WE CONVEY QUALITY

Conveying and Cooling in the Iron and Steel Industry

AUMUND

CONTENT

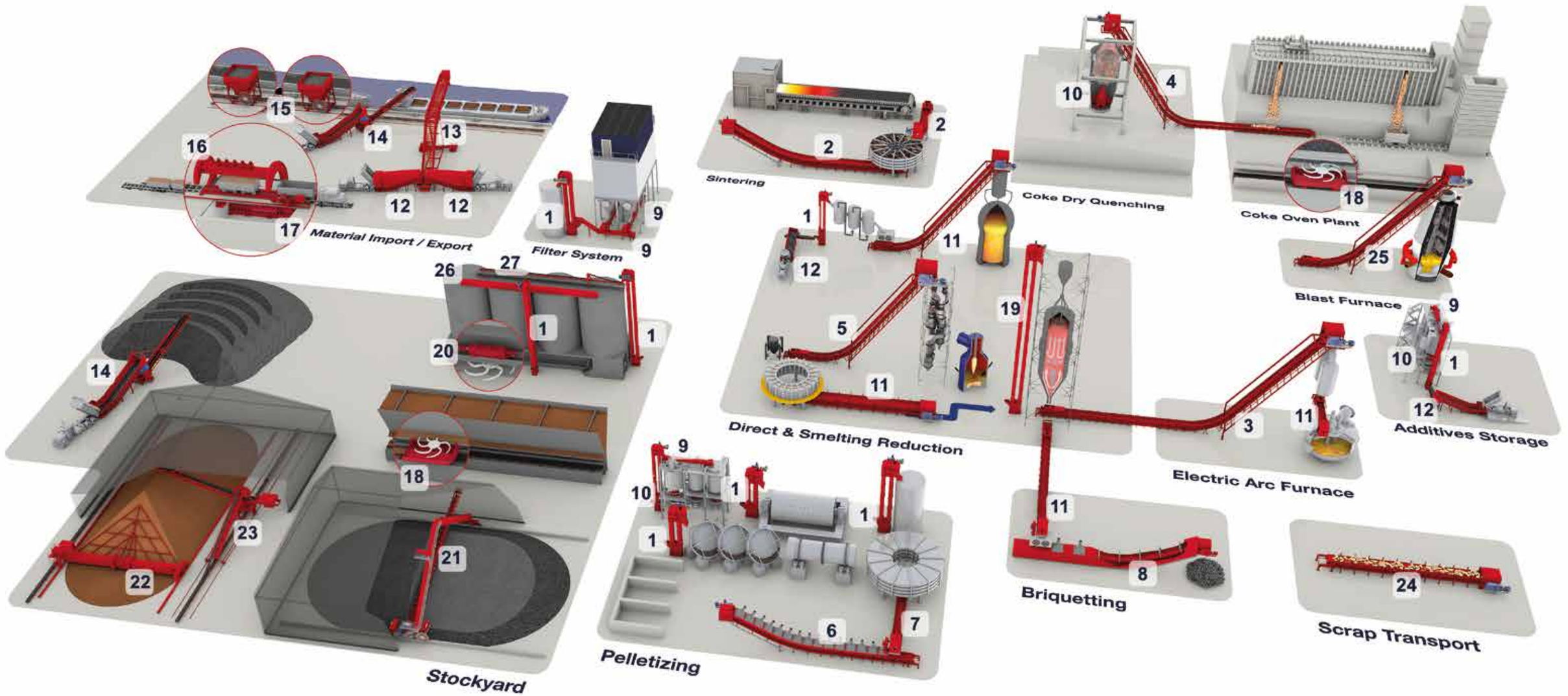
Serving customers' needs has been our strategy since incorporation more than 90 years ago. This concept is the essence of our vision and the driving force for the development of every area of our business. Our competence in the field of materials handling is proven by more than 10,000 installations of high technological standard operating in more than 100 countries.

We have developed innovative solutions for state-of-the-art technologies in direct reduction and electric steelmaking. With our unique conveying systems for hot DRI and for other outstanding technologies in iron and steelmaking we continue to meet the requirements of hot bulk materials handling in metallurgical processes and contribute to the success of our customers in saving resources and energy.

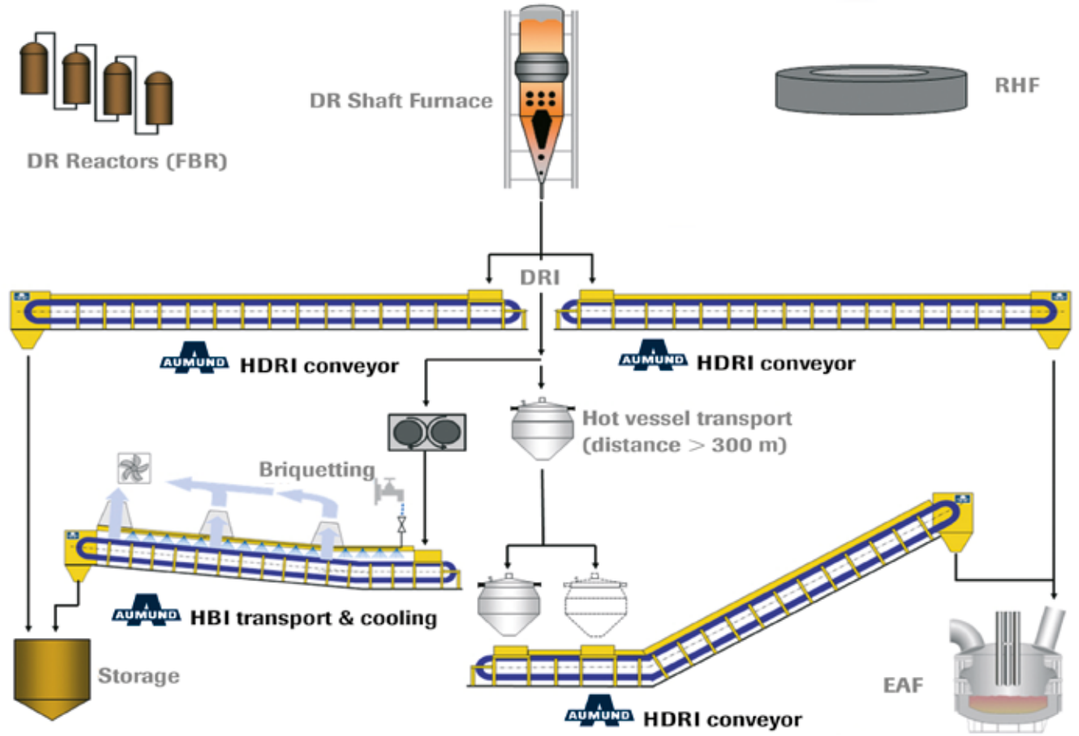
Innovative design, consistently high quality, close customer relationship, dedicated engineers and a sales and service network on all continents are our key assets as a recognized supplier of materials handling solutions to the global industry.

AUMUND Group Equipment in Iron and Steel Making

Hot Material Transport



01 Belt Bucket Elevator
02 Hot Sinter Conveyor
03 Hot DRI Conveyor
04 Hot Coke Conveyor
05 Hot Fines Conveyor
06 Air Cooling Conveyor
07 Pellet Conveyor
08 HBI / HCI Cooling Conveyor
09 Drag Chain Conveyor
10 CENTREX® Silo Extractor
11 DRI Conveyor
12 Samson® Material Feeder
13 Ship Loader
14 STORMAJOR®
15 Eco Hopper
16 Wagon Tippler
17 Apron Conveyor
18 Rotary Discharge Machine - Flat Design
19 Chain Bucket Elevator
20 Rotary Discharge Machine - Block Design
21 Portal Reclaimer
22 Bridge Reclaimer
23 Stacker
24 Flat Plate Conveyor
25 Blast Furnace Feeder
26 Pivoting Pan Conveyor
27 Tripper Car



Schematic of applications with the AUMUND Conveyor

AUMUND in Direct Reduction Plants

Energy efficient conveying of DRI

Hot charging of DRI, HBI, HCI and similar into Electric Arc Furnaces can significantly benefit the operating efficiency through reduced power consumption and reduced tap-to-tap cycles.

Most of new Direct Reduction Plants therefore feature hot charging options or are planned for future addition of hot charging equipment into the subsequent melt shop. Latest projects provide for even more flexibility by installing feeding systems able to choose between cold or hot material. This allows to manage market changes and to meet the future needs of the steel industry.

For mechanical conveying of hot DRI in a non-oxidizing atmosphere the AUMUND Conveyor represents the most adequate solution for modern applications, subject to the plant layout, the conveying distance and the conveying capacity. Capacities to 1,200 t/h are realized along horizontal sections whereas 210 t/h are handled up to an elevation of about 100 m, and 400 t/h up to 80 m.

An important feature with the AUMUND Conveyor is the air seal provided by the enclosure with integrated inert gas system ensuring that dust is contained inside and oxygen is kept out. No dust is emitted from the conveyor and no spillage is generated underneath.

Special sensors monitor the safe operation. No special tools, no specialized staff and no special equipment is required.

Features and benefits of the AUMUND Conveyor

Compared to a pneumatic system, the AUMUND Conveyor

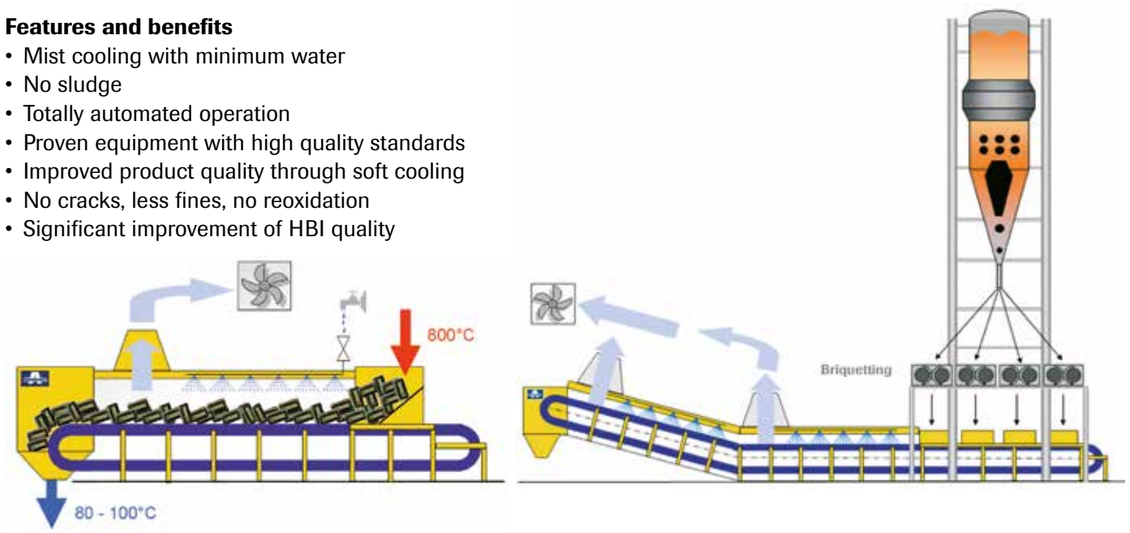
- Ensures handling of material temperatures up to 1,100 °C where a pneumatic system will accept only 600-700 °C
- Reaches conveying capacities up to 1,200 t/h with low slopes. Approx. 50 t/h are feasible with a pneumatic system
- Requires less power and reduces energy consumption
- Allows for operation with variable speed
- Guarantees simple and easy operation with Start/Stop by just pushing the button, whilst preparation/silent time is unavoidable with a pneumatic system

Transport and Cooling of HBI

The AUMUND Conveyor for cooling of Hot Briquetted Iron features a patented cooling system and ensures soft cooling in a short time.

Features and benefits

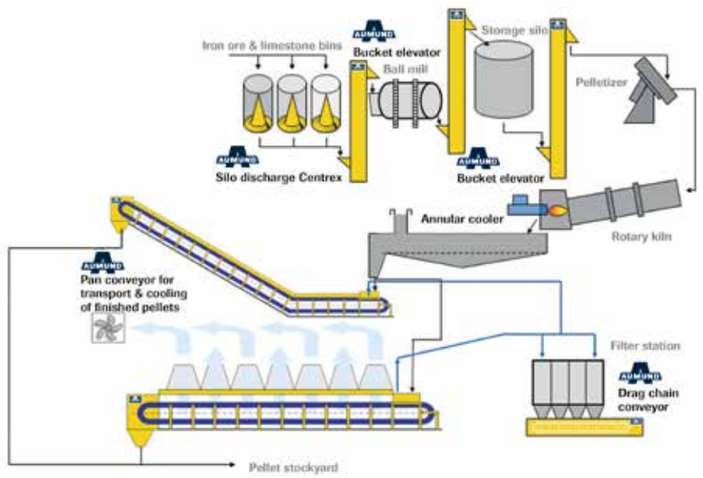
- Mist cooling with minimum water
- No sludge
- Totally automated operation
- Proven equipment with high quality standards
- Improved product quality through soft cooling
- No cracks, less fines, no reoxidation
- Significant improvement of HBI quality



Cooling conveyor type FPB-K 1400/250/12

AUMUND Conveyor after Annular cooler for hot pellets

Materials Handling in Pelletizing Plants



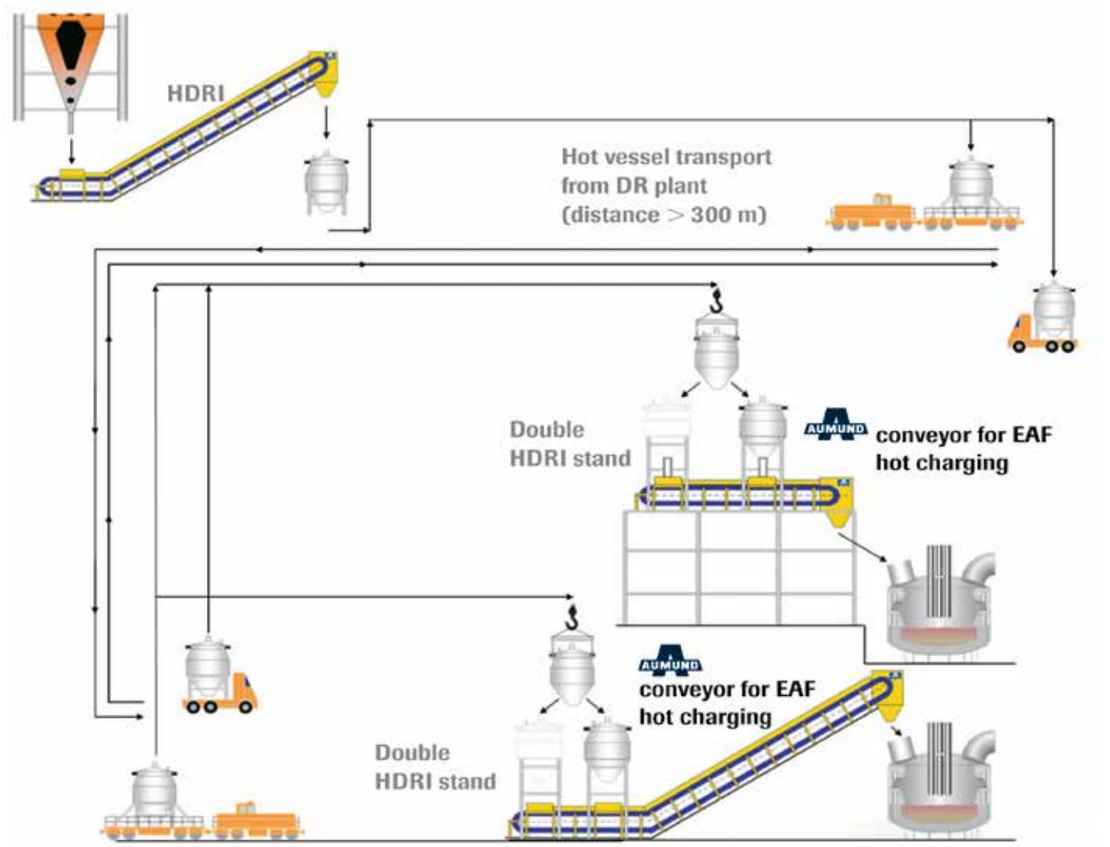
- Pan Conveyors to convey and/or cool finished pellets
- Chain Conveyors to reclaim and convey fines
- Silo Discharge equipment to reclaim raw materials
- Bucket Elevators to transport raw material, iron ore fines after grinding or pelletized fines

With installations i.e. in Oman, Bahrain, Venezuela, Brasil, India and Kazakhstan, AUMUND is the specialist in transport of hot pellets or cooling of pellets.

Hot Charging into EAF

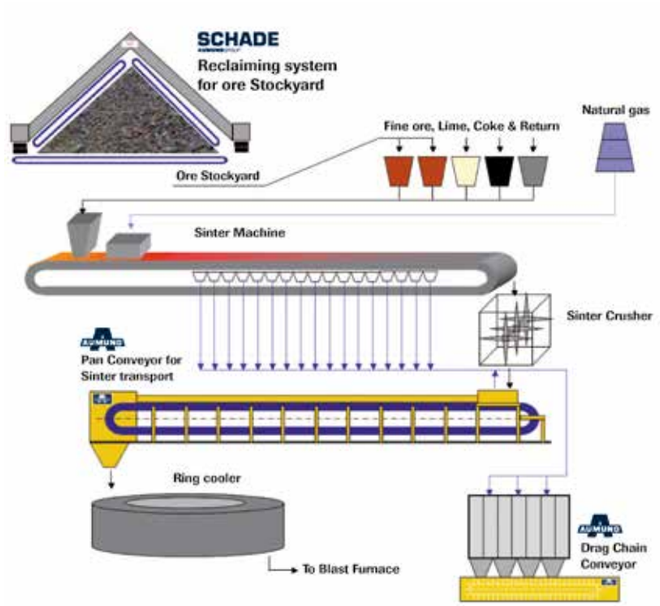
Major benefits of hot charging:
- Reduced carbon losses from SF to EAF
- Flexible Plant operation
- Availability to 98 %
- Yield improvement
- Quick ROI
- Significant lower CAPEX vs. pneumatic systems
- Significant lower OPEX vs. pneumatic systems
- Significant lower energy consumptions vs. pneumatic systems
- Green plant operation (CO2 emission reduction)

AUMUND hot material conveyor
- For hot DRI, hot HBI and similar
- Fully covered design with AUMUND inert gas system prevents reoxidation
- Minimizes temperature losses and reduces losses of carbon or metallization
- Direct connection between Direct Reduction Furnace and steel making furnace (e.g. to EAF as per figure page 7)
- For longer distances appr. 300 m various options with vessel transport possible
- Geometry and layout depends on situation at site. Horizontal or inclined conveyors possible.



Pan Conveyor, type KZB-S, Sinter plant

Sinter Plant Application



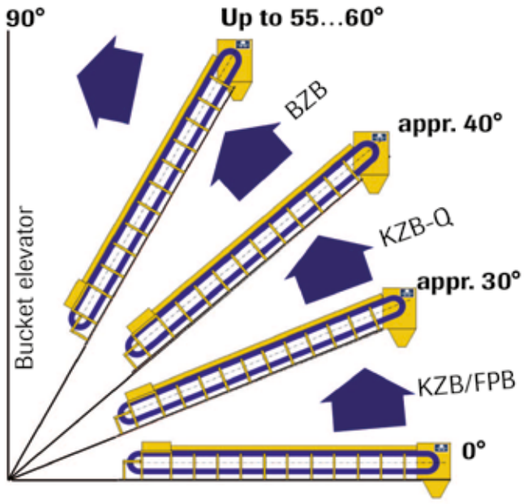
The AUMUND Pan Conveyor, type KZB-S transports the hot Fe-Sinter from the crusher to the ring cooler.

The Pan Conveyor receives the hot Fe-Sinter from the crusher at a temperature of 600 to 900 °C with a grain size of more than 250 mm and transfers it to the cooler. The particularly solid and stress resistant design avoids deformation of the conveyor pans and the pan overlapping prevents spillage of hot sinter. The sinter conveyor as shown is available with a pan width up to 3,000 mm and is able to transport up to 1,500 t/h.

With worldwide installations AUMUND is an expert for hot Fe-Sinter transport. Reference plants are in operation since many years in sinter plants in Germany, Austria, Brasil and Russia.

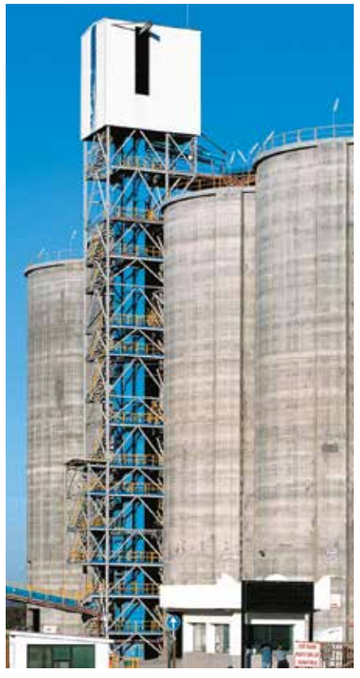
Pan Conveyor Types

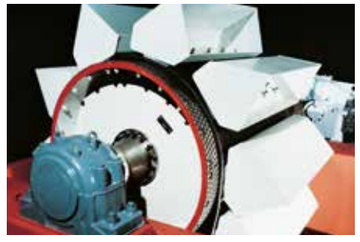
The AUMUND Pan Conveyor with its versatile design of pans or buckets fits into any plant layout, from horizontal to 60° inclination.



Bucket Elevators

AUMUND Bucket Elevators for vertical conveying, with central chain or steel-reinforced belt.

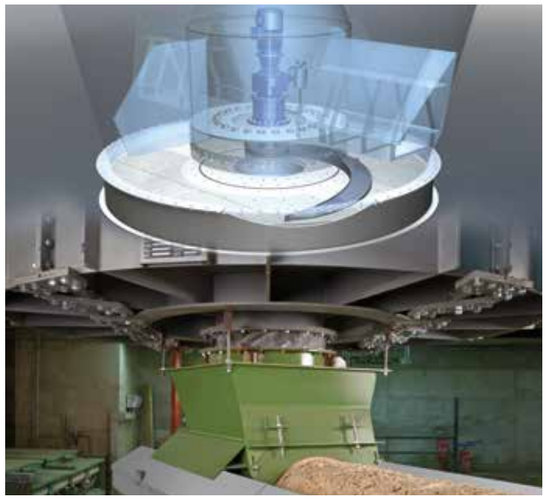




Belt Bucket Elevators for material size to 10 mm and temperatures to 130 °C

Chain Bucket Elevators for material size to 200 mm and temperatures to 300 °C

Apron Feeder
- For hopper discharge
- Light and heavy duty design
- With impact beams depending on drop height



Silo Discharge CENTREX®
- For silos with a diameter of 1,500 to 7,000 mm
- Capacity of 1-1,000 t/h variable
- Discharge of bulk materials with poor flow properties
- First in, first out

Feeding and Reclaim Equipment

Rotary Discharge Machine
- For reclaim from rectangular hoppers and open stockpiles up to 300 m length
- For reclaim from large silos with a diameter up to 50 m
- Discharge wheel diameter 2 to 5 m
- Capacity 1 - 3,500 t/h

Samson® Feeder
- Bulk material receiving unit from truck or rail wagon
- Dust control
- Buffer capacity and discharge rate control
- Flexible in location. No underground hoppers, no expensive civil work, no deep pits

Stockyard Equipment
Loading and Unloading Systems

SCHADE
AUMUND GROUP

Covered Stockyard with SCHADE Circular Stacker / Reclaimer

Longitudinal Stockyard with Portal Reclaimers

SAMSON
AUMUND GROUP

Material intake with SAMSON Material Feeder and stockpiling with Stormajor®

Ship unloading with Eco Hopper

After Sales & Field 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, Brazil, the USA and Saudi Arabia. Our product specialists provide assistance and respond instantly.

Preventive Maintenance
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.

Commissioning and Field Service
Today, presence "on the spot" is an absolute "must". Therefore, our commissioning and service engineers operate from support centers on all continents to guarantee immediate and competent support.

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