Copper Sulphate Passivation Verification Test (for Brewery Stainless Tanks)

1. Confirm tank material and test area

   Setup

   Make sure the tank alloy and surface are suitable for copper sulfate testing.
   Verify the tank is 304 or 316 stainless steel (typical brewery alloys).
   Choose a small, representative area: near welds, manways, outlet ports, and any previously rusted spots.
   Avoid painted, coated, or plastic components.
   Ensure the tank is drained, cleaned, and dry before testing.

2. Prepare the copper sulfate test solution

   Use a standard copper sulphate solution suitable for free-iron detection on stainless steel.

   Typical solution (per ASTM practice):
   ABI **Copper Sulphate Passivation Kit – 60 ml Dropper Bottle Solution**

   Shake the 60 ml Dropper Bottle Solution of Copper Sulphate Passivation Kit.
   Wear gloves, goggles, and apron.
   Keep away from product-contact surfaces except test areas and rinse thoroughly afterward.

3. Apply solution to stainless test area

   Expose the stainless surface to the solution for a controlled time to reveal free iron.
   Wet a small pad or swab with the copper sulfate solution.
   Apply to the selected stainless area, ensuring full wetting of the surface.
   Maintain contact for about 6 minutes without drying.
   Avoid dripping onto floors or adjacent equipment; contain any runoff.

4. Inspect for copper deposition

   Check whether copper has plated onto the surface, indicating free iron and poor passivation.
   After contact time, gently rinse with water and visually inspect.
   Pass (no free iron): No visible copper-colored film or plating; surface looks unchanged.
   Fail (free iron present): Brown/penny-colored copper deposit or staining on the test area.
   Record location, date, and result for each test point.

5. Rinse and restore food-contact condition

   Remove all test solution and residues from the tank to maintain hygienic conditions.
   Thoroughly rinse the tested area with potable water until no blue tint or residue remains.
   If testing inside a tank, follow with a full CIP rinse cycle before returning to service.
   Dispose of spent solution according to local regulations for copper-containing waste.
   Confirm no residual solution remains on gaskets, seals, or product-contact surfaces.

6. Act on results: pass or re-passivate

   Use the test outcome to decide whether the tank needs passivation or just routine cleaning.
   If all test points pass: Document results and continue normal operation.
   If any area fails: Schedule chemical passivation (citric or nitric-based) for the tank or affected section.
   After passivation, repeat the copper sulfate test on the same locations to confirm improvement.
   Keep records as part of your maintenance and quality program.

Suggested maintenance and verification schedule for breweries

New tanks (commissioning):
Test once after initial cleaning and passivation, before putting into production.
Document as part of installation QA.

Routine operation (normal breweries):
Annual copper sulfate verification on a few critical points per tank: welds, manways, outlet ports, and any historically problematic areas.

Increase to every 6 months for high-use tanks or aggressive CIP regimes.

After major events:

Re-test any tank that has had:

Weld repairs or grinding
Heavy mechanical cleaning or abrasive pad use
Visible rust, pitting, or discoloration

If failures are found, perform full passivation, then re-test.

Record keeping:

Keep a simple log: **date, tank ID, locations tested, pass/fail, and follow-up actions**.

This becomes part of your **preventive maintenance and quality assurance** story—especially useful for audits or when selling the brewery's reliability to investors or partners.