TAILORING ADHESIVE COAT-WEIGHTS
A toolkit for solutions providers

Technical Capabilities for added value
UPM Raflatac’s Technical Capabilities offer you a world of opportunity to create products with high added value and fit-for-purpose functionalities. Our solutions bring together technical and materials expertise, world-class production technology and a thorough understanding of your business.

Technical Capabilities for added value

Take control of a major influence on adhesive performance

Adhesives are formulated according to the demands of the application. This is the general foundation for successful adhesion.

Factors taken into account include the relative surface energies of the adhesive and labelled substrate, temperatures during label application and service life, and degrees of resistance required to exposures such as water, oils and UV light.

But there’s another aspect to adhesive selection that has a major influence on the characteristics of the adhesive, and therefore the overall performance of label stock and labels. Significant benefits are to be gained by tailoring the adhesive coat-weight.

Tailoring your adhesive coat-weight...

- Helps resolve issues in label conversion, dispensing and final application
- Supports modification of the strength and reliability of the final adhesion to get an ideal fit to the application
- Adapts an existing solution to a change in the labelled substrate
- Profiles your business as a solutions provider meeting specific needs
- Reduces the risk or frequency of recurring quality and stoppage claims

Qualify your solutions faster!

Modifying the coat-weights of adhesives already approved by the end-user is typically quicker and more cost-effective than qualifying a totally new adhesive.
A toolkit for solutions providers

Tailored adhesive coat-weights offer a range of benefits when they are increased for rough surfaces and reduced for smooth surfaces.

Coat-weight increased

Rough substrates like coarse plastics, grained and pitted metals, big bags, wood, pallets and concrete present a challenge to successful adhesion.

Contact is limited between the adhesive and substrate, which restricts wet-out and in consequence final adhesion. Increasing the adhesive coat-weight increases its tack – a precondition to good wet-out and strong final adhesion.

• Helps resolve issues with poorly adhered labels and label loss. On rough substrates it’s possible to double or even triple the strength of final adhesion!
• Increases the reliability of adhesion when there’s a wide variation in substrate profiles.
• Provides more dependable results and makes work more efficient when labels are applied by hand due to higher initial tack.

Coat-weight reduced

Smooth substrates like glass, glossy plastics and polished metals are extremely favourable to good adhesive wet-out. High tack isn’t required to secure close and uniform contact with the substrate.

This leaves potential to reduce the adhesive coat-weight without compromising the strength of final adhesion – even with high performance adhesives used in demanding applications like Durables labelling.

• Helps resolve issues with adhesive bleeding during label conversion.
• A solution to inconsistent unwinding on-press (‘picking’).
• Reduces resource consumption, which improves environmental performance.
Dramatic gains on rough substrates

By increasing the adhesive coat-weight, dramatic gains in the strength of final adhesion are achieved particularly on rough substrates.

This is because higher coat-weights increase an adhesive’s tack. Tack defines the ability of the adhesive to ‘wet’ the substrate. The more uniform the wet-out, the greater the contact area between the adhesive and substrate.

Modest adhesive contact on rough surfaces provides less than optimal results even when the adhesive composition is well-optimized to the substrate’s composition. Tack from an appropriately high coat-weight is therefore a precondition to strong final adhesion. Final adhesion is measured as ‘peel’ strength.

Based on tests carried out in UPM Raflatac’s R&D labs, these graphs represent the increases in tack and therefore final adhesion achievable with increased adhesive coat-weights on rough substrates. The degree of performance improvement varies according to individual combinations of adhesive, substrate composition and substrate roughness.
Room to tune on smooth substrates

On smooth substrates, the gains in final adhesion achieved with increased coat-weights are less significant than can be achieved on rough substrates.

Certainly the adhesive will have higher tack, but achieving good wet-out on smooth substrates is usually not such a challenge. As illustrated by data from a particular set of UPM Raflatac test data below, increasing the coat-weight therefore has a modest effect on peel, which measures final adhesion.

Conversely, it is because smooth substrates are so favourable to good wet-out that it is often possible to marginally reduce the coat-weight without significantly reducing final adhesion. Any sacrifice in tack and peel must be balanced, for example, against performance improvements pursued in label conversion and dispensing.
Use our resources to put your own tailored solutions to the test

UPM Raflatac has the technical resources, in-house expertise and R&D facilities to evaluate and develop tailored solutions case-by-case, according to your requirements. For example, the tests for the results presented on the previous pages were conducted as follows:

To ensure that comparable laminates were used, PET White TC50 was selected as the label face for all tests, and RC18 adhesive coat-weights of 20, 25 and 30 g/m² were coated in a single coating run.

Tack was measured with FINAT’s Loop Tack test, and peel (the strength of final adhesion) was measured with the Peel Adhesion 180° test. Details of the FINAT test methods can be found from FINAT’s handbook or UPM Raflatac’s Adhesive Book.

FINAT test methods are modifiable in various ways according to the demands of the intended application.

The test substrates were:
- Glass (smooth and polar)
- Smooth HDPE (smooth and non-polar)
- Rough Aluminium (rough sandblasted SA2.5 with corundum 0.8–1.2 mm, polar)
- Rough PP (roughness 200 microns, non-polar)

Loop Tack
(FINAT Test Method FTM9)

The tack value describes initial adhesion on a substrate.

Peel Adhesion 180°
(FINAT Test Method FTM 1)

Peel or final adhesion describes the permanence of adhesion of pressure sensitive adhesives, or how well the adhesive/label sticks to the substrate.
Contact us for advice and optimization

UPM Raflatac tailored adhesive coat-weights are for solutions providers wishing to optimize adhesive performance or help resolve issues in conversion, dispensing and final application.

In most cases, it is likely that your first option will be to select the most suitably adapted solution from UPM Raflatac’s extensive and continually developing adhesive range. Tailored adhesive coat-weights then meet very precise needs. They are also the right choice when modifying an adhesive already approved by the end-user; it is often preferable to starting a lengthy new qualification process.

UPM Raflatac’s expertise and resources are at your service. Tell us what you want to achieve, and we’ll evaluate your options, and set up tests to identify the optimal solution. Contact your local UPM Raflatac representative for assistance and advice.

The effects of modified adhesive coat-weights presented in the previous pages are indicative. Similar results will be achieved for other combinations of adhesive and substrate, but they will vary in each case. The degree to which the coat-weight can be increased or reduced is dependent on the adhesive and the intended application.