

THE IMPORTANCE OF A GOOD RECYCLABILITY OF LABELS AND ADHESIVE APPLICATIONS IN PRINTED GRAPHIC PRODUCTS

Erwin Krauthauf
INGEDE e. V.
Oberföhringer Strasse 58
89125 Munich, Germany
E-Mail: ek@ingede.com

1. Introduction

Voluntary agreements of the paper chain in Europe and in EU member countries exist which support efforts for a good recyclability but experience has shown that the road to achieve practical improvements is full of obstacles. For getting further improvements of the recycling conditions it is necessary that the recyclability of printed products will have to get more attention by all members of the paper chain. Printed products are considered “good recyclable” when they have a good deinkability and a good degree of removability of contraries like stickers and adhesive applications which are detrimental to the recycling process if they cannot be removed. A lot of work has to be done until a good recyclability will be defined, accepted and become part of the specification for every new graphic paper product developed.

The International Association of the Deinking Industry (INGEDE) was founded 1989 by several deinking mills in Central Europe and has grown to represent the European deinking mills. The annual consumption of used graphic paper of the INGEDE members has grown to 7 million tonnes per year in 2002. INGEDE is working in all areas which will lead to better conditions for the collection and recycling of used graphic paper.

2. Recyclability of Labels and other Adhesive Applications

Adhesives can disturb the recycling process and degrade the quality of the deinked pulp if they cannot be removed to a large extent. Adhesives break down into fragments during the pulping of the recovered paper mixture in a deinking plant. Fragments of adhesives which remain in the final DIP have a serious potential to form “stickies” which have a detrimental effect either on the performance of a paper machine or on the quality of the paper produced, especially when they contain a large amount of recycled fibres (RCF).

One of the two focal points for a good recyclability of a printed graphic product is the behaviour of adhesive applications in a standard deinking process.

Many Research projects in the past have shown that it is important that adhesive applications do not disintegrate into such fine fragments in the pulping process that they cannot be removed by industrial screening operations. Development work has therefore to be directed to adhesives and their application technique to make them resistant to the pulping conditions in a deinking plant.

3. Development work

Many efforts have been made and reported in the past to develop recycling friendly adhesives, and a lot of knowledge has been built up in various research projects. FINAT and INGEDE were among the associations which funded such research projects. But experience has shown that the development of recycling friendly materials of any kind need the active involvement of the customers of printed graphic products – publishers, advertising agencies and other users. Only then the engagement of suppliers of paper, adhesives and other materials will lead to a printed product with a good recyclability.

4. Example for the development of Environmentally Benign PSAs

A very good example is a project of the United States Postal Service (USPS) which was started in the framework of “Greening the Government through leadership in Environment Management” and endorsed by the President by the Executive Order 13.148 of April 21, 2000. The target was the development of “Environmentally Benign PSAs” for stamps. The process and the results are well documented at the internet page www.usps-stamp-technology and need no further explanation.

Main facts are

- the customer defined his interest to use only environmentally friendly materials,
- the customer is active involved in the development work and
- the customer requires his suppliers to use the certified adhesives.

In the course of the development of the project a number of adhesive suppliers joined and developed new adhesives or modified existing products. The new products were tested according to the test methods developed and those which passed were entered into the Qualified Product List (QPL).

QUALIFIED PRODUCTS LIST (QPL)

The pressure sensitive adhesive (PSA) suppliers/converters ...listed below have formally demonstrated their ability to produce a PSA "lamin ate" that is in compliance with USPS-P-1238. Procurement of face stock, liner and PSA from sources other than those listed, is not authorized for PSA based stamps produced under contract or Interagency Agreement with the United States Postal Service.

Pressure Sensitive Adhesive Supplier & Code	Con ver ter
3M, 201	
Fasson,LP430/S3433/S9601/S246/S1772/S2176	Fasson (Fasson)
Solutia A2956	FLEXcon Company (Flexcon)
Air Products Inc., LC-18	MACTac, (MACtac)
DynaTech 2077	
Franklin International, Covinax 2000-21, DynaTech, 2077	United States Paper Corp/Spinnaker Coatings, Inc. (Spinnaker)

Fig. 1: USPS Qualified Product List

Suppliers which now are interested to have their product added to the QPL are required to follow the Self-Qualification Procedure. An adhesive will be entered into the QPL after passing the USPS Laboratory Recycling and Pilot Scale Recycling Protocol successfully. The cost for this elaborate procedure has to be carried by the supplier.

The USPS plans to extent the usage of environmentally benign PSAs also for other PSA applications but there has not been much information released.

5. Development in Europe

In Europe there has not been a large customer who uses the purchasing power to develop environmentally friendly paper products. But there has been progress in the last years and the understanding for the needs of the deinker has grown. Several research institutes have developed methods for testing the recyclability of printed products in general and adhesive applications in particular, in the laboratory as well as in pilot scale.

Since it is important that only one method will be used throughout Europe FINAT and INGEDE have put some soft pressure on the leading institutes to develop a common methodology for laboratory and pilot scale testing of adhesives in printed products, the project is on the way.

In research projects contracted by INGEDE in Germany the INGEDE Method 12 is used for the evaluation of the recyclability of stickers and adhesive applications. It is based on the INGEDE Method 4, "Evaluation of Macro Stickers". An adhesive application is considered to be good recyclable if the total amount of macro stickies and macro sticky area with an equivalent circle diameter of 2.0 mm is as low as possible.

6. Some results from research projects

Major concern for the users of recovered graphic paper and especially of over issues of magazines are the sticky potential of back binding (brochures) and of PSAs used for label stickers and other applications in magazines, printed advertising products and other paper products.

The German Association of recovered paper collectors and suppliers (bvse) had send a complaint to the Association of the Magazines Publishers (VDZ) about the growing amount of Stickers in magazines which causes the rejection of recovered paper by deinking mills and had asked VDZ to look for improvement. Research and development has been started by INGEDE and VDZ to identify Label stocks for Stickers which are good recyclable.

Research has shown that the variation of the sticky potential of market PSAs is enormously large, and there are PSAs available in Europe which have a very low sticky forming potential due to a good screenability. Some of them proved to be at least equal in this respect to some of the certified USPS PSAs which have been available for testing by the same test method as is shown in Fig. 2.

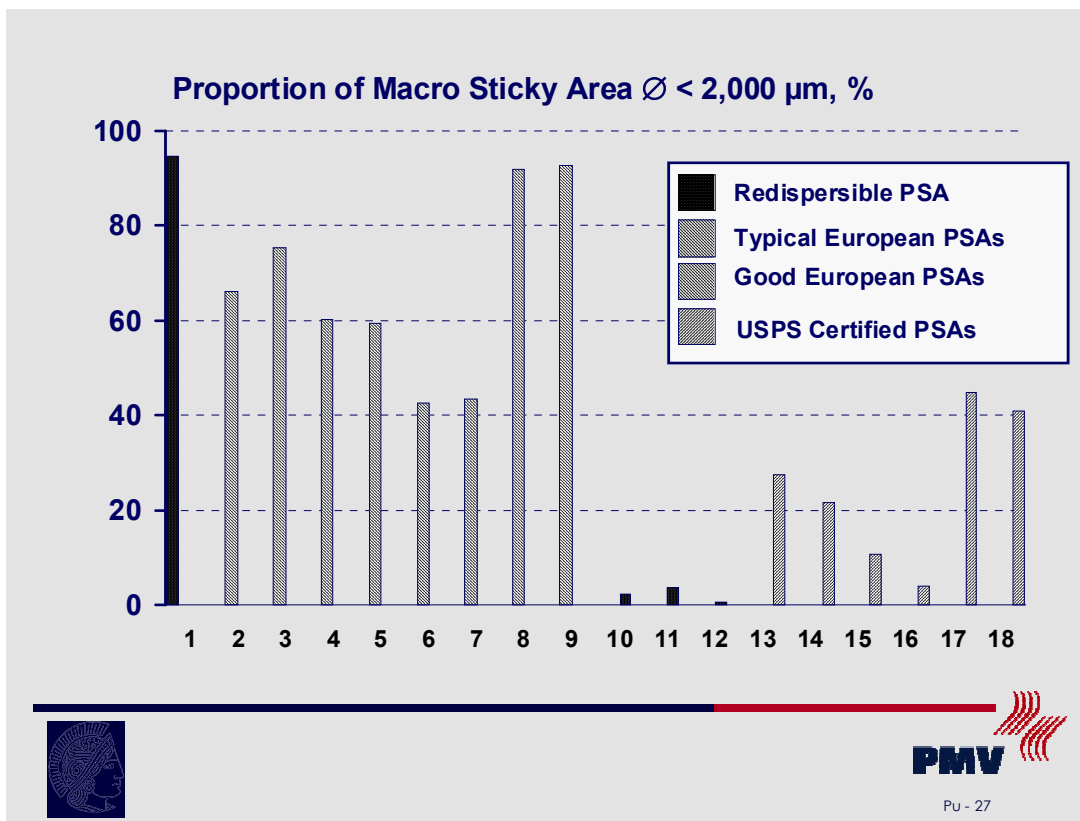


Fig 2: Sticky Potential Assessment of PSA Applications – First Test Parameter (Source: PMV)

One group of adhesives that does not qualify as recycling friendly is the group of redispersible adhesives. By the nature of their construction they disperse into very small particles when rewetted and can therefore not be removed by screening in a deinking process. This has been evaluated in several research projects, for example in a joint research project by FINAT and INGEDE which has been carried out by PTS in Munich in 1997.

7. Future work

During the last decade a lot of development work has been done in numerous research projects for keeping the recycling of paper in general and of recovered graphic paper in particular at a satisfactory level. To achieve this status all European deinking mills have continued to install new and more sophisticated equipment to offset negative developments in the production of printed graphic paper products for the recycling process. But every new process equipment will reduce the yield of deinked pulp and thus endanger the economics of the RCF process.

It is therefore of utmost importance that every member of the European paper chain accepts his share of responsibility for making printed products good recyclable. Knowledge and expertise are available and have to be used by the producers of printed products. The results of a number of Task Forces is showing that the way for success needs the common interest to achieve positive results and the co-operation of all the parties involved.

There are plans to establish a European Eco-Label “Good recyclable printed product”, and first steps have been made into this direction. This Eco-Label should be carried by all major printed products. But the need of an Eco-Label would be of much less importance if the members of the paper chain would accept their responsibility to include a good recyclability into the specification for every new printed product under development as well as for the existing printed products.

8. Conclusion

The recycling of paper is an outstanding example of a working sustainable process. In order to continue the successful recycling cycle it is necessary that the members of the paper chain – publishers, printers, manufacturers of printing presses, of printing inks, of adhesives and of auxiliary materials as well as paper manufacturers work together. It is important that a good recyclability has to become an established part of the product specification of any printed graphic matter. The greatest contribution can be primarily made by the customers of the printing industry, the advertising industry and the publishers.

Mr. Tiddens, Vice President of CEPI’s Recycling Committee concluded the “Spotlight on Paper Collection and Recycling” organised by ERPA on October 2002 at Brussels by saying “Improvements need the co-operation of all members of the paper chain. That will create winners in all areas, environment, suppliers, producers of paper and board, converters and consumers alike”.