Vandezande BVBA

SPECIALIST IN MECHANICS

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SCREW PUMPS
AND HYDROPOWER SCREWS

SCRAPER BRIDGES

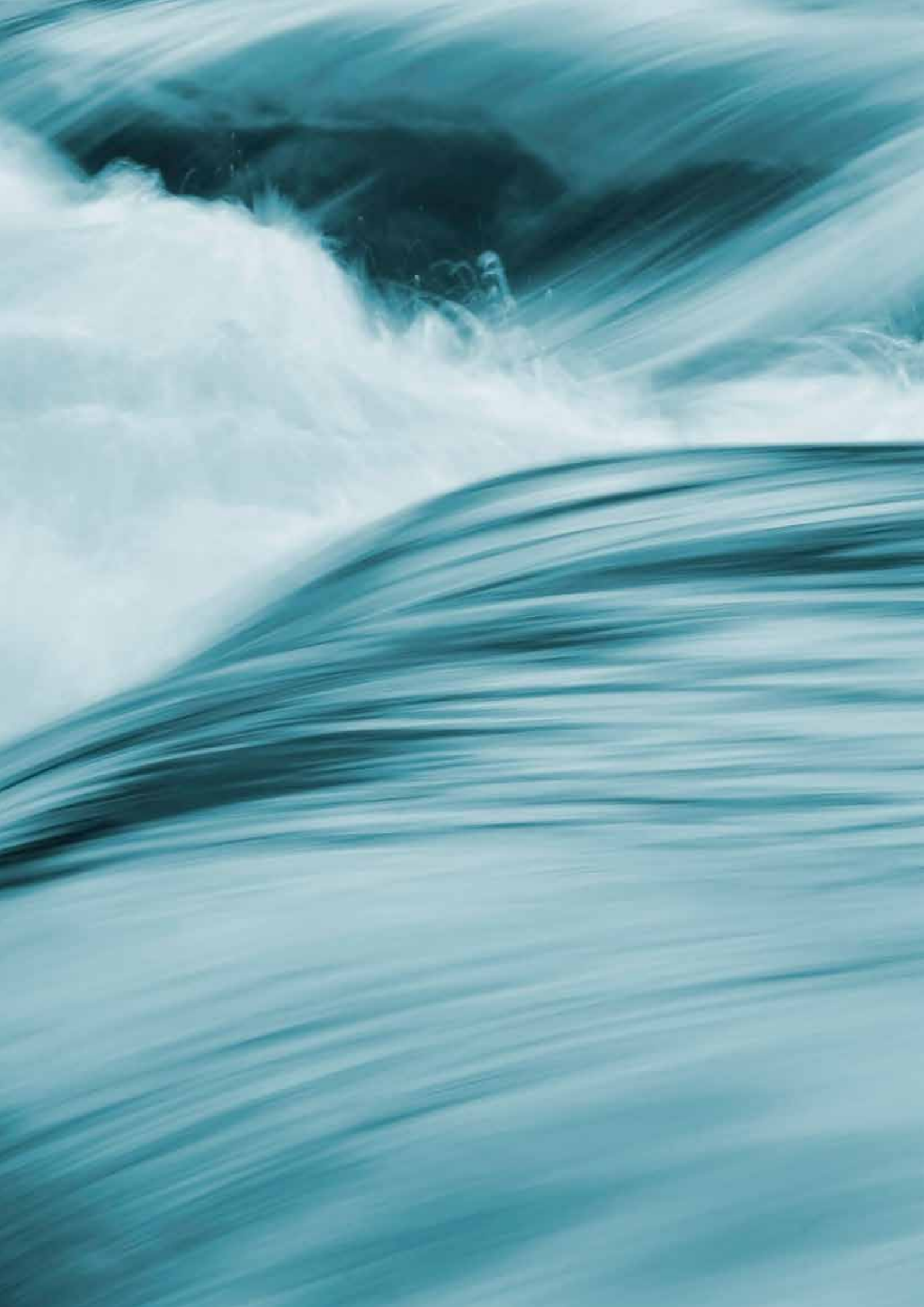
SLUDGE THICKENER

GRIT AND SCUM REMOVER

TRASH RACK

WATER MANAGEMENT

ELECTROMECANICAL INSTALLATIONS



CONTENT

Chris Vandezande, Rufin Vandezande, Eric Vandezande, Maurice Vandezande

VANDEZANDE

Vandezande is a *family business* which was founded in 1930. Since then it has been growing steadily and has developed into one of the most dynamic companies in the market of **screw pumps & hydro power screws, wastewater treatment equipment and electromechanical equipment for moveable bridges and locks**. Because of its many years of experience and knowhow, **Vandezande is synonymous with quality, flexibility and service.**

Vandezande has its own research department with experienced and qualified master degree engineers, bachelors, and skilled professionals.

The use of sophisticated CAE programmes, when designing metal constructions, allows us to design with greater precision, creating a better insight, which results in faster completion times.

Chris Vandezande - managing director

SCREW PUMPS AND HYDROPOWER SCREWS

Screw pumps are mainly used to pump large amounts of liquids to a relatively limited higher level. Screw pumps are mainly used for controlling water levels in canals and rivers but they are also used for transferring contaminated water in water treatment installations (return activated sludge pump, influent pump).

Hydropower screws produce electric energy by passing large amounts of liquid via a turbine from a higher to a lower level.
The electro-mechanical configuration is similar to that of a screw pump, however the optimal implementation parameters are totally different.

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Compact screwpumps/ hydropower screws on the Albert Channel in Ham and Olen (Belgium) - 6 screws - 780 kW pumping operation - 360 kW generating operation - 5 m³/s - Screw diameter 4,3 m - Bladed length 21,6 m

Compact screwpumps on the Leopold channel at Zeebrugge (Belgium) - 2 screws - 315 kW - 5 m³/s - Screw diameter 3,7 m - Bladed length 10,6 m

Vandezande supplies screw pumps and hydropower screws of a very high quality and offers the possibility to combine both techniques in one and the same screw. The conflicting boundary conditions for optimal implementation of the screw are regulated by a hydraulic powered valve at the upper waterlevel which controls the optimal filling of the screw turbine and, at the lower waterlevel the screw pump body has optimized blades.

The main advantages of screw pumps and hydropower screws are:

- High flow
- High efficiency
- High reliability
- Low maintenance
- Long life (little wear and tear)
- Fish friendly and easily installed in natural streams (due to the atmospheric function principal and the relatively low nominal revolutions per minute)
- Self drawing
- Easy access
- Possibility to run dry over longer periods

Vandezande screw pumps and hydropower screws consists of the following main components:

Screw unit
The screw unit consists of a central tube, on which blades are welded to form a continuous spiral thread. Depending on the required flow a two or multiple bladed spiral is fitted.

Screw trough
As well as a custom made concrete trough, for the installed screw for casting, it is also possible to choose either a steel trough, mounted together with the screw pump in a rectangular concrete trough, or a self-supporting prefabricated steel unit which is provided with the necessary supports. With this last option, the screw assembled in trough and connected with the drive train is delivered as one unit.

Splash guards
The purpose of these guards is to minimize the leakage rate which in turn optimizes the take-up rate of the screw thereby increasing the efficiency.

Upper bearings
The greased upper bearings take axial as well as radial forces. The bearing housing is either wall or floor mounted. Self-aligning bearings are used to take any misallignment, originating from deflection of the screw body.

Lower bearings
The self adjusting lower bearings only take radial forces and allow for thermal expansion of the screw pump. The lower bearings are mounted in a cast-iron housing with an alloy specially designed for this application. Different types of lower bearings are available: grease lubricated, oil lubricated or without lubrification (ecological bearings).

Drive unit
The drive unit consists of an external brake fitted on the rotating shaft of the motor connected to the rotating shaft of a right-angled or parallel gearbox via a transmission belt or flexible coupling. The low speed shaft of the gearbox is connected to the screw shaft with a flexible coupling. Screw pumps are fitted with a backstop brake in the gearbox. Hydropower screws are fitted with an external brake fitted on the rotating shaft of the gearbox.

Compact screwpumps at RWZI Poperinge (Belgium)

Hydro power screws with steel trough for casting at Kocherwehr Hofratsmühle in Künzelsau (Germany) - 2 screws - 132 kW - 8,95 m³/s - Screw diameter 4,1 m - Bladed length 4,8 m

COMPACT HYDROPOWER SCREW IN WARBURG (GERMANY)

CLASSIC DRIVE TRAIN OF A SCREW PUMP

COMPACT HYDROPOWER SCREW IN MÜNSTERHAUSEN (GERMANY)

COMPACT SCREWPUMPS/ HYDROPOWER SCREWS ON THE ALBERT CHANNEL IN HAM AND OLEN (BELGIUM)

COMPACT SCREWPUMPS/ HYDROPOWER SCREWS ON THE ALBERT CHANNEL IN HAM AND OLEN (BELGIUM)

SCREWPUMPS WITH CONCRETE TROUGH IN THESSALONIKI (GREECE)

SCRAPER BRIDGES

A scraper bridge is a mechanical construction that is an integral part of a waste water treatment installation. It can be used for transferring precipitated particles to a sludge collector pit or alternatively for depositing floating substances into a scum removal container.

There are two types available: for round basins (circular cleaning type bridge) and for rectangular basins (rectangular cleaning type bridge).

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Scraper bridge Aluminium Profile - tank diameter 42,5 m - RWZI Harelbeke (Belgium)

Scraper bridge Steel profile - Step Tubize (Belgium)

At **Vandezande** a scraper bridge consists of the following main components:

Bridge construction
The bridge consists of either an aluminium casing, a steel coated or thermally galvanized tube construction or a modified beam construction. The construction spans either a half, two thirds or the total diameter of the basin. In the latter case, the bridge is in two sections and is vertically hinged one meter beyond the central rotation point. This is to allow the support trolleys, mounted at the end of each bridge section, to make maximum contact with the external perimeter wall. This avoids any surface irregularities affecting the smooth distribution of the load.

Central rotation point (only for circular cleaners)
The bridge is hinged at the rotation point with a grease lubricated ball race. At the location of the rotation point an electric power distribution unit is also installed, which provides the power supply for the drive mechanism and includes all appropriate safety controls.

Drive unit
Circular cleaner:
In addition to the bearing housing mounted on the central rotation point of the circular scraper bridge, the bridge is supported on the basin perimeter edge via a one or two wheeled trolley. The motorized wheel is powered by a reduction motor via a continuous shaft. In the case of a two wheeled trolley there is, in addition to the motorized wheel, an extra support wheel. The displacement speed at the height of the external perimeter of the basin is 2.5 m/min.

Rectangular cleaner:
The transverse bridge is fitted with a two wheeled trolley on either end and four guiding wheels along the sides of the basin. The motorized wheels are connected to a single reduction motor to prevent skewing of the bridge. The drive shaft, the shell coupling and the supporting bearing housings are sturdily mounted to the side of the bridge. The displacement speed is about 1.8 m/min. Furthermore the wheeled trolleys both types are of a semi closed unit equipped with adjustable snow clearing shields, obstacle protection and wheel slippage sensors.

Bottom scrapers
Circular cleaners:
The steel bottom bridges which are fitted with rubber scraping blades must clear away the precipitated sludge lying on the bottom of the basin and transport it to the central sludge collector pit. There are two types available: the first type is where the scrapers are hinge connected to the bridge with tie rods and a second type is where the scrapers are fitted with wheels that run around the bottom of the basin.

Rectangular cleaners:
The bottom scrapers cover the entire width of the basin and clear away the precipitated sludge lying on the bottom of the basin and transport it to the central sludge collector pit. The scrapers are suspended from the bridge with box section profiles and are kept at the correct distance by wheels which run along the bottom of the basin. The suspension of the bottom scrapers is constructed in such a way that they can be easily inspected from the bridge after they have been hoisted clear, via a (powered) cable drum.

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Scraper bridge Aluminium Profile - tank diameter 52 m - RWZI Brugge (Belgium)

Scraper bridge - steel tube construction - tank diameter 15 m - Bastogne (Belgium)

Sludge scrapers (only for circular cleaners)
The central sludge collector pit is equipped with one or two sliding blades and connected to the bridge with a specially constructed sturdy framework. When the resistance is too high in the sludge collector pit the sliding blades retract automatically.

Input drum (only for circular cleaners)
The feeding of the contaminated medium takes place via a central cylinder that discharges into the top of the input drum. The input drum directs the medium into the underlying sediment and thus prevents a short circuit flow between the central cylinder and the overflow ledge. An additional deflection baffle can be suspended under the inflow drum to prevent feedback from within the sludge collector pit. An opening is provided in the inflow cylinder to facilitate scum removal. This opening is equipped with a drawer and can be operated from the bridge.

Surface cleaner
Grease, oil and other floating substances are removed in an efficient manner by a surface cleaner. With a circular cleaner the surface cleaner is set up in such a way that all floating substances are collected from half of the diameter of the sediment basin and pushed to the scum removal unit. With a rectangular cleaner the cleaning action is executed in an efficient way from the dividing partition at the drainage section of the basin through to the scum removal unit.

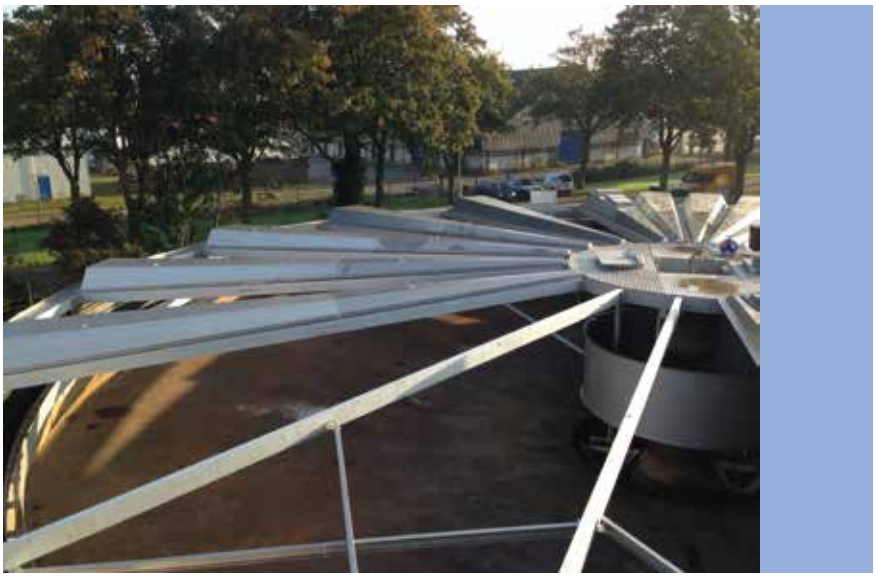
Scum removal unit
Circular cleaner:
The scum removal unit consists of a collection chute in stainless steel, which feeds, by means of a gravity pipe, into a floating substances collector located outside of the basin. A movable scraper pushes the scum layer into the chute. An automatic rinsing valve flushes the installation with surface water from the sediment basin.

Rectangular cleaner:
The scum removal unit consists of a scum collector or trough which is connected, by means of a gravity pipe, to a floating substances collector located outside of the basin. The trough has a sufficient incline so that all collected floating substances are fed into the drainage system. The movable scraper on the bridge pushes the floating layer into the collector tank.

Overflow trough cleaning
The sediment basin can be equipped with a trough cleaning system, that is lowered into the overflow trough during the rotating movement of the bridge. Alternatively this can be rotated by means of an electric motor.

Vacuum cleaner
For both circular- as well as for rectangular cleaners the option exists for removal of the sludge via vacuum rather than scraping it into a collection pit.

Scraper bridge with rotating roof in Aluminium - diameter tank 27 m - Dronten (Netherlands)



Scraper bridge with rotating roof in Aluminium - diameter tank 27 m - Dronten (Netherlands)

Scraper bridge - steel tube construction - tank diameter 48,5 m - Aarle Rixtel (Netherlands)

Scraper bridge Aluminium Profile - tank diameter 52 m - RWZI Brugge (Belgium)

Scraper bridge - steel tube construction - tank diameter 15 m - Bastogne (Belgium)

SLUDGE THICKENER

Sludge is an important side product in the waste water treatment process. The dewatering of sludge, which consists of 99% water, is carried out by installing a solidifier facility. The sludge is stored for a few days in round basins in which a slowly revolving paddle induces the sludge to solidify, due to the influence of gravity, which produces 2 to 4% of solid matter.

The paddle homogenizes and breaks down the sludge layers which in turn allows the water to separate so that the sludge can sink more rapidly to the bottom. Finally the sludge is transferred via the sludge scrapers to the sludge collector.

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Sludge thickener RWZI Amsterdam West (Netherlands)

At **Vandezande** the Sludge thickener consist of the following main components:

Gantry unit
The gantry is of metal profile beams or of concrete construction and spans the entire basin.

Drive unit
The drive unit of the paddle is installed on the gantry unit and is fitted with a reduction motor. On the output shaft of the gearbox there is a pinion, that connects to the gear toothed bearing housing. This is in turn flanged onto the central tube of the paddle and the sludge scrapers. A mechanical torque limiter automatically switches the motor off when the maximum admissible torque is exceeded.

Paddle
The paddle consists of a framework of vertical bars and is connected to the central tube via a specially constructed framework, which covers the entire diameter of the solidifier facility.

Scraper mechanism
The scrapers are equipped with adjustable rubber blades, ensuring the optimal removal of the solidified sludge. The scraper arms are attached via struts to the central tube.

Input drum
The feeding of the sludge takes place via a central cylinder that discharges into the top of the input drum. The input drum directs the medium into the underlying sediment and thus prevents a short circuit flow between the central cylinder and the overflow ledge.

Sludge thickener RWZI Amsterdam West (Netherlands)

GRIT AND SCUM REMOVER

In a water treatment plant the grit and scum remover separates grit (and oil and grease) from the contaminated medium. There are 2 different types of grit and scum removers: the circular grit and scum remover and the rectangular grit and scum remover. The feeding of the medium in the circular grit and scum remover basin is carried out via a supply channel, in which flow vanes are mounted to ensure an even distribution of the flow. The precipitated grit and organic substances are pushed into a recessed pit by the bottom scrapers, while the waste water on the other side of the collector runs off the overflow ledge. With a rectangular grit and scum remover the gantry performs a back and forth movement. The gantry can be equipped with a vacuum pump or bottom scrapers to remove precipitated particles, and with surface scrapers to remove floating substances (scum).

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Rectangular grit and scum remover with airlift system - Step Tubize (Belgium)

Rectangular grit and scum remover with airlift system - Step Tubize (Belgium)

At **Vandezande** a grit and scum remover consists of the following main components:

Gantry unit
The gantry consists of an aluminium casing or metal profile beams which spans the entire basin. The circular grit and scum remover can also be made of concrete.

Drive unit
The drive unit of a circular grit and scum remover is similar to the drive unit of a solidifier facility. The drive unit of a rectangular grit and scum remover is similar to the drive of a rectangular cleaning gantry.

Scraper mechanism
With a circular grit and scum remover the scraper arms are mounted to the central tube via struts. With a rectangular grit and scum remover the scraper mechanism is mounted onto the gantry unit and can be raised. The forward movement lowers the scraper mechanism and the backward movement raises the scraper mechanism. Both types of scrapers are fitted with adjustable rubber blades, ensuring optimal removal of the solidified sludge.

Vacuum pump (only with rectangular grit and scum removers)
By blowing air through suppressors at the bottom of the basin, the precipitated particles can be removed from the basin via a funnel shaped shroud and a submersible tube. The vacuum pump is only active during the forward movement of the gantry.

The scum remover unit (only with rectangular grit and scum removers)
At the end of the forward movement the floating substances are removed by means of the surface rakes. During the backward movement the surface rakes are raised.

Rectangular grit and scum remover with airlift system - RWZI Wulpen (Belgium)

Construction of gantry unit

AUTOMATIC TRASH RACK

An automatic trash rack facility is employed for removing a build-up of miscellaneous coarse debris in a canal or river by catching it in a grid structure. It is installed on the upstream side of pump stations or rivers. The debris is then collected, transported and finally deposited into a container.

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Automatic trash rack - Hybrid type - Brugge (Belgium)

Automatic trash rack - Overhead transfer type - Woumen (Belgium)

An automatic trash rack facility consists of the following components:

• Depending on the width of the canal, 1 or more removable grid frames of stainless steel, equipped with vertical grid bars, are required. The distance between the grid bars can be selected. There is a choice between 40 mm or 100 mm. The grid frames are supported by guide rails, mounted at an angle of 75° in relation to the horizontal surface. The mechanical resistance of the grid frames with grid bars is calculated on a maximum height of the water upstream, without back pressure downstream.

• The stainless steel bucket consists of a fixed part and a hinged part. When cleaning, the fixed part of the bucket slides down the grid bars into the build-up of debris. The hinged part of the bucket is then closed, using 2 stainless steel hydraulic cylinders. The fixed part of the bucket is compatible with the distance between the grid bars for a smooth operation and intrusion. In standard versions, the width of the bucket varies between 1,200mm to 1,800mm.

• A moving trolley with support structure.

There are 3 different types :
Overhead transfer type: a moveable trolley is suspended from a monorail which is supported by a portal structure. The bucket is suspended from steel cables, wound round 2 cable drums.

Crane type: a trolley with hinged crane arms, moving on a track fitted with crane rails. The bucket is suspended from the end of the crane arms.

Hybrid type: a combination of the overhead transfer type and crane arm type: a trolley with fixed gallows, moving on a track fitted with crane rails. The bucket is suspended from steel cables, wound around 2 cable drums.

Overhead transfer:
- A reduction motor fitted with a brake operates the 2 cable drums of the bucket, which is suspended from steel cables.
- Idlers prevent the unwanted unwinding of the steel cables.
- A hydraulic power unit feeds the hydraulic cylinders of the bucket.
- An electronically driven hose reel controls the hydraulic TWIN hose, which powers the hydraulic cylinders of the bucket.
- The moveable trolley is suspended on runners, each of them are equipped with 2 vulcanized running wheels.
- The transfer movement on the monorail of the trolley unit is operated via a reduction motor fitted with a brake.
- All necessary sensors and limit switches are provided for monitoring the operation of the equipment.
- The frame of the trolley and the machine housing are made of stainless steel. The access hatches are equipped with gas springs.
- The steel portal structure with monorail is anchored onto the adjacent concrete structure.

Crane:
- The steel crane arm consists of a main arm and a swivel arm; the bucket is hinged at the end of the swivel arm.
- Hydraulic cylinders perform the movements of the crane arm.
- A hydraulic power unit feeds the hydraulic system.

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Automatic trash rack - Overhead transfer type - Woumen (Belgium)

- In this setup the crane arm is moved rotationally on a turntable fitted with a ring gear.
- The rotational movement of the crane arm and the transfer movement of the trolley is driven by a reduction motor or via a hydraulic motor.
- During the transfer of the trolley all steel wheels of the trolley are powered.
- The steel track fitted with 2 crane rails is anchored onto the adjacent concrete structure.

Hybrid:
- A reduction motor fitted with a brake operates the 2 cable drums of the bucket, which is suspended from steel cables.
- The end of the gallows has guide wheels, over which the steel cables roll.
- Idlers prevent the unwanted unwinding of the steel cables.
- A hydraulic power unit feeds the hydraulic cylinders of the bucket.
- An electronically powered hose reel controls the hydraulic TWIN hose, which powers the hydraulic cylinders of the bucket.
- In this setup the crane arm is moved rotationally on a turntable fitted with a ring gear.
- The rotational movement of the crane arm and the transfer movement of the trolley is driven by a reduction motor or via a hydraulic motor.
- During the transfer of the trolley all steel wheels of the trolley are powered.
- The steel track fitted with 2 crane rails is anchored onto the adjacent concrete structure.

For each configuration we provide the following custom engineered facilities:
- Access steps, handrails, stairs and ladders specific to the accessibility requirements and level of security.
- The installation of the monorail or track is undertaken to guarantee maximum integration with adjacent structures or to comply with legal building regulations.
- Protection of steel structures: galvanizing and painting in the desired RAL colour or hot dip galvanizing.
- Level of automation: PLC control and integration with already existing controls.

Automatic Trash Rack - Crane Type - Ertvelde (Belgium)

Automatic Trash Rack - Classic Type - Fenain (France)

Automatic Trash Rack - Crane Type - Hemiksem (Belgium)

WATER MANAGEMENT

Vandezande is specialized in all types of electromechanical installations used for the water management of canals and rivers (weirs, valves,...).

Design, calculations, drawings, construction and mounting is all within the scope of Vandezande.

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Electromechanical and Hydraulic equipment of weir at Lock Kain (Belgium)

Steel construction + Electromechanical equipment of weir at Lock Asper (Belgium)

Steel construction and electromechanical equipment of shutt off valve at Woumen Stenensluisvaart (Belgium)

Electromechanical equipment of weir at Lock Harelbeke (Belgium)

Steel construction + Electromechanical equipment of weir at Lock Asper (Belgium)

Electromechanical equipment of weir at Lock Harelbeke (Belgium)

Steel construction and electromechanical equipment of shutt off valve at Zandbergen (Belgium)

Steel construction, electromechanical and hydraulic equipment of weir at Zandbergen (Belgium)

Steel construction, electromechanical and hydraulic equipment of weir at Zandvoordebrug (Belgium)

ELECTROMECANICAL INSTALLATIONS

Vandezande is ‘master’ in the design, fabrication and mounting of mechanics on locks, moveable bridges and other mechanical constructions on waterways.

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Electromechanical and Hydraulic equipment Bridge 5 in Beerse (Belgium)

Vancauwelaertsluis (Belgium)

SOME REFERENCES

MOVEABLE BRIDGES

- Plassendale Jaagbrug - Ostend
  (Belgium - West Flanders)
- Straussbrug - Zeebrugge (Belgium - West Flanders)
- Zennegatbrug - Mechelen
  (Belgium - Province of Antwerp)
- Zandvoordebrug - Oudenburg
  (Belgium - West Flanders)
- Zeebergbrug - Aalst (Belgium - East Flanders)
- St-Annabrug - Aalst (Belgium - East Flanders)
- Brug N°11 - Brecht
  (Belgium - Province of Antwerp)
- Mexicobruggen
  (Belgium - Port of Antwerp)

LOCKS

- Evergem sluis (Belgium - East Flanders)
- Vancauwelaertsluis - Antwerp
  (Belgium - Province of Antwerp)
- Duwvaartsluis Albert Canal (Belgium -
  The Albert Canal connects Antwerp with Liège)
- Sluizen op Kanaal Leuven Dijle
  (Belgium - Flemish Brabant)
- Iepersluis - Nieuwpoort (Belgium - West Flanders)
- Harelbeke sluis - (Belgium - West Flanders)

Duwvaartsluis Albert Canal (Belgium - The Albert Canal connects Antwerp with Liège)

Evergem sluis (Belgium - East Flanders)

Zennegatbrug (Belgium)

Evergem (Belgium)

Kanaal-Leuven-Dijle (Belgium)

VAMECO BVBA
HYDRAULIC SOLUTIONS

Vameco is responsible for the design, manufacturing and assembly of hydraulic equipment. **Vameco** also performing repair and maintenance work on hydraulic systems.

Besides engineering, primarily for the parent company Vandezande, the company Vameco evolved over the years emerged as a leading designer, builder, manufacturer and supplier of hydraulic equipment.

The maintenance service is available day and night, seven days on seven days ready for urgent interventions.

www.vameco.be

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Zeepziederijstraat 5 - PB 62
8600 Diksmuide
Tel +32 51 50 01 17
Fax +32 51 50 41 17

info@vandezande.com
www.vandezande.com

www.vandezande.com

Vandezande BVBA
SPECIALIST IN MECHANICS

Zeepziederijstraat 5 - PB 62
8600 Diksmuide
Tel +32 51 50 01 17
Fax +32 51 50 41 17

info@vandezande.com
www.vandezande.com

بینا رایزن پارس
نمایندگی ایران
تلفن تماس : ۸ و ۸۸۳۲۴۹۳۷ – ۰۲۱
E-mail : sales@brp.co.ir