

## INFRARED SPECTROMETER ACCESSORIES

## Simulated Long Term Storage Condition Blocking Test for Ink Transfer and Cold Seal Properties on a Gravure Printed Film – Part 2

### Introduction

Films are widely used as packaging material in a large number of industries. In the food, confectionary and pharmaceutical industries in particular, presentation plays a major part in advertising and promotion of products via effective packaging. With increasing competition among manufacturers for larger share of the consumer market, it is important to maintain the long term appearance of printed film packaging. The blocking test enables the evaluation of the transfer of ink from the printed side of the film to the unprinted side, film adhesion to itself and cold seal properties of the printed film during storage. The use of Specac Heated Platens with digital automatic temperature controller and Hydraulic Press allows the simulation of various climatic conditions on printed films for the blocking test to be performed prior to storage.

Gravure printing has gained widespread use because of high quality prints obtainable. It is however more expensive to change print design than with flexographic printing and therefore more cost effective for high quality volume or repetitive applications.



Specac's Hydraulic Press

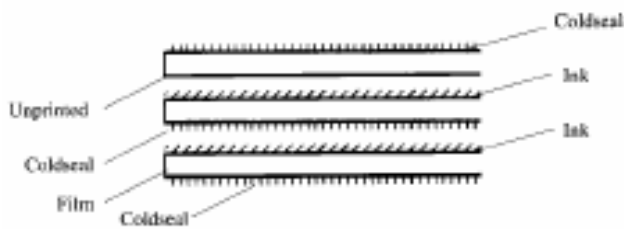
### Experiment

Treated polyethylene film was printed using the gravure process.

Two sets of gravure printed stacks were tested from cut strips (1 inch x 2 inch) of film. Each stack was made by placing the ink face of a printed film to the back face of another printed film followed by a layer of unprinted film. The two sets were pressed at ambient temperature (25°C) for 2 hours at 5 tons. One set was tested immediately

for ink blocking and film adhesion, the other set was tested after one hour “relaxation” time. The tests were repeated at 30°C and 35°C.

Coldseal adhesive was applied to the unprinted side of a film printed by the gravure method. Four sets of film stacks were prepared and packed as below (Fig.1). Two sets were pressed at ambient temperature (25°C) for 16 hours at 5 tons pressure. One set was tested immediately and the other was tested after 1 hour relaxation time. The other pair were pressed at 25°C for 4 months at 5 tons pressure and tested as the first two sets.



**Figure 1: Stack of printed film for ink blocking test**

## Results and Discussion

Manufacturing processes using film packaging are carried out universally under different climatic conditions. The gravure printed films showed no ink transfer from printed to unprinted side and film release was good, both immediately and after relaxation of the film. This was attributed to good matching of ink and treated film surfaces. Similar results were obtained at elevated temperatures (30°C and 35°C) indicating usage compatibility of the printed film in different climatic regions.

The choice of ink formulation is especially important for gravure printing where low viscosity ink is desired. To minimize cost and optimize efficiency, the vaporization rate of ink, especially in warmer climates, should be well

controlled and balanced against ink transfer to unprinted film.

Coldseal adhesive applied to the uncoated side (intended to seal the product after packaging), could be affected by the ink, or could cause film adhesion during storage if formulated incorrectly or not optimized. The films tested after 16 hours and 4 months showed no sealing failure. Generally, the maximum permissible ink block adhesion measure read on a tensiometer is for a 50gm weight applied across a 2 inch length to separate 1 inch wide of printed film.



**Specac's Heated Platens**

Specac Heated Platens and Hydraulic Press allow such critical tests to be performed, thereby eliminating the possibility of sealing failure which could be disastrous financially at the time of full scale processing. The test pressures used are generally higher than those generated at the centers of rolls of low density polyethylene films. This is to make certain that the results obtained are reliable at extreme pressure limits. Ink blocking test pressures vary for each film type

depending on the material (eg. coextruded polyolefins, cellulose) and on the tightness of the rolled printed films to be stored.

## Conclusion

Several different types of films are manufactured for the printing industry for conversion into eye catching packaging and wrapping products. The

use of Specac Heated Platens and Hydraulic Press allows an easy and quick test of printed films for ink transfer, adhesion and coldseal properties of printed films, the failure of which could be costly during product processing. Testing enables printed film requirements to be achieved at minimum cost by proper balanced formulation of ink and coated film surfaces.

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### Specac Ltd

River House  
97 Cray Avenue, Orpington  
Kent, BR5 4HE.  
United Kingdom  
T: +44 (0) 1689 873134  
F: +44 (0) 1689 878527  
E: [sales@specac.co.uk](mailto:sales@specac.co.uk)

### Specac Inc

301 Berkeley Drive, Suite B  
Swedesboro, New Jersey  
08085-1255, U.S.A.  
T: 1 800 477 2558  
T: 401 854 5281  
F: 401 463 6206  
E: [sales@specac.co.uk](mailto:sales@specac.co.uk)