SEALANTS + ADHESIVES FEATURE

Adhesives and sealants in the construction ecosystem

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The sustainability of products in the construction sector is receiving alot of attention in Europe. The importance of this subject is justified by the sheer scale of the construction sector; its share in the materials used and produced in the European Union; as well as the share of greenhouse gas emissions it represents. In addition, the ongoing geopolitical and energy crisis is also impacting this particular sector significantly.

Legislative initiatives focused on sustainability, such as the EU Green Deal, cover the construction sector explicitly and with specific provisions. This attention concerns all levels, from the entire building to individual construction elements, as well as the materials used for their production and installation. As a result, adhesives and sealants designed for the construction sector are therefore also of interest.

The construction ecosystem comprises all the elements involved in the complete lifecycle of buildings – for example, blueprinting, erection of the structure, maintenance of various fixtures and building elements, renovation and demolition. In the sustainability transition pathway for the construction ecosystem, there are two critical elements – the energy efficiency of buildings and the material efficiency of the installed materials. Adhesives and sealants strongly support both of these elements.

The key element in the transition pathway for the construction ecosystem is energy efficiency. Buildings have a very long lifespan and so the 'use phase' of these structures have a major effect on the environmental footprint. The heating and cooling of buildings and the efficient use of energy therefore becomes paramount. The current energy crisis and prediction of a harsh winter accentuate the need for energy efficiency ever further. Adhesives and sealants play a crucial role in this as the energy efficiency of buildings is augmented by the use of thermal insulation and decarbonised heat sources, which contribute to further reduction of the carbon footprint of buildings in use – ensuring less energy consumption within the buildings.

Regarding thermal insulation, adhesives and sealants facilitate insulation systems that are both durable and airtight. The latter is a very important element. This is accomplished, specifically, through the use of adhesively bonded insulation panels, polyurethane foams for filling gaps, adhesive tapes at insulation joints and sealants around door and window openings, and adhesives in the construction of insulated (multipaned) glass units.

All these aspects of adhesives and sealants apply not only to new construction of buildings but also to (deep) energy renovation activities. As far as the decarbonisation of heat sources is concerned, adhesives and sealants make possible, for example, photovoltaic panels furnishing electricity for heat pumps, as well as batteries holding surplus daytime electrical energy.

Besides promoting energy efficiency during the 'use phase' of buildings, adhesives and sealants play a second key role in terms of promoting material efficiency. Material efficiency concerns the material make-up of the parts of a building, that is, the 'so called' 'embodied carbon' and the circularity of materials. Adhesives and sealants support the reduction of material used – the 'construction phase', the extension of building life through maintenance and repair – the 'use phase', and the reuse and recycling of building materials that is possible so that the creation of waste is avoided – the 'end of life phase'.

The amount of adhesive or sealant in a final product is very low, in construction often less than one weight percent of a building. Yet, they can reduce the amount of material used by, for instance, the adhesion of glass directly to frames or the use of highly insulated glazing on the exteriors of buildings. Furthermore, thanks to adhesives and sealants, renewable construction materials, such as engineered wood to replace steel and concrete, can also be used in buildings and thus reduce the overall carbon footprint of the construction.

Regarding maintenance and repair, adhesives and sealants are also able to extend a building's life by both avoiding the need to replace elements and by preventing damage through maintenance and repair. They additionally prove to be very important for repairing and maintaining construction machinery. With respect to reuse and recycling, adhesives and sealants promote approaches towards disposing materials at a building's 'end of life'. +

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