INNOVATIVE LARGE SCALE SILO STORAGE SYSTEMS

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Best partner for the best fit

With more than 160 Eurosilos built around the world and more than 50 years of experience in the Agribulk, Power and Chemical industry, ESI has become a global leader in advanced storage solutions for non-free flowing bulk materials. We work closely with contractors, engineering firms, operating companies, various suppliers and manufacturers. Our goal is to make each project work and to deliver technology that helps you meet your requirements in the best possible way. Hence, best partner for the best fit. The fully enclosed and highly automated Eurosilo system offers more economic, more sustainable operation at production sites around the world.

Leading the way in future proof silo storage

End-to-end approach

As an engineering firm and contractor, ESI can manage projects in every phase, from feasibility study and engineering to production, assembly, commissioning and takeover. So you are assured of one partner with the right expertise and control throughout the project. In addition, we offer a range of services that will keep your Eurosilo running safely, smoothly and at low cost over a lifespan of decades. As an independent company we are not tied to manufacturers or suppliers. This enables us to work with local parties and existing suppliers within your network.

End-to-end project approach

• Feasibility study

• Basic engineering

Detail engineering

• Procurement

Manufacturing

• Erection

• Commissioning

• Take over

• After sales services

Cost saving, safe and reliable

For each type of bulk material stored in an industrial production environment, our engineers and project managers are dedicated to find the best possible solution for the customer. The silo system combines reliability and safety with a large storage capacity on the smallest possible surface area. At the same time it complies with

Three different bulk handling systems

What started in the late sixties as an innovative storage solution for potato starch, has developed into a range of silo storage systems for producers all over the world. To cope with the different characteristics of products such as coal, FGD Gypsum, potato starch, fly ash or fertilizers, we have developed 3 different bulk handling strict environmental legislation through enclosed storage and automated material handling. Most importantly, the Eurosilo system provides significant savings on maintenance and operational costs. This in turn leads to a very short payback period and a very favorable TCO, given its lifespan of 30 years or more.

systems. These allow you to handle any bulk solid, whether it is cohesive, flammable, hygroscopic or with very fine particles. Input, storage and discharge can be handled without blocking. The enclosed storage keeps the products in perfect condition.

MASS FLOW	SLOTTED COLUMN	SHUTTER COLUMN
Steam coal	FGD Gypsum	Potato Starch
Petcoke	Ammonium Sulphate	EAFD
Ore	Fertilizer	Fly Ash

Infeed

Mass flow system for controlled extraction of coal and petcoke

CLEANEST COAL STORAGE



Outfeed

WORKING PRINCIPLE

The Eurosilo system offers storage capacities of up to 100,000 m³ so far. The coal is fed from the top of the silo into a telescopic chute through which it reaches the distributing frame on the coal surface. The distributing frame with screw conveyors spreads the material evenly over the entire area of the silo, layer by layer. Reclaiming is done by withdrawing coal from the hoppers and by inducing core flow. The distributing frame feeds the coal into the formed core flow.



BUILD-IN SAFETY SYSTEMS

The Eurosilo is known as the safest storage method on the market. It comes with a range of sensitive safety systems. The air monitoring system ensures the measurement of carbon monoxide, methane and oxygen. By monitoring carbon monoxide, changes in concentration can be localized to indicate hotspots at a very early stage. A number of systems are in place to minimize the influx of air. In addition, a nitrogen purging system and a foam or gel spraying system can be installed to prevent and counteract rises in coal temperatures.

FUEL MANAGEMENT

Most power plants can only operate at the highest efficiency rate by burning a designated coal blend. The Fuel Management System helps to prepare the right blends at the right time. The software visualizes the different grades of coal in different silos and enables the operators to plan the coal blending in the optimal way. The boiler specifications and the coal characteristics are the input data of the Fuel Management System as well as the actual storage levels. By reclaiming the respective coal grades from each silo in a controlled and adjustable rate, the optimal coal blend can be prepared.

KEY FEATURES OF THE EUROSILO SYSTEM

- No pollution or loss of calorific value
- Minimal footprint for large scale storage
- Safest storage method in the market
- Maximum logistic control and flexibility
- Minimal operating and maintenance costs
- High availability due to minimal downtime



200.000 M³ STORAGE AT THE CLEANEST POWER PLANT IN EUROPE

The 750 MW coal-fired power station in Lünen, Germany, is the cleanest and most efficient coal-fired power station in Europe. It serves more than one million citizens in a densely populated area. Therefore, the power station has the highest standards in safety and environmental friendliness. The Eurosilo system fully complies with safety standards. Risks of fire, explosion and pollution of air and ground water are reduced to an absolute minimum. Monitoring and warning systems are built into the two silos of a 100.000 m3 each, while the Fuel Management System and the automated operation enable optimal coal blending. The power plant in Lünen has received several awards since its commissioning in 2013.



Slotted Column for reliable reclaim of FGD Gypsum and fertilizer

OPTIMIZED SOLUTION

The Eurosilo system offers a reliable storage solution for non-free flowing bulk materials such as FGD Gypsum or Ammonium Sulphate. The FGD Gypsum Eurosilo building combines three vital functions with dewatering on top, storage in the middle and load out underneath. Instead of separate dewatering and transport to a storage and load out facility there is just one automated, cost saving and reliable solution. In addition, the FGD Gypsum silos are equipped with a drainage system on the bottom to prevent the formation of a sludge layer. More than 80 FGD Gypsum silos, and counting, are in operation at power plants around the world.

SMOOTH RECLAIMING

To prevent blockages, the slotted central column is designed for the smooth reclaiming of consolidating materials. Horizontal screw conveyors transport FGD Gypsum toward and through the slots, formed by the horizontal flat rings, so that it can flow freely downwards through the open central column.



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PROTECTIVE STORAGE

In order to deal with the hygroscopic characteristics of basic materials, the Eurosilo system offers a controlled environment inside and a well-protected environment outside. Use of non-corrosive materials protects the storage facility from damage or leaking due to the corrosive content. Filling and reclaiming of non-free flowing materials like ammonium sulfate or common salt can be perfectly handled by the slotted column system. This system is a well-proven concept to reclaim materials that are too cohesive for a core-flow system as used for e.g. coal and petcoke.

RELIABLE LOGISTIC SOLUTION

The main applications of the Eurosilo in the chemical or mineral industry are the storage between the production and the transport modes and the storage of the raw materials as input for the factory site. Because our Eurosilo systems are integrated in the production workflow, they are designed and built to be compact, robust and reliable. To ensure flawless operation, ESI offers inspection and maintenance services as well as a worldwide 24-hour technical service.

KEY FEATURES OF THE EUROSILO SYSTEM

- Flawless reclaim of cohesive material
- All-in-one solution for FGD Gypsum storage
- Controlled storage for hygroscopic materials
- High automation capacity minimizes operating costs
- Complying with severe environmental regulations
- Maximum logistic control and flexibility



RELIABLE STORAGE AND RECLAIM AT UNIPER BENELUX

The Maasvlakte Power Station in the Netherlands is a coal- and biomass-fired power station, owned by Uniper Benelux. To meet the latest emission requirements, the power plant is equipped with flue gas cleaning systems. ESI was asked to replace the initial storage system for FGD Gypsum as this system continued to cause logistic problems and extra costs as a result of block ups and down time. Since the retrofit in 2016, the Eurosilo system handles the storage successfully at the power station.

Shutter column handles starch, EAFD and fly ash without fluidization

CONTROL OF VERY FINE PARTICLES

Bulk materials with a very small particle size such as potato starch, fly ash or electric arc furnace dust (EAFD) have a tendency to fluidize when put into motion. This is the process by which the granular material changes from a solid to a liquid state, making effective bulk handling almost impossible. Enclosed storage in combination with the specially designed shutter column system enables producers to handle these materials in a controlled manner. Since its introduction in the 1960s, the shutter column system has performed successfully in food processing companies in the agribulk industry and more recently in recycling companies in the metal industry.

WORKING PRINCIPLE

The bulk material is brought into the silo from above via a filling conveyor and loading chute. During filling, the distribution frame spreads the material over the surface in the silo. A roller shutter column is programmed to open and close at a certain speed. By only opening the hatches at the surface of the stored mass, the material is conveyed by the distribution frame and a ring conveyor into the shutter column. As reclaiming progresses, the height of the distribution frame determines the correct opening/closing of the shutters in the column.



KEEPING POTATO STARCH AVAILABLE

The Eurosilo system is designed for the storage of large quantities of (potato) starch in order to keep it available during successive seasons. The use of stainless steel, the moisture free conditions and the elimination of residues in the silo prevent the organic material from being affected. Potential hazardous conditions are minimized by designing according to ATEX regulations. Given the potential economic impact of bulk market price fluctuations, the initial investment and low operating costs of the Eurosilo system make it an attractive solution.

SUPPORTING EAFD RECYCLING

Electric arc furnace dust (EAFD) is one of the by-products of the steel industry. As it is a hazardous solid waste, the use of EAFD as a source of new valuable raw material such as zinc offers both economic and ecological advantages. The only way to store and process the EAFD is to use a Eurosilo system, equipped with the shutter column system.



LARGE SCALE POTATO STARCH STORAGE FOR KMC

After evaluating the market developments, KMC decided to build the largest starch silo so far with a storage capacity of 88,500 m3. The new potato starch silo had to be built on the existing factory site in Karup. Due to its minimal footprint and logistical flexibility, the Eurosilo system offered the most space saving storage solution. According to the tight planning for this project, ESI Eurosilo designed, produced and installed the internal machinery, including the 50 meter high central roller shutter column for the supply of the very fine starch. Within 9 months of the order, the large-scale potato starch silo was put into operation.

After Sales Services to keep performance up



When technological issues, environmental regulations and cost reduction require a complete overhaul, ESI can provide a tailor-made retrofit for your silo system. In fact, we install complete new mechanical equipment in your existing silos on your factory site. We can also supply new bulk material handling equipment within your current storage facilities.

MAINTENANCE

To avoid costly breakdowns and downtime, you can rely on our technical specialists for preventive maintenance at agreed times. Preventive maintenance of the control system, material handling mechanisms and safety equipment ensures maximum uptime while extending the life of your installation. To support the logistic flow of process plants in large industries, we offer customized preventive maintenance at a fixed rate per year.



MIDLIFE CONVERSION

A new silo will always perform better than a system that was built decades ago. Instead of building a completely new silo system, we can also perform upgrades and modifications that improve performance and safety, while saving operational costs. By means of a conversion you can update and improve older silo equipment according to current standards (ATEX, NFPA and CE) and the latest techniques. A conversion could also enable the user to store new products in the existing facilities.

INSPECTIONS

To ensure that your silo system remains in operation after years, you can sign up for an annual inspection service. The extensive inspections include finding facts, the basic design in case of necessary modifications or repairs, and a clear study of the costs and planning. If your silo system is in perfect condition, we are happy to inform you. With timely inspections, we can significantly extend the lifespan of your installation at controlled costs.

SPARE PARTS

Over time, technology changes drastically. This makes keeping track of specific parts and suppliers vital. As a specialist in our industry, we can quickly provide insight into the availability of wear and spare parts. Our Wear and Replacement Service is ready to meet all your needs.







Flexibility First

In today's extraordinary times you have to meet challenges, no question about that. The scope of our business however, is much wider than next year or even the next five years. Our customers need to decide on projects that impact their performance for decades to come. This requires availability of the right expertise at the right time and moment, and accurate execution of scheduled works and projects when they reach the stage of implementation, sometimes many years later.

We simply always have to be there for our customers. What we see is that flexibility has become a key element to make large projects work. Flexibility as a team at ESI, flexibility to work with partners and stakeholders, and as a part of project teams around the world.

Reliability and flexibility is how we built trust, being 'The best partner for the best fit'.

Henri de Boer Managing Director ESI Eurosilo

Our engineers integrate requirements and specifications in basic and detailed engineering. Their design studies are a key component for successful projects in different industries.



ESI supervisors and project managers work closely together with crews and teams at building sites around the world. The job ends with successful commissioning of each Eurosilo.



Number of Eurosilos per region

1-2 Eurosilos
3-14 Eurosilos
≥ 15 Eurosilos

Due to flawless operation since 2012 at the pilot recycling plant of ZincOx in Korea, the Eurosilo system was chosen for a complete new EAFD recycling plant in Vietnam in 2018. Two petcoke silos streamline the logistic flow between the continuous production of petcoke at the Orpic plant and periodic loading of transport ships at the nearby port. The Eurosilo system was chosen due to the strong commitment to safety and sustainability.



The fertilizer plant at Yara Porsgrunn needed to be upgraded in order to expand the production capacity. This required additional storage capacity of fertilizer or Calcium Nitrate.





SPACE AND COST SAVING SUSTAINABLE STORAGE SOLUTIONS



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