White Paper: Designing in light curing adhesives - a holistic approach to adhesives in medical device assembly

UV curable adhesives grant significant manufacturing productivity benefits, curing in seconds, “on-demand” when exposed to UV light. With grades certified to ISO 10993 and USP Class VI stands available, they are also well-matched to the manufacture of medical devices.

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To fully realise the potential that this adhesive technology can bring, it is necessary to take a comprehensive, holistic look at the entire bonding process during the designing stage of any new device. In our White Paper, *Designing in light curing adhesives – a holistic approach to adhesives in medical device assembly*, we've gathered a few of the design considerations and implementation steps for you to reflect on.

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Introduction

By taking a holistic view of designing in light curing adhesives during the early stages of a project, it's easier to build a good process. This involves considering the entire bonding process at the design stage, including everything from substrates to joint design, surface preparation, quality control, application, and cure. Changing or being flexible about any one of these choices can help optimise the process — a small variation can open the door to a new adhesive and a large process improvement.

Fastening options for medical devices include heat sealing, welding, solvent bonding, mechanical interlocks, and adhesives. The advantages of adhesives compared with alternative methods include the distribution of load or stress, the elimination of joint fatigue, improved impact resistance, and good aesthetics.

Generically, UV curing adhesives are resilient and tough — with high tensile, shear, and peel strength, and a cured hardness range of Shore A80 to D80. Medical device manufacturers can consider them as a structural bonding agent for multiple substrates, from glass, to metal, to many types of plastic, including those used in certain medical device assemblies like PEEBAX or PEEK. These adhesives are tested to ISO 10993 and USP Class VI, and are compatible with typical sterilisation methods.

Figure 1 – UV curable adhesives can significantly reduce assembly processing time and costs

Light curing adhesives are extensively used in medical device manufacturing due to their process advantages, finding applications in products like catheters, syringes and needles, anesthesia masks, reservoirs, tube sets, and medical electronics assembly. One key benefit is that they cure in seconds, "on demand", on exposure to the correct wavelength of UV light. They reduce the need for jigs and tooling, reduce work in progress freeing up factory space,

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