Filtration Solutions

THM INERALS

TH MINERALS

THE COMPANY
SINCE 1966

Since 1966 Técnicas Hidráulicas, S.A. has been developing leading technology and offering premium service. TH Minerals is a division of the parent company which is focused on the Mining and Metallurgy Industries providing solutions in the field of Solid-Liquid Separation.

TH Minerals is heavily involved in the Mining Industry and not only through the filtration field. Rover Asteca is a company of the Técnicas Hidráulicas Group that counts on a 45 years experience in manufacturing crushing and screening equipment for mines and quarries. The intense cooperation and technology transfer between both companies enables TH Minerals to better understand and solve every customer need that could arise when facing a turnkey project.

TH Minerals substantial reference list highlights a large variety of applications and customers. TH Minerals has been working and cooperating with the most important mining and metallurgy companies in the world passing through the most exhaustive and large quality controls. Some of our references are "Jing Chen" for China National Coal, "Mafube Colliery" for Anglo American, "Bellary" (Iron ore) for Hari Machines, "Phola Coliery" for BHP Billiton, "Matomo" (Platinum Concentrate) for Sylvania Metals or "Befesa Zinc Aser" (Zinc oxide) for Abengoa Group.

TH Minerals experience providing filtration solutions is quite significant and it is spread worldwide. The philosophy of the company has made possible that TH Minerals technology is applied in several countries around the word such as:

- China
- India
- USA
- England
- Belgium
- Botswana
- South Africa
- Portugal
- France
- Poland
- Iran
- Taiwan
- Switzerland
- Zambia
- Vietnam
- Italy

THE APN FILTER PRESS

APPLICATIONS & EQUIPMENTS

TH Minerals filtration experience has been applied not only in the mining industry but also in the construction, chemical, metallurgy and environmental industry. Every dewatering process is different. In order to design the most suitable filtration equipment TH Minerals provides filtration test services either in the TH Minerals facilities (sending a sample) or directly on site. Complete skid mounted mobile pilot test units are available for trials on your site.

Applications

High Density Slurries (Minerals)

Copper, hematite, magnetite, lead, gold, molybdenum or platinum among others. Top feeding system, manifold core blowing and special cloths are necessary to avoid wear or blocking the feed manifold.

Low Density Slurries

Coal concentrate, coal tailings, kaolin, glass, dust, marble, concrete, dredging and organic or inorganic waste. Individual chamber feed through hoses obtains a uniform cake and fast chamber filling.

Equipments

APN Filter Press

Based on a "mechanical simplicity" in order to obtain the maximum reliability.
Required moistures are achieved by air blowing, draining and pressing.

APN-M Membrane Filter Press

For heterogeneous slurries, mechanical pressing through a membrane at high pressure obtains better handleable cakes and required moistures at minimal lower operating costs.

BENEFITS

The APN Series Filter Press is specifically designed for the Mining Industry. The steel core plates and structure and the "simplicity design" technology makes this filter press be the market leader in robustness and reliability. Since 1970, every re-engineering of the APN series Filter Press is the consequence of a quality product development that is continuously adapted to every process and client requirement.

APN Main Features

Simplicity Design

TH Minerals philosophy in the Mining Industry has always been conservative. Sometimes mines are located at very remote areas; the maintenance of APN Filter Press does not require any technician or special tools. The objective when designing the filter press is to obtain reliability and minimal operational costs.

The Filter Plate

The steel core avoids any breakage and its flat surface ensures trouble-free cake discharge. Its rubber seals in the perimeter of the plate ensure the tightness of every chamber, avoid leakage in the perimeter of the plates (that would decrease the drying efficiency) and allow to increase the production by only modifying its thickness.

Water Recovery

The rubber seals and the water collecting manifolds allow the APN Filter Press to recover the 100% of the filtrate during the dewatering process.

Top Feeding System

Individual chamber feeding from the top of the plates through a main manifold and core blowing reduces wear and avoids material settlements.

Fast Opening System

The opening of the filter press and cake discharge is done in less than one minute by means of the cake discharge system.

Efficient Electrohydraulic System

It ensures the minimum energy consumption. Both the filter press and the slurry feed pump is driven by the same power unit.

Fully Automatic

The PLC manages every filter press operation being able to control all the different processes during the filtration cycle. The PLC can be interconnected to the main control room.

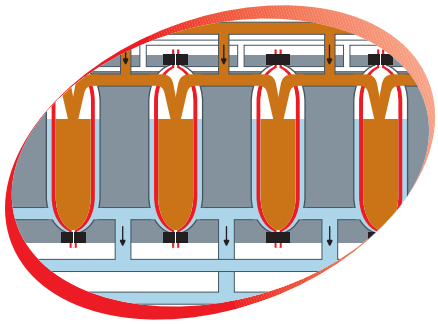
Other Technologies

The APN Filter Press design is individual depending on each process requirements. Draining System, Cake Moisture Detection System, Cake Washing System, Cloth Washing System, Core Blow System or Second Side Air Drying Systems are features that can be added to the filter press to obtain the best results for any process.

THE PROCESS

1. Filling and Filtration

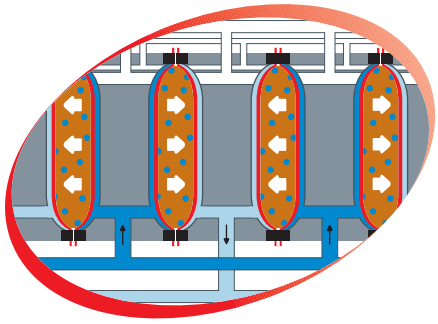
All chambers are filled at the same time in order to avoid differential pressures. During filtration the filtrate is displaced through the cloths and solids are kept inside the chambers. Filtration stops when the desired solids concentration is reached.



2. Cake Washing*

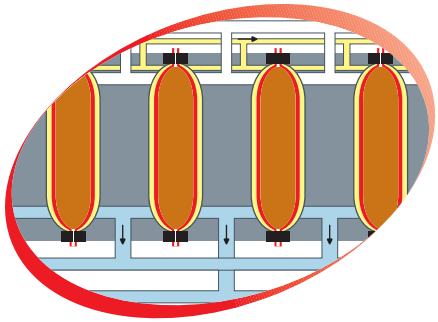
After filtration wash water is pumped into the chambers in order to remove the mother liquor. The wash water is pumped through the filtrate manifold of one side of the filter press and it is collected in the filtrate manifold of the other side.

* Optional



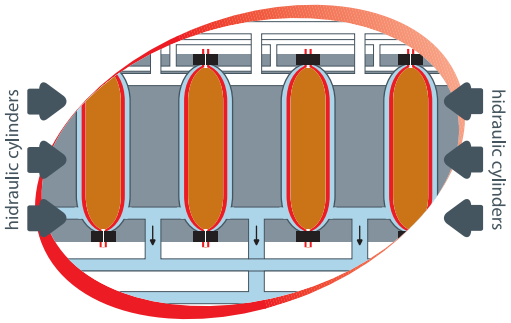
3. Draining

A short air blowing is done from the top of the plates between the cloths and the filter plates in order to remove the remaining filtrate. This process is very beneficial in order to avoid the introduction of the filtrate into the cake during the air drying process.



4a. Squeezing

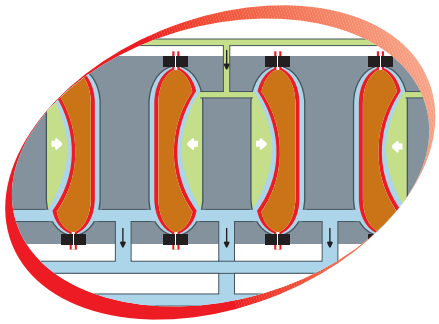
A mechanical squeezing of the cake is carried out by compressing the plate seals simultaneously to the air drying process. This process optimizes the air drying process and reduces the compressed air consumption by closing the voids created by the removed filtrate when drying.



SLURRY/CAKE
FILTRATE
CLOTH
RUBBER SEALS
PLATE
WASH WATER
AIR
WATER/AIR

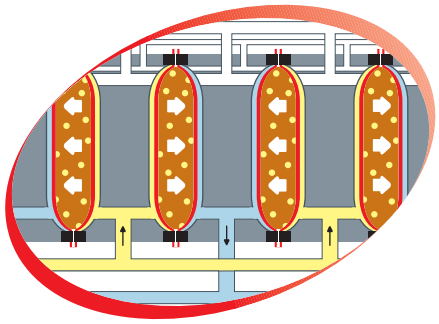
4b. Membrane Squeezing

The filter cake is dewatered mechanically by squeezing with a membrane at high pressure. For heterogeneous slurries this process enables to dewater the filter cake and to optimize the air drying process.



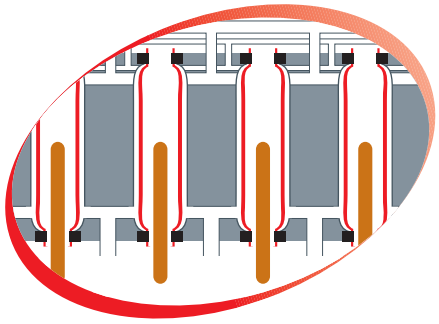
5. Air Blow. Drying

Filtrate is removed by blowing compressed air through the cake. The filter cake remains under pressure during the air blow drying to reduce compressed air consumption, closing the holes that the removed water has left in the cakes. This ensures low residual moisture.



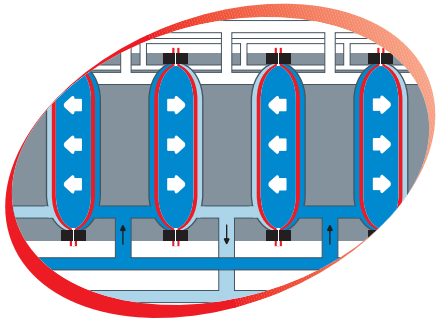
6. Cake Discharge

Once the desired moisture has been achieved the filter press opens automatically to allow the cakes to fall out of the filter. Cake discharge is 100% ensured due special plate design and cake discharge mechanism.



7. Cloth Washing

Once the cake discharge has finished fresh water is pumped from the back side of the cloths into the chambers in order to remove any remaining material that could be stuck into the cloths. The water current can flow in both directions.



SLURRY/CAKE
CLOTH
PLATE
AIR
FILTRATE
RUBBER SEALS
WASH WATER
WATER/AIR

ROLLERS

Each plate is suspended on the frame by the rollers which allow the plates to swing to ensure the cake discharge.

MAIN HIDRAULIC CYLINDERS

PULLING RODS

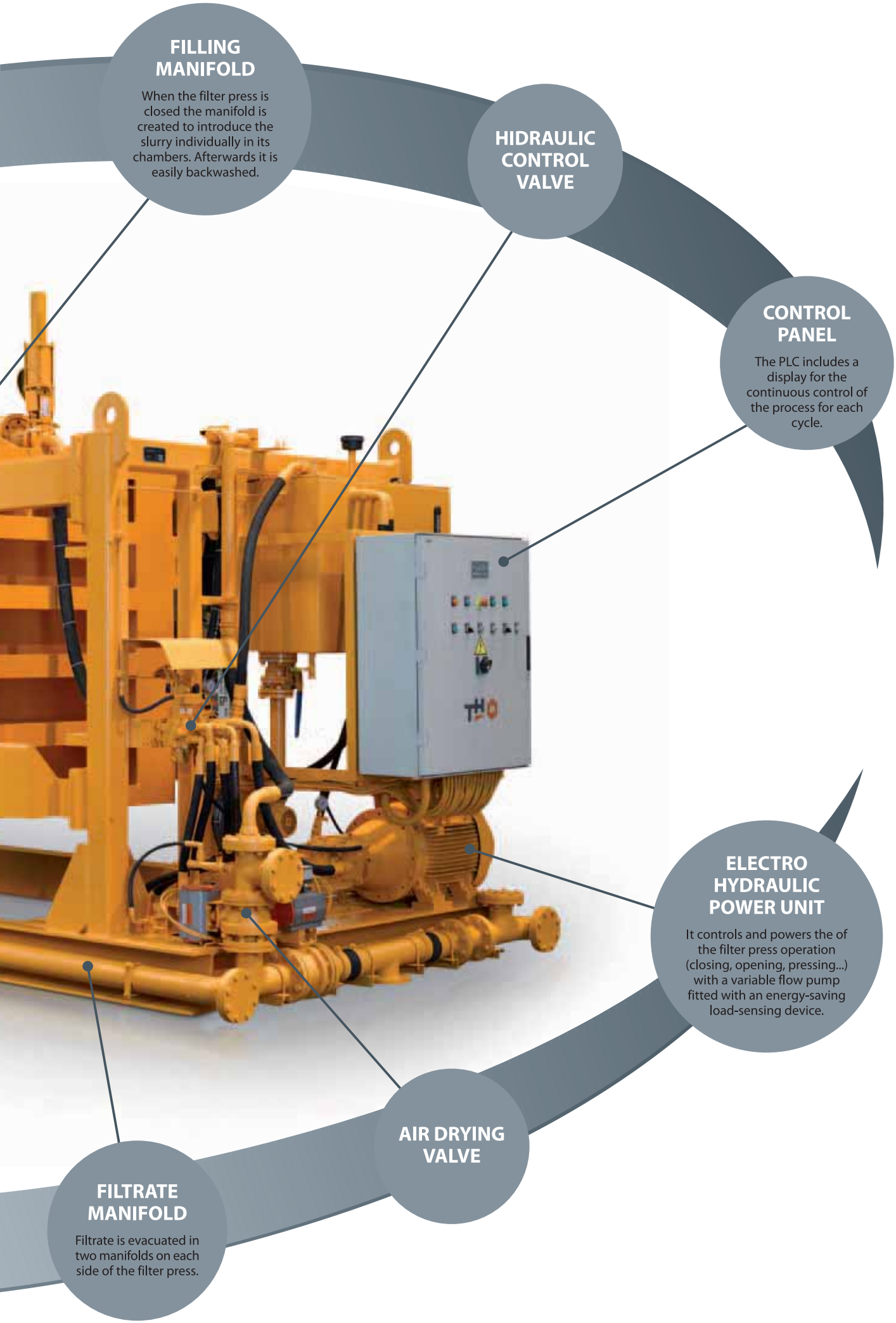
Traction design.
No vertical forces are transmitted to the foundations.

FILTER PLATE

Its steel core can stand the maximum filtration pressure avoiding breakage. The aluminum sections support the polypropylene filter drainage grid, house the rubber seals and evacuate the filtrate from the four corners of the plate.

MOBILE PLATE

Guided along the frame and connected to the pulling rods, it transmits the pressure to the rest of the plates.



FILLING MANIFOLD

When the filter press is closed the manifold is created to introduce the slurry individually in its chambers. Afterwards it is easily backwashed.

HIDRAULIC CONTROL VALVE

CONTROL PANEL

The PLC includes a display for the continuous control of the process for each cycle.

ELECTRO HYDRAULIC POWER UNIT

It controls and powers the of the filter press operation (closing, opening, pressing...) with a variable flow pump fitted with an energy-saving load-sensing device.

AIR DRYING VALVE

FILTRATE MANIFOLD

Filtrate is evacuated in two manifolds on each side of the filter press.

TECHNICAL DATA

The following tables show the standard APN filter presses designed for the Mining Industry. The following equipments achieve dry solids productions from 2 - 45 tons/h.

TYPE	APN16 Q	APN16 M8	APN16 M12	APN16 L18	APN18 L18
Cake size (mm)	1350 x 1350				1700 x 1700
Number of cakes	4	8	12	18	18
Filtration surface (m^2)	14,6	29,2	43,7	65,6	104
Pressure of hydraulic cylinder (bar)	240	240	240	240	240
Installed power (kW)	2	3,5	11	11	11
Dimensions (mm) Length x With x Height	2100 x 1960 x 220	4100 x 2232 x 2086	4100 x 2232 x 2086	4900 x 2232 x 2086	6650 x 2511 x 4900
Compressed air without drying (N l/min)	190	320	480	720	1.100
Compressed air with drying (N l/min)	760	1.200	1.920	2.880	4.000
Air receiver (N l)	500	800	1.200	1.600	2.300
Weight (Kg)	11.000	15.000	18.000	30.000	46.000

Variable values depending on the process.

Each equipment dimension depends on the process requirements and type of slurry. The following equipments will achieve dry solids productions from 25 - 325 tons/h.

TYPE	APN18 L24	APN18 SL36	APN20 SL40	APN25 SL45	APN25 SL60
Cake size (mm)	1700 x 1700		1900 X 1900	2850 x 1850	
Number of cakes	24	36	40	45	60
Filtration surface (m^2)	138	208	266	475	633
Pressure of hydraulic cylinder (bar)	240	240	240	350	350
Installed power (kW)	11	22	22	22	22
Dimensions (mm) Length x With x Height	6650 x 2511 x 4900	8500 x 2511 x 4900	13000 x 2800 x 2500	13500 x 2800 x 4900	14500 x 2800 x 4900
Compressed air without drying (N l/min)	1.500	2.200	3.000	5.000	6.000
Compressed air with drying (N l/min)	6.000	8.000	11.000	20.000	25.000
Air receiver (N l)	3.300	4.500	6.000	11.000	14.000
Weight (Kg)	55.000	75.000	100.000	150.000	180.000

Variable values depending on the process.

THE APN SIX SLURRY FEED PUMP

A key feature of a TH Minerals Filtration System is the **APN SIX Piston Membrane Slurry Feed Pump.** Slurry pumping is insured even for very tough conditions and the APN SIX Slurry Feed Pump design ensures reliability and robustness. Main characteristics are the following:

Maximum reliability and effectiveness

Its hydraulic performance makes it a robust machine that has been designed to work with all types of difficult to pump slurries.

Positive displacement

It maintains flocculation and thus, improves filtration.

Easy maintenance

Accessibility in order to replace clapets and membranes permits a fast and easy maintenance.

Low wear due to only one moving part and its positive displacement

the speed of the slurry in the pumping chamber is quite low compared with centrifugal pumps. The life of the APN SIX pump and its components is very high even when pumping abrasive slurries.

Low energy consumption

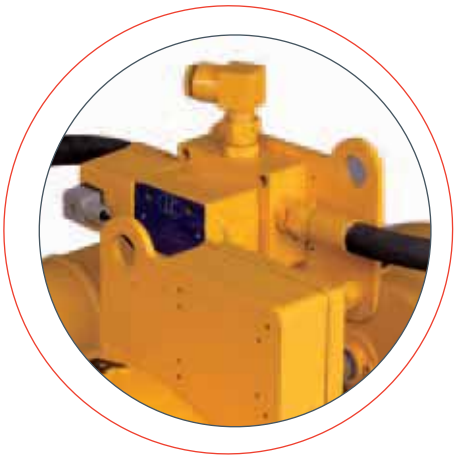
Both the filter press and the slurry feed pump are driven by the same hydraulic unit that includes the load sensing system in order to adjust hydraulically both, pressure and flow.

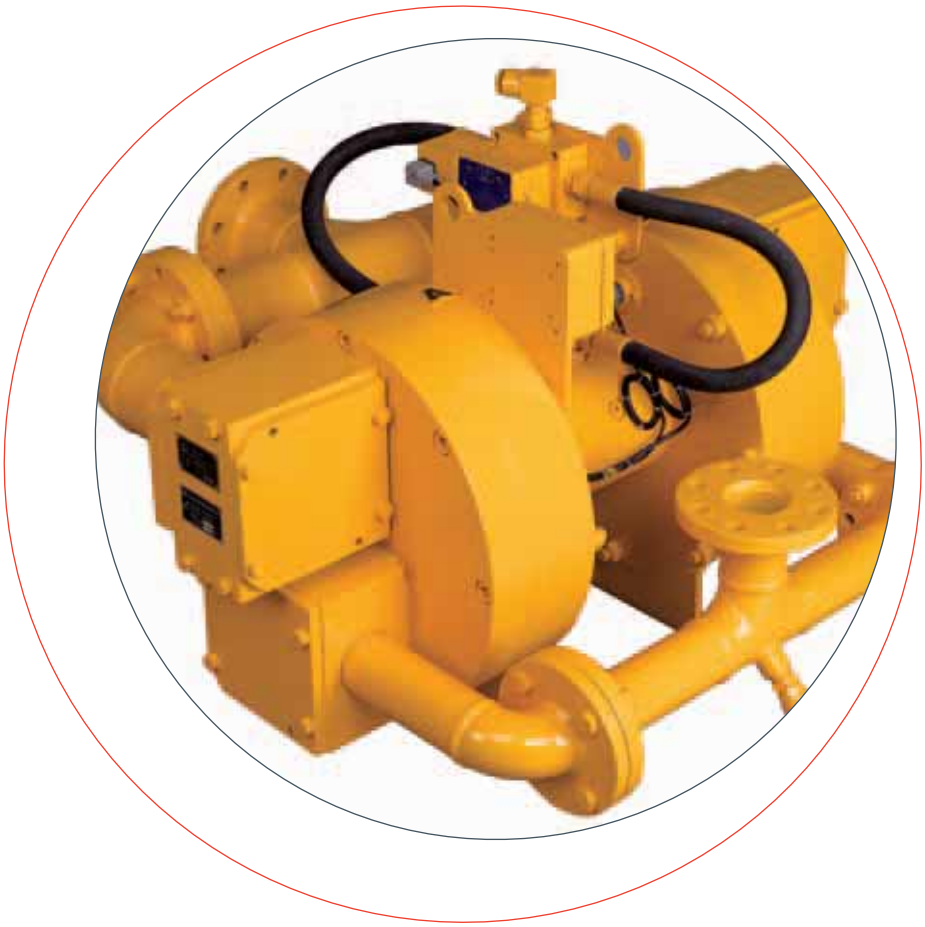
TECHNICAL DATA

The following table shows the standard APN SIX pumps designed for the Mining Industry.

TYPE	SIX 2C	SIX 6CS	SIX 10C	SIX 20C	SIX 40C
Nominal flow (m^3/h)	3	20	40	80	200
Working pressure (bar)	16	16	16	10*	10*
Dimensions (mm) Length x With x Height	740 x 550 x 540	1055 x 1115 x 700	1650 x 1175 x 900	1860 x 1695 x 1060	2770 x 2200 x 1355
Oil flow (l/min)	7	30	60	80	200
Oil pressure (bar)	200	200	200	180	180
Motor power** (kW)	3	11	18,5	22	37
Weight (Kg)	180	605	1770	3320	8400

** Upon request the working pressure can be increased up to 16 bar.*
*** Total motor power including the filter press consumption.*
Variable values depending on the process.





THE EXPERTISE • SERVICE TEAM

Individual Needs

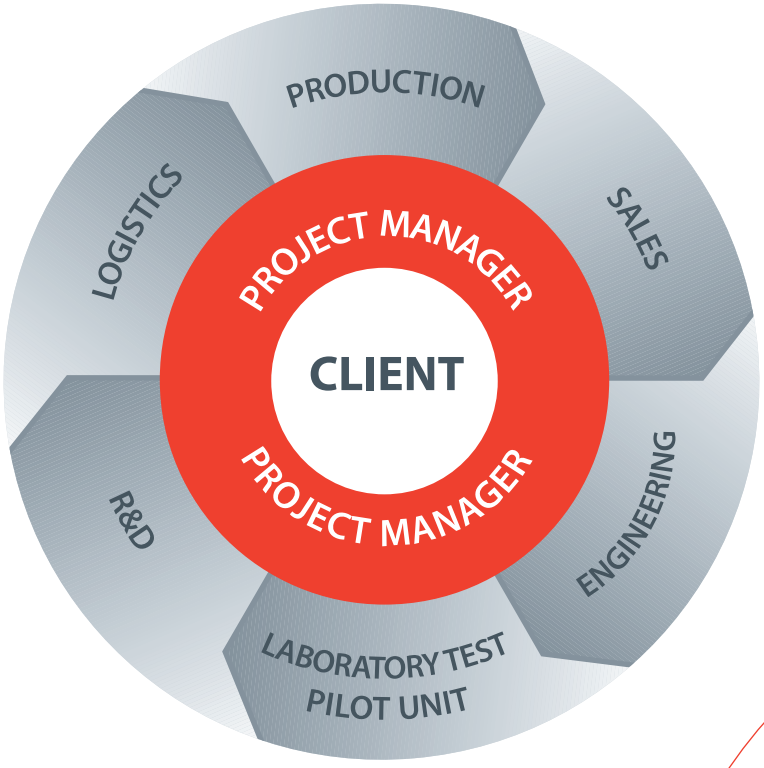
TH Minerals has a large experience in dewatering and filtration turnkey projects. TH Minerals service team counts on a Project Manager that is the link between the client and the company. At the same time, every TH Minerals department involved in a project counts on a Manager responsible to face any requirement from the client.

From the order until commissioning TH Mineral commitment is to obtain project excellence.

Test Pilot Unit and Test Report

TH Minerals Test Pilot Units can be sent anywhere in the word. Tests are carried out directly on the site under the current process conditions. Samples can also be sent to TH Minerals facilities in order to be tested in the laboratory test unit. After discussing such results with the client a test report is issued.

TH Minerals Test Reports provide test process conditions, the results obtained and the recommendations of the most suitable filtration system. The client is always advised on the best solution.



Worldwide Client Service

TH Minerals offers a fast response and variety of services. Services that are usually required by the clients are maintenance and training works, productivity improvement reports, spare parts / wear parts orders or Solid-Liquid Separation consultancy.

TH Minerals counts on a net of subsidiaries and agents around the world with extensive experience in mineral processing that is close to the client in order to give the best service possible. Since 1966 TH Minerals After-Sales Services guarantees performance for life.

A Quality Product and Company

TH Minerals Quality Control includes all the process from the initial phase of design, calculations, definition and selection of materials to the exhaustive protocols of manufacturing and tests, which are followed up during the manufacturing phase, such as welding controls, measurements or sealing.

TH Minerals Quality Control procedures guarantee that the equipments are fully tested and updated to the latest technologies and requirements from the market. In addition TH Minerals is accredited with the ISO 9001 Quality Management Certification and the New Machinery Safety Directive 2006/42/CE.

LOCATION:
STRATEGIC SITE

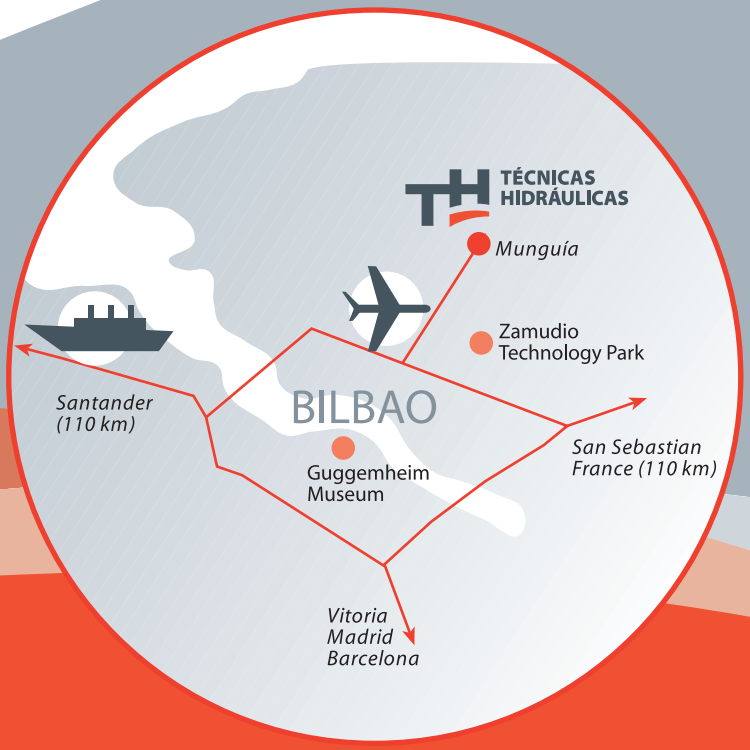
Bilbao

Bilbao (Spain) 15 km

International Port Bilbao (Spain) 25 km

Airport 8 km

Connection for the European motorway network



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