Automotive security labeling

Combatting VIN crime through laser sets

This report covers the complexities of automotive security labelling from vehicle theft to the basics of labeling in the automotive industry, choosing an automotive laser label, the top security features to look for and why they are important, the benefits of the label set system over the single set system and how to improve label tampering performance.

Vehicle theft - Global state of play

Theft of vehicles is a problem that occurs all over the world. According to data agency Knoema, New Zealand takes the lead in car theft rate globally. As of 2018, the private car theft rate in New Zealand was 1,172 cases per 100,000 of the population. Joining them in the top 5 countries to reach the pinnacle of this rate includes Uruguay, Italy, the United States of America (USA), and Greece.

Some thieves chop up the cars and sell the parts and others are more sophisticated and practice what is called vehicle identification number (VIN) cloning. This is where the crooks take the VIN identification off the car they stole, and replace it with a VIN of an identical car.

According to the Federal Bureau of Investigation (FBI), how this might play out in the USA is: after stealing a car from a mall, the thieves head for a neighbouring state. They seek out a large car dealership and look for a car that is the exact make and model (and even the same colour) of the stolen one. Then, they jot down the VIN stamped on the top of the dashboard and drive off. Later, they make an exact replica of the VIN tag, pull the old tag out of the car, and pop in the new one. Voilà, a clone is born: two identical cars, one identification number.

To help combat this sophisticated crime tesa has created a range of indestructible security labeling and in doing so has become the world leader in supplying this product to the automotive industry.

But it's not just the labels that stop VIN crime that keep tesa at the head of the pack for the industry. Vehicles need other types of labels like certification, service, security or warning/instruction information. Some have to be absolutely tamper proof and others have to resist extreme external influences, e.g. in the engine.

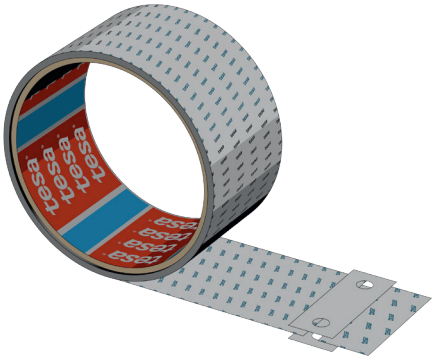
1. Fuel filler cap
2. Door pillars
3. Dashboard
4. Engine
5. Fender
6. Front end

Basics on labelling in the Automotive Industry

Apart from combating VIN crime, one of the main reasons to use labeling in the automobile industry is to comply with legislative reasons in your country.

Generally you may need individual, in-line laser marking and cutting of security labels for vehicle and part identification, warnings and instructions.

These laser engravable labels need to be manipulation proof, tamper evident and resistant to extreme external influences such as the engine area. They also need high security and customization options for items such as logo, UV footprint and hidden features.



Did you know?

tesa offers a comprehensive assortment of laser labels to fulfill all requirements, combining the knowledge of laser marking technologies with expertise in self-adhesive films.

Choosing an Automotive Security Laser Label

When it comes to choosing a laser label you want the choice of flexible content. You may want a low level variety but equally you may want to add a security warning, instructions or color choice.

tesa offers a comprehensive assortment of laser labels to fulfil all requirements, combining the knowledge of laser marking technologies with expertise in self-adhesive films.

The laser labels combine a high-performance adhesive with a data carrier that is destroyed upon tampering. These labels comply with the legal (NHTSA, EEC, GB) and manufacturer-specific regulations of the automotive industry.

The laser labels are also available with customer-specific visible and hidden security features integrated into the labels to maximize security against tampering. In addition to the standard security labels used on metal and plastics, tesa offers an unique glass-marking laser-transfer film for windowpane marking.

What to Look for in an Automotive Security Label and Why

There are a series of basics that you need to look for when selecting an automotive security label. tesa's range covers all the basics and the benefits of these listed in the table below.

What to look for in security label.	Why is this a benefit?
Cannot be removed without destruction	Tampering is evident and reusing of label is not possible
It is possible to combine security features	Protection against cloning
Cutting and marking can be done in one process	Reduction of labels stocks (e.g. label family sheets)
	Reductions of logistics and storage costs
Computer aided manufacturing is used	Provides flexible in marking and label size cutting (e.g. sequential series numbers)
Highly durable and resistant against chemicals, solvent, temperature and all weather conditions	The information maintained over entire product life cycle
High marking resolution	Realization of micro marking (e.g. 2D barcodes)
	Provides excellent resolution and contrast for clear info

Why security is important?

Earlier in the paper we addressed how theft of vehicles is a problem that occurs all over the world and New Zealand took the lead in car theft rate globally. But one question to answer is:

Of those stolen cars, which ones will be recovered and which ones are rebirthed?

To describe rebirthing, The North Central Review says:

"Vehicle rebirthing is the practice of transferring identifying parts of a wrecked car onto a stolen car of the same make and model, allowing the stolen car to be sold with the identity of the wrecked car".

According to AVc Netherlands, out of 1,000 stolen cars

- 600 are taken by 'transports' or 'joyriders' and will be found sooner or later
- 400 will never be recovered because of rebirthing

Of the 400 rebirthed cars

- 320 will get a cloned VIN

Of the 320 that get a cloned VIN

- 4% (16) will get a reused VIN

Top Security Features to Look Out for in Labels

tesa's security labeling combats reusing via providing proof of originality and providing taper evidence. When looking to produce security labels there are a few features that are needed to ensure security.

tesa Top Security Features of Automotive Security Labels are listed in the below table.

Feature	Benefit
Tamper evidence performance via an acrylic contrast layer with embedded logo	The voiding property causes complete damage of information if an attempt is made to remove the label
Customized logo or unique identifier that is 100% laser compatible with embedded watermark	This show proof of orginality and is easily identifiable. The watermark cannot be printed which is a major technological barrier for faking. This is a guaranteed exclusivity from tesa and is tesa patent protected.
Customized microscript where the logo could be partially reversed illustrated	This makes it incredibly hard for thieves to replicate
Logo arrangement at a defined angle	A free-style angle position where the angle reference point is only known by authorized personnel makes it near impossible for thieves to fake.
Modified adhesive with UV-pigment is transferring a permanent "footprint" into the substrate (painted surface, plastics, no metal)	Proves that a label was applied and is an indication for label manipulation.
Individualized customized solution	Providing a customized solution over a standard solution is a specialized feature against cloning that protects the Original Equipment Manufacturer (OEM) and dealer.

Single label system vs. Label set system

On average you might apply 15 labels onto one vehicle and you can do it via a Single Label System or a Label Set System.

Over the years tesa has developed the Laser L set. Prior to that customers might purchase 13 single labels and two metal tags which is more costly and takes longer to apply.

Single Labels

Using Single Labels makes the process complex and is influenced by more variety of car models, shorter lifetime of car models, increasing export rate, country-specific regulations and mix-production.

Organizational questions you need to ask to manage the complexity of the Single Label Process are:
- How to implement the amount of single labels into the production flow?
- How many labels can be handled within cycle time?
- How to minimize the effort?
- How to fulfill the different security requirements of labels?
- How to perform labels with variable data and languages?

Reasons against installing a Single Label Process:
- High complexity = high costs
- Complex labelling management and staff assignment
- Administration and process effort
- Minimum flexibility due to high dependence on other process flow
- No standardized process
- High failure rate and rework
- Special labeling supports needed - shelves with control lamps and IT support

Laser Label Sets

13 Single Labels are replaced with one Laser L-Set. These can be customized with information that includes labels with security requirements and labels with flexible information such as car model relevant data and different languages.

The benefit of replacing single labels with a tesa laser label-set reduces the label complexity and ensures compliance to all standards and regulations.

The reduction of label complexity by Label Sets include:
- Simpler logistics
- Cost savings in
    - Purchasing
    - Quality Assurance
    - Logistic
    - Planning and Preparation
    - Handling
- Vess testing effort
    - One material for all labels
- Time saving in label handling
- Control of applied labels
- Lesser failure rate

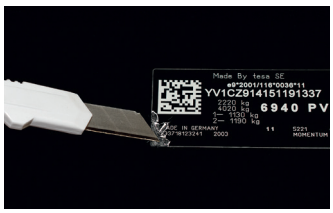
Other Benefits of the tesa label sets include:

- High-speed laser engraving and cutting of the desired format in one step ensures maximum production efficiency and a high degree of flexibility in terms of content and dimensions
- High contrast and resolution ensures that the label is correctly and easily read
- All labels for one specific car are on one sheet ensures that no label is forgotten
- Ideal for labels containing flexible data, such as VIN; Compliance Labels; Tire Pressure, Vacuum Hose, etc.
- Resistance against thermal, chemical, and physical influences to survive the entire vehicle lifetime
- Controlled production and distribution channel for a maximum level of security
- Highly durable for traceability over entire product lifecycle
- High speed process for label production on demand - Marking and cutting in one production step

tesa® security labels offering

Product	tesa® 6957	tesa® 6940	tesa® 6947	tesa® 6930
Category	Rapid	Rapid	Rapid	Standard
Max. marking speed [mm/s]	4,000	4,000	4,000	1,000
Laser hardware	Nd:YAG CO_2	Nd:YAG CO_2	Nd:YAG CO_2	Nd:YAG CO_2
Available colors top layer	Black glossy	Black glossy	Black glossy, black matte	Black glossy, black matte, silver glossy, silver matte
Backing	Double-layered acrylic	Double-layered acrylic	Double-layered acrylic	Double-layered acrylic
Tamper evidence	•	•	•	•
Customized logo and micro scipting	•		•	
UV footprint (on request)	•	•	•	•
High heat resistance	•			
High-speed marking	•	•	•	
Different thicknesses		•	•	•

Our product security features



Tamper evidence: label is destroyed upon tampering; manipulation leaves visible traces; no label transfer possible

Customized logo design: material is available with customer-specific logo design with visible and hidden security features

Customized micro scripting: hidden customer-specific micro-scripting maximizes security

UV footprint: proof of label-removal by permanent marking of substrates

tesa® 6940/6947 Rapid - New innovation

tesa has created longer sets to match cycle time.

- More labels within cycle time
- Cost saving
  - Less laser needed
- ND:YAG and CO2 compatible
- Much faster than standard LL
- Ensures highest marking speed on state of the art lasers
- Engraving at minimized dust generation
- Enables more design flexibility for
  - advanced security features
  - color variations
- Patent protected
- Intended to replace the standard tesa® 6930 and tesa® 6937 within 3 to 5 years

Improving Tampering Performance

tesa security labels offer the highest level of protection against attempts of manipulation due to its brittle product construction and other integrated security features. The label is destroyed upon any attempt of tampering and manipulation leaves a visible trace. This means that there is no label transfer and car cloning is not possible.

How to Improve Tamper Evident Performance?

In rare cases it is possible to remove the security label from a repellent substrate, e.g. powder coated surface, with high manual effort, tool equipment and time investment.

In this case we recommend:

- To adhere the label, especially on plastic substrates, in recesses, as this makes it more difficult to remove it.
- To implement additional ‘security cuts’ to improve the tamper evident performance.

Do Security Cuts Help?

Customer tests proved that labels with additional ‘security cuts’ could not be removed intact even from demanding substrates.

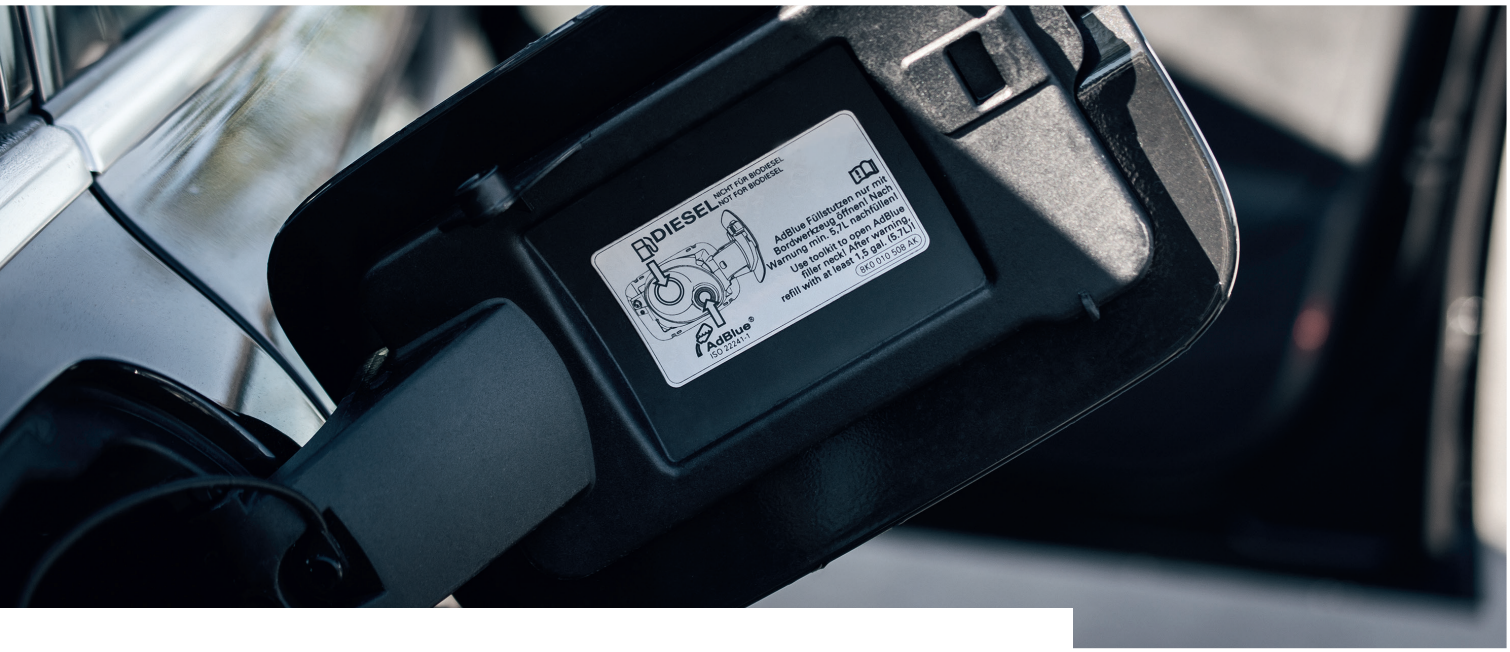
How to Implement Security Cuts?
In the event of individual requirements, tesa recommends to introduce security cuts using the laser process as an additional security feature to improve the tamper evident performance.
Marking, the introduction of security cuts and format cutting can be achieved by a laser in one step.

How to remove a label with security cuts from release paper?
Due to its brittle product construction the handling removal from the release paper and application needs some practice.
A non-destructive lifting off the liner is possible, if:

- The edges are round shaped
- The label is not bent too much (avoid angles close to 180°)
- The pulling force / lifting speed is moderate (not too high)
- The security cuts aren’t too close to the edge, from where the label is manually lifted off
- Lesser failure rate

Last word

tesa launched laser labelling over 20 years ago and has high market recognition, so much so that 70% of all laser labels used for the automotive applications are made by tesa. The reason for this is no other brand can offer features in its entirety such as tamper evidence, watermark, watermark plus, High Speed Nd and High Speed CO2.



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