ELGRESSY
WATER TECHNOLOGIES LTD

Blow Down - zero liquid discharge Treatment

THE BDZ SYSTEM

Thinking outside the box
Developing innovative technologies

About Us

- Elgressy Water Technologies Ltd has been established in Israel by engineer Gaby Elgressy, which is an expert in the field of electrochemical water treatment with experience of 39 years.

- The company specializes in green & Environmental Friendly water treatment solutions, basing on the electrochemical processes.

- The company mission is to supply a worldwide network of green technologies, which not only eliminate the need to use chemicals and other toxic substances, but also enhance the effectiveness of the treatment and as a by-pass can ultimately enrich the client application.

- Elgressy mission statement is to build long term relationships with our clients and provide exceptional customer services by pursuing business through innovation and advanced technology.

- Our core value is growing through creativity, invention and innovation.

- Elgressy Water Technologies Ltd markets water treatment technologies as well as water engineering consulting.

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Blow Down Problems

- Evaporative cooling is commonly used in every manufacturing facilities all over the world. This cooling technology cools the water by special evaporation process.
- Water evaporation concentrates the dissolved solids, which as a result form scale, silica, magnesium and etc on the water systems surfaces. This requires the continuous disposal, and replacement by fresh water.
- If so, Blow down water refers to water which is drained from the cooling systems to control dissolve solids and other substances and is normally discarded into the sanitary sewer system.
- Blow down is often required in the following cooling systems: Cooling towers, Evaporations and Boilers.
- The hardness ions, Calcium, Magnesium and dissolved silica are the most problematic scale-forming species in cooling tower waters. To prevent loss in water systems efficiency, the concentrations of Calcium, Magnesium and silica must be kept below levels that result in scale formation on heat transfer surfaces.
- The blow down water contains not only a high level of the dissolved solids but also toxics, algae, bacteria and etc.
- Therefore the blow down water cannot be re-used if not treated, so facilities often just waste this water and have to replace them with fresh water – a very uneconomical decision.

Blow Down various solutions

There are many technologies which are being used for the water blow down treatment; here is a little review of the different technologies:

The technology	Main use	Disadvantage
Ion exchange	Removes water hardness	• Increases sodium concentrations to the extant of its being dangerous • Cannot be applied in large plants
Lime	Softening	• Increase the permanent hardness • Produces sludge – which clogs the water systems and filters • Increasing risk of health diseases
Chemical coagulation	Ca, Mg and silica removal	• Produce unwanted anions along with metal cations that form the precipitates
Membranes	Hardness removal	• Increases scaling problems • Suffers from frequent membrane fouling

Our Solution

- Elgressy Water Technologies has recently found that separating anode and cathode by appropriate ion-exchange make possible to overcome the limitations of current used treatments.

- Our solution is based on electro chemical process:
  - The novel technology consists one of the most important physio-chemical reactions used in water treatment.
  - The precipitation of ions (heavy metals) and colloids (organic and inorganic) are mostly held in solution by electrical charges.
  - By the addition of ions with opposite charges, these colloids can be destabilized.

- Our solution is:
  - Effective – can be even more effective than chemicals
  - Economical
  - GREEN – Environmental Friendly
  - Requires little space
  - Doesn't change the existing plant design
  - Eliminates the need to store or deliver toxic and hazardous chemicals
  - Saves water – by allowing the re-use of the blow down water

An RO Reject Pilot made in PAGS, USA

Fig 1. The water analysis before the pilot operation.

Test		Make Up Water	Cooling Tower after chemicals treatment
Conductivity	µS/cm	392	2846
pH		7.45	7.86
Total Hardness	ppm	160.2	1174
Ca Hardness	ppm	180	1140
Alkalinity M.O	ppm	106.8	62.3
Chloride	ppm	20	180
Silica	ppm	9	30
LSI		-0.9	0.78
Appearance		Clear	Clear

Fig 2. The water analysis before the pilot operation – EQ tank and after ELGRESSY BDZ System treatment

Test		Cooling tower	(*) After ELGRESSY BDZ System treatment
Conductivity	µS/cm	2846	2300
pH		7.86	6.8
Total Hardness	ppm	1174	656
Ca Hardness	ppm	1140	540
Silica	ppm	30	0
Appearance		Clear	Clear

(*) Note: The water analysis data were received after 1 pass only.

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RO Reject & CT blow down Pilot Water Analysis

Tests were made in ICP laboratory in the Hebrew University of Jerusalem

N1+N2 - RO Reject: AZRIELI ACRE MALL

N3+N4 - CT BlowDown: AZRIELI TEL AVIV MALL (the CT is treated by Elgressy EST system)

Date of sample: 14.08.2016

האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM
הפקולטה לחקלאות, מזון וסביבה
Faculty of Agriculture, Food and Environment
Z.B.M. - The Analytical Laboratory **צ.ב.מ. - המעבדה האנליטית**
Vasiliy V. Rosen, Ph.D. ד"ר וסילי רוזן

16-10249

Direct ICP-OES analysis of 4 waters

Concentration, mg/L

Element	N 1	N 2	N 3	N 4
Mn	0.024	0.004	<0.001	<0.001
Mo	<0.005	<0.005	<0.005	<0.005
Na	68.5	60.1	71.5	72.9
Ni	<0.005	0.042	<0.005	<0.005
P	1.645	<0.01	<0.01	<0.01
Pb	<0.02	<0.02	<0.02	<0.02
S	14.3	12.1	12.9	5.2
Sb	<0.005	<0.005	<0.005	<0.005
Se	<0.01	<0.01	<0.01	<0.01
Si	20.48	2.45	1.92	0.16
Sn	<0.01	<0.01	<0.01	<0.01
Sr	0.877	0.230	0.142	0.062
Ti	<0.001	<0.001	<0.001	<0.001
V	<0.003	<0.003	<0.003	<0.003
Zn	0.507	<0.002	<0.002	<0.002

בברכה

ד"ר וסילי רוזן

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Direct ICP-OES analysis of 4 waters

Concentration, mg/L

Element	N 1	N 2	N 3	N 4
Ag	<0.002	<0.002	<0.002	<0.002
Al	<0.01	0.034	0.087	3.613
As	<0.007	<0.007	<0.007	<0.007
B	0.044	0.067	0.786	0.560
Ba	0.184	0.008	0.019	0.005
Ca	302.6	109	43.7	4.09
Cd	<0.001	<0.001	<0.001	<0.001
Co	<0.001	<0.001	<0.001	<0.001
Cr	<0.001	<0.001	<0.001	<0.001
Cu	<0.003	<0.003	<0.003	<0.003
Fe	0.029	<0.002	<0.002	<0.002
Hg	<0.004	<0.004	<0.004	<0.004
K	5.71	4.41	3.10	3.09
Li	<0.001	<0.001	<0.001	<0.001
Mg	109	53.6	4.98	0.29

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N1 – RO reject BEFORE treatment
N2 – RO reject AFTER treatment
N3 – CT EST System Blow Down BEFORE treatment
N4 – CT EST System Blow Down AFTER treatment

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RO Reject & CT blow down Pilot Water Analysis

Additional parameters tests made in Elgressy Laboratory

N1+N2 - RO Reject: AZRIELI ACRE MALL
N3+N4 - CT BlowDown: AZRIELI TEL AVIV MALL (the CT is treated by Elgressy EST system)
Date of sample: 14.08.2016

Test		N1	N2	N3	N4
Conductivity	µS/cm	2240	1322	637	402
pH		7.29	7.68	7.94	8.62
Chloride	ppm Cl	150	120	90	30
Alkalinity	ppm $CaCO_3$	945	300	105	300
Appearance		Clear	Clear	Clear	Clear

N1 – RO reject BEFORE treatment
N2 – RO reject AFTER treatment
N3 – CT EST System Blow Down BEFORE treatment
N3 – CT EST System Blow Down AFTER treatment

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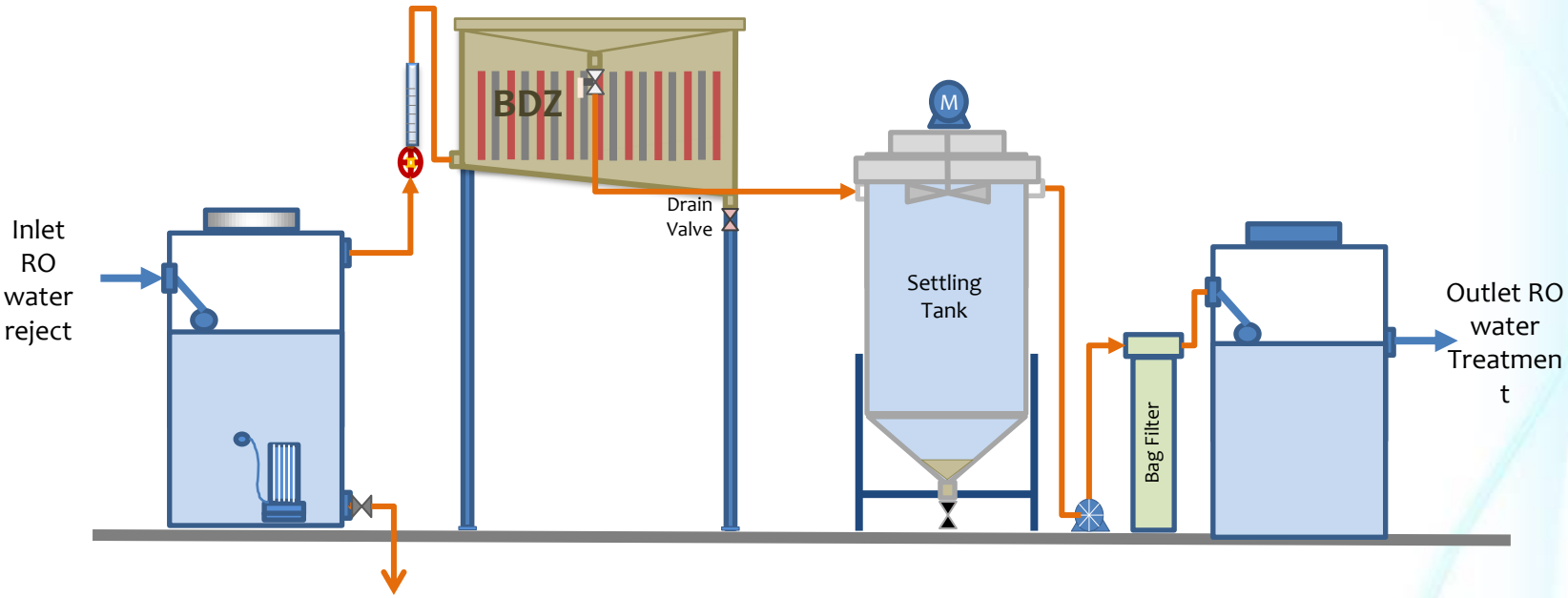
RO Reject BDZ System - Azrieli Mall Acre

Drawing



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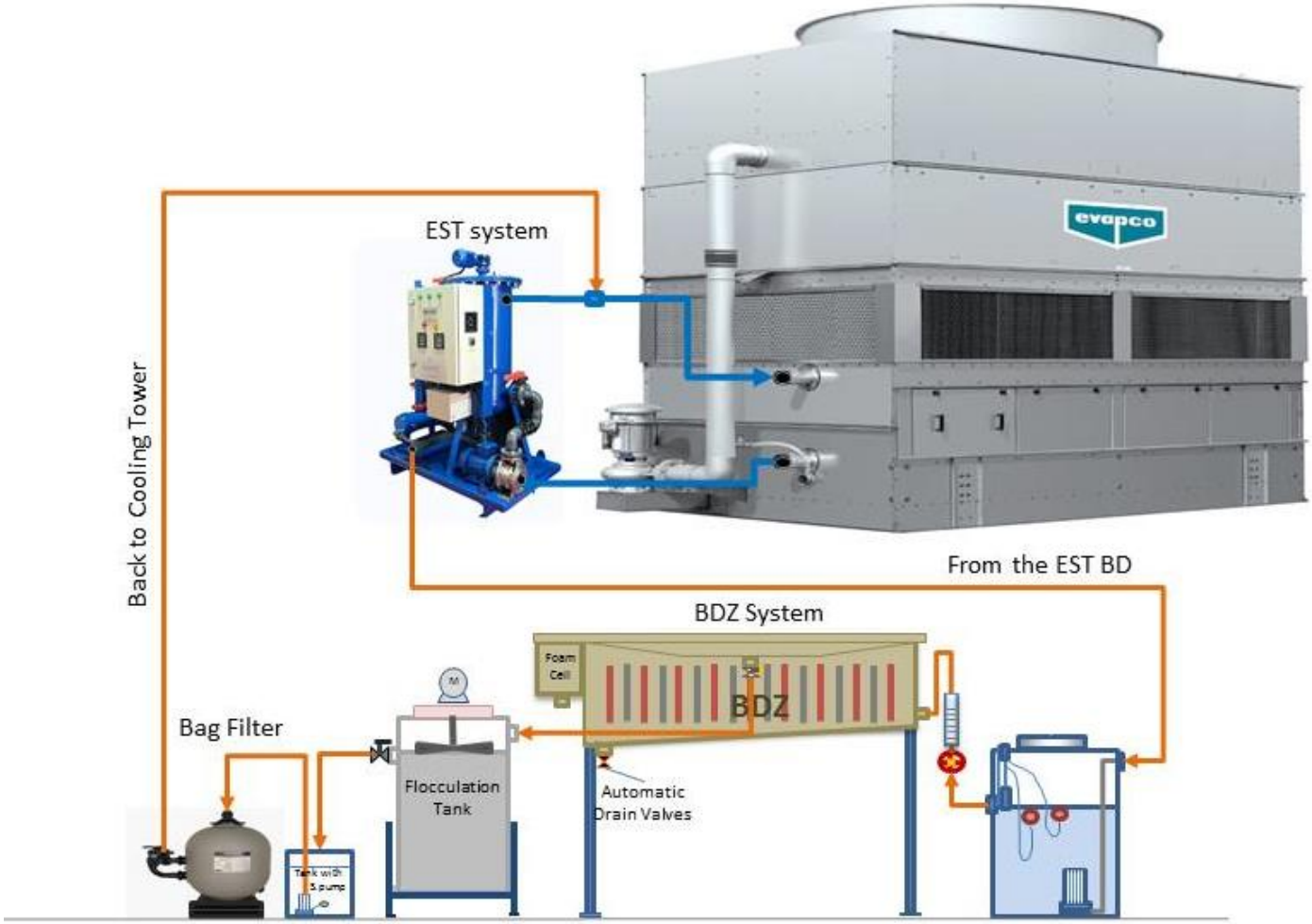
CT Blow Down BDZ System - Azrieli Mall Tel Aviv

CT is treated by Elgressy EST system

Drawing and site picture



The iconic 3 Azrieli Tel Aviv Towers

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THE MARKET NEED AND BUSINESS OPPORTUNITY
A growing market opportunity

- Our invented novel technology was checked for its feasibility in the Technion Institute by experts in this field, chemical engineers and RO treatment experts.

- The market for this technology is unlimited and can be used in various water treatments.

- The global market for electro chemical treatment in cooling systems is worth > 54,850,000 $ USD.

- The proposed solution will enable facilities to increase their conversion efficiencies to >90-95%, thereby:
    - i) increasing the yield of product water
    - ii) ii) reducing costs associated with the disposal of toxic blow down
    - iii) It is estimated that the technology will deliver a combined cost saving of the water.

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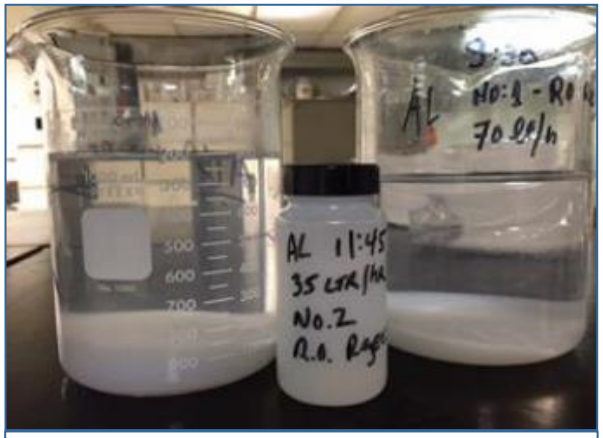
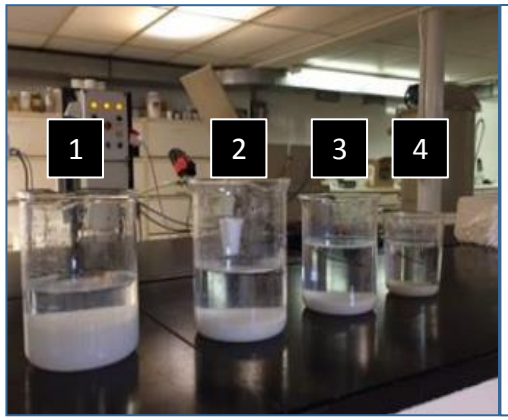
Pilot Held at Fremont, Minneapolis US



The sample after BDZ System flocculation

The samples BEFORE & AFTER BDZ Treatment



1. A sample after 2minutes of the BDZ flocculation
2. A sample after 4 minutes of the BDZ flocculation
3. A sample after 7 minutes of the BDZ flocculation
4. A sample after 15 minutes of the BDZ flocculation

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Thank You

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