

# Roxia Tower Press TP16™



## BENEFITS

- ✓ Driest filter cake
- ✓ Low energy and water consumption
- ✓ Efficient cake wash
- ✓ Single cloth with fully automatic cake discharge
- ✓ Integrated Smart features

## Fully Automatic & Reliable Operation

Roxia Tower Press™ (TP) is a fully automatic pressure filter excellent for any process that requires efficient solid/liquid separation. The design follows 40 years of respected experience in the field. Roxia TP filter is a reliable production machine that delivers high performance over and over again. Horizontal pressure filtration technology provides the following benefits:

- × Uniform cake formation in the chamber enables efficient cake wash and air drying.
- × High-pressure diaphragm pressing ensures a more even and drier cake.
- × A single and continuous cloth design ensures a fast and reliable cake discharge without operator intervention.

### Complete filtration support

Roxia can also provide a detailed analysis of the process, filtration testing, equipment selection and sizing. Get complete service through the entire filter life cycle, modernizations, refurbishments, spare parts and maintenance support.

### Roxia TP filter is ideal if you need:

- × High production capacity
- × Dry cake
- × Clear filtrate
- × Efficient cake washing
- × Reliable cake discharge
- × Fully automatic & safe operation
- × Low water and energy consumption
- × Small footprint
- × Low total cost of ownership



Roxia Tower Press is engineered to withstand demanding use and deliver reliable performance.

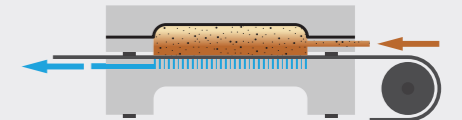
### Sizes and main dimensions

Filter type	Roxia TP16									
Filter size	16/19	19/19	22/25	25/25	28/32	32/32	35/38	38/38	41/44	44/44
Filtration area (m <sup>2</sup> )	16	19	22	25	28	32	35	38	41	44
Length (m)	4.3 (with service platform 5.1)									
Width (m)	3.8									
Height / 45mm (m)	3.9	4.1	4.6	4.8	5.3	5.5	6.0	6.2	6.8	7
Height / 60mm (m)	4.3	4.5	5.2	5.4	6.0	6.2	6.9	7.1	-	-
Weight / 45mm (t)	15	16	17	18	19	20	21	22	23.5	24.5
Weight / 60mm (t)	15.5	16.5	17.5	18.5	20	21	22.5	23.5	-	-

## Pressure Filtration Principle

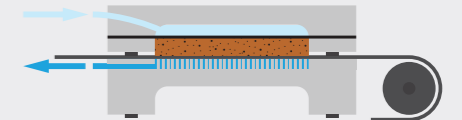
### Slurry feed and filtration

- × Closed filter plate pack forms filter chambers.
- × As the slurry is pumped into the chambers, liquid passes through the filter cloth and solids remain at the top of the cloth.
- × Filtrate flows out from the filter chamber's filtrate ports.
- × Solid particles start to build up forming the filter cake above the filter cloth.
- × Slurry feed continues until optimal cake thickness is achieved.



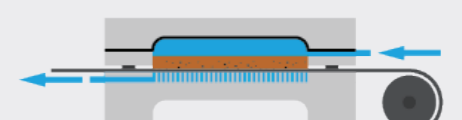
### Diaphragm pressing I

- × Using pressurized water, diaphragms squeeze the cake and finalize cake forming.
- × Pressing continues and more filtrate is discharged.
- × This step ends when the optimal cake structure is reached.



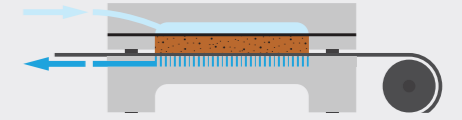
### Cake washing (optional)

- × Wash liquid is fed into the filter chamber on top of the cake.
- × Pressure is pushing the wash liquid into the cake. The mother liquid gets replaced and other substances from the mother liquid are removed.
- × This step ends when desired wash result is achieved.



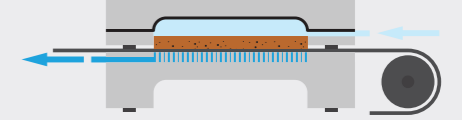
### Diaphragm pressing II (optional)

- × Using pressurized water, diaphragms squeeze the remaining free wash liquid within the chamber through the cake.
- × Pressing continues and discharges more filtrate.
- × This step ends when an optimal cake structure is reached.



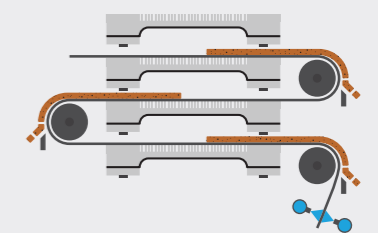
### Air drying

- × Pressurized air is fed into the chamber above the cake.
- × Air passes through the cake and dries it by replacing part of the liquid with air.
- × This continues until the desired cake dryness is reached.



### Cake discharge and cloth washing

- × Filter plate pack opens.
- × Filter cloth acts as a conveyor belt and simultaneously discharges cakes from each chamber in less than 30 seconds.
- × During cake discharge, the filter cloth is washed from both sides.
- × After this step is finished, the entire cycle is repeated.



## Typical Application Areas

Metal concentrators	Metal refineries	Chemical industry
Base metals	Leach residues	Graphite
Platinum Group metals	Battery metals and other applications	Titanium dioxide
Battery metals		Starch
Rare Earth Elements		Industrial minerals / Organic materials

*Note! Tower press filtration technology is successfully used in approx. 200 different applications globally.*

## Filtration Testing and Process Support

Testing the slurry is essential before choosing the correct filter type and size. By careful testing, we can ensure the best possible process performance and the most cost-efficient solution for each solid/liquid separation application. Filtration testing can be done on-site or in the Roxia filtration laboratory.



*Tower press test unit simulates the operation of the full-scale industrial filter.*

We only require a minimum sample of 20 litres of slurry or 20 kg of dry solids.

### Obtained test results:

- × Recommendation of the most suitable filtration technology
- × Optimal filtration parameters
- × Achievable filtration capacity [kgDS/m<sup>2</sup>]
- × Cake moisture [%w/w]
- × Filtrate clarity
- × Cake washing efficiency (optional)
- × Filter cloth recommendation
- × Air consumption

### Typical concentrate slurries performance at Roxia TP filter:

Material	Cycle time (min)	Capacity (kgDS/m <sup>2</sup> h)	Production with TP16 44 (t/h)	Cake moisture (w/w%)	Availability	Air consumption (m <sup>3</sup> /h) *	Clean water consumption (m <sup>3</sup> /h) **
Iron	8 - 9	600	25 - 30	8.5	93 %	495	1.2
Lead	9 - 10	800	30 - 40	8		440	1.1
Copper	10 - 12	410	15 - 18	8		396	1.0
Nickel	10 - 12	440	15 - 19	7		396	1.0
Zinc	10 - 13	400	14 - 18	9 - 11		396	1.0
Starch	8 - 15	250	9 - 12	30 - 35		396	1.0

\* Drying air consumption (typically 10 - 14 bar) calculated in atmosphere pressure flow

\*\* Cloth wash water consumption. (Depends on wash time per cycle)

## Safety Features

ROXIA TP filters safety features are designed according to European Machinery Directive. Other countries safety requirements are carefully followed during each delivery project.

### Safety interlocks integrated into the automation program

- × Protect the operators and the filter itself from accidents, failures and unintended misuse.

### Perimeter protection with safety interlocked doors

- × When any of the doors open, the filter automatically stops. This prevents access to the possibly hazardous areas during the filter's operation.
- × See-through construction minimizes the need to open the door and approach the filter during operation.
- × Emergency stop buttons are located on each corner of the filter.

### Safe working at height

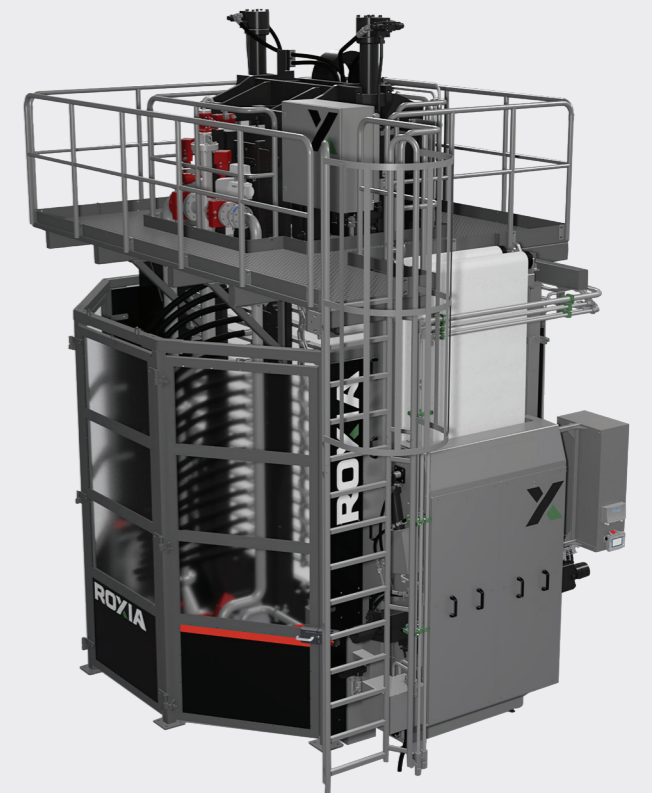
- × Filter comes with a caged ladder with fall arrest system.
- × Railings around the top maintenance platform protect users from falling.
- × Personnel lifts provide safe and ergonomic working environment for the plate pack maintenance.

### Safe use

- × Filters come with a user manual including safety instructions for safe operation and working procedures.
- × Before starting to use the filter, operators and maintenance crew receive safety training.
- × The operator interface guides users to safe use during daily operation. It also includes warnings about possible safety threats.
- × Password-protected user roles secure critical filter parameters.

### Easy and safe maintenance

- × Filter cloth change happens at only one access point outside the filter.
- × Filter design includes extra space around the filter and enables an easy approach.
- × Check and maintenance points are easily accessible and away from the most corrosive areas.
- × Includes a remote handheld unit for safe maintenance and troubleshooting.



*Perimeter protection prevents access during filter's operation, but leaves enough room for safe maintenance.*

# Smart Filtration

Roxia connects industrial filters to the Roxia Malibu online portal and enables remote monitoring of performance. With Smart Filtration, operators can analyse and optimize filtration process, increase production volume and detect failures before they even occur. All that can be done from anywhere with any computer, smart phone or other handheld device with internet connection.

## Roxia Smart Filtration for All Filters

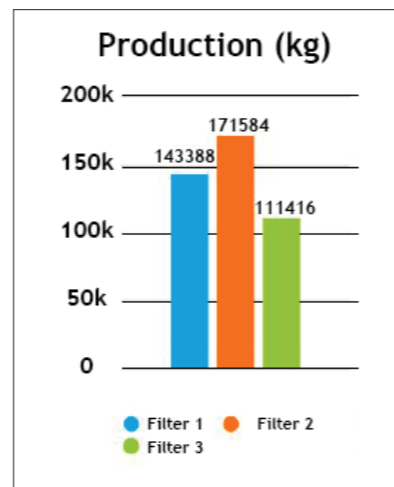
Roxia Smart Filtration can be installed on any filter and integrated with any other process equipment and control systems (DCS). Monitoring the filtration process online through Roxia Malibu™ portal is easy and user-friendly. Access is possible when- and wherever with any computer, smart phone or other handheld device connected to the internet. Malibu also automatically generates user defined reports which are easy to understand. Data analysis provided by Smart Filtration can be used for comparing filter's productivity, quality changes, energy consumption, production output, to determine reasons for its waiting time, alarms and more.

### Production Volume and Process Results Information

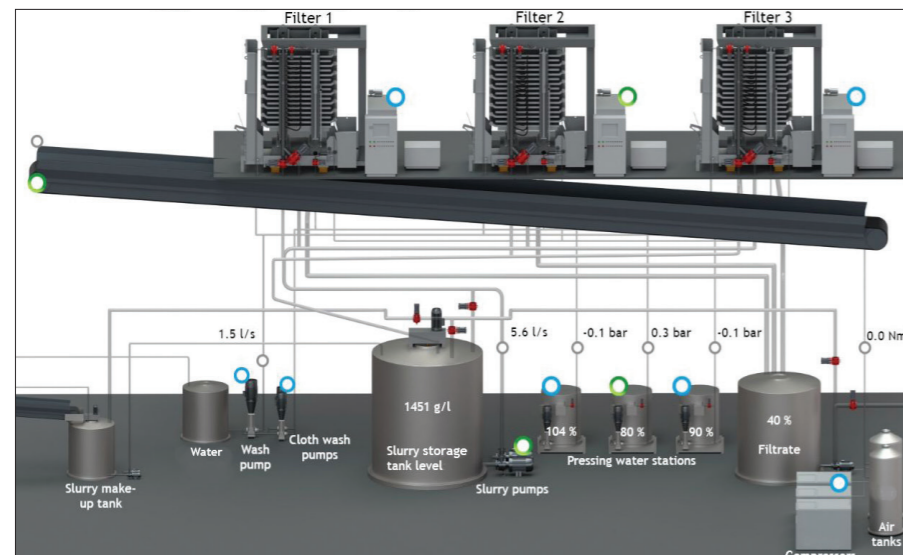
- × Fast analysis of production numbers and process results
- × Performance comparison between multiple filters
- × Utilities comparison and OPEX reporting

### Runtime Monitoring

- × Generates utilization timeline
- × Extracts most common alarms and reasons for downtime
- × Reports of chosen time periods and measurements



In multiple filters installation, clear comparison of production between the filters is one of the most useful KPI's for everyday use.



Live and detailed online view of the filter process plant shown on Roxia Malibu™ portal.

## YOUR BENEFITS

- ✔ Improved performance by comprehensive process understanding
- ✔ Less unplanned downtime
- ✔ Quick troubleshooting
- ✔ Efficient failure analysis

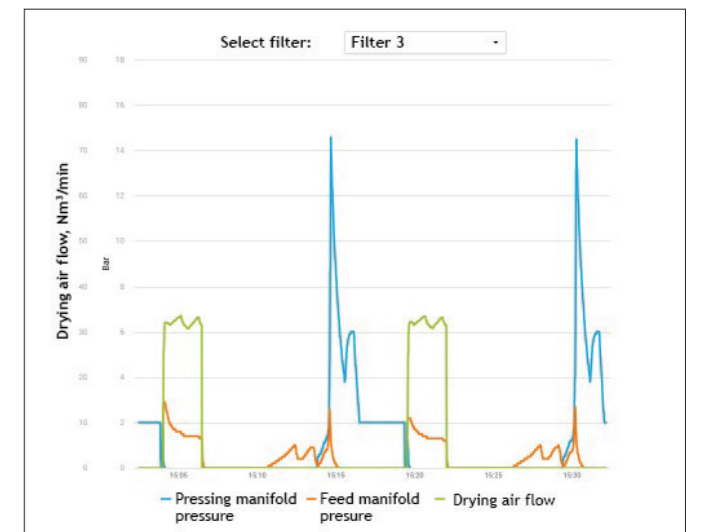
## Optimize Your Filtration Process

Roxia Smart Filtration includes complete evaluation of your filtration process. Roxia professionals will help you optimize the entire filtration process to reach quality targets and to maximize production capacity.

Different alarm limits can be set to automatically notify you via email about changes in the process. Optionally, additional sensors and equipment can be added for more comprehensive analytics, observations of spare part replacement intervals and assistance with auxiliary synchronizing. The tool can even detect filtration problems originating from upstream and downstream of the filter.

## How Can You Benefit From Roxia Filtration Analysis?

- × Discover problems in drying by following abnormalities in air pressure curves. Efficiency in drying phase can be estimated from changes in pressure. Even possible cake cracking can be detected.
- × Detect cloth and membrane damages at early stage by analyzing water volume changes.
- × Ensure product quality by analyzing cake moisture or filtrate turbidity or conductivity.
- × Discover indications of cloth damage and clogged grids and put a stop to decreased production, raised cake moisture and bending filter plates.
- × Determine the reasons for waiting times. Get a real-time insight into the process: how long are the waiting times, what are the filters waiting for (slurry, air, conveyor). Discover the real reasons for delays and instantly improve the filtration process.



Roxia troubleshooting tools and filtration analysis detect abnormalities in the process and automatically send alarms via email.

**Production (kg)**

Filter 1	143388
Filter 2	171584
Filter 3	111416

**Utilization Rate (%)**

Filter 1	89
Filter 2	81
Filter 3	81

**Productivity (kg/h)**

Filter 1	6976
Filter 2	5745
Filter 3	4642

**Average cycle duration (min)**

Filter 1	17
Filter 2	16
Filter 3	18

**Average cake weight (kg)**

Filter 1	1017
Filter 2	959
Filter 3	1082

**Average moisture content (%)**

Filter 1	90
Filter 2	93
Filter 3	93

**Alarm occurrence distribution**

Duration: 110.00 min, # of occurrences: 5

**Productivity per cycle (kg/h)**

**Waiting times (min)**

Filter 1	122.00 min
Filter 2	78.00 min
Filter 3	230.00 min

**Executive summary for 24 h Production calendar time.**

- Total production 426388 kg
- Plant Productivity 17766 kg/h
- Plant Utilization Rate 88 %

**Waiting times (min)**

- Slurry tank level low / Pump reserved
- Air pressure low / Line reserved
- Cake washing line reserved
- Cloth washing line reserved

Values are fictional

Key Performance Indicators - Tailored view according to user needs

## Complete Delivery: Filter and Auxiliaries

Auxiliaries play an important role in filter operations. Correctly selected or sized auxiliaries are essential for an optimal filter performance. Therefore it is Roxia's goal to ensure the best performance of the entire filtration process.

Roxia TP filter

Slurry pumps

Filtrate pumps

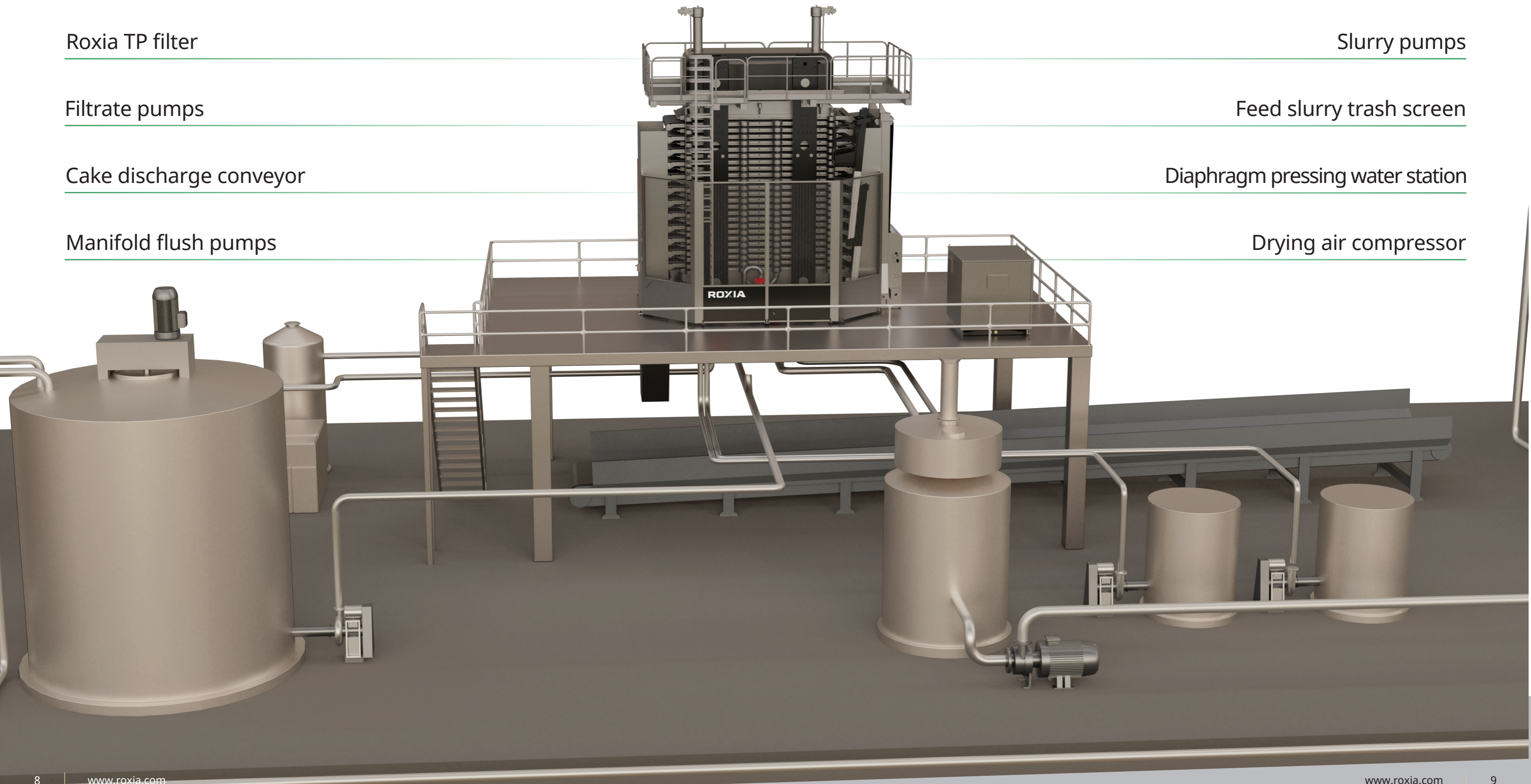
Feed slurry trash screen

Cake discharge conveyor

Diaphragm pressing water station

Manifold flush pumps

Drying air compressor



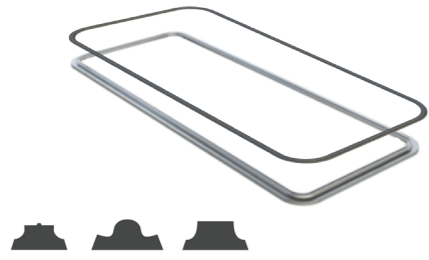
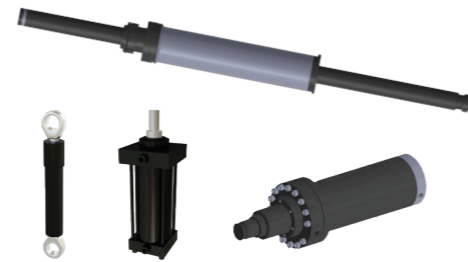


Plate seals



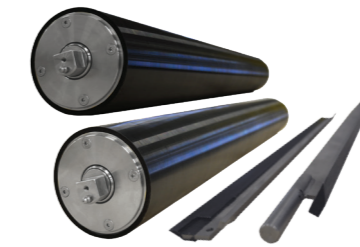
Mounting components for plate pack



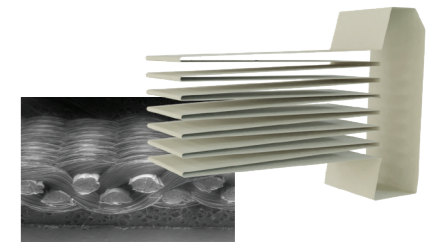
Hydraulics



Hoses for plate pack



Rollers and scrapers



Filter cloths

## Genuine Roxia spare parts

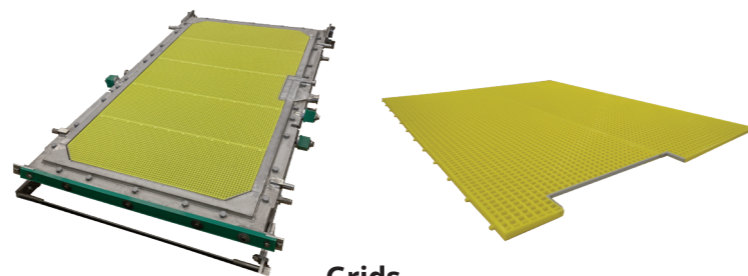


## Services & Service Agreements

- × Filtration testing and cycle optimization
- × Filter inspection
- × Maintenance support
- × Modernization, expansions and refurbishments
- × Installations and Shutdown services
- × Operator and maintenance staff training



Filter plates and frames



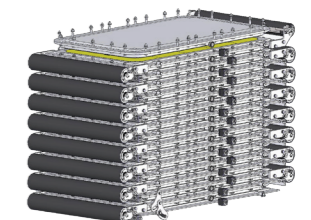
Grids



Diaphragms



Pinch valves



Complete plate packs

## About us

Roxia delivers high-tech dewatering, industrial automation and environmental technologies. Specializing in mining, minerals, metallurgy, chemical, food and pharmaceutical industries, our team generates best performing solutions for each specific need.

We offer our support from Australia, Chile, China, Finland, Germany, Peru, South Africa, Sweden, the UAE and the United States.



Tower Press Filter TP16, Brochure - Roxia (EN) / 12-2022

