



World Class Cleaning Solutions

CASE STUDY

International Airframe Parts Maker Supplier to major Airframe OEMs

Customer Details:

Product: AquaVantage 815GD-NF*

*Customer originally used AquaVantage 815GD until local government registry restricted the NPE (nonylphenol ethoxylate) surfactant ingredient. AquaVantage 815 GD-NF (the NPE-free equivalent to AquaVantage 815GD) was then validated as the detergent of choice.

Prior History: Before cleaning with aqueous media the user did Vapor Degreasing with TCE.

Parts Cleaned: Multiple parts, 2024 AI airframe fuselage skin panels, fairings, winglets, as well as other airframe parts.

Removing: Processing and machining oils, particulate and process debris, corrosion inhibitor oils.

Why: "In process" cleaning of parts at the end of a manufacturing process prior to de-ox and anodizing.

Washing Process:

Immersion with air sparging:

1. Aqueous Degreasing with AquaVantage 815 GD-NF
 - Wash tank ~ 8500 gallons (~32,000L)
 - No oil skimming
 - Particulate filtration
 - Wash temperature controlled at 60-70°C (140-158°F)
 - Agitation: air sparging
2. Rinses
 - 1st immersion rinse 50°C (122°F)
 - 2nd spray rinse (ambient)
3. Alkaline Cleaning
4. Rinse
5. Deoxidizing
6. Surface treatments including Anodizing

Customer Tank Maintenance Procedure for 815GD/815GD-NF:

- Monitoring of tank condition via pH measurement and alkalinity titration done weekly.
- Concentration controlled at 12% ± 2%. Maintenance logs show very tight adherence within control limits.
- pH controlled within 9.6 – 10.4 (Initial pH will be higher than the control range; once the initial pH drops below 10.4, the limits should be maintained between 9.6 and 10.4). Maintenance logs show very tight adherence within control limits. Customer used a special pH monitoring and maintenance protocol developed by BHC for airframe manufacturers seeking to extend bath life in very large tanks.
- Bath life: Tank was used and maintained without full replacement of the detergent solution for 8 years, which is extraordinarily long for an aqueous cleaning bath.
- BHC recommended to consider replacement of the bath or to increase monitoring at 6 years due to reduced levels of in-process corrosion inhibitor. Customer was able to maintain tank within limits and achieve good results in both cleaning and corrosion control for 2 more years.
- Regular testing of 2024 coupons to detect and evaluate corrosion helped to predict eventual end of bath life.

Potential Process Adjustments

- Recommended a replacement of the existing air agitation system. Air agitation undoubtedly has taxed the bath life by all the mechanisms of introducing CO₂ as documented in BHC's white paper on this topic (shown at bhcinc.com/our-markets/industrial/immersion-tank-program/). As discussed in the publication, under-surface turbulence would result in more effective agitation for cleaning performance, as well as eliminate the accelerated formation of carbonic acid. Nonetheless, the appropriate maintenance of the bath permitted extremely long tank life.
- Adding oil skimming or coalescing would increase cleaning effectiveness by removing a portion of the soil load.

Comments

- A tank life of 8 years is extraordinarily long. The eventual decision to dump a very large tank (8500 gallons) has significant cost implications that must be weighed against the value of the parts being cleaned. Brulin/BHC is able to support customers weighing these options.
- This tank life was achieved both by diligent process control by the customer, and by utilizing BHC support in evaluating tank condition.