

# Lab 6: Tensile Testing

## 1. Introduction

The mechanical properties of materials are determined by performing carefully designed laboratory experiments that replicate as nearly as possible the service conditions. In the real life, there are many factors involved in the nature in which loads are applied on a material. The following are some common examples of how these loads might be applied: tensile, compressive and shear, just to name a few. These properties are important in materials selections for mechanical design. Other factors that often complicate the design process include temperature and time factors.

The topic of this lab is confined to the tensile property of polymers. Figure 6.1 shows a tensile testing machine, which looks similar to the one used in this lab. This test is a destructive method, in which a specimen of a standard shape and dimensions (**prepared according to *ASTM D 638*: standard test method for tensile properties of plastics**) is subjected to an axial load. As shown in Figure 6.1, during a typical tensile experiment, a dog-bone shaped specimen is gripped at its two ends and is pulled to elongate at a determined rate to its breakpoint; a highly ductile polymers may not reach its breakpoint. The tensile tester used in this lab is manufactured by Shimadzu Corporations (model *AJS-J*)<sup>1</sup>. It has a maximum load of 5 kN and a variable pulling rate. The setup of the experiment could be changed to accommodate different types of mechanical testing, according to the ASTM standard (e.g. compression test, etc).

For analytical purposes, a plot of stress ( $\sigma$ ) versus strain ( $\epsilon$ ) is constructed during a tensile test experiment, which could be done automatically on the software provided by the instrument manufacturer.



Figure 6.1. A photograph of a tensile machine (Shimadzu, Autograph AG-10TC).<sup>2</sup>

<sup>1</sup> The website of the Austrian Research Center, Materials and Technology:  
“<http://www.arsc.ac.at/AMTT/reports/report47.pdf>”

# Lab 9 Tensile Testing Materials Science And Engineering

**Wolfgang Guggemos**



## **Lab 9 Tensile Testing Materials Science And Engineering:**

## Enjoying the Tune of Term: An Mental Symphony within **Lab 9 Tensile Testing Materials Science And Engineering**

In some sort of used by screens and the ceaseless chatter of quick communication, the melodic beauty and emotional symphony developed by the published term usually diminish into the back ground, eclipsed by the relentless noise and interruptions that permeate our lives. However, nestled within the pages of **Lab 9 Tensile Testing Materials Science And Engineering** a wonderful fictional prize brimming with fresh feelings, lies an immersive symphony waiting to be embraced. Constructed by an elegant musician of language, this captivating masterpiece conducts viewers on a psychological journey, skillfully unraveling the concealed songs and profound impact resonating within each cautiously constructed phrase. Within the depths with this touching analysis, we can investigate the book is main harmonies, analyze their enthralling publishing design, and submit ourselves to the profound resonance that echoes in the depths of readers souls.

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