

ACOTEC

ACOTEC PRIMO



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1. Introduction

The Acotec Primo line is a compact, highly automated production line that is based on a stationary extruder and is designed to produce of max 3.3 m long 68-140 mm thick hollow-core, non-load-bearing walls elements. The elements are usually made of lightweight aggregate concrete and are used in all kind of housing applications; for example, internal walls that require good moisture and sound insulation in bathrooms, kitchens, bedrooms, offices, hotels, etc., and even the inner leafs of outer walls are typical applications for the Acotec walls. In addition, they have also been used as factory walls, boundary walls, and fences, even made of colored concrete with corrugated surfaces can be found.

The Acotec walls are a good alternative to brick and block walls, especially since they can be installed quickly and easily by normal construction workers.

The line easily fits into existing concrete product factories and is thus the right choice when adding value to the existing production needs or replacing old processes with new ones.

The first Acotec Primo line was delivered in the early 1990s and is still up and running.

As this is a new process and end product for many areas, Elematic, your one-stop-supplier, is at your service throughout the process: layout designing, installation supervision, production training and supervision, and training on the end product and its application.

Partition walls make roughly 10% of share of housing construction, but the square meters involved numerous. For example if 100000 residential dwellings are built annually, that would come out to a total of 7200000 m² of partition walls (60-100 m² of partition wall/dwelling) – every year.

The output of one Acotec Primo line for wall elements is 100000 – 150000 m²/shift.

1.1. Advantages

The Acotec Primo line provides the following benefits:

- good profitability
- a quick return on investment, lowering both financing needs and working capital costs
- a nearly automatic production plant means less involvement in labor management
- flexible production cycles enable the company to adjust to the market situation
- economical production costs
- low energy consumption and need
- low labor requirements, both in number and level of education
- economical production facilities requirements
- environment-friendly process – silent, non-vibrating, and non-waste – an improved working atmosphere as well.
- all raw materials are recyclable
- easy to use and maintain
- Elematic is a proven, reliable technology partner, and readily available

1.2. General data

The Acotec Primo line is a unique, state-of-the-art production system for manufacturing of lightweight, hollow-core, room-high Acotec panels, Acotec wall elements.

Acotec elements are:

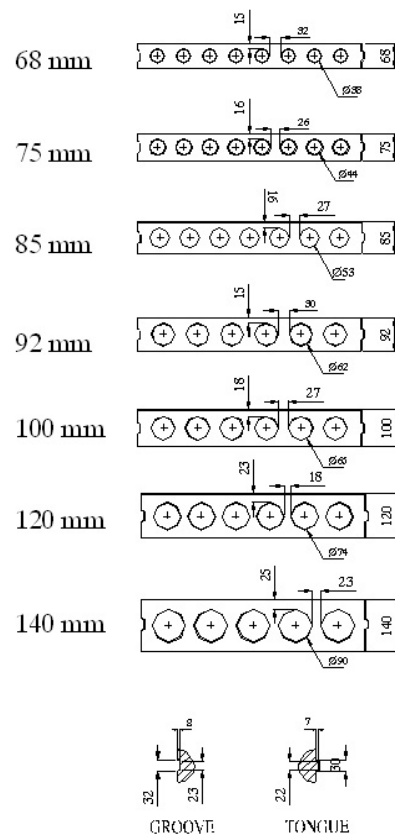
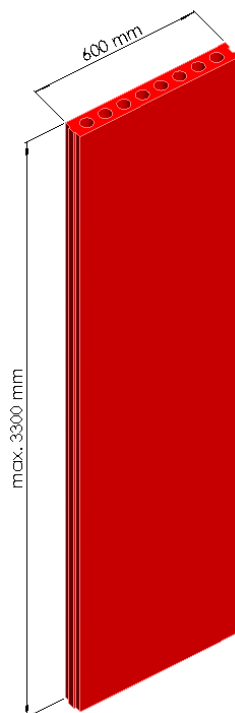
- 2500-3300 mm long
- 68-40 mm thick
- 600 mm wide as standard, 2 x 300 mm on special request
- have 5-8 hollows depending on the thickness
- for special purposes, e.g. for seismic conditions, produced with safety wiring.
- lightweight aggregate concrete to achieve a very low weight/m² (starting from 50 kg), use of normal concrete possible

The production line needs roughly 900 m² (25m x 42 m) of ordinary industrial space



1.3. Detailed data

The standard dimensions of Acotec Primo elements are:



2. Key features

The Acotec Primo line production is roughly 40 m long, requiring a 5.5 m high factory space and can be operated with 2-3 workers.



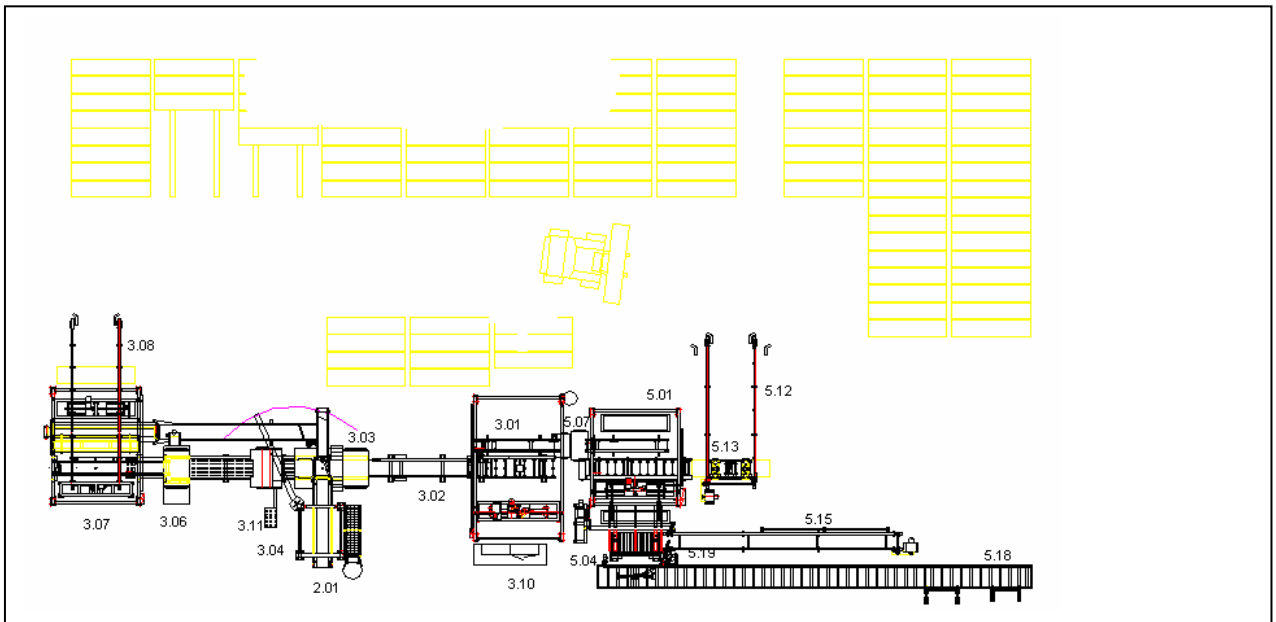
The heart of the line is the stationary extruder, which is formulated so, that it only takes a half hour to change thickness. Changing panel thickness in the Acotec process is very simple: just change the screw set and side forms and a few minor adjustments is all you need – there is no need to change the whole lower part.

Another new feature is that the producer can vary the kind of concrete according to local availability of raw materials and the end use of the element. This line is designed to function as a single synchronized machine to produce a specific unique product the Acotec wall element.

3. Product components

The Acotec Primo line production is a compact process consisting of numerous parts synchronized by a unique automation and control system. This line should be considered “one machine” as none of its parts has an individual function and all of them are needed, as original, in order to achieve the guaranteed, flexible production of the elements.

The line can be divided up according to functional areas, which consist of one or more positions, i.e. components.



The main functional areas and components of Acotec Primo line (cf. the layout above) are:

- Concrete Feeding (2.01)
- Extruding, cutting and plate feeding (3.01, 3.02, 3.03, 3.04)
- Trimming (3.06)
- Tipping and recycling (3.09, 3.15)
- Stacking (3.09, 3.07, 3.08)
- Restacking (5.12, 5.13, 5.01, 5.04)
- Cleaning and oiling (5.06, 5.07)
- Delivery (5.14, 5.15)

A short description of each part of the line and the functions within follows.

3.1. Concrete Feeding

Concrete buffer (pos 2.01)

- Concrete from the automatic batching and mixing plant (buyer's delivery) is brought into the buffer hopper for the extruder.
- Equipped with a hoist (lifting capacity 1000 kg) for lifting the upper part of the extruder
- Hopper size 2.5 m³, water volume.

3.2. Extruding , cutting and plate feeding

Plate Feeder (pos 3.01)

- Automatically feeds the backing base molds to the extruder.
- Works as storage for clean base molds.
- 5 storage places, max. plate length 3300 mm. Max. 300 plates in each place.
- Equipped with an automatic vacuum gripper for horizontal and vertical transfer of base molds.
- Automatic mold straightness detection.
- The plate feeder station is shielded with wire mesh fences.

Plate feeder conveyor (pos 3.02)

- Conveys base molds from the plate feeder to the extruder.

Extruder (pos 3.03)

- A stationary extruder for producing hollow-core wall elements that are 2000 to 3300 mm in length.
- Earth-dry, zero-slump concrete with a maximum aggregate size of 8 mm is extruded onto base molds.
- Equipped with a standard ACOTEC Primo thickness set as selected by the client. Standard thicknesses are 68 mm, 75 mm, 85 mm, 92 mm, 100 mm, 120 mm, 140 mm. The standard product width is 600 mm. The extruder can also be equipped for production of 2x300 mm wide panels
- Equipped with a special tongue-and-groove side-forming set.
- Automatic operation.
- Depending on product thickness, equipped with 5 – 8 extrusion screws of special material.
- Equipped with compression and leveling equipment.
- Low noise (< 85 dB), emission free extruder.
- Capacity ca. 80 m²/h.
- Screw drive units, 8 gear motors each, driven by 8 frequency converters.

- Extruder equipped with 3 vibrators.

Cutter (pos 3.04)

- Consists of a moving circular saw installed onto a roller conveyor.
- The saw grips to the base mold coming out of the extruder and moves automatically along with the product while sawing.
- Cutting takes place from the seams of the base molds.
- The cutting length is selected from the control board and detected by limit switches.
- Cutting speed 10 m/min, diamond blade \varnothing 450 mm.

3.3. Trimming

Trimmer (pos 3.06)

The trimmer cutter is installed after the first cutter (Pos. 3.04). The trimmer makes it possible to adjust the product length for special needs that do not match existing base mold lengths. 1 – 20 cm can be trimmed off, after which the concrete is moved back to the extruder. The trimming length is set manually.

3.4. Tipping and recycling

Belt conveyor (pos 3.09), Tipper and recycling (pos 3.15)

The tipper shifts non-acceptable product, e.g. when starting and finishing the production, off the line to the recycling system. The concrete that has been tipped off is automatically transferred back to the extruder, and the base mold goes on to the plate feeder.

- Tipping pneumatically.
- Automatic operation, possibility for manual operation.
- Also the possibility to transfer the rejected concrete totally out of the process.

3.5. Stacking

Pallet conveyor (pos 3.05), Stacker (pos 3.07), Stack conveyor (pos 3.08)

The stacking system stacks the extruded products and their backing plates into 4 – 10 piece-stacks onto steel pallets in order to transfer them to precuring.

- The chain-driven pallet conveyor is shielded with steel covers.
- Stacking capacity max. 500 kg/min.
- Automatic operation, possibility for manual operation.
- Electric drives for lifting and horizontal movements.
- Pneumatic catching.
- Base mold handling with a vacuum gripper.
- Equipped with stack height control

- Chain-driven stack conveyor.

3.6. Restacking

Stack conveyor (pos 5.12), Crossing station (pos 5.13), Restacker (pos 5.01), Roller conveyor (pos 5.02), Turning device (pos 5.04),

The precured stacks are brought (e.g. by a forklift) to the conveying system, which then transports them to the restacker. At the restacking station, the precured products are separated from the base molds. After visual quality control the A-grade products are stacked into 4–10 pc delivery stacks. The stacks are turned on their edge for delivery. B-grade products can be removed.

- All operations are automatic, possibility for manual operation.
- Restacker equipped with a dual operation catcher (product + base mold), and a vacuum gripper for base mold handling. Pneumatic catching .
- Restacker equipped with a transfer wagon vertical and horizontal movement via gear motor.
- Roller conveyor equipped with nylon brush for cleaning steel pallets.

3.7. Cleaning and oiling

Plate conveyor (pos 5.06), Cleaning and oiling (pos 5.07)

At the cleaning and oiling station, the backing base molds are cleaned of concrete residues and oiled before being transferred back into the process. Vegetable oil is suggested for environmental reasons.

- Chain conveyor followed by a cleaning /oiling equipment.
- Equipped with adjustable rolling steel brushes.
- Mould oil spraying and spreading equipment.
- Waste and drip oil collectors.
- Automatic operation.

3.8. Delivery

Receiving conveyor (pos 5.14), Chain conveyor (pos 5.15)

The delivery stack is moved on again and transferred to long-term storage outdoors. If necessary, the delivery stack can easily be wrapped in plastic and tied on this conveyor system.

- Receiving conveyor equipped with a tilting shield

3.9. Additional required components

In addition to the aforementioned, at least the following components are necessary:

Concrete batching and mixing plant and concrete transportation

The concrete batching and mixing plant (an Elematic plant is recommended) needs to be an automated mixing plant with a pan mixer of min 1,5 m³ capacity fitted with activators, the output of which is a min. 10 m³/h. Moisture control must be automatic. There must be 3-4 aggregate silos/hoppers and a cement silo. A belt conveyor from the batching plant to the concrete buffer (pos 2.01) is also required.

Base molds

The Acotec-panels are formed on 5-mm-thick, flat steel plates. A minimum requirement is 450 pcs/shift, with lengths ranging between 2500-3300 mm. A typical plate mix might be 200 pcs/3300 mm, 300 pcs/3000 mm, 300 pcs/2700mm, 200 pcs/2500

Steel pallets

The element stacks are moved along the line on heavy steel pallets. The minimum amount required is 50 pcs.

Delivery pallets, packing and strapping equipment

The elements are automatically stacked on wooden delivery pallets (minimum requirement 2000 pcs/one shift operation).

The in-feed and on-line handling of these pallets can be automated (pos 5.18 and 5.19 in the layout above)

Strapping and packing equipment are also needed.

Forklift trucks, overhead crane etc for stack handling

The element stacks into and out of the procuring area are typically moved by a forklift truck or an overhead crane. An automated precuring system is another alternative.

4. Technical data

Production personnel	2 -4	Person
Production space	20 - 30 x 40	m
Land area	3000 - 5000	m ²
Connecting power (without mixing plant)	50 - 60	KVA
Compressed air consumption (6 bar)	0.3 – 0.5	Free air m ³ /min
Water consumption	1.5	m ³ /h
Concrete consumption	4 - 8	m ³ /h
Temperature in the factory	+10 - +35	° C
Site area	Paved	
Free inside height in the factory	min 5.5	m

5. Additional information

Acotec Primo elements are nowadays produced in tens of factories in Europe and Asia.

Country	Product thicknesses, mm	Country	Product thicknesses mm
China, <i>Shanghai</i>	75, 100, 120	Philippines	75, 100
China, <i>Beijing</i>	90, 120	Portugal	75, 100
China, <i>Xinjiang</i>	68, 90, 120	Saudi Arabia	68, 100, 120
China, <i>Shenzhen</i>	75, 100	South-Korea	75, 100
Finland	68, 92, 120	Spain	75, 92,120
Indonesia	75, 100	Taiwan	75, 92,100
Ireland	75, 100, 120	Thailand	85
Malaysia	75, 100	United Kingdom	92

The table above gives the most common product thicknesses for the Acotec elements. The thicknesses follow the norms and standards common in each country (EN, DIN, and BS).



China



Spain



United Kingdom



Elematic is a leading supplier of precast concrete machinery and equipment as well as the only supplier capable of delivering complete production plants anywhere in the world. Elematic's superior technology and industry expertise is currently in use in more than 100 countries across five continents. Elematic is headquartered in Toijala, Finland.

