**CHECKLIST FOR BLACK OXIDE COATING IAW MIL-DTL-13924D, Class 4**

1. Identify the drawing; specification or document that invokes the requirements for black oxide coating. Specify:
2. Do the acquisition documents specify the number of samples to be used for lot testing? If not, file a Contract Deficiency Report (CDR) in EDA for a contract modification to include this information. NOTE: Most of the lot tests are nondestructive, but it should be conveyed to the Procurement Contracting Officer that the 96 hour salt spray test for 300-series stainless parts is destructive.
3. Does the supplier have written processing instructions?

Identify procedure number and revision:

1. Are cleaning solutions analyzed and adjusted to maintain them within established parameters?

Are records of these analyzes and adjustments maintained?

Are the cleaning baths at the proper temperature, and are the temperature regulators calibrated?

1. Does the cleaning process utilized effectively remove all soils from the parts as evidenced by a water-break free surface (water from the final rinse in the cleaning cycle flows freely down the surface of the parts without breaks)?
2. Is the black oxiding bath maintained within the specified operating temperature (typically 250 -265F, or as otherwise specified by the manufacturer of the black oxiding salts – see manufacturer’s technical data sheet)?

Is the temperature regulator for the black oxiding bath calibrated?

Are parts black oxided within the specified time limits noted in the supplier’s processing instruction (should be 15 – 30 minutes, or as otherwise specified by the manufacturer of the black oxiding salts – see manufacturer’s technical data sheet)?

1. A lot is defined as a maximum of 8 hours continuous production consisting of parts of the same class, same basis metal, and approximately the same size and shape, coated under similar conditions. Is the following lot testing performed and properly documented:
2. Coverage and color (3.7)
3. Workmanship (3.12)
4. Visual inspection at 10X magnification for surface attack (4.3.1)
5. Smut test (4.4.1)
6. Salt spray test of 300-series stainless only (4.4.3)
7. Is the supplementary preservative treatment material in accordance with contractual requirements?

Is the preservative material used listed in the Qualified Products List, when applicable, for the specification called out in contractual documents?

Is the preservative material applied in accordance with the manufacturer’s technical data sheet?

*Note: Black oxide coatings should produce no appreciable dimensional change of the treated piece. The dimensions shown on the drawings are, therefore, the dimensions before and after application of the coatings. (6.3.1)*

When 300-series stainless steel has been black oxided to Class 4 of MIL-DTL-13924D, a 5% salt spray test for 96 hours is required prior to application of any supplementary preservative. Below are the operating and control parameters for this test (ref. ASTM B117-09).

1. Does the supplier have a documented procedure for salt spray testing?

Identify procedure number and revision:

2. Does the procedure specify that the reagent water must meet the requirements of ASTM D1193 Type IV?

Is objective evidence available to substantiate water conformance to ASTM D1193 Type IV?

3. Does the procedure specify that the salt must be a minimum of 99.7% pure, with a halide content (bromide, fluoride and iodide) of less than 0.1%; a copper content of less than 0.3 ppm; and no anti-caking agents added?

Is objective evidence available to substantiate salt purity requirements?

4. Does the procedure describe solution preparation (4-6 parts by mass of NaCl in 95 parts H2O), and pH adjustment and measurement?

5. Are test specimens supported or suspended between 15 to 30 degrees from vertical, and placed to permit unencumbered exposure to the salt fog? *Note: The spray from the chamber nozzle(s) should not impinge directly upon the test specimens, however.*

6. Is the compressed air supply to the air saturation tower passed through suitable filters to ensure it is free of grease, oil, dirt?

7. Is the temperature in the chamber exposure zone during test maintained at 92-98⁰ F?

 *Note: Temperature readings must be taken with the chamber cover closed.*

8. Is the chamber temperature recorded at least once per day during test (excluding weekends and holidays)?

9. Are at least two fog collectors per atomizer tower placed within the chamber during test?

 Are the collectors located in proximity to the test specimens, but positioned so that no drops of solution from the test specimens (or any other source) fall from them into the collector?

Is one collector positioned nearest to any nozzle, and the other farthest from all nozzles?



*Note: Above is a typical fog collector. The fog concentration in the chamber shall be such that for each 80 cm2 (10 cm diameter) of horizontal collecting area, there will be from 1.0 to 2.0 ml of solution per hour collected based on an average run of at least 16 hours.*

10. Are daily records of the following information available for review:

1. Chamber temperature readings (92-98⁰ F)?
2. Volume of salt solution collected from each (individually) fog collecting device in ml/hr (requirement is 1.0 - 2.0 ml/hr)?
3. Concentration or specific gravity of collected solution and the temperature of that solution when measured (may be a composite from multiple fog collectors for this test)?
4. pH of collected solution at 68 - 78⁰ F (may be a composite from multiple fog collectors for this test)? *Requirement is a pH range of 6.5 to 7.2.*

11. Is the following information (log) also available for review:

1. The type of water and salt used in preparing the salt solution?
2. Description of part, or type and dimensions of test specimen, tested?
3. Method of cleaning specimens before and after testing?
4. Method used to support or suspend specimens in the chamber?
5. Description (including location) of any masking used on the test specimens *(ref. ASTM B117-90, paragraph 6.5)*?
6. Exposure period?
7. Interruptions in exposure, the cause, and the length of time?
8. The angle at which the specimen is positioned?
9. Results of all tests?