INTERNATIONAL TAX STAMP ASSOCIATION ITSA Guideline

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Why Tax Stamps Provide the Best Combined Solution for Traceability and Security Features Under the EU Tobacco Products Directive

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1. Purpose of this Document

This document has been compiled by the International Tax Stamp Association (ITSA) to provide a guideline to those authorities responsible for implementing the technical standards for traceability and security features under the EU Tobacco Products Directive (Articles 15 and 16 respectively).

The guideline aims to demonstrate to these authorities how tax stamp programmes provide the best solution for ensuring that EU Member States implement systems that are both highly secure and independent from the tobacco industry, in full compliance with the TPD, and as effective measures to counter the illicit trade of tobacco products.

It is also important for Member States to understand that what may be compliant under the TPD may nevertheless violate technical standards to be issued under the WHO FCTC Protocol to Eliminate Illicit Trade in Tobacco Products. Given that the European Union as a whole, and many of its Member States individually, have ratified the Protocol (which will enter into force on 25 September 2018), the Union is obliged to comply with its provisions. Furthermore, since the Protocol is an international law, its technical standards will take precedence over those of the TPD.

ITSA is concerned that the TPD and some of its technical standards for traceability, security features and data storage facilities do not comply with the Protocol, and has repeatedly communicated these concerns to the European Commission. Specifically, the TPD contains several weaknesses that could undermine the security of the tracking and tracing systems to be implemented, and that delegate unnecessary responsibility to the tobacco industry.

As a reminder, Article 8 of the Protocol states that 'with a view to enabling effective tracking and tracing, each Party shall require that unique, secure and non-removable identification markings, such as codes or stamps, are affixed to or form part of all unit packets and packages and any outside packaging of cigarettes…', and that 'obligations assigned to a Party shall not be performed by or delegated to the tobacco industry'.

Therefore, with the provisions of the Protocol in mind, the purpose of this guideline is to propose ways for Member States to mitigate some of the weaknesses and vulnerabilities of the TPD, through the use of tax stamp programmes, in order to ensure that their traceability and security systems are more likely to be in line with the requirements of the Protocol.

2. A Journey Through Key Aspects of the Technical Standards for Traceability and Security Features Under the EU Tobacco Products Directive

Let's start by taking a journey through the various provisions of the TPD technical standards for traceability and security features, and highlighting (in **red**) those sections of relevance to tax stamp programmes.

a. Technical Standards for Traceability

In order to address the issue of illicit trade in tobacco products, the TPD provides that all unit packets of tobacco products are to be marked with an irremovable unique identifier in order for their movements to be recorded. This will enable such products to be tracked and traced through the Union.

Article 7 of the traceability technical standards – verification of unit level UIs

Manufacturers and importers must ensure that the application of UIs is verified for correctness and readability, by means of an anti-tampering device supplied and installed by an independent third party. The information recorded by the anti-tampering device must be available for a period of nine months from the time of recording, and must be made accessible to Member States upon request.

Article 8 – structure of unit level UIs

Each unit packet of tobacco products shall be marked with a unit level UI (unique identifier). It shall consist of as short a sequence of alphanumeric characters as possible, not exceeding 50 characters. The sequence shall be unique to a given unit packet and shall be composed of the following data elements:

a. the alphanumeric characters that constitute the ID issuer identification code;

b. an alphanumeric sequence, whose probability to be guessed shall be negligible;

c. a code ('product code') allowing for the determination of:

- the place of manufacturing;
- the manufacturing facility;
- the machine used to manufacture the tobacco products;
- the product description;
- the intended market of retail sale;
- the intended shipment route;
- where applicable, the importer into the Union;

d. the time stamp indicating the date and time of manufacture.

ID issuers shall be responsible for the generation of a code consisting of the elements listed in a), b) and c), and manufacturers or importers shall add the time stamp referred to in d) to the code generated by the ID issuer.

Where ID issuers use encryption or compression for the generation of unit level UIs, they shall inform the Member States and the Commission of algorithms used for such encryption and compression. Unit level UIs shall not be reused.

Article 9 – request and issuing of unit level UIs

The ID issuer shall generate the unit level UIs, transmit them to the primary repository of the requesting manufacturer or importer, and electronically transmit them to the requesting manufacturer or importer.

However, a Member State may require ID issuers to offer physical delivery of unit level UIs as an alternative to electronic delivery. In that case, the ID issuer shall deliver the codes in the form of optical barcodes, placed on physical carriers, such as adhesive labels.

Article 10 – marking by means of aggregated level UIs

Article 15.5 of the TPD calls for Member States to ensure that all economic operators involved in the trade of tobacco products, from the manufacturer to the last economic operator before the first retail outlet, record the entry of all unit packets into their possession, as well as all intermediate movements and the final exit of the unit packets from their possession. Article 10 of the technical standards provides that this recording obligation may be complied with by the marking and recording of aggregated packaging such as cartons, master cases or pallets, provided that the track and tracing of all unit packets remains possible.

Where economic operators choose to comply with the recording obligations provided for under Article 15.5 by means of the recording of aggregated packaging, they shall mark aggregated packages containing tobacco products with a unique identifier (aggregated level UI).

Aggregated level UIs shall be generated and issued on the basis of a request to the competent ID issuer or directly by the economic operator.

Where the aggregated level UI is generated directly by the economic operator, it shall consist of an individual unit code generated in accordance with ISO/IEC 15459-1:2014 or ISO/IEC 15459-4:2014.

Article 12 – link between UI levels

The aggregated level UI shall be capable of identifying the list of all unique identifiers contained within the aggregated packaging by means of an electronically accessible link to the repositories system.

Article 13 – request and issuing of aggregated level UIs generated by ID issuers

The ID issuer shall transmit the aggregated level UIs electronically to the requesting economic operators.

Aggregated level UIs issued by competent ID issuers shall not be reused.

Article 21 – data carriers for the unique identifiers

Unit level UIs shall be encoded using at least one of the following types of data carriers:

- an optical device-readable Data Matrix;
- an optical device-readable QR code;
- an optical device-readable DotCode.

In the case of unit level UIs delivered electronically, manufacturers and importers are responsible for encoding unit level UIs.

In the case of unit level UIs delivered physically, ID issuers are responsible for encoding the UIs.

b. Technical Standards for Security Features

The EU TPD provides that all unit packets of tobacco products placed on the market are to carry a tamper proof security feature, composed of visible and invisible elements, for the purpose of facilitating the verification of whether or not the tobacco products are authentic.

Article 3 – security feature

Member States shall require security features to be composed of no less than five types of authentication elements, of which at least one is overt, one is semi-covert, and one is covert.

- 'Overt' means directly perceptible by one or more of the human senses without recourse to external devices (such as a hologram or colour-shifting image, which are perceptible to the naked eye);
- 'Semi-covert' means not directly perceptible by the human senses but detectable by those senses through the use of external devices (such as a UV torch);
- 'Covert' means not directly perceptible by the human senses and detectable only through the use of purpose-built tools or professional laboratory equipment (such as a taggant reader).

Member States shall require at least one of the authentication elements to be provided by an independent third-party provider.

Each Member State shall communicate to manufacturers and importers the combination(s) of authentication elements that it permits to be used in security features applied to unit packets of tobacco products placed on its national market.

Such authentication elements may include any of the overt, semi-covert and covert types of elements set out in the Annex of the technical standards.

Article 4 – use of tax stamps as security feature

Member States allowing tax stamps or national identification marks for fiscal purposes to be used to develop security features shall ensure that the final security features comply with the requirements of Article 3.

Where a tax stamp or national identification mark for fiscal purposes intended for use as a security feature do not comply with one or more of the requirements referred to above, it shall only be used as a part of the security feature. In such cases, Member States shall ensure that manufacturers and importers of tobacco products are informed of the additional types of authentication elements required to develop a compliant security feature.

Article 5 – applying security features to unit packets

Member States shall require security features to be applied to unit packets of tobacco products using any of the following methods: affixing, printing, or combination of affixing and printing.

Article 6 – integrity of security features

Member States may lay down formal guidelines or requirements on the security of production and distribution procedures, such as those relating to the use of secure equipment and other components, audits, monitoring tools for production quantities, and secure shipping, in order to avert, deter, identify and mitigate the unlawful production, distribution or theft of security features and the authentication elements of which they are composed.

3. ITSA's Recommendations for a Tax Stamp-Based, TPD-Compliant Solution for Optimum Security and Independence from Economic Operators

Now that we have gone through the provisions in the TPD technical standards that are of relevance to tax stamp programmes, let's bring these together in the below table, accompanied by ITSA's recommendations for an independent, secure solution in compliance with the technical standards of the TPD and in line with the requirements of the WHO FCTC Protocol:

Wording of technical standards (extracted from Section 2 above)	What does the wording mean?	What does ITSA recommend?	Why does ITSA recommend this?
Anti-tampering device Manufacturers and importers shall, upon request from Member States, provide full access to the UI verification records created by the anti-tampering device.	Member States have the right to request access to the UIs that have been used to successfully encode unit packs.	Member States should require **online** access to the records created by the anti-tampering device, in near-real-time, as opposed to relying on occasional onsite access.	Full access in near-real-time to the UIs used to encode unit packs on the production lines provides increased security and allows identification of possible UI misuse or duplication.
Structure of unit level IDs Where ID issuers use encryption for the generation of unit level UIs, they shall inform the Member States and the Commission of algorithms used for such encryption. Unit level UIs shall not be reused.	There is no obligation for UIs to be encrypted and neither is there any mention of the use of any physical security features whatsoever for securing the UI.	Encrypt the UI and print it with embedded security features.	Encryption can provide additional security with regard to the authenticity and provenance of the UI. If the UI carries no physical security there will be no way to tell whether UIs are duplicated and reused (see the Ross/Eads/Yates study, *Why governments cannot afford Codentify to support their track and trace solutions*, which states that pure digital codes are ineffective as authentication tools).

Wording of technical standards (extracted from Section 2 above)	What does the wording mean?	What does ITSA recommend?	Why does ITSA recommend this?
Issuing of unit level IDs and encoding into data carrier A Member State may require ID issuers to offer physical delivery of unit level UIs as an alternative to electronic delivery. In the case of unit level UIs delivered electronically, manufacturers and importers are responsible for encoding unit level UIs. In the case of unit level UIs delivered physically, ID issuers are responsible for encoding the UIs.	The encoding and printing of the UI can be done by either the manufacturer or the ID issuer (by means of a pre-printed label).	The independent ID issuer generates, encodes and prints the UI onto a label, or delivers the encoded UI to the label manufacturer who will print onto a label such as a tax stamp. Such pre-coded digital data can meet all the requirements of the EU TPD (Article 8 above) with the sole exception of date and time of production which can be added in a visible, uncoded form, rather than within the code.	To secure the digital data, making duplication more difficult. Combined digital and material security is best. To ensure optimum use of the limited space available on the pack (especially given the large size of health warnings). To comply with the provision of the WHO FCTC Protocol to Eliminate Illicit Trade in Tobacco Products that calls for tasks delegated to manufacturers to be kept to the strict minimum.
Marking with aggregated level UIs This recording obligation may be complied with by the marking and recording of aggregated outer packaging.	Member States can either use aggregated level UIs to record product movement or use unit level UIs only (which entails unpacking and repacking the product each time the UIs need scanning).	Use aggregated UIs.	To facilitate the task of recording product movement. To comply with the provision of the WHO FCTC Protocol, which calls for UIs to be affixed to 'any outside packaging'.

Wording of technical standards (extracted from Section 2 above)	What does the wording mean?	What does ITSA recommend?	Why does ITSA recommend this?
Aggregated level UIs shall be generated and issued by the ID issuer or directly by the economic operator. Aggregated level UIs issued by competent ID issuers shall not be reused	The standards allow manufacturers and importers to generate their own aggregated level UIs, and also to reuse these aggregated UIs.	Aggregated UIs should not be used more than once.	Although all UIs should ideally be issued by an independent issuer, as a way to increase security and guarantee non-reusability, this will be difficult to implement in the case of aggregated UIs linked to unit level UIs on labels (given that some labels will be discarded due to production wastage). Therefore, if economic operators are to be allowed to issue their own aggregated UIs, they should at least be forbidden from using the same UIs more than once.
Security feature Member States shall require at least one of the authentication elements of the security feature to be provided by an independent third party.	Four out of five authentication elements can be provided by the manufacturer himself.	All authentication elements should be provided by a third-party provider, ideally combined into one or more multi-layered security features.	To ensure that non-compliant manufacturers don't have control over the creation and application of security features. To ensure that the most robust, counterfeit-resistant security features are used. To comply with the provision of the WHO FCTC Protocol that calls for tasks delegated to manufacturers to be kept to the strict minimum

Wording of technical standards (extracted from Section 2 above)	What does the wording mean?	What does ITSA recommend?	Why does ITSA recommend this?
Use of tax stamps as security feature Member States allowing tax stamps or national identification marks for fiscal purposes to be used to develop security features shall ensure that the final security features comply with the requirements of the technical standards. Where a tax stamp or national identification mark for fiscal purposes intended for use as a security feature do not comply with one or more of the requirements referred to above, it shall only be used as a part of the security feature.	Tax stamps can be used as the security feature as long as they comply with the requirements of the technical standards. If they don't fully comply, they can still be used as a partial security feature	Even if current tax stamps don't fully comply they can be easily upgraded to carry all required authentication elements… as well as the unique identifier for tracking and tracing.	From the point of view of security level, ease of examination, cost-effectiveness, and independence, combining all authentication elements, together with the UI onto one tax stamp, provides the best overall solution. This solution is aligned with ISO 16678:2014 which recommends the combination of digital codes with physical security features.

Wording of technical standards (extracted from Section 2 above)	What does the wording mean?	What does ITSA recommend?	Why does ITSA recommend this?
Applying security feature to unit packets Member States shall require security features to be applied to unit packets of tobacco products using any of the following methods: affixing, printing, or combination of affixing and printing.	Security features can either be applied on or embedded into the packaging itself or affixed by means of a label.	Combine all authentication elements together in one area – ie. on a tax stamp.	It will allow all elements to be produced in a high-security environment by a skilled security provider, to work together on one label to provide a robust counterfeit-resistant solution, and to offer a less expensive and easier to examine solution than scattering five different authentication elements over the surface of the pack. From the risk assessment point of view, there is a much higher chance of the 'overproduction' of packs (common printing environment) than the 'overproduction' of pre-coded tax stamps (high-security environment).
Integrity of security features Member States may lay down formal guidelines or requirements on the security of production and distribution procedures.	Member States are not obliged to establish any kind of production and distribution requirements, which indicates there may not be any measures in place to control the quality of the security features and how and to whom they are distributed.	Member States put in place comprehensive control measures with regard to the production and distribution of the security feature (which will, in any case, happen naturally if all authentication elements of the security feature are produced by a high-security solutions provider).	Without such measures, the value of the security features may be highly compromised.

4. Summary of ITSA's Recommendations

In summary, ITSA proposes the following recommendations for an EU TPD-compliant solution that guarantees security and independence from the tobacco industry, therefore is more likely to be aligned with the WHO FCTC Protocol:

- That Member States call for online access to the UI verification records created by the anti-tampering device, in near-real-time, as opposed to relying on occasional onsite access;
- That the unit level UI is encrypted and embedded with security features;
- That the third-party ID issuer generates, encodes and prints the unit level UI and other data onto a tax stamp. This ensures optimum use of the limited space available (an important factor given the large size of health warnings), and secures the code, making duplication more difficult. Combined digital and material security is the best way to go;

  In addition, pre-coded digital data, printed onto a tax stamp, can meet all the requirements of the EU TPD with the sole exception of date and time of production which can be added in a visible, uncoded form, rather than within the code.
- That the tax stamp also carries all authentication elements for the security feature, produced by a third-party security provider, since tax stamps are the best bearers of robust security features. (It is possible that the ID issuer and the producer of the tax stamps are one and the same entity – or are part of the same group of associated entities);
- That although aggregated UIs may be provided either by an independent issuer or by the economic operator itself, in all cases they should not be used more than once;
- That Member States put in place comprehensive control measures with regard to the production and distribution of the security feature (which will, in any case, happen naturally if all authentication elements of the security feature are produced by a high-security solutions provider).

5. What does a TPD-Compliant Tax Stamp Look Like?

Here are some examples of tax stamps that incorporate all the required security features and unique identification for track and trace:

Example 1

Includes:

- Unique identifier for unit level traceability, in the form of a visible alphanumeric sequence which is also encoded into the QR code. Apart from the UI, the QR code contains the product's date of manufacture, tax level, order reference and product details.
- At least five authentication elements for product authentication:
  - Overt – 3D holographic effect;
  - Overt – metallic aspect with colour-change;
  - Semi-covert – polarisation effect;
  - Semi-covert – high-definition micro-image and authentication of the hologram with a smartphone;
  - Covert – nano-images;
  - Other – deliberate faults.
- Tamper-evidence: frangible substrate that is destroyed upon attempting to remove the stamp; resistant to product usage conditions.

Example 2

Includes:

- Unique identifier for unit level traceability, in the form of a visible alphanumeric sequence. The UI is also encoded into a QR code which casual inspectors, including consumers, can verify with their smartphone, as well as into an encrypted DataMatrix code for use by officials with dedicated devices.
- At least five authentication elements for product authentication:
  - Overt – colour-shifting ink in two places: the 'SRI' logo and within the QR code;
  - Overt – fine-line definition;
  - Overt – latent image;
  - Semi-covert – double polarisation properties of colour-shifting ink, authenticated with a low-cost credit card-sized polarisation filter;
  - Semi-covert – UV ink;
  - Covert – forensic marker that can be authenticated using specialised laboratory equipment.
- Tamper-evidence: frangible substrate that is destroyed upon attempting to remove the stamp.

Example 3 (based on the EU eIDAS regulation)

Examples using Slovakia (left) and Croatia (right) as intended markets.

Includes:

- Unique identifier for unit level traceability in the form of a visible alphanumeric sequence, which is encoded into a DotCode (on left side of Slovakian example) or DataMatrix (on left of Croatian example). The codes contain (or link to) all other data required by the TPD. The graphical representation of the DotCode is particularly adapted for high-speed readability on the production line;
- A second DataMatrix code (on the right side of the above examples), is encoded according to the standards for visible digital seals (VDS). The code also contains the UI and other TPD data, as well as the ID issuer's eIDAS qualified electronic signature, and a secure link to information on all five authentication elements on the tax stamp;
- The capability and space to incorporate multilayered security features in line with the TPD, as well as in line with VDS standards implemented within an EU eIDAS trusted environment. The VDS allows for a straightforward rotation of security features.

The DotCode/DataMatrix on the left side of the examples should be read by the manufacturer and at the end of production, the list of all validated UIs should be signed, using the manufacturer's eIDAS qualified electronic certificate, and transferred to the data repository.

The VDS code (DataMatrix), on the right side of the stamp, will enable any Member State inspector, or even consumer, to check if the UI and other data are genuine and consistent with the pack. It will also give them access to trusted information on the authentication elements and allow them to be redirected to the corresponding services, without connecting to the repository.

The VDS containing the UI, together with a commonly available certified mobile app, will act as a Trusted Entry Point (TEP), as described in ISO 22381:2017 'Security and resilience - Guidelines for establishing interoperability among object identification systems to deter counterfeiting and illicit trade'.

6. Frequently Asked Questions

Aren't tax stamps too expensive compared to digital codes?

Not if you bear in mind that digital codes, without any physical security, cannot be distinguished from illicit, duplicated codes.

What's more, a tax stamp is able to carry all of the TPD security feature requirements as well as those for the UI - in one combined solution. Compare this to the cost of applying five separate authentication elements to the tobacco product packaging, in addition to the UI, and you'll find that the cost of the tax stamp will be much lower.

Tax stamps can be removed from the pack, can't they?

Today's tax stamps are usually produced on frangible substrate which breaks apart if any attempt is made to remove them. In addition, special adhesives are available which penetrate the material the stamp is affixed to, creating a molecular, inseparable bond between stamp and packaging.

Implementing a tax stamp programme feels like I'm going back in time. This is the digital age – why can't we have an all-digital solution to cover the traceability and security feature provisions?

Let's go to ISO 16678 to help us answer this question. This standard covers the relationship between unique identification and authentication, and recommends that in order to mitigate the risk of duplicated (or cloned) unique identifying codes, an intrinsic, physical security layer can be incorporated into a code as an authentication element, including but not limited to:

- Security inks, taggants, optically variable devices and other authentication features;
- Embedded secret keys;
- Encrypted information related to the secure element;
- Physical uncountable functions or markings.

ISO 16678 therefore recommends the incorporation of multilevel digital and physical security features into the code. However, digital codes are applied by digital printing methods, such as inkjet printing, and such methods can only apply a relatively narrow range of security features compared to other printing and application methods – such as silkscreen, intaglio, the hot stamping of holographic foils and the embedding of security fibres.

In particular, digital codes cannot usually carry overt features – or at least not highly effective ones. And in this day and age, with fraudsters having access to the same digital reprographic technology as everyone else, the necessity of using the range of material-based authentication features that can be built into a substrate-based tax stamp is clearer than ever.

Why shouldn't the tobacco industry be trusted to take responsibility for some of the tasks relating to traceability and security features? Aren't the days of industry complicity in acts of illicit trade and tax evasion a thing of the past?

There continues to be evidence of tobacco industry complicity in illicit trade (for example, the evidence described in two studies by Bath University – **https://www.eurekalert.org/pub_releases/2018-08/uob-nru082218.php**), even in the EU. This raises serious questions as to whether the industry should be allowed the freedom to manage, and actually legally own, some key aspects of the tobacco traceability, data storage and security feature systems.

Ask yourselves this: are you prepared to give manufacturers and importers the responsibility for:

- Encoding, printing and validating the unit level UI – and even generating and reusing their own aggregated UIs?
- Selecting, paying and having a legal contract with the actual providers of key elements of the solution (to which the government is not party and has no rights under any legal contract with service providers)?
- Choosing the security features from their own providers, who are not subject to standards or controls – as is the case with the security printing industry?

ITSA strongly discourages this level of delegation, in particular because it violates the provisions of the WHO FCTC Protocol, which puts a much stronger emphasis on the need for suppliers of the control systems to be independent of the tobacco industry, as compared to the EU TPD.

7. What Should Member States Do Now?

ITSA recommends that Member States take the following action:

- **Member States with tax stamps in place should keep – and upgrade – them**
  Member States that have a tobacco product tax stamp programme in place (23 out of 28 states) should use the existing programme to comply with the traceability and security feature requirements of the TPD. This is an opportunity for the states to audit their current programmes and, if appropriate, upgrade the stamps to the higher security levels recommended by ITSA and the TPD technical standards, should this be required.
- **Member States with no tax stamps in place should consider adopting them**
  Member States that have no tax stamp programme in place are encouraged to adopt one. The stamps should, as a minimum, incorporate the security features required under the TPD, but ideally also incorporate the unique identifier for track and trace, as this will allow the UI to be supported by the security on the stamp.
- **Member States that already use tax stamps with a unique identifier for traceability should keep them**
  Member States that already have an integrated tax stamp and traceability programme in place for tax collection purposes should retain this programme and extend it to cover the traceability and security feature requirements of the TPD.

8. Contact ITSA

Don't hesitate to contact us for further information or for answers to questions not covered above. We stand ready to help you to implement a solution that not only complies to the TPD – whilst avoiding unnecessary delegation of duties to the tobacco industry – but that provides the most effective solution to counter the illicit trade of tobacco products in your state. We hope that you will agree that tax stamps are the best bearers of both robust security features and the unique identifier required for track and trace.

I looking forward to hearing from you.

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