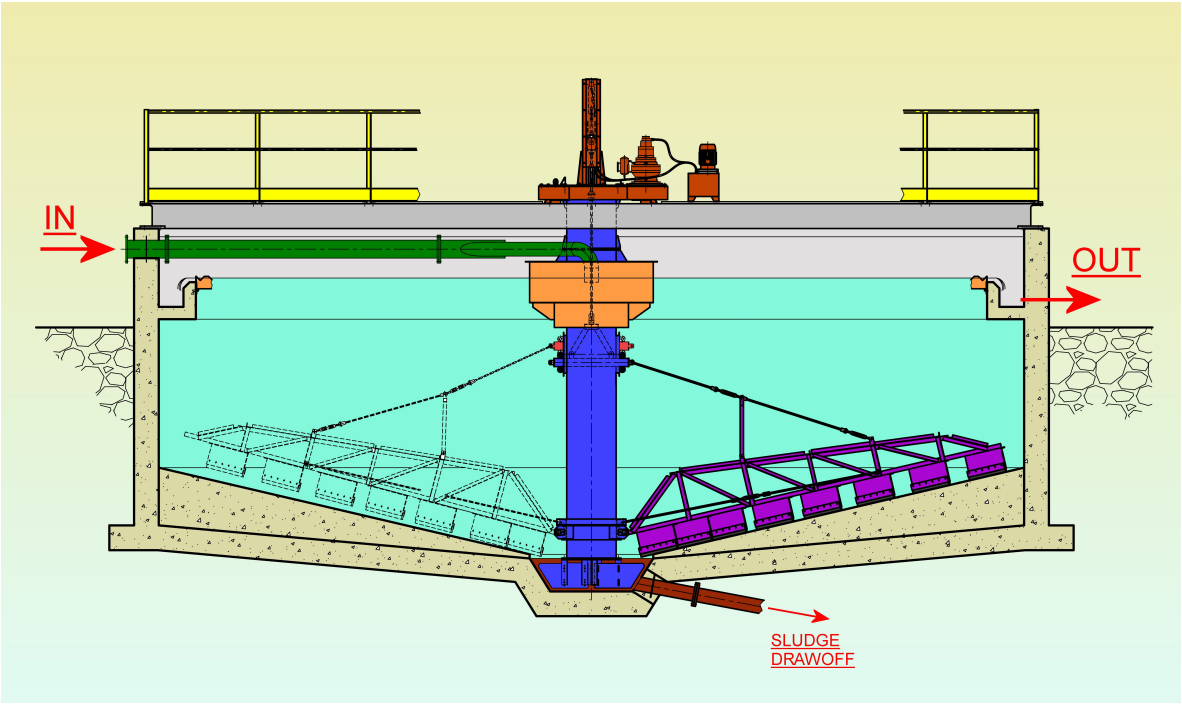
FULL BRIDGE CIRCULAR THICKENER
PRTCL type



APPLICATIONS

The clarification of process water represents for modern industry a concrete possibility to increase the benefits derived from the entire industrial operation, as it allows the integral exploitation of important resources:

- Water that can be almost entirely reused in the technological cycle with a proportional reduction of fresh water
- The same solid substances suspended in water, often economically interesting and sometimes valuable.

The **ECOPLANTS** circular thickeners **''PRTCL''** are suitable for the rational clarification of industrial waters.

In the diversified range it is possible to identify the model suitable for various flow requirements and numerous sectors including, in particular:

- Mining industry (recovery of mineral and water)
- Extractive industry (recovery of washing water and discharge of only thickened sludge not usefully recoverable)
- Chemical industry (recovery of substances and water)

GENERAL INFORMATION

Each clarification unit includes:

- Diametral support bridge with walkway and regulatory railings
- Supply piping up to the tank edge
- Feed cylinder connected to the supply piping
- Traction group consisting of pinion and gear wheel
- Reducer mounted on the pinion shaft
- Electric or hydraulic rotation motor
- Scraper arms, 2 or 4, equal and symmetrical

The feed of water to be treated occurs from the top and sludge extraction from the bottom, below the tank.

Optional Accessories

- Oil heater
- Electro-hydraulic equipment for automatic or controlled lifting of scraper arms
- Skimming device
- Preparation and dosing system for flocculating additives
- Special pump for thickened sludge extraction

TECHNICAL DESCRIPTION

The bridge walkway will be covered with gratings or walkable sheet metal.
The bridge will have railings constructed with 1" tube and vertical posts with spacing not exceeding 1.5 meters.
The bridge structure is supported by the tank walls and the rotation group, mounted on the bridge, operates at the center.
The rotation mechanism is driven by an electric or hydraulic motor, air-cooled, completely enclosed, protected for outdoor use and connected to a completely enclosed and oil-lubricated reducer.

A second reduction stage is obtained with a pinion and gear wheel, inserted in a metal container and oil-lubricated.

The vertical torsion shaft is stabilized by the upper gear wheel bearing which supports both radial and vertical loads and has been dimensioned with ample margin to resist all torsional loads.

The central diffuser is supported by the same shaft and rotates with it.
The influent piping is suspended from the bridge structure and discharges inside the central diffuser.

Hydraulic scraper lifting system – Detail without safety protection

The arms that support the scrapers are connected to the vertical torsion shaft and are constructed with adequate reinforcements, in order to form a robust construction resistant to bending and torsion when operating under load conditions.
A braced frame structure connected to the rotating shaft supports the bottom scrapers arranged regularly.
All electrical components and equipment requiring maintenance are placed above the bridge.

THICKENER SELECTION

Model		**60**	**80**	**100**	**120**	**140**	**160**	**180**	**200**	**220**	**240**
Tank diameter	m	6	8	10	12	14	16	18	20	22	24
Tank height at weir (m)	m	2 - 3									
Tank surface	m2	28	50	78	113	154	200	254	312	378	450
Max inlet solids flow *	t/24h	240		550		940			1200		
Max sludge discharge flow	m3/h	14		32		55			70		
Arm rotation speed	rpm	0,32		0,21		0,14			0,11		

(*) Indicative values corresponding to maximum sludge discharge flow with specific weight 1.45 and 50% concentration

SIZING

The dimensional and functional parameters of ECOPLANTS PRTCL thickeners, for exact correspondence to specific treatment requirements, are defined through laboratory analysis of turbid samples or based on analogous plants.

The values indicated below are only indicative.

Sludge type	Detention Time (hours)	Surface Loading ($m^3/day/m^{2)}$	Weir Flow Rate ($m^3/day/m$)	Botton Slope
Primary sludge	2,0	36	190	1:12
Activated sludge	2,0 – 3,0	24 - 32	100 -120	1:12
Aluminium and iron salt floc	1,5	54	240	1:12
Calcium precipitate	2,0	36	190	1,5:12

TORQUE CALCULATION

The torque of the rotation group depends, in addition to the diameter of the sedimentation tank and the number of scraper arms, also on the type of settled sludge, i.e., the corresponding Load Factor (LF).

Settled Sludge Type	Load Factor LF (N/m di arm)	Tangential Velocity (m/min)	Tank Bottom (m/m)
Hydroseparator: Foundry sand Rolling mill scale	 750 1050	 4,5-6,0 3,0-4,5	
Plain sedimentation	200	3,6	1:12 a 1:10
Sand	1150	3,0-4,5	1:5 a 1:4
Lime coagulation: Primary solid sedimentation Tertiary sedimentation	 450 230	 3,0-4,5 3,0-4,5	 1:12 a 1:8 1:8 a 1:6
Primary sludge	370	3,0-4,5	1:12 a 1:8
Secondary activated sludge	230	4,0-5,0	1:12 a 1:8
Secondary biological sludge. (Suction)	120	4,5-5,4	Piano
Digested sludge	540	3,0-4,5	1:8 a 1:6
Alluminum/Iron coagulation Low turbidity sedimentation Tertiary	 90 110	 3,0-4,5 1,8-2,4	 1:6 1:12
Lime softening (cold)	830	3,0-4,5	1:8
"Flue Dust" thickening	1200	2,4-3,0	1:5 a 1:4
"BOF Dust" thickening	1050	2,4-3,0	1:5 a 1:4
Rolling mill discharge	1050	2,1-2,4	1:4
Paper mill water thickening	600	3,0-4,5	1:5
Paper mill white water	380	3,0-4,5	1:6
Post-thickening Lime sludge Primary sedimentation sludge	 600 900	 3,0 3,0-4,5	 1:5 a 1:4 1:5 a 1:4
“BF flue” or “BOF” sludge	1500	2,1-2,4	1:4 a 1:3

ACCESSORIES

AUTOMATIC LIFTING

The rotation group of ECOPLANTS PRTCL thickeners can be supplied with a system capable of lifting the scraper arms up to 600 mm.
The lifting system is offered for manual or automatic operation. The automatic system prevents damage, due to overload, of the vertical torsion shaft and/or scraper arms.
When the torque required for rotation of the scraper arms reaches the maximum design value, a hydraulic cylinder lifts the scraper arms until the rotation torque returns within limits. Should the torque exceed the safety value, the system goes into alarm and stops.