

Adhesive Tips

Surface treatment

Primer chemical treatment

Primer chemical (bottom coating), smear a small amount of non-volatile, low viscosity liquid to improve the adhesion material surface's adhesiveness. The key point is to smear thinly. Smear the adhesion agent upon it when it is fully dried. Different bonding material decides the different type of primer chemical. Different types of adhesives, leak-proof agent also decide the premier chemical, so it is necessary to use the designated premier chemical. Besides the function to improve the adhesion, it also has multi-function such as the stability after the surface treatment, anti-corrosion and adhesion ability to prevent the metal surface from deterioration, and also prevent the degradation of the adhesion.

Mechanical treatment

Mechanical treatment means using the abrasive paper, abrasive cloth, wire brush, polishing, machine, sand blasting and other materials to grinding the surface of adhered material to improve its adhesion. If the surface is different from the internal, such as metal and weak acid substance layer, the surface of mold release agent and the deployment agents is adhere with plastic and rubber, due to wood surface's hydrophobicity it is not suitable for adhesiveness, we need to get rid of this surface and then bonding with the adhesive surface, which is the purpose of mechanical treatment. Bond the adhesive as soon as possible after the mechanical treatment.

Chemical treatment

Chemical treatment is to modify the surface which is hard to bond, and to achieve durable bonding by using agents on the surface to conduct treatment, it includes the chemical treatment to the plastics which is hard to bond, this has been explained in JISK6848, leaving it aside if it is in the experimental condition, but if it is in the actual scene it is considered to be not practical enough. However, to the metal light parts which is hard to get chemical treatment, to get high reliability adhesive effect it needs corresponding chemical treatment. To make the chemical treatment as a necessary process before bonding for the aircraft aluminum alloy and titanium alloy can ensure the durability of adhesion.

Physical treatment

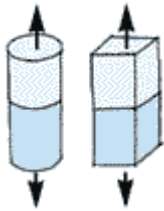
Mainly used for the surface modification of plastics

1. UV irradiation treatment
2. Corona discharge treatment
3. Plasma processing treatment

etc. Treatment 1 is using the short-wave ultraviolet of strong energy to processing, as different types of plastic have different UV absorption rate, so it is necessary to conduct confirmation. Treatment 2 is applying high-frequency and high voltage to the ground circle located between the fixed electrode and dielectric, thus to generate corona discharge through the plastic to conduct treatment, which is more widely used in handling plastic film and plastic sheeting. Treatment 3 is using gas in vacuum condition through the glow discharge to modify the surface. It is used by part of the industrial because of the processing devices limited.

Test Method

1. Adhesive tensile strength test JISK6849 (1994)



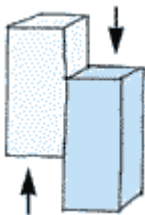
Vertical stretch load test on the adhesive surface

2. Stretchability shear stress strength test JISK6850 (1999)



Parallel shear stress load test on the adhesive surface

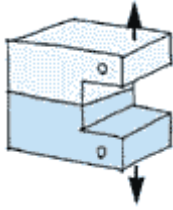
3. Compressibility shear bond strength test JISK6852 (1994)



Compress shear stress load test on the adhesive surface

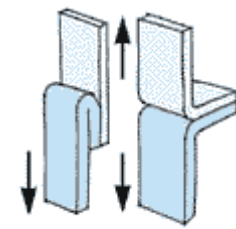
The Bonding material is wood, plastic, metal, and other inorganic plank.

4. Fragmented bond strength test JISK6853 (1994)



Fragmented load added at one end of experimental metal to test the adhesiveness strength.

5. Peeling adhesive strength test JISK6854 (1999)

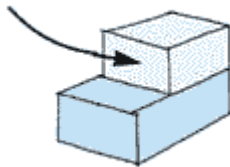


180° はく離 T形はく離

180 ° peel T-peel

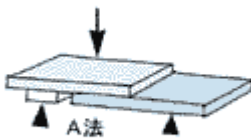
T-and 180-degree or floating and rolling peel treatment on using the test pieces of softness from the bonding material one side or both sides to test the bond strength

6. Impact bond strength test JISK6855 (1994)



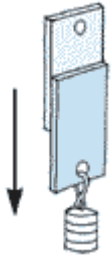
Use the impact testing machine to impact on the test pieces with adhesive surface on the parallel direction, and test the impact bond strength when the test piece is broken.

7. Bending bond strength test JISK6856 (1994)



This method is suitable for the bending of the adhesive bond strength, which means exerting stress on the bonding surface from the right angle, it include the A and B method.

8. Creep property destructive test JISK6859 (1994)



Add static load to one end of the bond test piece under certain temperature to test the creep destructive property (or dislocation property) of the test adhesive. The temperature, static load is different according to different test condition

Adhesion section design

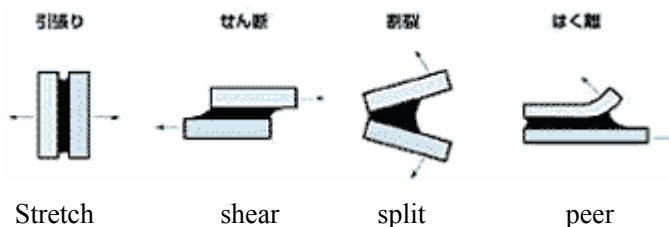
1. Stress dispersion

Bonding layer formed during the adhesive process would generate all kinds of stress under normal circumstances. Therefore the most satisfactory part of the adhesion section design is, "to make the stress distribute equally on the largest possible area." This is also basic method of dispersing the stress and to exert the advantages of adhesive's joint design surface bonding most effectively.

1. Should minimize the stress exert on the joint
2. Should exert the stress on the direction of adhesive maximum strength (shear, stretch).
3. Should minimize the stress exert on the adhesive minimum strength (peel).
4. Adhesive area should try to maximize.
5. Should maintain the continuity of adhesive layer. (Elimination of shortcomings section)

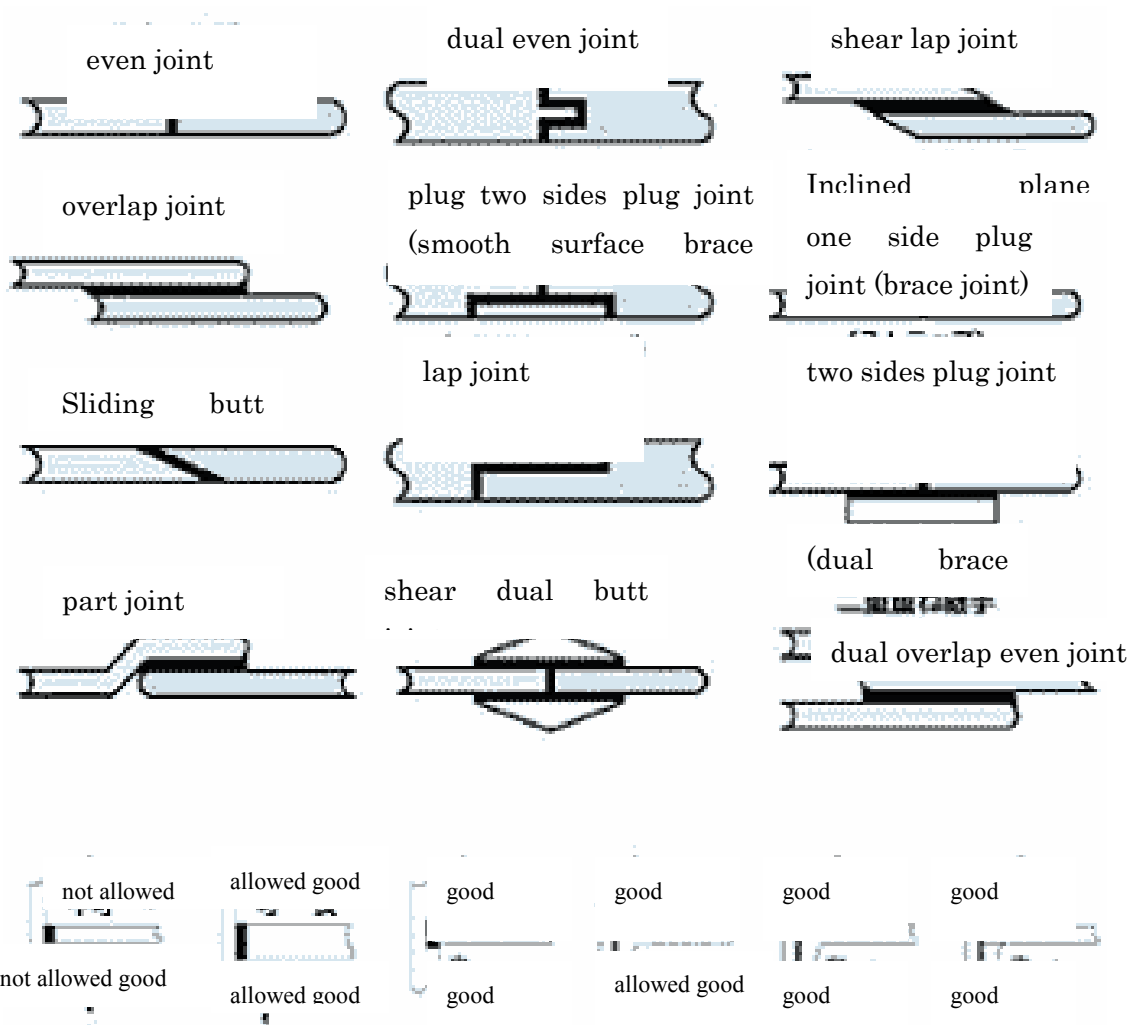
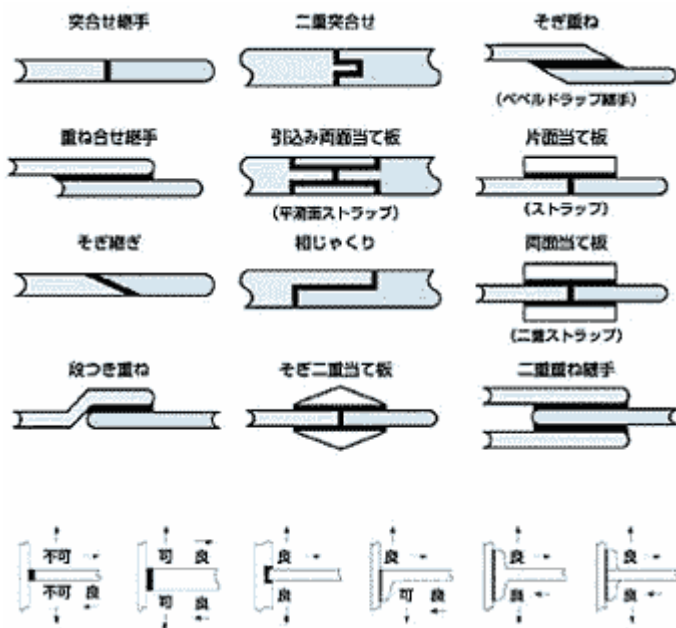
2. Basic form of joint section imposed stress

The basic form of the stress on the adhesive layer is shown below as stretch, shear, split, peel. Among the four basic forms, stretch and shear are the forms that its adhesive surface receive the same stress to show the joint section. However, the split and peer are the forms that the stress is exerted on one end or exerted more on the end to show the incomplete joint section design.



3. Conjugation Design

Conjugation Design shown below has been widely put into practical use.



4. Instructions on design

- As for the extremely complexity of the machining on the joint part, and if pad need extra material, then it will lose lightweight adhesion advantages, so to get the effective practical use, the adhesive joint design can be used through different purpose.
 - For the purpose of bonding adhesive, if it is not solid enough when use alone, the adhesive and mechanical joints can be used together to avoid the use of adhesives alone in vain.
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International units (adhesive related)

The SI units

- abbreviation for international unit sequence (Système International d'Unités in French)
- with the expansion and development of the 11th GGPM in 1960, it decides and advises to use “principle of a unit one volume, excellent integration of SI units”
- already implement in Europe, was launched in Japan in November 1993.

What kind of unit

- mainly for strength and stress and use Newton as a unit; Stress, pressure, while viscosity use Pascal units; energy, heat use Joule units.

The name of these units is based on the scientists who discover and propose the relationships law, which is intended to celebrate the great achievements of the scientists.

What kind of change comes to adhesives unit?

- bond strength (example)

1kgf/cm² → 0.098MPa or 0.098N/mm²

- peel adhesion strength (example)

1kg/25mm → 0.39N/mm

- Viscosity (example)

10P → 1Pa · s

1cP → 1mPa · s