

MATERIALS SCIENCE LABORATORY I.

TESTS FOR INVESTIGATION OF MATERIAL PROPERTIES

Summary

Knowledge of Material Science constitutes a significant part of any BSc-level technical education program. Practical activities in the laboratory, or even experiments realized by courses contribute to a better understanding of material properties.

The efficiency of the laboratory work is simulated by involving workgroups having a small number of students. Practical applications are based on frequent phenomenon that appear in industrial production. These lead to instantaneous clarifying of theoretical notions. Moreover, these allow the presentation of the newest scientific results or some interesting peculiar cases, especially industrial applications that are not included in the program of the discipline.

It is important and also necessary to present the constituents, the structure and different assortments of material. Knowledge of physical properties is useful in the designing process, while technological properties determine the machineability. It is also important to know the resistance of corrosion in different industrial applications. This book focuses of the most prevalent testing procedures when quality is described using quantitative attributes that could be measured or/and verified.

First of all are studied properties and corresponding testing procedures that are relevant for the choosing of material type. These properties allow the comparison between different materials having the same field of applicability-unavoidable in the designing phase. The properties and afferent tests accord with standards that describe chemical structure, physical and mechanical properties.

In some cases adequate investigation equipment is missing, or the time and cost level of some test is not justified. Here is to appeal to simplified investigation procedures.

Complex wear resistance of a material can be investigated by inducing cumulative wear processes based experiments. Complex wear resistance can be described by a large set of influence factor values. Based on this factors indications regarding the designing, manufacturing and exploitation criteria can be established.

The present book is of educational importance. It describes first of all the materials that apply to the machinery industry. It presents the investigation tests, the physical and mechanical properties that can be determined by applying a test, and the connected calculus. Investigation of standard properties like tensile strength, hardness or tenacity is at large explained. Crawling stress evolution, fatigue and elements of fracture mechanics are also detailed.