FLAGSHIP DHAKA Central ETP (BD) Ltd.

ENVIRONNMENT & WATER SOLUTIONS Division

ECR Technology EXPERIENCE

WASTEWATER Applications

2008 – 2017

ELECTRO CONTAMINANT REMOVAL (ECR)

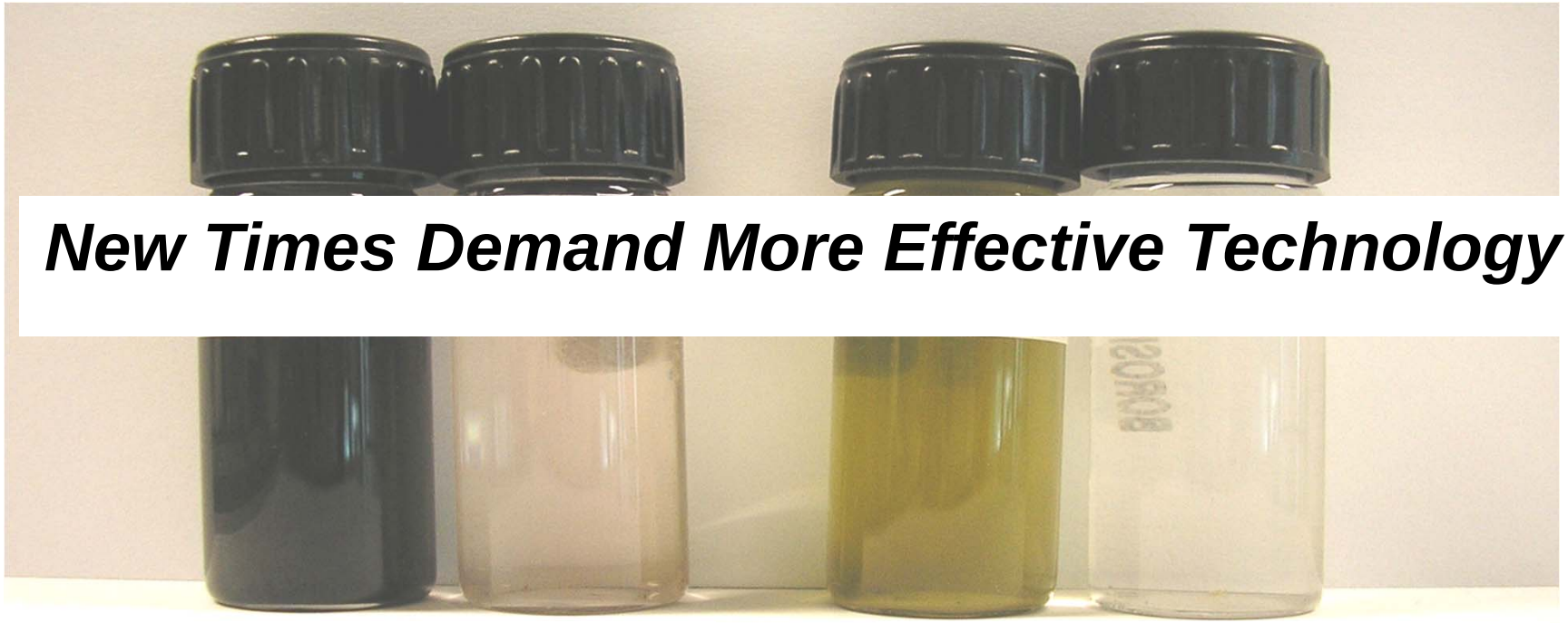
TEXTILE RMG Mills

ECR Installations at Woven-Knit/Print-Washing Units

FLAGSHIP Dhaka

Since March 2009

Electro Chemical Coagulation
Electro Floatation
Electro Chemical Oxidation



New Times Demand More Effective Technology

ECR CAPABILITIES

- Breaks oil emulsions
- Removes O&G & COLOR
- Reduces BOD, COD, & TSS
- Removes colloidal solids
- Removes HEAVY METALS
- Removes complex organics
- Processes multiple pollutants
- DESTROYS bacteria & viruses

ECR APPLICATIONS

- Cooling towers
- Sewage treatment
- Water pretreatment
- Surface water cleanup
- Drilling & produced waters
- Food & beverage processing
- Radioactive isotope removal
- Process rinse & wash waters

DHAKA EPZ - Series 60+ Modified by Mfr. Flagship Singapore For = 300m3/Hr - CETP Commissioned 1st FEBRUARY 2012

ECR + O2 = is a combination of Electro Chemical Coagulation, Sedimentation & Oxygen stripping at various Steps in CETP Process

DEPZ CETP operates 24/7

Real Time
Ultra Sonic
Flow Metering

ECR – O2 Reduction at CETP

COD from 950 to < 120 Mg/L
BOD from 280 to < 30 Mg/L
TSS from 250 to < 30 Mg/L

- **Daily Tested by In-House Laboratory**
- **Monthly Tested by DEPZ Laboratory**
- **Quarterly Tested by DOE Laboratory**
- **Private Testing by Joined Enterprises**

ETP UPGRADE's

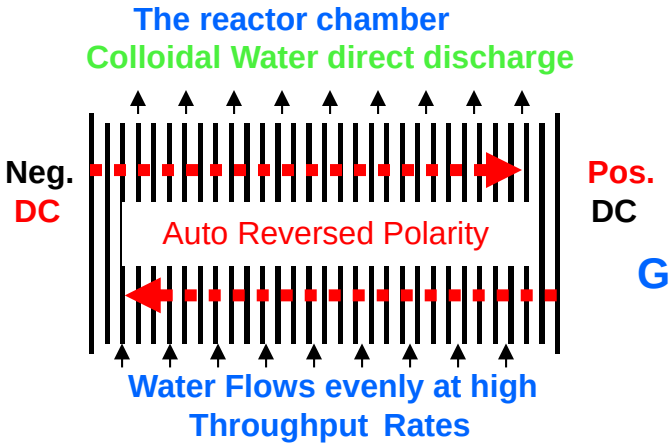
FLAGSHIP

Converted biological Plant with increased flow using ECR-O2 process.

ETP upgraded For Recycling Facility 2017

Recommended for Synthetic type Wastewater(s) Treatment

"The ***E**lectro **C**ontaminant **R**emoval process* is based on **valid scientific principles** involving responses of water contaminants to strong electric fields and electrically induced oxidation and reduction reactions"



Instant Flocculation

Atmospheric pressure chamber

Units sized from small to 180 M^3/Hr.

Greater surface reaction area with vertical flow

Easy blade replacement & CIP cleaning

LESS voltage = LESS energy consumption

used at CETP & individual RMG Dye Mills

FLAGSHIP Dhaka Environment & Water Solutions

Sales & Services for TEXTILE Industry

ECR INTEGRATIONS / ETP UPGRADES

- Increased Flow
- Decreased Sludge
- Decreased Op. Costs
- Decreased land Area
- Non Hazardous Residue

END USER must Accommodate Sedimentation / HRT

Outlet ECR Clarifier Raw

KNIT & Print Plant
Meets BSR-DETOX

Electro Floatation REMOVAL

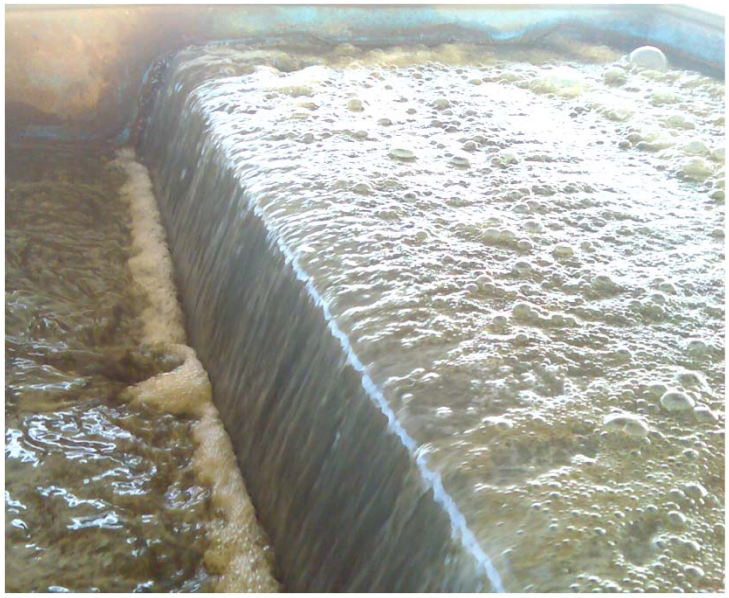
Minimized solids before O2 – UF & RO

World Wide Review & Use

Including **Dhaka and Shahjalal Universities**

❑ Office of U.S. NAVAL RESEARCH

"**The use of ECR in front of a multi-membrane systems of UF/RO promises to improve the performance of the membrane system** and to broaden its application to include feed water having high suspended solids levels".



❑ Journal of Hazardous Materials

"**Treatment of TEXTILE Wastewaters by ECR"**

The process has been found to be very efficient in **COD removal and de-coloration with low-energy consumption".**

❑USEPA & U.S. Coast Guard"

"The results show that electro-coagulation treatment is effective in destabilizing oil emulsions. **Removal efficiencies (extractable oil) exceeded 99% resulting in non-detectable values of less than 0.2mg/L TPH values in the effluent.**

The process was also effective in **removing heavy metals with removal efficiencies ranging from 71 to 99%".**

Contaminant(s) Removed by ECR

Irrespective of Industry

Heavy Metals	Average % Removed	Other Contaminants		Average% Removed
Aluminum	99.0	Aldrin		98.0
Arsenic	96.0	Chloreiviphos	PESTICIDES	99.0
Barium	98.0	Cypermethrin		94.0
Calcium	98.0	DDT		99.0
Cadmium	98.0	Diazinon		99.0
Total Chromium	99.0	Lindane		99.0
Cobalt	62.0	Proptamphos		99.0
Copper	99.0	Boron		70.0
Iron	99.0	Cyanide		99.0
Lead	97.0	E. Benzene		99.0
Magnesium	98.0	MP-Zylene		98.0
Manganese	83.0	O-Zylene		98.0
Mercury	66.0	Toluene		99.0
Molybdenum	80.0	Fluoride		60.0
Nickel	99.0	Nitrate		40.0
Vanadium	95.0	Nitrogen TKN		93.0
Zinc	99.0	PCB-Arochlor		82.0
Platinum	83.0	Hydrocarbons		98.0
Selenium	42.0	Phosphate		98.0
Silver	91.0	Potasium		45.0
Tin	89.0	Silicon		99.0

Destroys Bacterial Growth mechanism protecting RO systems from BIO-FOULING

REWE GROUP Group Detox Program

Waste Water and Sludge Testing

DETOX PRIORITY – 11 – GROUPS

- Akylphenols & Ethoxylates
- Phitalates
- Brominated and Chlorinated Flame Retardents
- Azo Carcinogenic Dyes
- Organotin Compounds
- Poly & Perfluorinated Chemicals
- Chlorobenzenes
- Chlorinated Solvents
- Chlorophenols and Other Phenol
- Short-Chained Chlorinated Parafins
- Heavy Metals

NON-DETECT on DETOX GROUPS
Using ETP with :

- ❑ Pre-conditioning
- ❑ Aerated Equalization,
- ❑ Electro Coagulation,
- ❑ Electro Floatation
- ❑ Sedimentation, and
- ❑ Oxidation /Gas Stripping
- ❑ Secondary Clarification

21ST CENTURY ECO SOLUTIONS

BUYER Memberships

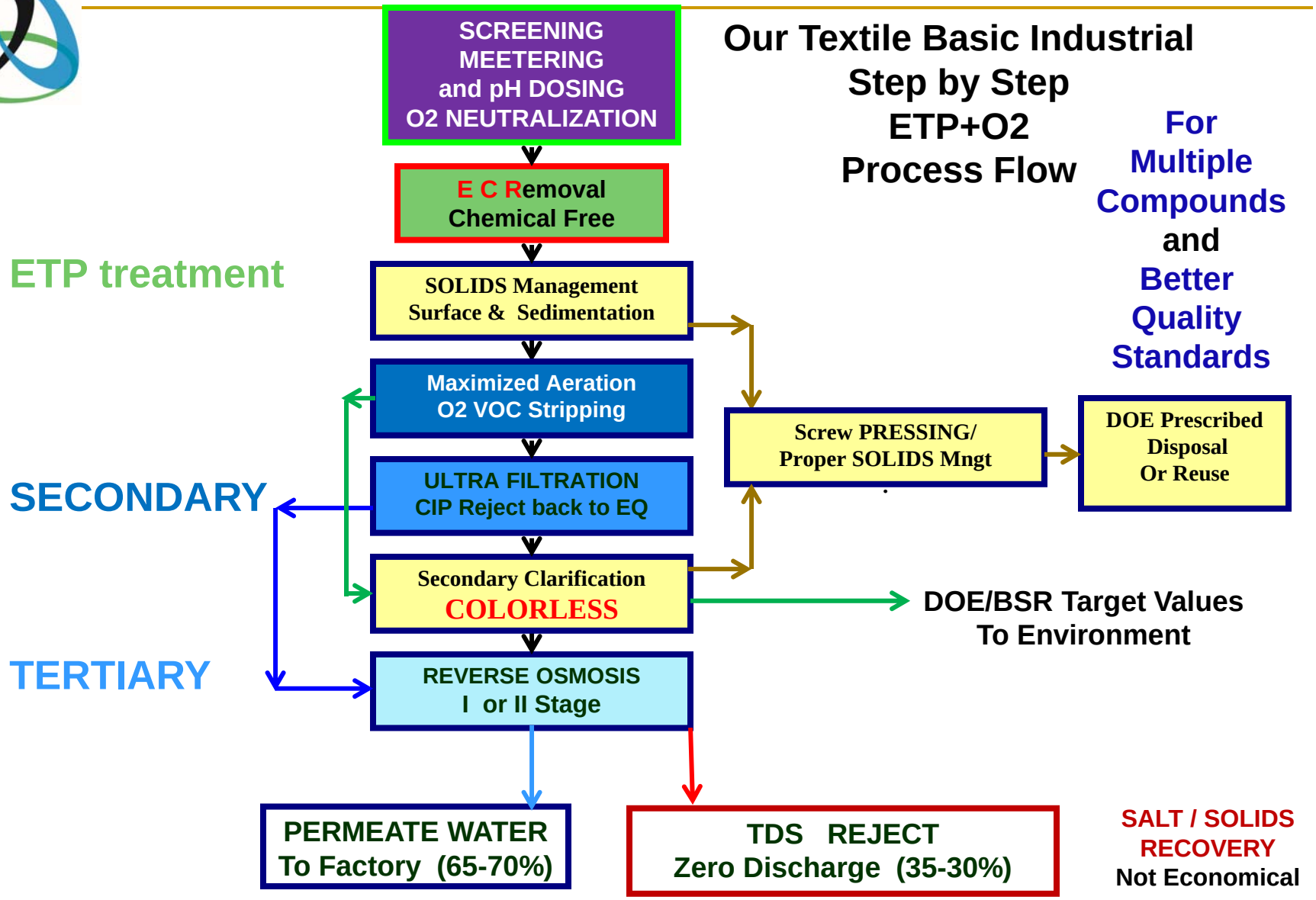
ECR Guarantees

✓**BSR**
✓**DETOX**
✓**STWI**

German - Western Buying Co-operatives Auditing Association

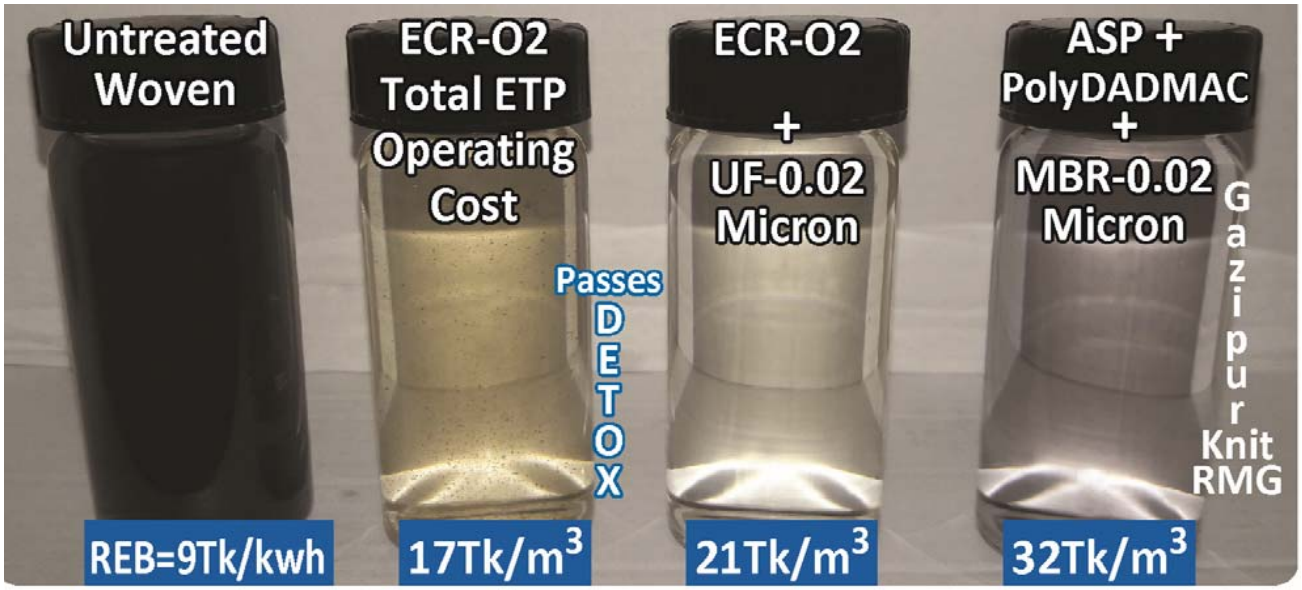
Our Textile Basic Industrial Step by Step ETP+O2 Process Flow

For Multiple Compounds and Better Quality Standards



ECR-O2 is coagulation followed by Sedimentation (CS) and Aerobic Conditioning

The process electro chemically oxidizes biodegradable compounds**.**



Using ASP

+ De-colorant

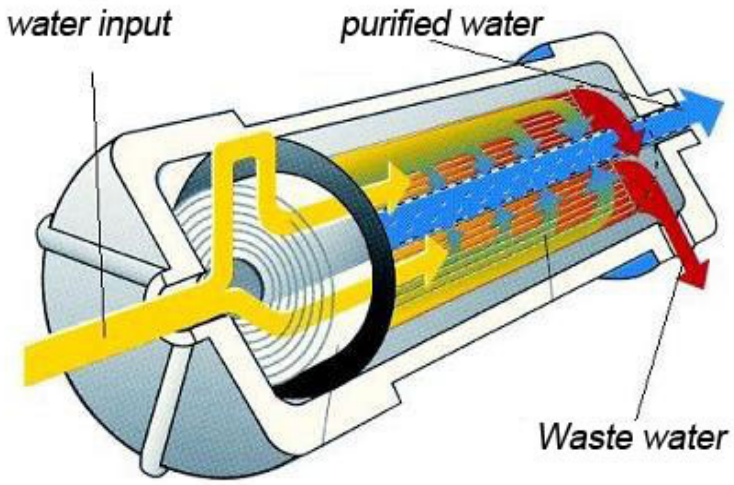
+ MBR does NOT

achieve great

success

or good

economics.



The more Color, bacteria & Contaminants through UF and into RO Elements – Will result in:

- **greater cleaning chemicals and cleaning frequency**
- **more Power due to increased pressure**
- **shorter Life Span of elements**

Coagulation / Flocculation/ Sedimentation prescribed by STWI and other Science based NGO's for Textile

Textile ETP's TODAY do not need to use conventional chemicals or Sensitive micro-organisms

With

CHEMICALS

Aluminum Chlorides

Aluminum Sulfates

Ferrous Chlorides

With

ELECTRICITY

Ferrous Ions **ONLY**

No Chemicals

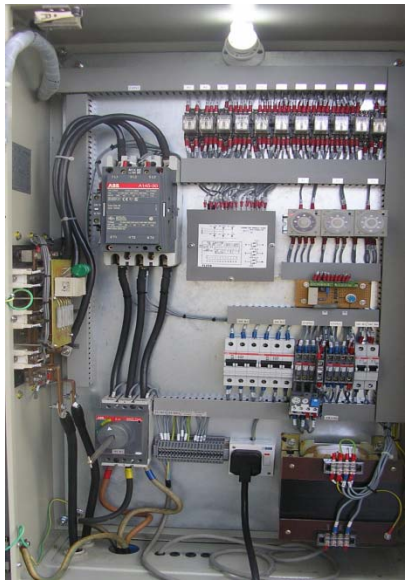
No Micro-organisms

EFFLUENT TREATMENT is all about REMOVING SOLIDS from WATER

SLUDGE Note: ***Heavy metals processed with sufficient activation energy precipitate into acid resistant oxide sludge that pass the Toxicity Characteristic Leaching Procedure (TCLP) which allows the sludge to be reclassified as non hazardous (Renk, 1989; Franco, 1974; Watanabe and Nojiri, 1975; Duffey, 1983).***

ECR Series – The future for Electro coagulation as a local water treatment technology is proven

Units are built in Singapore for Asian requirements



ALL Units are SKID Mounted

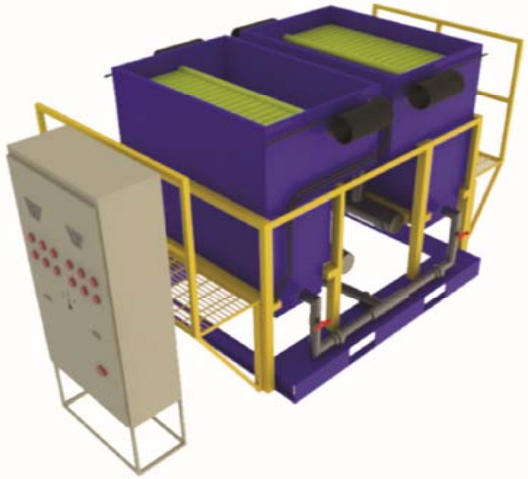
Easy Quick & Reliable

ECR Unit Flow Through Capacities

24-7 Operations

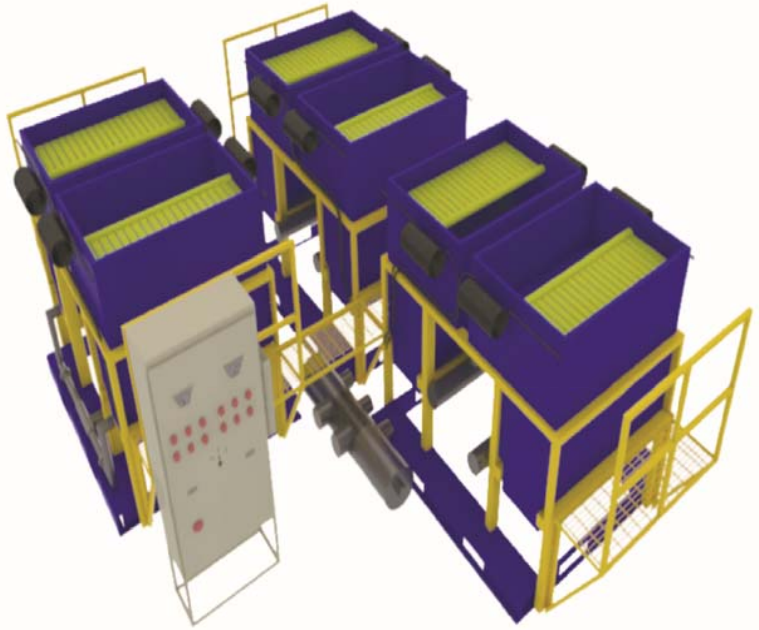
Series 5 & 10
Flowrate **15** and **30** M^3/Hr.

Series 20
Flowrate 30 to 60 M^3/Hr.



ECR CAPACITIES

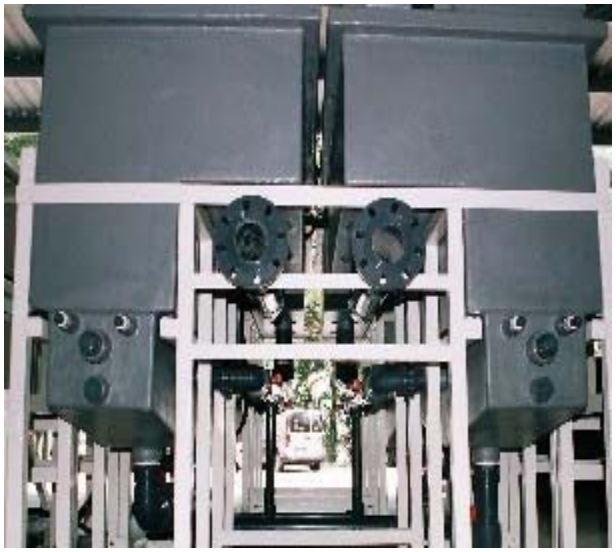
Series 60
Flowrate 60 to 180 M^3/Hr.



Series 40
Flowrate 60 to 120 M^3/Hr.

FLAGSHIP SINGAPORE
Manufacturing & Engineering
DHAKA after Sales and Service 24/7

- Strong & Durable Design
- Minimized Operator attention
- Best Plumbing & Electronics



Plug and Play
ECR Installations

Installation
in 4 days

REPEAT CUSTOMER NOW 120m3 FLOW RATE
starting with a 30M3/Hr chemical plant – 1st Unit 2009 / 2Nd in 2011
Knit – Print – Some Woven

TRIDENT T-40 = 120m3 FLOW RATE
Installed 2011 – Knit Dyeing

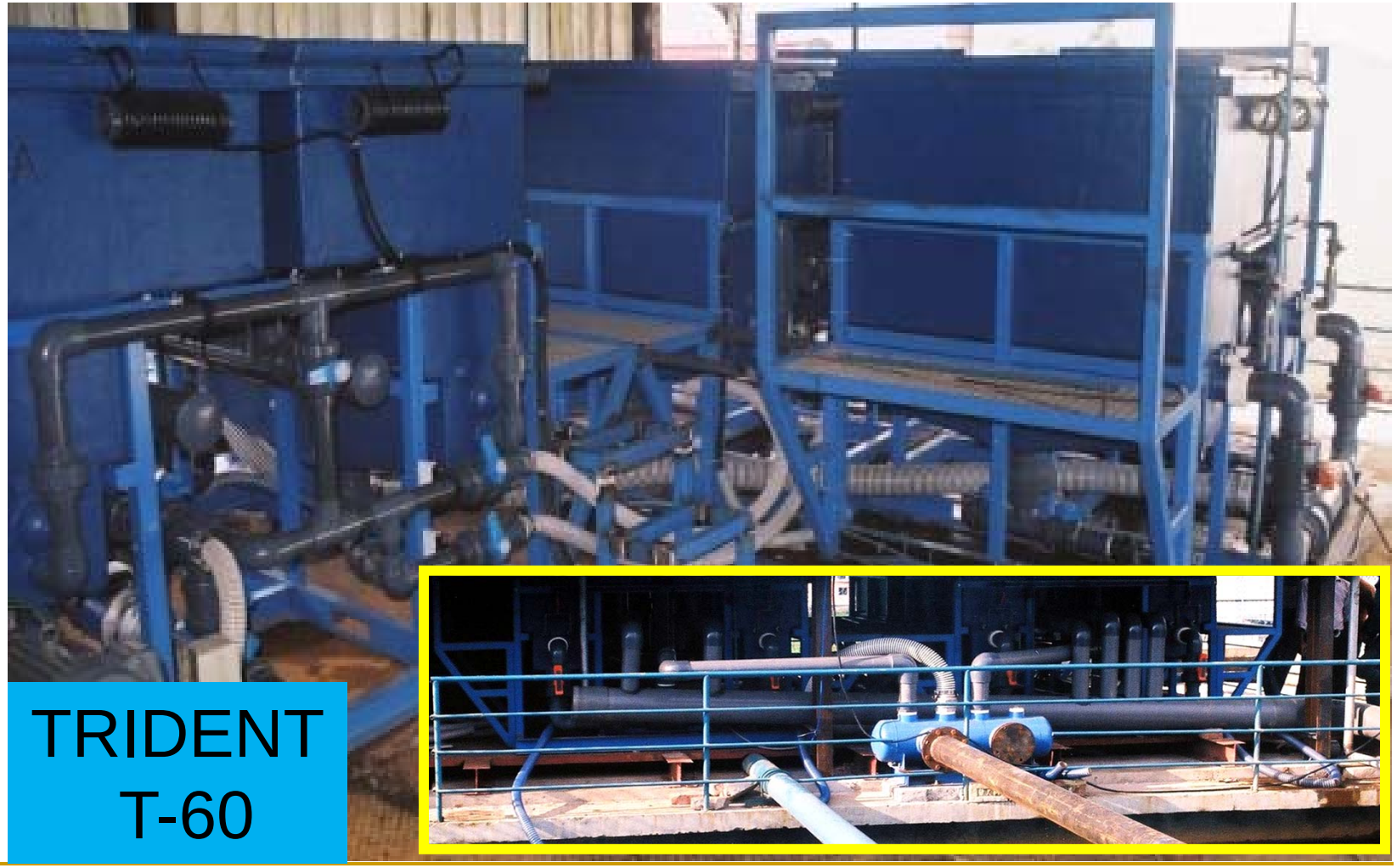
ECR INTEGRATION Into Existing Chem. ETP
New FLOW RATE FROM 80 to 150m3/Hr Jan.. 2012 Knit Dyeing

TRIDENT T-40 = 120m3 FLOW RATE upgrade with additional 60M3 Clarifier FEBRUARY 2012 – Knit Dyeing

REPEAT CUSTOMER NOW 120m3 FLOW RATE
First Unit Installed 2009. Second Unit installed 2010 – Knit Dying

ECR INTEGRATION into existing Chem. ETP
New FLOW RATE FROM 30 to 50+m3 Aug. 2012
Upgrades included new clarifier and additional O2 Aeration – Woven Dyeing

ECR INTEGRATION Into Existing Chem. ETP
New FLOW RATE FROM 70 to 150+m3 Aug. 2012 – Knit Dyeing



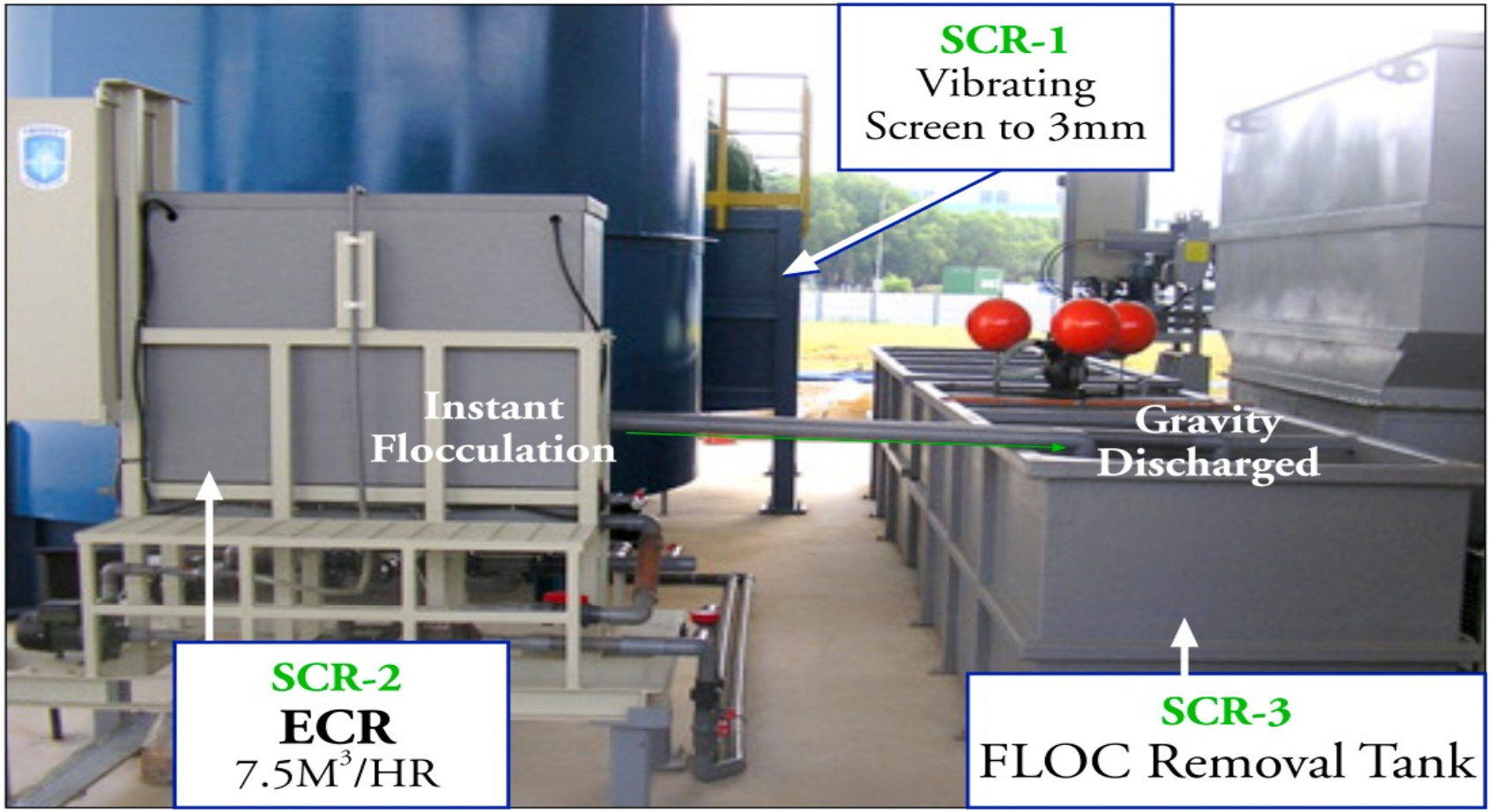
TRIDENT
T-60

ECR INTEGRATION Into Existing Chem. ETP New FLOW RATE FROM 80 to 150+m3 Sept. 2012 – Knit & Print Dyeing

TRIDENT T-60

SembCorp Env.

Singapore - Garbage Leachate



ECR Summary – ETP Technologies

- Water Recovery or clean discharge
- Handles wide pollutant variations
- Consistent & reliable results
- Treats multiple contaminants
- Minimal operator attention
- Low power requirements
- No unwanted chemicals
- Low operating cost
- Low capital costs
- Low maintenance
- Sludge minimized
- SMALL Green FOOTPRINTS
- No Micro Organisms

FLAGSHIP DHAKA Environment & Water Solutions

Completes the
Water Recycle Spectrum
With Proven Applications
for Industrial Waste Water

Into NEWater with

hydromaster

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