore di azionamenti meccanici per il Service, ricostruzioni, riammodernamenti e nuove installazioni;

Sono forniti sotto il marchio Santasalo, che porta in dote decenni di esperienza sviluppata con aziende conosciute come Metso Drives, Santasalo, Valmet e Sauerwald.



Elimina gli alti costi della cera, adesivi e problemi di contaminanti

La nostra Esperienza al tuo servizio