

# Equipment & Systems for Coal Preparation



**One Source**

**Maximize recovery of clean coal while  
reducing ash and sulfur content**

# The Leader in Coal Preparation Equipment

## FLSmidth delivers:

- Metallurgical Testing
- Dense Media Separation
- Water-based Separation
- Froth Flotation
- Concentrate & Tailings Thickening
- Screening
- Dewatering Filtration
- Fines Classification
- Water Clarification
- Material Handling
- Hydrocyclones & Pumps
- Centrifuges
- Expert Controls
- Performance Predictions/Simulations
- Flowsheet Development
- Plant Design



FLSmidth can supply modular or complete Heavy Media Separation systems like this one showing WEMCO HMS Drums installed in a plant in Turkey.



FLSmidth is a global leader in high-efficiency process systems for coal and mineral beneficiation.

For over a century, the company has helped advance the productivity of mineral processing operations with mechanical systems and process innovations of ever greater capacity, efficiency and reliability.

Today, FLSmidth continues to push the limits of mill performance, pioneering the integration of process hardware and intelligent control systems in self-optimizing plants of unprecedented profitability. FLSmidth's legacy started 130-years ago in Denmark, and now enjoys the financial stability and trusted brands of a worldwide technology organization.

### Complete System Supply Capability

FLSmidth is your One Source for the world's largest installed base of original equipment, enhanced products, technologies, and services unmatched in the minerals processing industries.

We maintain a comprehensive range of design and engineering capabilities. Our trusted brands include ABON, Buffalo, CEntry, Conveyor Engineering, Dawson

Metallurgical Labs, Dorr-Oliver, EIMCO, FFE, Fuller-Traylor, KOCH, Knelson, KREBS, Ludowici, Möller, MVT, Pneumapress, Raptor, Shriver, Technequip, VECOR and WEMCO.

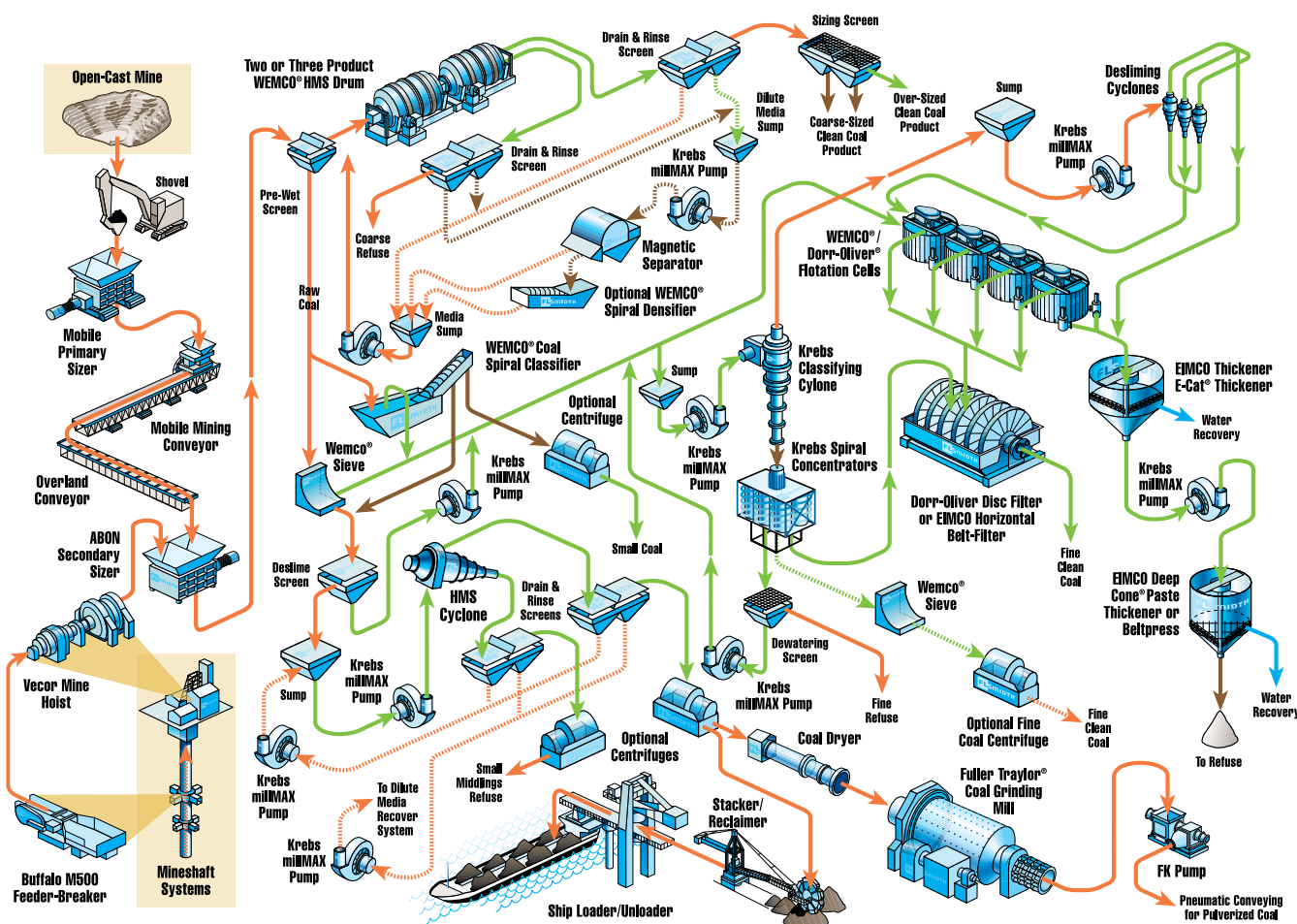
FLSmidth offers a broad range of equipment and processes including: testing, design, engineering, crushing, grinding, classifying, flotation, thickening and clarifying, vacuum and pressure filtration, pyroprocessing, material handling, slurry handling, automation, along with OEM quality replacement parts, modernization services and other after-sale services.

We can provide single pieces of equipment or a complete process plant designed, constructed and fully equipped.

### Extending Our Reach

To successfully compete in today's challenging world economy, companies often require innovative solutions to make their plant operating systems function at peak efficiency. Utilizing the latest in equipment technology, resources, and materials, we deliver the optimum design, equipment, and process support needed.

When you select FLSmidth as your partner, you also bring this solid foundation and support to your business.



## Bulk Materials Handling

Our material handling products and systems include traditional trough-type belt conveyors, fixed/overland conveyors, portable conveyors, at-the-face mining conveyors, stacker/reclaimer systems, mobile conveyors, radial stackers, bulk material and bag loading and unloading systems for barges and ships, shuttle conveyors, chain feeders, belt feeders, apron feeders, spreading technologies, complete crushing and screening plants, fully enclosed pipe conveyors, and ancillary equipment such as high capacity tripper cars.

Considered the worldwide market leader with hundreds of installations and over 60 years of experience from trusted brand names like Möller, KOCH, MVT, RAHCO, Conveyor Engineering and FLSmidth Pneumatic Transport.



FLSmidth is a leader in engineering and supplying material handling solutions to the minerals industries. For the latest in conveying, stockpiling, loading and unloading technologies, FLSmidth delivers.



## Crushers, Sizers & Feeder Breakers

This expertise is supported by more than 1,700 installed crushers, feeder-breakers and sizers.

The Feeder Breaker is traditionally used between the mobile mining machinery and the fixed conveyor systems. The main function of the Feeder Breaker is to reduce the product down to a manageable size and smooth the flow on to the mine's conveyor belts.

Our ABON sizer range utilises a combination of low roll speed / high torque and tooth profiles to arrive at the specified end product sizes with a minimum of fines production.

FLSmidth offers and manufactures a range of Buffalo plant flight-bar Feeders and chain Feeder Breakers used in open-pit and underground coal and potash mining applications.

The original Buffalo Feeder Breaker was developed and successfully introduced into coal mines in 1975.

FLSmidth offers a complete range of reliable Ludowici vibrating grizzly separators and vibrating feeders to suit almost every application. Vibrating feeders driven by out-of-balance motors have been used for many years to feed and convey all types of bulk materials. The feeders can be installed below hoppers and silos to feed material continuously or intermittently, or can be used to simply transfer material.

All of our crushing and sizing equipment is available for surface or underground installation, for stationary or mobile applications, and for climatic conditions that range from tropical to arctic.



## Mine Shaft Systems

For over 80 years, FLSmidth has applied its specialized expertise to provide innovative solutions to all facets of ore handling in underground mining operations.

FLSmidth equipment includes Dorr-Oliver® mine hoists, head sheaves, cages, skips, mine cars, loading stations, spill pockets and conveyor suspension.

FLSmidth maintains a leading position in the field of mine hoist technology through the well known Vecor® brand. Our products are used worldwide and have long been considered "the standard" of the industry.

## Coal Classification & Water-based Cleaning Equipment

From advanced hydrocyclones and classifiers to spiral concentrators, FLSmidth delivers cutting-edge washing, solid-particle recovery and classification technology.

FLSmidth manufactures durable and flexible classifying equipment to dewater, concentrate, size and recover solids.

Optimum cyclone performance relies on minimizing turbulence while extending residence time. The Krebs® gMAX® cyclone has the capability to produce finer and sharper particle separations using large high capacity hydrocyclones.

WEMCO® classifiers are designed to settle and dewater relatively coarse particles from high volume, low percent solid streams.

FLSmidth offers a comprehensive range of spiral concentrators\* for coal preparation. Krebs® coal spiral concentrators wash the coal while using differences in density to efficiently separate the particles.



The world-renowned Krebs gMAX Cyclone is the standard in classification and proven in coal applications around the world.



## Heavy Media Separation

Wemco HMS systems are installed and operating on many different minerals ranging from coal, manganese, magnesite, right through to fluorspar, iron ore, and diamonds.

FLSmidth supplies a comprehensive range of modular Dense Media Cyclone Plants utilising Krebs® HM cyclones and Wemco® HM drums. Particle sizes up to 100 mm can be treated depending upon the size of Wemco and Krebs dense media equipment selected.

Wemco HMS drum (top)  
Krebs millMAX pumps (middle)  
Krebs vMAX pumps (bottom)



## Centrifuges

FLSmidth manufactures a range of Ludowici centrifuges that have established an unequalled track record of performance and reliability. Our Ludowici models include coarse and fine coal centrifuges, both boasting high capacity, advanced technology, durability, value and efficiency. Our Ludowici centrifuges are all backed up by professional support and on-site service.

Through research and development, FLSmidth offers a longer-wearing Decanter Machine horizontal centrifuge by experimenting with various grades of materials, such as ceramics and tungsten carbides, in its fabrications.

## Pumps

FLSmidth's pumps increase wear life, lower power consumption, increase plant throughput & reduce downtime. FLSmidth is your leading supplier of high performance slurry handling equipment offering complete slurry pump, vertical pump, centrifugal pump, and pneumatic pump assemblies under industry-leading brands.

FLSmidth develops slurry handling products exclusively to your particular requirements. Our products include the popular Krebs millMAX™ severe-duty slurry pumps and Dorr-Oliver® ODS pumps.

FLSmidth's Decanter centrifuges have extended the life of screenbowl machines by fabricating specific parts at much tighter tolerances than do our competitors. We have also dramatically increased the amount of input or feed our machines can handle by manipulating conveyor configurations and gearbox ratios and by altering the size of certain internal parts.

FLSmidth offers some of the most technologically advanced and rigorously tested products on the market today

# Flotation

FLSmidth is the world's largest supplier of flotation equipment with over 55,000 units sold.

FLSmidth combines the strength of WEMCO and Dorr-Oliver flotation technology, which accounts for more than two-thirds of all annual flotation sales globally. We attribute this success to our ability to provide either self-aspirated or forced-air flotation technology or a combination of the two.

FLSmidth is at the forefront of the industry's trend to install fewer, but larger units rather than multiple smaller cells, to save space, power, maintenance, and auxiliaries. FLSmidth pioneered the way for large cell technology. From its first Wemco 257m<sup>3</sup> cell installed in 2003, to now even bigger 600m<sup>3</sup> SuperCells.



Our flotation tanks universal design, can accommodate self-aspirated WEMCO® mechanisms, or forced-air DORR-OLIVER® mechanisms. Thus allowing our clients to achieve greater flexibility and more control over processing of coarse and fine particles for maximum recovery.





# Thickening

FLSmidth supplies the world's largest thickeners with the highest torque ratings.

From the well-known brands of EIMCO and Dorr-Oliver, our thickening equipment is utilized around the world and recognized as the leader in minerals-duty thickening applications such as concentrate, tailings, preleach, and CCD.

We offer a wide range of thickening and clarification equipment with enhanced flocculation to accelerate settling, and higher flow and loading rates to help reduce space requirements.

Our engineers will work with you to determine correct heavy-duty thickener and clarifier sizing to determine the most cost-effective mechanism for your application.

## Deep Cone & High-Density Thickeners

FLSmidth has the most experience when it comes to high solids concentrations and paste thickening.

Our EIMCO® Deep Cone® Paste Thickeners produce underflow solids with a paste consistency and the highest solids concentration of any thickener on the market. Paste is a non-segregating liquid/solid mixture with a yield stress and slump. The benefits of producing paste are considerable.



# Screening

FLSmidth offers a full range of world-class vibrating screens to suit almost every screening application. Through FLSmidth Ludowici we have been producing screens for over 60 years and we are proud to be the market leader in the provision of mechanical screening equipment. Whether your requirements are for wet or dry screening or for polyurethane, wedgewire, wire mesh or rubber, we are able to supply it.

## Our range includes:

- Exciter driven linear motion screens
- High frequency de-watering screens
- Unbalanced motor driven horizontal screens
- Circular motion horizontal/declined screens
- Sieve bends

# Filtration

Since 1910, FLSmidth has manufactured pressure and vacuum filters and continues to supply filtration technology for minerals and industrial processing flowsheets throughout the world.

Whether using for concurrent or countercurrent cake formation, cake discharge, washing, dewatering, settling, or drying, you can rely on years of experience with industry leading brands (Dorr-Oliver, EIMCO, Pneumapress, and Shriver) to gain the most efficient and cost-effective filtration equipment solutions tailored to your requirements. A choice of Belt Press for the duty, for example if the product is for sale, as is the case in some coal fines pressing applications, then a type HDP™ Belt Press would be selected; this gives maximum moisture reduction, giving the lowest possible moisture content. If the product were merely a waste product which just requires stocking out for disposal, then a type MDP™ Belt Press would be recommended.

FLSmidth's AFP IV™ Automatic Filter Press is another highly efficient solution for coal refuse dewatering when used in conjunction with FLSmidth paste thickening technologies. Contact our FLSmidth specialists to see which of our filtration technologies will best meet your coal processing requirements.



EIMCO Belt Press operating on coal in Siberia 



# Capabilities

## Engineering services

FLSmidth provides the services required to engineer, procure and construct in virtually every major industrial market – from mining, metals & minerals to hydrocarbon processing and hazardous incineration.

Our full-time engineering teams are trained in each discipline. These teams provide the best available solutions to your project using the most current resources, training and software.

## Customer Services

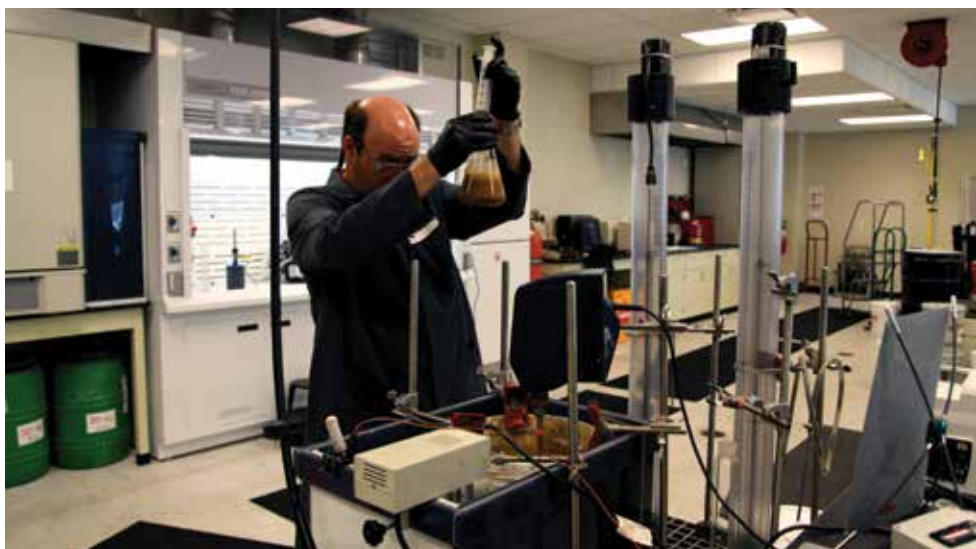
FLSmidth is your One Source for spare parts, service, maintenance, asset management and operational services. Our Customer Services support mineral processing equipment and systems including raw material testing, process design, equipment installation, troubleshooting, process and mechanical analysis and commissioning of new plants.

Customers are our most important



Spare Parts and Upgrades Drive Replacement (top) ▲

Engineering Services available to optimize your system(bottom)



assets. Once we have designed and installed your processing systems, we do everything possible to ensure that those systems continue to operate at optimum levels, all the time. We deliver on this promise.

## Testing

FLSmidth continues to look for ways to improve service to our clients and now operates a Minerals Testing and Research Center. This facility has created expanded services for increased process testing capabilities.

The Minerals Testing and Research Center houses the

- Separation Technology Laboratory
- Dawson Metallurgical Laboratory
- Analytical Laboratory
- Ore Characterization & Process Mineralogy Laboratory
- Research & Development Laboratory

## Testing capabilities

- Ore Amenity Testing
- Process Development
- Flowsheet Layout
- Plant design
- Detailed engineering
- Constructability analysis
- Quantitative XRD rietveld mineralogy
- SEM and optical microscopy

- Automated mineral analysis
- NIR data base development
- Clay analysis
- AAS, ICP, ICP-MS, LECO and fire assay
- Hydrometallurgical testing
- Flotation concentration
- Grinding & classification
- Bench testing
- Pilot testing

## Research and development

FLSmidth is committed to strong and on-going Research and development which is focused on developing new and improved equipment and processing technologies that provide solutions to the ever-changing needs of our customers and the industries that we serve. Our R&D and technology centers are globally located. In addition to our own facilities, we foster and fund cooperative R&D efforts with global universities and contracted research organizations. Interaction with our customers sets the foundation of many of our R&D activities as seen by the numerous projects being conducted jointly with customers throughout the world.

One Source

**Mineral Processing  
Technology Center**

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