



ATC Position on the Safe and Sustainable by Design Concept in the Context of the EU Chemical Strategy for Sustainability

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Executive Summary

The Technical Committee of Petroleum Additive Manufacturers in Europe (ATC) was established in 1974 for member companies to discuss topics of a technical and statutory nature which are a concern to our industry. ATC members produce innovative lubricant and fuel additives that are essential in delivering a sustainable future for EU's societal and economic wellbeing, and therefore welcome the goals of the EU Green Deal and the EU Chemical Strategy for Sustainability (CSS). A significant element of the CSS is the Safe and Sustainable by Design (SSbD) initiative which aims to encourage innovation through the design of new 'safer' chemicals and processes to support the transition to a greener and 'toxic-free environment'. However, this concept is not well defined today, and this paper aims to present ATC's position concerning the definition of SSbD.

ATC members believe that a concept of 'safe' based only on inherent hazard properties in the SSbD criteria is too simplistic to be practical. The OECD in particular recognise that identifying safer alternatives involves a critical comparative assessment of both hazard and exposure.

When defining the term 'sustainability' in any SSbD criteria, ATC members advocate for a holistic approach including circularity and use of appropriate Life Cycle Assessment methodology.

Achieving a "toxic-free environment" cannot be practically achieved by the petroleum additives industry in a short timeframe because of the complexities of product development, product application testing and global chemical registration, which are lengthy and expensive in terms of both money and human resources. SSbD criteria must therefore be ambitious but proportionate, so that they will drive changes in behaviour by industry and downstream users, including consumers, that are achievable and affordable, and that balance the economic realities and capacity for change of each stakeholder in the short-, medium- and long-term.

Even though e-mobility will increase in importance there will be several decades where there will continue to be a need/demand for high-performing lubricant and fuel additives for vehicles and machines powered by the ICE to maintain existing emissions and efficiency targets. ATC therefore seeks an early dialogue with the Commission to ensure that the eventual definition of SSbD does not have unintended consequences for all stakeholders in the transportation and industrial sectors, potentially reversing many of the Environmental, Social and Governance benefits that the continual development of high-performance lubricants and fuels has permitted.

1. Introduction

The Technical Committee of Petroleum Additive Manufacturers in Europe (ATC) was established in 1974 for member companies to discuss topics of a technical and statutory nature which are a concern to our industry.

ATC works to develop common industry approaches in response to health, safety and regulatory legislation which are based on scientific and technical principles, to the benefit of end consumers and environmental protection. ATC provides its members with a platform to build and share high-level technical expertise and to cooperate with relevant stakeholders active in the development of petroleum additive specifications and testing.

Our members continuously innovate to find ways to improve the performance of lubricants and fuels, whilst ensuring that their products are safe when used as intended. The in-use benefits of ATC members' products can be directly linked to UN sustainability goals. The ATC therefore welcomes the goals of the EU Green Deal¹ and the EU Chemical Strategy for Sustainability². Indeed, we fully recognise that our industry has a key role to play in tackling the environmental challenges that our modern society faces and in achieving the objectives set out by the EU Commission.

Nevertheless, ATC members strongly advocate that regulatory actions should follow a holistic approach, balancing the several trade-offs at play, and considering the interdependencies that characterise a complex society. For example, a restriction or ban of a chemical based on hazard properties alone could lead to the adoption of a different process/product that may, paradoxically, result in less desirable environmental/health impacts and potential sustainability deficits, especially when the whole life cycle of the chemical is considered.

2. EU Chemical Strategy for Sustainability (CSS)

The CSS, published on 14 October 2020, lays out more than 50 wide-ranging regulatory and other initiatives that will impact all sectors of industry. It aims to catalyse the shift towards chemicals, materials and products that are inherently safe and sustainable, from production to end of life, and announces that the Commission will develop criteria on safe and sustainable by design by 2022.³ Whilst the Strategy recognises the fundamental role of chemicals for human well-being and for the green transition of the European economy and society, it also seeks to address health and environmental challenges posed by the most hazardous chemicals.

¹ https://ec.europa.eu/clima/eu-action/european-green-deal_en

² https://ec.europa.eu/environment/strategy/chemicals-strategy_en

³ https://ec.europa.eu/environment/events/safe-and-sustainable-design-criteria-chemicals-materials-and-products-first-stakeholders_en

The initiatives are very wide ranging and, as well as including new hazard classification criteria that diverge from the UN GHS criteria⁴, the CSS also indicates the Commission's intention to depart from the principle of allowing the presence of hazardous chemicals on the EU market based on the actual risks they pose to human health and/or the environment, to a system of Restrictions based solely on intrinsic hazard properties (the so-called "*generic approach to risk management*").

3. Essential Uses

The CSS seeks to achieve protection of the environment, consumers, and vulnerable groups by intensifying efforts to remove chemicals of concern from the market and allow their use only when proven to be "essential for society". The Essential Uses concept that the CSS introduces would allow the continued use of such substances of concern only when necessary for health, safety or for the functioning of society and only if there are no suitable alternatives that are acceptable from a health and/or environmental perspective.

The ATC's opinion concerning how an Essential Use should be defined and employed as part of risk management measures to control the most hazardous substances is fully outlined in ATC Position Paper Document 143⁵. ATC strongly believes that if the opportunities of the CSS are to be realised, the principles described therein must be appropriately reflected in the SSbD criteria.

4. Safe and Sustainable by Design (SSbD)

A further aim of the CSS is to encourage the European Chemical Industry to innovate by designing new 'safer' chemicals and processes which will support the transition to a greener and 'toxic-free' environment. SSbD as a concept is not defined today but the European Commission has entered a period of consultation with stakeholders concerning its definition and has committed to implementing SSbD during 2022.

The European Chemical Industry Council (CEFIC) is committed to working with the European Commission and other stakeholders to arrive at a common assessment framework. In their position paper 'Safe and Sustainable-By-Design'⁶, CEFIC has mapped an extensive list of criteria which it considers important, and has assigned each criterion to one of three fundamental areas, namely market related, environmental, or societal. Other trade associations have published their positions concerning SSbD and it is expected that others will do the same in due course, as no doubt will Member States. Non-Governmental Organisations (NGOs) will also be key stakeholders in defining this new concept and one of these

⁴ <https://unece.org/transport/standards/transport/dangerous-goods/ghs-rev9-2021>

⁵ [Document 143 - ATC position paper on Essential Uses.pdf \(atc-europe.org\)](#)

⁶ [Safe-and-Sustainable-by-Design-Report-Boosting-innovation-and-growth-within-the-European-chemical-industry.pdf \(cefic.org\)](#)

organisations, ChemSec, has recently published their proposals for SSbD criteria⁷. Their proposals and overall position about what SSbD should mean differs from that of the ATC, especially regarding hazard classes and categories that can never be regarded as 'safe', but there are other areas of agreement. Finally, the OECD has published guidance in 2021 outlining its recommendations for the identification and selection of safer alternatives⁸. This internationally recognised organisation clearly considers hazard and exposure to be equally important criteria when considering the concept of 'safer' alternatives. This guidance also recognises that sustainability attributes or trade-offs associated with a chemical choice should be considered in the context of a product's lifecycle as well as hazard and exposure, and that life-cycle approaches which consider other environmental impacts such as energy use and resource consumption at all points of the life cycle are equally important. It therefore follows that any definition of SSbD that did not equally consider exposure and life cycle assessment rather than inherent hazard alone would lack international credibility.

5. Defining 'safe'

ATC members take very seriously their obligations under existing chemical control legislation to ensure that their products are safe during production, use and disposal, taking into consideration the product hazard classification and its risk profile, using the mechanism of the Chemical Safety Assessment required by REACH (Regulation (EC) 1907/2006) and by ensuring that suitable information is communicated appropriately to all downstream users. By following REACH and CLP (Regulation (EC) No 1272/2008) ATC members therefore already design and market new chemistry and products that are safe for their intended use. Indeed, where lubricant or fuel additives are designed to be used in products that are eventually used by consumers, whether intended or not, EU legislation already exists to ensure that such products placed on the market are safe.⁹ In essence this legislation already defines the term 'safe' to include a consideration of the normal or reasonably foreseeable conditions of use of a product and describes a 'safe product' to be one that does not present any unacceptable risk under the conditions of use taking various other considerations into account, including any warnings and instructions for its use and disposal and whether children and/or the elderly would use the product.

As described above in Section 4, some stakeholders have put forward the opinion that any chemistry with an inherent hazard or without data addressing a particular hazard end point cannot qualify as 'safe' under any circumstance. ATC members believe this to be too simplistic to be practical, and in any case, as explained above, the concept of 'safe' has always considered the level of exposure to a product alongside any inherent hazard properties. ATC

⁷ [Safe and Sustainable by Design Chemicals](#)

⁸ [OECD guidance on key considerations for the identification and selection of safer chemical alternatives](#)

⁹ [General Product Safety Directive 2001/95/EC](#)

members accept the necessity of eliminating ‘Substances of Very High Concern’ as defined by EU REACH, where possible and where so-called ‘regrettable substitution’ does not result in a worse outcome, either due to incomplete data or to a negative impact on environmental impacts such as GHG emissions. However, it is patently impractical to extend this concept to any hazard class and category regardless of exposure. For example, a sharp scalpel is an extremely *safe* and effective tool in the hands of a surgeon but the same scalpel is clearly *unsafe* when in the hands of an infant. It is therefore self-evident that for the SSbD concept to be widely adopted and be effective in addressing the EU CSS goals the definition of ‘safe’ must consider use and exposure as well as inherent hazard.

For lubricant and fuel additives, it is frequently the case that the same properties that give these products their desired performance characteristics such as surface activity and/or an ability to remain functional for a long period of time under harsh operating conditions also confer certain health and environmental hazard properties to the same molecules that some stakeholders would wish to qualify as ‘unsafe’. This is the challenge faced by ATC members when innovating new chemistry and formulating new products to allow end users to meet or exceed their performance requirements and those of EU regulators, such as improvements in operational efficiency or reduced harmful emissions.

It could be argued that the EU has already defined ‘safe’ (and sustainable) for certain lubricants, with EU ecolabel criteria applying to lubricants intended for use in environmentally sensitive areas and/or total loss in use. Indeed, by adopting these criteria, which allow the presence of a limited amount of hazardous ingredients in certain end use lubricants, the EU Commission and the German government^{10,11} has already recognised that it would be totally impractical to disqualify all inherently hazardous chemistry or lubricants containing any amount of a hazardous ingredient because of their undoubted performance benefits. The ATC recognises the importance of such ecolabel schemes for lubricants that are used in environmentally sensitive areas but cautions against introducing technical criteria which are too narrow and restrictive for lubricants not intended for use in environmentally sensitive areas, or where total loss is not part of the intended use. The ATC does not wish to see situations arise where EU decisions on SSbD criteria have unintended consequences such as, for example, overly strict limitations on lubricant and fuel ingredients which would make it impossible to formulate high performing lubricants or alternative fuels, as this will prevent the transition outlined in the European Green Deal.

6. Contributing to enhanced safety and sustainability along the entire value chain

ATC is supportive of the concept of designing safer, more sustainable lubricants and alternative (non-fossil-based) fuels, and the performance additives needed to make these end

¹⁰ [Commission Decision \(EU\) 2018/1702 establishing the EU Ecolabel criteria for lubricants](#)

¹¹ [Biodegradable Lubricants and Hydraulic Fluids DE-UZ 178](#)

use products function optimally, which are complimentary to the use of new and existing equipment or vehicles; and in the case of used lubricants, designing products that can further enhance opportunities for collection, regeneration, re-use, recycling, and re-refining. Nevertheless, this cannot be at the expense of inferior in-use benefits, such as reduced efficiency, increased oil consumption or reduced durability of equipment, which will have a negative consequential impact on greenhouse gas emissions and other environmental markers. The societal and environmental benefits of the fuel and lubricant additives produced by ATC members are described elsewhere^{12,13,14} and are exemplified by enabling:

- engine manufacturers to meet the emission reduction targets embodied in European legislation¹⁵ delivering cleaner air
- fuel efficiency gains, reduced energy consumption, greater durability of machinery and reduced raw material use in many automotive and industrial applications
- the transition to alternative fuels (sustainable and advanced biofuels, hydrogen, synthetic e-fuels and recycled carbon fuels)
- the transition to sources of sustainable renewable energy (for example, wind turbines)
- the transition to e-mobility

ATC members would argue that they already design new chemistry and products to be 'safe' and 'sustainable' in the sense that these activities are already significantly controlled by existing EU legislation, with products intended to be long-lived and to bring benefit to the end user. This aligns with the UEIL definition of Sustainable Lubricants:

"Lubricants created by innovative businesses enabling the use of safe, resource saving technologies and processes which reduce the burden on the planet, local environments and benefit people and society."

The challenge for industry and regulators alike is to redefine this concept in the terms of the current (and future) understanding of what 'sustainability' means generally and specifically for fuels and lubricants.

ATC believes that improving circularity within the lubricants supply chain is imperative but in context of full and transparent Life Cycle Assessment (LCA). To drive circularity in the EU, the following elements are required:

- holistic assessment of products in their respective uses via LCA
- consistency with upcoming rules with chemicals legislation
- harmonisation of waste legislation to create a functional market for secondary raw materials
- new recycling technologies

¹² [ATC Document 113 - Fuel Additives Use and Benefits 2020_06.pdf \(atc-europe.org\)](#)

¹³ [ATC Document 118 - Lubricant Additives Use and Benefits.pdf \(atc-europe.org\)](#)

¹⁴ [ATC Document 144 - Industrial Lubricant Applications and Impact of Additives on Performance.pdf \(atc-europe.org\)](#)

¹⁵ [Reduction of National Emissions - National Air Pollution Control Programmes](#)

- transparency and acceptance on chain of custody models such as mass balance ^{16,17} to drive verifiable replacement of fossil-based feedstock with certified bio-based ^{18,19,20,21,22} or waste-based recycled feedstocks
- harmonised measurement of transport / logistics emissions

As outlined in ATC Document 139²³, ATC advocates the use of LCA as a critical tool in allowing industry to design and quantitatively assess innovative solutions that address global challenges, such as reducing greenhouse gas emissions and improving energy efficiency. ATC strongly recommends that EU regulators should employ LCA as a critical cornerstone of policy-defining decisions affecting transportation and industrial processes and their consequential impacts. Furthermore, for an LCA to be credible, the methodology must be transparent and based on models and hypotheses that have been validated technically and scientifically.

A well-conducted, transparent LCA is therefore essential to enable industry partners to target the human and environmental hot-spots within the entire supply chain (linear and circular economy) and to identify where the maximum benefit can be achieved without compromising on in-use benefits. ATC members believe that the practice of employing LCA across the entire supply chain also prevents unscientific, political decisions being made instead of decisions based on sound scientific evidence.

ATC members therefore advocate for a holistic approach to defining the term ‘sustainability’ in the SSbD criteria including circularity and use of appropriate LCA methodology, thereby balancing the ability of ATC members to continue to innovate with the basic principles of SSbD without compromising the highly desired in-use benefits of lubricant and fuel additives. Products designed and placed on the market by ATC members over the course of many years, have enabled many societal and economic advances, exemplifying why a consideration of the in-use benefits of the products *as designed* must be included in the SSbD criteria.

Arguably the term ‘sustainable’ is so broad as to be impractical as a criterion and ATC members want to see this more tightly defined in the definition of SSbD. To enable direct comparison between products or with any regulatory thresholds included in any future SSbD criteria these values must be obtained by way of a transparent Life Cycle methodology agreed by the entire industry and validated independently. ATC members are already working

¹⁶ [Mass balance approach to accelerate the use of renewable feedstocks in chemical processes](#)

¹⁷ [A methodology for integrating the biomass balance approach into life cycle assessment with an application in the chemicals sector](#)

¹⁸ [Round Table on Sustainable Palm Oil](#)

¹⁹ [International Sustainability and Carbon Certification](#)

²⁰ [Red Tractor Certified Standards](#)

²¹ [Sustainable Castor Oil \(Sustainable Castor Caring for Environmental & Social Standards\)](#)

²² [RSB Certification for Biomaterials Biofuels and Biomass](#)

²³ [ATC Document 139 - The role of Life Cycle Assessment.pdf \(atc-europe.org\)](#)

towards such an agreed approach together with other key actors in the lubricant and fuel value chain.

7. ATC Proposals for SSbD Criteria

The implementation of the CSS will only be successful if innovation and competitiveness are given space to thrive. The question then becomes how all stakeholders can work together effectively to best achieve the goals of the EU and ensure that technological implementation is completely aligned with the political framework and is economically viable for all stakeholders.

ATC supports the concept of SSbD to continuously improve the sustainability and safety profile of products, an approach that is already widely implemented throughout the European Chemical Industry and by member ATC companies.

The World Business Council for Sustainable Development 'Chemical Industry Methodology for Portfolio Sustainability Assessment (PSA)²⁴ describes in detail the overall principles involved in portfolio assessment and product design, providing "*..a robust, yet pragmatic methodology to proactively steer (part of) an overall product portfolio towards improved sustainability performance*". Some ATC members already consider PSA as best practice when evaluating existing products/product ranges, and when designing new 'safer' molecules and products to fulfil the needs of the market, whilst also minimising the health and environmental impacts directly associated with fuel and lubricant additives. For example, some member companies^{25, 26} already systematically review and evaluate the sustainability aspects of relevant product applications to provide products with improved performance, lower environmental footprint, and minimised hazard potential, while phasing out existing products where a sustainability concern has been identified for specific applications. One of the ultimate aims of this new methodology is to enable a constant portfolio review based on a holistic assessment of products for their intended uses to stimulate the innovation for safer and more sustainable chemicals and products. Similar approaches may be developed uniquely by other member companies and any definition of SSbD should not restrict individual companies from adopting an approach that works for them.

At the product level, ATC envisions three interconnected elements that are essential to SSbD, namely:

- Safety
- Sustainability

²⁴ [WBCSD Chemical Industry Methodology for Portfolio Sustainability Assessment \(PSA\) Platform - World Business Council for Sustainable Development \(WBCSD\)](#)

²⁵ <https://www.basf.com/global/en/who-we-are/sustainability/we-drive-sustainable-solutions/sustainable-solution-steering.html>

²⁶ <https://corporate.evonik.com/en/responsibility/sustainability-analyses/sustainability-analysis>

- Performance (including circularity when relevant)

In designing new safer molecules and products, ATC members aim to deliver performance benefits such as improved energy efficiency, reduced greenhouse gas emissions and improved durability, whilst minimising the use of non-renewable raw materials and lowering the hazard profile. These elements can be represented as overlapping circles in a Venn diagram (figure 1), with the overlap of all three elements exemplifying *Safe and Sustainable by Design*.



Figure 1. SSbD = Safety, Sustainability and Performance

ATC acknowledges that there are fuel and lubricant additives which currently may not fulfil all three elements, but it must be recognised that member companies already practice a responsible, well-considered and balanced design approach to safety and sustainability of fuel and lubricant additives, whilst aiming to maximise in-use performance benefits. This approach is consistent with the current REACH approach to the evaluation of hazard, assessment of risk, control and containment of substances in-use and recognising that a user can be industrial, professional, or individual consumers.

ATC members and our industry partners are committed to the transition to safer, more sustainable ingredients and products however they are ultimately defined but are mindful that there cannot be any compromise on performance, which would harm the environmental benefits already realised. Whilst ATC members aim to maximise the number and range of additives which are safe, sustainable and deliver maximised performance in use, they believe there is a need for a pragmatic and sensible approach to designating ingredients and products as Essential Use, as reflected in figure 2.

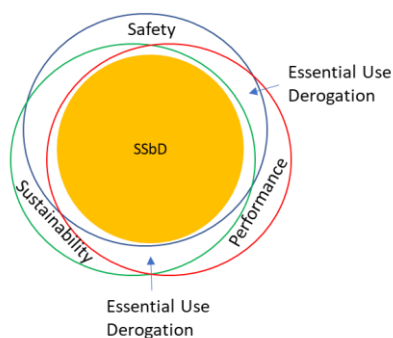


Figure 2. Maximising safety, sustainability and performance whilst allowing essential use derogation.

As described earlier, in many applications the risk associated with using harmful chemicals and products is mitigated by the fact that they are used in a controlled manner with limited or no opportunity for human or environmental contact, where used correctly. The ATC continues to advocate for this approach to be widely adopted, and to form the cornerstone of the SSbD definition.

8. The timeframe for implementation of product-specific legislation

This paper demonstrates that ATC is supportive of the overall aim to increase the overlap between the three elements of safety, sustainability and performance through the new SSbD concept. Equally, there must be a pragmatic approach which recognises that there will be uses where such a product design approach is not wholly feasible or that the time to achieve 'safe and sustainable' design for all products will be long and arduous. In this regard, the ATC supports the use of phased substitution where suitable alternatives exist, as advocated by the European automobile industry²⁷ and practiced by the offshore industry regulators²⁸.

Sustainability-related environmental policies are often associated with far-reaching political decisions that have an impact on the long-term strategic focus and new concept developments of Original Equipment Manufacturers (OEMs). For the automotive industry, for example, this would include vehicle safety, new mobility concepts, electromobility and/or lightweight design. In the case of automotive lubricants, it is anticipated that the transition to safer and more sustainable additives will need to parallel the transition from the ICE to electric vehicles. This is because the different actors in the lubricant and fuel value chain, especially OEMs, will likely not want to invest in replacing ingredients in existing lubricants or fuels that only have a finite product life cycle due to the transition away from the ICE and will preferentially prioritise investment in additive chemistry for new lubricants and alternative fuels enabling new mobility technologies, such as, electrification.

Fundamentally, ATC members advocate that the European Commission takes great care and consideration in defining SSbD criteria and in determining what are Essential Use chemicals, so as not to prejudice the transition to a more sustainable Europe. For practical reasons, achieving a 'toxic-free environment' is not a goal that can be achieved in a short timeframe due to the complexities of product development, product application testing and global chemical registration, which are lengthy and expensive, both in terms of money and human resources.

SSbD criteria must therefore be proportionate and pragmatic, so that it will drive changes in behaviour along the different industry sectors' value chains that are achievable in the short-, medium- and long-term.

END

²⁷ [ANNEX O: ACEA Best Practice for the Use of Sustainable Chemicals in the Automotive Industry](#)

²⁸ [CEFAS substitution warnings](#)