

The company emphasizes on people
and the environment to create a better society



Global FINE, Smart Life !
2017'

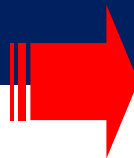
FINE-ELODE

**REMARKABLE SLUDGE
DEWATERING**

Remarkable Dewatering system
50% Volume Cut-Down
Reborn to Renewable Energy

***30 years Know-How for Sludge
Dewatering***

Belt Press



FINE-ELODE

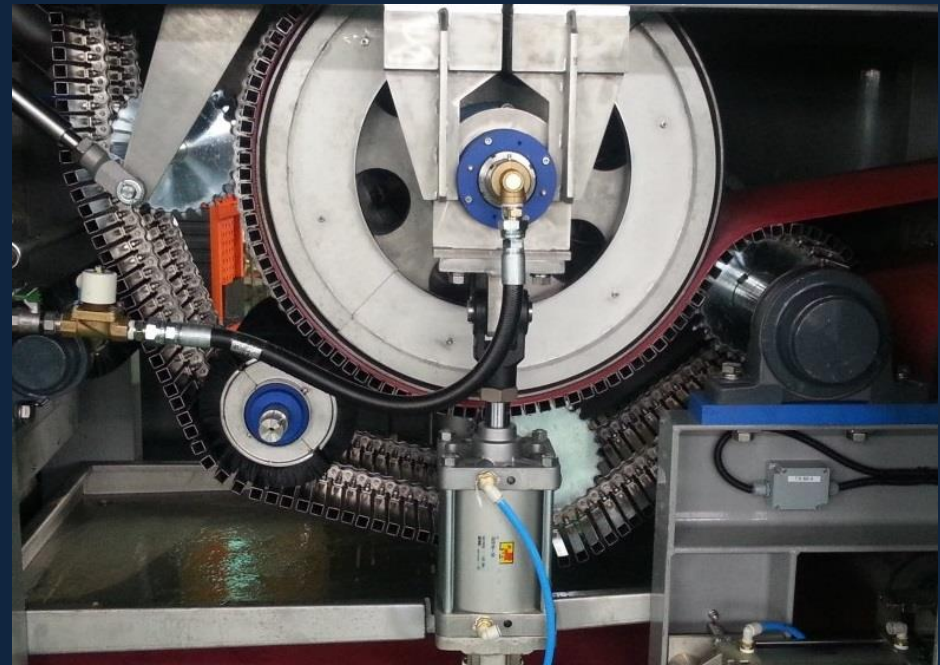


What is FINE-ELODE?

FINE-ELODE = ELECTRO OSMOSIS DEWATERING EQUIPMENT

The world's first “Field Proven” commercialized electro osmosis dewatering device which treat almost all types of Organic wastewater,

- **Municipal sewage**
- **Paper mill**
- **Food & beverage**
- **Livestock**
- **Dyeing & painting**
- **Chemical**
- **Fishery**
- **Etc...**



Why FINE-ELODE?

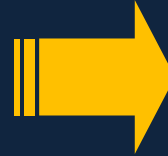
The “Deficiency” of present available equipment

Conventional Dewatering Devices

- ▶ Only extract the free water contained in the liquid sludge, limited to ~25%DS in sludge cake.
- ▶ Cannot extract the remaining of absorbed water.

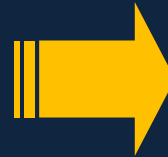
Thermal Dryers

- ▶ High capital
- ▶ High energy consumption



FINE-ELODE

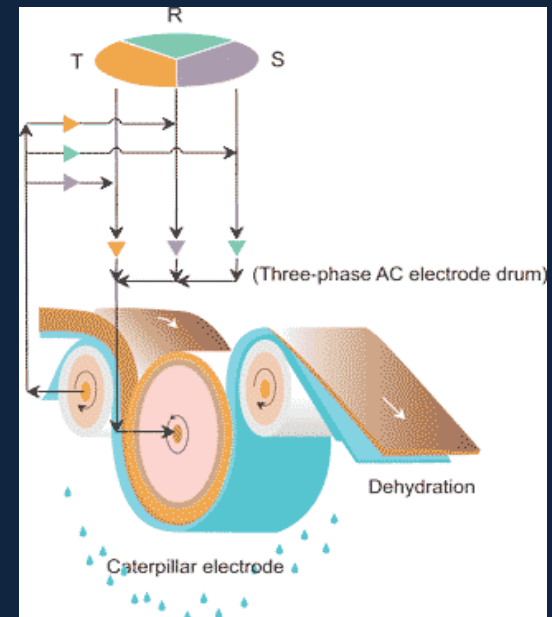
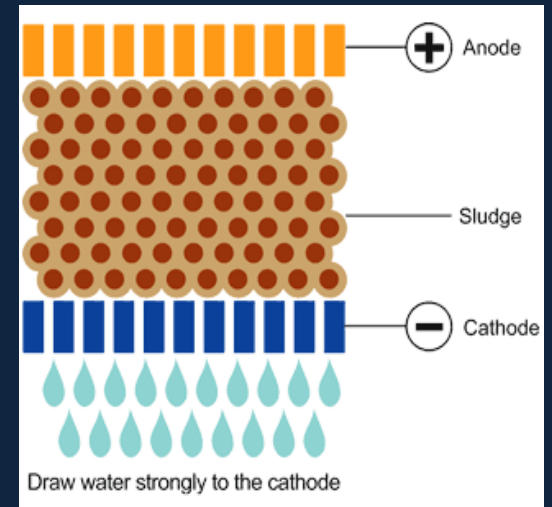
- ① Extract both “Free & Absorbed” water
- ② Cuts typical waste volume in half
- ③ Efficiently Achieves >40~50% dry solid
- ④ Low energy consumption against thermal dryers



How FINE-ELODE works?

Dewatering Method

- ▶ Combined actions of **electrophoresis** and **electro-osmosis**
- ▶ The sludge cake first goes through between the **anode Drum** and the **cathode Carbon**.
- ▶ Apply 3-phase DC voltage between the two electrodes, strongly push the sludge particles (-) toward the anode and water (+) toward cathode.



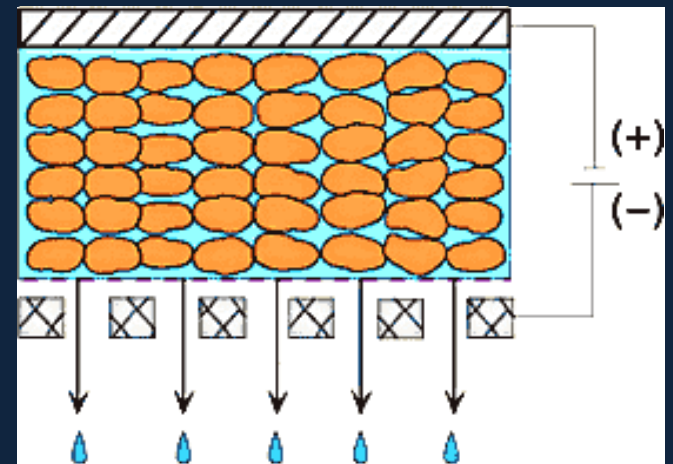
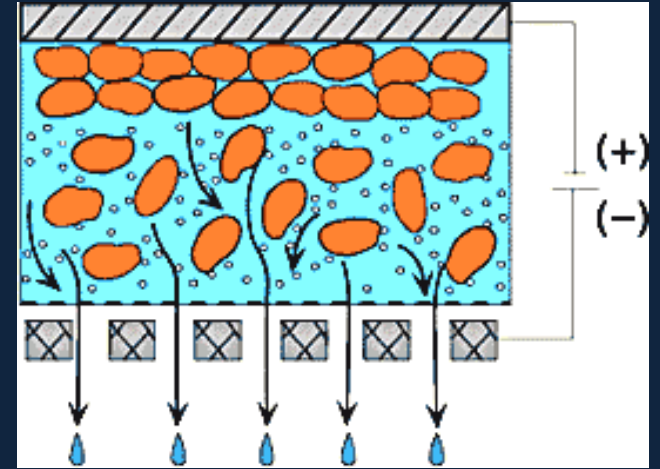
How FINE-ELODE works?

Electro-Osmosis Process of FINE-ELODE

1. **Early Electro-Osmosis, Electrophoresis**
 - Strongly push sludge particles (-) to anode (+) by an electrical potential difference



2. **Intermediate Electro-Osmosis**
 - Dehydration through movement of water (+) to cathode (-)

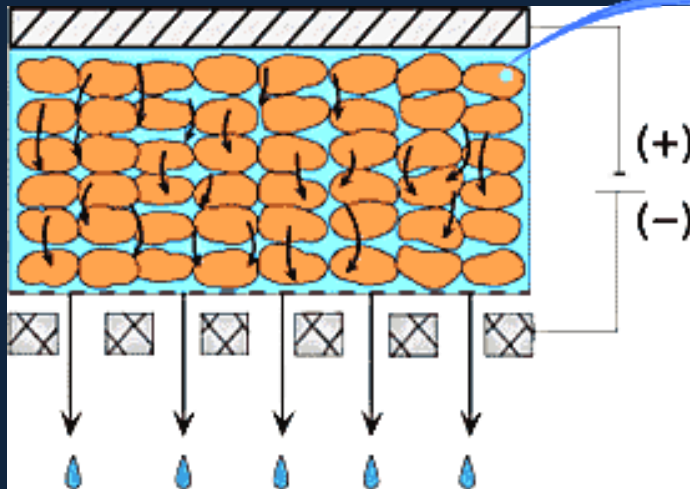


How FINE-ELODE works?

Electro-Osmosis Process FINE-ELODE

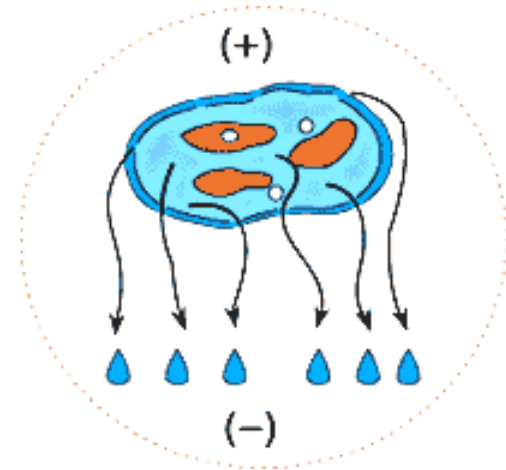
3. Final Electro-Osmosis Capillary Pressure

- Force the absorbed water flow through porous solid to cathode (-)



Destruction of Cell Membrane

- Destruction of cell membrane discharge the absorbed water of sludge



The FINE-ELODE Machine



EODS- SINGLE FINE-ELODE

- 2nd stage of dewatering
- Retrofit to existing conventional dewatering device



EODB – BELT-PRESS BUILT-IN FINE-ELODE

- New Setup
- Integrate 1st & 2nd stage dewatering into one machine

EODS — Single FINE-ELODE

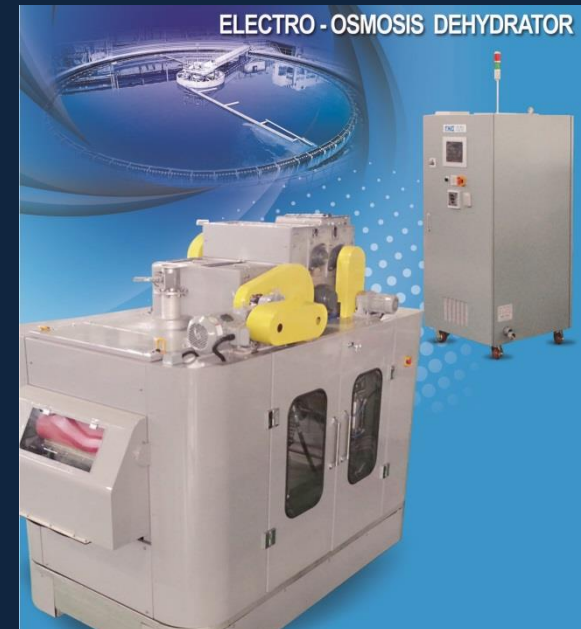
Specification

Dimension (m) L x W x H	Model	Belt With (mm)	Thought put @ 15% DS (kg)	Energy Consumption (kw/h)
2.7 x 0.6 x 1.5	500S	500	250	40~60
2.7 x 1.6 x 1.5	1000S	1,000	520	80~120
2.8 x 2.6 x 1.6	2000S	2,000	1,040	140 – 160
2.9 x 3.6 x 1.7	3000S	3,000	1,560	190 – 220

Typical Examples with SELO

Dryness (% DS)	Wet Ton (Unit)	Improvement (Weight Reduction)
18% ➔ 42%	100 ➔ 43	57%
22% ➔ 45%	100 ➔ 49	51%

Note : Input sludge must be > 6% DS
: Optimal sludge condition for FINE-ELODE processing is with conductivity of 2000 μS – 8000 μS



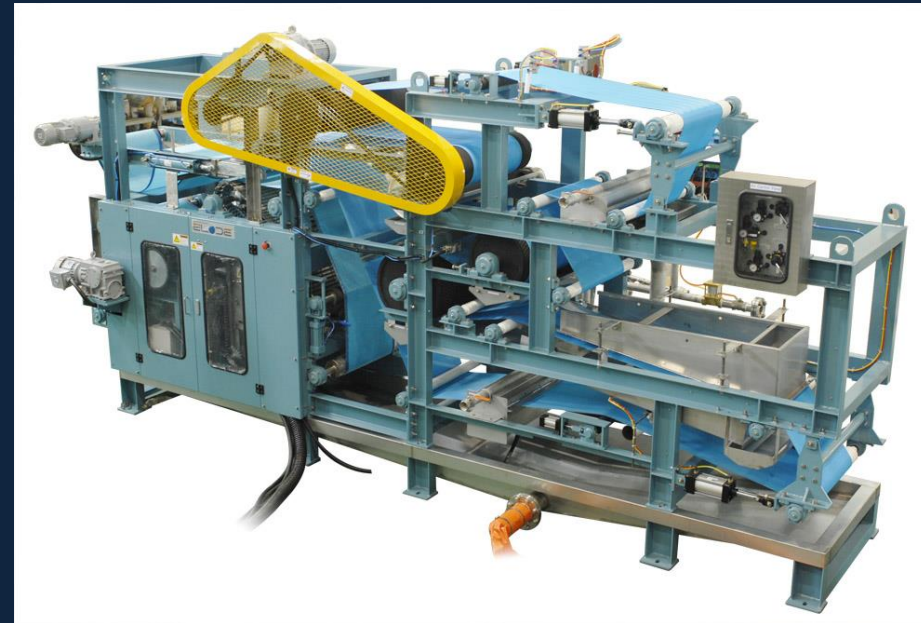
EODB — Belt-Press Built-In FINE-ELODE

Specification

Dimension (m) L x W x H	Model	Belt With (mm)	Thought put @ 1% DS (kg)	Energy Consumption (kw/h)
4.48 x 1.35 x 2.38	1000B	1,000	7,800	80 – 120
4.58 x 2.56 x 2.38	2000B	2,000	15,600	140 – 160
4.58 x 3.86 x 2.38	3000B	3,000	23,000	190 – 220

Typical Example with BELO

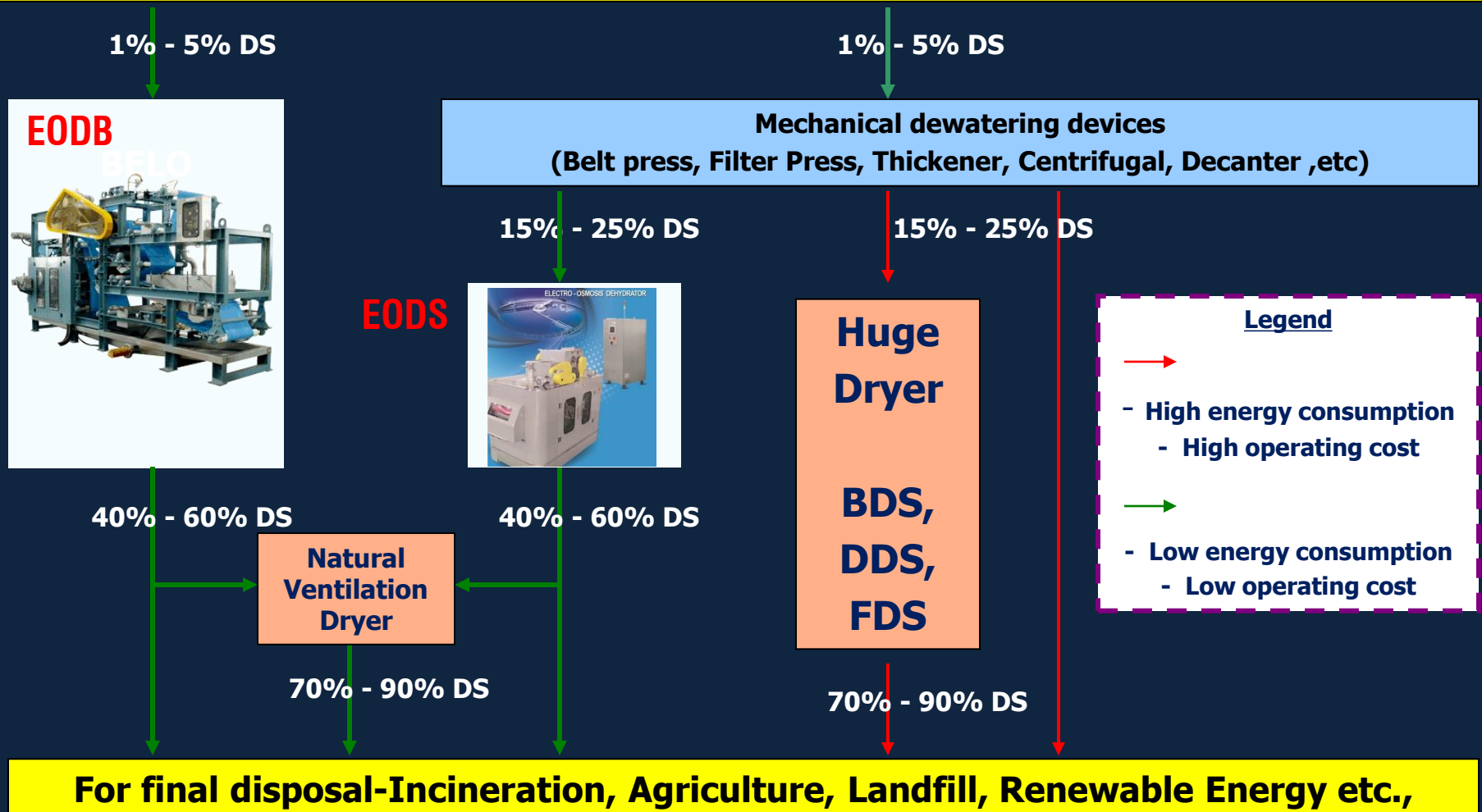
Dryness (% DS)	Wet Ton (Unit)
1% → 45%	100 → 2.22



Note : Optimal sludge condition for FINE-ELODE processing is with conductivity of 2000 μS – 8000 μS

FINE-ELODE Improves Environment

Sludge mixed with Polymer (Influent)



FINE-ELODE Cuts Disposal Cost

Typical municipal sewage sludge

Example : Sludge concentration : 1% DS (99% wt)
Sludge weight : 1,000 ton daily

Mechanical dewatering device

(Belt-Press, Filterpress, Centrifugal, Screwpress, Decanter, Thickener-Dewatering, etc.,)

EODS

Sludge concentration : 45% DS (55% wt)
Sludge weight : 22.2 ton
Est. Disposal cost : USD 1,776
Est. Electricity cost : 7,920 kW x USD 0.15
= USD 1,188
Est. Total cost = USD 2,964

Sludge concentration : 18% DS (82% wt)
Sludge weight : 55.5 ton
Est. Disposal cost : USD 4,440

Reduction in waste sludge = 33.3 ton (66.6%)
Cost Saving = USD 1,476 daily
Annual Saving = USD 442,800

Assumption

Sludge disposal cost = USD 80 / ton

Working Hour = 22 hrs / day

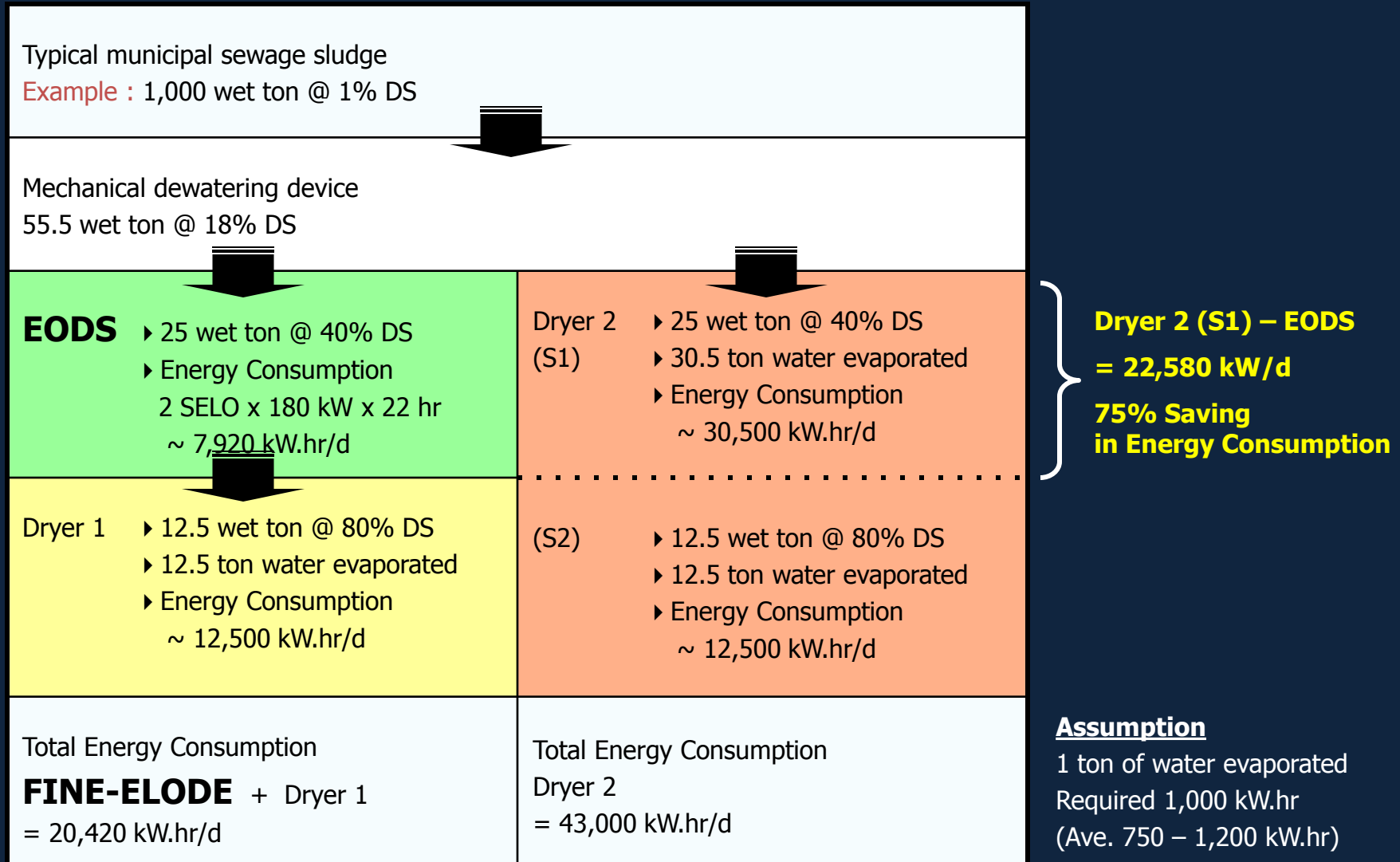
= 25 days / month

Electricity tariff = USD 0.15 kW.hr

No. of SELO = 2 units

Energy Consumption = 180 kW / machine

FINE-ELODE Reduces Energy Consumption



Features & Benefits

1. High dryness (reduce water level 20%+)



Significant reduction in disposal cost

- **Facilitates storage**
- **Transportation using standard vehicles**
- **Reduce costs of incineration**

2. Reduce final cake to half (50%+Reduced)



Significant cost reduction in

- **Transportation**
- **Landfill disposal**
- **Enable energy recovery**

3. Low energy consumption compared to dryers (40%+ Saved)



Minimum operating cost

- **Use less electricity, high energy efficiency**

Features & Benefits

4. Universal and compatible



Easily integrated into existing mechanical dehydrators

5. Compact in size



Reduction in infrastructure cost

6. Field tried and tested for more than 2 years



Minimum production lost

- **Reliable, superior quality and performance**
- **Potential polymer reduction**

7. Fully automated, easy to use and less maintenance



Minimum operating cost

- **Less operation supervision**
- **Easy parts accessibility for maintenance**

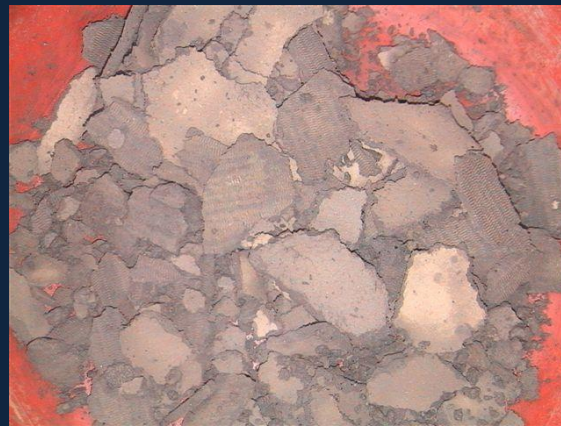
REFERENCES OF FINE-ELODE

PERFORMANCE :

Result of Final Cake Out for each Different Sludge



Municipal Sludge 57%wt



Chemical Sludge 53%wt



City Bio Sludge 55%wt

Livestock Sludge 52%wt



High Organic Dyeing 48%wt



Municipal+Excreta 51%wt

PERFORMANCE :

Result of Final Cake Out for each Different Sludge



Industrial Oil Sludge 52%wt



Soy Bean Sludge 53%wt



Organic Mineral 55%wt

Pharmaceutical Sludge 48%wt



Milk Sludge 58%wt



Human Excreta 43%wt



RESULT : Average Reduced Volume

Before : 14%DS (86%WT)



After : 52%DS (48%WT)



61.3% Out-Cake volume reduced!

DETAIL DATAS

CLIENTS	DuPont Inc. Korea		Remark
Model	FINE-ELODE: EODS-150, 1.5meter Belt Width		Main Process machine
Running Start	November, 2013		
Operating term	3.2 years		
Site Location	Ulsan. Korea		
Sort of Sludge	High Organic Chemical Sludge		
Sludge Characteristic	Very difficult high organic sludge		Impossible at existing FINE-ELODE
1 st Machine & Input DS%	Beltpress 88%wt ±2%		
Daily Throughput	700kg x 5hours = 3.5ton		
Result of Before & After	Before (88%wt)	After (64%wt)	2.34tonx300days=702ton reduced. x\$150 = Yearly U\$105,300 SAVED
	3.5ton/day	1.16ton	
	Reduced 66.85%	Daily 2.34ton Reduced	
Refer-Photos			
Electric Consumption	Average : 120~140kWh		
Electric-Consumption vs Dehydrated	Dewatering discharged/hr : 468liter, Max 140kW = 0.299kWh		Old ELODE was 0.65kW/liter
Others Feature	NEW UP-GRADED FINE-ELODE Guaranteed: +50% Electric consumption saved, Main drum 3 years guarantee, Belt 1year guarantee, High Organic sludge is available.		

DETAIL DATAS

CLIENTS	SONGWON INDUSTRIES. Korea		Remark
Model	FINE-ELODE: EODS-300, 3.0meter Belt Width		Main Process Machine
Running Start	December 2013		
Operating term	3.1years		
Site Location	Ulsan city. KOREA		
Sort of Sludge	High Organic Sludge		
Sludge Characteristic	Non-Dewaterable sludge with high conductivity of 15,000 μ S.		impossible at existing FINE-ELODE
1 st Machine & Input DS%	Multiple discs Press 83%wt $\pm$ 3%		
일일 처리량 / Daily Throughput	1000kg x 20hours = 20ton		
FINE-ELODE 후 감량률 및 결과 Result of Before & After	Before (83%wt)	After (65wt)	10.3tonx300days=3,090ton reduce dx\$170 = Yearly U\$525,300 SAVED
	20ton/day	9.7ton	
	Reduced 51.5%	Daily 10.3ton Reduced	
참고사진 Refer-Photos			
Electric Consumption	Average : 80kW~120kWh		
Electric-Consumption vs Dehydrated	Dewatering discharged/hr : 515liter, Max 120kW = 0.27kWh		Old ELODE was 0.68kW/liter
Others Feature	NEW UP-GRADED FINE-ELODE is lower the electricity consumption for higher the conductivity without spark or be It melting, always Guaranteed: +50% Electric consumption saved, Main drum 3 years guarantee, Belt 1year gua antee, High Organic sludge is available.		

DETAIL DATAS

CLIENTS	EXPORT TO JAPAN		Remark
Model	FINE-ELODE: EODS-50, 0.5meter Belt Width		PILOT Machine
Running Start	March, 2014		
Operating term	2.9 years		
Site Location	Japan night soil Treatment Plant		
Sort of Sludge	Organic Municipal Sludge		
Sludge Characteristic	90% high organic Night Soil, 10% city sludge		
1 st Machine & Input DS%	DECANTER 80%wt ±5%		
Daily Throughput	200kg/hr x 12 hours = 2.4ton		
Result of Before & After	Before (80%wt)	After (57%wt)	1.24tonx300days=372ton reduced x\$180 = Yearly U\$66,960 SAVED
	2.4 ton/day	1.16ton	
	Reduced 53.48%	Daily 1.24ton Reduced	
참고사진 Refer-Photos			
Electric Consumption	Average : 40kW~60kWh		
Electric-Consumption vs Dehydrated	Dewatering discharged/hr : 103liter, Max 60kW = 0.58kWh		Old ELODE was 0.72kW/liter
Others	NEW UP-GRADED FINE-ELODE Guaranteed: +50% Electric consumption saved, Main drum 3 years guarantee, Belt 1year guarantee. High Organic sludge is available		

MOVIE

Click here to see FINE Group; link to U-Tube

The company emphasizes on people
and the environment to create a better society

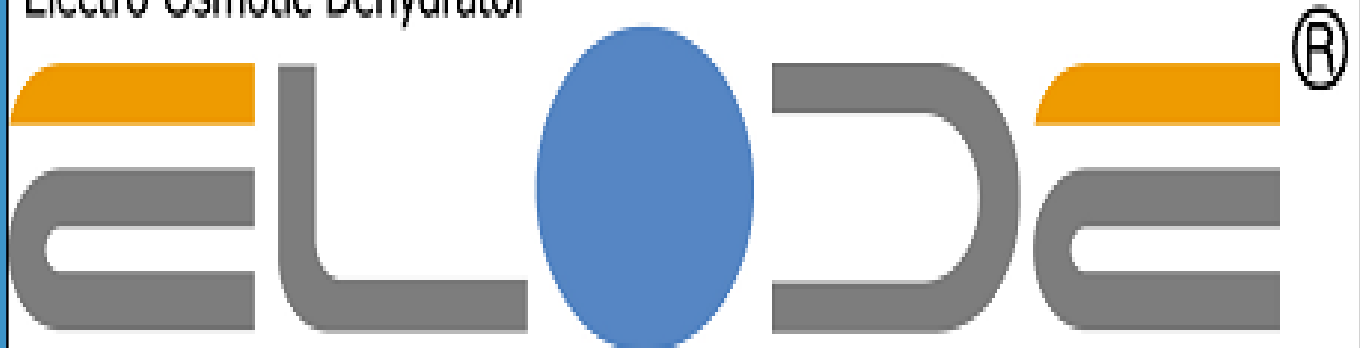


MOVIE

**Click here to see FINE-ELODE operating; link to U-Tube
“Full Operating BELTPRESS+FINE-ELODE”**



Electro-Osmotic Dehydrator



MOVIE

**Click here to see FINE-ELODE operating; link to U-Tube
“DuPont Korea Plant”**



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We are always ready to reply within 24hours & Serve for you

THANK YOU