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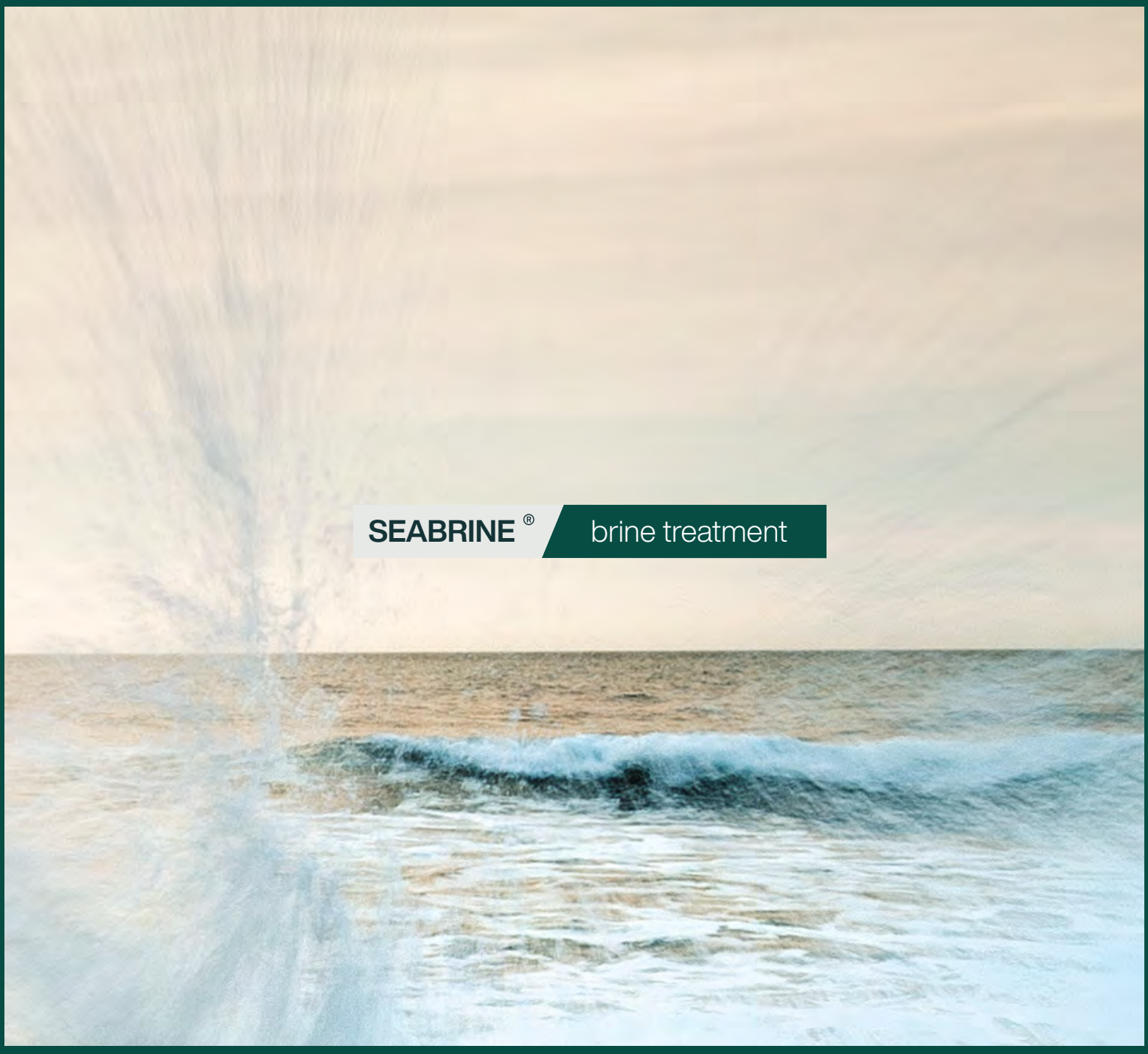
Industrial waste water is a big challenge for the chemical industry.

the most stringent laws that regulate the industrial water pollution and the increased requirements for cost effectiveness and rational use of resources push the industry to adjust process plants to the new needs. For the treatment of brine we offer an innovative solution: **The SEABRINE technology.**



renewable feedstocks.
closed loops.
clean emissions.

SEABRINE® brine treatment

The brine treatment process has been developed by our engineering team to purify contaminated, salt containing wastewater streams from industrial processes, with the aim to recover pure brine which can be re-used in processes like the Chlor-Alkali process. Generally the contaminated brine is a mix of water, salt, hydrocarbons and chlorinated hydrocarbons in various percentages. The **SEABRINE** process is based on a high pressure oxidation concept with special designed reactor and heat exchanger systems for maximum energy recovery.

Our customers are:

- **Epichorohydrin producers,**
- **Epoxy-Resin producers,**
- **Propylenoxide producers**
- **MCPA and MCPP producers**, operating with membrane technology and using purified brine coming from other industrial process as raw material feed.
  Other similar industries producing contaminated brine that need to be purified.

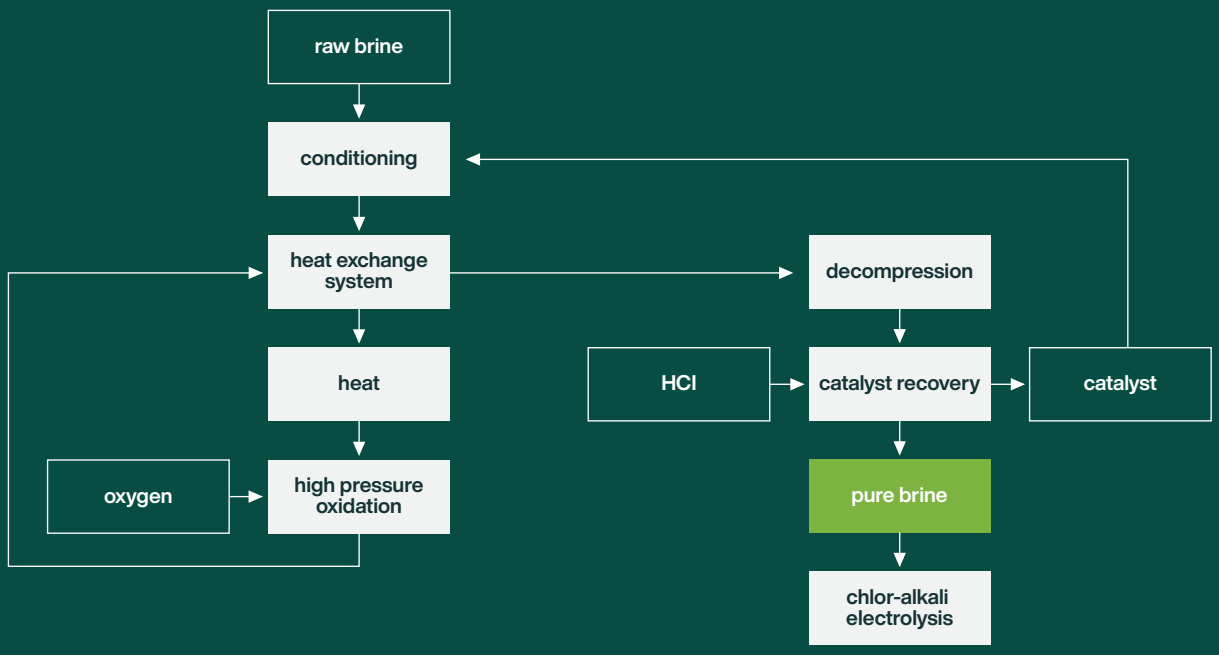
Competitor processes

Alternative treatment:
To operate such brine in a biological waste water treatment requests a dilution by factor 20 - 50. Therefore the possibility is very limited.

Crystallisation:
Crystallisation of the brine is an other possibility. But both, the separated salt as well as the remaining water has to be cleaned in a second stage of the process. Other chemical treatments have very low efficiency and therefore the high consumption of chemicals and energy makes treatment impossible.

Typical KVT Plant Consumptions	Typical Data per m^3 of raw brine
Steam[1] (30 - 40 bar)	100 kg/m^3
Oxygen	15 Nm^3/m^3
Electricity	9 kWh/m^3
Washing Water	0.2 m^3/m^3
H Cl (100%)	5 kg/m^3
NaOH (100%) for neutralisation	~ 6 kg/m^3
Catalyst make-up	~ 0.01 kg/m^3

[1] For start-up only



Raw Brine Composition:

Water, salt, hydrocarbons and chlorinated hydrocarbons in various percentage.

Process Steps:

1. Conditioning

After adjusting the ph-value with HCl, the brine is mixed in the mixing container with the catalyst .

2. High Pressure Oxidation

The brine mix is fed into the high pressure part where is heated to the injection temperature by several heat exchangers (Heat Exchange System). Then the brine is fed into reactors together with oxygen and the reaction takes place. The hydrocarbons and chlorinated hydrocarbons are oxidized.

3. Decompression

The reaction is exothermic, the brine temperature is cooled by the heat exchangers (Heat Exchange System) and sent to the decompression tank. During the decompression phase the formed vapor is condensated.

4. Catalyst Separation

The brine is sent to the ion exchange unit where the precipitated catalysts are separated from the rest. The brine can contain also impurities, it is necessary to export a small amount of separated catalyst for external recycling. After the neutralisation the brine
(H O and NaCl) purity reaches the required value.

We believe in a sustainable future for chemicals based on renewable feedstocks, closed loops, and clean emissions.

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