

Innovative acrylate security films set a new standard of technology

Free of PVC and plasticisers, prolonged shelf life

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Each year, product tampering and the counterfeiting of branded products cost manufacturers billions of euros. Unauthorised access to technical components exposes industry and consumers to high security, safety and warranty risks. Optimal protection from this is provided by counterfeit-proof labels made of ultra-destructible security films. Once attached, they can no longer be removed without tearing into tiny pieces.

Until now, the production of these special materials has mainly been based on PVC or acetate technology, although this is associated with considerable drawbacks, e.g. limited storage life, the emission of volatile plasticisers or residual solvents, and odour nuisance. As a completely new alternative, VPF has now developed two ultra-destructible security films based on innovative acrylate technology. With the same functionality, they not only are totally free of plasticisers and PVC, but also exhibit a longer storage life while being totally odourless as well. They are thus setting a totally new standard of technology on the market. Their key product properties and typical applications are outlined in the following.

Product characteristics and typical applications

The distinctive feature of ultra-destructible security films is that, once attached, they cannot be re-

moved in one piece. In other words, the adhesive specially tailored to this application is stronger than the facestock's tear resistance. As a result, any attempt to release ultra-destructible security films causes them to disintegrate into tiny pieces (see Figure 1). This makes them ideal as the starting material for tamper-proof authenticity seals, test marks and inventory labels as well as for protection from tampering before first use.

While a defined low elongation at break is required for label removal as protection from tampering, the machining of the reel-fed label material calls at the same time for sufficient tear resistance during coating, label converting and dispensing. Therefore, in addition to a balance of film characteristics, no less important are suitable adhesives systems and liners with appropriate die-cuttability and release properties.

The right adhesive for this has to display good initial tack and final adhesion on a large variety of substrates. At the same time, it must be neither too gentle nor too aggressive so that the extremely fragile security material can still be cleanly die-cut and reliably matrix-stripped. For these demanding converting and application requirements, VPF has selected pressure-sensitive adhesives with a long track record in that field combined with specially adapted liners and defined release values.

Ultra-destructible security films are particularly suited to the following applications:

- **Document films/protection of company inventory:** Seals on inventoried office equipment, small appliances and tools can no longer be removed and affixed to other objects without the label disintegrating. The identification labels are available pre-printed and/or can be subsequently post-printed with any variable data like unique inventory numbers – most commonly done by thermal transfer printing.

- **Overlabelling of medicines:** In certain cases, already packaged medicine blisters have to be reliably overlabelled, without the sealed tablets having to be fully repackaged. To this end, the original print on the package has to be masked with a sufficiently opaque material without making it more difficult for the patient to press out the blisterpacked tablets. This is only possible with an ultra-destructible security film (see Figure 2).

- **Tamper-protection before first use of branded products and in the pharmaceuticals sector:** Tamper protection before first use is growing in importance both for high-grade consumer goods and for secondary packages of medicines. Depending on whether the text on the outer package is to remain legible or be masked, transparent or opaque white destructible films are required.

- **Tamper-proofing and use as a test seal:** On technical equipment in particular, it is essential to make the tampering of meter readings or test seals from technical superviso-

Figure 1: Attempts to release ultra-destructible security films causes them to tear into tiny pieces.



Source: VPF

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ry organizations or governmental inspection authorities impossible. But also on devices for which the warranty rights are rendered void if opened without authorisation, ultra-destructible security labels offer the best-possible protection (see Figure 3).

Disadvantages of conventional ultra-destructible films

When processed by self-adhesive label printers or in their end use, conventional security labelstocks based on PVC or acetate films have various disadvantages that were long considered insurmountable.

To produce ultra-destructible security films based on PVC, the addition of plasticisers is essential. However, these volatile substances are released gradually and may ultimately give rise to such serious embrittlement that considerable problems arise during die-cutting and matrix-stripping. After exces-

Acrylate security films set new technology standard

Leaving the drawbacks of conventional materials behind them, the innovative security films developed by VPF are setting a totally new technological standard.

VPF ultra-destructible acrylate security labelstocks are:

- + Totally PVC-free
- + Amenable to prolonged storage and resistant to ageing
- + Suitable for direct food contact
- + Free of solvent residues and plasticisers
- + Odourless
- + Suitable for outdoor use
- + Available in transparent and matt/opaque white
- + Easily printable with a large variety of common printing technologies

The feature of the new acrylate security films that most benefits downstream processing is the total omission of PVC, solvents



Figure 3: Heat-resistant guarantee seal based on ultra-destructible acrylate security labelstock

and easy-release Glassine B700-473. Permanent 980 adhesive is low-odour, suitable for direct food contact and can be used in the temperature range up to 120°C. For challenging overlabelling applications, the matt white film can also be made available

	Plasticiser-free	Ageing resistance/shelf life	Food contact	Free of solvent residues	Transparent and white/opaque	Odourless	Suitable for outdoor use
Acrylate	+	+	+	+	+	+	+
PVC	-	-	o	-	o*	o	+
Acetate	-	+	+	-	+	-	-

sively long or incorrect storage, it is also possible that test seals or inventory labels in consequence become too brittle, thus reducing their amenability to manual or automatic dispensing. The shelf life of PVC based ultra-destructible labelstock is therefore often limited to not more than six months. In addition, PVC-based labels and packaging materials are nowadays more and more banned in a variety of end applications by legal regulations or voluntary self-commitments of large customers and industry associations.

Although acetate-based security films are PVC-free on principle and have an often longer shelf life, they can still contain considerable process-related shares of plasticisers or solvent residues. This means they are not entirely odourless either and are therefore ineligible for sensitive applications in close consumer contact, on exclusive branded articles as well as on medicines. On top of this, they are not suitable for outdoor applications.

and plasticisers in its production. As a result, the innovative materials from VPC deliver significantly longer storage life not only on the label manufacturer's site (for reliable die-cutting and matrix-stripping), but also in the various technical, medical/pharmaceutical and consumer-related end uses.

The ultra-destructible acrylate security labelstocks of VPF are supplied as standard with Perma-

with opaque adhesive Permanent 980 dark or with UV acrylate hot-melt HM 709 UV for long-term outdoor applications.

Building on its many years of experience in the field of ultra-destructible security films, VPF is launching a genuine product innovation with its newly developed acrylate security films and facilitates with these advanced materials a much higher, future-oriented standard of technology.

Table 1: Comparison of application properties of acrylate security films with conventional ultra-destructible technologies
* = only available in white



Figure 2: When blisterpacks are overlabelled, it must still be possible to press out the contents with ease.