What are the limitations of 440C stainless steel?

by Mike Mortensen - Director of Engineering RBI-USA

The most common material used in stainless steel bearings is 440C.

440C stainless steel has higher carbon content and can be heat treated to form a martensitic microstructure, leading to increased strength, hardness, and wear resistance over 300 series stainless steels. These qualities make heat treated 440C stainless steel suitable for bearings rings and rolling elements.

Despite these advantages, however, there are some drawbacks to using 440C. The strength and wear resistance of 440C stainless steel is less than that of standard 52100 bearing steel. Load ratings of bearings made from 440C stainless steel are typically about thirty percent less than load ratings of bearings made from 52100 steel. Although 440C exhibits significantly more corrosion resistance than 52100, it is still vulnerable to water mixtures containing salts and chlorine.

In fact, martensitic stainless steels tend to be less corrosion resistance than austenitic stainless steels found in the 300 series stainless steels (i.e. 302, 304, and 316). 440C stainless steel is magnetic, like 52100, whereas 300 series stainless steels are not. Due to these characteristics, it is important to factor in all application conditions before assuming that 440C stainless steel is appropriate.

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