NCFS- Non Clogging Filtration System

'pursuing sustainability where unsustainability occurs'

With Arun's commitment to sustainability, NCFS has achieved anti-clogging technology in various environmental events. This technology brings better efficiency, simplification, high return on investment for our customers. Also, NCFS is well compliable to every different water treatment process including water-reuse and zero-discharge systems

As optimal water filtration solution, NCFS will provide consistency from irregularities of environmental and technical challenges.

HISTORY

2015

May. Arun founded
Nov. First NCFS filter sheet + housing

2016

Jan. First framed NCFS
May. Improved durability of NCFS filter (level 2)
Oct. NCFS integrated system

2017

Jan. Self-cleaning function
July. Patented Non-Clogging Filtration System
Nov. NCFS Automation system

2018

Apr. K-water partnership (Korea water resources cooperation) Municipal NCFS
Oct. NCFS capacity scale up (small)
Nov. Korea government procurement (machinery)

2019

Mar. Sewage treatment project in remote area (KOR) 'K-water president' award
NCFS capacity scale up (medium)
Sep. (KOR) 'Excellent water tech' award
Improved durability of NCFS filter (level 3)

Use of filtration technology

Filters remove various types of particles and components contained in the influent water(liquid) and are applied in industries depending on the purpose and efficiency of treatment

• Filtration technology in water industry

Due to environmental factors, scarcity and contamination of water arise all over the world.
In the water industry, advanced filtration technology has become essential to solving challenges with the increasing environmental irregularities.

• Filtration process

*Micro ~0.5㎛ | Ultra ~0.01㎛ | Nano ~0.001㎛ | R/O 0.001㎛>

*NCFS Range

• Advantages & Benefits

	NCFS (Non-clogging filtration system)	Conventional filtration
Turbidity	High – Low	Low
Efficiency (Sustainability)	High	Low
Maintenance	Low	High
Footprint	Small	Large – medium

* Sewage treatment standard

• UN SDG 6.3

SUSTAINABLE DEVELOPMENT GOALS

Arun focuses on SDG 6.3 for the sustainability of the water environment

Agenda

"By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally"

Korea government procurement (machinery)

New excellent technology

ISO 9001 / 14001

• Arun – a history of innovation

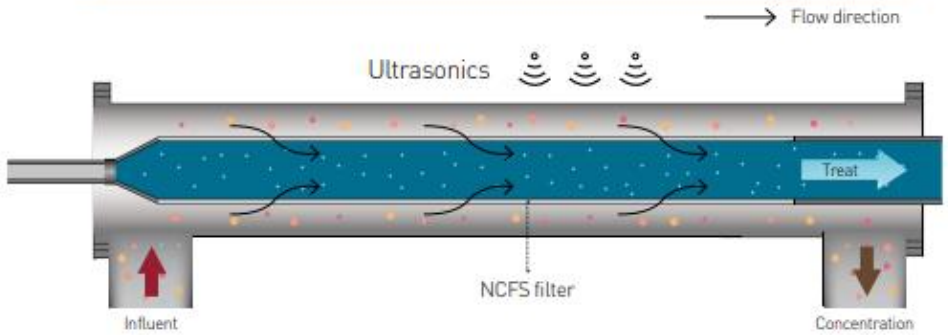
- 2015: First NCFS filter sheet with Bernoulli's principle applied
- 2016: First Non-Clogging Filtration system
- 2017: Patented NCFS Self cleansing feature
- 2018: Municipal NCFS
- 2019: Medium Municipal & Industrial NCFS
- 2020: New excellent technology ISO 9001 / 14001

Sustainable filtration solution

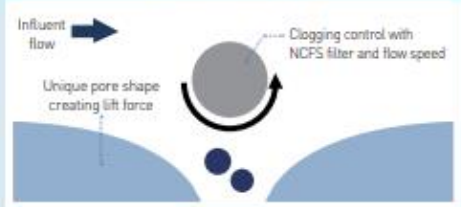
NCFS-Non-Clogging Filtration technology

Arun's innovative NCFS technology is developed to provide sustainability in tough conditions and turbulent water

Non-Clogging Filtration System



NCFS principle



- Clogging resistance to high turbidity (Suspended Solids)
- Turbulent water control
- Low management cost (operation, maintenance)
- No backwashing required
- A wide range of industrial applications
- Compact and Automation system

Conventional microfiltration technology

- Easy clogging to high turbidity
- Vulnerable in turbulent water
- High management cost
- Backwashing required
- Limited range of industrial applications

Sustainable filtration solution

NCFS Performance

	NCFS	Conventional filtracion
1yr management cost (*1,000m³/day sewage treatment) *2.6 MGD Maintenance & Operation cost Energy cost *May vary on facility environment	$12K	$46K
* Sewage treatment standard (Influent(SS) 8.7mg/L)	0.6mg/L	4.4mg/L

• Case study

▶ NCFS performance test report by K-water

"A definite alternative filtration solution for various wastewater issues"

▶ KTL(Korea Testing laboratory)

Influent 1054.7mg/L → NCFS 4.06mg/L

K-water (Algae)

Kyung-gi (Sewage)

Se-jong (Sewage)

SKC (Chemical)

Sustainable filtration solution

NCFS features

Arun's Non- Clogging filtration systems are built out of standard modules with high customization flexibility

❶ Simple maintenance & small footprint

① Easy installation with high customization flexibility
- *1,000m³/day : 2.0mL x 0.8mW x 1.8mH (2.6 MGD : 7.0ftL x 3ftW x 6ftH)

*may vary on site

② Simple, operator friendly system

❷ Long term filtration stability

Effective filtration for high Suspended Solids(SS) and irregular turbidity

Pulp wastewater

	Influent	NCFS	Removal
NTU	73	12	83.5%
Suspended Solids (SS)	138	8	94.2%

❸ Anti-scale coating for pipe (Option)

❹ No Backwashing

NCFS filters micro sizes of particles without getting clogged regardless of type and shape

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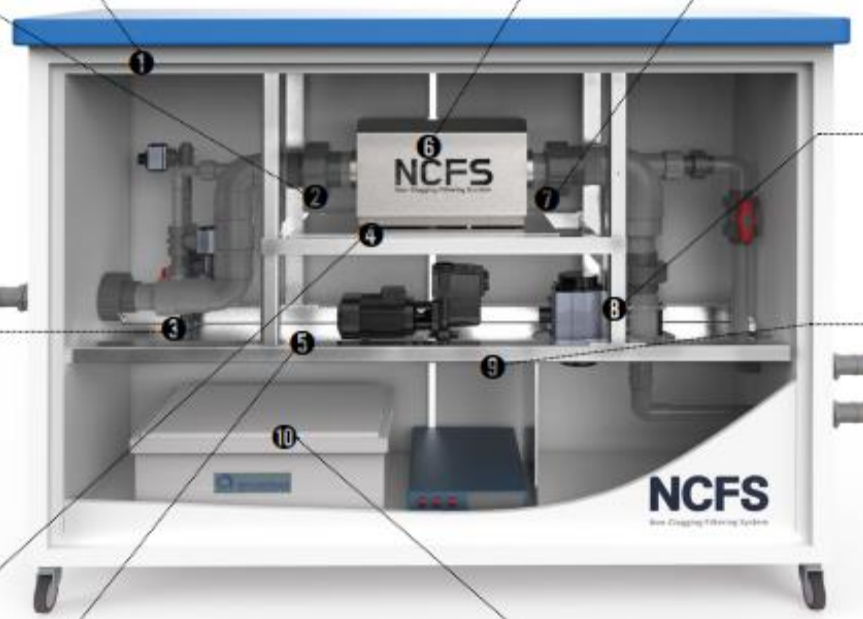
❺ Pump(Option)



❻ Self-cleaning

Filter scaling and deposition control

❼ Low energy

① Low operation pressure

② Gravity filtration (Option)

❽ Multistage design(Option)

Maximizing treatment capacity

❾ Auto-detect valve system

Managing Irregular turbidity of influent

❿ Control

① Automation system

② High customization flexibility

③ IoT monitoring system (Option)

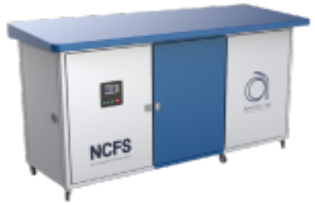
Sustainable filtration solution

NCFS S-Series

Treatment facility for Sewage, reuse and industrial applications

▶ S1,S2 Series

▶ S3,S4 Series



▶ S5 Series

Model		S1	S2	S3	S4	S5
Capacity / Parameter						
Capacity	MGD	0.03	0.12	0.32	0.64	1.6
	m^3/day	120	480	1,200	2,400	6,000
Treatable sizes of Suspended Solids(SS)	㎛	5 – 200 *1				
Max. Concentration (SS)	mg/L	– 100 *2				
Operating pressure	bar	Below 1				
Specification						
Material (pipe)		PVC OPTION: STS304,316		STS304 OPTION: PVC,STS316	STS304 OPTION: STS316	
Ani-scale coating (pipe)		OPTION	OPTION	√	√	√
Multistage design *2		OPTION	OPTION	OPTION	OPTION	OPTION
Water level sensor		√	√	√	√	√
Air compressor		√	OPTION	OPTION	OPTION	OPTION
Gravity filtration		OPTION	OPTION	OPTION	OPTION	OPTION
Control						
LCD Status display		OPTION	√	√	√	√
IoT monitoring		OPTION	OPTION	OPTION	OPTION	OPTION

*1 Less than 5um, Contact Arun for more details
*2 Above 100mg/L, Contact Arun for more details
*3 Primary filter and Secondary filter

Sustainable filtration solution

NCFS H-Series, C-Series

▶ **H - Series**
- High concentration influent

▶ **C- Series**
- Distinctive market
- Particle separation

Model		H-Series	C-Series
Capacity / Parameter			
Capacity	MGD	~3.15	~1.2
	m^3/day	~1,200	~480
Treatable sizes of Suspended Solids(SS)	㎛	5 – 200	0.5 – 5
Max. Concentration (SS)	mg/L	100 ~1,000 *1	
Operating pressure	bar	Below 1	
Specification			
Material (pipe)		PVC OPTION: STS304,316	
Ani-scale coating (pipe)		√	√
Multistage design *2		OPTION	OPTION
Water level sensor		√	√
Air compressor		OPTION	OPTION
Gravity filtration		OPTION	OPTION
Control			
LCD Status display		OPTION	√
IoT monitoring		OPTION	OPTION

*1 Above 100mg/L, Contact Arun for more details
*2 Primary filter and Secondary filter