

What is black oxide and how is it applied? by Brian Kleszyk - Applications Engineer RBI-USA

When parts undergo a black oxide treatment, the result is jet black color, commonly seen in firearms. A black oxide treatment is different than other surface coating or plating processes in that it is chemical surface treatment. The process can be applied to a variety of ferrous metals and alloys as well as copper, brass, and bronze.

There is both a hot and cold black oxide process. At elevated temperatures, the hot process uses various chemical mixtures that consist of caustic sodas, oxidizing salts, and other agents, which can vary from vendor to vendor. This mixture then chemically reacts with the iron on the surface of the part, converting it to the black oxide of iron. The volume of this new black oxide of iron is the same as the original iron. The hot blackening process is very hazardous, and must be performed with extreme caution due to the high heat required and caustic nature of the mixture.

Cold blackening process uses a different chemical mixture and does not require elevated temperatures. Because of this, the cold blackening process is not as hazardous. Although the chemical reaction in cold blackening results in the same black surface appearance, it is typically not as effective or as permanent as the surface finish resulting from a hot blackening process.

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