SURFACE CLEANING

Satisfactory wetting of surfaces to be bonded can only be achieved if they are made very clean prior to bonding. The presence of any grease or oil, including sebum from contact with fingers, is detrimental to the formation of a strong bond. In the presence of dirt, dust or rust, the adhesive will attach itself to it and not to the surface of the part to be bonded.

In the case of some metals used in a humid environment such as steel, the adhesive must be chosen to prevent the formation of rust under the adhesive film.

Several methods are available to achieve a satisfactory level of surface cleaning depending on the type of surface contaminant and the quality of the bond desired.

a. Mechanical

The surface is ground with sandpaper or with other abrasives (sand blasting). The dust formed must be thoroughly removed, ideally with hot water and detergent. Abrasion will increase the surface available to bonding. However, if the surface is too irregular the film thickness will increase, affecting the strength of the bond. Wood surfaces must be dry and plane and all debris should be removed.

b. Physical

Certain processes capable of forming reactive sites on difficult surfaces such as polyethylene plastic are only available industrially, such as corona/plasma discharge or gas-phase fluorination.

c. Primers

For some surfaces which are either highly porous or which require protection against rust a primer is useful. Application of the primer also requires careful cleaning.

d. Cleaning with solvents or water

Solvents are effective degreasers (particularly chlorinated solvents which are now becoming out of fashion due to toxicity concerns).

Acetone gives good results too, but must be used with caution due to its ability to dissolve certain plastics and paints for example. As seen previously, this property can be used to "weld" plastics using acetone as a dissolvent.

Alternatively, hot water with the addition of detergent (or soap) or pressurized water can be used. Vapor degreasing is used industrially.

e. Chemical

Certain chemicals are used industrially to etch the surface of materials, particularly metals to make them more receptive to wetting. Galvanized steel surfaces can be primed with phosphoric acid solutions while the hot sulfochromic mixture is useful for other metal surfaces to be cleaned as well as glass. Strongly alkaline solutions (15% sodium hydroxide in water) are also very effective in some cases. Due to the corrosivity of these chemicals, only trained personnel wearing adequate personal protective equipment should handle them in all safety.