LORD® 400 Series Acrylic Adhesives

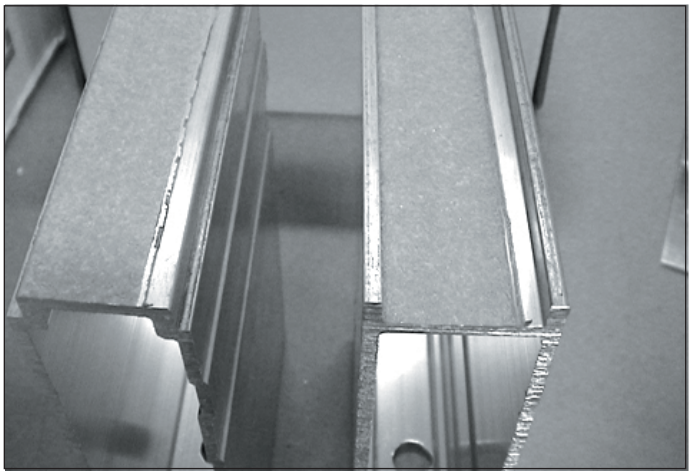
Troubleshooting Guide

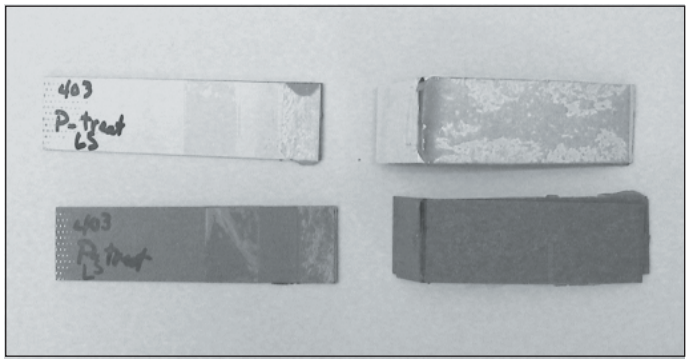
This document is a guide to help troubleshoot and resolve common issues encountered when utilizing LORD® 400 series structural acrylic adhesives.

There are only a few common causes of failures when working with LORD adhesives. These include dirty parts, opening and closing of the joint, exceeding the working time of the adhesive, under application of the adhesive and a change in coatings on the metal part.

Ideal Failure

The preferred method of failure for adhesive joints is cohesive failure. This failure mode indicates excellent adhesion to the substrates and any coatings, which are being bonded to, are well adhered to the substrate.





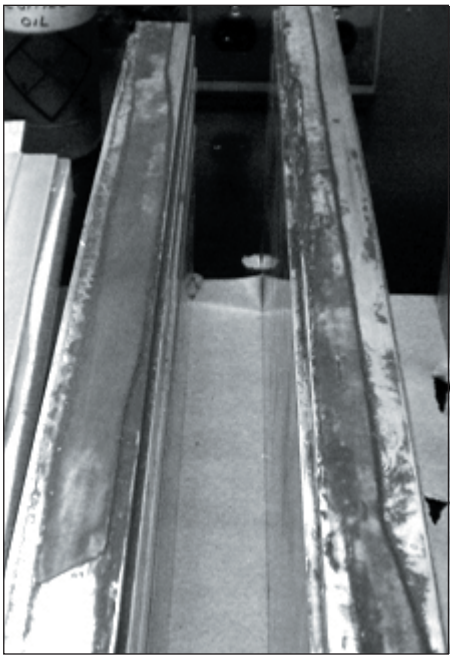
Cohesive failure

Cohesive failure can be identified by the residue of adhesive left on both substrates. With this failure mode, typically more that 2000 psi in shear pressure is generated and the substrate often breaks before achieving cohesive failure. Notice on the aluminum extrusions in the examples provided, the joint is full of adhesive with little squeeze out.

Dirty Parts

While LORD acrylic adhesives are excellent at bonding through common surface contaminates such as the oils found on as received metals, there are some parts that should be cleaned before bonding.

Any loose dirt, rust or other foreign material should be removed before bonding. Typically a dry rag wipe will suffice. If a solvent is needed, an isopropyl alcohol wipe is recommended. Depending on the extent of the dirt/ rust, scuffing or grinding may be required.



Failure mode – dirty parts

Opening and Closing the Joint

When assembling the parts, place them in position as gently as possible and avoid applying pressure. Let the clamping systems do the work. When a part has been mated and needs to be moved or repositioned, it is CRITICAL that the part is NOT pulled apart to reposition. This introduces air gaps into the adhesive that significantly weaken the bond and may even prevent the adhesive from curing completely.

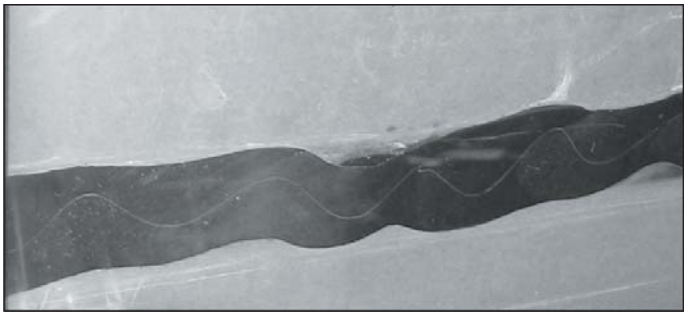
If a part needs minor repositioning, ALWAYS SLIDE the part to the new position. If a part needs major repositioning, it may be better to remove the part, remove the adhesive and begin the bonding process again. In the example provided, notice the spider webbing along the edge of the bondline which is a key to identifying this type of failure.

Failure mode – incorrect repositioning methods

Exceeding the Working Time

Working time is the amount of time from when the adhesive starts to travel down the mixing tip until the parts must be mated and clamped.

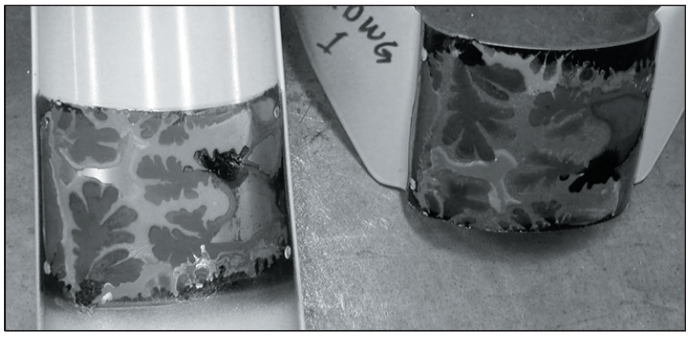
When the working time of the adhesive is exceeded, the adhesive will no longer wet out on one of the surfaces to be bonded. This will generally show up as a shiny, very smooth surface on the adhesive after dissembling the parts, which is in contrast to the rough surface seen on a cohesive failure. In the example provided, the bead has not been fully compressed.



Failure mode – exceeding the adhesive working time

Under Application

Engagement area is critical to adhesive performance, so it is important to apply enough adhesive to fill the designed joint. In the example provided, it appears the failure was a combination of opening and closing the joint (notice the spider webbing) and not having enough adhesive. Another solution to this problem could be to improve the fixture and provide more intimate contact between the two parts.



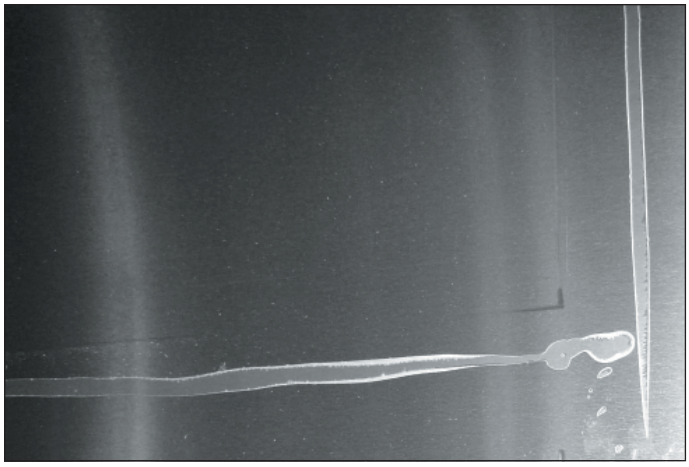
Failure mode – under application

Coating Changes

When bonding to a coating rather than to an uncoated metal, it is important to identify the coating and ensure that the supplier does not change coating without advanced notification. LORD Corporation can assist with testing and screening of new coatings.

In the examples provided, a clear wash coat is present on the aluminum and the adhesive bonded better to the coating than the coating did to the metal. This can be identified by where the shine is taken off the material at the bead location and by where an edge can be felt along the parameter of the bondline by scratching with a finger nail. The example also depicts a case of under applying adhesive. A 1" wide bondline is ideal and the bead did not extend to the edge of the sheet.

Failure mode – coating changes



Failure mode – coating changes

Cautionary Information

Before using this or any LORD product, refer to the Material Safety Data Sheet (MSDS) and label for safe use and handling instructions.

For industrial/commercial use only. Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

LORD provides valuable expertise in adhesives and coatings, vibration and motion control, and magnetically responsive technologies. Our people work in collaboration with our customers to help them increase the value of their products. Innovative and responsive in an ever-changing marketplace, we are focused on providing solutions for our customers worldwide . . . Ask Us How.

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