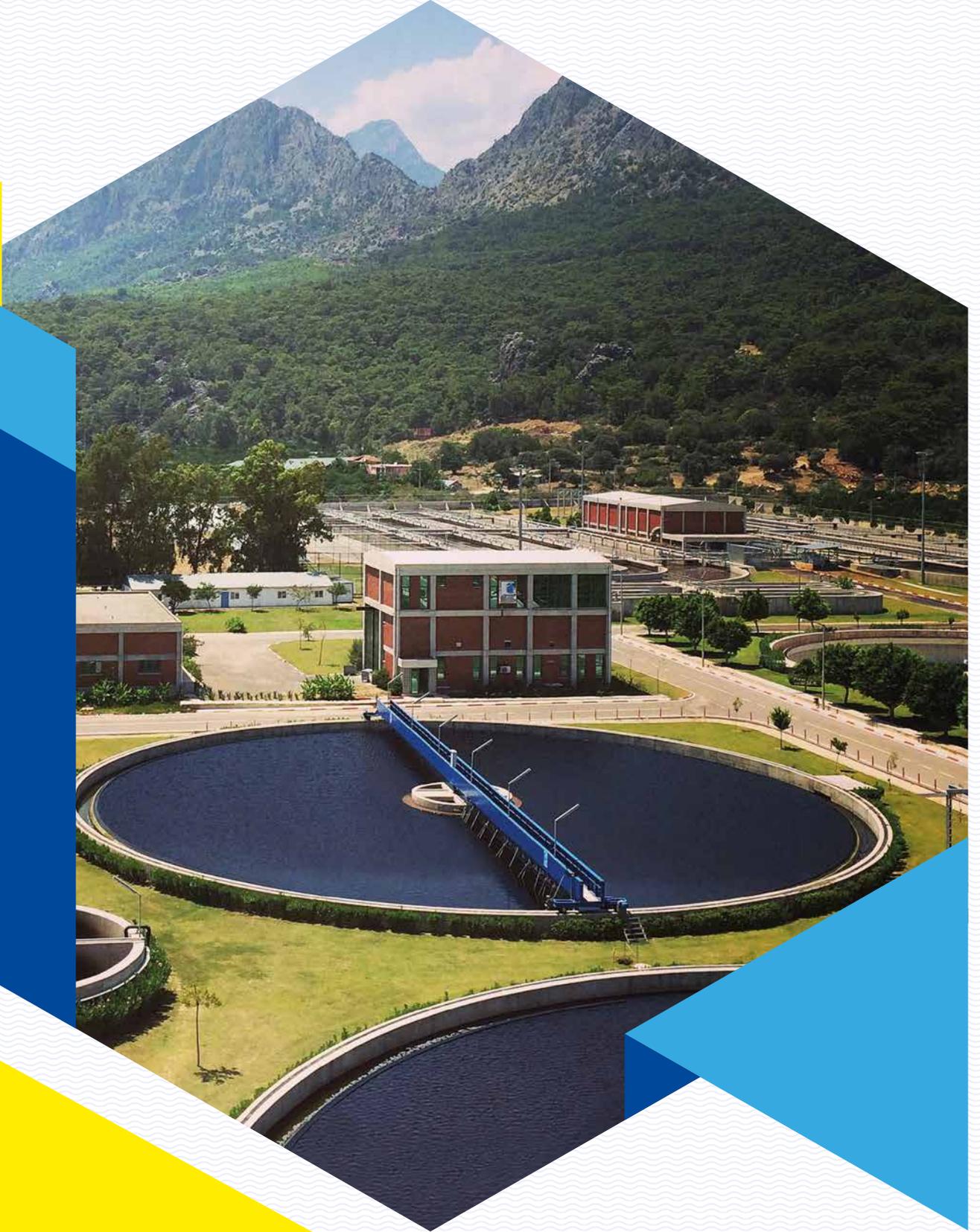




Sismat Uluslararası  
Arıtma Makinaları  
İnşaat Mühendislik  
Sanayi ve Tic. A.Ş.



**SCRAPERS**



## SCRAPERS

Sedimentation basins, also called settling tanks or clarifiers, are large tanks in which water is made to flow very slowly in order to promote the sedimentation of particles or flocs. Scrapers which are used in repressing sedimented thick substances that float from the water treatment plant can also be used at several phases of water purification.

- Sand and oil separation
- Pre-sedimentation
- Final sedimentation
- DAF (diffused air floatation)
- Sludge Thickening

Sismat Uluslararası provides many alternatives for all sorts of different bridges, with circular or longitudinal scrapers that are designed according to the tank's geometry. Scrapers can be grouped in terms of bridge lengths and types, scraping types and modes of operation.

### Bridge type

- Profile
- Panel
- Cage
- Pipe
- Box

### Bridge length

- Full scale
- Half scale
- ¾ scale

### Mode of operation

- Central driven
- Peripheral driven
- Linear

### Scraping types

- Suction
- Shield
- Picket fence

Sismat Uluslararası designs its scrapers, based on static calculations and its engineering expertise. The appropriate calculation of sludge load and mass, leads to a strong and reliable work process. As a result, the dead points in the sedimentation or thickening tanks are eliminated.



## CIRCULAR SCRAPERS

Sludge scrapers for circular tanks utilize either central drive or peripheral drive. This depends on the process, tank diameter, design and sludge loads. Circular scrapers can be studied through various classifications. They can be classified as central driven fixed bridge scrapers and peripheral driven rotating bridge scrapers with regard to their drive. The length of a rotating bridge scraper can be equal to the basin diameter or a fraction of the basin diameter. The solid load of the treatment plant determines the method of sludge disposal. The sludge that accumulates at the bottom can either be scraped into the sludge funnel or be pumped to the pipeline of the central structure by suction pipes. Numerous options can be proposed for both methods.

## CENTRAL DRIVEN FIXED BRIDGE CIRCULAR SCRAPERS

Central driven scrapers are manufactured as column or fixed bridge mounted. Concrete or steel fixed bridges are commonly used. Central driven motor, shaft and pallets are used. Scraper is mounted to the bottom bearing. Sludge is collected in the sludge cone by the help of the pallets. Shaft is fixed at the bottom conical shaped construction with bearing. Scraper pallets are connected to the pallet arm. Easily changeable scraper rubbers are used on the pallets. Bridge mounted: The bridge-mounted configuration has a bridge spanning the full diameter of the tank, at the centre of which is mounted a drive. The output of the drive is a shaft, which is connected to the main rake drive shaft or torque tube. Column mounted: The column mounted centre drive requires the construction of a column or post in the centre of the clarifier tank. A drive is positioned on this post. The drive has an output drum on the outside on to which is suspended a rake cage. The rake cage rotates and supports the rake arms.

**Removal of the settled sludge can be provided by the following ways:**

- Scraper blades
- Sludge pumps
- Suction

Sismat Uluslararası also provides central driven fixed bridge circular clariflocculators commonly used in water and wastewater treatment plants. Clariflocculator is a combination of flocculation and clarification in one unit which is especially designed to treat the screened and dewatered industrial wastewater and to promote coagulation, flocculation and sedimentation processes using different zones of the clarifier unit for having an optimum performance. It has two tanks where the inner tank is operated as a flocculation unit and the outer tank is operated as a clarification unit. In this type of clariflocculator, the drive unit is fixed at the centre of the bridge and the tubular centre shaft is connected to the drive unit. There are two structural rake arms mounted on the shaft which are provided with blades to rake the sludge accumulated at the tank bottom.

# FEATURES AND BENEFITS OF SISMAT ULUSLARARASI CENTRAL DRIVEN FIXED BRIDGE CIRCULAR SCRAPERS

- Long lifetime
- High degree of reliability
- Effective scraping
- Easy-to mount and –transport
- Can withstand very high sludge loads
- Scraper bridge rigid and resistant-to-torsion
- Fast and precise installation
- Low operational and maintenance cost

## APPLICATIONS

- **Municipal wastewater treatment plants**
  - Circular primary and secondary sedimentation tanks
- **Industrial wastewater treatment plants**
  - Circular primary and secondary sedimentation tanks

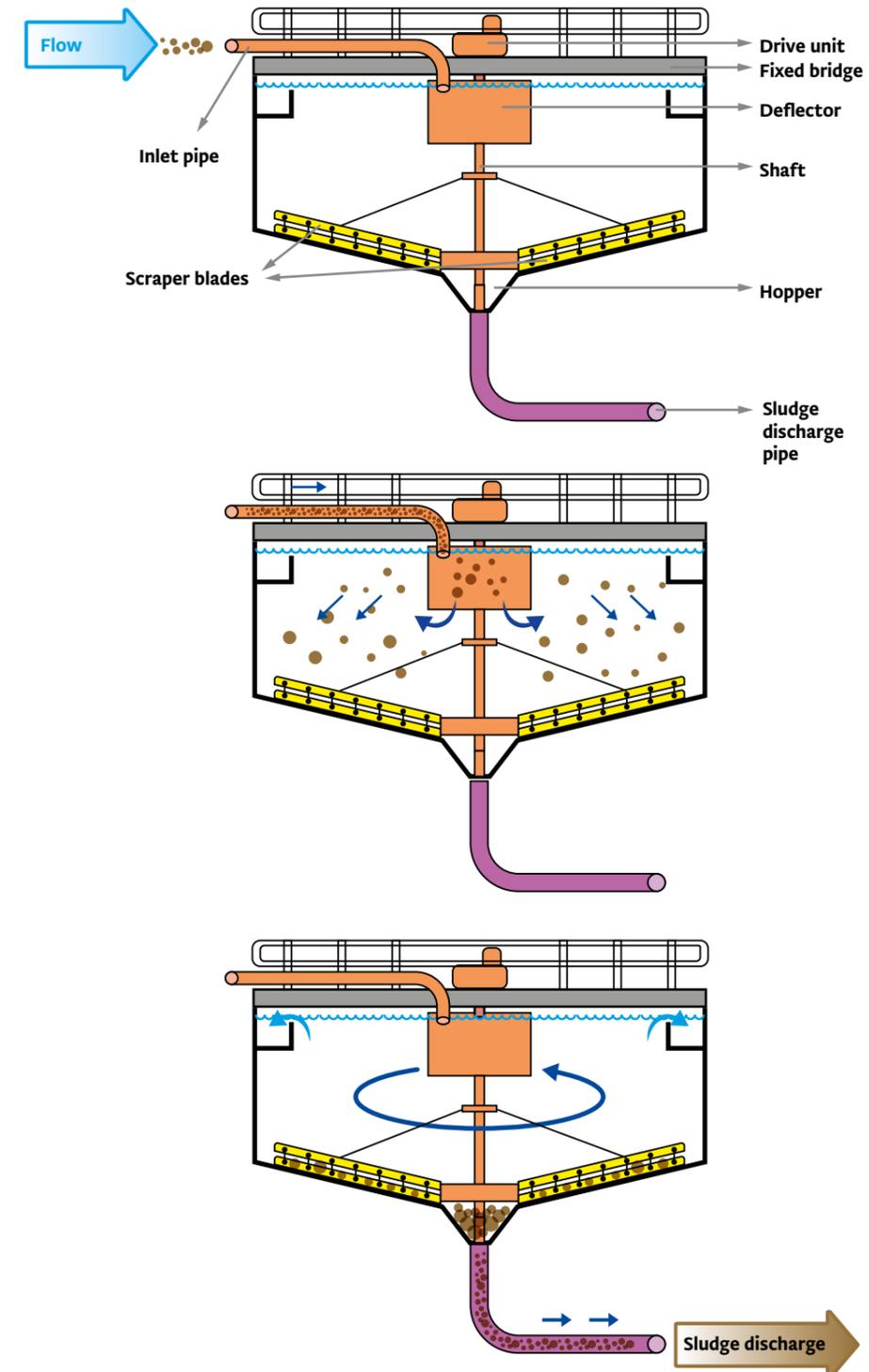
## FACTS

- Diameter up to 28 m
- Scraper rate between 1.2 m/min and 3.6 m/min

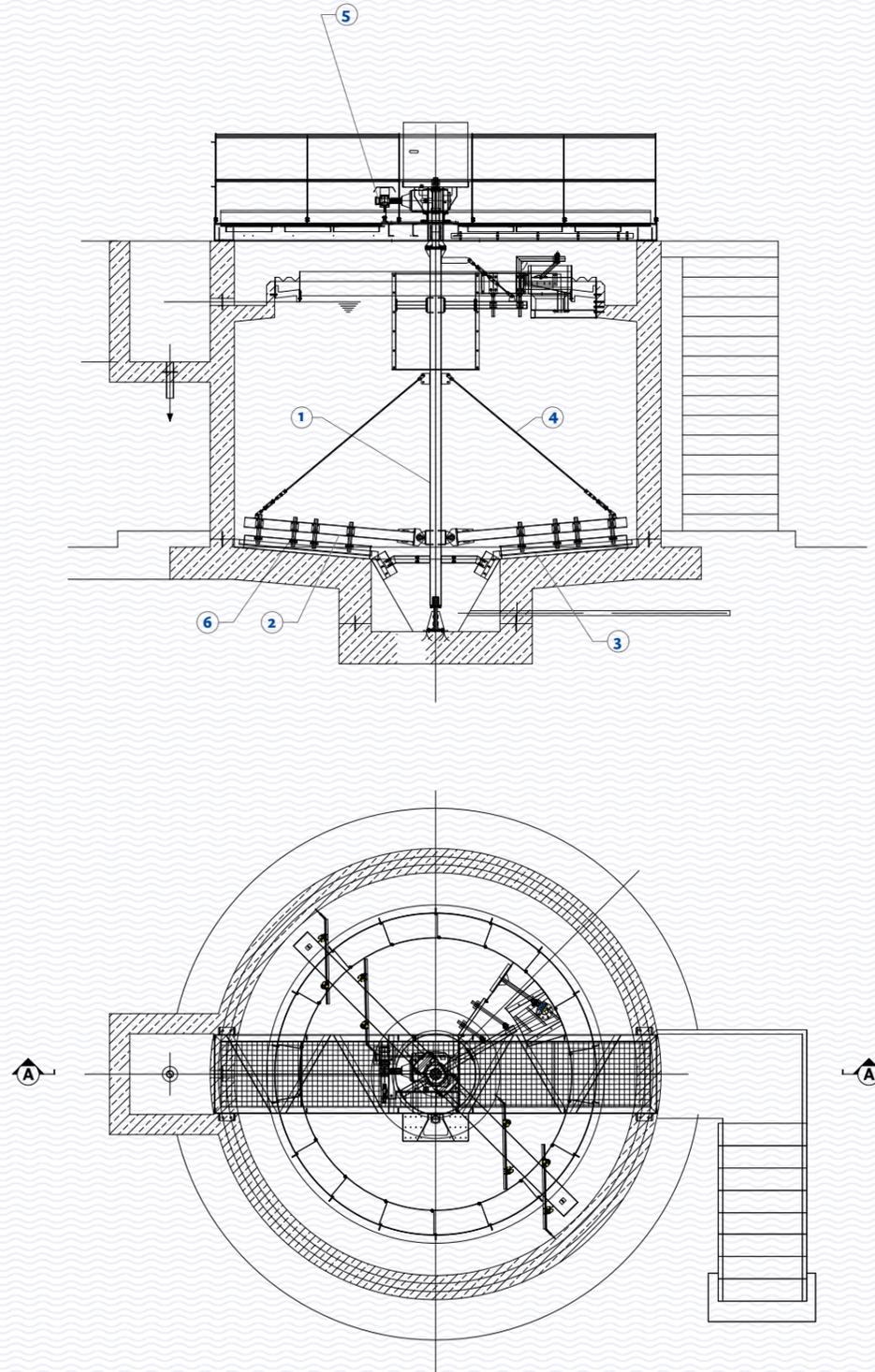


## WORKING PRINCIPLE

Sismat Uluslararası Central Driven Fixed Bridge Circular Scrapers consist of arms which are fitted on a centre tube. There are angled scraper blades welded under the arms for bottom scraping. The drive unit is located on a fixed bridge, and the gear is directly connected to the centre shaft whose lower part is equipped with a bottom bearing to prevent abrasion caused by friction. Fixed bridge circular scrapers remove settling sludge during operation from the circular sedimentation basin. Those settling materials which cannot sink directly into the collecting hopper are pushed towards the hopper at centre by means of rotating blades. Clear water is collected in the collection channels. Sludge collected in the hopper is removed from the system through a discharge pipe.



## Typical Central Driven Fixed Bridge Circular Scraper & Components



Typical drawings are for information only.

## OUR CENTRAL DRIVEN FIXED BRIDGE CIRCULAR SCRAPER COMPONENTS

|   | Central Driven Fixed Bridge Circular Scraper Components | Materials Available  |
|---|---|--|
| 1 | Shaft   | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX |
| 2 | Bottom scraper frame                                    | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX |
| 3 | Scraper blades  | Neopren  |
| 4 | Tension bar   | Stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX                 |
| 5 | Drive unit  | -according to norm of manufacturer   |
| 6 | Fasteners   | 8.8, A2, A4  |

## ACCESSORIES AND OPTIONAL ITEMS

- Steel bridge
- Control panel
- Grease battery for central bearing
- Mechanical torque limiter
- Inlet deflector
- Weir & Weir channel
- Surface scraper
- Scum scraper
- Cone scraper
- Ladder
- Chemical dowels
- Scum baffle
- Cabling on the bridge
- Bridge lighting





## PERIPHERAL DRIVEN ROTATING BRIDGE CIRCULAR SCRAPER

Sismat Uluslararası Peripheral Driven Rotating Bridge Circular Scrapers mainly consist of a central pivot structure with power distribution system installed at sedimentation tank's centre part and a travelling bridge.

**Removal of the settled sludge can be provided by the following ways:**

- Scraper blades
- Sludge pumps
- Suction

For the system designed with scraper blades, peripheral driven rotating scrapers removes the settled sludge by scraper blades in the central located sludge collection pit. Mounted to the central concrete structure, the bridge is fabricated in standard profile construction in order to resist static and dynamic loads. Sludge is scraped to the sludge cone by rotational movement with a peripheral speed changing from 2 to 4 cm/sec. Polyamide wheels, rubber scrapers under the sludge scraper and swing joint of the arms ensure the smooth rotational movement of bridge.

In circular tanks; the wastewater can enter the tank from the centre or around the periphery of the tank.

**SUCTION SYSTEM:** Also suction system can be widely used where flat or very shallow bottom is designed, or where some process limitations force a short retention time. Suspended solids in the influent, settle down to the bottom of the settling tank and settled sludge is sucked from the bottom by suction heads which are suspended from continuously revolving peripheral drive scraper bridges. The suction lift draught tubes discharge into partially submerged recovery tank mounted on the bridge. It is possible to regulate the flow from each suction lift by telescopic valves. Sludge transfer from the recovery tank to the fixed annular sludge extraction trough is

equipped with a siphon system. Suction-lift scrapers have many advantages, including: No need for a central sludge collection hopper or sloped tank floor thereby simplifying civil construction. The profile permits a deeper side wall depth, benefitting the settlement flow patterns within the tank, thus improving performance. Abstraction-at-source operation reduces sludge age within the tank and allows the outside of the sludge blanket to be removed preferentially to avoid movement of suspended solids plumes over the weirs.

**Semi-bridge scrapers:** Peripherally driven mechanisms require a static support in the centre of the tank. A bearing located on the top of the static support allows the rotation of the complete bridge that spans from the centre of the tank to the wall. Suspended from the bridge is a set of rake arms. **Full-bridge scrapers:** Full bridge scrapers also require a static support or tripod at the centre of the tank. Unlike a half bridge scraper, the bridge spans the full diameter of the tank passing over the centre where it spins on the centre bearing. Both ends of the full bridge scraper need to be driven and some form of load balancing is therefore necessary to ensure even wear across the two gearboxes. In this design the settled sludge is evacuated by pipes.

Sismat Uluslararası also provides peripheral driven rotating bridge circular clariflocculators commonly used in water and wastewater treatment plants. Clariflocculator is especially preferred for flocculation and sedimentation of solid materials in a combined unit as an economic solution. In this type of clariflocculator, two separate drive units are provided for flocculator and clarifier mechanisms where the flocculator is driven from the centre and the clarifier is driven peripherally. It has a central inlet which distributes the flow radially in flocculator.

# FEATURES AND BENEFITS OF SISMAT ULUSLARARASI PERIPHERAL DRIVEN ROTATING BRIDGE CIRCULAR SCRAPERS

- Long lasting and reliable design
- High scraping efficiency
- Simple and reduced maintenance
- Easy handling and fast assembly
- Can handle high amount of sludge
- Easy application also on existing units
- Low operational and maintenance cost

## APPLICATIONS

- **Municipal wastewater treatment plants**
  - Circular primary and secondary sedimentation tanks
- **Industrial wastewater treatment plants**
  - Circular primary and secondary sedimentation tanks

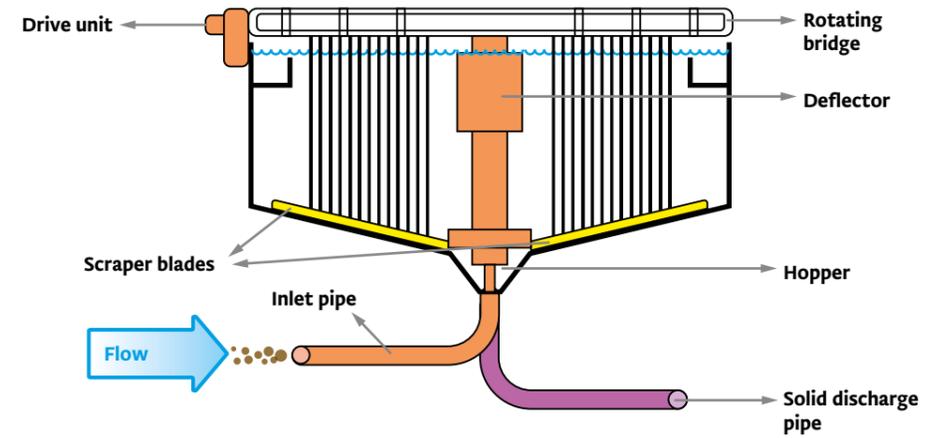
## FACTS

- Diameter up to 56 m
- Scraper rate between 1.2 m/min and 3.6 m/min



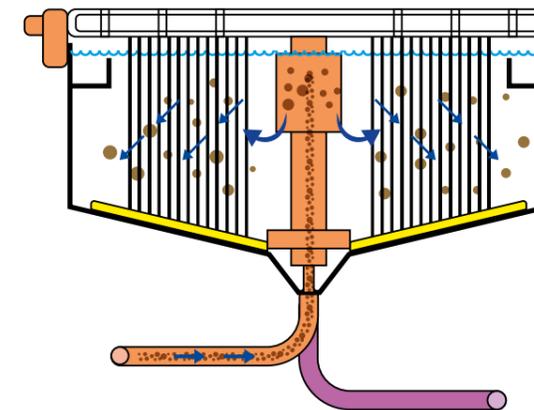
## WORKING PRINCIPLE

Sismat Uluslararası Peripheral Driven Rotating Bridge Circular Scrapers are the equipment used for scraping the sludge accumulated at the bottom of circular clarifiers and removing the scum floating at the surface from the system. The bridge that can be manufactured as semi- or full-bridge according to the customers' demands is driven at the periphery by a motor and gear box. The bottom scrapers collect the settled sludge in a hopper at the centre, at the same time, surface scrapers remove the scum into a scum hopper.



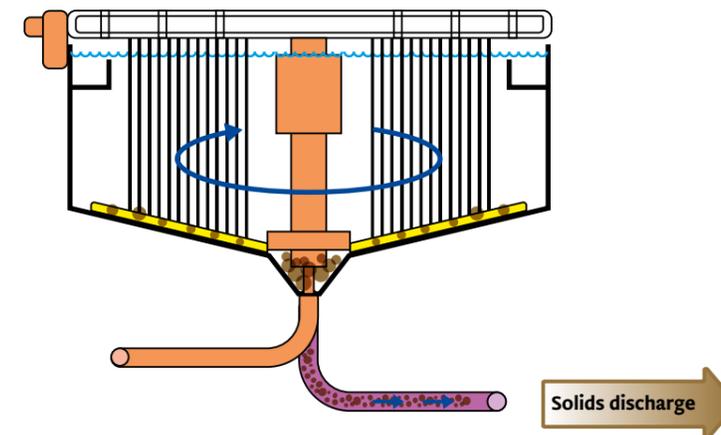
1

The wastewater enters the system through the central column.



2

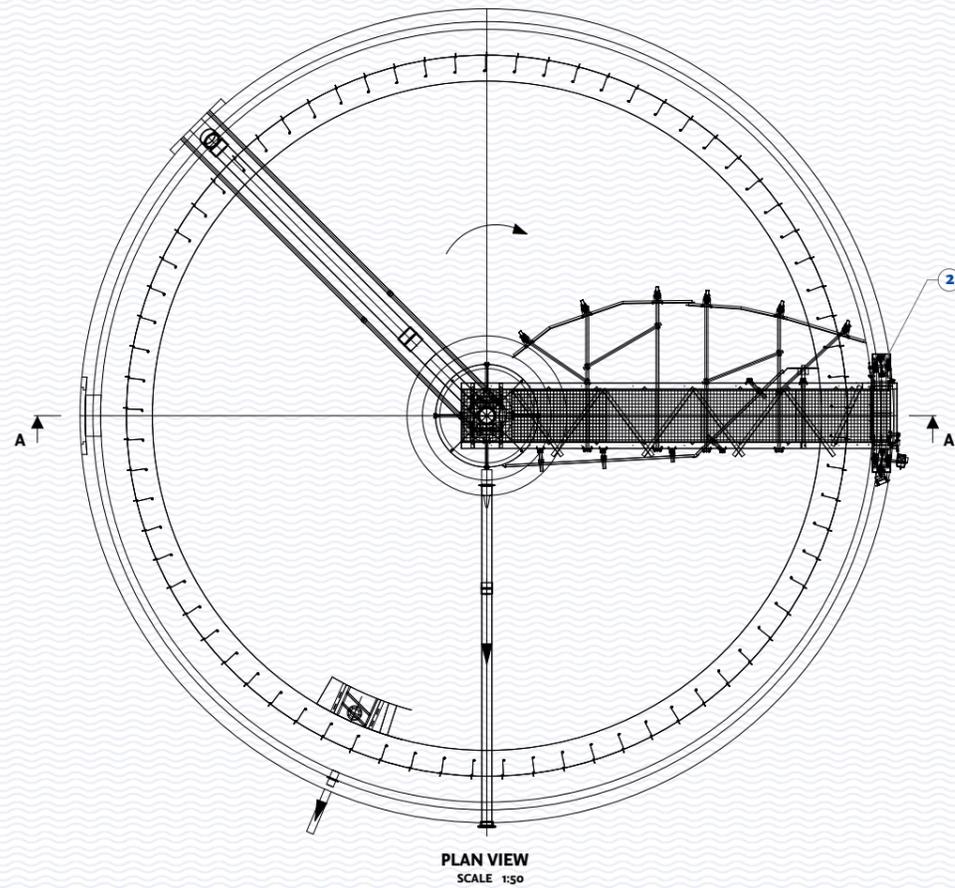
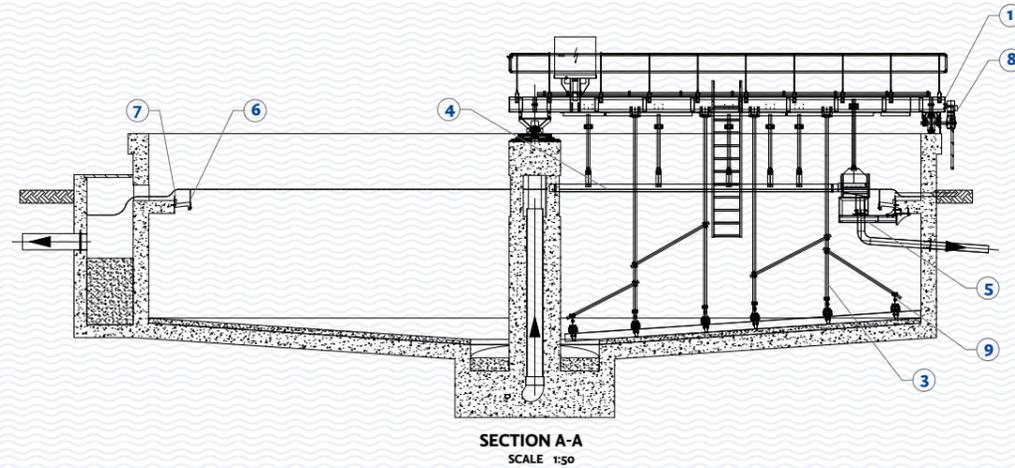
The solid materials present in the water spread around the tank and they start to settle at the tank bottom. Thus, it is needed to remove the sludge accumulated at the bottom.



3

The peripheral driven rotating bridge circular scraper starts to move and scrape the materials accumulated by the bottom scrapers directly connected with the rotating bridge. The sludge scraped is collected into a hopper and removed from the system.

## Typical Peripheral Driven Rotating Bridge Circular Scraper & Components



Typical drawings are for information only.

## OUR PERIPHERAL DRIVEN ROTATING BRIDGE CIRCULAR SCRAPER COMPONENTS

|   | Peripheral Driven Rotating Bridge Circular Scraper Components | Materials Available  |
|---|---|--|
| 1 | Bridge  | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, Aluminum |
| 2 | Bogie   | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, Aluminum |
| 3 | Bottom scrapers   | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti           |
| 4 | Surface scrapers  | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti           |
| 5 | Scum hopper   | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti           |
| 6 | Weir  | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti           |
| 7 | Baffle plate  | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti           |
| 8 | Drive unit  | -according to norm of manufacturer   |
| 9 | Fasteners   | 8.8, A2, A4  |

## ACCESSORIES AND OPTIONAL ITEMS

- Control panel
- Surface scraper
- Scum scraper
- Mechanical torque limiter
- Proximity sensor against skidding
- Weir & Weir channel
- Weir channel cleaning brush
- Baffle plate
- Lifting crane for scum pump
- Ladder
- Junction box
- Motor protection cap
- Emergency stop button on equipment
- Cabling on the bridge
- Grease battery for central bearing
- Influent piping
- Scum discharge pipe
- Scum pump
- Scum hopper
- Stengel group
- Inlet deflector
- Sludge blanket level sensor
- Bridge lighting
- Park switch
- Chemical dowels

### Peripheral Driven Rotating Bridge Circular Clariflocculators



# LONGITUDINAL SCRAPERS

Longitudinal scrapers are used in sedimentation tanks with a rectangular design for sludge or grit removal. This equipment scrapes the sludge or sand longitudinally and transfers it to the sludge collection hopper at the end of the tank. At the same time, the surface scraping pallets carry the foam or the oil to the discharge point at the opposite side. Removal of the settled materials can be provided by the following ways depend on the settled material.

## For the settled grit:

- Scraper blades
- Grit pumps
- Air-lift system

## For the settled sludge:

- Scraper blades
- Sludge pumps
- Suction

The floating scum is generally moved in flow direction to the outlet end of the tank, from where it is removed. Bridge is mounted on end carriages at both sides which have two guiding wheels or wheels driven on rails. Speed reducing unit includes a gearbox for required gentle slow moving and optionally a torque limiter. Power input can be realised by means of cable drum or cable trolley.

## FEATURES AND BENEFITS OF SISMAT ULUSLARARASI LONGITUDINAL SCRAPERS

- Robust and reliable design
- Quick and easy installation even into existing tanks
- Efficient separation of liquid and solid phases
- Low energy consumption
- Low wear and tear as only slow running components
- High efficiency
- Single or multiple tanks

## APPLICATIONS

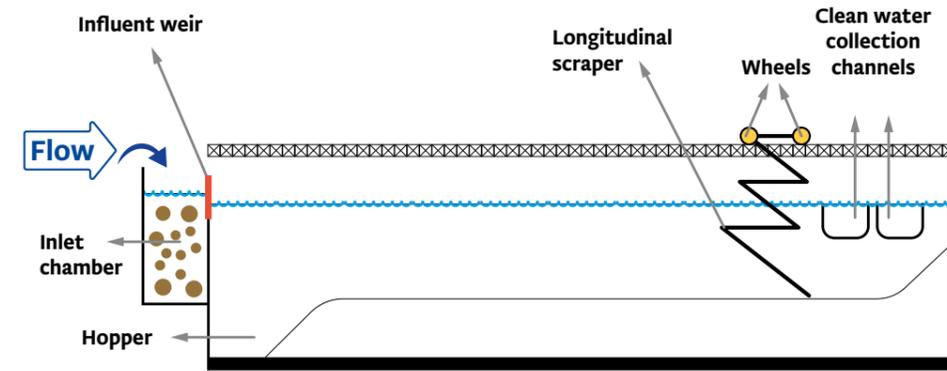
- Water treatment plants
- Municipal wastewater treatment plants
- Biological treatment plants
- Industrial treatment plants
  - Pulp and paper industry,
  - Iron industry, etc.

## FACTS

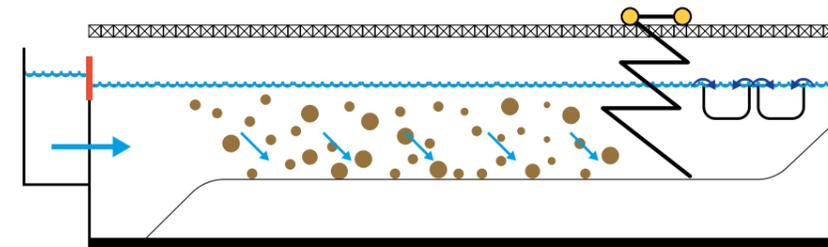
- Width up to 24 m
- Scraper rate between 1 m/min and 3 m/min

## WORKING PRINCIPLE

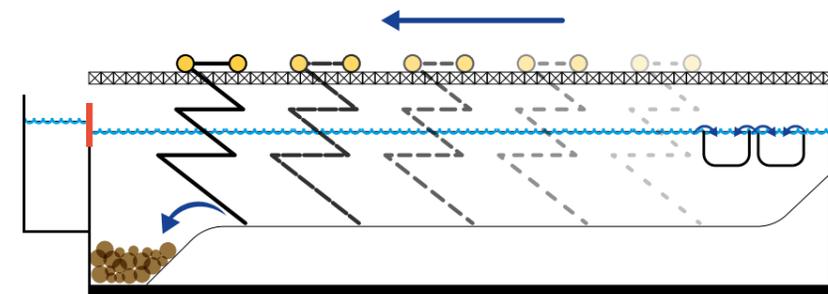
Sismat Uluslararası Longitudinal Scrapers can be installed in rectangular basins for the purpose of removing the grit particles that are settled at the bottom of the grit chambers or removing the sludge accumulated at the bottom of primary or secondary sedimentation basins. For the travelling bridge mechanism, the scraper blades, which is fitted on the travelling scraper bridge, is automatically started to operate in the opposite direction to the wastewater inlet to be able to remove the settled particles into the hopper or collecting discharge channel as the amount of grits or sludge accumulated at the bottom of tank increases. According to the scraper blade method, the blades are let down during scraping the settled materials from the outlet end to the inlet of the basin. The scraper blades are lifted above the water level by means of a lifting gear for return to the starting point. The return travel takes place twice as fast as the scraping process.



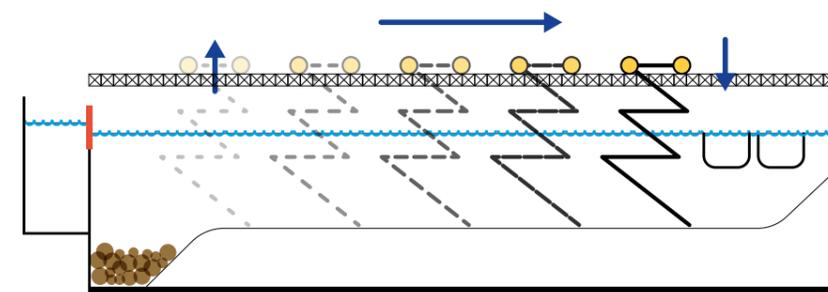
1  
The wastewater enters the tank.



2  
The solid materials present in the water are settled at the bottom of tank. Thus, it is needed to remove the sludge accumulated at the bottom.

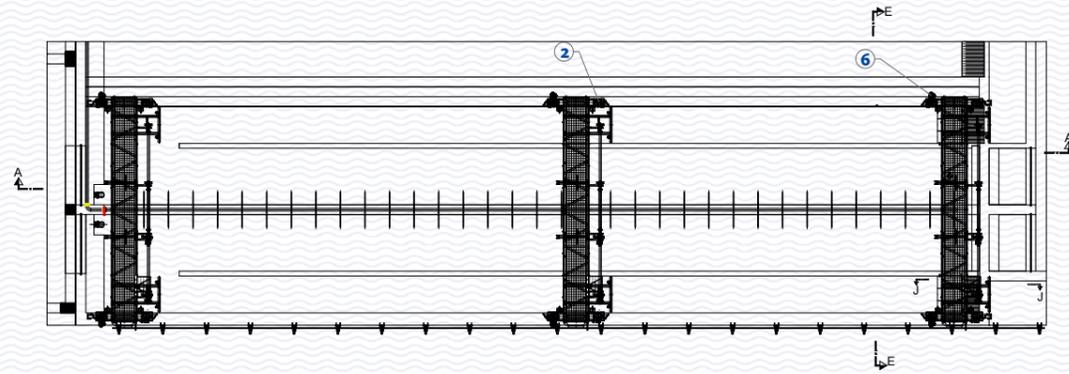
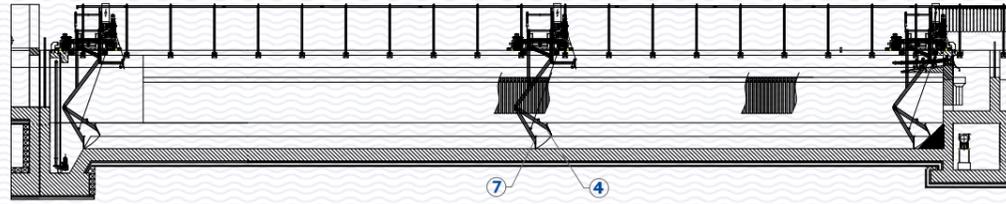
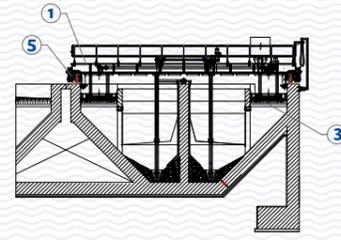


3  
The longitudinal scraper starts to move through the tank and scrape the materials accumulated during its movement. The sludge scraped is collected into a hopper and then removed from the system.



4  
The scraper blades are lifted to turn back to the starting point.

## Typical Longitudinal Scraper & Components



Typical drawings are for information only.

## ACCESSORIES AND OPTIONAL ITEMS

- Motor cable reel with rubber hose line
- Spring cable reel
- Running wheel monitoring
- Travelling system on rails instead of wheels
- Control unit installed on the bridge
- Grease and grit channel dividing wall
- Scum discharge channel
- Bridge lighting
- Grit suction by means of submersible or air lift pump
- Snow sweeping and de-icing devices
- Cable holding chain
- Alternative voltage and frequency
- Alternative motor protection degrees
- Scraper blades can be lifted to upper edge of basin
- Torque limiter



## OUR LONGITUDINAL SCRAPER COMPONENTS

|   | Longitudinal Scraper Components | Materials Available  |
|---|---------------------------------|--|
| 1 | Bridge                          | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX, Aluminum |
| 2 | Bogie                           | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX, Aluminum |
| 3 | Surface scraper                 | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX           |
| 4 | Bottom scraper                  | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX           |
| 5 | Ladder                          | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX, Aluminum |
| 6 | Drive unit                      | -according to norm of manufacturer   |
| 7 | Fasteners                       | 8.8, A2, A4  |



# CHAIN SCRAPERS

Similar to longitudinal scrapers, they are utilised in rectangular tanks. Scraping blades are mounted between two chains, which, in turn, are fitted between the shafts and wheels at channel corners. The continuous motion of the chain actuated by the revolution of the shaft drive the scraper blades clean the sludge settling at the bottom. The chain scraper system scrapes sludge from the bottom to a lateral hopper and skims surface of the tank from floating substances conveying them to a lateral channel.

The chain scraper consists of a gear motor control unit, a drive shaft, driving chains, idle shafts and scraping blade secured to the pulling chain. The gear motor motion is transmitted to the shaft by means of two lateral crowns, puts in motion the two gearing chains. On the opposite side there is the transmission unit helps the chain tightening. Specific guides keep the chain in the right position. Chain scrapers cleaning only the tank bottom or surface with two independent scrapers is possible upon request.



## FEATURES AND BENEFITS OF SISMAT ULUSLARARASI CHAIN SCRAPERS

- Long life time
- Robust and reliable design
- Quick and easy installation
- Low investment and operation costs
- Low wear and tear as only slowrunning components
- High efficiency with low energy consumption

## APPLICATIONS

- **Water treatment plants**
  - Pre-sedimentation process
  - Chemical sludge removal process
- **Municipal wastewater treatment plants**
  - Dissolved oxygen floatation (DAF) thickening process
  - Primary and secondary clarification process
- **Industrial wastewater treatment plants**
  - Oil and water separation process
  - Clarification process

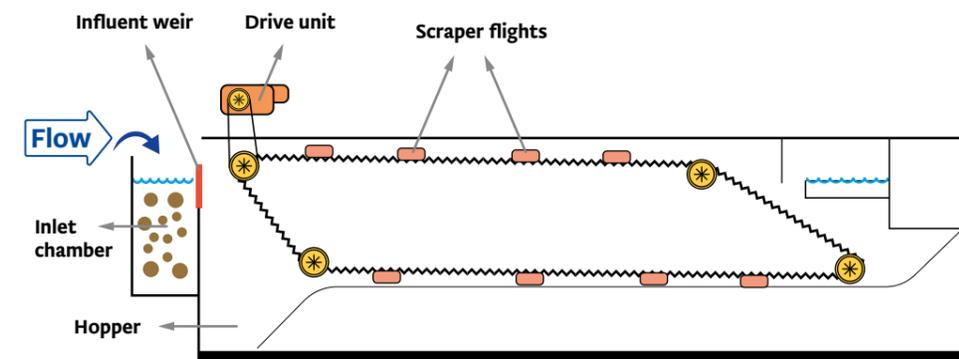
## FACTS

- Width up to 12 m
- Scraper rate between 0.9 m/min and 2.1 m/min

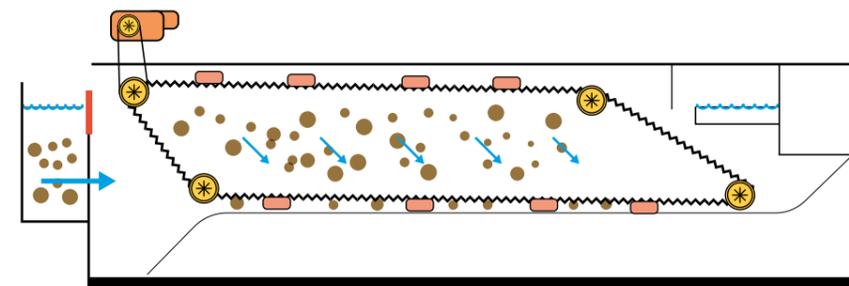
## WORKING PRINCIPLE

Sismat Uluslararası Chain Scrapers are used to clean rectangular sedimentation basins of even the large amount of sludge during their operation.

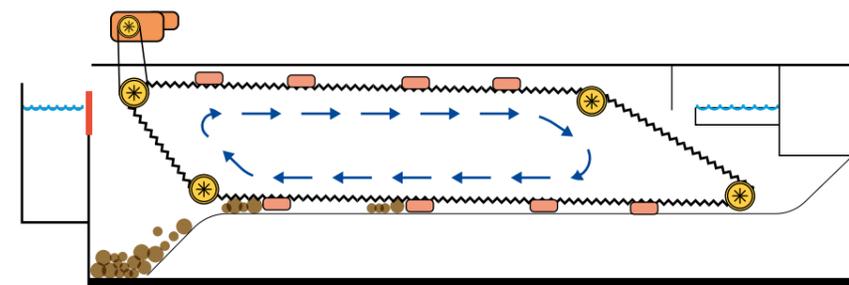
An endless sprocket chain running over two, three or four sprocket wheels is arranged on each side of sedimentation basin. A pair of sprocket wheels, which is fitted on a common shaft, is driven by a motor. The scraper flights fixed between the chains scrape and transport the sludge accumulated at the tank bottom to a hopper. During return journey, scum floating at the surface is conveyed to the skim channel.



1  
The wastewater enters the system.

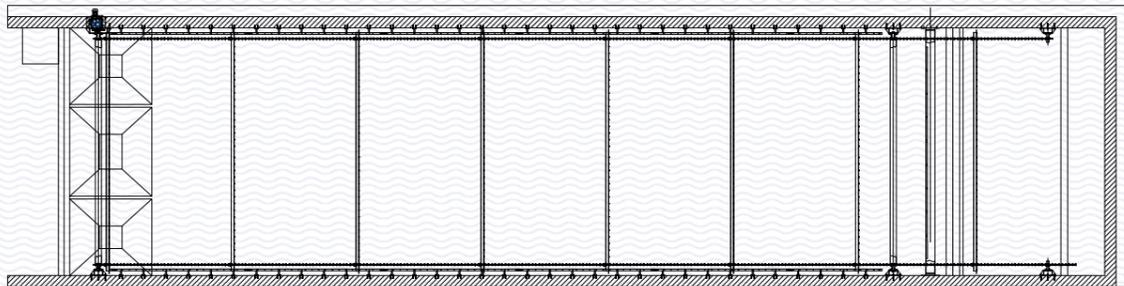
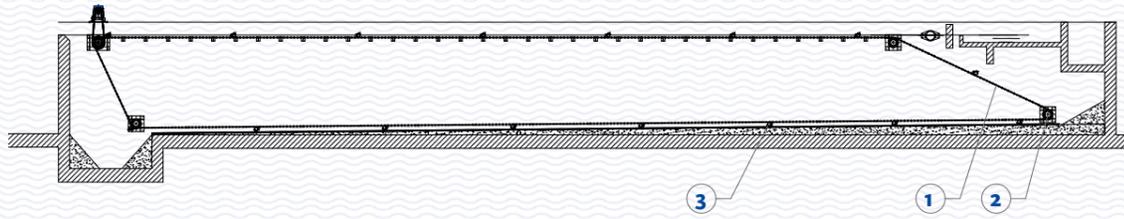
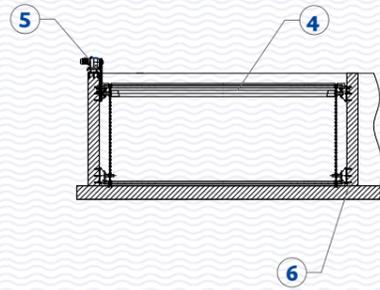


2  
The solid materials present in the water are settled at the bottom of the tank. Thus, it is needed to remove the sludge accumulated at the bottom.



3  
The chain scraper starts to move as an endless loop and scrape the materials accumulated by the scraper flights fitted on the chain moving. The sludge scraped is collected into a hopper and removed from the system.

## Typical Chain Scraper & Components



Typical drawings are for information only.

## OUR CHAIN SCRAPER COMPONENTS

|   | Chain Scraper Components | Materials Available   |
|---|--------------------------|---|
| 1 | Chain                    | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX      |
| 2 | Sprocket                 | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX      |
| 3 | Scraper flights          | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX, SUPER DUPLEX or GRP |
| 4 | Main shaft               | Carbon steel or stainless steel grade, AISI304, AISI304L, AISI316, AISI316L, AISI316Ti, DUPLEX or SUPER DUPLEX      |
| 5 | Drive unit               | -according to norm of manufacturer  |
| 6 | Fasteners                | 8.8, A2, A4   |

## ACCESSORIES AND OPTIONAL ITEMS

- Fixing collars
- Skim trough for scum outlet
- Inlet and outlet systems
- Central lubrication system for the bearings
- Special accessories upon request





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