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**ENVIRMINE**

## Dear business partners,

The ENVIRMINE company is an engineering, manufacturing, and supplying organisation providing its customers with the supplies of technological entities and complete technical services in the field of conveying, piling, and processing of loose materials, and with the production of mixtures – stabilising and solidifying agents, the technology to make dry mortar mixtures, the production of concrete mixtures of a concrete mixing plant), mixing all sorts of components in the manufacture of building materials, food industry, etc. We supply ecological units to process and pile the waste materials, especially in the manufacturing plants of power industry (processing and disposal of ash materials). Furthermore, technologies exploitable in metallurgy, coking plants, coal mining as well as building, ore mining, glass and chemical industries and also in the public waste incinerating plants.

The ENVIRMINE company started in 1990. Its core is composed of experts who have longstanding experience in the field of mechanical engineering, mining technologies, waste processing, and in ecological projects. The company operates both ways: by engineering it provides designing, supplying, commercial, technical and advisory activities as well as by manufacturing and assembling along with providing the supplies of technological entities based on a turnkey contract, i.e. if the customer is interested in, the company will provide him with the necessary site work of building.

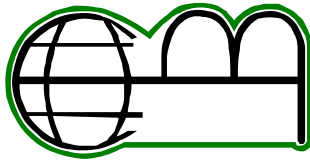
## Principal branches of activity

- Designing, engineering, and supplying activities.
- Manufacture and supplies of technological plants.
- Making projects and supplies of electrical part of building including measurement and control.
- Supplies of technological plants for mechanical, pneumatic, fluidic haulage and storage of loose materials.
- Designing and implementing the technology to make stabilising and solidifying materials from fly ash and slags of black and hard coal, flotation waste, power plant gypsum, contaminated rock, etc.
- Designing and supplies of technological entities for coal and ore cleaning plants, coking plants, smelting works, and quarries.
- Designing and supplies of production plants and mills to make mixtures for building industry ( production of dry mortar mixtures and binding materials, production of concrete mixtures, etc. ).
- Designing and supplies of technological plants for cement works and kilns.
- Projects and deliveries to make fodder mix.
- Technological entities producing mixtures to fill spaces for the purposes of underground mining or piling onto the surface disposal sites made from waste materials of power plants, heating plants, mines, smelting works, foundry plants, etc.
- Designing and supplies of technological entities for ceramic works and porcelain factories.
- Supplies of arch shaped halls and cylinder bunkers including those with great diameters made using a special technology based on coiling up a strip of sheet metal on the spot.
- The equipment to pack and bag loose materials
- Construction and other manufacture

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## **Technological machinery for conveying, storage of loose materials and packaging lines**

( Examples of various technological entities to be offered )

Based on given input data and typical material properties we design, make projects and supply machinery for conveying and storage of loose materials. Where necessary, we provide conveying systems based on mechanical handling, fluidic and pneumatic conveying, or by combining both these systems.

### **Material entry and storage :**

- Storage in dust-free bins – installation of high quality filters.
- Receiving tankers and cisterns of road and railway haulage (Raj wagons), unloading containers, BIG-BAGS, trucks, eventually, unloading the goods in bags, optimally by request .
- The method how to remove materials out of their silos and their dosage is designed in compliance with the properties of the loose material including the necessary aerators and staging devices in the storage bins.

### **Mechanical handling :**

- Standard belt conveyors
- Special FLEXOWELL belt conveyors - vertical conveying of loose materials
- Screw conveyors
- Spiral shaftless conveyors
- Bucket conveyors
- Vibrating feeders and chutes
- Other specific machinery for mechanical handling

### **Pneumatic and fluidic conveying :**

- Chamber feeders ( pressure vessels for conveyance )
- Fluidic conveyors
- Supplying conveying systems with the compressed air ( ventilators, air blowers, compressors )
- Necessary treatment of the NT air
- Conveying routes are designed with regard to the abrasive properties of the material to be conveyed
- Conveying systems are always in dust free design
- Packaging lines
  - Filling the BIG-BAGs with loose materials
  - Sackers
  - Bag-filling machine with palletisation
  - Filling machine to fill the truck cisterns and Raj carriages

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## **The Centre to mix dry mortar mixtures**

( Examples of various technological entities to be offered )

- A package of technology to convey, stock, feed and weigh the raw materials needed for mixing dry mortar mixtures. The product is conveyed to the place it is packed into bags, bulk mobile tanks or into concrete silos.
  
- On customer's demand, it is made possible to dose about 10 principal components automatically, and to add an unlimited number of various types of chemicals manually.
  
- The process of mixing is a discontinuous one and the size of the mixing equipment is at the option of our customer.
  
- The technological process is controlled automatically by the PC found in the control room; in order to access easy control the eye-minded environment called "IN TOUCH" is offered. It is made possible to enter many prescriptions at the option of our customer so that the technological process of mixing the separate batches can run without being influenced by human factors. The system enables weighing the individual components in the weighing receptacles of defined accuracy.
  
- The entire work can be carried out by means of a turnkey contract; that includes the implementation project, delivery of both structural and technology parts, automatic control system, putting into operation, and user training. It is also possible to choose other forms of delivery, e.g. part deliveries by request of our customer.

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## **Systems to make concrete mixtures**

( Examples of various technological entities to be offered )

Based on input data and by request of our customer we design, make projects and supply technological equipment to make concrete mixtures. While in designing, we lay stress on price, efficiency and reliability of the technology.

Mixing of the raw materials according to required prescription with a reproducible accuracy and by request of our customer is carried out. In principal, the feeding and weighing equipment is controlled and checked by computer in order to ensure effective weighing process and documentation and all relevant information is alternatively used during sales. Conveying systems are controlled by the computer monitor and keyboard from the control room or by means of special control consoles displaying the technological process.

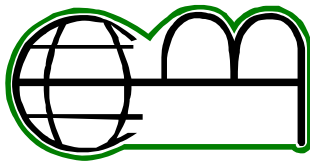
### **Our offer :**

- Designing and planning of the concrete mixing plants to carry out the production and conveyance of concrete
- Supplying of bunkers for gravel aggregate and cement
  - in-line bunkers, pocket chutes, radial storage bins, cement silos, ...
- Machinery to convey and stockpile sand, gravel, and aggregate
  - standard belt conveyors, special FLEXOWELL conveyors , bucket conveyors ,vibrating feeders and chutes, ...
- Machinery to remove materials out of the bunkers
  - belt conveyors, screw conveyors, and shaftless spiral conveyors, ...
- Technological entities to weigh and dose the elementary materials and addition agents
  - weighing conveyors, weighing strain-gauge receptacles, skip car weighing
  - accurate dosage of water and liquid additives for concrete mixture
  - measurement of levels, pressures, and dampness of the elementary materials and additives
  - consistence measurement of the concrete mixture in mixing process
- Equipment to recycle remnants of concrete and to dose sludge liquor
- Steel structures and halls

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## **The centre to process ash matter, gypsum and other waste materials**

( Examples of various technological entities to be offered)

- Ash matter processing plant – mixing that is designed by ourselves has been field tested in the long term during the installation of these plants in the coal mining districts such as ČMD, OKD as well as in uranium mines. The plant is located close to the downcast or upcast air shafts (in coal mines installations), or on the customer's demand (close to a stockpile, in the place of application where mixtures are used for building purposes, etc.)
- Mixtures can be prepared from waste materials such as ash matter and slag making materials by adding various additive or binding agents (e.g. lime and cement to stabilise or speed up the solidification, or to enhance the solidity of the mixture, etc.)
- To make a stabilising agent from the desulphurisation products it is gypsum (in solid or saturated consistence), fly ash from the electrostatic precipitator and the required amount of lime that are needed.
- The process of mixing is either continuous or discontinuous (batching) with an option of gradual control of the output with specified feeding along with weighing of single components of the mixing process.
- On customer's demand the technological process is controlled manually from the control centre or it is fully automatic.
- The fabrication can be carried out starting from supplying the equipment for discharging, conveying and storage of ash matter and various units (such as bunkers and stock piles), through the particular deliveries of the technological equipment for staging and mixing including electrical equipment, measurement and control, up to a turnkey contract. The form of the delivery is tailored to customer's demands.

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## **Designing and other mechanical engineering products**

( Examples of various technological entities to be offered )

Based on input data and by our customer's request we design, make projects and supply steel erections, structures and their equipment for installation of technological entities including surface treatment.

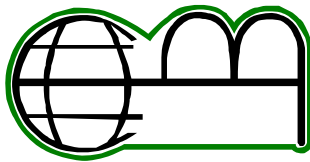
### **Our offer :**

- Steel erections
- Steel shops and storage halls
- Sheathing of buildings using shaped steel sections
- Air conditioning conduits, piping, etc.
- In-line storage bins, pocket chutes, radial tanks, cement silos, fly ash bunkers, etc.
- Products made by bending and compression moulding
- Locksmithery products
- Manufactured products

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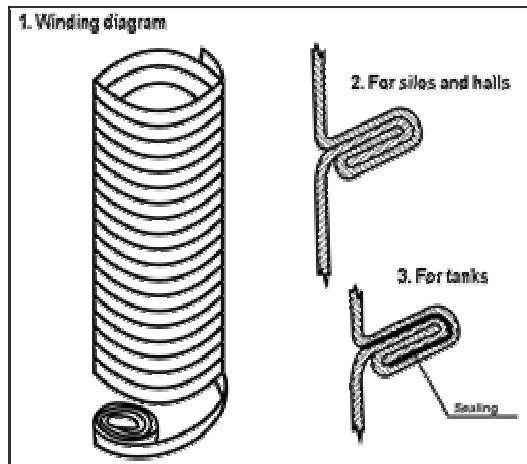
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## Arched halls and cylindrical LIPP bins

( Examples of various technological entities to be offered )

We design, make projects, and supply assembled arched halls and cylindrical bins made by the special technology – LIPP system. The manufacture is carried out on the spot using special machinery that joins a strip of metal sheet by winding it up so as to make a spiral. The strip of sheet metal is joined up with double borders.



### Material :

2 – 4 mm deep-drawing sheet.

The sheet can already be provided with anticorrosive finish or it can be sprayed and/or painted while the housing is being wound .

### Parameters :

Sizes – practicable housing diameters – minimum 4.5 m, others 5, 6, 7, 8, 9, 10, 12, 14, 16 up to 18 m.

The height of the housing is arbitrary, it is limited only by the statics of the structure – up to 20 m.

The most suitable surface treatment provides the zinc-coated sheet that is varnished or it might be paint coated additionally. It is advantageous to use stainless sheet steel for tanks.

### Utilisation :

1. Tower silos for loose materials – cement, lime, fly ash, granulated plastics, wood waste, sawdust, seeds and granulated feed, corn and the like.
2. Reservoirs for liquids – water tanks, settling lagoons for sewage treatment plants, sewage from chemical processes, etc.
3. Halls and shelters – garages, defrosting tunnels, warehouses for lump materials, fruit and vegetables, garden cots, sheds for building materials, coal, sand, etc.

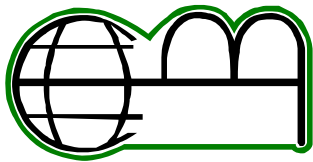
### Merits :

1. Despite the LIPP structure is light it shows enormous rigidity against internal and external pressures as the housing perimeter is reinforced using double borders.
2. Arbitrary storage capacity of the towers and tanks ranges from approx. 50 m<sup>3</sup> up to 3, 500 m<sup>3</sup>.
3. Low purchase costs.
  - Where necessary, it is possible to spare your site area using a greater height and a lesser diameter of the housing.
  - The structure can be built very quickly, the winding process takes only a few of hours.
  - There is no need to erect scaffolding in order to fit structural elements and paint the housing.
  - Lower material usage: 2 – 4 mm metal sheet
4. High lifetime and insignificant maintenance costs.

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## **Mining activity**

( Examples of various technological entities to be offered )

- As for mining activity, our company is especially aimed at designing and carrying out the technology for cavingless mining methods.
  
- The purpose of these activities is to enhance safety work and health protection in the course of mining operations, to reduce negative impacts on the environment and minimise the extent of damage, as well as land reclamation.
  
- We design the mining technologies to fill the stoped-out workings with a solidifying filling.
  
- In order to carry it out we design convenient prescriptions to make the filling mixtures of useful properties as well as the technology of their production.
  
- We design, make projects, and supply our customers with technological plants to make the designed filling mixtures for the stoped-out workings.
  
- We carry out all the necessary measurements of the properties of these filling mixtures.

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## A LIST OF CHOSEN REFERENTIAL PLANTS

### **OKD , a.s.**, Darkov Colliery, PZ

The ash matter mixing centre. This centre provides the production of ash matter and fly ash-concrete mixtures suitable for depositing into the underground spaces. The Centre contains the following technologies: pneumatic haulage of fly ash and cement into the bunkers, truck cistern discharging, batching and mixing machinery. The continuous mixer made by ourselves. The output is 60 m<sup>3</sup>/ hour, ash-concrete mixture , thickening is approx.1400 – 1600 g / l , content of cement approx. 2 – 4 % , selectable by the user.

### **Českomoravské doly , a.s.**, Kladno Colliery, Ronna Plant

The ash matter mixing centre. This centre provides the production of ash matter and fly ash-concrete mixtures suitable for depositing into the underground spaces. The Centrum contains the following technologies: pneumatic haulage of fly ash and cement into the bunkers (truck cistern discharging), cement and binding agents, truck cistern discharging, batching and mixing machinery. The continuous mixer is made by ourselves. The designed output is 25 – 35 m<sup>3</sup> of mixture per hour. Available output 45 m<sup>3</sup>/ hr ash matter mixture of high thickening.

### **OKD, a.s.**, Paskov Colliery, Staříč Plant II

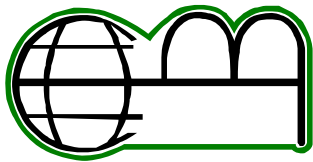
The ash matter mixing centre. This centre enables ash matter mixing to reach the state of dampness and loading the moistened fly ash into pit cars or containers in dust free and ecological design. The centre contains the following technologies: fly ash conveyed into the storage bin by pneumatic haulage (truck cistern and RaJ carriage discharging ) , batching and mixing machinery . The continuous mixer made by ourselves.

### **Českomoravské doly , a.s.**, ČSM – South Colliery, Stonava

The ash matter mixing centre. The centre provides the production of ash matter and fly ash-concrete mixtures suitable for depositing into the underground spaces. The centre contains the following technologies: pneumatic haulage of fly ash and bonding agents (cement, slag) – truck cistern and RaJ carriage discharging, batching and mixing machinery, the mixture is handled hydraulically into the pit. The continuous mixer is made by ourselves. The output of the plant is 35 – 55 m<sup>3</sup>/ hr. The fly ash-cement mixture is thickened up to 1200 – 1600 g / l.

### **OKD , a.s.**, ČSA Colliery, Doubrava Plant

The ash matter mixing centre. The centre provides the production of fly ash matter and fly ash-cement mixtures suitable for depositing into the underground spaces. The centre contains the following technologies: pneumatic haulage of fly ash and bonding agents (truck cistern discharging), fly ash is conveyed 450 m from the boiler plant to the mixing plant, discharging of non deposited fly ash from lorries and conveying plus batching by adding the damp fly ash in the mixer, batching and mixing plants, dry ash sacking/bagging. The continuous mixer is made by ourselves. The output is 50 t / hr of filling mixture. The fly ash-concrete mixture with addition of redeposited ash matter and clinker, the supply of matter using truck cisterns and RaJ wagons, lorries. The mixture thickened up to 1,200 –1,700 g/l and conveyed by hydraulic transport.



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**Českomoravské doly , a.s.**, ČSM Colliery–North, Stonava

The ash matter mixing centre. The centre provides the production of fly ash and fly ash-concrete mixtures suitable for depositing into the underground spaces. The centre contains the following technologies: pneumatic haulage of fly ash and bonding agents into storage bins (truck cistern discharging), fluidic handling of fly ash, loading truck cisterns and pit cars with fly ash, batching and mixing plants. The continuous mixer is made by ourselves. The output 15 – 45 m<sup>3</sup> / hr. Sorts of mixtures produced: fly ash, fly ash-concrete, with another stabilising agent (e.g. ground lime). Supplying by truck cisterns or by RaJ carriages. The mixture thickened up to 1,200-1,700 g/l and conveyed by hydraulic transport.

**OKD , a.s.**, Paskov Colliery, Paskov Plant

The ash matter mixing centre. The centre provides ash matter mixing. This centre enables the ash matter mixture to become damp and the moistened fly ash is loaded into pit cars or containers in dust free and ecological design. The centre contains the following technologies: fly ash pneumatic haulage (truck cistern discharging) into the storage bin, batching and mixing machinery, pit car loading. The continuous mixer is made by ourselves.

**Severočeské doly , a.s.**, Ledvice coal cleaning plant

Pneumatic haulage of ground lime from the RaJ carriages and truck cisterns up to 250 m. Storage of lime in bunkers and the production of additive fuel made from brown coal.

**Cement Bohemia , a.s.**, Králův Dvůr cement mill

The implementation of technological equipment to add fly ash to cement. The batching accuracy is below 1 % .

**Cementárna Hranice, a.s.**

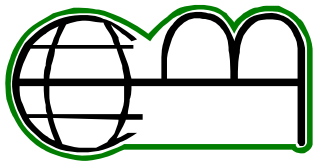
The technical system and the "Terminal" project to load sintered clay. The sintered clay is conveyed and loaded onto railway carriages using the dust free system with capacity 350 t / hr.

**Nová huť Ostrava, a.s.**

Discharging and moistening of coke dross. The coke dross is removed from the filters; it is then moistened to become dust free in the mixing plant and transported on to the wagons. The continuous mixer is made by ourselves.

**Cement Hranice, a.s.**

Production of dry mortar mixtures – the turnkey contract. The output of the fully automatic plant producing dry mortar mixtures is 60t/hr. The FORBERG mixer F2000. The product is transported to the truck cisterns or to the packer.



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### **Teplárny Karviná, a.s.**

The dry process of slag removal – the slag is removed from boilers K 1 – K 4 to the TKV and it is automatically conveyed onto the truck containers.

### **Teplárny Karviná, a.s.**

Installation of the necessary technology and the filter press for sewage water from the chemical water treatment plant.

### **Třinecké železářny, a.s.**

Removal of dust from the electrostatic separator at the agglomeration (2 filters, agglomeration plants 3 and 4) – sintered fly ash. The pneumatic haulage and dust mixing using the FORBERG F500 mixer enables the dust to get moistened, the product is transported to the dump, part of the dry dust is conveyed and deposited in the truck cisterns and containers.

### **Třinecké železářny, a.s.**

The implementation of the fully automated coal grinding plant at the TZ coking plant with the outgoing granulation 0-2mm, including dust free loading on to railway carriages with the output 86t of coal per hour.

### **Keramtech Žacléř**

The installation of equipment homogenising the porcelain matter. Output 24 t.

### **OKD, OKK, a.s. – Koksovna Svoboda**

Batching and mixing of coal charge for coking kilns – continuous mixer FORBERG F-1000 Conti, coal and coke dross are mixed together with the output 100 t / hr. Two of these production plants are installed there.

### **ČLUZ, Nové Strašecí**

The semimobile (transferable without costly construction work) continuous mixing centre to process fly ash from fluidised combustion. Fly ash is mixed with water to become saturated and the mixture is deposited into the extracted spaces of a quarry. The output of the mixing centre 50 t / hr of fly ash (powder density 0.6 t / m<sup>3</sup>), which represents 83 m<sup>3</sup> of fly ash / hr. The continuous mixer is made by ourselves. There is a hydraulic transportation system to the dump.



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### **ČERNUC, the sand pit area**

The semimobile continuous mixing centre to process the fly ash developed from fluidised combustion. The

fly ash is mixed with water to become saturated and free of dust and the mixture is deposited into empty spaces of the sand pit. The output of the mixing centre is 50 t of fly ash / hr ( powder density 0,6 t/m<sup>3</sup> ), which represents 83 m<sup>3</sup> of fly ash/ hr. The continuous mixer is made by ourselves.

### **U.S. STEEL Košice**

The sintered fly ash is mixed with water to become saturated and free of dust – FORBERG F-200 mixer, the product is conveyed to the removal route. There are four of these technologies altogether.

### **ŠKROBÁRNÝ HORAŽŤOVICE - AMYLEX**

The acidification line for starch. This line makes it possible to batch starch and mix it perfectly with hydrochloric acid. This raw material is fundamental for the production of dextrin. The mixer FORBERG F-350 is used there. The output of this plant is 3.5 m<sup>3</sup> of mixture per hour.

### **NORSK HYDRO - Sunndalsora Norway**

Deliveries and installation of special ventilation louvres for the aluminium works having an 800 m long hall.

### **Cable works KABEX Holýšov**

Project, manufacture and delivery of "machinery to mix components for the production of cable insulation"

### **OSRAM Bruntál**

Conveyance of ground limestone and magnesite into a bunker and limestone charging into a reaction chamber along with acid and water with 1% accuracy.