



2024-2025 FALL TERM
MLZ 447 Materials Processing Laboratory II
Experiment 2: Jominy End- Quench Test, Hardness Techniques
REPORT CONTENT



As mentioned in your meeting, reports will be a digital copy (MS word or PDF document) and it will be sent to Turnitin class. Informations about turnitin class were shared in your laboratory document.

Please pay attention the file name!

Files should be uploaded by the name format of `GroupName_Student Number_Name&Surname` (For exp.; `GroupA_12345678910_AhmetYilmaz`).

You only need to answer the following 4 questions in your reports. There is no need for a formal report format.
You only need to show the sources you have used at the end of the report under the title of references.

QUESTION 1

- a) Please plot the hardenability curve of 4140 steel based on the values obtained from the Jominy-End Quench test **(15 points)**. Then, interpret the hardenability curve by discussing its relation to the microstructure, cooling rate, and the chemical composition of the steel **(10 points)**.
- b) How would the hardenability curve change if the material used was 4120 steel instead of 4140 steel **(15 points)**? In this explanation, you must provide the chemical composition of both 4140 steel **(5 points)** and 4120 steel **(5 points)**

QUESTION 2

- a) Present the measured hardness values and calculate the average hardness for the 5-pass cold-rolled Al and Cu samples, as well as the 8-pass cold-rolled Cu sample for all hardness conditions **(21 points)**.
- b) Explain in detail the effect of the applied force on hardness in the Vickers hardness test **(4 points)**.
- c) For the 5-pass cold-rolled samples of Cu and Al, why are the hardness values different? Explain this in terms of the structure-property relationship **(15 points)**.

For both question, you are required to conduct a literature search and give the references in questions in the form of a bibliography list, numbered in the text (10 point)