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## Static and Packaging

Wednesday 8 January 2003 at Institute of Physics, London

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*Organised by the Printing, Packaging and Papermaking Group and the Electrostatics Group of the Institute of Physics*

This meeting will discuss the relevance of static electricity to packaging. This will cover problems from unwanted static, how materials for packaging may be modified or treated to reduce problems, the use of static charge to improve processes and products and how the relevant characteristics of materials may be measured. Packaging materials include plastics, paper, glass and metals, as sheets, mouldings or containers (including fabric intermediate bulk containers, FIBCs), in processes from initial manufacture through forming, filling and distribution. These issues are relevant to manufacturers, handlers and users of materials for microelectronics, powder handling and retail industries.

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| 10.00-10.30  | <i>Registration and coffee</i>   |
| 10.30-10.45  | <i>"Overview of Static and Packaging" John Chubb (JCI)</i>   |
| 10.45-11.15  | <i>"How packaging materials may affect character of static discharges relevant to damage of semiconductors and ignition of flammable gases" Jeremy Smallwood (Electrostatic Solutions)</i> |
| 11.15- 11.45 | <i>"Comparison of the electrostatic properties of antistatic Type D flexible intermediate bulk containers (FIBCs)". Graham Hearn (Wolfson Electrostatics, University of Southampton)</i>   |
| 11.45- 12.15 | <i>"Experiences at the measurement of packaging materials for electronics devices according to the new standard EN 61340-5-1" Hartmut Berndt (B E Stat)</i>                                |
| 12.15-12.35  | <i>"How to clean web surfaces for quality printing" Reinhold Rutks (Swedish Electro Static)</i>  |
| 12.35-13.30  | <i>Lunch</i>   |
| 13.00-13.30  | <i>Annual General Meeting of the Printing, Papermaking and Packaging Group</i>   |
| 13.30-14.00  | <i>"Use of electrostatics with 'in-mould' labelling" Reinhold Rutks (Swedish Electro Static)</i>   |
| 14.00-14.30  | <i>"Using static creatively in packaging" Graham Dawson (Arrowquint)</i>   |
| 14.30-15.00  | <i>"Temporary pinning with electrostatic charge: method &amp; applications" Mark Sheldon (WLT)</i>   |
| 15.00-15.15  | <i>Tea</i>   |
| 15.15-15.45  | <i>"Recent developments in long range static elimination" Chris Francis (Meech)</i>  |
| 15.45-16.15  | <i>"Methods to assess the suitability of materials" John Chubb (JCI)</i>   |
| 16.15-16:30  | <i>Discussion</i>  |
| 16:30        | <i>End of Meeting</i>  |

### **“Overview of Static and Packaging” John Chubb (JCI)**

Introductory comment to note the wide range of ways static electricity is relevant to packaging. These include attraction of atmospheric dust and dirt affecting cosmetic appearance and printing quality, cling, handling thin films in manufacture, shock and ignition risks (e.g. printing and FIBCs). Static may be helpful in holding items in place. Topics to be presented cover control of static in processing operations to assessment of materials.

### **Comparison of the electrostatic properties of antistatic Type D flexible intermediate bulk containers (FIBCs) Graham Hearn (Wolfson Electrostatics)**

FIBC's generally fall into 4 classifications A, B, C and D. Type D refers to an FIBC design which has 'anti-static' qualities even when used ungrounded.

A number of manufacturers now produce FIBC designs which are classified as type D most of which are similar in construction and comprise woven polypropylene fabric with a partially conductive coating, and/or partially conductive parallel threads.

In this investigation the electrostatic performance of 6 commercially available type D designs were compared by monitoring the following parameters.

1. Electrostatic charge migration rate over fabric surface.
2. Electrostatic potentials developed during emptying/filling with polypropylene beads.
3. Ignition of propane/air mixture set at 0.25mJ minimum ignition energy from the FIBC wall during filling/emptying of polypropylene beads.

The results of these tests are presented and discussed.

### **“Experiences at the measurement of packaging materials for electronics devices according to the new standard EN 61340-5-1” Dipl-Ing H Berndt (B E Stat)**

Experience is reported on the measurement of special ESD material. In the first part the problems of the conductive rubbers on the probes are described. A new small probe is used for the measurement of several packaging materials.

### **"Temporary pinning with electrostatic charge: method & applications" Mark Sheldon (WLT)**

Experience is described in using corona charging to temporarily clamp together multiple insulating films and insulating and metal films. Comments will be made of the various ways electrostatic pinning is useful in industrial operations.

**“Recent developments in long range static elimination”** Alan Chadwick, Business Development Manager, Meech

Contamination is a major problem for packaging producers, especially where highly insulating materials are used.

Until recently, the only way to provide effective longer range static neutralisation was to use conventional AC powered static eliminators in conjunction with air provided by fan or compressed air systems.

However, such systems cause contaminants to be blown back onto the neutralised substrate. Also, compressed air systems are associated with high running costs.

This presents the packaging processor with a dilemma - the need to neutralise the static charges that attract airborne contaminants but using conventional static elimination systems that can themselves create contamination.

Recent developments in AC and Pulsed DC static elimination systems can present a solution to this dilemma.

**“Methods to assess the suitability of materials”** John Chubb (JCI)

The best way to avoid problems from static, and the best way to ensure reliable constructive use of static, is to get right the characteristics of the materials involved. While it is not always possible to make materials suitable, so additional local control methods are needed, this is a good objective. Test methods will be outlined measuring for charge decay, capacitance loading and shielding.