

Frame Coating Repair for the SBE 32 Carousel Water Sampler

Background

The SBE 32 Carousel's frame is aluminum. The frame components are coated with Plascoat® PPA 571ES, a polymer alloy coating manufactured by Plascoat Systems Limited. PPA 571ES is a thermoplastic coating powder, which melts to form a fusion-bonded coating. PPA 571ES is unlike the thermosetting power paints normally associated with the powdercoat process, as it does not undergo chemical cross-linking during the curing process.

Damage to the coating such as chips and scrapes can lead to corrosion of the frame. Additionally, use of the Carousel for trace metal analysis of water samples requires that the aluminum frame be completely encapsulated. The best method for repairing damage to the frame coating is to have the part(s) stripped and recoated. However, this is not always practical; this application note provides a method for repairing frames in the field, using the PPA 571ES powder.

Notes:

- While other paints and materials *may* be used to make cosmetic repairs to the frame parts, they are not likely to completely adhere to the existing PPA 571ES coating, and may allow water to penetrate, leading to corrosion of the aluminum frame. In addition, most other coating products do not have the elasticity of the PPA 571ES, and are likely to crack and flake when exposed to sea pressure; again, this will allow water penetration, leading to corrosion of the aluminum frame.
- See Plascoat's website for the most up-to-date specifications—
https://www.axalta.com/thermoplasticcoatings_global/en_GB/products/plascoat/ppa-571-range.html

Repairing Small Chips and Scrapes

This repair procedure applies only to small areas of damage, where the coating has been *pushed* away from the surface rather than scraped off of the surface. For example, a small gouge caused by a tool or a small nick can be repaired using this technique.

If there are multiple gouges or nicks on a part, consider carefully removing the material around the gouges/nicks and following the instructions for repairing larger damaged areas. It may be easier to repair one large area than to repair many small ones.

Recommended Tools and Supplies

- Soldering iron with clean tip, preferably un-tinned (electric or propane)
- Heat gun, high temperature (648 °C recommended); typically available at industrial supply shops
- Cellulose thinner or white spirit, for degreasing

Procedure

1. Clean the area of any salt residue.
2. Clean/degrease the exposed metal using a cellulose thinner or white spirit.
3. Heat the outside edges of the damage, using direct contact with the tip of the **soldering iron**. Use the tip of the soldering iron to push the plastic material back together.
4. Once the material has been pushed together, smooth the material with the **heat gun**. Aim the heat gun directly at the repair until enough heat is built up to allow the repaired material to flow and smooth out. This will take quite some time, due to the large thermal mass of the frame parts (in tests at Sea-Bird, it took approximately 5 minutes to heat the part sufficiently for the material to flow and smooth out).

Repairing Larger Scrapes

This procedure applies to larger areas of damage, where the coating has been severely scraped and removed from the part (see photo below).

Recommended Tools and Supplies

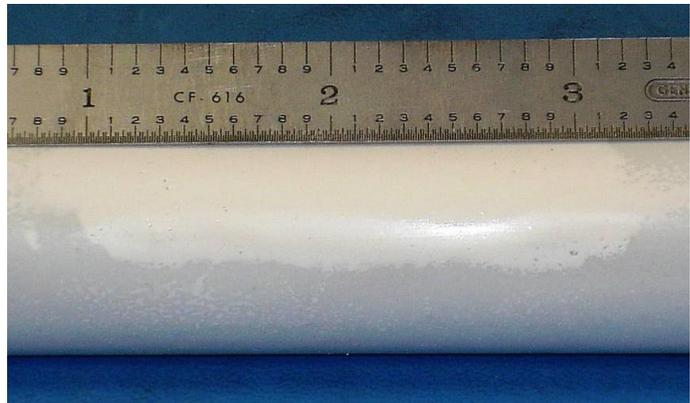
- Heat gun, high temperature (648 °C recommended); typically available at industrial supply shops
- Propane torch (for extremely large areas)
- Infrared thermometer, to determine temperature of repair area; typically available at industrial supply shops
- Metal file, for removing loose coating
- Sandpaper, non-metallic, varying grits, for removing loose coating and sharp edges, and smoothing new coating
- Cellulose thinner or white spirit, for degreasing
- Plascoat® PPA 571ES powder; available from Sea-Bird in part number 50439 (Carousel Frame Powder Kit), which contains 100 grams of the powder in a small container. *The example repair shown in the photos below used approximately 5 grams of the powder.*
- Small flour sifter, for evenly dispersing powder onto the metal surface

Procedure

1. Completely remove all loose coating material from the area to be repaired, using a metal file or sandpaper.
2. Sand any burrs or gouges in the aluminum to remove sharp edges.
3. Clean and degrease the exposed metal with a cellulose thinner or white spirit.
4. Heat the exposed metal using a heat gun or propane torch. **Do not allow a direct flame to contact the undamaged coating material;** direct contact will damage and discolor the material. Use the IR thermometer to monitor the temperature; a minimum temperature of 150 °C is required for the powder to adhere to the part. (In tests at Sea-Bird, it took approximately 15 minutes to heat the part to 150 °C with a heat gun).
5. Once the part has reached the required temperature, carefully apply the PPA 571ES powder to the part. Sprinkle the powder on evenly, in thin coats, using a small flour sifter. It is important to build the repair slowly, with thin coats of powder. Continue to maintain the heat on the part to allow the material to flow evenly. When enough powder has been added to fill in the damaged area, allow the part to cool.
6. When cool, the new coating can be treated further to improve the appearance of the repair, if desired (these steps improve the appearance of the repair, but are **not required**):
 - A. To match the contour of the surrounding coating, sand the new coating.
 - B. To restore the *gloss* to the coating, heat the repaired and sanded area with the heat gun.



Coating scraped from frame part;
damaged area approximately
2 inches (5 cm) long



Repaired frame part.
Repair has been sanded and had heat applied to
restore *gloss* finish (steps 6A and 6B).