

Title (en)  
Non-chromated cobalt conversion coating

Title (de)  
Chromatfreier Kobalt-Konversionsüberzug

Title (fr)  
Revêtement de conversion au cobalt, sans chromate

Publication  
**EP 0488430 B1 19970611 (EN)**

Application  
**EP 91202181 A 19910827**

Priority  
US 62113290 A 19901130

Abstract (en)  
[origin: EP0488430A2] (A.) A process for forming a cobalt conversion coating on a metal substrate, thereby imparting corrosion resistance and paint adhesion properties. The invention was developed as a replacement for the prior art chromic acid process. The process includes the steps of: (a) providing a cobalt conversion solution comprising an aqueous solution having a pH of about 7.0 to 7.2 and containing a soluble cobalt-III hexacoordinated complex, the concentration of the cobalt-III hexacoordinated complex being from about 0.1 mole per gallon of solution to the saturation limit of the cobalt-III hexacoordinated complex; and (b) contacting the substrate with the solution for a sufficient amount of time, whereby the cobalt conversion coating is formed. The substrate may be aluminum or aluminum alloy, as well as magnesium and its alloys, Cd plated substrates, and Zn plated substrates. The cobalt-III hexacoordinated complex may be present in the form of  $\text{Me}_3[\text{Co}(\text{NO}_2)_6]$  wherein Me is one or more of Na, K, and Li. (B.) A chemical conversion coating solution for producing the cobalt conversion coating on a metal substrate, the solution being an aqueous solution having a pH of about 7.0 to 7.2 and containing a soluble cobalt-III hexacoordinated complex, the concentration of the cobalt-III hexacoordinated complex being from about 0.1 mole per gallon of solution to the saturation limit of the cobalt-III hexacoordinated complex. The cobalt conversion solution may be prepared by a bath makeup sequence including the steps of: (a) dissolving a metal nitrite salt; (b) dissolving an accelerator such as NaI; (c) dissolving a cobalt-II salt; and (d) then adding an oxidizer such as  $\text{H}_2\text{O}_2$ . (C.) A coated article exhibiting corrosion resistance and paint adhesion properties, the article including: (a) a metal substrate; and (b) a cobalt conversion coating formed on the substrate, the cobalt conversion coating including aluminum oxide  $\text{Al}_2\text{O}_3$  as the largest volume percent, and cobalt oxides  $\text{CoO}$ ,  $\text{Co}_3\text{O}_4$ , and  $\text{Co}_2\text{O}_3$ . <IMAGE>

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Cited by  
US5551994A; US5411606A; US5378293A; EP0523288A1; AU687740B2; US6022425A; US5472524A; US5873953A; US5468307A; US5298092A; US5415687A; EP1009867A4; EP0826792A1; FR2752851A1; US6068709A; US5843617A; US7537663B2; US6773516B2; US6315823B1; US6755917B2; US7291217B2; WO03060191A3; WO9605335A1; US6206982B1; US7422793B2; US7235142B2; WO9400619A1; US7407711B2; US7294211B2; US6503565B1

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