

BYLUX

UV light curing adhesives

one-component systems

solventfree

easy to use:
bottles with 100 g or 1000 g
or special cartridges

fast reaction

low energy costs

resistant against
chemicals, humidity and thermal shock

History

An early example of light-induced curing of polymerisation adhesives was recorded when the ancient Egyptians dipped linen strips into bitumen for use in the preparation of mummies. Subsequent exposure to sunlight caused the unsaturated compounds present in the bitumen to cross-link and so harden. Similarly, early mariners used asphalt based oils to seal the hulls of wooden ships. Upon exposure to sunlight, they polymerised to give an impermeable, water resistant coating.

Hence, whilst we like to think that curing systems are a product of our late 20th Century technology, it can be seen that simple examples of radiation curing have existed since the dawn of recorded history. However, it is only in recent years that the use of the very reactive multiacrylates, has resulted in a growing market for UV radiation curable adhesives, finding uses in the electronic, medical equipment, printing and glass industries. A large variety of monomers and oligomers are now commercially available which permit the production of a well-defined cross-linked polymer that will exhibit the exact characteristics required in a given application.

General Principles

The idea of a single component, room temperature curing adhesive, which does not polymerise until a controllable external force is applied is very attractive to manufacturing industry. The Byllux range of adhesives provides such benefits, utilising the influence of certain wavelengths of light to initiate polymerisation. Industrial use favours the 200-400 nm band, which occurs in the ultra violet section forming part of the electromagnetic spectrum.

The longer the wavelength of the radiation, the greater the depth of penetration, whereas conversely, the shorter the wavelength the greater the energy available to induce curing.

Hence, whilst adhesives exist that can cure in natural daylight, the majority of industrial applications are designed to cure at around 380 nm; i.e. in the safest 'A' part of the UV spectrum. They require the least shielding of operatives in the form of UV safety glasses. In reality, most production line situations use an enclosed cabinet or conveyor belt system allowing curing to take place in total isolation from the operatives. Such shielding is essential if the high energy UV-B or UV-C wave bands are to be used, as damage to skin tissue can result.

The light source is usually a medium pressure mercury lamp system, which has the best combination of speed of cure, low cost and ease of use for most applications. Differing configurations of reflector shape allow the light beam to be focussed or diffused. The required exposure time will depend on the intensity and wavelength of the particular light source. To determine the optimum cure time, the adhesive should be exposed until it has solidified to the depth required.

Applications

Medical Automotive Glass Electronics
Printing

Storage

Store products out of direct sunlight. The expected shelf life under proper conditions is at least 6 months at temperatures between 5° and 25° C.

Safety

UV adhesives are skin and eye irritants. Prolonged contact can cause sensitisation. Wear gloves, overalls and eye protection. If skin contact occurs, wash with soap and water. In case of eye contact, flush immediately with water and seek medical attention.

Type	Application	Viscosity [mPas]	Colour	Dens. [g/ml]	Wavelength [nm]	Time to Fix	Depth of Cure	Tack Free	Tensile Str. [N/mm ²]	Temperature Range [°C]
5108	Glass to Glass big areas e.g. tables	50 ~ 80	clear	1,09	390	5 sec & 10 mW/cm ²	3 - 5 mm in 30 sec & 10 mW/cm ²	30 sec & 10 mW/cm ²	150	-50 ~ +120
5118	Metal to Glass Glass to Glass	100 ~ 150	clear	1,09	390	5 sec & 10 mW/cm ²	3 - 5 mm in 60 sec & 10 mW/cm ²	10 sec & 50 mW/cm ²	150	-50 ~ +120
5228	Metal to Glass Glass to Glass	1.800	clear	1,09	390	5 sec & 10 mW/cm ²	3 - 5 mm in 60 sec & 10 mW/cm ²	10 sec & 50 mW/cm ²	150	-50 ~ +120
6108	Fast Repair of Window Screens	20	clear	1,09	390 and Daylight	5 sec & 10 mW/cm ²	3 - 5 mm in 30 sec & 10 mW/cm ²	5 sec & 50 mW/cm ²	150	-50 ~ +120
6308	Casting and Bonding of Plastics, esp. PC	30	clear	1,09	380 and Daylight	10 sec & 10 mW/cm ²	3 - 5 mm in 30 sec & 10 mW/cm ²	5 sec & 10 mW/cm ²	N/A	-50 ~ +120
6338	Plastics, Glass, Metals	> 10.000 thixo	clear	1,09	380	5 sec & 10 mW/cm ²	3 - 5 mm in 30 sec & 10 mW/cm ²	30 sec & 10 mW/cm ²	150	-50 ~ +120
6484	Casting and Coating with Colour Code	5.000	clear	1,09	380	5 sec & 10 mW/cm ²	3 - 5 mm in 30 sec & 10 mW/cm ²	10 sec & 10 mW/cm ²	150	-50 ~ +120