Model Curriculum

QP Name: Automotive Heat Treatment Technician

QP Code: ASC/Q3901

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 2.0

Automotive Skills Development Council | 153, Gr Floor, Okhla Industrial Area, Phase – III, Leela Building, New Delhi – 110020

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Training Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Heat Treatment
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8121.3701
Minimum Educational Qualification and Experience	8th Class + 2 years ITI with 2 years of relevant experience OR 10th Class pass with 2 years of relevant experience OR 10th Class + 2 years ITI OR 12th Class with 1 Year of experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	30/09/2021
Next Review Date	30/09/2024
NSQC Approval Date	30/09/2021
QP Version	2.0
Model Curriculum Creation Date	30/09/2021
Model Curriculum Valid Up to Date	30/09/2024
Model Curriculum Version	1.0
Minimum Duration of the Course	390 Hours 00 Minutes
Maximum Duration of the Course	390 Hours 00 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Carry out pre-heat treatment activities such as lifting of workpiece, inspection of tools and equipment etc. in co-ordination with Heat treatment Technician.
- Carry out heat treatment operations.
- Carry out post-heat treatment operations such as cleaning and inspection.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**05:00**	**00:00**			**05:00**
Module 1: Introduction to the role of an Automotive Heat Treatment Technician	5:00	0:00			5:00
ASC/N9803 – Organize work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 3	**15:00**	**30:00**			**45:00**
Module 2: Organize work and resources according to safety and conservation standards	15:00	30:00			45:00
ASC/N9802 – Interact effectively with colleagues, customers and others NOS Version No. – 1.0 NSQF Level - 3	**15:00**	**25:00**			**40:00**
Module 3: Communicate effectively and efficiently	15:00	25:00			40:00
ASC/N3901 – Perform heat treatment activities NOS Version No. – 2.0 NSQF Level - 4	**90:00**	**210:00**			**300:00**
Module 4: Prepare for heat treatment process	30:00	90:00			120:00
Module 5: Perform heat treatment and post-treatment activities	60:00	120:00			180:00
Total Duration	**125:00**	**265:00**			**390:00**

Module Details

Module 1: Introduction to the role of an Automotive Heat Treatment Technician

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Heat Treatment Technician

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Heat Treatment Technician. • Discuss the job opportunities of an Automotive Heat Treatment Technician in an automobile industry. • Explain about Indian automotive market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Discuss the standards and procedures involved in the different processes of heat treatment. • Identify the standard checklists and schedules recommended by OEM.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 2: Organize work and resources according to safety and conservation standards

Mapped to ASC/N9803, v1.0

Terminal Outcomes:

- Employ appropriate ways to maintain safe and secure working environment.
- Perform work as per the quality standards.
- Apply conservation practices at the workplace.

Duration: *<15:00>*	**Duration**: *<30:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the potential workplace related risks and hazards, their causes and preventions. • Identify PPE to be used at workplace. • Identify various warning signs used at the workplace. • Describe appropriate strategies to deal with emergencies and accidents at the workplace. • Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities. • Discuss the importance of keeping work area clean and tidy. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps if any to the concerned authorities. • Discuss the ways of dealing with stress and anxiety. • Discuss how to complete the given work within the stipulated time period. • Explain how to maintain a proper balance between team and individual goals. • Explain 5S guidelines at workplace. • List the various materials used at the workplace. • Explain organisational recommended procedure for storage of tools, equipment and material after completion of work. • Explain the ways to optimize usage of resources. • Discuss various methods of waste management and its disposal.	• Apply appropriate safety practices to ensure safety of people at the workplace • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate the use of fire extinguisher. • Apply basic first aid procedure in case of emergencies. • Perform routine cleaning of tools, equipment and machines. • Employ various techniques for checking malfunctions in the equipment as per Standard Operating Procedure (SOP). • Show how to sanitize and disinfect one's work area regularly. • Demonstrate the correct way of washing hands using soap and water. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Demonstrate how to evacuate the workplace in case of an emergency. • Demonstrate sorting of materials, tools and equipment and spare parts after completion of work. • Demonstrate the steps involved in storage of tools, equipment and material after completion of work. • Perform basic checks to identify any spills and leaks and that need to be plugged /stopped. • Demonstrate different disposal techniques depending upon types of waste. • Employ different ways to check if equipment/machines are functioning as per requirements and report malfunctioning, if observed. • Employ ways for efficient utilization of material and water.

• List the different categories of waste for the purpose of segregation • Differentiate between recyclable and non-recyclable waste • State the importance of using appropriate colour dustbins for different types of waste. • Discuss common practices for conserving electricity at workplace. • Discuss the common sources of pollution and ways to minimize it.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher • Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit	

Module 3: Communicate Effectively and Efficiently

Mapped to ASC/N9802, v1.0

Terminal Outcomes:

- Use effective communication and interpersonal skills.
- Apply sensitivity while interacting with different genders and people with disabilities.

Duration: *<15:00>*	**Duration**: *<25:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the organizational structure for communicating with colleagues, seniors and others. • Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD). • Explain the importance of respecting personal space of colleagues. • State the procedure to receive work instructions and report problems to the supervisor. • List the various organizational policies and procedures to be followed at the workplace. • Describe different ways to rectify commonly occurring errors. • Explain the importance of complying with the instructions/guidelines and procedures while performing tasks related to the job specifications. • Discuss the importance of PwD and gender sensitization.	• Employ different means of communication depending upon the requirement while interacting with others. • Demonstrate using new ways to maintain good relationships with colleagues and supervisor. • Prepare a sample report to send the work status to the supervisor. • Demonstrate how to communicate with different genders and persons with disability (PwD) in a sensitive manner.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 4: Prepare for heat treatment process

Mapped to ASC/N3901, v2.0

Terminal Outcomes:

- Identify tools and equipment required for heat treatment process.
- Perform the steps to carry out pre- heat treatment activities such as lifting of workpiece, collection and inspection of tools and equipment etc.

Duration: *<30:00>*	**Duration**: *<90:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the information derived from the loading plan, SOPs and instructions from supervisor. • List the tools, heat treatment machine, equipment, consumables and input materials required during heat treatment work. • Discuss the organisational process of collecting and storing the tools, heat treatment machine, equipment, consumables and input materials from the store. • Discuss the necessary precautions to avoid any hazard and accident during heat treatment activities. • Summarise the steps to be performed for checking and cleaning the input material, tools and equipment before use. • Discuss heat treatment parameters and their impact on output. • Discuss the process of lifting and placing the workpieces on heat treatment line as per the work instructions.	• Demonstrate the standard operating procedure to use tools, heat treatment machine and equipment required during heat treatment process. • Show how to collect the required tools, equipment, consumables and input materials from the store. • Apply appropriate ways to check and clean the input material, tools and equipment before use. • Show how to set the heat treatment equipment and its parameters as per the SOP. • Perform the steps of lifting and placing the workpieces on heat treatment line by using lifting tools.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• PPT's, teaching aids, drawing / blue print, work order • **Machinery:** Heat treatment machine, Shot blasting machine, Washing machine • **Fuel:** Charcoal • **Consumables:** Lime powder, washing chemicals • **Measuring Tools:** Steel tape, Steel rule, Vernier calliper, Micrometer, Compass • **Lifting devices:** Hoists, cranes, bins, part trolleys, pallet trucks • **Safety materials**: Fire extinguisher, leather safety gloves, leather aprons, safety glasses, helmet, safety shoe and first-aid kit • **Cleaning material**: Wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel	

Module 5: Perform heat treatment and post-treatment activities

Mapped to ASC/N3901, v2.0

Terminal Outcomes:

- Demonstrate heat treatment and washing process.
- Perform steps to carry out shot blasting process.
- Perform steps to carry out post-heat treatment activities.

Duration: *<60:00>*	**Duration**: *<120:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe heat treatment and washing process. • Discuss the process of unloading the workpieces on heat treatment line as per the work instructions. • Discuss different washing mediums of washing machine. • List the steps to be performed for washing the components in washing machine. • Describe shot blasting process. • Discuss ways to handle washing medium chemicals safely. • Discuss the process of loading/unloading and placing the workpieces from shot blasting machine as per the work instructions. • Discuss the importance of proper mixing of lime powder in shot blasting dust. • Discuss post-heat treatment activities like inspection, cleaning, maintenance etc. • Explain methods of inspecting the quality of moulded workpieces. • List the commonly occurring defects in the treated components. • Discuss the process of segregating, tagging and storing of damaged and ok components and maintaining records of segregation as per organisational guidelines. • List different methods for disposing off waste material and scrap.	• Demonstrate organisational specified procedure of performing various heat treatment activities. • Perform the steps of unloading the components from heat treatment line by using lifting tools and as per the supervisor's instructions. • Show how to load the component in washing machine and set the washing machine on required washing medium for appropriate cleaning. • Perform steps of washing the component in washing machine till the complete cycle of washing and drying is completed. • Perform the steps of unloading the components from washing machine. • Apply appropriate ways to check that component is cleaned properly after washing process. • Apply appropriate ways to check the shot blasting machine and its components for before use. • Perform the steps of lifting and placing the components on shot blasting machine manually or by using lifting tools. • Demonstrate organizational specified procedure of starting the shot blasting machine and performing the shot blasting process for cleaning and descaling of component. • Perform the steps of lifting the components from shot blasting machine and placing them on trolleys manually or by using lifting tools. • Apply appropriate inspection methods for identifying the defects and checking the quality of treated components. • Show how to segregate, tag, store and record data of damaged and ok

	components as per organisational guidelines. • Show how to dispose scrap or waste as per organisational guidelines.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• PPT's, teaching aids, drawing / blue print, work order • **Machinery:** Heat treatment machine, Shot blasting machine, Washing machine • **Fuel:** Charcoal • **Consumables:** Lime powder, washing chemicals • **Measuring Tools:** Steel tape, Steel rule, Vernier calliper, Micrometer, Compass • **Lifting devices:** Hoists, cranes, bins, part trolleys, pallet trucks • **Safety materials**: Fire extinguisher, leather safety gloves, leather aprons, safety glasses, helmet, safety shoe and first-aid kit • **Cleaning material**: Wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Turner/Fitter/ Electrician	5	Turner/ Fitter/Electrician	1	Turner/ Fitter/Electrician	NA
ITI	Turner/Fitter/ Electrician	6	Turner/Fitter/ Electrician	0	Turner/Fitter/ Electrician	NA
Diploma	Mechanical/ Electrical/ Automobile	3	Mechanical/Electrical/ Automobile	1	Mechanical/Electrical/ Automobile	NA
Diploma	Mechanical/ Electrical/ Automobile	4	Mechanical/Electrical/ Automobile	0	Mechanical/Electrical/ Automobile	NA

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Heat Treatment Technician, ASC/Q3901, version 2.0". Minimum accepted score is 80%.	"Trainer, MEP/Q2601 v1.0" Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Turner/ Fitter/Electrician	6	Turner/ Fitter/Electrician	1	Turner/ Fitter/Electrician	NA
ITI	Turner/Fitter/ Electrician	7	Turner/Fitter/ Electrician	0	Turner/Fitter/ Electrician	**NA**
Diploma	Mechanical/Electrical/ Automobile	4	Mechanical/Electrical/ Automobile	1	Mechanical/Electrical/ Automobile	**NA**
Diploma	Mechanical/Electrical/ Automobile	5	Mechanical/Electrical/ Automobile	0	Mechanical/Electrical/ Automobile	**NA**

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Heat Treatment Technician, ASC/Q3901, version 2.0". Minimum accepted score is 80%.	"Assessor; MEP/Q2701 v1.0" Minimum accepted score is 80%.

Assessment Strategy

1. Assessment System Overview:
    - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records

2. Testing Environment:
    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
    - If the batch size is more than 30, then there should be 2 Assessors.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:
    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA certified & trainer must be ToT Certified
    - Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Centre photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
WI	Work Instructions
PPE	Personal Protective equipment