

Endurakote® Plating for Corrosion-Resistant Bearings

Introduction

Endurakote® plating protects bearings from corrosion and provides substantial life improvements in hostile environments. Endurakote® plating is applied over conventional bearing materials and offers the benefit of corrosion resistance normally found only in stainless steel bearings. The coating is applied to each entire bearing race ring, including the paths, thus leaving no area exposed. Other commercial chrome or cadmium coatings normally accepted and used cannot be applied to the path due to the rolling contact stresses. Endurakote® plating is hard chromium, electrodeposited by a proprietary process which achieves a true molecular bond, and will not flake or peel even under the high contact stresses experienced in the bearing paths.

Laboratory and field testing results have proven the benefits of this process. Severe salt spray testing has shown that bearings with Endurakote® plating withstand corrosion as well as or better than AISI 440C stainless steel. The hard, dense exterior surface formed by the coating is extremely wear resistant and is excellent in the retention of the lubricant film. Conventional life testing of bearings with Endurakote® plating has shown that no life derating is necessary. In fact, the extremely hard surface of Endurakote® plating protects the bearing from surface generated damage which can promote premature failure. Since the coating is capable of withstanding extremely high temperatures, the bearings are limited by the bearing materials or lubricant used.

The coating used for Endurakote® plating can be applied to any type of bearing and to most bearing materials. Its primary advantage is to utilize stock materials with their economies, and convert them to wear- and corrosion-resistant bearings. This is particularly beneficial for larger diameter bearings or where quick delivery is critical. Thus, cost savings can be achieved over more exotic or specialized materials. Also, stock bearings can have Endurakote® plating applied for quick delivery.

The net result is that we can offer bearings with the capacity of conventional bearing steels and the corrosion resistance of AISI 440C stainless steel from standard stock components.

Application

Endurakote® plating provides corrosion resistance and is effective in increasing wear resistance in sliding surface contacts. The micro-surface composition of Endurakote® plating aids in lubricant dispersion, enhancing base metals to the degree of reducing or eliminating galling, seizing, and high friction, over a wide range of installations and environments.

Advantages

Endurakote® plating effects a buildup of less than .0002 under normal circumstances. Thus, it can often be applied to stock bearing components which have been specially selected. Endurakote® plating is compatible with most ferrous and nonferrous metal, allowing maximum flexibility in selection of base material. Endurakote® plating is normally a final process, and its quality is constant with any given base metal, insuring design reproducibility.

Properties and Characteristics

A. Hardness

Endurakote® plating, as deposited, has an equivalent hardness in excess of 70 Rockwell "C." When measured by conventional micro-hardness methods, the host material will modify this measurement to some degree.

B. Coefficient of Friction

(**Note:** Measurements made at 72°F, using other materials for comparison.)

Material	Against Material	Static — Sliding
Steel	Steel	0.30 — 0.20
Steel	Brass, Bronze	0.25 — 0.20
Steel	Endurakote® plating	0.17 — 0.16
Brass, Bronze	Endurakote® plating	0.15 — 0.13
Endurakote® plating	Endurakote® plating	0.14 — 0.12

Endurakote® Plating (continued)

C. Adhesion

Endurakote® plating will not flake, crack, chip, peel or otherwise separate from the base material under standard bend tests or under conditions where severe heat is induced. The adherence is adequate to withstand the extremely high compressive stresses in the contact areas of ball and roller bearings.

D. Effect On Base

The purity of the chromium surface will not be less than 99% as deposited. A comprehensive testing program at Kaydon established that bearings with Endurakote® plating exhibited load-carrying capacities and life expectancy equal to or better than uncoated steel bearings.

E. Corrosion Resistance

Endurakote® plating resists attack by most organic and inorganic compounds with a pH within the range of 4 and 11, except sulfuric and hydrochloric acids. Porosity of the base metal, compound concentration and exposure time to the compound become corrosion factors, but Endurakote® plating greatly enhances the base material. In severe salt spray tests as well as tap water immersion tests, bearing steel with Endurakote® plating proved equal to fully hardened AISI 440C stainless steel in resistance to rusting. In many instances, Endurakote® plating is better for corrosion protection than cadmium plate, zinc plate, phosphates, chromates, black oxide or normal chrome plate. We invite inquiries about and will be pleased to arrange tests to qualify Endurakote® plating for specific environments.

F. Heat Resistance

Bearings with Endurakote® plating are designed to maintain their operating characteristics over a temperature range from -65°F to 250°F.

G. Surface Quality

Endurakote® plating conforms to the texture of the existing surface. Ra finish will be improved slightly down to about 8 Ra; below 4 Ra there is little change. Endurakote® plating has a matte or micro-orange peel surface with very good lubricant retention qualities.

H. Food Industries

Endurakote® plating can be used on food processing equipment.

I. Load Capacity

Endurakote® plating does not affect the static or dynamic load capacity of the bearing.

Bearing Size Capabilities

Endurakote® plating can be applied to slewing ring bearings up to 45 inches.

Restrictions

Kaydon does not recommend the use of Endurakote® plating in any low torque or torque-sensitive applications.