

Choosing the Right Instant Adhesive for Your Manufacturing Process

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Introduction

The key to selecting the correct cyanoacrylate (instant) adhesive for your application is having a clear definition of your objectives. An adhesive cannot be selected based only on its bond strength, it is always best to look at as many factors as possible:

- **Substrate material** – what surfaces are you trying to bond?
- **Cure Speed** – how much open time do you require?
- **Environmental Resistance** – what factors will affect your bond?
- **Thermal Resistance** – what level is required?
- **Automation Suitability** – if you have a large volume production; can the parts be brought together quickly?

Materials to Be Bonded

Consider the materials you are looking to adhere together. Knowing the chemical or trade names of your substrates can help narrow down your search. The cleanliness of the surface and porosity of the substrate can also affect the sensitivity of the cyanoacrylate to the surface area of the bond. Be aware, some substrates can cause an inhibition with some adhesives which will hinder the bond strength.

Mating of Bonded Surface

To determine the viscosity required from your cyanoacrylate adhesive it is worth identifying the desired gap between the two surfaces which are being joined together. Cyanoacrylate formulas range from extremely low viscosity products, to thixotropic gel formulations. The closer the bond required the lower viscosity you need; the higher viscosity gel products are more designed to fill gaps in uneven surfaces.

Another determining factor to consider is if the adhesive is to be applied pre-assembly or post-assembly on the surfaces to be bonded. Some surfaces may have to be pre-treated by cleaning, sanding or priming to ensure a strong, permanent bond.

Speed of Cure

Your assembly procedure plays an important role in the selection process. If you are using high speed automated equipment, generally speaking you are looking for a very fast setting adhesive, whereas a manual assembly may require a slightly slower setting time allowing the pieces to be positioned correctly, and allow an element of repositioning where required.

Aesthetic Requirements

If your bonded joints are visible they may require additional thought. For example, the chlorosis (blooming) potential needs to be considered, the stringiness of adhesive, the product clarity/surface resolution and method of application.

Assembly Environment

The performance of cyanoacrylate adhesive can be influenced by external factors during assembly. Aspects to consider when choosing the correct instant adhesive would be the temperature and humidity where the adhesive is applied, the assembly methods being used and the equipment and materials being bonded.

End-Use Environment

The end-use environment is an equally important area to analyse. Temperature, humidity and chemical interaction/corrosion are key elements which can effect and damage the bond over time. It is advisable to think through all final use and/or operating environment the adhered parts will be exposed to.

Bond Stress

If the bonded assembly is to be subjected to stress in its final environment, the proper instant adhesive becomes critical to strength and durability. Types of stress to consider are:

- Tensile Load
- Compression Load
- Shear Load
- Impact Load
- Peel Load
- Cleave Load

Joint Design

The final point to consider is the joint design. This can sometimes influence the functionality of the bond and, in conjunction with the proper adhesive selection, bonded parts can provide better, more cost efficient assembly solutions.

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