

Adhesive Failure

As we know adhesives are commonly used in everyday construction and assembly situations and it is reasonable that builders expect them to work as intended without failing and leaving them to wonder, what happened.

Adhesive failure can occur for many reasons and determining what went wrong helps understand how to fix the issue and prevent it from happening in the future.

Seven Common Causes

1. Incorrect adhesive selection: Each unique project and situation requires a specific adhesive to obtain the best possible chance for success. While adhesives and substrates may appear very similar, this may not be the case.

2.Improper adhesive preparation: The best type of preparation will depend upon the specific substrate and adhesive chemistry used. Lack of consistent surface preparation can be a big contributor to adhesion issues.

Certain adhesives require specific preparation and mixing directions to be followed. These are included on our labels and TDS, so encourage builders to read all our on-product instructions.

If builders are still un-certain they should also consult with the substrate provider for the appropriate preparation.



3.Poor surface cleaning: To assist adhesion, remove any oil, dust, dirt, or other debris with a solvent or cleaner that doesn't leave a residue and ensure the surface is dry.

4.Material design changes: Manufacturers sometimes change a production process that does not affect the component performance or tolerances but can unintentionally affect the bonding of/to that component. Careful attention to the cleaning process at the usage site is the best method to ensure occurrence of this potential problem does not arise.

5. Plasticizer migration: Some substrates can actively interfere with the cure mechanism of an adhesive making them incompatible.

Certain plastics/membranes & environmental substrates can contain plasticizers which seep to the surface over time, causing a bond to fail. This seepage could be inconsistent from lot to lot so that some parts never fail while others lose adhesion. This is usually an issue that is addressed when selecting the adhesive, but sometimes appears later.



6. Cure time and temperature: Attention to stated curing temperatures ranges is important. Some materials must be exposed to certain temperatures in order to cure. EG;

- Too high a temperature may cause a material to polymerize incorrectly and cause degraded properties.
- Some materials may cure at lower temperatures, but not produce the same optimum physical characteristics as when cured with elevated temperatures.
- Alternatively, certain chemistries designed for low temperature cure, should not be heated when cured.



7. Environmental conditions: Many materials can be affected by their surroundings. For example, high moisture levels can prevent cure in some materials while it speeds up the reaction in others. Carbon dioxide, PH, Oxygen and environmental temperature could all adversely affect the finished adhesive.

Summary

These are seven of the most common causes we see for adhesive failure and should be a starting point when considering why an adhesive has failed. In addition to these, specific problems like substrate failure, adhesion failure, and cohesion failure would be the next step for consideration.