

Sandblast and Oxidation



Sandblast

1. Sandblasting: There are mainly two kinds of metallic grit and glass grit/sand. (The difference between them: The cost of former is higher, the sand is sprayed to the surface slowly, which makes a better metallic sense on the surface; while the cost of glass sand is lower. And it is easier to deal with a higher production efficiency)

2. Sand usually includes the following models: 60 #, 80 #, 100 #, 120 #, 150 #, 180 #, 220 # (Notes: The larger the model is, the finer the sand is. For example, iPhone's aluminum frames' sand is 220 #)

3. Types of sandblasting machines

There are two types commonly used: manual sandblasting machine and automatic sandblasting machine; (Manual sandblasting machine is suitable for small batch, small and medium-sized products as well as irregular products. It is quickly prepared and easy to be operated.

Automatic sandblasting machine is for bulk and large products, because it has advantages in efficiency and sandblast is evenly sprayed on the surface)

4. Common sandblast problems:

1). Sandblasting is not evenly sprayed (It is mainly about inconsistent thickness of sandblasting on the surface, which is caused by operator).

2). Sandblast deformation (mainly affected by product shape and structure. One important thing, the local thickness of one product is generally required to be larger than 0.5mm, which could ensure that sandblasting does not get deformed.

While it is a flat piece/plate, the products' thickness is generally required greater than 1mm, and to be double-sided sandblasting to avoid its deformation problems.

3). Pinholes formed for infiltration of different sand.

That is because the surface is mixed with different sand, such as: sandblasting 150 # ago, incompletely cleaned off, when changing the sand for another product with 80 # sand.

4). Sandblasting fingerprints (It is mainly for products which is required to matte oxidation subsequently.

The operator's gloves are dotted with oil, or the fingerprint is printed on the sandblast finish, which will be visible after oxidation.

The measures: To wear clean/new gloves in the process of sandblasting.

Oxidation

1. Oxidation process is as follows:

One with sandblast(sand product) and the other without sandblast (glossy product)

A. Sandblasting products:

- 1) Alkali washing (removal of surface oil, dirt).
- 2) Water washing.
- 3) Neutralization reaction between salt and alkali.
- 4) Water washing again.
- 5) Chemical polishing (It is mainly to improve the surface brightness, if the nature product is bright, this step could be omitted.
- 6) Water washing for the 3rd time.
- 7) Neutralization reaction between salt and alkali.
- 8) Water washing for the 4th time.
- 9) Oxidation in the pool.(Notes: The period is determined by the required finish color.

For example, it costs 10~12 minutes to have the part nature oxidated, while about 50 minutes to be black oxidation. That's to say, it costs more time on oxidation, when the finish is required to be darker.
- 10) Water washing for the 5th time.
- 11) Dying.(Notes: Considering the different color and period of anodize, we divided dying into 2 types: One is opening a new/dedicated anodize pool for the specified color, which is easier to control the color congruously, but its cost is much higher. The other is being tinted, which gets through two or more different color pools. Then the color is not so easily controlled, that might cause chromatic aberration.
- 12) Water washing for the 6th time.
- 13) Closing (ie : closing oxidation film micro-holes to improve product surface's corrosion resistance, wear resistance, insulation, and oxidation color is not easy to fade) .
- 14) Water washing for the 7th time.
- 15) Drying in the oven or by an air pressure gun.
- 16) Hanging down and packaging for inspection.

2.Common issues in oxidation

1). Material selection:

Oxidation of 6 aluminum series/5 series is easily controlled (eg: AL6061, AL6063, AL5052, etc.).

Oxidation of 7 aluminum series/2 series is not easily controlled. When doing color oxidation on both series, the surface might be spotted, which won't make a good appearance. But black oxidation is still good both series, because the color is dark so that the spot is so visible.

2).Racks selection:

Titanium hanger or aluminum hanger is often used; and both are often available in the oxidation plant/factory. But for some parts with special structures, a kind of dedicated rack might be ordered in advance. Only in this way, oxidation of production could be facilitated, meanwhile the quality could be controlled. And the period for custom-made special racks is generally 3-5 days.

3). About oxidation brightness and its color:

When the brightness for pre-treatment is not accurate, it is not easy to get the required color during its subsequent dyeing. Therefore during the period of pre-treatment for brightness, we'd better keep one prototype and match the color of the prototype, which could meet the color consistent subsequently.

4) Blind holes' acid regurgitation and whitening: The main reason is that the waste water in the pre-treatment process is not cleaned off and acid water is still in the blind hole. When the acid water flows out after the anodic oxidation, which destroys the surface's oxide film and results in whitening.

5).Notes about oven baking: We suggest that parts for color oxidation shall not be baked, but dried naturally or dried by an air pressure gun to avoid color change in the oven; Also it is better not have the products with more blind holes baked into the oven. That would avoid the outflow of acid water in the blind holes to destroy the oxide film and whiten at edge of these holes.

3.About the thickness of anodize layer

Hard oxidation

1).Black/natural hard oxidation for general brightness without sandblasting (Its film thickness is 25-30UM, size change: aperture and inner shape size will get smaller about 0.01-0.015MM), unilateral size will be larger 0.01-0.015MM ;

Namely: The size change is about half of the film thickness (unilateral)

Sandblasting + matte black / natural hard oxidation (such as: its film thickness is 25-30UM, size change: aperture and internal size will get unilaterally smaller 0.008-0.012MM), dimensions of external shape will be unilaterally larger about 0.008-

0.012MM;

Namely: the size change is about 2/5 of the film thickness (unilateral)

2) Sandblasting + bright black / natural hard oxidation (eg: When its film thickness is 25-30UM, its size change depends on the surface brightness.

A. Aperture and inner dimensions will get unilaterally smaller, 0.005-0.010MM, and unilateral dimensions will get larger, about 0.005-0.010MM;

B. The size doesn't change;

C. Size changes: The inner hole becomes larger, while the external shape becomes smaller;

De-oxygenation:

When the film thickness of hard oxygen is 35-40UM, its size change after de-oxygenation is about 0.06-0.09MM; (When the products have precision holes, the holes could be plugged)

When the film thickness of hard oxygen is 25-30UM, de-oxygenation size change is 0.03-0.05MM; (When the products have precision holes, the holes could be plugged)

Common black oxygen products, the size of the oxygen evolution changes within 0.01-0.03MM; (When the products have precision holes, it is suggested to be hard oxidation later to get the original size)

- 1) Film thickness of common black and hard oxygen (not specifically required): 25-30UM;
- 2) Nature oxidation: film thickness is 3-5UM;
- 3) Black oxidation: 15-18UM;
- 4) Color oxidation:
(For example: Gold oxidation: its film thickness is 5UM-8UM, red oxidation and blue oxidation: its film thickness is 12-15UM;) Namely: the lighter the color is, the thinner the film thickness is, and vice versa.)

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April of 2018

