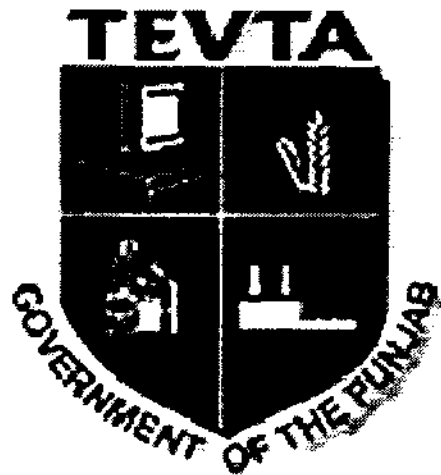


GOVERNMENT OF THE PUNJAB

TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY



CURRICULUM FOR

Heat Treatment (Auto parts)

(6 – Months Course)

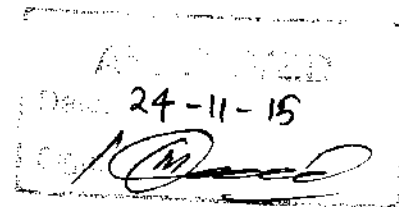
Evaluated November 2015

CURRICULUM SECTION
ACADEMICS DEPARTMENT

96-H, GULBERG-II, LAHORE

Ph # 042-99263055-9, 99263064

gm.acad@tevtg.gov.pk, manager.cur@tevtg.gov.pk



TRAINING OBJECTIVES:

- To train about the basic concept of heat treatment.
- To train about the art of technology in respect of heat treatment of auto parts.
- To produce need based skilled manpower, equipped with latest techniques and advanced technical know-how in heat treatment.
- To train about the vacuum that already exists in this specialized field of study.

CURRICULUM SALIENT:

Name of the Course	:	“Heat Treatment (Auto parts)”
Entry level	:	Middle and above
Duration of course	:	6-Months.
Total training hours	:	800 hours.
Training hours per week	:	40 hours
Training Methodology	:	Practical 80 % Theory 20 %

SKILL COMPETENCY DETAILS: -

After the successful completion of the course, the trainee would have attained following skills;

- apply Heat Treatment Methods
- perform different types of Heat Treatment Processes
- Use the salt bath process equipment's
- Carry out different heat treatment processes like Hardening & Tempering, Case Hardening, Annealing and Normalizing

KNOWLEDGE PROFICIENCY DETAILS: -


After the successful completion of the course, the trainee would have attained following knowledge;

- Understand the process of heat treatment and its purpose
- Recognize with the types of Heat Treatment processes
- Understand the techniques of Heat Treatment of Auto Parts
- Awareness of occupation health and safety standards
- Know the purpose of Heat Treatment of Metals.

CURRICULUM DELIVERY STRUCTURE

	Course Delivery	Co Curricula Activities / Vacations	Revision & Final Test	Total
Week	1-20	21-24	26	26
	20	4	2	

Developed by Curriculum Section, Academics Department TEVTA.

24-11-15


SCHEME OF STUDIESHeat Treatment of Auto Parts
6 Month Course

Sr #	Main Topics	Theory Hrs.	Practical Hrs.	Total Hrs.
1	Introduction to Heat Treatment	10	48	58
2	Classification of Heat Treatment Facilities	10	54	64
3	Types of Heat Treatment Processes	16	66	82
4	Salt Bath Process Equipment	12	62	74
5	Operational Controls	16	46	62
6	Process Flow of Heat Treatment Processes	10	54	64
7	Quality Controls in HT	16	46	62
8	Maintenance Techniques of HT Equipment	12	52	64
9	Health & Safety	14	62	76
10	Kaizen in Heat Treatment	12	55	67
11	5-S Implementation in HT	12	55	67
12	Functional English	20	20	40
13	Work Ethics	-	20	20
Total		160	640	800

DETAIL OF COURSE CONTENTS
Heat Treatment (Auto Parts)
6 Month Course

Sr. No.	Detail of Topic	Theory Hrs	Practical Hrs.	
1	Introduction To Heat Treatment 1.1 Definition 1.2 Purpose of Heat Treatment	10	48	58
2	Classification of Heat Treatment Facilities 2.1 Salt Bath 2.2 Gaserus Heat Treatment 2.3 Vacuum Heat Treatment	10	54	64
3	Types of Heat Treatment Material and Processes 3.1 Carburizing 3.2 Nitriding 3.3 Induction Hardening 3.4 Annealing 3.5 Normalizing 3.6 Hardening 3.7 Tempering	16	66	82
4	Salt Bath Process Equipment 4.1 Furnace 4.2 Temperature Control Instruments 4.3 Heating Instruments 4.4 Bath Chemicals 4.5 Fixture	12	62	74

5	Operational Controls 5.1 Temperature 5.2 Time 5.3 Bath Pointage 5.4 Quenching	16	46	62
6	Process Flow of Different HT Process 6.1 Hardening & Tempering 6.2 Case Hardening 6.3 Annealing 6.4 Normalizing	10	54	64
7	Quality Controls 7.1 Hardness 7.2 Case Depth 7.3 Deformation 7.4 Others – Specified by Customer	16	46	62
8	Maintenance Techniques of HT Equipment's 8.1 Corrective Maintenance 8.2 Preventive Maintenance 8.3 Predictive Maintenance	12	52	64
9	Health & Safety 9.1 Importance Personal Protection Equipment's 9.2 Emergency Preparedness 9.3 Others	14	62	76

10	Kaizen in Heat Treatment			
	10.1 Introduction			
	10.2 Importance	12	55	67
	10.3 Implementation			
11	5-S Implementation			
	11.1 Introduction			
	11.2 Importance	12	55	67
	11.3 Implementation			
	Functional English	20	20	40
	Work Ethics	-	20	20
TOTAL		160	640	800

LIST OF PRACTICAL:

- Assignment Sheet
- Cleaning of fixtures for part handling
- Degreasing of part
- Loading of parts in fixtures
- Preheating of parts
- Heating & Soaking in Furnace
- Oil quenching the parts
- Water Quenching
- In process Quality checking
- Tempering of work piece
- Sand Blasting
- Process of Pickling
- Applying rust prevention oil mixture
- Perform the following types of Heat Treatment Process

Carburizing

Nitriding

Induction Hardening

Annealing

Normalizing

Hardening

Tempering

24-11-15

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LIST OF LABS:

- Heat Treatment Lab required in standardized way and to meet the industrial specification safety
- Machine shop

LIST OF TOOLS, MACHINERY & EQUIPMENT

(For the Class of 25 Students)

Sl. No.	Nomenclature of Equipment / Tools	Quantity Per Person
1.	Safety Helmet (full screen)	25
2.	Ear Plugs	50
3.	Safety Shoes Leather	25 pair
4.	Safety Shoes Rubber	25Pair
5.	Preclearing (Alkaline) machine	01
6.	Fresh Running Water Bath	01
7.	Preheating Furnace	01
8.	Carburizing Salt Bath Furnace	01
9.	Neutral Salt Bath Furnace	01
10.	Oil Quenching Bath	01
11.	Electric Furnace for Tempering	01
12.	Sand Blast Machine	01
13.	Pickling Bath	01
14.	Rust Prevention Bath	01
15.	Amawa gas cylinder	01

LIST OF TOOLS, MACHINERY & EQUIPMENT

(For the Class of 25 Students)

Sr. No.	Nomenclature of Equipment / Tools	Quantity Per Person
1.	Leather Gloves	25
2.	Masks (if cloth type)	25
3.	Mobil oil	As per requirement
4.	Kerosene oil	As per requirement
5.	Sand paper	As per requirement
6.	Coack	As per requirement
7.	Salt (carbonate)	As per requirement
8.	Any other consumable material required as per types of practical	-

MINIMUM QUALIFICATION OF INSTRUCTOR

B. SC Engineering in Mechanical/Metallurgy Engineering/B.Tech (Hons)

Or

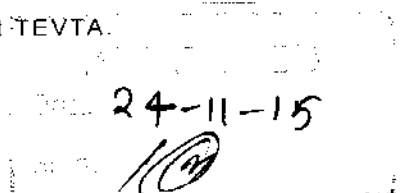
3 year Diploma in mechanical (with 3-4 years practical experience)

24-11-15



REFERENCE BOOKS

- Hand book of Heat Treatment of Steel
- Metal handbook of Metallography and Microstructure
- Physical Metallurgy



EMPLOYABILITY OF PASS-OUTS

The pass outs of this course may find job / employment opportunities in the following areas / sectors: -

- Surgical Instrument Industry
- Automobile Industry
- Petrochemical Industry
- Manufacturing Industry etc.

CURRICULUM EVALUATION COMMITTEE

Mr. Tanveer Iqbal

Sr. Instructor Mechanical

GCT Railway Road Lahore.

(Convener)

Mr. Atif Attique

Instructor Mechanical

GCT Railway Road Lahore

(Member)

24-11-15

