

Black Oxide

Common Names: Blackening, Black Oxide

Applicable Specifications: Federal Specification Mil-DTL-13924 and SAE-AMS2485

Description: Black Oxide is a process for producing an adherent black finish on steel and iron parts. This film is most often used to provide a uniform black color on steel parts or as a carrier for an oil film which provides limited corrosion protection. At Palmetto Plating Co., Inc., we utilize the so-called "hot process." This process produces by simple immersion a uniform black coating of ferro-ferric oxide.

Black oxide should be used for indoor use or limited exposure to corrosive conditions.

Function & Physical Finish: The primary purpose of black oxide coatings is to provide an attractive uniform color to steel or iron parts. The coating has almost no thickness, being only 0.00006" to 0.0001" thick, and is not porous. It withstands severe deformation without flaking. After the black oxide coating is formed, the part is still essentially iron or steel and as such, is subject to further oxidation which will result in red rust. To prevent this, it is necessary to maintain a coating of protective oil.

Examples of Use: Machine tool components, bearing races, hardware.

Considerations & Limitations:

- Base Material: Steel, Tool Steel, some Iron Alloys.
- Shape of parts: Unlimited except that blind cavities or holes may require a subsequent repeat after repositioning to ensure adequate coverage. Assemblies are not recommended because of the potential for the caustic solution being trapped.
- Size: Parts up to 30 inches by 30 inches by 30 inches. Maximum weight 1000 lbs.
- Quantity: Although quantity affects price, quantity is not a limiting factor. Price is determined by how many parts can be processed in an hour.
- Thickness of Finish: N/A
- Masking: Can be used to protect critical machined dimensions. Due to the high temperature (~ 285°F) of the process, masking is difficult.
- Heat Treatment: Generally has no effect although heat treated parts may not develop a deep black color. Some tool steels, including those which have been nitrided, may not accept the coating. Blackening of Stainless Steels is a different process which we do not do.
- Method of Processing: Parts must be racked, barrel or basket processed. They are exposed to a caustic solution at 285°F.
- Pre-Treatment: Parts must be free of scale and clean and free from oil, grease and tape residue. Parts must be "chemically" clean prior to processing. Normal processing includes caustic soak, and an acid pickle. Sometimes abrasive blasting or mechanical finishing is required for a more uniform surface finish.
- Post Treatment: A protective oil (water displacing is recommended) is required to prevent rusting.
- Packaging: **Parts are repacked as received.** It is often necessary to wrap parts with paper to prevent scratching. This will be done at the customer's request.

Quality Control Process solutions are checked and analyzed following an established schedule and monitored using SPC techniques.