

















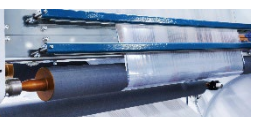

The Stood-up Drop: A versatile method with many applications

18 cases and growing - see if you find what you're looking for!

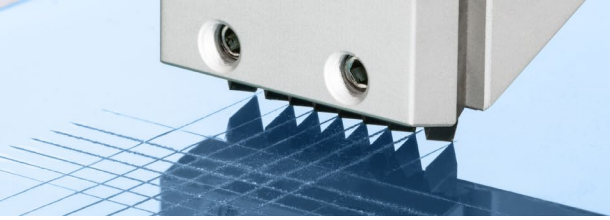
	1	Reducing the number of cross hatch tests		7	Evaluating flame treatment for car interior
	2	Characterizing pressure sensitive adhesives (PSA)		8	Cleaning control of metal parts before welding
	3	Pretreatment of a protective foil before laminating		9	Water repellency of medical fabrics
	4	Adhesion of stamped parts as rolled goods on films/liners		10	Dewetting behavior of coated aluminum surfaces
	5	Cleaning control of stamped metal parts		11	Adhesion force of PU-based adhesives
	6	Optimizing pretreatment time for atmospheric plasma		12	Quality control of coated textiles

The Stood-up Drop: A versatile method with many applications

Cases 13-18 - see if you find what you're looking for!

	13	Checking vapor transmission after plasma treatment		16	Sticking behavior of adhesive labels
	14	Correlating the SUD with ink test results		17	Activation of flexible films for reduced delamination
	15	Conveying behavior of printing rollers		18	Cleaning control of electrical boards

Case 1: Reducing number of cross hatch tests



Our customer's work field

Does **cross hatch tests** to

- develop a new coating process
- do QC for existing coating process

Questions

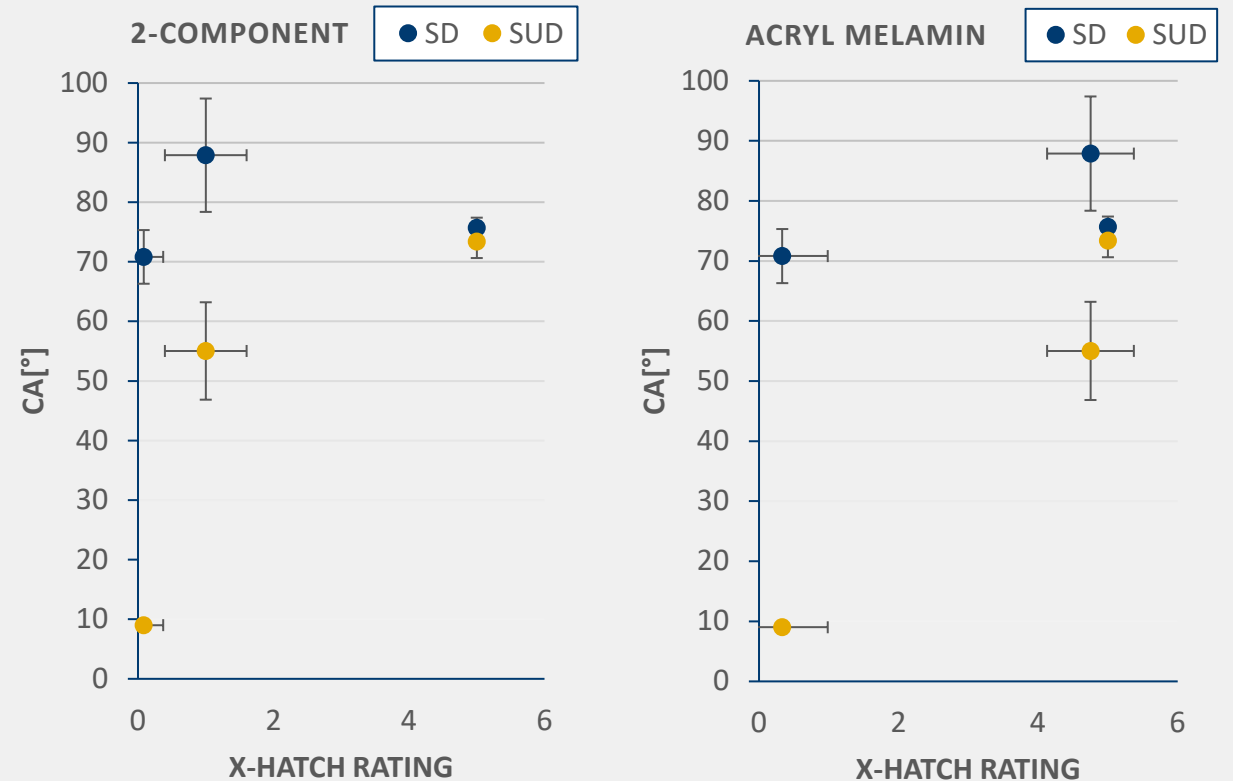
Would any of three new substrates need pretreatment when applying two established lacquers? Can **lengthily cross hatch tests be avoided** in the future?

Our approach

We analyzed three substrates with SD and SUD before coating with 2-component or acryl melamine lacquer and subsequent cross hatch test.

Our results

Simple SUD test allowed to predict cross hatch test failure.



Our customer now prescreens substrates with fast and easy SUD tests before starting with time-consuming cross hatch tests.

Case 2: Characterizing pressure sensitive adhesives (PSA)



Our customer's work field

Develops **pressure sensitive adhesives** (PSA).

Questions

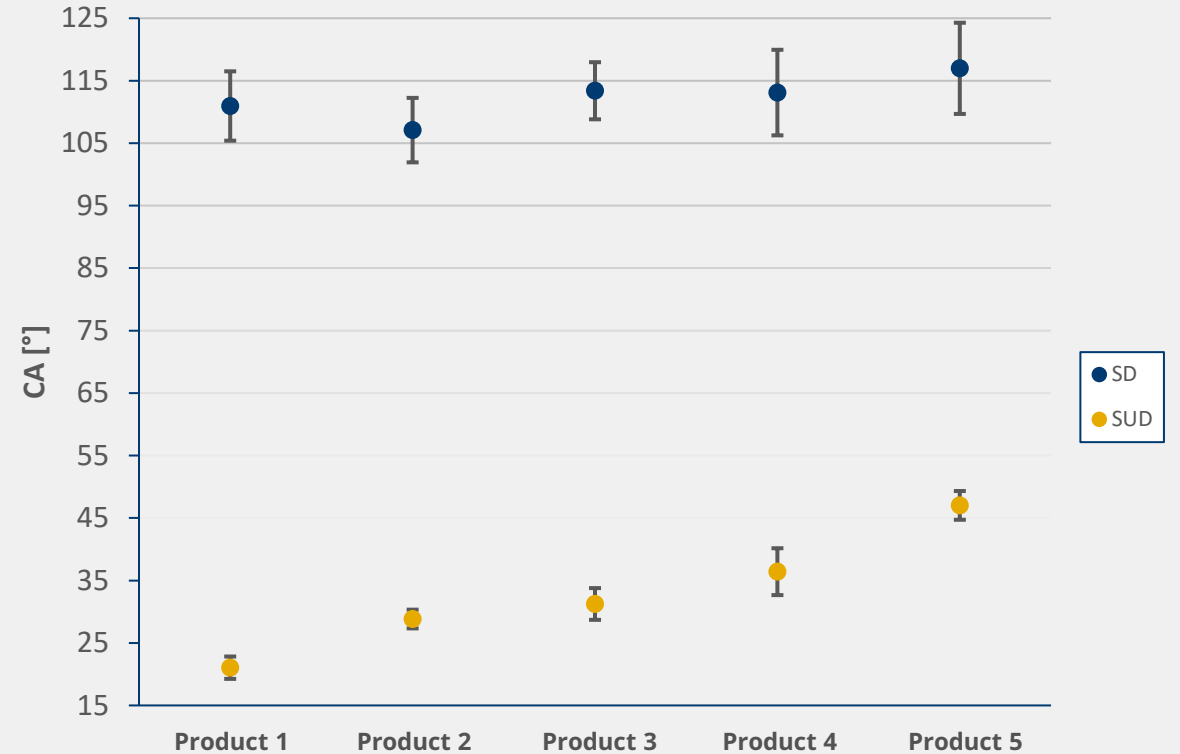
Is there a **better technique for characterizing PSA layers** on a tape?

Our approach

We analyzed five different adhesive tapes with SD and SUD.

Our results

Only SUD shows significant difference among the tapes.



Our customer now is happy about the “widened scale”, i.e. a more sensitive method which is also closer to the dewetting process of a tape being removed.

Case 3: Pretreatment of a protective foil before laminating



Our customer's work field

Polymer based product-protection solutions such as **surface-protection foils**.

Questions

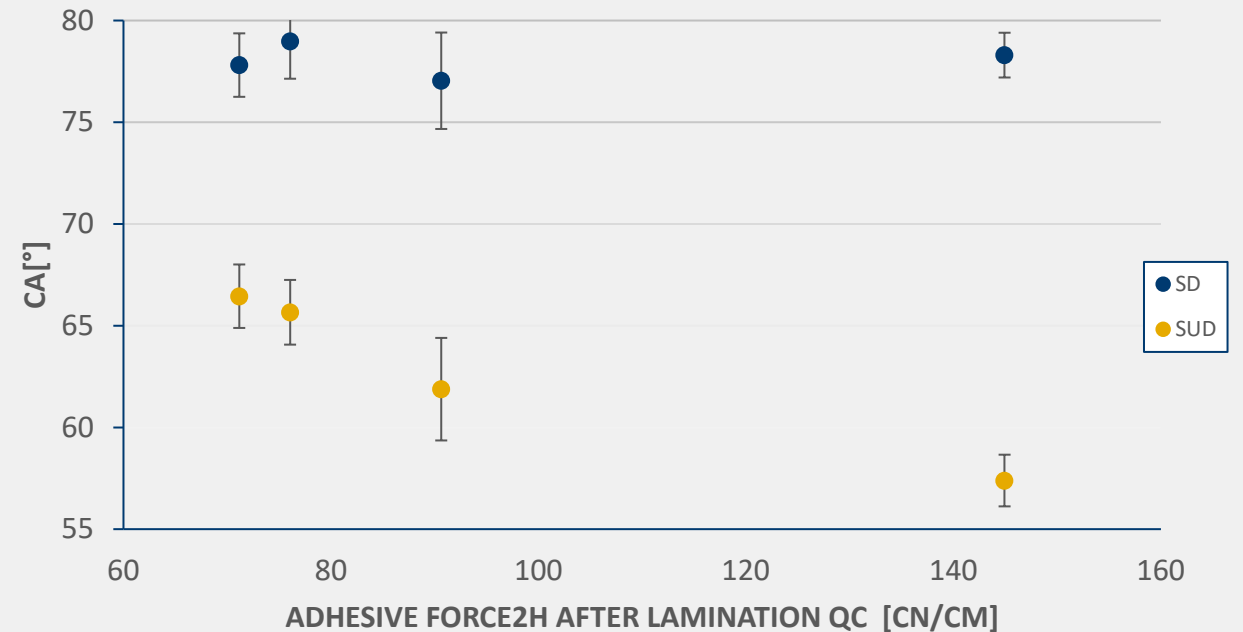
How are the surface chemical settings prior lamination to be set to **assure well adjusted adhesive force** between protection foil and the surface to be protected?

Our approach

We analyzed the foils with 4 different surface chemistry settings with water SUD and full SFE analysis before lamination and subsequent adhesive force tests.

Our results

Only the SUD data showed a correlation to the subsequently determined adhesive force values.



Our customer now, as an already satisfied MSA user, is looking forward to using SUD to even better predict delamination by means of dewetting measurements.

Case 4: Adhesion of stamped parts as rolled goods on films/liners



Our customer's work field

Produces stamped **metal parts** (seals, washers...).

Questions

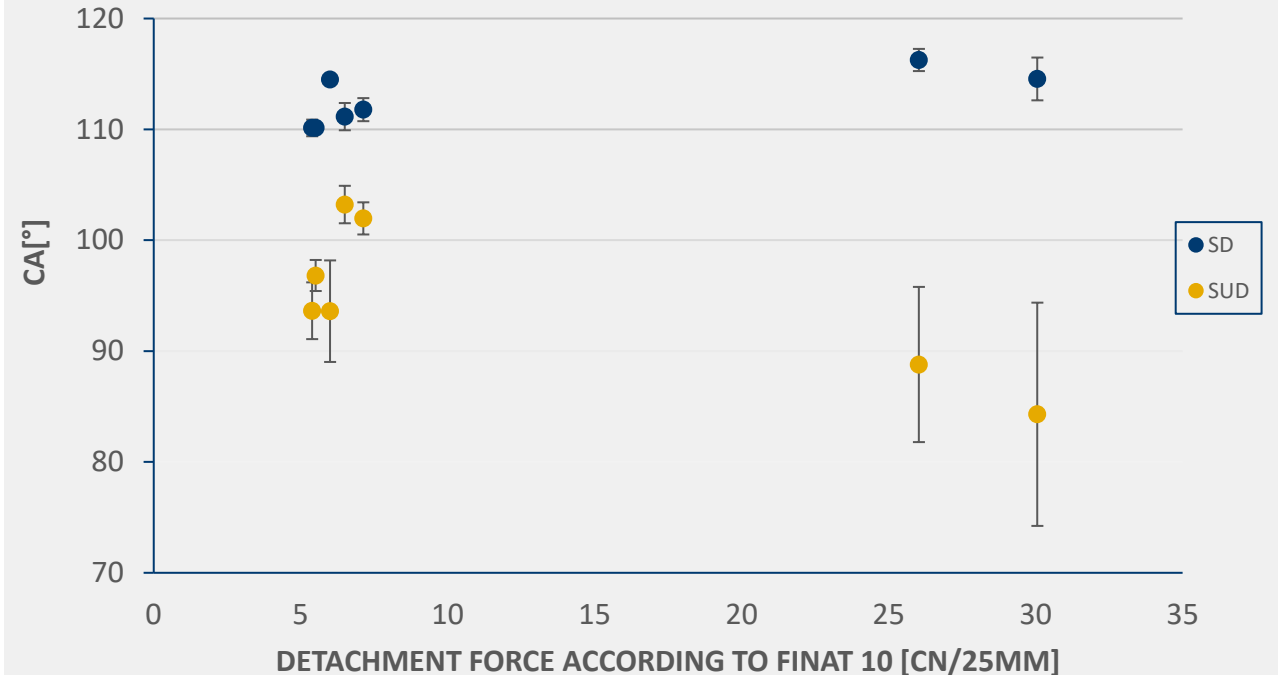
Stamped parts on plastic films and liners should stick and also be easily removed, but the quality of films purchased is fluctuating. The **stickiness test** (*FINAT 10 standard*) used is lengthy and not ideal. Is there a better way?

Our approach

We analyzed 7 different films with SUD and SD and characterized the detachment force according to *FINAT 10* standard.

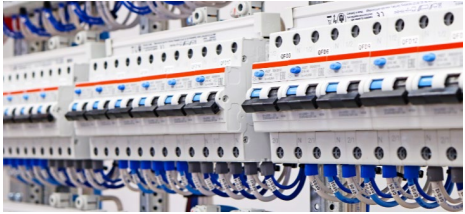
Our results

The lower the SUD CA the larger the detachment force.



Our customer now is measuring the RCA on each incoming foil and looking forward to using the SUD as an even faster and more user-independent tool to characterize the foils.

Case 5: Cleaning control of stamped metal parts



Our customer's work field

Produces **electromechanical switchgears**, among other parts.

Questions

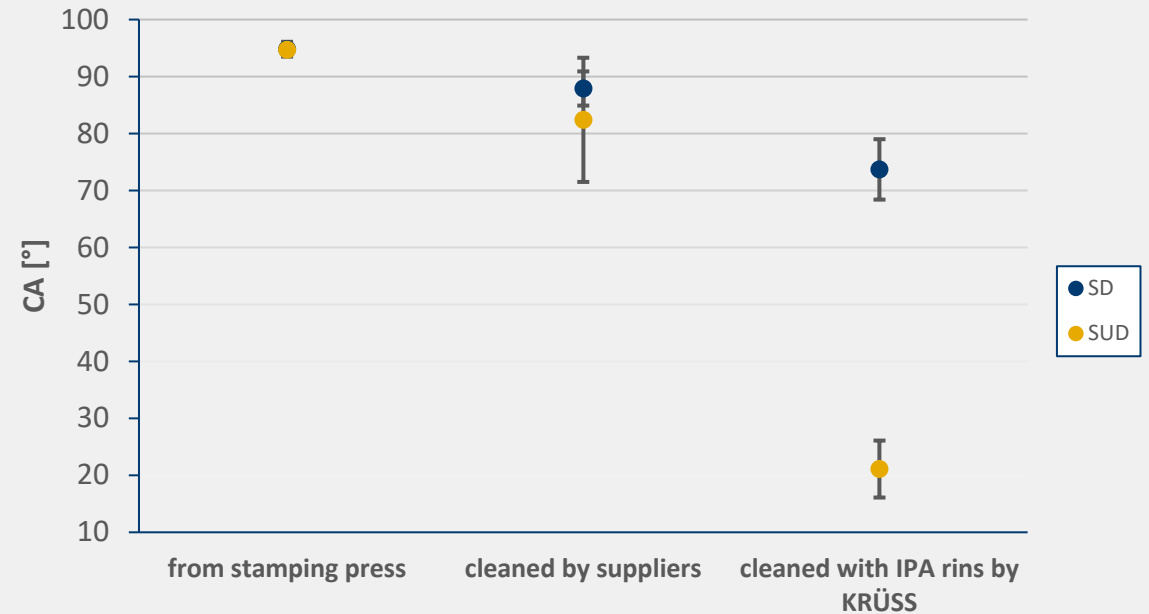
Built-in metal parts must be cleaned from the oil used in the stamping process. So far, they produced these parts themselves and had full control over it. But how can **cleanliness be monitored** when the parts are sourced externally from now on?

Our approach

We measured SD and SUD on these parts: directly out of stamping press, cleaned by supplier, cleaned at KRÜSS with IPA rinse.

Our results

Both methods could detect differences but the SUD exhibits a significantly wider scale and turns out to be the more "safe" test method for the cleanliness.



Our customer now uses simple SUD measurements for control the cleanliness of incoming goods.

Case 6: Optimizing pretreatment time for atmospheric plasma



Our customer's work field

Atmospheric **plasma treatment**.

Questions

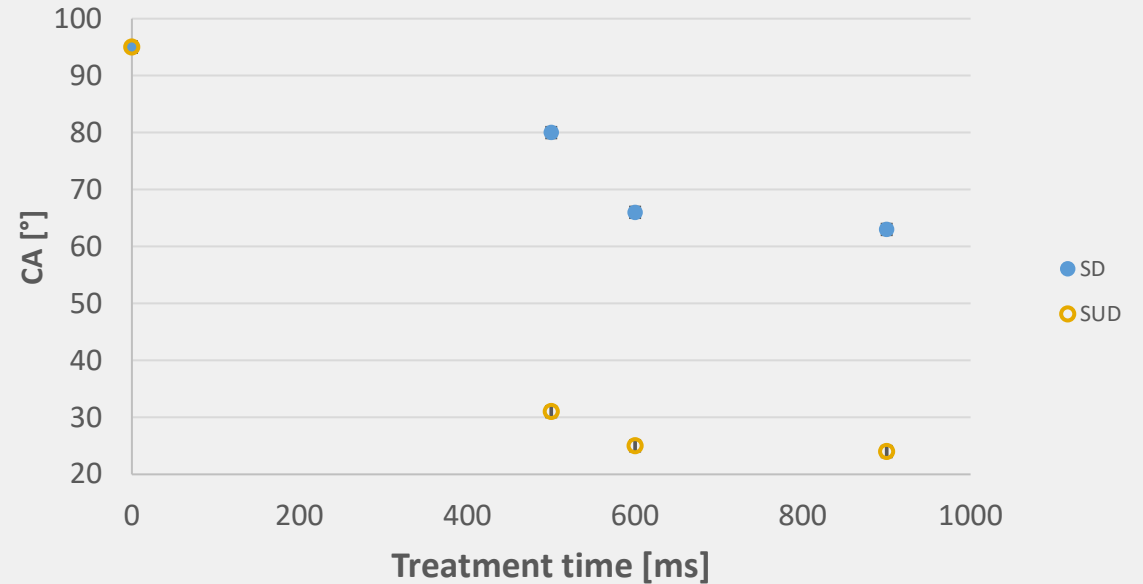
How can **optimum pretreatment times** of workpieces be determined?

Our approach

We measured SD and SUD on the work piece after four different treatment times of the atmospheric plasma.

Our results

Whereas both methods detected differences, the SUD showed a significantly *wider scale* and was the more accurate test method to monitor the plasma treatment



Our customer now is happy to broaden their portfolio of analytical methods to monitor best the effect of their plasma machines.

Case 7: Evaluating flame treatment for car interior



Our customer's work field

Automotive interior (dashboards, steering wheels).

Questions

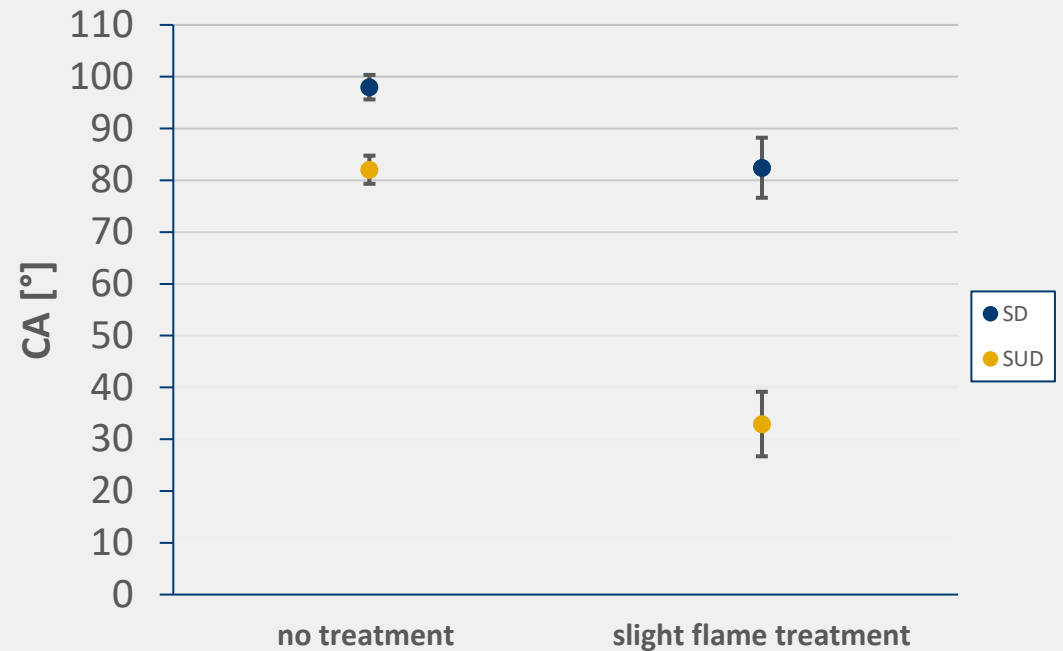
The customer laminates dashboards with a leather imitate. He found that flame treatment greatly increases the cohesive-failure area in destructive testings. Since SFE measurements failed to track the flame treatment, is there another alternative to test inks?

Our approach

We measured SD and SUD of the untreated and flame treated leather imitate (polymer based).

Our results

The SUD CA was found to be significantly more sensitive in detecting the effect of a flame treatment than normal SD.



Our customer now is looking forward to using SUD as a simple tool to optimize and control the flame treatment process.

Case 8: Cleaning control of metal parts before welding



Our customer's work field

Automotive supplier for electronic components.

Questions

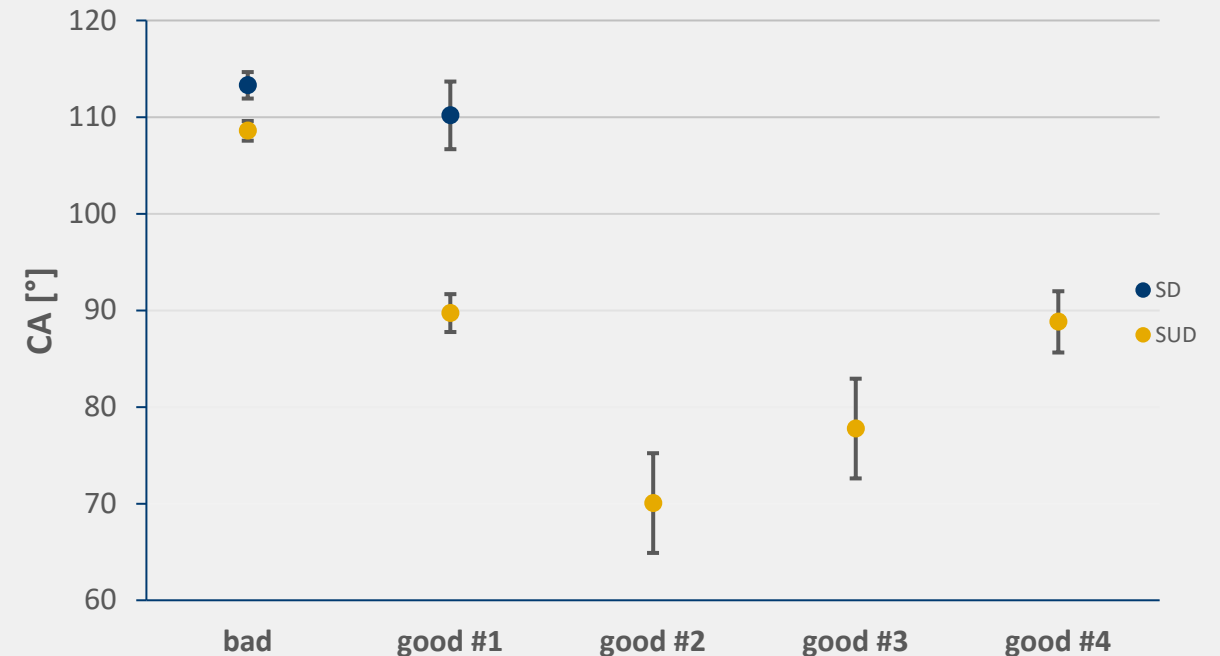
The customer processes punched/stamped metal parts as connectors. These need to be cleaned before they undergo an ultrasonic welding process. The customer observed that some parts exhibited bad welding results. Is there an analytical method to screen the parts prior welding?

Our approach

We measured SD and SUD on the connectors of "bad" and "good" charges.

Our results

Only SUD CA was able to predict the welding failure of the connectors.



Our customer now Is looking forward to using SUD as a simple tool to reduce welding failures of the punched connectors and optimize their cleaning process.

Case 9: Water repellency of medical fabrics



Our customer's work field

Manufacturer of **medical fabrics** like bandages and wound care.

Questions

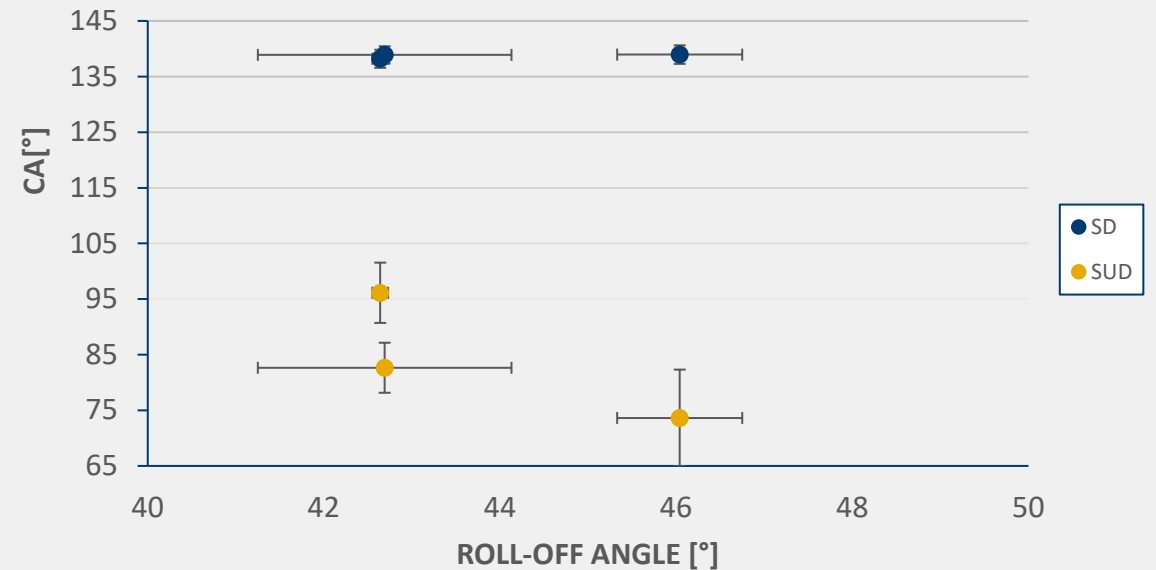
The customer is coating bandages with natural rubber and currently **characterizes water repellency and coating homogeneity using roll-off angle (ROA)** experiments. Is there a quicker and more user-independent prescreening method for the fabrics?

Our approach

We measured SD, SUD, and ROA of three different fabrics.

Our results

The SUD allowed to discriminate the different fabrics and allowed a prescreening with respect to the water roll-off angle.



Our customer now is looking forward to start with a quick prescreening on many sample spots with the SUD before he starts with the more detailed analysis of the roll-off angles.

Case 10: Dewetting behavior of coated aluminum surfaces



Our customer's work field

Produces **water repellent coatings** for aluminum surfaces.

Questions

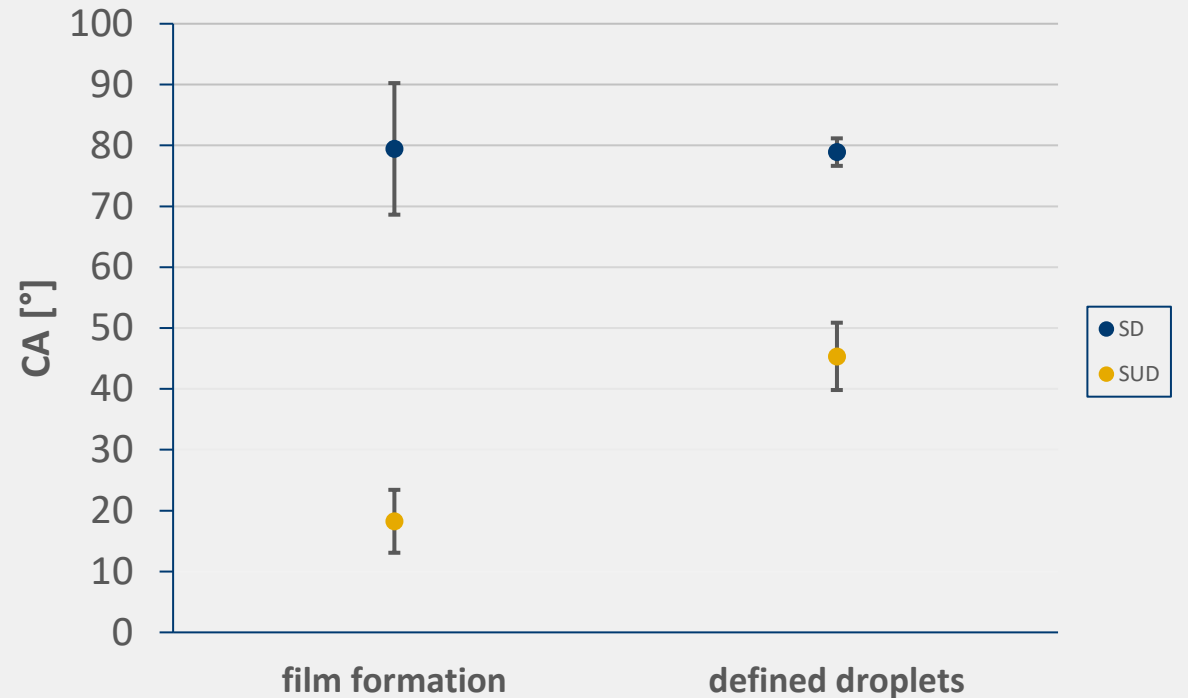
The customer currently does **raining simulations** on inclined surfaces, in which water either **flows off as liquid films or rolls off in defined droplets**. Time-consuming roll-off tests could not reliably predict this behavior. Is there an easy and quick method to pre-screen the coating prior the elaborate raining tests?

Our approach

We measured SD and SUD on two substrates, one showing *film formation* and one showing *droplet formation* in raining simulations.

Our results

Only the SUD allowed a clear discrimination between the two differently behaving samples.



Our customer now is looking forward to doing quick pre-screenings on many sample spots with the SUD before he starts with the more detailed analysis of the roll-off angles.

Case 11: Adhesion force of PU-based adhesives



Our customer's work field

Produces polyurethane based adhesives.

Questions

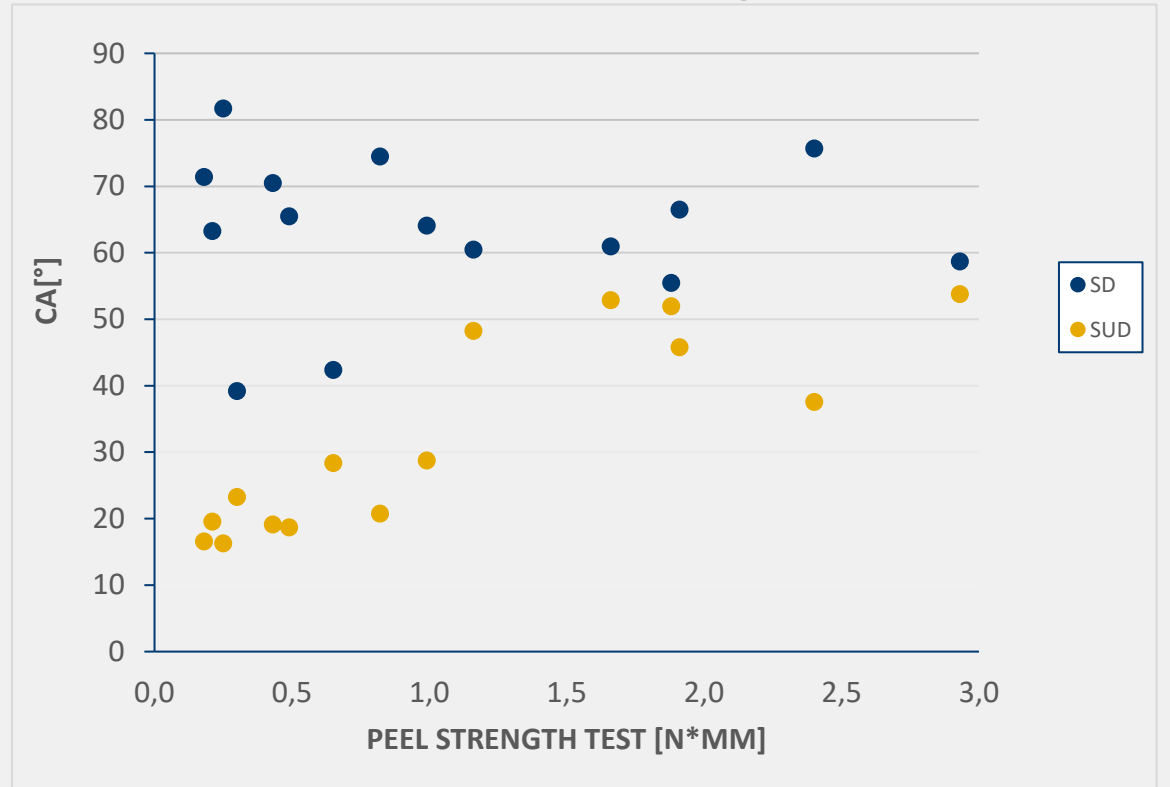
The destructive **adhesion force test** by measuring the peel strength are **labor and time intensive**. Is there a new method to expand the analytical portfolio and increase development speed for new or better products?

Our approach

We measured the SD, SUD, and full SFE on 15 different PU samples and correlated the results with the adhesive peel strength between these glues and one defined substrate.

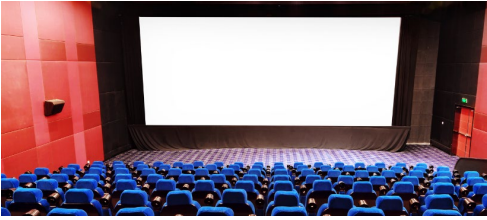
Our results

Only the SUD allowed a prediction of the peel strength from the destructive adhesion-force testing.



Our customer now is happy to use another quick, easy and meaningful method for his product development.

Case 12: Quality control of coated textiles



Our customer's work field

Produces cinema screens, coated textiles.

Questions

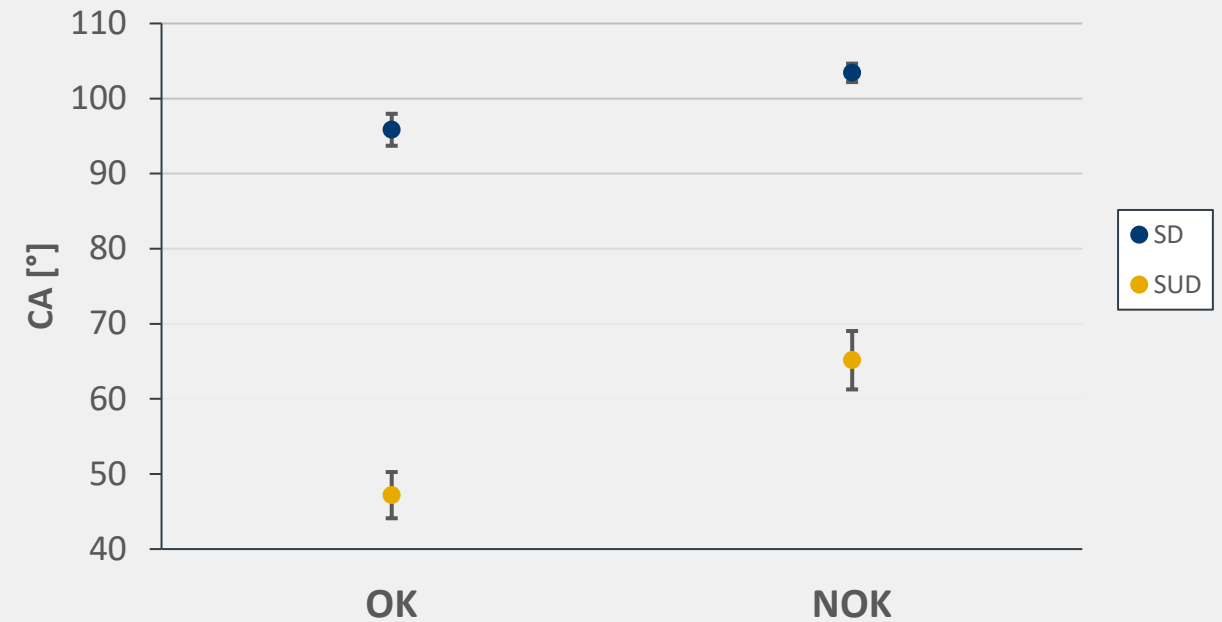
The customer produces screens for cinemas. In his production he observed that some fabric led to finished products that were OK and some that were NOK. He could not detect differences with normal CA (SD). Is there another way?

Our approach

As always if normal SD does not differentiate samples, we measured both SD and SUD on the "OK" and "NOK" samples.

Our results

The SUD was shown to be significantly more sensitive in differentiating between "OK" and "NOK" samples.



Our customer now is using SUD measurement to control his samples.

Case 13: Checking the vapor transition after plasma treatment



Our customer's work field

Film and foil producers in food and medical packaging.

Questions

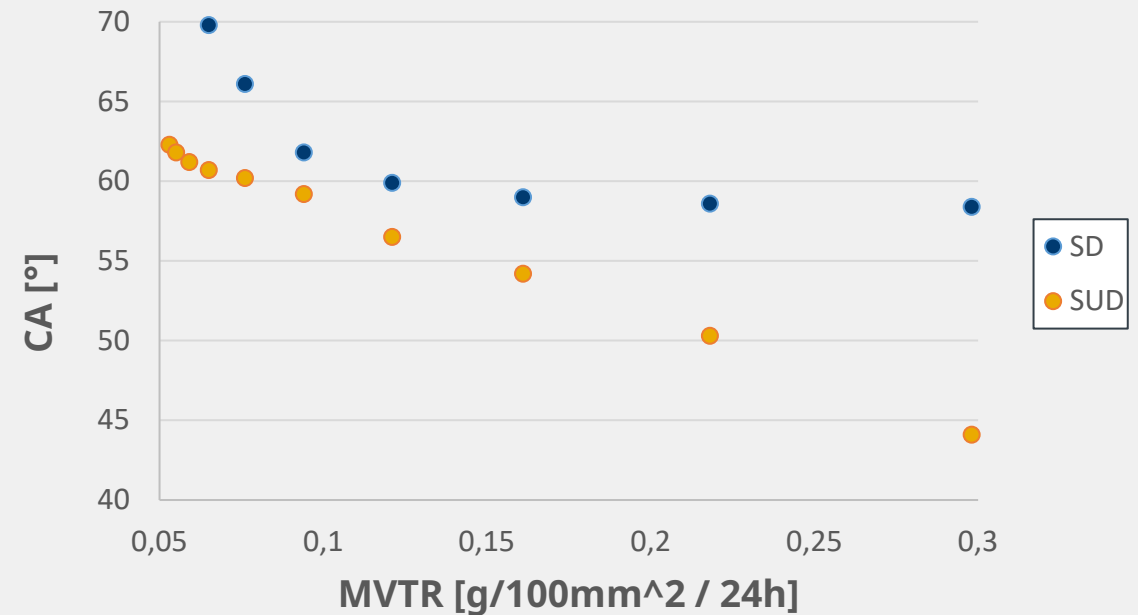
To control protection of packagings from water, time extensive (12h!) **Moisture Vapor Transmission Rates (MVTR)** are determined. When foils are corona treated the MVTR can be increased. Is there a quicker tool to see **how corona treatment affects the MVTR?**

Our approach

We measured advancing (SD) and receding contact angle (SUD) as well as MVTR of differently corona-treated polymers films.

Our results

SUD showed a linear correlation to MVTR performance in the relevant area, thus being more sensitive than SD.



Our customer now quickly and easily follows MVTR using SUD.

Case 14: Self-challenge - correlating the SUD with ink test results



Our challenge

Considering the fact that ink tests are based on receding behavior, we wanted to find out whether **test ink results for different plastics** correlate with the RRCA.

Questions

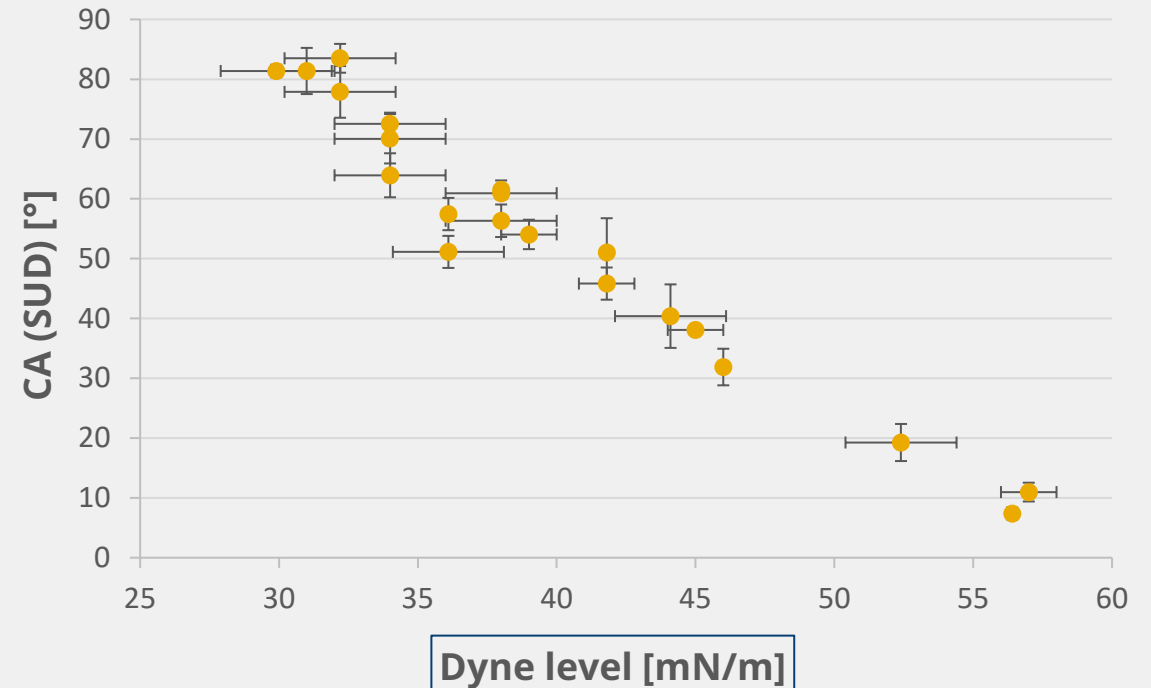
Is there a way to **replace test inks by the SUD** in quality control while building on existing data and quality limits? Can the **relationship between test inks and contact angle** results lead to a solution?

Our approach

We carried out ink tests with ethanol-based inks on several untreated and treated polymers and compared results with the RRCA measured with the SUD.

Our results

The SUD showed a good correlation with the “Dyne level” determined with test inks.



Our conclusion is that a calibration curve between test ink results and the RRCA can be used to determine a “digital dyne level”.

Case 15: Conveying behavior of printing rollers



Our customer's work field

Material development of rubber formulations for printing rollers.

Questions

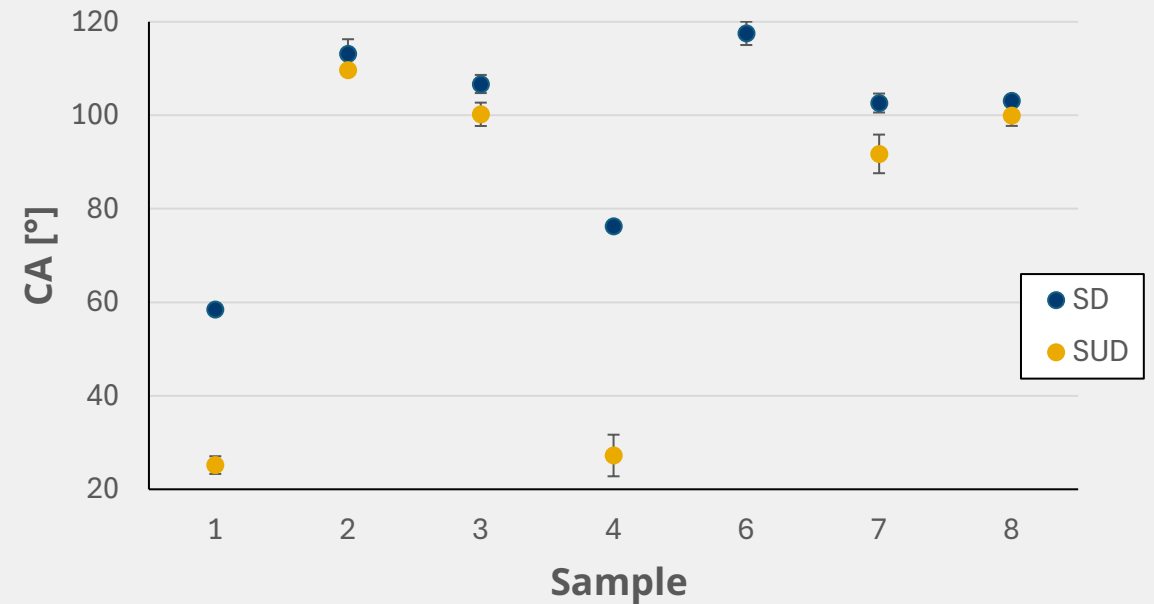
Is there a way to predict the paint conveying behavior of printing rollers even when it was not possible to reliably differentiate between samples with the sessile drop?

Our approach

We measured SD and SUD of several material compositions.

Our results

Different samples could be clearly distinguished by both methods, but SUD showed greater differences between different formulations. Identical samples (and 1/4) showed reproducible values.



Our customer can now make a preliminary assessment of the expected conveying behavior depending on the rubber compound.

Case 16: Sticking behavior of adhesive labels



Our customer's work field

Production of **adhesive labels**.

Questions

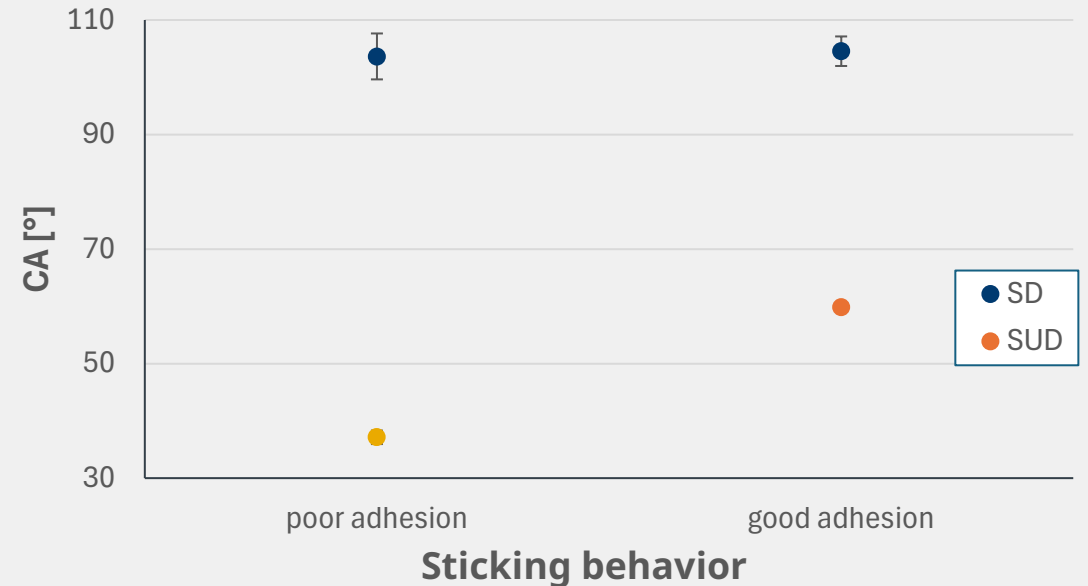
One **glue** for the labels **detached too easily** while the other showed good adhesion. **Peel-off tests did not produce usable values to differentiate** between the two. Is there another possibility to assess the glue?

Our approach

We measured the SUD of the labels with satisfying adhesion and the ones which did not stick to the substrate.

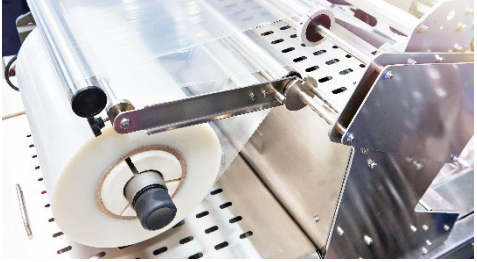
Our results

The SUD showed that the labels with better adhesion had a higher CA compared to the non-sticking labels while the SD did not show any difference.



Our customer can now differentiate between usable and non-usable labels using a simple and safe method.

Case 17: Controlling film activation to prevent delamination



Our customer's work field

Flexible packaging, inks, coatings.

Questions

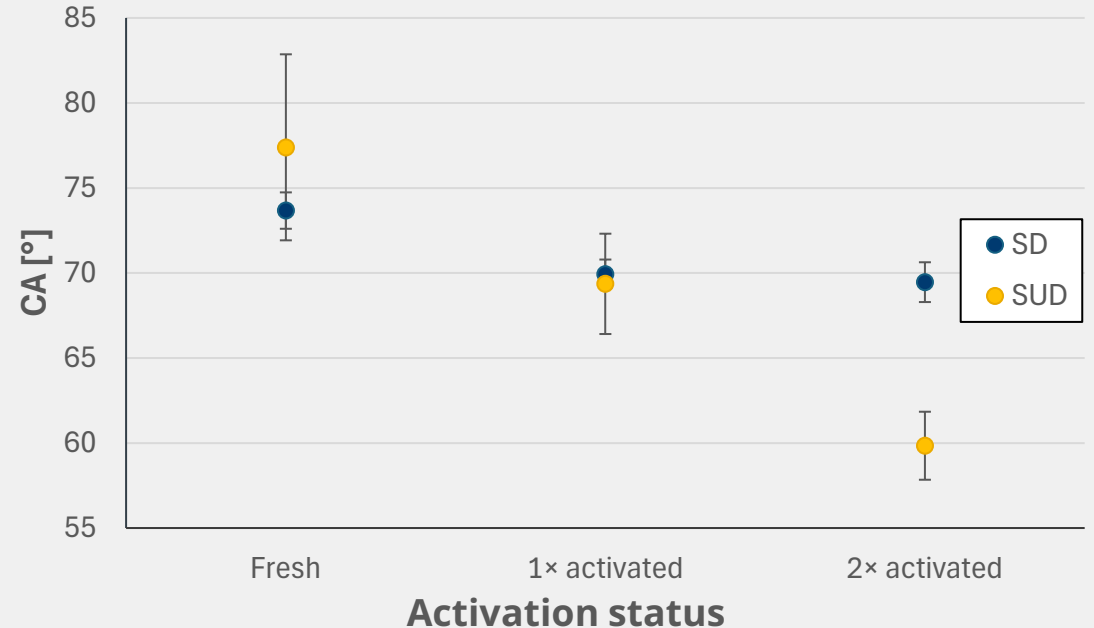
CPP-films are **activated to prevent delamination**. Current measurement methods were not reliable or too cumbersome. Is there **a more precise and faster method** to be used on the production site?

Our approach

We measured SD and SUD of the films before and after activation.

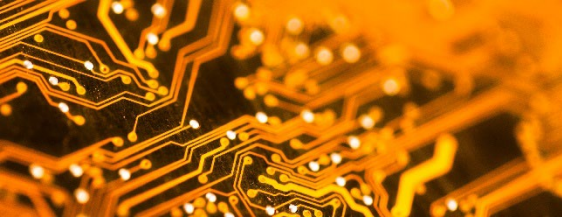
Our results

The SUD can clearly distinguish between the different samples. The sessile drop (SD) was similar for all samples.



Our customer now can use SUD to assess activation of the CCP films. The results are more trustworthy than previously used test inks.

Case 18: Cleaning of electrical boards



Our customer's work field

Manufacturing computer modules and building systems for embedded computing.

Questions

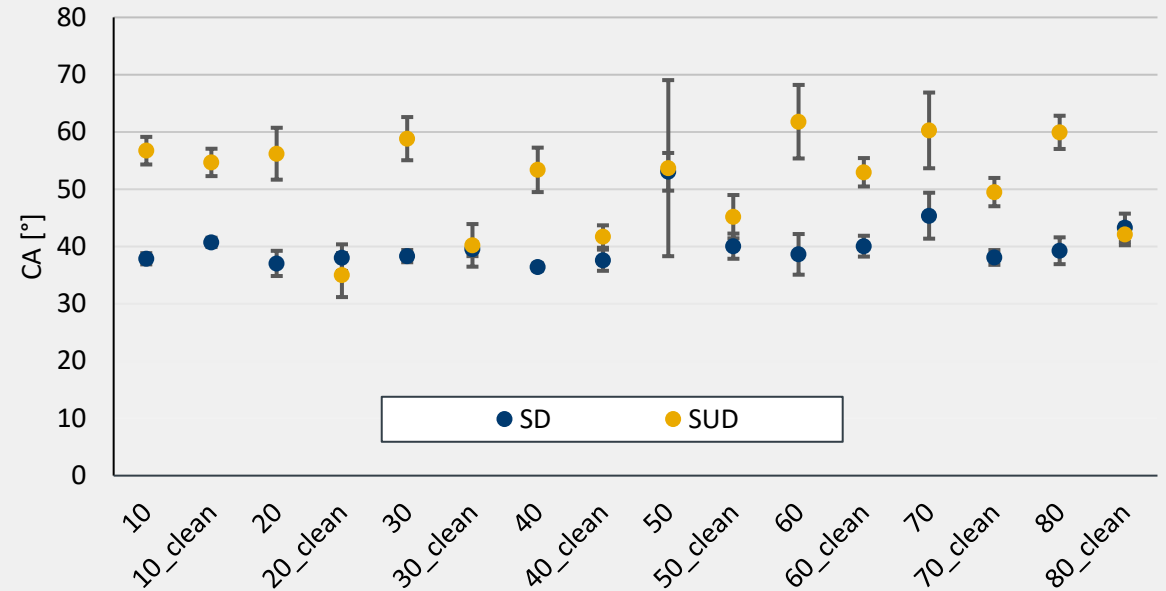
Some modules show poor adhesion after glueing. The customer wants to know whether this behavior correlates with differences in the contact angles measured beforehand.

Our approach

We measured SD and SUD on the edge of several boards before and after cleaning with isopropanol.

Our results

Compared to the SD, the SUD showed bigger differences between samples and between the same sample before and after cleaning.



Our customer can now use the SUD to check cleanliness and thus predict the adhesion outcome.