KPM

WE CRAFT ASSURANCE

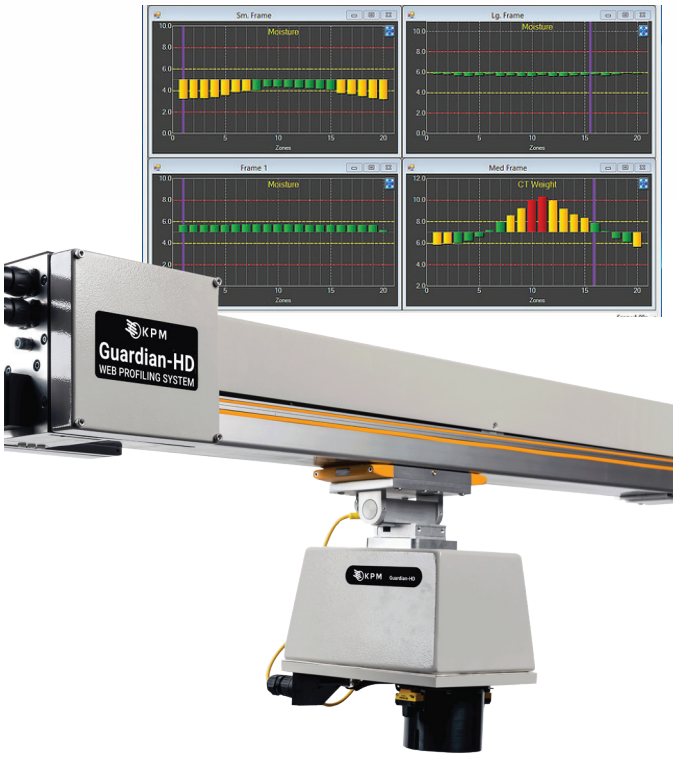
APPLICATION NOTE

In-Line Measurement of Coat Weight for Pressure Sensitive Adhesives

Pressure sensitive adhesives are a unique form of adhesive that are permanently tacky at room temperature. They adhere to substrates under pressure via polar attractive forces rather than forming chemical bonds. The two most common types are rubber and acrylic based. The rubber-based adhesive is more economic but lacks the physical and chemical stability of the acrylic based adhesive.

There are three distinct ways of applying PSAs:

- In solvent – the adhesive ingredients are polymerized in solvent, then cast onto the web.
- As hot melt – hot melt is coated onto the web then cooled before/during wind-up.
- Emulsion based – the adhesive ingredients are polymerized in water, cast on the web, and dried.



The Guardian-HD Web Profiling Series is a rugged and world-class analyzer to measure moisture, coat weight, adhesive thickness, and web temperature for all paper, film, and web-converting processes.

PSAs CAN BE SINGLE-COATED, DOUBLE-COATED, PATTERN-COATED AND SELF-WOUND

Single coatings are bonded to one surface, referred to as the face stock, typically film, PE foam, paper, tissue or non-woven. A release liner, silicone coated, PET, PE or poly coated Kraft is applied to protect the adhesive layer.

Double coatings are used to bond two substrates, different PSAs can be used on each side of a carrier (typically plastic film, tissue, or non-woven material), the carrier add strength to the adhesive configuration.

Transfer tape is unsupported adhesive film, it is coated onto a release liner. Used in medical packaging, it is frequently pattern coated.

Self-wound systems comprise face stock coated with PSA on one side, and silicone release on the other. Examples include diaper tapes and short roll lengths of tape. PSAs are used in the manufacture of specialty tapes, medical packaging, surgical drapes, and laminated film.

MEASUREMENT OF COAT WEIGHT IS IMPORTANT FOR 2 MAIN REASONS:

1. Adhesive coating needs to be uniform in the area to which it is applied, to provide a high coefficient of adhesion between the two substrates.
2. To minimize usage of costly acrylic, the aim is to apply the minimum quantity of coat weight to achieve adhesion.

MANUFACTURING PROCESS

This varies according to the product being manufactured, but essentially the solvent-based and aqueous-based adhesives are applied through an excess application system such as a Mayer rod coater, or a metered system, such as a transfer coater or gravure roller.

The possibilities vary according to the process, but if the PSA is applied in aqueous solution, the most accurate measurement is made on the wet end, measuring water and inferring dry coat weight from the solid's ratio %. Dry end measurements are made on PSAs and on solvent-based systems to avoid the need for NEMA 4 sensor housing for the latter. Solvent wet end is feasible, especially if coat weight is low, but solvent ratios must be maintained, and sampling errors can be significant if not carefully controlled.

MEASUREMENT PERFORMANCE

Measurement	Product/Location	Range	Typical Accuracy
Coat weight	Rubber adhesive (wet end)	5-75 gsm	+/- 0.3 gsm
Coat weight	Acrylate adhesives (dry end)	10-30 gsm	+/- 0.3 gsm
Coat weight	Adhesives (water based wet end)	5-50 gsm	+/- 0.15 gsm
Coat weight	Adhesives (solvent based wet end)	5-50 gsm	+/- 0.25 gsm

Scan here to learn more about the Guardian-HD Web Profiling Series Analyzer

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