WE CONVEY QUALITY

Conveying and Storing in the Cement Industry

AUMUND

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Company Headquarters in Rheinberg

Concept and Engineering

The guideline for the AUMUND concept is maximum customer benefit.

- Adapted to the customer's specific requirements, all transport processes are constantly optimised on the basis of innovations and the latest technical know how.
- Offered solutions combine economical and ecological aspects which will also comply with future demands.
- High safety standards in all functions and under all conditions with worldwide proven technology, quality and reliability.

Manufacture, Assembly, Service

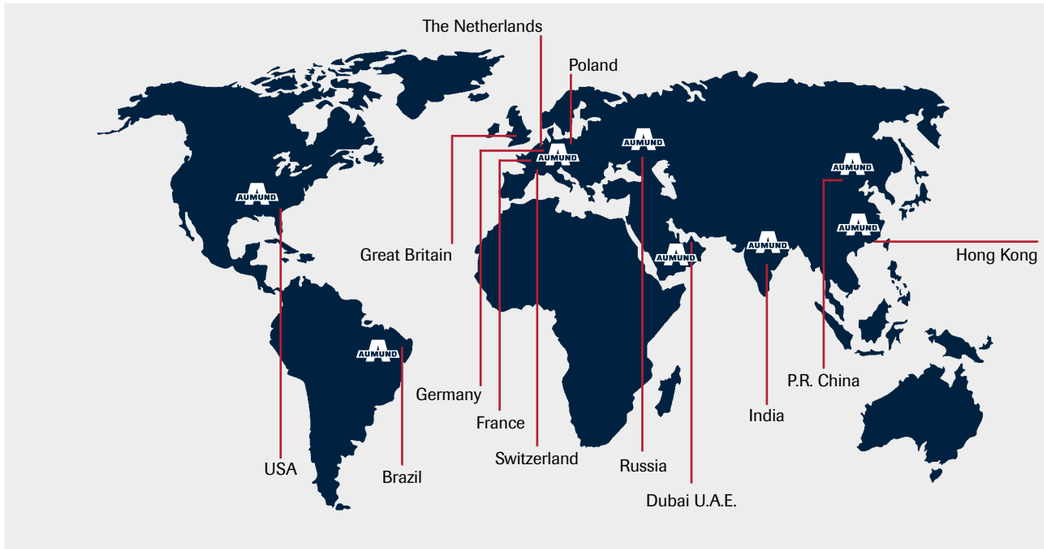
For the conveying and storage technology AUMUND offers a unique combination of:

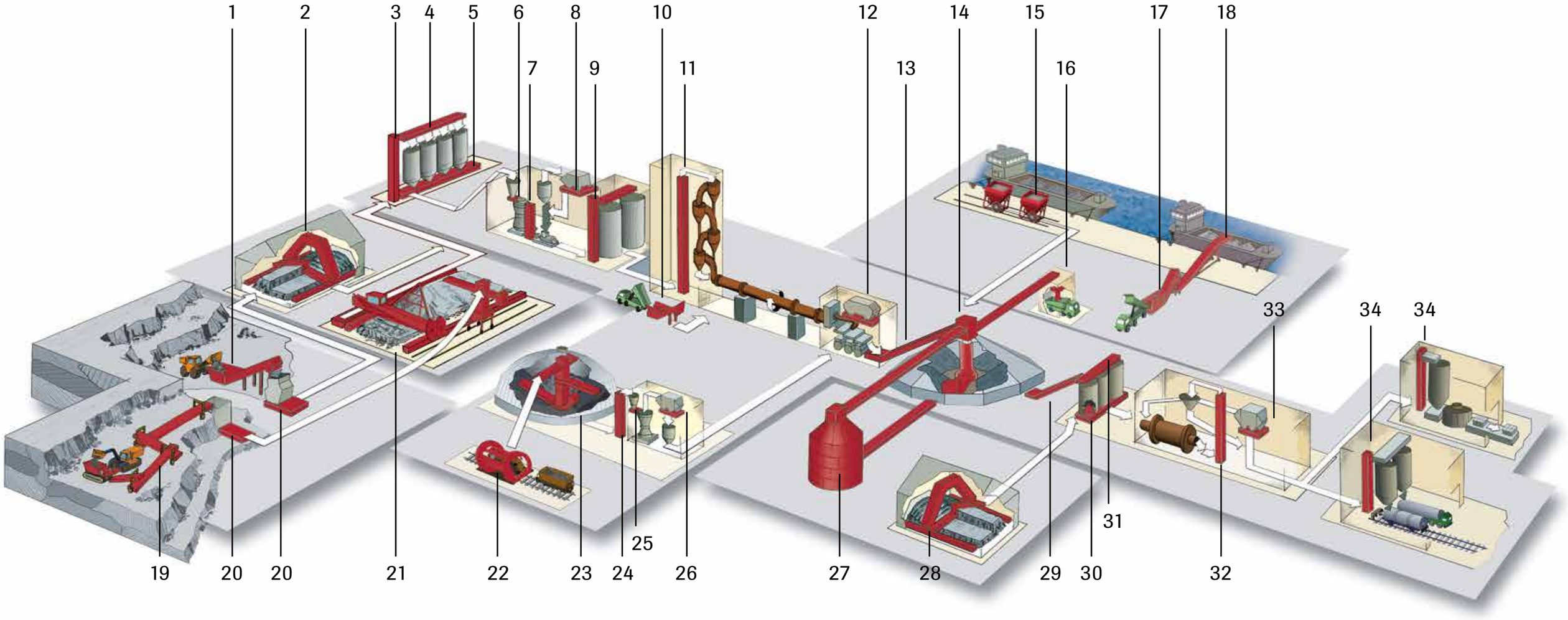
- Highest quality standards ensuring reliability
- Efficiency and profitability
- Central manufacture with intra-plant quality assuring systems
- Field assembly and commissioning with highly qualified supervisors
- Certification according to DIN ISO 9001
- Worldwide After-Sales Services

The AUMUND Group

AUMUND Group products are successfully operating on all continents.

The high standards in the fields of concept, engineering, manufacture and assembly are supported by a network of worldwide offices and representations.





AUMUND Group Equipment in the Cement Industry

1. Limestone intake and transfer to stationary crusher (Samson® Feeder)
2. Storage and reclaim of shale/ clay (Portal Reclaimer)
3. Feeding pre-blending silos (Bucket Elevator)
4. Distribution of limestone and aggregates (En Masse Chain Conveyor)
5. Discharge and reclaim of limestone and aggregates (CENTREX®/Rotary Discharge Machine)
6. Proportional feeding of raw mill (Weigh Feeder)
7. Raw mill circulation (Bucket Elevator)
8. Filter dust reclaim (En Masse Chain Conveyor)
9. Raw meal silo feeding (Bucket Elevator)
10. Reception and transfer of alternative fuels (Samson® Feeder)
11. Raw meal feeding to pre-heater (Bucket Elevator)
12. Clinker dust reclaim (En Masse Chain Conveyor)
13. Clinker transport from cooler to storage (Pan Conveyor)
14. Automatic clinker discharge (MOLEX®)
15. Grab unloading (Eco Hopper)
16. Truck loading of clinker (Telescopic Spout)
17. Clinker intake and transfer to shiploader (Samson® Feeder)
18. Clinker loading with Mobile Shiploader
19. Link Conveyor with mobile face crusher
20. Limestone crusher reclaim (Arched Plate Conveyor)
21. Limestone blending bed (Stacker/Reclaimer)
22. Coal/petcoke unloading and reclaim (Rotary Wagon Tipper)
23. Storage and reclaim of coal/ petcoke (Circular Stockyard)
24. Bucket elevator to coal mill
25. Proportional feeding of coal mill (En Masse Chain Conveyor)
26. Coal dust reclaim (En Masse Chain Conveyor)
27. Clinker storage in steel plate silo
28. Gypsum storage and reclaim (CENTREX®/Rotary Discharge Machine)
29. Clinker transfer to mill hoppers (Pan Conveyor)
30. Discharge and reclaim of clinker and additives (Silo Discharge Gate/CENTREX®/ Rotary Discharge Machine)
31. Distribution of clinker and additives (Pivoting Pan Conveyor)
32. Cement mill feeding (Bucket Elevator)
33. Filter dust reclaim (En Masse Chain Conveyor)
34. Cement silo feeding (Bucket Elevator)

Deep-Drawn Pan Conveyors with transfer station

Deep-Drawn Pan Conveyor type KZB

- **Inclination up to 30°**
- **Quality assured and cost-effective**
- **Recognised and proven on all continents**

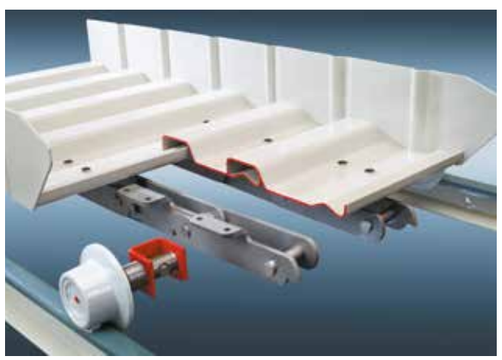
When conveying hot, abrasive cement clinker, a trouble-free operation of the transport system is decisive for the availability of the whole system.

AUMUND Deep-Drawn Pan Conveyors type KZB, stand out for reliability and long service life.

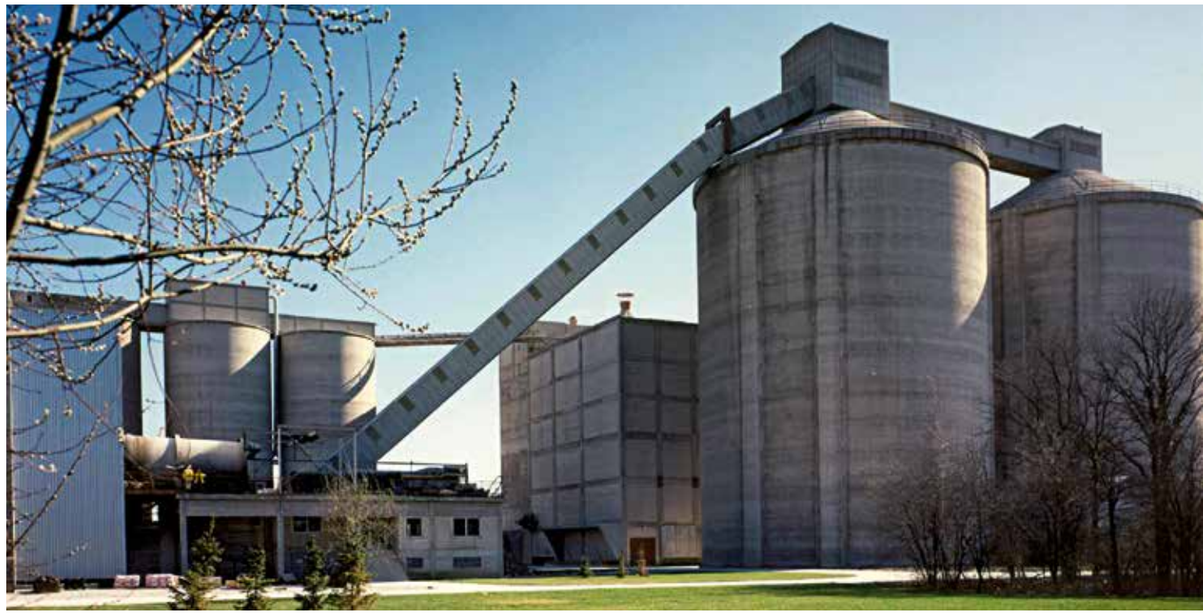
KZB – the economic conveying system for the transport of cement clinker in continuous operation.

- Capacities exceeding 1,600 t/h
- Standardised components
- Plate widths from 400 to 2,400 mm
- Stiffened side plates
- Contact free overlapping of the plates
- Chain breaking loads of up to 3,900 kN/chain strand

Pan Conveyor with Deep Drawn Pans type KZB



Deep-Drawn Pan Conveyor - Detail



Silo feeding with steep-angle conveyor

Pan Conveyor with baffles

Pan Conveyor with Deep Drawn Pans and Baffles type KZB-Q

- **Inclination up to 45°**

The standard Deep-Drawn Pan Conveyors fitted with baffle plates allows for conveying at inclinations up to 45°.

The standard chain program allows for **conveying heights up to 90 m**.

KZB-Q inclined at 45 degrees

Feeding of steel plate silos

Pan Conveyor with Buckets type BZB

- **Inclination up to 60°**

AUMUND Bucket Apron Conveyors type BZB are designed for extreme inclinations in cement plants. Unfavourable space conditions and inclination angles up to 60° are regarded as preferred application conditions, especially in case of conversions in existing plants. The narrow bucket spacing is ideal for fine-grained clinker with high dust content.

- Capacities to 600 t/h
- Smallest curve radius 10 m
- Standardised components
- Chain breaking loads up to 3,900 kN/chain strand

Bucket Apron Conveyor type BZB Detail

Feeding of mill hoppers

Feeding two silos in line

Pivoting Pan Conveyor type SPB

- **Feeding multiple hoppers and silos**

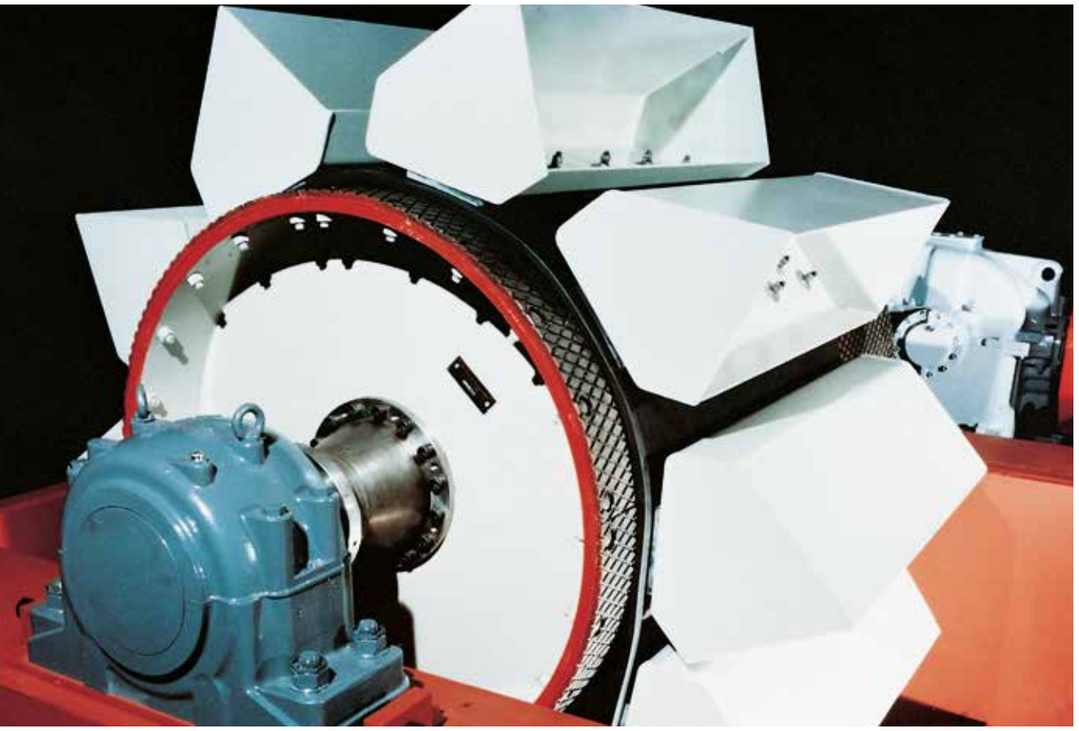
Important AUMUND developments have turned the Pivoting Pan Conveyor type SPB into an efficient instrument for automized distribution.

If more than two silos are to be fed, the AUMUND Pivoting Pan Conveyor is the best solution.

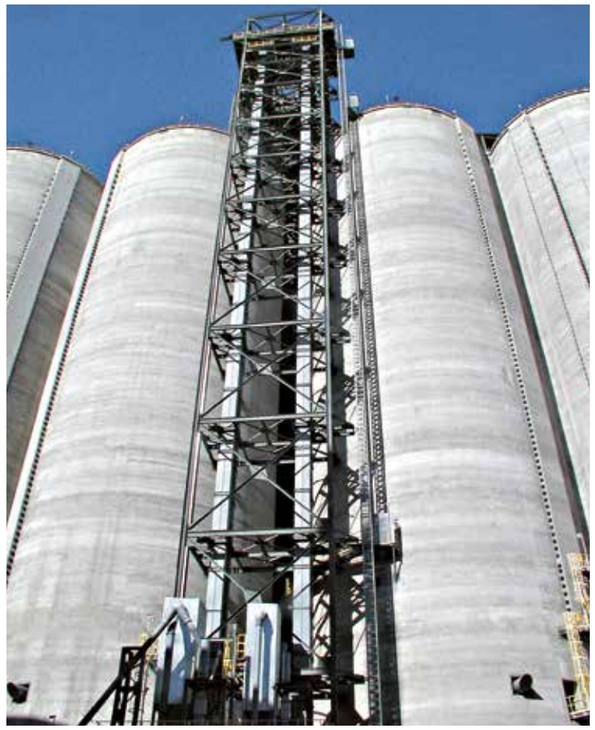
- Automated feeding of clinker silos and mill hoppers
- Remote-controlled
- Several intermediate discharge points
- System length of 400 m and more
- Simultaneous conveying of different bulk materials in the upper and lower run
- Low maintenance
- Minimum energy consumption
- Long service life

Mill hopper feeding

Conveying of Raw Meal, Cement and Additives



Drive pulley



Cement silo feeding

Belt Bucket Elevators handling raw meal

Bucket Elevator with Steel-Reinforced Belt type BWG

- **High performance**

AUMUND Belt Bucket Elevators type BWG, with automatic parallel tensioning device are applied for the conveying of cement, raw meal or fine-grained additives.

For pre-heater feeding, lifts to 175 m and conveying capacities of more than 1,850 m³/h have been achieved with AUMUND belt bucket elevators.

- Conveying heights to 175 m
- Conveying capacities of more than 1,850 m³/h
- Continuous receipt and discharge of conveying material by means of tight bucket sequence
- Optimum discharge conditions
- Continuous operation with low maintenance requirement

The **steel reinforced belts** feature longitudinal cords with two layers of transverse cords. The **belt ends are spliced with special clamp connections**.

As a standard, the drive pulleys are equipped with exchangeable friction lining, thus enabling the exchange of the segments without opening the belt. A parallel toothed rack guided tensioning device provides automatic belt tensioning and prevents off-track running.

- Conveying material temperatures up to 130 °C
- Belt with high tensile strength
- Inching drive for maintenance purposes
- Secure bucket attachment

Pre-heater feeding

Transport of Raw Material, Clinker, Additives and Cement

Bucket Elevator for silo feeding

Central Chain

Bucket Elevator with Central Chain type BWZ

- **Reducing vibrations**
- **Preventing crack formation**
- **Long service life**

High conveying capacities due to a tight bucket sequence and buckets up to 1,200 mm width are the characteristic features of the AUMUND Bucket Elevator type BWZ with forged central chain.

The typical AUMUND bucket attachment reduces vibrations and thus prevents crack formation at bucket walls and welding seams.

The chain with lubricated labyrinth seals contributes to a long service life.

- Conveying capacities of more than 900 m³/h
- Conveying heights to 90 m
- Long service life with continuous operation
- Forged central chain with largely dimensioned joint surfaces
- Designed for operation with material temperature peaks up to 400 °C
- Drive ring and tension wheel in segments
- Inching drive for maintenance purposes

Head of Double Bucket Elevator with double drive and two bucket strands

Double Bucket Elevator type BWZ-D

- **Conveying capacities of more than 1,800 m³/h**
- **Conveying heights over 60 m**
- **High operational reliability**
- **Solid design**

Higher kiln capacities and new grinding processes in the cement industry require Bucket Elevators with high conveying capacities and center distances.

AUMUND Double Bucket Elevators type BWZ-D are the appropriate solution for these requirements and ideal as circulating Bucket Elevators in grinding plants.

Silo feeding

Hopper Discharge and Crusher Feeding

Loading and unloading station

Arched Plate Conveyor type BPB and BPB-S/SF

- **Designs to suit conveying of cohesive materials or heavy duty applications**

For the transport of moist, sticky materials, such as clay, gypsum, anhydrite, puzzolana and marl the slightly arched plates of the Arched Plate Conveyor type BPB, allow a simple scraping off of cohesive materials.

Heavy plate conveyors type BPB-S or SF are installed for feeding or reclaim of run of mine materials.

The conveyors are equipped with forged chains and wear-resistant components. The plates, chains and roller design are configured to suit the related task and required conveying capacity.

Hopper discharge type BPB

Workshop assembly type BPB-SF

Heavy duty apron feeder type BPB-SF

Hopper discharge with Armoured Chain Conveyor

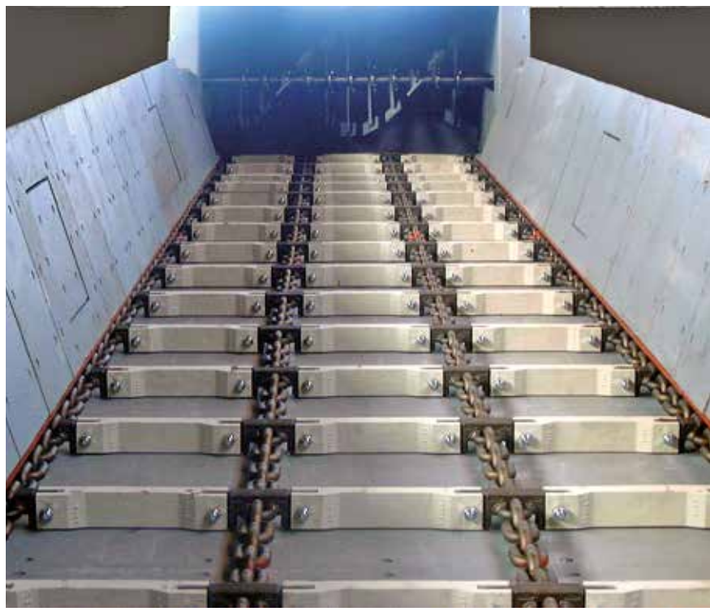
Armoured Chain Conveyor type PKF

- **Low overall height**
- **Adaptation to given hopper geometries**

The Armoured Chain Conveyor type PKF, is used as hopper discharge equipment for crushed limestone or for sticky raw materials, such as chalk, gypsum, clay or coal.

- Discharge capacities of 10 to over 1,200 t/h
- Overall widths from 600 up to 2,600 mm
- Traction forces up to 680 kN/chain strand
- Two to five strand versions depending on the hopper width

- Adapts to given hopper geometries while the low overall height also enables installation into existing plants.



Armoured Chain Conveyor type PKF

Proportional Feeding, Proportional Discharge

Apron Weigh Feeder with arched plates

Proportional feeding of additives

Apron Weigh Feeder type DPB

- **Proportional feeding**
- **Proportional discharge**

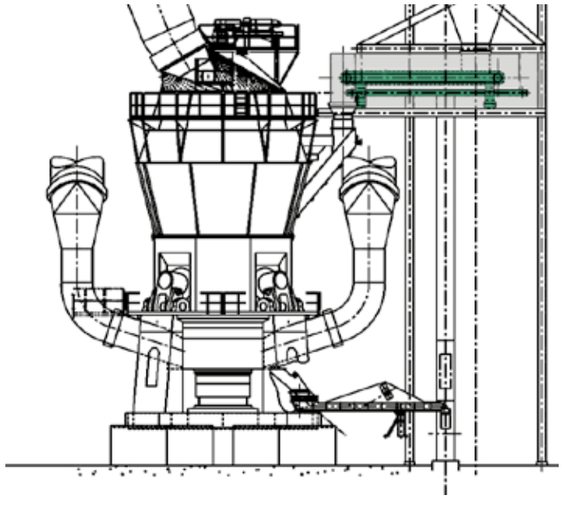
For proportional reclaim of bulk materials with poor flow properties such as clay, gypsum, marl, limestone, puzzolana etc. the Apron Weigh Feeder features arch-shaped plates especially designed for cohesive materials.

The Apron Weigh Feeder performs conveying and weighing in one step.

For grained bulk materials such as clinker, slag sand and petcoke the Apron Weigh Feeder is equipped with deep-drawn pans.

For mill feeding the Apron Weigh Feeder is also available as completely enclosed and pressure-proof design.

Apron Weigh Feeder with deep drawn pans



Mill feeding

Silo and Hopper Discharge

CENTREX® type CTX-AFD/AV/IV

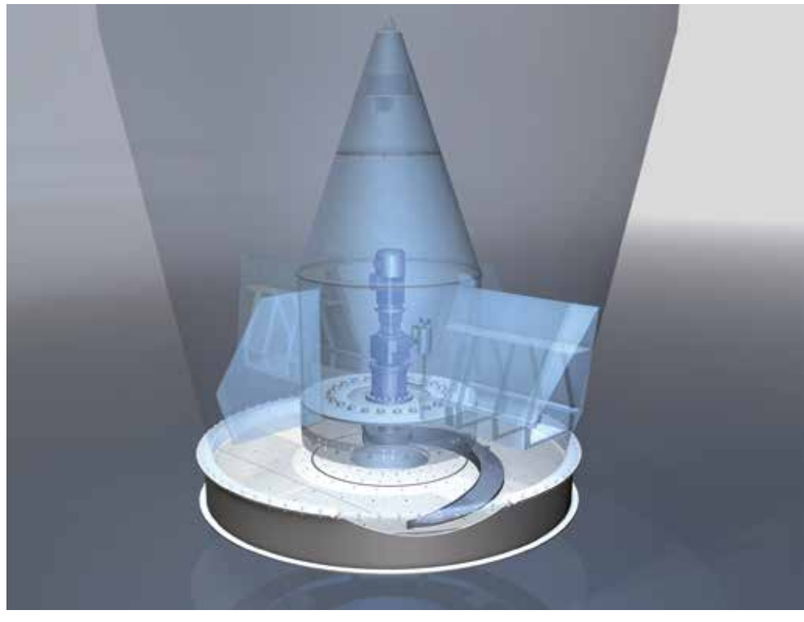
- **Trouble-free silo discharge for cohesive materials**
- **No segregation or bridging**

On account of its compact and rigid design, the CENTREX® is an **ideal solution for installation into or underneath existing silos or hoppers**. Three basic alternatives are available within the CENTREX® system:

- CENTREX® with external drive and rotating inner cone type CTX-AFD
- CENTREX® with external drive and stationary inner cone type CTX-AV
- CENTREX® with internal drive type CTX-IV

CENTREX® for discharge of natural gypsum and trass

Internal drive



CENTREX® with internal drive

BEW-BL in block design

BEW-FL in low profile design

Rotary Discharge Machine type LOUISE BEW

- **Reliable discharge**

Rotary Discharge Machines ensure the reliable discharge of a wide variety of different additives or raw materials such as:

- Limestone, marl, clay or other raw materials
- Natural and FGD-gypsum
- Coal

The **design** alternatives of the discharge machine allow its adaptation to completely different applications: For the **discharge from longitudinal hoppers or a line of silos**, the block or low profile design variant is used, while the circular design is applied for the **discharge from cylindrical silos**.

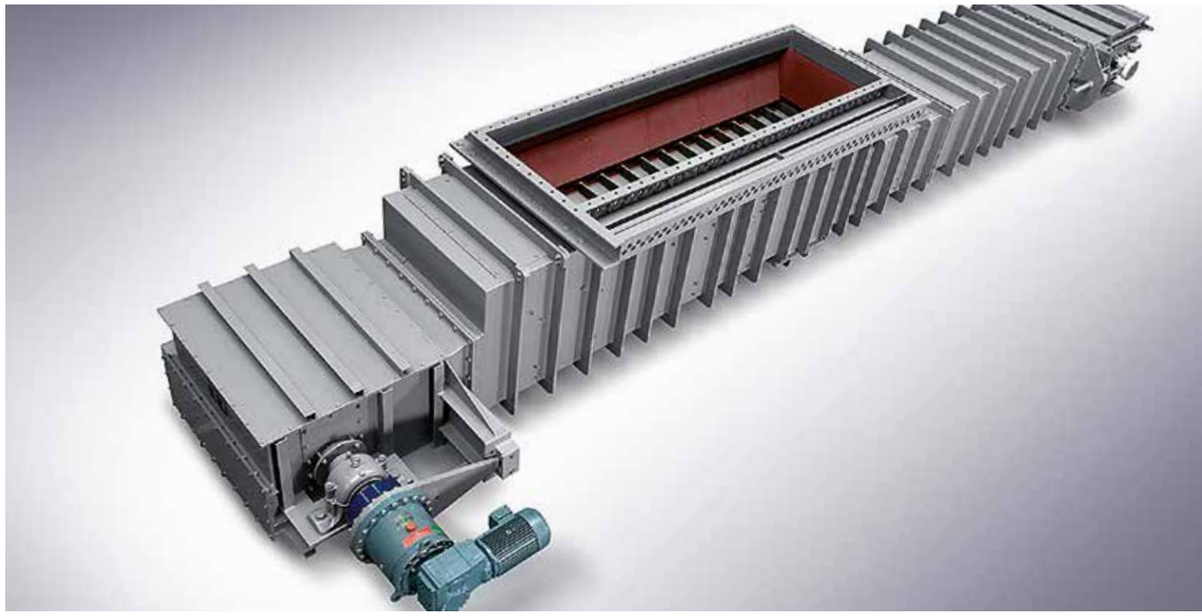
For the specific control of the reclaim capacity the block or low profile design can be equipped with a weigh feeder which comes fully integrated into the mobile discharge machine.

The circular design guarantees a trouble-free reclaim of material from concrete or steel silos of up to 12 m diameter, offering an adjusting range of 1:10.

- First in / First out
- Simultaneous feeding and discharge
- Proportional reclaim

BEW-K Rotating discharge machine

Dust-Tight Transport



Chain Conveyor in shock-pressure proof design for coal mill feeding

“EN MASSE” Chain Conveyor type LOUISE TKF

- **Especially wear-resistant design**
- **Ensures a uniform material flow**
- **Dust-tight**

For conveying, distributing, and reclaiming cement, filter dusts, coal and additives such as gypsum, anhydrite, sand or limestone.

In especially wear-resistant design the Chain Conveyor is also used to convey cement clinker.

- Intermediate discharge through electro-mechanically driven gates
- Wear-resistant chains for a long service life
- Conveying capacity up to 500 t/h
- Length up to 50 m
- Shock-pressure proof design as an option

For coal mill feeding applications, all Chain Conveyors come in a design which is shock-pressure proof up to 3.5 bar on a standard basis. Additionally, such Chain Conveyors feature a double-strand chain. A variable speed drive with frequency converter ensures a uniform material flow and a controlled feeding capacity.

Dust reclaim

Material Reception and Transfer

Samson® Feeder - Transfer of additives

Samson® Feeder - for crusher feeding in a quarry

Samson® Feeder

The ideal solution for the reception of all bulk materials in the cement industry such as cement clinker, coal and pet-coke, clay, limestone, gypsum rock, FGD gypsum, granulated slag, alternative fuels.

Where materials are imported to cement plants by tipping or dump trucks and transferred to the next process step, the Samson® Feeder offers an economical alternative to conventional and expensive underground pits and hoppers.

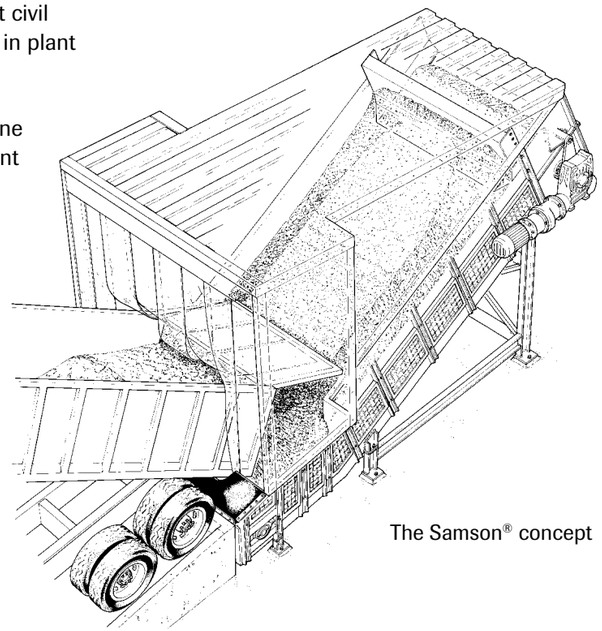
Surface installation eliminates costly permanent civil engineering works and allows greater flexibility in plant layout regardless of local ground conditions.

Since the Samson® is a single integrated machine it may be easily re-located to accommodate plant development.

The Samson® is available in different series designed for a specific range of applications.

Holding capacities up to 300 tons may be provided with a controlled rate discharge.

- **Fast truck discharge**
- **No bridging regardless of material handling characteristics**
- **Minimum dust generation**
- **Easy access for maintenance**
- **Flexibility in location and relocation**
- **Reduced energy demand and operating cost**
- **Minimum investment risk**



The Samson® concept

Clinker Loading

Ship loading

Truck loading

Telescopic Loading Spout type TS

- **Integral dust control**
- **Low and heavy duty operation**

The AUMUND Telescopic Spout with integral dust control ensures the loading of clinker into trucks, barges or ships, offering an economic solution for low and heavy duty operation.

The **heavy duty version** of the telescopic spout is designed for rapidly successive loading cycles and high **capacities of up to 700 t/h**. This system is used in more than 200 installations worldwide.

Applications with approximately five loading cycles per day and loading **capacities of 100 t/h to 150 t/h are the ideal field for the application of the low duty design**. Due to the diminished segments, the smaller hoist and the reduced dedusting volume, this system is the economical solution for installations requiring a low or medium handling capacity.

Clinker Storage

Concrete silo with steel roof

- Cylindrical steel plate silos
- Special design for extremely large storage volumes
- Concrete silo with steel roof
- Circular storage hall with steel roof
- Circular storage hall with concrete wall and steel roof

To receive an optimum overall conveying and storage layout, early implementation of experienced layout engineers is recommended.

Clinker storage hall with concrete wall and steel roof

Clinker Discharge

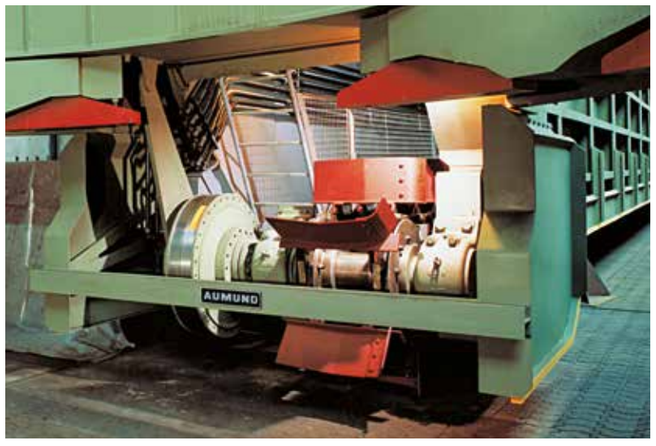
Silo Discharge Gate type SAK

The design principle of the silo discharge gates prevents the free fall of the clinker onto the discharge conveyor and avoids dust generation (gravity principle).

The systematic alternating between the silo discharge gates ensures a uniform discharge of the clinker over the whole silo basis.

Gravity silo discharge

Version with central column



Scraper chain drive

Covered stockpile with automatic discharge

Automatic Clinker Discharge type MOLEX®

- **Successfully operating**
- **Lower investment**
- **Lower operating and maintenance costs**

The MOLEX® is the residue-free discharge system successfully operating in several cement plants.

- 100% active stock
- Availability of clinker even during yearly kiln shutdown
- Blending of old and fresh clinker
- Blending of coarse and fine-grained clinker
- Almost consistent clinker mixture for mill feeding

Lower investment and/or operating and maintenance costs are the result of:

- Reduction to only one reclaim tunnel
- Less conveyors and discharge gates
- No residue stock to be removed with loading shovels

Installation of new bucket strand

Conversions and Refurbishments

- **Upgrading of existing plant components**
- **Targeting increased efficiency**
- **Higher output**
- **Improved availability**

With our expert team of engineers planning selective modernisation measures, we pay special attention to the upgrading of existing plant components, targeting increased efficiency, higher output rates and improved availability.

Upgrading of your materials handling and storage equipment to state-of-the-art technology is achieved through a tailor-made refurbishment process under optimum utilisation of time and budget.

Most of the existing components are re-used in the refurbishment process to save cost.

Engineered conversions and refurbishments for increased efficiency and output are performed on AUMUND equipment as well as on the equipment of other manufacturers.

AUMUND Services

Customer Proximity around the World
At AUMUND, service does not end at the sale of the equipment. It's the beginning of a long-term partnership. AUMUND offers you a full range of services – from commissioning to the delivery of quality spare and wear parts to customized preventive maintenance programs and equipment upgrading. The benefits for you: Maximum equipment efficiency at lower operating cost.

Spare and Wear Parts
A comprehensive range of genuine spare parts is available for our entire product range from stocks in Germany, Hong Kong/China, Brazil, the USA and Saudi Arabia. Our product specialists provide assistance and respond instantly.

Preventive and Predictive Maintenance PREMAS 4.0
Knowing beforehand that service will be needed allows you to schedule downtime and save money with timely repairs. Repairs or retrofits can be accurately anticipated allowing for the downtime to be at the most convenient times and at the lowest possible cost.

Retrofits & Modernisation
Aged and worn equipment? Capacity increase needed? Too high operating cost? AUMUND "just as new" retrofits are economical and tailor-made solutions for improving your existing equipment at reasonable cost.

Errection & Commissioning
Today, presence "on the spot" is an absolute "must". Therefore, the AUMUND Group Field Service engineers are available on all continents to guarantee immediate and competent support.

Other AUMUND Group Equipment in the Cement Industry

SCHADE
AUMUNDGROUP

Stockyard Technology

- Portal, bridge-type or cantilever reclaimers
- Longitudinal stockyards and blending beds
- Fixed and mobile stackers
- Wagon tipplers
- Circular stockyards and blending beds with portal, semi-portal, bridge-type or cantilever reclaimer

SAMSON
AUMUNDGROUP

Bulk Material Handling

- Mobile Shiploaders
- Eco Hoppers
- STORMAJOR®
- Material Feeders

AUMUND Group Spanning the Globe

The AUMUND Group offers efficient solutions for conveying and storage of bulk materials. A particular strength is the technologically mature and extremely reliable machinery for handling all kinds of bulk materials, even hot, abrasive or sticky. Nearly 24,000 installations worldwide substantiate the excellent reputation and good market position of the Group. The companies of the AUMUND Group are active in about 150 countries with 20 locations all over the world and a global network of almost 100 representatives.

AUMUND Holding B.V. / The Netherlands

AUMUND Fördererbau GmbH / Germany

AUMUND Fördertechnik GmbH / Germany
Branch Office Dubai / U.A.E
Branch Office Wroclaw / Poland

AUMUND S.A.R.L. / France

AUMUND Corporation / USA

AUMUND Ltda / Brazil

AUMUND Machinery Technology (Beijing) Co. Ltd / China

AUMUND Asia (H.K.) Ltd / Hong Kong / China
Branch Office Jakarta / Indonesia

AUMUND Engineering Private Ltd / India

SCHADE Lagertechnik GmbH / Germany

SAMSON Materials Handling Ltd / GB
Branch Office Bristol / GB

AUMUND Group Field Service GmbH / Germany

TILEMANN GmbH / Germany

AUMUND Logistic GmbH / Germany

The AUMUND Group operates Service Centres and Warehouses for spare parts in Germany, the USA, Brazil, Hong Kong, Saudi Arabia, and in Great Britain. Almost 60 dedicated Supervisors tend to clients' needs across the globe and a specialized PREMAS® Team provides Preventative Maintenance and Service support including inspection and consulting.

AUMUND headquarters in Rheinberg, Germany

AUMUND Foerdertechnik GmbH
www.aumund.com