



■ **Bystronic Lenhardt GmbH, Germany**

Sealing with Drive

Drive-based motion control enables extremely dynamic and precise application of butyl on semiconductor thin-film substrates.

The first system in the world to allow fully automated continual application of thermoplastic butyl sealants on semiconductor thin-film substrates is in production in Germany's Black Forest region. The manufacturer is Bystronic Lenhardt GmbH based in Neuhausen-Hamberg, a subsidiary of the Bystronic glass group. The group has already explored the basic principles of horizontal photovoltaic

TPAs (Thermo Plastic Applicators) with its tried-and-tested solutions for sealing insulated glass windows. "With Siemens' support, we have further developed the systems in essential areas and adapted the automation concept that was previously based on PLC and CNC to the Simotion D Motion Control System," says Dr. Christian Daniel, technical manager at Bystronic Lenhardt. Integrating this system means

interfaces can be eliminated and cycles times can therefore be reduced. The high-performance motion control and communications functions also ensure faster processes and precise, repeatable results.

Motion control and PLC in one

A Simotion D445 forms the heart of the new automation solution and combines motion control, PLC and technology functions in a single device. The motion-control unit of the system is housed in the modular Sinamics S120 drive system in a compact book-size format. This provides complex motion control of the applicator's ten servo axes, operated continuously by Siemens High Dynamic 1FK7 motors. The Simotion system also controls all other processes of the applicators, simplifying coordination significantly and making it possible to eliminate previously unavoidable downtimes.

Motion control in top form

The Top Loading standard library, specially designed for handling applications with Simotion, enables optimum motion control for the applicator head. This is done by interpolating smooth and at the same time highly dynamic path motions from the few polynomial descriptions generated in the CAD system – particularly relevant when changing directions in corners, making sure motion is not abrupt but that it follows a smooth radius. For changes of direction, the rotation of the applicator head is coupled to the transverse motion by means of an electronic cam. This makes it possible to adjust the motion speed and therefore apply more sealant in the corners, and allows optimum sealing all over the module.

Another new feature is the connection of the operating panel via Industrial Ethernet using the latest OPC XML mechanisms. This means the machine can transfer up to 3,000 variables in less than 100 ms, as is required, for example, to quickly archive process data.

Reaching goals more quickly

Thanks to this integrated solution, it is no longer necessary to align PLC and CNC parts during engineering stages, and using the Top Loading standard library significantly reduces the amount of programming required. Simotion also allows programming in the user-friendly standard language Structured Text (ST), and makes it possible to easily insert stops in the program to simplify troubleshooting. The high-performance Trace functionality from Simotion also assists troubleshooting by rapidly providing an overview of the technology and processes. "All this together results in a significant reduction of development and commissioning time, allowing us to reach our goals more quickly," says Jürgen Schnorr, head of Engineering. Bystronic Lenhardt makes use of the

many possibilities of scripting with Simotion, such as for automated parametering of projects and of identical axes. Version management is another potential area of application. When a project is opened, a script automatically checks if there is a newer version of the relevant library or software module. The operator then has the choice to update or not. Another script assists in preparing the integration of safety functions such as SS1 (Safe Stop 1) and STO (Safe Torque Off) into the Sinamics S120 drive system, and therefore also helps save valuable time.



The tried-and-tested horizontal photovoltaic TPA (Thermo Plastic Applicator) for sealing insulated glass was further developed for sealing solar modules with butyl

Simulation supports evolution

Commissioning times can also be greatly reduced by simulating the entire application on an office PC in advance. This means a machine can be mostly pre-programmed, tested and optimized before commissioning so that all work on the actual machine won't have to be carried out all at once during the often short and problematic commissioning phase in which the various components of a line are aligned with each other. ■

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