



# Sealing

## Case study: Tight automobile doors, CeraCon, Germany

### Applications in Plastics

- Cutting/Finishing
- Glueing/Sealing/Dispensing
- Flaming/Painting
- Assembly
- Packing/Palletizing
- Inspection/Quality control
- Machine Tending

Three IRB 2400 robots work hand-in-hand at renowned automobile suppliers, providing tight automobile door modules

### SEALING TECHNOLOGY

CeraCon GmbH is a German based, machine manufacturer, specializing in creating water-tight automobile door modules - sealing the electrical and mechanical components. The newly developed "Penguin Foam System" with FOAMPLY technology, applies foam seals created from single-component elastomers, such as polyurethane and silicone compounds, directly onto the component to be sealed. Even complex seal geometries are easy to implement with this FIPFG sealing technology (form-in-place foamed gaskets). Foaming occurs on the basis of a patented process by ventilating the liquid elastomer compound. The required time for hardening is only a few minutes, due to low temperature heat cure characteristics of the sealer. When cured the foam seals form a closed cell structure with even pore distribution.

### FINE PORED FOAM

The majority of users of this innovative foam sealing technology are found in the automotive industry, where the highest possible quality and system availability are of major importance. At the end of last year, the company secured new business from a renowned international automobile supplier. The order specified the construction of a fully-automated system, to seal automobile door modules made of plastic. The most important requirement was the density of the applied foam material. This was easy to accomplish because in contrast to the competition, CeraCon produces its sealing foam "mechanically" with the "FOAMPLY" technology. This means, the foam structure is created by directly mixing the liquid polyurethane base material with air, not relying on "chemically reacting", but by controlling the air to elastomer mixing ratio. The advantage is that an even, fine pored, and most importantly, closed-cell foam structure is created that will not lose its sealing effect even if its outer skin is damaged due to, for example, careless installation.

### SHORT CYCLES AND LIMITED SPACE

Another challenge was pairing the short cycle time with the high utilization of the system. A sealed door module must leave the system every 15 seconds for a minimum of five days per week within a three-shift operation. The special properties of the Penguin Foam sealing foam were important here also. CeraCon is gaining ground on its



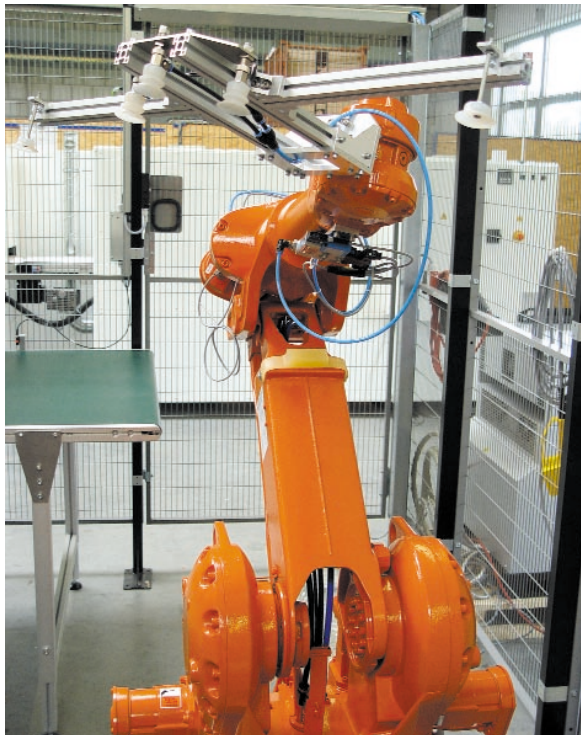
competitors' systems because of the short hardening time of only five minutes (with heat treatment at only 80°C) before processing of the sealed component can continue.

The customer's third challenge was the very limited available space at the plant: an equilateral production space of only 50 square meters had to be considered for a component size of about 47 x 101 cm. "It became clear very quickly that we had to work with a revolving table," explains Dieter Neis, the responsible project engineer at CeraCon.

"We divided the revolving table into four work areas. The first area (outside of the automated zone) was assigned to an operator to manually load and unload the table. Two IRB 2400/16 robots and one IRB 2400/L robot handled the other three tasks.

### FLEXIBLE ROBOTS

The door module to which the foam is to be applied is pre-treated with highly energetic plasma at the first station following assembly. When the plasma stream meets the plastic, the surface is changed long-term on the molecular level and provides for better bonding of the PUR foam, which is applied at the next station. In order to adhere to the short cycle time, we had to equip the pretreatment station and the foam application station with separate robots. Although this resulted in higher acquisition costs initially, we were then able to show the customer how to safeguard against a damage scenario because of the flexible and simple handling of the new IRC5 controller" says Dieter Neis, explaining further.



IRB 2400/L with suction component gripper to load and unload the thermo system

The introduction of the new IRC5 controller provided CeraCon, with many important advantages. IRC5 presents a significant simplification not only within the current project, but also for day-to-day operations, especially for the company's technical programming professionals. "We apply foam to a few blank parts for test purposes for the customer before the customer purchases a system from us. Therefore, our employees are entering many different component contours into our robots. The high level track and concurrent speed constancy, even in tight curves, has always been an extraordinary characteristic of ABB robots. These advantages now enhance the new IRC5 controller with its graphic based Flex Pendant and the completely revised software. It makes the ABB robot a preferred handling tool both for us and our customers," reports Dr. Frank Kukla, who is managing partner at CeraCon and responsible for the foam sealing systems product area.

### EXTENDED REACH

The advantages of ABB robots also shine at the third station of the revolving table in the current door module project. The robot at the third position is responsible for loading and unloading the thermo system (a vertical pater-noster furnace that dries the dimensionally stable but still moist foam on the door modules). "This position requires a robot with an extended working range because larger distances have to be handled. The L version of the IRB 2400 with its extended arm was the ideal choice for this task because we were able to avoid having to switch to a larger and thereby significantly more expensive robot model solely due to the greater reach," emphasizes Dieter Neis.

### GLOBAL SERVICE

"In addition to technical advantages of its robotic systems, ABB also came up with attractive soft facts," adds Andreas S. Kreissl, also managing partner at CeraCon and responsible for commerce, distribution and marketing. "The worldwide setup of the company provides us with the ability to respond quickly, if needed. However, because of the systems' very high level of dependability, not least due to their high degree of maturity, this almost never occurs. We are certain that we have found the correct trio for our four tasks," concludes Dieter Neis. ABB has made its contribution so that as of this fall the door modules in automobiles from a large south German automobile maker will actually be tight.

#### About CeraCon:

Founded: July 2000  
Employees: About 50  
Location: Weikersheim, Germany  
Web site: [www.ceracon.com](http://www.ceracon.com)

#### ABB and the Plastics Industry

ABB's wide range of plastics robots can handle most of the tasks involved in and around injection moulding machines, regardless of required cycle time or size of the machine. Together with our partners, we provide automation solutions for most manufacturing processes in the plastics industry.