

# Information

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## Tonindustrie Heisterholz

Works 3 for accessory tiles

Parallel production of various formats



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## Tonindustrie Heisterholz

### Parallel production of various formats in the Works 3 for accessory tiles

In February 1999 the second construction stage of the completely renewed Works 3 for accessory tiles at the Tonindustrie Heisterholz Ernst Rauch GmbH & Co. KG in Minden went into operation. This increases the net annual output to 3.2 million accessory units.

The special feature of this works, which has been entirely erected from the press to the packaging by Lingl, is its particularly high production flexibility.

On the one hand, at this plant, which is equipped with two pressing lines, parallel production of two different formats, also with varied surface finishes – natural red, engobed or glazed – is carried on throughout up to the packaging station.

On the other, the wet and dry sides can be operated independently of each other. Production is performed with ten shifts per week.



### Drying, engobing, glazing

The freshly pressed green ware is dried in the Lingl continuous dryer taken over (Line 1) or in the new chamber dryer (Line 2).

The ten single chambers and three double chambers have the same capacity and have been constructed of insulated steelwork. They are equipped with travelling air recirculation appliances, specially developed for the drying of accessory and special products, with which the drying air is blown out specifically at the rack height.

Another feature is that the laden setters can be turned through 180 degrees before setting in the drying cars, so that the hot air is blown at either the head or eaves side of the green tiles.

The drying process for every individual chamber is performed according to format-related and correspondingly pre-programmed temperature and moisture curves via a process computer, using the tunnel kiln waste heat and directly applied gas burners. The drying time is between 24 and 44 hours.

The dried green tiles of Line 2 are passed by robot from the setters on a conveyor line to the engobing and glazing stations (flat and inclined conveyors and centrifugal cabins). They then arrive via a switching point alternately with green tiles of Line 1 on a joint flat belt conveyor line to the setting stations, while verge tiles and special accessories are passed to a suspension conveyor.





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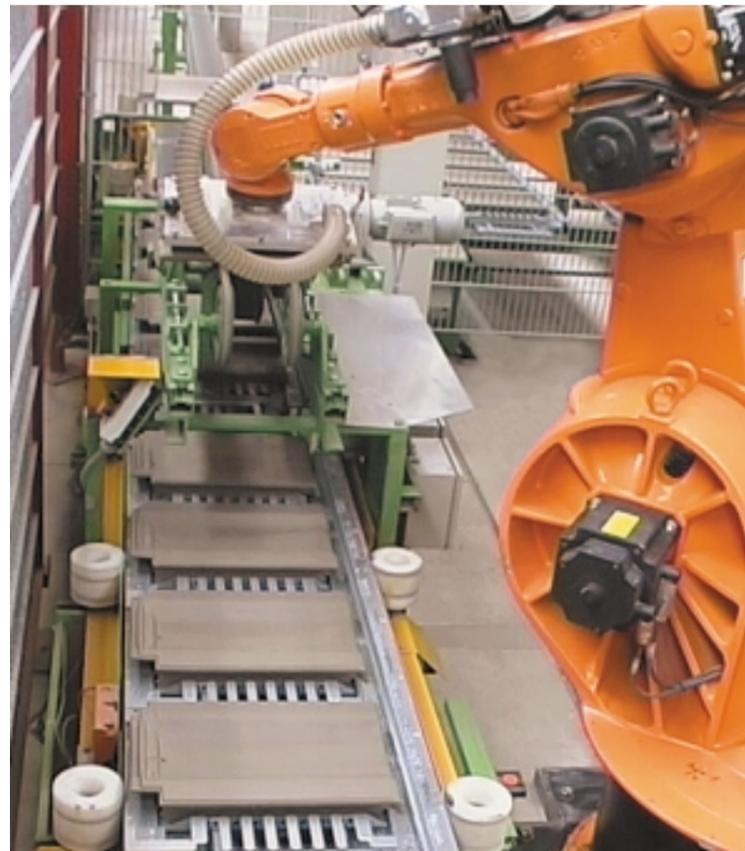
### Setting with robots

Special accessory ware is removed by hand from the suspension conveyor at a separate station and transferred to the H-setters or removed from the setters after firing and stacked on pallets for dispatch.

Verge tiles and other tiles on the suspension conveyor are recorded with video cameras at the automatic setting stations and transferred according to program control by robots into the H-setters.

The same robots can remove the green tiles, which are segregated by camera control from their joint transport line and distributed via a switchpoint onto two conveyor lines, from the flat lines and set them in the H-setters.

These are then grouped and stacked on the kiln cars by two transfer grippers.





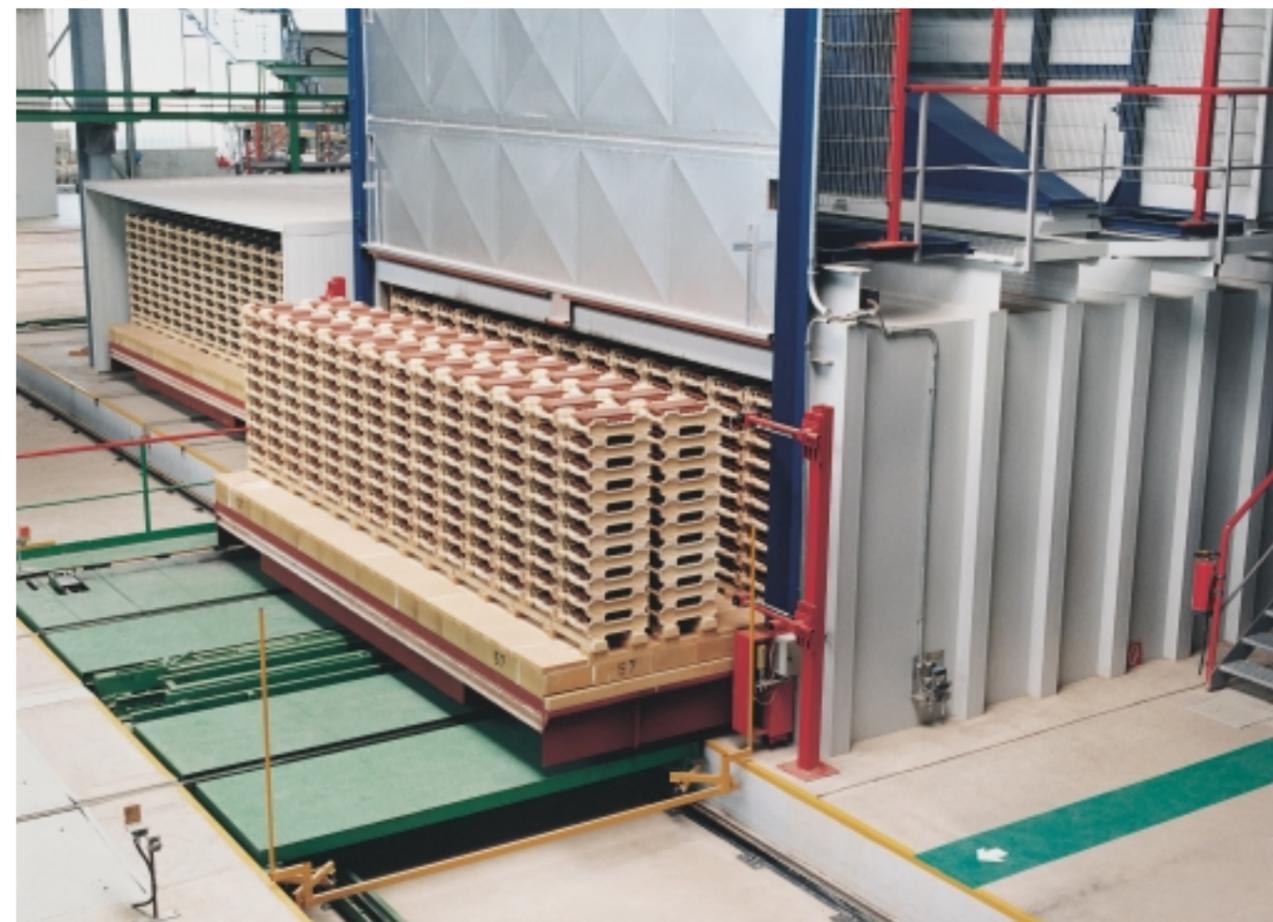
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## Firing

The kiln cars are then routed via storage tracks, where the cars also with hand-set special accessories can be locked in by a shunting unit, to a hot chamber and from there fed to the preheater, which, as a lock before the tunnel kiln, can take up five cars.

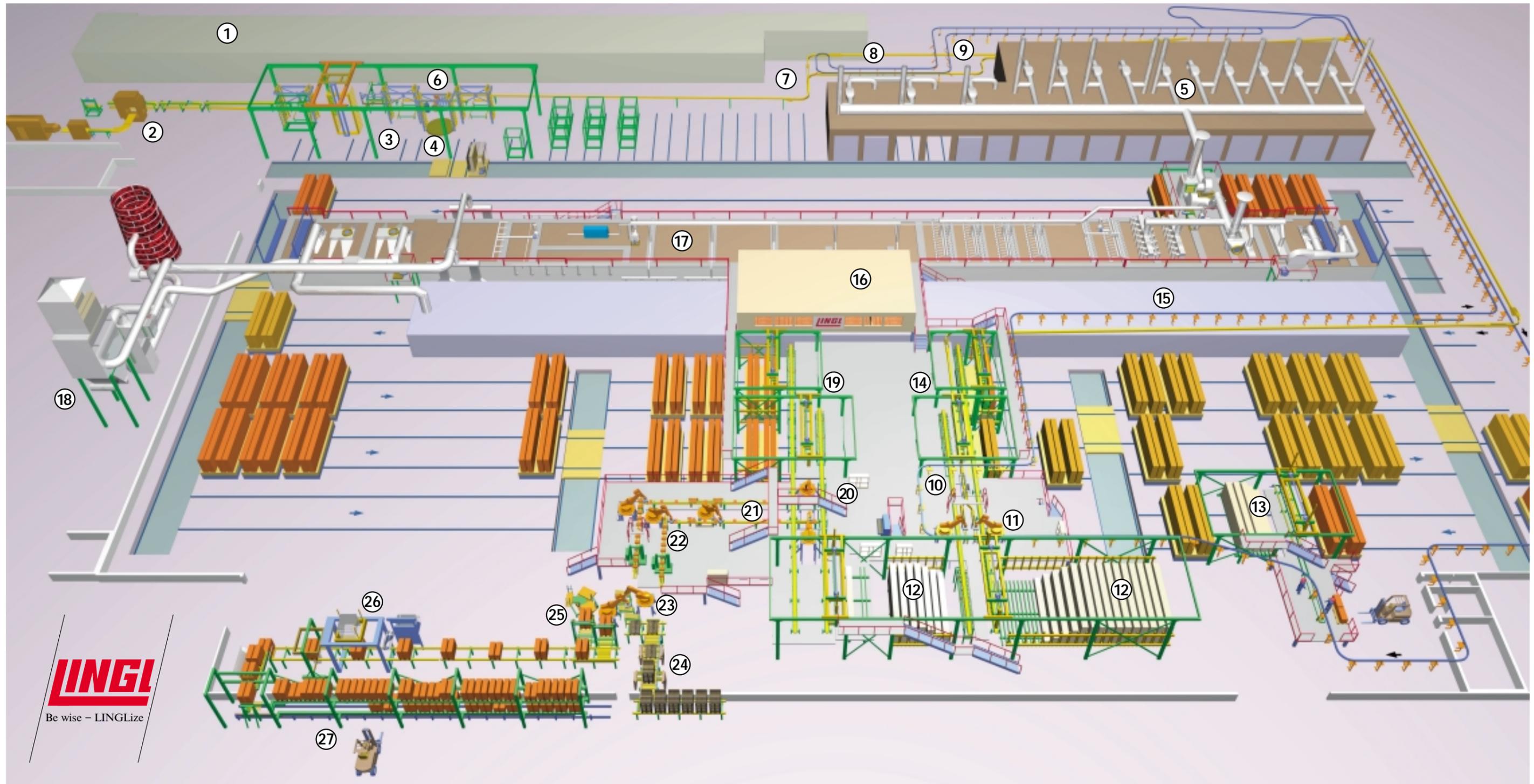
The 90 m long DrySeal® tunnel kiln with indirect undercar cooling has a steel casing and is equipped for side and top firing with natural gas. For firing with a flashing effect two reduction burner groups have been installed on the kiln roof in the area of the last main burner zones. The firing temperature is 1020 °C and the kiln cycle time about 50 hours. The firing is automatically controlled by computer via the preset firing curves, according to the product and kiln capacity, so that fully efficient degassing and sintering are achieved.



# Tonindustrie Heisterholz

Ernst Rauch GmbH & Co. KG, Minden

Works 3 for accessory tiles



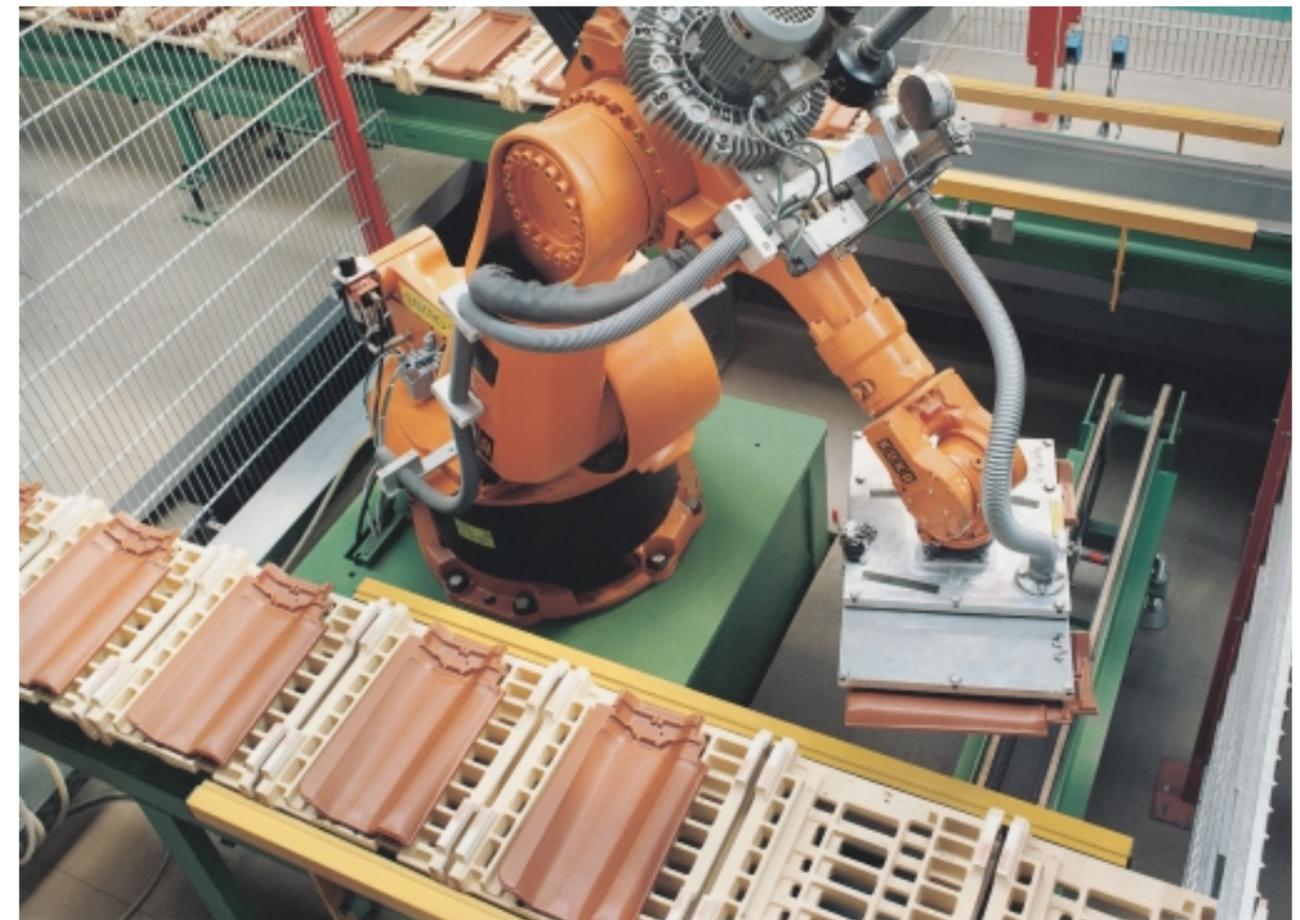
- |   |  |   |  |
|---|--|---|--|
| 1 Continuous dryer Line 1   | 8 Engobing/glazing lines   | H-setter storage magazine for special accessory tiles | 21 Sorting stations Lines 1 and 2                                      |
| 2 Shaping Line 2  | 9 Transfer of tiles from Lines 1 and 2 to joint suspension or flat belt conveyor             | 14 Automatic setting stations 1 and 2                 | 22 Grouping and bundling of small packs                                |
| 3 Dryer car loading/unloading   | 10 Camera-controlled distribution switch   | 15 Hot chamber  | 23 Grouping of rows on separate positioning stations for Lines 1 and 2 |
| 4 Turntable for dryer car load  | 11 Robots load the H-setters with green tiles from the suspension and/or flat belt conveyors | 16 Central control room                               | 24 Shipping pallet feed with testing station                           |
| 5 Chamber dryer   | 12 H-setter storage magazine for four different models                                       | 17 DrySeal® tunnel kiln with steel cladding           | 25 Pack-forming robot for Lines 1 and 2                                |
| 6 Unloading of drying pallets by robot                                    | 13 Manual setting and unloading station with   | 18 Fluorine filter unit                               | 26 Shrink-film hood packaging  |
| 7 Tile transfer from the continuous dryer to the engobing/glazing station |  | 19 Automatic unloading stations 1 and 2               | 27 Shipping pack storage unit  |
|   |  | 20 H-setter unloading by robots                       |  |



### Unloading, sorting

The fired ware is pre-sorted on three storage tracks and made ready on two unloading tracks.

The setter stacks are unloaded layer by layer with transfer grippers and passed on two transport conveyors to the two robots which re-move the tiles from the setters and transfer them to the sorting lines.





### Pack-forming, packaging

After the ring test (i. e. sounding test) small packs are grouped by robots, strapped transversely or lengthways, and fed on two conveyor lines to another robot for forming into rows at various prepared positions allocated respectively to product lines 1 or 2.

Stacking of the shipping packs with inlays of vertical and horizontal protective cardboard is performed by a robot with multifunctional gripper, with which the robot also picks up the prepared shipping pallets and deposits them in pack-forming position; defective pallets are identified in a testing station and automatically discarded.

The tile packs are then passed on a joint conveyor line to the automatic shrink-hood packaging station. Here normal and half-size packs are recognized and provided with the appropriate film hoods. They are then placed ready in a pack storage unit on the outer wall of the production building.





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### Plant control with Lingl software

The control of the plant and machinery is by means of a number of Simatic S5 automating appliances with DIMOS X5 visualization system in Windows technology. These are connected with a bus system and thus facilitate rapid access to and data exchange in the works combination. Thus all important control data can be seen, checked and if necessary corrected in the central control station.

The production and operating data are passed on to a central data acquisition system and evaluated for the Manager-Info-System. At the same time the product tracing throughout the entire production flow creates the essential precondition for a quality management system according to the conditions specified in the ISO 9000, which Heisterholz has installed for itself.





## Technical data

Products: Clay roofing tile accessories (around 30 formats), special accessories

Hours of work: 10 shifts per week

Capacity: Ridge tiles and semi-accessories: 743 pieces/h  
Verge tiles left/right: 495 pieces/h

Various formats can be manufactured in parallel throughout up to the packaging

## Lingl Chamber Dryer

10 single chambers + 3 double chambers

Steelwork of prefabricated insulated construction

Air recirculation with travelling air recirculating appliances

Drying time 24 to 44 hours.

## Robot application

- |   |          |
|---|----------|
| ◆ Removing the dry ware                               | 1 robot  |
| ◆ Loading of H-setters                                | 2 robots |
| ◆ Unloading of H-setters                              | 2 robots |
| ◆ Turning over every second verge tile                | 1 robot  |
| ◆ Grouping of small packs                             | 2 robots |
| ◆ Transferring small packs into row units             | 1 robot  |
| ◆ Pack-forming of normal and half-size shipping packs | 1 robot* |

\* with multifunctional gripper for inserting vertical and horizontal protective cardboard and the positioning or discarding of the shipping pallets.

## Lingl DrySeal® Tunnel Kiln with Steel Cladding

Side- and top-firing with natural gas, reduction burner groups for flashing effect

Capacity: gross 385 t/week,  
net 3.2 million pieces/p.a.

Preheater: 5 cars in front of the kiln

Kiln length: 93.20 m (with exit lock)

Firing channel: 6.10 m wide, 1.60 m high

Kiln cycle time: 50 hours

## Plant and machine control system

Simatic S5 Automating appliances with DIMOS X5 visualization system in Windows technology and Lingl software. Bus system for the data exchange in the works combination, central production data acquisition and Manager-Info-System. Product-tracing throughout as an essential precondition for the quality management system installed according to ISO 9000.

