

Transforming recycled plastic into high-quality products

## Production and machine construction from one source

Every year Govaerts Recycling processes more than 5,000 tons of recycled plastic into high-quality products for landscaping and horticulture or agricultural applications. The company started off with a single extruder, which gradually grew into a full production plant. Meanwhile, four production lines went up and running. The basic product consists of polyolefin-based recycled plastic such as PE and PP. In order to be able to ensure consistently high quality, Govaerts cooperates closely with raw materials suppliers and only uses cleaned recycled plastic. Production is based on one step technology, which makes repeated melting unnecessary and is characterized by low energy consumption.

### The production process

At the core of the production plant is an extruder that homogeneously plasticizes the recycled material. The extruder is supplied with recycled material, colorant and additives via an integrated mixer. A horizontally driven rotary table carrying



→ Govaerts Recycling, based in Alken, Belgium, specializes in the production of plastic tongue and groove boards that are mainly used for horse stables, street furniture and related uses. There is a growing market for these products due to the decline in the use of exotic timber for environmental reasons. The company not only produces, but also develops and builds its own machines, in close cooperation with Beckhoff Belgium.



the molds for the end product is located at the extruder outlet. At the first rotary table position, the heated plastic compound is pressed into the mold. During the next rotary motion, the filled mold is transported to a water bath, while the next open mold is in the filling position. After passing several rotary table positions, the material in the first mold has cooled down far enough for the end product to be ejected. In previous machine designs, the ejector was driven pneumatically. More recent machines feature a continuously operating hydraulic cylinder. The finished products are manually taken from the container and stacked.

### Optimization through simplification

Govaerts Recycling started with an off-the-shelf machine. Mechanical problems and the special nature of the company's production process necessitated in-house development of a new machine. This standard machine was reengineered mechanically, electrically and in terms of control. Beckhoff Belgium provided support for the engineering and the required controls know-how. The first machine still has the original PLC, complemented through five separate temperature controllers for heating the extruder barrel. PROFIBUS is used for the connection between the I/O terminals and the PLC.

For cost reasons and because of their advanced diagnostic features, Govaerts decided to use Beckhoff Bus Terminals. Safe operation with high availability is crucial for the high efficiency of the systems. Govaerts Recycling therefore takes full advantage of the diagnostic features of the Bus Terminals. "It meant we could be very close to the machine and could see if something went wrong", said company owner Eddy Govaerts. "In addition, this modular system enables terminals to be added without having to adapt the whole addressing table. Address adapta-

tion is handled by the TwinCAT System Manager on a software basis right down to the bit level," Govaerts said.

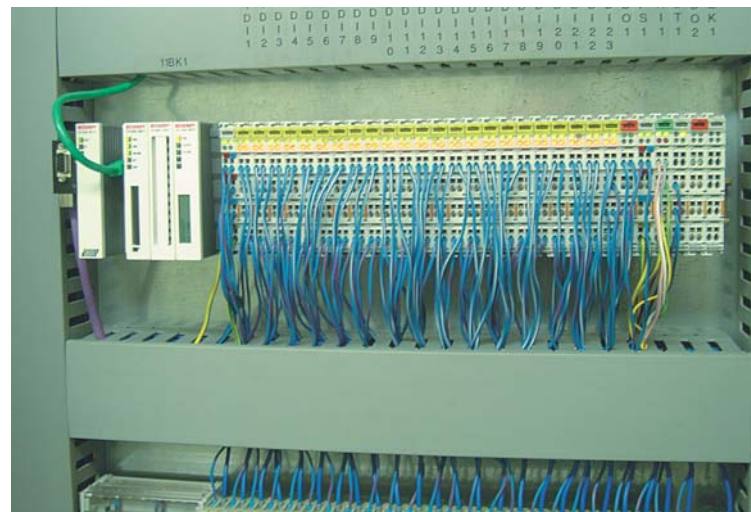
### Flexibility despite standardization

When additional systems were required due to expanding production, the company decided to standardize based on an integrated automation solution. The Beckhoff Bus Terminals with PROFIBUS were retained as the standard on the new machines. Standardization was also the aim with regard to the control cabinets. The solution should easily be transferable to future production lines and at the same time be flexible enough to enable further technical development. Due to the functional standardization, each machine controller consists of a series of modular control cabinets.

"For the PLC functionality we use the CX1000 DIN rail PC from Beckhoff, a PC without movable components such as fan or hard drive", Govaerts said. The CX deals with the traditional PLC functions and the temperature control for the extruder. As in our first machine, the PLC processes the I/Os via the PROFIBUS network. The CX1000 features four standard controller function blocks from the Beckhoff Temperature Control Library. The current temperature is read with PT100 sensors via PROFIBUS.

→ Govaerts® Recycling [www.govaertsrecycling.com](http://www.govaertsrecycling.com)

→ Beckhoff Belgium [www.beckhoff.be](http://www.beckhoff.be)



The CX1000 deals with the traditional PLC functions and the temperature control for the extruder screw.



Govaerts Recycling systematically designs their own machinery.