

# Three-metal blackening challenge solved.

## The Challenge

The ‘more the merrier’ may be a better solution for a lot of situations, but when it comes to blackening parts, it can sometimes lead to trouble. That was the case for a manufacturer of sound reduction products for the firearms industry that was needing a part blackened that was comprised of three separate metals. When issues arose in getting a consistent finish on the part, the manufacturer called in Hubbard-Hall to see what they could do in helping blacken the part to a finish that met and exceeded expectations.

## The Approach

Hubbard-Hall teams were also working with the manufacturer in solving a cleaning issue that was leaving a white haze on the stainless steel parts after vapor degreasing. The water-based cutting fluid was causing the haze effect, which created an issue because



## Executive Summary

**A manufacturer needed to blacken a part made from three welded substrates.**

- **Aquease PL** recommended for to solve a white haze effect
- Testing done to blacken part included Cobalt 6, Inconel, and 17-4 Stainless Steel
- **Black-Magic RT SS4** used to provide deep and consistent black finish

the parts needed to subsequently be welded and could have no residue on them. After Hubbard-Hall solved that issue by installing an aqueous cleaning line with its **Aquaease PL** product, the team began testing the parts with its **Black-Magic** line of blackening chemistry to find the right combination for the three types of metal that was being finished: Cobalt 6, Inconel, and 17-4 Stainless Steel.

## The Outcome

The Cobalt 6, Inconel, and 17-4 Stainless Steel substrates presented a challenge for the Hubbard-Hall team in developing the right chemistry that would work on all three substrates. Most parts that are 17-4 can be easily blackened, but the Cobalt 6 and Inconel in the welded part created significant research at Hubbard-Hall's Inman, South Carolina lab, where parts were tested to see how closely they met specifications. **Black-Magic SS C** was initially tested at mid temp 255°F, followed by **Black-Magic RT S20** at room temp, and then **Black-Magic RT S30** also at room temp, but none produced a consistent and deep black among all substrates that were satisfactory to the Hubbard-Hall team. Additional testing was done and resulted in a deep and consistent black with **Black-Magic SS4** at room temp using the following process:

1. Parts are cleaned in **Aquaease PL 918** made up at 10% by volume and heated to 160°F for 5 minutes.
2. Cool, clean water rinse.
3. Parts are immersed in a solution of 50% muriatic acid for 90 seconds.
4. Cool, clean water rinse.
5. Parts are immersed in **Black-Magic RT SS4** made up at 50% by volume for 30 seconds.
6. Cool, clean water rinse.
7. Parts are immersed in **Metal Guard 500** for 30 seconds.
8. Parts are air-dried.

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“Hubbard-Hall stayed focused on finding us a solution.

I was impressed with their determination and communication to our team.”

**Tech Manager**

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