

Wet gas Sulfuric Acid (WSA) technology is enabled by fluoropolymers

Summary

This document represents the joint view of providers and users of Wet gas Sulfuric Acid (WSA) technology* with regard to the proposal of Restriction on the manufacture, placing on the market and use of PFASs published by ECHA 23 March 2023. Fluoropolymers play a key enabling role for the WSA technology as it relies on fluoropolymer coatings. Inclusion of fluoropolymers in the restriction of PFAS will have a significant negative impact on this technology. Fluoropolymers should not be taken in scope of this proposal. In case they remain, the maximum derogation time is required.

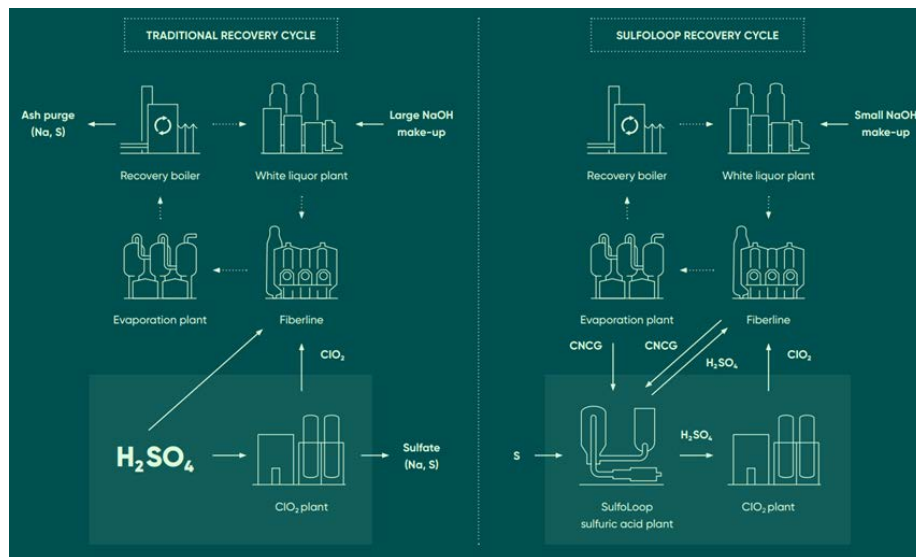
*Wet gas Sulfuric Acid (WSA) covers the following applications: WSA, SNOX, TopClaus and SmartSAR.

WSA, safety and circularity by fluoropolymers

Wet gas Sulfuric Acid (WSA) technology removes > 99,5% sulfur from dilute or lean off-gases and waste streams across many industries (e.g., paper & pulp, petrochemicals, metallurgy, etc.) to produce sulfuric acid. With its introduction 40 years ago, WSA technology has only been possible because of fluoropolymer coatings, as critical parts of the system have these coatings. The high thermal and harsh chemical environment would otherwise result in fast degradation of the installation, thereby challenging the safety and the economic feasibility of the technology. Because of WSA technology, various industry sectors can now meet requirements from environmental regulations on sulfur emissions in a safe and sustainable way by promoting sulfur circularity.

WSA technology circularity can be divided into three geographies, in-house, local, and global circularity. This distinction depends on the industry the technology is applied in.

- WSA technology supports circularity on a global scale. The sulfuric acid produced as a by-product will be shipped and sold on the global market.
- WSA users can be situated on larger chemical sites. This opens the possibility of local sales of sulfuric acid to a third company, thereby preventing long transportation trips.
- Lastly, certain industries allow for in-house circularity. One of Topsoe's partners regarding WSA technology, ANDRITZ, published an excellent example in their 2022 annual report. A case from the paper & pulp industry is described that displays the application of WSA technology in their SulfoLoop system. As shown in the image below, WSA technology not only limits the amount of sulfuric acid that needs to be brought in, but it also prevents the emission of other waste.



ANNUAL REPORT 2022, ANDRITZ

Based on Topsoe's life cycle analysis calculations, sulfuric acid is synthesized at lower CO₂ emissions (~0.6 ton CO₂e/ton H₂SO₄) via WSA technology compared to conventional production methods. As excess heat from the process can be converted into steam to support the local heat network. This technology increases the profitability of the industry and promotes circularity through recycling, waste prevention and energy efficiency.

Various investigations on the stability of the fluoropolymer coatings used in this technology have not given any indications of erosion or degradation of the material. Therefore, it is not expected that there is a risk of emissions of fluoropolymers or degradation products thereof, to the environment during use. The restriction proposal for PFAS in its current form will heavily affect the WSA technology. Given the stability of fluoropolymers and their technical importance, we consider that these materials should not be in the scope for the proposal. If there are no derogations for sectors using this technology ((petro-)chemical industry, refineries, pulp & paper) or exemptions for fluoropolymers, WSA technology can no longer be applied in the EU.

To the best of our knowledge, investigations into the availability of alternatives have not resulted in any feasible alternatives, in other words, there are no short-term solutions for this technology with the current proposal. Development of an alternative to fluoropolymers, establishing documentation for technical and safety feasibility as well as documentation on hazard properties and relevant risk management measures, will take a long time. If fluoropolymers remain in the restriction as is, a maximum derogation time is needed.

Key messages

WSA technology heavily relies on fluoropolymers from both a safety and circularity aspect. Furthermore, no emissions are expected during use. Hence:

- Fluoropolymers should be taken out of the proposal's scope.
- The maximum derogation time is needed to establish technically comparable and safe alternatives to prevent regrettable substitution, in the case that fluoropolymers will remain in the proposal.

This case is supported by the companies below:



Sources

ANNUAL REPORT 2022, Michael Buchbauer, ANDRITZ AG, 8045 Graz, Austria, andritz.com