GAMA-IAOPA-EHA-EAS-ERAC-EBAA-ECOGAS-IAAPS Response to EC Consultation on Draft regulation - Ares(2021)4120146 / Chemicals (REACH) regulation – amendment to the list of substances of very high concern in Annex XIV

The General Aviation Manufacturers Association (GAMA), the European branch of the International Council of Aircraft Owners and Pilots Associations (IAOPA), Europe Air Sports (EAS), European Council of General Aviation Support (ECOGAS), European Business Aviation Association (EBAA), International Association of Aviation Personnel Schools (IAAPS), European Regional Aerodromes Community (ERAC), and the European Helicopter Association (EHA) are grateful to the European Commission for the opportunity to respond to EC Consultation on Draft regulation – Ares (2021)4120146 as published on the Better Regulation Website.

Together, we jointly submit the following comments, representing the interests of industries, businesses, and individuals that would be directly impacted by the inclusion of Tetraethyllead in Annex XIV as this substance is a key component in 100LL aviation gasoline (high-octane, low-lead / ref. ASTM standard D910), which is the only fuel that is currently certified and approved for use in over 16,000 general aviation aircraft registered in the European Union. This represents around one third the European aviation fleet.

All of the above associations fully support the efforts of the EU and ECHA in support of the European Environmental objectives in general, and also more specifically in the case of tetraethyllead (TEL). Obviously, it needs to be ensured that hazardous substances are carefully controlled, and that citizens are always protected. Our industry, on a global level is already fully working towards finding a replacement high octane aviation gasoline without the additive TEL. However, at this time, such a replacement fuel without TEL has not been approved and we would therefore request the European Commission to postpone the inclusion of TEL in Annex XIV until such times as a replacement fuel has been successfully made available on the European market.

It should be worth noting that over time TEL-consumption is already in a strong and continuing decline: understanding that only a few decades ago, Avgas 100LL containing TEL was the only aviation fuel available. This situation has clearly improved, and the trend is still continuing: Lower power piston-engines up to approx. 180 hp mainly run on lead-free aviation or automotive fuels, while larger piston engines over 400hp are gradually being replaced by turbine-engines consuming Jet A1. The first electric aircraft was already certified by EASA and entered the market with high success, with many more are expected to come soon. The agreed objective of our industry is to significantly further reduce the TEL consumption until it is no longer used for aviation fuel at all, and our efforts show positive results.

We also fully support the PAFI programme in the United States with the objective to find a lead-free replacement for TEL (See Annex for further details). The PAFI-project has made good progress to date,

but has not yet come to the desired result of phasing out TEL. In this context we would strongly suggest proper funding for a European research activity on a TEL-replacement. Over time such an activity could be complemented by research for a carbon-free piston-engine fuel. We are aware that this recommendation is clearly supported by EASA, the European Union´s Aviation Safety Agency.

A promising interim solution worth consideration would be the use of Avgas 100VLL, “Very Low Lead”, with a substantially reduced maximum allowed TEL content by 20%, which is covered by the pertinent fuel-specifications.

As a penultimate point we would strongly like to suggest revisiting the REACH risk assessment. After Brexit the relevant TEL-quantity should be around 90% below the magnitude of the 2018 figures in the current risk assessment. The reason is that the only remaining TEL-producer worldwide, “Innospec”, is based in the UK, and consequently the TEL-risk assessment of 2018 was still based on the figures of the UK company Innospec producing TEL for the world-market. The European TEL-market only has a share in the order of 10% of the world-market.

Finally, we would like to draw your attention to the need to avoid a foreseeable economic reaction, in which an authorisation for TEL is either not requested or granted: all Avgas 100LL supplied to aircraft in the EU would have to be made by shipping TEL from the UK to the USA, blending it, then importing it back from the USA into the EU, damaging the business of the current EU blending facilities and leading to significant environmental costs as well as additional shipping costs that would have to be borne by EU citizens.

In conclusion, all the above associations see the risk that by the inclusion of TEL into the Annex XIV, the European Union´s citizens would not benefit and the European General Aviation industry, in most cases SMEs and private individuals would suffer from uncertainties and increased cost. Even the ecological cost for longer distribution channels could increase.

Therefore, at this time, a replacement fuel without TEL has yet not been approved and we request the European Commission to postpone the inclusion of TEL in Annex XIV until such times as a replacement fuel has been successfully made available on the European market.

We are very happy to answer any questions you may have and look forward to a constructive dialogue.

ANNEX: Additional Background Information

CURRENT EFFORTS TO TRANSITION TO UNLEADED FUELS

Existing Use of Unleaded Fuels in the GA Fleet

For decades, Avgas 100LL was practically the only fuel used in the GA. Today the situation is more differentiated as light aircraft engines up to around 160 hp in their majority use either automotive fuels or lower-octane unleaded Avgas UL 91. More powerful engines over 400 hp almost exclusively consume Kerosene / Jet A1. Consequently, the number of aircraft in the GA fleet, which still depends on Avgas 100LL and TEL in the middle of this power spectrum of 200-400 hp, is continuously decreasing.

Development of High-Octane Unleaded Avgas

Although the technical challenges of removing lead from aviation gasoline are formidable, the general aviation community is committed to an unleaded future and actively working to ensure it is realised. Through the collaborative U.S. government and industry Piston Aviation Fuels Initiative (PAFI) which includes aviation gasoline producers in Europe, a comprehensive process has been defined to identify, authorize, and deploy a safe, unleaded aviation gasoline with minimal impact negative impact on the operators of the piston-engine fleet.

There is a significant technical challenge involved in finding a “drop-in” fuel replacement that is compatible with the diversity of legacy piston engines, fuel systems, sealants and fuel tanks. The Federal Aviation Administration in the USA (FAA) continues to fund the PAFI programme and several candidate fuels remain under evaluation. Testing has been delayed in the last 18 months due to the COVID-19 pandemic situation but is starting to resume.

Key Challenges identified by PAFI:

An acceptable replacement high octane unleaded avgas has become a formidable technology challenge with the specifics of acceptability and impacts being the core of the challenge.

- After 25 years of research by the best in the industry including major fuel producers, fuel additive suppliers, engine manufacturers, aircraft manufacturers, FAA research, collaborative industry/FAA research (CRC project), and a host of entrepreneurs, an acceptable unleaded high-octane replacement for the existing leaded 100LL product remains a challenge with intense efforts continuing both within PAFI and industry.
- **Technology Barrier** – the technology for creating an acceptable high octane unleaded replacement for 100LL has become a formidable challenge where the term “acceptable” refers to extent of possible impacts and PAFI acceptance criteria.
- **Octane Enhancers** – There are several available, but each tends to have its own unique set of environmental, technical, and human impact negatives. PAFI is continuing to evaluate several novel unleaded candidates brought forth late in the PAFI program at the encouragement of the aviation industry. Additionally, there are several active STC programs which have the goal of obtaining FAA approval for the use of an unleaded fuel.
- **Backward Compatibility** - The crux of the challenge is best explained in terms of the requirement

for a new fuel to be backward compatible (*interoperability with an older legacy system*).

- Materials compatibility, engine durability, and comingling with existing stocks of 100LL can be critical criteria that overshadow detonation as the key differentiator for acceptability of new fuels.
    - Main Factors
        - Fuel Composition
        - Uniqueness of Components
    - Octane Enhancers added to meet Detonation Requirements
        - Effective MON varies based on 100LL comingling mixture ratio
        - Can cause materials compatibility issues
            - Fuel Bladders
            - Tank / Hose Sealants
            - Aircraft Paint
        - Can cause engine deposits resulting in poor durability results
        - Not as effective as TEL, thus larger volumes must be added
        - Physical Properties diverge from ASTM D910, particularly the density of the fuel
        - Engine performance impacts

PAFI has agreed to technical acceptance criteria for an unleaded fuel, which are summarized as follows:

1. Fuel system changes are out of scope
2. Changes to engine full rich schedule are out of scope
3. Engine hardware changes are out of scope
4. Aircraft hardware changes are out of scope
5. Performance is within 5% of performance with 100LL
6. Engine durability demonstrated to be acceptable based upon testing to PAFI test protocols
    a. Fuel oriented test based on 150 Hour 14 CFR 33.49 Endurance Test (EASA equivalent is CS-E 440)
    b. Fuel oriented test based on 200 Hour Durability Test per AC 33.19-1 (EASA equivalent is CS-E 250)
7. Engine transient performance demonstrated to be acceptable
8. Capability of comingling with 100LL has been demonstrated by testing
9. Materials compatibility shown to be acceptable

PAFI has also defined the Test Protocol for the validation of new unleaded fuels covering the broad and diverse range of engine, aircraft and component test criteria, as well as key engine characteristics (e.g. compression ratio) and aircraft characteristics (e.g. high altitude helicopter operations). The associated pass/fail criteria for each has been agreed and the critical test engines for each criteria have been identified to ensure coverage of all corner points of the piston aircraft fleet design and operations. Given the diversity of the general aviation aircraft fleet, this has been a significant undertaking and has taken considerable time and technical effort. However, now that this hurdle has been overcome, the pathway for the testing and eventual approval of new unleaded fuels has been agreed.

We would greatly welcome the initiation of an EU-funded programme to develop candidate unleaded fuels to help ensure the transition of the European GA fleet to an unleaded fuel. The testing programme is a significant financial undertaking, without a guaranteed return on investment due to the risk of failure. Support should be given to fuel companies to develop and test candidate fuels as this would be of great

benefit to the European aviation and energy sectors.

We are concerned that, any actions prior to that program's completion and viable unleaded fuel identification and authorization of aviation safety regulatory authorities would effectively ground a significant portion of the fleet, adversely affect safety, and have long-lasting negative economic impacts.

SAFETY

There is currently no demonstrated unleaded replacement for 100LL avgas that meets the safety and operational requirements of the entire piston GA fleet. Unlike the transition away from leaded gas in automobiles, performance issues in aircraft have potential life-and-death consequences for pilots and passengers.

Those living underneath flight paths also face risks associated with potential accidents caused by poorly performing aircraft. While the general health risks associated with lead are well documented, we must also ensure the safe operation of the sizable EU GA fleet. An EASA study from July 2021 showed a total of 54,000 piston engines operating in Europe, of which, 16,000 were identified as requiring a high- octane 100LL avgas.

There have been significant historical and current efforts to develop an unleaded high-octane aviation gasoline that maintains the properties necessary for the safe operation of aircraft engines. Tetraethyllead is the key compound that raises octane, which reduces gasoline's tendency to suddenly and instantaneously ignite from compression (also known as detonation or "knocking") during a reciprocating engine's combustion cycle. Sustained detonation can cause catastrophic engine failure. There is a direct relationship between the amount of horsepower a high-performance aircraft engine can produce and the octane level it requires to operate safely. In addition, the alloys used in aviation engine construction are chosen for their durability and synergistic relationship with the lubricating properties of lead. As a result, engine wear and maintenance issues arise in the absence of leaded fuel. Increased maintenance has an economic impact, but also raises safety concerns due to the increased potential for engine component failure. The current international avgas specification, ASTM D910, defines the acceptable limits for several physical and performance properties necessary for an aviation gasoline to ensure safe operation of aircraft across a broad range of very demanding conditions.

The lead additive and high-octane rating detonation protection it provides is just one of several safety issues that must be addressed when developing a lower-lead or unleaded alternative to 100LL and taken into consideration when proposing the inclusion of tetraethyllead in Annex XIV.

There is a potentially significant safety risk associated with a potential restriction or complete interruption of the availability of 100LL fuel for general aviation, as aircraft operators may be forced or inadvertently use unapproved fuels, which may well result in partial power loss or complete engine failure, and thus potentially lead to the loss of life of those onboard the aircraft and/or those on the ground.

SOCIETAL AND ECONOMIC IMPACTS

General aviation is a key component of Europe's transportation infrastructure and economy. Public use airports are often the only available option for fast, reliable, flexible air transportation to small and rural communities in every corner of the continent. General aviation directly supports jobs in these communities,

provides a lifeline for small to mid-sized enterprises, and provides critical services to remotecities and towns, particularly in time of natural disaster or crisis. As a result, general aviation is uniquely situated to serve some of the public's most crucial transportation needs.

The economic impact of general aviation is also significant. General Aviation contributes to the EU economy by creating output, employment, and earnings that would not otherwise occur. Direct impacts, such as the purchase of a new aircraft, multiply as they trigger transactions and create jobs elsewhere inthe economy (e.g., sales of materials, electronics, and a wide range of other components required to make and operate an airplane). Indirect effects accrue as general aviation supports other facets of the economy, such as small business, rural economies, and tourism.

Any regulatory action by the Commission related to tetraethyllead could directly affect general aviation. Without appropriate consideration of aviation safety, technical feasibility, and economic impact, a transition to an unleaded replacement for 100LL could have a significant impact upon the viability and long-term health ofthe general aviation industry and related SMEs and rural communities.

EASA COORDINATION

We recognize and appreciate the need to ensure the appropriate and safe use of chemicals to protect citizens. However, any actions impacting the use of TEL in aviation fuel could have a significant impact on European aviation so it is important to appropriately consider aviation safety implications. Therefore, in accordance with the new provisions of Article 87(2) of Regulation EU 2018/1139, the Basic Regulation of the European Aviation Safety Agency (EASA), we strongly urge ECHA to engage the expert opinion of EASA on the impact of implementing any restrictions on the use of TEL in aviation fuel before promulgating any such restrictions. As defined in this regulation, there is a need to balance the interdependencies between health, aviation safety, environmental and economic impacts as well as technological feasibility of alternative fuels.

ECHA Risk Assessment and the TEL Supply Chain in the EU

There is currently only one supplier of the TEL additive used in 100LL aviation gasoline, Innospec, based in the United Kingdom. Our current understanding is that they supply the additive to four fuel producers in the European Union who blend the additive with the fuel to produce 100LL fuel compliant with the ASTM D910 standard. We will leave it to the fuel companies themselves to provide additional details about the control and protection measures for the handling of TEL. However, we would like to highlight that this is clearly a highly controlled and very limited supply chain, and therefore the risk to EU citizens from the handling and mixing of TEL is minimal.

Furthermore, in 2018 when ECHA conducted its risk assessment for TEL, the United Kingdom was at that point still a member state of the EU, and therefore Innospec's full global production volumes were included in the volumes of TEL used to perform ECHA's risk assessment for this substance. However, as the UK is no longer a Member State and the volumes of TEL in the EU are therefore reduced by at least a factor of 10, we encourage the Commission to request ECHA to update their risk assessment for TEL to take into account this changed situation and lower risk score.

CONCLUSION

For the reasons stated above, including current efforts to identify, test, authorize, and transition to a viable, high-octane unleaded fuel; adverse safety impacts; societal and economic impacts; and the need to coordinate with EASA and other stakeholders, we believe the inclusion of tetraethyllead in Annex XIV would be premature. Only after careful consideration of all the issues and collaboration with both industry and government stakeholders would an inclusion be appropriate and ensure both the safety and vitality of this important segment of the EU economy.

The risk to aviation safety must be considered to be of critical importance, as it represents a much more direct impact on the lives of millions of EU citizens compared to the very small number of EU citizens who have any direct contact with the TEL additive used by 4 fuel companies in the EU.

Signatory Associations:

IAOPA EUROPE	The International Council of Aircraft Owner and Pilot Associations (IAOPA) is a nonprofit federation of 82 autonomous, nongovernmental, national general aviation organizations. IAOPA Europe has affiliates in 32 European states. The combined total of individuals represented by these constituent member groups of IAOPA is nearly 400,000 pilots, who fly general aviation aircraft for business, fun, and personal transportation. www.iaopa.eu
General Aviation Manufacturers Association	The General Aviation Manufacturers Association (GAMA) represents more than 130 of the world's leading manufacturers of Business and General Aviation aeroplanes, rotorcraft, engines, avionics, components, and related services and technologies. GAMA members are also providers of maintenance and repair services, fixed-based operations, pilot and maintenance training, and aircraft management. Additionally, GAMA represents companies in the emerging sector of new air mobility, which includes the development of vertical take-off and landing (VTOL) aircraft as well as electric, hybrid and hydrogen propulsion and autonomous systems for civil purposes. GAMA member companies have facilities in over 30 countries. www.gama.aero
EHA European Helicopter Association	The European Helicopter Association (EHA) is a non-profit Association representing the interests of the rotorcraft operators at European and international Institutions. EHA has been influencing safety standards and growth of the European rotorcraft industry, creating new opportunities for its members since its foundation in 1980. EHA represents more than 500 Members in 12 European countries. http://www.eha-heli.eu/
EUROPEAIRSPORTS	Europe Air Sports (EAS) is the voice of sports and recreational aviation in Europe. Established in 1988 as a non-profit organisation, and since 1994 affiliated to the global Fédération Aéronautique Internationale (FAI), our objective is the long-term promotion and protection of sports and recreational aviation in Europe. In particular our mission is to represent the interests of pilots and light aircraft owners / operators in civil aviation regulatory developments. https://www.europe-air-sports.org/
ECOGAS	European Council of General Aviation Support (ECOGAS) is a Non-profit association under French law. The aims of ECOGAS are to further the interest of the European General Aviation Industry, to promote the growth of a profitable General Aviation Industry and to work together to seek common beneficial interests. ECOGAS represents maintenance repair organisations and facilities, manufactures, aviation training organisations for technicians, pilots and air traffic controllers, airports and airfields, engineering, business and commercial aviation operators as well as service providers as legal services, air displays / air sports / special events, flight planning, operations and consultancy and advisory enterprises. In total has ECOGAS almost 700 members from France, Germany, Switzerland, the United Kingdom and Denmark.
EBAA	The European Business Aviation Association (EBAA) is the leading organisation for operators of Business aircraft in Europe. Our mission is to enable responsible, sustainable growth for Business aviation, enhance connectivity and create opportunities. EBAA works to improve safety standards and share knowledge, to further positive regulation and to ease all aspects of closely tailored, flexible, point to point air transportation for individuals, governments, Businesses and local communities in the most time-efficient way possible. Founded in 1977 and based in Brussels, EBAA represents +700 members companies, corporate operators, commercial operators, manufacturers, airports, fixed-based operators, and more, with a total fleet of +1,000 aircraft. www.ebaa.org
ERAC	The European Regional Aerodromes Community's international and national member associations work together for adequate common aviation laws and standards in order to enhance a safe, economic and ecological air traffic infrastructure. Furthermore ERAC´s members support either as origin or as destination the fastest inter-regional public mobility. The multiplicity of knowledge and experience of more than 120 member-aerodromes, more than 30 SES-certified Air Navigation Service Providers (ANSP) and aviation-affine companies range through the complete field of aviation from legal, technical, operational to administrative and economic aspects, with focusing of interests in the regional aerodromes and airfields. http://www.erac.aero/
International Association of Aviation Personnel Schools	IAAPS is a global association of over 30 aviation training organisations formed for the purpose of maintaining and improving standards of training for aviation personnel and to serve the joint interests of members within the aviation training industry. For more information: https://www.iaaps.info/