

## Determine the Relationship Between Corrosion Rate and Grain Size of Low Carbon Steel

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There are few studies on the effect of grain size on the corrosion rate of low carbon steel. In the current work, a series of grain sizes have been obtained in typical low-carbon steels through simple heat treatment. As we all know, grain refinement can improve strength and wear resistance. The inherent processing involved in grain refinement will change the volume and surface area of the material, resulting in changes in grain boundary density, orientation and residual stress. Ultimately, these surface changes will have an impact on the electrochemical behavior, thereby affecting the corrosion sensitivity. A large number of studies on the effect of grain size on corrosion have proved this, covering a variety of materials and test environments. However, the basic understanding of how grain refinement affects the corrosion resistance of steel, and more generally, how grain size affects the corrosion rate of low carbon steel, is very limited. The existing literature is often contradictory, even within the same steel category, and to a large extent lacks a consistent understanding of how grain size affects corrosion response. It is necessary to consider whether or how changes in grain size affect the behavior of specific steel in a specific environment.

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