



## **ECONOMICAL SOLUTIONS FOR THE CEMENT INDUSTRY**



## SPECIALIST IN CEMENT SINCE 1935

BEUMER was founded in Beckum, Germany, in 1935 as a manufacturing company for conveyor equipment, and its first order came from the cement and lime industry in Westphalia. Since then, products and solutions have been manufactured worldwide for the cement industry. Today, BEUMER Group is an experienced, internationally active operator in the cement industry and has the right solution ready for any challenge in conveyor, loading, silo, filling, palletising or packaging technology.



#### SYSTEMS YOU CAN RELY ON

A bag of cement has a lengthy journey behind it before it arrives at the building site. Between being quarried, processed and supplied as the finished product, the material passes through many different stages. At each of these stages, special systems are in place to ensure the process is smooth, economical and environmentally friendly: systems from BEUMER Group. Systems you can rely on – whether the job involves conveying, loading or packaging cement.

### BEUMER GROUP - MADE DIFFERENT

For us, this means creating a long-term perspective based on top quality, sustainability and innovation. Since 1935 the BEUMER Group has been developing tailored system solutions throughout the world in the areas of conveying and loading technology, filling, palletising and packaging technology, as well as sortation and distribution systems.

Some 4,200 employees worldwide pool their many years of experience and their extensive knowledge about the different means of transport and requirements for goods in specific sectors, backed by a wide, well developed service network. Our production teams use the best materials and the latest technologies to ensure that all systems satisfy even the most stringent specifications. And our commitment to research and development guarantees that our solutions meet your current and future requirements. We know how to transport products and other goods that need to be conveyed, and understand their specific properties. This knowledge is fed into the development of all of our plant and systems. Working closely with our customers, we develop the right solution for each location. Solutions that will ensure you are well prepared for the future and ahead of the competition.

#### **BEUMER QUALITY**

- Partnerships we listen to your needs and develop the most appropriate solution.
- Technology everything including conveying, loading, silo, palletizing and packaging technology.
- Logistics covering planning, transport, installation, commissioning and customer support maintenance.
- Service global customer support programmes.

## FROM QUARRY TO LOADING - BEUMER IS YOUR PARTNER



## 1. RAW MATERIALS HANDLING

- > Belt conveyor
- > Pipe conveyor
- > Blending bed

### 2. RAW MEAL MANUFACTURE

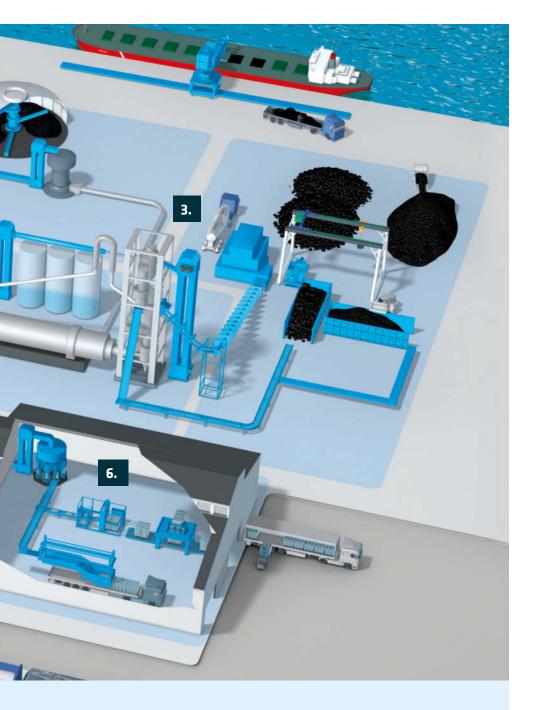
- > Bucket elevator
- Belt conveyor or tipping tray conveyor

#### 3. FUELS

- Coal store
- > Bucket elevator
- System technology for alternative fuels
- Pipe conveyor

#### 4. CLINKER PRODUCTION

- Bucket elevator
- > Belt apron conveyor
- Apron conveyor
- > Silo discharge
- > Bulk loading head



#### **CONVEYING TECHNOLOGY**

- > Troughed belt conveyors
- Pipe conveyors
- Apron conveyors
- > Belt apron conveyors
- Tipping tray conveyor
- > Belt bucket elevators
- Heavy duty belt bucket elevators
- > Central chain bucket elevators
- System technology for alternative fuels

#### STORAGE TECHNOLOGY

- > Blending bed
- > Coal pile

#### PACKAGING TECHNOLOGY

- > BEUMER fillpac® RC & RM
- > BEUMER fillpac® IC & IM
- > BEUMER stretch hood®

#### PALLETISING TECHNOLOGY

- > BEUMER paletpac®
- > BEUMER robotpac®

#### 5. CEMENT MANUFACTURE

- Bucket elevator
- Belt conveyor or tipping tray conveyor

#### 6. PACKAGING

- > BEUMER fillpac®
- > BEUMER paletpac®
- > BEUMER stretch hood®
- Manual loading system
- > BEUMER autopac®

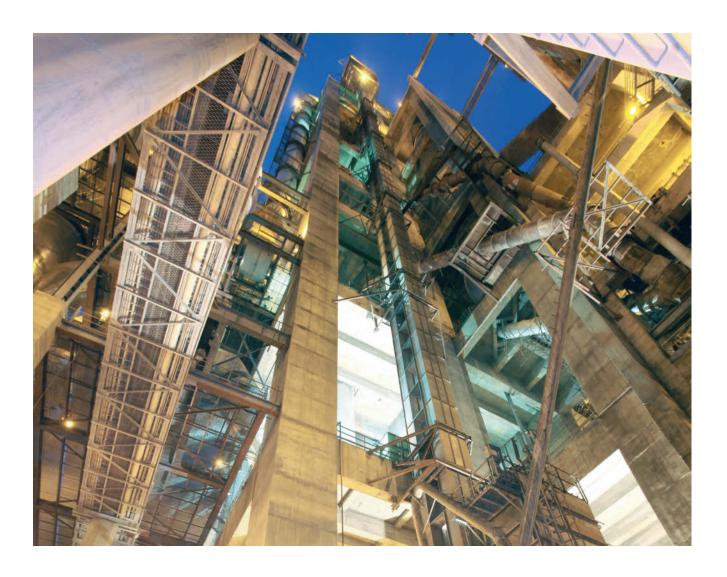
#### 7. BULK LOADING

- Bucket elevator
- Airslide
- Bulk loading system
- Silo discharge technology

#### LOADING TECHNOLOGY

- > Bulk loading head
- Ship loading system
- > Railway wagon loading system
- > Silo discharge technology
- > BEUMER autopac®
- > Bag loading





#### INDIVIDUAL TRANSPORT

The BEUMER Group has been supplying systems and plant for transporting bulk and loose goods around the world. And when it comes to the cement industry, too, BEUMER has the right solution for all transport tasks. By producing runs with horizontal curves, e.g. for transporting limestone from the quarry to the cement works, the BEUMER Group has created trend-setting systems. The same goes for transporting hot materials, like clinker transportation for instance.

If the task involves large volumes to be transported, or transport over difficult terrain, BEUMER belt conveyors are far superior to transport by goods vehicle or rail. Why? Because they score thanks to energy recovery systems, low CO<sub>2</sub> emissions and low investment and operating costs.

BEUMER bucket elevators come into play when vertical transport is required, e.g. for mill or silo feed. As the market leader, the BEUMER Group has developed more and more highly refined technical designs for this type of conveying system for a number of decades now.

#### **EVERYTHING IN MOTION**

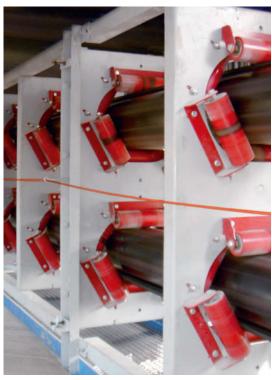
There is a wide range of solutions available for conveying applications in the cement works:

- > Troughed belt conveyors
- Pipe conveyors
- Apron conveyors
- > Belt apron conveyors
- Tipping tray conveyor
- > Belt bucket elevators
- > Heavy duty belt bucket elevators
- > Central chain bucket elevators
- System technology for alternative fuels

- Ideal for long distances
- > Long centre distances
- Great flexibility
- High-temperature bulk goods can be transported
- Highly economical with low investment costs
- Low-wear construction with a lengthy service life even with highly abrasive materials

## CONVEYING TECHNOLOGY FOR LONG DISTANCES





#### TROUGHED BELT CONVEYORS

Open troughed belt conveyors transport bulk goods for cement manufacture quickly across large distances and rough terrain, e.g. from the quarry to the cement plant. The narrow curve radii and long centre distances permit large mass flows, particularly where heavy and solid materials are involved. This makes BEUMER troughed belt conveyors every bit as economical as they are flexible, and they pay for themselves quickly thanks to the low investment cost. The efficiency of the troughed belt conveyors can be increased still further thanks to energy recovery on downward slopes: this means the motors can be operated in motor-driven or in regeneration mode, and adjustably, to permit optimum load distribution over the drive unit under different operating conditions.

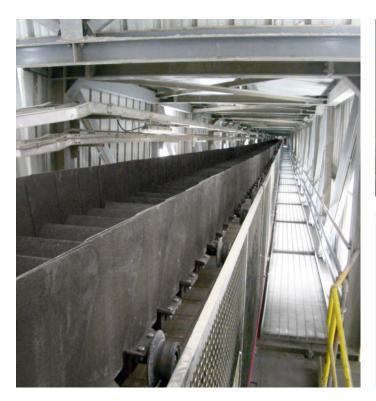
The electrical energy that is recovered is fed back into the grid via a feedback unit, which helps keep the overall system costs down.

#### PIPE CONVEYOR

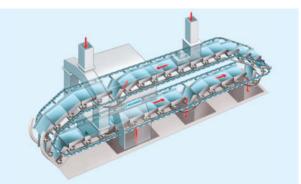
A pipe conveyor is recommended if sensitive products such as pulverised cement raw materials have to be protected against environmental influences, or if the environment needs to be protected against the dust from these products. The closed construction of these pipe conveyors prevents losses of material during transport – even when the route includes major inclines or tight curves. Downhill transport when the route includes major inclines can be used efficiently and economically for energy recovery. The BEUMER pipe conveyors permit these tight curve

radii and steep angles of inclination, while doing away with transfer towers. This low-maintenance solution also allows two different materials to be transported in the upper and lower strands.

## CONVEYING TECHNOLOGY FOR TRANSPORTING HOT MATERIALS







#### APRON CONVEYORS

High temperatures, complex configurations and overcoming extreme heights – hot materials such as cement clinker can be transported safely and at low cost using the BEUMER Group's apron conveyors with extra heat resistance. These systems use sturdy double-sidebar chains as the traction element. This keeps the costs of construction to a reasonable level. Different versions can be used to overcome inclinations of up to 60° at a speed of 0.3 m/s.

#### **BELT APRON CONVEYOR**

The belt apron conveyor from the BEUMER Group make it possible to transport hot materials safely and economically at angles of incline of up to 60° and at speeds of up to 0.6 m/s with no need for special features. The conveyor system is highly heatresistant. It is based on tried-and-true belt technology as used in the bucket

elevators: the steel cells are attached by screws to a wear-resistant longlife steel cable, enabling transport capacities of up to 1,300 m<sup>3</sup>/h.

#### TIPPING TRAY CONVEYOR

The tipping tray conveyor with intermediate discharge is utilised in cases where several discharge points are employed at random, or where different bulk goods such as clinker, limestone and plaster have to be transported and distributed simultaneously, such as for feeding silo batteries and storage halls. Different bulk goods can be conveyed and discharged simultaneously using the upper and lower strands.

#### **HIGHLIGHTS**

Troughed belt conveyor and pipe conveyor

- > Ideal for long distances
- > Energy recovery option
- > Angle of inclination up to 30°
- Performance: troughed belt conveyor up to 6,000 t/h, pipe conveyor over 10,000 t/h

Apron and belt apron conveyor

- Ideal for hot materials and highly abrasive substances
- > Angle of inclination up to 60°
- Conveying speeds up to 0.6 m/s

# BUCKET ELEVATORS FOR MAXIMUM VERTICAL LIFTING







#### **BELT BUCKET ELEVATORS**

BEUMER Group belt bucket elevators provide vertical transport for bulk goods ranging in consistency from powder to small pieces to a height of up to 200 metres. These are ideally suited for feeding a pre-warming tower or a raw meal or cement silo with powdered raw materials. Different bucket widths are available to accommodate required transport volumes. And special high-performance belts and systems that minimise the risk of belt damage ensure a long service life and high availability for this bucket elevator.

### HEAVY-DUTY BELT BUCKET ELEVATORS

The heavy duty belt bucket elevator was developed for use with coarse, highly abrasive bulk materials. HD bucket elevators can transport piece sizes up to 120 mm. By using a specifically designed BEUMER Group steel

wire belt, HD bucket elevators enable maximum conveying heights and conveying capacities. They are particularly suitable as recirculation units behind high-pressure roller mills and vertical mills.

#### CENTRAL CHAIN BUCKET ELEVATOR

The BEUMER central chain bucket elevator was developed expressly for maximum conveyor performance; depending on design, sizeable centre distances can thus be achieved, and conveyed volumes can reach 1,900 m³/h depending on bucket width. Their full strength comes to the fore with hot, abrasive or granular bulk material, as in milling operations in the cement industry, for instance. A range of BEUMER chain types is available to ensure the best possible use.

- Vertical conveyance of bulk material to heights of over 200 m
- Transport capacities of up to 2,000 m³/h
- Maximum wear resistance even with highly abrasive materials
- High-temperature bulk material can be transported

## ALTERNATIVE FUELS FOR ECONOMICAL RE-USE





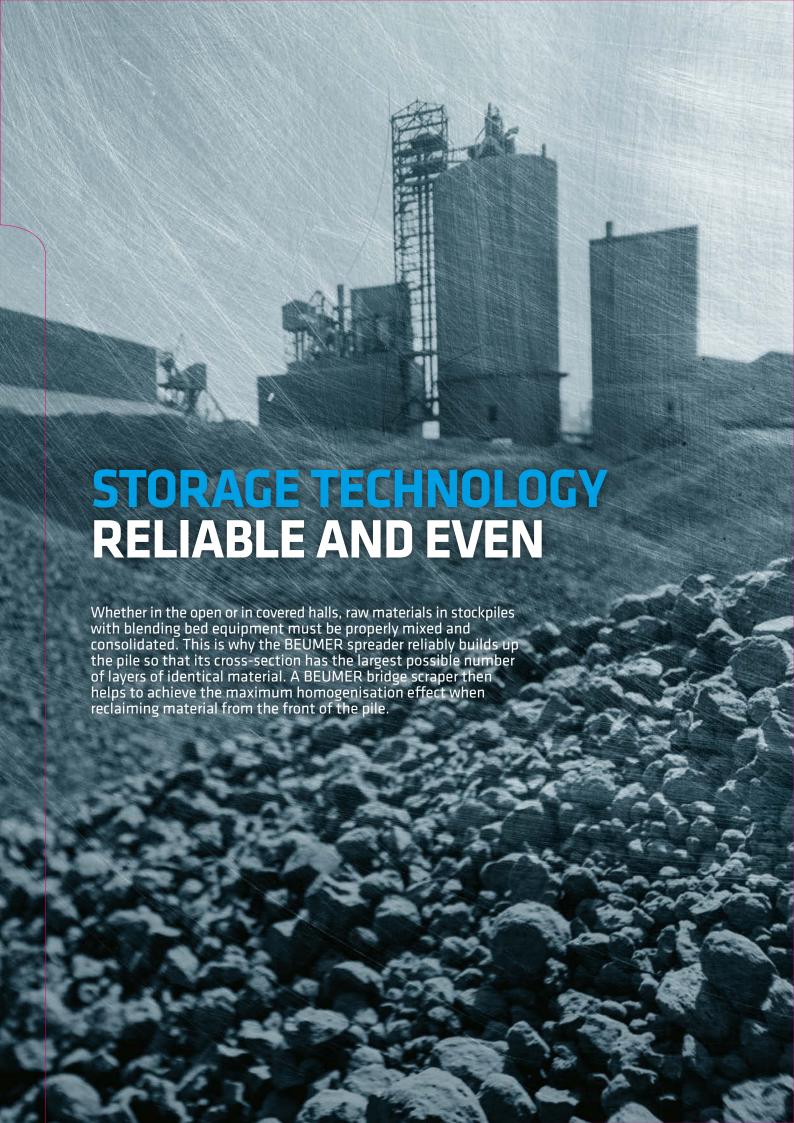
### SYSTEM TECHNOLOGY FOR ALTERNATIVE FUELS

What technology provides better control over the huge energy costs incurred in the cement manufacturing process? Energy costs still account for about 40 percent of the cost of production. The BEUMER Group's answer is a series of system solutions that properly dispose of waste and secondary fuels and convert them into valuable energy at the same time.

Old tyres, shredded tyres, plastics and other oil-based mineral products – large volumes of alternative fuels are available at low cost and can be safely disposed of using the high-temperature process in the rotary kiln systems in cement works, leaving no residues. The BEUMER Group's systems enable these alternative materials to be stored, separated, weighed, metered out and transported efficiently and without harming the environment. It is also possible to change fuel types.

These plants thus ensure that kilns in cement works are operated and fuelled much more economically. At the same time, the ash from the alternative fuels is added to the mineral components of the cement clinker and thus reduces the volume of additives needed.

- > Economical energy recovery
- Low-cost waste disposal
- No unacceptable environmental impacts
- > Fuel types can be changed
- Precisely metered combustion processes





#### **BLENDING BED**

Longitudinal or circular stockpiles are used to mix or homogenise the raw materials. This can be achieved both in covered halls and in the open. The basis for a blending bed is achieved by building up the pile in layers using a spreader and then using a bridge scraper to reclaim material from the front of the pile. The result is the best-possible mixing effect, since an almost constant quality is needed when it comes to further processing the material.

#### COAL PILE

A distinction is made between longitudinal and circular stockpiles. Both have a reserve or interim storage function. The shape of the stockpile depends on the space available and the volume of the material to be stored. A rotary spreader is used to fill the stockpile, and material is taken from the pile using a scraper chain with buckets.

- Most appropriate use of space (longitudinal or circular stockpile)
- Designed for extreme operating temperatures
- Continuously adjustable discharge rate
- Very high feed-in performance
- Maximum possible homogenisation in blending bed
- Detailed, material-specific solutions
- > Sturdy, wear-resistant fittings
- Minimum environmental impact from noise and dust





### FROM DIRECT PACKING TO OUTER PACKAGING

The BEUMER Group provides comprehensive solutions for all standard filling and packing processes, specifically with the cement industry in mind. It has the knack when it comes to direct packaging of cement products: the BEUMER Group is an expert in filling technology you can trust when you need to bag large volumes of any kind of free-flowing, fine-grained product reliably, economically and efficiently.

For outer packaging, too, the BEUMER Group has many years of experience and innovative, modular packaging systems to offer. Stretch hoods reliably protect the palletised load units against the weather, interference or accidents. At the same time, the good display qualities provided by the film complement the outward appearance of the products.

### STATE-OF-THE-ART PACKING OF CEMENT PRODUCTS

The BEUMER Group has efficient filling and packing systems to pack cement products.

#### Direct packing:

- ▶ BEUMER fillpac® RC rotary filling machine
- ▶ BEUMER fillpac® IC inline filling machine

#### Outer packaging:

- BEUMER stretch hood® A packaging system
- BEUMER stretch hood® M packaging system
- BEUMER stretch hood® S packaging system
- BEUMER stretch hood® G packaging system

#### **HIGHLIGHTS**

#### Direct packing

- > Low acquisition cost
- Good availability of parts
- > Good ease of maintenance

#### Outer packaging

- > Flexible product sizes
- > High throughput rates
- Protection against environmental impacts
- > Ease of operation

## DIRECT PACKING A TALENT FOR FILLING





#### BEUMER FILLPAC® RC

Equipped with up to 20 filling modules and with a compact design, the BEUMER fillpac® RC can fill up to 300 tonnes of free-flowing material per hour, e.g. cement or various types of plaster, into a range of bag types. The bag weight correction function, which automatically adjusts the weight of the next bag in sequence, ensures filling results are always accurate.

The motor-driven bucket wheels on the impeller packers maintain especially high filling pressure and thus achieve the best possible compaction of the free-flowing materials being bagged. At the end of the process, the filled bags are both compact and stable, and no additional de-airing is required.

#### BEUMER FILLPAC® IC

In addition to the rotary impeller filling machines, BEUMER Group also supplies inline versions: the BEUMER fillpac® IC with up to four modules and a capacity of 1,200 bags per hour. The filling modules are arranged next to each other to save space and maximise access, making them very easy to maintain. BEUMER inline packers score particularly well in terms of efficiency in production environments with low product throughput.

#### **HIGHLIGHTS**

BEUMER fillpac® RC

- > Up to 20 modules
- > Up to 300 tonnes per hour
- Bag placer: 300 to 3,600 bags per hour

BEUMER fillpac® IC

- > 1 to 4 modules
- > 300-1,200 bags per hour
- Bag placer: 300 to 1,400 bags per hour

## OUTER PACKAGING PROTECTION UNDER THE HOOD







#### BEUMER STRETCH HOOD®

The BEUMER stretch hood® series is a range of modular packaging systems to secure palletised load units using stretch hoods. The clever use of film tension ensures maximum protection during transportation. The latest control technology, individual configuration and flexible functionality ensure that the machine fits perfectly into every customer situation.

The BEUMER stretch hood® also scores on sustainability: the packaging process uses no heat and consumes very little power, while also minimising the fire risk. Only the exact amount of film required is used, in just a single layer. The sturdy, watertight film and the high level of stability of the packed pallets guarantee outstanding performance for outdoor storage.

Ease of handling is provided by automatic recognition of the pallet dimensions and precise selection of the film format. The system can also be operated simply and intuitively via the touch panel, with explanatory video covering the more technical functions.

The following maximum performance figures are possible, depending on the system chosen:

- Output: up to 135 pallets per hour at 0.04 kWh
- Minimum package dimensions: 500 x 500 mm
- Maximum package dimensions: 2,500 x 1,250 mm

- > High load stability
- > Excellent display qualities
- Protection against environmental impacts and interference
- Low power and film use
- Fully automatic pallet and package recognition
- Film length automatically calculated using ultrasound





#### TOP-QUALITY PALLETISING

To be able to survive in international competition, companies need highcapacity palletisers that guarantee long service lives even under extreme loads - and our systems constantly satisfy these requirements. BEUMER palletising technology is individually tailored to a company's specific requirements and wishes, and takes into account the product characteristics of the individual packaged goods as well as the desired packing patterns and pallet dimensions. With palletising systems from the BEUMER Group, all packaging units are handled gently and palletised optimally.

#### BEUMER PALETPAC®

Palletisers from the BEUMER paletpac® series can palletise up to 6,000 bags per hour, while providing high stacking quality and gentle bag handling. Filling plants can thus achieve an impressive daily output.

The high-capacity models also stand out for their state-of-the-art drive technology, variable parameters, and a high level of user-friendliness. An impressive aspect to the BEUMER paletpac® is its ability to achieve a very high throughput while maintaining a low processing speed by distributing the flow of bags. The geometric precision and stability of the palletised stacks ensure there are no problems with storage and guarantee perfect compatibility with downstream packaging systems.

#### **BAR TURNING DEVICE**

With bar turning devices, a swivelling bar brings the bags conveyed sideways into the desired position. While it can be used in BEUMER paletpac® systems regardless of the performance category, it showcases its strength in particular with robust products and large mass flows.

- Capacity: up to 6,000 bags per hour
- Gentle bag handling
- Precise stack formation
- Programs for all conventional packing patterns
- Intuitive adjustment of parameters for variable bag and pallet dimensions





### HIGH-PERFORMANCE LOADING SYSTEMS

Goods vehicles, railway wagons or ships – you name the form of transport and BEUMER Group will have the right loading and unloading solution, thanks to expertise and experience refined over decades in loading both bulk material and bags.

The loading machine itself is the core around which complete loading systems are planned, manufactured and assembled to suit the customer's requirements and the products to be loaded. Loading systems from the BEUMER Group score in terms of economy, user-friendliness and high capacity.

## A SOLUTION FOR EVERY FORM OF TRANSPORT

There is a variety of BEUMER solutions available when it comes to loading cement products or raw materials for cement:

- Bulk loading head for bulk transporter vehicles
- > Ship loading system
- > Railway wagon loading system
- Silo discharge technology
- > BEUMER autopac®
- > Bag loading

- Dust-free and environmentally friendly operation
- High plant compatibility and flexibility
- > Automatic dispatch control
- High throughput rates
- Low acquisition cost
- Good availability of parts
- > Good ease of maintenance

## BULK MATERIAL LOADING FAST AND DUST-FREE







#### **BULK LOADING SYSTEMS**

Bulk transporter vehicles can be loaded quickly and free of dust with the BEUMER bulk loading head, which has been designed according to the double-wall system. The material inlet and the dedusting unit are separated from each other. The bulk loading head must be connected to a dedusting air system. A bulk loading head with a compressed-air filter is available for bulk transporter vehicles with an integrated filter.

## LOADING SYSTEM FOR VEHICLES AND RAILWAY WAGONS

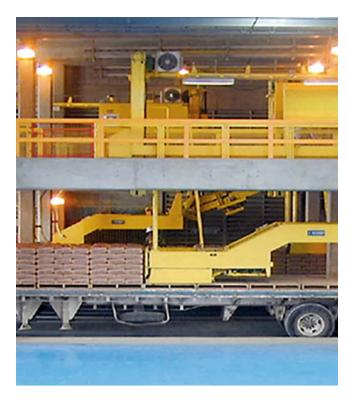
Besides transport using goods vehicles, rail is another major factor to consider when transporting bulk goods by land. BEUMER offers a range of solutions with telescoping loading systems to load rail wagons.

The refined BEUMER technology enables coarse bulk material such as clinker or lumpy ores to be loaded efficiently and with minimal dust into open rail wagons and open goods vehicles. This makes use of belt conveyor systems and a vertical telescopic tube.

#### SHIP LOADING SYSTEM

There are two different systems available to load ships. Coarse bulk materials, such as clinker or lumpy ores, are loaded into bulk carriers using belt conveying systems and a vertical telescopic tube, efficiently and without dust. Swivelling and telescopic loading machines make it possible to fill most of the cargo space without shifting the ship. The loading of powdered goods is handled by fully enclosed loading machines – an extremely environmentally friendly solution.

## BAG AND PALLET LOADING ACCURATE AND INGENIOUS





#### BEUMER AUTOPAC®

The BEUMER autopac® is an economical and high-performance system for the simultaneous loading and palletising of bagged goods such as cement, sand, gravel or concrete and lime products. It is available in two different versions: the BEUMER autopac® 2400 and BEUMER autopac® 3000. Depending on the version, the BEUMER autopac® can process 2,400 or 3,000 bags per hour, with or without pallets.

#### **BAG LOADING**

Mechanised and semi- or fully automatic bag loading equipment has become a BEUMER Group speciality – including a patented, three-dimensionally adjustable bag loading machine with telescopic head. These enable maximum loading volumes to be combined with careful handling. Bag transport equipment, bag cleaners and devices for rejecting broken bags as well as the system controls expand the bag loading equipment into complete installations.

- Automatic loading and palletising of bagged products
- Gentle bag handling
- Built for tough environmental conditions
- Flexible packing patterns
- Suitable for a wide range of materials: paper valve bags, HDPE bags and PP valve bags; others available on request



## SAMPLE REFERENCES AND PROJECTS WORLDWIDE



#### **CONVEYING TECHNOLOGY**

- > TPI Polene Public Company, Thailand
- > P.T. Semen Gresik, Indonesia
- > ACC Wadi Cement, India



#### STORAGE TECHNOLOGY

- > E.on-Kraftwerk Datteln 4, Germany
- > Azot Beresniki, Russia
- > Afyon Ciment, Turkey







- > Jebel Ali Cement, United Arab Emirates
- > Wonder Cement, India
- > Schwenk Zement, Germany



#### LOADING TECHNOLOGY

- > Dyckerhoff, Germany
- > Saudi Cement Company, Saudi Arabia



#### PALLETISING TECHNOLOGY

- > P.T. Holcim Indonesia, Indonesia
- > Gandl Natursteine, Germany

## SIMPLY WORLD-CLASS CUSTOMER SUPPORT



BEUMER Group is known worldwide for its individually tailored customer support. This is based on a global network of regional service centres. Our support solutions will keep your systems operating – 24 hours a day, 365 days a year.

#### BEUMER GROUP – EVERYTHING FROM ONE SINGLE SOURCE

We also act as the main contractor on behalf of our customers providing comprehensive, highly customised concepts from product filling to palletising and packaging.

Competent engineering, fast and reliable on-site service as well as optimal spare parts supply round out our offering and ensure high reliability of the systems.









At BEUMER Group, the focus is always on people. We build strong partnerships through personal relationships and individual attention.

Our customer care programme entitles you to multiple service options, such as maintenance and repair on site through our field service engineers or regular safety checks according to statutory rights. If hardware replacements are needed, our comprehensive warranty service ensures you are always covered.

MODERNISATION

We are constantly developing new ways to upgrade our software and hardware to extend a system's lifetime, lower energy costs and increase efficiency. We will keep you informed of all relevant upgrade opportunities, based on an understanding of your business and system needs.

TRAINING AND QUALIFICATION

We offer standard and tailored customer training programmes to make sure your teams are fully qualified to operate your systems. With hands-on guidance, conducted either on-site or at BEUMER Group locations, your teams can maintain optimal operational performance.

PARTS LOGISTICS

We guarantee spare part replacements around the world through our local companies. As a BEUMER Group customer, you will have your own individual contact to assist you with technical inquiries, warranty issues or repair orders and to secure that your order is delivered on time.

HOTLINE SUPPORT

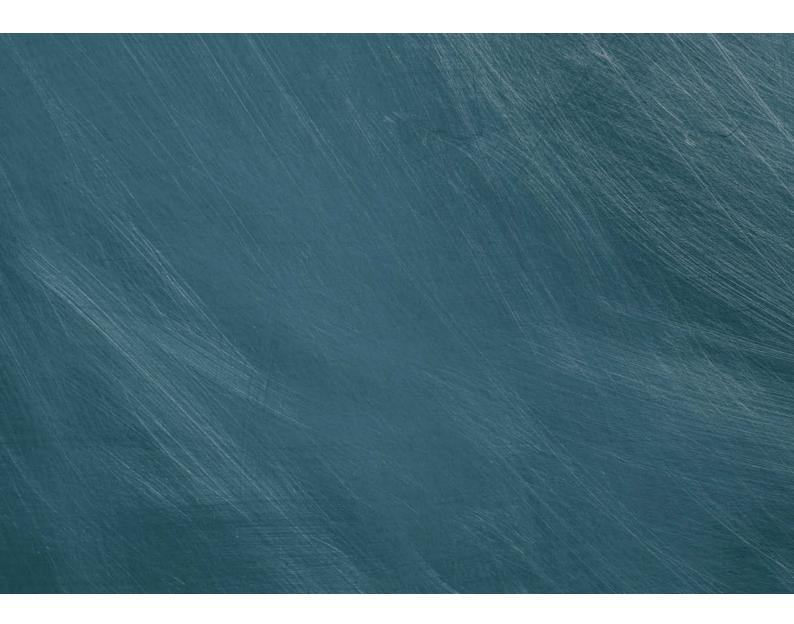
Our hotline support is manned

24/7 by highly trained, multiskilled engineers who all have at least four years of direct field experience. Most cases are solved remotely, however, should the problem require more specialised attention, a BEUMER Group engineer will be quickly sent out.

RESIDENTIAL SERVICE

With our residential service, we are on-site every day to take complete responsibility for your system uptime, performance and operational efficiency. We can take care of all maintenance and management, including system improvements, contingency plans, specialist advice and repairs.





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Products and technologies carrying BEUMER's "made different" seal are characterised by their sustainability based on their economic, environmental and social performance as measured by the BEUMER Sustainability Index (BSI).