

Information

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New drying technology at RAPIS[®] brickworks





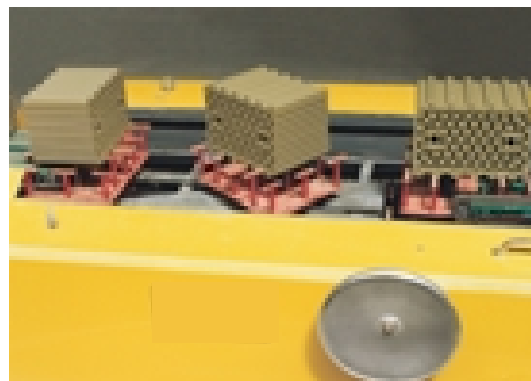
New drying technology at RAPIS® brickworks

December 1998 marked the date when the new brickworks of RAPIS Schmid GmbH & Co. KG in Schwabmünchen, Bavaria, went into operation (RAPIS incidentally was the name given to the authenticated pottery centre here in Roman times). Up to 72 different formats of common bricks can be manufactured. Production time is in 12 shifts on 6 days a week. The plant concept drawn up by Lingl in close co-operation with the client permits an equivalent increase in production output with additional shifts, without changing the machines, dryer or tunnel kiln.

A feature of this works is the very compact and clear layout of the plant and machinery with the complete operator side occupying approximately 30 x 30 m.

The new Lingl casing-pallet dryer, Model H, with double-rack cars, which is flexible in use for a wide range of products and has been developed jointly with Alfred Schmid, is employed here for the first time.

The energy consumption of the works is very low because dryer and kiln are totally shut down when not producing.



The raw material after preparation is fed to the extruder via large-capacity box feeders followed by a saw dust supply unit and conveyor belts.

After cutting the green bricks are turned through 90° and placed with the perforations at right-angles to the direction of travel on metal laths of perforated box design. The bricks are placed at close intervals in order to promote effective drying.

Drying

The setters loaded with green ware are gathered in a lifting frame and placed by a special, double-action loading rack in the dryer cars – of a new type of box design with two shelves formed as casing-pallets.

Normally one pile is placed per tier, however two piles or 500 mm long bricks can also be set.



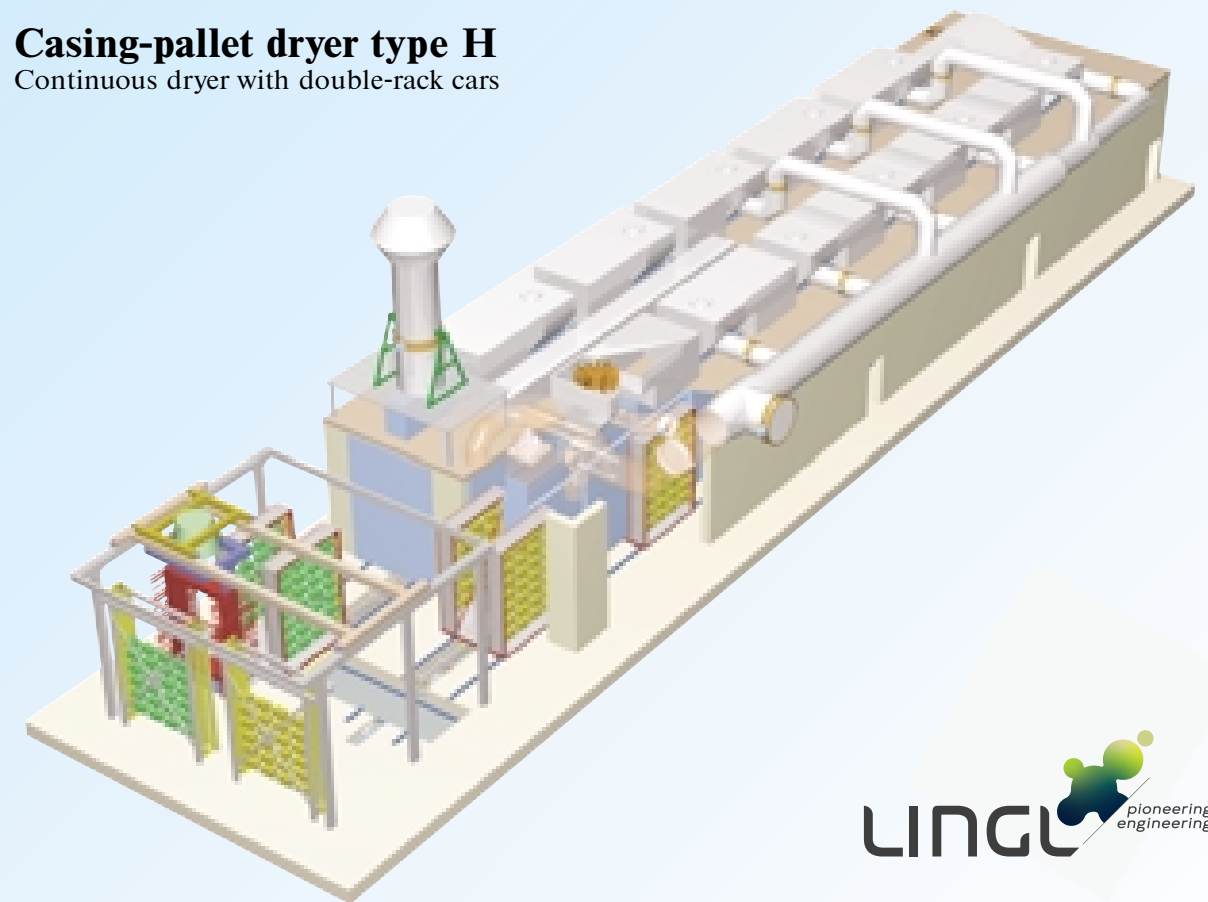
The dryer has one forward track and one return track respectively of twelve cars each. The ventilating equipment is located between the shelves and the ventilation is performed in such a way that during travel through the dryer, part of the hot air flow which is passed along the dryer cars is diverted in sections and drawn or forced in horizontal loops through the two halves of the green brick setting of the dryer cars (Patents Nos. DE 197 19 183 C1 and DE 198 02 856 A1 pending).

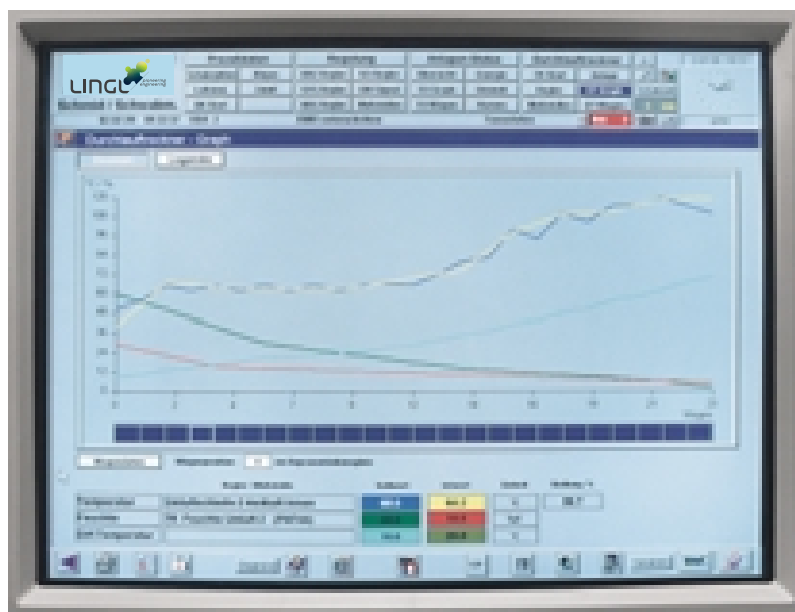
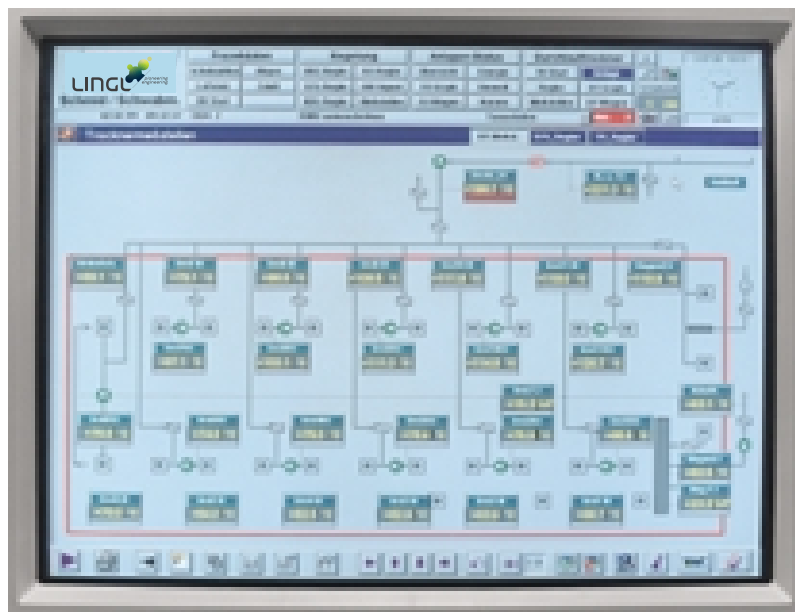
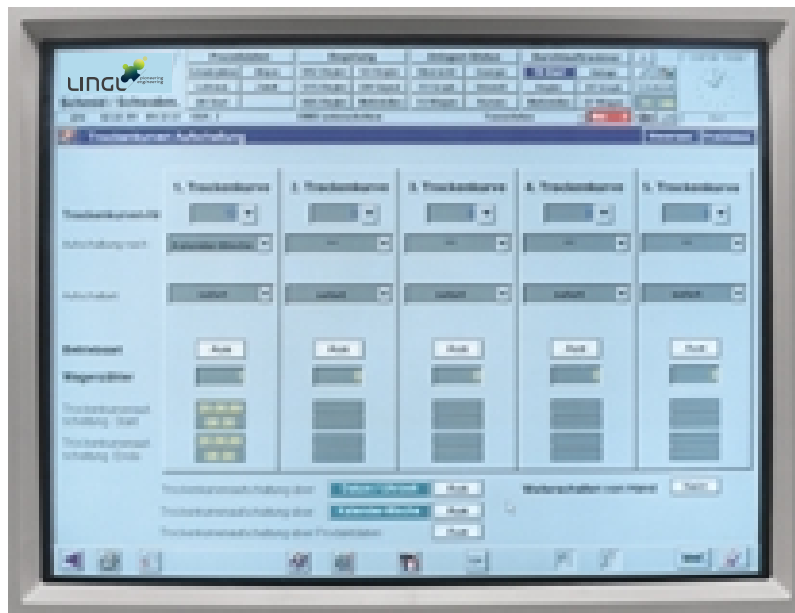
The air loops in the direction of the main air flow cause a reduction in the air resistance in the system. The power consumption for the free wheeling radial fans is therefore low, despite a high drying rate.

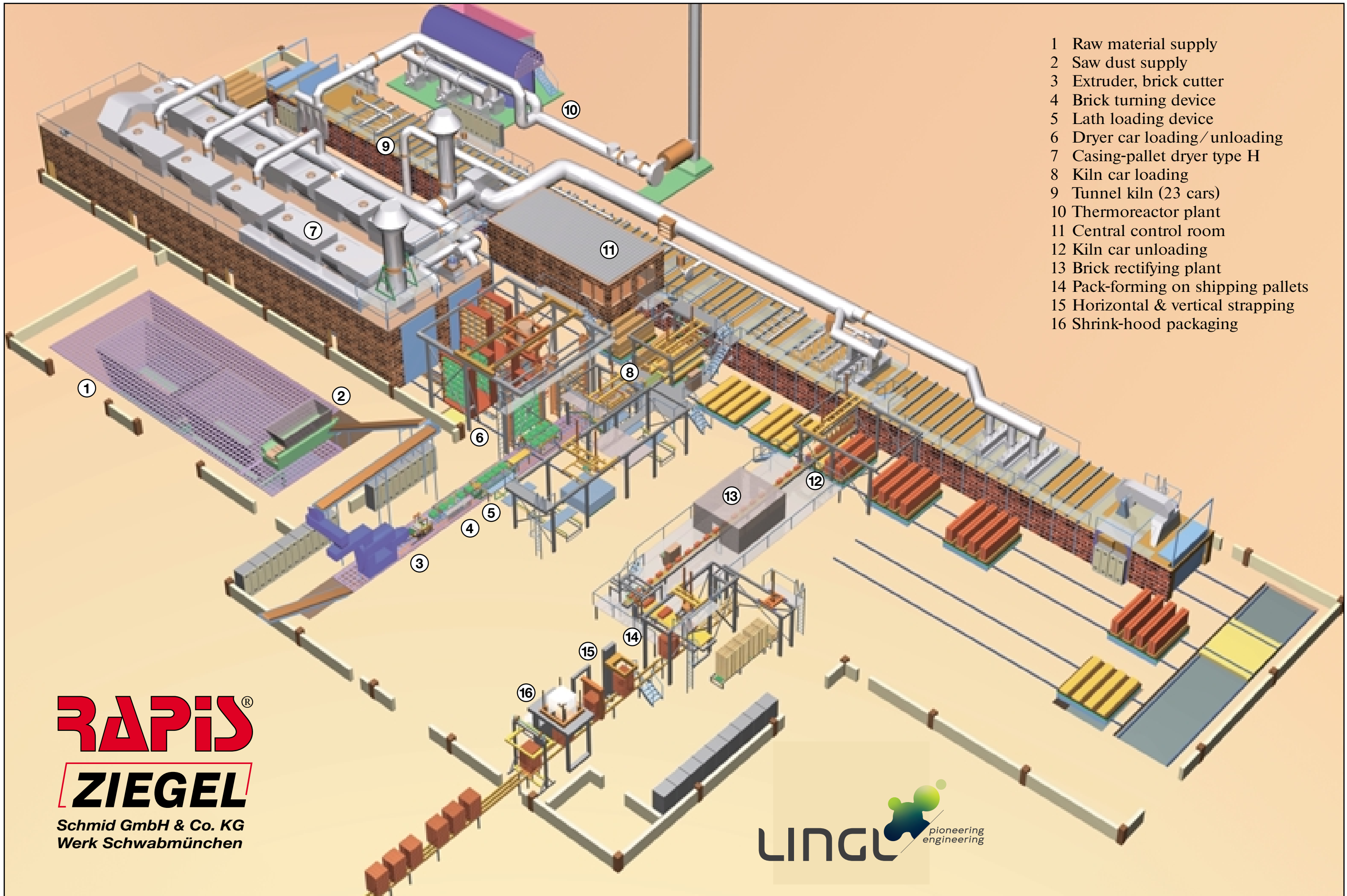
The drying time is 4.6 hours on average, the heat consumption 4200 kJ/kg water and the specific power consumption 12 kWh/t.



Casing-pallet dryer type H
Continuous dryer with double-rack cars







- 1 Raw material supply
- 2 Saw dust supply
- 3 Extruder, brick cutter
- 4 Brick turning device
- 5 Lath loading device
- 6 Dryer car loading/unloading
- 7 Casing-pallet dryer type H
- 8 Kiln car loading
- 9 Tunnel kiln (23 cars)
- 10 Thermoreactor plant
- 11 Central control room
- 12 Kiln car unloading
- 13 Brick rectifying plant
- 14 Pack-forming on shipping pallets
- 15 Horizontal & vertical strapping
- 16 Shrink-hood packaging

RAPIS[®]
ZIEGEL
 Schmid GmbH & Co. KG
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LINGL pioneering engineering

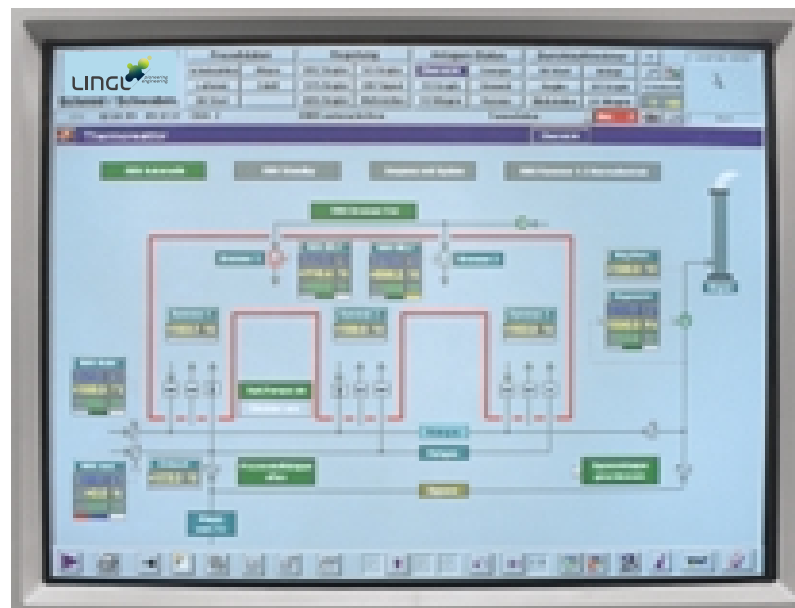
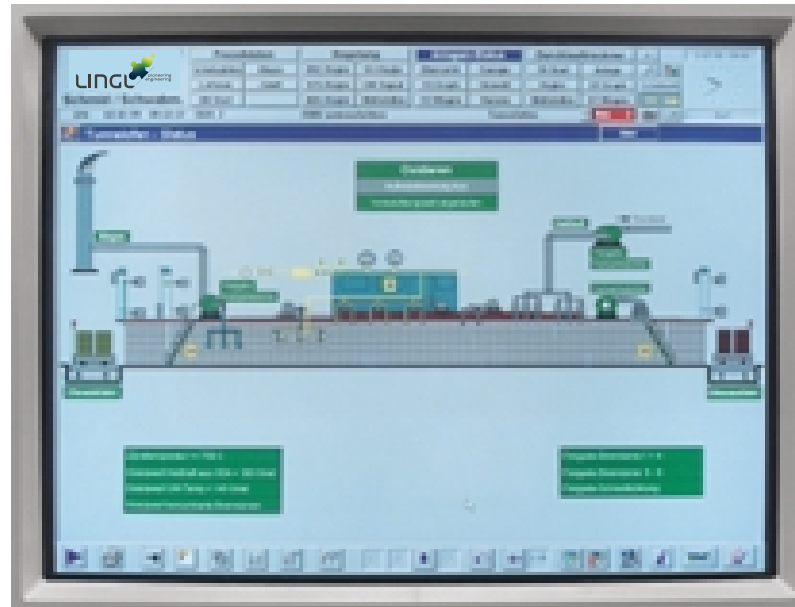


Setting

After unloading the dryer cars with the same equipment as was used for loading them, the dried bricks are taken up from the setters by a clearing gripper and placed on a marshalling track. They are then tipped, according to format, and grouped in rows. The kiln cars are then loaded with 600 mm long row-type pile setting.

The kiln cars, in order to reduce the exit losses, are designed in lightweight construction with a fibre core. The bricks are set with the perforation in the direction of travel, if possible on pile joints, about 1 m high. The setting between the firing slots has a depth of only two bricks, so that the depth effect is very short. This achieves a good temperature equilibrium and high firing quality, and the firing time is also reduced.





Firing

The Lingl tunnel kiln has a total length of 93.85 m including vestibule. It is side- and top-fired and the travelling time is approximately 14 hours.

The pushing time is varied during the course of the day for the purpose of heat storage and discharge.

The kiln exhaust air is cleaned by a high-efficiency thermo-reactor plant.

Unloading

The fired bricks are unloaded, layer by layer, using a transfer gripper and passed through a rectifying plant, where they can be ground to be plane-parallel.



Pack-forming, packaging

The brick layers then grouped are stacked to form shipping packs on transport pallets.

To adequately secure the packs during transport they are strapped or given film hoods, serving as weather protection and offering advertising appeal as well.

Plant and machinery control

A Lingl machine operator attendance system BS 3000 and a Simatic S5-115 U automating appliance were installed for control of the machines and plant installations.

The kiln and dryer including the thermoreactor plant are controlled by a Simatic S5-155U central device and Simatic S7 extension unit in conjunction with the DIMOS X5 Visualization System and Lingl software according to *Windows* technology.



Technical Data

Production:	Common bricks (72 formats)
Capacity:	190 t/working day
Reference format:	365/247/238 mm, 17 kg
Hours of work:	12 shifts per week
Personnel:	2 operators/shift

Lingl tunnel kiln

Kiln length:	89.70 m (23 cars)
Vestibule:	4.15 m (1 car)
Firing channel:	4.30 m wide /1.12 m high
Car coverage:	4 x 2 pile setting rows
Firing time:	14 hours

Energy consumption for drying and firing, incl. steam generation: 1320 kJ/kg fired ware

Lingl casing-pallet dryer Model H

1 forward travel and 1 return track for 12 cars respectively	
Dryer length:	42.80 m
Dryer width:	9.00 m
Drying time:	4.6 hours
Heat consumption:	4200 kJ/kg water
Power consumption:	12 kWh/t

Plant and machinery control

Machines, transport and handling equipment: BS 3000 + Simatic S5-115U
 Dryer, kiln and thermoreactor plant: Simatic S5-155 U-central device + S7-extension units, DIMOS X5-Visualization System, Lingl software in *Windows* technology.



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