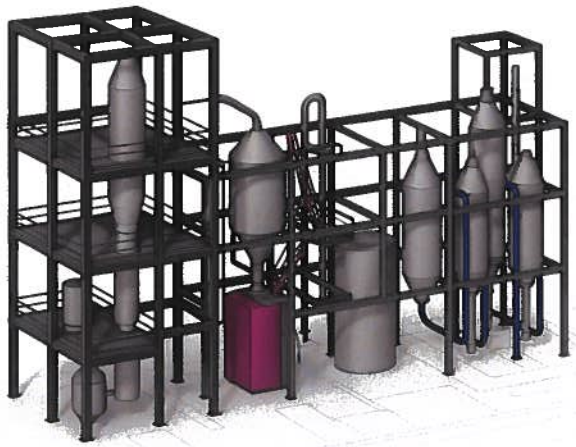
K-UTEC
SALT TECHNOLOGIES

FROM WASTE TO VALUE



/ "From Waste to Value" – Turning Sodium Sulphate Waste Into Premium SOP

Sodium sulphate waste streams are becoming a major challenge across the battery supply chain, chemical manufacturing (including methionine and silica), and industrial and fiber production (such as pulp and paper, viscose fiber). K-UTEC's proven process transforms this waste into high-value sulphate of potash (SOP) and industrial-grade sodium chloride (NaCl), unlocking new revenue opportunities amid growing ESG requirements and regulatory pressures.

With strong global demand and premium pricing, SOP represents a highly attractive market. K-UTEC supports a low-disruption transition by leveraging existing infrastructure wherever possible and offering flexible commercial models, ranging from feedstock supply to fully integrated SOP production. Backed by unmatched technical expertise, K-UTEC is the partner to turn this opportunity into reality.

/ Commercial Drivers

Sodium sulphate is a common by-product in lithium refining, battery recycling, pulp and paper, and chemical manufacturing — often managed as waste under increasing compliance pressure. In parallel, demand for SOP is rising, driven by:

- Premium pricing and market stability
- Agricultural needs (e.g. chloride-sensitive crops)
- Tightening regulatory limits on waste discharge

K-UTEC's SOP-from-Na_2SO_4 solution helps producers, capture SOP margin uplift, meet ESG targets by valorising regulated waste, and enhance NaCl output as a value-added by-product.

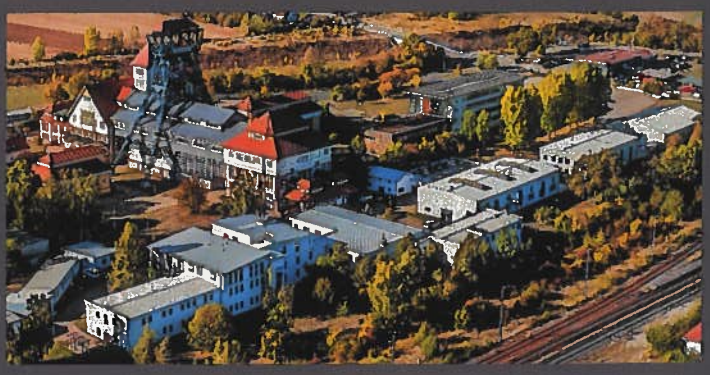
/ SOP: High-Value Potassium for High-Value Crops

SOP (K_2SO_4) is a premium potassium fertiliser used in high-value agriculture. It delivers essential potassium without added chloride, making it ideal for crops that are salt-sensitive or grown in saline-prone soils.

- **Chloride-Free Advantage:** SOP contains no chloride, unlike MOP (Muriate of Potash), which makes it suitable for delicate crops like fruits, vegetables, and nuts.
- **Premium Crop Performance:** Enhances plant quality, boosts disease resistance, and improves taste, colour, and shelf life.
- **ESG-Aligned Product:** SOP supports sustainable farming by reducing salinity risk and improving soil health.
- **Target Crops:** Commonly used on grapes, berries, citrus, avocados, coffee, tea, tobacco, leafy greens, and flowers.
- **Higher Market Value:** Commands a price premium over MOP due to its crop-specific value and lower environmental impact.

/ K-UTEC Credentials

- Decades of leadership in salt, potash, and brine processing, from feasibility to production.
- Trusted partner on global SOP projects, including pilot plant design, process optimisation, and start-up support.
- Process development including bench and pilot scale testing
- ISO 9001-certified QA; in-house ISO 17025-accredited analytics.
- Global project footprint across industrial brines and salt waste streams, with deep integration experience.



/ Proven SOP Process, Engineered for Waste Valorisation

K-UTEC's SOP-from-Na_2SO_4 solution applies a proven, industry-standard process based on the well-established Glaserite route, combining sodium sulphate (Na_2SO_4) and potassium chloride (KCl) to produce high-purity sulphate of potash (SOP) and saleable sodium chloride (NaCl) as a by-product.

The process is environmentally efficient, modular, and engineered for flexible integration with existing industrial sites, including lithium refineries, battery recycling facilities, paper mills, and chemical plants. It maximises integration with available infrastructure and offers a practical, low-disruption pathway to valorise regulated waste streams.

/ Estimated Consumption Metrics

Indicative utility and reagent consumption per tonne of SOP produced:

		Low-Yield	High Yield
Input Na_2SO_4	$t_{Na_2SO_4}/t_{SOP}$	0.82	0.82
Input KCl	t_{KCl}/t_{SOP}	0.90	0.86
Output - NaCl	t_{NaCl}/t_{SOP}	0.69	0.67
Water Requirements	t_{water}/t_{SOP}	3.40	3.52
Energy Requirements	kWh/t_{SOP}	200	
Steam Requirements	t_{5bar}/t_{SOP}	0.1	
Evap.	t_{vapour}/t_{SOP}	3.20	3.34
Fresh Water Feed	$t_{water\ add.}/t_{SOP}$	0.20	0.18
Recoveries	Potassium	95,5%	99.3%
	Sodium	99.1%	99.6%

/ Utility & Infrastructure Requirements

The SOP plant requires a stable and modest utility setup:

Power

Stable supply is essential. Depending on site conditions, a dedicated or upgraded power station may be required.

Steam

A compact boiler provides steam for drying and granulation.

Water

Fresh water use is limited, mainly for washing and conditioning. Existing water systems can often be used.

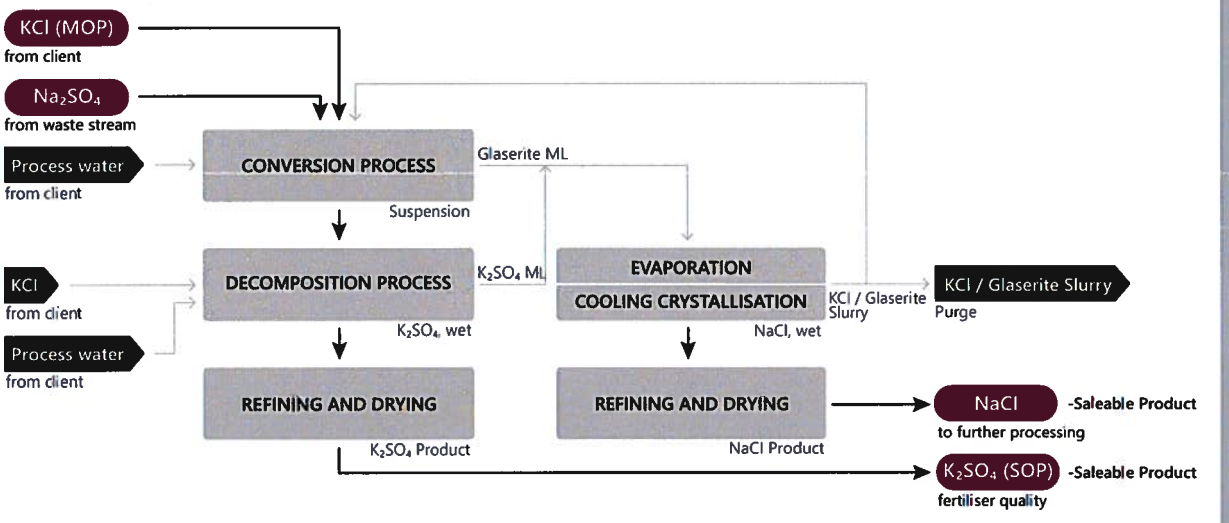
Cold & Chilled Water

Will be used for temperature control and recycling condensate to minimize fresh water consumption.

/ Core Process Steps

1. **Raw Material Preparation:** Suitable Na_2SO_4 and KCl are dosed, dissolved, and mixed using screw conveyors and belt scales.
2. **Glaserite Formation:** In loop reactors, Na_2SO_4 and KCl react under special process parameters to form Glaserite ($Na_2SO_4{\cdot}3K_2SO_4$).
3. **Solid–Liquid Separation:** The resulting slurry is centrifuged to separate the Glaserite solids. Mother liquor is collected for further treatment or NaCl recovery.
4. **SOP Conversion:** Glaserite is reacted with additional KCl in a second-stage reactor. A leaching step removes remaining NaCl and improves SOP purity.
5. **Final Separation and Polishing:** SOP undergoes clarification and polishing. Leaching and washing steps reduces chlorides and enhances quality.
6. **Drying and Packaging:** SOP is dried, compacted, and dispatched. Packaging options include 20kg bags, 1-tonne bulk bags, or direct bulk export.

/ Process Of Na_2SO_4/KCl Input To SOP & NaCl Output.



/ UNLOCK VALUE FROM SODIUM SULPHATE WASTE

Turn sodium sulphate waste into premium sop with a proven process, flexible delivery models, and the most experienced team in the industry.

To explore opportunities or request a workshop, contact:

K-UTEC SALT TECHNOLOGIES

- info@k-utec.de
- www.k-utec.de
- K-UTEC AG Salt Technologies, Sondershausen, Germany