

Company summary for 「SSENG」

'23. 03

Summary	Company	SSENG Co., Ltd	Establishment	Nov. 23, 1999
	Head Office	285, Noksansnaeopjung-ro, Gangseo-gu, Busan, Korea		
Main Business	<ul style="list-style-type: none">• 3Min WTP (1/100 of the standard RSF process)<ul style="list-style-type: none">- WTP : SMIF Process - tub.< 0.1NTU, Removal rate(for 5μm partical) is over 99%• 3Min RO PTP (1/30 of the DMF process, 1/20 of the UF process)<ul style="list-style-type: none">- BWRO (Brackish Water Reverse Osmosis) : SMiF+RO PROCESS- SWRO (Sea Water Reverse Osmosis) : SMiF+RO PROCESS• 3Min T-P TP (1/20 of the Sedimentation-Flotation) / Re-use for Sewage water<ul style="list-style-type: none">- TPR (Total Posphate Removal) : SCoF(GFF) or IPS+GFF-T.P<0.2- SER (Sewage Effluent Reuse) : SMiF+RO Process-TDS<50<ul style="list-style-type: none">o SMIF : Single Mixing & filtrationo IPS : Inclination Plate Settler			
	Patent	• Regustered : 102 cases (Domestic-48, Overseas-54)		
	Award	<ul style="list-style-type: none">• The grand prize of national environmental management in 2007• President’s award in 2009 (Ministry of Public administration and security)• Jangyoungsil award in 2009 (Minister of Environment)• Paten technology prize “Chungmugong” in 2011 (KIPO)		
Certific- ation	<ul style="list-style-type: none">• Environmental new technology (NET-2 cases) / PCF(Appointed No.87, Approved No. 62) , GFF(Appointed No.169, Approved No.91)• KOTRA Warrant Brand(2009 - 150 - 01 / Ministry of Knowledge Economy)• Superior Environmental Business (2013 No.0401097 / Ministry of Environment)• Green Technology Certification (GT-14-00237 / Ministry of Environment)• Selected Green Export-100 in 2016 (Ministry of Environment)			
National Strategic Program (16 cases)	Program		Judgment	Department
	Next generation core environmental technology development business and other 6 cases		Success(All)	Ministry of Environment
	Innovative technology development business and other 6 cases		”	Small and Medium Business Administration
	R&BD and other 2 cases		”	Ministry of Knowle- dge Economy
	Local industry joint technology development business		”	Ministry of Com- merce, Industry & Energy

Core
Techn-
ology

- Filtration : Pressurized fiber media, SS removal by formed pore.
- Backwash : Released fiber media, backwash to eliminate & drain SS captured by air and water

• 3Min WTP(Water Treatment Plant)

In 1884, Conventional Water Treatment Process developed by HAYTT(USA) widely applied around the world takes about 5 hours for the processes of coagulation, sedimentation and sand filter.

But after 130 years, SSENG has developed an innovative water technology named “3Min WTP”, which completes the processes of instant coagulation, direct fiber filtration processes within 3 minutes and construction period, Capex & Opex are dramatically reduced by minimizing size with new technology. There are Container type, Skid type, Plant type and Mobile type for water treatment plant.

단위 : 분

Type	Retention time(mim)				Volum- e	Delive- ry	Capex	Opex	Treated water(NTU)
	Coagu- lation	Sedim- entation	Filter- ation	Total					
3Min WTP	1 sec.	-	3.0	3.0	1	1	1	1	0.05~0.5
RSF	30	240	30	300	100	5	3	3	0.1~0.5

• 3Min RO PTP(PRE-Treatment Plant)

- The DMF method takes 90 minutes and the UF method takes about 60 minutes if the sedimentation tank is included in the RO pretreatment.

SSENG completes this in 3 minutes (coaguration-instant, filtration-3 minutes).

Reduce the size to less than 1/30 and 1/20 respectively.

Reduction of construction period, construction cost, operation cost, etc.

- Seawater is coagurated and filtered directly through PCF to SDI¹⁵ 3.0 or less, and ion substances such as salt are removed with SWRO (drinking water, living water, agricultural and industrial water), etc.

단위 : 분

Type	Retention time(mim)				Volum- e	SDI ¹⁵	Pressure (bar)	Capex	Opex
	Coagu- lation	Sedim- entation	Filter- ation	Total					
3Min RO PTP	1 sec.	-	3.0	3.0	1	3.0	0.2~1	1	1
UF PTP	20	40	1.3	61.3	20	2.0	2~3	3	3
DMF PTP	20	40	30.0	90	30	5.0	2~3	3	3

WTP
Refere-
nce

THA/304Complex
160,000m³/D

INA/Cirebon PP
6,500m³/D

INA/Nyanyi WTP
4,000m³/D

PHI/Boracay
10,000m³/D

VIE/Binhдай WTP
15,000m³/D

Fabrication type	PLANT TYPE	SKID TYPE	CONTAINER TYPE	MOBILE TYPE																																												
																																																
																																																
STP Core Technology	<ul style="list-style-type: none">• 3Min T-P TP(Total Phosphate Treatment Plant)<ul style="list-style-type: none">- The sedimentation/flotation method for T-P treatment of sewage discharge water is it takes about 1 hour (coagulation - 20 mins, sedimentation./flotation - 40 mins) but, SSENG completes this in 3 minutes (coagulation -1.5 mins, filtration -1.5 mins). Construction time, construction cost, operation cost, etc. are reduced by making the size less than- Low concentration phosphate : Coagulation + GFF direce filtration- Low concentration phosphate : Coagulation + Inclination plate clarification + GFF direce filtration <p style="text-align: right;">단위 : 분</p> <table><tr><th rowspan="2">Type</th><th colspan="4">Retention time(mim)</th><th rowspan="2">Volume</th><th rowspan="2">Capex</th><th rowspan="2">Opex</th><th rowspan="2">Treated water(T-P)</th></tr><tr><th>Coagu-lation</th><th>Sedim-entation</th><th>Filter-ation</th><th>Total</th></tr><tr><td>3Min T-P TP</td><td>1.5</td><td>-</td><td>1.5</td><td>3.0</td><td>1</td><td>1</td><td>1</td><td>0.2,0.3,0.5</td></tr><tr><td>Coag. + Float.</td><td>20</td><td>40</td><td>-</td><td>60</td><td>20</td><td>2</td><td>2</td><td>"</td></tr><tr><td>Coag. + Sedim.</td><td>20</td><td>40</td><td>-</td><td>60</td><td>20</td><td>2</td><td>2</td><td>"</td></tr></table>								Type	Retention time(mim)				Volume	Capex	Opex	Treated water(T-P)	Coagu-lation	Sedim-entation	Filter-ation	Total	3Min T-P TP	1.5	-	1.5	3.0	1	1	1	0.2,0.3,0.5	Coag. + Float.	20	40	-	60	20	2	2	"	Coag. + Sedim.	20	40	-	60	20	2	2	"
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	<ul style="list-style-type: none">• Re-use for Sewage water<ul style="list-style-type: none">- After coagulation and filtering sewage discharge water to around SDI¹⁵ 3.0, Treatment with BWRO and reuse for agricultural, industrial water, etc.																																															
STP Reference																																																
	Bucheon STP 900,000m ³ /D	Gangbeyon STP 630,000m ³ /D	Joongang STP 60,000m ³ /D	Jeongeup STP 67,900m ³ /D	Hadong PP WWTP 40,000m ³ /D																																											
Reference	<ul style="list-style-type: none">• PCF FILTER - 1,918 set / GFF FILTER - 4,190 set / Total - 6,108 set																																															

Reference for PCF filter

삼성그린센터

Samsung
greencenter

14,400m³/d
(4,800x3)



화명 정수장
Hwamyong
WTP

8,400m³/d



남부발전

Nambu power

2,500m³/d



포스코 동호안

Posco
donghoan

64,800m³/d
(7,200x9)



포스코오수
POSCO STP

8,000m³/d
(4,000x2)



일본 쿠마모토

Japan
Gumamoto

15,000m³/d
(5,000x3)



남동발전
해수담수화

Namdong
power

5,000m³/d
(2,500x2)



포스코
우수재이용

Posco rain
reuse

7,200m³/d
(3,600x2)



포스코 압연

Posco rolling
mill

40,000m³/d
(10,000x4)



태국
프라친부리

Thailand
Prachindur
160,000m³/d
5,000x51



중국 시안

China
Xian
30,360m³/d
(4,340x7)



러시아
블라디보스톡

Russia
Vladivostok
10,000m³/d
(5,000x2)



영등포 WTP

Young Deung
Po WTP
3,750m³/d
(1,250x3)



인도네시아
찌레본 발전

Indonesia
Cirebon power
plant
6,500m³/d
(1,250x24)



포스코
소둔산세

Posco
annealing acid
washing
16,800m³/d
(8,400x2)



Reference for GFF filter

부천 STP

Bucheon
STP
900,000m³/d
(9,376x96)



장림 STP

Janglim STP
460,000m³/d
(23,000x20)



영암대불 STP

Youngam
Deabul STP
37,500m³/d
(7,500x5)



유니온스틸 WTP

Unionsteel
WTP
14,400m³/d
(7,200x2)



정읍 STP

Jungeup STP
54,800m³/d
(5,480x10)



양산 STP

Yangsan STP
147,000m³/d
(7,000x21)



영암 STP

Youngam STP
9,000m³/d
(3,000x3)



통영 STP

Tongyoung
STP
60,000m³/d
(7,500x8)



군포 STP

Gunpo STP
5,000m³/d
(2,500x2)



의정부 STP

Ue-jung-bu
STP
16,000m³/d
(2,670x6)



울산 여천배수장

Ulsan Yeochun
12,000m³/d
(6,000x2)



삼성전자 통합 WTP

Samsung total
WTP
120,000m³/d
(7,500x6)



구리 STP

Guri STP
110,000m³/d
(9,167x12)



중국 즈버시

China
ziboshi
53,300m³/d
(4,442x12)



하동 화력

Hadong
power
48,000m³/d
(9,600x5)



SSENG'S 3Min, 6Min WTP Reference list

No	Nation (IOC)	Project	Date	Capacity	Process	Turbidity (NTU) ():Guarantee	Remark
1	MAS	Langat	'10.03	75 m ³ /d	6MIN WTP	323.1 → 0.36	PILOT
2	KOR	Yeongheung Power Plant	'10.06	2,500	6MIN WTP	7.5 → 0.2	SWRO
3	JPN	Kumamoto	'11.05	14,400	6MIN WTP	100 → 1	WTP (Industrial)
4	KOR	Deoksan C-12000	'10.06	12,000	6MIN WTP	141.9 → 0.18	PILOT
5	INA	Cirebon	'11.12	6,500	6MIN WTP	173.8 → 0.4(1)	SWRO
6	THA	Mahasawat	'13.01	3,750	6MIN WTP	39 → 0.47	PILOT
7	INA	Bali Nyanyi	'14.12	4,000	6MIN WTP	50 → 0.5(1)	WTP
8	KOR	Deoksan C-13000VS	'15.01	13,000	3MIN WTP	141.9 → 0.31	PILOT
9	COL	Bogota	'15.01	2,250	6MIN WTP	20 → 0.3	WTP
10	THA	304Complex#5	'15.01	76,000	6MIN WTP	20 → 0.3 (0.3)	WTP + Industrial
11	TAN	Kisarawe	'15.02	150	6MIN WTP	15 → 0.3(1)	WTP
12	COL	Neiva	'15.07	1,500	6MIN WTP	40 → 0.4(1)	PILOT
13	THA	304Complex#5A	'16.03	84,000	6MIN WTP	20 → 0.3 (0.3)	WTP + Industrial
14	COL	Manaure	'16.04	500	6MIN WTP	65 → 0.5(1)	SWRO
15	MOZ	Mafuiane	'16.05	150	6MIN WTP	5 → 0.5(1)	WTP
16	THA	Pattani	'16.08	3,000	6MIN WTP	300 → 0.3(1)	WTP
17	MAS	Terangganu	'16.10	300	6MIN WTP	50 → 0.5	WTP
18	ECU	Chone C-3000VS	'17.07	3,000	3MIN WTP	40 → 1(5)	WTP
19	KOR	Deoksan S-4000HS	'16.08	4,000	3MIN WTP	20 → 0.05	PILOT
20	MAS	Terangganu	'17.04	3,000	6MIN WTP	100 → 0.3(1)	WTP
21	KOR	Deoksan C-3000HS	'17.07	3,000	3MIN WTP	9.05 → 0.05	PILOT
22	PHI	Boracay S-10000	'18.04	10,000	3MIN WTP	5.2 → 0.1(1)	WTP
23	VIE	BinhDai P-15000	'19.12	15,000	3MIN WTP	(70) → (2)	WTP (Installing)
24	KOR	Busan Hoedong P-600	'18.07	600	3MIN WTP	20 → 0.05	Demo. Plant (Figure1,2)
25	KOR	Daegu Korea Water Cluster P-150	'20.06	150	3MIN WTP	10 → 0.06	Certification Plant
26	KOR	Bucheon DB HITEK	'22.06	12,000	3MIN WTP	5 → 0.1	Industrial WTP + BWRO
27	KOR	Gumi KOLON Industrial	'22.07	12,000	3MIN WTP	5 → 0.1	Industrial WTP + BWRO

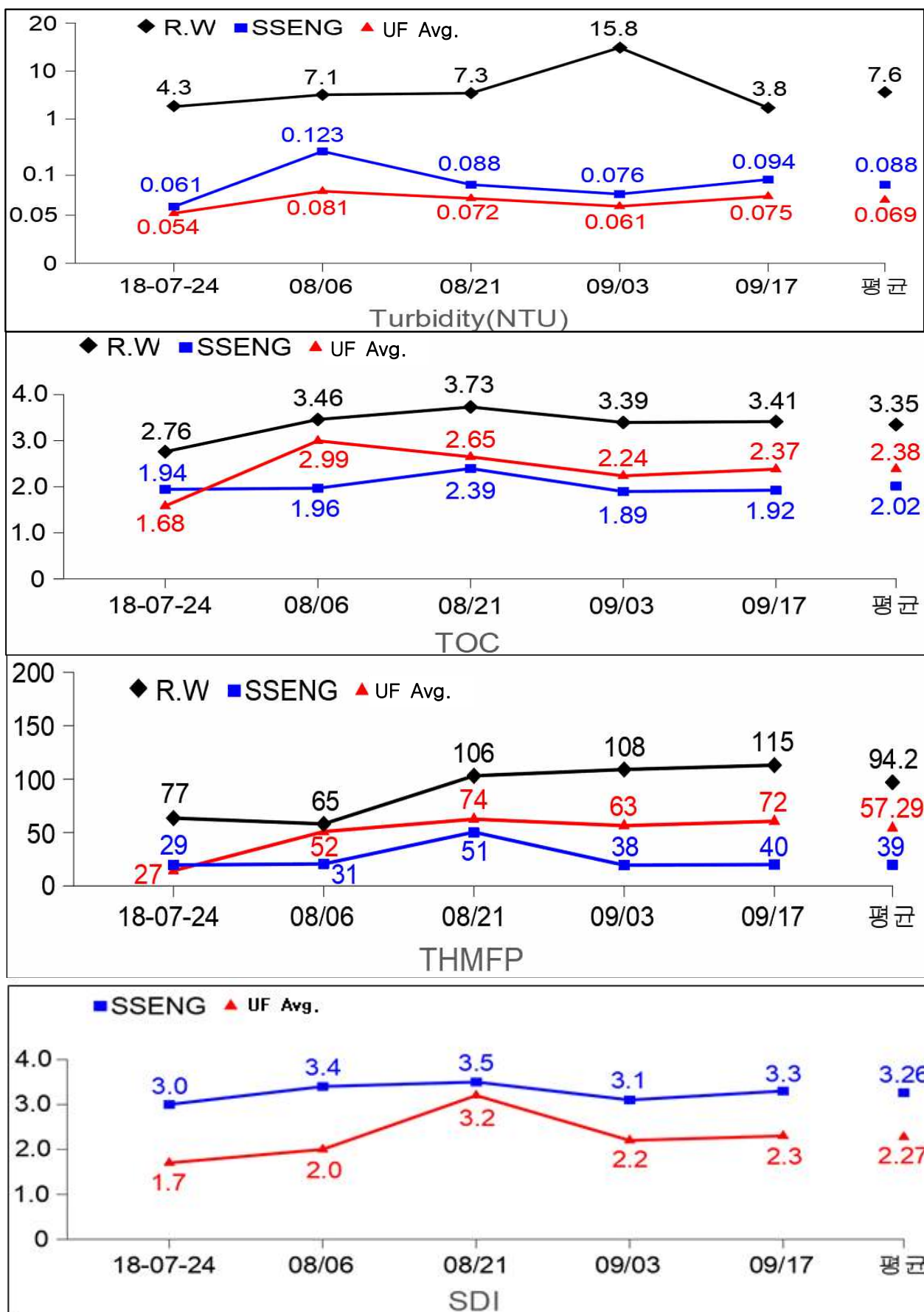
Operation data for Busan Hoidong Demonstrate Plant

Analysis institute : Busan water quality institute

Item	Date	R.W	DAF	SSENG	UF Ave. (A~G)	UF for pressure type					UF for immerse type	
						A	B	C	D	E	F	G
T u r b i d.	18-07-24	4.3	1.9	0.061	0.054	0.054	0.05	0.052	-	0.05	0.066	0.054
	08/06	7.1	-	0.123	0.081	-	0.086	0.083	0.094	0.078	0.0678	0.077
	08/21	7.3	0.24	0.088	0.072	0.146	0.052	0.061	0.061	0.057	-	0.057
	09/03	15.8	0.73	0.076	0.061	0.086	0.064	0.055	0.064	0.05	-	0.048
	09/17	3.8	0.184	0.094	0.075	0.175	0.063	0.069	0.07	0.049	0.051	0.051
	Average	7.66	0.76	0.088	0.069	0.115	0.063	0.064	0.072	0.057	0.062	0.057
	Remval rate		90.0%	98.8%	99.1%	98.5%	99.2%	99.2%	99.1%	99.3%	99.2%	99.3%
T O C	18-07-24	2.76	2.03	1.94	1.68	1.67	1.73	1.66	-	1.63	1.7	1.66
	08/06	3.46	-	1.96	2.99	-	3.3	2.98	3.29	3.00	2.23	3.13
	08/21	3.73	2.28	2.39	2.65	3.2	2.26	2.97	2.96	2.16	-	2.36
	09/03	3.39	1.8	1.89	2.24	-	3	1.88	2.79	1.76	-	1.76
	09/17	3.41	2.1	1.92	2.37	2.85	3.13	1.96	2.77	1.98	1.89	2.00
	Average	3.35	2.05	2.02	2.38	2.57	2.68	2.29	2.95	2.11	1.94	2.18
	Remval rate		38.7%	39.7%	28.8%	23.2%	19.9%	31.6%	11.9%	37.1%	42.1%	34.9%
T H M F P	18-07-24	77	40	29	27	30	27	25	-	28	21	28
	08/06	65	-	31	52	-	60	60	59	54	24	52
	08/21	106	46	51	74	99	48	93	106	49	-	47
	09/03	108	37	38	63	92	88	35	89	36	-	35
	09/17	115	51	46	72	112	92	54	98	51	47	52
	Average	94.20	43.50	39.00	57.29	83.25	63.00	53.40	88.00	43.60	30.67	42.80
	Remval rate		53.8%	58.6%	39.2%	11.6%	33.1%	43.3%	6.6%	53.7%	67.4%	54.6%
S D I	18/08/06			3.0	1.7	-	1.9	1.8	1.95	1.67	-	1.08
	08/21			3.4	2.0	-	3.01	2.47	1.28	0.81	-	2.31
	09/17			3.5	3.2	-	2.92	3.35	3.14	-	3.02	3.74
	10/20			3.1	2.2	-	2.79	2.13	1.97	1.63	2.11	2.33
	19/01/22			3.3	2.3		2.97	2.11	2.19	2.14	2.49	1.76
	Average			3.26	2.27							

Figure_1

Figure_2



Rerence for WTP



THA #304Complex
160,000m³/d



INA Cirebon
6,500m³/d



INA Nyanyi
4,000m³/d



VIE Bindai
15,000m³/d



MAS Terengganu
3,000m³/d



PHI Boraçay
10,000m³/d



JPN Kumamoto
14,400m³/d



THA Mahasawat
3,750m³/d(P)



THA Pattani
3,000m³/d



ECU Chone
3,000m³/d



KOR Yeongheung PP
2,500m³/d



KOR Doeksan WTP
12,000m³/d(P)