

ADHESIVE BONDING (INTRODUCTION)

Adhesive bonding is a process of joining two or more solid parts with an adhesive substance.

- ☐ **Advantages of adhesive bonding**
- ☐ **Disadvantages of adhesive bonding**
- ☐ **Stages of adhesive bonding**
- ☐ **Applications of adhesive bonding**

Advantages of adhesive bonding

- ☐ Ability to join dissimilar materials;
- ☐ Fast and cheap joining technique;
- ☐ Provides design convenience and flexibility;
- ☐ Sealing properties (adhesive fills gaps and voids);
- ☐ Provides thin and invisible joint;
- ☐ Joints may be electrically/thermally conductive or insulating;
- ☐ Eliminates Galvanic corrosion;
- ☐ Good vibration damping properties;
- ☐ Uniform distribution of mechanical stress over the joint;
- ☐ Good Fatigue resistance.

Disadvantages of adhesive bonding

- ☐ Requires careful substrate (adherent) surface preparation;
- ☐ Long mixing and curing time may be required;
- ☐ Importance of right joint design;
- ☐ Difficult disassembly of joined parts;
- ☐ Necessity to fixture (hold together) the joined parts during curing;
- ☐ Service temperature and environment limitation;
- ☐ Low creep strength;
- ☐ Changing properties during service.

Stages of adhesive bonding

1. **Assembly and joint design.** Proper design provides minimal peel and cleavage stresses. Tension, compression and shear stresses may be increased.
2. **Adhesive selection.** Selection of a proper adhesive is based on the substrate material, service temperature and environment, requirements to the bonding strength, flexibility and durability.
3. **Surface preparation.** The substrate surfaces should be cleaned from dirt and oils, and then abraded. Clean and roughened surfaces provide good wetting of the adhesive, which results in strong adhesion.
4. **Applying and spreading a proper amount of the selected adhesive over the substrate surface.** The operation is performed either manually or by means of dispensing devices.
5. **Assembly of the parts to be joined.**
6. **Clamping the parts in a fixture at a controlled pressure.**
7. **Curing.** In the curing process the adhesive molecules are cross-linked forming a strong adhesive joint. Curing method depends on the adhesive type.

Applications of adhesive bonding

- Construction;
- Electronics;
- Telecommunications;
- Automotive industry;
- Furniture manufacture and other woodworks;
- Medical devices;
- Surgery (Bonding of tissues and bones);
- Textile industry;
- Package materials (stickers, stick tapes).

Source : http://www.substech.com/dokuwiki/doku.php?id=adhesive_bonding_introduction