

Heat-seal lamination splitting

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Sheet splitting by heat seal pouch lamination

Sheet splitting refers to the operation of dividing a paper sample into distinct layers (or splits) parallel to the plane of the sheets. Innventia has developed a splitting technique based on hot lamination of the sample onto a plastic film. The technique can be applied to any paper product from thin tissue to multi-ply paperboard and solid board. The largest sample size is A3 (297 mm × 420 mm).

Sheet splitting for studies of structure and behaviour

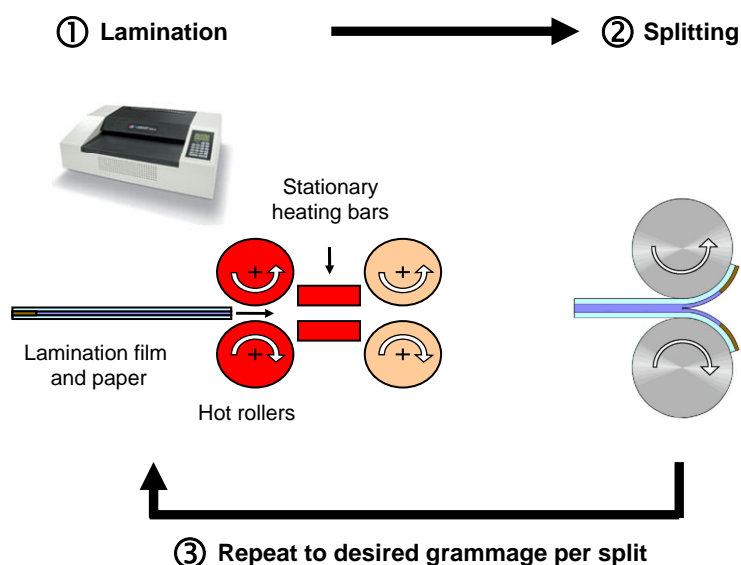
Parallel splitting of paper is of great practical interest since it enables the characterization of composition and structure across the thickness direction of the sample. Sheet splitting is the first step when measuring local fibre orientation, z-directional formation profiles, local ink penetration depth or wire marks. The large size of the samples opens for study of the correlation between sheet structure and paper properties and behaviour. The printing properties of the surface, the cockling pattern at a change of humidity and the out-of-plane dimensional stability are three examples of features that can be correlated to and explained by the local structure of paper.

The method

Sheet splitting by heat-seal pouch lamination takes place in two consecutive steps:

1. The sample is sandwiched and laminated between two transparent plastic multi-layers, comprising a hot melt adhesive and a non-melting substrate.
2. Splitting the sample in two layers by separating the plastic laminates.

These two steps are repeated until each individual layer has reached the desired grammage: *e.g.* 5 – 8 g/m² for measurement of local fibre orientation or 10 – 15 g/m² to characterize z-directional formation profiles.



The penetration of the hot-melt adhesive and consequently the thickness of the individual splits can be controlled by selecting:

- The plastic laminate.
- The temperature of the heating elements in the laminator.
- The residence time in the laminator.

A flexible and reliable technique

Sheet splitting by heat-seal lamination is a reliable technique with significant advantages:

- Good repeatability.
- Handling of large scale sample (up to A3).
- Applicable to all paper products (tissue to multi-ply paperboard).
- Produces thin and homogeneous splits with controlled grammage.
- Produces flat splits covered in transparent plastics, which simplify image acquisition by flat-bed scanning.
- Allows reconstruction of the 3D structure by using reference markings.

Contact

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