

masa

Milestone to your success.

Sand-Lime Brick Production

**MACHINES
PLANTS
CONCEPTS**





The output figures listed in this brochure are guidelines only. In practice, the production output depends on different factors. These are: individual plant layout, machine settings, mixing recipes, raw materials and additives used, ambient and other conditions.

CONTENTS

Masa – Your partner for successful building materials production	04
The wall building product Sand-Lime Brick	06
Expertise: We are the all-round carefree package	08
The Sand-Lime Brick making plant for your requirements	10
Overview of the production process.....	12
Raw material handling: Storage. Dosing. Mixing.....	14
Centrepieces: Overview of the hydraulic Sand-Lime Brick presses (HDP)	16
Hydraulic Sand-Lime Brick Press: Press type HDP 800	18
Hydraulic Sand-Lime Brick Press: Press type HDP 1200 Jumbo	20
Autoclave control system: Masa know-how for the hardening process.....	22
All in the right place: Handling and packaging systems.....	24
Manufacture of fitting pieces: Sawing plants.....	26
Masa technology centre: Sand-Lime Bricks.....	32
Safety: Better safe than sorry.....	34
Energy efficiency: Sustainable means future-proof	36
Modernisation and modification: Permanently up-to-date.....	38
Consultative service: More than mechanical engineering.....	40
Values we stand for	44
Masa worldwide.....	46

MASA – YOUR NUMBER ONE PARTNER FOR SUCCESSFUL BUILDING MATERIALS PRODUCTION

Individual, sustainable plant solutions

Since the day we were founded, we have significantly influenced developments in the building materials industry. Our concepts, machines and plants, which have demonstrated their worth for many years, can be quickly updated or expanded if necessary. Our basic philosophy is: to provide flexible and intelligent solutions that enable us, as partners, to help our customers succeed.

WE DO THIS BY MEANS OF:

- Fully automatic machines for the manufacture of concrete products, AAC products as well as sand-lime bricks
- Sophisticated and well-engineered technology
- Several decades of experience gathered by competent professionals
- Service centres all over the world
- Active and effective advice, from design to implementation
- Reliable spare parts supply and customer support

An approach which, combined with hard work, has borne fruit: Today, we can claim to be a global market leader in the design and manufacture of plants and machines for the building materials industry. This success is made possible by some 500 staff at present.

FROM RAW MATERIAL TO FINISHED PRODUCT

The manufacture of concrete products, AAC products, and sand-lime bricks sets high demands on the individual production plant. Only when all components harmonize and the processes are optimised, the plant will run efficiently.

DESIGN COMPETENCE

We define machine configurations as well as logistically and process-optimised plant layouts together with you, based on your requirements for the products to be manufactured, the desired production output and the local conditions at your site.

The close-knit interaction between design, engineering, production and service leads to complete solutions which can encompass all relevant elements of a production plant:

- Preparing, dosing and mixing of the raw materials
- Manufacturing the products
- Hardening
- Handling
- Packaging
- Surface treatment
- Plant control
- Further equipment

**EXPERT ADVICE,
EXCELLENT QUALITY AND
CUSTOMER-ORIENTED SERVICE**

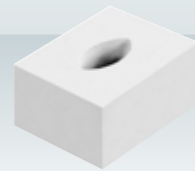


THE WALL BUILDING PRODUCT SAND-LIME BRICK

Efficient and sustainable

DID YOU KNOW?
HALF OF THE CO₂ THAT IS GENERATED DURING THE PRODUCTION OF SAND-LIME BRICKS IS BOUND AGAIN BY MEANS OF RECARBONISATION DURING THE LIFE CYCLE OF THE PRODUCTS.

Wall brick



Raster element



U-shaped element



Chamfered bricks



Plane elements in various sizes



PROFITABLE AND LASTING
SAND-LIME BRICKS IMPRESS
WITH THEIR VERY GOOD CO₂ BALANCE
AND THEIR FLEXIBILITY
IN WALL BUILDING.

06

07

WHAT HAS MADE SAND-LIME BRICKS SO POPULAR IN THE BUILDING MATERIALS INDUSTRY IN THE PAST 125 YEARS?

Perfect bearing capacity

Sand-lime bricks enable high raw densities and thus high compressive strength classes of up to 25. This enables the manufacture of very thin load-bearing walls that can be used in residential building and multi-storey residential building.

Optimum fire protection

Components made of sand-lime offer an excellent structural fire protection. The mineral building material does not contain any combustible components and belongs to the highest building material class ("non-combustible"). This does not just mean safety, but a financial incentive as well: Many insurance companies reward preventive fire protection measures with lower insurance rates.

Best possible noise control

Structural noise protection is particularly important in residential buildings. Outer walls and particularly building separating walls made of sand-lime bricks with their high raw density offer structural noise protection.

Healthy living climate

A comfortable sense of living can be generated by ecologically compatible building materials. Further wellness factors are consistent air humidity and temperature. Sand-lime bricks bear these advantages due to their composition of natural raw materials and their excellent heat and moisture retention capacities.

WE ARE THE ALL-INCLUSIVE CAREFREE PACKAGE EXPERTISE IN SAND-LIME BRICKS

Service based on experience



08

09

**MASA - YOUR LONGTIME PARTNER
FOR THE BUILDING MATERIALS INDUSTRY:**
FROM FORWARD-LOOKING PLANNING
TO COMMISSIONING
- AND BEYOND.

THE SAND-LIME BRICK PRODUCTION PLANT FOR YOUR REQUIREMENTS

Extendable Masa solutions

10

- 01** Raw material storage, dosing, and mixing
- 02** Reactor and chemical reaction
- 03** Masa double-shaft mixer
- 04** Hydraulic sand-lime brick press Masa HDP
- 05** Hardening car transport from the press to the autoclaves
- 06** Autoclaves/steam boiler
- 07** Packaging
- 08** Cleaning of the hardening cars
- 09** Magazine for empty/full hardening cars
- 10** Return of empty hardening cars
- 11** Moulding tools with changing device

Please note: The shown production plant for sand-lime bricks just serves as an illustration and does not substitute a real layout plan. The displayed solutions are special solutions partly. For reasons of clearness, safety grating is missing.

RAW MATERIAL
PREPARATION
PRESSING
HARDENING
PACKAGING
PROCESS



- 01 Raw material preparation and storage
- 02 Dosing and mixing
- 03 Lower part of reactor with double-shaft mixer
- 04 Hydraulic sand-lime brick press Masa HDP
- 05 Autoclave loading and unloading
- 06 Steam pressure hardening
- 07 Packaging
- 08 Finished products packaged and ready for transport

RAW MATERIAL HANDLING STORAGE. DOSING. MIXING.

The optimum sand-lime brick mix

The quality of the finished sand-lime products principally depends on the storage, mixing and dosing of the raw materials sand and lime. We supply all the necessary components to ensure the best possible layout of the plant.

MIXING PLANTS

The different sand and lime types required for different recipes are stored separately. They are then mixed in an intensive mixer. Depending on the sand moisture, water is added in the re-mixer. All quantities are dosed exactly as per the recipe before they are fed into the charge mixer.

REACTOR

A belt conveyor transports the sand-lime compound into the reactor. After approximately two hours, the reaction of lime and water is completed. Calcium oxide and water have combined to calcium hydroxide. This pre-mix is processed in the press.

PROCESS CONTROL

The fully automatic Masa mixing plant control system supervises, controls and records all process-relevant parameters for an efficient manufacture of sand-lime brick products.



Intensive mixer for a homogeneous basic product.



Component for the precise dosing of sand.

14



Sand is supplied and screened.



Lower part of the reactor with double-shaft mixer for further reaction.

15

CENTREPIECES

The hydraulic presses (HDP) are the heart of the sand-lime brick making process. We offer various tried and tested press models for this task. The presses are electronically controlled and enable a uniform, double-sided or one-sided compaction over the complete brick height.

Depending on the type, our sand-lime brick presses are designed for different capacities. The actual capacity depends on various factors, such as the mixing recipe and the size of the final product - from small bricks to big-size plane elements.

16

**HDP
800**

**HDP
1200 J**

**HDP
800 U**



HYDRAULIC SAND-LIME BRICK PRESS PRESS TYPE HDP 800

Number 1 in the global market with more than 200 installed machines

With our centrepiece, the hydraulic press, the physical characteristics and geometrical dimensions of the products are precisely defined.

The HDP 800 enables a double-sided compaction for products with a height of up to 300 mm and the manufacture of various geometrical features, such as chamfers, grip holes or tongue and groove systems.

The HDP 800 U enables the cost-efficient manufacture of products with a height of up to 250 mm with one-sided compaction.

CHARACTERISTICS

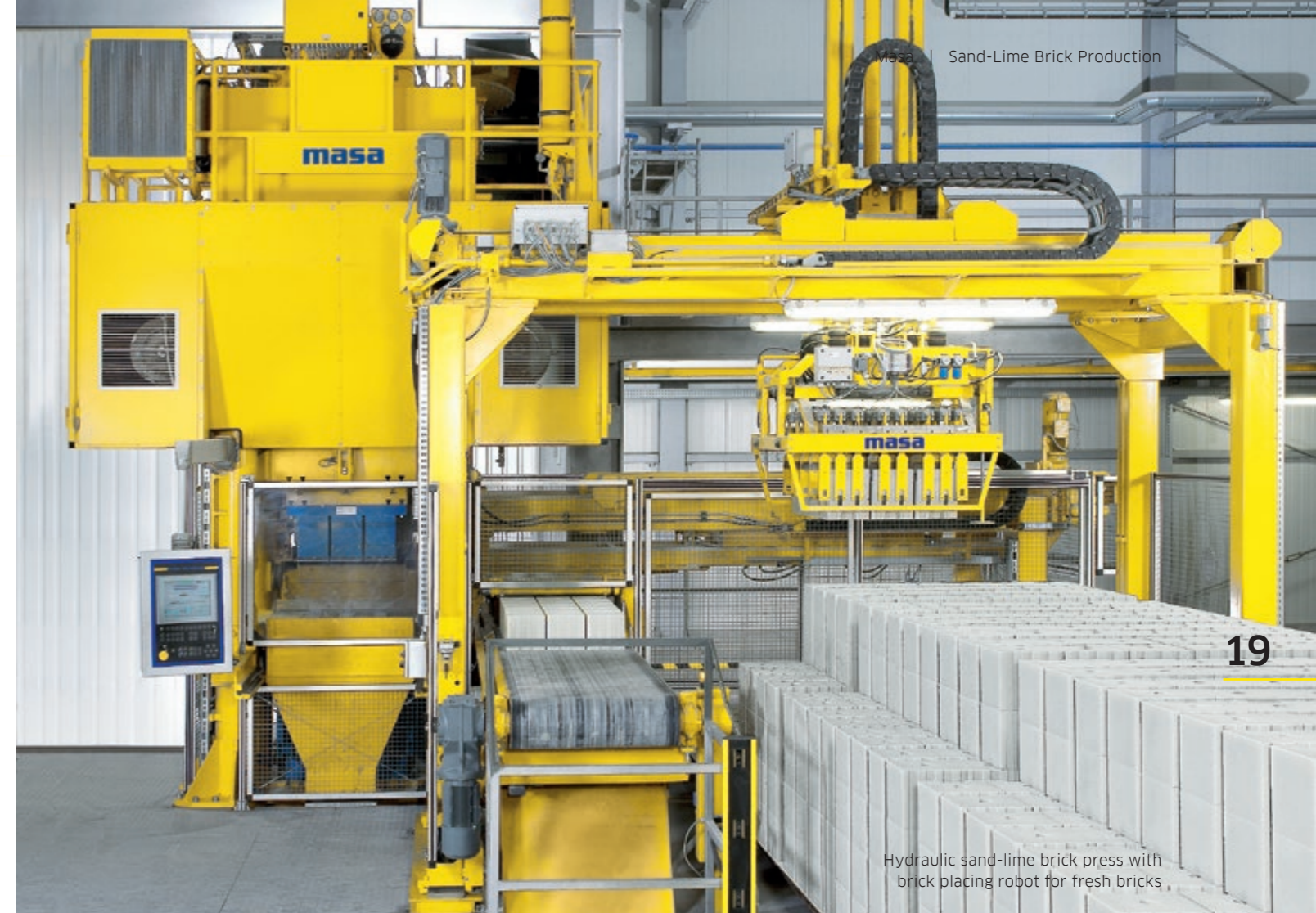
- Precise brick heights due to pre-tensioned frame system which prevents a linear extension of the press during compaction
- Maximum durability due to solid construction
- Optimum use of energy due to the use of hydraulic swing pumps
- Automatic product administration by freely adjustable compaction and stacking parameters
- Compact space requirements in case of several presses due to right-hand and left-hand versions

18

Control panel for the press plant and the brick placing robot






Pressing table with exchangeable mould insert



19

Hydraulic sand-lime brick press with brick placing robot for fresh bricks

TYPE	MOULD OPENING	MAX. BRICK HEIGHT	PRESS CAPACITY IN BRICKS PER HOUR*		
			 240 x 71 x 113 mm	 240 x 115 x 113 mm	 250 x 240 x 248 mm
HDP 800	1050 x 770 mm	300 mm	8,500	4,580	1,900
HDP 800 U	1050 x 550 mm	250 mm	8,500	4,580	1,900

*The calculation of the capacity per shift is based on an efficiency factor of 90%. The actual capacity depends on factors like mixture of raw materials and product size.

HYDRAULIC SAND-LIME BRICK PRESS PRESS TYPE HDP 1200 JUMBO

Manufacture of large-size products at optimal cost

20

With our HDP 1200 Jumbo, we help you to manufacture large-size products that have a consistent raw density throughout the complete brick height of up to 675 mm.

Using the latest servo motor technology to regulate the hydraulic pumps helps to generate higher dynamics and less noise emission. Particularly during the manufacture of large-size products, the press can save up to 30 % of energy compared to a classical hydraulic system.

As a positive side effect, 1/3 less mechanical elements are used. A clear advantage for the operation and maintenance of the press.

CHARACTERISTICS

- Precise brick heights due to pre-tensioned frame system which prevents a linear extension of the press during compaction
- Automatic expansion rate correction by additional brick height measuring device after the compaction process
- Maximum durability due to solid construction
- Automatic product administration by freely adjustable compaction and stacking parameters
- Easy error analysis with the visualisation system in the operating panel






EFFICIENT MANUFACTURE OF PLANE ELEMENTS WITH MODERN SERVO-HYDRAULICS SYSTEM

CLASSICAL HYDRAULIC SYSTEM

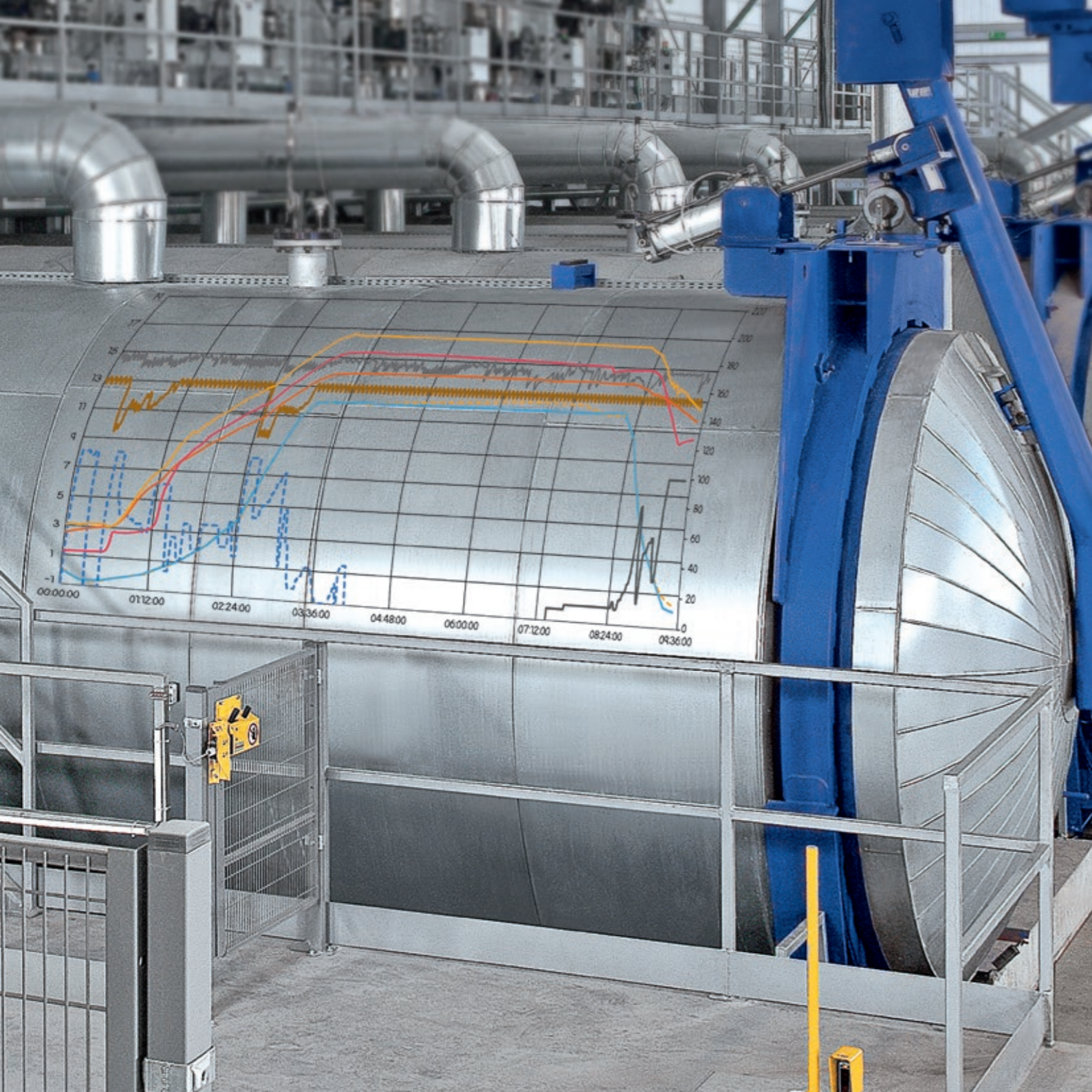
As an alternative to the servo technology, we still offer the HDP 1200 Jumbo with hydraulic swing pump technology.



21

TYPE	MOULD OPENING	MAX. BRICK HEIGHT	PRESS CAPACITY IN BRICKS PER HOUR*		
			 250 x 240 x 248 mm	 498 x 240 x 498 mm	 998 x 240 x 623 mm
HDP 1200 Jumbo	1100 x 772 mm	675 mm	1,920	400	160

*The calculation of the capacity per shift is based on an efficiency factor of 90 %. The actual capacity depends on factors like mixture of raw materials and product size.



AUTOCLAVE CONTROL SYSTEM MASA KNOW-HOW FOR THE HARDENING PROCESS

Process control. Energy efficiency. Recording.

SAFE PROCESS CONTROL THROUGHOUT THE COMPLETE HARDENING CYCLE

The Masa autoclave control system regulates and supervises the process-relevant parameters pressure, time, and temperature so as to achieve the best possible final strength of the sand-lime brick at the lowest possible power consumption.

MAXIMUM FOCUS ON PRESERVATION OF RESOURCES

The hardening process in particular consumes a great quantity of energy. Therefore, we focus on an optimum utilisation of water, steam, and energy. Our systems are designed in that way that the plant can be optimized modularly.

POSSIBLE CO₂ SAVINGS:

- Process water heating
- Direct steam transport
- Steam retention
- Heat recovery
- Re-use of condensate

- | | |
|------------------------|--------------------------|
| — Boiler pressure | — Inside temperature |
| - - - Inside pressure | — Bottom temperature |
| — Set pressure | - - - Steam outlet valve |
| — Fresh steam pressure | - - - Fresh steam valve |
| — Peak temperature | |

The modular design of the Masa autoclave control system aims at a reduction of the CO₂ emission to a minimum.



EVERYTHING IN ITS PLACE HANDLING AND PACKAGING SYSTEMS

Safe transport - Quality up to the building site

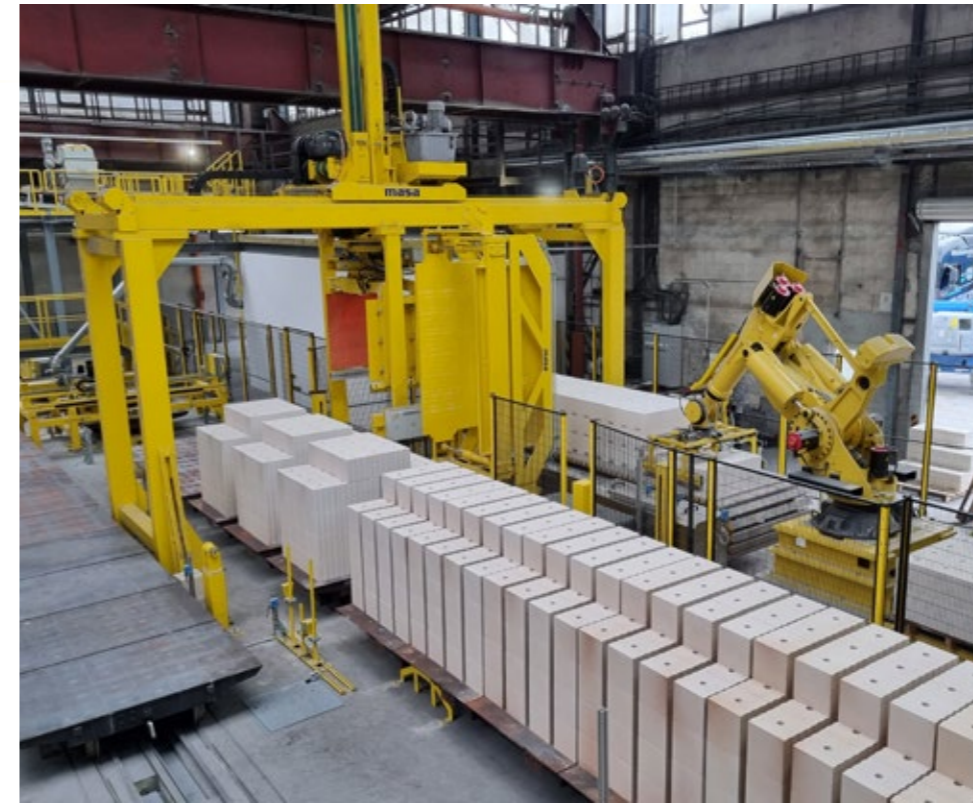
The transport system is one of the most important components of a sand-lime brick making plant.

SMOOTH TRANSPORT

Hardening cars are used for smooth transport of the fresh and finished products on a rail system between the individual plant units. Transport to the press as well as transport from the brick placing robot and the autoclave feeding system are carried out this way. Finally, the products are transported to the packaging plants.

Fully automatic transfer platforms, fixing devices as well as rope-pulled conveyors and cycle pushers are used to feed and transport the hardening cars inside the factory.

Robots in the packaging area



Removal of the strapped bricks

From hardening car to packaging plant:
Efficient and appropriate for the material.



PACKAGING

We also plan, manufacture and install the complete equipment for the packaging of the sand-lime bricks. According to a programmed pattern, the bricks or elements are taken off the hardening cars and cubed into packages - if required, on pallets. Finally, the packages are strapped vertically and horizontally.

Strapping device for all brick sizes



Masa sawing plant

MANUFACTURE OF FITTING PIECES SAWING PLANTS

Solutions for maximum flexibility

As part of our range of products for the manufacture of sand-lime bricks, we also offer plants and equipment for the manufacture of fitting pieces.

Practically all shapes that are required in the architecture of a building, such as mitre cuts, bevels or cavities, are possible.



EFFICIENT ARCHITECTURE PRE-FABRICATED BRICKWORK

In the right place at the right time

A fast and efficient building sequence is a decisive factor for economic and technical success in residential building. This is ensured by Quadro sizes or wall construction sets of plane elements that comprise standard elements as well as individual fitting pieces.

The brickwork prefabricated in the sand-lime brick making plant is perfectly adapted to the requirements on a modern building site. After all, it is enormously important to have the required sand-lime brick elements in the right place at the right time and in sufficient quantities.

Efficient planning and optimized production processes contribute to shorter construction periods and lower costs of a building project.

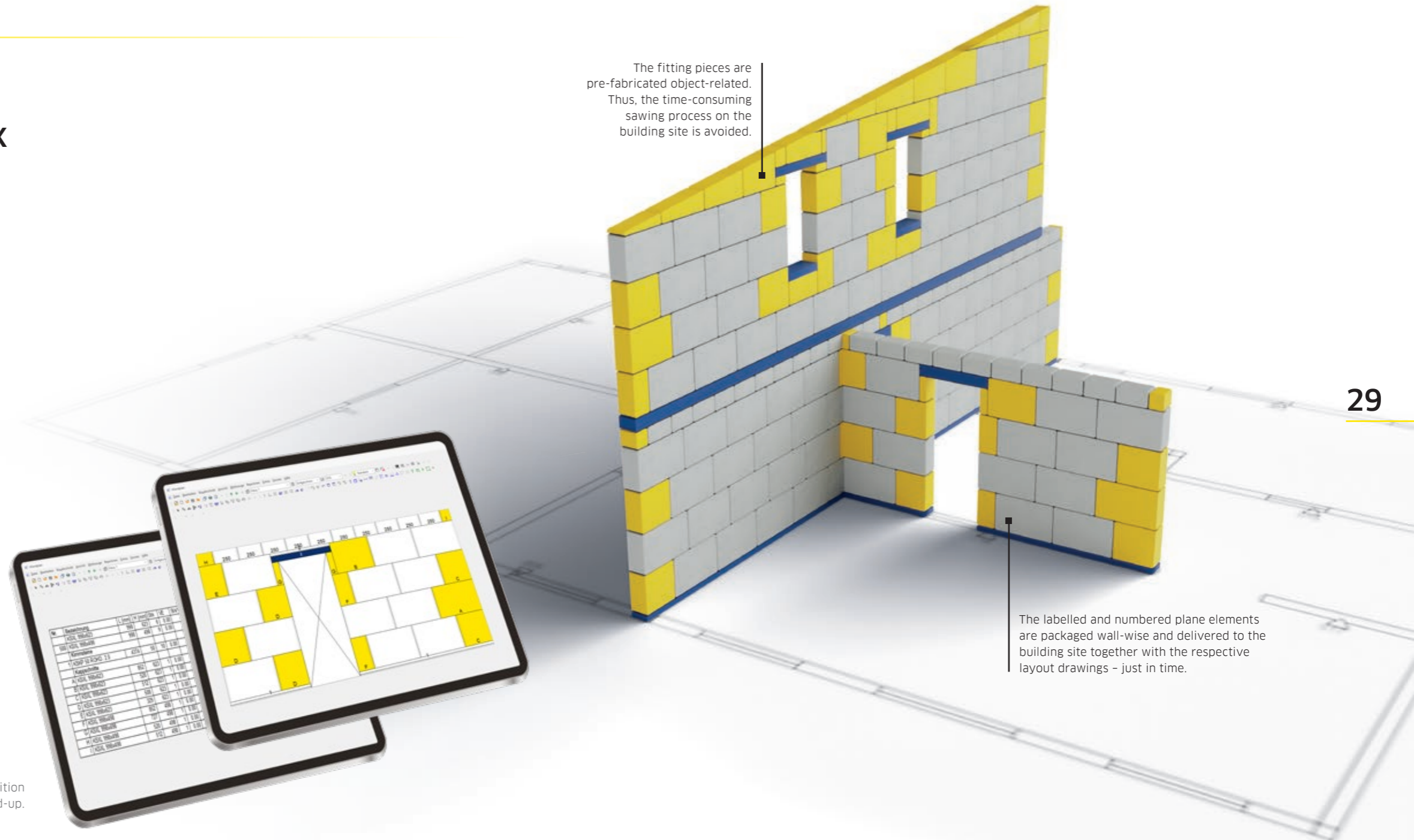
Each fitting piece has a defined position number - from planning through to build-up.

The fitting pieces are pre-fabricated object-related. Thus, the time-consuming sawing process on the building site is avoided.

The labelled and numbered plane elements are packaged wall-wise and delivered to the building site together with the respective layout drawings - just in time.

28

29



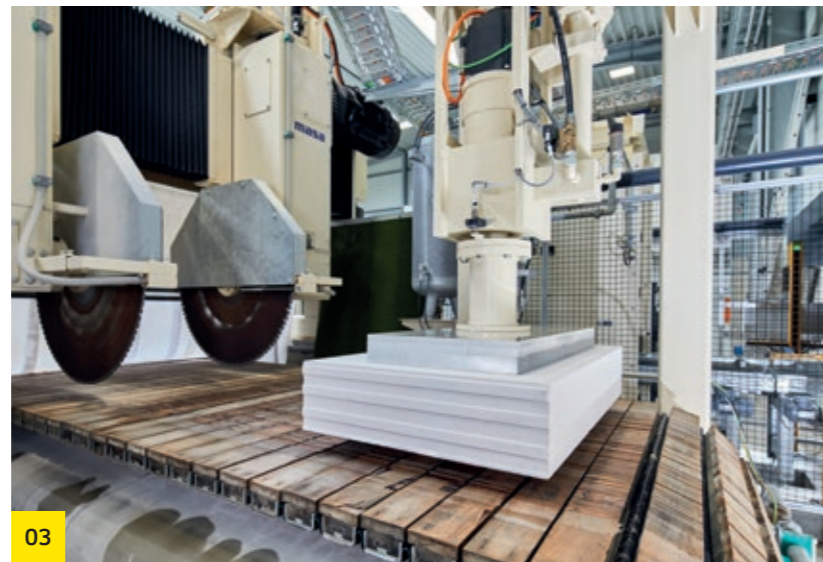


01

Feeding station

Supply of the prefabricated full plane elements

STEP BY STEP WET SAWING



03

Sawing portal I

Individual cutting of plane elements by adjustable sawing heads for the manufacture of fitting pieces.



02

Give-over station

Centering of the plane elements and precisely aligned transfer to transfer manipulator I.



04

Vacuum plate

The division into several vacuum chambers enables the transfer of various fitting piece sizes.



05

Sawing portal II

Manufacture of special shapes, such as gable and mitre cuts.



06

Transfer manipulator II

The finished fitting pieces are transferred to transport pallets.



08

Take-off station

Packages of pre-fabricated fitting pieces are ready to be supplied to the building site.



07

Control system

Fully automatic control system of the sawing plant incl. quality control.

DORSA

Alternatively, our DORSA fitting piece automat offers the possibility to manufacture individual shapes directly after the pressing process.

SAND-LIME BRICKS MASA TECHNOLOGY CENTRE

Raw material analysis. Process optimisation.
Transfer of knowledge.



Laboratory equipment to evaluate raw materials and to simulate the manufacturing process

Our Technology Centre is a guarantee for an efficient production process.

The Masa Technology Centre is continuously developed further to satisfy the growing requirements of the sand-lime brick production and the quality standards of our customers. We provide the technology for comprehensive raw material and product analyses.



Sand-lime brick laboratory press

RAW MATERIAL ANALYSIS

The selection of appropriate raw materials is the first step for the development and manufacture of sand-lime brick products. We can carry out all chemical, physical and mineralogical analyses for you.

PROCESS OPTIMISATION

Based on the analysed, available raw materials, we design optimum recipes for your various products. Our target: Resource-saving and efficient manufacture of top-quality sand-lime bricks.

TRANSFER OF KNOWLEDGE

Close to actual practise and competent: One key to increase productivity and quality is the continuous training of the operating staff. Supported by comprehensive Masa training materials, we qualify you in workshops here at our works and training courses at your works.

Talk to us!

BETTER SAFE THAN SORRY SAFETY

Durable and comprehensive concepts

Two aspects are particularly important to us when designing and implementing plant concepts: Maximum work safety and easy operation. Both serve to protect employees, prevent accidents in production and minimise production downtimes. Masa plants meet the highest safety standards worldwide!

WHAT ARE OUR SAFETY CONCEPTS BASED ON?

- Applicable machinery directives and functional safety
- Country-specific functional safety concepts
- Customer-specific requirements
- Integration of cross-industry solutions
- Risk analyses and performance level calculations

SAFETY ALWAYS COMPRISES THREE ASPECTS:

- The safety of your employees
- The safety of your production process
- The safety of your plant and its components

PLANT SAFETY
NON-NEGOTIABLE FOR MASA!

SAFE TO THE
POWER OF 3

Since machines must never endanger personnel, neither during normal operation nor in the event of a malfunction, Masa have committed themselves to one of the highest safety levels worldwide!



SUSTAINABLE MEANS FUTURE-PROOF ENERGY EFFICIENCY

In line with quality and quantity

36

Environmental protection, resource conservation and sustainability? These are not the first things that are commonly associated with building materials. But these considerations play a key role in our industry as well – and all the more so in the future! Resources are already scarce and will become scarcer and thus more expensive all over the world. This has urged us to constantly work on technologies to make our machines and plants ready for the future, also with regard to the ecological balance.

WHAT MAKES PLANTS ENERGY-EFFICIENT?

- Intelligent drive concepts
- Reduction of reactive energy
- Higher efficiency factor
- Use of energy-efficient components
- Cross-component overall concepts

SYSTEMATIC SUSTAINABILITY

We reconcile our customers' economic goals with ecological and social goals for a future-oriented coexistence.

ECOLOGICAL RESPONSIBILITY

As a manufacturing company, we acknowledge our ecological responsibility.

**ENERGY EFFICIENCY
ALWAYS ALSO MEANS
CO₂ REDUCTION**

37



PERMANENTLY UP-TO-DATE MODERNISATION AND MODIFICATION

Higher plant availability by state-of-the-art technology

To keep up the profitability of an existing plant in the long run, modernisations or modifications tailored to suit the market requirements are necessary. We can help you to bring your plant up to date.

38



CONTROL SYSTEM

Modern sand-lime brick presses are characterised by a high degree of automation. The requirements on control systems are continuously rising because of the fast technological progress and increasing market requirements. An upgrade of your existing control systems can help you to keep pace with these developments.



HYDRAULICS

The modification to up-to-date valve and pump technologies and the conversion of the main cylinder seals to modern systems can possibly be worthwhile. New valves with on-board electronics allow a faster error diagnosis.



MECHANICS

To avoid disturbances and down-times due to wear, the guidings for the upper and lower pressheads can be converted to low-maintenance systems. The conversion of the travelling and lifting drives to toothed belt technologies increases the operational reliability of the press.



39

ALWAYS WITHIN SIGHT

INSPECTIONS, SPARE PARTS, FIRST AID, TRAINING
OR PROCESS ENGINEERING: WE ARE JUST A PHONE CALL AWAY

40

MORE THAN MECHANICAL ENGINEERING CONSULTATIVE SERVICE

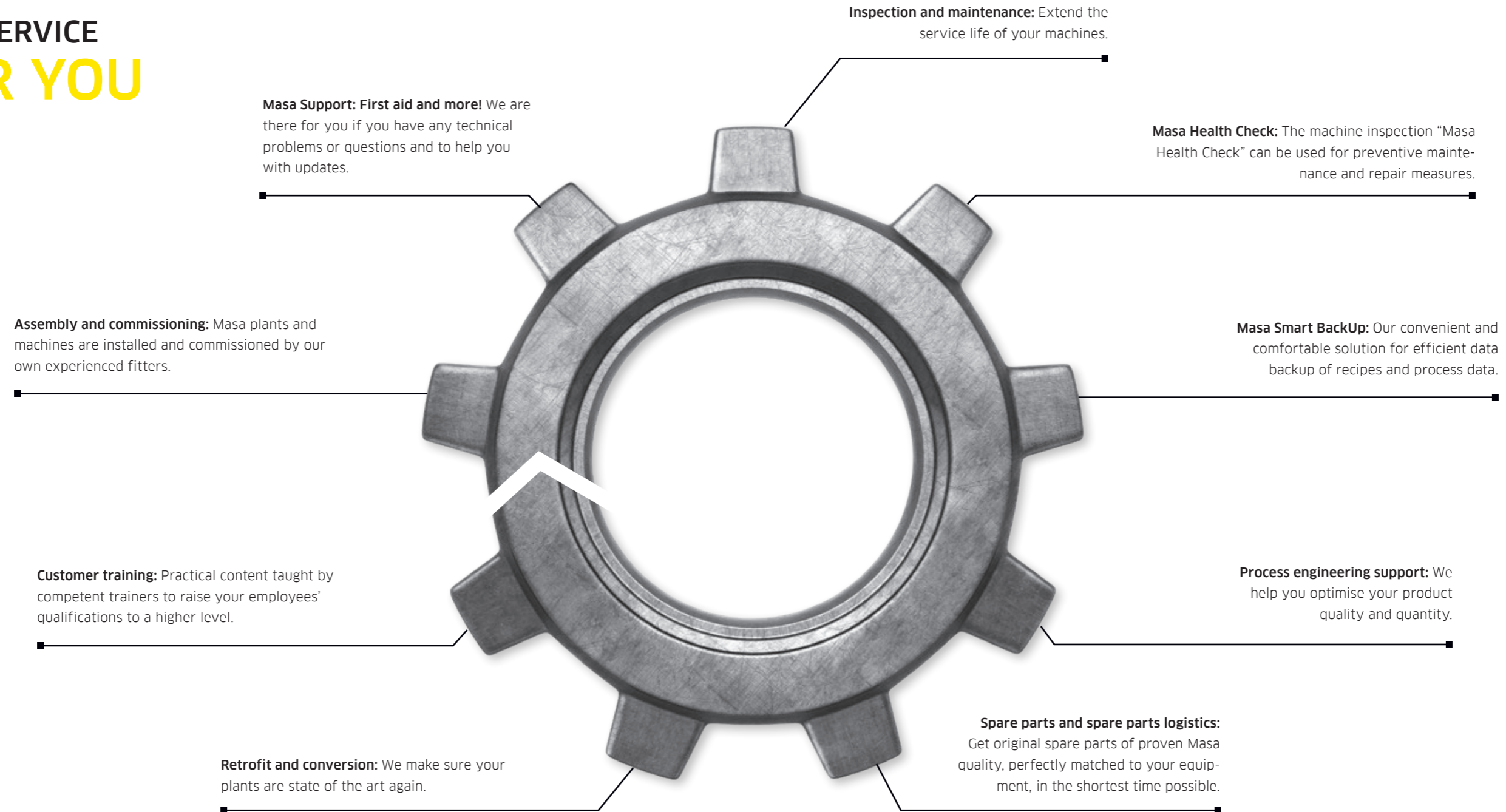
We accompany you throughout the lifetime of your machines

41

Why are we a good partner?

Our efforts do not stop once we have delivered a plant! The Masa Lifetime Service, which includes training and support, begins once the installation and commissioning have been completed. It is important to us that you never feel left on your own and know that you can rely on us.

OUR SERVICE FOR YOU



VALUES WE STAND FOR



SUCCESS AND PARTNERSHIP

Decisive for the joint success is always the close and cooperative exchange of opinions and experience with our customers.



EXPERIENCE

In our long company history, we have experienced and significantly influenced developments in the construction materials industry. The technical and operational experience we have thus gathered greatly benefits us and our customers today.



SAFETY

Two aspects are particularly important to us when planning and implementing plant concepts: maximum work safety and easy operability. These two aspects serve our employees' health and continuously ensure the manufacturing processes.



CUSTOMER ORIENTATION AND SOLUTION COMPETENCE

Experience has shown that customised, individual solutions significantly strengthen and improve our customers' market positions.



QUALITY

As ever, for us, "Engineered in Germany" equals our commitment to quality, stability and sustainability. Our engineering principles are applied to all development and production phases.



EXPERTISE FROM PASSION

MASA WORLDWIDE

USA
Green Bay, WI

2x GERMANY
Andernach
Porta Westfalica

UAE
Dubai

INDIA
Navi Mumbai

masa

Milestone to your success.

**COMPETENCE CENTRE
AAC AND SAND-LIME BRICKS**

Masa GmbH
Osterkamp 2
32457 Porta Westfalica | Germany
Phone +49 5731.680-0

**COMPETENCE CENTRE
CONCRETE BLOCKS AND PAVERS**

Masa GmbH
Masa-Str.2
56626 Andernach | Germany
Phone +49 2632.9292-0