Written by MT Staff
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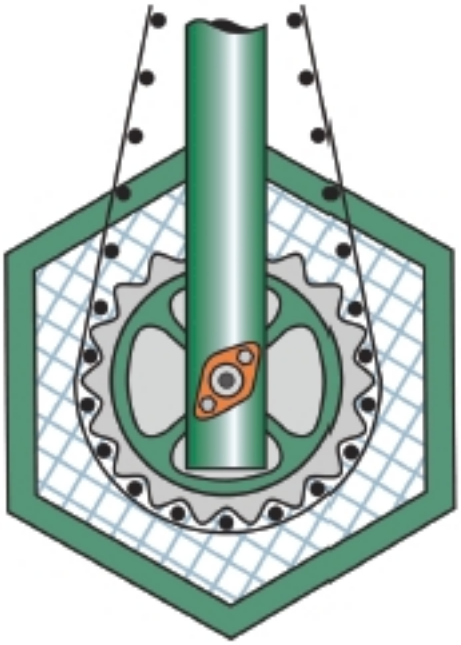
Midwest metal fastener manufacturer had a serious problem with the bushings in its new high-tech electrostatic painting line. The components were having trouble performing under three extremely difficult conditions: carrying current, surviving caustic solutions and enduring high temperatures.



The application in question involved placing batches of small metal parts to be painted into stainless steel baskets, then cycling them through a series of operations during the painting process. The baskets were suspended from an overhead conveyor by supporting rods connected to stub axles protruding from the sides of each basket. Metal parts were first dipped into a caustic cleaning and de-greasing solvent, treated with a primer, then immersed into an Ecoat paint tank. Painted parts were then cured as they traveled through a 350 F oven.

Because these fully-loaded baskets weighing over 100 lbs. were required to tumble during part of the operation, each would be driven by a sprocket and heavy-duty chain to achieve the necessary rotation (see diagram). Since paint would be applied electrostatically, the baskets were charged with 360 volts DC of electricity supplied from an overhead power source and transmitted to the baskets and parts via the chain/ sprocket/axle assembly.

An arcing problem

Soon after starting up the new painting line, the plant’s production manager discovered a problem. The combination of high voltage coupled with a weak point of contact along the

transmission circuit—specifically the axle to basket housing—was causing arcing and sparking problems. The situation was so extreme that it was actually pitting and melting metal components. Entire sections of chain, for example, were being “eaten away” by the electrical charges!

To the rescue

John Graff, engineering representative with Graphite Metallizing Corporation, was invited in to review the application. Established in 1913, this company produces GRAPHALLOY, a graphite-metal alloy used in the manufacture of bushings, bearings and discrete components for machinery and process systems.

Graff knew that the high temperature and corrosive environment were key problems, but that any solution would have to eliminate the arcing on the chain. In light of GRAPHALLOY’s electrical-conducting capabilities, he recommended an iron GRAPHALLOY bearing in a cast iron flanged housing, the combination of which would provide an effective path for the current flow.

The flanged units solved the “triple threat” problem. The path of electrical transmission was controlled and the arcing problem was eliminated. The bushings also survive caustic solvents and the application’s high heat environment. Furthermore, they’re maintenance-free. That’s because the chemical and mechanical properties of these components are so unique that they never need lubrication and perform exceptionally well in applications where other bearings would easily fail.

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