

Carriage construction: elastic mountings absorb vibrations and noise The field of railway carriage construction is discovering the benefits of rigid but elastic and malleable polyurethane: as a floor mounting, the elastomer isolates vibrations and absorbs noise. Siemens is currently at work in Vienna fitting 190 carriages with elastomer strips. Angst+Pfister has built up specific know-how in affixing these safety-relevant parts, and also places this expertise at the disposal of other customers.



An aluminum plate is bonded to the polyurethane blocks. The adhesive bond is just as safety-relevant as the elastomer itself.



The Angst+Pfister production facility in Zoetermeer, the Netherlands. One of the European Adhesive Specialists at work.

Anyone who makes his way through a modern train is most likely moving along a double floor. Elastic mountings between the underfloor, on the one hand, and covered plywood floor, on the other, make it possible

to forget any unevenness in the wheels and in the tracks. The mountings not only dampen vibrations, but also reduce noise and sound.

The elastomers in Angst+Pfister's product range are increasingly being used as the material for these flooring structures. They significantly increase passenger comfort, and above all also extend the useful life of the carriages and their components, thereby facilitating an overall reduction in life-cycle costs.

Siemens is using a high-performance elastomer for the large-scale order which has received from Russia: this material is required to withstand the harsh climate and large temperature differences that prevail there. In addition, the polyurethane must meet the DIN 5510-2 fire protection standard.

Safety-relevant adhesive bond An aluminum plate is mounted on the polyurethane blocks. What makes this adhesive bond between the polyurethane and the metal so special is that it is just as safety-relevant as the elastomer itself. It is for this reason that Chief Technology Officer Erich Schmid, who is personally taking care of Siemens out of our headquarters in Zurich, has trained as a European Adhesive Specialist (EAS).

The adhesive work is carried out in the Netherlands, at Angst+Pfister's production facility in Zoetermeer, where an additional four colleagues have completed EAS training.

Absolute precision and reliability "For the flame-retardant two-component epoxy adhesive to be applied, both the elastomer blocks and the aluminum plates must be completely clean," explains Erich Schmid. The staff must wear silicone-free gloves during production.

There is not even the slightest breeze to be felt in the production hall, because the wind could blow up dust. Additionally, temperature fluctuations are kept to an absolute minimum. Throughout the entire production process, members of our staff are accompanied at all times by at least one of the European Adhesive Specialists. They record the stages of the work in painstaking detail in a logbook so that every single step can be retraced. The fact that the Angst+Pfister operation in Zoetermeer meets high standards of precision and reliability is highlighted by its certificate from the Fraunhofer Institute for Manufacturing Technology and Advanced Materials: upon completion of the corresponding training of specialist staff, it awards Angst+Pfister a certificate of suitability for adhesive work in connection with rolling stock and rolling stock parts in accordance with DIN 6701-2.

Know-how that benefits the customer "This process has enabled us to acquire new know-how and additional skills," explains Erich Schmid. "This in turn also enables other customers to benefit." And here he is thinking not only in terms of professional diligence – the focus in the development of the adhesive process is also on efficiency. "If a customer involves us at an early stage of a project, this has a positive impact on production," says

The elastomer blocks and the aluminum plates must be completely clean before being affixed.

Erich Schmid. "We feel responsible – not only for the final result, but also for the manufacturing processes. In engineering we often succeed in taking a customer's wishes and translating them into solutions that simply no one had previously thought of."

A brief question to conclude: How are the polyurethane blocks installed together with the aluminum plates? Siemens attaches the floor mounts, which vary in length and height, to the underfloor at clearly defined intervals and at right angles to the longitudinal axis of the carriage. The aluminum plate is screwed to the plywood floor, enabling the elastomers to exert their full effect in absorbing vibrations and noise.

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Certificate Fraunhofer class A 2 as specified in DIN 6701-2.