Mass Balance Chain of Custody Approach

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ATC

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 that are of concern to our industry. ATC works to develop common industry approaches based on scientific and technical principles, to the benefit of end consumers and environmental protection in response to health, safety and regulatory legislation. 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.

Introduction

In a collective effort towards sustainability and circularity, the lubricant and fuel additives industry is exploring new approaches to reduce greenhouse gas (GHG) emissions and gradually increase use of renewable or circular materials, while ensuring product quality and properties remain the same.

This white paper advocates for the adoption of the mass balance chain of custody approach within the lubricant and fuel additives industry. It aims to provide an overview of the approach, highlighting its alignment with sustainability goals and targets in the industry. The document covers the principles of mass balance, compares it with other chain of custody models, and presents a case for its implementation as a practical and effective strategy for transitioning towards lower carbon intensity feedstocks and reducing GHG emissions.

ATC recognises that the mass balance approach is a mechanism that can support the industry's transition, balancing investment cost with the potential for value creation.

Chain of Custody Models Available

Different chain of custody models offer varying levels of traceability and cost-effectiveness.

1. Identity Preservation: Maintains complete traceability of materials from the different certified sources to the final product, ensuring they remain physically separate from each other and from non-certified materials through the value chain.

2. Segregation: Involves keeping certified materials separate from non-certified ones throughout the supply chain, allowing for mixing of certified materials from different sources.

3. Controlled blending: Treats certified and non-certified materials separately in the supply chain allowing for mixing during production step and resulting in known proportions in the final product.

4. Mass Balance: Tracks the amount of certified material entering and leaving the production process, allowing for mixing with non-certified materials with appropriate attribution of the claim to the final product based on auditable bookkeeping while ensuring the overall balance is maintained.

5. Book and Claim: Decouples the certified product from the certified supply, allowing companies to purchase certificates for the amount of certified material they wish to claim, despite no physical connection.

Challenges of Chain of Custody in the Additives Industry

Chain of custody models, such as identity preservation / segregation, are often impractical for complex additive mixtures. Physically separating components throughout the supply chain is expensive and can be technically challenging.

The mass balance approach strikes a practical balance, being scalable, cost-effective, and auditable, making it the most sensible choice for transitioning towards the adoption of alternative feedstocks in line with rising market demand.

The Mass Balance Approach: A Viable Solution

The mass balance approach, as a well-known and widely used chain of custody model, offers a robust option in the lubricant and fuel additives industry to support the transition towards using more renewable and recycled feedstocks. It enables the tracking of certified sustainable materials throughout the supply chain even in complex value chains. The approach relies on meticulous record-keeping and audited calculations of the associated sustainability claims through the supply chain. This ensures that the sustainable feedstock replaces an equivalent amount of conventional feedstock at the beginning of the value chain (input) to be attributed to the product (output) in such a manner that the input and output match. The mass balance approach strikes an effective balance by avoiding the high costs and efforts associated with identity preservation / segregation, enabling industry to start the transition, while also mitigating the potential challenges of justifying the book and claim model.

The mass balance approach necessitates that participants align with ISO standards (ISO 22095:2020 and ISO/DIS 13662)and maintain rigorous bookkeeping systems to ensure accurate tracking and verification of certified materials. This adherence, being verified and validated by an independent third-party certification body, ensures transparency and accountability throughout the supply chain.

Benefits of Mass Balance for the Additives Industry

- **Facilitates Circular Economy**: By incorporating renewable and recycled materials, the mass balance approach supports the circular economy principles within the additives industry.
- **Provides a cost-effective means of transitioning**: Supports the gradual use of sustainable alternatives to replace fossil-based feedstocks in existing production processes without the need for extensive capital investment.
- **Offers transparency and auditability**: Verified by an accepted certification scheme, it offers credibility to the additive industry's decarbonisation efforts.
- **Enables a transfer mechanism of sustainability credentials**: It offers the opportunity to transfer sustainability attributes to specific products, thereby enabling customer demand for circular and low carbon footprint products to be met.

Conclusion

Adopted via an accepted certification scheme, the mass balance approach presents a practical and effective solution in advancing the transition to more sustainable products in the lubricant and fuel additives industry. By adopting this approach, stakeholders can enhance transparency, promote sustainability practices, and drive innovation throughout the supply chain.

Note:

Other industry organisations have recently supported similar positions on the mass balance approach: https://cefic.org/media-corner/newsroom/the-recognition-of-the-mass-balance-chain-of-custody-is-key-to-accelerating-chemical-recycling-and-meeting-the-eus-climate-and-circularity-targets/

https://www.tfs-initiative.com/app/uploads/2023/10/TfS-2097-White-Paper-EN_hi_single_page_no_crop_.pdf

ATC has previously recommended the TfS methodology; see Document-152---ATC-Position-PCF-Calculation-Methodology.pdf