

CRAFTSMAN'S CRIBSHEET

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 Miles Free – Director of Industry Research and Technology Technical Regulatory Quality Management

5 Ways Coarse Austenitic Grain Size Affects Your Machine Shop

Austenitic grain size is a material characteristic that is usually reported on test reports and certification documents for the steel materials we machine in our shops.

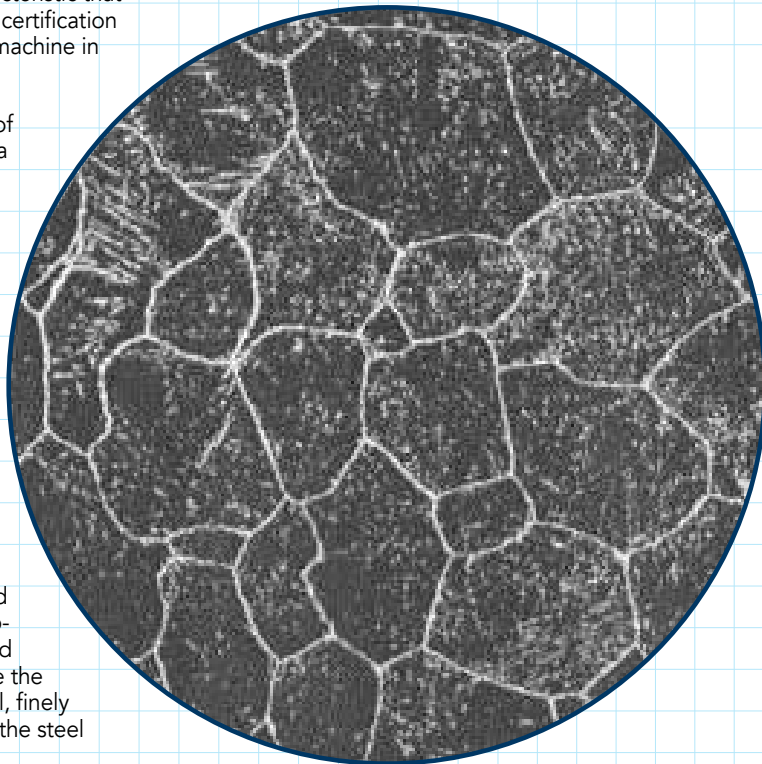
Coarse austenitic grain size is a result of not adding grain refining elements to a heat of steel. Because these grain refining elements have not been added, the steel has a coarse austenitic grain size.

Typically, this practice is applied to free machining grades such as 11XX and 12XX steels. These steels are sold primarily for their ability to be machined at high production rates.

What does Coarse Austenitic Grain Size imply for the parts that you make?

1. Better machinability. Coarse Grained Steels are more machinable and provide longer tool life than fine grained steels. The elements added to make the austenitic grain size fine create small, finely dispersed hard abrasive particles in the steel
2. Better plastic forming than fine grained steels
3. More distortion in heat treat than fine grained steels
4. Lower ductility at the same hardness than fine grained steels
5. Deeper hardenability than fine grained steels

Coarse austenitic grain size will show up on the test report as an ASTM value of 1 to 5. Values of 5 and higher are called fine grained steels and are the result of additions of aluminum, vanadium or niobium.



The methods for determining austenitic grain size are detailed in ASTM Standard E112, "Standard Test Methods for Determining Average Grain Size."

While we think that chemistry may be the controlling factor for machining performance of the steel in our machines, the contribution of austenitic grain size is also important. As long as you are ordering your free machining steels (11XX and 12XX series) to coarse grain practice, austenitic grain size should not be an issue in your shop.

All Craftsman's Crib sheets are available for viewing and download at short.productionmachining.com/cribsheets.