

December 2021

3XX Aluminum Alloys for ICE Implementation

Kyle A. Taylor
kat390@msstate.edu

Eric Cleckner
ec1352@msstate.edu

Jeffery Garrett
jmg1054@msstate.edu

Follow this and additional works at: <https://scholarsjunction.msstate.edu/metallurgy>



Part of the [Metallurgy Commons](#)

Recommended Citation

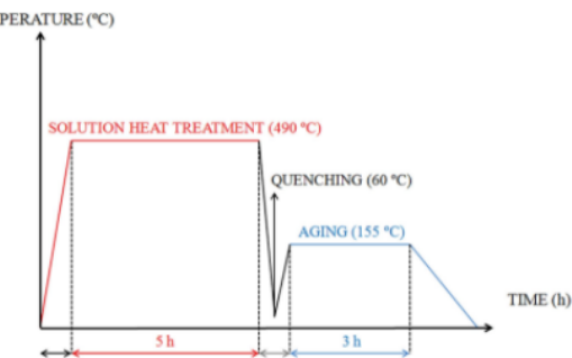
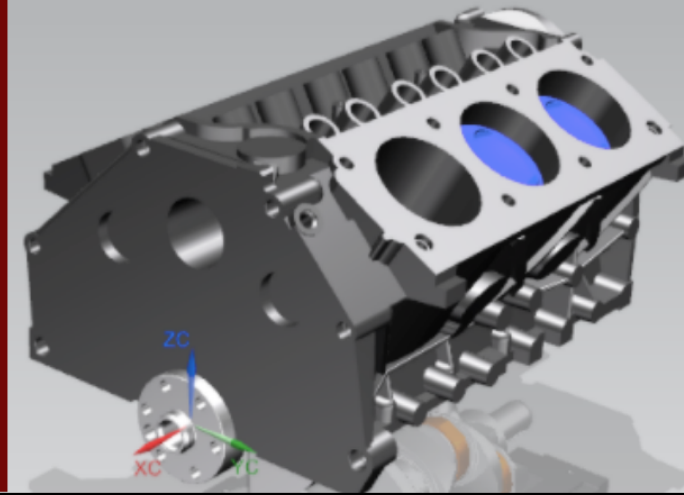
Taylor, Kyle A.; Cleckner, Eric; and Garrett, Jeffery, "3XX Aluminum Alloys for ICE Implementation" (2021).
ME 4133/6133 Mechanical Metallurgy. 2.
<https://scholarsjunction.msstate.edu/metallurgy/2>

This Digital Video is brought to you for free and open access by the College of Engineering, James Worth Bagley at Scholars Junction. It has been accepted for inclusion in ME 4133/6133 Mechanical Metallurgy by an authorized administrator of Scholars Junction. For more information, please contact scholcomm@msstate.libanswers.com.

ERIC CLECKNER
JEFFERY GARRETT
KYLE TAYLOR

The Change of Automotive Engine Blocks from Cast Iron to 3XX Aluminum

The 3XX Aluminum used for these engine applications have seemingly slight differences, especially in their processing and material structures, that actually cause incredible performance and property differences that allow them to compete with, and even surpass, Cast Iron traditionalists.



Solution Heat Treatment: the aluminum is heated and held at a temperature for a certain period of time, then rapidly cooled. This allows other elements like magnesium to insert themselves into the solid aluminum, making it stronger. It is then aged at a certain temperature to allow the atomic structure to settle and further strengthen the aluminum.

Silicon: has a positive effect on wear resistance, and tends to increase Aluminum's fatigue life with a reduced particle size due to Silicon's hardness.

Magnesium: has the greatest effect on yield strength at relatively low percentages, with the optimal weight being at .7% .

Strontium: also increases Aluminum's yield strength while simultaneously decreasing the optimal amount of Magnesium required to maximize the strength to about .3% percent weight.

