

Higher Technical Institute
MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

JOMINY END QUENCH HARDENABILITY

TEST

BY

RODOSTHENOUS KONSTANTINOS

M/367

JUNE 1999

HIGHER TECHNICAL INSTITUTE
MECHANICAL ENGINEERING COURSE
DIPLOMA PROJECT

JOMINY END QUENCH HARDENABILITY
TEST

BY :
RODOSTHENOUS KONSTANTINOS

JUNE 1999



JOMINY END-QUENCH HARDENABILITY TEST

BY
RODOSTHENOUS KONSTANTINOS

PROJECT REPORT

Submitted to
The Department of Mechanical Engineering of the
Higher Technical Institute
Nicosia Cyprus

In partial fulfilment of the requirements for the diploma
of

TECHNICIAN ENGINEER

In

MECHANICAL ENGINEERING

June 1999



CONTENTS

Page

Abstract

Chapter 1

Introduction – Hardenability

Introduction	1
Principle of hardening	2
Hardenability	3
Mass effect	4
Hardness	5
The hardening process of :	
(a) hypoeutectoid steels	6
(b) hypereutectoid steels	6
Ruling section	8
Quantitative hardenability	10
Severity of quench	12
Critical size	14
Effect of composition of hardenability	17

Chapter 2

Alloys

Effect of alloying elements19

Classification of alloying elements21

Chapter 3

Hardness testing

Hardness testing23

Rockwell hardness testing23

Vickers hardness testing26

Chapter 4

Jominy end-quench test

Jominy end-quench test28

More about Jominy29

Test procedure30

Scope and field of application31

Principle31

Symbol and designations32

Dimensions of the test piece	34
Heat treatment	35
Machining	36
Apparatus	36
Heating and quenching of test piece	
Heating	37
Quenching	39
Preparation and measurements of hardness after quenching...	40
Expression of results	44
Test report	47
Safety	50
Laboratory report	51

Abstract

The objectives of this project are firstly a refer to hardenability and hardness of metals, and construct the Jominy end-quenched hardenability water bath.

In the first chapter reference is made on hardness and hardenability.

In the second chapter reference is made on the effect of alloying elements on the hardenability of the metals.

In the third chapter reference is made on the hardness testing.

Finally, on the forth chapter references are made on the Jominy end quench test and on measurement of hardenability.