AFEMS Position Paper on the Marking of Ammunition

Introduction

The Association des Fabricant Européen de Munitions de Sport (AFEMS) - Association of European Manufacturers of Sporting Ammunition - is a non-profit organisation which was set up in 1951. With 60 members and affiliates from over 30 European countries, AFEMS represents a network of manufacturers and distributors of ammunition, components, clay targets and machinery, each boasting vast experience and a long history in the industry.

The mission of AFEMS is to strengthen the dialogue and cooperation among its members, to represent and safeguard their interests to the relevant decision-making bodies. AFEMS is regarded as the sole spokesperson and representative for the entire European ammunition industry and undertakes active dialogue with governments and institutions to contribute, through its expertise, to the drafting and implementation of legislation and technical solutions on the production, classification and distribution of civilian ammunition and related products.

For years, discussions at the United Nations have revolved around the possibility of applying the latest available technologies to mark every individual cartridge produced, with the aim to trace it and prevent its diversion to criminal channels. However, in AFEMS’ view, such discussions have always failed to give the issue the necessary attention, ignoring the complexities and the numerous challenges that manufacturers, retailers and law enforcement authorities would face.

Additionally, the UN has always referred to Small Arms and Light Weapons (SALW) and related ammunition, without making the necessary and proper distinction between military and civilian uses, nor between shotshell and bullet ammunition.

This document sets out AFEMS’ position on the issue of the marking of ammunition, describing how the production process for civilian ammunition works, highlighting the main technical, economic, and administrative challenges that the marking of ammunition with laser technologies would pose, and pointing out the limits of the Brazilian marking system.
The civilian ammunition production process

First, it is important to note that the ammunition industry is built on large-scale production. This means that efficiencies, costs, and prices of the final products are based on large production volumes at the fastest possible pace.

While in the production of ammunition for the military market it is possible to know who the final user will be in advance (i.e. military, law enforcement bodies, or any other governmental entity), this is not possible when ammunition is produced for the civilian market, whose distribution covers thousands of customers at the end of a chain made of different intermediate sellers and purchasers. Therefore, in the production of civilian ammunition, it is impossible to know in advance the final destination and user of the ammunition.

During the production process, every manufacturer of civilian ammunition identifies each box of ammunition with a production lot number that, in the internal management system, can then be linked to batches in sales orders for distributors or large retailers. This traceability is accomplished only long after creating the number and/or identification of the batches.

The reason for this is that production systems are normally divided into two main types:

- **Production for stock**: to adapt to the needs of the market, manufacturers often produce ammunition for stock. Once a batch of ammunition is produced, it is placed in stock and then, in due course, sent to the retailer in response to their sales order. Therefore, it is not always possible to have information about intermediate customers or final destination at the production stage, since cartridges from the same batch can be distributed to different distributors/retailers in different countries or continents after being held in stock.

- **Production for a specific sales order**: normally, this happens when the clients are large distributors or retailers requesting significant quantities (hundreds of thousands or even millions of units) which are then sold to different final customers at the end-of-life cycle of the cartridge. Also in this case, these distributors often stock ammunition to support their own sales strategy, without knowing in advance who their final customers will be.

Therefore, the prospect of marking ammunition for the civilian market in order to be able to trace the final customer in order to prevent any single piece of ammunition falling into the hands of criminals cannot be achieved at the production stage.
The challenges posed by laser marking

Technical Challenges

- **Practical difficulties in applying laser marking**
  - Not all cartridges have an extractor groove which can be marked.
  - Not all cartridge cases are made of brass; laser marking would also need to be compatible with plastic cases of different sizes and colour.
  - Ammunition cases already include information on the caliber and type of ammunition. Adding additional information through laser marking would mean reducing the size of the text since it would all still need to fit in the same space, thus significantly affecting the readability.
  - Several ammunition calibers with very high production volumes (e.g. 22LR, 6.35 Browning, 7.65 Browning, 9mm Browning short, etc.) are so small that it is almost impossible to affix an additional alphanumeric code.

- **Safety concerns**
  - Laser marking on brass would remove part of the protective layer, with the possibility of causing metal fatigue, damage to the structural integrity of the ammunition or rust.
  - Most companies are Seveso industries. Changing the production process would involve amendments to Safety Plans already in place, which would, in turn, need to be approved by the relevant authorities. This would have an economic cost, not least due to the enormous human effort and time required with onsite inspections, meetings, papers etc.
  - Every production line must be CE marked (not only every single machine, but every connected machine). In addition, if a new laser marking station were to be incorporated into the production line, companies would have to recertify the whole production line. This would need to be done for every single production line, thus generating new costs.
  - Legislation in many countries provides that the surface temperature of every single part of the assembly machine must not exceed a given temperature (e.g. in Italy, the limit is 65°C). Laser marking is likely to exceed this limit and therefore could not be used in explosive facilities.

Economic Challenges

- **Huge investment in new equipment** - most factories’ industrial capacities are based on many small/medium machines within the same facility. This means that the implementation of laser technology to mark every single cartridge would require the
development of new additional equipment for every single loading machine. For many producers this would require huge investment in new technologies, software, hardware, and human resources to standardise the entire process, with the result that companies’ competitiveness would significantly decrease. It would also create increased responsibility on manufacturers, with consequent higher risk of human error by employees.

- Automation in the production and storage process would be seriously affected: considering the high level of automation required to ensure standardisation, both in terms of production and storage, the inclusion of a laser marking process would dramatically impact on the costs, speed and capacity of both production and management of the process and stock. This would also cause logistical problems post-production, as customers often require moving pallets and combine multiple calibers in one pallet. All these challenges will significantly endanger companies’ competitiveness, especially if the same requirements are not adopted by all countries.

**Administrative challenges**

- Database: if laser technology were to be applied at the production stage to mark every single cartridge with information about the distributor/retailer, then it would be necessary to set up and maintain a complex database tracking ammunition all the way down the supply and distribution chain. To keep track of the ammunition sold to final users, a second database at trade level would need to be created and maintained by retailers, interconnected to the first production database. This would mean higher costs at both stages in terms of equipment and human resources, and further responsibility on producers and retailers to manage this sensitive data.

- Tracing reloaded ammunition: The reloading of ammunition is a very common practice among end users. End users usually buy cartridge cases at the gun shop or, more often, recover those at shooting ranges that might have been purchased and used by another shooter, to reuse them. This would, of course, jeopardize any efforts to trace the final user and could generate problems in the case of reloading ammunition being diverted into criminal channels and subsequently discovered in a crime scene.
**Laser marking of ammunition in Brazil**

The marking of ammunition in Brazil is often presented at UN level as an example of best practice. However, the marking of ammunition in Brazil is only applied to ammunition supplied to law enforcement and military sectors, and only to clients in Brazil.

Apart from traditional head-stamping, some Brazilian companies use laser technology to mark the extractor groove of the cartridge with a combination of characters and numbers that are exclusive to each client and each production series. The same code is applied to all cartridges of the same lot.

Therefore, laser marking of ammunition in Brazil is not applied to the civilian market for which, as we have described, it would be practically impossible to know the final user at the production stage. Moreover, the marking is made on the extractor groove which, as already mentioned, is not present on all cartridges.

It must be added that the introduction of this technology in the production line, with the consequent development of new equipment (machinery, hardware and software) and the increased controls implemented at every stage of the production process, not only increased costs but also affected the efficiency and speed of production.

**Conclusion**

It is clear that marking every single civilian cartridge for tracing purposes is practically impossible. Even if it were somehow possible, the economic, technical, and administrative challenges faced by all those involved in the production and retail process would be enormous and would be disproportionate to the effectiveness of the measure in addressing the underlying problem.