

## **Austempering Heat Treatment of AISI 4340 Steel and Comparative Analysis of Various Physical Properties at Different Parameters**

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**Abstract :** In this study a special heat treatment process named austempering on AISI 4340 steel is carried out. Heat treatment on steel is carried out to enhance mechanical properties. In this regard, it is considered essential to undertake a study to evaluate different changes occurred in AISI 4340 steel in terms of hardness, tensile strength and impact strength at different austempering temperatures and cooling times and achieving the best combination of these improved mechanical properties for better and optimum utilization of this grade of steel. By using software Design Expert DOE is formulated with Taguchi orthogonal arrays comprising of L18 (3\*3) with 03 factors and 03 responses to be calculated. Results of experiments are analyzed via Taguchi method. Signal to noise ratio of responses are carried out to determine the significant factors among the 03 factors chosen for experimental runs. Overall analysis showed that impact factor along with hardness is improved to great extent by austempering process.

**Keywords :** austempering temperature, AISI 4340 steel, bainite, Taguchi

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