



## AFEMS Position Paper: REACH Restriction on Lead in Gunshot

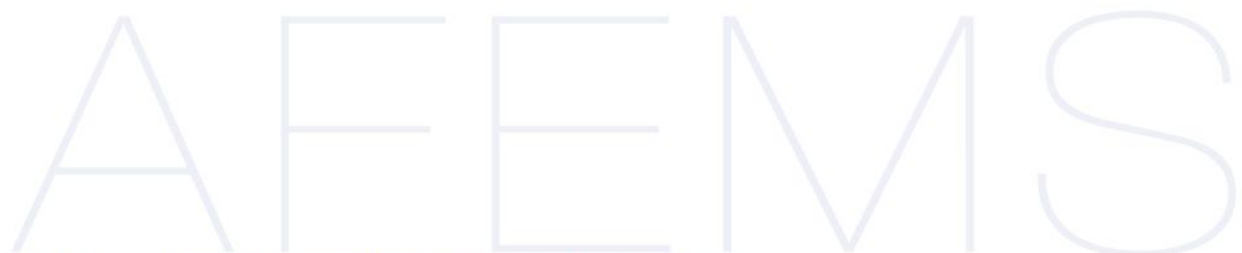
### Executive Summary

The proposed REACH restriction on lead in gunshot will have significant implications for the European gunshot segment used in both hunting and sport shooting. The transition toward alternative materials requires substantial industrial adjustments across the ammunition supply chain.

In this context, AFEMS highlights the following key considerations:

- **A minimum transition period of seven years is necessary** to redesign shotgun cartridges, adapt propellant and primer formulations and complete the required ballistic testing and certification procedures.
- **The civilian gunshot market sustains the broader ammunition manufacturing ecosystem**, including component suppliers, specialised machinery manufacturers and technical expertise that also support defence-related ammunition production.
- **A European supply chain capable of producing steel shot at the required scale does not currently exist**. This creates a major risk in terms of the sovereignty of European Member States regarding a critical component of munitions production.
- **The proposed risk management measures for sport shooting ranges may lead to closures of facilities**, potentially resulting in a contraction of demand for sport shooting ammunition and further affecting production volumes.
- **Developing a resilient European supply chain for alternative shot materials will require cooperation between industry and EU institutions**, in order to avoid increasing dependence on external suppliers for key raw materials.

For these reasons, AFEMS considers that a transition period of **no less than seven years represents the minimum timeframe necessary** to ensure a technically feasible and operationally stable transition.



## 1. Introduction

The proposed restriction on lead in ammunition is being discussed in a complex geopolitical and geoeconomic environment. European ammunition manufacturers currently operate in a context characterised by evolving global supply chains, increasing defence-related demand and heightened geopolitical uncertainty. Instability in several regions, including the Middle East, continues to affect international logistics, raw materials sourcing, trade routes and industrial supply chains.

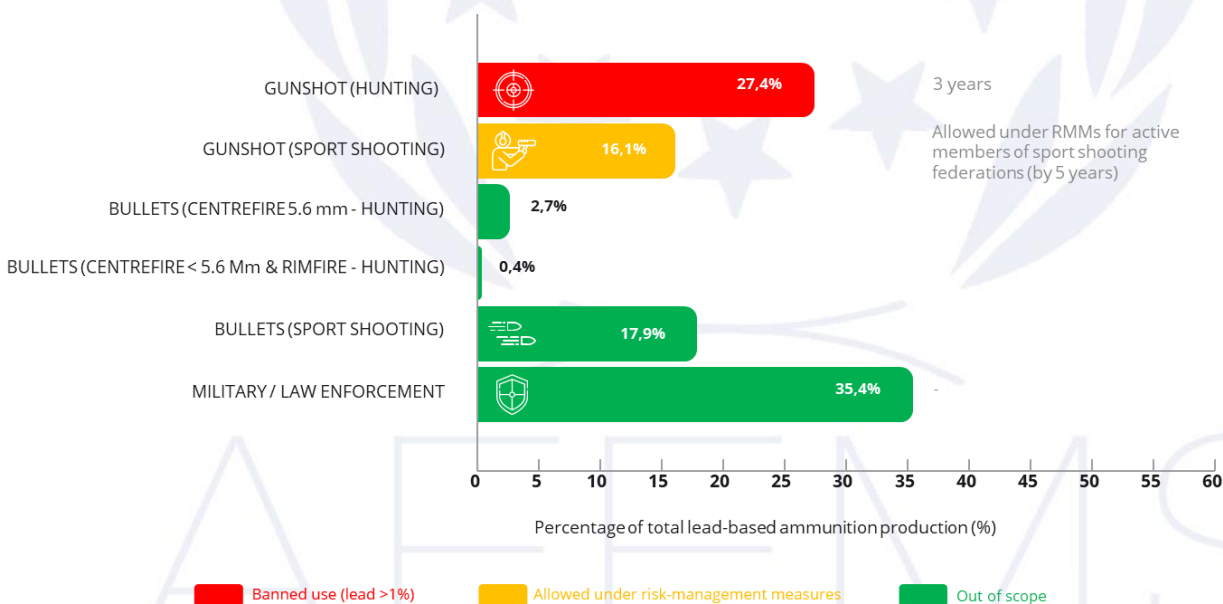
Within this environment, the European ammunition industry forms part of a broader industrial ecosystem that supports both civilian markets and defence supply chains. Civilian ammunition production shares and sustains supplier networks, technical expertise and manufacturing infrastructure that are also used for defence-related production.

The transition away from lead gunshot should therefore be understood not only as an environmental regulatory adjustment but also as a significant industrial transformation affecting a major segment of civilian ammunition production. This transition must be carefully calibrated to avoid unintended disruptions to the wider ammunition supply chain.

While the objective of reducing environmental lead emissions is recognised, the transition to alternative materials must remain technically feasible and compatible with the operational realities of the sector.

For these reasons, the transition period for gunshot should be **no less than seven years**, which represents the minimum timeframe required to implement the industrial adjustments associated with the transition to alternative materials.

## 2. Structure of the European lead-based ammunition production ecosystem





The civilian gunshot ammunition segment represents one of the largest production areas within the European ammunition industry. Gunshot cartridges used for hunting and sport shooting together account for a substantial share of total lead-based ammunition production.

This production volume sustains a broad industrial ecosystem including component suppliers, machinery manufacturers and specialised technical expertise. Changes and disruptions affecting this segment therefore have implications that extend across the wider ammunition supply chain.

Unlike more specialised ammunition segments, shotgun ammunition production operates at very large industrial volumes and plays a key role in maintaining multiple elements of the manufacturing ecosystem.

### **3. Adaptation of ammunition components and implications for EU defence supply chains**

Replacing lead shot with alternative materials affects the internal ballistics of shotgun cartridges and therefore requires adjustments that extend beyond the projectile itself.

Lead shot has specific physical characteristics, including high density and particular deformation behaviour during firing. Alternative materials such as steel have significantly lower density and different friction behaviour inside the barrel. These differences alter pressure curves, ignition dynamics and propellant combustion characteristics.

In practice, the transition to alternative materials requires manufacturers to redesign the most common cartridge calibers loading parameters (i.e. 28 gauge and .410 bore) and adapt propellant formulations, charge weights and primer specifications in order to maintain safety, reliability and ballistic performance. To meet CIP safety and certification standards, each cartridge variant requires extensive ballistic testing and pressure verification.

A significant proportion of the existing civilian shotgun fleet in Europe – particularly older firearms, shotguns equipped with non-certified chokes, and small-gauge guns – is not compatible with steel shot ammunition. This incompatibility could lead to a reduction in the number of active hunters and sport shooters, ultimately resulting in lower demand for shotgun ammunition.

The implications extend beyond the civilian gunshot market. The production of primers and propellants relies on a limited number of specialised industrial facilities in Europe, supplying both civilian ammunition manufacturers and defence-related ammunition production.

Civilian ammunition production plays a key role in maintaining the baseline industrial demand that allows these facilities to sustain continuous production capacity. Reformulating shotgun cartridges on a large scale would therefore require substantial technical resources from these suppliers, including engineering work, testing capacity, and adjustments to production processes.



Because these same facilities also provide critical inputs for military small-calibre ammunition and other defence systems, a rapid transition in civilian gunshot ammunition could create competing demands on the same industrial resources, requiring suppliers to allocate technical and production capacity simultaneously to civilian reformulation and defence-related production.

Given the highly specialised nature of primer and propellant manufacturing and the limited number of facilities involved, these adjustments cannot be implemented within a short timeframe without placing significant pressure on the broader ammunition supply chain.

#### **4. Industrial role of the civilian gunshot market and defence surge capacity**

The European ammunition industry operates according to an industrial model in which civilian and defence production are structurally interconnected

Civilian ammunition production represents the most stable segment of the market and provides the stable volume demand that sustains industrial capacity, specialised personnel and supplier networks.

These same industrial assets – production lines, machinery, suppliers and technical expertise – are also used in defence ammunition production. As a result, the civilian market maintains the baseline capacity that can be mobilised expanded to meet increases in defence demand.

Recent developments in Europe have demonstrated the importance of maintaining this industrial base in order to respond to increased defence demand. In some cases, technological developments initially carried out within the civilian ammunition segment have also contributed to the rapid adaptation of ammunition solutions for emerging operational needs, including anti-drone applications. Notably, certain gunshot configurations, including lead-based shotgun ammunition, have been used in specific counter-drone scenarios due to their dispersion characteristics at short range.

At the same time, a rapid regulatory transition requiring significant investment in the large-scale conversion of civilian gunshot production toward lead-free alternatives would inevitably require the reallocation of industrial resources, engineering capacity and capital investment within the sector. In the short term, this could divert attention and investment from other production priorities, including activities related to defense supply chains.

If the civilian gunshot market were to contract abruptly due to an accelerated transition away from lead, this could weaken the economic foundations that sustain these industrial capabilities. Reduced civilian production volumes would affect utilization rates of production facilities, the viability of specialized suppliers and the retention of skilled personnel.

Over time, this could reduce the flexibility of the European ammunition industry to respond to fluctuations in defense demand.

## 5. Absence of a European supply chain for steel shot

Steel is expected to become the dominant alternative material for gunshot cartridges.

However, the European Union currently lacks a sufficiently developed industrial supply chain capable of producing steel shot at the scale required to replace lead shot across the European civilian market.

Only limited production capacity currently exists within the EU and the volumes produced remain significantly below the quantities that would be required following the implementation of the restriction.

Beyond production capacity constraints, an additional challenge lies in the fact that the technology and industrial know-how required for the large-scale manufacturing of steel shot are currently very limited within Europe. Much of the technical expertise and industrial capability required for producing steel shot at scale is concentrated outside the EU, particularly in China.

This lack of technological capability represents a strategic vulnerability in itself. In addition to cost considerations, the absence of European industrial know-how for steel shot production could lead to a structural dependence on external suppliers for a critical component of ammunition manufacturing.

Because of the link with military ammunition, particularly anti-drone ammunition, it will be necessary to develop a European supply chain capable of supporting the transition. This development would require investment in new steel-shot production facilities, the establishment of reliable sources of raw materials, the installation of specialized production equipment and the qualification and testing of new cartridge designs.

Companies would also need to invest in the conversion of existing shotgun cartridge loading lines and the acquisition of steel-compatible loading machinery.

Industrial developments of this scale typically require several years to design, finance, construct and bring into operation. A transition period of seven years should therefore be considered the **minimum timeframe necessary to establish a viable European production base** for alternative shot materials.

## 6. Strategic dependence on external suppliers and geopolitical risks

The transition toward steel shot also raises important questions regarding the sourcing of raw materials.

Steel used for shot production requires specific metallurgical properties to ensure appropriate hardness and ballistic performance. In practice, this type of steel is typically low-quality carbon steel produced in very large volumes which must remain available at low cost in order to be economically viable for shotgun ammunition manufacturing.



Production of such steel is currently concentrated outside the European Union, particularly in China, where manufacturers benefit from large industrial scale and significantly lower production costs.

European steel producers generally focus on higher-value steel products, while the large-scale production of low-cost steel suitable for shot manufacturing remains limited within the EU. As a result, a rapid transition toward steel shot could lead to increasing reliance on imports from China or other external suppliers.

Recent precedents illustrate the vulnerability associated with such dependencies. China has previously imposed export restrictions on materials relevant to ammunition production, including antimony and bismuth, both of which are used in several ammunition alloys.

Without sufficient time to develop a resilient European supply chain, the transition away from lead gunshot could therefore increase Europe's dependence on external suppliers for materials that are essential to ammunition production.

In the current geopolitical environment, creating new structural dependencies on external suppliers for materials used in ammunition production would raise significant concerns from both an industrial and strategic perspective.

In this context, AFEMS would welcome closer cooperation with the European Commission and Member States to identify possible policy instruments or funding mechanisms that could support the development of a resilient European supply chain for lead alternatives, **in line with the EU's broader objectives on industrial resilience and strategic autonomy.**

## 7. Conversion of ammunition loading lines

The transition away from lead shot also requires structural adaptation of ammunition loading lines for shotgun cartridges, as existing equipment is designed around the physical properties of lead, including its density, deformation behaviour and feeding characteristics.

Alternative materials such as steel require modifications to feeding systems, loading mechanisms and quality control procedures, and in many cases, the installation of dedicated steel-compatible equipment. These technical constraints, combined with lower processing efficiency of steel-loading systems, may reduce overall production capacity during the transition phase.

The conversion of loading lines therefore involves engineering modifications, installation of new machinery and validation of modified production processes, accompanied by significant investments and may also involve administrative procedures related to industrial permitting and equipment certification.

Given the delivery times for specialized machinery and the technical adjustments required, a transition period of seven years represents the **minimum timeframe necessary** for manufacturers to adapt production capacity while maintaining market supply.

## **8. Impact on sport shooting and shooting ranges**

Gunshot is also widely used in sport shooting disciplines across Europe. The proposed restriction introduces risk management measures for outdoor shooting ranges that may prove difficult to implement within the proposed timelines.

Many shooting ranges would be required to implement significant infrastructure upgrades in order to comply with these measures, including systems for shot containment, environmental monitoring and remediation. For a large number of ranges, particularly smaller facilities, these requirements may be technically complex and financially difficult to implement within a short timeframe.

If a substantial number of ranges are unable to comply with the proposed measures, this could lead to closures or reductions in shooting activity, resulting in a contraction of demand for sport shooting ammunition. Such a decline would further reduce production volumes within the civilian gunshot segment.

This contraction would have direct implications for the broader industrial ecosystem supporting shotgun ammunition production, reinforcing the systemic effects outlined in previous sections.

## **9. Strategic autonomy and resilience of the European defense industrial base**

The transition away from lead gunshot should also be considered in the broader context of the European Union's efforts to strengthen industrial resilience and strategic autonomy.

Recent EU policy initiatives emphasize the need to maintain a robust European Defense Technological and Industrial Base (EDITB) capable of supporting the Union's security objectives.

Civilian ammunition production contributes significantly to sustaining the industrial capabilities that underpin this ecosystem, as production infrastructure, specialized suppliers, technical expertise and component manufacturing are frequently shared between civilian and defense-related ammunition production.

In this context, ensuring a realistic transition timeframe is essential to avoid disruption to these interconnected capabilities, and is therefore consistent not only with industrial considerations but also with the EU's broader objective of strengthening the resilience and autonomy of its strategic supply chains.

## **10. Conclusion and key considerations**

The exclusion of bullets in the latest proposal does not address all the concerns related to defense that have been raised for the past two years. The transition away from lead gunshot therefore remains a significant industrial adjustment for the European ammunition sector and for the broader supply chain supporting its production.



As outlined in this paper, the transition involves a combination of technical, industrial and market-related challenges. These include the redesign and certification of shotgun cartridges using alternative materials, the adaptation of propellant and primer systems, the conversion of loading machinery and the development of a reliable supply chain for steel shot and other alternative materials.

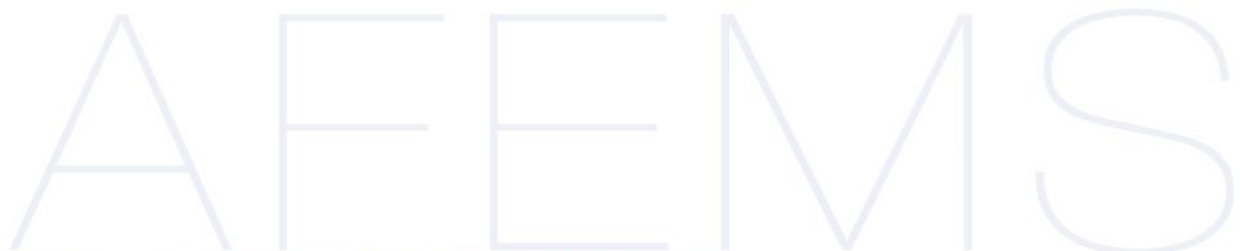
At present, the industrial capacity required to support this transition does not yet exist within the European Union at the necessary scale. Developing such capacity will require substantial investment, coordination across the supply chain and sufficient time for manufacturers and suppliers to adapt their production systems.

In parallel, the proposed risk management measures affecting sport shooting ranges may lead to structural changes in the sport shooting market, potentially resulting in a reduction in civilian gunshot demand and further affecting the industrial ecosystem that sustains ammunition production in Europe.

In the current geopolitical environment, ensuring the resilience of European industrial supply chains has become an increasingly important policy objective. The ammunition manufacturing ecosystem, which includes civilian and defense-related production activities, forms part of this broader industrial landscape.

For these reasons, the transition toward lead-free gunshot must be implemented in a way that remains technically feasible and economically sustainable for the sector.

A transition period of no less than seven years should therefore be considered the minimum timeframe necessary to allow manufacturers and suppliers to adapt production processes, develop alternative material supply chains and ensure a stable transition toward lead-free gunshot.





## About AFEMS

The Association of European Manufacturers of Sporting Ammunition (AFEMS) is a non-profit, Europe-wide association based in Brussels representing a network of manufacturers and distributors of ammunition for civilian and professional markets. The association also brings together companies involved in the production of machinery and equipment used in ammunition manufacturing.

Through its members, AFEMS represents a significant part of the European ammunition manufacturing ecosystem. The association represents almost 70 manufacturers and distributors of ammunition whose members cover more than 90% of the military production of small arms ammunition in the European Union.

This industrial base includes production facilities, specialized suppliers and technical expertise that support both civilian markets and defense-related ammunition supply chains in Europe.

