

Water-based car paints *part 1*

EVERY SIGNMAKER HAS HAD TO DEAL WITH THIS

Help! The vinyl comes off in grooves and swage lines

Why is that? Am I doing something wrong? Can it be avoided?

Time and again alarmed sign makers have called us about problems in connection with cast films that come off in swage lines and grooves. 'It seemed to be sticking so nicely,' they say, 'but after a while everything lost its bonding. Any idea why that is?' We're not just asked about our products, but often also for some good advice, which is no problem, of course. As a supplier with lots of practical experience we are proud to be of help with the right answers.



For quite some years now there has been a persistent problem that producers and suppliers of vinyl film do not like to address. It is the releasing of vinyl in critical spots, as shown in the pictures in this article.

Suppliers tend to blame the signing companies: 'You did not degrease thoroughly enough' or 'too much heat used while applying'. But is this true? Are those really the reasons?

Quality of vinyl film

One of the causes is to be found in the great variety of vinyl film qualities. Make sure you get the correct information and mounting instructions of the film you're using. Another good suggestion is visiting practical seminars where you'll be shown what to watch out for when applying the particular vinyl film.

Blame vs ability

'The sad thing is that the signmaker is burdened with doubts about whether he has been doing things right,' says Damian van Grunsven (*Sales Advisor signing materials with Sign o' the Times BV, Netherlands*).

On top of that the customer could start doubting the skills and competence of the signmaker. But if the basic knowledge is there which we have been teaching our clients for more than 16 years knowability is not the issue. Actually it is the suppliers that should keep their clients informed about the current developments in the market', said Damian.



Water-based car paints

Since 1997 nearly all car manufactures have been using water-based paints. Our 1998 research showed that it was Volkswagen and Mercedes that had begun using these environmentally friendlier, water-based car paints. That's when our troubles began. This applies to all well-known brands of cast vinyl film.

Loss of bonding also called rupture

Let's have a closer look at the technical aspects. Defective bonding is also called 'rupturing' in technical terms. In fact there are two important kinds of ruptures: the **adhesive rupture** and the **cohesive rupture**.

We have to keep in mind that a rupture will always happen at the weakest point of the bonding, just as a chain will logically always break at its weakest link.

Adhesion is the molecular attraction between different materials. In other words, an adhesive rupture is caused by insufficient bonding of the adhesive layer with the film or substrate. The adhesive rupture will happen at the spot or spots with the least amount of bonding.

Cohesion is the attraction between molecules of the same material. A cohesive rupture is easy to recognize, there will always be visible bits that were torn away on both sides of the rupture. This can be a cohesive rupture either of the adhesive layer or of the substrate material. A cohesive rupture of the adhesive layer leaves adhesive on the substrate and on the film. This is caused by type and/or processing of the adhesive, or by the properties and prepping of the substrate.

The weakest link of an adhesive bond is usually the adhesive itself, not the contact surfaces of the adhesive and substrate. If the vinyl film is of high quality, this seldom causes issues. The cause of the problem is to be found elsewhere.



Figure 1: adhesive rupture

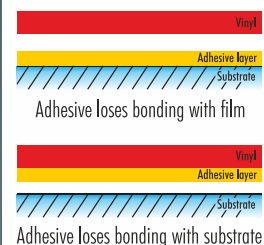
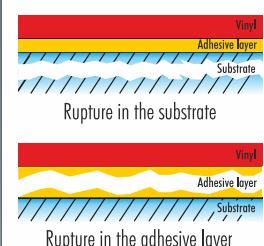


Figure 2: cohesive rupture



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Information for distributors:

Water-based car paints *part 2*

The vinyl comes off in grooves and swage lines

Bad adhesion on water-based car paint layers

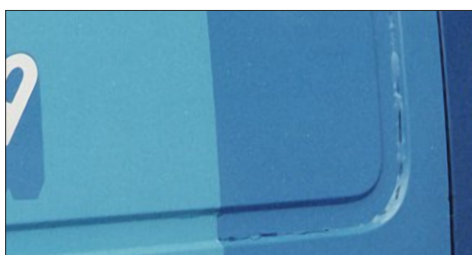
All this means that in the case of lettering or marking on water-based paints we are dealing with adhesive ruptures: the adhesive layer insufficiently bonds with the car paint, a problem that cannot be solved with common adhesives. Perfect bonding of adhesives on a car with a water-based paint coat appears to be very difficult to achieve. So what is it with this water-based paint? Why does the adhesive not bond well?

Water-based car paints contain silane (silicon-containing substance) as a flow agent to improve sprayability. The disadvantage for us lies in the repelling nature of the silicone residue on the paint coat surface. Whatever adhesive vinyl you use, bonding will always be less than optimal. But is this true? Are those really the reasons?

An example

Imagine a situation in which the silane from the car paint prevents a 100% bonding of the tiny adhesive beads, but allows only about 70 - 80% of them to actually bond. This problem consequently will be amplified if the film is stretched into a groove. The stretching of the vinyl will decrease the amount of available adhesive beads per square centimetre to about 75% or less of the usual amount. If the bonding on waterbased paint is only 70% in the first place, after stretching it will be even less, namely about 70% of 75%, a total bondage percentage of only 52%...

Not enough for parts that were heated and stretched into place.



Is there a solution?

More aggressive adhesives could be a solution. These would strengthen bonding, but stronger adhesives are not recommended for the signing and marking industry. The increased tackiness of the vinyl would seriously affect manageability of cut graphics, weeding and lettering.

It is preferable to look for a solution to improve the bonding of the substrate, to improve the 'grab' of the adhesive onto the paint coat.

Other suppliers sell pens with which the surface tension of the car's paint coat can be measured, based on the principle that a higher surface tension of the paint makes for better bonding with the adhesive. Water-based

paints have a higher surface tension and can thus be recognized that way, which is nice to know, but not very helpful. On the contrary, if high surface tension is measured, the job has become unpleasant before it even starts. What good does that do?!



We have the solution!

Fortunately we have achieved good results after intensive testing with a special colourless primer that creates a molecular layer between the bonding surfaces, thereby causing highly improved bonding.

This especially developed primer 'sticks' to the silane molecules, neutralising them. This creates a layer between the vinyl and the car paint coat that allows the adhesive to bond freely with the substrate.

Not aggressive

In contrast with other primer products, this is no clear coating or otherwise aggressive solvent-containing product. No molecules are chemically changed or damaged! No chemical reactions take place whatsoever.

The silane in the car paints bonds with the **SOTT Adhesive Activator 600-AA1400** by means of adhesion. If one would use this neutraliser without applying anything afterwards, the surface would return to its former state after a few days.

But watch out! **SOTT Adhesive Activator 600-AA1400** is only an aid to improve bonding onto waterbased car paints. This is no magic potion. The quality of your vinyl and the thoroughness of your preparation of the substrate will determine the value of the job.



SOTT ADHESIVE ACTIVATOR 600-AA1400 helps in those spots where the film remains under tension. The primer reduces the surface tension of the substrate and consequently improves bonding with the adhesive.

Figure 2: adhesive film applied without SOTT Adhesive Activator 600-AA1400

This principle causes of loss of bonding of adhesive film at difficult spots.

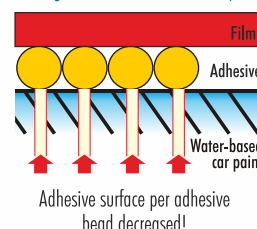
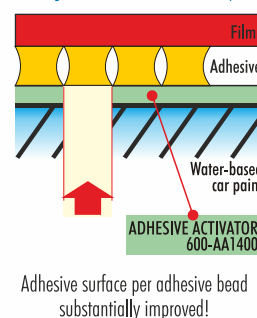


Figure 4: adhesive film applied with SOTT Adhesive Activator 600-AA1400

This principle causes of loss of bonding of adhesive film at difficult spots.



THE ADVANTAGES OF 600-AA1400:

- doesn't harm the substrate.
- Texture of surface remains the same.
- works on all kinds of surface structures.
- creates strong initial tack
- allows for application of large car wraps, graphics, and lettering in one piece on structured surfaces



100 ml.

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