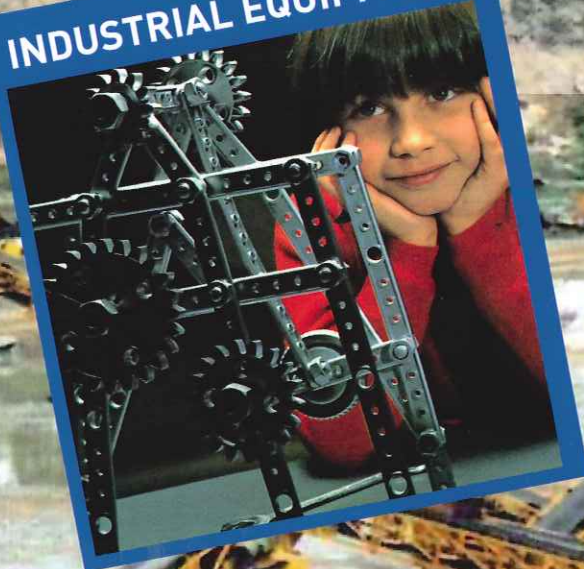


COMSPAIN



XXI
COMSPAIN S.A.

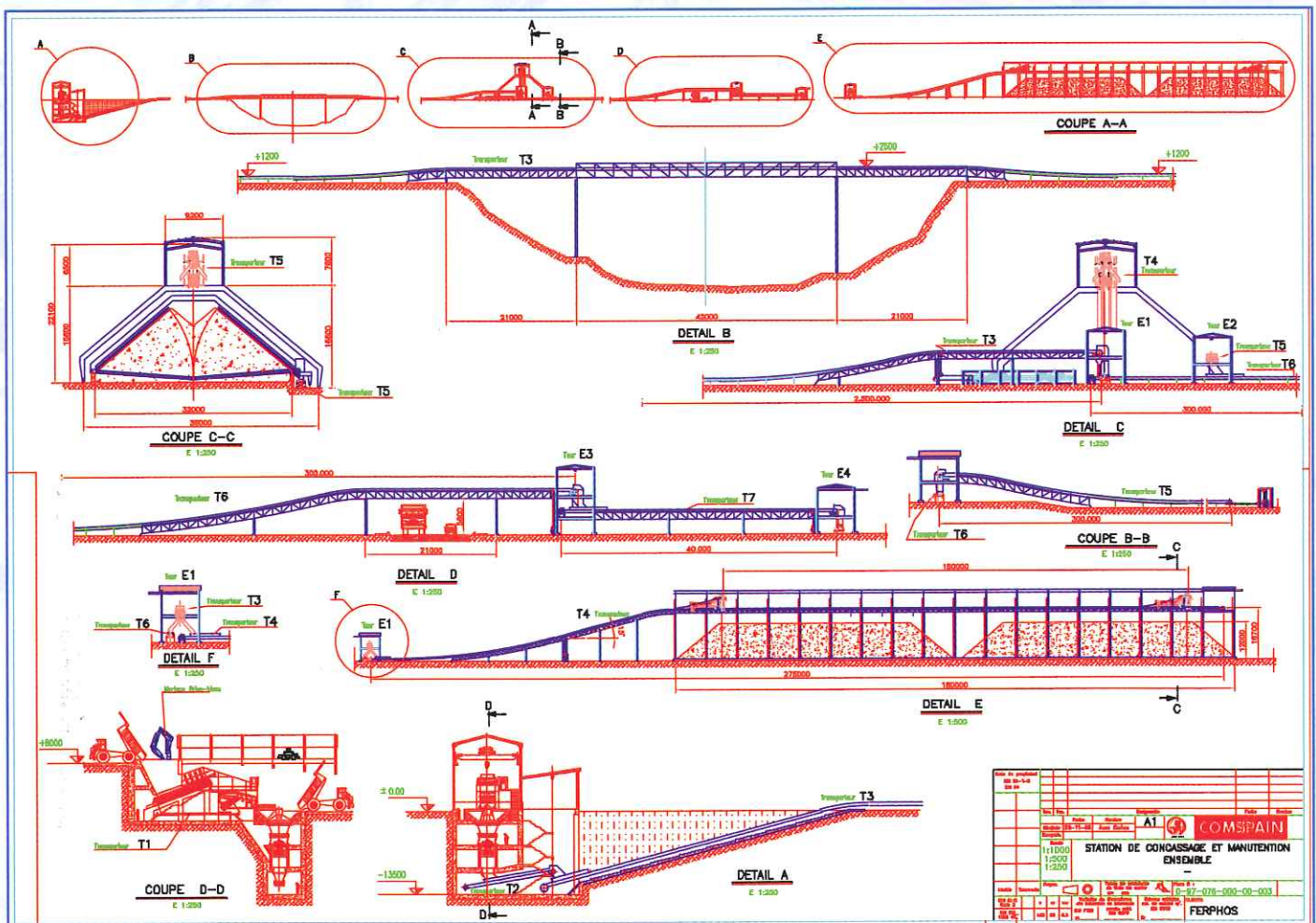
INDUSTRIAL EQUIPMENT



HANDLING AND STORAGE

COMSPAIN : EXPERTS IN DESIGNING AND MANUFACTURING INSTALLATIONS FOR SOLIDS HANDLING AND STORAGE

- Conveyor belts, extracting belts below hoppers, belts in galleries, special belts for organic waste, rigid elevating belts, portable belts, reversible belts, trippers, etc.
- Apron conveyors
- Horizontal chain conveyors, inclined chain conveyors (ashes draining, elevation, etc.)
- Screw conveyors
- Rotary extractors below silos
- Bucket elevators
 - Vertical
 - Vertical, special, without dredging
 - Z-shaped (vertical, horizontal)
- Loaders, stackers
- Dischargers, bucket wheels, scrapers
- Storage parks, indoors or outdoors
- Silos
- Mobile groups
- Gas filtration and purification



HANDLING OF SOLIDS

COMSPAIN can convey and store all kind of rocks, minerals, chemical products and urban waste materials, with productions of up to 7000 t/h, granulometries from "quarry gross" down to a few microns; Parks of up to 250,000 tons and belts of any length as well as special belts.



Reclaimer type bridge with two bucket wheels of 3,500 t/h: ENDESA (As Pontes de Garcia Rodríguez, Spain) Coal, KOCH technology.



Loading framework with reversible and mobile belt: DRAGADOS TIR MADRID (Madrid, Spain) Urban Waste Materials.



Conveyor belts: FERTIAL (Arzew, Oran Algeria) Calcium Ammonium Nitrate.



Silos and bucket elevators: FERTIAL (Annaba, Algeria) Dolomite.



Screw conveyors and silos: FOSFATOS DE CARTAGENA (Escombreras, Spain) Monocalcium Phosphate and Dicalcium Phosphate.

CONVEYOR BELTS

- Conveyor Belts
 - Extracting Belts
 - Belts In Galleries
 - Elevating Belts
 - Feeding Belts
 - Portable Belts
 - Reversible Belts
 - Weighing, Dosing Belts
 - Belts With Trippers
 - Elevated Belts
- Food Industry
Animal Food
Dry Phosphate
Washed Phosphate
Fertilizers
Limestone
Dolomite
Clay
Copper Mineral
Iron Mineral
Waste
Coal
Explosives
Salt
Additives
Clinker
Uranium Mineral
Etc.



Limestone in AGRUMINSA (Gallarta, Spain)



Clinker in REKAYASA (Kupang, Indonesia)



Uranium Mineral in "QUERCUS" Project (Saelices, Spain)

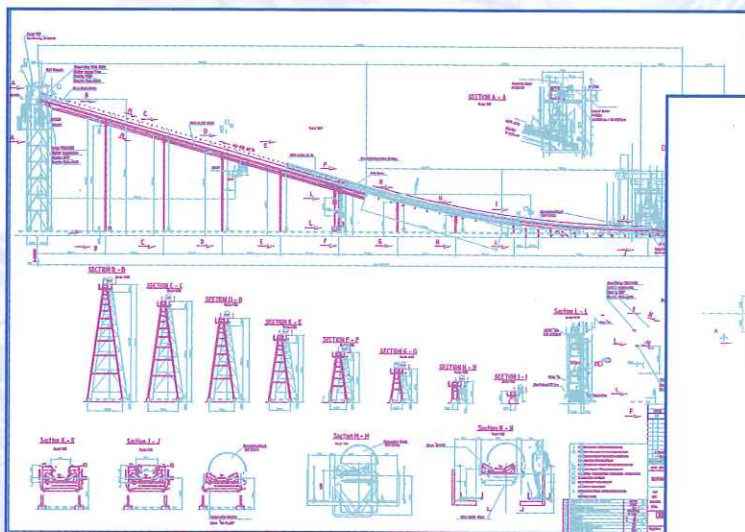
EXPERIENCE AND CAPACITIES

Production: Up to 4,400 T/H
 Width: Up to 3 meters
 Power: Up to 2 x 500 Kw
 Length: Up to 3 Km
 Galleries: Up to 4 belts

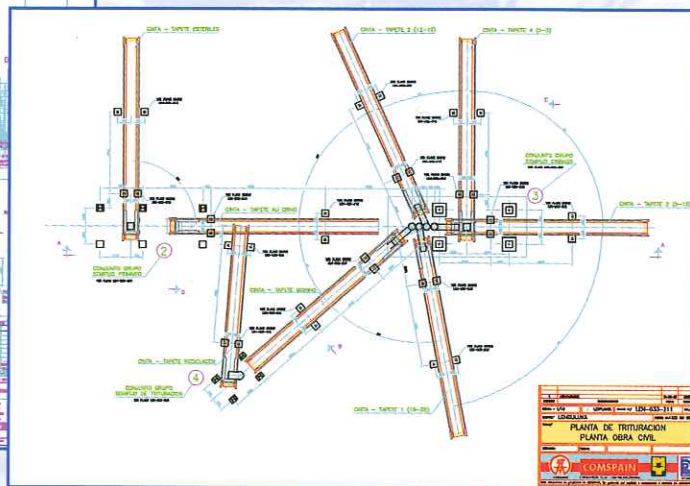
- Magnetic Separators
- Inductive Separators
- Counterweight Towers
- Elevating Towers
- Transfer Towers
- Trippers
- Scrapers
- Safety systems



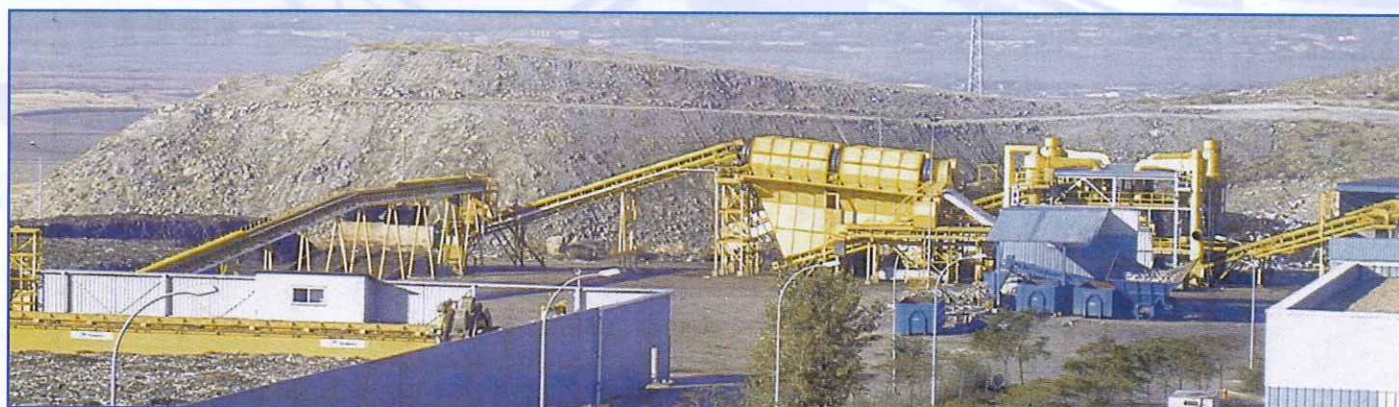
Iron in ALTOS HORNOS DE VIZCAYA
(Sestao, Spain).



Washed Phosphate in GECOPHAM (Palmyra, Syria).



Limestone in LENGULUKA (Benguela, Angola).



Feeding Comspain's Compost Refining Drums in URBASER (Madrid, Spain).

TWO REMARKABLE PROJECTS IN SAUDI ARABIA

The so-called MH1 project ("Material Handling" no. 1) collects the washed phosphate from the AL JALAMID Mine and from the Beneficiation Plant, discharging it from the railroad at a rate of 4,400 t/h.

This phosphate is stored at an indoor park of 21,300 m² and 160,000 T and it is distributed to the whole chemical complex of Ras Az Zawr, made up of factories for ammonia, sulphuric acid, phosphoric acid and complex fertilizers (DAP).

COMSPAIN is also in charge of the collection of additives (Kaolin and silicate), of their storage in silos of up to 13,000 m³ and of their distribution throughout the complex.

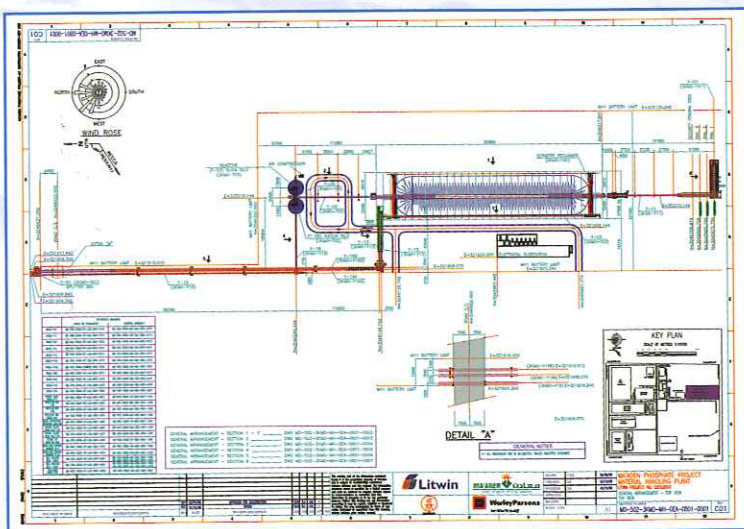
The Project Belts are the following:

	Item	Material	Capacity (T/h)	Belt width (mm)	Power (kW)	Length (m)	Speed (m/s)
1	30MO-Y11	Phosphoric rock	4,400	1,800	2x500	485	3.3
2	30MO-Y01	Phosphoric rock	4,400	3,000	2x500	43.5	0.3
3	30MO-Y03	Phosphoric rock	1,000	1,000	90	305.2	2.05
4	30MO-Y05	Silicate/Kaolin	1,000	1,000	160	111	2.5
5	30MO-Y06	Silicate/Kaolin	1,000	1,000	15	20.5	2.5
6	30MO-Y12	Phosphoric rock	1,000	1,000	75	78.5	2.5
7	30MO-Y13	Phosphoric rock	1,000	1,000	75	87	2.5
8	30MO-Y16A	Phosphoric rock	1,000	1,000	160	487	2.5
9	30MO-Y16B	Phosphoric rock	1,000	1,000	160	487	2.5
10	30MO-Y18	Silicate/Kaolin	100	1,000	30	131	1.75
11	30MO-Y19	Silicate/Kaolin	100	1,000	30	372.6	1.75

The Phosphate Park is fed by a tripper conveyor with a capacity of 4,400 t/h phosphoric rock. The extraction is carried out by a reclaimer or scraper framework with two arms and a 60 m span, with a capacity of 1,000 T/h.

Silos for additives (Kaolin and silicate) – the silicate silo is fitted with a fluidization system, which guarantees a complete extraction by means of canyons and panels.

As a complement to both projects, COMSPAIN has supplied to DRAGADOS INTECSA the fertilizer granulation plant (4 lines of Granulator Drums, Drying Drums, Coater drums, Combustion Chambers, Cooling Fluid Beds, Ammonium Tanks, etc.) with a production of 3 million tons/year.



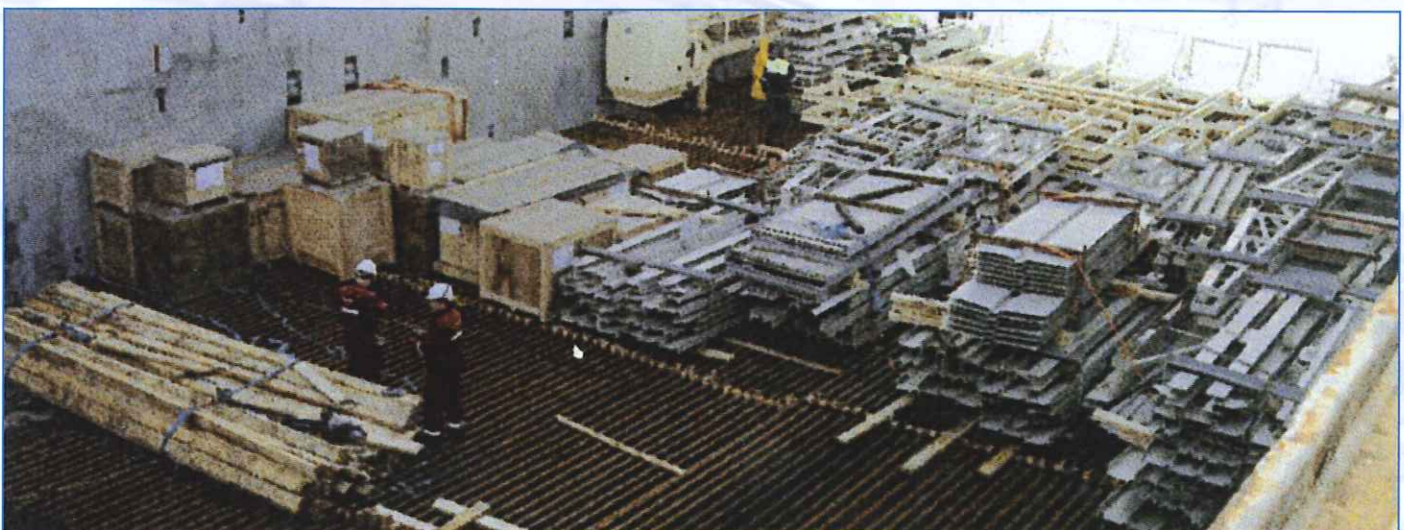
FOR MA'ADEN WITH WORLEY PARSONS AND LITWIN

The so-called "PAP conveyors" project (transportation of the phosphoric acid plant) conveys the phosphate and the additives, by means of a gallery elevated at 25 m, with 4 belts, to the phosphoric acid factory, distributing it throughout each of the three production units.

The product fed amounts to 1,300 T/h and the longest belt has 466 m.

The Project Belts are the following:

	Item	Material	Capacity (T/h)	Belt width (mm)	Power (kW)	Length (m)	Speed (m/s)
1	6110-Y02A	Phosphoric rock	400	800	75	465.9	1.75
2	6110-Y02B	Phosphoric rock	400	800	75	361.7	1.75
3	6110-Y02B	Phosphoric rock	400	800	75	249.9	1.75
4	6150-Y05	Silicatete/Kaolin	100	1.000	45	462.5	1.75
5	6A50-Y01A	Gypsum	245	800	7.5	14.8	1.2
6	Gypsum	Gypsum	245	800	7.5	17.1	1.2
7	Gypsum	Gypsum	245	800	7.5	14.8	1.2
8	Gypsum	Gypsum	245	800	7.5	17.1	1.2
9	Gypsum	Gypsum	245	800	7.5	14.8	1.2
10	Gypsum	Gypsum	245	800	7.5	17.1	1.2
11	Gypsum	Gypsum	245	800	7.5	28.3	1.2
12	Gypsum	Gypsum	245	800	7.5	28.3	1.2
13	Gypsum	Gypsum	245	800	7.5	28.3	1.2
14	Gypsum	Gypsum	245	800	7.5	28.3	1.2
15	Gypsum	Gypsum	245	800	7.5	28.3	1.2
16	Gypsum	Gypsum	245	800	7.5	28.3	1.2
17	6A10-Y04	Phosphoric rock	375	800	7.5	7	1.75
18	6B10-Y04	Phosphoric rock	375	800	7.5	7	1.75
19	6C10-Y04	Phosphoric rock	375	800	7.5	7	1.75



Preparing a shipment

STACKERS

COMSPAIN can supply several types of loaders or stackers, adapting to the product or to the belt, or to the circumstances or characteristics of the mine, quarry, plant or grounds.



They are always sturdy constructions, prepared to last in adverse conditions, and they can be:

- Framework on lanes with an elevating belt and with a reversible and portable distribution belt. For uniform heaps of controlled height.
- Launching belt
- Rotary belt for "bean-shaped" parks
- Elevating belt on one side of the park, going over the whole length of the park on lanes on a lateral ridge
- Belt on top of the storage room, discharging on lateral exits by means of a tripper. It is completed with an elevating belt to reach the level.



RECLAIMERS

We can supply several types of reclaimers:

- Simple Bucket wheels shifting on the bridge. The bridge moves all along the park on lanes and articulated cars.
Inside the bucket wheel there is a belt which discharges the material down to the lengthwise belt.
 - Double Bucket Wheel with the same characteristics. This technology is used when high heaps of triangular section could give uneven productions. These Rotary Bucket Wheels are fitted with static or dynamic scrapers, which help the product slide towards the loading area.
 - Lateral scrapers with lengthwise running on lanes
 - Scrapers on frameworks, with only one articulated arm
 - Scrapers on frameworks, with two articulated arms
- In both frameworks, lengthwise running is carried out on lanes
- Floating scraping assemblies
 - Scrapers on the bridge

It is obvious that, in all scrapers, discharge takes place sideways, towards the extracting lengthwise belt.



ELEVATORS

COMSPAIN manufactures several types of bucket elevators, adapting our technology to the product characteristics and to the production requested.



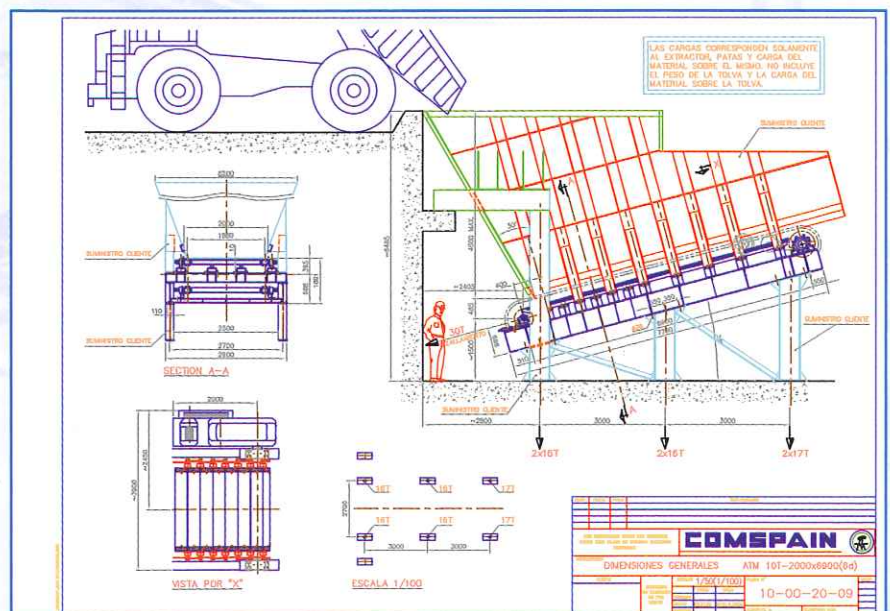
We can supply:

- Belt Bucket elevators for chemical products.
- Chain Bucket elevators, particularly sturdy and suitable for working with hot fertilizers.
- Elevators with vertical loading and discharge by gravity, with articulated buckets and product in contact only with synthetic materials.

APRON FEEDERS

The apron feeders are designed for discharging large size hoppers with products with a high granulometry, and their aim is to feed our vibrating prescreeners (scalpers) in a grid widening cascade.

Construction is very sturdy, resisting strong impacts, and they are fitted with a crumbs-collection belt in its lower part.



MOBILE GROUPS



A typical mobile group is composed of a series of belt conveyors that feed classified products to a receiving hopper. In sequence, this machinery connects to a jaw crusher and a pre-screening device. If separation and diversion of rejection-type materials is required, additional belt conveyors can be deployed.

The portability of a mobile group makes it useful in situations that require adaptation to changes in the location of the work. The ever changing front of a mine's advance and the progression of road and motorway construction are excellent examples of mobile group application.

A new application utilising mobile groups is found in solid-waste managing systems.

They are particularly effective in transporting, reducing and sorting solid materials in an ecological friendly way, as concerns for environmental and economic efficiency become important to the design, construction and operation of these facilities.



The Groups can be "Mobile", over caterpillar or rubber wheels, or "Semi-Mobile", which are sometimes adapted to the homologated dimensions of a container. The latter can be transported by special trucks which make this kind of work.

DIESEL OR ELECTRICAL MOTORS

TYPE		
Mobile Minigroup	600 x 400	40 T/H
Container Group	800 x 400	80 T/H
Mobile supporting group	1000 x 750	175 T/H
Group over skid	1200 x 900	350 T/H

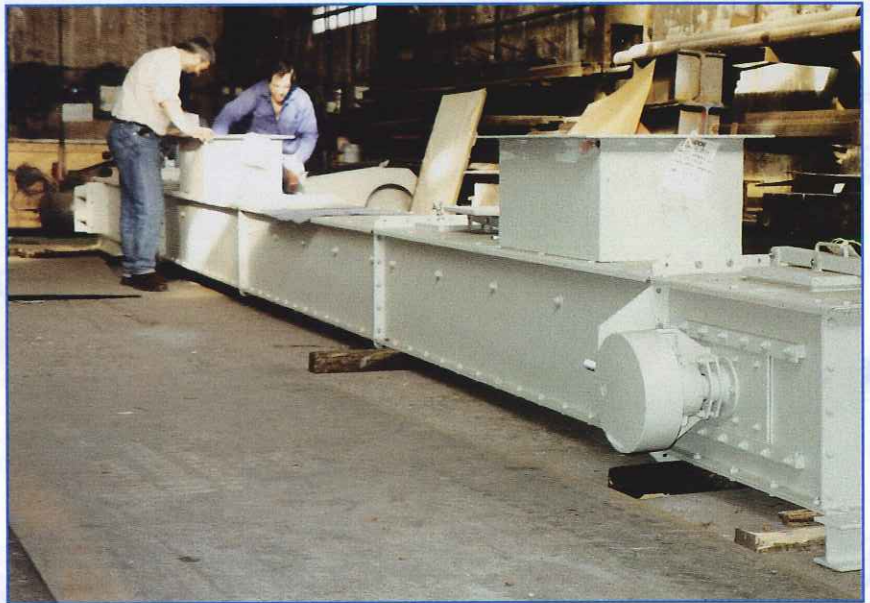


CHAIN CONVEYORS

Chain conveyors are manufactured by COMSPAIN using the best technology in design as well as in material quality, both in the chain and in the scrapers, crazy wheels and driving wheels.

They can be made of carbon steel or stainless steel and they can be adapted to fit different constructive geometries:

- Horizontal
- Inclined, with a pronounced slope
- Mixed, with both horizontal and inclined areas, typical for the draining of ashes from thermal power plant boilers



SCREW CONVEYORS

We can offer a wide range of screw conveyors.

We can build in carbon steel and in stainless steel.

Scrolls can be of full type, belt type, with cuts or with special layouts.

Our design is typically used with reduced speeds.

For long lengths we fit tight intermediate supports, and for fine pulverulent products we fit external bearings, separate from the screw body.



SILOS



Our silos for solid products can reach considerable volumes and capacities.

Upon request, they can be fitted with weighing cells.

High, low and continuous measuring levels are also fitted.

They can be completed with fluidization units or canyons to help the emptying process.

We also manufacture beam activator extractors and bag filters placed on top for the exhaust air.

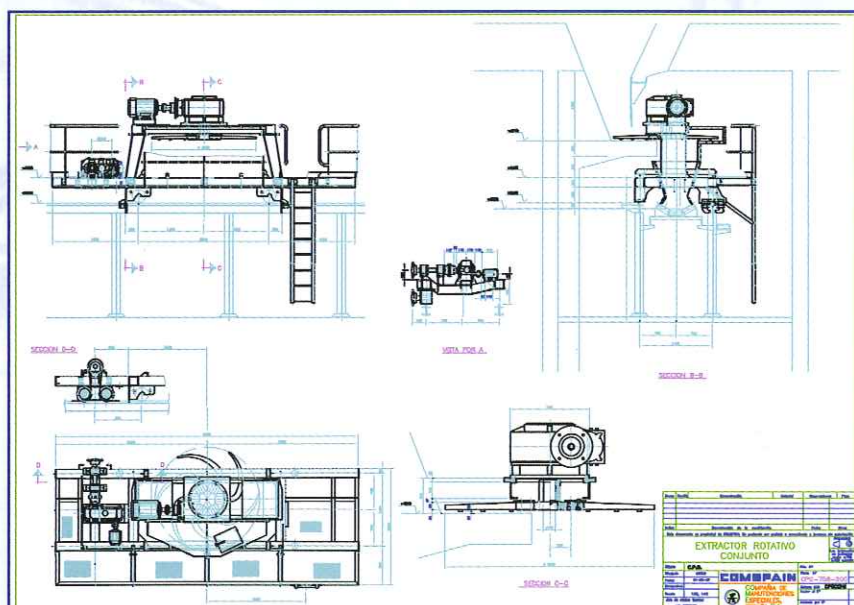
They are typically of metallic construction, with capacities of 250, 500 and 1,000 m³, and concrete silos can reach up to 13,000 m³.

ROTARY EXTRACTORS

Rotary extractors with blades are typical for the continuous extraction of lengthwise silos for dry or wet phosphate.

The extracting car shifts lengthwise all along the silo edge, on both sides of the silo. Motion can be carried out by means of tractor wheels, and, in difficult cases, by chain traction.

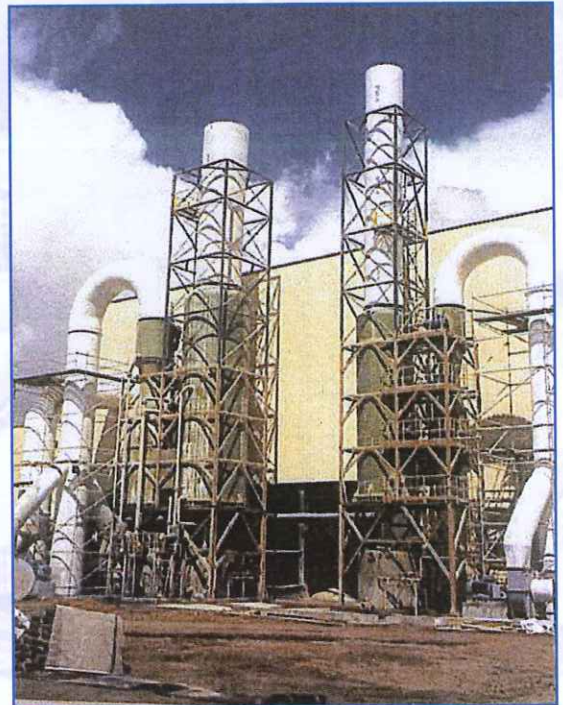
The blade wheel gets into the silo, it helps freeing any caked areas and it discharges onto a lengthwise belt located below the machine car.



INSTALLATIONS FOR GAS FILTRATION AND PURIFICATION

In all solid transport installations there is usually a certain dust emission, which normally should be collected and filtered to avoid environmental problems.

- Bag filters and cartridge filters. High and low gas temperature. Filtering surface from 6 m² up to more than 15,000 m².
- Cyclones and multicyclones
- Dry electrofilters. Flows up to >500,000 m³/h
- Scrubbers, venturis: Medium and high efficiency
- Dry, semidry and humid processes for acid gases uptake with: lime, bicarbonate, soda, etc...
- Desulphuration (SO_x) by dry, semidry and wet way
- Denitrification (NO_x) by "SNCR", "SCR" processes with urea or ammonia

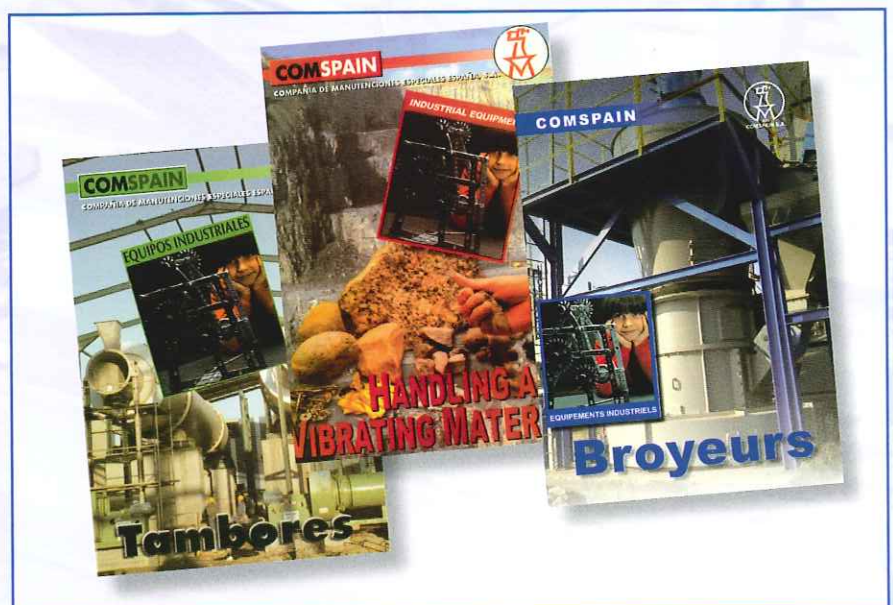


COMSPAIN

COMSPAIN is also one of the first European manufacturers in the past 30 years of:

- Rotary drums.
- Handling & Vibrating material.
- Crushers.
- Fluid Beds.

With special attention to the Complete Plants for the production of Complex Granulated Fertilizers and Porose Ammonium Nitrate for explosives, monocalcium phosphate, dicalcium phosphate for animal feeding, and absorbing clays... among others.



REFERENCES (SUMMARISED LIST)

The Handling Division has been created to cover all industrial activities and to offer our customers a global and safe solution for their installations

Customer	Country, City	Project	Equipment
MA'ADEN	Saudi Arabia, Ras Az Zawr	Handling Material 1	Belts, Silos and Park with scrapers
LITWIN	Saudi Arabia, Ras Az Zawr	Phosphoric Acid Plant	All belts in the plant
DRAGADOS	Spain, Madrid	Valdemingómez Plant	Bucket Wheel, stacker, "tripper" belt, distribution belt and belts in general
LENGULUKA	Angola, Benguela	Grinding Plant	All belts in the plant
FERTIBERIA	Spain, Bilbao	Sefanitro Plant	Feeding and discharge of the Fertilizer Cooling Area
OCP	Morocco, Safi	NPK Plant	Feeding and discharge of the Granulation Area
GECOPHAM	Syria, Palmira	Phosphate Beneficiation	Storage, feeding and discharge of the Drying Area
SOVRAM	Syria, Palmira	Phosphate Washing	Wet phosphate transportation
SOGAMA	Spain, Cerceda	Cerceda Plant	Feeding and exit of drying drums, cyclones extraction, transport to combustible homogeneization park.
ENUSA	Spain, Saelices	Uranium Plant	Feeding and exit of prescreeners and screens
ERCROS	Spain, Escombreras	MCP and DCP Plant	All belts in the plant, bucket elevators, screw conveyors
URBASER	Spain, Estepona	Urban Waste Material Plant	Feeding and exit of classifying drums
ENDESA	Spain, As Pontes	Coal Homogeneization Park	Coal discharge to Central Power Station
FERTIAL	Algeria, Annaba	NAC 27	Belts, Bucket Elevators, Silos
FERTIAL	Algeria, Arzew	NAC 27	Belts and screws
TÉCNICAS REUNIDAS	China, Guixi	NPK / DAP Plant	Chain conveyor
TECI	Turkey, Samsun	GTSP Plant	Silos and chain conveyors
ICF	Tunisia, Gabes	Fluorspar	Silos and belts
S. GUBRE SANAYII	Turkey, Samsun	TSP Plant	Silos and fluidisation
ERPO	Spain, Els Monjos	Urban Waste Material Plant	Feeding and Classification area
IBERDUERO	Spain, Pasajes	Power Station	Coal feeding
INSTALACIONES INDUSTRIALES	Spain, Sestao	Sinter	Classification and transportation
AGRUMINSA	Spain, Gallarta	Limestone Quarry	Classification and transportation
INI	Spain, Valverde del Camino	Pyrrhotite	Chain conveyors, bucket elevators
GCT	Tunisia, Gabes	Wet phosphate	Rotary feeders
GRANUPHOS	Tunisia, La Skidda	NPK Plant	Rotary feeders
CPG	Tunisia, Metlaoui	Raw Phosphate	Rotary extractors



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BUREAU VERITAS
Certification



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