

# Surface Preparation for Bonding

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## Surface Preparation for Bonding

### **There are Three Requirements for a good surface preparation**

- 1) It must allow the adhesive to wet the substrate surface**
- 2) It must enable the formation of bonds across the adherand and the adhesive or primer.**
- 3) It must form a stable interface**

## Surface Preparation for Bonding

# KEEP IN MIND

**A high quality adhesive will not excuse a poor surface preparation**

**A high quality surface preparation will not excuse poor quality adhesive**

# Anodizing Aluminum

**Anodizing is an Electrolytic Oxidation Process in which an Aluminum component is made Anodic in a cell containing an aqueous acidic solution and a metal cathode. When electric current is passed through the cell, the Aluminum surface is converted to an Aluminum Oxide coating which is integral with the aluminum substrate.**

# Surface Preparation for Bonding

## Surface Preparation

### Vapor Degreasing:

Vapor Degreasing is usually used for parts which have crevices or intricate surface detail which may be difficult to clean with a rag.

### Chemical Cleaning:

- Hot Alkaline Cleaning
- Pickling
- Etching

The difference between etching & pickling is a matter of severity. Pickling removes only the surface oxides and part of the underlying surface.

## Surface Treatment for Bonding

### Effect of substrate pretreatment on adhesive bonded joint Strength

<u>Adherend</u>	<u>Treatment</u>	<u>Adhesive</u>	<u>Shear Strength</u>
Aluminum	As Received	Epoxy	444 psi
	Vapor Degreased		837 psi
	Grit Blast		1751 psi
	Acid Etch		2756 psi
Stainless Steel	As Received	Vinyl Phenolic	5215 psi
	Degreased		6306 psi
	Acid etched		7056 psi

## Surface Treatment for Bonding

### Effect of substrate pretreatment on adhesive bonded joint Strength

<u>Adherend</u>	<u>Treatment</u>	<u>Adhesive</u>	<u>Shear Strength</u>
Cold Rolled Steel	As Received	Epoxy	2900 psi
	Vapor Degreased		2912 psi
	Grit Blast		4260 psi
	Acid Etch		4470 psi
Titanium	Acid etched	Epoxy	3183 psi
	Liq. pickle		3317 psi
	Hydroflourosilicic acid		4005 psi
	As Received	Vinyl phenolic	1356 psi
	Degreased		3180 psi
	Acid Etch		6743 psi

# Surface Preparation for Bonding

## Adhesion

**In order to obtain interaction between an adhesive and a substrate, it is necessary for the adhesive to wet the substrate.**



# Surface Preparation for Bonding

## Adhesion

**Adhesion will occur if the adhesive diffuses in the substrate and sets or cures while within the substrate.**