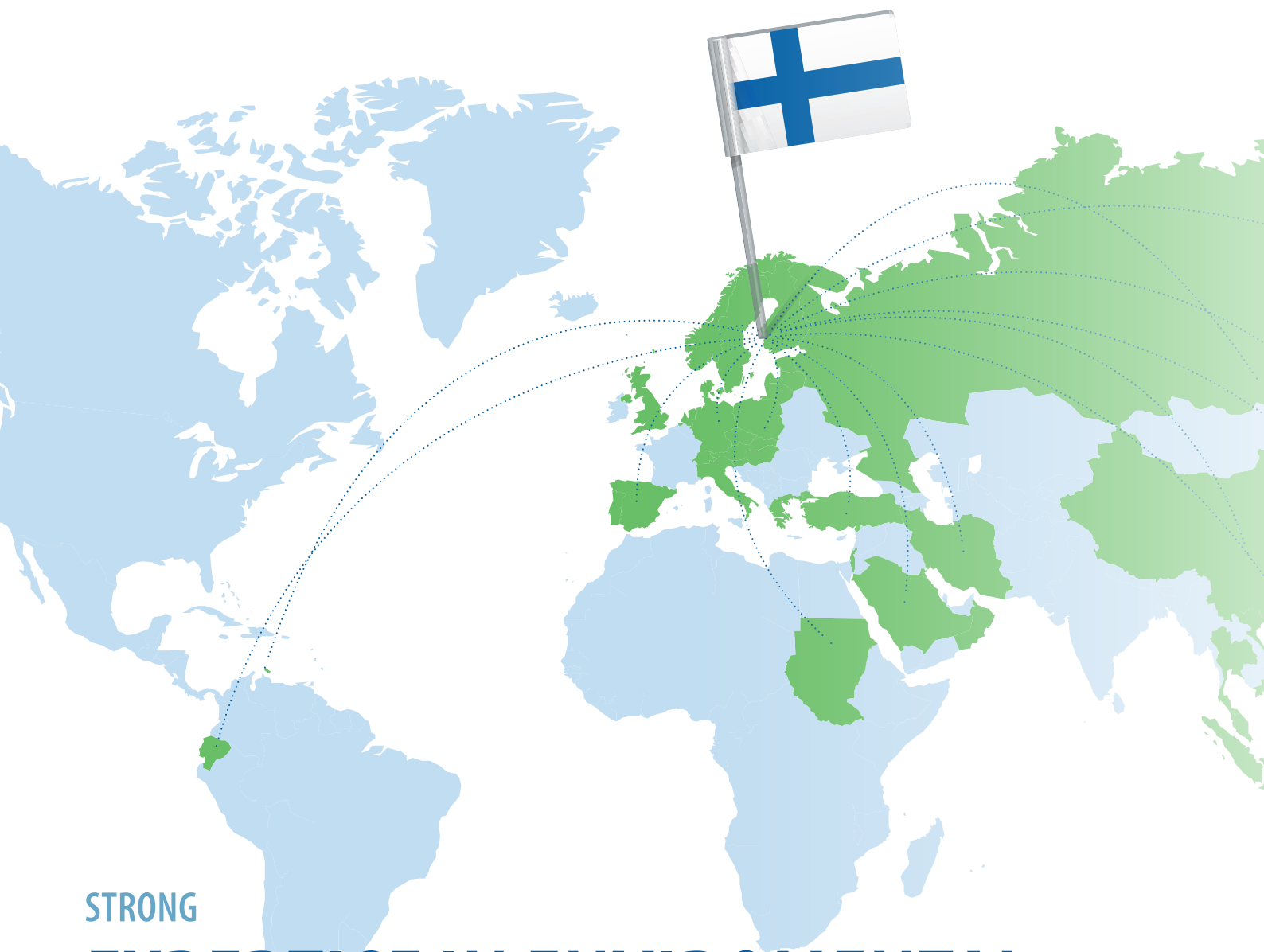


CIRCULAR SEDIMENTATION TANKS

# FINNCHAIN SCRAPER SYSTEM





STRONG

# EXPERTISE IN ENVIROMENTAL TECHNOLOGY

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For decades Finnchain's strong expertise and continuous development work produces innovative and patented solutions for water and waste water treatment globally.

Finnchain Oy represents strong expertise in the chain field, specializing in environmental technology applications. The company develops, manufactures, markets and installs advanced sludge scraper systems for water and waste water treatment. We offer the latest technology in the field, as well as the maintenance-free and operationally reliable complete system. The importance of the product development is proved by several international

patents awarded, as well as its success on the international market. As a turnkey supplier we are able to provide fast and flexible delivery. Operational integrity and reliability are the keywords of our operation. Our whole operation, from design up to the maintenance free product use, reflects our uncompromising manner to fulfil the demands and needs of our clients in a professional and comprehensive way.

# CHAIN SCRAPER SYSTEM



## ✓ DRIVING MECHANISM

The drive motor, located on the edge of the tank, rotates a gear, from which the stainless-steel drive shaft transmits the motion to the drive wheel. Depending on the size of the tank the scraping speed at periphery is 1,2 - 3 m/min and the motor power is 0,18 - 0,55 kW.

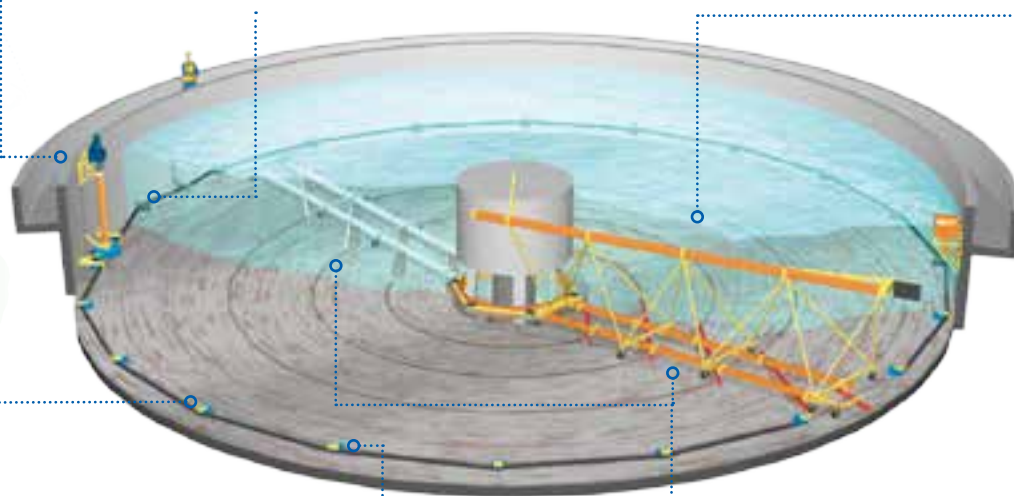
## ✓ SURFACE SCUM SKIMMER

The surface scraper is made of a fibreglass profile and is attached to the bottom scraper with a stainless pipe structure. The patented scum collector at the end of the scum skimmer efficiently transfers the floating scum to the scum box at the edge of the tank.



## ✓ DRIVE WHEEL

Stainless steel drive wheel carries the collector chain. The drive wheel has a patented adjustment feature that extends operating life of collector chain and wheel.



## ✓ IDLE WHEELS

The chain travels over idler wheels made from polypropylene, installed onto the tank wall. Idler wheels are installed in 3-4 m intervals.



## ✓ COLLECTOR CHAIN

The patented, polyamide collector chain is attached to the pulling chain, which moves the bottom- and surface scrapers.

## ✓ BOTTOM SCRAPER

Each tank has at least two bottom scrapers, made of fibreglass profile. If there is a lot of sludge or the tank has a large diameter, additional bottom scrapers can be easily installed.





# OUTSTANDING FEATURES

### ✓ EASY TO COVER

Tanks can be easily covered in order to prevent odour. The scraper will be rotated from the bottom, so that the covering of the tank can be attached to the tank walls.



### ✓ EASY TO TRANSPORT, INSTALL AND MAINTAIN

The scraper consists of components which can be assembled during the installation of the tank. The components are light-weight, which eases and speeds up the installation and the maintenance. The heaviest parts are the drive motor and gearbox weighing about 100 kg. Therefore the scraper can be delivered without special transportation and unloading of the cargo nor does the installation require special cranes.

### ✓ LOW CONSTRUCTION COSTS

Light-weight structure of the scraper does not require massive concrete walls. A support structure in the middle of the tank is also not necessary, as the scrapers are attached to their own central bearing which is to be installed at the bottom of the tank. Due to its innovative structure the tank operates without complex electrical installations, it is sufficient to provide a power supply to the drive, located at the wall of the tank. The scraperload on the wall is carried by the idler wheels. Maximum load is 300 kg/ idler wheel.



### ✓ NO PROBLEMS WITH FROST

Freezing on the top of walls of the tank does not cause scraper's operational problems as all parts of the scraper are submerged.

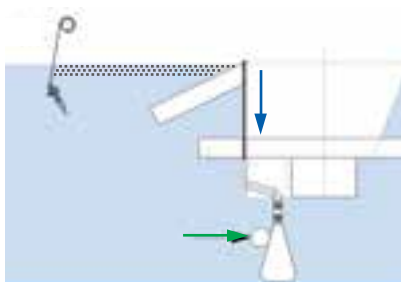
### ✓ CORROSION-FREE PARTS

The parts of the system are non-corrosive. The materials are plastic, fibreglass or stainless steel, surface treatment of components is not required.

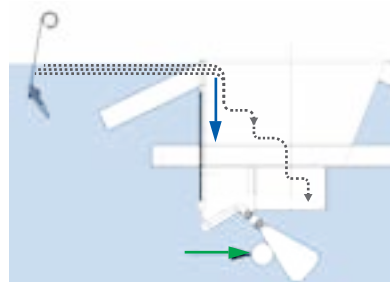
# INGENIOUS FEATURES

## ✓ PATENTED EFFICIENT REMOVAL OF THE FLOATING SCUM

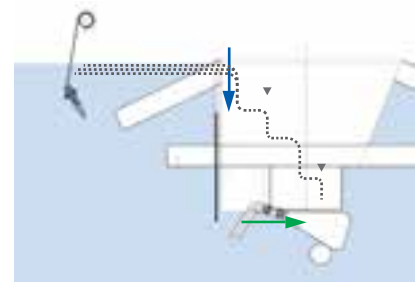
In the Finnchain system the scraper flight, moving at the surface of the tank, transfers the floating scum to the scum box on the side wall of the tank. The efficiency of the scum removal is ensured by scum gates, located on the scum box. They will be opened by the scraper flights when approaching the scum box. The flow, arising by opening these gates, helps to efficiently collect the scum. At the same time the water coming along flushes the floating sludge through the pipes for further treatment. The flush also prevents freezing problems in winter. The scum gates can be adjusted, which enables more efficient removal of the floating scum.



In the front part of the patented scum box is a scum gate that stops the water flow when the scraper flight is not at the scum box.



Patented scum gate opens with the help of the scraper flight, releasing the system when the scum scraper is approaching.



The release system can be adjusted according to the amount of the scum: height of opening gate before scraper approach, length of opening period.



## ✓ PATENTED SYSTEM WITH TWO DRIVES

If the tank has large sludge loads or the diameter of the tank is more than 40 m, Finnchain's patented system with two drives can be used. The results of the load tests performed in the Finnchain's test tank showed that the maximum load on the chain decreased almost 40% when the second drive was installed. This enables the use of the Finnchain system also in larger tanks.



## ✓ AUTOMATICALLY ALIGNING BOTTOM SCRAPER WHEELS

Scraper flights move at the bottom of the tank on wheels. Due to the possible irregularities of the tank's bottom the wheels might get locked or stuck. For this reason Finnchain has developed self-aligning wheels, which automatically find the correct path. This saves the bottom of the tank and the wheels from wearing.



## LONG-TERM

# PRODUCT DEVELOPMENT PROCESS

Finnchain switched to using plastic chains in rectangular tanks already in 1984. There are thousands of Finnchain systems installed around the world in rectangular sedimentation tanks. Due to positive experiences we have decided to develop a solution also for the circular sedimentation tanks, where the advantages of the plastic structure will replace the traditional model with the heavy bridge scraper.

## OWN TEST TANK FOR PRODUCT DEVELOPMENT

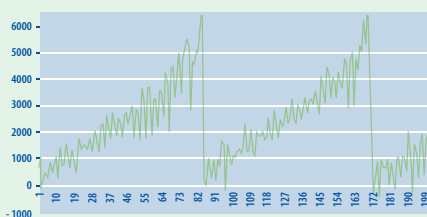
Product development at Finnchain is continuous. That is why we have built our own 25-meter diameter test tank. During this massive project we have renovated the scraper's structure and also found better possible raw materials for different components. Thanks to the product development project we have re-engineered almost all parts. The biggest reworks are the patented collector chain and drive wheel arrangements, new idler and tightening wheels, lighter surface scraper and more efficient removal of the floating sludge, as well as self-steering wheels and use of two drives in big tanks.

## LOW SLUDGE LOADS DO NOT REQUIRE MASSIVE STRUCTURES AND MECHANISMS

Finnchain systems have been used mainly in municipal waste water treatment plants, where sludge loads are low. To confirm the statement above we have measured the sludge loads in three different municipal water treatment sedimentation tanks in actual operating conditions.

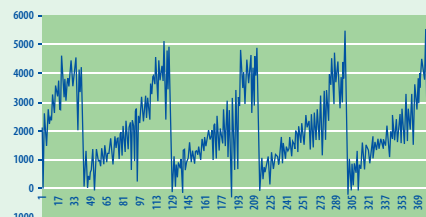
### START-UP PHASE

19. October 2006, at 8:46



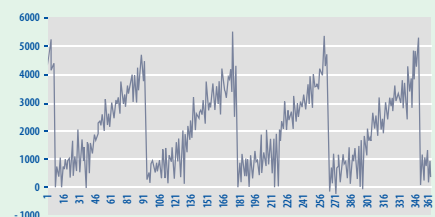
### AFTER 7 DAYS OF OPERATION

26. October 2006, at 6:55



### AFTER 11 DAYS OF OPERATION

30. October 2006, at 6:26 a.m.



The largest loads were measured during the implementation phase, before the tank had been filled with waste water. The highest force the chain was subjected to was 6.1 kN. As the chain's breaking load is 35 kN, the safety factor was more than sufficient. The testing was performed by Arotekno Oy.



# REFERENCES

Our clients are waste water treatment plants and operators all over the world.

FINLAND, KOTKA

POLAND, POZNAN



POLAND  
POZNAN

Central Wastewater Treatment Plant in Kozięgłowy, in Poznan is one of the biggest waste water treatment plants in Poland. Its current treatment capacity is 200 000 m<sup>3</sup> water per day. After purification the water goes to the river Warta.

The investment project carried out by Aquanet SA is a part of the modernisation work, which will develop the operational capacity of the plant for years in the future. The most recent renovation at the facility was performed in 2014. The tanks, with Finnchain scrapers, were covered to minimize the odours.

TANK TYPE	DIAM.	QUANTITY
Primary sedimentation	ø 48 m	4 tanks

**ROOF COVERING** Aluminium



FINLAND  
KOTKA



The first chain scraper system was installed at Mussalo waste water treatment plant in 2003 replacing a bridge scraper. Based on this positive experience it was decided to use chain scrapers by Finnchain in the Mussalo expansion and renovation project.

After the expansion (2008-2009) Mussalo treatment plant has the following tanks with Finnchain-scrapers:

TANK TYPE	DIAM.	QUANTITY
Primary sedimentation	ø 26 m	3 tanks
Secondary sedimentation	ø 36 m	2 tanks
Secondary sedimentation	ø 39,5 m	2 tanks

