



European Customs Laboratories

*Experience
you can rely on*



Customs
Laboratories
European
Network

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*Experience
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Foreword



Stephen Quest
Director-General
European Commission

As the European Commission Director-General responsible for taxation and customs, I am delighted to present the Customs Laboratories European Network (CLEN) to you.

European customs laboratories are an important tool for customs and tax authorities. Their work is crucial in traditional areas of customs, excise and agriculture policy, such as analyses to determine tariff classification, level of duties and other taxes. However, their role has also evolved over time with changes in the trade environment. Customs laboratories now play an important role in other activities, such as antifraud operations, determining the authenticity and origin of products, detecting illegal imports like narcotics and drug precursors, protecting consumers against dangerous goods or contaminated food, safeguarding the environment and endangered species ... Indeed, today's EU customs and border services face similar problems and challenges. Alongside the traditional task of collecting customs duties, administrations have to ensure that legitimate trade is facilitated, while maintaining security in the international supply chain. Customs protect intellectual property rights, fight terrorism and organised crime and protect EU citizens.

The CLEN plays a key role in delivering results and keeping expertise in pace with the policy developments. This close collaboration brings the advantages of a share of the burden, a more rapid and comprehensive response to fraud, the maintenance of equipment and expertise even for rare and unusual analyses, the wide and correct implementation of EU policies and the support to the development of new EU policies, while at the same time permitting economies of scale.

Within the general objective of supporting the functioning and modernisation of the European customs union, the customs laboratories work together to coordinate their activities and share their expertise. This requires networking (European Union and worldwide), benchmarking, assessment of their performances, updating of databases, cooperation with other stakeholders and information initiatives. The CLEN provides the structure for the coordination of the Member States customs laboratories.

Finally, the CLEN does not miss any opportunity to start new working methods, new ways of cooperation, and to promote the latest developments in technology, in the laboratory as well as on the ground with mobile laboratories and portable devices.

So, if you have a consignment that needs analysing or investigating, if you have a scientific or a technical question or if you need any support, the best thing you can do is to contact your country's customs laboratory. They are at your disposal, and, as this brochure highlights, they have the experience and expertise to assist you with a wide range of tasks.

The food on our plate, the drink in our glass, the fuel in our car, the shoes on our feet: welcome to the work of the European customs laboratories

As shown by the Palmyrian Tariff from the time of Emperor Hadrian (137 AD), customs and tax authorities have existed for several thousands of years, imposing duties on the movement of goods such as perfumes, olive oil or dried fish, and taxing activities and services like the consumption of spring water by camel caravans.

Because they are situated at the interface with non-EU countries, customs have the opportunity to see and control all goods entering or leaving the customs' territory. Another particular characteristic of customs and tax authorities is their broad power of control, of anybody, at any time and in any place, especially when fraud is suspected. It is then not surprising that customs and tax authorities, and consequently their laboratories, control all types of goods and participate actively in the enforcement of many legislations and in the resolution of many crises, also on behalf of other authorities.

With their scientific and technical expertise, the European customs laboratories therefore play an essential role in the implementation of the law, the correct calculation of customs duties and other taxes and the fight against illegal trafficking and fraud.

While some laboratories were established relatively recently, most of the laboratories involved in customs and excise work in the European Union have a long history. The oldest ones were created in the mid-19th century — 1842 for the laboratory of the Board of Excise in London, already dealing with tobacco fraud, and 1848 for the customs laboratory in Vienna — and the majority of laboratories came into being before the mid-20th century: many therefore have at least a century's worth of experience in customs and excise work.

Over time, the role of customs laboratories has evolved with the changes in the trade environment and it is no longer just about classic customs and excise issues. Determining the authenticity and origin of products, detecting illegal imports such as narcotics and drug precursors, protecting consumers against dangerous goods, safeguarding the environment and helping to combat terrorism are all challenges that customs laboratories are increasingly called upon to face in the modern era.

The customs laboratories' structure has evolved according to the geographical situation and the specific needs of their country within a union of 28 Member States, but most of them still belong to the ministries of finance. Finally, their working methods have also evolved, towards more and more sophisticated technologies of course, but also becoming mobile, going where the samples are.

The services provided by customs laboratories are often crucial in dealing with 'spectacular' cases that come up from time to time — be it fraud cases of great financial significance or emerging public health and safety issues. Their work, however, goes on behind the scenes on a daily basis, as one of the unseen faces of customs and border management. Yet this does not make the task any less important. By supporting the work of customs and tax authorities, the customs laboratories in fact help to protect society. Some things remain unchanged though, and some products like olive oil and tobacco are still topical issues.

The Palmyrian Tariff

Situated at the intersection of trade routes which connected the Mediterranean countries with India, Arabia and Iran, the city of Palmyra in Syria depended heavily on international trade. It was through Palmyra that cloths, spices and jewellery were transported.

In the year 137 A.D. the council of the city agreed to revise and publish the tariff and the regulation according to which duties were levied on goods brought into and exported from the city.

This was done in order to avert disputes that had previously arisen between tax collectors, merchants and tradesmen. In order to make the situation absolutely clear, the council ordered that

both the new and the old (suspended) tariff regulation be inscribed and displayed in a public place.

The text of the tariff was carved on 'stele' in Greek and Aramaic. Nowadays, the Palmyrian Tariff 'stele' is displayed at the State Hermitage Museum of St. Petersburg.

THE PALMYRIAN TARIFF — THE STATE HERMITAGE MUSEUM,
ST. PETERSBURG



© THE STATE HERMITAGE MUSEUM



Union Customs Code — Article 134 (Regulation (EU) No 952/2013)

Goods brought into the customs territory of the Union shall, from the time of their entry, be subject to customs supervision and may be subject to customs controls. Where applicable, they shall be subject to such prohibitions and restrictions as are justified on grounds of, inter alia, public morality, public policy or public security, protection of the health and life of humans, animals or plants, protection of the environment, protection of national treasures possessing artistic, historic or archaeological value and protection of industrial or commercial property, including controls on drug precursors, goods infringing certain intellectual property rights and cash, as well as to the implementation of fishery conservation and management measures and of commercial policy measures.

Methanol crisis

The European customs laboratories also play an important role in the fight against low-quality and fraudulent foodstuffs and beverages. In a Member State, the recent fatal alcohol poisoning scandal in 2012, which resulted in the nationwide ban on alcoholic beverages with more than 20 % of alcohol, was an excellent example of cooperation of state action. Public health authorities, police, fire rescue service, agriculture and food inspection authorities and customs administration were all involved in searching for the source of poisoned drinks. Thousands of spirit samples were checked

directly in the field and then collected for analysis in the chemical laboratories. The illegal production lines producing beverages from denatured alcohol as well as concealing containers with alcohol liable to excise tax were found. The customs laboratory helped the police and justice systems to identify supply chains and provide good evidence to sentence the perpetrators. Similar cases have occurred in other Member States in the past. Customs laboratories routinely analyse all the spirit samples for a wide number of characteristics such as density, alcohol content, added substances, denaturing agents and their traces after removal of denaturants.



SPIRIT SAMPLES



Honey

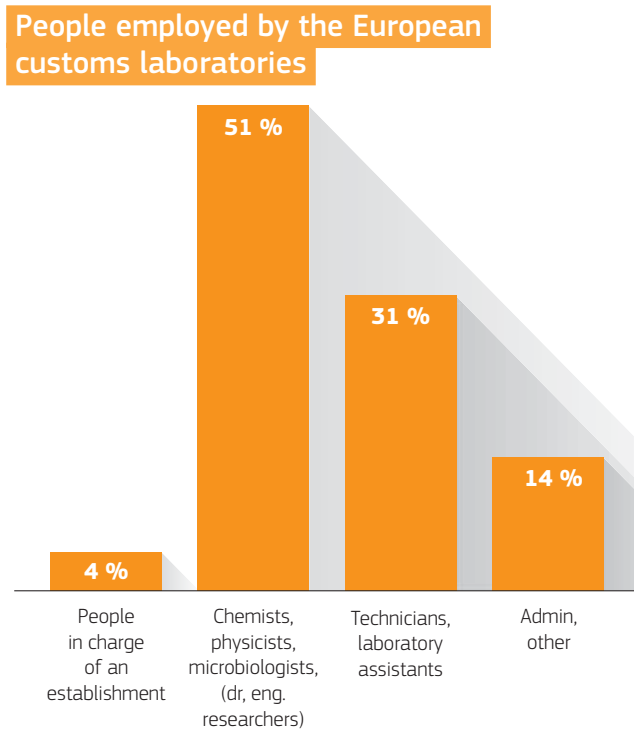
The customs laboratories help customs authorities to classify different goods. For instance, honeys transported from non-EU countries to the EU are analysed for their nature, quality characteristics and foreign substances. In our case, the samples represented a 15-tonne consignment of honey (net weight) taken from 50 barrels loaded on the road truck. The request was to find added sugars or substances which are not usually present in honey. The laboratory provided all the requested parameters to enable correct product classification; the presence of only natural components was confirmed. Some laboratories are able to make deeper inspection to check the origin of honey using specialised techniques, e.g. by isotopic analysis and pollen examination.

Customs laboratories: the scientific arm of customs

All customs laboratories in the European Union provide scientific expertise to support the work of their local customs offices and exchange information and expertise with their European colleagues to facilitate and coordinate actions across the national borders. Although the main objective for every laboratory is therefore the same, no two laboratories are identical. Due to differences in local laws and policies as well as significant differences in the amount and types of goods that arrive or leave the individual Member States, there is a need for differentiation in the amount of people they employ, the range of equipment at their disposal and the analytical methods they are specialised in and accredited for.

Numbers: labs and staff

There are 78 customs laboratories in the European Union and 10 mobile labs. The majority of EU Member States have a single central laboratory, some also have additional mobile units and a few countries have a network of laboratories spread over their territory. Around 2 000 people work in these laboratories, the majority of them chemists or scientists from related fields (physics, engineering, microbiology), closely followed by technicians and lab assistants.



Ensuring your safety and more: tasks of the laboratories

The classical tasks related to customs and excises, such as tax provisions, tariff nomenclature and common agricultural policy (CAP), still represent two thirds of the work done by the customs laboratories. An increasing share, however, can be attributed to the investigation of narcotics, product quality, fraud and the assurance of consumer and environmental health, as well as other safety issues. However, the averages hide wide variations between the Member States. Narcotics investigations can vary between 0 % and 80 % between Member States and safety issues can take up as much as 50 % of some labs' allotted time.

Just analysing samples? Our daily activities

Without exception, all labs are primarily involved with the analysis of samples. This accounts for 75 % of the work performed. Depending on the size of the lab, the amount of samples analysed varies from a few hundreds to around 30 000 per year for the biggest labs. The types of samples submitted to the customs laboratory can vary from country to country, but the graph opposite gives an average overview over all European customs laboratories.

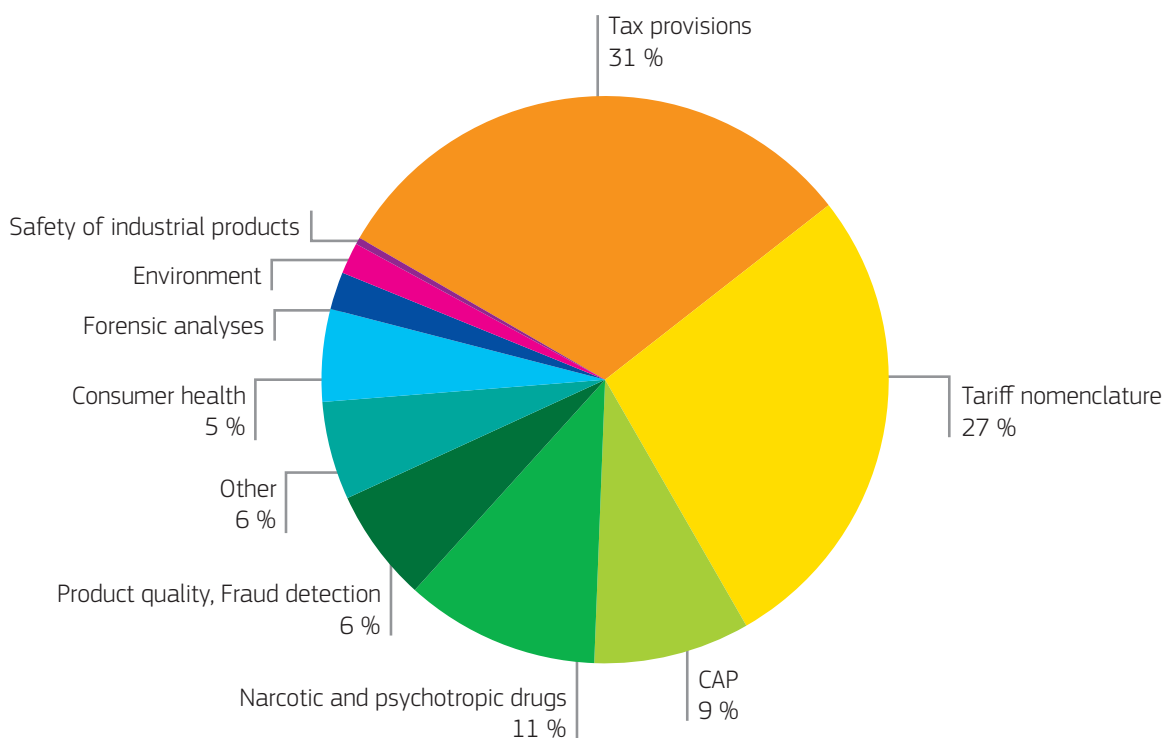
The second most important task is sharing their expertise, by participating in European committees for instance.

Finally, most labs also provide training for their fellow customs officers on a regular basis.

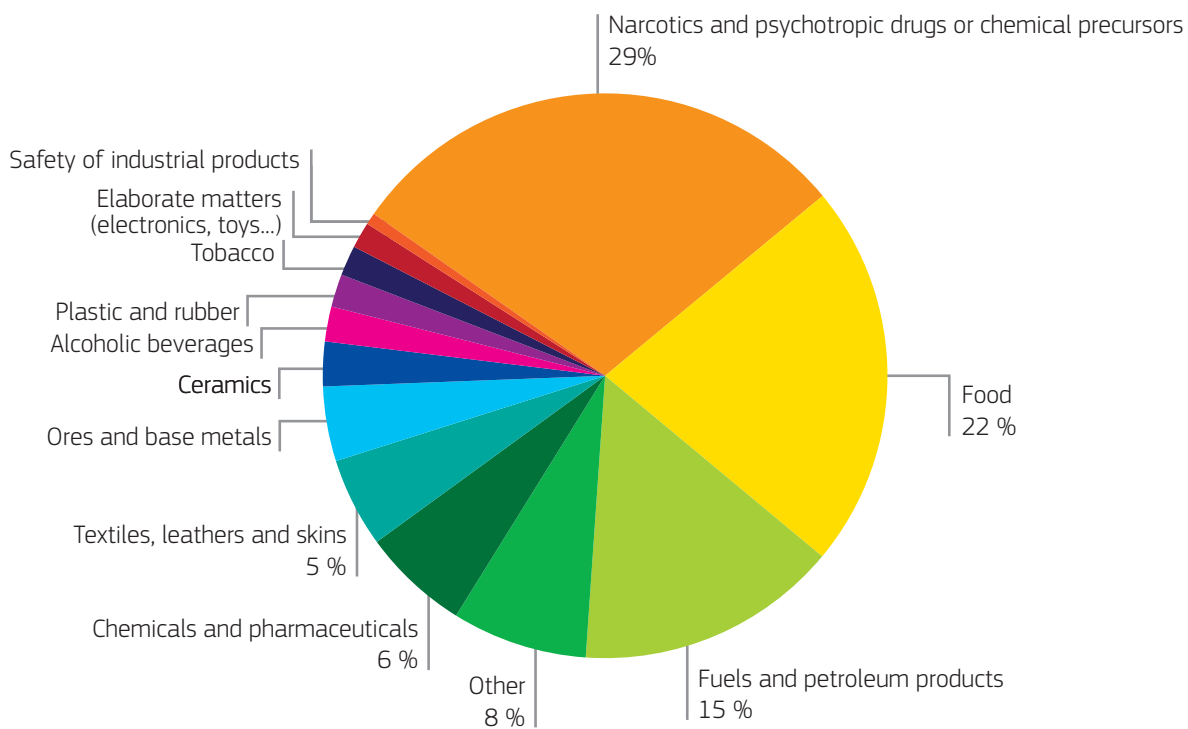
Working together as one

In today's world, a customs lab cannot exist on an island. European policy and the (by definition) international character of trade require close cooperation between the Member States in order to exchange ideas, unify procedures, identify focal points and coordinate actions on a European level. Of course, every customs laboratory also works together with its own customs offices. On occasion, the labs will join efforts with other institutes such as universities, other governmental services, standardisation bodies and police services.

Distribution of laboratory activities between economic, legal and protection issues



Types of samples analysed



Accreditation: guarantee for quality!

Laboratories that are accredited to the international standard ISO 17025 have demonstrated that they are technically competent and able to produce precise and accurate data. This is also highly valued by the customs laboratories: in 22 Member States, the customs laboratory is accredited and in two Member States, the process of getting an accreditation is ongoing.

SMOKING TEST



CONTROL OF FISH FILLETS



IR-MS LABORATORY

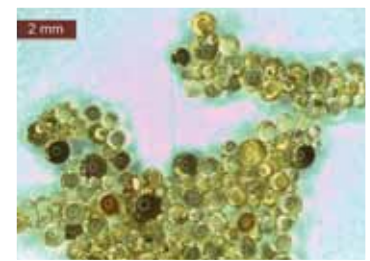


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SAMPLE WEIGHING



ION EXCHANGE RESIN (MICROSCOPY)



Going behind the scenes: the route taken by the sample

The sample sent for analysis to the customs laboratory by the customs authority — or sometimes by other bodies such as government departments and private companies — is at the heart of the whole process of cooperation between clients requesting information and the customs laboratory.

The process typically starts by sampling — on roads, at ports, at airports or in warehouses throughout the EU territory. If a consignment arrives that you as a customs officer want to check, you can always take samples for more thorough examination. Sampling is of course an important part of the process: while this is generally performed by the customs officers themselves, the customs laboratories often provide some broader training or advice about how to take samples, especially when it comes to potentially hazardous substances or chemicals, for instance.

The quality of the analytical results depends largely on the quality of the samples brought to the laboratory. Sampling is therefore the first and a crucial step in the laboratory work and customs laboratories largely assist customs officers in their complicated task. Many questions arise when it comes to drawing samples from heterogeneous materials, such as tobacco, or when a complicated sampling situation occurs — e.g. fuel sampling from road vehicles with bottom loading. Is the sample representative of the consignment? Is my equipment sufficient to perform sampling correctly? Is there a risk and how can I avoid all possible hazards? Hence the necessity to have a good sampling manual.

Customs laboratories routinely accept almost any conceivable product, except live animals, from sweets to toys, to pharmaceuticals, to fuel and to metal bars. Arriving by post or by car (usually as a pair of samples — one for immediate analysis and one for control purposes), the sample is

registered in the system and assigned to the relevant part of the laboratory, accompanied by an identification mark for traceability purposes. The laboratory treats the request for analysis as promptly as possible, conducting the tests and interpretations, reaching an opinion on the proposed customs classification (or other issue) and making this available to customs or other beneficiaries. Samples are also placed in storage for a time in case they are needed for further analysis. The way samples are stored is important because different items need to be stored at different temperatures, at different humidity levels, etc.

At every step of the way taken by the sample — from recording its arrival to completing the scientific analysis and storing it for future reference — the customs laboratories work to produce results that are based on quality, efficiency and reliability. All customs laboratories have implemented modern quality control and assurance principles. Almost all European customs laboratories maintain their quality systems on the basis of EN ISO/IEC 17025 quality standard on the competence of testing laboratories, which is recognised by accreditation authorities.

The customs laboratories are very often part of an information system, where the whole process is integrated into an application, allowing the customs officers to fill in an electronic form to request clarification of the customs classification or on tax-related issues and to add images of the relevant product consignment. The same system is visible to the laboratory, saving time and informing staff which samples are on their way before they physically arrive on the premises. The customs officers can later see the outcome of the laboratory outputs on screen as the laboratory testing reports are issued electronically.

SAMPLING OF HONEY



SAMPLING OF TOBACCO



SAMPLE PREPARATION FOR MINERAL OIL ANALYSIS



Fuel from train or truck

The European customs laboratories are also very often involved in the inspection of all kinds of fuels for classification, taxation and quality purposes. Dozens of characteristics are checked, including physical properties such as density, viscosity, flash and pour points, etc. The chemical composition is also analysed, e.g. content of sulphur, bio-components or marking and colouring substances.

An example of a typical request is the analysis of diesel oil to make sure the correct amount of duty is paid. The samples drawn from road vehicles with bottom-loading tanks represented a total volume of 8 000 litres. The request was to find whether this fuel conformed to legislative

and normative requirements, especially EN 590. Additionally, the content of bio component (fatty acid methyl esters) and the possible presence of a marking substance were also required. The laboratory provided all the parameters to enable correct product classification. The duty paid was also confirmed as taxation is related to the goods classification. Finally, the product conformity with the quality standards was also checked.

SAMPLING FROM A TANK



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Facilitating trade and securing revenues

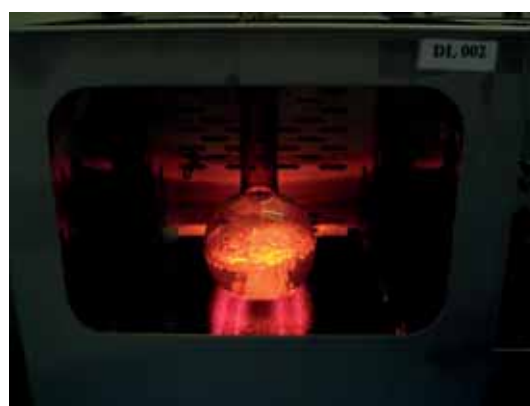
When the first customs laboratories were founded more than 100 years ago, their aim was to assist customs officers in securing revenues for the state. Trade was facilitated and so customs duties were an important part of the national revenues. This task of securing revenues still dominates the work of today's customs laboratories. The classification of goods is the basis for customs duties and excise but also for antidumping procedures and trade statistics for instance, and the verification of a correct classification is often impossible without scientific analysis.

A very important task for customs laboratories is therefore to give a well-founded and even court-proof basis for the classification, which could not be achieved by untrained personnel. Without chemical analysis, it is not possible to decide whether a white powder is indeed a vitamin, which is duty free, or a food preparation with a relatively high customs duty.

Another task of the laboratories is to facilitate trade by giving expert opinions for binding tariff information. These so called 'BTI' help to ensure equal duties for all traders. In many cases, products can move across the EU border while a sample is still being checked in a laboratory and, if necessary, additional duties can be imposed (or, indeed, refunded) at a later stage without holding up the consignment. Although the laboratory may not necessarily be aware of the precise impact, its analysis can have significant — potentially multi-million euros' worth — financial implications.

For example, there is a close relationship between classification and energy taxation. Several cases of tax evasion have occurred that add up to many million euros in tax loss in Europe. These cases have been successfully tracked with the help of the customs laboratories. In these cases certain products based on diesel fuel had been declared to be used as anticorrosive oils or form oils — a usage that is tax free in many EU Member States. The transport of this kind of goods is not covered by the excise movement and control system (EMCS) of the European community. After moving the goods between different Member States to make tracking more difficult, the products had been used as motor fuel — by evading any fuel taxes. The customs laboratories supported the prosecution by determining several analytical parameters like distillation and the composition of the products by gas chromatography.

DISTILLATION-EN ISO3504



AUTOSAMPLER-DENSITY-EN ISO12185



Tariff classification of common tobacco products is not very difficult. Tobacco is one of the most important excise products. The idea of masking an excise product to avoid taxation is an old tool. In some Member States, whole tobacco leaves can be bought and cut by consumers in the same shop. Cut tobacco can be bought for roll-your-own (RYO) cigarettes already rolled into extremely big cigars, too big to be considered as smokable. Both are cut tobacco products with lower or no taxes. Did you know that fine-cut tobacco could be used for cooking, incense, herbal cure, room freshener, medicine, a collection in a museum, heating for glasshouse and so on? Do all of these products belong to Chapter 24?

SAMPLE PREPARATION FOR TOBACCO ANALYSIS



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TOBACCO SAMPLES

Safeguarding health and protecting consumers

Customs laboratories are often involved in tackling a range of potential threats to Europeans' well-being. These include trafficking in illegal narcotics (whether carried by people or in shipments) and trade in counterfeit (and potentially dangerous) goods, such as fake pharmaceutical products and new psychoactive substances. Laboratories routinely examine imported food supplements to check if they contain illegal hormones, amphetamines or medicines bought on the net as well as toys that might not be safe to play with.

Customs laboratories in the EU have helped to detect many products over the years which, on a greater or lesser scale, could pose a health and safety risk to the general public, sometimes without any perception of danger such as the presence of heavy metals. To name just a few examples of the problems investigated by customs laboratories: dangerous or unauthorised chemicals such as bisphenol A in feeding bottles or release of primary aromatic amines from polyamide and melamine plastic kitchenware; illegal food additives (such as some preservatives) or additives exceeding the limits defined in EU legislation; melamine in baby food;

plastic toys for children under three with high concentrations of phthalates; shoes containing excessive amounts of lead and phthalates or dimethyl fumarate; unauthorised active principles in cosmetics like hydroquinone.

Chemical analyses are therefore a fundamental tool for customs to stop unwanted imports.

Laboratory analyses can ultimately lead to unsafe products being withdrawn and destroyed. Problems detected or confirmed by laboratories can range from minor isolated incidents to wider emergencies. If there is sufficient cause for concern, the analyses can be the basis for issuing EU-wide alerts using the rapid alert system for food and feed or the EU rapid alert system for all dangerous consumer products except food, pharmaceutical and medical devices (RAPEX).

Consumer protection also involves transparent and honest labelling to declare a specific geographical origin, for it is unfair to pay for the finest quality food and get a low added-value product instead. Customs laboratories fulfil this need by using sophisticated stable isotopes techniques.

BAG WITH ECSTASY PILLS



RAMAN DETECTION OF COCAINE



Dangerous goods: no toying around

Having a child choke on part of a toy or being injured as he or she plays are among every parent's worst nightmare. Given the large volume of toy products imported into the European Union every year, not least in the run-up to the festive season, toy safety is an area that impacts customs laboratories across the EU and is an important example of laboratories' contribution to safeguarding health and protecting consumers.

Various analyses are carried out to test for mechanical and physical properties, flammability, toxic elements and phthalates. The laboratories also check that products carry the required age-guidance labelling. A range of testing equipment is useful: a kinetic energy machine checks that a toy car is not propelled faster than allowed by current regulations (because of the damage it could cause to an eye, for example); a

simple cylinder is used to test products for children under three — if the part fits in the hole, it is too small and therefore dangerous; a grabber tests the resistance of other parts such as buttons; a special flame booth is used to see how easily a cuddly toy will ignite.

Products are also submitted to a shock test, i.e. dropped from a height onto a hard surface and then hit. Such tests are always based on standard parameters and on the least favourable outcome for the toy, to make sure it cannot get off lightly.

Ultimately, if it is found that a product is unsafe or inappropriately labelled, it must be brought into conformity or else face withdrawal and destruction. The reports issued by the laboratories to the relevant government offices can also lead to warnings being issued via the EU's RAPEX alert system. All of which just goes to show that, when it comes to scrutinising the safety of toys, it is certainly not child's play as far as customs laboratories are concerned.

New psychoactive substances

During these last few years, the number of new psychoactive substances (NPS) has been growing. Although the legal approach is not the same as for drugs, this 'new drugs' market has been linked to health problems.

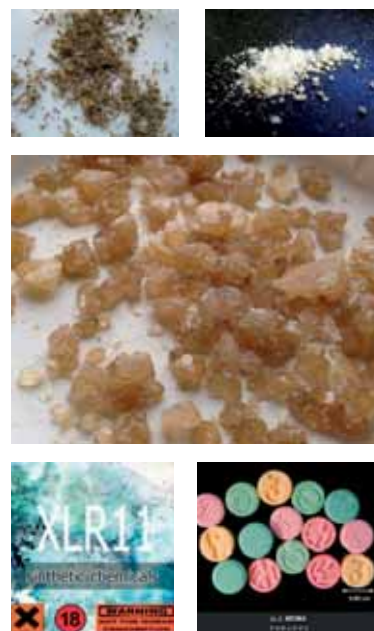
Among NPS, synthetic cannabinoids and cathinones are the main families.

With the development of these continually reinvented compounds, detecting and identifying them is a challenge the laboratories have to face.

High-resolution techniques, such as liquid chromatography quadrupole time-of-flight mass spectrometry (LC-QToF-MS) and nuclear magnetic resonance (NMR) spectroscopy, as well as sharing of information between laboratories, are required.



LC-QTOF-MS



Food supplements

Food supplements may include a wide variety of products ranging from those used for muscles growing to alcoholic mixtures of herbs extracts, to powders for hunger control and to health-promoting active substances (vitamins, amino acids, etc.).

Customs laboratories check the constituents to establish if they are supplements or medicines, but also to have a close look for illegal substances like hormones and amphetamines.

The analyses performed by customs laboratories on some food supplements revealed they contained analogs of active pharmaceutical substances, i.e. sildenafil analogs (used to treat erectile dysfunction and pulmonary arterial hypertension). The efficacy of these structurally modified active ingredients is unknown and these products are not regulated, but they are potentially dangerous.

FOOD SUPPLEMENTS



© ITALIAN CUSTOMS LABORATORY OF TURIN

PDO and PGI products

Protected designation of origin products and protected geographical indication products such as wines, cheeses, meats or even pizza are a precious cultural and economic wealth for European countries.

Their counterfeiting causes heavy repercussions on producers and sometimes injures a whole country's image.

Customs laboratories, in cooperation with other national departments, monitor and help to protect EU-specific foods by using stable isotopes techniques (such as SNIF-NMR and IR-MS), minor components analysis and chemometric tools.

GRANA PADANO CHEESE



COURTESY OF THE CONSORTIUM FOR THE PROTECTION OF GRANA PADANO CHEESE



Helping the environment

Protecting the environment is a relatively recent addition to the customs laboratories' sphere of activities, but one that is growing in importance. The world is increasingly concerned by environmental matters such as ozone-depleting substances (i.e. chlorofluorocarbons in foams), dangerous substances and persistent pollutants. At the same time, in view of greater globalisation, customs are increasingly called upon to provide an integrated service to society and to act as a 'single window', encompassing not only traditional fiscal activities, but also a range of other functions, including environmental protection.

Support for the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is just one area where customs laboratories have an important role to play, by identifying CITES-controlled species.

Many types of wood used for floorings or small pieces intended for perfumes are on the CITES list.

Because each wood has its own distinct pattern, a microscope can be used to identify different species, or a fragment can be placed in a more sensitive mass-selective detector apparatus.

In addition, DNA/PCR (polymerase chain reaction) are techniques that can be used to check, among other things, fish for CITES or tariff purposes.

WOOD REFERENCE SAMPLE



CAT HAIR REFERENCE SAMPLE



Heavy metals

Heavy metals such as lead, cadmium, chrome or copper are a major concern both for consumers' health and for the environment. In fact, their content in food (such as food supplements) or their migration from packaging, kitchenware, shoes or cosmetics can directly affect health. Moreover, heavy metals in plastics, ceramics and gums have a negative impact on the environment at end-of-life disposal.

Waste import and export also need to be checked for heavy metals content.

Determination of nickel, lead and cadmium is also performed on jewels, and soaps are examined for the



presence of mercury salts, on the basis of the European community regulation on the registration, evaluation, authorisation and restriction of chemical substances (REACH).

Techniques like X-ray fluorescence (XRF), inductively coupled plasma optical emission spectrometry (ICP-OES) are used by customs laboratories to detect and check the amount of metals, so that dangerous goods can be stopped. Some of these techniques can also be used on site, thus ensuring a prompt response to such a wide health concern.

Recently, within the scope of the European RoHS Directive 2011/65/EU, the screening of electrical and electronic devices has been implemented. The purpose of this screening is to check whether imported electrical and electronic devices contain lead, cadmium, mercury, bromine or hexavalent chromium. The aim is to restrict these hazardous substances before the device becomes a waste material.

Promoting security and combating terrorism

Potential threats from terrorism and weapons of mass destruction are another recent evolution in the area in which European customs offices operate. The customs laboratories can have an important role to play in preventing and dealing with any such threats. It is an evolution that is likely to bring them increasingly out of the laboratory building and into the field, notably using mobile equipment and mobile laboratories. It is a challenge that customs services must face in close cooperation with the relevant authorities at national and international level.

Customs laboratories can contribute to promoting security through checks on chemical or biological substances that could be used as weapons, nuclear and radioactive material, restricted goods and dual-use items that could have both civilian and military applications — this can entail checking goods or documentation pertaining to items to be sent to countries that are subject to certain security-related export restrictions.

Some customs laboratories are also involved in the examination of highly valuable goods such as diamonds, precious stones and metals which can originate from conflict-affected areas and can be used for the financing of international terrorism. The customs laboratories can reveal the real value as well as, to a certain extent, the origin of such products. This contributes to ensure that such products do not finance conflict and terrorism such as, e.g. implementation and control of the 'Kimberley process' — an international diamond certification scheme.

Customs laboratories have very often their potential supporting role to play in the event of the need to respond to a terrorist attack: they can be called upon to provide their services as part of a contingency for national cooperation between laboratories offering various specificities.

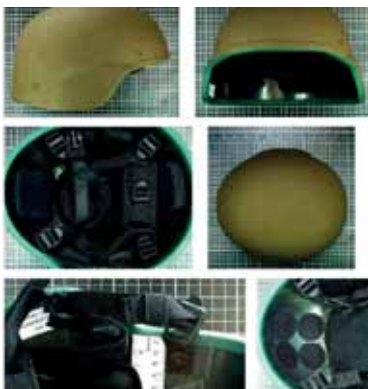
Significantly for security-related controls, the technology also exists to test for harmful substances or explosives that might be present in cargo containers — helping customs in their efforts to promote security and combat terrorism.

Labs in action: response to terror threats

There are many goods that might be worthy of attention when it comes to security, from chemicals, specialised materials and industrial and scientific equipment to items such as hair bleach, bullet-proof textiles, heat-stroke tablets and devices such as mobile phones or smoke alarms. The expertise of customs laboratories can be invaluable in such cases. An example we can show is a request from customs

officers for an expert opinion on helmets with declared use for hunters and paintball players. After analysis, identification of material composition (aramid fibres detected) and ballistic expertise performed in a more specialised military institute, it was established that the helmets, due to their characteristics, had to be classified into the category of combat ballistic helmets and thus these goods were subject to export restrictions according to the national and international provisions.

MILITARY HELMETS

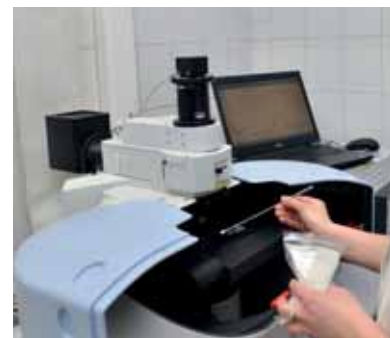


UNKNOWN BLUE POWDER



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TRANSFORM INFRARED SPECTROMETRY APPARATUS



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Moving with the times: equipment and new technologies

The customs laboratories need many types of equipment in their day-to-day work. These vary from relatively low-tech items, like a simple old Bunsen burner, to much more high-tech equipment needing specialist operating and sensitive handling. Production methods evolve, new health risks arise and methods used to cheat the system change. This requires the customs labs to maintain a state-of-the-art service.

New technologies used to solve the issues faced by customs laboratories include NMR (for the identification of 'unknowns') and liquid scintillation counting (LSC) (for the determination of the bio-based content in products). Also, the testing and implementation of handheld equipment by the customs laboratories on site at the border is of increasing importance and already successful for Raman, XRF and infrared technology in the search for narcotics, new psychoactive substances, precursors and dangerous chemicals.

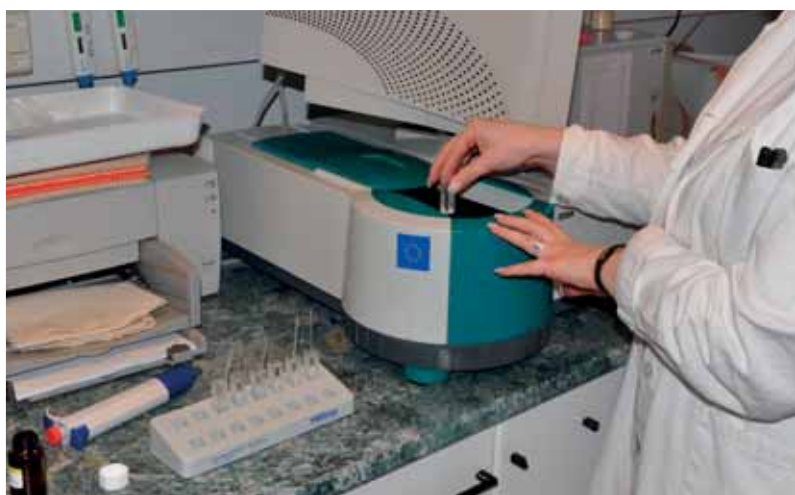
The list of equipment that the respective laboratories have at their disposal is wide ranging and is updated on an ongoing basis. It includes instrumentation such as liquid or gas chromatographs, densimeters and polarimeters, mass spectrometers and mass-selective detectors, along with a host of acronyms like FTIR (Fourier transform infrared spectroscopy), UV/Vis (ultraviolet-visible spectrophotometry), XRF and LSC.

The good news for customs managers and others is that you do not have to know exactly how all of these devices work: you can rely on the customs laboratories for that.



DENSITY METER WITH AUTO-SAMPLER FOR ALCOHOL ANALYSIS

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UV/VIS SPECTROMETER FOR STARCH DETERMINATION

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Going mobile

Customs and excise tasks imply on-the-spot control and measurements in the field. In most EU countries, there is portable equipment (equipment small enough for a bag or the back of a car) that can be used for performing checks in the field.

Mobile analytical instruments are used in some countries for drug control at the airport (ion mobility spectrometry, FTIR and Raman spectrometry). Portable XRF equipment is a valuable tool for the determination of sulphur content in mineral oil for the purpose of combating mineral oil fraud.

Analyses on wheels — the laboratory that comes to you

Due to technological developments, the use of vehicles made for the purpose of examinations on the spot opens a new possibility for the customs laboratories to develop their core services.

In an ever-evolving world, laboratory equipment is also becoming better and smaller with each generation. Some of them can even be taken 'on the road'. Several EU Member States have 'mobile laboratories' which are used for the analysis of goods 'on site'. Although the mobile laboratories cannot replace the static laboratories, they can play an important role. Mobile laboratories can provide rapid screening of potential risks.

An additional benefit of on-site control is the increased and direct contact between customs chemist and customs officers, which is helpful for advising on sampling procedures.

Two EU Member States have been operating their mobile laboratory for many years now.

One possibility is the 'general control': the mobile laboratory visits post offices and airports as part of a customs/health action on counterfeit medicines arriving in packages from overseas. This control helps to determine import duties and to detect illegal trade, for example in CITES-listed products.

Another possibility is using mobile control for excise products, mainly for mineral oil products and for alcoholic beverages. In case of mineral oil control, the mobile team measures all the necessary analytical parameters for on-the-spot tariff classification. These results are an effective tool against fraud (cheap mineral oil products from non-EU countries with higher sulphur content, or again the misuse of 'base' oil). The continuous control of alcoholic beverages ensures a market surveillance to detect dangerous spirits (methanol content in spirits).

MOBILE DETECTION DEVICES (RAMAN AND FTIR)



MINERAL OIL ANALYSER IN A MOBILE LABORATORY



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FTIR ANALYSIS OF MINERAL OIL IN A MOBILE LABORATORY



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MOBILE LAB



The benefits of European coordination

The CLEN (formerly known as the group of European customs laboratories (GCL)) provides the structure for the coordination of the Member States customs laboratories. 78 European customs laboratories take part in the various activities organised by the CLEN as it moves towards achieving its ambitious goal of an integrated network of European customs laboratories that are well prepared to meet tomorrow's challenges.

Dating back to 1999, the CLEN aims to rationalise, coordinate and optimise the use of human and technical resources among the European customs laboratories. One of its most important missions is to anticipate changes in the customs environment and to ensure that the customs laboratories are sufficiently prepared to meet both current and future challenges. Through networking and face-to-face contacts between the customs laboratories, the CLEN adds value by making it easier to exchange experience and best practice.

The CLEN carries out coordination through six integrated actions

Action 1 — Inter-laboratory inventory of analytical determinations

The inter-laboratory inventory of analytical determinations (ILIADe) is a shared directory of the analytical methods initially developed by the Italian Customs Agency and currently hosted by the European Commission. Its main purpose is to provide all EU customs laboratories with an up-to-date compilation of analytical methods used for customs purposes as well as for authenticity and quality controls, consumer health protection and environmental controls. The database contains more than 500 methods, official analytical methods, international standards and in-house developed methods. The ILIADe database content is discussed and validated by a dedicated working group. The list of methods and contacts is also available to non-EU countries.

Action 2 — Inter-comparisons and method validations

The main objective of CLEN Action 2 is to ensure uniform application of the control of goods in the European Union through the harmonisation and the validation of methods



used by the laboratories, mainly for tariff classification, as well as the organisation of proficiency tests. These studies are specifically tailored for customs purposes and cover all types of traded products such as sugars, nuts and seeds, products requiring the determination of an additional code (the Meursing table), animal feed and pet food, tobacco, spirits, mineral oils, textiles and ceramics.

Participation in proficiency testing schemes is an important means for each laboratory to assess its own performances and ways of working and to confirm the results are comparable to the others. It is also essential to achieve accreditation.

Action 3 — Networking on quality

The aim of Action 3 is to work towards the development of a common quality policy for all customs laboratories to ensure uniform interpretation of the new standards and to establish the basis for the mutual acceptability of test data without the need for further re-testing of products and articles when they are traded internationally.

Action 3 also deals with the methodology of sampling as the quality of samples is so important for further laboratory expertise.

Sampling manual for customs and tax authorities

The sampling manual for customs and tax authorities (Samancta) is an internet application designed for prompt use by customs and tax officers when drawing samples. The application consists of two cross-linked sections: the general part and the sampling cards for sampling specific commodities. Additionally, this application contains an exotic names glossary with tariff classification of local goods and a part focusing on training. The detailed information on sampling of specific goods is found in the so-called sampling procedure cards. Samancta is being developed to provide a consistent set of sampling instructions for officers in all the Member States. It is available on the internet in all EU languages.

Action 4 — Communication and strategy

CLEN Action 4 is a multiple action devoted to scientific and technical communication and exchanges between the individual customs laboratories as well as between the CLEN and other institutional partners such as the European Commission services, customs administrations and non-EU countries' customs laboratories.

The main activity is the Seminar of European Customs Chemists which is organised every 3 years.

This action also covers strategic discussions in order to enhance cooperation. It explores new ways, virtual and physical, to respond rapidly to unforeseen situations, to share the workload and to fully benefit from the whole capacity and expertise of the European customs laboratories as a network, in particular in highly sophisticated techniques and specialised areas.

Action 5 — Scientific expertise

This CLEN action is devoted to expertise in specific domains. Initial activities included a workshop on molecular biology and other techniques used in the enforcement of the CAP or the control of food products as well as the protection of CITES species and timber, a working group on textiles and shoes looking at the determination of raw material composition and tariff classification, and another on tobacco looking at parameters and methods related to controls of tobacco and tobacco products for excise and classification. More recent activities encompassed workshops and working groups on topics such as designer drugs (new psychoactive substances), plants and plant products and customs detection technologies, developing the concept to go on the field with mobile laboratories and handheld equipment where the samples are. This action also organises training sessions on specialised methods like the latest one on LSC to enable a better identification and quantification of bio-based products in controlled samples, an important step towards customs controls related to the development of bio-economy.

Action 6 — European customs inventory of chemical substances

The European customs inventory of chemical substances (ECICS) is an information tool on chemicals specifically designed for customs officials and economic operators involved in customs declarations. It is one of the first concrete results of the cooperation between the European Commission and EU Member States in the customs field (first publication in 1974). ECICS is the sole database in the world providing reliable classifications in the customs nomenclature for chemicals. It is available on the internet and currently contains more than 43 000 approved classifications. While it was initially dedicated to the tariff classification, it now provides all the information necessary for the rapid and efficient control and the safe handling of chemicals by customs officials. It is destined to become the cornerstone of customs' implementation of all chemical regulations such as on designer drugs, chemical weapons precursors, chemicals dangerous for health or environment, and REACH.

Various activities are then organised by the CLEN under the six themes. These activities are carried out on an ad hoc and voluntary basis by the customs laboratories themselves. They are regularly opened to non-EU countries' customs laboratories.



Additionally to the meetings and ad hoc groups, a Seminar of European Customs Chemists is held every 3 years.

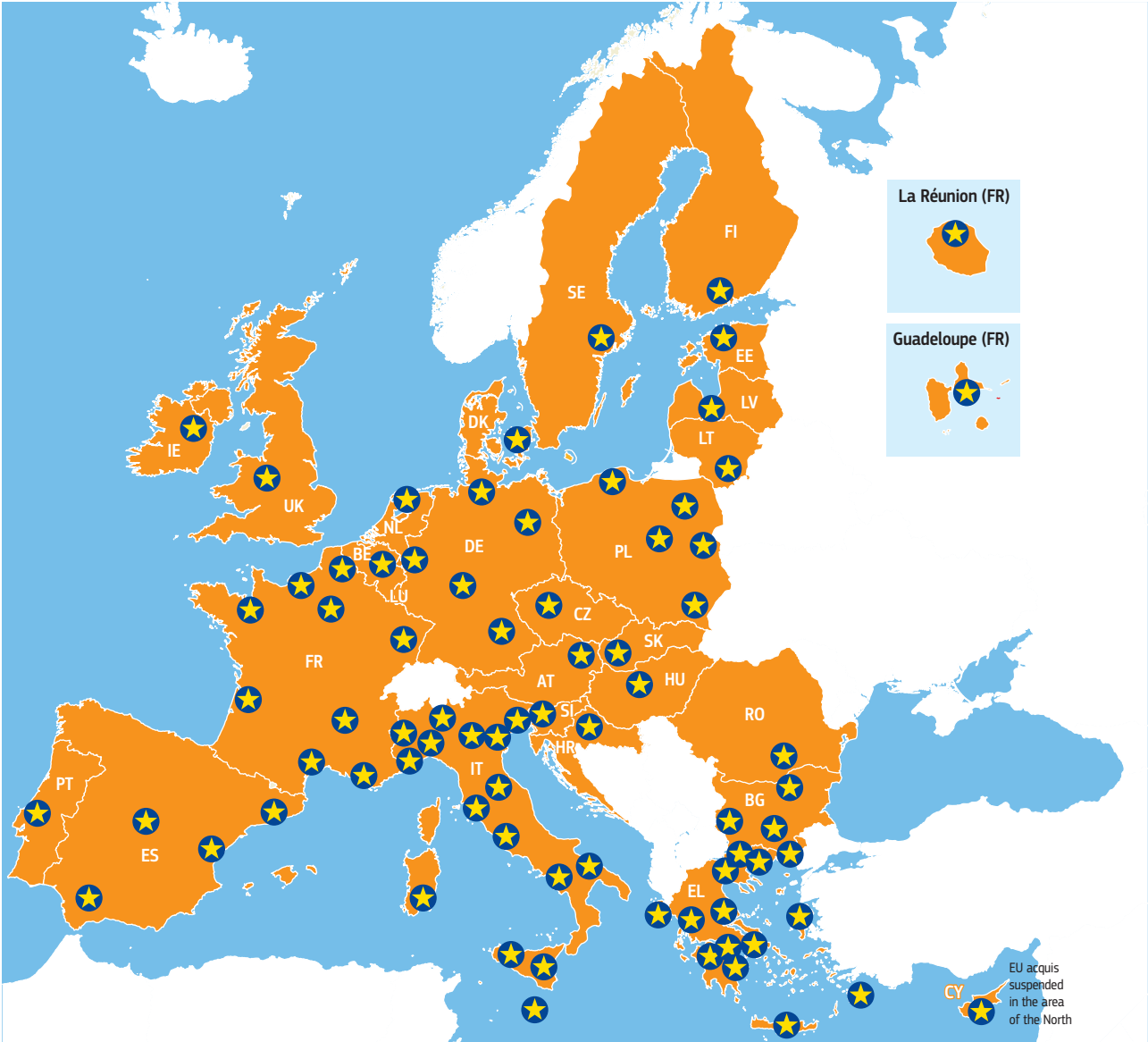
So far, five seminars have taken place: in Fiumicino, Prague, Athens, Helsinki and Paris. They have become regular and increasingly attended events. In Paris in 2013, there were 259 participants from 50 countries, and not only from the European Union but from almost all over the world.

These seminars are very important events for the participating customs authorities and customs laboratories. They are an excellent way of showing the challenges currently faced by the customs laboratories and comparing results and solutions for pending problems.

They are also unique opportunities to meet and share thoughts, ideas or concerns. These seminars mix plenary sessions, parallel sessions and poster sessions, all of them of a high quality, and therefore help strengthen the whole CLEN.



Map showing the locations of customs laboratories in the European Union Member States





Contacting your laboratory

Member States customs laboratories

Belgium

Laboratorium Douane en Accijnzen
Blijde-Inkomststraat 20
3000 Leuven
+32 25753160

As from mid-2017:

Gustaaf Levisstraat 2
1800 Vilvoorde
www.fiscus.fgov.be

Bulgaria

**Central Customs Laboratory
Customs Agency**
Rakovski 47
1202 Sofia
+359 98594150
www.customs.bg

Czech Republic

**General Directorate of Customs
Customs Technical Laboratory**
Budějovická 7
140 96 Praha 4
+420 261333504
www.celnisprava.cz

Denmark

SKAT (Tax and Customs)
Told — Tariferingscentret
Sluseholmen 8 B
2450 København SV
+45 72221818
www.skat.dk

Customs laboratory FORCE Technology

Park Allé 345
2605 Brøndby
+45 43267000
www.forcetechnology.com

Germany

**Generalzolldirektion
Bildungs- und
Wissenschaftszentrum
der Bundesfinanzverwaltung
Abteilung Wissenschaft und
Technik**
Gescherweg 100
48161 Münster
+49 2518670-0
www.zoll.de

Estonia

**Estonian Environmental Research
Centre**
Marja 4d
10617 Tallinn
www.klab.ee

Ireland

**State Laboratory
Customs and Excise Section**
Backweston
CELBRIDGE
Co. Kildare
W23 VW2C
+353 15057000
www.statelab.ie
www.revenue.ie

Greece

**Ministry of Finance
General Chemical State Laboratory**
Section of Technical Tarification
A. Tsocha str. 16
115 21 Athens
+30 2106479000
www.gcsl.gr

Spain

**Agencia Estatal de Administración
Tributaria
Departamento de Aduanas e
Impuestos Especiales
Subdirección General Químico
Tecnológica**
Calle Navalunga, 2 A
28035 Madrid
+34 913768000
www.aeat.es

France

**Service commun
des laboratoires (SCL)
Unité de direction (UD)**
Le Vitalys
22-26 rue Renée Fonck
75019 Paris
+33 153015080
www.douane.gouv.fr

Croatia

Croatian Customs Laboratory
Avenija Gojka Šuška 1
HR-10000 Zagreb
www.carina.hr

Italy

**Central Directorate
for Product Analysis
and Chemical Laboratories**
Via Mario Carucci 71
00143 Roma RM
+39 0650246031-6035
www.agenziadogane.it

Cyprus

State General Laboratory
Kimonos street 44, Acropolis
1451 Nicosia
+357 22809119
www.moh.gov.cy/sql

Latvia

**State Revenue Service of the
Republic of Latvia
Customs Board Customs
Laboratory**
Talejas Str. 1
Riga, LV-1978
+ 371 67120961
www.vid.gov.lv

Lithuania

Lithuanian Customs Laboratory
Akademijos str. 7
LT-08412 Vilnius 21
+370 52375650
www.lrmuitine.lt

Hungary

**Forensic Institute of the National
Tax and Customs Administration
of Hungary**

1163 Budapest
Hősök fasora 20-24
Box 35
+36 14022233
www.nav.gov.hu

Malta

Malta Customs Laboratory

Lascaris Wharf
Customs House
Valletta
VLT 1920
+356 25685295
www.maltacustoms.gov.mt

Netherlands

**Dutch Customs Laboratory
Belastingdienst Douane
Laboratorium**

Kingsfordweg 1
1043 GN Amsterdam
+31 881538200
www.douane.nl

Austria

**Steuer- und Zollkoordination
Technische
Untersuchungsanstalt**

Vordere Zollamtstrasse 5
1030 Wien
+43 50233571431
www.bmf.gv.at

Poland

**Customs Chamber in Warsaw
Central Customs Laboratory**

Kolorowa 13
05-402 Otwock
+48 227198447
www.clc.warszawa.ic.gov.pl

Portugal

**Direção dos Serviços Técnicos,
Análises e Laboratório**

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Edifício da Alfândega de Lisboa 2º
Rua do Terreiro do Trigo
1149-603 Lisboa
+351 218813102
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Romania

**National Agency for Fiscal
Administration
General Directorate of Customs
Central Customs Laboratory**

Strada Vulturilor nr. 2, sector 3
30855 Bucureşti
+40 213260386
www.customs.ro

Slovenia

**Financial Administration of
the Republic of Slovenia
Customs Laboratory**

Šmartinska 55
SI-1000 Ljubljana
+386 14783800
www.fu.gov.si

Slovakia

**Financial Directorate of
the Slovak Republic
Customs Laboratory**

Bajkalská 24
821 09 Bratislava
+421 258102618
www.financnasprava.sk

Finland

Finnish Customs Laboratory

Tekniikantie 13
P.O. Box 53
FI 02151 Espoo (Helsinki)
+358 2955200
<http://www.tulli.fi>

Sweden

Swedish Customs Laboratory

Box 6055
SE-171 06 Solna
+46 84050386
www.tullverket.se

United Kingdom

HMRC

(Her Majesty's Revenue and Customs)
Alexander House
21 Victoria Avenue
South-End-On-Sea
SS99 1AA

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Excise**

Campden BRI (Chipping Campden) Ltd.
Station Road
Chipping Campden
GL55 6LD
Gloucestershire
+44 (0) 1386842000
www.campden.co.uk

**I would like to participate in a CLEN activity. I would like to analyse a sample but I do not have the equipment. I would like to borrow a mobile lab.
I would like to develop my laboratory ...**

You need an expert opinion, an analysis or a training session? You want information to buy new equipment or develop a new domain and test it before? You have an unforeseen crisis? You want to participate in a CLEN activity? Whatever you need, the CLEN can help you.

Please contact the European Commission's Directorate-General for Taxation and Customs Union or one of the Member States customs laboratories.

Information on the European customs laboratories is available at:

http://ec.europa.eu/taxation_customs/customs/customs_controls/customs_laboratories/index_en.htm

The list of analytical methods contained in the ILIADe is available at:

http://ec.europa.eu/taxation_customs/customs/customs_controls/customs_laboratories/group_ecl/article_6747_en.htm

Samancta is available at:

http://ec.europa.eu/taxation_customs/dds2/SAMANCTA/

ECICS is available at:

http://ec.europa.eu/taxation_customs/dds2/ecics/chemicalsubstance_consultation.jsp?Lang=en

