Sustainable linerless solutions with TEGO® RC Silicones

EVONIK
Leading Beyond Chemistry

NO LINER – NO WASTE

LINERLESS LABELS WITH TEGO® RC SILICONES

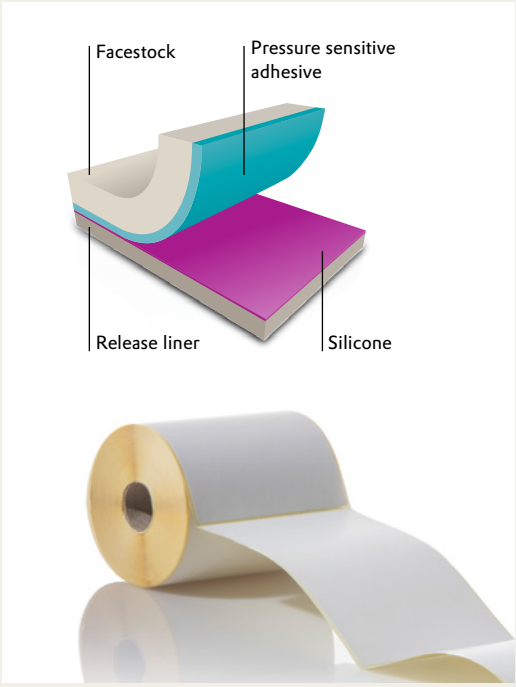
Labels play an important role in today's economy. The global production of pressure sensitive labels is approximately 26 billion square meters and is expected to grow with more than 4% a year.

One approach to reduce waste and costs are to make the backing paper thinner. Reusing and recycling the release liner only apply for a minor portion.

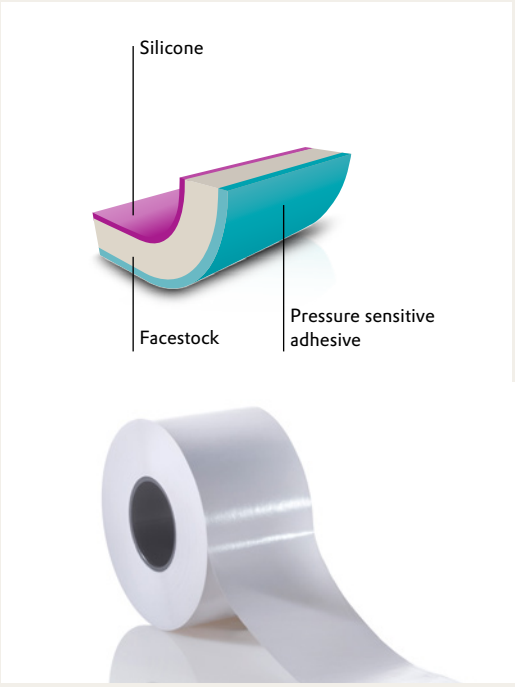
This cannot be the only answer to the requirements today for sustainability, preservation of natural resources, energy efficiency and waste prevention standards. The far more sustainable solution is linerless technology, which does not require any carrier at all.

THE CONCEPT OF LINERLESS

LABELS WITHOUT A RELEASE LINER



STANDARD LABEL OR TRADITIONAL PRESSURE SENSITIVE LAMINATE
Standard self-adhesive labels consist of 4 layers: a label-face, adhesive, silicone coating and a release liner. The liner accounts for up to 40% of the weight and is therefore also a major driver of material costs. After the labelling process, the liner becomes expensive waste.



LINERLESS LABELS
Linerless labels consist of 3 layers: a silicone-based release coating, an adhesive and label-face. The label is wound directly into a roll, like adhesive tape. The silicone coating ensures that the windings separate cleanly and quickly before dispensing the individual label.

In recent years, the interest in linerless labels has increased enormously. Here, the labels no longer stick to the release liner, but are wound directly into a roll, similar to adhesive tapes. A silicone-based release coating ensures that the individual windings separate cleanly, quickly and without any residue before further processing or labelling.

Linerless labels offer clear advantages for the labelling process and the eco-balance by providing less waste, more efficient and flexible labelling processes, as well as a reduction of CO_2 in production, logistics and disposal. Hence linerless labels are already being used effectively in numerous applications, from health and beauty, food and beverage to postal and logistics applications.

Linerless labels are especially suitable for thermal labels for variable print information. Likewise, prime labels can also be produced. Especially wrap around labels are rapidly growing in food packaging. Many good reasons for the increasing interests in linerless labels. The label industry is ready for the next step – get rid of the release liner. No liner, no waste.

TEGO® RC FOR LINERLESS LABELS APPLICATIONS

The very robust free radical curing mechanism of TEGO® RC Silicones can be a key for linerless label applications on a wide variety of paper and filmic surfaces. Curing at room temperature allows coating of thermal sensitive materials like thermal papers. Since the silicone curing is completed in fractions of a second, adhesive can be applied inline on one coating line. TEGO® RC's advanced curing technology allows paper and filmic labels to be siliconized on top of the print, no interference with the substrate, dye and printing. The reverse side of the label is coated with adhesive and the label is rolled up without a liner, just like a tape.

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THERMAL LABELS

Variable Information Print (VIP) thermal labels represent a major part of pressure sensitive labels. Key applications are in weight scaling, fast food, warehousing, and transportation, driven by increasing on-line sales. Today in Europe about 275 million parcels are delivered daily, representing several million square meter of labels. Standard VIP thermal labels can be easily adapted to liner free labels. This explains why today many thermal labels are already linerless. UV curable TEGO® RC Silicones work well without activating the heat sensitive dye of the thermal paper. The release coating is applied on top of the thermal sensitive face stock and cured by UV radiation. It adheres in a fraction of a second. The adhesive is coated on the backside when the label is wound on itself like a tape. The thermal printing of the image appears underneath the translucent silicone coating. Especially suitable for labels used in weight scale systems, transportation, warehousing, logistics, point of sale solutions and business form applications.

Evonik offers TEGO® RC especially designed for thermal linerless label applications. These TEGO® RC release coatings can be applied for manual and auto applied labels. Contamination of the electronic printing head and label cutting tools is reduced to allow high production efficiency, long printing cycles at high quality.

CHARACTERISTICS AND ADVANTAGES

- Flexible label length
- High tact rates
- Premium surface feel and look
- Improved surface protection against scratch, water, oil, and abrasion
- High accurate scan read rates

PRIME LABELS

Today, linerless technology and applicator systems are available for both primary and secondary product decoration labels. Linerless technology offers manifold opportunities for decorative labels for packaging containers and for consumer products.

In standard prime labels the release liner plays an important role in the production for both hand-applied and automatically dispensed labels, i.e. for die cutting or during the dispensing. In the production of prime linerless labels a process liner is laminated to allow for die cutting and removal of the matrix. After dispensing the labels with a standard label dispenser, the process liner is rewound and can be reused multiple times before being recycled. Separation of single labels can be also achieved through a laser perforation step.

No liner, no matrix, lower thickness and reels with much more labels bring several additional benefits like less raw material, improved logistics, and lower CO_2.

CHARACTERISTICS AND ADVANTAGES

- Applicable for, but not restricted to rectangular shaped labels
- For decorative and informational printing
- Labels to be separated by cutting tool or via perforation
- Die cutting and dispensing through reusable process liner
- In case of microperforated labels no process liner for dispensing is needed
- Full in-line label finishing
- Laser printing of variable information prior to dispensing possible

WRAP/SLEEVE LABELS

Sleeve labels are a subgroup of prime labels. One major application of prime labels are so called wrap around labels printed on carton board paper, standard paper grades or filmic substrates. The labels are printed rectangular to the roll direction. These linerless labels are pre-printed (one and two side print labels are possible) and often coated with a pattern/stripe coating of silicone and adhesive. This application is ideal for packaging of fresh food (poultry, meat, fish, desserts). Innovative solutions demonstrate that such linerless labels can take over additional functions as becoming the lid of a fruit box. In-line variable data can be added with laser print during the dispensing process on the container. Innovative solutions on the material and equipment broaden the opportunities for linerless labels.

CHARACTERISTICS AND ADVANTAGES

- Printed paper or film for the label face
- For decorative and informational printing
- Pattern coating of silicone and adhesive possible
- Produced as a linerless roll label
- Label is cut on a special dispensing tool
- Variable information printing prior to dispensing possible
- Different label formats (top, one/two sided/C-wraps) are possible

GENERAL ADVANTAGES ACROSS ALL LABEL APPLICATIONS:

Performance	Logistics	Sustainability
Flexible/Customizable label length	Reduction of logistic footprint	Better CO_2 footprint
Surface Protection	Extended reel duration: 50% more labels on reel	No release liner waste management
	Less downtime in label dispensing	

SMART SOLUTIONS ARE SUSTAINABLE

LINERLESS LABELS HAVE SIGNIFICANT SUSTAINABILITY BENEFITS WITH UP TO 40% REDUCED MATERIAL USAGE AND CO_2 EMISSIONS.

With conventional self-adhesive labels, the liner accounts for up to 40% of the weight and is therefore also a major driver of the overall cost of materials. After the labelling process, the liner just becomes very expensive waste. In the EU alone, around 400,000 tons of paper is disposed every year, worldwide the figure is 1.2 million tons. Although in the EU about 35% of the total waste of release liner material is fed back into recycling processes, a large part of high-quality and costly cellulose paper still ends up in landfills or incineration, further adding to the waste problem. At first glance, the equation for linerless labelling sounds simple: no substrate is equal to no waste. There is an overarching benefit for sustainability which comes with this solution that the whole value chain can take advantage of. The converter as well as the user generate no waste for a release liner, that they need to take care of in terms of collecting and disposing or sometimes even paying fees. A model calculation shows that for every 1.000 m^2 of label, around 75 kg of CO_2 can be saved compared to a standard label, which equals to a saving of 40 %. Increasing public discussions about environmental protection is changing consumer behavior to be more ecological, and manufacturers are adapting too – the search for environmentally friendly packaging solutions is increasing.

The relevance of this solution will grow in times when e-commerce reaches new records all-time highs year on year. Sustainable, flexible, reliable and cost-effective labelling – with TEGO® RC silicone coatings from Evonik, for the right ecological and economic balance.

29 billion square meters*

of release liner waste can be avoided worldwide every year

A model calculation shows that for every

1,000 m^2 of label, around **67 kg**

CO_2 can be saved compared to a standard label, which equals to a saving of **41 %**

*The figures are based on 2021 market data. Source: AWA

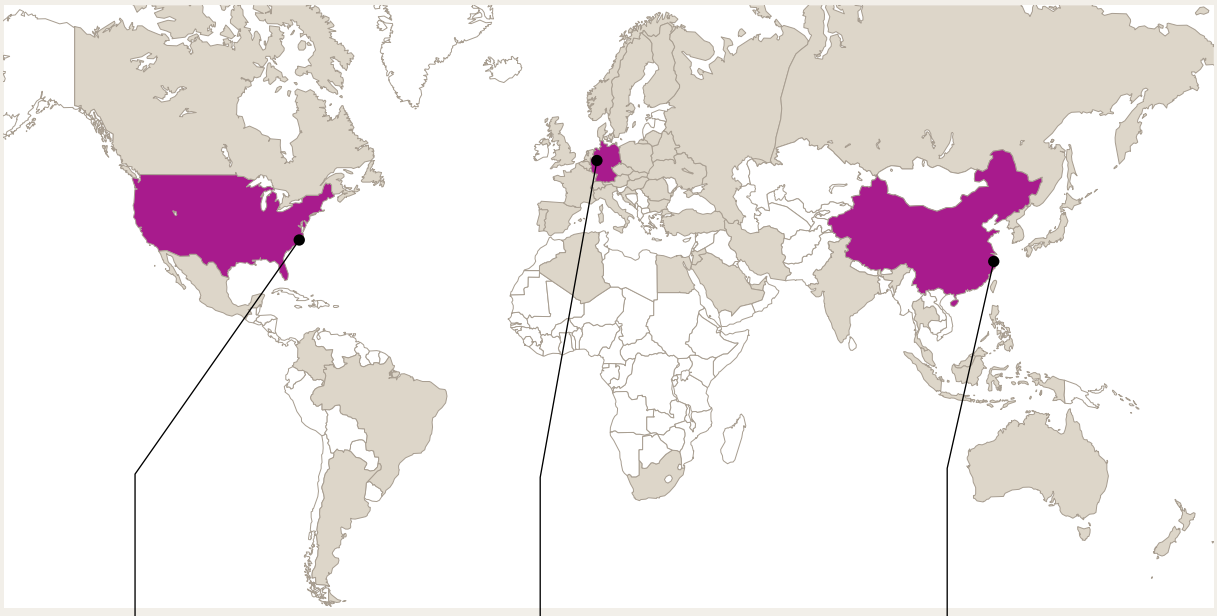
TEGO® RC SILICONES STAND FOR FACE-TO-FACE PERFORMANCE

WITH EVONIK'S MULTIPLE GLOBAL LOCATIONS OF PILOT LINES AND LABORATORY TESTING FACILITIES WE ASSIST YOUR DEVELOPMENTS AND SPECIFIC FORMULATIONS.
OUR TEAM OFFERS CLOSE CONSULTATION TO ENTER THE INNOVATIVE WORLD OF LINERLESS LABELS.

OUR GLOBAL RC-SILICONE TEAM WILL ASSIST WITH

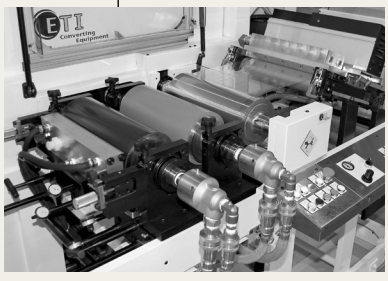
- Training and assistance in application & processing of the TEGO® RC Silicones
- Technical service during start-up phase and on-going production
- Utilize our wide network of contacts to equipment and machine suppliers
- Innovative developments for future challenges
- Long-term relationships based on trust

LOCATIONS AND EQUIPMENT



Richmond, VA USA
- FAUSTEL 3 roll offset gravure coater
- ELTOSCH inerted UV unit with 2 x 160 W/cm UV lamps
- Web width 610 mm
- Substrate on 3" or 6" core
- Line speed: 25-250 m/min

Essen, Germany
- COATEMA 5-roll-smooth coater
- In-line silicone and adhesive coating (dispersion or hotmelt)
- IST/HOENLE inerted UV units for silicone and hotmelt curing with 1 x 200 W/cm UV lamp each
- Web width 500mm
- Substrate on 3" or 6" core
- Line speed: 20-100 m/min



Shanghai, China
- ETI 3 roll offset gravure coating line
- ETI inerted UV unit with 160 W/cm UV lamp
- Web width 336 mm
- Substrate on 3" core
- Line speed: 150 m/min

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