

Technical Report

Reference: A-065-18
For: Mr. David, EMPRESA: Pars / Mr. Eloy Ingraín
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Description: Bonding of protective rubber pads to biker's fabric overalls
Date: 17/09/2018

1. INTRODUCTION: ANTECEDENTS AND TARGETS

PARS sent them out samples biker's fabric overalls two different materials. It is needed to find out the best adhesive choice to bond rubber protective pads (to prevent biker's injuries when falling down to floor) to these fabrics.

2. TEST DESCRIPTION / PRODUCTS INVOLVED

These are the fabrics and materials Customer supplied us for testing:

- Biker's overalls carried out with the following three fabrics:
 - "Reissa" type Material
 - Woven fabrics
 - "Type 600" Polyester
- Rubber pads for preventing injuries in Bikers when possible racing accidents take place.

For bonding testing two cianoacrylates have been selected:

- Loctite 401**, very fast curing (curing speed nonsensitive and regardless of surface humidity) liquid instant bonder. Multi substrate adhesive, it is specially recommended for plastics, rubber and fabrics.
- Loctite 431**, higher viscous liquid version of Loctite 401, exhibiting a longer fixture time too.

-Testing procedure was as follows:

- 1) Half of the rubber pad protection specimens to be bonded with Loctite 401 and the other half with Loctite 431, making good pressure contact with the fabrics for some seconds (both the fabrics and the rubber pads were cleaned enough, so no prior cleaning process was required).
- 2) Leave the adhesives to cure completely for at least 24 hours.
- 3) Attempt to separate all rubber-fabrics adhesions by means of peel forces manually in order to

check if either a cohesive, adhesive or substrate failure takes place. Cohesive failure mode is always the best choice.

-Next photos show details of the Biker's fabrics areas where the rubber pads protections must be bonded:



Photos. 1 a 4: Details of the different Biker's fabrics models supplied by the Customer.

-Next, photos of the different rubber pads to fabrics adhesion details are shown:



Photo 5: Adhesion carried out with Loctite 401

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Photo 6: Adhesion carried out with Loctite 431

-It can be clearly noticed that both type of adhesions undergone with Loctite 401 and Loctite 431 show an outstanding bonding performance. With Loctite 401 the cohesive failure mode (part of the adhesive layer is strongly bonded to both substrates) is found. Same optimal situation happens with Loctite 431, where the adhesion removal even slightly breaks the biker's fabrics bonded area too.

-In addition, Loctite 431 exhibits longer working time and allows for a more consistent application on irregular and curved shapes and in vertical position due to its better sag resistance performance.

3. RESULTS.

-Both Loctite 401 and Loctite 431 are optimal adhesives for the Customer's application of bonding Biker's overalls fabrics to rubber protective pads. With the two bonders the optimal outcome of cohesive adhesive failure (that assures good and easy to get reliable adhesions) has been obtained.

-However, due to the soft and irregular shaped nature of the fabrics areas to be bonded and the adhesion themselves, it is recommended to use the highest viscous, better gap filling capability and sag resistance performance bonder of these two (in order the adhesive does not flow out of the adhesion area and better adapt to surfaces irregularities). **Thus, the best chance is Loctite 431.**

4. NOTE

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We strongly recommend not modifying the process, unless previous extensive tests are carried out to fully assess the effect of modifications in the performance of the products used. It is remarkably significant to test the impact of any variation of surface treatments, substrates involved (including any source change), product cure procedure, or any subsequent process that might take place.

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