

EVER-CLEAR

ENVIRONMENTAL ENG. CORP.

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INNOVATION & PROFESSION



Create a Better Environment for Our Next Generation



Ever-Clear has expertise in industrial wastewater treatment, especially in advanced wastewater treatment. In the past few years, we developed our own critical and patent technologies and got success all over the world.

We expect that through our efforts it may bring some positive contributions to make the environment better.

- **Established:** 1999.03.15
- **Employee:** 55
- **Capital:** 180 million NTD
- **References:** > 300
(www.ever-clear.com.tw)
- **Revenue:** ~400 million NTD
- **Service:** Water/Wastewater treatment design, Treatment equipment supply, EPC/Turnkey/Key technology supplier

“Economic”, “Effective”, “Stable”, and “Simple”

Milestone

- ◆ R&D Department established in 2017
- ◆ IPO and Emerging Stock listed in 2017
- ◆ Start business in Thailand, Singapore and Israel



2012 — 2018

- ◆ Established in 1999
- ◆ Start business in China, Vietnam, Indonesia, Nicaragua and Lesotho



1999 — 2004

2019~

- ◆ Headquarter completed
- ◆ TPEX listed



2005 — 2011

- ◆ Start business in Korea, Mexico, Cambodia, India and Malaysia
- ◆ Lab established in 2010



Global Service & Marketing



Global service, more than 300 references.

Now we have been provide our service in 14 countries, such as China, Vietnam, Malaysia, India, Singapore and Israel.



AQUA TAIWAN 2017



WETEX 2017, Dubai



TAIWAN EXPO 2017, Indonesia



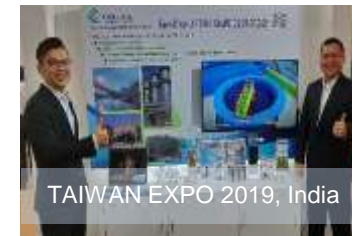
TAIWAN EXPO 2018, India



VIETWATER 2018, Vietnam



VIBRANT GUJARAT 2019, India



TAIWAN EXPO 2019, India



THAIWATER 2019, Thailand

Attend Professional Expo and Expand our Market

Total Solution Provider

Primary Treatment

FBC

Screen Coagulation DAF

Secondary Treatment

UASB

Activated Sludge MBR

Advanced Treatment

BioNET

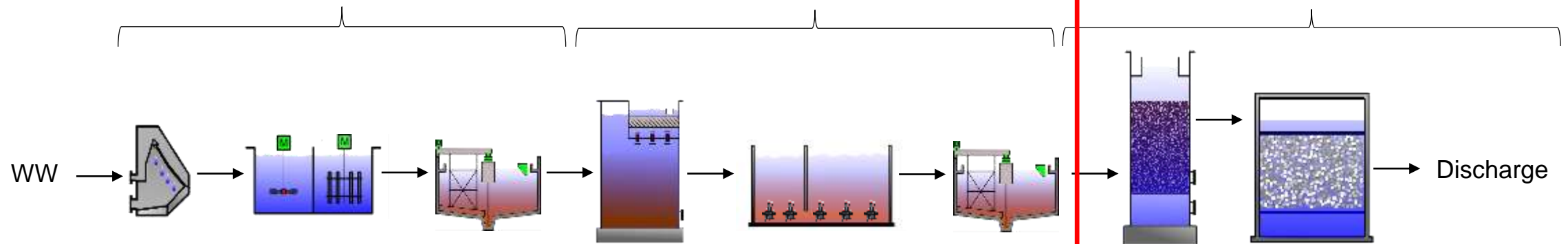
FBR-Fenton

AFB

FeRed-Fenton

GAC

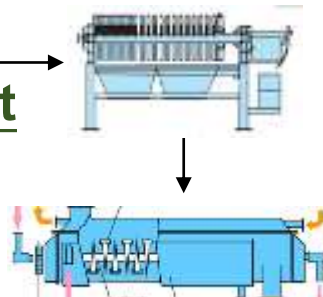
Sand Filter



Sludge Treatment

Digestion
Dewatering
Dryer

Sludge



Purpose

- ❑ New discharge standards
- ❑ Emerging pollutants removal
- ❑ Pretreatment of water reuse

Marketing of Core Technologies



Up Flow Anaerobic Bed (UASB)



- Methane production
- Low running cost

- Total Ref: 32
- Total Cap.: 48,000m³/day

Anaerobic Fluidized-Bed (AFB)



- Methane production
- Specific pollutant removal
- Denitrification

- Total Ref: 14
- Total Cap.: 37,280m³/day
- **Largest supplier in Taiwan**

BioNET



- Surface water treatment
- Groundwater treatment
- Pretreatment for water reuse

- Total Ref: 28
- Total Cap.: 177,000m³/day

Fluidized-Bed Fenton Reactor (FBR-Fenton)



- AOP treatment
- Stable effluent quality
- Pretreatment for water reuse

- Total Ref: 60, 125 reactors
- Total Cap.: 900,000m³/day
- **Largest supplier in Aisa**

FeRed Fenton



- Refractory pollutant reduction
- Increase BOD/COD ratio

- Total Ref: 24
- Total Cap.: 3,040m³/day
- **Only supplier in Taiwan**

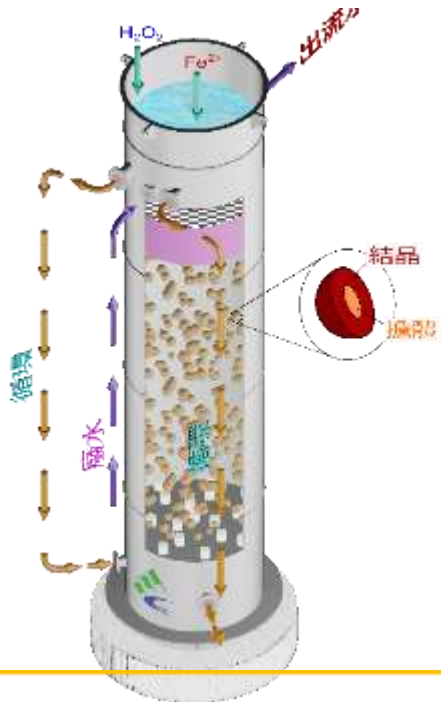
Fluidized-Bed Crystallization (FBC)



- Metal ion recycle
- Low running cost

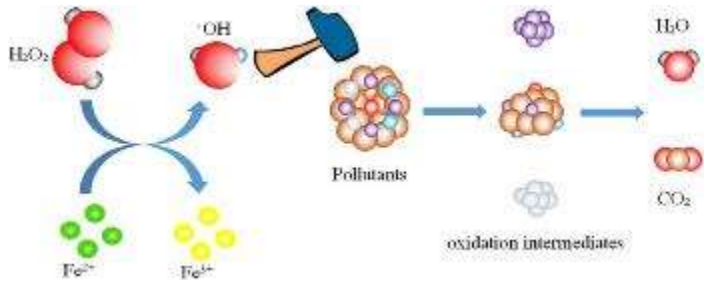
- Total Ref: 11
- Total Cap.: 20,000m³/day

FBR-Fenton- low COD and biorefractory wastewater treatment



Product Description

Fenton technology utilizes Fe^{2+} as a catalyst to react with H_2O_2 to generate $\text{OH}\cdot$. That is one of the Advanced Oxidation Processes (AOPs), which can effectively decompose organics to carbon dioxide and water.



山東亞太森博漿紙公司
ASIA SYMBOL PULP AND PAPER
SHANDONG CHINA
160,000 CMD



山東華泰紙業公司
HUATAI PAPER CO., LTD.,
SHANDONG CHINA
64,000 CMD

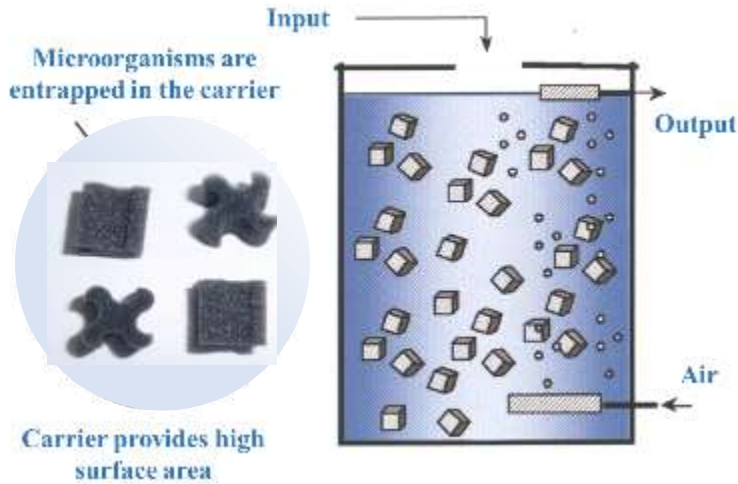


山西大同市污水處理廠
DATONG YUDONG CETP
SHANXI CHINA
30,000 CMD

BioNET[®] – Low organic concentration or Nitrogen-containing wastewater

Product Description

BioNET[®] is a novel bio-treatment system based on porous bio-carriers. The porous carriers can provide high surface area for microbial adhesion and growth, forming a biofilm with specific microbial that can increase treatment efficiency.



Fresh Carrier



Used Carrier

Microorganism



蒲城清潔能源化工有限責任公司
PUCHENG CLEAN ENERGY CHEMICAL
CHINA
14,400 CMD



東豐纖維企業股份有限公司
TUNTEX TEXTILE (THAILAND)
THAILAND
2,300 CMD

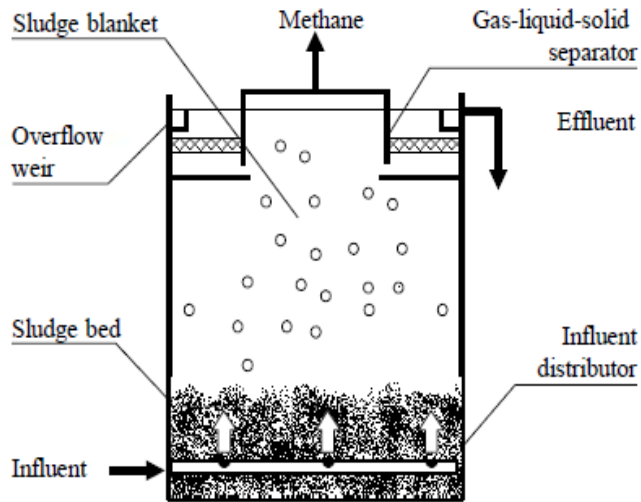


寶成國際集團印尼廠
POU CHEN GROUP
INDONESIA
15,000 CMD

Up-flow Anaerobic Sludge Bed – High organic concentration wastewater treatment

Product Description

UASB utilizes an anaerobic process to degrade organics in wastewater and generate methane and carbon dioxide. Wastewater flows upwards through a blanket of granular sludge which suspends in the reactor and the pollutants are digested by the anaerobic microbial.



Granular Sludge



三芳化學工業股份高雄廠
SAN FANG CHEMICAL INDUSTRY
TAIWAN
605 CMD



長春化工(江蘇)有限公司
CHANG CHUN PETROCHEMICAL
JIANGSU CHINA
9,000 CMD

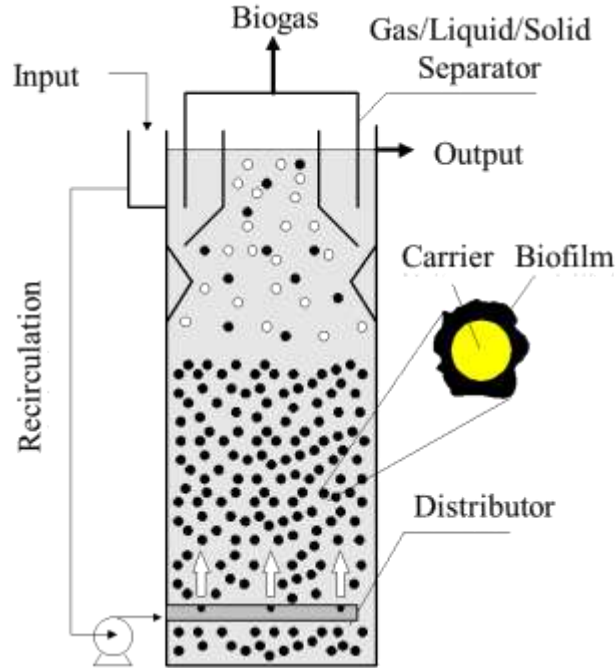


味全食品工業股份有限公司
WEI CHUAN CORP.
TAIWAN
2,000 CMD

Anaerobic Fluidized-Bed– Nitrate containing wastewater

Product Description

AFB reactor is filled with fluidized carriers which provide large surface area for the growth of anaerobic or anoxic microbial. the inflow and recirculated wastewater enter from the bottom of the reactor and provide an up-flow force for carrier fluidization.



Granular
Denitrifying
Bacteria



Granular
Methanogenic
Bacteria



台硝股份有限公司桃園廠
TNC INDUSTRIAL CO., LTD., TAIWAN
3,600 CMD



中石化南京化學工業有限公司
SINOPEC NANJING CHEMICAL INDUSTRIES, CHINA
4,800 CMD



允強實業股份有限公司埔心廠
YC INOX CO., LTD., TAIWAN
180 CMD

FeRed Fenton – High COD and biorefractory wastewater

Product Description

In FeRed-Fenton oxidation, the generated Fe^{3+} can be reduced to Fe^{2+} at the cathodes, therefore reduces the Fe^{2+} dosage and the generated sludge immensely. Moreover, the interactions with electric fields can also enhance the oxidation efficiency.



FeRed-Fenton Reactor



友達光電公司(龍科廠)
AU OPTRONICS CORP.
15 CMD



台灣電力公司林口電廠
LINKOU TAIWAN POWER COMPANY
200 CMD

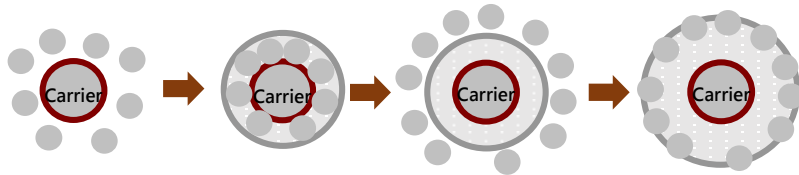
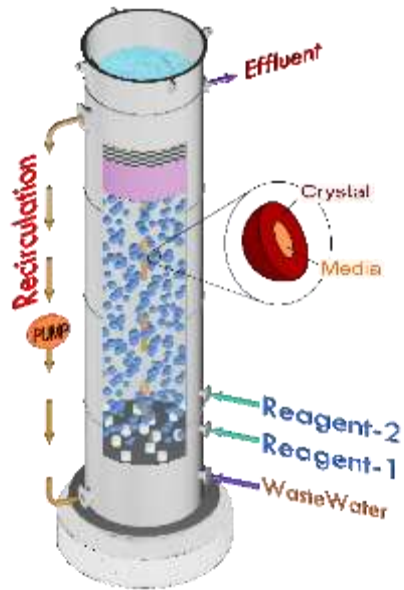


生泰合成工業股份有限公司
SYN-TECH CHEM. & PHARM. CO., LTD.
500 CMD

Fluidized-Bed Crystallization – Inorganic wastewater treatment and ion recovery

Product Description

- Carriers are used to remove metal salts or inorganic ions.
- Well-controlled chemical dosing system.
- Sludge reduction by 75%
- Recover valuable resources in crystal form



中華映管公司 (龍潭廠)
CHUNGHWA PICTURE TUBES
TAIWAN
Ammonia Removal



美光科技(新加坡)
MICRON TECHNOLOGY
SINGAPORE
Fluoride Removal



自來水公司 荊桐淨水廠
TAIWAN WATER CORP.
TAIWAN
Water Hardness Removal

Research & Development

- Lab established in 2010
- Water quality analysis and wastewater test & evaluation
- Innovative technology survey and development
- Collaboration with NCKU, FCU, NCHU and ITRI
- Move in Business Incubation Center of FCU in 2015
- R&D department setup in 2017

Matured Technology Transfer	5
Preliminary Technology Transfer	18
Research Project	13
Patent	5



Customization and Scale-up

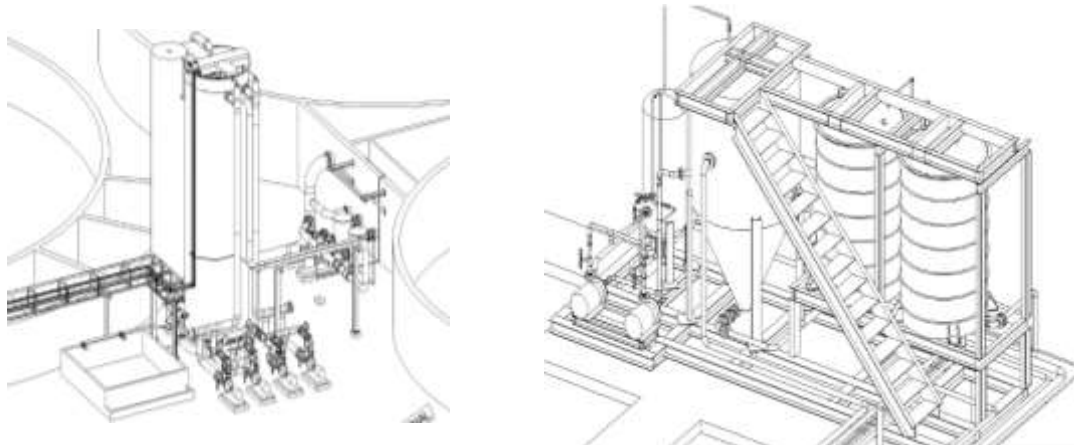
- ◆ Provide customized design based on customer's wastewater quality and discharge standards.
- ◆ Solutions cover physical/biological/chemical treatment.
- ◆ Largest scale in our reference is 160,000 CMD.



0.5 m³/day



2 m³/day



160,000 m³/day



Business Model

- ◆ EPC/Turnkey work of wastewater treatment plant (Taiwan Only)
- ◆ Basic design/Detailed design service
- ◆ Tie up with local engineering company and provide critical equipment/technology support only



Highlights of Recent Works

- Advanced treatment technology to meet new and improved wastewater discharge standards. Ex:
 - COD: Vietnam Class A ≤ 75 mg/L; China $\leq 50\sim 80$ mg/L
 - Ammonia: Vietnam Class A ≤ 5 mg/L; China $\leq 8\sim 12$ mg/L
- Industrial wastewater reuse
 - Leather industry: 1500 CMD, 70% recovery
 - Textile industry: 7500 CMD, 50% recovery
 - RO reject WW treatment (COD & Ammonia removal)
- Power plant wastewater treatment
 - FGD WW, pipeline cleaning WW, general WW
- Bioenergy production
 - Anaerobic treatment system (AD, UASB, IC)



Thanks for Your Attention!

Q & A

