



**WKB**

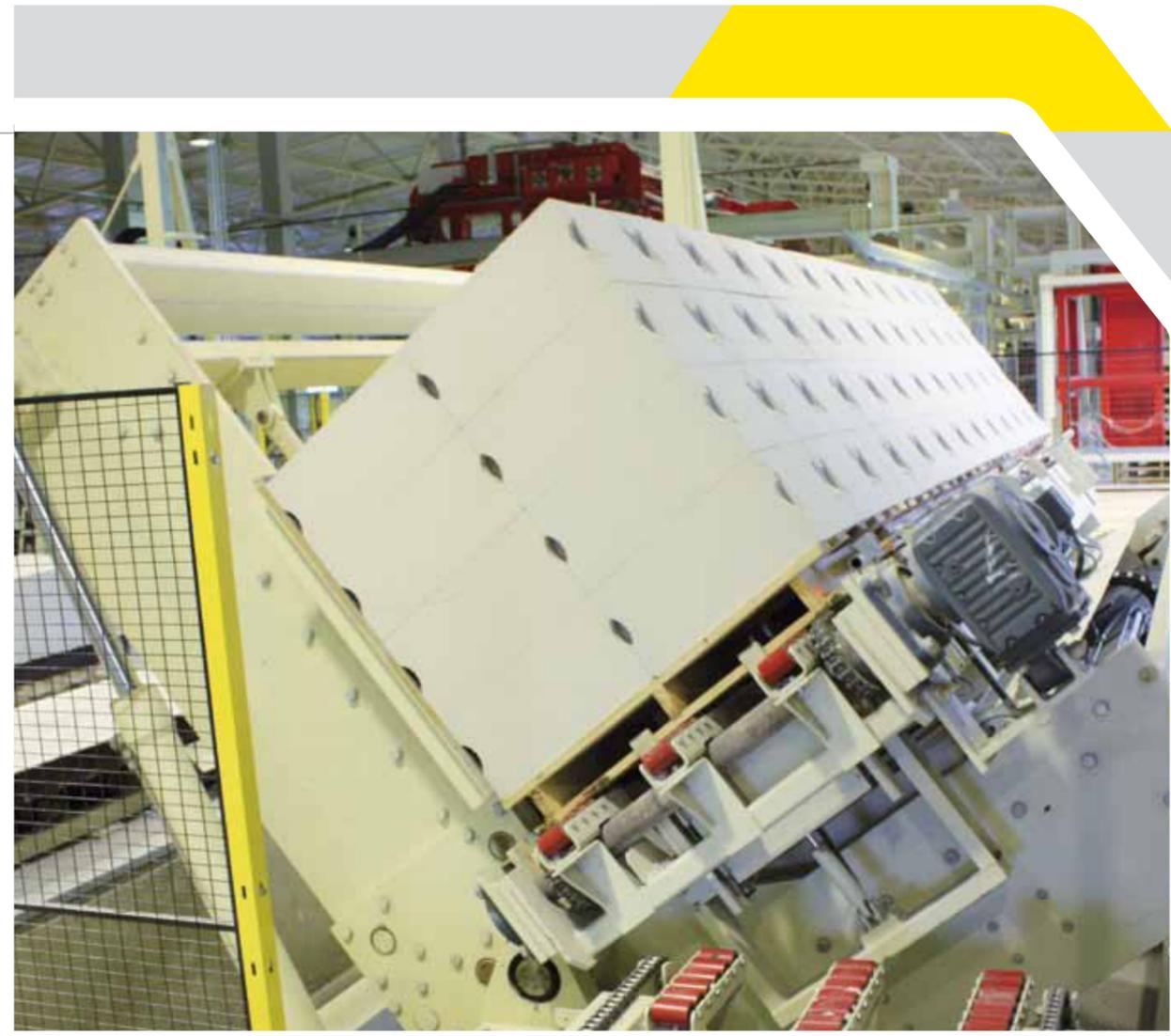
in operation worldwide



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## EXPERTISE IN AUTOCLAVED AERATED CONCRETE



innovation made by experience

## WKB - Your partner for autoclaved aerated concrete production

### We work out technical solutions – together with our customers

WKB supplies machinery for the production of autoclaved aerated concrete (AAC)

### We are specialised in:

Processing of  
raw materials

Cutting lines

Autoclaving

Transport / Packaging

Reinforced elements /  
U-shells / hollow blocks

Modernisation /  
Turn key plants

Take advantage of proved technology and wide experience  
WKB – innovation made by experience



WKB Systems GmbH is an innovative and worldwide operating manufacturer of high tech investment goods for the building materials industry. We develop and manufacture turn key plants as well as stand-alone machines and facilities for the production of autoclaved aerated concrete blocks, sand lime bricks and ceramic bricks.

### Approved technology - worldwide

The WKB machinery (formerly developed and produced by W+K Maschinenfabrik GmbH) is in operation all over the world and has been proven successful in Europe, CIS countries, Middle East, the USA, Mexico, Africa, China and Canada, etc.

### WKB stands for:

- Innovative solutions according to your requirements
- Outstanding quality
- Customised equipment
- High-performance, reliable and easy to maintain machinery
- Best value for money

### WKB: qualified – innovativ – dynamic

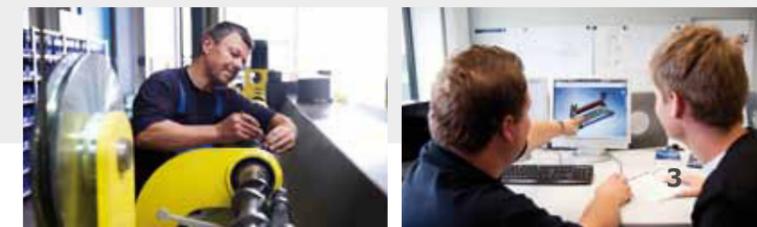
Our young and motivated team consists of highly qualified professionals in all business areas and gives you ongoing support as a reliable partner. Our customer always takes part in the development process of a project, so individual solutions are developed for every of his requirements.

Our engineering specialists possess the broad technical know-how, professional experience of many years and strong customer orientation. At the same time they have a direct access to the international experience in the production of autoclaved aerated concrete. In such a way we supply state-of-the-art practice-oriented solutions from one source:

- Definition of your requirements
- Planning of a technical solution
- Design and electrical engineering
- Production and assembling

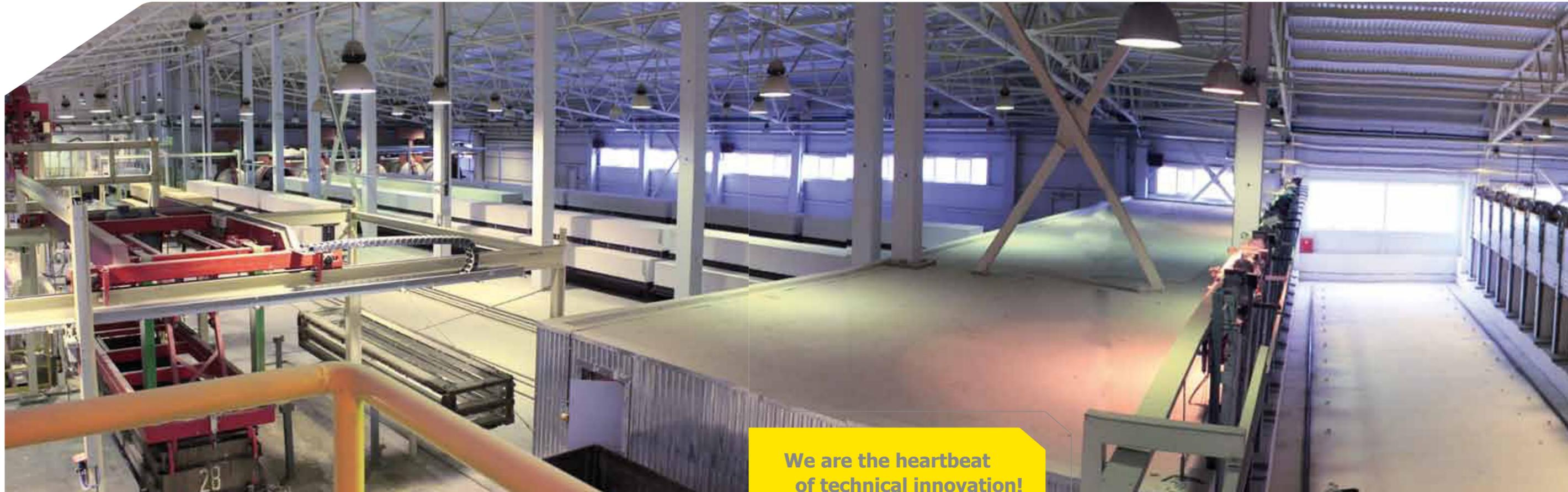
### And at your site:

- Supervised assembling, commissioning and handover of the equipment
- Operator training
- Spare parts supply and after sales service
- Maintenance
- Modernisation and production process optimisation



Complete solutions from one source – we work for your success.

Turn key plants



We are the heartbeat  
of technical innovation!

#### Innovative solutions for highest aspirations

As a well-known manufacturer of the machinery for autoclaved aerated concrete industry WKB equips turn key plants for the production of AAC blocks.

According to the motto "from the idea to the machinery" we support you in the planning of your plant and develop individual concepts depending on the daily production capacity, automation level und engineering design.

There is a close cooperation between WKB Systems GmbH and competent partners, whose specialists have international experience of many years in the production of autoclaved aerated concrete.

#### We offer you:

- Technical consulting
- Project planning and engineering
- Production, supervised assembling and programming
- Commissioning and operator training at your site
- Development and implementation of individual solutions together with the customer
- On-site technical support
- Support of the customer during the whole project duration

Feasibility studies, material tests and reliable service ensure you an ongoing production process.

#### Highest standards ensured by WKB technology

Our engineers work out special concepts according to customer requirements for:

- Raw materials processing and mixing
- Cutting and sawing
- Autoclaving with steam generation
- Product transportation and tracking
- Packaging and warehousing
- Process control and visualisation

Autoclaved aerated concrete – a building material with perfect properties.  
A contribution to effective building.

## Autoclaved aerated concrete as a building material



### Autoclaved aerated concrete – a special building material

Autoclaved aerated concrete consists of natural components such as silica sand, quicklime, cement and anhydrite or gypsum as a binder and water. Additionally small quantity of aluminium is used as a propellant for pore formation.

5 m<sup>3</sup> of autoclaved aerated concrete could be produced out of 1 m<sup>3</sup> of solid raw materials. This efficient usage of raw materials encourages economical subsistence strategy.

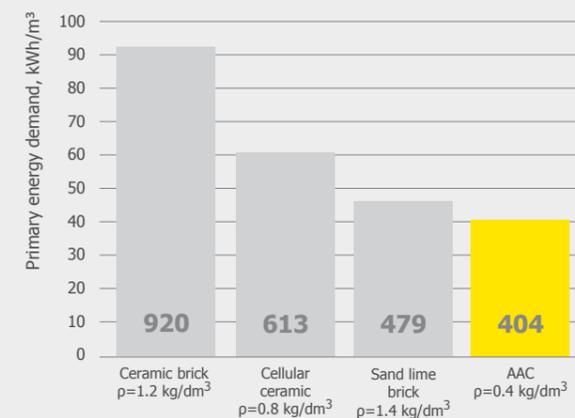
Autoclaved aerated concrete is a perfect heat insulator that consists of 80% air and only 20% of solid materials. After fermentation and hardening process in autoclaves it receives following characteristics:

- Cellular structure
- Low density
- High strength
- Perfect heat insulation
- Good sound insulation
- Perfect fire protection
- Suitably for usage in earthquake areas
- Almost endless life cycle

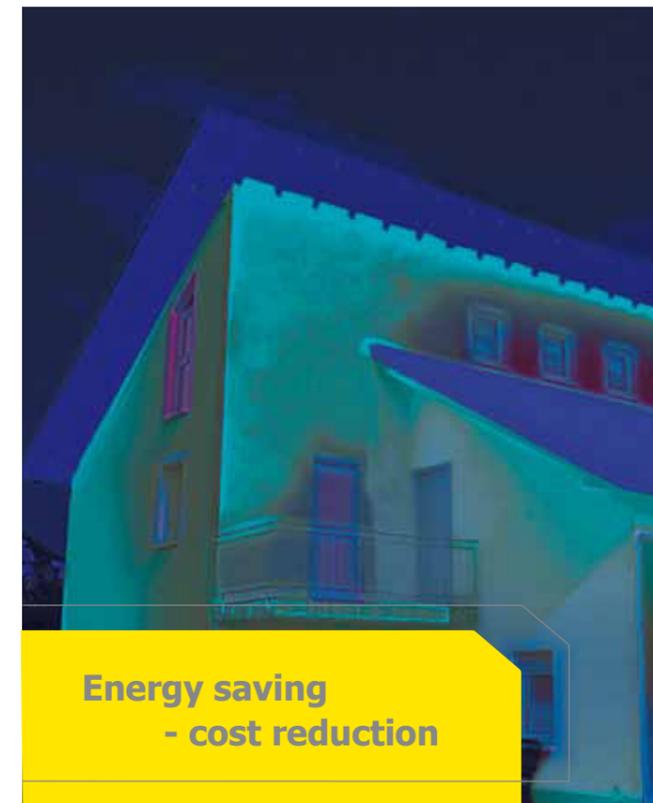
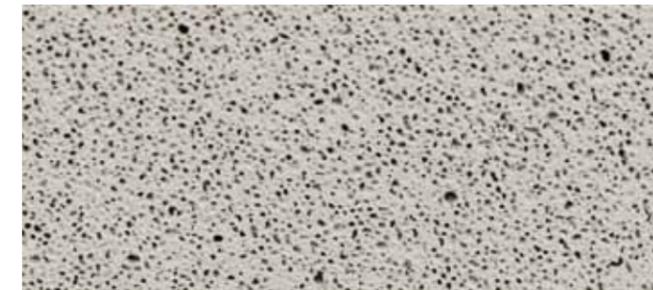
Autoclaved aerated concrete can be used for new building and modernisation of single family or two-family houses, multi-storey building and commercial construction.

### Characteristics:

- **Strength density:** between 0.30 and 1.00 kg/dm<sup>3</sup>.
- **Strength:** on average it is between 2.5 and 10.0 N/mm<sup>2</sup>. That is why it is possible to use AAC products in building of houses with up to nine floors. Tensile strength is 10% of cube compressive strength. Bending tensile strength is one-fifth of the cube compressive strength, that is 0.5 - 2.0 N/mm<sup>2</sup>.
- **Heat conductivity:** thanks to its low heat conductivity of 0.09 W/(mK) there is no need in multilayer wall building as Perfect fire protection
- **Heat storage:** heat storage of AAC is between extremes of lightweight construction (for example timber panel building with ca. 50 kJ/m<sup>2</sup>K) and solid building (for example blocking or armored concrete with ca. 250 kJ/m<sup>2</sup>K). An AAC wall has heat storage factor of ca. 90 kJ/m<sup>2</sup>K.



Accumulated primary energy demand in the production of important building materials



Energy saving  
- cost reduction



Grinding, mixing, casting, handling - WKB offers solutions.

## From raw material to a „green cake”



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### Raw materials

Raw materials used in the production of AAC are finely ground silica sand, anhydrite, quicklime and cement (as a binder) and also aluminium (as a propellant) as well as water.

Alternatively fly ash could be used instead of sand. The suitability of fly ash must be checked in special tests. However it is not possible to produce reinforced elements in this case.

For every mixing process raw materials (depending on their quality) are weighted in weighing containers and mixed in a specified order with special agitators in the mixer. Precise dosing of raw materials and high mixing velocity ensure that sand slurry, lime, cement, anhydrite and additional water are mixed to have a homogeneous mixture in short time.

### Casting mould

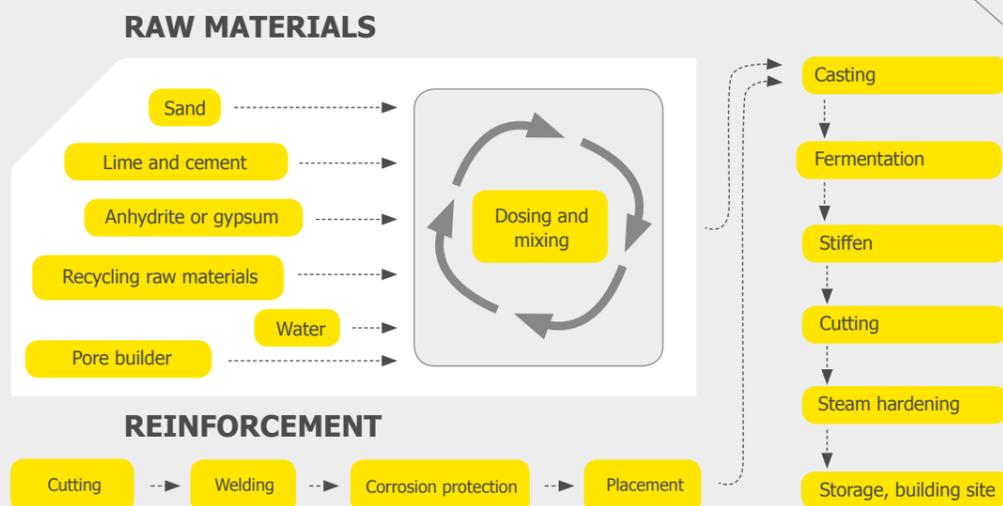
A certain quantity of the mixture is poured from the mixer in an oiled casting mould that consists of 2 parts that are extremely tightly closed. In a casting mould the AAC cake ferments for approx. 2,5 hours in a heated chamber to stiffen under a certain temperature.

The casting mould is specially developed for the following tilting process. The casting mould is of a torsionfree construction with conical sides that can be lifted off upwards. So it is possible to gently remove the cake from the mould. The mould base and mould sides find one another over and over again to build one perfect unit.

There is a portal unit used for mould detachment from the base, also called form removal, as well as for further handling. WKB equipment handles the "green cake" very gently to minimise possible damages that could be seen only after autoclaving process.



### Production process of autoclaved aerated concrete



Innovative cutting technologies for autoclaved aerated concrete.  
We supply solutions for the requirements of our customers.

## WKB cutting lines



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Individuality  
- Innovation - Precision

### Cutting lines WKB CL 1 and 2

The cutting process starts after the form removal. Cutting lines WKB CL 1 and 2 consist of the following units:

- **Pre-cutter:** a slope of the cake in horizontal position is cut at right angle there.
- **Tilting device:** the cake is tilted by 90° on the cutting board, so the cake is standing upright.
- **Vertical cutter:** the sides of the cake standing upright are cut and **tongues and grooves** are inserted there.



- **Horizontal cutter:** pneumatically tensioned and offset steel wires have an entry and exit angle of 0-60°, which can be continuously adjusted. This prevents the material from breaking off while leaving the cutting wire.
- **Cross cutter:** tensioned cutting wires, which are arranged according to the desired formats, rotate oscillating in opposite direction. They go through the cake top down. If necessary a recess pocket milling device can be switched on there. A suction hood sucks up the top layer of the cake with vacuum. Later on this top layer falls into the cutting trough and is returned to the production process with a scraper conveyor. Finally, head sides of the cake are straightened with a groove cutter.

### Compact cutting line WKB CL 4 Compact: small place required

Compared to WKB CL 1 and 2 the compact cutting line WKB CL 4 operates with only one tilting table. The upright cake comes into an immovable position and cutting modules start to cut the cake.

Processing units of the cutting line go through the upright cake. Vertical and horizontal cutters are of portable construction and simultaneously cut the AAC cake. In the vertical cutter the cake sides are trimmed with steel wires and tongues and grooves are inserted with particular blades according to the desired format. The horizontal cutter cuts the cake according to the needed block width.

Finally steel wires of the cross cutter that are arranged according to the desired block format cut the cake in downward movements. Also according to the block size a recess milling device mills grip pockets in the cake.

### Modernisation: could be integrated in every plant

With WKB CL 4 we are able to satisfy market requirements for plant modernisation concepts in the production of AAC. Many customers want to replace their old cutting lines. As a result the compact cutting line was developed that could be integrated in almost every plant because of small place required.

In order to achieve optimal cut quality the cake is cleaned with compressed air nozzles after the cutting process. As a result all the material rests are removed.

**WKB cutting lines are of state-of-the-art technology and combine innovation and ease of use.**

All cutting lines could be adjusted according to the individual requirements of our customers, such as block size.



Vertical cutter WKB CL 4



Horizontal cutter WKB CL 4



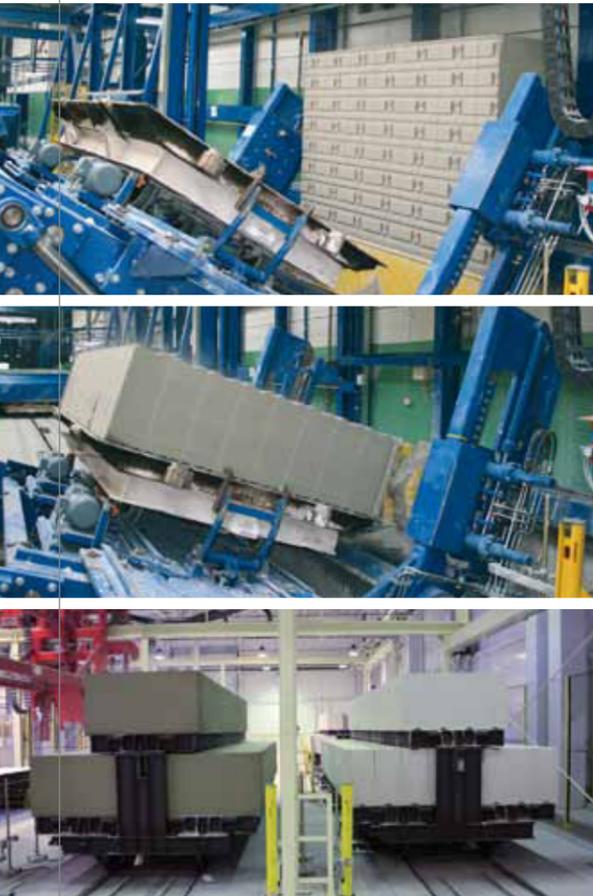
Cross cutter WKB CL 4

Energy saving – issue of a new generation.  
Efficient usage of the vessel thanks to the stacking method of WKB.

## Autoclaving



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#### Two tilting processes optimise production process

During the second tilting process the AAC cake is tilted by 90° on the autoclave pallet that moves across later on. At the same time the bottom layer of the cake is sucked on the cutting board.

As soon as the autoclave pallet has moved away and the vacuum is released, the bottom layer falls into the cutting trough to be forwarded to the section of returned material processing.

An autoclave pallet with the cut cake is forwarded with a conveying device to the loading station, where a special gripper puts pallets on an autoclave carriage.

#### Innovative: WKB stacking method

WKB stacking method enables to put three autoclave pallets on one autoclave carriage. Here one autoclave pallet is placed on two adjacent pallets. This new development ensures more efficient vessel usage and reduces energy costs.

A standard autoclave is supposed to be used under the pressure of 12 bar. Being 39 m long and of 2,75 m in diameter it could be loaded with 6 hardening trolleys with 3 autoclave pallets each, so totally with 18 cakes.

#### Energy saving thanks to efficient usage of vessel

There is an advantage not only because of reduction in material consumption but also in the fact that the hardening of the bottom layer, as it is common in other AAC technologies, is not needed any more.

Another advantage is that blocks are placed on the autoclave pallet on their top side so they generally do not adhere to each other during autoclaving process. Furthermore there is no need for a separating unit.

#### Waste heat recovery

The autoclaving process is a production step that consumes the most energy. There are usually several autoclaves used on a time-delayed basis as well as steam accumulator used for partial waste heat recovery.

Waste heat recovery means the usage of the condensate as well as reusage of the steam generated in autoclaves.

While decompressing of the autoclave the steam is stored to be used once more in the next autoclaving process or for building and feed water heating.



With a heat exchanger it is possible to recover heat from the condensate that could be used for preheating of fermentation chambers or building heating.

**Take advantage of WKB innovative technology in order to make your production process more economical.**

**More efficiency:  
WKB stacking method**



Perfect plant logistics with WKB equipment.  
Make your production process more efficient!

## Transport / Packaging



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### Innovative for the highest aspirations

Transport and conveying systems are essential not only for efficient material flow or stock keeping but primarily for automation of the production process.

That is why they become such important factors for cost and time saving and therefore for the rate of return of your company.

You need innovative components and facilities for handling, transport and packaging of AAC products? WKB supports you there!

Portal systems, robots, grouping systems or handling systems specially developed by WKB specialists are used to carry out precise handling operations.

#### innovative – individual – customised to meet your requirements

Different conveying systems (tackle systems, pushing mechanisms, traversers) ensure reliable transportation within your AAC plant. There are also chain, roll and belt conveyers used there.

### Packaging

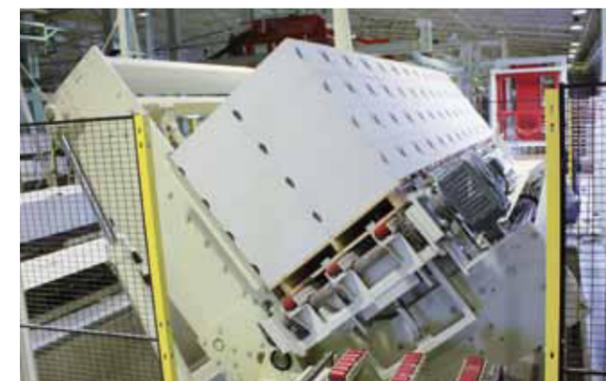
After autoclaving process the autoclave pallets are taken with a gripper from the autoclave carriage and forwarded to the third tilting table.

Here the gripper positions the whole package of hardened blocks on the tilting table. As a next step the second package of blocks is put on the first one and the tilting table tilts both by 90° on wooden pallets.

These pallets will be separated and forwarded to the packing station. The packaging with the stretch foil is usually used. Here there is a variety of packaging techniques. One technique is the usage of a stretch hood that is pulled and stretched on a holder. Later on it is put over the products and shrinks around them to protect against water and dust.

Furthermore the readily packed pallets are wrapped with stretch-foil by a satellite coiler. Usage of a shrink hood is also very popular.

After packaging the AAC blocks are brought into stock by a forklift truck and are ready for dispatch.

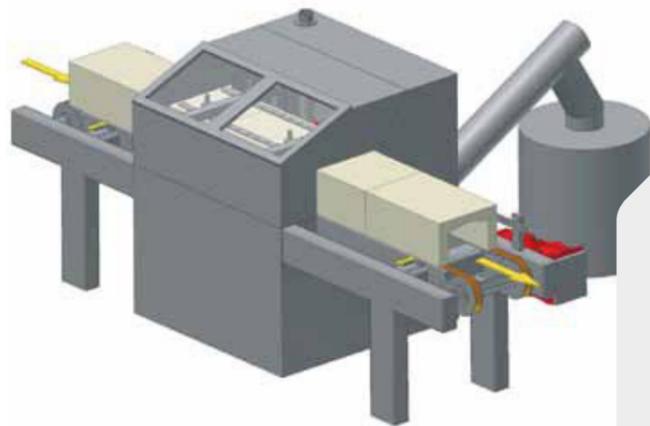


Restyle your product portfolio!  
Meet requirements of your customers and increase your market value.

## Reinforced elements / U-shells / hollow blocks



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#### U-shells / hollow blocks – open up new markets

Alternatively it is possible to produce U-shells and hollow blocks. Only one additional machine must be integrated in an AAC plant to produce these AAC products.

WKB offers two techniques for the production of **U-shells**.

##### Milling technique:

According to this technique a U-shell is produced with a milling device that mills a groove in an AAC block. The result is an extremely robust U-shell.

##### Hotmelt technique:

WKB Systems GmbH developed a fully automated U-shells gluing station for these purpose. Firstly a robot takes an AAC block from the pallet and brings it to the saw, where the AAC block is sawn to appropriate pieces.

As a next step these pieces are glued to a robust U-shell with special hot glue in a gluing station. The robot takes the finished U-shell and puts it down on the pallet. WKB Systems GmbH offers also the U-shells gluing station with manual feeding.

The powerful drilling machine is used in the production of **hollow blocks**. First of all the robot brings a solid AAC block to a turnover device, where the AAC block is tilted by 90°. Then the robot places the AAC block on the drilling machine. Here the holes for core rods, power, phone, water and wastewater disposal lines are made with high precision. Afterwards the robot brings the hollow AAC block to the turnover device to tilt it by 90°. As a next step the AAC block is stacked on the pallet.

#### Options for your plant

##### Reinforced elements – broaden your product portfolio

In order to strengthen the market position of our customers WKB offers an option to produce AAC reinforced elements to offer a wide range of products to the end customer.

The reinforcement frame consists of some welded steel wires that are specially arranged or bent and put in mats with spot-welding.

It is essential to prevent corrosion of frames in a dipping bath as AAC could not protect the steel from corrosion.

The reinforcement mats are adjusted and fixed in a casting mould with special fixing elements. Here it is very essential to precisely position the mats in a cake as it must be cut afterwards.

Standard elements are wall panels, roof panels and ceiling panels, that are usually 625 mm wide and 6000 mm long (depending on the size of a casting mould). Their thickness depends on the application purpose and static loading. According to the requirements the dimensions of panels could be individually changed. In order to change the panel length and for special cuts there must be an additional dry cut saw acquired.

A line for production of reinforced element in an AAC plant broadens the product portfolio with wall panels, roof panels, ceiling panels and brackets/covers. As a result it is possible to win new markets and to improve plant flexibility.



Use the state-of-the-art technology in your plant.  
Improve your competitive advantage – now and in the future.

## Modernisation



■■■■■ innovation made by experience

### Competitive for the future

#### Modernisation and optimisation

Do you have a plant and want to modernise it? Or want to optimise production process? WKB develops modular concepts for all common production technologies.

WKB offers approved low-priced solutions for modernisation. In such a way it is possible to improve not only the effectiveness and efficiency of an AAC plant but also the product quality.

#### Service and spare parts supply

Also after the equipment delivery we provide you with ongoing support as a reliable partner. Our team offers after sales service and consulting service worldwide. We support your personnel in all issues concerning production process with remote maintenance and of cause at your site if needed.

WKB also ensures flexible and efficient spare parts supply all over the world. Fast and reliable processing of enquiries and orders as well as permanent storage of important spare and wear parts in our warehouses are our strengths.

#### Improve your competitive advantage – now and in the future

We optimise and modernise your production – thanks to the modular design of our production lines it is possible to pay attention to every single machinery component.

#### We are specialised in:

- Mixing units
- Cutting lines
- Casting moulds and hardening trolley circulation
- Steam generation
- Packaging lines
- Process automation
- and others

WKB lines ensure highest flexibility and quality. Thanks to the individually developed concepts according to the customer requirements there is a high customer benefit reached.

#### Advantages for your production:

- Increase in the production volume
- Staff saving
- Automation improvement
- Reduction in working cycle time
- Improvement of quality
- Cost reduction as a result of usage of an existing building

**WKB supports you every time and develops with you the best solution for optimisation of your plant.**

**Improve your competitiveness - now and in the future**

