Salt Partners

Counter-Current Hydroextraction Technology Produces Ultrapure Vacuum Salt for Membrane Chloralkali Electrolysis

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Salt production world-wide

Salt type	World production
Solar salt	90,000,000 t/y
Rock salt	80,000,000 t/y
Brines	80,000,000 t/y
Total	250,000,000 t/y

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Salt consumption world-wide

Salt user	Salt consumption
Chemical industry	150,000,000 t/y
Food	70,000,000 t/y
Other	30,000,000 t/y

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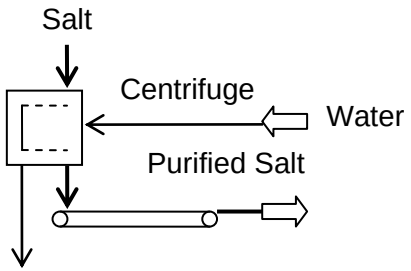
HYDROSAL Process



Centrifuge separates salt and brine

Conventional washing with water in the centrifuge

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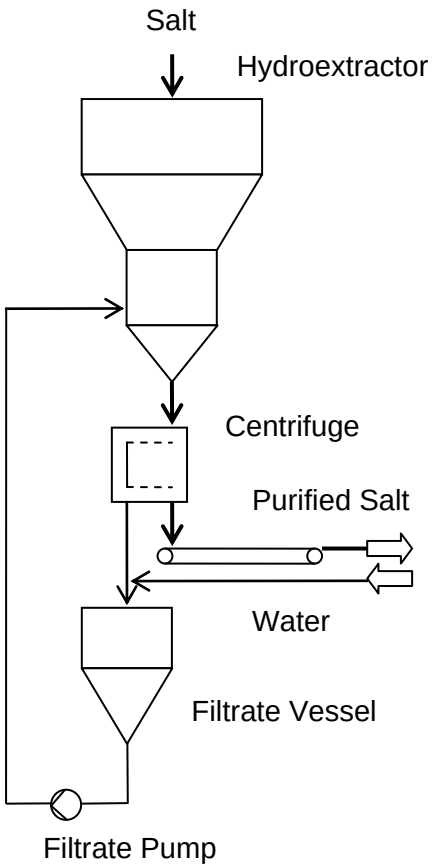
HYDROSAL Process



Dissolve salt fines in water and use this pure brine to remove impurities from salt in the hydroextractor

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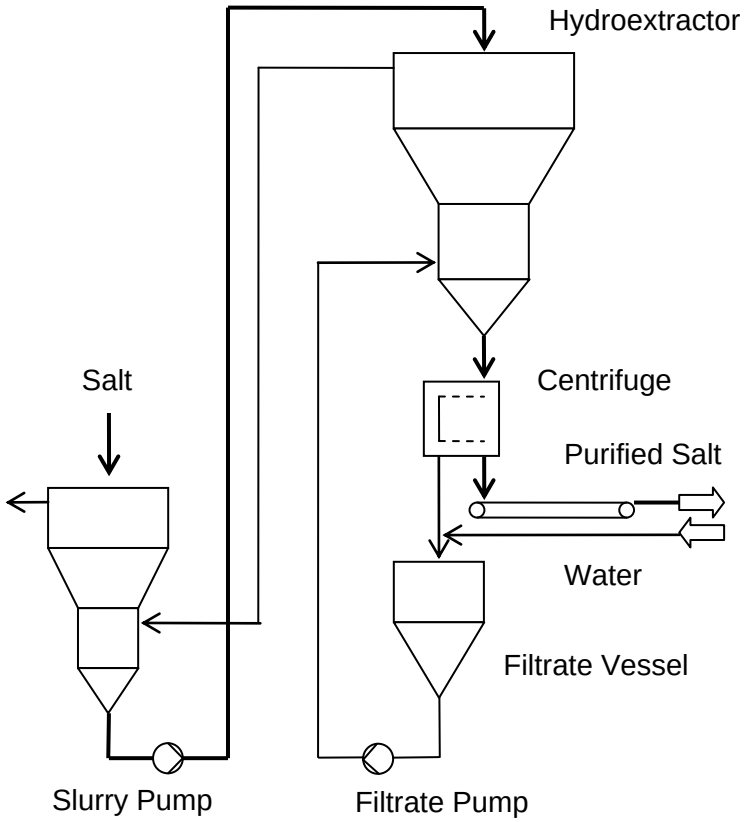
HYDROSAL Process



Hydraulically transport salt to the hydroextractor and return the transport brine to the elutriator

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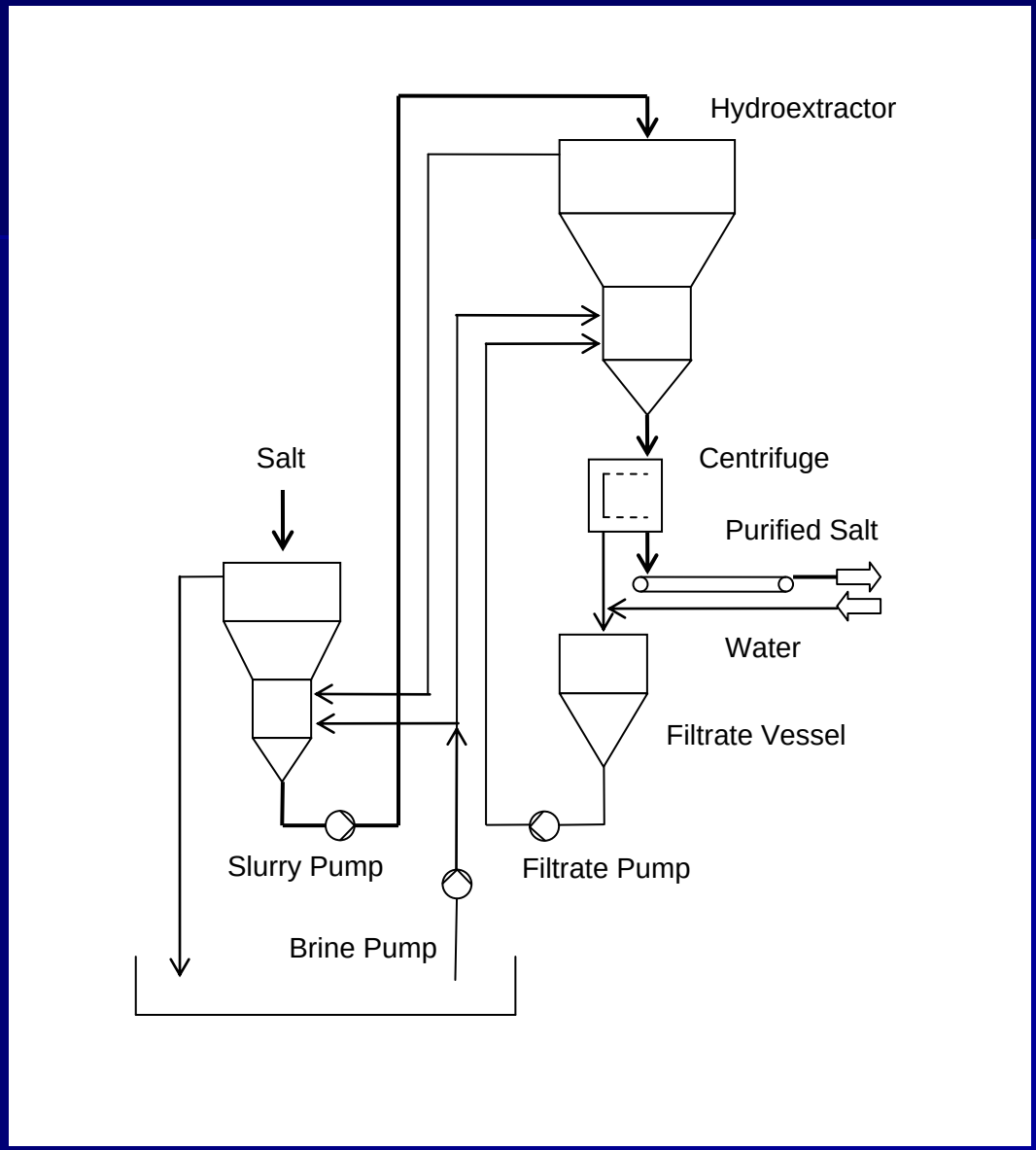
HYDROSAL Process



Circulate impure brine to control hydroclassification and elutriation efficiency

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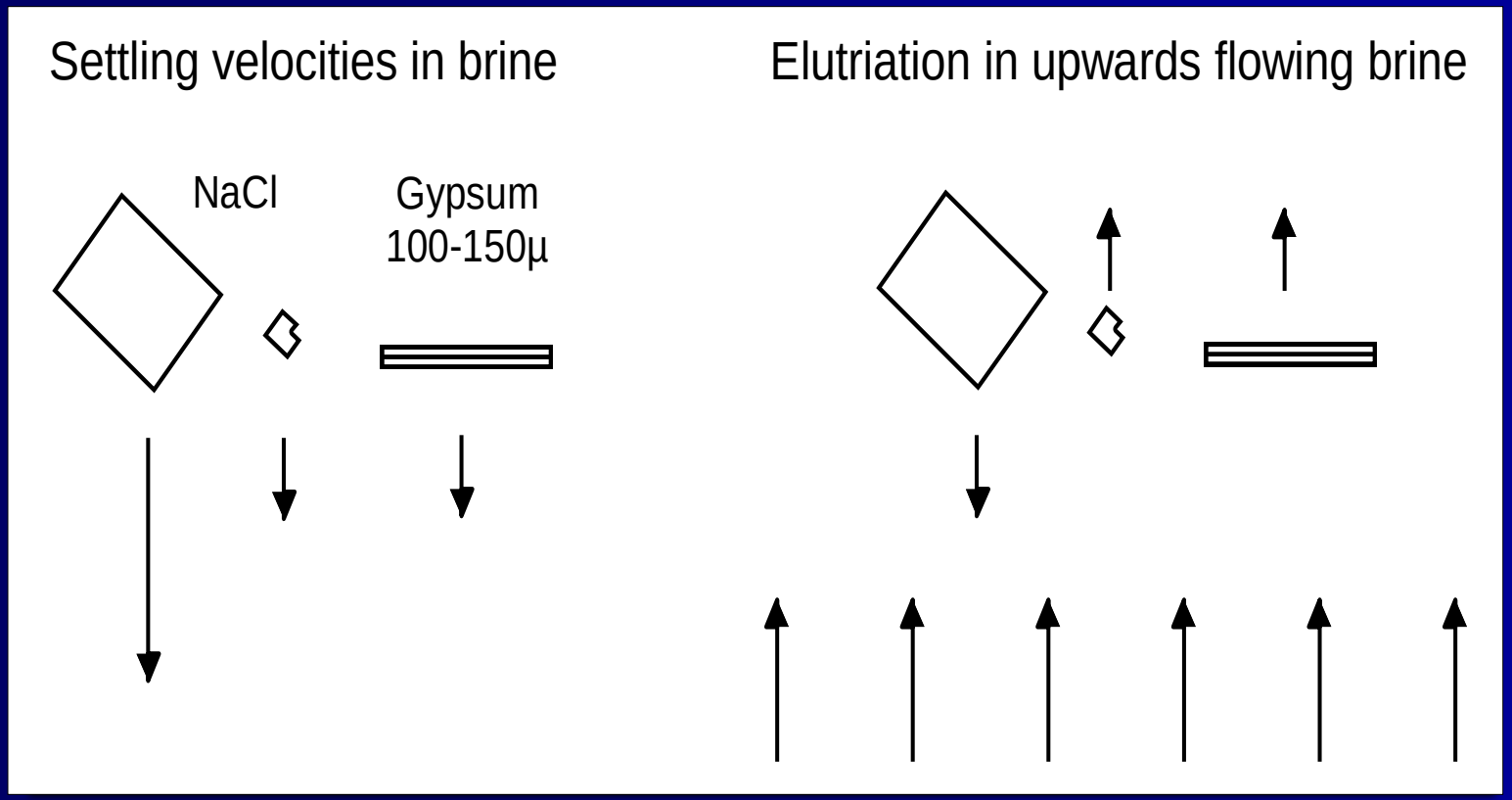
Elutriation



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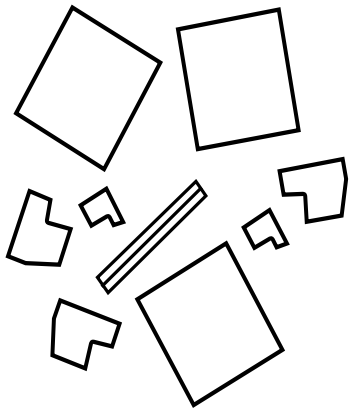
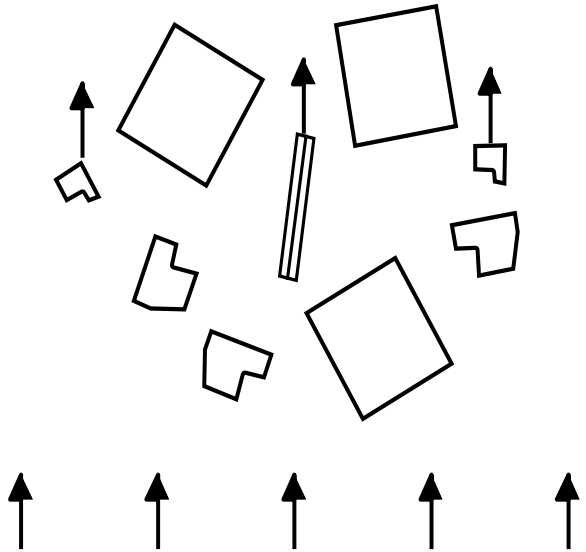
Hydroclassification

Salt bed with buried impurities



Hydroclassification of impurities in partially fluidised salt bed



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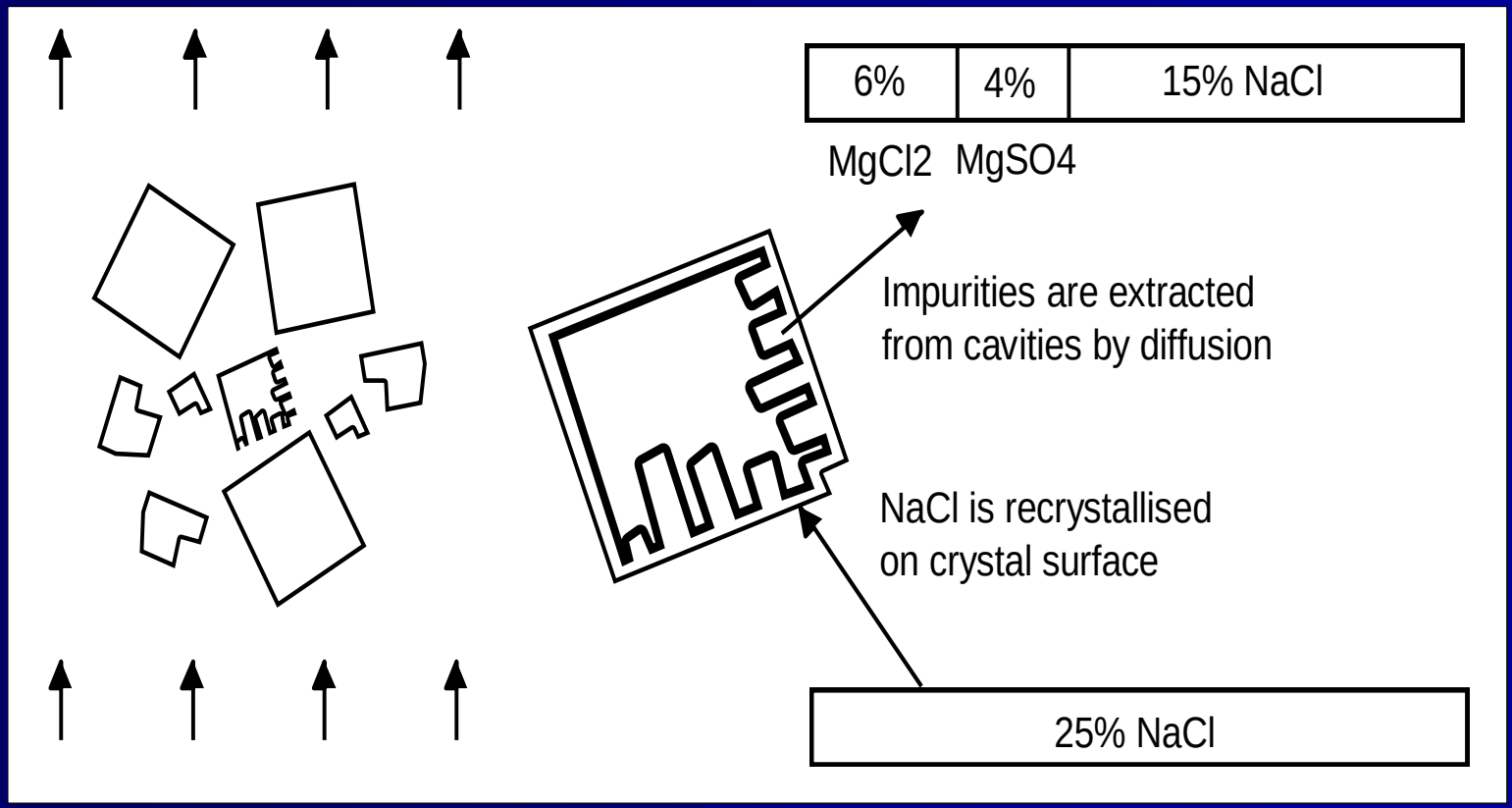
Hydroextraction



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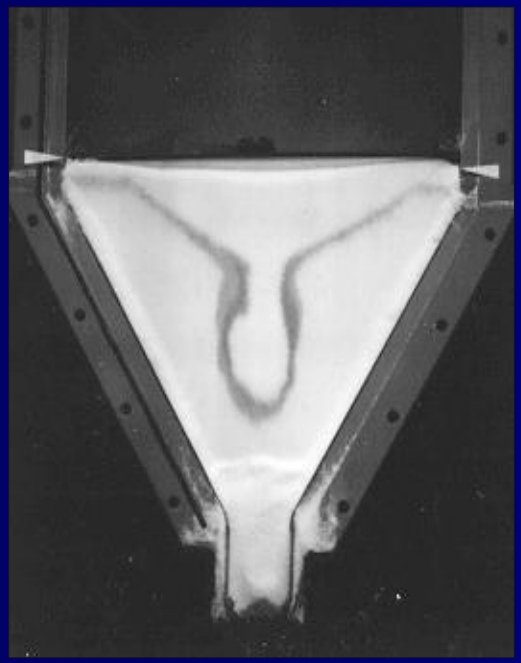
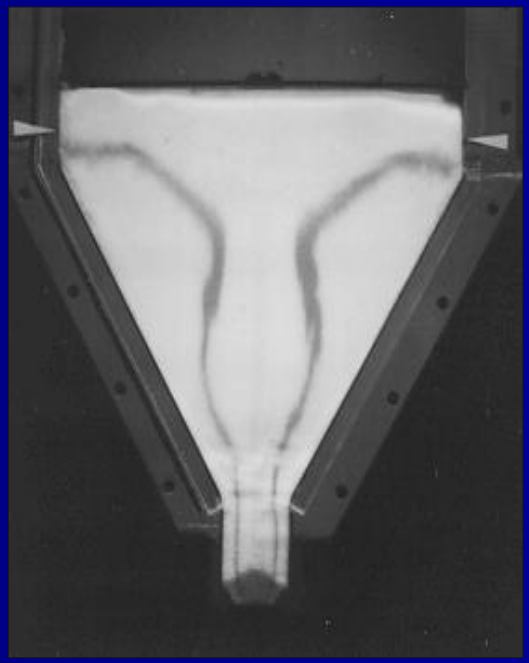
Hydroextraction does not work in all vessels



In this vessel salt flows out mainly through the centre



So called rat hole develops in the centre of the vessel

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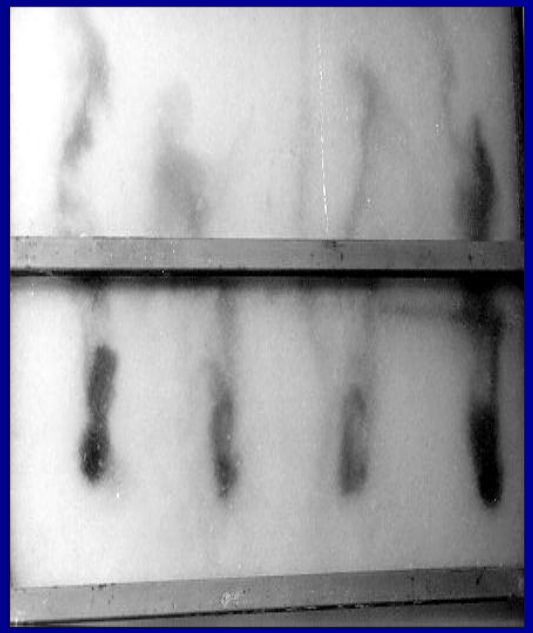
Hydroextraction works only with plug flow of salt

Picture 1: Injection of black ink into brine flowing upwards through salt flowing downwards in plug flow

Picture 2: Black ink flows upwards with brine in counter-current flow



Picture 3: Second black ink injection. There are no traces of black colour in the salt flowing downwards in plug flow

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Solution mining for natural gas storage, co-generation, brine purification, salt crystallisation and refining plant in Portugal

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40 t/h salt purification plant in Portugal is producing purest industrial salt in Europe

		Performance test
Ca	ppm	0.6
Mg	ppm	0.2
SO4	ppm	53

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Indian vacuum salts from concentrated sea water before and after HYDROSAL purification

		Tata salt from old vacuum plant	Sudh salt from new vacuum plant	Tata salt from new vacuum plant with HYDROSAL purification
Ca	%	< 0.05%	< 0.02%	< 0.02%
Mg	%	< 0.15%	< 0.1%	< 0.02%
SO4	%	< 0.35%	< 0.2%	< 0.07%
Insolubles	%	< 0.05%	< 0.02%	< 0.01%
NaCl	%	> 99.1%	> 99.5%	> 99.8%

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100 t/h industrial salt purification plant in Spain

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High quality European vacuum salt “A” before and after HYDROSAL purification

		Commercial vacuum salt product	HYDROSAL purified
Ca	ppm	< 1	< 1
Mg	ppm	0.12	0.07
SO4	ppm	118	29
K	ppm	87	72
Br	ppm	35	34
I	ppm	< 0.1	< 0.1
Ba	ppm	< 0.02	< 0.02
Sr	ppm	< 0.1	< 0.1
Al	ppm	< 0.05	< 0.05
SiO2	ppm	0.58	0.23

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High quality European vacuum salt "E" before and after HYDROSAL purification

		Commercial vacuum salt product	HYDROSAL purified
Ca	ppm	6.5	5.8
Mg	ppm	3.1	2.9
SO4	ppm	191	33
K	ppm	36	29
Br	ppm	29	28
I	ppm	< 0.1	< 0.1
Ba	ppm	< 0.02	< 0.02
Sr	ppm	0.1	< 0.1
Al	ppm	< 0.05	0.05
SiO2	ppm	0.81	0.47

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High quality European vacuum salt "N" before and after HYDROSAL purification

		Commercial vacuum salt product	HYDROSAL purified
Ca	ppm	211	66
Mg	ppm	6.8	1.2
SO4	ppm	820	229
K	ppm	225	185
Br	ppm	43	36
I	ppm	0.4	< 0.1
Ba	ppm	0.04	< 0.02
Sr	ppm	6.3	2.2
Al	ppm	1.0	0.1
SiO2	ppm	< 0.1	< 0.1

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Why not turn your salt into gold?

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